SELCOPY User Manual - Release 2.0x
MULTIPLE INFORMATION RETRIEVAL

Architecture	Operating Systems	SELCOPY Release
S/390 & zSeries	IBM OS/390 (inc TSO) IBM z/OS IBM VM/ESA (CMS) IBM z/VM IBM VSE/ESA	**2.00**
AS/400 & iSeries	IBM OS/400	**2.08**
RS/6000 & pSeries	IBM AIX	**2.08**
SUN SPARC	SUN Solaris	**2.08**
COMPAQ ALPHA	COMPAQ Tru64	**2.08**
HP PA-Risc	HP-UX	**2.08**
Intel x86	Microsoft Windows 95/98/ME Microsoft Windows NT/2000/XP/Vista	**2.08**

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Documentation Notes

The **SELCOPY User Manual** is available in Adobe Acrobat PDF format at CBL web page http://www.cbl.com/documentation.php.

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Summary of Changes

This section describes the major new features and changes provided by SELCOPY Release 2.0x. The last edition of this manual, published in April 1998, documented SELCOPY Release 9.8 for Mainframe platforms and SELCOPY Release 2.01 for iSeries, UNIX and PC platforms.

Note that changes and new features may be subject to alteration, at the discretion of CBL, according to advice and feed-back from users. CBL welcomes your new feature suggestions and requirements.

Changes to SELCOPY for Mainframe Platforms

Introduced in **Rel 9.8P** (March 1999):

The SELCNAM file.	***IMPORTANT***
OPT SITE='string' parameter.	***IMPORTANT***
OPT PASS=x'nnnn,nnnn,nnnn,nnnn' parameter.	***IMPORTANT***
OPT RANGE=yyyy/mm/dd-yyyy/mm/dd parameter.	***IMPORTANT***
4 digit year for VM/VSE DIR.	***IMPORTANT***
OPT Y2/Y4 support.	
OPT CONTMAX support.	
CBLC5050 CBLNAME field.	
New Error Messages: 001, 153, 154	

Introduced in **Rel 2.00** (May 2001):

PRINT output changes for TYPE=B,C,D,M.	***IMPORTANT***
ASCII/EBCDIC Translation changes.	***IMPORTANT***
PAGEWIDTH=nnn changes.	***IMPORTANT***
OPT DATAWIDTH supported.	
POS UXREPLYL supported.	
Control card length restriction relaxed for MVS and CMS SYSIN.	
Changes to default SELCOPY output listing.	

Changes to SELCOPY for iSeries, UNIX and PC Platforms

Introduced in **Rel 2.02** (June 1998):

NORDW made default for RECFM=V input.	***IMPORTANT***
Platform supported: HP-UX and OS/2.	
REVERSE Range Test.	
RECFM=V2 supported.	
RECFM=MFV supported.	
NOBDW for RECFM=V files supported.	

Introduced in **Rel 2.03** (September 1998):

OPT RANGE=yyyy/mm/dd-yyyy/mm/dd parameter.	***IMPORTANT***
POS FHDR supported.	
Arithmetic: 31-digit for Packed Decimal.	
Control Statement Maximum LRECL increased to 512.	
Larger SELCOPY.NAM file supported.	
Unsupported Keywords tolerated.	

Introduced in **Rel 2.04** (May 1999):

Platform supported: AS/400.	
Platform supported: Windows 95/98/ME/NT/2000.	
INCLUDE statement supported.	
Syntax: Comments to summary using *> supported.	
OPT BAN/BANNER and NOBAN/NOBANNER supported.	
FILL=x or NOFILL for RECFM=U input files.	
Print TYPE=DX for Hex Only Dump PRINT.	
AS/400 stdin redirection with "<".	
AS/400 native printer file.	
AS/400 auto ASCII/EBCDIC conversion of text input file.	

Introduced in **Rel 2.05** (October 1999):

UPD statement (Update in place).	
GEN statement (Generate random data).	
%ENVVAR% system environment variables for literals or Fnames.	
OPT ENVFAIL = SAME/NULL/CANCEL supported.	
OPT ENVVAR/NOENVVAR supported.	
Syntax: Allow POS 3 +2 -1 to mean POS 4.	
POS VOLID for Volid of current disk volume.	
Short last RECFM=F input record now gives actual length for LRECL.	

Introduced in **Rel 2.06** (August 2000):

RECFM=U input LRECL=0 no longer treated as LRECL=1.	***IMPORTANT***
EOF and RC=8, not ERROR 571, when file not found.	***IMPORTANT***
"C++" to "C" for CALL Shared Library source, slccall.	***IMPORTANT***
DEFER is no longer default for Output files.	***IMPORTANT***
CAT statement (Concatenate files).	
READ/WRITE DSN=n AT p (Dynamic Allocation).	
Syntax: LRECL = 0 assignment allowed.	
Syntax: @A = 0 (Allow any value for @ptrs).	
Syntax: IF @A = NULL supported.	
Syntax: END statement treated as /* (End of Ctl Statements).	
Euro Currency Symbol printable.	
LOG REPLY support for UNIX, but not AS/400.	
Number of open files restriction for DOS and Windows removed.	
CALLed C/C++ sub-routines DLL for Windows and OS2.	
OPT FILL=x or NOFILL for SELCOPY.NAM file.	
Network Machine UNC "\\" filename prefix supported.	
Arithmetic: Error Processing for field overflow and validity.	
Record returned at EOF/CLOSE.	
NOTRUNC the default if EOL=NO coded.	
Allow "/*" as end of file on FILE=CARD if column 3 is blank.	
Default LOG length changed from 79 to 80.	
Start of execution SELCOPY Banner Format changed.	
New Error Messages: 031, 157, 158, 159, 160, 161, 570, 580.	

Introduced in **Rel 2.07** (February 2001):

MASK test bug fixed.	***IMPORTANT***
SYSTEM statement return code reflected in RETSYS (RETCMS).	
UTIME statement to Update file Timestamps.	
CVDATE NOW TO DATECB statement.	
SLEEP statement to pause processing.	
SPACE with no argument treated as SPACE 1.	

Introduced in **Rel 2.08** (August 2003):

DIR/DIRDATA sub-directory input suppressed. See also: SUBDIR.	***IMPORTANT***
Default file extension ".FIL" removed. (Applicable to PC only.)	***IMPORTANT***
DIFF position following different length field compare	***IMPORTANT***
UXADIFF now in Big Endian format.	***IMPORTANT***
Syntax: Continuation Character "\" supported.	***IMPORTANT***
PRINT TYPE=D output default format changed.	***IMPORTANT***
DIFF value testing.	
Expiry Date displayed correctly in SELCLST footer.	
Expiry Date warning message output to console.	
8-byte POS UXATPTR for 64-bit machines	
Command line options "-ctl", "-lst", "-log" and "-V".	
stdin and stdout files for streamed input and output.	
FILE=CARD input no longer synonymous with FILE=SYSIN.	
@ pointer name length and total number	
DIR and DIRDATA input support for UNIX platforms.	
DIR and DIRDATA input SUBDIR/NOSUB parameter.	
DIR and DIRDATA input SORTDIR/NOSORT parameter.	
DEFDIR=path option for I/O Operations.	
DUMPALL and DUMPENC options for PRINT TYPE=D.	
POS VOLID for UNIX platforms.	
Default WORKLEN=80 if no input file and no WORKLEN option specified.	
SELCLST output changes to PRINT counting guide and footer.	
CVBx/CVxB up to 8-byte binary field conversion.	
POS RBA support for Relative Byte Address of current record.	
KEY, RBA and REC for Direct Reads on a Disk File.	
STARTKEY, STARTRBA and STARTREC for Disk Files.	
OPTION RC_KEYNF=n for the Key Not Found condition.	
ASC/EBC parameter on literals.	
POS UXREPLYL supported.	
POS UXLINE, UXLINEREM, UXPD, UXPW, UXDW supported.	
Floating Sign on FORMAT for CVxC.	
New Error Message: 166.	

Introduction

General Information

SELCOPY is primarily concerned with the reading, writing, manipulating and updating of files on IBM (or equivalent) mainframe, AS/400, UNIX and PC computers. Its intention is to insulate users whenever possible from the rigorous rules and tedious tasks found in data processing, thereby gaining productivity.

Simple SELCOPY applications include: copying one file to another, modifying and manipulating input data, accumulating totals, writing modified data to a second output file, printing original data, new data and accumulated totals at the end of the run; and even interrogating the operator at execution time.

Everything can be done on a conditional basis. Printing, copying and modifying may each be governed by different selection criteria. The number of conditions is not limited by SELCOPY, and may be as complex as the user wishes. One can even examine or alter down to the "Bit" level.

The number of times a statement is to be actioned may be limited by the STOPAFT parameter, which is very useful in a testing environment.

SELCOPY does not limit the number of output or input files which may be read, written or updated (as allowed by the Operating System) in a controlled sequence. Thus, match and merge, or match and update is simple with SELCOPY.

The **only limiting factor** on the number of files, number of conditions and number of actions permitted within a SELCOPY run, is the **machine size** in which SELCOPY is operating.

Flexibility of syntax has been given special attention. As a result, there are numerous methods of saying the same thing. For example, blanks, commas, or a combination of both are all acceptable for separating parameters.

Arithmetic functions supported are addition, subtraction, multiplication and division for Packed Decimal or Binary data, while conversion functions include character, packed decimal, binary and hexadecimal notation. (Any type to any other.)

Mainframe Version

The SELCOPY program was initially developed for all mainframe operating systems and consists of Basic Assembler Language modules.

All mainframe SELCOPY code is **independent of Operating System**. The same program will work under all varieties of **MVS, VSE, TSO** and **CMS**. SELCOPY is ideal for developing systems under CMS or TSO for subsequent operational use in a Batch environment.

iSeries, UNIX and PC Versions

See also:

- Section *AS/400, UNIX and PC Processing*.

To open up the product for use on other platforms, the bulk of the Mainframe SELCOPY program has been translated into the **C++** language.

SELCOPY is currently operational on **INTEL** x86/Pentium (or equivalent) machines running **PC/DOS**, **MS-DOS**, **Windows 95/98/ME/NT/2000/XP/Vista** and **OS/2; Sun Sparc** machines running **Solaris; COMPAQ Alpha** machines running **Tru64 UNIX (Digital); RS/6000** machines running **AIX; HP PA-Risc** machines running **HP-UX;** and **iSeries** machines running **OS/400**.

New Computer User

The first-time computer user may already be wondering what a **file** in computer terminology really means. To begin with, let us consider a "record":

A **Record** is a string of numbers and/or letters representing information concerning a certain entity. This entity may be an employee with a name, address, age and salary. Alternatively, it could be a component description with a number indicating how many of these components are in stock in the warehouse at the moment. Records are also known as **Logical Records**.

A **Block** is a number of logical records strung together. The concept of a block is meaningless to AS/400, UNIX and PC systems. However, on mainframe systems, records are stored on magnetic media in blocks in order to minimise the amount of space used by control information between blocks of data.
Blocks are also known as **Physical Records**.

A **Data Set** is a collection of records, which, for mainframes, may be blocked or unblocked, stored on a computer medium such as magnetic tape, magnetic disk, or even the now old fashioned punched cards.
For AS/400, UNIX and PC systems, data sets can be stored on any magnetic media such as disk, tape, diskette, optical disk and CD-ROM.
Normally, records in any one "data set" are all associated with the same type of entity. The "Payroll" data set only has records which describe employees. The "Stock" data set only has records describing warehouse stock.

Control Card and **Control Statement** are terms used frequently throughout this manual to refer to a record which contains control information, a statement, directing SELCOPY as to what processing is to be done. Historically, SELCOPY's instructions were read off punched cards.

Broadly speaking, each "data set" on a computer system is referred to by a unique name.

In a mainframe environment, depending on the type of Operating System used by your machine, Job Control Language **(JCL) of** one type or another, is usually required to link a particular **Data Set** to a unique **File** name which may in turn be referenced in your SELCOPY control statements.
In an AS/400, UNIX or PC environment, a data set may be referenced directly by its file identification name (fileid.)

Therefore, for mainframe, a **File** is an abstract or logical concept of a collection of data. The data set referenced depends on JCL statements, supplied separately or generated by SELCOPY's Dynamic Allocation feature.
For AS/400, UNIX and PC, a File is a collection of data referenced by a unique fileid.

MVS users have a built-in facility in the **JCL** to **concatenate** (join together in a string) several **Data Sets** to form one **File**, which results in a need to differentiate between Files and Data Sets.
Although VSE users now have the same facility via SELCOPY's **CAT** control statement, traditionally, data set concatenation was never available to them and data sets were always referred to as files.
Usually in a mainframe environment, a file **does** refer to a single data set but long established confusion within the industry has resulted in the two being effectively treated as synonomous.

Bits and Bytes Explained

The computer memory consists of a series of switches known as **"Bits"** in either the **ON** or the **OFF** position. A combination of eight switches is called a **"Byte"**, and one byte is used for each character on your keyboard.

Note that data on IBM midrange (AS/400 and iSeries) and IBM compatible mainframe systems is transmitted using **Extended Binary Coded Decimal Interchange Code** (EBCDIC). In contrast, UNIX and PC operating systems transmit data using **American Standard Code** for **Information Interchange** (ASCII). Because of this, alphanumeric and special characters on IBM AS/400 and mainframe systems have different binary representations to those on UNIX and PC systems.

The **letter A**, for instance, is stored in AS/400 and IBM compatible mainframe computer memory as **1100 0001**, and in UNIX and PC computer memory as **0100 0001** (where 1 represents an 'on' bit, and 0 represents an 'off' bit).

It is useful to be able to refer to a byte of data, and know its bit configuration. But using a string of 1's and 0's is laborious and leads to errors. For this purpose we use **Hexadecimal** Representation.

Hexadecimal Explained

The first four bits of any byte are, broadly speaking, coded to distinguish between numbers, letters and special characters. It is therefore convenient to split the byte into two groups of four bits.

The highest possible value of a four digit binary number is 1111 which is equivalent to 15 in base 10. This means, that to represent this number as a single digit, we have to work in base 16.

Base 16 (Hex)	**Binary**	**Base 16 (Hex)**	**Binary**
0	0000	8	1000
1	0001	9	1001
2	0010	A	1010
3	0011	B	1011
4	0100	C	1100
5	0101	D	1101
6	0110	E	1110
7	0111	F	1111

If we refer to each group of four digits as a single hexadecimal (base sixteen) digit, we can then represent an eight digit number (one byte) with two hexadecimal digits.

As we have already seen, the **EBCDIC** letter A is stored in AS/400 and IBM mainframe computer memory as 1100 0001. This can be represented in hex as **X'C1'**, which tells us that the first two and the last bits are on, and all the rest are off. Similarly, the **ASCII** letter A, stored in UNIX and PC computer memory as 0100 0001, can be represented in hex as **X'41'**, which tells us that the second and the last bits are on, and all the rest are off. We distinguish hex numbers from other data by enclosing them in quotes and preceding them with an X.

It is important to realise that hex and character format are for our benefit only. The computer does everything at the bit level.

Packed Decimal Explained

Although packed decimal is not inherent to AS/400, UNIX and PC environments, SELCOPY for AS/400, UNIX and PC fully supports this form of numeric field. It is, in fact, the default numeric field type used by all SELCOPY arithmetic functions.

A single digit number is stored in the memory of the computer as an eight bit binary field. The first four bits are coded to signify a numeric value, i.e. binary **1111** (X'F') for AS/400 and mainframe, binary **0011** (X'3') for UNIX and PC. However, if we already know that we are dealing with a number, the code becomes unnecessary, and the first four bits are only wasting valuable storage space.

To save this storage space we **"pack"** the data - that is we leave out the coded bits - thus reducing the storage space needed by half.

Consider the numeric string **'987'**: Normally it would be stored as **X'F9F8F7'** for AS/400 and mainframe, and **X'393837'** for UNIX and PC, but if we pack the data it becomes **X'987C'**, and we have saved one byte of storage.

The X'C' (or 1100 in binary) denotes a Positive value, while a Negative value is normally represented by X'D'.
The hex values **X'A', X'C', X'E'** and **X'F'** are all valid Positive codes.
The hex values **X'B'** and **X'D'** are both valid Negative codes.

So to summarise with an example: The representation **'2'** (in IBM Assembler Language, shown as **C'2'** for Character 2) has precisely the same meaning as the representation **X'F2'** on AS/400 and mainframe computers, and **X'32'** on UNIX and PC computers. This is because AS/400 and mainframe machines process it as simply eight switches set as 11110010, and UNIX and PC machines as eight switches set as 00110010.
The representation X'2C' **to us** means the same thing, because we recognise it as Packed Decimal data holding the number 2. But **to the computer** it is totally different. It is a combination of eight switches set as 00101100.

Packed decimal data is unprintable and must therefore be converted (unpacked) into a character representation, called **Zoned Decimal**, before it can be printed.

Zoned Decimal Explained

Zoned Decimal representation uses a full byte for each numeric digit, but the junior (right-most) byte is zoned according to the sign of the complete numeric string, thus differentiating between positive and negative values.

As we saw above, the first four bits (left-most) of a byte are coded to signify a numeric value by having all four bits either set to binary **1111** (X'F') for AS/400 and mainframe, or binary **0011** (X'3') for UNIX and PC.
These "first four bits" are known as the **Zone** portion of a byte, while the last 4 bits (right-most) are known as the **Numeric** portion of a byte.

Only the junior (right-most) byte of a zoned decimal string may be zoned to indicate the sign, or to be more precise, it is only the junior byte which is used for defining the sign. All other zones on other bytes in the string are ignored for arithmetic purposes.

Conveniently, the sign representations for zones are identical to those used for Packed Decimal data:
The hex values **X'A', X'C', X'E'** and **X'F'** are all valid Positive codes.
The hex values **X'B'** and **X'D'** are both valid Negative codes.

SELCOPY will always use **X'F'** for positive because the character so generated is printable on AS/400 and IBM mainframe machines.
SELCOPY for UNIX and PC, performs an EBCDIC to ASCII translation on the zoned byte so that the same character is printed for UNIX and PC as would be printed in a mainframe environment.
Thus +1 +2 through to +0 in the junior byte will print as 1 2 3 4 5 6 7 8 9 0.

SELCOPY will always use **X'D'** for negative because this is traditionally the standard. Thus -1 -2 through to -9 in the junior byte will print as J K L M N O P Q R, and the byte containing -0 (X'D0') will print as a "brace" (right-hand curly bracket) on some printers, but on others it will be unprintable.

New SELCOPY User

See also:

- READ, WRITE and FILE in section *Operation Words, Parameters and Keywords*.

Copying a complete file from one disk to another is achieved by the following two control statements:

```
READ  FILE=A
WRITE FILE=B
```

SELCOPY will obey the control statements you supply in the sequence that you supply them. SELCOPY does not read the whole file at once. It could well be too big to get into the machine storage. SELCOPY reads the file one record at a time and applies all your control statements to each record individually.

On reaching the last of your control statements, it loops back to the first one and reads another record off the input file which again has all your control statements applied to it. Thus your control statements are obeyed once for each input record, and this will continue until all records from the input file have been processed.

The File names **A** and **B** could of course be other names of your own choosing, making the statements more meaningful for your particular application. The length of the file name is however limited by the type of Operating System under which you are using SELCOPY.

If at the same time you want the file printed then the control statements become:

```
READ  FILE=A
WRITE FILE=B
WRITE FILE=PRINT
```

Abbreviations and Synonyms

But already it is becoming tedious to have to repetitively key in the fact that 'A' and 'B' are files. Surely SELCOPY should know that they are files because we are either reading or writing them. This should also be true of a printer file.

YES - this assumption is made by SELCOPY, and users may omit the **FILE=** on all READ and WRITE statements. Also the word **WRITE** may be omitted for the **PRINT** output. Thus, the above example could be rewritten as:

```
READ  A
WRITE B
PRINT
```

Even further, for the ultimately lazy, READ may be abbreviated to **RD**, WRITE to **WR**, and PRINT to **PR**. You will see later that many such abbreviations and synonyms are available to you.

Different users of SELCOPY may have different programming backgrounds, and as such may prefer to use the term **GET** instead of **READ**. When SELCOPY was first written, the only keyword for reading an input file was **INPUT**, which of course is still supported. The word **IN** then became the first abbreviation.

In the same way, the word **WRITE** may be replaced with **PUT, OUTPUT** or **OUT**. So again we can rewrite the above example:

```
GET A
PUT B
PRINT
```

For the purposes of this introduction however, we will stick to the words READ and WRITE. It is hardly worth continuing to use **FILE=** any longer, so further examples will omit it.

Selection

Usually it is unnecessary to print every record that is being copied, so you could very easily restrict the printing to only certain records:

```
READ  A
WRITE B
IF POS 20  =  'XYZ'
  THEN PRINT
```

SELCOPY processes the above set of control statements in sequence.

The READ statement causes file 'A' to be read. This really means that the first record is read from file 'A'. So as well as having data recorded on file 'A', we now also have a copy of the first record stored in the machine memory under control of SELCOPY.

The WRITE statement causes file 'B' to be written. Again, this really means that one record is written to file 'B'. The data used for writing this record is taken from SELCOPY's input area in the machine memory.

The IF statement causes the data starting at position 20 of the input area, (arbitrary position chosen for this example), to be checked for equality with the characters XYZ, which will result in a true or false condition.

The THEN statement is ignored for false conditions, but actioned for true conditions. Action in this case would cause the data held in the input area in the machine memory to be printed.

Later you will see that you can modify and move around this data held in the input area before writing it to file 'B' or printing it.

Having reached the end of your control statements, SELCOPY goes back to the beginning to repeat the operation. This time the READ statement will cause the second record of the file to be processed. And so it goes on until finally the end of the input file is reached.

At this point SELCOPY prints totals of how many records it read from file 'A', wrote to file 'B' and printed. The **Selection Summary** is described below.

Multiple Selection

Similarly, records written to file B could be restricted:

```
READ A
IF POS 20  =  XYZ
  THEN WRITE B
IF POS 20  =  XYZ
  THEN PRINT
```

Note that this time the quotes around XYZ were omitted. Quotes around a string of characters are optional, provided the string does not contain blanks, commas, quotes, asterisks or lower case characters. But the output to file 'B' and to the printer are based on identical conditions, so it is better written as:

```
READ A
IF POS 20  =    XYZ
  THEN WRITE B
  THEN PRINT
```

There is no restriction on the number of THEN statements that follow an IF statement other than the amount of machine storage available to SELCOPY for storing details of your control statements. Similarly you may have as many IF statements and as many output files as you require. Later, you will see that you can also have as many input files as you require, but for the time being it is easier to restrict yourself to a single input file.

Other Control Statements

At this stage, other control statements in SELCOPY may become meaningful with little need to reference this manual:

```
READ A
IF  POS  6 NE 'XYZ'
AND POS 42 =  ','
  THEN PRINT
  THEN POS 42 = ' '       * Modify it to blank.
  THEN PRINT
  THEN LOG      STOPAFT=6
WRITE B   BLKSIZE=800
```

All records that are Not Equal **(NE)** to 'XYZ' in positions 6 through 8, and also have a comma in position 42, are printed. i.e. the data stored in the input area at that time is printed.

Position 42 of the input area for these records is then modified to blank and the input area is printed again. So these records are printed twice, once before modification and once after. Records that do not satisfy the IF/AND condition are not printed or modified.

Also conditional on the **IF**/**AND** is the **THEN LOG** which is similar to print, but instead of printing to a real printer device or a print file on disk, it writes the data from file A to the operator's log device which is a screen, allowing quick verification that the job is running as expected. **STOPAFT=6** as you have guessed means stop after this action has been taken 6 times.

All records are written to file 'B' because the WRITE statement is unconditional. i.e. it did not have the word THEN in front of it which would have made it conditional on the IF/AND combination preceding it. Note that some of the records written to file 'B' have been modified first.

Blocked Files

The **BLKSIZE=800** in the above example tells SELCOPY that records written to file 'B' are not to be physically transferred to the output medium immediately, but stored until enough of them are available to build up a block of length 800 bytes. Thus for records of length 80 bytes there will be no physical data transfer to the file 'B' until 10 logical records are stored. At that point, one physical record, known as a **block**, is written to the output file 'B'.

Mainframe

In mainframe environments, input files are usually blocked, so it is essential SELCOPY knows the Logical RECord Length in bytes, **(LRECL)**, in order to process a single record at a time.

MVS and CMS users are fortunate because this information is available to SELCOPY from details stored by these operating systems when the file was created.

VSE users are obliged to supply this LRECL information themselves on the control statement that mentions the input file:

```
READ OLDMAST   LRECL=100
WRITE NEWMAST    BLKSIZE=3600   STOPAFT=50
```

Omission of LRECL by VSE users will result in SELCOPY making the assumption that the input logical record length (LRECL) is 80 bytes.
For output files, the default assumption is made that the logical record length (LRECL) is the same as that of the input file.

A STOPAFT of 50 indicates that only 50 records are to be written to the file 'NEWMAST'. SELCOPY will, therefore, terminate the run prematurely without reading any more records than necessary from the file OLDMAST, than are required to write 50 of them to the file NEWMAST.

iSeries, UNIX and PC

The concept of storing data in blocks is meaningless for most AS/400, UNIX and PC files. However, data is still transferred to the output medium in discrete amounts as specified by the BLKSIZE parameter.

Input files for AS/400, UNIX and PC, are usually character data files with LRECL defined as the length of data delimited by **EOL** (End of Line) character(s). The EOL character(s) may be defined by the user or allowed to default to any type of standard line-end protocol. These are typically Carriage Return/Line Feed **(CR/LF)** for PC's (X'0D0A') and AS/400 IFS (X'0D25'), and Line Feed **(LF)** for UNIX systems (X'0A').
Note that **LRECL** may be coded on I/O statements to read or write fixed length records **(RECFM=F)**. In this case, if EOL characters exist, they are included as data within the logical records. The LRECL parameter should be used when reading or writing files containing binary data.

Selection Summary

Automatically, SELCOPY will print a **Selection Summary** at the end of every execution. This summary gives you a count of how many times each selection was actioned. Your selections are numbered by SELCOPY when it prints out your control statements.

This automatic selection summary can be useful if for control purposes you require to count the number of records on a particular file. In the above example however, you must give SELCOPY something to justify reading beyond record 50, even if it is only a dummy output file.

```
READ OLDMAST LRECL 100
WRITE NEW BLKSIZE=3600 STOPAFT=50
WRITE DUMMY      * Comments allowed on any statement,
                 * but must be preceded by "*".
```

DUMMY is a reserved file name which indicates that no data transfer is to take place. Thus no file is actually created, but you still get a total of the number of times SELCOPY obeyed the WRITE DUMMY command. In this case the total will be the same as the number of input records read, but consider the following:

```
READ PAYROLL LRECL 248    * Get an input record.
IF   POS 25  =  A
  OR POS 25  =  M
  OR POS 25  =  D
    THEN GOTO GET         * Go back to 1st ctl stmt.
PRINT STOPAFT=20
WRITE DUMMY
```

The **THEN GOTO GET** statement causes SELCOPY to ignore subsequent control statements and loop back to the first control statement to read or **"get"** the next logical record. The total for the dummy file will therefore only reflect those records that do not have A, M or D in position 25.

In the case of a control card that causes no file I/O, comments may be reproduced on the corresponding Selection Id in the Selection Summary, by coding **'*>'** instead of **'*'** before the comment data.

The real example below illustrates the layout of the **Selection Summary**. Later, you may wish to refer to the section **Further Information** for a detailed description of the **Selection Summary**.

```
  SELCOPY/WNT 2.08 at CBL - Bridgend UK (Internal Only)                                                    2002/08/23 14:15   PAGE   1
o ---------------------------------------------------                                                    ----------------   -------- o


o          ** SMXINT01.CTL ***            L=001 --- 2001/10/23 10:10:20  (P24)                                                    o


o      1.    READ  D:\S\200\MFR\INSTALL\CBLNAME.MAC   INTO 21   WORKLEN 333    ** The CBLNAME assembler macro on CD-ROM **            o

       2.    PRINT 'CBLNAME Macro Parameter           Default    Field Name   Offset   Product   OpSys'   STOPAFT 1
o      3.    PRINT '------------------------          -------    ----------   ------   -------   -----'   STOPAFT 1                 o

       4.    POS LRECL+21, 200 = ' '                 * Blank out residue from previous, longer records.
o                                                                                                                                    o

             IF  POS 21 = '.***'                     * Header for CBLNAME Macro parameter name.
o      5.       THEN MOVE  34   FROM  26 TO 201      * Store the parameter higher up in work area.                                    o
       6.       THEN GOTO GET                        * No further checking required for this record.

o                                                                                                                                    o
             IF  POS 21 = '.*'                       * Assembler macro comment record.
             AND POS 69 = 'SELCOPY'                  * Description of fields applicable to SELCOPY only...
o            AND POS 79 = 'MVS'                      * ..and MVS only.                                                               o
       7.       THEN MOVE 34    FROM 201 TO   1      * Overwrite 1st 14 bytes of latest record with CBLNAME parameter.
       8.       THEN PRINT  LEN 100              *> Print all matching records.
o                                                                                                                                    o

      INPUT   SEL SEL                                                                                                  1  RECORD
o     RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH    o
      -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------
          1     1   2 CBLNAME Macro Parameter            Default    Field Name   Offset   Product   OpSys                     69
o         1     1   3 ------------------------           -------    ----------   ------   -------   -----                     69      o
        264     1   8 DB2SubSys=character(4)             DB2A       CBLCDB2S     X'044'   SELCOPY   MVS                       61
        272     2   8 DB2Plan=character(8)               CBLPLAN0   CBLCDB2P     X'048'   SELCOPY   MVS                       61
o       376     3   8 SVsamRc160=Error|Empty             Error      CBLSREL      X'058'   SELCOPY   MVS                       61      o
        386     4   8 SDynallocFail=Error|Empty          Error      CBLSREL      X'058'   SELCOPY   MVS                       61
        518     5   8 SMVSBufIn=integer                  0          CBLSBUFI     X'060'   SELCOPY   MVS                       61
o       525     6   8 SMVSBufOut=integer                 0          CBLSBUFO     X'061'   SELCOPY   MVS                       61      o
                    ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0

o SUMMARY..                                                                                                                          o
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
   ------      ------      ----     -------  -----           -----   --    ---
o     1         4,154 READ CBLNAME    2048    72 U           4,154       D:\S\200\MFR\INSTALL\CBLNAME.MAC                           o
      2----3        1
      4         4,154
o     5----6      235                                                                                                            o
      7             6
      8             6   Print all matching records.
o                                                                                                                                    o

      ** SELCOPY/WNT 2.08.158  Licensed by Compute (Bridgend) Ltd  +44 (1656) 652222 & 656466 **
o                                ** Expiry: 08 Jul 2003 **                                                                           o
```

Figure 0. Selection Summary.

Work Area

So far, **POS n** has always referenced a position within the input **record**. This is fine for simple executions with a single input file.

If however there is a **second** input file, or data manipulation is required, you need the ability to reference positions outside the current input record.

To cater for this, it is possible to request that a record is read into a specific position within a **work area** which is common to all files. Thus you may read different files into different positions within the same work area.

Parts of the work area which are not used for input data may then be used to store information or accumulate totals.

The **WORKLEN** parameter, coded on the first READ statement, or on an **OPTION** statement, is used to indicate to SELCOPY the **length** of the work area required.

```
READ ABC   WORKLEN 2000      * Reads into pos 1 (default).
READ XYX   INTO 50
PRINT   FROM 20   L 80       * Print data from 2 files, length 80.
```

Job Control Language

You do of course also have to supply **Job Control Language** (JCL) statements.

The essential one of course is the one which will invoke the SELCOPY program:

z/OS	// EXEC PGM=SELCOPY
VSE	// EXEC SELCOPY
CMS UNIX & Windows	SELCOPY
iSeries	CALL SELCOPY

Mainframe Only

Unless SELCOPY's **Dynamic Allocation** is being used, other **JCL** is required to link the **files**, which were mentioned in your SELCOPY control statements, with **real physical data** stored on a computer readable medium.

These are:

- **DD** statements for **MVS** users,
- **ALLOC** statements for **TSO** users,
- **FILEDEF** statements for **CMS** users, and
- **TLBL, DLBL, EXTENT** and **ASSGN** statements for **VSE** users.

Detailed information on **JCL** is available in the **IBM** literature on that subject.

Your Next Step

You now have sufficient knowledge of **SELCOPY** to copy and/or print selected records from the most common type of computer based file. i.e. one that has a **Fixed length** record format for mainframe, and **Undefined length** record format for AS/400, UNIX and PC.

The **Control Card Summary**, a few pages on, is intended as a quick reference table for the experienced user.

Glance through it - you may find it useful, even at this stage. - but don't let it frighten you.

Then **browse** through the manual without worrying about learning it. **Do not** try to absorb it all. Just read the bits that look interesting, or easy.

Then look at the **examples** at the back of the manual. They may now begin to make some sense.

Where you meet parameters and operations that you do not understand, go back and look them up in the body of the manual.

Control Statement Syntax Rules

1. For **MVS and CMS systems**, length restriction for SELCOPY control statements is equal to the LRECL of the SYSIN control card input file, up to a maximum of **256 bytes**.
   For **RECFM=V** input, the LRECL value includes a 4-byte Record Descipter Word (RDW) so the maximum control statement length will be the lesser of the allocated maximum LRECL minus 4, or 252 bytes. The RDW is ignored by SELCOPY for RECFM=V SYSIN.
   Similarly, any **sequence numbers** that exist in the last 8 bytes of the record are included in the LRECL value and reduce the control card maximum length value accordingly. Note that sequence numbers are also ignored by SELCOPY syntax checking.

   For **VSE systems**, if SELCOPY's control card file is **RECFM=F** (Fixed length records), then, reminiscent of the "Punched Card" days, the last eight bytes of each control statement are reserved for use as a sequence or identification field. i.e. card columns 73-80 for all types of control card input, except the 96 column card where the sequence field is in columns 89-96. SELCOPY will ignore this field for syntax checking, so it may contain anything.
   No sequence field is expected for **RECFM=V** and **RECFM=U** control statement input

   For **iSeries, UNIX and PC systems**, control statement input may be of any length up to 512 bytes.

2. SELCOPY has been developed so that the same syntax is supported across all systems. However, where keywords are coded that are not applicable or not yet supported in SELCOPY on a particular platform, the keyword is tolerated and ignored and processing continues provided no logic problem ensues.

3. For compatibility with earlier releases of SELCOPY, it is permissable to code **./** in positions 1-2 of any control statement. The ./ is treated as two blanks.
4. A comma (X'6B' EBCDIC, X'2C' ASCII), or an equals sign (X'7E' EBCDIC, X'3D' ASCII), in **any** position, is treated as blank (X'40' EBCDIC, X'20' ASCII) unless it is enclosed in single quotes (X'7D' EBCDIC, X'27' ASCII) or in double quotes (X'7F' EBCDIC, X'22' ASCII).
5. An asterisk (X'5C' EBCDIC, X'2A' ASCII) in position 1, or in any position which is preceded by a blank and is not enclosed in quotes, defines the start of comment data. The sequence field at the end of the statement defines the end of the comment. Comment data is ignored by SELCOPY for syntax purposes.
   If the comment ends with the continuation character (Syntax Rule 25) then the subsequent control card is read as comment data.

6. A card that is totally blank up to the sequence field is quite acceptable to SELCOPY. Its only effect is to increase the spacing on the SELCOPY print-out.

7. Multiple blanks or commas or combinations of both are treated as a single blank, unless enclosed in quotes. Hex strings are exceptions to this (Syntax Rule 17).

8. A **word** is defined as a sequence of characters with no intervening blanks, commas, equal signs, quotes or asterisks. Thus a blank, or its equivalent, delimits the beginning and end of a word. It is not necessary to delimit the beginning of the first word with a blank, so position 1 of the control statement may be used.

   Words may be supplied in **Upper Case** or in **Lower Case**, or even as a mixture of both. SELCOPY will ignore the case setting and process all words as upper case. **Lower case literals** which are not enclosed in quotes will be used as if they had been supplied in **upper case**. e.g. The word **abc** is the same as if **ABC** were coded.

   Exceptions to this rule are:

   - **Dynamic Allocation** for mainframe SELCOPY, where upper casing of the filename on **DSN=** will occur whether it is supplied in quotes or not. (To disable this upper casing for **CMS I/O**, refer to section relating to CBLNAME switches later in this manual).
   - **iSeries, UNIX and PC File Names** which do **not** undergo **case translation** by SELCOPY, thus eliminating the need to supply the lower, or mixed case file names in quotes. If lower or mixed case file names are unsupported (e.g. on FAT formatted PC drives), then upper casing is performed automatically by the operating system.

9. Delimiters within a word which is enclosed in quotes are processed as though they were not delimiters and considered to be part of the word. Words of this nature are later referred to as **strings**.
   Lower case strings will **remain lower case**. e.g.
   'abc' is not the same as **'ABC'** because of the quotes.
   abc however, is the same as **'ABC'**.

10. A string literal may be enclosed in either Single quotes or Double quotes. Strings containing a single quote must be enclosed within double quotes and vice versa. e.g.

```
PRINT 'Can use "QUOTE2" in a literal.'
PRINT "Can use 'QUOTE1' in a literal."
```

    Alternatively, a quote in a string may be represented as two consecutive quotes, and the whole string enclosed in the same type of quote. This will not affect the maximum string length, as the two consecutive quotes are counted as one byte. e.g.

```
PRINT 'Can use ''QUOTE1'' in a literal.'
PRINT "Can use ""QUOTE2"" in a literal."
```

11. The first word on a SELCOPY control statement is normally an Operation Word such as **READ, IF, THEN, ELSE, WRITE** or **END**.

The section *Control Statement Syntax Summary* illustrates the full list of operation words. Syntax alternatives are described in Abbreviations and Synonyms in section **Further Information**.

If no Operation Word is found, and the statement has only one word, it is treated as a **user label**, otherwise it is treated as a **NOW** (unconditional) operation.
Certain exceptions to this, such as **REPORT, NOP, PRINT, LOG** etc are listed under GOTO GET/EOJ/CANCEL/user-label in section *Operation Words, Parameters and Keywords*.

12. The second and subsequent words are known as **Parameters** and may be supplied on control statements in any order.

    Abbreviations may be used where many parameters are required, or the **EQU** statement may be used to combine parameters.

13. Parameters normally consist of a keyword and an associated argument. Some parameters however, such as **VSAM, DIRECTORY, NOTRUNC** and **APPEND**, do not have an argument.

    The keyword and argument may be separated by an equals sign (X'7E' EBCDIC, X'3D' ASCII), with or without intervening blanks. Blanks on their own of course are equally acceptable, but for readability, this manual will often give examples using equals signs:

```
READ XYZ  LRECL=150  BLKSIZE=600  RECFM=F
```

    Additional, redundant commas or equal signs can therefore be used to enhance readability:

```
====TOTALRTN====         * Accumulate totals *
   ==RETURN==
```

14. An argument consisting of a **decimal** numeric value which is to be used as a **length** or **position** may be up to 10 digits long, with or without leading zeros. Machine architecture limits the numeric value to decimal **2,147,483,647** (X'7FFF,FFFF') which is the maximum value for fixed binary arithmetic. For **lengths**, this value is further limited to decimal **16,777,215** (X'00FF,FFFF) which is the maximum value for a single-instruction move or compare.

    The operators **"+"** and "-" for addition and subtraction are obeyed resulting in a value calculated at control statement interpretation time. No operators are supported for multiplication and division at this level. Operators with intervening blanks are supported in SELCOPY for iSeries, UNIX and PC only. For mainframe SELCOPY, no intervening blanks are allowed. The following example illustrates the only situation in SELCOPY where an intermediate comma is not treated as blank but is mandatory in order to terminate the first positional expression. e.g.

```
IF POS +20 + 2 -1 -1,  +30 +3 -3  = 'XYZ'
```

    means:

```
IF POS 20 30 = 'XYZ'                * A range test.
```

    EQU names may be used to provide part of the numeric expression.

```
POS=0008    POS=8    POS 1+2+3+4-2    POS 300-292    POS EQUNAME+27-9
```

15. Other arguments are defined as strings. Strings may be of any length and may contain any character. Syntax Rule 25 describes use of the control card continuation character in long strings. Strings which contain the delimiters blank, comma, equals, asterisk or quote must be enclosed in quotes. The enclosing quotes do not count as part of the length of the string.

```
GT  0008                    * is the same as GT='0008'
NE    ABCDEF                * is the same as NE='ABCDEF'
EXACT='ABC,DEF X'           * the quotes are needed.
FILE=MASTER                 * is the same as FILE='MASTER'
LT  '''A'''                 * the string length is 3.
```

16. For compatibility with previous releases of SELCOPY, it is still permitted to use **POS=*** to represent **POS=@**. In this case, the asterisk will not be treated as the start of a comment field. Note however that while **POS @** is valid, **POS *** will result in the asterisk defining the start of a comment.
    The **POS=*** notation however is **obsolete** and should be avoided.

17. If the string required cannot be represented in character form (contains characters which are not on the keyboard) then the option to specify the string in hexadecimal notation should be used. The 'bit' testing and manipulating facilities of SELCOPY are examples of where 'hex' notation is virtually essential.

    Each byte of the string is represented by two hexadecimal digits, the whole string is enclosed in quotes and prefixed with the letter **X**.

    If the number of hexadecimal digits is not a multiple of 2, a senior (leftmost) hexadecimal zero is added to the string.

```
 IF P 1 = ABC              *                        \
 IF P 1 = 'ABC'            *                         |
 IF P 1 = X'C1C2C3'        * Mainframe and iSeries.  |   mean the same.
or                                                   |
 IF P 1 = X'414243'        * UNIX and PC.           /

 IF P 1 ONES=0000          *                        \
 IF P 1 ONES='0000'        *                         |
 IF P 1 ONES=X'F0F0F0F0'   * Mainframe and iSeries.  |   mean the same.
or                                                   |
 IF P 1 ONES=X'30303030'   * UNIX and PC.           /
```

```
  IF P 1 LT  X'A'          *                       \
  IF P 1 LT  X'0A'         *                        |   mean the same.
                           *                       /

  IF P 1 NE  ''''          *                       \
  IF P 1 NE  X'7D'         * Mainframe and iSeries.  |   mean the same.
 or                                                 |
  IF P 1 NE  X'27'         * UNIX and PC.          /
```

Long hexadecimal strings are notoriously difficult to read. To reduce this problem embedded commas are allowed within hex strings in SELCOPY control statements. For even more clarity, blanks are also permitted. These commas and blanks are totally ignored by SELCOPY, so the user may have as many of them as he may wish, placing them anywhere within the quotes.

```
  IF POS 4 = X'0000,123C  0000,456D'
  IF POS 4 = X'00,01,02,03,04'
  IF POS 4 = X'0000,05,06,0000'
  IF POS 4 = X'0,0,0,A,B,C,D,00,F'
  IF POS 4 = X',,,00,,,,0,,,0000000,,,A'
  IF POS 4 = X'4780,D172   1B88   D201,C112,D185'
```

18. A control statement causing **file input** is required in order to invoke SELCOPY's automatic looping back to the beginning of the control statements when it reaches the end.

    Because the first **READ** or **OPTION** statement defines the length of the input record area, or work area if **WORKLEN** is coded, it must be placed before any position is addressed, or any output file mentioned. With the exception of non-logic control statements such as **OPTION, EQU, REPORT, NOPRINT** etc, a **READ** statement, if used, should be the first control statement read by SELCOPY.

19. Output to **at least one file** must be present in a set of control statements. This output may be to the printer, the operator's console or even to FILE=DUMMY.

20. Each IF statement may be followed by as many AND/OR statements as required.

21. At least one THEN statement must follow each IF statement or its associated AND/OR statements.

22. If input data to SELCOPY is to be via the same device as the control statements, then an END must be the last control statement.

23. For **users** of VSE (both native and under CMS/DOS), CMS (VM/ESA 1.2 or earlier) and **TSO**, a **/* statement**, or its equivalent end-of-file indication which may be set by an EOF statement, is always necessary. Native MVS users may omit this statement, while users of CMS (VM/ESA 1.2.1 or later) require a null line.
    Users of iSeries, UNIX or PC may code a /* in pos 1,2 to indicate end of input control cards. All data following this statement is ignored (not even read in.)

24. It is sometimes irritating to use a whole card in order to code one SELCOPY statement. To overcome this, a separator character has been defined to indicate that the logical SELCOPY control statement ends there, and further data on that control record is to be treated as a new logical control statement.

    The separator character is not taken to be part of the record, and is not printed. It is only effective on control statements, so your data cards will remain unchanged.

    The **default** separator character is "!" (exclamation mark - X'5A' EBCDIC, X'21' ASCII). This may be modified to an installation default via an entry in **CBLNAME** or via the **OPTION SEP=** statement in SELCNAM. A temporary override may be specified for a SELCOPY job step by coding **OPTION SEP=** statement at the start of the control statements.

    ```
      IF P 8 NE ABC    !THEN GOTO GET
    ```

    will produce

    ```
      IF P 8 NE ABC
                       THEN GOTO GET
    ```

25. It can also be irritating to have to code extra SELCOPY statements due to control card width restrictions. To overcome this, a continuation character has been defined to indicate that the next control record is to be concatenated to the end of the current logical SELCOPY control statement.

    The continuation character is not taken to be part of the record, and is not printed. It gets replaced by position 1 of the continuation control statement, and is only effective on control statements, so your data cards will remain unchanged.

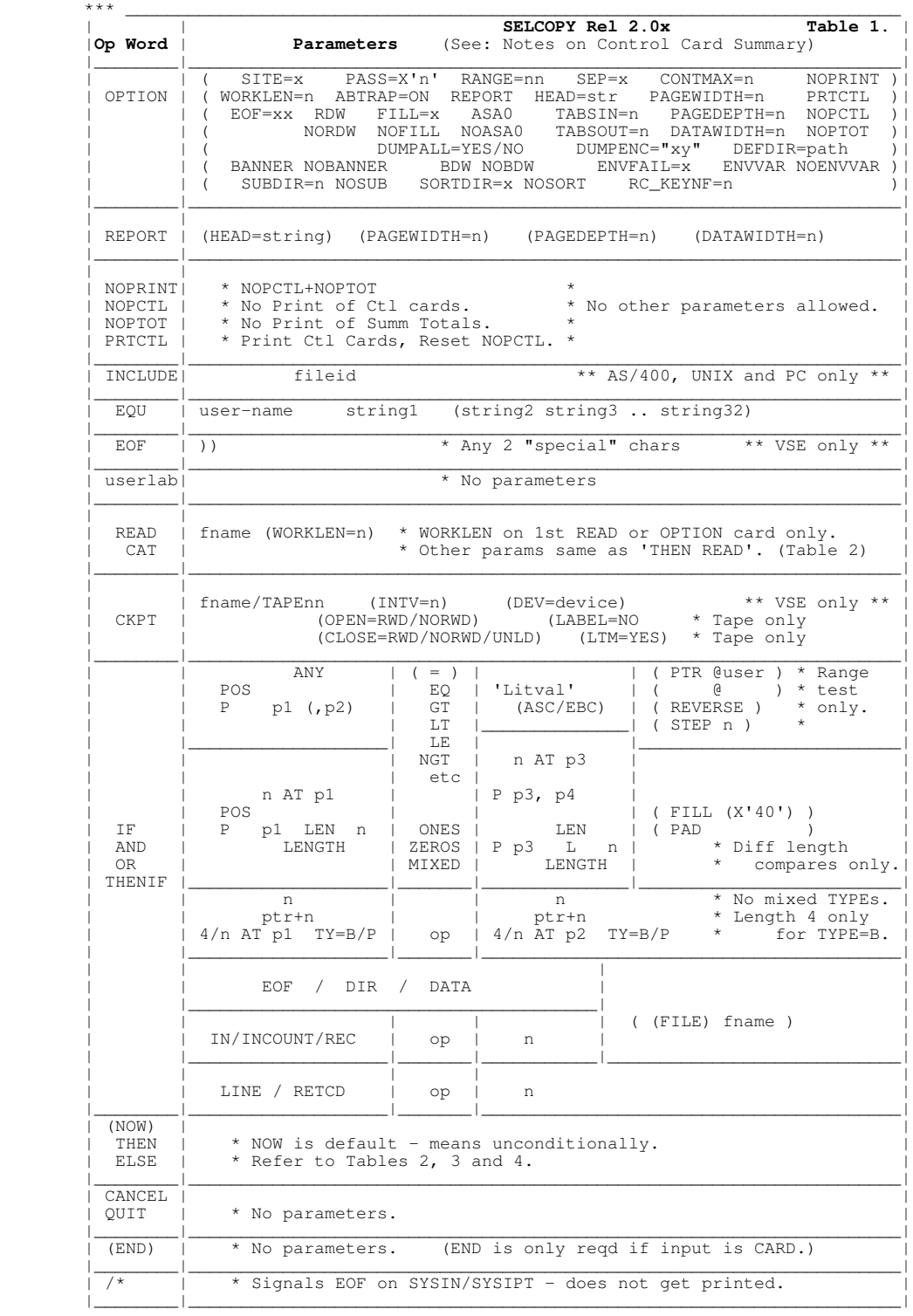
    The continuation character is a "\" (backslash - X'E0' EBCDIC, X'5C' ASCII) as the **last character** of a control statement.

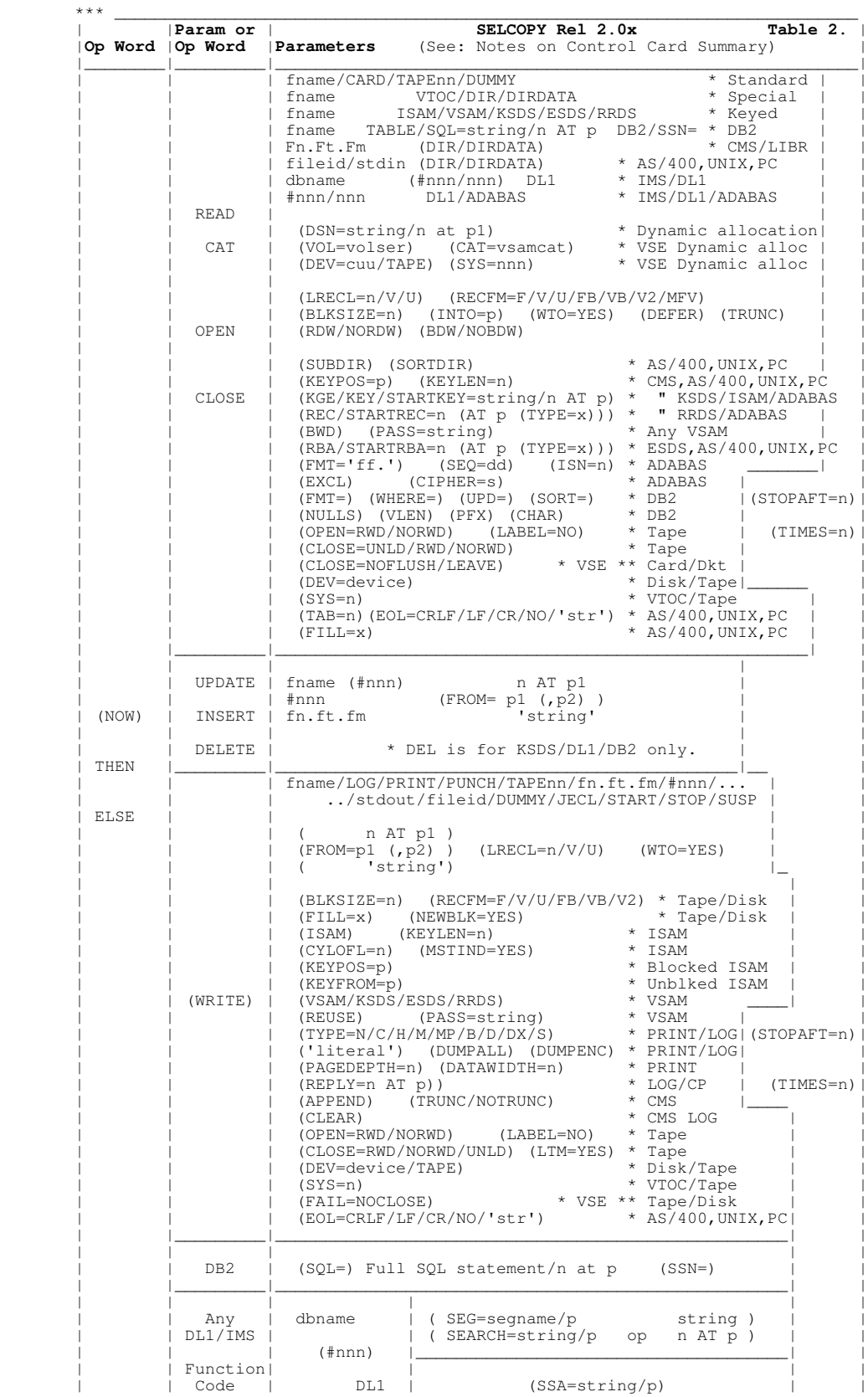
    ```
      PRINT 'THIS IS A LONGER TH\
    AN NORMAL LITERAL \
    FOR ILLUSTRATION'
    ```

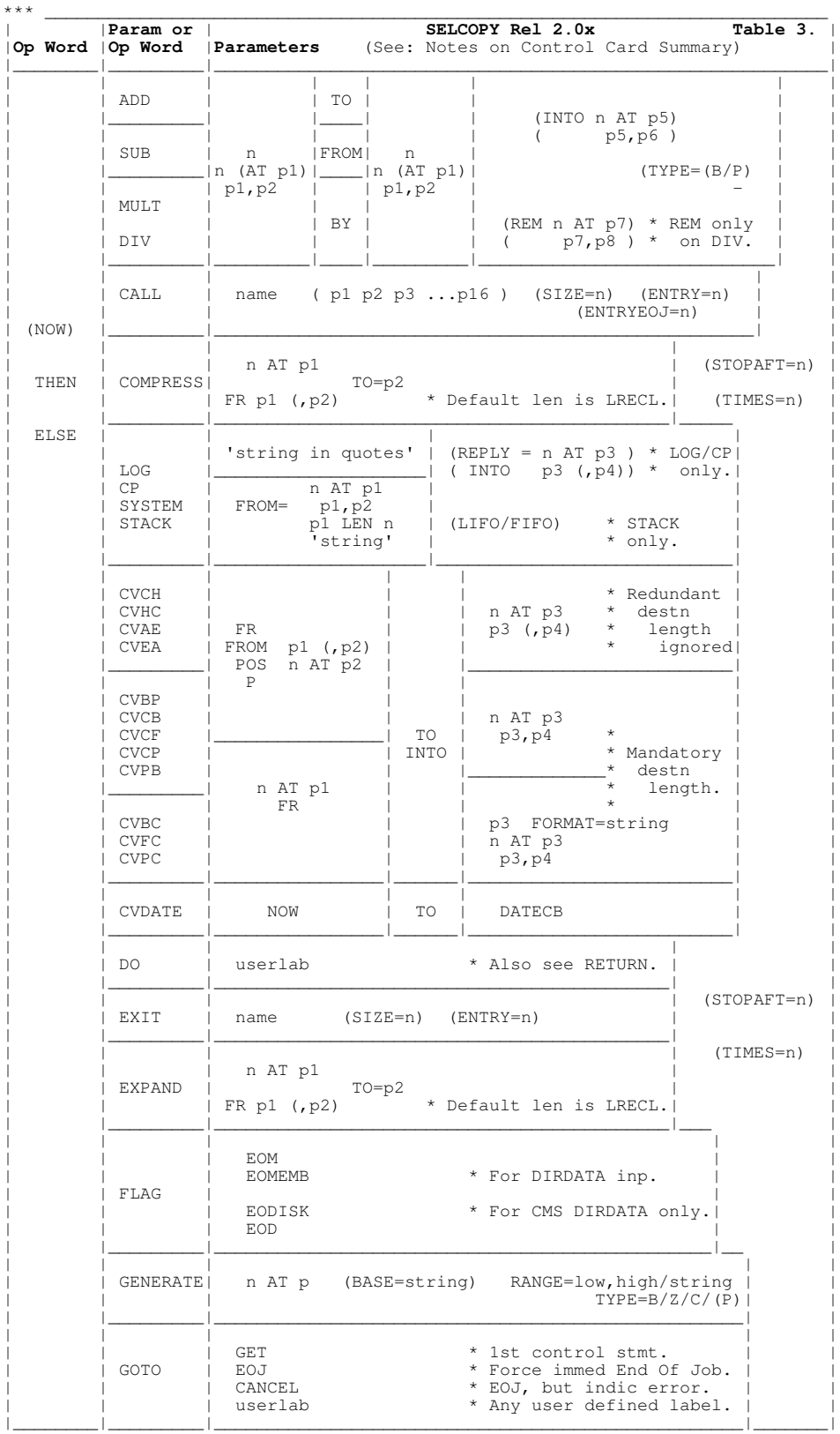
    will produce

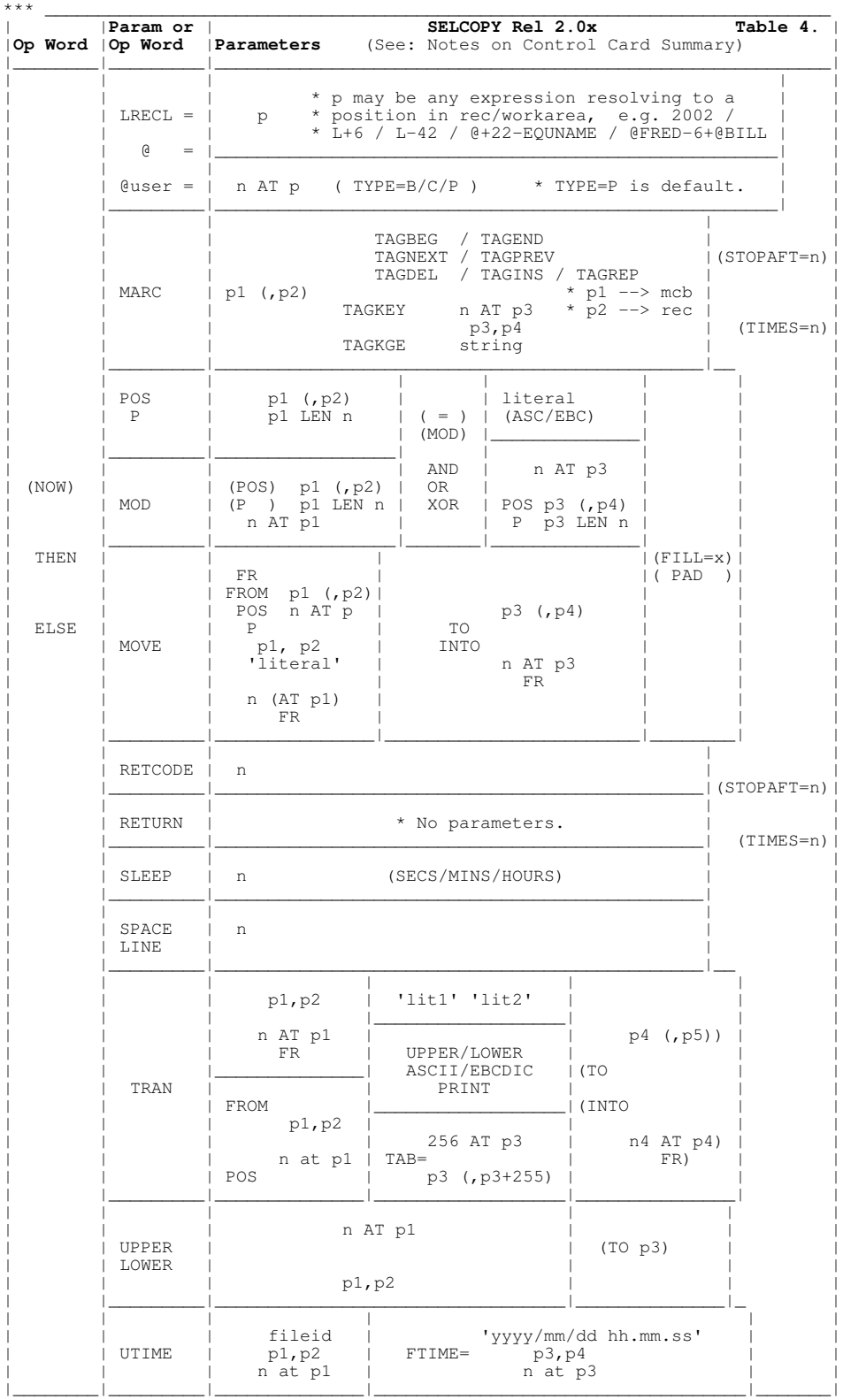
    ```
      PRINT 'THIS IS A LONGER THAN NORMAL LITERAL   FOR ILLUSTRATION'
    ```

Control Statement Syntax Summary




Op Word
Param or Op Word
SELCOPY Rel 2.0x Table 2.
Parameters (See: Notes on Control Card Summary)
fname/CARD/TAPEnn/DUMMY * Standard
fname VTOC/DIR/DIRDATA * Special
fname ISAM/VSAM/KSDS/ESDS/RRDS * Keyed
fname TABLE/SQL=string/n AT p DB2/SSN= * DB2
Fn.Ft.Fm (DIR/DIRDATA) * CMS/LIBR
fileid/stdin (DIR/DIRDATA) * AS/400,UNIX,PC
dbname (#nnn/nnn) DL1 * IMS/DL1
#nnn/nnn DL1/ADABAS * IMS/DL1/ADABAS
READ
(DSN=string/n at p1) * Dynamic allocation
CAT
(VOL=volser) (CAT=vsamcat) * VSE Dynamic alloc
(DEV=cuu/TAPE) (SYS=nnn) * VSE Dynamic alloc
(LRECL=n/V/U) (RECFM=F/V/U/FB/VB/V2/MFV)
(BLKSIZE=n) (INTO=p) (WTO=YES) (DEFER) (TRUNC)
OPEN
(RDW/NORDW) (BDW/NOBDW)
(SUBDIR) (SORTDIR) * AS/400,UNIX,PC
(KEYPOS=p) (KEYLEN=n) * CMS,AS/400,UNIX,PC
CLOSE
(KGE/KEY/STARTKEY=string/n AT p) * " KSDS/ISAM/ADABAS
(REC/STARTREC=n (AT p (TYPE=x))) * " RRDS/ADABAS
(BWD) (PASS=string) * Any VSAM
(RBA/STARTRBA=n (AT p (TYPE=x))) * ESDS,AS/400,UNIX,PC
(FMT='ff.') (SEQ=dd) (ISN=n) * ADABAS
(EXCL) (CIPHER=s) * ADABAS
(FMT=) (WHERE=) (UPD=) (SORT=) * DB2
(STOPAFT=n)
(NULLS) (VLEN) (PFX) (CHAR) * DB2
(OPEN=RWD/NORWD) (LABEL=NO) * Tape
(TIMES=n)
(CLOSE=UNLD/RWD/NORWD) * Tape
(CLOSE=NOFLUSH/LEAVE) * VSE ** Card/Dkt
(DEV=device) * Disk/Tape
(SYS=n) * VTOC/Tape
(TAB=n)(EOL=CRLF/LF/CR/NO/'str') * AS/400,UNIX,PC
(FILL=x) * AS/400,UNIX,PC
UPDATE
fname (#nnn) n AT p1
#nnn (FROM= p1 (,p2))
(NOW)
INSERT
fn.ft.fm 'string'
DELETE
* DEL is for KSDS/DL1/DB2 only.
THEN
fname/LOG/PRINT/PUNCH/TAPEnn/fn.ft.fm/#nnn/...
../stdout/fileid/DUMMY/JECL/START/STOP/SUSP
ELSE
(n AT p1)
(FROM=p1 (,p2)) (LRECL=n/V/U) (WTO=YES)
('string')
(BLKSIZE=n) (RECFM=F/V/U/FB/VB/V2) * Tape/Disk
(FILL=x) (NEWBLK=YES) * Tape/Disk
(ISAM) (KEYLEN=n) * ISAM
(CYLOFL=n) (MSTIND=YES) * ISAM
(KEYPOS=p) * Blocked ISAM
(KEYFROM=p) * Unblked ISAM
(WRITE)
(VSAM/KSDS/ESDS/RRDS) * VSAM
(REUSE) (PASS=string) * VSAM
(TYPE=N/C/H/M/MP/B/D/DX/S) * PRINT/LOG
(STOPAFT=n)
('literal') (DUMPALL) (DUMPENC) * PRINT/LOG
(PAGEDEPTH=n) (DATAWIDTH=n) * PRINT
(REPLY=n AT p)) * LOG/CP
(TIMES=n)
(APPEND) (TRUNC/NOTRUNC) * CMS
(CLEAR) * CMS LOG
(OPEN=RWD/NORWD) (LABEL=NO) * Tape
(CLOSE=RWD/NORWD/UNLD) (LTM=YES) * Tape
(DEV=device/TAPE) * Disk/Tape
(SYS=n) * VTOC/Tape
(FAIL=NOCLOSE) * VSE ** Tape/Disk
(EOL=CRLF/LF/CR/NO/'str') * AS/400,UNIX,PC
DB2
(SQL=) Full SQL statement/n at p (SSN=)
Any DL1/IMS Function Code
dbname
(#nnn)
DL1
(SEG=segname/p string)
(SEARCH=string/p op n AT p)
(SSA=string/p)


Op Word
Param or Op Word
SELCOPY Rel 2.0x Table 3.
Parameters (See: Notes on Control Card Summary)
ADD
SUB
MULT
DIV
TO
FROM
BY
n (AT p1) p1,p2
n (AT p1) p1,p2
(INTO n AT p5) (p5,p6)
(TYPE=(B/P)
(REM n AT p7) * REM only
(p7,p8) * on DIV.
CALL
name (p1 p2 p3 ...p16) (SIZE=n) (ENTRY=n) (ENTRYEOJ=n)
(NOW)
THEN
ELSE
COMPRESS
n AT p1
TO=p2
FR p1 (,p2)
* Default len is LRECL.
(STOPAFT=n)
(TIMES=n)
LOG
CP
SYSTEM
STACK
'string in quotes'
n AT p1
FROM= p1,p2
p1 LEN n
'string'
(REPLY = n AT p3) * LOG/CP only.
(INTO p3 (,p4)) *
(LIFO/FIFO) * STACK only.
CVCH
CVHC
CVAE
CVEA
CVBP
CVCB
CVCF
CVCP
CVPB
CVBC
CVFC
CVPC
FR
FROM p1 (,p2)
POS n AT p2
P
n AT p1
FR
TO
INTO
n AT p3 p3 (,p4)
* Redundant destn length ignored
* Mandatory destn length.
p3 FORMAT=string
n AT p3 p3,p4
CVDATE
NOW
TO
DATECB
DO
userlab
* Also see RETURN.
EXIT
name (SIZE=n) (ENTRY=n)
EXPAND
n AT p1
TO=p2
FR p1 (,p2)
* Default len is LRECL.
FLAG
EOM
EOMEMB
* For DIRDATA inp.
EODISK
* For CMS DIRDATA only.
EOD
GENERATE
n AT p (BASE=string) RANGE=low,high/string TYPE=B/Z/C/(P)
GOTO
GET
EOJ
CANCEL
userlab
* 1st control stmt.
* Force immed End Of Job.
* EOJ, but indic error.
* Any user defined label.


SELCOPY Rel 2.0x Table 4.
Op Word
Param or Op Word
Parameters (See: Notes on Control Card Summary)
LRECL =
@ =
@user =
* p may be any expression resolving to a
p * position in rec/workarea, e.g. 2002 /
* L+6 / L-42 / @+22-EQUNAME / @FRED-6+@BILL
n AT p (TYPE=B/C/P) * TYPE=P is default.
MARC
p1 (,p2)
TAGBEG / TAGEND
TAGNEXT / TAGPREV
TAGDEL / TAGINS / TAGREP
TAGKEY
TAGKGE
n AT p3
p3,p4
string
* p1 --> mcb
* p2 --> rec
(STOPAFT=n)
(TIMES=n)
POS
P
p1 (,p2)
p1 LEN n
(=)
(MOD)
literal
(ASC/EBC)
(NOW)
MOD
(POS) p1 (,p2)
(P) p1 LEN n
n AT p1
AND
OR
XOR
n AT p3
POS p3 (,p4)
P p3 LEN n
THEN
ELSE
MOVE
FR
FROM p1 (,p2)
POS n AT p
P
p1, p2
'literal'
n (AT p1)
FR
p3 (,p4)
TO
INTO
n AT p3
FR
(FILL=x)
(PAD)
RETCODE
n
RETURN
* No parameters.
SLEEP
n (SECS/MINS/HOURS)
SPACE
LINE
n
TRAN
p1,p2
n AT p1
FR
FROM
p1,p2
n at p1
POS
'lit1' 'lit2'
UPPER/LOWER
ASCII/EBCDIC
PRINT
256 AT p3
TAB=
p3 (,p3+255)
p4 (,p5))
(TO
(INTO
n4 AT p4)
FR)
UPPER
LOWER
n AT p1
p1,p2
(TO p3)
UTIME
fileid
p1,p2
n at p1
FTIME=
'yyyy/mm/dd hh.mm.ss'
p3,p4
n at p3

Op Word	Param or Op Word	SELCOPY Rel 2.0x Table 5. Parameters (See: Notes on Control Card Summary)	
		* Transfer Variable - CMS, VSE and MVS/TSO.	
(NOW)		FETCH 'varname' GET n AT p1 INTO n AT p3 SET p1 p2 p3 p4 (NOSUBS)	(STOPAFT=n)
THEN	XV	NEXT n AT p1 INTO n AT p3 * CMS and TSO. p1 p2 p3 p4	
ELSE		'varname' DROP n AT p1 (NOSUBS) * CMS REXX only. p1 p2	
		ARG SOURCE INTO n AT p1 * CMS REXX only. VERSION p1 p2	

POS Keyword	SELCOPY Rel 2.0x Table 6. Description (See: Notes on Control Card Summary)
	Additional POS keywords allow reference to data outside the input or work area, or to special positions within it. POS keywords can be arguments to: POS, FROM, TO, INTO, and AT parameters. Numeric displacements on these keywords allow reference to keyword+n or keyword-n as required,
@	The @ pointer, set by assignment or by a Range Test.
@user	A user defined @ pointer.
ANY	Anywhere within logical record, from POS 1 to POS LRECL.
CBLNAME	Points to the start of the currently loaded CBLNAME module.
COMREG	VSE: The COMREG system control block. (synonym COMRG.)
DATE	A table of today's dates in various formats, built by SELCOPY.
DIFF	Points to first difference in string1 after a string compare.
DSN	MVS: The 44-byte Data Set Name of the last file processed. CMS: The 18-byte Fileid, Fn Ft Fm of last file processed.
FHDR	The 128-byte File Header Record of the last RECFM=MFV input file.
FNAME	The 8-byte File Name of the last file processed.
FSIZE	The 4-byte binary File Size at OPEN time of last file, if known. e.g. VSAM and CMS files.
FT	The start of SELCOPY's File Table for the file last accessed.
HEAD	The start of SELCOPY's Heading. POS HEAD-1 --> ASA char.
LRECL	Last position in current logical rec, assuming POS 1 is 1st.
L	Synonym for LRECL.
PARM	The PARM data passed on the EXEC invoking SELCOPY.
PCB	IMS/DL1: The PCB for the last data base used.
PGNO	Synonym for UXPGNO, Current Page Number.
RBA	Relative Byte Address within the file of the last record read.
RETSYS	Return Code from last SYSTEM command. 4-byte Binary.
RETCODE	Highest Return Code last set by SELCOPY. 4-byte Binary.
RETCD	Synonym for RETCODE.
RETVSAM	Return Code from last VSAM operation. 4-byte Binary.
RETXV	Return Code from last XV command. 4-byte Binary.
RPL	SELCOPY Request Parameter List for VSAM, DB2, IMS, DL1 & ADABAS.
SEG	IMS/DL1: 8-byte Segment Name of last data base used.
STATUS	IMS/DL1: 2-byte Status Code following last dbase operation.
SQLCA	DB2: SQL Communication Area.
SQLDA	DB2: SQL Descriptor Area.
SQLMA	DB2: SELCOPY Message Area.
UPSI	VSE: The UPSI byte in COMREG.
UXADIFF	Absolute addr of where POS DIFF is pointing. 4-byte Binary.
UXATPTR	Absolute addr of where POS @ is pointing. 4-byte Binary.
UXDW	Current Data Width value. 4-byte Binary.
UXINCNT	Input Record Count of Prime input file. 4-byte Binary.
UXLINE	Line count in current page of PRINT. 4-byte Binary.
UXLINEREM	Lines remaining in current page of PRINT. 4-byte Binary.
UXLRECL	Length of current input record. 4-byte Binary.
UXPD	Current Page Depth value. 4-byte Binary.
UXPGNO	SELCOPY's internal Page Number accumulator. 4-byte Packed Dec.
UXPW	Current Page Width value. 4-byte Binary.
UXREPLYL	Length of last LOG REPLY input. 4-byte Binary.
VOLID	11 byte volume label of the disk containing the last input fileid.

Control Statement Syntax Summary Notes

( )
Words or parameters enclosed in brackets are optional and may be omitted on SELCOPY control cards. The brackets **must be omitted**.

= ,
Equal signs and commas in SELCOPY control cards are for the user's readability only, and may be kept or replaced with blanks as required. Multiple occurrences are acceptable. e.g.

```
==write== abcfil,,,,from==,,==1,,,,,,,,,=
```

The only exception to this rule is where a comma is used to separate the start and end positions of a p1, p2 range or field definition, where the p2 expression starts with a positive or negative displacement. e.g.

```
pos 1, +10-@+1
```

/
Indicates a choice from a list of parameters separated by '/'.
You may choose **ONE only**. If one of the parameters is enclosed in brackets, that parameter is the default if none are used.

fname
Represents a file name. This may be a user chosen name for an ordinary file, or one of the SELCOPY keywords representing a special file, or special action. They are: CARD DUMMY JECL LOG PRINT PUNCH START STOP SUSP and TAPEnn.

fn.ft.fm
Represents a **VM**/**CMS** file name in native form.

fileid
Represents a full **iSeries**, **UNIX** or **PC** file name in native form.

#nnn
Represents a **DL1** or **ADABAS** file identifier where **nnn** is numeric. The hash sign is optional.

string
Represents A character data of any length. Only needs to be enclosed in quotes if it has embedded blanks, commas, asterisks or quotes.

'literal'
Represents a string to be moved, printed or written to a file. It **must always** be enclosed in quotes.

n
Represents a number of bytes or a record number. An expression is allowed, provided it evaluates to a simple number. The @ pointer, user @ pointers, or the Position Keyword, LRECL, may also be included. e.g.

```
22+@+45-7+EQUATEDNAME-6+EQUNAM2+17+@FRED-@A+@BB+1+LRECL
```

This is valid provided the equated names do not involve special Position Keywords. The maximum value varies according to where it is used. Please refer to the Parameter Description for details.

p p1 p2 etc.
Represent a position within the input or work area. The theoretical maximum value is 2,147,483,647, but the size of the work area, defined by **WORKLEN=n** is the practical limit. Certain keywords have a special interpretation, e.g. **@ ANY DATE L PCB** and **UXLRECL**. Numeric displacements, including pointer variables, may be used. e.g.

```
AT 2+4+@A-@B+20
POS=@+92-47+6
FROM=L-23+9-EQUNAME+7
```

p1,p2 or **p1 (,p2)**
Represents a range where p1 is the start of the range and p2 is the upper position (last). The syntax (,p2) indicates that a range is optional. The position p2 must always be greater than or equal to p1, and the keyword **ANY** may not be used because **ANY** is defined as the range starting at POS 1 up to POS LRECL, where LRECL is the length of the current input record.

name
The name of a link-edited VSE PHASE, z/OS or CMS Load MODULE, a UNIX Shared Object Module or a MS Windows Dynamic Link Library.

x
Represents a single byte which may be supplied as character or hex.

userlab
This is a user chosen name to be used with GOTO and DO (PERFORM). Labels may be any length which fits on a card, and may contain any character other than SELCOPY delimiters. They are **underlined** when the control statements are printed. Certain words, such as **PRINT, PR, EOJ** and **QUIT**, may not be used as labels because they are treated in preference as **Operation Words**.

))

This may be any combination of non-alpha non-numeric characters, used for VSE to define a non-standard EOF char sequence for SYSIPT.

device

This may be any of the device codes listed under the DEV parameter.

op

This may be any of the SELCOPY defined Comparison Operators for use within an IF-type statement, or a DL1 SEARCH argument.

Operation Words, Parameters and Keywords

See also:

- Section Control Statement Syntax Summary

All SELCOPY **Parameters** and **Operation Words** are listed below in alphabetical order.

Sometimes it is difficult to find the parameter, keyword, argument or comparison operator that is required. Some are the synonym form of something else, which starts with a different letter. For example the **LOW** parameter is described under the heading of its synonym, **GE**.

Under such difficulty the **index** may provide assistance. It should have an entry for each synonym, as well as an entry for anything else of interest.

Each **parameter** is followed by a description of its action in each situation where it is used plus any necessary information concerning the argument. Some will have a reference to a more elaborate discussion later in the manual on the same subject. e.g. IMS and DL1.

Reference to one particular parameter description may not necessarily give you every other possible parameter that may be used on the same SELCOPY statement.

Operation Words permitted in SELCOPY control statements are detailed below, merged in with the parameters in alphabetical order.

Examples of Operation Words are:

```
OPTION   REPORT   NOPRINT   EOF

EQU              <------------- (This is an important one)

READ   CAT   OPEN   CLOSE   CKPT   WRITE   UPD   INS  DEL

DL1func   DB2   SQL=sqlstmt

IF   AND   OR   THEN   ELSE   THENIF   ELSEIF

DO   RET

EOJ   CANCEL   END
```

All Operation Words are optional with the exception that there must be at least one causing **input** of a file (or an OPTION statement defining a WORKLEN), and at least one causing **output** to a file, where PRINT, LOG or DUMMY are sufficient to satisfy the requirement for an output file.

! (Default separator character)

See also:

- SEP in this section.
- Separator Character in section *Further Information*.

* (Comment)

```
  READ FILE=ABC            * Read a record from ABC
  PRINT   STOPAFT=22       * Print the 1st 22 of them.

 ** Update eyecatcher **
  IF POS 1 = '*!*'         * Asterisks must be in quotes.
    THEN POS 2 = '*'       * Set to ***
```

An asterisk (X'5C' EBCDIC, X'2A' ASCII) in position 1, or in any position which is preceded by a blank and is not enclosed in quotes, defines the start of comment data. The sequence field at the end of the statement defines the end of the comment.
If the comment ends with the continuation character '\' then the subsequent control statement is read as comment data.

Comment data is ignored by SELCOPY for syntax purposes.

*< (Comment Ignoring Separator)

```
*< IF POS 22 = 'ABC'  !T POS 13 = 'DEF'
*< IF @A = 1  !AND @B = 2  !AND @C <> 3
   IF P 1 '<' *<?   !T DO LT-RTN      * Normal comment
```

Any control statement which has an asterisk in **position 1** and a **less than** sign in position 2 (***<** in positions **1, 2)** is considered to be wholly comment.

Any **separator** character is ignored, thus multi-statement lines may be commented out with a single change.

*> (Comment in Summary)

```
IF POS 1,22 = 'ABC'  !THEN DUMMY   *> ABC found in 1,22.
```

All comment data must commence with an asterisk. However, comments on **THEN** and **ELSE** statements which do not cause file I/O are subject to further inspection.

If the next character is a **greater than** sign, then that comment is stored and reproduced on the **Selection Summary** for that selection id.

The follwoing statement would therefore have the text **Comment data** printed on the summary against that selection id.

```
THEN POS 20 = XYZ                  *>Comment data
```

/* (End of Input Control Statements)

/* starting in column 1 is used to signify end of input control statements for SELCOPY processing.

VSE, CMS/DOS, TSO and CMS (VM/ESA 1.2 or earlier)
: /* **must** be used to signify end of SYSIN/SYSIPT input control statements.
VSE users may alter the /* default by using the EOF operation word.

CMS (VM/ESA 1.2.1 or later)
: /* or a **null line** may be used to signify end of SYSIN input control statements.

MVS Batch
: No indication of end of control statements is required for batch **MVS**.

iSeries, UNIX and PC
: /* **must** be used to signify end of STDIN if statements are input via the console or command prompt, and is optional if control statements are redirected from a control file. All data following the /* statement is ignored (not even read in). Comment data may be included on the same record provided column 3 is blank. e.g.

```
/*  End of SELCOPY Control Statements.
```

Alternatively, the **END** statement may be used to indicate end of input control statements. Note, however, that if **F=CARD** input has been requested, then input is required following the END statement and so /* should be used to terminate.

\ (Control Statement Continuation)

See also:

- CONTMAX in this section.

```
DB2   SQL='CREATE TABLE=CBL.SQUERY                \
          (SQNO    DECIMAL(6) UNIQUE    NOT NULL  \
           CUSTKEY VARCHAR(7) PRIMEKEY  NOT NULL  \
           CONTACT VARCHAR(7)       DEFAULT NULL) \
          IN DATABASE CBLSUPP  AUDIT CHANGES'
```

Logical control statements may be **continued** over one or more control statement record. The continuation character is a backslash (\ - EBCDIC X'E0', ASCII X'5C') as the **last character** of a control statement.

If the last non-blank character on a control statement is a continuation character, then the next control statement is concatenated with the **current** control statement. Position 1 of the **next** control statement replaces the continuation character. This process of concatenation is repeated until a control statement is read with no continuation character.

Concatenation of control statements takes place before syntax analysis. This means that continuation characters can be freely inserted at any convenient point in a **long** SELCOPY control statement, including inside literal strings.

As illustrated above, this is particularly useful when coding long SQL statements for the SELCOPY DB2 Processing feature.

Notes on Control Statement Continuation:

For AS/400, UNIX and PC only, the length of the full control statement is limited to a maximum of 512 bytes.

It is recommended that continuation records are **not used** in the SELCNAM file because the first continuation record encountered will cause allocation of a continuation record buffer, which by default will be length 4096. This will be unnecessary and wasteful on most SELCOPY runs, which no not use continuation records, and **wrong** for SELCOPY runs which require continuation records in excess of 4096. OPTION **CONTMAX** may be used to override this default maximum for continued statement length.

Long **OPTION** statements in the SELCNAM file may be broken up into several OPTION statements. e.g.

```
OPT SITE='Your installation name - location'
OPT RANGE='1900/01/01-2001/06/11'
OPT PASS=x'0123,4567,89ab,cdef'
```

ABTRAP

--- Mainframe only ---

See also:

- Section *Mainframe Debugging Aids*.

```
OPT    ABTRAP ON      WORKLEN=2000
OPTION    ABTRAP=OFF
```

The **ABTRAP** parameter and its argument may be used on an **OPTION** statement for switching the Abend Trap ON or OFF as required for an individual execution of SELCOPY, thereby temporarily overriding the default setting in CBLNAME.

Valid arguments are: **ON, OFF, YES** and **NO**.

ABTRAP=YES/**ON** will suppress the storage dump produced by the system in **abend** situations, and instead give the user more readable diagnostics.

It is recommended that this option is taken at install time for all operating systems, by setting the appropriate "bit" in **CBLNAME**, because with the Abend Trap **enabled** it is normally much easier to find the cause of the problem.

The Abend Trap needs only to be disabled, using **ABTRAP=NO**/**OFF**, when the problem is such that a conventional dump is needed by CBL for investigation.

The abend trap in SELCOPY is not activated until the selection process is about to begin, so if coded on more than 1 **OPTION** statement, the last setting will be used during the selection process.

ADABAS

--- Mainframe only ---

ADA

See also:

- Section *ADABAS Processing*.

```
READ 047 ADABAS    FORMAT='AC,AD,AH.'    WORKLEN=2000
RD #047 ADA    FMT=ALL      SEQ=AC    W=3000
INS 22 ADA    FROM 100    FMT='AA.'
```

Because non ADABAS files may also be processed within SELCOPY simultaneously, it is necessary to inform SELCOPY that the file number used is an ADABAS file, and this is done by coding the **ADABAS** parameter, or its synonym, **ADA**, as illustrated above.

You may omit the ADABAS parameter on subsequent SELCOPY control cards which use the same ADABAS file, provided no ambiguity arises from use of an IMS/DL1 numbered PCB within the same run.

The ADABAS Data Base may be processed using the **READ, WRITE, INS, DEL** and **UPD** commands, or any synonym. However, the current implementation of ADABAS support does not support a **READ HOLD** facility, so the **DEL** and **UPD** functions are effectively disabled.
For ADABAS, **WRITE** is treated as a synonym for **INS**.

The command must be immediately followed by a number indicating the required file. Leading zeroes are permitted. Also permitted is a leading hash-sign.

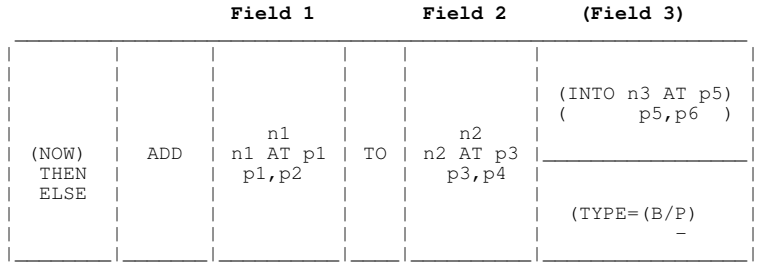
The keyword **ADA** or **ADABAS** must follow next to indicate that it is an ADABAS file rather than a DL1 PCB number.

Any ADABAS function requires the existence of a Workarea. i.e. the **WORKLEN** parameter, or its synonym **W**, must have been used on the first **READ** type or **OPTION** control statement, and must be large enough to accommodate data retrieved.

ADD=n

See also:

- *Packed Decimal Explained* in section *Introduction*.
- Section *Mainframe Debugging Aids*.




```
THEN ADD=4 AT=20   TO=8 AT=30                * TYPE=P is default.
ELSE ADD 2 AT 20   TO 4 AT 30 TYPE=B         * Binary addition.
NOW  ADD 14        TO 8 AT 30                * Adds dec 14 to p.d. field.
ADD 14             TO 2 AT 6  TY=B           * Adds dec 14 to binary field.
ADD  @A at @B  to  @C at @D  into  @E at @F   * Variable lengths and positions.
```

The **ADD** operation will cause **Field 1** to be **added** to **Field 2** with the result being optionally stored in **Field 3**.

INTO Parameter
If an **INTO** parameter is supplied, the result is stored at **Field 3**, otherwise **Field 2** is overwritten.

Literals
A literal, an unquoted decimal number, may be used for either or both source fields if so required. However, a literal value for Field 2 may only be used if an **INTO** parameter is also supplied.

TYPE Parameter
Only **TYPE=P** (the default) and **TYPE=B** are supported.
If any other TYPE parameter is coded, **TYPE=P**, the default, is assumed and the operation done assuming **Packed Decimal** for both source and destination.

The TYPE parameter may only be coded **once** on each arithmetic statement.
SELCOPY will accept the **TYPE** parameter either following the source or the destination, but it is applied **to both** source and destination fields. **ERROR 045** is issued if the **TYPE** parameter is coded more than once.

TYPE=B (Binary)
All data is valid for Binary arithmetic, up to a **maximum** length of 4 bytes.

The senior bit (leftmost) defines the sign. Zero is positive, and one is negative, but for a **1-byte** binary field, the value is treated as unsigned and always positive. If an arithmetic operation with a 1-byte destination field has a negative result, then **Return Code 8** is set.

Important Note
Please refer to Section *AS/400, UNIX and PC Processing* which gives details on the two different methods by which a binary field is interpreted outside SELCOPY, depending on the type of machine processor.

Note that TYPE=B arithmetic data cannot be invalid and Binary addition and subtraction are useful for modifying the @ pointer.

TYPE=P (Packed Decimal - Default)
If **TYPE** is not coded, **TYPE=P** (Packed Decimal) is assumed, having a **maximum** length of 16 bytes, (31 decimal digits and a sign).

If the result of the operation is too large to be held in the destination field, then it will be truncated to fit the destination field length. If truncation involves the loss of significant digits (non-zero), then Return Code 8 is set.

If the data is not valid Packed Decimal, then SELCOPY will set **Return Code 8** in an AS/400, UNIX or PC environment, or, in a mainframe environment, a **Data Exception** will occur. This may result in ERROR 536, indicating an error in **SEL---27** for instance, or it may produce a storage dump, depending on whether your Systems Programmer has enabled SELCOPY's **Abend Trap**.

ALL --- ADABAS only ---

See also:

- FORMAT in section *ADABAS Processing*.

AND (Operation Word)

A

```
IF POS=20   ONES X'F0F0F0'
AND POS 44   GT 406   LT 512
AND POS ANY = 'FRED BLOGGS'
AND POS @-3 NE 'MR'
AND INCOUNT   GE 12
AND POS=0000006   ZEROS X'808080'
  THEN  WRITE DISKOUT  LRECL=560  BLKSIZE=5600
```

Not to be confused with the AND Logical Operator.

The **AND Operation Word** may be used to produce compound conditions, and has the same range of parameters as the **IF** card.

The **AND** card must be immediately preceded by an **IF, AND, OR, ELSEIF**, or **THENIF**.

AND has a higher priority than **OR**, thus:

```
IF cond1   !AND cond2    !OR cond3   !AND cond4
```

means

```
IF (cond1  !AND cond2)   !OR (cond3  !AND cond4)
```

AND=string (Logical Operator)

See also:

- OR and XOR in this section.

Destination			Source	
				'Litval'
(NOW)	POS p1 (,p2)			n AT p3
THEN	P p1 LEN n	AND		
ELSE			POS p3 (,p4)	
			P p3 LEN n	

Arguments p1, p2, p3, p4 and n are supported also as @ and @user pointer values or Position Keywords.

```
POS 99 AND '000'           * Force numeric zones.
POS 50 AND X'BF,BF'        * Set 2 EBCDIC alpha chars to lower case.
POS 50 AND X'5F,5F'        * Set 2 ASCII  alpha chars to upper case.
POS=12 AND=X'F8'           * Set OFF low order 3 bits (right most)
POS=20 AND POS 30 L=5      * "AND" data with data.
```

Not to be confused with the AND Operation Word described above, the **AND** in this instance is a **Logical Operator** which gives the facility of forcing any bit setting **to become zero**, regardless of its original status, while leaving other bit settings in the same byte(s) unchanged.

The contents of the input record or work area at the position specified by the **POS** parameter are logically ANDed with the **AND** argument.
This will **set to zero** all bits in the record corresponding to **'0' bits** in the argument. Bits in the record corresponding to '1' bits in the argument remain the same.

The argument may be supplied as a **literal**, or in **POS p LEN n** notation, where **LEN** is unlimited provided it fits in the record or workarea.

Using **AND** in combination with **OR** (Logical Operator), half a byte can be set, leaving the other half unchanged. e.g. force negative packed-decimal sign at pos 20 without losing the decimal number held in the same byte.

```
POS 20   AND X'F0'         * Set jnr 4 bits all OFF.
POS 20   OR  X'0D'         * Set jnr 4 bits to X'D'.
```

The following listing is generated when run in a mainframe environment and illustrates **AND logical** together with its **dangers**.

The same SELCOPY job run on UNIX or PC would, of course, produce a PRINT output with hex characters interpreted using the **ASCII** character set. In this example, many of the characters, produced as a result of the logical AND with X'BF', would be unprintable.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)   PW000 pw=0 (133)     (OS) VM/CMS=VM05      10.44 THU 22 NOV 2001    PAGE   1
o ----------------------------------------------------------------------                                ---------------------    -------- o


o          * SMXAND CTL N *             L=002 +++ 90/02/10 15:09:33                                                                  o

       1.    rd card  w 2222   * Please read the informative data records.
o      2.    p 1001 =x'bf'                 * Use of STOPAFT=1 would be better here.                                                    o
       3.    move 999 fr 1001  to 1002         * Propagate the X'BF'.     and here.
       4.    print         ty b  l=80          * Print original data.
o                 *---*                                                                                                                o
       5.    p 1   AND  p 1001  len 1000       * Set off all the X'40' bits.
                  *---*
o      6.    pr            ty b  l=80          * Print modified data.                                                                  o

             end
o                                                                                                                                      o

      INPUT   SEL SEL                                                                                                  1  RECORD
o     RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH     o
      -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------

o         1     1   4 *ABCD - ORIGINALLY UPPER CASE - WXYZ 0123456789 "!%&*()+:@/,.=<>'                                          65      o
                      5CCCC464DDCCCDCDDE4EDDCD4CCEC464EEEE4FFFFFFFFFF4756554547766474674444444444444444
                      C1234000699795133804775903125000678900123456789 0FAC0CDDEAC1BBECED000000000000000
o                                                                                                                                      o
          1     1   6  abcd   originally upper case   wxyz                                                                          65
                      18888020998889899A0A9989088A8020AAAA0BBBBBBBBBB0312110103322030230000000000000000
o                     C1234000699795133804775903125000678900123456789 0FAC0CDDEAC1BBECED000000000000000                                o

          2     2   4 * NOTE DANGERS:- NUMERICS, SPECIAL CHARS, BLANKS - ALSO CHANGED *                                          65
o                     54DDEC4CCDCCDE764DEDCDCCE64EDCCCCD4CCCDE64CDCDDE464CDED4CCCDCCC45000000000000000                                o
                      C0563504157592A0054459932B02753913038192B0231522000132603815754 0C000000000000000

o         2     2   6   note dangers   numerics  special chars  blanks   also changed                                             65      o
                      1099A80889889A3209A98988A20A98888908889A2089899A02089A9088898880100000000000000
                      C0563504157592A0054459932B02753913038192B0231522000132603815754 0C000000000000000
o                     ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0             o

  SUMMARY..
o  SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN                                                        o
   ------      ------      ----     -------  -----           -----   --    ---
      1             2 READ SYSIN        72    65 U               2
o     2----6        2                                                                                                                  o


o          ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **         o
                                                   ** EXPIRY DATE -- 2002/05/21 **
```

Figure 0. AND (Logical Operator).

Note that the preferred method of forcing a character string to be upper or lower case is to use the UPPER or LOWER command parameters. These will leave special characters and numerics unchanged, and operate appropriately on all system platforms.

APPEND

--- CMS, MVS, iSeries, UNIX, PC only ---

APP

```
WRITE OUTDD           APPEND
WR   TEMP.LISTING.A   APPEND
WR  C:\BATCH\ERROR.LOG   APPEND
```

For use on output statements in a **CMS** system with DOS set ON or OFF, **MVS** with **DISP=MOD** and in **AS/400**, **UNIX** and **PC** environments. This parameter will cause output records to be appended to data that already exists in a file prior to execution of the SELCOPY job.

For **CMS** only, **ERROR 538** is issued (CMS WRITE ERROR) if the RECFM of the output file does not match that of the existing file, or if LRECL does not match when RECFM=F.

If **APPEND** is omitted the **default** action for output to a sequential file or MVS PDS member is to **erase** the named output file prior to writing anything to it.

The **APPEND** parameter need only be mentioned on 1 **WRITE** statement for any particular file.

Notes on APPEND:

1. **MVS** data sets should be allocated with **DISP=MOD** for this WRITE APPEND to succeed.
2. **APPEND** is the default for **VSAM** files. The VSAM file must be defined with IDCAMS parameter **REUSE**, and REUSE must also be specified as a parameter on WRITE in order to overwrite existing data in a VSAM file.

ASA0

```
  OPTION    ASA0
```

The ASA0 parameter may be supplied on the **OPTION** statement only.

ASA0 switches on print of the mainframe ASA print control character 0 in column 1 for all PRINT records that are preceeded by a blank line in the SELCOPY output listing. Print of the blank line immediately prior to these records is suppressed.

PRINT **TYPE=S** output for system print is not affected by the ASA0 and NOASA0 options.

ASA0 may be specified in **SELCNAM** to override the system default which is **NOASA0**.

ASC

--- iSeries, UNIX, PC only ---

```
  POS 1  =  'ABC'   ASC
  IF   POS 11  =  'ABC'   ASC
  READ   /usr/cbl/test/keyed_txt  KEY='10AGFH3'   ASC   KEYPOS=11
```

ASC may be specified after a **quoted literal** to indicate that the literal is to be treated as being in the ASCII coding convention, regardless of the native coding convention of the host machine.

By default, literals are stored in the native coding convention of the host machine.

ASCII

See also:

- TRAN and CVEA in this section.

Parameter of **TRAN** statement to convert EBCDIC to ASCII.

ASSGN

Assignment statements are discussed under MOD.

AT=p

```
ADD 3 AT 20   TO 4 AT 30
IF P 200 = XYZ
  THEN SUB 2 AT 40   FROM 4 AT @TOT
  ELSE SUB 1         FROM 4 AT @TOT
```

The AT parameter indicates the position within the input record area, or workarea, from which data is to be used for the previously mentioned field. It may be used to define the position of more than one field in an operation, and is therefore a positional parameter.

In the above ADD statement, three bytes of packed decimal data at positions 20,21 and 22 will be added to a four byte packed decimal accumulator found at positions 30,31,32 and 33.

Omission of the first AT parameter causes the SUB argument to be treated as an absolute value. In the above example, the accumulator is decremented by 1 by the ELSE statement.

BANNER

--- iSeries, UNIX, PC only ---

BAN

```
  OPTION    BANNER       * Display banner line on terminal.
```

The BANNER parameter may be supplied on the **OPTION** statement only.

BANNER activates display of the SELCOPY banner line to the user's terminal. By default, the SELCOPY banner line is displayed at startup of every SELCOPY execution. e.g.

```
....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8
SELCOPY/OS2 2.07 at Your Installation Name                  2001/02/09 02:24
```

The banner line is not displayed until all control statements have been processed, so it may be switched off using the **NOBANNER** option, switched on, and back off again, as you prefer, anywhere within your control statements.

If a control card error occurs, the Banner Line is automatically switched on, and a banner line is displayed before displaying the error message.

BASE=xxxx

See also:

- GEN in this section.

```
GEN   8 AT 10       BASE=X'ABCD,EF00'   RANGE 'ABCDEFGHI'   TYPE=C
 THEN GEN 3 AT 20   BASE XYZ            RANGE 10000 59999   TYPE P
```

BASE is an optional parameter for use on the **GEN** statement. Its 4-byte argument provides the base for random number generation.

If omitted, the **Default BASE** is the 4-byte **TOD clock**, in combination with the Selection number, which results in a different set of random numbers for each execution.

BDW

--- iSeries, UNIX, PC only ---

```
READ  C:\OS390\CBLLIB\SSC\VBDATA  RECFM=V  BDW   * RECFM=V input data contains BDWs.
WRITE C:\TEMP\TESTDATA.RFV        RECFM=V  BDW   * Write Mainframe format RECFM=V file.
```

BDW may be specified on a **READ** or **WRITE** statement only.

For **RECFM=V**, both input and output files, **BDW** may be coded to indicate that a Block Descriptor Word exists or is required. BDW is the default for all RECFM=V Input/Output.

NOBDW should be specified if no Block Descriptor Word exists or is required.

BLKSIZE=n (for Input)

BLK=n
B=n

```
READ F1 LRECL=97  BLKSIZE=32000      * Means buffer size.
 THEN RD FILE2    BLK=100            * Restrict input buffer size.
 ELSE RD FIL3   B=441  L=44          * Need not be multiple of LRECL.
```

BLKSIZE for Input should be avoided. If coded, it is used by SELCOPY for **buffer allocation** only, as the maximum input blocksize to expect.
No check is made that the stated blocksize agrees with the actual blocksize read, and even for **RECFM=F**, it does not have to be a multiple of **LRECL**. However, mainframe SELCOPY will check that the stated blocksize is greater than or equal to the actual blocksize read.
The keywords, SAME, MAX and UNB, are **not permitted** on Input files.

iSeries, UNIX and PC Input Blocksize

The concept of blocking logical records together does not exist for standard AS/400, UNIX and PC files, so a default input buffer size of 2048 is used. Coding BLKSIZE on the input statement will override this default.

On **RECFM=F** input, if BLKSIZE is omitted and an **LRECL** is specified, then the input BLKSIZE is equal to the LRECL.

On **RECFM=U** input, if the BLKSIZE specified is less than the maximum LRECL, then records are read with an LRECL no greater than the BLKSIZE minus the length of the **EOL** character(s).

RECFM=V input is supported in SELCOPY on AS/400, UNIX and PC environments in the same way as for mainframe MVS and VSE. The input BLKSIZE defaults to the value contained in the 4 byte BDW (Block Descripter Word) located at the start of each Physical Record.
Coding a blocksize smaller than that defined in the BDW will reduce the memory requirements. However, coding BLKSIZE

less than the maximum length record (incorporating the 4 byte RDW) will give **ERROR 537** together with the following:

```
cblfio: RECFM=V insuff data for RDW value on last rec.   File='xxxxx'
```

The maximum input and output BLKSIZE permitted in SELCOPY for **PC/DOS** is 32751 bytes.

Input Blocksize Check

Mainframe SELCOPY instructs data management to read **1 byte more** than expected, provided this does not exceed device capacity. If the data returned fills the input buffer, then we must have an error condition, and the job is cancelled with **ERROR 501** or **502**.

If this problem is encountered then use of the following control statements will help diagnose the problem:

```
read FILE1  recfm=u  blksize=32760    !print   l=100
```

This will print only the 1st 100 bytes of each input block, but has the advantage of displaying the length of each block under the **Record Length** heading on the right hand side of the report.

Avoid coding BLKSIZE for Input

Under normal circumstances, the **BLKSIZE** parameter **should NOT be coded** on input files because the default size for buffer space **is adequate**.

BLKSIZE is never required for **VSAM**.

MVS and CMS Input BLKSIZE

Input files have the full file geometry known to the system at OPEN time for all standard files, so buffer allocation is done **precisely** for a known BLKSIZE.
Do NOT override it by coding **BLKSIZE** on the SELCOPY statement, or on the DD card. Reducing it will cause an error, and increasing it is wasteful.
LRECL or **RECFM** may of course be changed if you wish to process a file differently. e.g. reading a RECFM=VB file as RECFM=U.

Only unlabelled tapes or foreign files (from a VSE machine) have no geometry information, in which case an override is necessary, preferably on the **DD** card.

VSE use of BLKSIZE

On an Input file, BLKSIZE should only be used to override the **default** size if it is either too small, or ridiculously large, i.e. wasteful.

Too small is exceptional, in which case ERROR 043, 501, 502, 509 or 543 is returned. Code an appropriate **BLKSIZE** to increase the buffer size used.

Too large is normal and acceptable within limits which can be set in **CBLNAME**, but in a **virtual storage** environment, buffer storage must be **"fixed"** before every read operation. This can be **very inefficient** if storage belonging to another partition has to be **paged out** first, before the read starts. After the read, the other partition will cause its storage to be **paged back in**, thereby causing the phenomenon known as **'thrashing'**.

Thrashing can be reduced by coding a **smaller default** buffer size in the **CBLNAME** phase, or alternatively by coding a **BLKSIZE** parameter on the READ card. However, if a small CBLNAME default is used, jobs with large input blocksizes will need a **BLKSIZE** parameter on the READ card.

VSE Buffer Size determination

The amount of storage allocated for an input buffer, (there are 2 of them for each input file), is determined in the following order of precedence:

1. The value on the **BLKSIZE** parameter on the READ card is used if coded.
2. The default value in the **CBLNAME** phase/load module is used if present.
3. For **CKD** (Count Key Data) disk devices, if a DEV parameter is coded, the track capacity of that device is used, otherwise track capacity of the **CBLNAME** default disk type, normally **SYSRES**, is used, or **32760** if this is smaller.
4. For **FBA** (Fixed Block Architecture) disk devices, 0671, 3310, 3370, 9332, 9335 and 9336 disks, a value of 16384 is used unless an override value has been coded in the **CBLNAME** phase/load module for **FBA** maximum buffer size. Note that the maximum blocksize for an FBA device is 32761.
5. For **Tape** devices, the track capacity of the default disk device is used, or 32760 if this is smaller. Note that the maximum blocksize for a tape device is 32767.

VSE with Mixed Disks - Caution

Reading a **3340** input file, with a **3375** SYSRES, with **BLKSIZE** coded at **3340 maximum**, will fail unless **DEV=3340** is also coded, or **3340** is the **default DEV** type in **CBLNAME**.

This is because SELCOPY adds 1 to its input buffer size, checks it against the device capacity (rather large on a 3375), and finding it acceptable, will pass control to the system to perform the input function. The operating system complains because **3340** device capacity has been exceeded (by 1 byte), and the job is cancelled.

BLKSIZE=n/SAME/MAX/UNB (for Output)

BLK=
B=

```
  WRITE STOCKF  LRECL=97  B=970           * Must be multiple of LRECL.
    THEN WR LOWSTK   BLKSIZE=SAME         * Mainframe - use same as input file.
    ELSE WR STKHI  L=44  BLK=MAX          * Mainframe - use device maximum.
```

BLKSIZE for output is **important** and should usually be supplied, unless the data set is managed by **MVS SMS**.

Numeric argument
The value of BLKSIZE determines the length of each block of data written, and may range from a length equal to the logical record length up to the maximum allowable for the device in question.

For **RECFM=F** records, **BLKSIZE** must be an exact multiple of **LRECL** to satisfy data management, but SELCOPY will accept any value from the user and **round it down** to the nearest multiple of **LRECL**. Thus it is allowable to code **LRECL=199 BLKSIZE=2000** for a RECFM=F output file. BLKSIZE will be rounded down to 1990, the nearest multiple, and accepted.

iSeries, UNIX and PC Output Blocksize
Since data records in AS/400, UNIX and PC environments are not blocked together as for mainframe, specifying BLKSIZE on output serves only to define the size of buffer to which output records are stored before eventually being written to disk. Data is written to disk when the output buffer is full or at the end of the job run.

Variable output is supported in SELCOPY on AS/400, UNIX and PC environments in the same way as for mainframe MVS and VSE.

Coding BLKSIZE for RECFM=V output defines a **maximum** size for the blocks into which variable length logical records are to be written.

The maximum input and output BLKSIZE permitted in SELCOPY for **PC/DOS** is 32751 bytes.

Keyword argument
The following keywords may be used for **Mainframe Output files** only:

BLKSIZE=SAME
For MVS only, use the same Blksize as the Primary Input file.

BLKSIZE=MAX
Use the maximum valid BLKSIZE for device.

For MVS users, **BLKSIZE=MAX** is not actioned unless the **CBLNAME** field **CBLSDEV** is set for the appropriate device. Because CBLSDEV is only used in MVS for BLKSIZE=MAX calculations, it may be set to an **FBA** device, in which case **CBLSFBAM** (FBA Max) may also be set to reflect your preferred installation BLKSIZE maximum.

BLKSIZE=UNB (Default)
Write unblocked output.

Default BLKSIZE
If BLKSIZE is omitted, it will default to being equal to the record length (LRECL) of the output file, and it will therefore be **unblocked**. (Default Output **LRECL** is to use the same LRECL as the Input file.)
For AS/400, UNIX and PC, where the input file is **not Fixed** Record Format, the output BLKSIZE defaults to **2048**.

Default for **Variable** output files in a **mainframe environment** causes the output file **to be unblocked**, but the physical records will always contain the leading four 'blocksize' bytes required by Data Management, as well as the four bytes for the record size. SELCOPY in this case still has to allocate an output buffer of a finite size, so the value taken is the track capacity of the SYSRES device.

In an **AS/400, UNIX or PC environment**, the default BLKSIZE for **Variable** output files is **2048** unless BLKSIZE is coded on a preceding READ statement, in which case the specified input BLKSIZE defines a **maximum** for RECFM=V output BLKSIZE. As for mainframe, the output BLKSIZE value is stored in a 4 byte binary **Block Descripter Word (BDW)** found at the start of each Physical Record.

In the case of **Undefined** output files in a mainframe environment, omitting the BLKSIZE parameter again allocates an output buffer of size equal to to the track capacity of the SYSRES device. If this value is to be exceeded, (e.g. for tape), BLKSIZE must be specified at a value not less than the largest record expected. However, this value may not exceed 32760.

DISP=MOD for MVS
If **BLKSIZE** is coded on the SELCOPY control card for an output file with **DISP=MOD**, then it is ignored if the system supplies an existing blocksize when SELCOPY opens the file. Overruling this with a smaller, coded, BLKSIZE would cause earlier data to be ignored by some programs when the file is next read. SELCOPY however would give **ERROR 501**.

MVS use of DD Statement
For MVS users it is often preferable to supply **BLKSIZE** and other **DCB information** on the **DD statement** in order to maintain installation standards.
This method also allows DCB information to be copied from another cataloged data set using **DCB=data.set.name**, or

from the DCB parameter on an earlier DD statement using **DCB=*.ddname**.

MVS SMS (System Managed Storage)

Users with **SMS** may want to take advantage of the **System Determined BLKSIZE** facility, which will choose an optimum block size based on the output file and device geometry.
System Determined BLKSIZE is only activated when **no value** for the blocksize of an **output** data set is available from any source, at **open** time.
In order to stop SELCOPY from using a default value when none is provided, the **X'08'** bit of **CBLSREL**, the Release Dependencies flags in **CBLNAME** must be set on.

VSE FBA Devices

FBA devices will have an output BLKSIZE restricted to a fixed installation defined value. (Default of 16384.) This value is used as the maximum for RECFM=U files if no other is specified. To **modify** this maximum, refer to **SMaxFBABlock** parameter in the **CBLNAME macro** which is distributed with both the SELCOPY and CBLVCAT software products. Consult your installation's Systems Programmer for details of changing this maximum value to what is required at your installation.

Notes on Output BLKSIZE Parameter Usage

The presence of a BLKSIZE parameter on only one THEN or NOW card for a particular output file is sufficient. It is not necessary to include it on every reference. If coded on more than one THEN or NOW card, the **last blocksize** encountered will take effect.

Coding BLKSIZE alone when copying records from a **RECFM=U** (e.g. any **VSAM)** file will result in an **unblocked** output file. In this case **RECFM** must also be coded to override the default, which is that of the prime input file.

PUNCH files may be treated as blocked, by coding LRECL, but only if the length of the logical record is a factor of the real length of a card, 80 or 96 bytes, as appropriate.

BUFNO

--- MVS only ---

```
READ ABCFIL   BUFNO=20
WRITE XYZFIL  BUFNO=6
```

For **MVS** only, the number of buffers used for a **QSAM** file may be controlled by the **BUFNO=n** parameter on a READ or WRITE command.

The **default** number of buffers used for **MVS** is controlled by a setting in **CBLNAME**. Refer to **SMVSBufIn** and **SMVSBufOut** parameters in the **CBLNAME macro** which is distributed with both the SELCOPY and CBLVCAT software products. If the argument to either of these parameters is zero, then the default value for that parameter is determined by **MVS** (usually 2 buffers).

BUFNO=n and its associated **CBLNAME** default are ignored for **VSAM**.

BWD

--- VSAM only ---

```
READ ABCFIL  KSDS   BWD
READ ABCFIL  KSDS   STARTKEY ZZZZ     BWD
```

The **BWD** parameter on a READ statement for a **VSAM** file will read the next record, but **working backwards**. If the file has just been opened, the record returned will be the last record in the file. Subsequent reads work backwards through the file.

The **EOF** condition is given when the 1st record in the file has just been read, and a read backwards is attempted. The EOF condition will cause normal End-of-Job unless the EOF condition is tested.

Reversing Direction for KSDS

Currently, SELCOPY only supports reversing the direction on a **KSDS** file.

The **BWD** parameter applies only to the READ statement on which it is coded. Other statements reading the same file must then have either the **BWD** or **FWD** parameter to avoid confusion, otherwise an ERROR message is issued. **FWD** will read the file conventionally, i.e. **Forwards**.

Looping with FWD/BWD logic is an obvious danger, but the facility can give powerful advantages.

```
IF POS 22 = 'XXX'
  THEN READ ABC  KSDS  BWD            * Read the file ABC Backwards.
  ELSE READ ABC FWD                   * Read FORWARDS.
  THEN READ ABC                       * This will give ERROR message.
```

BY=n

See also:

- MULT and DIV in this section.

```
MULT 4 AT 20   BY 2 AT 30   INTO 6 AT 40
THEN DIV 6 AT 20    BY 2 AT 600
ELSE MULT 4 AT 20   BY 7              * Using a literal.
MULT 4 AT 20   BY 7   INTO 5 AT 50
```

Describes the multiplier or divisor in a **MULT** or **DIV** operation.

For multiplication, the destination field **MUST have** a length of at least the number of **significant bytes** (not decimal digits) in the multiplier **PLUS** the number of significant bytes in the multiplicand.

CALL modname

--- Mainframe, UNIX, PC only ---

Mainframe users may use the **CALL** statement to invoke **modname**, a separately compiled and linked **VSE** phase or **MVS** Load Module which uses standard IBM linkage.

UNIX and **PC** users may use the CALL statement to invoke a Shared Object contained within a **Dynamic Shared Library**.

The **CALL** statement is not yet supported in SELCOPY for **AS/400**.

CALL (for Mainframe)

See also:

- Section *The User EXIT*.

```
CALL RTNX   98 'LITVAL' @+2 UXLRECL '44' X'014C'   SIZE=512  ENTRY=8
THEN CALL ASMRTN   ENTRY=4096   SIZE=600    parm1 p2 p3 p4 etc.
ELSE CALL COBOLRTN              SIZE=8192   p1 p2 p3 etc.
```

R1	Address of parameter address list.
R14	Return Address within SELCOPY. (Absolute address.)
R15	ENTRY point of called module. (Absolute address.)

User Exit Information

It may be useful within a called subroutine to have access to the same information as is passed to the (now obsolete) User Exit feature. This is provided in Register 0.

R0	Address of UX information.

Parameters

If required, parameters may follow the module name. Up to **16 parameters** may be supplied in any of the following formats:

numeric	Position in work area or current input record.
keyword	Any SELCOPY POS Keyword.
'ccccc'	Anything in quotes = Character literal.
non-numeric	Treated as Character literal.
X'xxxx'	Hexadecimal literal.

A standard parameter list is built consisting of a full word for each parameter containing the absolute address of its data. The last full word pointer has the senior bit flagged on. For other pointers, the senior bit is zero.

The phase/load module, "modname", is then invoked with a standard **BALR 14,15** with Register 1 pointing at the beginning of the parameter list.

If no parameters exist, register 1 will be set pointing to a parameter list of one entry which points at position 1 of the work area, or current input record if no work area exists.

Return Code

A return code may be passed back to SELCOPY in Register 15, which if greater than any previous return code received by SELCOPY will be used as the return code passed back by SELCOPY at End of Job.

XA Environment

Called subroutines running in either **AMODE(24)** or **AMODE(31)** are supported. **SELCOPY** will reset its own addressing mode when it regains control.

SIZE

SIZE=nnn may be coded for VSE users wishing to override the default size of 2048 bytes allocated for the module to be loaded in by SELCOPY. The SIZE parameter for MVS users is ignored.

ENTRY

ENTRY=nnn may be coded to give control to that module at a displacement within it of **nnn** bytes (decimal).
Note that the **ENTRY** displacement may be **different** for each CALL statement, and therefore **must be coded** every time.
If no ENTRY parameter is coded, an entry displacement of zero is used for that particular call.

ENTRY and **SIZE** parameters may be supplied before, after, or even in between parameters of the CALL statement, so if a character literal of **ENTRY** or **SIZE** is required for the CALLed module, it must be enclosed in quotes.

```
CALL ASMRTN2   parm1 parm2  ENTRY=4096  parm3 p4 p5
CALL ASMRTN2   'LIT1','ENTRY','LIT3',ENTRY=16
```

ENTRYEOJ

ENTRYEOJ=nnn may be coded giving a called subroutine the option of cleaning up just before EOJ. The **ENTRYEOJ** routine, at offset **nnn** in the module, is called only once just before EOJ. Registers are set as follows:

R0	Address of UX information.
R1	0
R14	Return address within SELCOPY. (Absolute address.)
R15	Address of the ENTRYEOJ routine. (Absolute address.)

Language Environment (LE)

SELCOPY may CALL Language Environment routines written in any LE supported programming language (e.g. Assembler, COBOL, C++, etc.) To successfully CALL routines created with LE, the **SELCOPLE** load module/phase must exist in your load library. The SELCOPLE object deck is supplied on the product CD-ROM along with SELCOPY. Refer to the **SELCOPY Installation Guide** for details.

COBOL (non-LE)

Calling COBOL II and COBOL/370 subroutines under **MVS** requires initiation via the module **ILBOSTP0**. **COBOL II** or **COBOL/370** is recognised by SELCOPY and the module **ILBOSTP0** is invoked automatically.
Please note that the level of ILBOSTP0 module used for the call should be that supplied with the release of COBOL being used. Selecting an earlier level of ILBOSTP0 may result in longer job run times caused by unnecessary I/O.

Example

An Assembler routine which will take the byte at parameter 1 and use it to overwrite the 1st byte of all other parameters:

```
CALLTEST CSECT
     USING *,15
     STM 14,12,12(13)    Save registers.
     L   2,0(1)          1st Parm, Source.
     IC  3,0(2)
LOOP LTR 2,2       Test the flag bit which makes value negative.
     BM  EXIT      If we've just done last one. (Branch Minus)
     LA  1,4(1)    Next Parm pointer, Destination.
     L   2,0(1)
     STC 3,0(2)
     B   LOOP
EXIT LM  14,12,12(13)    Restore registers.
     LA  15,243          Set a Return Code, other than 0.
     BR  14
     END
```

The following SELCOPY calls the above Assembler routine.

Note that the **EOJ** command at the end has been asterisked out because it is unnecessary.
OPTION is used instead of **IN DUMMY** to specify **WORKLEN**. Both **CALL** and **EXIT** statements are not counted as either input or output functions for the purposes of checking if it is worth continuing the run, so having actioned all control statements, SELCOPY will not loop back to the first because there is no input available. (Use **GOTO label** to overcome this if required.)
The Return Code of 243 was actually set by the called routine, although in the warning message it is described as **"FROM SELCOPY"**.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)   PW000 pw=0 (133)     (OS) VM/CMS=VM05      10.56 THU 22 NOV 2001    PAGE   1
o ------------------------------------------------------------------------                          ---------------------    -------- o


o          ** SMXCALL CTL N **              L=003 +++ 92/03/02 14:30:14                                                          o
           OPTION  W 100            * Work area auto initialised to blanks.

o      1.    PRINT                  * Print a blank line length 80.                                                                o

       2.    CALL  CALLTEST   X   5 10 15 20 25 30    * Will also set Retcode=243.
o                                                                                                                                  o
       3.    PRINT                  * Should have X in pos 5,10,15,20,25 and 30.

o            IF P 26,33 = X         * Should succeed at pos 30 and set @  ptr.                                                     o
       4.      T CALL CALLTEST    X'E9'  @+8  @+11  L-32       * (X'E9' is 'Z')

o      5.    PRINT             * Should now have Z in posns 38,41 and 48.                                                           o
                               * EOJ for loop prevention not reqd. (No input file).

o                                                                                                                                  o
      INPUT   SEL SEL                                                                                                  1  RECORD
      RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH
o     -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------   o
          0     1   1                                                                                                          80
          0     1   3     X    X    X    X    X    X                                                                          80
o         0     1   5     X    X    X    X    X    X       Z  Z      Z                                                          80   o
                      ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0

o SUMMARY..                                                                                                                        o
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
   ------      ------      ----     -------  -----           -----   --    ---
o     1             1                                                                                                            o
      2             1 CALL CALLTEST
      3             1
o     4             1 CALL CALLTEST                                                                                              o
      5             1

o ***WARNING***                 243 = RETURN CODE FROM SELCOPY                                                                     o

           ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **
o                                                  ** EXPIRY DATE -- 2002/05/21 **                                                 o
```

Figure 0. CALL an Assembler Sub-routine.

CALL (for UNIX, Windows and OS/2)

For UNIX systems, the object code for any CALLed function must be held as a **Shared** Object in a library of shared object modules, known as a **Dynamic Shared Library**. Similarly, for Windows and OS/2 systems, the object code must be linked into a **Dynamic Link Library** (DLL). Dynamic share libraries and dynamic link libraries are in fact files not directories, but of course, they may contain object code for several functions, hence the name library.

For the purpose of running SELCOPY, the library **must** have a file name with suffix **.so** in **COMPAQ Tru64** and **SUN Solaris** systems; suffix **.a** in **IBM AIX** systems; and a suffix **.dll** in **MS Windows** and **IBM OS/2** systems. In addition, Shared Objects in an AIX environment (referred to as **archive** libraries), **must** have file name beginning with the characters **lib**. e.g. **libc.a** is an archive library for C compiler functions.

The C source code supplied with the distribution material, **slccall.c** and **slccall.h** need to be modified locally according to your CALL statement requirements, then compiled and linked separately at your site.

Every SELCOPY **CALL** statement is routed at execution time through the module **slccall**, which must identify the required function and call it using a standard C or C++ function invokation. In earlier releases of SELCOPY, the slccall library had to be compiled using a C++ compiler. While the SELCOPY program itself is still compiled with C++, its definition of the **slccall()** function now uses 'extern "C"' to indicate that linkage is according to "C" standards. This has the following advantages:

- Customers without a C++ compiler may adapt slccall.c as they require for their own routines and recompile it using a C compiler.
- Dependency on the C++ compiler's name mangling technique for external function names is removed. Thus, the user may recompile slccall.c using a different version of the compiler for their platform than was used for the SELCOPY program itself. For example, name mangling differences occur between the following versions of SUN's C++ compiler: **SC3.0.1 and SC5.0** The "C" function names are not mangled, so no compatibility problem arises.

The C++ compiler may still be used for the slccall.c source if your own functions depend on C++ facilities, and the source file named slccall.cpp if preferred. However, if you use the C++ compiler, all function names and all external variables must be defined with 'extern "C"' to indicate "C" linkage.

The slccall.h header file defines the name EXTERNC for this purpose, set as follows:

```
#if defined(__cplusplus)
  #define EXTERNC    extern "C"
#else
  #define EXTERNC
#endif
```

For **UNIX**, the main SELCOPY program has been linked in such a way that the runtime linker will search the directory **/usr/selcopy** for any shared object files it may require, **(i.e. slccall.so or libselc.a)**. Therefore, the file slccall.so for COMPAQ and SUN or libselc.a for AIX, **must** exist on the /usr/selcopy/ directory. The linkage command used for each flavour of UNIX SELCOPY is detailed below. You may wish to set up a **symbolic link** so that any reference to /usr/selcopy will be re-routed to the name of your

choice.

For **Windows** and **OS/2**, SELCOPY will search the directories referenced in the **PATH** environment variable for the file **slccall.dll**.

Since a Shared Object will allow undefined symbols, slccall could call a function that resides in yet another Shared Object file.

Please also refer to documentation and **examples** within the slccall.c file itself.

Parameters

If required, parameters may follow the function name. Up to **16 parameters** may be supplied in any of the following formats:

numeric	Position in work area or current input record.
keyword	Any SELCOPY POS Keyword.
'ccccc'	Anything in quotes = Character literal.
non-numeric	Treated as Character literal.
X'xxxx'	Hexadecimal literal.

A standard parameter list is built and passed to the called function as a list of parameters, terminated with a **NULL** pointer. Unlike the mainframe version, if no parameters exist, the first pointer in the parameter list is NULL.

Return Code

A return code may be passed back to SELCOPY, which if greater than any previous return code received by SELCOPY will be used as the return code passed back by SELCOPY at End of Job.

Routines with Non-standard Linkage

Certain callable objects, for example those compiled using **MicroFocus** Cobol, may require that **main()** is linked using its own linker. To support this, the SELCOPY program is supplied also as a dynamic shared object, which may be called from a dummy front-end.
At this time, the objects needed to be able to tailor SELCOPY for calling Non-standard linkage routines have only been required for the **COMPAQ Tru64** platform.
Please contact **CBL** should you require this feature for SELCOPY on other platforms.

The required objects are as follow:

numeric	Position in work area or current input record.
slcmain.cpp	C++ Source code for selcopy.dyn which allows the user to link selcopy **main()** with his own special hooks.
selcopy.dyn	SELCOPY executable which can be re-linked by the user from slcmain.cpp.
slcgg.so	Shared Object library which is linked dynamically only by the selcopy.dyn executable. Must reside in /**usr**/**selcopy**.

The routine to be called should exist within a separate Shared Object (.so) but still be referenced in **slccall.so**. The **selcopy.dyn** object must be linked, using the non-standard linker, before it can be used to execute SELCOPY statements containing CALL statements to non-standard routines.

SUN Sparc (Solaris)

The **-Kpic** (position independent code) option must be used for the compilation, together with the **-c** (compile only) option. e.g.

```
CC  -c  -Kpic   slccall.c
```

The object file, **slccall.o**, from the above compilation must be linked separately, using **ld** with the **-G** option to produce the Shared Object (.so). The **-z text** option will force a fatal error from **ld**, if any relocations against non-writable, allocatable sections remain. e.g.

```
ld  -G   -z text   -o slccall.so   slccall.o
```

The main SELCOPY/Solaris program has been linked with the option:

```
-R   /usr/selcopy
```

This causes the runtime linker to search the directory /usr/selcopy for any shared object files it may require.

COMPAQ Alpha (Tru64/Digital UNIX) and IBM RS/6000 (AIX)

The **-shared** option must be used for the compilation, together with the **-c option** (compile only), and **-o option** defining object destination file. e.g.

```
cxx  -c  -shared  -o ./olib/slccall.o   slccall.c          * Tru64 UNIX.
cc   -c  -shared  -o ./olib/slccall.o   slccall.c          * AIX.
```

The object file, **slccall.o**, from the above compilation must then be linked separately, using **ld**, as follows, to produce output as a Shared Object (.so for DEC and .a for AIX). e.g.

```
ld  -o /usr/selcopy/slccall.so  -shared  -no_archive  -lc ./olib/slccall.o     * Tru64 UNIX.
ld  -o /usr/selcopy/libselc.a   -shared  -no_archive  -lc ./olib/slccall.o     * AIX.
```

The main SELCOPY program has been linked with the option:

```
-rpath   /usr/selcopy
```

This causes the runtime linker to search the directory /usr/selcopy for any shared object files it may require.

Microsoft Windows 95/98/ME/NT/2000 and IBM OS/2
Many different C/C++ compilers exist for these operating platforms. Please refer to the documentation that accompanies your compiler for compile and link options and details on how to create a run time DLL (slccall.dll).

CANCEL (Operation Word)

--- Mainframe only ---

QUIT

Caution: Do not confuse this operation word with the parameter. It is totally different from **GOTO CANCEL** which is described under the GOTO heading.
Also **THEN CANCEL** is equivalent to **THEN GOTO CANCEL**.

CANCEL, or its synonym **QUIT**, is only interpreted in the following way if coded as a **single word** on a card of its own.

On reading a **CANCEL** statement, no further control cards are read, the CANCEL statement and Selection Summary are printed, and the run is terminated **immediately** with **Return Code 52**.

No processing is done on any output file. However, certain input files may have already been opened in order to establish their **LRECL** etc. These files are **NOT** closed.

Because **CANCEL** causes immediate termination during the reading of your **Control Cards**, it is only required when using SELCOPY conversationally.

CANCEL is useful conversationally when an error has been made keying in control statements under **TSO, CMS** or on the operator's console in a VSE environment, with SYSIN control card input taken from the TERMINAL.

In a **VSE environment**, (including **VM/CMS** with "SET DOS ON"), a syntax error keyed in on the console or terminal will result in an error message and a request to enter further statements. The statement in error is totally ignored, so you may try again.
Thus the **CANCEL** statement would only be required after keying in a valid statement, accepted by SELCOPY, but nevertheless wrong.

CANCEL (Parameter)

CANCEL may be used as a parameter in the form **GOTO CANCEL** to terminate processing with an error indication at **Selection Time**. It is described further under the GOTO heading.

Note that:

- **`THEN CANCEL`** is equivalent to **`THEN GOTO CANCEL`**.
- **`NOW CANCEL`** is equivalent to **`GOTO CANCEL`**.

Beware:

- **`CANCEL`** is equivalent to **`QUIT`**.

CAT fname

See also:

- INCOUNT and IF INCOUNT in this section.

```
READ XYZ      LRECL 147       INTO 101   WORKLEN 2000
 CAT CARD                                * Will use LRECL of 80.
 CAT DDNAME                              * LRECL not required for MVS.
 CAT /USR/TESTDATA/UNIX.TEST.DATA
 CAT //XSERV/C/DOCUMENTS/MYCLIENTS.LIST  * Networked directory.
 CAT ABC DSN='VSE.SAM.FILE' VOL=SYSWK1   * Dynamic Allocation.
 CAT TAPE10   LRECL=217   LABEL=NO   OPEN=NORWD
 CAT XYZ44    RECFM=V                    * Variable length disk file.
 CAT GHI   ESDS                          * VSAM file in entry sequence.
 CAT DBAAAA00  DL1 SEG=DBAAAA01          * A DL1 data base.
 CAT LIB2   DIR                          * A PDS directory.
 CAT TAPE10                              * A magnetic tape.
 CAT ABCFIL KSDS
WRITE BIGFIL   RECFM VB   LRECL 200   BLKSIZE 32760
```

Refer to **CAT=catref** in this secion for VSE VSAM catalog reference in association with Dynamic Allocation.

The **CAT** statement gives **Concatenation of Input** files on any type of file. There are **no restrictions** on File type, Record format, record length, blocksize or device type. Even **DIRDATA** input can be concatenated.

The **CAT** statement **must** follow a **READ** or another **CAT**.

The same input file may be concatenated as many times as required following a **READ** statement. e.g.

```
READ AA   !CAT XX
 CAT BB   !CAT XX
 CAT CC   !CAT XX
WR ABCFIL                   * Files AA,XX,BB,XX,CC,XX written.
```

CAT supports the same parameters as the **READ** statement, except: **INTO, WORKLEN**, and **KEY, STARTKEY, KGE, STARTREC**, or any other parameter for direct reading.
Note that the **INTO** on the **READ** statement remains in effect for associated **CAT** files.

Historically, the CAT statement was used as a device for **delayed OPEN** by concatenating the file with a known **empty** file. Please use the **DEFER** parameter in future.

Storage Considerations

Beware that the **buffer allocation** for each **CAT** statement is not released until end of job is reached. So for jobs with many **CAT** statements, storage must be a consideration.
On MVS and CMS the input BLKSIZE is known to the system and so buffer allocation is accurate and not wasteful, but for **VSE** it may well be worth explicitly coding **BLKSIZE** in order to reduce an excessive default buffer size.

IF EOF tests on CAT files

The **EOF** condition may be tested for any **CAT** file by specifying the filename, but if that filename is used on several **CAT** statements, then once **EOF** has been reached on the first, the **EOF** condition for that file will always be **true**. e.g.

```
READ AA   !CAT AA   !CAT AA
IF EOF AA                   * Will be true after 1st AA.
  THEN LOG 'EOF found on AA'
  THEN EOJ
```

Use of **IF EOF** without mention of the filename is regarded as testing for EOF on the **Prime** input file.
If the **Prime** input consists of several files using the **CAT** statement, **IF EOF** will only be true on reaching **EOF** on the **Last CAT** statement, even if that filename has already been mentioned in 1 or more earlier **CAT** statements. e.g.

```
READ AA   !CAT AA   !CAT AA
IF EOF                      * Will be true after 3rd AA.
  THEN LOG 'EOF found on AA (3rd)'
  THEN EOJ
```

IF INCOUNT tests on CAT files

IF INCOUNT tests (synonym **IF REC)** may be used on **CAT** files. The INCOUNT is maintained for each CAT file and so you can look at specific records for each file by quoting filename.
IF INCOUNT without a filename will reference the **Current** file. e.g.

```
READ AA  !CAT BB   !CAT CC
IF INCOUNT AA = 1    !T LOG 'INCOUNT=1 on file AA'
IF INCOUNT BB = 1    !T LOG 'INCOUNT=1 on file BB'
IF REC 1   CC        !T LOG 'INCOUNT=1 on file CC'
IF IN = 1            !T LOG 'INCOUNT=1 on some file or other.'
```

Note that **IF IN 1** will have 3 hits (one for each concatenated file). The **default STOPAFT=1** for IF INCOUNT equality tests is suppressed here due to the presence of CAT input.

CAT Example for VSE

This **VSE** example reads an **MVS** tape volume which has standard labels, and contains 2 logical data sets. It processes everything (all 6 physical data sets) as data by reading the tape as unlabelled using SELCOPY's **NL** parameter, No Label.
An MVS data set on tape consists of 3 sections, each one terminated by a Tape Mark which denotes physical EOF (End-of-File) for a VSE unlabelled tape.

- The **1st section** contains two 80-byte Tape Header records for the data set, and on the 1st data set on the tape volume this section will also contain one 80-byte Volume label preceding the HDR records.
- The **2nd section** contains the data records for the data set which may be of any length up to 32760 bytes.
- The **3rd section** contains two 80-byte Trailer records for the data set.

Thus the 2 data sets constitute 6 unlabelled VSE files, which we will read as one file using the **CAT** statement.
Note that **TLBL** cards are not required for unlabelled tapes.

```
// ASSGN SYS010,X'280'
// ASSGN SYS011        etc up to  SYS015, all to the same drive.
// EXEC SELCOPY
  READ TAPE10   NL                CLOSE=NORWD  B=80     RECFM U
   CAT TAPE11   NL   OPEN=NORWD   CLOSE=NORWD  B=32760  RECFM U
   CAT TAPE12   NL   OPEN=NORWD   CLOSE=NORWD  B=80     RECFM U
   CAT TAPE13   NL   OPEN=NORWD   CLOSE=NORWD  B=80     RECFM U
   CAT TAPE14   NL   OPEN=NORWD   CLOSE=NORWD  B=32760  RECFM U
   CAT TAPE15   NL   OPEN=NORWD                B=80     RECFM U

  IF LRECL = 80              * Check length of current record.
    TI P 2 = 'VOL'  !OR P 2 = 'HDR'  !OR P 2 = 'TRL'
      THEN PRINT   TYPE M              * Statistics info.
      THEN GG                          * GOTO GET if reqd.
  WRITE BIGFIL  RECFM U  LRECL 32760   * Make a Disk copy.
/*
```

CAT Example for MVS

An example **for MVS users** is to concatenate several associated files of different types. e.g. A RECFM=FB unlabelled tape file, a RECFM=VB file and a VSAM ESDS on different disk types.

This cannot be done via JCL concatenation because it is restricted to data sets with like characteristics i.e. They are processable using the same DCB etc. Any exception such as BLKSIZE, RECFM or DEV type makes them unlike.

Assuming DD statements for TAPE1, DISK1, DISK2, SYSPRINT and SYSIN:

```
READ TAPE1   RECFM=FB   L=46   INTO 11   WORKLEN 222
 CAT DISK1                             *  Recfm, Blksize & Lrecl known to system.
 CAT DISK2   ESDS                      *  Must identify as VSAM ESDS.
IF IN 1  !THEN MOVE 8 FR FNAME  TO 1   *  Current filename.

IF POS 11 = 'CUST'                     *  Test pos 1 of inp rec.
  THEN LRECL = L+10                    *  Allow for filename.
  THEN PRINT                           *  Print Customers only.
```

CAT=catref

--- VSE only ---

```
READ INDD DSN='VSE.VSAM.FILE' KSDS CAT=UCAT1   * Dynamic VSAM for VSE.
```

Refer to CAT fname in this section for data concatenation.

CAT=catref is used to specify the catalog on which a Dynamically Allocated VSE VSAM file resides.

Dynamic Allocation for a VSE **VSAM** file, as well as requiring the **VSAM, KSDS, ESDS** or **RRDS** parameter, will also need to identify the VSAM catalog which owns the dataset.
CAT=catref is therefore required to define the **DDNAME** for the VSAM Catalog owning the dataset.

Note that, although no DLBL is required for the target VSAM **file**, it is still required that a **DLBL** exists for **catref**.
It is common practice, however, to have **DLBL** statements residing in the **Standard Label Area** for all VSAM catalogs.

CHAR

--- DB2 only ---

See also:

- Section *DB2 Processing*.

```
READ   TAB='CBL.SQUERY'   WHERE=SQNO>9000   CHAR
```

Indicates that all data within the row of a DB2 results table is to be returned in displayable character format.

All fields will be padded with blanks or the default **FILL** character if coded, and separated with character '|' (X'4F').
Binary, packed decimal and floating point columns are converted so that all data in the workarea is returned in **external** (printable) format.
If **CHAR** is omitted then all data values are returned in internal format.

CHKP

--- DL1, IMS only ---

SYNC

```
CHKP #0     DL1      * Checkpoint all accessed databases.
CHKP #999   DL1
```

CHKP calls for DL1 apply to **all data bases** in use. The data base name is ignored for **CHKP** calls, so any data numeric base name that is not used for real I/O may be used.

In the Selection Summary, no matter which number is specified, the database is always reported as **#0000**.

Note the difference in spelling of the **VSE** command **CKPT**, which is used for writing checkpoint records to ordinary sequential files on tape or disk.

The **Checkpoint Id** (length 8) is taken from position 1 of the input or work area.

Use of CHKP causes SELCOPY to attempt to use the I/O PCB, which is only made available if **CMPAT=YES** is coded in the **PCBGEN**. If CMPAT=YES is not coded, then CHKP calls result in **STATUS=AD**.

CIPHER

--- ADABAS only ---

```
READ #042 ADA   FMT='AA,BB.'  CIPHER=XYZABC
```

For **ADABAS** use only, the **CIPHER parameter** , if coded, has an 8-character argument which is the cipher code to be used.

CIPHER need only be coded once for each ciphered file.

CKPT

--- VSE only ---

```
CKPT TAPE10   CLOSE=UNLD  LABEL=NO  INTV=1000
CKPT XYZ   DEV=3330       * Disk device different from SYSRES.
```

CKPT may be used as an **operation word** only. **Only one** CKPT operation is allowed, and this must **immediately follow** the first **READ** statement.

CKPT initiates check-point recording, to either tape or disk, at regular intervals during the SELCOPY selection process. Tape checkpoint may share the same tape volume as an output file.

The interval between check-points is based on the number of input records processed, and is controlled by the **INTV** parameter, default **INTV=5000**.

Restarting from the check-point records so produced is as described in the relevant IBM system documentation.

CLEAR

--- CMS, iSeries, UNIX, PC only ---

```
READ PROFILE.EXEC.A
LOG CLEAR   STOPAFT=1        * Clear the screen.
LOG 'Message literal' S=1    * Any data.
LOG  S=6                     * Write 1st 6 recs to the screen.
```

For use on mainframe in **CMS mode (with** DOS set ON or OFF), **UNIX**, **AS/400** and **PC**. The **CLEAR** parameter on an output statement to the file LOG, WTO or TERM will clear the screen of the user's terminal. On a teletype terminal, the parameter is ignored.

No data is transferred to the terminal - the screen is just cleared.

For CMS, if the screen is already full, or if it contains a **CP** asynchronous (highlighted) message, the terminal will enter the "HOLDING" state before the clear operation takes place. Otherwise the clearing takes place immediately.

CLOSE fname

See also:

- OPEN and DSN in this section.

```
CLOSE OUTDD                  * Release file OUTDD.
CLOSE INFILE                 * DSN is field in workarea.
```

The **CLOSE fname** statement may be used to immediately **close** a file, thereby releasing the resource to the operating system.

Following the close of an input file, data is returned to the user as follows:

- If **WORKLEN=n** has been coded, LRECL is equal to the size of the last record successfully read. The data is unchanged, unless the FILL option was coded for that input file, in which case the previous record will be filled with the FILL character.
- If **WORKLEN** has been omitted, a blank record of LRECL=80 is returned to the user.

SELCOPY sets the **DEFER** flag on for the closed file. If a further **READ** or **WRITE** statement is actioned for the file it will be **re-opened** and processing starts at the first record.

For both **input** and **output** files, this then allows use of a different **DSN** (dataset name), provided as a field in the workarea using dynamic allocation.

CLOSE=disp

--- VSE only ---

CL=NORWD/RWD/UNLD
CL=NOREW/REW/RUN
CL=LEAVE/NOFLUSH

```
READ TAPE12 LRECL=100   OPEN=NORWD   LABEL=NO   CLOSE=NORWD
READ DKTFIL L=128   CLOSE=LEAVE
WRITE TAPE14 FROM=6 LRECL=95   CLOSE=UNLD
READ CARD   CLOSE=LEAVE
```

For **MVS**, please refer to IBM's Job Control Manual. Use the **LABEL** parameter of the **DD** statement for tape positioning.

For **VSE**, the **CLOSE** parameter defines the action required (disposition) at **CLOSE** time of a **TAPE, CARD** or **DISKETTE** file. i.e. at end-of-file or end-of-job. Permitted arguments are:

UNLD/RUN	Rewind and unload tape.
RWD/REW	Rewind Tape to Load Point.
NORWD/NOREW/LEAVE	No Rewind, leave tape as it is.
LEAVE	Do not eject Diskette.
NOFLUSH/LEAVE	Do not flush unprocessed cards. (Refer to FILE=CARD in this section.)

If omitted, **default** action is:

- **UNLD** for diskettes or input tape files.
- **RWD** for output tape files.
- The Card Reader is flushed of any unprocessed cards.

At installations using a **Tape library management system**, these options might be effectively **ignored**, because SELCOPY uses standard Logical IOCS, and the tape management system intercepts the CLOSE and modifies its action according to parameters usually supplied on the TLBL card. This will override anything you may have coded on the SELCOPY control card.

CMS

--- CMS, iSeries, UNIX, PC only ---

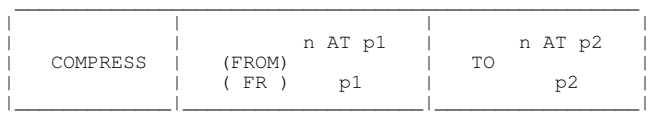
See also:

- SYSTEM in this section.

COMPRESS

See also:

- EXPAND in this section.



Storing data is extremely inefficient when the data consists of many embedded blanks and other duplicated characters. To avoid this inefficiency, the **COMPRESS**/**EXPAND** facility allows compression before writing, and expansion back to the full record size after reading a compressed record.

COMPRESS and **EXPAND** operate on storage only, and are not concerned with any particular file.

If the source length is not provided, the default length used for the **COMPRESS** statement is **LRECL**.

After compression or expansion, the **LRECL** value is modified to reflect the size of the compressed or expanded data.

It is possible that the compressed data is longer than the source.

Restrictions

Restictions on COMPRESS usage.

1. Source and destination may not overlap.
2. Destination length, if provided, does not cause the operation to fail if its confines are exceeded. However, a syntax error will occur if the destination field is not within the work area.
3. For **iSeries**, **UNIX** and **PC**, the optional FROM parameter has been made mandatory. Thus:

```
COMPRESS  1           TO 1001                * Gives a syntax error.
COMPRESS  FR 1        TO 1001                * Acceptable. (Length=LRECL.)
COMPRESS  456 AT 1    TO 1001                * Acceptable.
COMPRESS  LRECL AT 1  TO 1001                * Acceptable.
```

Example

For back-up purposes, the following statements would be suitable:

```
READ BIGFILE    NORDW    W=2222              * Read normal file.
COMPRESS FR 1         TO=1001               * Compress LRECL bytes.
WR TAPEFIL  RECFM=VB  FR=1001  B=32000 L=512  * Write Back-up.
```

The **NORDW** parameter has been included on the input file because we do not wish to include any **RDW** in the compression algorithm. If input is not **RECFM=V**, then the **NORDW** parameter is simply accepted with no error message because RECFM=F and RECFM=U records have no RDW anyway.
SELCOPY will of course generate an appropriate **RDW** for the output file which is explicitly coded as RECFM=V.

CONTMAX

```
OPTION   CONTMAX=6144        * Override continuation record buffer maximum.
```

The **CONTMAX** parameter may be supplied on the **OPTION** card only.

The **continuation record** character (\ - EBCDIC X'E0') allows long logical control statements to be constructed from multiple control records, up to a **default maximum** of **4096** bytes. **OPTION CONTMAX=n** may be used to **overrule** the default maximum length of a logical control statement when using continuation records.

If the CONTMAX argument is not a valid positive decimal number or the CONTMAX buffer has already been allocated due to the processing of a continuation character on an earlier control statement, then SELCOPY will terminate with the following message:

```
ERROR 154 INVALID CONTMAX OR ALREADY SET
```

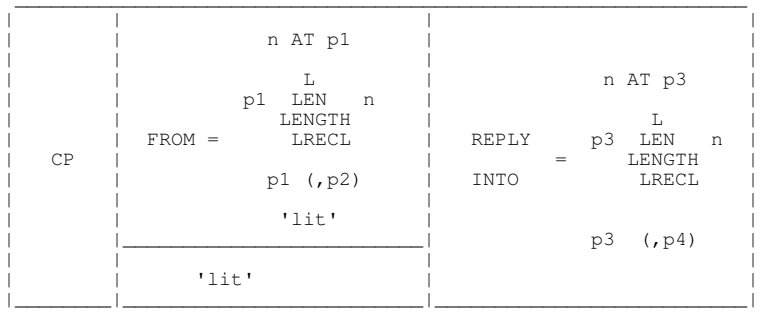
Use of the continuation character and CONTMAX is most useful for processing a **DB2** database which can result in the requirement for literals defining long, complicated **SQL** statements.

CP

--- CMS only ---

See also:

- POS RETCMS in this section.
- *Issuing CP commands* in section *VM/CMS Processing*.



Arguments p1, p2 and n are supported also as @ and @user pointer values or Position Keywords.

For use in **CMS mode only**, with DOS set ON or OFF, the CP parameter may be used to issue CP commands from within a SELCOPY execution.

Literals must be in enclosed in quotes otherwise incorrect spelling of a legal parameter could be processed as a literal.
Beware that CP must have its commands provided in upper case and SELCOPY's literals in quotes always retain their upper/lower case integrity.

REPLY Parameter

The **REPLY** parameter, **(INTO** is a synonym), is optional. If omitted, any reply from **CP** is placed in the work area starting at POS 1.

Length of the **REPLY** area may be defined at any value using the above syntax. (The 8192 byte restriction no longer exists on current versions of CP.)

If no **REPLY** length is provided, then the remainder of the work area is made available, starting from the position p3.

Because the CP reply is of variable length, SELCOPY will place four asterisks immediately following the reply. This will occur even for CP commands with no reply, as in the example below for instance. In that example, no REPLY/INTO parameter was supplied for the CP reply, so the default of INTO=1 is assumed. The **CP** reply is of zero length, so position 1 to 4 will be overwritten with '****' by SELCOPY.

If a **CP** statement supplies a length for the **REPLY** data and the reply from **CP** is not at least 4 bytes less than this length, then **"****"** is no longer appended by SELCOPY to the **CP** reply data, even when sufficient space exists beyond the reply area within the confines of the **WORKLEN** parameter.

CP's reply uses **X'15'** as a line separator, which for console devices is the **New Line character**. In fact, CP will accept multiple commands from the caller if they are separated by X'15' characters. e.g.

```
CP 'Q DASD'  REPLY 900 AT 101       * Restrict reply to 900 bytes.
CP 'Q DASD'                         * Reply may use whole of workarea.
THEN CP 'QUERY RDR ALL'   INTO 101    STOPAFT 1
ELSE CP   FROM=1 LEN=20    REPLY @BEG,@END   STOP=1
```

Return Code

The **CP** command for **VM**/**CMS** users gives feedback to SELCOPY both with a **return code** and a **condition code**. SELCOPY then passes the return code to the user as a 4-byte binary value at **POS RETCMS**.

It is possible however for **CP** to return a zero return code (indicating success) but a bad condition code (indicating failure). e.g. when the REPLY area is too small.
In such cases, SELCOPY will overrule the **CP Return Code** by setting it to 256, thereby allowing the user to recognise success with a single test. Also the first character of the reply area is overwritten with a "not" sign (X'5F').

Use **IF 4 AT RETCMS TY=B = 0** in preference to testing for asterisks or not signs. It is inconvenient to have storage overwritten when it may contain data that is still required.

A **later release** of SELCOPY **may remove** the current action of overwriting the work area with Return Code information.

Reply to Terminal

If you require to get CP's reply straight back to the terminal, instead of into storage, use the **CMS** command in the form:

```
CMS 'CP QUERY NAMES'
```

Example

```
&BEGSTACK
  READ    '* LISTING W'   DIRDATA   INTO=44   W=200
  IF POS 44,44+LRECL-1 = 'ERROR'
           * ....,....1....,....2....,....3....,....4...
    T P 1 = 'MSG OPERATOR --ERROR FOUND IN xxxxxxxx--'
    T MOVE 8   FR DSN   TO 31      * Fname of current file.
    T CP  FR 1   L=70              * Send message to Operator...
                                   * ...using data from a CMS file.
    T LOG FR 1   L=70              * Same message on user's TERM.
    T FLAG EOMEMB                  * Only 1st for each file.
&END
EXEC SELC
```

Prohibited Use

The use of **CP** commands at your installation may have been prohibited by your Systems Programmer at install time, in which case the following message is issued.

```
ERROR 115   PRIVILEGED COMMAND (CP/CMS/STACK)
```

CVDATE

--- iSeries, UNIX, PC ---

```
CVDATE   NOW    TO    DATECB   * Update POS DATE table with current date and time.
```

At this time, the CVDATE operation, used for date and time manipulation, is in a primitive form available only in SELCOPY for AS/400, UNIX and PC. It supports only 1 type of Source Date field **(NOW)**, and 1 type of Destination Date field **(DATECB)**.

NOW refers to the current date and time, and **DATECB** is the entire **POS DATE** Control Block.

Therefore, use of CVDATE in its current form will refresh every field in the POS DATE table based on the exact date and time at which the operation is executed.

```
  SELCOPY/OS2 2.07 at CBL - Bridgend UK (Internal Only)                                                    2001/10/26 12:33   PAGE   1
o ---------------------------------------------------------                                                ----------------   -------- o


o          ** z:\cd\sm200\SMXCVDAT.CTL ***    L=001 --- 2001/10/26 12:33:53  (P24)                                                  o

             opt worklen  222                        * No input file so work area required.
o                                                                                                                                    o

       1.    print  from  date-28, date+64   ty=d     * 1st Dump PRINT of the entire POS DATE table.
o      2.    sleep   82  secs                        * Pause processing for 82 seconds.                                             o
       3.    cvdate   now   to   datecb              * Update the POS DATE table with the date and time now.
       4.    print  from  date-28, date+64   ty=d     * 2nd Dump PRINT of the entire POS DATE table.
o                                                                                                                                    o


o     INPUT   SEL SEL                                                                                                                o
      RECNO   TOT ID.
      -----   --- ---
o         0     1   1            80                                                                                                  o
    0000  2001299F 01233580 31302F32 362F3031  2032362F 31302F30 31203230 30312F31     * .)..#5 10/26/01 26/10/01 2001/1*
    0020  302F3236 2031323A 33333A35 382E3020  46726964 61792020 20203236 7468204F     *0/26 12:33:58.0 Friday    26th O*
o   0040  63746F62 65722020 20323030 312F3239  3920576B 3A343320 00009145 00          *ctober   2001/299 Wk:43 ...E.   *          o
          0     1   4            80
    0000  2001299F 01235200 31302F32 362F3031  2032362F 31302F30 31203230 30312F31     * .)..#R.10/26/01 26/10/01 2001/1*
o   0020  302F3236 2031323A 33353A32 302E3020  46726964 61792020 20203236 7468204F     *0/26 12:35:20.0 Friday    26th O*          o
    0040  63746F62 65722020 20323030 312F3239  3920576B 3A343320 00009145 00          *ctober   2001/299 Wk:43 ...E.   *

o SUMMARY..                                                                                                                          o
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
   ------      ------      ----     -------  -----           -----   --    ---
o     1----4        1                                                                                                              o


o         ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 **                                          o
                            ** EXPIRY DATE -- 12 JUN 2001 **
```

Figure 0. CVDATE Conversion (Date Control Block).

CVxx=n Conversion Synonyms

CVCH CVHC CVAE CVEA	FR p1,p2 FROM n AT p2 POS P	TO	n AT p3 p3 (,p4)	* Redundant * Destination * length * ignored.	(STOPAFT=n) (TIMES=n)
CVBP CVCB CVCF CVCP CVPB	FR p1,p2 FROM n AT p2 POS P	TO INTO	n AT p3 p3,p4	* Source * and * Destination * length * mandatory.	(STOPAFT=n) (TIMES=n)
CVBC CVFC CVPC			p3 FORMAT=string n AT p3 p3,p4		

A variety of synonyms exist for the conversion facilities available within SELCOPY. They are:

Name	Synonym	Source	Destination
CVAE	CVE	ASCII	EBCDIC
CVBC	UNPKB	Binary	Character
CVBP	CVD	Binary	Packed Dec
CVCB	PACKB	Character	Binary
CVCF	- (no synonym)	Character	Floating Point
CVCH	CVH	Character	Hexadecimal
CVCP	PACK	Character	Packed Dec
CVEA	CVA	EBCDIC	ASCII
CVFC	- (no synonym)	Floating Point	Character
CVHC	- (no synonym)	Hexadecimal	Character
CVPB	CVB	Packed Dec	Binary
CVPC	UNPK	Packed Dec	Character

CVAE=n (ASCII --> EBCDIC)

CVE=n

See also:

- TRAN and CVEA in this section.

```
CVAE 50 AT 200
THEN   CVAE=50 AT 200   TO 300
ELSE   CVAE @A,@B       TO @C
```

Use of the **CVAE** parameter, with its associated numeric argument, allows conversion of the specified number of bytes of data at the position defined by the AT parameter, from **ASCII** to **EBCDIC**.

If a **TO** parameter is supplied, the converted data is placed in the position defined by the TO parameter, and the original data is unchanged.

For compatibility with the **PC Server S/390 System**, with permission of the author of **PCOPY**, **Mr Charles R. Berghorn**, IBM/OEM Poughkeepsie, the translate tables in SELCOPY are identical to those used by the **PCOPY** program. PCOPY is supplied as part of the PC Server S/390 system for import/export of files between mainframe VM and OS/2.

Note that the same ASCII/EBCDIC translate tables are used by SELCOPY on all operating platforms. For example ASCII x'80', which is displayed as the euro character on most Windows PC systems, will always translate to EBCDIC x'9F', the euro character's equivalent representation on most mainframe systems.

The keyword **CVE** (ConVert to Ebcdic) is a synonym for CVAE.

SELCOPY ASCII->EBCDIC Translate Table

HEX	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**0A**	**0B**	**0C**	**0D**	**0E**	**0F**
00	**00**	01	02	03	37	2D	2E	2F	16	05	25	0B	0C	0D	0E	0F
10	10	**11**	12	13	3C	3D	32	26	18	19	3F	27	22	1D	35	1F
20	40	5A	**7F**	7B	5B	6C	50	7D	4D	5D	5C	4E	6B	60	4B	61
30	F0	F1	F2	**F3**	F4	F5	F6	F7	F8	F9	7A	5E	4C	7E	6E	6F
40	7C	C1	C2	C3	**C4**	C5	C6	C7	C8	C9	D1	D2	D3	D4	D5	D6
50	D7	D8	D9	E2	E3	**E4**	E5	E6	E7	E8	E9	AD	E0	BD	5F	6D
60	79	81	82	83	84	85	**86**	87	88	89	91	92	93	94	95	96
70	97	98	99	A2	A3	A4	A5	**A6**	A7	A8	A9	C0	4F	D0	A1	07
80	9F	20	21	1C	23	EB	24	9B	**71**	28	38	49	90	BA	EC	DF
90	45	29	2A	9D	72	2B	8A	9A	67	**56**	64	4A	53	68	59	46
A0	EA	DA	2C	DE	8B	55	41	FE	58	51	**52**	48	69	DB	8E	8D
B0	73	74	75	FA	15	B0	B1	B3	B4	B5	6A	**B7**	B8	B9	CC	BC
C0	AB	3E	3B	0A	BF	8F	3A	14	A0	17	CB	CA	**1A**	1B	9C	04
D0	34	EF	1E	06	08	09	77	70	BE	BB	AC	54	63	**65**	66	62
E0	30	42	47	57	EE	33	B6	E1	CD	ED	36	44	CE	CF	**31**	AA
F0	FC	9E	AE	8C	DD	DC	39	FB	80	AF	FD	78	76	B2	43	**FF**

CVBC=n (Binary --> Char)

UNPKB=n

See also:

- FORMAT in this section.

```
CVBC   3 AT 402   TO 27   FORMAT 'ZZ,ZZ9.99'
CVBC   3 FR 402   TO 27   FORMAT 'zz,zz9.99'
THEN UNPKB=3  FROM=402   TO=27 FORMAT='ZZ,ZZ9.99'
CVBC   2 AT 123   TO 5 AT 31                    * No FORMAT used.
```

Convert **BINARY ---> CHARACTER**, the **CVBC** (UNPKB) operation will convert **Binary** data to **Character** format numeric data suitable for printing.

Source

The argument of CVBC determines the number of bytes of binary data to be converted, up to a **maximum length** of 4 bytes of binary data for mainframe and AS/400, 8 bytes of binary data for UNIX and PC.

The **Sign** of the source is dictated by the senior **bit** of the binary number (the leftmost). If this is "1", the number is treated as negative.
But there is an exception: if the binary source is only one byte long, the value is assumed to be positive. Thus X'FF' becomes 255, and not -1.

Destination

The destination field may be specified with or without a **FORMAT** parameter.

With FORMAT

The argument of the FORMAT parameter indicates how the source field is to be converted to character, allowing insertion of special characters and zero suppression.
Maximum FORMAT length is 255.

Without FORMAT

If the **FORMAT** parameter **is omitted** then it is necessary to indicate the length of the destination by using the **TO n AT p** syntax, i.e. the destination is to be of length "n", starting at position "p". **Maximum length** of a **CVBC** destination field without a **FORMAT** parameter is 16 bytes on mainframe and 32 bytes on AS/400, UNIX and PC platforms.

The whole of the destination field will be numeric, without zero suppression, but the junior (right-most) byte will be zoned if the result is negative, thereby preserving the sign.
This is known as **Zoned** Decimal representation.

A positive result will not be zoned.
Thus if we consider a result of 12 for a destination defined by **TO 4 AT 2000**, then at the end of the operation, positions 2000 to 2003 will contain the character string "0012".
However, a result of -12 would produce the string "001K", where the K represents the number 2 with a negative zone.

Without a **FORMAT** parameter, if the result is too large to fit in the number of bytes specified, then it is merely truncated on the left, whereas with a FORMAT the field is filled with asterisks and RC=8 is set.

Important Note

Please refer to Section *iSeries, UNIX and PC Processing* which gives details on the two different methods by which a binary field is interpreted outside SELCOPY, depending on the type of machine processor.

CVBP=n (Binary --> Packed)

CVD=n

```
CVBP   1 AT 20   TO 3 AT 30
THEN CVD=4 FROM=27   TO=27 INTO=4
```

Convert **BINARY ---> PACKED DECIMAL**. Conversion from **Binary** to **Packed** decimal is achieved with the CVBP parameter.

The 1st statement will ConVert the **Binary** value of the single byte starting in position 20, to a **Packed** decimal number, storing the result in the 3 bytes starting at position 30.

Binary **maximum field lengths** are 4 bytes for mainframe and AS/400, 8 bytes for UNIX and PC systems. Packed Decimal **maximum field length** is 16 bytes. If the result of the conversion is a value too large for the chosen length of packed decimal destination, it is truncated from the left. i.e. high order bytes lost.

Note that the maximum size source, 8 bytes of binary data, is only large enough to fill 10 bytes of packed decimal data. Thus, the limitation of 16 bytes for the destination is **more than enough**, and the high order 6 bytes of a 16 byte destination **must always** be zero after a **CVBP** operation.

The **Sign** of the number is dictated by the senior bit of the binary number (the leftmost). If this is "1", the number is treated as negative.

But there is an exception: if the binary source is only one byte long, the value is assumed to be positive. Thus X'FF' becomes 255, and not -1.

Important Note

Please refer to Section *iSeries, UNIX and PC Processing* which gives details on the two different methods by which a binary field is interpreted outside SELCOPY, depending on the type of machine processor.

CVCB=n (Char --> Binary)

PACKB=n

```
CVCB 7 AT 420   TO 4 AT 880
PACKB=7 FROM=420   TO=880 INTO=4
```

Convert **CHARACTER ---> BINARY**, the CVCB operation will ConVert Character data (zoned decimal) to Binary. It is similar to the CVCP (PACK) as described below, except that the result is stored as a binary number instead of Packed decimal.

The **maximum length** of the source is 256 bytes. The **CVCP** parameter gives full details of source data allowed, and how it is interpreted.

The **maximum length** of the destination is 4 bytes on mainframe and AS/400, 8 bytes on UNIX and PC platforms. Therefore, for mainframe, the **maximum value** of the character source is +(2**31)-1 and the **minimum value** is -(2**31). For AS/400, UNIX and PC systems, the maximum value of the character source is +(2**63)-1 and the minimum value is -(2**63).

Important Note

Please refer to Section *iSeries, UNIX and PC Processing* which gives details on the two different methods by which a binary field is interpreted outside SELCOPY, depending on the type of machine processor.

CVCF=n (Char --> Float)

See also:

- CVFC in this section.

```
THEN CVCF   22 AT 1001   TO 8 AT 2001   * Char --> Float.
```

For the **CVCF** operation, the character **source** data may be in any format as supported for **CVCP**, up to length 256.

Maximum length of a floating point **destination** is **8 bytes**.

Conventionally, floating point numbers are held as 4, 8 or 16 byte variables, known as **Single, Double** or **Extended** precision respectively. Extended precision is not supported.

Although SELCOPY will allow you to create a floating point variable of length 7, 5 or even 3 for instance, it will not be suitable for most systems - only for further processing with SELCOPY. For compatability, lengths 4 or 8 should be used.

Precision Problems are described under **CVFC**.

CVCH=n (Char --> Hex)

CVH=n

See also:

- CVHC and CVCP in this section.

```
THEN CVCH   20 AT 55   TO=55
ELSE CVH=57   FROM=23   TO=509
```

CVCH (ConVert Character to Hex) will expand data, regardless of data type, into printable hex format. This allows printing part of a line in character form as normal, while printing another part in hexadecimal notation.

CVCH=n will take 'n' bytes from the FROM position, convert them into printable hex, and store the '2n' bytes in the TO position.

The length of the destination is always double the length of the source, so an INTO parameter is not required. e.g

- On Mainframe and AS/400, **'ABC 23'** becomes **'C1C2C340F2F3'** with no blanks.
- On UNIX and PC, **'ABC 23'** becomes **'414243203233'** with no blanks.

Maximum length of source data is **128 bytes**.

Source and destination may overlap.

The **CVCP** operation description contains an example print where **CVCH** is used as a means of illustrating the **CVCP** conversion.

The following **mainframe** example is equally applicable to **AS/400 UNIX**, and **PC** environments.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)   PW000 pw=0 (133)     (OS) VM/CMS=VM05      11.11 THU 22 NOV 2001    PAGE   1
o ------------------------------------------------------------------------     ----------------------    -------- o


o          ** SMXCVCH CTL N **            L=002 +++ 92/05/28 16:43:39                                                 o

       1.    rd cblname.text    w 200
o                                                                                                                      o
             if p 2 'TXT'
       2.      t cvch 1 at 1     to 101     * x'02' code in pos 1.
o      3.      t move 4 fr 2     to 104     * the TXT and a blank.                                                      o
       4.      t cvch 3 at 6     to 109     * the hex displacement.
       5.      t cvch 2 at 11    to 116     * length of TXT data.
o      6.      t cvch 2 at 15    to 122     * the ESD id.                                                               o

       7.      t cvch 4 at 17    to 130     * 1st 4 bytes of data.
o      8.      t cvch 4 at 21    to 139     * 2nd 4 bytes                                                               o
       9.      t cvch 4 at 25    to 148     * 3rd 4 bytes
      10.      t cvch 4 at 29    to 157     * 4th 4 bytes .. etc.
o                           * Only 16 bytes converted here, just as illustration.                                      o
      11.      t move 16 at 17   to 168     * The 16 bytes in orig CHAR format.
      12.      t pr  fr 101,200    ty c     * Print 100 bytes of reformatted data.
o                             * TYPE=C used in case orig char data is unprintable.                                     o


o     INPUT   SEL SEL                                                                                  1  RECORD      o
      RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH
      -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------
o        2     1  12 02 TXT  000000 0038  0001    C3969497 A4A3854D C2998984 87859584   Compute(Bridgend                    80      o
         3     2  12 02 TXT  000038 0038  0001    00000000 4B615A00 00000000 00000000   ...../!.........                    80
         4     3  12 02 TXT  000070 0038  0001    00010000 00FF0101 040A5555 00000000   ................                    80
o        5     4  12 02 TXT  0000A8 0038  0001    00000000 00000000 00000000 00000000   ................                    80      o
         6     5  12 02 TXT  0000E0 0020  0001    00000000 00000000 00000000 00000000   ................                    80
                    ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0
o                                                                                                                      o
  SUMMARY..
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL          FSIZE   CI    DSN
o  ------      ------      ----     -------  -----          -----   --    ---                                          o
      1             8 READ CBLNAME      80    80 F             8       CBLNAME.TEXT.A5
      2---12        5
o                                                                                                                      o

           ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **
o                                        ** EXPIRY DATE -- 2002/05/21 **                                               o
```

Figure 0. CVCH Conversion (Char to Hex notation).

CVCP=n (Char --> Packed)

PACK=n

See also:

- CVPC and CVHC in this section.

```
CVCP   10 AT 1000   TO 4 AT 2000
PACK 10   FROM 1000   TO 2000   INTO 4
```

The argument of the **CVCP** parameter defines the number of bytes to be ConVerted from **Character** to **Packed** decimal format.

The **maximum length** of the source field is 256 bytes.
The **maximum length** of the destination field is 16 bytes. Consequently, a maximum 31 of the junior numerical characters within the source field can be packed.

The **CVHC** operation description details a method of overcoming the 16 byte destination field restriction.

In the above example, 10 bytes of character source data, starting at position 1000, are packed into 4 bytes of packed decimal data and stored in positions 2000-2003.

For the CVCP operation, any type of source data is acceptable, but certain non-numerics will have a special effect. Interpretation rules are:

1. Blanks and embedded non-numerics in the source data are ignored. e.g.
   123 456X# 789 becomes **123456789**

2. Left-adjusted non-numerics are ignored unless '+' or '-' is the leftmost non-blank character, in which case it will take priority in determining the sign of the result. e.g.
   KX.FW/6(B)789 becomes **6789**

3. More than one right-adjusted non-numeric causes the result to be negative, but does not contribute to the value of the number. e.g.
   6789ZYDTZ becomes **-6789**

4. A single right-adjusted non-numeric character in the range X'C0' - X'C9' (i.e. 0 - 9 with '+' overpunch) is treated as numeric and contributes to the number. (X'C1' to X'C9' is 'A' to 'I') The result is positive unless overridden by a leftmost '-' sign. e.g.
   6789D becomes **67894**

5. A single right-adjusted non-numeric character in the range X'D0' - X'D9' (i.e. 0 - 9 with '-' overpunch) is treated as numeric and contributes to the number. (X'D1' to X'D9' is 'J' to 'R') The result is negative unless overridden by a leftmost '+' sign. e.g.
   6789K becomes **-67892**

Source and destination may overlap without restriction or loss of integrity of the result. If the receiving field is too short to contain the whole of the PACKed number, then truncation will commence from the senior (left-hand) end.

The following **mainframe** example is equally applicable to **AS/400 UNIX**, and **PC** environments.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)   PW000 pw=0 (133)     (OS) VM/CMS=VM05      11.19 THU 22 NOV 2001    PAGE   1
o ----------------------------------------------------------------------                                ---------------------    -------- o


o          * SMXCVCP CTL H *                L=013 +++ 92/01/23 20:52:21                                                          o


o      1.  read card worklen 1000                                                                                                 o

           IF INCOUNT LT 4                 * 1st 3 records are for heading.
o      2.    THEN PRINT   PAGEDEPTH=66     * Prevent going to 2 pages.                                                            o
       3.    THEN GOTO GET                 * Don't process heading recs.

o      4.  MOVE 40 FR 21  TO 61            * Reposition the Comment data.                                                         o
       5.  MOVE 40 FR 20  TO 21            * Blank out original Comment data.

o      6.  CVCP 16  FR 1  TO 20  INTO 8    * Convert CHAR ---> P.D. (Pack)                                                        o
       7.  CVH 8   FROM 20   TO 40         * Convert P.D. ---> HEX for readability.
       8.  PRINT L=100  TYPE M  STOPAFT=2  * Use 'TYPE M' for 1st 2 lines.
o      9.  GOTO GET             STOPAFT 2  * But don't print them twice.                                                           o
      10.  PRINT  L 100   TYPE C           * 'TYPE C' for the rest. (less paper)

o          END                                                                                                                    o


o     INPUT   SEL SEL                                                                                                  1  RECORD     o
      RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH
      -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------
o         1     1   2                    --------  Destination Data  --------                                                  80      o
          2     2   2 SOURCE (in Char)   (Packed Dec)             ( Hex )         Comments                                    80
          3     3   2 ----------------   --------            ----------------     ----------->                                80
o                                                                                                                                 o
          4     1   8 4.242,22 . 21      00002221            000000042422221C     PUNCTUATION IGNORED.                        80
                                        0004422C
o                                                                                                                                 o
          5     2   8 3$186#4 14.6       0000161%            000000031864146C     SO ARE EMBEDDED NON-NUMERIC CHARACTERS.     80
                                        0003844
o         6     1  10 1234567890123456   ...i...%            234567890123456C     TOO LARGE - WILL BE TRUNCATED.              80      o
          7     2  10 -12F               ......._            000000000000126D     'F' TREATED AS +6 BUT MINUS OVERRULES.      80
          8     3  10 ABC12F             .......%            000000000000126C     'ABC' IS IGNORED.                           80
o         9     4  10   K                ........            000000000000002D                                                 80      o
         10     5  10 2X                 ........            000000000000002D     'X' CAUSES MINUS RESULT.                    80
         11     6  10 12FD               ........            000000000000012D                                                 80
o        12     7  10 + 12FD             ........            000000000000012C     Result forced positive by the + sign.       80      o
         13     8  10 ASDCVHJKGHJSDFGH   ........            000000000000000D                                                 80
         14     9  10 S** HJSC6BN7TYU    .......'            000000000000067D                                                 80
o                     ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0            o

  SUMMARY..
o  SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN                                                      o
   ------      ------      ----     -------  -----           -----   --    ---
      1            14 READ SYSIN        80    80 U              14
o     2----3        3                                                                                                             o
      4----7       11
      8----9        2
o    10             9                                                                                                             o


o          ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **      o
                                                   ** EXPIRY DATE -- 2002/05/21 **
```

Figure 0. CVCP Conversion (Character to Packed Decimal).

CVEA=n (EBCDIC --> ASCII)

CVA=n

See also:

- TRAN and CVAE in this section.

```
CVEA 50 AT 200
THEN   CVEA=50 AT 200   TO 300
```

Use of the **CVEA** parameter, with its associated numeric argument, allows conversion of up to 256 bytes of data at the position defined by the AT parameter, from **EBCDIC** to **ASCII**.

If a **TO** parameter is supplied, the converted data is placed in the position defined by the TO parameter, and the original data is unchanged.

For compatibility with the **PC Server S/390 System**, with permission of the author of **PCOPY**, **Mr Charles R. Berghorn**, IBM/OEM Poughkeepsie, the translate tables in SELCOPY are identical to those used by the **PCOPY** program. PCOPY is supplied as part of the PC Server S/390 system for import/export of files between mainframe VM and OS/2.

Note that the same ASCII/EBCDIC translate tables are used by SELCOPY on all operating platforms. For example EBCDIC x'9F', which is displayed as the euro character on most mainframe systems, will always translate to ASCII x'80', the euro character's equivalent representation on most Windows PC systems.

The keyword **CVA** (ConVert to Ascii) is a synonym for CVEA.

SELCOPY EBCDIC->ASCII Translate Table

HEX	**00**	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**0A**	**0B**	**0C**	**0D**	**0E**	**0F**
00	**00**	01	02	03	CF	09	D3	7F	D4	D5	C3	0B	0C	0D	0E	0F
10	10	**11**	12	13	C7	B4	08	C9	18	19	CC	CD	83	1D	D2	1F
20	81	82	**1C**	84	86	0A	17	1B	89	91	92	95	A2	05	06	07
30	E0	EE	16	**E5**	D0	1E	EA	04	8A	F6	C6	C2	14	15	C1	1A
40	20	A6	E1	FE	**EB**	90	9F	E2	AB	8B	9B	2E	3C	28	2B	7C
50	26	A9	AA	9C	DB	**A5**	99	E3	A8	9E	21	24	2A	29	3B	5E
60	2D	2F	DF	DC	9A	DD	**DE**	98	9D	AC	BA	2C	25	5F	3E	3F
70	D7	88	94	B0	B1	B2	FC	**D6**	FB	60	3A	23	40	27	3D	22
80	F8	61	62	63	64	65	66	67	**68**	69	96	A4	F3	AF	AE	C5
90	8C	6A	6B	6C	6D	6E	6F	70	71	**72**	97	87	CE	93	F1	80
A0	C8	7E	73	74	75	76	77	78	79	7A	**EF**	C0	DA	5B	F2	F9
B0	B5	B6	FD	B7	B8	B9	E6	BB	BC	BD	8D	**D9**	BF	5D	D8	C4
C0	7B	41	42	43	44	45	46	47	48	49	CB	CA	**BE**	E8	EC	ED
D0	7D	4A	4B	4C	4D	4E	4F	50	51	52	A1	AD	F5	**F4**	A3	8F
E0	5C	E7	53	54	55	56	57	58	59	5A	A0	85	8E	E9	**E4**	D1
F0	30	31	32	33	34	35	36	37	38	39	B3	F7	F0	FA	A7	**FF**

CVFC=n (Float --> Char)

```
THEN CVFC  8 AT 2001  TO 1001 FORMAT=fmt   * Float --> Char.
```

For the **CVFC** operation, the floating point **source** data may be up to length 8, as described above for the CVCF destination.

The character **destination** is defined by the **FORMAT** parameter, which is restricted to a maximum length of 48 (what you can get on a control card), but is further restricted to: a maximum of 9 places of decimal **before** the decimal point, and a maximum of 9 places of decimal **after** the decimal point.

Examples of the **FORMAT** parameter are:

```
FORMAT  ZZ9.999999
format 'szzz9.9999'
FMT='ZZZ,999.9999S'
fmt='999,999,999.999,999,999 s'
fmt   '99.9999999 -'
```

The first full-stop encountered in the FORMAT is taken to be the **decimal point**.

If **S** (upper or lower case) is coded as the first or last digit of the FORMAT, the **sign** of the result (+ or -) will be placed in that position.

If the first or last digit of the FORMAT is a minus sign (-) then a minus sign will be placed in that position if the result is negative. Otherwise it will be blank.

Beware of Precision Problems

The first 8 bits of all floating point fields represent the number's sign and exponent.

A floating point field of length 4 has 3 bytes (24 bits) representing the number's mantissa which yields a maximum value of 2**24 (16,777,215), i.e. 8 decimal digits of which only the first 7 digits are reliably precise.

Therefore, for a 4-byte floating point field, it would be misleading to use a FORMAT string that represents a number of more than 7 significant (non-zero) digits, even though SELCOPY will not object. For example, specifying `FORMAT=999,999,999.999,999,999` would produce a character reresentation of the floating point value for which only the first 7 significant digits are reliably precise. The remainder of the numeric value is garbage.

Similarly, a floating point field of length 8 has 7 bytes (56 bits) representing the number's mantissa which yields a maximum value of 2**56, i.e. 17 decimal digits of which the first 16 digits are reliably precise.

CVHC=n (Hex --> Char)

```
CVHC 8  AT 200   TO 220
```

Use of the **CVHC** parameter (ConVert Hex to Character), with its associated numeric argument, allows conversion of up to 256 bytes of data at the position defined by the AT parameter, from **printable hexadecimal** notation to **character** notation, which may or may not be printable. e.g.
For **Mainframe** and **iSeries** platforms,

- **C1C2C3** will convert to **ABC** (6 bytes to 3).
- **F54BF6F0** will convert to **5.60** (8 bytes to 4).
- **F1,F2 F3,F4** will convert to **1234** (12 bytes to 4).

Similarly, for **UNIX** and **PC**,

- **414243** will convert to **ABC** (6 bytes to 3).
- **352E3630** will convert to **5.60** (8 bytes to 4).
- **31,32 33,34** will convert to **1234** (12 bytes to 4).

Two characters of the source field are required to generate one character of the destination field. i.e. it is the reverse of CVCH (CVH) conversion.

Invalid hex data in the source will result in an Asterisk being placed in the destination. RC=8 is set and processing continues.

An odd number of characters specified as the source data will result in the **last** character being treated as invalid.

Blanks and **commas** in the source are **ignored**.

Uses

Common uses for the CVHC operation.

1. It is not often that data held in Hex notation is required back in its original character form. However, Hex notation exists on a dump file for instance, so **CVHC** could be used to convert the expanded dump data back to its original form.

2. On a **Link Edit** map file, the offsets which are displayed in Hex notation can be converted back to a binary number, thereby allowing sorting or arithmetic to be performed.

3. The restriction on length of destination field, imposed when packing (CVCP) numerical data, may be overcome by using **CVHC**. So long as the character string contains no non-numerics, other than blanks and commas, then the required sign byte may be inserted immediately following the string and converted from hex to character (CVHC). e.g.

```
POS   1 = '12345678901234567890123456789012345'  * 33 byte char. field.
POS  34 = 'C'                                    * Upper case 'C' (SIGN).
CVHC 34 AT 1 TO 17 AT 101                        * 17 byte p.d.  field.
```

CVPB=n (Packed --> Binary)

CVB=n

```
CVPB   6 AT 20   TO 4 AT 30
THEN CVB=6  FROM=20  TO=20  INTO=4
```

Convert **PACKED DECIMAL ---> BINARY**. Conversion from **Packed** decimal to **Binary** is achieved with the CVPB parameter.

The 1st statement above will take 6 bytes of packed decimal data from position 20 of the record or work area, convert the decimal number to binary, and store the result in 4 bytes which start at position 30. The THEN statement illustrates that fields may overlap.

If **invalid packed decimal** data is found in the source, the destination is filled with binary zeros, **Return Code 8** is set and processing continues.

Length of **source** may not exceed 16 bytes.
Length of **destination** may not exceed 4 bytes for mainframe and AS/400 systems, 8 bytes for UNIX and PC systems. Therefore, the ranges of decimal values that may be converted are -(2**31) to +(2**31)-1 on mainframe and -(2**63) to +(2**63)-1 on AS/400, UNIX and PC.

These limits equate to values with a maximum of 10 significant decimal digits (6 bytes packed decimal) on mainframe and 19 significant decimal digits (10 bytes packed decimal) on AS/400, UNIX and PC platforms. Thus, a source field of length greater than 6 bytes or 10 bytes respectively, must contain leading zeroes.

If the packed decimal number is within the defined limits but is too large for the destination field, the result is **truncated** from the left. i.e. **high order** bytes may be **lost**.

Important Note

Please refer to Section *iSeries, UNIX and PC Processing* which gives details on the two different methods by which a binary field is interpreted outside SELCOPY, depending on the type of machine processor.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)   PW000 pw=0 (133)     (OS) VM/CMS=VM05      11.22 THU 22 NOV 2001    PAGE   1
o ------------------------------------------------------------------------     --------------------    -------- o


o          * SMXCVPB CTL H *               L=009 +++ 88/02/10 14:41:41                                          o


o      1.  READ CARD   WORKLEN 1000                                                                               o
       2.  MOVE 100   FR 100    TO 21            * Ensure destination portion blank

o      3.  CVCP  10 AT 1   TO 4 AT 22      * PACK  (4th record is truncated)                                      o
       4.  CVPB  4 AT 22   TO 3 AT 32      * CVB
       5.  CVPB  4 AT 22   TO 2 AT 50      * CVB (1st 4 records are truncated)
o      6.  CVBP  3 AT 32   TO 4 AT 40      * CVD                                                                  o

       7.  CVCH  4 AT 22   TO 22     * Convert to hex notation for printing.
o      8.  CVCH  3 AT 32   TO 32     * Note that destination overwrites source.                                   o
       9.  CVCH  4 AT 40   TO 40
      10.  CVCH  2 AT 50   TO 50
o                                                                                                                 o
      11.  print 'Orig Char  Comment     P.D.    Binary    P.D.    Bin' STOPAFT=1
      12.  print '---------  -------     ----    ------    ----    ---' STOPAFT=1
o     13.  space 1   STOPAFT=1              * A blank line.                                                       o
      14.  print                            * print the card area.

o          end                                                                                                    o


o     INPUT   SEL SEL                                                                                  1  RECORD      o
      RECNO   TOT ID.          1         2         3         4         5         6         7         8         9    0  LENGTH
      -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------
o         1     1  11 Orig Char  Comment     P.D.    Binary    P.D.    Bin                                        80      o
          1     1  12 ---------  -------     ----    ------    ----    ---                                        80

o         1     1  14 10,460.98            1046098C  0FF652  1046098C  F652                                       80      o
          2     2  14 4.240,22             0424022C  067856  0424022C  7856                                       80
          3     3  14 3 186 40             0318640C  04DCB0  0318640C  DCB0                                       80
o         4     4  14 1234567890 TRUNCATED 4567890C  45B352  4567890C  B352                                       80      o
          5     5  14 -176       NEG'VE    0000176D  FFFF50  0000176D  FF50                                       80
          6     6  14 - 2 20     NEG'TVE   0000220D  FFFF24  0000220D  FF24                                       80
o         7     7  14 25 CR      NEG       0000025D  FFFFE7  0000025D  FFE7                                       80      o
          8     8  14 20 f 3gk   NEG       0000203D  FFFF35  0000203D  FF35                                       80
          9     9  14 cr 20      POSITIVE  0000020C  000014  0000020C  0014                                       80
o        10    10  14 2 CR 0     POSITIVE  0000020C  000014  0000020C  0014                                       80      o
         11    11  14 2 #(=0     POSITIVE  0000020C  000014  0000020C  0014                                       80
                   ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0
o                                                                                                                 o
  SUMMARY..
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
o  ------      ------      ----     -------  -----           -----   --    ---                                     o
     1            11 READ SYSIN        80    80 U             11
     2---10       11
o   11---13        1                                                                                             o
    14            11

o                                                                                                                 o
          ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **
                                          ** EXPIRY DATE -- 2002/05/21 **
```

Figure 0. CVPB Conversion (Packed to Binary). Also illustrates **CVBP** and **CVCH**.

CVPC=n (Packed --> Char)

UNPK=n

See also:

- CVCP and FORMAT in this section.

```
CVPC   3 AT 3000   TO 2000   FORMAT='ZZZ,ZZ9.99 CR'
CVPC   3 AT 3000   TO    6 AT 2000          * No FORMAT used.
UNPK=4  FR=101  TO=420  FORMAT=9999.99      * Original style.
```

This parameter indicates that data is to be unpacked, that is, ConVerted from **Packed** decimal to formatted **Character** numeric data suitable for printing.

Source

The argument of CVPC determines the number of bytes of packed decimal data to be converted up to **maximum length** of 16 bytes.

The 16 byte source restriction may be overcome by treating it as a character string, converting it to hex (CVCH) and removing the sign byte. The **CVCP** operation description contains an example print where **CVCH (CVH)** is used as a means of illustrating the **CVCP** conversion.

Destination

The destination field may be specified with or without a **FORMAT** parameter.

With FORMAT

The argument of the FORMAT parameter indicates how the packed decimal number is to be converted to character, allowing insertion of special characters and zero suppression. If a FORMAT parameter is used then conversion of an **invalid packed decimal** field will result in RC=8 being set and the destination field being filled with asterisks
Maximum FORMAT length is 255.

Without FORMAT

If the **FORMAT** parameter **is omitted** then it is necessary to indicate the length of the destination by using the **TO n AT p** syntax, i.e. the destination is to be of length "n", starting at position "p".

The whole of the destination field will be numeric, without zero suppression, but the junior (right-most) byte will be zoned if the result is negative, thereby preserving the sign.
This is known as **Zoned** Decimal representation. A positive result will not be zoned.

Thus if we consider a result of 12 for a destination defined by **TO 4 AT 2000**, then at the end of the operation, positions 2000 to 2003 will contain the character string "0012".
However, a result of -12 would produce the string "001K", where the K represents the number 2 with a negative zone.

Without a **FORMAT** parameter, if the result is too large to fit in the number of bytes specified, then it is merely truncated on the left, whereas with a FORMAT the field is filled with asterisks and RC=8 is set.

For **UNIX** and **PC**, CVPC without a **FORMAT** parameter will fill the destination field with asterisks if the source is invalid.
Mainframe SELCOPY, however, will accept any source field for a **CVPC** operation if a **FORMAT** parameter and argument is not provided.

CYLOFL=n

--- ISAM only ---

CO=n

```
WR ISOUT ISAM   KEYLEN=8   KEYPOS=6   CYLOFL=2
THEN WRITE ISOUT2 INDEXED   KL 8   KP=6   CYLOFL=3
ELSE ISFIL3 IX  CO=4  KL=9  KP=39
```

For use on Indexed Sequential output files only, the CYLOFL parameter defines the number of tracks per cylinder that are to be allowed for overflow records on the prime extent.

If the CYLOFL parameter is omitted, the default value used is zero, and no cylinder overflow area is allocated for the new ISAM (Indexed Sequential Access Method) output file.

The **CYLOFL** parameter is **illegal** on **ISAM input** files.

DATAWIDTH

DW

```
OPT      HEAD=OFF   DW=50
REPORT   HEAD 'My Report'   DATAWIDTH=89
PRINT    dw 66
```

DATAWIDTH (abbreviation **DW)** may be specified on an OPTION or PRINT statement to define the number of bytes of data that are printed on 1 line of SELCOPY's output to the **PRINT** file before wrap occurs on to the next line. Thus, extremely useful for printing in portrait.

The **maximum** and **default** DATAWIDTH value is 100 bytes, the **minimum** is 10 bytes.

The position of the **RECORD LENGTH** column in the PRINT block, is always 2 bytes to the right of the printed data and unaffected by narrow **PAGEWIDTH** values.

```
o SELCOPY/OS2 2.07 at CBL - Bridgend UK (Internal Only)                                  2001/11/22 11:34   PAGE   1 o
  ----------------------------------------------------                                   ----------------   --------

o                                                                                                                    o
          ** z:\cd\sm200\SMXDW.CTL ***       L=003 --- 2001/11/22 11:34:36  (P24)

o      1.    rd  c:\config.sys                                                                                       o

             if lrecl > 0                * If this record is not length 0.
o      2.      t upper  1, lrecl         * Ensure data is upper case.                                                 o

             if  p any = ' PATH='
o      3.      t print  fr @+1  dw=50    * Print the OS/2 directory path.                                             o


o     INPUT   SEL SEL                                                      RECORD                                    o
      RECNO   TOT ID.          1         2         3         4         5  LENGTH
      -----   --- --- ....,....0....,....0....,....0....,....0....,....0  ------
o       132     1   3 PATH=D:\MPTN\BIN;D:\IBMCOM;D:\P390;D:\IBMLAN\NETPR    351                                      o
                      OG;D:\MUGLIB;D:\NETSCAPE\404\COM\PROGRAM;D:\NETSCA
                      PE\202\NAV;J:\DUP;J:\;E:\;E:\CA;E:\CD;E:\CG\XO;E:\
o                     CG;E:\CP;E:LET;E:\;C:\OS2;D:\PCOMOS2;D:\CMLIB;C:\O                                             o
                      S2\SYSTEM;C:\OS2\MDOS\WINOS2;C:\OS2\INSTALL;C:\;C:
                      \OS2\MDOS;C:\OS2\APPS;C:\MMOS2;E:\ACROBAT3\READOS2
o                     ;D:\REM2;Z:\WC\BINP;Z:\WC\BINW;D:\READIBM2;                                                    o
                      ....,....0....,....0....,....0....,....0....,....0

o SUMMARY..                                                                                                          o
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
   ------      ------      ----     -------  -----           -----   --    ---
o     1           399 READ config     2048   351 U             399       c:\config.sys                                o
      2           281
      3             1
o                                                                                                                    o

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o                                ** EXPIRY DATE -- 2002/05/20  **                                                    o
```

Figure 0. PRINT with DATAWIDTH.

DB2 (Operation Word) --- DB2 only ---

See also:

- Section *DB2 Processing*.

```
DB2  'COMMIT'
DB2  'DROP TABLE MYTAB'
```

Execute a general SQL statement provided by the user in full SQL syntax.

For any SQL verb, other than SELECT, SELCOPY passes the statement directly to DB2 for execution.
For SQL verb SELECT, SELCOPY prepares the statement for execution but does not perform the automatic open and execute as for the READ statement.

DB2 (Parameter) --- DB2 only ---

See also:

- Section *DB2 Processing*.

```
READ INTAB  TAB='SYSIBM.SYSTABLES'   DB2   W 1000
```

DB2 may be coded to identify input as a DB2 Base Table or Results Table. However, it is not mandatory, since the presence of **TAB=** will enable SELCOPY's DB2 processing.

DEFDIR=path --- iSeries, UNIX, PC only ---

DEFAULTDIR
DFLTDIR

```
opt defdir=g:\Tmp   * Mixed case will remain intact.
wr abcfile.da       * Will write file "g:\Tmp\abcfile.da"

opt defdir=ABC\xyz  * Mixed case will remain intact.
wr PQR\abcfile.da   * Will write file "c:\curr\sys\dir\ABC\xyz\PQR\abcfile.da"
```

DEFDIR, or its synonyms DEFAULTDIR and DFLTDIR, may be specified on an OPTION statement to define the default run-time directory for all SELCOPY I/O Operations.

OPTION DEFDIR=path may be coded in the SELCNAM file, in the SELCOPY control statements, or in both. The last DEFDIR coded must appear before any file I/O statements. ERROR 169 will be issued if an OPTION DEFDIR is encountered following any file I/O statement, regardless of whether the existing DEFDIR path was specified.

When DEFDIR=path has been coded, and a file I/O statement references a DSN, or filename without a DSN, which does not start at the root directory of a filesystem, then the DEFDIR path is used as a prefix instead of the system's current working directory. Note that no change is made to the system's current working directory.

If the DEFDIR argument is a relative path, it is appended to the system's current working directory.

If the DEFDIR argument is an EQU name, then the argument of the EQU statement should be enclosed in quotes in order to prevent the string being uppercased during the EQU processing.

System environment variables may be used as part or all of the DEFDIR argument.

DEFER

See also:

- OPEN and DSN in this section.

```
READ DSN='CBL.SELC970.DM(SMSUM)'   DEFER     * DEFER OPEN of PDS member.
WRITE  OUTDD  FROM 1001   DEFER              * DEFER OPEN of output file.
```

The **OPEN** of any file may be deferred until the file is used by coding the **DEFER** parameter on the READ or WRITE statement.

DEFER is the default **only** on dynamically allocated datasets, or where an explicit **OPEN** or **CLOSE** provides the first mention of the filename.

DEL fname

--- VSAM, DL1, IMS, DB2 only ---

DELETE
DLET

See also:

- Section *VSAM Files*.
- Section *IMS and DL/1 Processing*.
- Section *DB2 Processing*.

Strictly speaking, **DEL** is a parameter on the NOW, THEN or ELSE Operation Words, but may be used as an operation word in its own right.

DEL causes the last record, segment or row read to be deleted from the **VSAM** file, **DL1**/**IMS** database or **DB2** database referenced.

For DL1 delete only, if **INTO=n** is used for the **READ**, then **FROM=n** must be used for the **DEL**. This is required because DL1 will check that the key in the record at the FROM position matches with the record to be deleted.
For **VSAM** and **DB2**, DEL will delete the current record/row regardless of its position in the workarea.

The **DEL** statement may only be used on a **VSAM KSDS** or **RRDS** input file which has been given the **UPD** parameter on its first READ statement, or on a **DL1**/**IMS** database, or on a **DB2** database.

DEL is not available for: **AS/400, UNIX, PC, QSAM, ISAM**, ESDS, ADABAS or **CMS** files.

Must Read first

It is mandatory that a record must be read, either sequentially or by key, before being deleted.
Please note that after a **Key Not Found** message, following an unsuccessful keyed read, it is not allowed to issue a DEL command. VSAM will simply return a bad return code and SELCOPY will terminate the run.

```
READ XYZ KSDS UPD
IF P 28 = X'000C'
THEN PRINT                          * Keep a record of deletions.
THEN DEL XYZ
```

DB2 rows may also be deleted using full SQL statements via the **DB2 SQL='DELETE.. '** syntax. In this case, a previous SELCOPY read is **not** required.

VSAM Positioning

After a record has been deleted, it is permitted to issue a sequential read of the same KSDS which will simply read the record following the one just deleted. VSAM does not lose its positioning within the file.

READ, DEL, INS and UPD statements may all be included in the same SELCOPY run for the same KSDS as required. Similar statements for other KSDS files may also be included.

Example

An example of a **Generic** Delete is as follows:

```
READ XYZ KSDS   KEY 'B'   UPD   STOPAFT=99999
PRINT                           * Keep a record of deletions.
IF P 1 = '--- KEY/REC NOT FOUND ---'
  THEN EOJ                      * Must prevent loop.
DEL XYZ
```

This will print and delete all records in the KSDS file **XYZ** which have a key starting with the letter 'B'. Note that the **Key Not Found** message is also printed.

The **STOPAFT** is essential because SELCOPY will use a **default STOPAFT=1 on a** keyed read using a **literal**.

DEV=cuu

--- VSE only ---

```
READ ABC DSN='VSE.SAM.FILE'    DEV=342           * File on physical unit 342.
READ XYZ DSN='VSE.TAPE.FILE'   DEV=TAPE SYS=024  * Specific Tape unit.
```

Dynamic Allocation for a VSE **SAM** (Sequential) **disk** file will require to identify the disk device on which the dataset is located.

DEV=cuu indicates the **Channel Unit** address of a **disk** device. Alternatively, **VOL=volser** or **SYS=nnn** may be used to identify the disk.

For **tape** devices, the Channel Unit address should not be used, otherwise SELCOPY will try to open it as a disk.
DEV=TAPE must be coded instead, resulting in an available tape drive being dynamically assigned. To control which tape unit is used, the **SYS=nnn** parameter should also be coded on the control card and the required tape unit assigned to the logical unit nnn.

Note that, with no dynamic allocation, DEV=TAPE without SYS=nnn will default to SYS000 (i.e. no dynamic assign.)

DEV=dev

--- VSE only ---

DEVICE=

For **MVS** and **CMS**, the **DEV** parameter is totally ignored, provided it has the correct syntax. Thus **DEV** is only for use at **VSE** installations.

Even at **VSE** installations, the **DEV** parameter need only be considered if different disk device types are available on the same system. If all your disks are the same, **omit the DEV** parameter. If all your disks are **not the same**, use **CBLNAME** to set the default to your preferred device type.

DEV is for use only on READ, WRITE or CKPT operations on VSE disks where the device differs in type from that of the installation default as specified in the CBLNAME phase/load module. If no installation default were specified, then omission of the DEVICE parameter will default to a device type equal to that of the SYSRES disk, so normally it is not required.

There is no need to repetitively code the DEVICE parameter on every control statement that mentions the file concerned. Once per file is sufficient because only the last DEVICE parameter encountered per file takes effect.
Permitted arguments for 'DEVICE' are:

2311 2314 2319 3330 3340 3350 3375 3380 3390 9345
FBA (3310 3370 9332 9335)
DKT (DISKETTE 3540)
TAPE

TAPE Devices

Use of **DEV=TAPE** allows the **VSE** user to have a filename for a tape device without the restriction that it must start with **"TAPE"** and end with a number indicating the SYS number.

Unlike VSE **DLBL** names, the tape filename on a **TLBL** may then be up to **8 chars**.
If **DEV=TAPE** is used, the **VSE** user supplies **SYS=nnn** to establish the VSE System Logical Unit for use by SELCOPY when opening the file.
If the **SYS** parameter is omitted, then under Dynamic Allocation, an available tape drive will be dynamically assigned to a free programmer logical unit. Where Dynamic Allocation is not in use, the default of **SYS000** will be used.

```
RD TAPE20                        * // TLBL TAPE20, etc
RD MAGTAPFL  DEV=TAPE  SYS=20    * // TLBL MAGTAPFL, etc
RD ABC       DEV=TAPE            * // TLBL ABC, etc (uses SYS000)
RD CDE DSN='TAPE.INPUT' DEV=TAPE * Dynamic Assign.
```

FBA Devices

Although the 0167, 3310, 3370, 9332, 9335 and 9336 are different devices, they all have the same Fixed Block Architecture, and should be referenced by **DEV=FBA** as they are treated as synonomous within SELCOPY.

VSE with Mixed Disks

Please note the following 4 points:

1. Because the VSE Operating System offers a device independent open routine, it is only necessary to inform SELCOPY of the device type in order to prevent SELCOPY from building a control block for the file (DTF) with a blocksize, greater than the track capacity of the device, or, less than the actual blocksize of the file.
2. Thus, an installation with a 3340 SYSRES, may read and write 3375's without consideration of the device type, except that SELCOPY will insist that the blocksize is restricted to the track capacity of SYSRES, i.e of a 3340.
3. To read and write 3375 files with 3375 blocksize limits, it is necessary to tell SELCOPY that it is a 3375. This is done either with a **DEV** parameter, or by coding 3375 as the default disk device type in **CBLNAME**.
4. Although the track capacity of a 3375 is 36000, the maximum blocksize permitted is 32760, as governed by Logical IOCS.

Diskette Devices

The keywords 3540, DKT and DISKETTE are synonomous, indicating that the device is a 3540 diskette, but please note the following 3 points:

1. You **must supply** a DLBL and EXTENT card in the JCL for each diskette file. If the ASSGN card is omitted, **SYS010** is used for input and **SYS011** for output.
2. Input files **MUST** be on a track boundary. i.e. the first record must be on SECTOR 1 of a track.
3. Multiple volume files require an EXTENT card **for each volume**.

DIR

DIRECTORY
DCTY

```
READ ABC        DIR      INTO=101     WORKLEN=2000
RD  IJSYSRL    DIRECTORY
IN    MACLIB      DCTY
READ   '* EXEC *'   DIR
```

The directory of an MVS PDS or PDSE, CMS minidisk, VSE Library or iSeries, UNIX or PC disk, may be processed using the **DIR** parameter on a READ statement.

Each directory entry is processed as a logical record on which the usual SELCOPY operations may be applied.

Other parameters allowed with DIRECTORY are INTO=n, WORKLEN=n, DEV=dev and WTO=YES.

DIR (for MVS)

The length of entries within a **PDS** directory may vary due to the presence of "user" data. SELCOPY will handle this variation, so the LRECL parameter should be omitted.

Because directory entries are held in blocks of length 256, a default **LRECL=256** is used. Therefore, if **WORKLEN** is used, it must be greater than 256 in order to prevent **ERROR 20** occurring.
If an LRECL value is coded greater than 256, it is ignored.
Values less than 256 will be accepted and used, but if any entry is found that exceeds this value, a selection time error will be given and the run terminated.
Note that the Selection Summary shows the characteristics of **member** records, not of **directory** records.

Unless SELCOPY's **Dynamic Allocation** is being used, a **DD** card must be supplied which associates the **filename** with the **PDS** (Partitioned Data Set) used. An existing **STEPLIB** or **JOBLIB** will suffice if this load library is in fact the directory required.

If further data sets are concatenated at the **JCL** level, i.e. on the **DD** card, then these directories will also be processed. The input record count, **INCOUNT**, will be reset to 1 at the start of each new data set and **POS DSN** updated to reference the **data set name** of the concatenated **PDS**. All concatenated data sets must be **PDSs**. However, the **RECFM, LRECL** and **BLKSIZE** of member data is unimportant because only the **directories** are processed.

To process a directory a block at a time, replace the **DIR** parameter with **RECFM=U**, thus reading the directory as a normal sequential file. Standard **MVS** directories all have an EOF record at the end, separating them from the member records.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)                          OS JOB=NBJ       11.10 WED 28 NOV 2001    PAGE   1
o ----------------------------------------------------                                            ---------------------    -------- o


o          ** CBL.SMAN.EXAMPLES(SMXDIRM1) ***    L=001 --- 2001/11/22 12:45:57  (P390)                                                o
             OPT    W 333   PD=100  ** ADJUST PAGE DEPTH TO GET IT ALL ON 1 PAGE.

o                                                                                                                                      o
      1.    READ PDS1DD DSN='CBL.COB2.SOURCE'    DIR    * THE DIRECTORY OF AN MVS PDS.
             CAT PDS3DD DSN='CBL.SMAN.EXAMPLES'  DIR    * CONCATENATED WITH ANOTHER DIR.
o            CAT PDS6DD DSN='CBL.EXEC'           DIR    * 3 IS ENOUGH FOR THIS EXAMPLE.                                                o


o           IF P  1  = 'S'                 * ONLY MEMBERS BEGINING WITH 'S'.                                                            o
      2.      T MOVE  8  FR FNAME TO 91    * CURRENT DDNAME IN CONCATENATION.
                                           * COULD USE POS DSN FOR DATA SET NAME.
o     3.      T PRINT TYPE MC L 100 S 10   * FIRST 10 ONLY.                                                                             o


o     INPUT   SEL SEL                                                                                                      1  RECORD     o
      RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH
      -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------
o                                                                                                                                      o
          3     1   3 SQ9790  001000040p180p1812010000P390B                                                  PDS1DD         42
                              011F17070 9F0 9F990A0A00
o                                                                                                                                      o
          1     2   3 SELCPRT 000000040p180p1812010000P390B                                                  PDS3DD         12
                              008017070 9F0 9F990A0A00
o                                                                                                                                      o
          2     3   3 SELCPRTD001000040033003310010100NBJ                                                  PDS3DD         42
                              000F1001112F112F07090900
o                                                                                                                                      o
          3     4   3 SMXDIRM100100005003?003?14000000NBJ                                                  PDS3DD         42
                              008F1008112 112 270B0B00
o                                                                                                                                      o
          4     5   3 SMXOPEN100100003003"003"11010100NBJ                                                  PDS3DD         42
                              00EF1104112 112 54060600
o                                                                                                                                      o
          5     6   3 SSXVM03 00000003003"003"11010100NBJ                                                  PDS3DD         12
                              00A01104112 112 54060600
o                                                                                                                                      o
         31     7   3 SAMPLE  000000000q1?0q1?13050500P390A                                                PDS6DD         12
                              077010090 7 0 7 19020200
o                                                                                                                                      o
         32     8   3 SCANPDS 001000010p020p03130)0500P390A                                                PDS6DD         42
                              016F11070 4F0 4F000 0800
o                                                                                                                                      o
         33     9   3 SCANPDX 000000010p020p03130)0500P390A                                                PDS6DD         12
                              016011070 4F0 4F000 0800
o                                                                                                                                      o
         34    10   3 SCTL    000000040q020q0220010100P390A                                                PDS6DD         42
                              059F10090 8F0 8F14070700
o                     ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0          o

  SUMMARY..
o  SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN                                                        o
   ------      ------      ----     -------  -----           -----   --    ---
     1            42 READ PDS1DD    23440    80 FB              3       CBL.COB2.SOURCE                                CBLM02
o                    CAT PDS3DD    23476   222 VB              5       CBL.SMAN.EXAMPLES                              CBLM04          o
                     CAT PDS6DD    23440    80 FB             34       CBL.EXEC                                       CBLM01
                                 *EOF*NOT*REACHED*
o     2----3       10                                                                                                                  o

  ***WARNING***                   4 = RETURN CODE FROM SELCOPY
o                                                                                                                                      o
          ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **
                                                   ** EXPIRY DATE -- 2002/05/21 **
```

Figure 0. DIR input for MVS.

DIR (for CMS)

See also:

- *CMS use of DIR input* in section *VM/CMS Processing*.

CMS directory entries are returned reformatted to a **fixed** length of **81 bytes**, so any **LRECL** coded is ignored. Prior to SELCOPY Release 9.8P, the default formatted record length was **79 bytes**. This 2 byte increase is due to the introduction of a century indicator into the **date last updated** field. Consequently, all fields to the right of this field have been shifted right by 2.

Although a 4 digit year is now the default, the original 2 digit year and formatted record layout may be obtained by specifying the parameter **Y2** on the **READ** statement or on an **OPTION** statement. If specified on an OPTION statement in **SELCNAM**, then it will become the systemwide default.

Note that **CMS users** need no JCL.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)   PW000 pw=0 (133)     (OS) VM/CMS=VM05      10.24 THU 26 APR 2001    PAGE   1
o ------------------------------------------------------------------------     ----------------------    -------- o


o          ** SMXDIRC1 CTL N **             L=002 --- 2001/04/26 10:02:48                                          o

       1.  IN SMX*.*.N DIR
o                                                                                                                    o
           IF P 23 = '1992'
           AND P 61 = 'V'
o      2.  T PRINT                                                                                                   o


o     INPUT   SEL SEL                                                                                        1  RECORD     o
      RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH
      -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------
o         1     1   2 SMX      EXEC     N2  1992/02/08 16:19:47       38       64 V        1 PC01NN R/W                    81      o
          6     5   2 SMXCVCP  CTL      N4  1992/01/23 20:52:21       29       72 V        2 PC01NN R/W                    81
          9     6   2 SMXDIRC2 CTL      N4  1992/02/09 18:44:47       10       69 V        1 PC01NN R/W                    81
o        17     8   2 SMXINTRO EXEC     N2  1992/01/24 11:52:21       31       70 V        1 PC01NN R/W                    81      o
                   ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0


o SUMMARY..                                                                                                          o
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
   ------      ------      -----    -------  -----           -----   --    ---
o     1            28 READ SMX*               81 U              28       SMX*.*.N                                  o
      2             4


o                                                                                                                    o
          ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **
                                          ** EXPIRY DATE -- 2002/05/21 **
```

Figure 0. DIR input for CMS.

DIR (for VSE)

Any **LRECL** coded is ignored.

VSE users on **SP2** or later normally need no JCL because **DLBL** and **EXTENT** information for libraries is available from the Standard Labels area.

The file mask consists of **4 tokens**:

1. Library name (as on DLBL).
2. Sub Library name.
3. Member Name. (Default is * meaning all names)
4. Member Type. (Default is *)

The **LIBR** directory record, passed to SELCOPY in **LISTDIR** format, is reformatted for **DIR** input with fields in the same positions as the **CMS** directory record as far as possible.

As for CMS, all date fields in the default VSE directory record have increased by 2 bytes to accomodate a century indicator thus increasing the default fixed record length from 96 to 100. Consequently, all fields to the right of the **date last updated** field have been shifted right by 2, and all fields to the right of the **date created** field have been shifted right by 4.
Again, the original 2 digit year format record may be obtained by specifying the parameter **Y2** on the **READ** statement or on an **OPTION** statement, and may become the systemwide default by specifying **Y2** on an OPTION statement in **SELCNAM**.

Certain fields are **VSE** specific:

POS 23	"yyyy/mm/dd" is **Last-Changed** date.
POS 52	"B" indicates value represents **Bytes**, not Records.
POS 53	"#" indicates member is non-contiguous in library.
POS 54	"S" indicates member is **SVA** eligible.
POS 55	"M" indicates member is **MSHP** controlled.
POS 72	"yyyy/mm/dd" is **Creation** date if different from **Last-Changed**, else **blanks**.
POS 84	Member Id. i.e. **Name.Type** with blanks removed.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)                    VSE  F7 JOB=SSDIRV01  19.04 MON 30 APR 2001    PAGE   1
o ----------------------------------------------------                                                  ---------------------    -------- o


o          ** SSDIRV01 JCL N ***              L=003 --- 2001/05/08 10:32:30                                                          o
                         * VSE DIR input- used as example in manual.

o      1.    in PRD2.CBL.*.*        dir       w 2222                                                                                  o

             if p 23 = '2001'   * Select everything in this library last updated in 2001.
o      2.      t pr s 7                                                                                                                o


o     INPUT   SEL SEL                                                                                                      1  RECORD     o
      RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH
      -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------
o         1     1   2 CLR      DB          2001/04/27                28  #S                2001/04/18  CLR.DB                100      o
          2     2   2 DB210DEF DB          2001/04/23             3,006 B#S                            DB210DEF.DB           100
          3     3   2 PROF     DB          2001/04/29                25  #S                2001/04/18  PROF.DB               100
o         7     4   2 S20A     DB          2001/04/26               672  #                2             S20A.DB               100      o
          8     5   2 S20ADEF  DB          2001/04/28               137  #                 2001/04/26  S20ADEF.DB            100
          9     6   2 S98P     DB          2001/03/12             1,557  #                7 2000/09/07  S98P.DB               100
o        11     7   2 S980     DB          2001/03/12             1,432  #                7 2000/12/11  S980.DB               100      o
                      ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0

o SUMMARY..                                                                                                                          o
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN                                        VOL/CAT
   ------      ------      ----     -------  -----           -----   --    ---                                        -------
o     1            11 READ PRD2              100 U              11                                                                  o
                                   *EOF*NOT*REACHED*
      2             7
o                                                                                                                                    o
  ***WARNING***                   4 = RETURN CODE FROM SELCOPY

o          ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **      o
                                                   ** EXPIRY DATE -- 2002/05/21 **
```

Figure 0. DIR input for VSE.

DIR (for iSeries, UNIX and PC)

See also:

- SUBDIR and SORTDIR in this section.

Directory entries may be read with any wildcard fileid. e.g.

```
read c:\con*     DIR
read d:\ab*.xy*  DIR
read cde:*.bu    DIR   * Note:    3 disks processed. (Any number allowed).
read /usr/cbl/*  DIR   * UNIX or iSeries IFS directory.
```

The default number of subdirectory levels to be processed is 0. i.e. directory records of files contained in subdirectories of the specified fileid mask are not processed. The SUBDIR parameter may be specified to process levels of nested subdirectories.

By default, directory records are returned unsorted. i.e. in the order returned from the operating system. The SORTDIR parameter may be specified to process directory records in a specified sort order.

The output is formatted as follows:

POS 1	Timestamp in the form "yyyy/mm/dd hh:MM:ss".
POS 22-28	**(iSeries and UNIX)** Start of the file mode as described for **mknod**. POS 25-28 contains the file permissions information reported in the traditional octal representation. e.g. 777 for rwxrwxrwx, 744 for rwxr--r--, 661 for rw-rw---x
POS 25-28	**(PC)** Start of file attributes: a = amended r = read only h = hidden (currently not supported). s = system (currently not supported).
POS 30	File name.
POS 38	File extension prefixed by period.
POS 43	Number of bytes.
POS 60	Full fileid including directory.

```
  SELCOPY/WNT 2.08 at CBL - Bridgend UK (Internal Only)                                                  2002/08/20 10:01   PAGE   1
o ----------------------------------------------------                                                   ----------------   -------- o


o          ** z:\cd\sm200\SMXDIRP1.CTL ***    L=002 --- 2002/08/20 10:05:04  (P24)                                                  o

       1.    rd  c:\con*   DIR   subdir
o      2.    print s=13                                                                                                             o


o     INPUT   SEL SEL                                                                                                  1  RECORD     o
      RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH
      -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------
o         1     1   2 2002/07/03 15:03:42     a    CONFIG  .SYS               0  C:\CONFIG.SYS                                  72      o
          2     2   2 2002/07/03 15:03:42          CONFIG  .BAK               0  C:\CONFIG.BAK                                  72
          3     3   2 1992/03/03 22:04:16      r   CONTOVER.DOC             407  C:\CD\CONTOVER.DOC                             77
o         4     4   2 1992/02/05 13:46:54      r   CONTOVET.DOC             380  C:\CD\CONTOVET.DOC                             77      o
          5     5   2 2001/08/23 10:35:04      r   CONTRACT.DOC             594  C:\CD\CONTRACT.DOC                             77
          6     6   2 1994/06/13 17:55:34      r   CONTYYMM.DOC             908  C:\CD\CONTYYMM.DOC                             77
o         7     7   2 1996/05/31 17:12:34      r   CONTENTS.KEX           3,580  C:\cg\CONTENTS.KEX                             77      o
          8     8   2 2000/12/06 13:48:34     a    connect*.gif           1,917  C:\Program Files\Common Files\Adaptec Sha    126
                      red\CreateCD\connected.gif
o         9     9   2 2001/10/30 16:04:22     a    config  .txt               1  C:\Program Files\Data LifeGuard\8263142\c    109      o
                      onfig.txt
         10    10   2 2000/11/30 14:15:28     a    conemail.gif             971  C:\Program Files\Dell\Solution Center\Hel    114
o                     p\conemail.gif                                                                                                 o
         11    11   2 2000/11/30 14:15:28     a    connoff .gif           1,278  C:\Program Files\Dell\Solution Center\Hel    113
                      p\connoff.gif
o        12    12   2 1999/06/25 16:23:08     a    ConfigS*.dll          36,864  C:\Program Files\FoneSync\ConfigSupport.d    102      o
                      ll
         13    13   2 2001/09/12 14:29:36      r   Connect*.                  0  C:\Program Files\Internet Explorer\Connec    111
o                     tion Wizard                                                                                                    o
                      ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0

o SUMMARY..                                                                                                                          o
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
   ------      ------      ----     -------  -----           -----   --    ---
o     1            13 READ con*       2048  2046 U              13       c:\con*                                                     o
                                   *EOF*NOT*REACHED*
      2            13
o                                                                                                                                    o
  ***WARNING***                   4 = RETURN CODE FROM SELCOPY

o     ** SELCOPY/WNT 2.08.152  Licensed by Compute (Bridgend) Ltd  +44 (1656) 652222 & 656466 **                                    o
                                        ** Expiry: 08 Jul 2003 **
```

Figure 0. DIR input for iSeries, UNIX and PC.

DIRDATA (General)

DIRD
DD

See also:

- FLAG EOMEMB and FLAG EODISK in this section.
- *CMS use of DIR input* in section *VM/CMS Processing*.

SELCOPY's **DIRDATA** (Directory + Data) processing will read directory records, as above for the **DIR** parameter, **plus all data records** from the actual member/file for each directory entry in turn.

INCOUNT values

Two independent **INCOUNT** values are maintained for **DIRDATA** input:

For DIR records

The **INCOUNT** for **DIR** records is simply incremented by 1 to reflect the count of **CMS, iSeries, UNIX** and **PC filenames** or **VSE/MVS directory** member names processed.

For **MVS** DIRDATA input, the **INCOUNT** for the **directory** portion is reset to 1 at the start of a new PDS which may be concatenated with the first, either at the **JCL** level, or by use of SELCOPY's **CAT** statement.

For DATA records

The **INCOUNT** for **DATA** records is always reset to 1 at the start of each **CMS, iSeries, UNIX** or **PC file** or each member of a **VSE Library** or **MVS PDS**. The first data record is always record 1.

Use **IF DIR** and **IF DATA** to differentiate between directory and data records. e.g.

```
IF  DIR
  THEN DO NEWMEMB
IF  DATA
AND INCOUNT GT 4
  THEN FLAG EOM
```

UPDATE-in-Place

UPDATE-in-Place on the **DATA** records is supported, for MVS, CMS, iSeries, UNIX and PC DIRDATA input only, but please take adequate precautions by backing up your files. This is a powerful facility, but it can also be destructive if your changes were not those actually intended.
Directory records may not be updated.

MVS users **must specify UPD** on the first **READ** for the file.

No modification is made to the **length** of data records, regardless of changes made by the user to the **LRECL** value. However, any change made to the data content will be **updated in place** on the data set.

The same record may be updated by several **UPDATE** statements, or repeatedly with the **UPDATE** statement in a loop, without degradation, because SELCOPY does not perform the **physical I/O** for the update until the next block is requested.

Any attempt to update a **directory** record will result in **Select Time Error 565**, and termination of the run. However, use of **IF DIR** would avoid the risk of attempting to update a **DIR** record.

DIRDATA (for CMS)

```
READ   '* EXEC *'   DIRDATA
```

The **DIRDATA** (Directory + Data) processing of SELCOPY may be used to read the directory records of **CMS** minidisks, as described above for the **DIR** parameter, **plus all data records** from the actual file for each directory entry in turn.

The reformatted **FST** data (directory record) for each CMS file matching the **DIRDATA** file mask is the same format (length 81 bytes) as for CMS **DIR** input.

RECFM=U is the Record Format used by SELCOPY for **DIRDATA** input because it is a combination of reformatted FST records and data records of many files, which may be of various record formats. The reformatted FST records will of course contain details of the real CMS record format for each file processed, as well as other information such as timestamp, LRECL and file size.

INCOUNT values are discussed above under DIRDATA (General).

UPDATE-in-Place on the **DATA** records is supported, and is discussed above.

WORKLEN=n is only essential if the DIRDATA file mask includes files with LRECL exceeding 83, and the user requires the whole of the record.
The length 83 is an arbitrarily chosen figure for the default buffer size, and may be changed for later releases.
Records larger than this arbitrary buffer size, or larger than the work area if **WORKLEN** is coded, are truncated, and **Return** Code 5 is set.

Fmode 3 files are ignored for **DIRDATA** input because CMS files with a **File Mode of 3** are deleted as soon as they have been read.

POS=DSN may be used to refer to the CMS File Id of the current CMS file being processed. Refer to **SELCSCAN EXEC** which is supplied with the SELCOPY software product and is a generalised version of the following:

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)   PW000 pw=0 (133)     (OS) VM/CMS=VM05      16.41 THU 22 NOV 2001    PAGE   1
o ------------------------------------------------------------------------     ---------------------    -------- o


o          ** SMXDIRC2 CTL J ***            L=003 +++ 94/07/27 15:24:04                                             o

       1.    read '* EXEC G'   dirdata  w 200
o                                                                                                                    o

             if dir                       * If it's a directory rec
o            or p 1,2 = '*'               * or a comment line, * or /*                                            o
       2.      then goto get              * then skip it.

o          ** Data Recs only **                                                                                      o

             if pos any = 'EXEC '               * Scan whole record length.
o      3.      then pos L+1,80 = ' '            * Clear residual data.                                            o
       4.      then move  18 fr dsn  to 81-18   * CMS fileid.
       5.      then plog  1 80  stopaft 6       * 6 is enough for a demo.
o                                                                                                                    o

      INPUT   SEL SEL                                                                                  1  RECORD
o     RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH     o
      -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------
         80     1   5 EXEC SELC                                                AMCTL   EXEC    G6                              9
o        17     2   5 EXEC AMEQU                                               AMINFO  EXEC    G2                             10      o
       244      3   5 EXEC S                                                   AMINFO  EXEC    G2                              6
         41     4   5 EXEC SELC                                                AMREF   EXEC    G2                              9
o         5     5   5 EXEC P6 &1 &2 &3 &4 &5 &6                                AMSORT  EXEC    G2                             25      o
         50     6   5 EXEC SELC &0                                             AMSORT  EXEC    G2                             12
                    ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0
o                                                                                                                    o
   SUMMARY..
    SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
o   ------      ------      ----     -------  -----           -----   --    ---                                      o
      1           599 READ *                 81 U              50       AMSORT.EXEC.G2
                                *EOF*NOT*REACHED*
o     2            35                                                                                              o
      3----5        6

o ***WARNING***                  4 = RETURN CODE FROM SELCOPY                                                        o

           ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **
o                                          ** EXPIRY DATE -- 2002/05/21 **                                          o
```

Figure 0. DIRDATA for CMS.

DIRDATA (for MVS)

```
READ   PDSIN   DIRDATA    UPD
```

MVS users may access all members of single or concatenated **PDSs** by use of the **DIRDATA** input facility.
UPDATE-in-place is also supported, provided the **UPD** parameter is provided on the first READ statement.

Example of Use

Change the TSO userid ABCDXXXX to ABCD2222 all members of a library:

```
// EXEC     PGM=SELCOPY
// LIBS     DD DSN=LIB1
// SYSPRINT DD SYSOUT=A
// SYSIN    DD *
  read LIBS  dird  upd
  if data
  and    pos any = 'ABCDXXXX'
    then pos @+4 =     '2222'
    then upd LIBS
/*
```

Or from TSO use the SCANPDS procedure supplied on the distribution master:

```
ALLOC  F(LIBS)   DSN(LIB1)
SCANPDS  LIBS    ABCDXXXX    ABCD2222
```

DIRDATA (for VSE)

```
READ   IJSYSRS.CBL.*.PHASE   DIRDATA
```

Users of **VSE/SP2** or higher, may access System Library members, via any generic name defining a group of members as supported by VSE's **LIBR** program, by use of the **DIRDATA** parameter.

Unlike DIRDATA under MVS or CMS, 2 different input streams may not be open concurrently.

Member name records are returned, (in LIBR's **PUNCH** format), together with each member's **data records** in turn.
DIR records are **not reformatted**, but left in the same format as supplied by **LIBR**. They will contain either:

- **'CATALOG** ' in pos 1-8 and **REPLACE=YES** in position 43-53.
- **' PHASE '** in pos 1-7. (Note: there is a blank in pos 1.)

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)                    VSE  F8 JOB=SSLIBR06  17.20 THU 22 NOV 2001    PAGE   1
o ---------------------------------------------------------                                      ----------------------    -------- o

o          ** SSLIBR06 JCL D ***            L=004 --- 2001/11/22 16:53:36                                                        o
       1.    rd prd2.cbltest.*.*        dirdata  w 2222
o                                                                                                                               o
             if dir
o                    and pos any = 'PROG1'                                                                                      o
       2.      then flag eomemb
       3.                           t goto get
o                                                                                                                               o
             if data
o                    and in = 2                                                                                                 o
       4.      then flag eomemb
o                                                                                                                               o
       5.    print
o                                                                                                                               o
      INPUT   SEL SEL                                                                                          1  RECORD
      RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH
o     -----   --- --- ....,....0...,....0...,....0...,....0...,....0...,....0...,....0...,....0...,....0...,....0...,....0  ------  o
          1     1   5 CATALOG AAAA.BBBB                      REPLACE=YES                                                      80
          1     2   5 Data for AAAA.BBBB - Rec 1                                                                              80
o         2     3   5 Data for AAAA.BBBB - Rec 2                                                                              80      o
          2     4   5 CATALOG CCCC.DDDD                      REPLACE=YES                                                      80
          1     5   5 Data for CCCC.DDDD - Rec 1                                                                              80
o         2     6   5 Data for CCCC.DDDD - Rec 2                                                                              80      o
          3     7   5 CATALOG EEEE.F                         REPLACE=YES                                                      80
          1     8   5 Data for EEEE.F    - Rec 1                                                                              80
o         2     9   5 Data for EEEE.F    - Rec 2                                                                              80      o
                    ....,....1...,....2...,....3...,....4...,....5...,....6...,....7...,....8...,....9...,....0

o SUMMARY..                                                                                                                     o
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL          FSIZE   CI    DSN                                    VOL/CAT
   ------      ------      ----     -------  -----          -----   --    ---                                    -------
o     1           11 READ PRD2              80 U              0                                                              o
      2----3       2
      4            3
o     5            9                                                                                                        o

o          ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **          o
                                          ** EXPIRY DATE -- 2002/05/21 **
```

Figure 0. DIRDATA for VSE.

DIRDATA (for iSeries, UNIX and PC)

```
READ   A:READ*.*   DIRDATA
```

DIRDATA processing is supported in a similar fashion to that on the mainframe, giving the **directory** records plus all the data records from the actual file for each directory entry in turn.

```
 SELCOPY/OS2 2.08 at CBL - Bridgend UK (Internal Only)                                                  2002/08/20 10:47   PAGE   1
o ---------------------------------------------------------                                                ----------------   -------- o

o          ** z:\cd\sm200\SMXDIRP2.CTL ***    L=006 --- 2002/08/20 10:47:24  (P24)                                                  o

           ** Select DOS batch files that use EXIT to end job run. **
o                                                                                                                                    o

      1.    rd '//servp31/p31h/cg/*.bat'  DIRDATA  subdir  w 444    * Read DOS batch files on SERVP31.
o                                                                                                                                    o
      2.    p LRECL+1, 300 = ' '                  * Blank out residue.

o                                                                                                                                    o
            i dir                                 * DIRectory record ?
      3.     t move 80 fr 1 to 301, 380           * Store directory record.
o     4.     t gg                                                                                                                    o

o           i p any = 'exit'                                                                                                         o
                                o p any = 'EXIT' * DATA records only.
      5.     t pr fr 301 L 80                     * Print DIRectory record.
o     6.     t pr        L 80                     * Print DATA record containing hit.                                                o
      7.     t space   1                          * Print 1 blank line.
      8.     t flag   eom                         * Flag end of member after one hit.
o                                                                                                                                    o

     INPUT   SEL SEL                                                                                                  1  RECORD
o    RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH   o
     -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------
        34     1   5 1995/01/13 14:12:36      r   FLL     .BAT            648  \\servp31\p31h\cg\xd\                          7
o       34     1   6 exit rc                                                                                                      7   o

         9     2   5 1998/01/30 16:32:26      r   P       .BAT          2,125  \\servp31\p31h\cg\xd\                         75
o        9     2   6 :   2. If %1 = SMAN/VMAN/UMAN/DMAN then execute CBLDOCP immediately & exit.                                75   o

        34     3   5 1991/03/18 17:51:40      r   SELC    .BAT          1,017  \\servp31\p31h\cg\xd\                          9
o       34     3   6 goto exit                                                                                                    9   o

        24     4   5 1997/02/03 17:34:26      r   SELCCOMP.BAT          1,654  \\servp31\p31h\cg\xd\                          9
o       24     4   6 goto exit                                                                                                    9   o

        30     5   5 1991/02/21 12:57:42      r   SETDT   .BAT            928  \\servp31\p31h\cg\xd\                          9
o       30     5   6 goto exit                                                                                                    9   o

                     ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0
o                                                                                                                                    o
 SUMMARY..
  SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
o ------      ------      ----     -------  -----           -----   --    ---                                                      o
     1         1,492 READ *          2048  2046 U              27       \\servp31\p31h\cg\*.bat
     2         1,492
o    3----4       27                                                                                                              o
     5----8        5

o                                                                                                                                    o
     ** SELCOPY/OS2 2.08.152  Licensed by Compute (Bridgend) Ltd  +44 (1656) 652222 & 656466 **
                                     ** Expiry: 08 Jul 2003 **
```

Figure 0. DIRDATA for iSeries, UNIX and PC.

DIV=n

See also:

- *Packed Decimal Explained* in section *Introduction*.
- Section *Mainframe Debugging Aids*.

```
          Field 1          Field 2      (Field 3)          (Field 4)
 ____________________________________________________________________________
|      |           |     |           |                  |                 |          |
|      |    n1     |     |    n2     |                  |                 | (TYPE=   |
| DIV  | n1 AT p1  | BY  | n2 AT p3  | (INTO n3 AT p5)  | (REM n4 AT p7)  |  (B/P))  |
|      |  p1,p2    |     |   p3,p4   | (      p5,p6  )  | (     p7,p8  )  |     -    |
|______|___________|_____|___________|__________________|_________________|__________|

NOW    DIV 6 AT 20   BY 2 AT 30   INTO 4 AT 40   REM 5 AT 50
THEN   DIV 6 AT 20   BY 2 AT 30   INTO 4 AT 40
ELSE   DIV 6 AT 20   BY 2 AT 30
DIV        4 AT 34   BY 17                     TYPE=B
DIV        4 AT 34   BY 17        INTO 4 AT 40     REM 5 AT 50
```

The **DIV** operation will cause **Field 1** to be **divided** by **Field 2**, with the result being optionally stored in **Field 3**.

INTO parameter

If an **INTO** parameter is supplied, the result is stored at **Field 3**, otherwise **Field 1** is overwritten.

Literals

A literal, an unquoted decimal number, may be used for either or both source fields if so required. However, a literal value for Field 1 may only be used if an **INTO** parameter is also supplied.

TYPE parameter

Only **TYPE=P** (the default) and **TYPE=B** are supported.
If any other TYPE parameter is coded, **TYPE=P**, the default, is assumed and the operation done assuming **Packed Decimal** for both source and destination.

The TYPE parameter may only be coded **once** on each arithmetic statement.
SELCOPY will accept the **TYPE** parameter either following the source or the destination, but it is applied **to both** source and destination fields.
ERROR 045 is issued if the **TYPE** parameter is coded more than once.

TYPE=B (Binary)

All data is valid for Binary arithmetic, up to a **maximum** length of 4 bytes.

The senior bit (leftmost) defines the sign. Zero is positive, and one is negative, but for a **1-byte** binary field, the value is treated as unsigned and always positive. If an arithmetic operation with a 1-byte destination field has a negative result, then **Return Code 8** is set.

Important Note

Please refer to Section *AS/400, UNIX and PC Processing* which gives details on the two different ways in which a binary field is interpreted outside SELCOPY, depending on the type of machine processor.

Note that TYPE=B arithmetic data cannot be invalid and Binary addition and subtraction are useful for modifying the @ pointer.

TYPE=P (the default)

If **TYPE** is not coded, **TYPE=P** (Packed Decimal) is assumed, having a **maximum** length of 16 bytes, (31 decimal digits and a sign).

If the result of the operation is too large to be held in the destination field, then it will be truncated to fit the destination field length.
If truncation involves the loss of significant digits (non-zero), then Return Code 8 is set.

If the data is not valid Packed Decimal, then SELCOPY will set **Return Code 8** in an AS/400, UNIX or PC environment, or, in a mainframe environment, a **Data Exception** will occur. This may result in ERROR 536, indicating an error in **SEL---27** for instance, or it may produce a storage dump, depending on whether your Systems Programmer has enabled SELCOPY's **Abend Trap**.

Remainder

If a **REM** parameter is supplied on a DIV operation, the remainder is stored there, otherwise the remainder is lost because the quotient (the result) is always returned as a whole number. The REM field need not be initialised.

Maximum lengths

	Packed Decimal	**Binary**
Dividend	16 bytes	4 bytes
Divisor	8 bytes	4 bytes
Quotient	8 bytes	4 bytes
Remainder	8 bytes	4 bytes

Example

The following **mainframe** example is equally applicable to **AS/400**, **UNIX** and **PC** environments.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)   PW000 pw=0 (133)     (OS) VM/CMS=VM05      17.39 THU 22 NOV 2001    PAGE   1
o ------------------------------------------------------------------------                          ---------------------    -------- o

o          * SMXDIV CTL H *                L=008 +++ 88/02/10 22:11:53                                                          o

o      1.  READ CARD    WORKLEN 1000                                                                                            o

           IF INCOUNT LT 3
o      2.    THEN PRINT                                                                                                          o
       3.    THEN GOTO GET

o      4.  MOVE 100  FROM 100  TO 17          * ENSURE DESTINATION PORTION BLANK.                                              o
       5.  CVCP   10 AT 1   TO 4 AT 20        * Convert CHAR ---> PACKED for arith.
       6.  CVCP   6 AT 11   TO 2 AT 30
o                                                                                                                               o
       7.  DIV 4 AT 20   BY 2 AT 30   INTO 3 AT 40   REM 2 AT 50

o      8.  CVCH   4 AT 20    TO 20            * Convert CHAR ---> HEX                                                          o
       9.  CVCH   2 AT 30    TO 30            *          for readability.
      10.  CVCH   3 AT 40    TO 40            * (overwriting itself.)
o     11.  CVCH   2 AT 50    TO 50                                                                                             o

      12.  PRINT STOPAFT=50                   * Print the card area.
o                                                                                                                               o
           END                                * End of Ctl, Data records follow:

o                                                                                                                               o
      INPUT   SEL SEL                                                                                                  1  RECORD
      RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH
o     -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------   o
          1     1   2 ORIGINAL DATA      DIVIDEND  DIVISOR   QUOTIENT  REMAINDER                                                80
          2     2   2 -------------      --------  -------   ---(ANS)  ---------                                                80
o         3     1  12 10,460.98 200      1046098C  200C      05230C    098C                                                     80   o
          4     2  12 4.242,22  21       0424222C  021C      20201C    001C                                                     80
          5     3  12 3 186 40  14.6     0318640C  146C      02182C    068C                                                     80
o         6     4  12 1234567   -73      1234567C  073D      16911D    064C                                                     80   o
          7     5  12 -176      -17      0000176D  017D      00010C    006D                                                     80
          8     6  12 - 2 20    220      0000220D  220C      00001D    000C                                                     80
o                     ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0          o

  SUMMARY..
o  SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN                                                   o
   ------      ------      ----     -------  -----           -----   --    ---
      1             8 READ SYSIN        80    80 U               8
o     2----3        2                                                                                                           o
      4---12        6

o                                                                                                                               o
           ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **
                                                  ** EXPIRY DATE -- 2002/05/21 **
```

Figure 0. DIV (Arithmetic Divide).

DL1

--- DI1, IMS only ---

DLI
DL/1
DL/I
IMS

See also:

- Section *IMS and DL/1 Processing*.

```
READ FILE=dbdname DL1
GHU       dbdname DLI
ISRT      dbdname DL/I  SEG=ABCD1234  FROM=2000
```

The IBM databases, IMS and DL1, may be accessed using SELCOPY. In this instance, SELCOPY is invoked by DL1 and on termination returns control to DL1.

Because non IMS/DL1 files may also be processed within SELCOPY simultaneously, it is necessary to inform SELCOPY that the file name you mention is a DL1 file, and this is done by coding the **DL1** parameter, or one of its synonyms, as illustrated above.

You may omit the DL1 parameter on subsequent SELCOPY control cards which use the same DL1 file.

Any of the standard DL1 function codes may be passed to SELCOPY as an operation word, including DLET and REPL, provided you have the authorisation to do so. Refer to your IBM Reference Manual for IMS or DL1.

DO user-label

PERFORM user-label
GOSUB user-label

```
DO          HEADRTN
PERFORM     GET_MAST_SUBRTN
THEN DO    XX-ROUTINE       TIMES=6
ELSE GOSUB      RTN#43        STOPAFT=200
```

Repetitive coding may be reduced by use of the **DO** opword/parameter, synonyms **PERFORM** and **GOSUB**.

The argument to the **DO** parameter is a **user-label** which defines the beginning of the set of statements that are to be executed. It is essential to terminate this set with a **RETURN** statement.

It is not permitted to drop through into a sub-routine. Control must always be passed to a sub-routine via a **DO, PERFORM** or **GOSUB** parameter. Thus it is necessary to terminate previous main-line control statements with a **GOTO GET** or **GOTO user-label** statement.

Sub-routines may call each other, and may even call themselves.

Nesting of the DO statement is restricted to 32 levels.

DOS

--- CMS, iSeries, UNIX, PC only ---

See also:

- SYSTEM in this section.

DSN

See also:

- POS DSN in this section.

DSN=

See also:

- FILE=fileid in this section.

```
READ  DSN='CBL.SELC970.DM(SMERR)'                      * FILE=DEFAULTF used.
READ  FILE=SSIN DSN=//SERVA/PUBLIC/OPEN.HTML           * UNC for networked fileid.
OPEN  VSESAM DSN='VSE.CBLNAME.ASSEMBLE'   VOL=SYSWK2
WRITE DSN='VSE.EXISTING.KSDS.FILE'  CAT=UCATWK1 REUSE  * FILE=DEFAULT used.
READ  F=INDD DSN='SELCCTL   EXEC   B1'
READ  INDD  DSN= 44 AT 2001  DEV=141                   * Variable DSN in workarea.
```

Dynamic Allocation of a dataset using either a **literal** or a **variable** within the workarea.

If no filename is supplied, a default of **DEFAULTF** (for VSE, **DEFAULT** is used to accomodate its restriction of 7 characters) is given to the file for reference purposes. This is true whether the DSN is supplied as a literal or as a variable in the workarea.
If **DSN=** is also omitted and the DSN argument is provided as a **string literal**, then the filename defaults to the first qualifier of the dsn.

As a Literal

For mainframe SELCOPY only, if the dataset name is provided in quotes, then contrary to the SELCOPY standard in all other cases, the dataset name is made **Upper Case**. In all other environments, quotes ensure that the DSN is not upper cased. To disable upper casing of **CMS** filenames, refer to section relating to CBLNAME options later in this manual.

The maximum length of the DSN argument for VSE disk files (SAM and VSAM) is **44 bytes**, for MVS data sets is **54 bytes** (44 plus a possible 10 bytes for PDS member name), and **17 bytes** for tape files. If the maximum is exceeded, then the extra characters are truncated. There is no restriction on DSN argument length for CMS, AS/400, UNIX and PC.

On **VSE** and **MVS**, a quoted DSN literal with leading or embedded blanks will result in **"NO FORMAT 1 LABEL FOUND"** for VSE and SELCOPY **ERROR 574 DYN ALLOC FAILED** for MVS. However, **trailing** blanks do not cause an error and are simply ignored.

TSO Users

If the provided dataset name is **unquoted**, and the job is invoked from a **TSO** terminal, then the **TSO User Prefix** will be added to the data set name. Normally, this is the user's **TSO User Id**, but it may differ according to the user's Profile setting.

MemberName (MVS Only)
MVS partitioned data set **(PDS/PDSE)** member name specification accounts for the additional 10 bytes on the MVS DSN argument limit. These 10 bytes allow an 8-byte member name enclosed in parentheses to be added at the end of the PDS/PDSE DSN.

Short member names may be right-padded with blanks to make any length up to, but not exceeding **8 bytes**.
e.g. **'Mast.Lib(Mem1)'** means **'MAST.LIB(MEM1)'**.

Short dataset names may also be right-padded with blanks to make any length up to, but not exceeding **44 bytes**.
e.g. **'MAST.Lib (meM1)'** means **'MAST.LIB(MEM1)'**.

CMS File Ids
CMS fileids consist of 3 tokens: Fname (up to 8 bytes), Ftype (up to 8 bytes) and Fmode (1 or 2 bytes) which may be supplied totally **free format**.
e.g. **' Abc Exec B2 '** means **'ABC EXEC B2'**.

iSeries, UNIX and PC File Ids
The **Universal Naming Convention** (UNC) in the format //**server**/**resource**, may be supplied as the DSN argument for networked files. Note that the PC style directory separator '\' is also acceptable.

The parameters **DIR** and **DIRDATA** may be supplied on an input statement that invokes dynamic allocation. This is especially useful when used in conjunction with a variable fileid mask which is built in the workarea at run time. e.g.

```
opt worklen 1000                                  * Define a work area.
log 'Specify search directory:'  reply=100 at 901  * Required dir in 100 bytes at 901.
@dsnl = 4 at uxreply1  ty=b                       * @dsnl=actual fileid mask length.
read indir   dsn=@dsnl at 901   dirdata           * Read files that match the mask.
```

Note that use of **UNC** file id input with **DIR** or **DIRDATA** is not supported.

As a Variable
This use of the DSN= parameter allows a dataset to be processed, even when its name is unknown until execution time. The **DEFER** attribute is automatically set for such files. e.g. **DSN=n AT p** or **DSN=p1, p2**

Multiple further use of this filename must either omit the **DSN** parameter, or have exactly the same arguments.

No TSO prefix is included when the DSN is provided from the workarea.

The maximum allowable length of a variable DSN argument is the same as for a DSN literal. Similarly, MVS users may include a PDS member name with the same freedom of use of padded blanks as described above. This reduces the complications involved in handling variable PDS and member names.

CMS users may also use the free format as described above for a DSN literal.

DUMMY

```
READ DUMMY   LRECL=100   WORKLEN=22000
THEN WRITE   DUMMY
```

DUMMY is a synonym for the **FILE=DUMMY** and is discussed under the **FILE** parameter even though the word **FILE** is redundant and may be omitted.

DUMPALL [= YES | NO]

--- iSeries, UNIX, PC only ---

See also:

- DUMPENC in this section.

The DUMPALL parameter may be specified on an **OPTION** statement or a **PRINT** statement to control **TYPE=D** (Dump) print output.

DUMPALL=NO is default and will condense multiple, consecutive lines of duplicate data in the dump print output into a single line containing an indication of the number of lines that have been condensed.

DUMPALL or DUMPALL=YES will display all lines of the dump print so that multiple, consecutive lines of duplicate data are not condensed.

DUMPALL may be coded on an OPTION statement in the SELCNAM file.

DUMPENC = "xy" | "x"

--- iSeries, UNIX, PC only ---

The DUMPENC parameter may be specified on an **OPTION** statement or a **PRINT** statement to define the character used to delimit the character data of **TYPE=D** (Dump) print output.

The DUMPENC argument may only be 1 or 2 characters:

- The 1st character defines the enclosing character for the character interpretation part of a TYPE=D line.
- The 2nd character defines the enclosing character for the duplicate TYPE=D data lines which get suppressed into a single "=same=" line on the output, provided DUMPALL has not been coded on the PRINT or OPTION statement.

By default, these enclosing characters are "|" and ":". i.e. DUMPENC="|:"

```
 ____________________________________________________________________________
|                                                                            |
|      INPUT   SEL SEL                                                       |
|      RECNO   TOT ID.                                                       |
|      -----   --- ---                                                       |
|          0     1  11           190                                         |
|    0000  206C696E 65732073 75707072 65737365     | lines suppresse|      |
|    0010  642E2020 20202020 20202020 20202020     |d.              |      |
|    0020  20202020 20202020 20202020 20202020     |                |      |
|    0030       =same=          (7 lines)          :                :      |
|    00A0  20202020 20202020 44696666 20646174     |        Diff dat|      |
|    00B0  612E2020 20202020 20202020 2020         |a.              |      |
|____________________________________________________________________________|
```

DUMPENC may be coded on an OPTION statement in the SELCNAM file.

EBC

--- AS/400, UNIX, PC only ---

```
POS 1  =  'ABC'   EBC
IF   POS 11  =  'ABC'   EBC
READ   /usr/cbl/test/keyed_txt  KEY='10AGFH3'   EBC   KP=11
```

EBC may be specified after a **quoted literal** to indicate that the literal is to be treated as being in the EBCDIC coding convention, regardless of the native coding convention of the host machine.

By default, literals are stored in the native coding convention of the host machine.

EBCDIC

See also:

- TRAN and CVAE=n (ASCII --> EBCDIC) in this section.

Parameter of **TRAN** statement to convert ASCII to EBCDIC

ELSE

EL
L

It is sometimes required to make a selection based on a failure to find something. The **ELSE** statement provides this facility.

If more than one action is required to be based on an **ELSE**, it should be followed by **THEN** statements which will be actioned with the **ELSE** statement.

```
IF POS ANY = TORONTO
  THEN WRITE FILE TORONTO
  ELSE WRITE FILE OTHERS

IF POS 40,400 = ABC
  THEN DUMMY                  * Dummy file if ABC found.
  ELSE WRITE FILE NOABC       * If ABC not found.
  THEN NOABC2  STOPAFT=274000 * If ABC not found.
  THEN PRINT   S=50           * If ABC not found.
```

The **ELSE** will always relate to the previous **IF** or **ELSEIF**.

ELSEIF

ELSE IF
L I
LI

See also:

- Nesting of Operation Words in section *Further Information*.

When an **ELSE** needs to be tested for further conditions before taking action, the **ELSEIF** may be used. This statement may have the same parameters as the IF statement.

```
IF   condition 1
AND  condition 2
AND  condition 3
   THEN WR ABCFIL
   ELSEIF   condition 4
       AND  condition 5
       THEN WR XYZFIL
```

END

E

The **END** card indicates the end of SELCOPY control cards, and is **only mandatory** when **data cards** follow the control cards. An END card may be supplied however on any SELCOPY run.

For **AS/400**, **UNIX** and **PC**, the END statement may be used instead of /* to terminate the card input stream. No further control cards will be read. Note however, that if FILE=CARD input has been requested, then further input from the control card device will be requested, which must then use the /* in cols 1,2 to terminate.

END instead of /* is particularly useful for UNIX platforms where certain special characters need to be hidden from the shell, and the **'!'** needs to be followed by a blank in order to be treated as data for selcopy. e.g.

```
selcopy ! read readme.dec! if p 1 = #! t log s=22! t wr z.z! end
```

VSE and **TSO** users must always provide a /* card to terminate the card input stream, and this is still true even with an END card. Only the **END** card may be omitted.

```
READ  FILE=CARD
WRITE    DISK BLKSIZE=8000
END
Data cards for FILE=CARD go here.
/*
```

ENTRY

--- Mainframe only ---

```
CALL BALRTN       ENTRY=4     SIZE=28000
THEN EXIT UXRTN   ENTRY=64
```

ENTRY=nnn may be coded on the **mainframe CALL** or **EXIT** statement. It will give control to the module invoked at a displacement within it of **nnn** bytes (decimal).

Note that the **ENTRY** displacement may be **different** for each CALL or EXIT statement, and therefore **must be coded** every time. If no ENTRY parameter is coded, an entry displacement of zero is used for that particular call.

The **ENTRY** parameter may be supplied before, after, or even in between parameters of the CALL statement, so if a character literal of **ENTRY** or **SIZE** is required for the CALLed module, it must be enclosed in quotes.

```
CALL ASMRTN2   parm1 parm2  ENTRY=4096  parm3 p4 p5
CALL ASMRTN2   'LIT1','ENTRY','LIT3',ENTRY=16
```

ENTRYEOJ

--- Mainframe only ---

```
CALL BALRTN   ENTRY=4   ENTRYEOJ=16     SIZE=28000
```

ENTRYEOJ=nnn may be coded on the **mainframe CALL** statement to give a called subroutine the option of cleaning up just before EOJ, similar to the automatic entry at EOJ for the **EXIT** statement.

At EOJ, when the **ENTRYEOJ** routine is called, at offset **nnn** within the called module, registers are set as follows:

R0	Address of UX information.
R1	0
R15	Address of the ENTRYEOJ routine. (Its absolute address.)

ENVFAIL

--- AS/400, UNIX, PC only ---

See also:

- %ENVVAR% for literals or File names in section *AS/400, UNIX and PC Processing*.

The **ENVFAIL** parameter may be specified on an OPTION statement only.

When a referenced system Environment Variable does not exist, the action taken will depend on the ENVFAIL option. The 4 possible arguments to ENVFAIL are as follow:

ENVFAIL=SAME	%envvar% is processed unchanged. (Default)
ENVFAIL=CANCEL	The job is cancelled.
ENVFAIL=NULL	%envvar% is substituted with null.
ENVFAIL='string'	%envvar% is substituted with 'string'.

e.g.

```
OPTION   ENVFAIL='XXX'
IF '%ABC%' = 'XXX'
  THEN PLOG 'ENVIRONMENT VARIABLE NOT SET'
```

ENVVAR

--- AS/400, UNIX, PC only ---

See also:

- %ENVVAR% for literals or File names in section *AS/400, UNIX and PC Processing*.

The **ENVVAR** parameter may be specified on an OPTION statement only.

Translation of system Environment Variables in SELCOPY control statements may be switched on using the **ENVVAR** option. The **NOENVVAR** option should be used to switch off environment variable translation. ENVVAR is the default.

EODISK

--- CMS only ---

See also:

- FLAG in this section.

EODISK, and its synonym **EOD**, are parameters on the **FLAG** statement for **DIRDATA** processing.

EOF (Operation Word)

--- VSE only ---

See also:

- EOF (Testing for) in this section.

For **MVS**, the **EOF** operation is accepted by SELCOPY, but ignored. Please refer to IBM's Job Control Manual, and use the **DATA** parameter of the **DD** statement for processing JCL as data.

For **VSE**, the **EOF** operation word is used to alter the characters used by the **VSE System** to indicate end-of-file on the Card Reader. VSE /* and /& cards may then be read as ordinary data.

The **EOF** card may appear anywhere in the SELCOPY control cards, but because it is actioned immediately on processing the Control Cards, (not dynamically at execution time), it is recommended to follow immediately after the READ statement.
Use of more than one **EOF** operation word results in the last one taking effect throughout execution.
The **EOF** statement is coded as follows:

```
EOF ))
```

where)) are any two special characters of your choice, excluding the **Separator Character**, exclamation mark. (!). The two characters chosen do not have to be the same.

An **essential prerequisite** for the use of **EOF** is that a **Programmer** Logical Unit (i.e SYSnnn) must be assigned to the same device as SYSIPT. If this is not done, the presence of an 'EOF' card will either be ignored or produce the operator message:

```
INVALID ENVIRONMENT FOR EOF
```

Installations using **POWER** should note that POWER Control Cards may **not** be omitted, otherwise POWER will generate an automatic *** $$ EOJ** after the first /& card it finds.

```
READ   CARD
EOF ))
PRINT
END
data cards  which may include /* /& and    JOB    cards.
))
```

Note

Installations with the **CBLSIPTC=X'03'** bit set on in CBLNAME, in order to allow control statements to be read from a Procedure, will find the **EOF** Operation Word disabled.
Having set this option in CBLNAME, to **override** it for a specific job, it is only necessary to set **UPSI 11000001** (X'C1' for Console 1nput).

EOF (Testing for)

See also:

- Multiple Input Files in section *Further Information*.

```
IF EOF
IF EOF     ABC
IF EOF   FILE=ABC
```

By default, when SELCOPY reaches EOF (End of File) on the prime input file, normal EOJ (End of Job) is actioned and the run terminates without the user having to worry about it.

However, using the **IF EOF** statement, users may keep control after EOF has been detected in order to take some special action at this time. (But use the **CAT** statement if the special action is to read another sequential file.)

When **IF EOF** is used it then becomes **the user's responsibility** to terminate the job by issuing a GOTO EOJ statement. SELCOPY will only give automatic EOJ if control drops through to the last statement, which by definition means go back to the first statement, and there are either no input statements remaining, or no output statements remaining. (User Exits and CALL routines do not count.)

When processing data records with an **MVS PDS DIRDATA** read, **IF EOF** will be successful if a **FLAG EOM** has been issued for the current member.

Beware of Looping at EOF because your end-of-file test is in such a place that it never gets executed due to a preceding THEN GOTO statement that always succeeds.

When several input files are in use, it becomes necessary to identify which one is referred to when a test is made for end-of-file. This is achieved by quoting the filename on the IF EOF statement. If the filename is omitted, it is assumed to be the main input file, i.e. the first one mentioned.

Due to the presence of an EOF test, SELCOPY assumes that the user wishes to continue processing after reaching end-of-file. This could result in an attempt to read the file again, in which case the user is supplied with the same record as was left in the workarea or input buffer by the previous input operation, complete with any modifications the user may have already made to it. This is not treated as an error condition.

In fact, when end-of-file is recognised it is because an attempt was made to read a file when there was nothing left to read. Thus, if the EOF condition is not tested immediately after the READ operation, you run the risk of processing the last record twice.

The same file may be tested for EOF in as many IF/OR/AND/THENIF/ELSEIF statements as required. However, it would be more readable if the READ operation and the test for EOF were coded once only and invoked by the **DO** operation (PERFORM) which of course can be conditional on a THEN or ELSE.

WARNING 1

When End-of-File is detected, that file is immediately closed by SELCOPY, thus freeing up System resources at the earliest possible time. Also, all READ operations on that file are removed from the control card sequence, just as though they had reached a **STOPAFT** value.

On some operating systems, the I/O buffer is allocated in System Dynamic Storage, so if processing is to continue after **EOF** is reached, and **no work area** was coded, then a blank filled area, length 80, is supplied by SELCOPY to act as the current record. If a work area exists, SELCOPY returns LRECL equal to the size of the last record read and the data is unchanged. If the **FILL** option is coded on the input statement or in **SELCNAM**, the data from the last record read will be filled with the nominated FILL character.

WARNING 2

EOF tests **do not have to** follow a READ operation. They may go anywhere, but beware of a GOTO which can cause SELCOPY to bypass the test, resulting in an **EOF loop**, and beware too of the double processing of the last record mentioned above.

It is recommended that for safety and readability, EOF tests are placed immediately after the READ operation.

IF EOF Example

Read a file, record length 80, and print an accumulated total of the 4-byte packed decimal field in positions 20-23 of all records. Also display the same message on the operator's terminal.

```
READ ABC   WORKLEN 200
  IF EOF
    THEN POS 101 = 'FILE ABC TOTAL = 9999.99 '
    THEN CVPC 4 AT 90   TO 118   FORMAT 9999.99
    THEN PRINT      FROM 101   L=25          * Print accumulated total.
    THEN LOG L=25   FROM 101                 * Tell operator.
    THEN EOJ                                 * Means GOTO EOJ.
POS 90 = X'0000,000C'   STOPAFT=1            * Initialise (just once).
ADD 4 AT 20   TO 4 AT 90                     * Accumulate.
```

EOJ

STOP
GOTO EOJ
FILE=STOP

See also:

- EOF (Testing for) in this section.

```
NOW EOJ
THEN EOJ
EOJ
GOTO EOJ
```

EOJ is a parameter on the NOW/THEN/ELSE, or an Operation Word in its own right. It is **not a label** even if it is the only word on a card. **EOJ** indicates that the job is to be terminated immediately on execution of this statement. i.e. the same as **GOTO EOJ**.

When **EOJ**, or any of its above synonyms, is actioned, it is considered a deliberate and **calculated** act on the part of the user, so the **RC=4** and **RC=16** warnings, for not reaching EOF and not having any output selection hits respectively, are **suppressed**.

An **EOJ** command is **advised** if you have used **IF EOF** to handle end-of-file processing on the **Prime** input file.

EOL (End-of-Line protocol)

--- AS/400, UNIX, PC only ---

```
READ    C:\TEST\DATA.XYZ   EOL='XYZ'   * Input file with XYZ delimiter.
WRITE   C:\PAYROLL.UNX     EOL=LF      * Output file with UNIX EOL standard.
```

The EOL param is normally not needed, and when needed, EOL is applicable only on **READ** and **WRITE** to **RECFM=U** files.

For RECFM=U input, when the EOL parameter is omitted, any type of standard line-end protocol is acceptable to SELCOPY running under any supported operating system. UNIX will accept PC protocol and vice versa.

Since the Line Feed character in EBCDIC is x'25', SELCOPY for **AS/400** does not automatically recognise the **UNIX** end-of-line standard of LF (x'0A' ASCII) and so EOL=x'0A' would have to be coded on input. Note that on AS/400 systems, each input record is treated as though it is already in EBCDIC so, for ASCII character data, CVAE ASCII to EBCDIC conversion would be required following the input statement.

Uniquely for the **AS/400**, SELCOPY will automatically convert a RECFM=U file to EBCDIC if the **PC** end-of-line standard of CRLF (x'0D0A' ASCII) is encountered on the 1st record.

Defaults are usually correct, but you may for instance require RECFM=U output with a format in conflict with the default for your operating system, or for input, you may require to restrict SELCOPY's liberal acceptance of any EOL variant.

EOL=CRLF	forces the PC or AS/400 standard: CRLF. (X'0D0A' for PC, x'0D25' for AS/400)
EOL=LF	forces the UNIX standard: LF only. (X'0A')
EOL=CR	forces a non-standard: CR only. (X'0D')
EOL='str'	forces a non-standard: 'str' where 'str' may be any string. e.g. EOL=X'0D0D,0A0A' or EOL=EOLINE even.
EOL=NO	Indicates no End-of-Line delimiter at all. Output data is written using length LRECL only and **NOTRUNC** implied. Input data reads data length LRECL only, the value of which may be set or modified by the user before issuing the READ statement.

EOL is accepted on any type of file I/O statement, and **ignored** where inappropriate. i.e. when a RECFM other than U is explicitly set.

Where RECFM has not been explicitly coded, RECFM=U is implied from the EOL=xxx parameter, for both input and output files.

EOMEMB

--- Mainframe, PC only ---

See also:

- FLAG in this section.

EOMEMB, and its synonym **EOM**, are parameters on the **FLAG** statement for **DIRDATA** processing.

EQ 'string'

EX=
EXACT=
=

See also:

- Comparison Operators in section *Further Information*.
- ASCII/EBCDIC Differences in section *AS/400, UNIX and PC Processing*.

```
IF POS 12   EQ   PNBKRQZ
OR POS  1   EQ   POS 4001   LENGTH 4000
OR POS=57   EX=X'001F'
AND P 178   EXACT='CANCELED BY OPERATOR'
THENIF POS 201 280   =   'SYSTEM ABEND'
```

Used to specify an exact value to be tested for equality with a field in the input or work area. The argument may be a character or hexadecimal string of any length that will fit on a control card. The length of the input field for comparison is equal to the length of the string.

In the case of the argument being another position parameter it is essential to indicate the length of the comparison required.

If the result of the comparison is equality, the associated THEN Control Cards are actioned.

This operator may be **omitted altogether**. Absence of a comparison operator will default to an equality test.

```
IF POS 6 'ABC DATA'
```

is the same as

```
IF POS 6 EQ 'ABC DATA'
```

EQU (Operation Word)

!!! IMPORTANT FEATURE !!!

Remembering the position in the SELCOPY work area of various constants and areas is often a tedious task. Even worse is the task of finding all references to a position in order to change it.

The **EQU** statement allows the user to give meaningful names to such positions, or indeed to anything, as illustrated below. Thus any change to a value which is used many times may be made by altering just one statement, the **EQU** statement.

The first argument of an EQU statement is the equated name which may be of any length and consist of any character excluding **'!'**, **'='**, **'*'** and **','**. The next, and subsequent arguments are then used as substitutes for every further occurrence of the EQUated name. An **asterisk** denotes end of arguments, allowing comments.

No substitution occurs for equated names that are enclosed in quotes, but it is quite acceptable to equate a name to a literal that **is enclosed** in quotes.

The **EQU** statement may be supplied anywhere within the SELCOPY control cards, provided it comes before the use of the equated name. However, for ease of reference, it is recommended that all **EQU** statements are placed at the beginning of your control cards, immediately following the **OPTION** statement if used.

```
equ INA    1001                  * Input area.
equ INB    1046                  * Any comment allowed.
equ OUTA   1101
equ OUTB   1120
equ RF1    read STK1
  RF1     w 2222    into INA      * rd STK1 w 2222 into 1001
  move 6   from INA   to OUTA     * Etc etc...
  move 9   from INB   to OUTB     * Etc etc...
  print    from OUTA
```

EQU Nesting and Pointer Variables

An EQUated value may reference, without restriction, other EQUated values, **positional keywords** and **pointer** variables. e.g.

```
equ @LONGMEANINGFULNAME  @abcd     * Overcome 4 character name limitation.
equ OFFSET  cblname+@POS-1         * @POS cannot be zero.
equ DEFAULT OFFSET+256
```

EQU Names with Displacements

Having EQUated the name **FRED** to a number such as **14000**, users may refer to **POS FRED+22** in order to reference **POS 14022**.

If however an **EQU** statement already exists, such as **EQU FRED+22 192**, then it will take precedence, and any reference to FRED+22 will be interpreted as 192 instead of 14022.

EQU Names with Expressions

No limit is placed on the number of arithmetic elements used to make up a compound numeric argument, which may include as many **EQU** values as required. e.g.

```
equ AA 100
equ BB 50
pos AA+22-6-10-600+610+6           * refers to POS 122.
pos @+AA+AA+11-BB-1                * refers to POS @+160.
```

EQU Example

```
EQU INREC 2001
READ ABC   INTO INREC
IF POS INREC+21 INREC+79 = X'0D0A'
  THEN LRECL =  @-INREC            * Valid.
  THEN WR XYZ   FROM INREC
```

EQU Dangers

Resolution of **EQU** names is done **before validation** of keywords and parameters, and **no restrictions** are made - anything may be EQUated. So please beware of EQUating words such as **POS** or **FROM**, or indeed any of the reserved keywords.

You have the power. Please use it with care.

ESDS --- VSAM only ---

See also:

- VSAM Output LRECL in section *VSAM Files*.

```
READ (FILE=)fname ESDS (INTO=p) (WORKLEN=n) (WTO=YES)  (PASS=passwd)

(WRITE) (FILE=)fname ESDS (FROM=p) (LRECL=n/V/U) (STOPAFT=n)
          (REUSE) (PASS=passwd)  (FILL=c) (RECFM=F/V/U/FB/VB)
```

Indicates that the file mentioned is an **ESDS**, Entry Sequence Data Set, which is to be processed using **VSAM**.
Note that the LRECL and RECFM parameters are only available for output, and these are subject to special interpretation.

MVS environment

This parameter may be omitted altogether and SELCOPY will recognise the file as a VSAM file of the correct type (KSDS/ESDS/RRDS) from the JFCB.
Exceptions to this are: when the VSAM file is using **Local Shared Resources**, or when proprietary software is used to simulate **VSAM**.

VSE environment

If **VSAM** is coded instead of **ESDS**, the file is first opened assuming a **KSDS**, resulting in a VSAM Error Message on the Operator's console. It is then opened as an **ESDS**, and normal processing continues.

EXACT

EX

See also:

- EQ 'string' in this section.

```
IF POS 22   EXACT=XYZ
IF POS 22   =  XYZ          * Has the same meaning.
```

EXACT is a synonym for the **EQ** comparison operation. Both are redundant and may be omitted altogether.

EXCL --- ADABAS only ---

```
RD #7 ADA  EXCL  SEQ=AB  FORMAT='AB,AD.'  SRCH='sb data' 'XYZ'
```

The **EXCL** parameter, if coded on one or more statements referencing an ADABAS file, indicates that **Exclusive Control** is required for that file.

EXIT='phasenam' --- Mainframe only ---

```
EXIT=EXPAND   ENTRY=16   SIZE=8000   STOPAFT=350
THEN   EXIT=COMPRS                 * Default size of 2048 for VSE.
```

The **EXIT** facility has become effectively **obsolete** since introduction of the **CALL** statement.
Please refer to the **CALL** statement.

An **EXIT** statement indicates that at this point in the SELCOPY logic, control is to be passed to code supplied by the user in an Assembler Language **User Exit**. For an explanation of how to write a user exit, please refer to the later section *The User EXIT*.

The argument of **EXIT** is the name of the loadable phase/module of executable code. This is held on a VSE Library, an MVS Load Library (PDS), or a CMS TEXT file.

The **SIZE** parameter is **not required for MVS** users, and if present is ignored. For VSE it is required if the size of the phase is greater than 2048 decimal, the **default** size used.

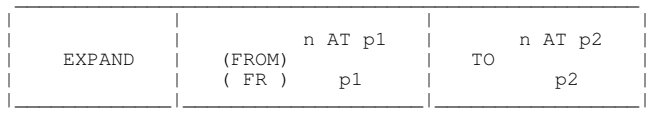
The **ENTRY** parameter, if present is used to cause entry to the exit routine at a **decimal** displacement other than zero.

All **EXIT** routines are called **unconditionally** just before **EOJ** to allow any clean-up which may be required, so an **ENTRYEOJ** parameter, as on the **CALL** statement, is not required.

EXPAND

See also:

- COMPRESS in this section.



Storing data on disk is extremely inefficient when the data consists of many embedded blanks and other duplicated characters. To avoid this inefficiency, the **COMPRESS/EXPAND** facility allows compression before writing, and expansion back to the full record size after reading a compressed record.

COMPRESS and **EXPAND** operate on storage only, and are not concerned with any particular file.

If the source length is not provided, the default length used for the **EXPAND** statement is **LRECL**.
After compression or expansion, the **LRECL** value is modified to reflect the size of the compressed or expanded data.

It is possible that the expanded data is shorter than the source.

Restrictions

1. Source and destination may not overlap.
2. Destination length, if provided, does not cause the operation to fail if its confines are exceeded. However, a syntax error will occur if the destination field is not within the work area.
3. For **AS/400**, **UNIX** and **PC**, the optional FROM parameter has been made mandatory.
   Thus:

```
EXPAND  1           TO 1001              * Gives a syntax error.
EXPAND  FR 1        TO 1001              * Acceptable. (Length=LRECL.)
EXPAND  456 AT 1    TO 1001              * Acceptable.
EXPAND  LRECL AT 1  TO 1001              * Acceptable.
```

Example

For restore purposes, the following statements would be suitable:

```
READ TAPEFIL  RECFM=VB NORDW   W=2222     * Read Back-up.
EXPAND   FR 1   TO 601                    * Expand LRECL bytes.
WR BIGFILE      FR 601   RECFM=VB B=8000  * Write normal file.
```

The **NORDW** parameter has been included on the input file because we do not wish to include any **RDW** in the expansion algorithm. If input is not **RECFM=V**, then the **NORDW** parameter is simply accepted with no error message because RECFM=F and RECFM=U records have no RDW anyway.
SELCOPY will of course generate an appropriate **RDW** for the output file which is explicitly coded as RECFM=V.

FAIL=NOCLOSE

--- VSE only ---

```
WRITE NEWMAST   BLKSIZE=13000   FAIL=NOCLOSE
THEN WR TAPE23     FAIL=NOCLOSE
ELSE WR TAPE24       FAIL=NOCLOSE
```

For VSE users prior to SP2, who do not have conditional JCL, this parameter and argument, FAIL=NOCLOSE, will cause SELCOPY to bypass closing the associated file if the run is terminated by SELCOPY due to an error encountered, or due to satisfaction of a THEN GOTO CANCEL condition.
Thus any VSE tape management system's catalog information, normally updated at 'close' time, will remain unchanged when a SELCOPY error condition arises.

Note that VSAM always tries to AUTOCLOSE clusters at end-of-step if the user has not closed them.

FILE=fname/keyword

F=

The parameter **FILE=** may also be replaced by the synonym **F=**, but is better **omitted altogether** because its argument is already known to be a file name.

```
THEN            PRINT        *   (Recommended usage)
THEN          F=PRINT        *   Same as THEN PRINT.
THEN       FILE=PRINT        *   Same as THEN PRINT.
THEN WRITE FILE=PRINT        *   Same as THEN PRINT.
```

4 types of FILE argument:

1. A keyword indicating a **pseudo** file which requires special **logical** action on the part of SELCOPY, without real I/O.

DUMMY	Logical - No real I/O.
START	Logical - Commence selection process.
STOP	Logical - GOTO EOJ.
SUSP	Logical - Suspend selection process.

2. A keyword indicating a file with **special** treatment, but using **real I/O**.

CARD	Same Device as Control Cards.
JECL	For **VSE** only with **POWER**.
LOG	Operator's or user's Terminal screen.
PRINT	Listing with various formatting.
PUNCH	ASA chars added.

3. The keyword **TAPEnn**, for **VSE users** only, indicating a Tape device, without having to code **DEV=TAPE** and **SYS=nn**. TAPEnn for MVS users is just another file name as discussed under 'fname'.

TAPEnn	For **VSE** only - Tape Device.

4. Any other **fname** represents the file name of a real file which may be on any device. This is the most common type of file name used.

fn.ft.fm	For **CMS** only - CMS native file, or generic group
fileid	For **AS/400**, **UNIX** and **PC** only - AS/400,UNIX,PC native file, or generic group
#nnn	IMS, DL1, or ADABAS file.
lib.sublib.name.type	VSE LIBR members or generic group.
fname	Any other file.

Detailed descriptions of each of the above **reserved file names** follow.

FILE=DUMMY (logical)

See also:

- Processing with no Input File in section *Further Information*.

```
READ  DUMMY    LRECL 123   WORKLEN 2222
WRITE DUMMY   STOPAFT 1234
THEN  DUMMY
DUMMY                              * Treated as    WRITE DUMMY.
```

DUMMY is a pseudo file name which will cause no real I/O. We will consider it first as **Input**, then as **Output**.

DUMMY Input

READ DUMMY will result in SELCOPY assuming it has reached immediate end-of-file, and unless an **IF EOF DUMMY** test exists, the job will be terminated equally immediately.
This is a convenient way to **initialise an empty file**.

```
RD DUMMY     * Immediate EOF.
WR OUTFIL    * Writes zero records, but file is opened and closed.
```

Other parameters normally associated with files are allowed, **LRECL** (Default LRECL=80), **STOPAFT** etc, also **WORKLEN** if it is the prime (1st mentioned) input file. So it is possible to use an **EQU** statement at the front of the control cards to change a filename to **DUMMY** even though the filename to be changed mentions geometry information such as LRECL etc.

```
RD DUMMY  LRECL=n  BLKSIZE=n  RECFM=x  DEV=xxxx   * etc
```

If no **WORKLEN** is coded anywhere, (not even on an **OPTION** stmt), and **IF EOF** processing is used, then an I/O area of length LRECL (80) is allocated which will be initialised to blanks or to the **FILL** character if coded on the **READ DUMMY** statement.

Note that the **OPTION** statement may be used more efficiently for **Processing with no Input File**, however the **READ DUMMY** will also give this facility:

```
READ DUMMY   LRECL 138   W=9999
IF EOF DUMMY         * Always true.
  THEN CP 'QUERY RDR ALL'
IF POS 1 8192 = 'MYJOB'
  THEN LOG   FR @-20   L=80
EOJ                  * Unconditional end-of-job. (Not a label)
```

Please remember that when you test for EOF, you **then have** the responsibility of terminating the job with an **EOJ** statement. SELCOPY will however terminate automatically if **EOF** has been reached on **all input** files, (i.e. no other input is possible), and control drops through to the end of control statements or **GOTO GET** is actioned.

DUMMY Output

No data is output, but at end-of-job, separate diagnostic totals are produced for this pseudo output file.

Other parameters normally associated with files are allowed, **LRECL**, **STOPAFT** etc, so an **EQU** statement may be used to change a filename to **DUMMY** if it is not required for a particular run.

```
EQU XYZ     DUMMY   * No real    XYZ output - TEMP -
WR XYZ    LRECL=n  BLKSIZE=n  RECFM=x  DEV=xxxx   * etc
```

WRITE DUMMY provides a convenient method of preventing SELCOPY's automatic EOJ when all selections are satisfied, thus allowing counting the number of records which satisfy a particular condition.

```
READ TAPE14   LRECL 138
PRINT   TYPE=M   STOPAFT=17
WRITE DUMMY              * Prevent EOJ after 17th record.
```

Use of FILE=DUMMY as a No Op

When action is required on the **failure of an IF test** only, then **FILE=DUMMY** can be used to effectively 'do nothing', on the mandatory **THEN** statement, which allows an **ELSE** to follow.

```
IF POS ANY = 'XYZ'   !THEN DUMMY   !ELSE POS L+1 = 'XYZ'
```

FILE=START (logical)

See also:

- FILE=SUSP (logical) in this section.

There are times when you only want to "start" your main selection logic when a certain condition arises. Until then all selections are to be suspended. The pseudo output file, START, will fulfil this requirement.

Selection activity is started when a **START** operation is actioned. Control is immediately passed to the next statement following the one with the FILE=START, and from there on, statements are actioned in the normal sequence. Selection to FILE=SUSP can subsequently alter this.

A **START** operation, when already in the "STARTed" state, is treated as a null operation, and the Selection Count is **not updated**.

The mere presence of one or more pseudo file **START** statements causes SELCOPY to suspend all ordinary selections right from the beginning of execution.
i.e to operate in the **SUSP** state.
Only conditions that could result in the actioning of a **START** command are checked. Once this START has been actioned, every condition is checked as normal.

Only the **Prime** input file is processed in the **SUSP** state, and no movement of data to the work area occurs until a **START** operation is successful.
Thus, the use of **INTO=n** on the prime **READ** statement is not permitted.

```
READ MASTER   RECFM=V
IF P 1 = H150     !THEN EOJ        * Terminate after 149 branch.
IF P 1 = H149     !THEN START      * Header rec for 149 branch.
```

```
PRINT     TYPE=B     STOPAFT=200
```

FILE=STOP

STOP
FILE=EOJ
GOTO EOJ
EOJ

The run is terminated immediately action is taken on this pseudo output file selection. All files are closed and totals are printed as for a normal end-of-job.

```
READ ABCFILE
PRINT
IF POS 21 GT X'0599,000C'
  THEN STOP
GOTO GET   STOPAFT=5000
STOP                              * Treated as    GOTO EOJ.
```

FILE=SUSP

SUSP can only be used in conjunction with **START** as described above. All **output** activity is suspended when **SUSP** is actioned.

Subsequently, only conditions that result in **THEN START** are tested, so beware of failure to satisfy an **INCOUNT** comparison when selection is in the SUSP state.

```
READ MASTER   RECFM=V
IF POS 1 = H                  * Only header recs have H in pos 1.
  THENIF P 2 GT '206'         *
        THEN EOJ              * Terminate after Branch 206.
        ELSE SUSP             * Suspend all Branches.

IF POS 1 = 'H149'             * Header rec for 149 branch.
OR POS 1 = 'H153'             * Header rec for 153 branch.
OR POS 1 = 'H206'             * Header rec for 206 branch.
  THEN START                  * Activate reqd branches.

PRINT TYPE=B   STOPAFT=200    * Only if in   START state.
```

FILE=CARD

FILE=SYSIN

See also:

- SYSIN for MVS and CMS in the section *Further Information*.
- EOF (Operation Word) in this section.

FILE=CARD is only applicable on a READ statement. For **mainframe** SELCOPY, the filenames **CARD** and **SYSIN** are synonomous. However, for **AS/400, UNIX** and **PC** SELCOPY, **FILE=SYSIN** is a synonym for **FILE=STDIN**.

READ FILE=CARD indicates that the input data records are read from the same data set as the SELCOPY control statements. The **CARD** data records follow immediately after the **END** statement which must be specified to define the end of SELCOPY control statements.

VSE CARD input is taken via **SYSIPT**, and **MVS CARD input** via the DD card for **SYSIN**. **AS/400, UNIX** and **PC CARD input** may be via **STDIN** standard system input, which may be piped or redirected; or via the **"-ctl fileid"** command line syntax, whereby records are read directly from fileid thus leaving STDIN free for **READ FILE=STDIN** piped data input.

LRECL of CARD input records depend upon the characteristics of the control statement file and device. MVS and CMS SYSIN statements may be fixed or variable up to a maximum LRECL of 256 bytes. AS/400, UNIX and PC CARD records are read via a RECFM=U input file with end-of-line characters, so LRECL is variable up to an imposed maximum of 512 bytes. VSE SYSIPT CARD input is fixed length 80 bytes although support still exists for the 96 column card with a default LRECL of 96.

FILE=CARD is reported in the execution summary of the SELCOPY listing as filename **SYSIN** on mainframe and **CARD** on AS/400, UNIX and PC systems.

```
READ CARD
PRINT
END
data cards ...
/*                Required for VSE only.
```

Reading Through VSE /* and /&

The **EOF** operation may be used if it is required to process **/*** and **/&** cards as data on a **VSE** system.

CLOSE=LEAVE for VSE Card Input: Conditional Job Control, which is available as part of the operating system to **MVS** and **VSE/SP2.1** users, may still be achieved in a limited way by the smaller VSE, DOS/VS or even original DOS user.

We will take advantage of the fact that **Card input data** which is intended for a VSE program, but which is not read by that program, is then processed by the VSE system as potential **JCL**.

Releases of SELCOPY prior to **Rel 8** have prevented this possibility by unconditionally flushing the card reader to EOF at EOJ, thereby clearing residual data cards and saving the operator the trouble of having to intervene to flush out invalid cards.

CLOSE=LEAVE may be coded on a **CARD** input statement to instruct SELCOPY that the Card Reader is **Not to be Flushed** at EOJ, thus allowing unprocessed cards to be handled by Job Control.

Careful choice of what is read or not read by the SELCOPY job will result in the next step being run or not run as the case may be. e.g.

```
   RD CARD   CLOSE=LEAVE  W 222
   RD ABCFIL KSDS   KEY='AAAAAA'      * User's Control Record.

   IF P 6 = X'0000'                   * User's indicator.
     THEN EOJ                         * Leave Cards in RDR.

FLUSH
    READ CARD                         * Flush next job.
    GOTO FLUSH

  END                                 * Indic end of SELC ctl.
* Data card read by SELCOPY.          * Always read by SELC.
* Start of Conditional JCL *
// DLBL and/or Extent info etc.          * Conditional *
// EXEC PROGNAME                         * Conditional *
* Data for program, PROGNAME.            * Conditional *
/*                                       * Conditional *
```

FILE=STDIN --- AS/400, UNIX, PC only ---

FILE=SYSIN

See also:

- Command Line Parameters in the section *AS/400, UNIX and PC Processing*.

For AS/400, UNIX and PC versions of SELCOPY, the filenames **STDIN** and **SYSIN** are synonomous on a READ statement. Both indicate that the input file is from the stdin input stream.

The command line argument **"-ctl fileid"** must be used to define the name of the Control Statement input file, thereby freeing up stdin for use as a regular input file.

This allows output from another process to be piped as input data to an execution of SELCOPY. e.g.
File **test01.ctl** contains the following SELCOPY control statements:

```
rd stdin
wr stdout s=22
pr        s=11
end
```

We then issue the following command:

```
dir testdir\*  |  selcopy    -ctl test01.ctl
```

The output (stdout) from the dir command will be piped into selcopy where it is read as stdin, but only the 1st 22 lines of input are written to stdout which is not piped and so is directed to the terminal. The 1st 11 lines are also printed on the SELCOPY output listing file, which will also report the number of stdin records processed.

Note that the following command would achieve the same result without the requirement to have a real file for the control cards.

```
dir testdir\*  |  selcopy ! in stdin ! wr stdout s=22 ! pr s=11 ! end
```

By default, STDIN is buffered by SELCOPY, using the default buffer size of 2048. This default may be overridden using the BLKSIZE=n parameter on the READ statement.

As for standard AS/400, UNIX and PC files, the default record format is RECFM=U (undefined length records) terminated with LF or CRLF according to the host operating system. RECMF=x and LRECL=n may be coded to override this.

FILE=STDOUT

--- AS/400, UNIX, PC only ---

FILE=STDOUT is only applicable on a WRITE statement.

WRITE FILE=STDOUT allows SELCOPY output to be piped as input data to another process. e.g.
File **test02.ctl** contains the following SELCOPY control statements:

```
in c:\testdir\keyfile.txt           * Keyed file.

if pos 21  >=  '2000'               * Test year later than 1999.
then  wr stdout
then  pr        s=11
end
```

We then issue the following command:

```
selcopy  < test02.ctl  |  sort  > c:\testdir\keysort.txt
```

All records containing string greater than or equal to 2000 in position 21 will be written to STDOUT. The 1st 11 lines of output will also be printed in the SELCOPY listing file, which will also report the number of stdout records written. The STDOUT output from SELCOPY will be piped into the SORT command where it is read as stdin. The records are sorted to stdout which is directed to fileid c:\testdir\keysort.txt.

Note that, if no pipe exists for WRITE FILE=STDOUT output, then data is directed to the terminal.

By default, STDOUT is buffered by SELCOPY, using the default buffer size of 2048. This default may be overridden using the BLKSIZE=n parameter on the WRITE statement.

As for standard AS/400, UNIX and PC files, the default record format is RECFM=U (undefined length records) terminated with LF or CRLF according to the host operating system. RECMF=x and LRECL=n may be coded to override this.

FILE=JECL

--- VSE only ---

```
WRITE JECL   '* $$ PRT FNO=1PRT,CLASS=C'
THEN  JECL     FROM 1501   LRECL 72
```

The filename **JECL** may be used at **VSE/POWER** installations in order to issue POWER JECL statements dynamically, controlling the destination of unit record device output. i.e. the **PUN** and **LST** cards.

Similar to **PRINT** output, data may be a literal or come from the input or work area. In the above example, the user must ensure that positions 1501 to 1572 hold a valid **POWER JECL** statement.

JECL data from the input/work area must be **length 72**, padded with blanks. JECL literals are padded to 72 bytes by SELCOPY.

Important

You **must not use LST=SYSnnn**, where nnn is numeric. All SELCOPY's print output goes via SYSLST, which is JECL's default anyway.

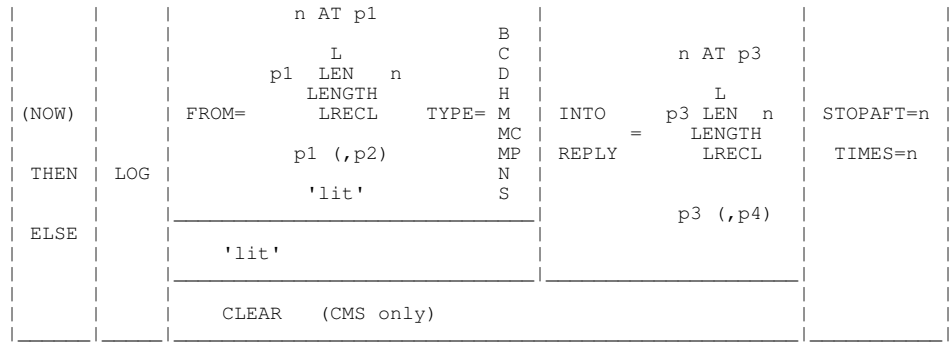
ERROR 035 is issued if an error is detected in the format of the **JECL** statement, but only basic validation is performed by SELCOPY.

FILE=LOG

LOG
WTO
SYSLOG

See also:

- FILE=PRINT, FILE=PLOG (Print and LOG) and CLEAR in this section.




```
WR LOG   L 50
LOG   FR=2000 LRECL=50
THEN LOG   'ERROR FOUND ON ABOVE DATA'
ELSE WTO   'CANCEL OR IGNORE?'    REPLY 3 AT 2050
LOG   CLEAR   STOPAFT=1            * For    CMS only.
LOG                                * Treated as    WRITE LOG.
```

LOG output is directed to the Operator's Console. However, with modern operating systems, this often means to the user terminal that initiated such output, as is the case under **TSO, CMS**, and **ICCF**, giving instant information on the terminal instead of having to edit a LISTING file.
Outside TSO, CMS and ICCF, use the **LOG** facility with caution, or in desperation when a printer is not available, because output is to the operator's console.

TYPE param

The same **TYPE** arguments are available as with the PRINT file, giving input record number and counting guide etc.
If omitted, **TYPE=S** is assumed. e.g. a 72 byte record will be written to the terminal as an unmodified 72 byte line.

LRECL param

As with **PRINT**, different lengths may be used on different **LOG** commands.
If data available is less than the requested LRECL, or contains right adjusted blanks then the line logged is truncated.
If omitted, **LRECL=79** is assumed for mainframe systems and **LRECL=80** for AS/400, UNIX and PC systems.

STOPAFT=50 is Default

To avoid the inconvenience of accidentally filling the operator's, or your own, screen with **LOG** output, if STOPAFT is omitted, **STOPAFT=50** is assumed.

CLEAR param

Available for **CMS** only, causes the user's screen to be cleared.

REPLY param

Not supported for **AS/400**. A reply from the operator can be requested by coding **REPLY n AT p** or any alternative syntax as shown above. **INTO** is treated as a valid synonym for **REPLY**. If only a length is supplied as a reply argument, then the reply data is placed in pos 1 of the input/work area. The **actual** length of the last string literal entered by the user is held in the 4-byte binary field at **POS UXREPLYL**.

TSO Users

When invocation of SELCOPY is at a **TSO user's** terminal, from a TSO **READY** prompt, **TSO** command within **ISPF** or from a **CLIST** or **REXX** exec, then:

- All **LOG** output is directed to the TSO user's **own** terminal.
- All **REPLY** data for a **LOG** statement is requested from the TSO user's **own** terminal.
- Error messages concerning a SELCOPY execution that **fails** are directed to the TSO user's **own** terminal.

FILE=PLOG (Print and LOG)

See also:

- FILE=PRINT and FILE=LOG in this section.

```
PLOG                          * Treated as    WRITE PLOG, (not as a label).
WR PLOG   L 50
THEN PLOG   'ERROR FOUND ON ABOVE DATA'
```

The **PLOG** file writes to both **PRINT** and **LOG** files, which is useful when the same message is required on both files, typically for application error message literals.

If **TYPE** is specified then it is applied to both PRINT and LOG files, otherwise the respective defaults apply:

- **TYPE=S** for **LOG**
- **TYPE=N** for **mainframe PRINT**
- **TYPE=C** for **AS/400, UNIX and PC PRINT** output.

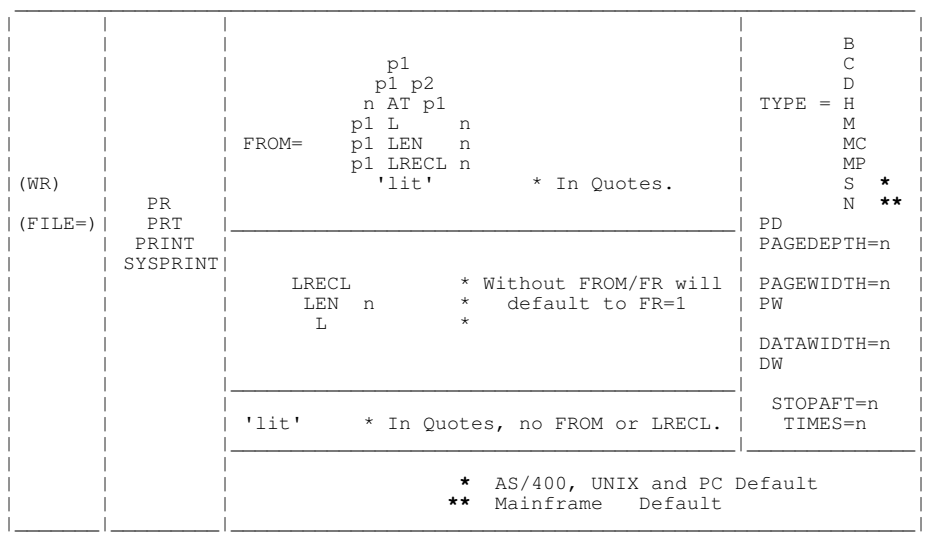
If no LRECL is specified, then the default value for PRINT applies to the LOG output also.

FILE=PRINT

PRINT
PR

See also:

- FILE=PLOG (Print and LOG), FILE=LOG, DATAWIDTH, PAGEWIDTH, PAGEDEPTH and TYPE=x (for Printing) in this section.



Arguments p1, p2 and n are supported also as @ and @user pointer values or Position Keywords.

Note that **L, LEN**, and **LRECL** apply to the individual selection statement, having no bearing on any other output statements to the file **PRINT**.

```
PRINT   FROM 20   LRECL=100   TYPE=B   STOPAFT=266   PAGEDEPTH=66
PR '** ERROR **'   TIMES=6          * Print literal 6 times.
PRT   L 100   S 250
PRINT                              * Treated as    WRITE PRINT.
PR   TYPE M
THEN PRINT   FR @+50   L 560   PD 66
```

PRINT indicates that data is to be output to a printing device.

FROM param

The data printed is by **default** from position 1, otherwise from the **FROM** argument if used. This may be numeric, or one of the **Position Keywords**.

LRECL param: Length printed is either that requested on the **LRECL** parameter. If no **LRECL** parameter is coded, the length printed is the length of the **last record read** from any file.

Different **PRINT** statements may use **different LRECL** values.

Note that if you are processing multiple variable length files, or processing several records (variable length) from the same file in the work area, the **default** length used for printing does not depend on where the data you are printing came from. It is the length of the **last record read**.

Note also that variable length records, when printed will include the 4-byte RDW, (unless **NORDW** is specified for the input file), whereas, when written out to a **Fixed** length file **will not** include the RDW.

Literal strings: To avoid the problem caused by poor spelling of parameters, or the use of illegal parameters on a PRINT statement, PRINT and LOG **literals must always be enclosed in quotes**. Thus an unrecognised word is not a literal by default.

TYPE param

Data may be printed in any of several different representations, controlled by the **TYPE** parameter.
Omission of TYPE for a **mainframe** environment causes the print to be straight forward unedited character, **TYPE=N**. However, for a **AS/400**, **UNIX** or **PC** environment the print will be character with unprintables translated to full-stops, **TYPE=C**.

For most print types, data is printed in as many 100 byte lines as are needed. The length of the data print line may be reduced by using the **DATAWIDTH** parameter.
A line of dots printed at the top and bottom of each page gives the user a **counting guide** to assist checking positions.
Furthermore, the **length** of the input record last read, the **input record number**, and the **selection id** number that caused the print operation, are also printed.

PAGEDEPTH param

Controls **page depth**, but is better coded on the **OPTION** statement because it effects **all printing**. If omitted, PAGEWIDTH is determined as follows:

1. The prevailing value coded on an **OPTION** PAGEDEPTH statement.
2. The system default value on an OPTION PAGEDEPTH statement in **SELCNAM**.
3. The system default value coded in **CBLNAME**.
4. The Operating System default. (VSE only).
5. The internal default value 58. (MVS only).

PAGEWIDTH param

Controls **page width**, but is better coded on the **OPTION** statement because it effects **all printing**. If omitted, PAGEWIDTH is determined as follows:

1. The prevailing value coded on an **OPTION PAGEWIDTH** statement.
2. The system default value on an OPTION PAGEDEPTH statement in **SELCNAM**.
3. The system default value coded in **CBLNAME**.
4. The default value 132.

PAGEWIDTH effects the format of **TYPE=D** (Dump) printing.

DATAWIDTH param

Controls the number of bytes of data that are printed in each line of the PRINT file. DATAWIDTH is better coded on the **OPTION** statement because it effects **all printing**. If omitted, the prevailing value on an **OPTION PAGEDEPTH**, or the **SELCNAM** default is used.

DATAWIDTH has no effect on **TYPE=D** (Dump) printing.

Job Control

PRINT and **SYSPRINT** are synonomous for both VSE and MVS users. They may be mixed at will.

MVS output goes via the **DD** card for **SYSPRINT**.

VSE output goes via **SYSLST**, which must be assigned to a printer, tape or disk device, or to **IGN**. Assignment to **UA** is not acceptable.

AS/400, **UNIX** and **PC** output is, by default, written to the file **SELC.LST** on the current directory on the current drive. This default may be overridden using one or both of the following methods:

1. Setting the Environment Variable **SLCLST** will override the default output fileid. e.g.

```
SET        SLCLST=c:\tmp\S.LST               for PC.
SET        SLCLST=\tmp\selcopy\s.lst         for UNIX.
ADDENVVAR     SLCLST '\tmp\selcopy\s.lst'       for AS/400.
```

   With this environment variable set, **PRINT** output will be sent to the file **\tmp\s.lst** for every SELCOPY execution.
2. Specifying the command line option **-lst** with the required output fileid on the SELCOPY execution statement, will direct the SELCOPY listing and PRINT output to the specified file. This will also override the fileid argument coded on the SLCLST environment variable. e.g.

```
SELCOPY       <c:\s\ctl\ssprint      -lst c:\s\lst\ssprint.001
```

   For this SELCOPY execution, **PRINT** output will be sent to the file **c:\s\lst\ssprint.001**

FILE=PUNCH

SYSPUNCH
CARD

```
WR PUNCH   FROM 101
PUNCH                          * Treated as    WRITE PUNCH.
```

In **AS/400**, **UNIX** and **PC** environments, the filename **PUNCH** and its synonyms are treated as disk fileids.

The filenames **PUNCH, SYSPUNCH** and **CARD** on a control card causing output are synonomous. In a VSE environment output will be via SYSPCH, and in an MVS environment via the DD card for SYSPUNCH.

VSE users should note that SELCOPY will take care of generating any ASA control character if SYSPCH is assigned to disk. You **should not** specify LRECL=81.

FILE=TAPEnn

```
READ FILE=TAPE10   LRECL=100   * uses SYS010
CKPT FILE=TAPE11               * Can only go on output tape.
WRITE TAPE11  LRECL=56  BLKSIZE=1120   * Truncated records to SYS011.
```

See also:

- FILE=fname in this section.

In **AS/400**, **UNIX** and **PC** environments, filenames **TAPEnn** are treated as disk fileids.

In an **MVS environment**, **TAPEnn** is just another filename, with no special meaning.

In a **VSE environment TAPEnn** indicates that the file is on magnetic tape. TAPEnn is the filename to be used on the TLBL card, and the 'nn' identifies the programmer logical unit, SYS0nn, to be assigned for this file.

TAPE, TAPE0, and TAPE00 will all use SYS000 as the logical unit. TAPE1 and TAPE01 will use SYS001 and so on, but remember that in your particular VSE supervisor, programmer logical units may not go as high as 99 in the partition you are using.

File names of this type may be used with the **READ, CAT, WRITE**, and **CKPT** operations. The parameters **OPEN=ctl** and **CLOSE=ctl** specify tape rewind options at open and close time, and **LABEL=NO** indicates an unlabelled tape.

For **VSE tape input**, SELCOPY provides an **Error Handling Routine** which endeavours to make the best of an I/O error. When an I/O error is encountered the operator is given the option to CANCEL, BYPASS or ACCEPT.

CANCEL	simply cancels the job.
BYPASS	ignores the questionable block and reads the next.
ACCEPT	attempts to use whatever data has been read as valid, and processing continues. Under certain circumstances no data has been transferred, in which case the operator will be informed that his choice has been reset to **BYPASS**.

Tape input **I/O errors** often result in the loss or gain of a few bytes of data, which means that if RECFM=U is not used, then it is highly likely that the block read will fail to satisfy logical requirements, and the job will be cancelled anyway with an error "BLKSIZE NOT MULTIPLE OF LRECL" for RECFM=F input, or "BLKSIZE DISCREPANCY" for RECFM=V input.
If this happens, rerun with RECFM=U on the input file, and copy it to another tape. Then repair the copied file.

FILE=fname

See also:

- FILE=fn.ft.fm and FILE=fileid in this section.
- **Table 2** in section *Control Statement Syntax Summary*.

```
READ FILE=INFIL   LRECL=123   DEV=3370
 CAT INFIL2   L 44                  * Concatenated with INFIL.
READ FILE=INDD  DSN=c:\selc\test\ddall.001
                                   * Use with Dynamic Allocation.
WR BB34567   FILL=X'FF'              * MVS gets geometry off DD card.
INS AA34567                          * KSDS, DL1 or ADABAS.
```

The **fname** may not exceed 8 alpha-numeric characters (7 for VSE disk files) and the first character must be alphabetic. (Note that this means no blanks.)

The word **FILE** need not be coded as the operations Read, Write, Insert, Delete, Replace etc, are sufficient to identify the next word as a **fname**.

If fname is not one of the reserved file names or SELCOPY keywords, then fname is the symbolic name that SELCOPY uses to reference a file or DB2 table, and is treated as follows:

- For **MVS**, the ddname of an allocated data set which may be on any device supported by **QSAM** or VSAM data management, e.g. tape, disk, card, etc.
- For **VSE**, the label name of a file which will be considered to reside on **disk**, unless **DEV=TAPE, DEV=DKT** or a synonym is supplied.
- For **CMS**, the filename of a file defined on a FILEDEF, or all, or part of, the file identifier in a "fn ft fm" combination.
- For **AS/400, UNIX** and **PC**, a fileid of a file on disk.

When used in conjunction with the **DSN** parameter, fname defines the symbolic name to be assigned to the specified file by SELCOPY's dynamic allocation.

On mainframe systems, where no dynamic allocation is in effect for fname, **JCL** is required to link **fname** with **real physical data**.

Mainframe Job Control

VSE users must supply a **DLBL/TLBL, EXTENT** and **ASSGN** for the file.
MVS users must supply a **DD** statement.
CMS users must supply a **FILEDEF**.
CMS/DOS users must supply a **DLBL** and **ASSGN**.
TSO users must supply an **ALLOC**.

Once allocated to a file, via JCL or dynamic allocation, FILE=fname may be used on SELCOPY control statements that need to reference the associated file. (e.g. READ, IF INCOUNT, IF EOF)

FILE=#nnn

--- DL1, IMS, ADABAS only ---

See also:

- Section *IMS and DL/1 Processing*.
- Section *ADABAS Processing*.

```
READ ABC #3   DL1                    * Use 3rd DBD with name ABC.
READ   #14    DL1                    * Use 14th DBD from PSB.
READ #057   ADA  FMT 'AA,BB.'        * ADABAS file number 57.
RD 000057   ADA  FMT 'AA,BB.'        * Same ADABAS file.
```

IMS/DL1 and **ADABAS** files may use a **numeric** filename, which may optionally be preceded by **#** (hash sign).

FILE=fn.ft.fm

--- CMS only ---

FILE=' fn ft fm '

See also:

- Section *VM/CMS Processing*.

```
READ   PROFILE.EXEC          * File Mode "*" assumed.
 CAT   ' &1 &2 &3 '
WRITE  'TEST EXEC A5'
```

This filename notation is available for **CMS users only**, allowing CMS disk files to be referenced directly by their **native CMS file name** which consists of three parts: **Fn** (File name), **Ft** (File type) and **Fm** (File mode) indicating the CMS disk on which it resides.

There are 2 ways to define a native CMS file. Only the syntax differs. The processing generated is identical:

1. By delimiting the 3 tier name with full-stops separating each part, and having no embedded blanks.
2. By delimiting the 3 tier name with blanks, (as many as required), all enclosed in quotes.
   Blanks are also permitted between the quotes and the file name. Thus, data via the **EXEC1 STACK** which has been tokenised, does not lose its integrity when truncated to 8 bytes.

The third part of the CMS file name (Fm) may be omitted, in which case, for input files it will default to '*', and for output files it will default to 'A1'.

All CMS files are processed using the native CMS I/O routines **FSREAD** and **FSWRITE**, except **File Mode 4** files which are treated specially by being forced to use standard **MVS Data Management**, which offers certain opportunities.

It is recommended that **fn.ft.fm** notation is used only for quick, one-off jobs. For readability, it is better to issue a **FILEDEF** for your CMS file, and refer to it within SELCOPY by its regular filename. SELCOPY will still process the file using native CMS I/O, and you will not have so much to key in if you refer to the file more than once.

When such file name syntax is used for files which have INCOUNT and EOF tests, and it is required to quote the filename on the tests in order to avoid ambiguity, the first part only, (the Fn), should be used.
Usually however, the default being the prime input file makes it **unnecessary**, although perfectly valid, to quote a file name:

```
RD   'PROFILE EXEC A'
IF EOF PROFILE
  THEN EOJ
IF POS 1 'GLOBAL'
AND INCOUNT PROFILE GT 10
  THEN POS 1 '*'
  THEN LOG
WRITE 'PROFILE2 EXEC D'
```

FILE=fileid

--- AS/400, UNIX, PC only ---

FILE=' fileid '

See also:

- Section *AS/400, UNIX and PC Processing*.

```
READ   C:\CONFIG.SYS
RD       %1                 * Fileid supplied as input parameter.
READ   lower.case.filename
WRITE  '\cbl\support\selcopy.query.file'
```

This FILE= notation is available for **AS/400, UNIX and PC users only**, allowing AS/400, UNIX and PC disk local or networked files to be referenced directly by their **native fileid**. The fileid is preserved with the case setting as coded on the control statement.

Directory separators within fileids may be represented using slash '/', commonly used for UNIX fileids; and/or backslash '\', used for PC fileids. SELCOPY executing on any AS/400, UNIX or PC system will accept fileids with either form of directory separator or a combination of both.

```
read    c:\accounts/2002/q1inv.txt
write   usr/bin/john/scripts/findfile
```

Fileids that contain blanks or special characters should be enclosed in quotes.

```
read    "C:\Program Files\Scan It! Publisher\Install Setup.txt"
```

When such file name syntax is used, SELCOPY constructs an 8 byte filename as described below. This filename may be used on INCOUNT and EOF tests in order to avoid ambiguity.

If the trailing bytes of a fileid obey the standard file extension convention as defined by the **FAT** (File Allocation Table) system, then the filename is assumed to be the 8 characters immediately preceeding the **dot**.
This is equally applicable to free format fileids that happen to fit this, usually **PC/DOS**, convention. e.g.

```
config.sys                  * Filename is    config
selcread.ll                 * Filename is    selcread
payroll.mast.a              * Filename is    oll.mast
```

For fileids that do not comply with this standard, the filename is assumed to be the last 8 characters of the whole fileid. e.g.

```
.oslevel_mlinfo.cache       * Filename is    fo.cache
lost+found                  * Filename is    st+found
payroll-mast-a              * Filename is    l-mast-a
```

All fileids are preserved with their original case settings as coded on the control statement.

ERROR 158

When 2 or more fileids, which are identical but for character case, are used in the same SELCOPY execution, **ERROR 158 FILEID CONFLICT POSSIBLE DUE TO CASE DIFFS** occurs. On UNIX platforms, these represent different files. However, on AS/400, PC/DOS, OS/2 and Windows, they represent different file control blocks which operate on the **same** file.

If the fileids are intended to reference the same file, they should be ammended so that the case settings match. If, however, you want files having the same fileids but with different case settings, then the DSN parameter should be used to define the fileid in conjunction with an arbitrary, unique file name for each variant. e.g.

```
READ  ABC  DSN='Master.Data'       * ABC is an arbitrary filename.
READ  XYZ  DSN='MASTER.data'
READ  ABC                          * Will refer to 'Master.Data'.
```

Network Fileids

Fileids that are prefixed with 2 directory separator characters (\\ or //) are treated as network resource references, having the Universal Naming Convention (UNC) format, and are processed in the same way as local files. e.g.

```
READ  //fileserv/accounts/invoices/compa.20011030.doc
```

Using the UNC fileid format to reference networked files has the benefit that disk mapping to a drive letter is not required.

When processing networked files, SELCOPY is subject to the usual network permissions allocated to the executing user.

FILL=x

PAD=x

See also:

- IF and MOVE=n in this section.

```
OPTION   WORKLEN 2000   FILL=X'FF'
WRITE XYZ   LRECL 400   BLKSIZE 800   FILL X'00'
IF   POS 101,200 = 'A'   FILL 'A'
THEN POS 101,200 = 'ABC'   FILL '-'
```

The **FILL** character may only be a single byte, in character or hex. If omitted, the default character used will be a blank (EBCDIC X'40', ASCII X'20').

On READ

For **AS/400, UNIX and PC only**, residual data from the previous, longer input record is cleared using the **FILL** character. This applies only to **RECFM=U** and **RECFM=V** input files, and only if **WORKLEN** is used.

No action is taken if the current record length is equal to or greater than the previous. If the current record length is less than the previous, then data that immediately follows the current record is cleared up to the length of the previous record.

No account is taken of any **INTO** parameter which may have been used for reading the same file into different positions of the work area. e.g.

```
read  indd  dsn='c:\tmp\variable.len.data'  into   1   fill=x  * 1st record is long.
read  indd                                  into 501           * 2nd record is short.
```

In this example, the 2nd input statement for INDD reads into position 501 a record that has a smaller LRECL value than the previous record read into position 1 by the 1st input statement for INDD. This results in data already in position 501 of the work area, being replaced with the FILL character X. Data in position 1 from the 1st READ is left intact.

The default for RECFM=U and RECFM=V input is **NOFILL**, unless changed with an earlier FILL parameter either in the current control statements or in the SELCNAM file.

On WRITE

FILL is used on a WRITE statement to specify the character to be used to fill out the record if insufficient data is available from the input record or work area.

When the work area is large enough to make up the entire output record, the **FILL** character is **not used**.

On OPTION

When **WORKLEN** is coded on an **OPTION** statement, **FILL=x** may also be coded to define the filler character to be used for initialisation of the work area.

FILL=x is not supported for a **WORKLEN** coded on a **READ** statement.

For **AS/400, UNIX and PC only**, OPTION FILL may be coded in SELCNAM to define the default FILL character for subsequent READ statements. Refer to FILL **On READ** above.

On an IF type operation

FILL may be used on an **IF,AND,OR,THENIF** or **ELSEIF** statement to specify the character to be used as filler when one of the fields being compared is short.

On a MOVE/MOD operation

FILL may be used on a **MOVE** or **MOD** statement to specify the character to be used as filler when the source field is short.

FLAG

--- Mainframe, PC only ---

```
 ___________________________________________________________________________
|          |       |                                                        |
|          |       |   EOM                                                  |
| (NOW)    |       |   EOMEMB                  * For CMS/MVS/VSE/PC DIRDATA inp. |
|  THEN    | FLAG  |              (STOPAFT=n)                               |
|  ELSE    |       |   EODISK                  * For CMS DIRDATA only.      |
|          |       |   EOD                                                  |
|__________|_______|________________________________________________________|
```

The **FLAG** statement is for use **only** in conjunction with **DIRDATA** input.

When reading both DIRectory and DATA records **(DIRDATA)** for all members of an MVS PDS or a generic group of members from a **VSE** library (SP2 or higher), or a generic group of **CMS** or **PC** files, the **FLAG** statement may be used to cause special action on the next read of the **DIRDATA** input file.

FLAG EOMEMB (FLAG EOM)
Supported for Mainframe and PC platforms only, set **End of Member** indicator so that, when the next **DIRDATA** read is issued, SELCOPY will bypass the rest of the current member without processing the data records.
Useful for improving speed over large volumes of data, or for ignoring unwanted data. e.g.

```
READ VSELIBA.SUBA.*.JCL   DIRDATA   W=1000

IF IN = 1                           * If DIR Rec.
 A POS ANY = ABC                    * Ignore members with ABC.
  THEN FLAG EOMEMB        S=9999    * Indicate End of Member.
  THEN GG                 S=9999    * GOTO GET (Bypass it)

WR BKUPFILE DEV=TAPE  RECFM=VB  B=32000 L=4096    * Take a copy.
```

When processing data records on an MVS PDS DIRDATA read, **IF EOF** will be successful if a **FLAG EOM** has been issued for the current member.

FLAG EODISK (FLAG EOD)
Supported for CMS only, set **End of Disk** indicator so that, when the next **DIRDATA** read is issued, SELCOPY will bypass the rest of the current **CMS Disk** without processing the remaining data records for the current CMS file or any further CMS files on the current CMS Disk.

Significant speed improvement when a whole disk is bypassed. e.g.

```
READ '* * *'    DIRDATA   W=1000

IF IN = 1                           * If DIR Rec.
 A POS 10  = 'MODULE'
  THEN FLAG EOMEMB        S=9999    * Indicate End of Member.
  THEN GG                 S=9999    * GOTO GET (Bypass it)

IF IN = 1                           * If DIR Rec.
 TI  POS 20  = 'S'                  * TI means THEN IF.
 OR  POS 20  = 'Y'
  THEN FLAG EODISK        S=2       * Indicate End of DISK.
  THEN GG                 S=2       * GOTO GET (Bypass it)

WR TAPEFIL  RECFM=VB B=32000 L=4096  * TAPEFIL needs a    FILEDEF.
```

FNAME

See also:

- POS FNAME in this section.

FORMAT='string'

FMAT
FMT

See also:

- FORMAT='string' and FORMAT=ALL in section *ADABAS Processing*.
- FMT=column-list in this section.

```
CVPC   4 AT  10   TO 10   FORMAT='zZ,zz9.99 NEGATIVE'
CVBC=2 FR=1    TO=87      FMT=S99.9      * Include sign.
CVFC   8 AT 101  TO 2001  FMAT='ZZ9.999,999-'
```

The **FORMAT** parameter for **ADABAS** file processing is described separately in the section on **ADABAS**.

FORMAT determines the format and length of the receiving field in an unpack operation. (Conversion of packed decimal, binary or floating point data to printable character data.) There must be one character in the 'string' for each byte of the receiving field. The length may not exceed 255.

If the source field contains invalid data or if the resulting number is too large for the 'string', the receiving field will be filled with asterisks, and **Return Code 8** is set.
FORMAT may be omitted, provided the length of the destination field is supplied, in which case a FORMAT of that length, containing all 9's, is assumed. e.g.

```
CVPC   2 AT 20   TO 5 AT 436                * Uses FORMAT=99999
```

Any character, within the format string, that is not one of the format control characters, is transferred without change to the corresponding byte of the receiving field.

FORMAT Control Characters

'9' indicates a numeric position and will result in no zero suppression.

'Z', or **'z'**, indicates that a non-significant zero occurring in that position is to be replaced by a blank. The user should beware of losing what could be important punctuation, such as a decimal point, when zero suppression is still active. e.g.

```
POS 11=X'00006d'  !CVPC 3 AT 11  TO 1 FMT='zzzzz.99-'   * Gives: "      06-"
```

Important punctuation should always be preceded by a '9' in the FORMAT string.

'S' or **'s'** at the start of the format string will output the sign '+' or '-' at the head of the output character field. Note that the position of the sign remains fixed, even if non-significant zeroes have been blanked out. e.g.

```
POS 11=X'00007c'  !CVPC 3 AT 11  TO 1 FMT='Szzzz9.99'   * Gives: "+    0.07"
```

Floating Sign

On AS/400, UNIX and PC systems only, 'S', 's' or '+' may be used repeatedly to indicate that the resultant sign is to be floated down to the junior insignificant 'S', and always displayed as either '+' or '-'.

The 'S' format character is processed as a 'Z' format character, giving zero suppression, except that the junior insignificant 'S' is replaced with the sign of the source. e.g.

```
POS 11=X'00007c'     !CVPC 3 AT 11  TO 1 FMT='SsSss9.99'   * Gives: "    +0.07"
POS 11=X'0654,321c'  !CVPC 4 AT 11  TO 1 FMT='++,Ss9.99'   * Gives: "+6,543.21"
POS 11=X'0000,021d'  !CVPC 4 AT 11  TO 1 FMT='++,++9.99'   * Gives: "    -0.21"
```

The '-' format character is similar to the 'S' format character, except that the junior insignificant '-' is only replaced with the sign of the source when negative. When the source is positive, the '-' format character is replaced with a significant digit or blank. e.g.

```
POS 11=X'0054,321d'  !CVPC 4 AT 11  TO 1 FMT='--,--9.99'   * Gives: "  -543.21"
POS 11=X'0054,321c'  !CVPC 4 AT 11  TO 1 FMT='--,--9.99'   * Gives: "   543.21"
POS 11=X'7654,321d'  !CVPC 4 AT 11  TO 1 FMT='--,--9.99'   * Gives: "*********"  (Too big.)
```

'S' or '-' format characters should not be coded to the right of 'Z' or '9' format characters because the sign position could get used for a significant digit. An exception is made for a '-' format character which is immediately preceded by a '9' format character. In this case, the '-' is processed as a punctuation character. However, use of '-' as a punctuation character is best avoided. e.g.

```
POS 11=x'00213d'     !CVPC 3 AT 11  TO 1 FMT='zzzzzs99'    * Gives: "     213"
POS 11=x'00213d'     !CVPC 3 AT 11  TO 1 FMT='ssss9-99'    * Gives: "   -2-13"
```

Negative Numbers

Other characters can be coded to the right of the junior 'Z', 'z' or '9' in the 'string'. These will be transferred to the receiving field **only if the result is negative**, otherwise they will be replaced by blanks.

Any character string may appear, with a length limited only by confines of the control statement itself, but notably the accounting standard either **CR** or **DR** may be appropriate, depending on the context.

Example

The example below illustrates use of the **FORMAT** parameter in CVPC operations. Its use with CVBC and CVFC is the same.

The following **mainframe** example is equally applicable to **AS/400**, **UNIX** and **PC** environments.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)   PW000 pw=0 (133)     (OS) VM/CMS=VM05      10.13 FRI 23 NOV 2001    PAGE   1
o ----------------------------------------------------------------------                            ---------------------    -------- o

o          * SMXFMAT CTL H *                L=011 --- 2001/11/23 09:53:46                                                          o

o      1.  READ CARD    WORKLEN 1000                                                                                               o

           IF INCOUNT LE 3                  * 1st 3 recs are for heading.
o      2.    THEN PRINT     PAGEDEPTH=66    * Keep to a single page.                                                               o
       3.    THEN GOTO GET                  * Just print, don't process them.

o      4.  POS 17, 100 = ' '                * Ensure destination portion blank.                                                    o
       5.  CVCP  16 AT 1   TO 8 AT 20       * Prepare the Packed Decimal source.

o      6.  CVPC 8   FR 20   TO 40    FORMAT 'ZZZ,ZZ9,999.99    NEGATIVE   '                                                       o
       7.  CVPC 2   FR 26   TO 30    FORMAT 'SZZ9 CR'

o      8.  CVH 8   FROM 20   TO 80          * Convert P.D. to HEX for readability.                                                  o
       9.  PRINT  LRECL 100   TYPE M

o          END                                                                                                                     o

o     INPUT   SEL SEL                                                                                                  1  RECORD   o
      RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH
      -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------
o         1     1   2 SOURCE DATA          P.D.   'SZZ9 CR' 'ZZZ,ZZ9,999,99 ---NEGATIVE---'                                  80   o
          2     2   2 ----------------   --------  -------   ----------------------------                                    80
          3     3   2                                                                                                          80
o                                                                                                                                o
          4     1   9 1046219200         00006120  +200       10,462,192.00                          000001046219200C          80
                                        0014290C
o                                                                                                                                o
          5     2   9 4.242,22  21       00002221  +221          424,222.21                          000000042422221C          80
                                        0004422C
o                                                                                                                                o
          6     3   9 1111111111111111   11111111  +111      ****************************           111111111111111C          80
                                        1111111C
o                                                                                                                                o
          7     4   9 -17F               0000001_  -176 CR         0,001.76    NEGATIVE              000000000000176D          80
                                        0000007
o                                                                                                                                o
          8     5   9   K                00000002  -  2 CR         0,000.02    NEGATIVE              000000000000002D          80
                                        0000000D
o                                                                                                                                o
          9     6   9 17FD               0000000'  - 17 CR         0,000.17    NEGATIVE              000000000000017D          80
                                        0000001
o                     ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0          o

  SUMMARY..
o  SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN                                                    o
   ------      ------      ----     -------  -----           -----   --    ---
      1             9 READ SYSIN        80    80 U               9
o     2----3        3                                                                                                            o
      4----5        6
      6             6      (***01 RETCD=8***)
o     7----9        6                                                                                                            o

  ***WARNING*** (SEL----6)        8 = RETURN CODE FROM SELCOPY
o                                                                                                                                o
           ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **
                                                    ** EXPIRY DATE -- 2002/05/21 **
```

Figure 0. FORMAT with CVPC Data Conversion.

FMT=column-list

--- DB2 only ---

See also:

- Section *DB2 Processing*.

```
READ INTAB  TAB='CBL.ADMIN'  FMT='EMPLOYEE,DEPT,INSNO,SALARY'
```

Used to specify a column-list, in standard SQL syntax, for DB2 **READ** and **INSERT** operations. If **FMT=** is omitted all columns of a table are selected.

Quotes, delimiting the column-list, are required where more than one column is specified.

FROM=p

FR=p

See also:

- POS in this section.

```
MOVE 100   FROM @+3   TO 300
THEN PACK 9 FROM 1600   TO 1800 INTO 5
ELSE LRECL=5 FROM 1800 TYPE=P
WRITE FILEA   RECFM=V   FROM=300
```

The **FROM** parameter defines the start position of the source data for an operation.
Normally this is a **numeric value** indicating a position in the current input area, or work area if used.
The special position keywords, such as **SEG, UXLRECL, @, L, RETCMS** are also allowed on the FROM parameter.

For example, **FROM=L+1** will take data from the end of the input record + 1, which is the first byte in the work area beyond the current record. Useful when the input is of variable or undefined length.

When used in conjunction with **an output file**, the FROM parameter with its associated position, causes the output to the specified file to be taken from that position in the input or work area, containing the record currently being processed.

Confusion can arise using FROM when copying RECFM=V to RECFM=F. This is due to the presence of the RDW (Record Descriptor Word), and is discussed more fully in the section *Changing Record Formats*.

FWD

--- VSAM only ---

```
READ ABCFIL  ESDS   FWD
READ ABCFIL  KSDS   STARTKEY ZZZZ     FWD
```

The **FWD** parameter is **default** for all **VSAM** input, provided the direction of reading is never reversed. So normally, **FWD** need never be coded.
The **FWD** parameter on a READ statement for a **VSAM** file indicates that the file is to be read in a forward direction.

Reversing Direction on a KSDS

Currently, SELCOPY only supports reversing the direction on a **KSDS** file.

If the **BWD** parameter, (to read the file in a **backwards** direction), is used on any **READ** statement, then it becomes mandatory that other **READ** statements for the same file also have either the **BWD** or **FWD** parameter, thereby avoiding confusion.

Please refer to the **BWD** parameter for more information.

GE 'string'

NLT
LOW
LO
>=

See also:

- Comparison Operators in section *Further Information*.
- ASCII/EBCDIC Differences in section *AS/400, UNIX and PC Processing*.

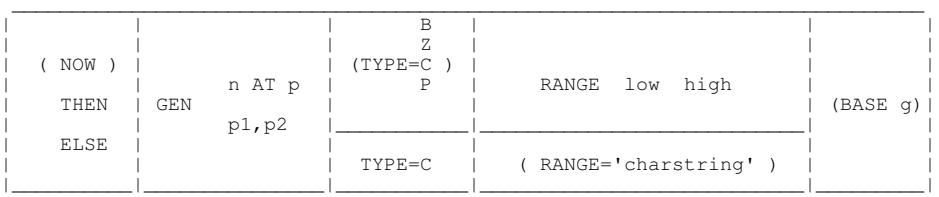
```
IF POS L-23  GE  POS 39  LEN 4
OR POS 88 NLT X'04'
  THENIF P 1  GE 'A'   LE 'D'        * Upper & lower limits.
```

Allows testing of a field in the input record against a lower limit. The data tested must be greater than or equal to the string in order to satisfy the condition.

GE and **LE** may be coded on the same **IF** card in order to define a **range** of values. If one is omitted, no test is made for that limit.

GEN=n

GENERATE=n
RANDOM=n



GENERATE or **GEN** indicates that generation of **random** data is required, and its argument, "n", indicates the length in bytes of the data to be generated.

AT together with its argument "p" defines the position in the record or work area where the generated data is to be placed. "p" may be any value allowed for position definition of a "destination" field.

TYPE and its argument indicate the type of data to be generated. The argument may have any of the following values:

C	generates Character data.
P	generates Packed decimal data.
B	generates Binary data.
Z	generates Zoned decimal data.

If TYPE is omitted, **TYPE=P** is assumed. **RANGE** and its arguments, "low" and "high", define the numeric range of values to be generated for this data field. **Both arguments must** be present and must be coded in decimal, with or without a preceding sign.

The **RANGE** parameter is **mandatory** for all data types except TYPE C.

RANGE=low,high for TYPE C generation means that characters will be taken randomly from character data as follows:

RANGE **1 26**	A through Z.
RANGE **27 36**	0 through 9.
RANGE **37 44**	' +-=,./*' (excluding quotes)
RANGE **45 52**	'() !:@#$' (excluding quotes)

Any range between 1 and 52 is acceptable. e.g.

```
GEN 33 AT 201 TY C   RANGE=1,3
```

This would fill positions 201 to 233 with a random mixture of A, B and C characters.
No check is made on the given range, so a range of say -44 +567 would give unpredictable (?) data, which will almost certainly be less random than required.

For **TYPE C** only, the RANGE parameter may be omitted, in which case the default of **RANGE 1 26** is assumed, which will result in character data in the range A through Z only.

For **TYPE=C only**, a **RANGE="charstring"** may be supplied, which is a string of characters to be used as the source of generated data. Characters will be randomly chosen from the string in order to fill the data field defined by GEN and AT. It is possible therefore to generate a predominance of certain characters by including them in the string more than once. e.g.
RANGE=XAXBXCXDXEXFXG would generate data, half X's, and half A-G. **BASE** is an **Optional** parameter. Its argument, "g" indicates that for this particular field the base for "random" number generation is to be "g".
This allows the user to ensure that every time SELCOPY is executed, this GEN statement will always generate the **same "random" values**.
"g" must be supplied as a 4 byte string according to standard SELCOPY syntax for strings. (i.e. Hex strings can be supplied).

If the **BASE** parameter is omitted, a base for "random" number generation will be taken using an algorithm on the **TOD clock**, in combination with the Selection number, and a **different set** of generated numbers may be expected each time the job is run.

An example of the GEN statement follows. Note that data generation may also be conditional, and also subject to further selective modification before writing to the destination file.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)   PW000 pw=0 (133)     (OS) VM/
          * SMXGEN CTL N *            L=002 +++ 90/02/21 18:58:12
                * Build a small file with generated data in just 4 fields.
          OPTION    W 2222           * No input file, but we need a work area.
       1. print 'ZONED     PACKED    CHAR      BINARY'
       2. print '-----     ------    ----      ------'
          LOOP
          ----
       3. GEN 4 AT 01       TYPE Z    BASE KGHJ     RANGE -20 +20
       4. GEN 3 AT 11       TYPE P    BASE BB       RANGE  51 99
       5. GENERATE 9 AT 21  TYPE C    BASE 7777     RANGE 2 8         * B ---> H.
       6. GEN 4 AT 31  TYPE B    BASE KTWXH    RANGE -16    +16
       7. LRECL = 3 at 11   type p         * Set record length in range 51 to 99.
       8. WR SMXGEN.DA.B  RECFM=VB B=22000 * Create Var length output file.
                * Now expand the data by converting to hex for readability.
       9. CVCH 4  FR 31   TO 31   * ConVert   Char --> Hex.
      10. CVCH 3  FR 11   TO 11
      11. PRINT  L 100             * Print length 100 regardless of rec len.
      12. GOTO LOOP   STOPAFT 5   * Loop back 5 times only.
                * EOJ stmt not necessary - automatic EOJ when it drops through.

     INPUT   SEL SEL
     RECNO   TOT ID.          1         2         3         4         5         6
     -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,
         0     1   1 ZONED     PACKED    CHAR      BINARY
         0     1   2 -----     ------    ----      ------
         0     1  11 0000      00096C    GHHFDBEFG FFFFFFF9
         0     2  11 0004      00087C    BCHBDFCCD 00000006
         0     3  11 001N      00078C    EEEHHGHGH 00000002
         0     4  11 0010      00079C    FFDGFEGGE 0000000F
         0     5  11 001J      00092C    GBGBHCEGG FFFFFFF8
         0     6  11 001P      00098C    HDFGCBECB FFFFFFFB
                    ....,....1....,....2....,....3....,....4....,....5....,....6....,

  SUMMARY..
    SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
    ------      ------      ----     -------  -----           -----   --    ---
     1----2          1
     3----7          6
     8               6 WR   SMXGEN    22000    42 VB              6       SMXGEN.DA.B1
     9---11          6
    12               5

          ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (165
                                                ** EXPIRY DATE -- 2002/05/21 **
```

Figure 0. GEN to Generate Data.

GET fname

See also:

- READ fname in this section.

GOSUB

See also:

- DO user-label in this section.

GOTO GET/EOJ/CANCEL/user-label

GO TO

```
IF POS 77 = FIN
THEN GOTO EOJ
ELSE GOTO GET STOPAFT=500            * Bypass 1st 500 recs.
GOTO NORM-RTN STOPAFT=300            * NORM-RTN is a user label.
THEN GOTO CANCEL
```

The basic logic used in SELCOPY for processing a file is simply to present each logical record to EVERY selection, in the same order as the selections were supplied on the control statements. Only after every selection has been checked against a record is the next record read. The 'GOTO' parameter allows this sequence to be broken.

A total of the number of records causing execution of the 'GOTO' is supplied at the end of job as for all other selections, and of course a **STOPAFT** parameter may be used if required.

The 4 different types of **GOTO** are as follow:

GOTO GET (GG)

GOTO GET, or its synonym **GG**, causes processing of subsequent control statements to be skipped. Control is passed immediately to the first **logic** control statement.

GOTO EOJ (EOJ, FILE=STOP, STOP)

The **GOTO EOJ** statement, or any of its synonyms, will cause an orderly termination of the job step before reaching **end-of-file** on the prime input.

The selection summary will still give the ***EOF*NOT*REACHED*** message on files which were not processed to EOF, but the usual **Return Code 4** will be suppressed because in this case it was the user's decision to terminate the job, not SELCOPY's. Note that the summary totals will not reflect true input file size(s).

Similarly, if **GOTO EOJ** is actioned, the normal check for all output selection totals being **zero** is also suppressed. Thus **Return Code 16**, or its CBLNAME-defined installation equivalent, will never be generated.

GOTO CANCEL

Causes similar action to **GOTO EOJ**, but the job is cancelled. No dump is produced, but the current input **Block** (not record) is printed in **TYPE=D** (Dump) format as an aid in debugging.

In a **DOS/VS** or early **VSE** environment the job is terminated causing subsequent executions within the same **JOB** to be flushed.

In all environments, the **Return Code 44** set by SELCOPY may be tested within the invoking procedure in order to flush subsequent steps.

If the TYPE=D print of the input buffer is not required, then instead of GOTO CANCEL use:

```
THEN RETCODE=123          * Your required Return Code.
THEN GOTO EOJ             * Force EOJ with high RetCode.
```

Beware that the **CANCEL** operation word on its own, with no other parameters, **is not the same** as **GOTO CANCEL**.

CANCEL (with no other parameters) means **QUIT**, i.e. quit immediately on reading this control card. No further control cards are read and the run is terminated **immediately** with **Return Code 52**.

GOTO user-label

This statement causes any further processing of the current record to be continued or restarted at the statement immediately following after the "user label" card.

The label may start anywhere on the card, and have any length between 1 and 67. Special characters may be used, but embedded blanks or commas are not permitted unless the label is enclosed in quotes whenever used. The underlining of the label, as illustrated below, is generated automatically by SELCOPY.

```
LOOP   * To change all commas to blanks.
----
  IF POS ANY = ','           * EBCDIC X'6B',  ASCII X'2C'
    THEN POS @ = ' '         * EBCDIC X'40',  ASCII X'20'
    THEN GOTO LOOP
```

A more efficient method of changing all occurences of one character within a string to another, is to use the **TRAN** parameter.

Reserved Labels

There are certain reserved words for Labels which if encountered as a single word on a control card are **still** actioned as an operation word. These are:

CANCEL	E	GET	NOP	PDUMP	PUNCH	RET
DUMMY	EL	GG	NOPRINT	PLOG	QUIT	RETURN
DUMP	ELSE	LOG	NOPCTL	PR	R	SPACE
	END		NOPTOT	PRINT	REPORT	STOP
	EOJ			PRT		WTO

GT 'string'

>

See also:

- Comparison Operators in section *Further Information*.
- ASCII/EBCDIC Differences in section *AS/400, UNIX and PC Processing*.

```
IF POS L-23 GT POS 39 LEN 4
OR POS 88 GT  X'04'
  THENIF P 1    > 'A'    < 'D'     * Upper & lower limits.
  ELSEIF P 1   GT 'A'   LE 'D'
```

GT (Greater Than) allows testing of a field in the input record against a lower limit. The data tested must be **greater than** the string in order to satisfy the condition.

GT and **LT** (or indeed any other 2nd operator) may be coded on the same IF card in order to define a range.

HEAD='string'

HD='string'
H='string'

See also:

- REPORT and POS HEAD in this section.

```
OPTION HEAD='the heading required'
REPORT H='the heading required'
```

The SELCOPY single line heading may be replaced by a heading of your own choice, or suppressed altogether by use of the **HEAD** parameter.

HEAD='user heading' may be coded on the **OPTION** statement, with or without the **REPORT** parameter, or coded on the **REPORT** statement.

The heading supplied, up to a **maximum length of 123 bytes** for **mainframe** and **56 bytes** for **AS/400, UNIX** and **PC**, is left adjusted and **underlined**. It actually replaces the standard SELCOPY heading,

```
  'SELCOPY REL n.nn AT installation - location'.
```

The partition/operating system identifier and Job name/User Id are **removed**, but time, date and page number **will remain** on the right.

HEAD=NO

A null string as the argument to **HEAD** is not permitted, but if **HEAD=NO** is coded, then the standard heading is suppressed, but the time, date and page number on the right will still remain.

POS HEAD, in section **Additional Position Keywords** defines the method of dynamically **examining** and **modifying** the SELCOPY Heading line and associated underlining.

As well as illustrating use of the **HEAD** parameter on an **OPTION** statement without using **REPORT**, the following example also lists the current **Distribution tape contents**.

The following **mainframe** example is equally applicable to **AS/400, UNIX** and **PC** environments.

```
  SELCOPY/WNT 2.07 at CBL - Bridgend UK (Internal Only)                                                    2001/11/23 11:38   PAGE   1
o ---------------------------------------------------                                                    ----------------   -------- o


o          ** z:\cd\sm200\SMXHEAD2.CTL ***    L=001 --- 2001/11/23 11:38:03  (P24)                                                 o
             option   head 'ALL MAINFRAME SELCOPY INSTALLATION MATERIAL ON CD-ROM'

o      1.    line 1    stopaft 1              * New page to see effect of our HEAD param.                                           o

       2.    rd  d:\s\200\mfr\install\*  dir   * D: is drive letter of the CD-ROM.
o      3.    plog                             * Output to both PRINT and LOG files.                                                 o
```

```
  ALL MAINFRAME SELCOPY INSTALLATION MATERIAL ON CD-ROM                                                    2001/11/23 11:38   PAGE   2
o ---------------------------------------------------                                                    ----------------   -------- o
      INPUT   SEL SEL                                                                                                    1  RECORD
      RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH
o     -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------     o
            1     1   3 2001/05/03 11:46:30      r   CBLNAME .ASS           9,590  D:\s\200\mfr\install\CBLNAME.ASS                91
            2     2   3 2001/05/03 13:44:10      r   CBLNAME .MAC         161,505  D:\s\200\mfr\install\CBLNAME.MAC                91
o           3     3   3 2001/05/04 10:51:10      r   CBLNAMEO.ASS          19,281  D:\s\200\mfr\install\CBLNAMEO.ASS               92      o
            4     4   3 2001/05/15 16:59:04      r   S200INST.HTM          96,966  D:\s\200\mfr\install\S200INST.HTM               92
            5     5   3 2001/05/15 16:33:00      r   S200INST.TXT          89,068  D:\s\200\mfr\install\S200INST.TXT               92
o           6     6   3 2001/05/17 15:25:56      r   SELC200 .OBJ         182,480  D:\s\200\mfr\install\SELC200.OBJ                91      o
            7     7   3 2001/04/19 15:16:32      r   SELCOPLE.OBJ           1,680  D:\s\200\mfr\install\SELCOPLE.OBJ               92
            8     8   3 2001/05/16 23:26:00      r   SELCOPQL.OBJ          61,600  D:\s\200\mfr\install\SELCOPQL.OBJ               92
o           9     9   3 1997/04/25 17:59:00      r   SELCOPQX.DBR          13,200  D:\s\200\mfr\install\SELCOPQX.DBR               92      o
           10    10   3 2001/05/03 11:54:54      r   SELCOPY .NMX             475  D:\s\200\mfr\install\SELCOPY.NMX                91
           11    11   3 2001/05/16 21:34:22      r   SNF200  .HTM          77,200  D:\s\200\mfr\install\SNF200.HTM                 90
o          12    12   3 2001/05/16 20:54:34      r   SNF200  .TXT          64,663  D:\s\200\mfr\install\SNF200.TXT                 90      o
           13    13   3 2001/05/07 17:52:24      r   SELCCFTR.BAT           1,782  D:\s\200\mfr\install\CMS\SELCCFTR.BAT           96
           14    14   3 2001/05/07 17:51:22      r   SELCCFTR.CMD           2,009  D:\s\200\mfr\install\CMS\SELCCFTR.CMD           96
o          15    15   3 2001/05/07 17:49:28      r   SELCCJ08.CTL             654  D:\s\200\mfr\install\CMS\SELCCJ08.CTL           96      o
           16    16   3 2001/05/07 17:50:20      r   SELCCJ08.XEC           1,055  D:\s\200\mfr\install\CMS\SELCCJ08.XEC           96
           17    17   3 1997/04/11 14:22:00      r   SELCGEN .XEC          37,311  D:\s\200\mfr\install\CMS\SELCGEN.XEC            95
o          18    18   3 2001/05/04 13:15:26      r   SELCMADA.JCL           1,323  D:\s\200\mfr\install\MVS\SELCMADA.JCL           96      o
           19    19   3 2001/05/07 18:54:36      r   SELCMDB2.JCL           1,928  D:\s\200\mfr\install\MVS\SELCMDB2.JCL           96
           20    20   3 2001/05/04 13:16:10      r   SELCMFTR.BAT           2,698  D:\s\200\mfr\install\MVS\SELCMFTR.BAT           96
o          21    21   3 2001/05/04 13:16:26      r   SELCMFTR.CMD           2,955  D:\s\200\mfr\install\MVS\SELCMFTR.CMD           96      o
           22    22   3 2001/05/03 12:13:18      r   SELCMJ01.JCL           1,835  D:\s\200\mfr\install\MVS\SELCMJ01.JCL           96
           23    23   3 2001/05/17 15:23:32      r   SELCMJ02.JCL             829  D:\s\200\mfr\install\MVS\SELCMJ02.JCL           96
o          24    24   3 2001/05/16 20:30:50      r   SELCMJ06.JCL           1,352  D:\s\200\mfr\install\MVS\SELCMJ06.JCL           96      o
           25    25   3 2001/05/16 20:31:06      r   SELCMJ07.JCL           1,733  D:\s\200\mfr\install\MVS\SELCMJ07.JCL           96
           26    26   3 2001/05/03 15:29:42      r   SELCMJ08.JCL             956  D:\s\200\mfr\install\MVS\SELCMJ08.JCL           96
o          27    27   3 2001/05/09 12:06:26      r   SELCVADA.JCL             875  D:\s\200\mfr\install\VSE\SELCVADA.JCL           96      o
           28    28   3 2001/05/07 17:54:40      r   SELCVCMS.BAT           2,029  D:\s\200\mfr\install\VSE\SELCVCMS.BAT           96
           29    29   3 2001/05/07 18:05:02      r   SELCVCMS.CMD           1,996  D:\s\200\mfr\install\VSE\SELCVCMS.CMD           96
o          30    30   3 2001/05/09 12:06:02      r   SELCVDL1.JCL             878  D:\s\200\mfr\install\VSE\SELCVDL1.JCL           96      o
           31    31   3 2001/05/07 17:53:36      r   SELCVFTR.BAT           3,389  D:\s\200\mfr\install\VSE\SELCVFTR.BAT           96
           32    32   3 2001/05/07 17:54:06      r   SELCVFTR.CMD           3,342  D:\s\200\mfr\install\VSE\SELCVFTR.CMD           96
o          33    33   3 2001/05/09 12:06:56      r   SELCVJ01.JCL             628  D:\s\200\mfr\install\VSE\SELCVJ01.JCL           96      o
           34    34   3 2001/05/09 12:07:58      r   SELCVJ02.JCL           1,268  D:\s\200\mfr\install\VSE\SELCVJ02.JCL           96
           35    35   3 2001/05/09 12:08:52      r   SELCVJ06.JCL           1,146  D:\s\200\mfr\install\VSE\SELCVJ06.JCL           96
o          36    36   3 2001/05/09 12:12:20      r   SELCVJ07.JCL           1,077  D:\s\200\mfr\install\VSE\SELCVJ07.JCL           96      o
           37    37   3 2001/05/09 12:12:52      r   SELCVJ08.JCL             911  D:\s\200\mfr\install\VSE\SELCVJ08.JCL           96
                       ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0
o                                                                                                                                      o
  SUMMARY..
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
o  ------      ------      ----     -------  -----           -----   --    ---                                                        o
      1            1
      2           37 READ *          2048  2046 U              37       d:\s\200\mfr\install\*
o     3           37                                                                                                               o


o         ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 **                                           o
                              ** EXPIRY DATE -- 12 JUN 2001 **
```

Figure 0. HEAD - User Heading.

IF

I

3 Types of IF

1. Character Strings. e.g.

```
IF  POS 22  =  POS 122   LEN 6
```

2. Arithmetic. e.g.

```
IF  4 AT 11  TYPE B  <  7
```

3. Specials. e.g.

```
IF  EOF   FILE=ABC
```

An **IF** statement tests a condition, resulting in a **true** of **false** condition.

When True
All related (immediately following) **THEN** statements are **actioned**. Any **ELSE** or **ELSEIF**, which is immediately following the **THEN** statements, is then bypassed, together with all its related (immediately following) **THEN** statements.

When False
All related **THEN** cards are **bypassed** until an **ELSE, ELSEIF, IF, NOW** or default NOW operation is found, and this statement is then actioned.

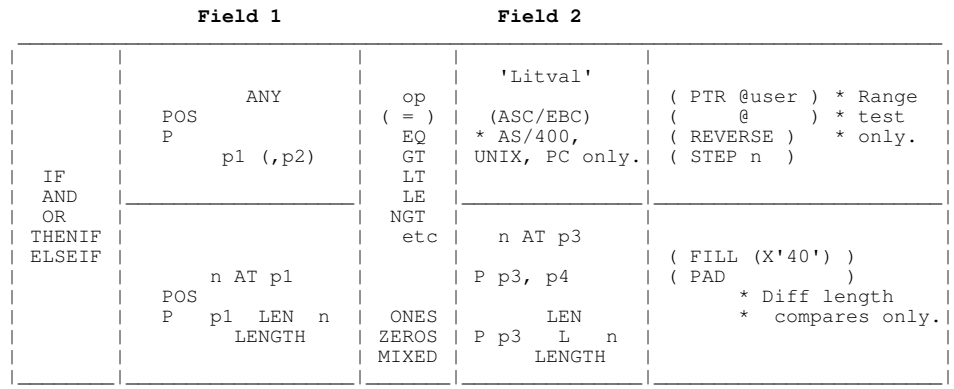
Positions and Lengths
Arguments referring to **positions** and lengths are also supported as @ and @user pointer values or combinations. SELCOPY's **Position Keywords** are also valid.

Return Code
Please refer to the **POS** parameter for discussion on **Non-Existent POS** testing. It is possible to get **Return Code 6** when comparison is on a Non-Existent position.

IF (Type 1 - Character Strings)

See also:

- POS in this section.



IF defines a logical comparison of 2 strings of data, **Field 1** and **Field 2**, as illustrated in the syntax box above.

```
IF  P 22     =  'ABC'                  * Test for literal
IF  P DSN    =  P 1001,1006            * Single test length 6.
```

Literals
Literals must be enclosed in **single quotes** if they are to contain **lower case alpha**, blanks, commas, equals signs etc. However, quotes are recommended for **all** string literals, especially **numeric** strings.

```
IF  P 20         = 'Literal'
IF    'Literal'  = 'Literal'           * Pointless but valid.
IF  EQUated-NAME = 'Literal'           * More valuable.
```

Data Fields
May be defined using any of the following:

n AT p1	**n** bytes at position **p1**.
POS p1 LEN n	**n** bytes at position **p1**.
POS p1,p2	Defines Start and End positions. Refer to **Range Tests** below.

Lengths
At least one of the fields must be supplied with a length. If only one field has a length, then the other field defaults to the same length.

The **exception** is when **Field 1** is defined using **p1 p2** syntax indicating a Range Test. **Field 2** must then also be supplied with a length otherwise **ERROR 069** is issued (Length Required).

```
IF  P 21,100   =    P 1               * ERR069 - LEN REQD
IF  P  ANY     =    P 1               * ERR069 - LEN REQD
```

If both **Field 1** and **Field 2** are supplied with lengths, then the comparison is either a **Range Test** (scan) or a **Padded Compare**.

Padded Compares
If **Field 1** does not use the **p1,p2** syntax and **Field 1** and **Field 2** both have lengths, it is considered a Padded Compare, where the shorter field is considered to be padded out with the **FILL** character up to the length of the longer field.

```
IF  80 AT 1  =  'ABC'                  * Test for ABC + 77 blanks.
```

If **Field 1** is defined using the **p1,p2** syntax then **FILL=x** must be coded explicitly in order to distinguish it as a padded compare and not a **range test**.

```
IF  POS 1,80 =  'ABC'   FILL=' '        * This is not a range test.
```

ASCII or EBCDIC Literals

For SELCOPY on **AS/400, UNIX and PC**, the **ASC** or **EBC** parameter may be specified on a string compare or range test that involves a string literal. These indicate to SELCOPY that the literal should be treated as being in the ASCII or EBCDIC coding convention respectively, regardless of the coding convention of the host machine.
By default, literals are treated as being in the coding convention of the host machine.

```
IF  POS 1  =  'ABC'   EBC               * Test for EBCDIC 'ABC'. (x'C1C2C3')
```

FILL=x for Padded Compares

The default **FILL** or **PAD** character for a Padded Compare is blank (EBCDIC X'40', ASCII X'20'.) This may be changed by use of the **FILL**/**PAD** parameter coded on **IF**/**AND**/**OR**/**THENIF**/**ELSEIF**.

```
IF  80 AT 1  =  'ABC'   FILL='-'        * Test for ABC + 77 minus signs.
```

Range Tests

A **Range Test**, or scan, is recognised if **Field 1** is defined using the **p1 p2** syntax giving the start and end of the range to be scanned.
Note that **p2** will define the last position to be compared with **Field 2**, and, provided enough data is available within the record or work area, the compare will be made for the full length of **Field 2**.

```
IF  P 1,100  =  P 1001  LEN 6           * Range Test sets @  ptr.
IF  P ANY    =  P 1001  LEN 6           * Means IF P 1,LRECL ...
```

A **Range Test**, is also recognised if a **STEP**, **PTR** or **REVERSE** parameter is coded, regardless of the syntax used to define **Field 1**.

```
IF  100 AT 1 =  P 1001  LEN 6  PTR=@A   * Treated as Range test.
```

STEP=n for Range Tests

Scanning a range of positions for a string may be restricted by stepping up the range with a user specified increment, other than the default.
If **STEP=n** is omitted for a Range Test, **STEP=1** is assumed.

```
IF  P 1,100  =  P 1001  LEN 6  STEP=10  * Check every 10 bytes.
```

PTR=@user for Range Tests

By default, any successful **Range Test** will set the @ pointer. This may be changed so that a specified **User @ Pointer** is set instead, leaving the standard @ pointer unchanged.

```
IF  P 1,100  =  P 1001  LEN 6  PTR=@A   * Range Test sets @A ptr.
```

REVERSE for Range Tests

For SELCOPY on **AS/400, UNIX and PC**, the REVERSE parameter may be specified to scan a range of positions starting at the end position and working backwards.

Always True

Beware of the dangers of testing for **NE** (Not Equal) over a range of positions, or **anywhere** in a record, by coding:

```
IF  POS ANY   NE   'XYZ'
```

You are guaranteed **'True'** on every record whose length exceeds 3 bytes because **POS ANY** means test **all possible** positions.

The test may return false at position 1 because pos 1-3 does actually contain XYZ, but that will make it impossible to find 'XYZ' at position 2. Therefore the condition is **true**.
On records less than 3 bytes the test is impossible, so **false** is returned.
On a record length 3 you will get a valid result depending on the contents of the 3 byte record. But to get **what you really want**, you should code:

```
IF POS ANY   EQ  'XYZ'
  THEN DUMMY
  ELSE GOTO NO-XYZ                      * Records without XYZ in them.
```

Multiple Comparisons

A **single IF statement** can be coded to cause multiple comparisons, as though an **IF**/**AND**/**AND** etc combination had been coded. e.g.

```
IF  POS 31   <> 3 AT 131   > 'DDD'   < 'QQQ'
```

IF (Type 2 - Arithmetic)

```
                Field 1                  Field 2
 ____________________________________________________________________________
|        |                   |       |                                        |
|  IF    |                   |       |                                        |
|  AND   |        n          |       |       n              * No mixed TYPEs. |
|  OR    |      ptr+n        |   op  |     ptr+n            * Length 4 only   |
| THENIF | 4/n AT p1  TY=B/P |       | 4/n AT p2  TY=B/P    *     for TYPE=B. |
| ELSEIF |                   |       |                                        |
|________|___________________|_______|________________________________________|
```

This gives a true arithmetic comparison with due respect for the sign when dealing with **Packed Decimal** or **Binary** data, and comparison of **@ Pointer** values.

Packed Decimal

Arithmetic comparison may be made on **Packed Decimal** data by coding **TYPE=P** on **both** comparands of an **IF**/**AND**/**OR** statement, except on literals.

Lengths of the comparands may differ, varying from 1 to **16 bytes**.

```
IF  4 AT 21 TY=P  =   8 AT 31 TY=P              * Test 4 bytes against 8.
```

A decimal numeric literal value, **not in quotes**, may be used for either comparand if required, but no **TYPE** parameter should be coded for the numeric literal.

```
IF  6 AT 11 TY=P  =   7                         * Test v literal.
IF  4 AT 21 TY=P  <   0                         * Test for negative.
```

Binary Data and @ Pointer Values

These are described together because they have exactly the same scope and also may be tested against each other. Note that the positional pointer **DIFF**, assigned following an unequal string compare, may be treated in the same way as an @ pointer on IF statements in an AS/400, UNIX or PC environment. e.g.

```
IF  LRECL         >   42                        * Binary and numeric lit.
IF  4 AT 22 TY=B  <   4 AT 33 TY B              * Binary only.
IF  4 AT 11 TY=B  <   @abc-17                   * Binary and @ptr

IF  @A            GT  -34                       * Pointer and numeric lit.
IF  @A            GT  L                         * Pointer and LRECL.
IF  @A-6+@B       =   7+@C-@D                   * Mult pointers.

IF  DIFF          GT  109                       * DIFF and numeric lit.
IF  DIFF+5        EQ  @A                        * DIFF and @ptr.
IF  DIFF+@A       =   7+@B-@C                   * DIFF and Mult pointers.
```

Comparison of **Binary Data length 4 only** is supported, using the **TYPE=B** parameter. The comparands, which for @ pointers are stored as absolute storage addresses, can be considered as positions relative to position 1 of the **workarea** for the comparison, so it is possible therefore to compare **@ABC** with **LRECL**, both of which will be considered numeric values.

If for instance, the current record length is **80**, and **@ABC** points to position 60 of the workarea, or position 60 of the current input record, then **@ABC** is considered to have the **value 60**, and the following condition test will result in **true**.

```
IF @ABC   = LRECL-20         * Is   true. (60 = 80-20)
IF @ABC+L = 140              * Also true. (60+80 = 140)
```

Outside the **workarea** is however still valid for @ pointers which have been set to point at special positions such as **HEAD, FNAME, DSN** and **DATE** etc.
Whether these positions are above or below the workarea is a function of dynamic storage management which may change with later releases of operating systems.

Negative comparands must therefore be allowed, and the comparison is made **arithmetically**. i.e. **-2** is lower than **-1** which is lower than **0**, thus:

```
IF @HHH > 0                  * If @HHH is set.    May be WRONG.
```

If **@HHH** points at the SELCOPY heading, **POS HEAD**, and if this exists in storage below the workarea, then when it is adjusted to become a number, (relative to the start of the workarea), it will be **negative**. i.e. not greater than zero. The test will then **fail**, in spite of the fact that **@HHH** is actually set to a valid position. The test should be:

```
IF @HHH <> 0                 * Must check for    NOT EQUAL.
```

If an @ pointer is not set, it has the value **zero**. However, setting @ pointers and LRECL to zero is supported in SELCOPY for AS/400, UNIX and PC, and so testing for zero may not be sufficient to determine that an @ pointer is not set. In this case, the @ pointer should be tested against the literal **NULL**.

```
IF @ABC = 0          * If @ABC is not set (Sufficient for mainframe).
IF @ABC = NULL       * If @ABC is not set (Supported for AS/400, UNIX and PC).
IF DIFF = NULL       * Similarly for DIFF pointer (AS/400, UNIX and PC only).
```

Note that the following is still not supported:

```
IF RETCMS > 44               * Gives    ERROR 008.
```

But the following is supported:

```
IF  4 AT RETCMS TY=B   > 44  * New syntax.
IF  P RETCMS > X'0000,002C'  * Original syntax.
```

IF (Type 3 - Specials)

See also:

- POS UXLINE in this section.

	EOF DIR DATA			
IF AND OR THENIF ELSEIF	IN INCOUNT REC	op	n	((FILE) fname)
	LINE RETCODE	op	n	

Special **IF keywords** are available which do not reference **user data**. Each is discussed more fully under the appropriate keyword heading, but in summary they are:

IF EOF fname
: Tests for **End of File** on the optionally mentioned file name. If no filename is mentioned then the **Prime Input** file is assumed.

```
IF EOF  ABC        * End of file on FILE=ABC  ?
IF EOF             * End of file on Prime Inp ?
```

IF DIR fname and IF DATA fname
: Relating to the **DIRDATA** input function only, which causes **DIR** ectory and **DATA** records to be read from all members of an **MVS PDS**, generic groups of **VSE library members** or **CMS, AS/400, UNIX** or **PC files**.

These tests allow the user to differentiate between directory and data records.

```
IF DIR             * Is it a DIRectory record ?
IF DATA            * Is it a DATA      record ?
```

IF INCOUNT op n fname
: Tests the **input record number** on the optionally mentioned file name. If no filename is mentioned then the **Prime Input** file is assumed.

```
IF IN > 4  F=ABC   * IN is an abbreviation.
IF REC = 1         * 1st rec of Prime Inp file?
```

IF LINE op n
: Tests SELCOPY's internal line count for printed output.

```
IF LINE > 62       * Are we getting towards page bottom?
```

IF RETCODE op n
: Tests SELCOPY's **return code** which may have been set either deliberately by the user or, having encountered certain error or unusual conditions during execution, by SELCOPY itself.

```
IF RETCODE=8       * Test for minor error.
```

Multiple Comparisons
: For **INCOUNT, LINE** and **RETCODE**, a **single IF statement** can be coded to cause multiple comparisons, as though an **IF/AND/AND** etc combination had been coded.

```
IF  RETCD  <> 24  > 21  < 30
```

IMS

See also:

- DL1 in this section.

IN

See also:

- READ fname and INCOUNT=n in this section.

INCLUDE fileid --- AS/400, UNIX, PC only ---

INC

```
INCLUDE g:\cc\slc/ctl/ssinc01.i02  * Both / and \ are acceptable on any platform.
INC     ctl\ssinc01.i01            * ssinc01.ctl may also contain INC statements.
INC     //serv00a/selc/ctl/equ01   * UNC fileid.
```

SELCOPY control statements from other control files may be inserted into the current input stream using the **INCLUDE** statement.

The contents of the include file are inserted, unchanged, during SELCOPY's control card analysis, immediately following the INCLUDE control statement. SELCOPY treats these statements as part of the main job stream.

Nesting of include statements is supported so that an included file can itself contain one or more INCLUDE statements.

This facility allows users to standardise SELCOPY code for certain tasks and store it in a common file for use in many job streams. A good example would be an EQUate deck that maps fields within records of a fixed format input file.

From the command line:

```
selcopy    !include  g:\cc\slc/ctl/ssinc01.i01    !/*
```

is same as:

```
selcopy            < g:\cc\slc/ctl/ssinc01.i01
```

However, use of the **INCLUDE** statement has the advantage of being able to add a little extra logic, such as:

```
selcopy    !inc ssinc01.i01   !inc ssinc01.i03   !if in gt 20   !t eoj   !end
```

INCOUNT=n

IN=n
REC=n d

See also:

- POS UXINCNT in this section.
- Comparison Operators in section *Further Information*.

```
IF INCOUNT=75                     * Assumes prime input file.
IF INCOUNT NLT 100   ABC          * \
IF ABC   INCOUNT GT 100           *  \ Checks file    ABC.
IF INCOUNT GT 26   FILE=ABC       *  /
IF FILE=ABC   INCOUNT NE 1        * /
```

The variable **INCOUNT** may only be referenced on an **IF-type** operation.

The **INCOUNT** value **n**, which **must be** positive **numeric** (decimal), is compared with a count of the input records for the file concerned. The full range of numeric Comparison Operators may be used for testing the INCOUNT value.

If no filename is mentioned, the **prime** (first mentioned) input file is assumed. The input record count of files other than the prime input file may be checked by specifying the filename on the **IF** statement.

After **EOF** has been reached, **INCOUNT** remains set at the number of records successfully read. Subsequent reads which do not return a record are not counted.

The **INCOUNT** value is also updated for direct reads with **KEY, RBA** or **REC** parameters. Naturally this upsets calculations on file size, but for files that support direct reading the **File Size** is often known from the Operating System, and is printed by SELCOPY in the **Selection Summary**.

Default STOPAFT=1

A default **STOPAFT=1** is assumed for all THEN statements that are dependent on an **INCOUNT equality** test, based on the assumption that **INCOUNT** can only increase, making it impossible to satisfy an **equality** test again.
However, this default is suppressed as soon as a **user-label** that follows the INCOUNT test is encountered. This is based on the assumption that **GOTO** statements may pass control to subsequent THEN statements via the label. e.g.

```
 IF INCOUNT = 2
=LABEL1==
   THEN ADD 1   TO 4 AT 101   TY=B    * Default STOPAFT=1 suppressed.
   THEN PRINT FROM 101   LEN 4   TY=B
   THEN GOTO LABEL1 STOPAFT 3         * Add and print executed 4 times.
```

CAT (concatenated) input and **DIRDATA** input however, both reset the **INCOUNT** value when switching to the next file/member, thereby invalidating the assumption that **INCOUNT** can only increase.

Thus, if **CAT** or **DIRDATA** input exists, whether it is **prime input** or not, a default **STOPAFT=1** is **NOT applied** to any subsequent **THEN** operations following an **IF INCOUNT=n** equality test.

INCOUNT values for DIRDATA

2 independent **INCOUNT** values are maintained for **DIRDATA** input:

For DIR records

The **INCOUNT** for **DIR** records is simply incremented by 1 to reflect the count of **CMS/PC filenames** or **VSE/MVS directory** records.

For **MVS** DIRDATA input, the **INCOUNT** for the **directory** portion is reset to 1 at the start of a new PDS which may be concatenated with the first, either at the **JCL** level, or by use of SELCOPY's **CAT** statement.

For DATA records

The **INCOUNT** for **DATA** records is always reset to 1 at the start of each **CMS** or **PC file** or each member of a **VSE Library** or **MVS PDS**.

So the confusion of recognising the **first** data record with the syntax **IF INCOUNT=2** is avoided. The first data record is now INCOUNT=1.

INPUT

See also:

- READ fname in this section.

INS fname --- Mainframe only ---

INSERT
ISRT

Strictly speaking, **INS** is a parameter on the NOW, THEN or ELSE Operation Words, but it is considered an Operation Word in its own right.

INS may only be used on **IMS/DL1, DB2, ADABAS** and **VSAM KSDS** or **RRDS** files. It causes a new record to be **inserted** into the file.
INS is not available for: **QSAM, ISAM, ESDS or CMS** files.
Use with IMS/DL1, DB2 and ADABAS are discussed in the appropriate sections, while use with a **KSDS** is discussed both here and in the section on *VSAM Files*.

READ, INS, DEL and **UPD** statements may all be included in the same SELCOPY run for the same KSDS - as many as required. Similar statements for other KSDS files may also be included.

Use WRITE instead of INS

New **KSDS** records may be written (i.e. inserted) into an existing KSDS using the **WRITE** statement, provided the records are written in **key sequence**.
WRITE does not use Update mode as it is effectively loading the file which gives it **significant speed advantages**.

Never use INS when **WRITE** will do the same job, particularly on high volume or frequent jobs.
INS is **only required** if update mode is essential in order to issue **DEL** and **REP** statements, or records have to be inserted **unsorted**, out of key order.

Processing Mode

To use **INS**, Processing Mode must be **for Update**, indicated by having the **UPD** parameter coded on the first **READ** statement for the **KSDS**.

Positioning

It is not necessary to cause any special positioning on the input KSDS before inserting a record. The new record will be inserted into the correct place in the file according to the key field which is embedded within the record.

Thus, records may be inserted in **any sequence** - there is no requirement to sort an input file containing insertions.

Note that if the **FROM** parameter is used, then the key will be taken from its defined position in the record, but relative to the FROM parameter's argument, not relative to POS 1 of the work area.

After a record has been inserted, it is **not permitted** to issue a sequential read of the same KSDS immediately following the insertion. VSAM's positioning is lost due to the change from direct processing (for the INS) back to sequential processing.
If subsequent sequential reading is required, a **keyed read** must be issued first, using KEY=keyarg, KEQ=keyarg or KGE=keyarg.

Duplicate INS

On getting a Duplicate Record Error from a VSAM Insert request, **Return Code 12** is set by SELCOPY, and processing continues. So to test for a Duplicate:

```
INS ABCFIL KSDS
IF RETCD=12
  THEN RETCD=11                  * Clear it for next time.
  THEN DO DUPLRTN                * Take appropriate action.
```

INS Example (a)

Note that this example **is sophisticated** (twice) in the next paragraphs, (b) and (c):

```
READ XYZ KSDS UPD                * Dummy read to indicate UPD mode.
LOOP
  READ NEWRECS                   * Seq file of new records.
  IF EOF NEWRECS
    THEN EOJ                     * End of Job at EOF on 2nd file.
  PRINT                          * Keep a record of insertions.
  INS XYZ
  GOTO LOOP                      * Can't allow another Seq Read.
```

The **GOTO LOOP** prevents further sequential reading after VSAM's position is lost due to the **INS** statement.
The test for end of file on **NEWRECS** is **essential** because automatic **EOJ** will only occur on **EOF** of XYZ, the **prime input**.

INS Example (b)

A better (still not the best) way to code the above would be:

```
READ NEWRECS   W=4000                    * Seq file of new records.
@LSAV = LRECL                 STOPAFT=1  * Save curr LRECL.
READ XYZ KSDS  UPD  INTO 1005 STOPAFT=1  * Dummy read to set UPD.
LRECL = @LSAV                 STOPAFT=1  * Reset NEWRECS LRECL.
PRINT                                    * Keep a record of insertions.
INS XYZ                                  * Do the actual insertion (FROM 1).
```

Note that the single dummy read **(STOPAFT=1)** of the **KSDS** will set the current record length to a value which may differ from that required for the first record to be inserted. So **LRECL** is saved and restored, but only once.
It is assumed that the new records, read into POS 1 of the workarea, do not extend beyond POS 1000.
No **EOF** test is required because **NEWRECS** is the **Prime Input**, first mentioned.

INS Example (c)

The **best**, and of course **simplest** way to code the above would be:

```
READ   NEWRECS                * Seq file of new records.
WRITE   XYZ  KSDS             * Writing is effectively   inserting.
PRINT                         * Keep a record of insertions.
```

Writing new records to a **KSDS** is most efficiently done by processing the file in **sequential output** mode, but note that the sequential file, **NEWRECS**, in this case **must be sorted** into ascending key sequence.
Update mode is only required when **DEL** and/or **REP** operations are required, or when **INS** is used to insert records out of sequence.

INTO=n

```
READ FILE=ABC LRECL=100 WORKLEN=4000 INTO 2000
NOW PACK 6 FROM 2000 TO 400 INTO 4
```

The INTO parameter is used on two different types of operation, but in both cases is associated with the destination field of the operation.

READ INTO n

When **INTO** is used on a **READ** operation, (note that the WORKLEN=n parameter must be present), the user may request data to be read into a specific position rather than into POS=1 of the work area. This is similar to the FROM parameter for output files. If omitted, data is read into position 1 of the work area.

INTO=@user is valid for on a **READ** operation, but beware of using an INTO based on **LRECL**, the position of which will reflect the length of the record just read, which for variable length input is unpredictable.
In order to use an INTO position based on the **LRECL** setting before the statement is executed use the following technique:

```
@ABC = LRECL
READ FILE=A    INTO @ABC+1      * i.e. Previous LRECL+1
```

When using **INTO** and **FROM** for Variable to Fixed length files, please read the section *Changing Record Formats* in *Further Information*.

CVxx INTO n

The **INTO** parameter is also used on certain **conversion** operations, viz: CVxx, PACK, PACKB, CVB, CVD. In these cases it does not define the position of the destination of the operation, but the length of the destination field.

In the above example we are taking six bytes from position 2000, and the result is going to position 400 where it is packed INTO four bytes in "packed decimal" format.

INTV=n

--- VSE only ---

```
CKPT FILE=TAPE14 INTV=22000
```

The value of 'n' determines the number of input records processed between checkpoints. The first checkpoint is always performed when INCOUNT is zero.
If omitted, the default checkpoint interval will be 5000.

ISAM

--- ISAM only ---

INDEXED
IS
IX
See also:

- Section *ISAM Files*.

```
READ FILE ABCD ISAM INTO 200 WORKLEN 3000
WRITE FILE XYZ INDEXED KEYLEN=8 KEYPOS=2 LRECL=43 BLKSIZE=860
```

```
WRITE PQRS IX L=43 B=43 KL=8 KEYFROM=2 FROM=109 MI=YES CO=3
```

ISAM indicates that the file is organised using the Indexed Sequential Access Method (ISAM), and may be specified for both input and output files on most disk devices.

VSAM however replaces ISAM on modern disk devices and operating systems. Its Key Sequence Data Set (KSDS) offers all the facilities of ISAM. Because ISAM is not supported under certain circumstances, the "ISAM Interface Program", known as the IIP, is available. This allows programs referring to ISAM files to continue running without change, even when the file has been rewritten as a VSAM KSDS.

SELCOPY supports VSAM in native mode, so it is not necessary to run via the IIP. If your file is VSAM, change your ISAM parameter to KSDS or VSAM - that is all you require to do.

Note that when ISAM is used on a READ card, all other parameters specifying geometry information for the file must be omitted.

If the parameter ISAM is omitted, the default assumption is that the file is organised using SAM (Sequential Access Method).

ISN

--- ADABAS only ---

See also:

- Section *ADABAS Processing*.

ISN is a synonym for **REC**. It represents the Internal Sequence Number for direct reading by record number of ADABAS files.

JECL

--- VSE only ---

JECL (for **VSE** users) is discussed under the heading **FILE=JECL**.

KEY=

--- CMS, AS/400, UNIX, PC, VSAM, ISAM, ADABAS only ---

KEQ=

See also:

- STARTKEY= in this section.
- Direct Read for CMS in section *VM/CMS Processing*.
- Direct Read for AS/400, UNIX and PC in section *AS/400, UNIX and PC Processing*.

```
                                                _              _
       READ                 (BWD)             |                |
(NOW)  RD     (FILE=)  fname      (ISAM)      | KEY  'keydata' |
THEN   IN      ( F=)  fn.ft.fm    (VSAM)      | KEQ   n AT p   |  (KEYPOS=n)  (KEYLEN=n)
ELSE   INPUT                      (KSDS)      | KGE            |  (BLKSIZE=n)  (RECFM=x)
       GET                                    |_              _|

                          (STOPAFT=n)   (INTO=n)   (UPD)   (WORKLEN=n)

READ ABC  ISAM     KEQ=H10700
THEN RD XYZ  KSDS   KGE=5 AT 200
RD KEYED.CMSFILE.A   KEY='KEYDATA'   KEYPOS=17   KEYLEN=10
```

Use of the **KEQ, KEY** or **KGE** parameters, with an associated generic key, provides **keyed input** from:

- **ISAM** files,
- **VSAM KSDS** files,
- **ADABAS** data bases,
- **CMS files** which are in a "key" sequence,
- **AS/400**, **UNIX** and **PC files** which are in a "key" sequence,

but cannot be used on **CAT** statements.

KEQ (Key EQual)

KEQ or its synonym **KEY**, allows the user to read an input file, going **directly** to the first record whose key **matches exactly** the generic key supplied.

KGE (Key Greater or Equal)

For **VSAM** and **CMS** only, **KGE** is similar to **KEQ**, but if no record is **equal to** the generic key, the next record with a higher key is returned.

Generic key Data

Key data may be supplied using the **n AT p** syntax, where **n** is the length of the generic key **AT** position **p** in the workarea. Thus it is possible to dynamically control the reading of a Keyed file using input data from a secondary card file or Console terminal input.

Generic key Literal

A key literal may be any length from 1 to the defined key length of the file, supplied as a simple **literal**, which need only be enclosed in quotes if it contains any SELCOPY delimiter.
But **STOPAFT=1** is default for key literals.

STOPAFT=1 Default

When a **literal** is supplied as the argument for the **KEY**, **KEQ** or **KGE** parameters, it is reasonable to suppose that the operation of reading that specific record will be required **only once**.
If a STOPAFT parameter is not supplied, then a **default STOPAFT=1** will be used for that read statement.
Coding **STOPAFT=n** will override this default.

Direct and Sequential reading combined

Use of **KEY**, **KEQ** or **KGE** will result in a direct read **every time**. **STARTKEY** may be used to revert to sequential reading after an initial direct read.
Other read statements for the same file which do not have the KEQ or KGE parameters will read the next sequential record following the previous record read, regardless of how the previous record was read, either sequentially or with KEQ or KGE. Thus a keyed read with KEQ or KGE will interfere with sequential reading.

CMS, AS/400, UNIX and PC Keyed Reads

Because **CMS, AS/400, UNIX** and **PC files** are not defined as "Keyed" files within the Operating System, it is necessary to inform SELCOPY of the position of the key within the input record using the **KEYPOS** parameter (abbreviation KP). Key length is not always required as the length is assumed to be that of the first key supplied. **KEYLEN=n** however is required if the first generic key length used is less than on subsequent keyed reads.

For AS/400, UNIX and PC files, the input record format may be **fixed, variable** or **undefined** (but not RECFM=V2 or MFV). If record format is variable, then the **LRECL** parameter is mandatory in order to give SELCOPY a maximum value to improve on its RDW validation. Since LRECL on a read statement implies RECFM=F, **RECFM=V** is also necessary.

Any **CMS, AS/400, UNIX** or **PC file** used with the KEY parameter must be in key sequence. It is the responsibility of the user to ensure this.

Key Not Found.

If a direct read using **KEQ** or **KGE** results in a **not found** condition, the job is not terminated and return code remains unchanged, however, a record length 25 is returned containing:

```
--- KEY/REC NOT FOUND ---
```

On mainframe systems, a CBLNAME option may be set to suppress this record so that the data is not overwritten and LRECL is unchanged.
Beware that, following a failed keyed read that returns this record, the LRECL value is updated so that LRECL=25. Therefore, if no special action is taken to modify the LRECL, any subsequent **WRITE** statement will output a record of length 25.
On AS/400, UNIX and PC systems, **RC_KEYNF** may be specified on an OPTION statement in SELCNAM or within the SELCOPY control statements to set a non-zero **return code** for a **not found** condition.
In contrast to the **STARTKEY** parameter, the **EOF** condition is **not given** when the requested generic key is higher than any other key on the file.

Example

Suppose we have a sequential file, called KEYDATA, where each record holds a 6 byte key in position 1-6 referencing a VSAM Key Sequence Data Set (KSDS). We require to print the first 50 bytes of each VSAM record.
If we read the sequential file into pos 1 (default), and read the VSAM file into pos 11, then print from 1 (default), length 60 instead of 50, we will get the keys printed on the left, as well as embedded in the data, but the advantage is that the Not Found error message which may get returned instead of a record will have its key identified.
End-of-file on the sequential input will cause automatic EOJ because it is the Prime (1st mentioned) input file. Please take care to avoid looping in more complicated routines.

```
RD KEYDATA     W 2000                 * Get 1st key rec.
RD CUSTFIL KSDS  INTO 11   KEQ 6 AT 1  * Direct Read of VSAM.
PR TYPE M  L 100                      * Print 100 bytes from 1.
```

Other applications might take the KEY data interactively off the terminal using the **LOG** with **REPLY** facility.

KEYFROM=n

--- ISAM only ---

KF=n

See also:

- Section *ISAM Files*.

```
READ FILE=TAPE10 LRECL=88
NOW FILE=ABC INDEXED LRECL=80 BLKSIZE=80 KEYLEN=8 KEYFROM=81
```

The KEYFROM parameter is for use only on unblocked ISAM output files.
It allows SELCOPY to take the key information from a specified position, rather than from position 1, which is the default if omitted.

Note very carefully that different THEN NOW and ELSE statements, which refer to the same unblocked ISAM output file, may have different KEYFROM arguments. Omission of the KEYFROM parameter for unblocked ISAM output results in the use of a different technique of obtaining the key and data portions.

In the above file copy, the 88 byte tape input records are truncated to 80 bytes of data, and written to the unblocked ISAM output file, ABC. The key for the ISAM record is taken from position 81 of the tape input record, and need not be duplicated anywhere within the 80 byte data portion.

KEYLEN=n

--- CMS, AS/400, UNIX, PC, VSAM, ISAM only ---

KL=n

```
READ  KEYED.FILE.A   KEY='A' KEYLEN=6   KEYPOS=11
WRITE FILE ISAMOUT INDEXED L=260 B=2600 KEYPOS=66 KEYLEN=17
```

For CMS, AS/400, UNIX and PC input

SELCOPY has special processing allowing keyed reads on CMS, AS/400, UNIX and PC files where a key set exists. SELCOPY dynamically builds its own index according to usage.

The argument, n, of the KEYLEN parameter specifies the length of the field within the input record which is to be used as the key for keyed reads.

Key length is not always required as the length is assumed to be that of the 1st key supplied. **KEYLEN=n** is required only if the length of the 1st generic key used is less than on subsequent keyed reads.

For ISAM output

The argument, n, of the KEYLEN parameter determines the length of the field within the record or work area which is to be used as the key.

This parameter must be supplied on at least one THEN or NOW card for an indexed sequential file. There is no default value.

Note that this parameter must be **omitted** on a **READ** card.

For VSAM input

The KEYLEN parameter is not applicable for VSAM input statements.

For **VSAM KSDS** files though, the defined **KEYLEN** may be accessed via a **4 byte binary** field at **POS FT+128**. e.g.

```
READ FILE=A    KSDS          STOPAFT=1   * So FT points at FILE=A.
@KLEN = 4 AT FT+128  TYPE=B  STOPAFT=1   * @KLEN = Defined KEYLEN.
READ FILE=A    KSDS   KEY=@KLEN AT 101   * Use KEY at POS 101.
```

KEYPOS=n

--- CMS, AS/400, UNIX, PC, ISAM only ---

KEYLOC=n
KP=n
RKP=n-1

```
READ  KEYED.FILE.A      KEY=7 AT 1001  KP=11
WRITE ADDRMST INDEXED   L=80   B=880   KEYLEN=9   KEYPOS=5
ADDRMST     ISAM       L=80    B=880   KL=9       RKP=4
THEN WR ISBLK   IX   KL=7   KEYPOS=16   L=50   B=900
```

For CMS, AS/400, UNIX and PC input

SELCOPY has special processing allowing keyed reads on CMS, AS/400, UNIX and PC files where a key set exists. SELCOPY dynamically builds its own index according to usage.

The argument, n, of the KEYPOS parameter specifies the start position of the field within the input record which is to be used as the key for keyed reads.

Because **CMS, AS/400, UNIX** and **PC files** are not defined as "Keyed" files within the Operating System, it is necessary to inform SELCOPY of the position of the key within the input record using the **KEYPOS** parameter.

For AS/400, UNIX and PC file RECFM=V input, the KEYPOS or RKP parameter is based on the position or offset within the data portion of the record, totally disregarding the RDW which always exists. This is true whether the RDW or NORDW option is in effect. Thus, the KEYPOS (or RKP) arguments do not require any change if the file is copied to a file of different record format, or if the user changes the NORDW option to RDW.

For ISAM output

For **Blocked ISAM Output** files only, the KEYPOS argument, 'n', specifies the position of the first byte of the field in the output record which is to be used as the key for blocked files.

KEYPOS **must be omitted** for **unblocked** ISAM output, and for **all input** functions.

There is **no default** value for **blocked ISAM output**. KEYPOS must be supplied on at least one THEN or NOW card.

Note that KEYPOS **is NOT** the position in the work area. It is for ISAM to use, not SELCOPY, and represents the position of the **key** in the record itself.

The synonym, **RKP**, may be used instead of KEYPOS to indicate a **Relative Key Position** which is always 1 less than the absolute position. KP starts at the value 1, while RKP starts at the value 0, both indicating the first byte of the record.
Thus the above statements for **ADDRMST** are identical because **RKP=4** means the same as **KP=5**.

KGE=

--- CMS, AS/400, UNIX, PC, VSAM only ---

KGE **(Key Greater or Equal)** permits direct reading of **CMS, AS/400, UNIX, PC** and **VSAM** files only, and is discussed under the **KEQ** param, synonym KEY.

KL=n

See also:

- KEYLEN=n in this section.

KP=n

See also:

- KEYPOS=n in this section.

KSDS --- VSAM only ---

See also:

- Section *VSAM Files*.

```
READ ABC    KSDS
WRITE   XYZ KSDS
```

Indicates a file of VSAM organisation, a **Key Sequence Data Set**.

MVS environment

This parameter may be omitted altogether and SELCOPY will recognise the file as a VSAM file of the correct type (KSDS/ESDS/RRDS) from the JFCB.
Exceptions to this are: when the VSAM file is using **Local Shared Resources**, or when proprietary software is used to simulate **VSAM**.

L

L is an abbreviation for the operation word **ELSE**, or the parameters **LRECL** and **LENGTH** according to context.

label

See also:

- GOTO GET/EOJ/CANCEL/user-label in this section.

LABEL=NO

NOLABEL
NOLAB
NL

```
READ TAPE10 LRECL 99 OPEN=NORWD LABEL=NO
WRITE TAPE11 OPEN=RWD NL
NOW F=TAPE12 LABEL=NO OPEN=NORWD CLOSE=UNLD LTM=YES
```

For **MVS**, please refer to IBM's Job Control Manual and use the **LABEL** parameter of the **DD** statement for unlabelled tapes. e.g. **LABEL=(1,NL)**

If LABEL=NO is coded, it indicates that the tape in question is unlabelled, and is not to have standard VSE label checking performed on it.

DO NOT USE this parameter if your tape is part of a Multivolume Tape file, **even if it is unlabelled**.
This is because the VSE label checking routine **is needed** to interrogate the operator at End-of-Volume of each tape to decide whether or not this is End-of File.
Unlabelled Multivolume Tapes should be processed as "labelled" tapes, and VSE's error messages concerning missing VOL1 and HDR labels should be given the reply "IGNORE".

If LABEL=NO is omitted, the default assumption is that the tape has standard labels.

LE 'string'

NGT
HIGH
HI
<=

See also:

- Comparison Operators in section *Further Information*.
- ASCII/EBCDIC Differences in section *AS/400, UNIX and PC Processing*.

```
IF POS 90   LE X'801C'
OR INCOUNT NGT 5989
  THENIF POS 227   GE 49   LE 87
```

Compares a field in the input record or work area for being either less than or equal to the supplied string argument. i.e. the 'string' denotes the upper limit which will satisfy the condition.

Any second comparison operator may be coded with its string argument on the same card in order to define a range. In this case, both comparisons must result in a true condition so as to satisfy the subsequent selection.
For example, the above, 2 byte packed decimal field at position 90 could also be tested for a lower limit:

```
IF POS 90 @b3  GE X'024C' @b3 LE X'801C'
```

LEAVE

--- VSE only ---

See also:

- CLOSE=disp in this section.

LEAVE is an argument on the **CLOSE** parameter, used to prevent **tapes** rewinding, **diskettes** being ejected, or unprocessed **cards** being flushed.

LENGTH=n

LEN=n
L=n

```
IF POS 8 GT POS 20 LENGTH 6
IF POS 22 = POS 48 LEN @ABC+@XYZ
```

The **LENGTH** parameter, or its synonym **LEN** or **L**, is used to indicate the length of the compare operation when both operands are data within the input or work area.

The argument to the **LENGTH** parameter may not exceed **16 MB**.

LENGTH or **LEN**, but not **L**, may also be used on the **DL1/IMS SEARCH** option and **DB2 TABLE/SQL** options, where the field value is held in the work area.
However, the **n AT p** syntax is preferred, rather than **POS p LEN n** which originally was the only syntax supported.

LINE=n

See also:

- POS UXLINE and SPACE=n in this section.

```
IF LINE GT 50
THEN LINE=1
```

The LINE parameter is used for both testing and setting SELCOPY's internal line count for printed output.

The line count is also maintained when **TYPE=S** printing is used, where, for **mainframe**, the user supplies the ASA character. An invalid ASA character is treated as blank, a single space.

For REPORT printing, SELCOPY generates a heading line, the underlining for this heading, and an automatic blank line. Thus the first line on which data is printed becomes line 4.

Testing the LINE number

SELCOPY's line count is the number of lines that have **already been used** on the page, so you can **never** succeed in testing for lines 1, 2 and 3 because the linecount goes instantly to 4 as soon as you write the first line of data on a page. It follows therefore that a test for **LINE=4** will only be true **after** line 4 has been printed.

It is recommended that **GE** is used instead of **EQ** when testing the line count because the **SPACE** command may have caused the line count to have exceeded the value tested, in which case equality will never be found.

```
          IF LINE GE 62
            THEN DO NEW-PAGE-RTN
```

To test for a **variable** line number, use the following:

```
@XX = n AT p    TYPE=p           * Set @XX to value from work area.
IF  4 AT UXLINE TYPE=B  >= @XX   * Test against binary value at UXLINE.
  THEN DO whatever
```

Setting the LINE number

The LINE parameter may be used to instruct SELCOPY on where to print the next line. The statement causes the printer to skip immediately to the line number specified. 'n' may be any number up to a maximum of the system line count.

If 'n' is not greater than the number of automatic header lines, including the blank line, the next line printed will be at the top of the page immediately after the heading(s).

If the next available line for printing is greater than the line number requested, then the internal line count value is set high (X'7F' is placed in the 1st byte of **UXLINE)** and the LINE=n request is considered satisfied. The next time a data line is printed it will be at the top of the next page.

In order to economise on paper when things don't go exactly as planned, all line requests are totally ignored if already at Line 1. (i.e. if Line 1 is the next line to be printed.) Thus, if no data is printed, then LINE=n commands are ignored. To **override** this, use the sequence:

```
LINE 1
PRINT ' '                    * Print a blank line.
LINE 33
PRINT                        * Print the data reqd.
```

The **SPACE operation** may be used to space lines in SELCOPY's printed output.

LOG

LOG may be used as an operation word in itself, causing output to the **LOG** file, and is not treated as a **user label**. It is discussed under the heading **FILE=LOG** .

LOWER

```
LOWER   80 AT 101                    * To lower case.
TRAN    80 AT 101    LOWER           * Identical to above.
LOWER  @BEG,@END       TO 401
```

The keyword **LOWER** may be used as a parameter on the **TRAN** statement or as an operation word in its own right, causing the field defined by the argument to be converted to **lower case**.

LRECL

3 uses of LRECL

1. As a **Position argument**.
2. As an **Operation Word** for changing the length of the **current** record in storage. Discussed **below**.
3. As a **Parameter** for files, defining the maximum record length permitted on that file. Discussed **below**.

LRECL (1. as a position)

L

LRECL or **L** (but not **LEN)** points to the **last byte** of the **current** record in storage (assuming it was read into position 1 of the workarea). Discussed under **POS=LRECL**.

LRECL (2. as an Operation Word)

LEN=change

See also:

- Changing Record Formats in section *Further Information*.
- Example 9 - RECFM=V from Card in section *Examples*.

```
 ____________________________________________________________________
|        |         |            * p may be any expression resolving to a    |
| (NOW)  |         |    p       *   position in rec/workarea,  e.g. 2002 /  |
|        | LRECL = |            *   L+6 / L-42 / @+22-EQUNAME / @A+@B-6-@C  |
|  THEN  |         |____________________________________________________|
|        |         |                                                    |
|  ELSE  |         |  n AT p   ( TYPE=B/C/P/Z )                          |
|        |         |                      _                             |
|________|_________|____________________________________________________|
```

LRECL or **LEN** (but not **L)**, without reference to any file name, may be used as an operation word on a **NOW**/**THEN**/**ELSE** card to modifiy the length of the **current logical record** held in SELCOPY's storage. i.e. the LRECL assignment may be made **after** reading a record.

Note that **L** as an operation word is a synonym for **ELSE**, and not for **LRECL**.

LRECL assignment is useful for writing a variable or undefined file where the record lengths differ from those of the input records.

Please note that if your input file is of variable or undefined record format, and the output is **RECFM=F**, (fixed length), it is **not necessary** to modify the LRECL. For fixed output, SELCOPY will truncate long records and pad out short records with the FILL character or contents of the workarea if used.

LRECL can be changed in any of the following ways:

LRECL=n

Sets the length of the current logical input record to the **decimal value, n**.

LRECL=L+n or LRECL=L-n

Increments or decrements the value stored for the length of the current logical input record by the **decimal value, n**.

LRECL=@+n or LRECL=@-n

Sets the value stored for the length of the current logical input record to the current setting of the **@ pointer**, plus or minus the **decimal value, n**. However, any **@USER** pointer, or pointer combination, may be used instead of @.

```
  IF POS=ANY EX=XYZ
    THEN LRECL=@+2              * Makes   Z the last byte of the record.
    ELSE LRECL=@A+@B-@C+20      * Multiple vars allowed.
```

LRECL = n AT p TYPE x

This will cause **n** bytes starting at position **p** of the work area to be evaluated as a numeric value and used to set value of the length of the current logical input record.

The **TYPE** argument, (default **TYPE=P)**, may be B, C or P, which indicates Binary, Character or Packed Decimal for the data type of the 'n' bytes.
Use of **TYPE=C** obeys the same rules as the CVCP (PACK) operation for obtaining the numeric portion of the 'n' bytes of **Character** data. e.g.

```
  READ CARD   W 2000
  LRECL = 4 AT 1 TYPE=C         * Set LRECL from 4 bytes of char data.
  WRITE XYZ   RECFM=V   B=4096
  END                           * Data records follow.
0450 This is a data record, len 80. LRECL written to XYZ will be 450.
0033 This data record, len 80, will get written to XYZ length 33.
```

Example 9 in section *Examples* sophisticates this technique.

Illegal Settings

1. a value based on invalid data for conversion. e.g. **TYPE** omitted, so **packed decimal** conversion used, but binary or character was required.
2. a value greater than the **original** record length, unless WORKLEN parameter used. So, without a **WORKLEN**, you are able to decrease LRECL, but you are **not able** to increase it **above** its original value.
3. a value greater than WORKLEN.
4. a value based on an **@ pointer** if it points outside the work area or input record, or has no setting. (i.e if the last range test was unsuccessful).
5. a value less than 1 (i.e. zero or negative) for SELCOPY on **mainframe** platforms, and a value less than 0 (i.e. negative) for SELCOPY on **AS/400, UNIX** and **PC** platforms,

In such cases the operation is ignored, **Return Code 8** is set, and at end-of-job a total is printed of LRECL modifications ignored.

RECFM=V input

Note that if input is **RECFM=V**, and **RDW** is in effect, **(RDW** is default for mainframe SELCOPY), and **LRECL** is changed, the **4-byte RDW** (Record Descriptor Word) at the start of the input record remains unchanged in the input area. In other words, SELCOPY has noted the "changed" LRECL, but does not modify any of your data in the input area.
Any **RECFM=V** output file will have RDW's regenerated from SELCOPY's internal store of the current LRECL value, ignoring the original input record RDW. (This avoids errors due to inadvertant modification of the RDW by the user.)
NORDW may be set as an installation standard in **CBLNAME** or **SELCNAM**, and is recommended.

LRECL (3. as a Parameter for Files)

RECSIZE
L

See also:

- LRECL, POS LRECL and RECFM= in this section.

```
  READ FILE=ABC LRECL=250
  WRITE FILE=XYZ LRECL=87 RECFM=V
  PRINT L 100
  THEN LOG TYPE S LRECL @A+@B
```

The value **n** defines the **maximum** Logical RECord Length permitted for a file. However PRINT and LOG are exceptions to this.

If the **RECFM** (RECord ForMat) of the file is **F** (Fixed), then all records are fixed at the same length, i.e. the value **n**.

If RECFM is omitted, then the explicit LRECL=n coded is taken to imply RECFM=F. To overrule this, RECFM=U or V should also be coded.

RECFM=V or **RECFM=U**, variable or undefined, allows the **LRECL** to vary for individual records within the file, up to the **maximum** specified.

The original **VSE** syntax combining **RECFM** and **LRECL**, which results in **LRECL** taking the **default** value, is still supported for both VSE and MVS:

LRECL=V to indicate standard **Variable** length format.
LRECL=U to indicate **Undefined** length.

PRINT and LOG files

Are exceptions in that the **LRECL** value applies **ONLY** to the single selection on which it is coded. Different values may be used therefore on different statements, but the value must always be **numeric**.

All other files

The presence of **LRECL** on any single **READ**, or **WRITE** defines that value as the **maximum LRECL** for **all selections** referring to that file. There is no need to code it repeatedly.
If coded **differently** on several statements, the value last mentioned will take effect for the whole of the file.

Coding LRECL on **READ** should be avoided for all types of input with the exception of VSE sequential and AS/400, UNIX and PC **RECFM=F** input. Unlike other access methods, the standard access methods or set of file I/O functions on these systems, do not return LRECL values.

To write different length records to a **RECFM=V** or **U** file, use the **WRITE fname FROM p1,p2** syntax.
Alternatively, precede the **WRITE** statement with a separate statement using **LRECL** as an **Operation Word** as described under the previous heading.

Default LRECL for INPUT

1. For **VSAM**, the catalog value of **LRECL** is used. Whatever you code is ignored.
2. For **DIR** (Directory), the appropriate system value is used. Whatever you code is ignored.
3. **LRECL=n** value used if coded on SELCOPY **READ** statement.
4. **MVS** files use the **DD** card value if present.
5. **MVS** files use the value stored in the tape **Header Label** or disk **DSCB** if available, and it usually is. **(Preferred method.)** Thus **MVS** users need only code **LRECL** on the rare occasions when they want to read a file with a different LRECL to that used on creation, and even then, it is preferably coded on the **DD** card.
6. **VSE ISAM** use the value in the **VTOC** entry. (c/f the DSCB for MVS)
7. **AS/400, UNIX** and **PC** files are **RECFM=U** by default, and the LRECL is assumed to be the length of data delimitted by standard or user defined **EOL** characters.
8. Failing all else, the value **80** is assumed.

Default LRECL for OUTPUT

1. **LRECL=n** value is used if coded on the SELCOPY **WRITE** statement.
   For **VSAM**, this has a **special meaning** overriding the catalog value, discussed at length in the **VSAM Section**. Its use however **should be avoided**.
2. For **VSAM**, the record length of the **current** record is used, up to the **maximum** permitted for the file as defined in the VSAM catalog.
3. **MVS** files use the **DD** card value if present. **(Preferred method.)**
4. **MVS** files use the value stored in the tape **Header Label** or disk **DSCB**, if the file already exists on the volume and is to be overwritten.
5. **BLKSIZE** value is used if available.
6. **LRECL** of the **Prime** input file used if available, else a value of **80**.

LT

<

See also:

- Comparison Operators in section *Further Information*.
- ASCII/EBCDIC Differences in section *AS/400, UNIX and PC Processing*.

```
IF  POS 90    GT  X'025C'     LT  X'800C'
OR  INCOUNT   LT    5989
  THENIF   2 AT 1  TY=P  <  4 AT  11  TYPE=P
  ELSEIF   @ABC          <  4 AT 111  TYPE=B
```

The **LT** comparison operator Causes the comparison between two objects to result in a **true** condition when the 1st object is **less than** the 2nd.

Any second comparison operator may be coded with its argument on the same card in order to define a range. In this case, both comparisons must result in a true condition so as to satisfy the subsequent selection.

In the example above, the 2 byte (positive) packed decimal field at position 90 must be within the range 26 to 799.
Note that this comparison is **strictly logical** on a binary value. The algebraic differences between packed decimal positive and negative are ignored. e.g. the value -45 is represented in packed decimal as X'045D' which would satisfy the above comparison.
For proper **Arithmetic Comparisons**, with respect for the **sign** (as shown in the above THENIF and ELSEIF examples), refer to the section on the **IF statement**.

LTM=YES

--- VSE only ---

```
WRITE TAPE22   LRECL=44  BLKSIZE=880 LABEL=NO   LTM=YES
WRITE ANYNAME8 DEV=TAPE   L=44 B=880 LABEL=NO   LTM=YES
```

VSE unlabelled tapes are acceptable with or without a leading tape mark. The **VSE** standard, **without LTM**, is used by SELCOPY when writing magnetic tape.

Coding **LTM=YES** causes a Leading Tape Mark to be written at **OPEN** time to an unlabelled magnetic tape, which may be required so that the tape is suitable for processing on some other system.

LTM=YES need only be coded on one control card relating to the relevant file.

MARC

--- Mainframe only ---

```
 ________________________________________________________________________
|       |      |           |                                              |
|       |      |           | TAGBEG              * Point before 1st TAG.  |
|       |      |           | TAGEND              * Point after last TAG.  |
|       |      |           | TAGNEXT             * Get next TAG into MCB. |
|       |      |           | TAGPREV             * Get prev TAG into MCB. |
| (NOW) |      |           |                                              |
|  THEN | MARC | p1   (p2) | TAGINS              * Insert new TAG from MCB. |
|  ELSE |      |           | TAGREP              * Replace current TAG.   |
|       |      |           | TAGDEL              * Delete current TAG.    |
|       |      |           |_____________________________________________|
|       |      |           |                                              |
|       |      |           | TAGKEQ    n AT p3   * Get TAG with Key EQ.   |
|       |      |           |            p3,p4                             |
|       |      |           | TAGKGE     'lit'    * Get TAG with Key GE.   |
|_______|______|___________|_____________________________________________|
```

p1 = Position of **MCB**, the MARC Control Block.
p2 = Position of MARC record within the workarea, **default 1**.

The **MARC** statement is for specialist users in the **Bibliographic** field, where a standardised record layout exists for the exchange of information concerning books and their titles, authors, publishers etc.

The record format of a **MARC** file is usually **RECFM=VB**, but **VSAM** is also used, which of course also supports records of varying length. However, the inner complexities of the **MARC** record take the "variable" concept much further.

The **MARC** record holds some fixed information, as well as a variable number of variable length **TAG** "records", and it is these **TAG** records that the user requires to manipulate.

MARC Formats supported

There are 3 types of MARC formats supported: **Exchange** Format. **JW** Standard Format. (J. Whitaker & Sons Ltd) **JW** Internal Format.

SELCOPY will automatically recognise the type of MARC format in use by checking flags in the **fixed** part of the record.

MARC users will of course already have full details of its formats, so here we will only list the functions available through SELCOPY.

Note that, for a **TAGINS** operation, if no MARC record has already been read, the **fixed** information required in a MARC record must **first** be initialised by the user.

ASCII Input

For Exchange format, untranslated ASCII input may be used. SELCOPY will recognise ASCII and translate to EBCDIC all data returned in the MCB.

MARC Control Block

SELCOPY will operate using a control block in the work area defined by the user with **WORKLEN=nnn** on the **OPT** statement or first READ. We will refer to this control block as the **MCB**, the MARC Control Block, and the format of the **MCB** is:

mcb+00	**CL6' '**	- Reserved -
mcb+06	**CL4'xxxx'**	Tag number (blank if no tag supplied)
mcb+10	**CL2**	Status code (blank if no error)
mcb+12	**CL12**	Tag directory
mcb+24	**CL2' '**	- Reserved -
mcb+26	**CLnnn**	Tag data, length nnn.

MARC Status Codes

blanks	Successful - No error.
DN	Del - No current tag to delete.
FI	Format Invalid - Tag pointers inconsistent.
GE	Get End (NEXT/PREV).
GK	Get Key - no key found.
IK	Ins Key - exists already.
RK	Rep Key - does not match existing.
RL	Rep/ins - wrong Length data.
SP	Spanned Exch format not supported.
UF	Unsupported Function.
UP	Unsupported Parameter.
XO	MCB - Storage Overflow - Worklen too small ?

SELCOPY/MARC Example

```
equ mcb       901
equ marcstat  911
  read marcfile     recfm v     w 2000

loop
  marc   mcb   tagnext             * Next TAG from MARC rec.

  if p marcstat = '  '             * If good status.
    t pr   fr mcb+26   l=50        * Print TAG data.
    t goto loop                    * If not last TAG.

  space 4                          * Separate physical recs.
```

MIXED='string'

See also:

- Bit Testing - ON/OFF/MIXED in section *Further Information*.

```
IF POS 31 MIXED X'C0'        * Test first 2 bits of pos 31.
OR POS 79 MIXED X'0303,0303' * Test last 2 bits in all 4 bytes.
THENIF POS 10 MIXED 000
ELSEIF POS 10 MIXED POS 20 LEN 2
```

In the above IF example only 2 bits are tested. One must be on, and the other must be off to give a 'true' result. In the OR example, 4 bytes are tested altogether, but only the 2 junior bits of each byte. Of the eight bits tested, one must be on, one must be off, and the rest could have any setting, in order to give a 'true' result.

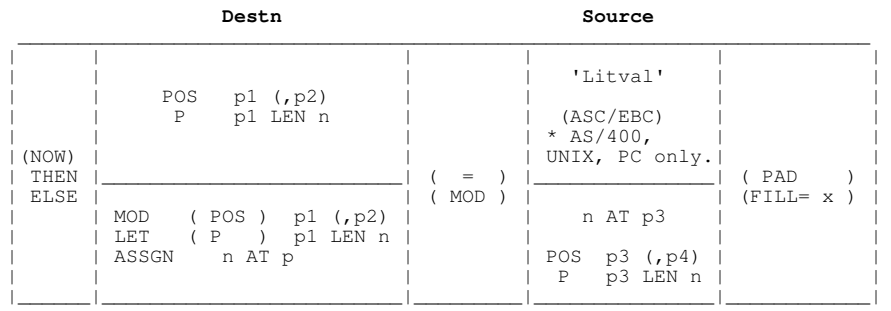
The data starting at the specified position will be tested against the supplied 'string'. This condition is satisfied if there is a mixture of bit settings in the data, corresponding to the '1' bits in the 'string'. Note that at least two bits need to be tested in order to obtain a 'mixture' of bit settings.
If the tested bits are all off, or all on, the result of the test is 'false'

Example

Check the sign of a 6-byte packed decimal field which starts at position 591, on the assumption that the sign is hexadecimal **C, D** or **F**. The sign is held in the last byte.

```
IF P 596   MIXED=X'03'
  THEN GOTO   NEGVE-RTN
  ELSE GOTO   POSVE-RTN
```

MOD (Redundant word)

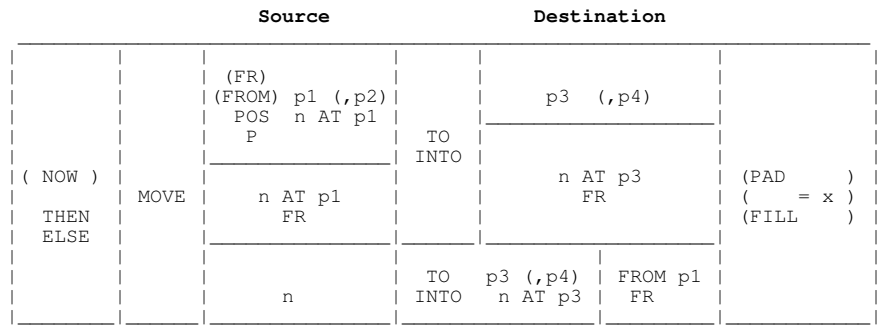


MOD causes data at the **destination** to be overwritten by data from the **source**, effectively the same as **MOVE**, but literals are allowed for the source.

The keyword **MOD** is best **omitted**, or for readability replaced with an **= sign** separating the destination and source.
If the keyword **POS** or its synonym **P** is the first word on a control statement, or the first word following **NOW, THEN** or **ELSE**, then an implied **MOD** statement is assumed.
MOD is also permitted as an operation word, but again, for readability, it is better to use the **POS p1 =** syntax.

Please refer to the **MOVE** statement below for discussion on the **FILL**/**PAD** character, **overlapping** arguments, maximum **lengths** and **Return Code 8**.

MOVE=n



Arguments p1, p2 and n are supported also as @ pointer values or Position Keywords.

MOVE will cause data from the **source** to be used to overwrite the **destination**, as defined in the above syntax box, effectively the same as **MOD**, but literals are **not supported**.

Maximum length for a **MOVE** argument is **16 meg**, but the movement of data may not extend outside the input or work area, whichever is the larger.

If only **1 length** is provided, then that length is used for **both source** and **destination**,

```
MOVE 100  FR 1      TO 1001                 * Moves 100.
MOVE      FR 1      TO 1001,1100            * Moves 100.
MOVE         1,100  TO 1001                 * Moves 100.
```

If **2 lengths** are provided, the **source** is padded or truncated to fit **destination**,

Padded Destination

The **FILL** character (synonym **PAD)** is used if the destination is longer than the source.
The **default** FILL character is blank (EBCDIC X'40', ASCII X'20').

```
MOVE         1,100  TO 1001,2000 FILL=X'00'  * Moves 100, pads 900
MOVE         @A,@B  TO @C,@D                 * Default FILL=X'40' or X'20'
```

Overlap for Propagation

Provided source and destination lengths are **the same**, (or only one length is supplied), the **Source** and **destination** fields may overlap, thereby providing a **propagation** facility,

A **MOVE** with overlapping fields will produce **repeats** when moving left to right.

```
          MOVE=9  FROM 1  TO 4      * Before: C'Mm.LKJNVCJXXXXXXXX'
                                   * After:  C'Mm.Mm.Mm.Mm.XXXXXX'
```

If this effect is not required, use **WORKLEN=n** and move it first to the top end of the work area, then back.

Return Code 8

For **mainframe**, if source and destination lengths **differ**, then the **Source** and **destination** fields **may not overlap** destructively.
i.e. cause overwriting of data **in the source** before it has been used **as a source**.
RC=8 is set if this occurs, and the **MOVE** operation is ignored.

The exception to this is when both source and destination start at the same position, in which case the MOVE operation is accepted and no RC=8 occurs.

The **AS/400, UNIX** and **PC** versions of SELCOPY allow, and action, any type of overlapping MOD or MOVE without error, whether it is padded or not. Therefore destructive overlapping of the source field does **not** cause RC=8, but instead actions the propagation facility as described above.

```
MOVE  1, 40  TO  2, 90   FILL='Y' * RC=8 on mainframe,
                                  * but actioned for AS/400, UNIX and PC SELCOPY.
MOVE  1, 40  TO  1, 90   FILL='Z' * Actioned by mainframe, AS/400, UNIX and PC SELCOPY.
```

MSTIND

--- ISAM only ---

MSTIND=YES
MI

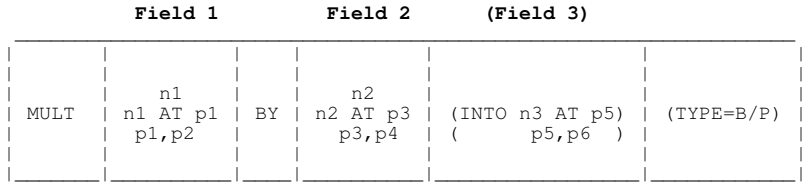
```
WRITE FILE=PQR ISAM KEYLEN=8 KEYPOS=2 L=80 B=800 MSTIND=YES
```

A **Master Index** area is required on a separate disk extent (Extent 0 for VSE users) for an Indexed Sequential **output** file. The argument **YES** is optional.
If omitted, no master index extent is constructed. (Must be omitted on a READ card.)

MULT=n

See also:

- Packed Decimal Explained in section *Introduction*.
- Section *Mainframe Debugging Aids*.



	Multiplicand	Multiplier	Destination
MULT	**4 AT 20**	**BY 2 AT 30**	**INTO 6 AT 40**
MULT	**4 AT 20**	**BY 2 AT 30**	
MULT	**4 AT 20**	**BY 700**	

The **MULT** operation will cause **Field 1** to be **multiplied** by **Field 2**, with the result being optionally stored in **Field 3**.

INTO parameter
If an **INTO** parameter is supplied, the result is stored at **Field 3**, otherwise **Field 1** is overwritten.

Literals
A literal, an unquoted decimal number, may be used for either or both source fields if so required. However, a literal value for Field 1 may only be used if an **INTO** parameter is also supplied.

TYPE parameter
Only **TYPE=P** (the default) and **TYPE=B** are supported.
If any other TYPE parameter is coded, **TYPE=P**, the default, is assumed and the operation done assuming **Packed Decimal** for both source and destination.

The TYPE parameter may only be coded **once** on each arithmetic statement.
SELCOPY will accept the **TYPE** parameter either following the source or the destination, but it is applied **to both** source and destination fields.
ERROR 045 is issued if the **TYPE** parameter is coded more than once.

TYPE=B (Binary)
All data is valid for Binary arithmetic, up to a **maximum** length of 4 bytes.

The senior bit (leftmost) defines the sign. Zero is positive, and one is negative, but for a **1-byte** binary field, the value is treated as unsigned and always positive. If an arithmetic operation with a 1-byte destination field has a negative result, then **Return Code 8** is set.

Important Note
Please refer to Section *AS/400, UNIX and PC Processing* which gives details on the two different ways in which a binary field is interpreted outside SELCOPY, depending on the type of machine processor.

Note that TYPE=B arithmetic data cannot be invalid and Binary addition and subtraction are useful for modifying the @ pointer.

TYPE=P (the default)
If **TYPE** is not coded, **TYPE=P** (Packed Decimal) is assumed, having a **maximum** length of 16 bytes, (31 decimal digits and a sign).

If the result of the operation is too large to be held in the destination field, then it will be truncated to fit the destination field length.
If truncation involves the loss of significant digits (non-zero), then Return Code 8 is set.

If the data is not valid Packed Decimal, then SELCOPY will set **Return Code 8** in an AS/400, UNIX or PC environment, or, in a mainframe environment, a **Data Exception** will occur. This may result in ERROR536, indicating an error in **SEL---27** for instance, or it may produce a storage dump, depending on whether your Systems Programmer has enabled SELCOPY's **Abend Trap**.

Packed Decimal Field Lengths
The destination field **MUST** have a length which is at least the number of **significant bytes** (not decimal digits) in the multiplicand (Field 1) **PLUS** the number of bytes, **(significant or otherwise)**, in the multiplier (Field 2).

For example, multiplying **130,000** by **30**, using 4 and 2 byte packed decimal fields respectively, (**X'01,30,00,0C'** and **X'03,0C'**) must have a destination length of 6 bytes minimum, otherwise a **Data Exception** will occur.

The same values, held in 4 and 3 byte fields respectively, would require a 7 byte destination field, in spite of the leading zeros in the multiplier.
The rule is that the multiplier is treated as if it could contain the maximum possible value, in this case X'99,99,9C'.
For the purpose of calculating the size required for the multiplicand (destination), the length generated for a literal is the number of significant digits, excluding leading zeros, plus one digit for the sign position, divided by 2, and rounded up to a whole number. e.g. a literal of 4444 becomes X'04444C' which is length 3 bytes.

Maximum lengths

	Packed Decimal	Binary
Multiplicand	16 bytes	4 bytes (the **MULT** param)
Multiplier	8 bytes	4 bytes (the **BY** param)
Destination	16 bytes	4 bytes (the **INTO** param)

NE

NOT
<>

See also:

- Comparison Operators in section *Further Information*.
- ASCII/EBCDIC Differences in section *AS/400, UNIX and PC Processing*.

```
IF  POS 33  NE  ABC                   * Literal char string 'ABC'.
OR  POS 33  NE  POS 123 LENGTH 3      * Data v data
OR  POS 33  NOT X'C1C2C3'             * Same as above IF.
  THENIF 2 AT 1 TY=P  <>  4 AT  11 TY=P
  ELSEIF @ABC         <>  4 AT 111 TY=B
```

The **NE** comparison operator causes the comparison between two objects to result in a **true** condition when the 1st object is **not equal to** the 2nd.

If the result of the comparison is inequality, the condition is **"true"**, and associated THEN control cards are actioned.

BEWARE of the dangers of coding:

```
IF POS ANY NE 'XYZ'
```

You are guaranteed success on every record whose length exceeds 3 bytes.
POS ANY means test all possible positions within the logical record. If any one position gives **true** then the **IF** is true.
The result may be **false** at position 1 because pos 1-3 does actually contain XYZ, but that will make it impossible for the test to fail at position 2.
Positions 2-4 will **NOT** be XYZ. Therefore the result is **true**.

NEWBLK

--- Mainframe only ---

NEWBLK=YES

```
READ TAPE11 RECFM=V
IF POS 5 = HEADER
THEN WRITE TAPE22 BLKSIZE=32000 NEWBLK
ELSE WRITE TAPE22        * Blocksize applies, NEWBLK does not.
```

Indicates that the current record is to be placed first in an output block, and therefore causes the current block to be truncated and written out immediately if it already holds records for output.

NEWBLK is a parameter that applies to a particular **selection only**. It does not cause truncation on other THEN/NOW/ELSE statements for the same file. If truncation is required on other selections to the same file, it is necessary to code **NEWBLK** on **each one**.

If omitted on a selection, records written out by that selection will only go on to a new block if there is not enough room for the record on the current block.

NEWBLK on every selection for a file will force unblocked output, regardless of what BLKSIZE was specified.

In the above example, TAPE11 is copied to TAPE22, but every header record is forced on to the start of a new block.
Programs reading a file so produced can then make use of the **RELSE** facility available in certain operating systems.

NEWBLK=YES is accepted as meaning simply **NEWBLK**.

NL

NOLABEL
See also:

- LABEL=NO in this section.

NOASA0 --- Mainframe only ---

```
OPTION    NOASA0
```

The NOASA0 parameter may be supplied on the **OPTION** statement only.

NOASA0 switches off print of the mainframe ASA print control character 0 in column 1 for all PRINT records. A blank line preceeding the data record is printed instead. **NOASA0** is default for SELCOPY SYSLST/SYSPRINT output.

PRINT **TYPE=S** output for system print is not affected by the **ASA0** and **NOASA0** options. Thus, a TYPE=S print line that has ASA character 0 in column 1, will be printed as is, even if NOASA0 is in affect.

ASA0 may be specified in **SELCNAM** to override the **NOASA0** system default.

NOBANNER --- AS/400, UNIX, PC only ---

NOBAN

```
OPTION    NOBANNER     * Suppress display of banner line on terminal.
```

The NOBANNER parameter may be supplied on the **OPTION** statement only.

NOBANNER suppresses display of the SELCOPY banner line to the user's terminal. By default, the SELCOPY banner line is displayed at startup of every SELCOPY execution.

The banner line is not displayed until all control statements have been processed, so it may be switched off, switched on using the **BANNER** option, and back off again, as you prefer, anywhere within your control statements.

If a control card error occurs, the Banner Line is automatically switched on, and a banner line is displayed before displaying the error message.

NOBANNER may be specified in **SELCNAM** to override the **BANNER** system default.

NOBDW --- AS/400, UNIX, PC only ---

```
READ  C:\FTP\OS390\LIST\SQL0001.LST  RECFM=V  NOBDW  * RECFM=V input  with no BDWs.
WRITE C:\TEMP\TESTDATA.RFV           RECFM=V  NOBDW  * RECFM=V output with no BDWs.
```

NOBDW may be specified on a **READ** or **WRITE** statement only.

Certain file transfer programs available for mainframe to PC conversion, omit the Block Descriptor Word (BDW) on the output file.

For **RECFM=V**, both input and output files, **NOBDW** may be coded to indicate that no Block Descriptor Word (BDW) exists or is required.

BDW is the default for all RECFM=V Input and Output. However, for RECFM=V input **without** BDWs, SELCOPY will recognize the missing BDW on the 1st block and thereafter treat the file as a NOBDW file, so for input, the NOBDW parameter could be omitted.

NOENVVAR --- AS/400, UNIX, PC only ---

See also:

- %ENVVAR% for literals or File names in section *AS/400, UNIX and PC Processing*.

The **NOENVVAR** parameter may be specified on an OPTION statement only.

Translation of system Environment Variables in SELCOPY control statements may be switched off using the **NOENVVAR** option. **ENVVAR** is the default and switches on environment variable translation. e.g.

```
option NOENVVAR          * Switch off translation of env vars.
pos 1 = '%path%='        * Will not be translated.
option   ENVVAR          * Resume translation of env vars.
pos 8 = '%path%'         * Will be translated.
```

NOENVVAR may be specified in **SELCNAM** to override the **ENVVAR** system default.

NOFILL --- AS/400, UNIX, PC only ---

NOFILL may be specified on a READ statement only, to preserve residual data from the previous, longer RECFM=U or RECFM=V input record.

NOFILL is the default and is only required if either **FILL=x** has been coded on an earlier READ statement for the same fileid, or **FILL=x** has been coded on an OPTION statement in the SELCNAM file.

NODUP --- DB2 only ---

See also:

- Section *DB2 Processing*.

```
READ  STATSIN  TAB=16 AT 110  FMT='TREETYPE,HEIGHT,AGE'  NODUP
```

Indicates that **NO DUPlicate** rows are to be returned from a DB2 table read. This generates a **SELECT DISTINCT** SQL statement.

NOPRINT

```
NOPCTL  * No print of Control Cards.
NOPSUM  * No print of Selection Summary Totals
NOPTOT  * No print of Selection Summary Totals
NOPRINT * No print of Control Cards or Totals.
NOP     * Abbreviation for NOPRINT.
```

NOPRINT, or its synonym **NOP**, will cause SELCOPY to suppress printing of both the user's **control cards**, and the standard **selection summary** at EOJ.

NOPRINT will have **no effect** on printing caused by use of the **THEN PRINT** statement. This may only be suppressed using **JCL**.

NOPCTL or **NOPTOT**, may be used in the same way to suppress only control cards or totals respectively.

NOPRINT, NOP, NOPCTL and NOPTOT may all be used as parameters on any SELCOPY control card, or may be supplied as an operation word on a control card of their own. As such, they are all **Reserved Words**, and are not allowed as labels.

Suppression of printing control statements commences on the card **following** the NOPRINT card or parameter, **except** where NOPRINT is encountered on the **very first** control card read, in which case no control cards at all are printed.

When **NOPRINT** is in effect, and a Control Card error is encountered, the option **NOPRINT** is reset immediately, and the control card actually causing the error is printed.

Error Messages will not be suppressed by the NOPRINT parameters. As soon as an error is encountered, NOPRINT is switched off.

NORDW

```
READ ABC   RECFM=V   NORDW        * Suppress Record Descriptor Word.
```

NORDW is recommended as it simplifies reference to the user data.

The **NORDW** parameter on an input statement will cause SELCOPY to suppress presenting to the user, for that particular input file, the 4-byte **Record Descriptor Word** which is always at the start of all **RECFM=V** logical records.

Conversely, the **RDW** parameter on an input statement will cause SELCOPY to present to the user the 4-byte Record Descriptor Word of RECFM=V input.

On a READ statement

NORDW and **RDW** are permitted on **input** statements referencing any type of RECFM. However, for input of **RECFM=F** and **RECFM=U**, they have no effect because no Record Descriptor Word exists for these record formats.

RDW/**NORDW** are **not permitted** on output statements, and if coded will result in an **error message**.

Statistics in the Selection Summary will reflect the **real** maximum LRECL found, which will **include** the 4 bytes for the **RDW**.

On an OPTION statement

The **NORDW** param may also be coded on the **OPTION** statement, in which case it will be effective on all **RECFM=V** input files, but for that run only.

The CBLNAME/SELCNAM default

NORDW is the default for **AS/400, UNIX** and **PC** SELCOPY and **RDW** is the **mainframe** SELCOPY default. NORDW or RDW may be set as the installation default for all executions of SELCOPY by setting a switch in **CBLNAME** or coding NORDW/RDW on an OPTION statement in **SELCNAM**.

Use the **RDW** parameter on an **OPTION** or **READ** statement to override the **CBLNAME**/**SELCNAM** settings.

NOSORT

--- AS/400, UNIX, PC only ---

SORT=NO

NOSORT may be coded on **OPTION** or **READ** to indicate that **DIR** or **DIRDATA** input is to be returned unsorted. i.e. in the order returned from the operating system. NOSORT is only required if the installation standard has been set to something else using the SORTDIR=x option in the SELCNAM file.

NOSUB

--- AS/400, UNIX, PC only ---

SUBDIR=0

NOSUB may be coded on **OPTION** or **READ** to indicate that **DIR** or **DIRDATA** input should not include nested levels of subdirectories. NOSUB is only required if the installation standard has been set to something else using the SUBDIR=n option in the SELCNAM file.

NOSUBS

--- CMS only ---

See also:

- XV func in this section.
- XV - Transfer Variable in section *VM/CMS Processing*.

Parameter of **XV** statement to suppress CMS REXX substitution and case translation when setting, dropping or retrieving REXX variables.

NOTRUNC

--- CMS, AS/400, UNIX, PC only ---

```
WR ABC.DOSLIB.A  RECFM V  NOTRUNC
WRITE OUTDD  NOTRUNC  RECFM U
```

The **NOTRUNC** parameter may be specified on a WRITE statement only to prevent record truncation of trailing blanks.

By default, SELCOPY will strip off any trailing blanks on a **Variable** or **Undefined** length **CMS**, **AS/400 UNIX** or **PC** output file. Note that in CMS, RECFM=V and RECFM=U are synonymous. Thus a record consisting of all blanks will be truncated to a 1 byte (blank) record for CMS or a 0 byte record for AS/400, UNIX and PC systems.

Certain CMS files **must not** be truncated. e.g. truncation of a DOSLIB will cause loss of storage initialisation (the trailing blanks) when a program is loaded from that library.

Use of **EOL=NO** for AS/400, UNIX or PC output, which implies RECFM=U, will force a default of NOTRUNC. EOL=NO is typically used to write raw data with no End Of Line characters and without stripping trailing blanks. e.g.

```
READ ABC   L=100       * An input file of 441 bytes, RECFM=F.
WR   OUTU  EOL=NO      * Will write 4 RECFM=U recs of 100, 1 rec of 41.
```

If for some reason trailing blanks need to be stripped off, then **TRUNC** should be coded on the **same statement** as the EOL=NO parameter wherever it is used.

TRUNC (the default) and NOTRUNC may be coded on any output statement but are ignored if not RECFM=U (CMS RECFM=V).

NOW (Redundant word)

N

The word **NOW** is **redundant**, and should never be coded. However, **NOW** and **N** are still supported as optional words.

NOW defines an action to be taken **unconditionally**. It is actioned every time SELCOPY loops through your control statements, provided SELCOPY's logic sequence is not interrupted by a **GOTO** parameter, or altered by the action of **FILE=SUSP** statement.

```
NOW POS 20 = X'FF'
NOW MOVE 20 FROM 1 TO 40
NOW  WRITE NEWMAST
```

If **NOW** is **omitted**, and the first word encountered is not another operation word, an **unconditional operation** is assumed by default.

Thus action words such as **READ, WRITE, GOTO, MOVE, PACK, ADD, SPACE,** etc become operation words themselves.

```
ADD 4000 TO 4 AT 120              * Default NOW card.
GOTO PROCESS-RTN                  * Default NOW card.
```

If the first word of a control card is not one of these secondary operation words, it is assumed that a **WRITE** operation is required.

```
NEWMAST STOPAFT=400     * This will write the file NEWMAST.
NEWMAST FROM=1          * So will this.
NEWMAST LRECL 100       * And this.
NEWMAST                 * Treated as a   User-label because it
                      * is a single unreserved word.

PRINT     * This is a   Keyword, NOT a label.
        * So it will   print a record.
```

THEN cards become **unconditional** if they follow a **NOW** or a **default NOW**.
In the days of SELCOPY control cards on real **punched** cards, (when **NOW** was not optional), this was a useful way of writing statements which might later be made conditional by changing the first **THEN** to a **NOW**.

```
NOW  POS 20 = XXXX      * The word   NOW could be changed to   THEN,
THEN POS 30 = XXXX      * and an   IF inserted in front of it,
THEN   P 40   XXXX      * making all   THEN
```

NULLS

--- DB2 only ---

See also:

- Section *DB2 Processing*.

```
READ  TEST  SQL='SELECT * FROM CBL.TYPE_TEST'    NULLS
```

Indicates that, on a DB2 read, **NULL indicator variables** are to be returned to the workarea as well as the column data for columns that can accept NULL values. The indicator variable is a 2 byte binary integer set to **-1 (X'FFFF')** if the column value is null. If requested it immediately precedes the column data in the workarea.

NULLS is implied if parameter **PFX** is coded.

ONES='string'

See also:

- Bit Testing - ON/OFF/MIXED in section *Further Information*.

```
IF POS 44   ONES   000
IF POS 44   ONES X'F0,F0,F0'
OR POS 77   ONES '0000'
AND P 888   ONES POS 140   LENGTH=14
```

ONES is a comparison operator for testing data at the "bit" level. It provides the means of testing that certain bits are ON, while ignoring the setting of other bits.

If there are '1' bits in the 1st **POS** corresponding to all the '1' bits in the string, (or in the 2nd **POS** for the specified length), the result of the comparison is **"true"**, and associated **THEN** control cards are actioned.

OPEN fname

```
OPEN INDD DSN='VSE.INPUT.FILE'   SYS=30          * Dynamic Allocation
OPEN ABC  DSN=44 AT 101
OPEN '/accounts/dept1/payroll_master.bkup.027'
OPEN C:\AUTOEXEC.BAT
```

Open the file referenced by **fname**. The **DSN** parameter may be supplied to dynamically allocate **fname** to the file before opening it.

If OPEN provides the first reference to fname then the **DEFER** parameter is implied for that fname.

OPEN is useful in the following circumstances:

- To reuse a filename for multiple dynamically allocated input or output files.
- To ensure that a dynamically allocated output file, using a variable dsn, is opened if no output operation is ever executed for it. This makes it possible to WRITE an empty file using Dynamic Allocation.

Note

SELCOPY normally opens a file automatically. For input files, this is done during validation of the first control statement to reference the fname. For output files, it is done at the end of control statement analysis.
Exceptions to this rule are:

1. The control statement is **OPEN** or **CLOSE**.
2. The control statement specifies **DEFER**.
3. The control statement specifies **DSN** parameter which is a variable.

In these cases, the open is actioned when the control statement is executed.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)                          OS JOB=NBJ       15.15 FRI 23 NOV 2001    PAGE   1
o ------------------------------------------------------                                          --------------------    -------- o


o          ** CBL.SMAN.EXAMPLES(SMXOPEN1) ***     L=001 +++ 2001/11/23 15:14:48 (NBJ)                                              o
           * Copy only the members of a PDS with names starting 'SELC*' to a 2nd PDS and rename them to 'SS*'.

o            equ    outdsn       2001         * Position of output data set name.                                                 o


o      1.    read   indd  dsn='CBL.SMAN.EXAMPLES.OPEN'  dirdata   w 2222                                                          o


o            if dir                                          * Start of new input PDS member.                                   o
       2.      then if pos 1     =  'SELC'                   * If member name starts with 'SELC'.
       2.             then  do newmemb
o      3.                              then goto get         * Initialise new output DSN.                                       o
       4.             else  flag eom
       5.                              then goto get         * Flag end of member data input.
o                                                                                                                                 o


       6.    wr     outdd                                * Write data records to current output DSN.
o      7.    goto get                                                                                                             o


o          ==newmemb==                                                                                                            o
             -------
           *               ...,....1....,....2....,....3....,
o      8.    pos outdsn = 'CBL.SMAN.EXAMPLES.OPEN.DUP(SS      )'   stopaft 1      * 1st time only.                                 o
       9.    move   4 fr 5  to  outdsn+29                     * Insert new member name.
      10.    print    fr        outdsn, outdsn+35             * New output DSN.
o     11.    open   outdd   dsn=36 at outdsn                  * Auto close on previous file.                                     o
      12.   =ret=

o                                                                                                                                 o
      INPUT   SEL SEL                                                                                                 1  RECORD
      RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH
o     -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------  o
          8     1  10 CBL.SMAN.EXAMPLES.OPEN.DUP(SS      )                                                                    12
          9     2  10 CBL.SMAN.EXAMPLES.OPEN.DUP(SSCKD   )                                                                    12
o        10     3  10 CBL.SMAN.EXAMPLES.OPEN.DUP(SSCOMP  )                                                                    12  o
         11     4  10 CBL.SMAN.EXAMPLES.OPEN.DUP(SSCTL   )                                                                    12
         12     5  10 CBL.SMAN.EXAMPLES.OPEN.DUP(SSERAS  )                                                                    12
o        13     6  10 CBL.SMAN.EXAMPLES.OPEN.DUP(SSFBA   )                                                                    12  o
         14     7  10 CBL.SMAN.EXAMPLES.OPEN.DUP(SSLL    )                                                                    12
         15     8  10 CBL.SMAN.EXAMPLES.OPEN.DUP(SSMEMO  )                                                                    12
o        16     9  10 CBL.SMAN.EXAMPLES.OPEN.DUP(SSPAGE  )                                                                    12  o
         17    10  10 CBL.SMAN.EXAMPLES.OPEN.DUP(SSPUR   )                                                                    12
         18    11  10 CBL.SMAN.EXAMPLES.OPEN.DUP(SSREAD  )                                                                    12
o        19    12  10 CBL.SMAN.EXAMPLES.OPEN.DUP(SSSCAN  )                                                                    12  o
         20    13  10 CBL.SMAN.EXAMPLES.OPEN.DUP(SSSKEL  )                                                                    12
         21    14  10 CBL.SMAN.EXAMPLES.OPEN.DUP(SSTEXT  )                                                                    12
o        22    15  10 CBL.SMAN.EXAMPLES.OPEN.DUP(SSTXTV  )                                                                    12  o
         23    16  10 CBL.SMAN.EXAMPLES.OPEN.DUP(SSTYP   )                                                                    12
         24    17  10 CBL.SMAN.EXAMPLES.OPEN.DUP(SSVSAM  )                                                                    12
o                  ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0          o

  SUMMARY..
o  SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN                                                 o
   ------      ------      ----     -------  -----           -----   --    ---
       1        1,775 READ INDD       1776   222 VB             34       CBL.SMAN.EXAMPLES.OPEN                      CBLM04
o     2----5      17                                                                                                          o
       6        1,741 WR   OUTDD      1776    88 VB             69       CBL.SMAN.EXAMPLES.OPEN.DUP(SSVSAM)          CBLM05
       7        1,741
o      8            1                                                                                                        o
       9---10      17
      11           17 OPEN OUTDD      1776    88 VB             69       CBL.SMAN.EXAMPLES.OPEN.DUP(SSVSAM)          CBLM05
o     12           17                                                                                                        o


o          ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **  o
                                          ** EXPIRY DATE -- 2002/05/21 **
```

Figure 0. OPEN - Open File Name.

OPEN=RWD/NORWD

--- VSE only ---

OP=REW/NOREW
OP=LEAVE

```
READ TAPE11 NOLABEL OPEN=NORWD
WRITE TAPE22 BLKSIZE=7800 OP NOREW
```

For **MVS**, please refer to IBM's Job Control Manual and use the **LABEL** parameter of the **DD statement** for tape positioning.

VSE users may control tape positioning at open time on both labelled and unlabelled tape files using the **OPEN** parameter. In an **MVS** environment, if coded, the **OPEN** parameter is ignored.

If **RWD** (synonym **REW)** is specified, the tape is rewound to load point before the file is opened. This is default action if omitted.

If **NORWD** (synonyms **NOREW** and **LEAVE)** is specified, it is assumed that the tape is already positioned correctly. For example **OPEN=NORWD** is required on **CAT** statements referring to the same tape.

At **VSE** installations using a **Tape library management** system, these options are effectively **ignored** because the special parameters on the TLBL card will override anything specified here.

OPTION

OPTIONS
OPT

```
                ABTRAP=ON|OFF|YES|NO     REPORT     HEAD=string|NO     DEFDIR=path
                                         R          HD

                    PAGEWIDTH=n     PAGEDEPTH=n     DATAWIDTH=n        DUMPALL=YES|NO
                    PW              PD              DW

               WORKLEN=n     PRTCTL     SEP=x|NO|OFF     SSN=xxxx       DUMPENC="xy"
               W             NOP
                             NOPRINT       Y2|Y4         ENVVAR|NOENVVAR
OPTION                       NOPCTL
                FILL=x       NOPSUM      ASA0|NOASA0     ENVFAIL=SAME|NULL|CANCEL|str
                             NOPTOT

                     NORDW|RDW          PRRECLEN=NO/YES         SUBDIR=n|NOSUB

                    BANNER|NOBANNER        RC_KEYNF            SORTDIR=x|NOSORT

                  SITE='string'     RANGE=yyyy/mm/dd-yyyy/mm/dd    PASS=x'n'
```

When used, it is recommended that the **OPTION** statement is supplied as the first control statement, but it may be coded anywhere, and used as many times as required.

The following parameters are supported on OPTION. They are discussed in more detail under their individual headings within the reference section of this manual.

ASA0
For mainframe only, switches on print of the ASA print control character 0 in column 1 of the SELCOPY listing.

ABTRAP=OFF
For mainframe only, switches the Abend Trap ON or OFF.

BANNER
For AS/400, UNIX and PC only, allows output of the SELCOPY banner line to the user's terminal.

CONTMAX=n
For mainframe only, changes the default maximum length of a logical control statement using continuation records.

DATAWIDTH=n
Changes the number of bytes of data that are printed on 1 line of SELCOPY's PRINT output.

DEFDIR=path
Controls default run-time directory for SELCOPY I/O operations.

DUMPALL [=YES | NO]
Controls display of duplicate of lines data for TYPE=D (dump) printing.

DUMPENC="xy" | "x"
Changes characters that delimit character data in a TYPE=D (dump) print.

ENVFAIL=SAME/NULL/CANCEL/string
For AS/400, UNIX and PC only, defines the action taken when a referenced system Environment Variable does not exist.

ENVVAR
For AS/400, UNIX and PC only, switches on system environment variable translation.

EOF=xx
For VSE only, controls the **End-Of-File** character sequence for SELCOPY control cards.

FILL=x
Defines the filler character for initialisation of the work area.

HEAD='user heading'
Changes the standard SELCOPY heading as indicated.
This option may not be specified in the SELCNAM fileto define an installation default.

NOASA0
For mainframe only, switches off print of the ASA print control character 0 in column 1 of the SELCOPY listing.

NOBANNER
For AS/400, UNIX and PC only, suppresses output of the SELCOPY banner line to the user's terminal.

NOENVVAR
For AS/400, UNIX and PC only, switches off system environment variable translation.

NOPCTL, NOPTOT/NOPSUM, NOP/NOPRINT

Controls printing of control cards, summary totals, or both respectively.

NORDW
Suppresses the 4-byte **Record Descriptor Word** on **RECFM=V** input records.

NOSORT
For AS/400, UNIX and PC only, forces DIR and DIRDATA directory records to be read in no fixed order.

NOSUB
For AS/400, UNIX and PC only, suppresses processing of nested levels of subdirectories for all **DIR** and **DIRDATA** input.

PAGEDEPTH=n
Changes the number of lines per page in SELCOPY's output listing.

PAGEWIDTH=n
Changes the number of bytes printed in the **header** and footer lines of the SELCOPY listing.

PASS=x'n'
Specifies the unique 8-byte hexadecimal password required for successful execution of SELCOPY.

PRRECLEN=NO/YES
For AS/400, UNIX and PC only, excludes/includes the **RECORD LENGTH** column in the SELCOPY PRINT block.

PRTCTL
Switches on printing of control statements in the SELCOPY listing.

RANGE=yyyy/mm/dd-yyyy/mm/dd
Specifies an operational date range during which SELCOPY will execute successfully.

RC_KEYNF
For AS/400, UNIX and PC only, sets the default return code for a direct read KEY/REC not found condition.

RDW
Includes the 4-byte **Record Descriptor Word** on **RECFM=V** input records.

REPORT
Forces SELCOPY's report format output.

SEP=x
Defines the separator character default or suppresses control statement separation **(SEP=NO)**.

SITE='string'
Specifies the user's company name and location as required for successful execution of SELCOPY.

SORTDIR=x
For AS/400, UNIX and PC only, forces DIR and DIRDATA directory records to be read in the specified sort order.

SSN=xxxx
For DB2 only, changes the, up to 4 byte character, standard or CBLNAME defined **DB2** sub-system name.

SUBDIR=n
For AS/400, UNIX and PC only, specifies the number of levels of nested subdirectories to be processed for all **DIR** and **DIRDATA** input.

WORKLEN=n
Defines a user work area fo size n bytes.

Y2
For mainframe only, sets a 2-digit year date format for **VM** and **VSE DIR** input records.

Y4
For mainframe only, sets a 4-digit year date format for **VM** and **VSE DIR** input records.

OR (Operation Word)

O

See also:

- IF in this section.

The **OR** statement has the same parameters as the **IF** statement.

Use of the **OR** statement allows the user to base a **THEN** statement on satisfaction of any of several conditions.

If an **OR** statement has **AND** statements following it, then the selection will be made only when the **OR** and the **AND** conditions are satisfied. In the example below, records 101 to 199 will only be written to the file **MINI** if position 6 and 12 also satisfy the stated requirements.

```
IF INCOUNT = 46
  OR INCOUNT 60

    OR INCOUNT   GT 100   LT 200
    AND POS 6 = 'XXX'
    AND POS 12 NE '*'

       OR POS 20 = POS 30   LENGTH 7

         OR POS 55 89 = 'AK/985/HX'
         AND POS 47   =   'CR'

THEN MINI                    * This will WRITE    FILE=MINI.
```

Perhaps the above control statements are clearest if the **separator character** is used to combine the associated statements onto a single line, as follows:

```
if incount =  46
or incount =  60
or incount > 100   < 200     !and p  6  = 'XXX'  !and p 12 <> '*'
or p 20    = pos 30   len 7
or p 55,89 = 'AK/985/HX'     !and p 47  =  'CR'
  then write MINI
```

OR= 'string' (Logical Operator)

Destn			Source	
			'Litval'	
(NOW)	POS p1 (,p2)		n AT p3	
THEN	P p1 LEN n	OR		
ELSE			POS p3 (,p4)	
			P p3 LEN n	

Arguments p1, p2 etc and n are supported also as @ and @user pointer values or Position Keywords.

```
POS 44   OR   000                      * Set 3 EBCDIC bytes to numeric.
POS 44   OR   X'4040,4040,4040'        * Set 4 EBCDIC alpha chars to upper case.
POS 44   OR   X'2020,2020,2020'        * Set 4 ASCII  alpha chars to lower case.
  THEN POS @+77   OR   POS L-23   LEN 80
  ELSE P 99   OR   X'F0'               * Set 1 EBCDIC byte  to numeric.
  THENIF P 99 GE X'FA'
      THEN GOTO NOT_NUMERIC
```

Modification of data at the **"bit"** level is achieved with the **AND, OR** and **XOR** operations.
The **OR** operation gives the facility to **force bits ON**.

OR causes data in the record or work area to be logically **OR** ed with the **OR** argument.

Bits in the data which correspond to '1' bits in the argument will be set to '1'. Bits in the data corresponding to '0' bits in the argument will remain unchanged.

The argument may be supplied as a **literal**, or in **POS p LEN n** notation, where **LEN** is unlimited provided it fits in the record or workarea.

PACK=n

See also:

- CVCP=n (Char --> Packed) in this section.

PACKB=n

See also:

- CVCB=n (Char --> Binary) in this section.

PAD=x

See also:

- FILL=x, MOVE=n and IF in this section.

PAD is a synonym for **FILL** on a move or compare operation that uses fields of different lengths.

PAGEDEPTH

PD

```
OPT      HEAD=OFF   PD=50
REPORT   HEAD 'My Report'   PAGEDEPTH=86
PRINT    pd 72
```

The **PAGEDEPTH** (abbreviation **PD)** parameter may be supplied on the **OPTION** card, **REPORT** card, or on any **PRINT** operation.

The argument of the **last** PAGEDEPTH parameter encountered will be the number of lines used per page for all SELCOPY's printed output from that point on, including its own control cards.

The **minimum** allowed for PAGEDEPTH is 10 lines. **Maximum** is 2,147,483,647 or effectively unlimited.

Default

If the PAGEDEPTH parameter is omitted, the value coded in the **SELCNAM** file or **CBLNAME** module, will be used in preference if it is non-zero. Your installation's System Programmer will have the necessary information to set this default if required.

If no value is set in CBLNAME or SELCNAM, then:
For VSE, the System default is used for the number of lines per page.
For MVS, the value is taken from a constant held within SELCOPY, which is currently set at 58.
For **AS/400**, **UNIX** or **PC**, the value is taken from a constant held within SELCOPY, which is currently set at 86.

PAGEWIDTH

PW

See also:

- DATAWIDTH and PAGEDEPTH in this section.

```
OPT      HEAD=NO   PW=120
REPORT   HEAD 'My Report'   PAGEWIDTH=100
PRINT    pw 96
```

The **PAGEWIDTH** (abbreviation **PW)** parameter may be supplied on an **OPTION** statement, **REPORT** statement, or any **PRINT** operation.

PAGEWIDTH defines the number of bytes available for printing report headings and the CBL details at the foot of the listing. **DATAWIDTH** controls the number of bytes of data that are printed on 1 line of SELCOPY's output to the **PRINT** file before wrap occurs on to the next line.

Headings, footings and TYPE=D printing are adjusted according to the page width specified as the argument of the **last** PAGEWIDTH parameter encountered.

Default, Min/Max

For mainframe, the PAGEWIDTH argument does not include the ASA print control character.
If the PAGEWIDTH parameter is omitted, then the default is obtained from the following:

1. The value coded on an OPTION PAGEWIDTH statement in the **SELCNAM** control file if non-zero.
2. The **CBLNAME** value if non-zero.
3. A value of **132 bytes** which will result in output length 133 bytes including the **ASA character**.

Minimum PAGEWIDTH is 72 bytes, **maximum** is 160 bytes. However, since the actual I/O command for printing is restricted to 133 characters, coding **PAGEWIDTH>132** (SYSIN/SYSLST output > 133 with ASA) will force the date and page number to be right adjusted at output column 133. Thus no truncation will occur.

For AS/400, UNIX and PC, if the PAGEWIDTH parameter is omitted, then the default is obtained from the following:

1. The value coded on an OPTION PAGEWIDTH statement in the **SELCNAM** control file if non-zero,
2. A value of **132 bytes**. No ASA characters are produced on AS/400, UNIX and PC output listings.

Minimum PAGEWIDTH is 66 bytes, **maximum** is 155 bytes.

Headings

The Page Number is always right adjusted to whatever width is available, the Operating System and Jobname are removed, and the **date** in the heading is compressed into **International Date Standard format**. If the page width is sufficiently small, the company details will be overwritten by the date and page number fields. The new page width takes effect immediately for headings even when still printing control cards,

TYPE=D Printing if PW < 132

If **Page Width** is less than 132, all **TYPE=D** printing will print **X'10'** bytes per line instead of **X'20'**, thus making the whole of the print output line visible when displayed on a standard 80 byte screen. e.g.

```
 ____________________________________________________________________________
|                                                                            |
|    INPUT   SEL SEL                                                         |
|    RECNO   TOT ID.                                                         |
|    -----   --- ---                                                         |
|        1     1   2              55                                         |
|    0000  C4C1E3C1 40C3C1D9 C440C6D6 D940E3E8     |DATA CARD FOR TY|      |
|    0010  D7C57EC4 40D7D9C9 D5E3C9D5 C740E2C1     |PE=D PRINTING SA|      |
|    0020  D4D7D3C5 40404040 40404040 4DD3C5D5     |MPLE         (LEN|      |
|    0030  C7E3C840 F5F55D                         |GTH 55)          |      |
|        2     2   2              72                                         |
|    0000  F2D5C440 C4C1E3C1 40C3C1D9 C440C6D6     |2ND DATA CARD FO|      |
|    0010  D940E3E8 D7C57EC4 40D7D9C9 D5E3C9D5     |R TYPE=D PRINTIN|      |
|    0020  C740E2C1 D4D7D3C5 40404040 40404040     |G SAMPLE         |      |
|    0030  40404040 40404040 40404040 404DD3C5     |              (LE|      |
|    0040  D5C7E3C8 40F7F25D                       |NGTH 72)         |      |
|____________________________________________________________________________|
```

PASS=x'nnnn,nnnn,nnnn,nnnn'

See also:

- SITE='string' and RANGE=yyyy/mm/dd-yyyy/mm/dd in this section.
- PASSWORD=string in this section.
- Section *CBLNAME & SELCNAM*.

```
OPTION   PASS=X'0123,4567,89AB,CDEF'
```

PASS and its argument x'nnnn,nnnn,nnnn,nnnn' may be provided as a parameter on an **OPTION** statement in the **SELCNAM** file only. It specifies a unique 8-byte hexadecimal password supplied to the user by CBL for normal execution of SELCOPY. The password is based on the information specified on the **SITE** and **RANGE** parameters which are also supplied by CBL.

Note that, unless the password is already defined in the CBLNAME load module, use of the PASS option is **mandatory**. Since CBLNAME does not exist for SELCOPY on AS/400, UNIX and PC platforms, a SELCNAM file containing SITE, RANGE and PASS parameters is always required.

Refer to the separate document "SELCOPY Installation Guide" for more details.

PASSWORD=string --- VSAM only ---

PASSWD=string
PASS=string

```
READ ABC   VSAM        PASSWORD=XNCRTYKM
WRITE XYZ  KSDS         PASSWD=ABCDEFGH
```

```
  THEN READ FILEXXX  ESDS   PASS 'XY+Z,8'
```

VSAM files which are passworded may have the password supplied on a SELCOPY control statement instead of having the operator given the option to key it in on the console.
The password must be enclosed in quotes if it contains any of the SELCOPY delimiters.

When SELCOPY prints the control cards, both the keyword, **PASS**, and its argument are blanked out, thus avoiding disclosure of the password on the printed output, or even that a password were supplied.

PERFORM user-label

See also:

- DO user-label in this section.

PFX --- DB2 only ---

See also:

- NULLS and VLEN in this section.
- Section *DB2 Processing*.

```
READ  SQL='SELECT * FROM P390.TESTDEC'   PFX
```

PFX may be used to imply **both** the **NULLS** and **VLEN** keywords.

VARCHAR columns are placed in the workarea in fields of maximum width, with a 2 byte binary length prefix.
Similarly, all columns which can accept NULL values will have a 2 byte binary indicator variable preceding them in the workarea.

PLOG

See also:

- FILE=PLOG (Print and LOG) in this section.

PLOG causes output to both **PRINT** and **LOG** files.

POS

1. as an operation word.
2. as a parameter with numeric argument(s).
3. as a parameter with Special Keyword argument(s). e.g. POS @, POS DATE.

POS (1. as an Operation Word)

See also:

- MOD in this section.

```
POS 20 = 'XYZ'
POS 20 = 4 AT 80
```

POS as an operation word defines the destination field for an assignment statement.

POS=p1 (,p2) (2. as a Parameter with Numeric Arg)

P=p1 (,p2)

See also:

- IF in this section.

- Section *Pointers and LRECL - Discussion*.

```
IF POS 1,28 = ABC                  * A range test.
OR POS=27 GT X'40'
```

The **POS** parameter may have 1 or 2 arguments defining a **position**, **p1**, or a field (range) from position **p1** to **p2** inclusive.

POS is required to indicate where a test is to be made (IF/OR/AND/THENIF/ELSEIF card), or where data manipulation is to commence (NOW/THEN/ELSE card), and its **unquoted decimal** numeric argument(s) must be within the input record or work area, defined by **WORKLEN**.

However, either or both **p1** and **p2** may be special **Position Keywords**, such as **DATE, L, @, @user** and **HEAD** etc, all of which are described on the following pages.

POS=p1 (1 argument)

Defines a single position as the **start** of a field, without defining its length.
If WORKLEN has been specified, POS=27 for example indicates the 27th position in the work area, regardless of what INTO parameters were used for reading files. Without WORKLEN, POS=27 indicates the 27th position in the last record read. Numeric positions always start at 1, so **POS=0** has no meaning.

POS=p1,p2 (2 arguments)

Give the **start** and **end** positions of a **field** or a **range** in the record or work area.

Range Tests

IF-type operations, where the first argument (field) is defined using the **POS p1,p2** syntax, are considered to define a **range** of positions which are all to be checked against a specified condition.

The first **POS** argument, **p1**, indicates the position at which to start the scan, while **p2** indicates the position in the input record or work area at which the last compare is to be made, regardless of the length of the string:

```
IF POS 6 8  EQ MANCHESTER * Gives 3 compares.
```

The **IF** statement describes testing a **POS Range** for **not** containing a string.

Use of the **REVERSE** parameter in SELCOPY for AS/400, UNIX and PC systems, scans the range starting with the end position and working backwards.

Range Tests set the @ Pointer

Range tests, **POS=p1,p2** and **POS=ANY** allow **scanning for data** and will always set the **@ pointer**. If the string argument is **found** within the range, the @ pointer will be set to point to it.
If the argument is **not found**, the @ pointer is set to null, and any subsequent operation using the @ pointer will become a No-op. No error message is given, the operation is simply ignored.

Special **@user Pointers** may be used instead of the standard **@ Pointer** by coding **PTR=@user** on the **IF** statement.

POS Reference

If no **WORKLEN=n** parameter is provided to define a work area, and the **LRECL** of the current record has been reduced, users may still reference data that exists in the upper portion of the original record, even though this data may be above the newly defined current record length.

Non-Existent Position

Be aware of the **danger** of testing a position that may **not exist**.
If **no WORKLEN** is used, and input records are of variable or undefined length, then, on a record of length 120, any test on position 121 or greater must return **"false"**.
No error message is given, and the Return Code is unchanged except when the test made is **for inequality**, in which case **Return Code 6** is set to alert the user of the possibility of a logic error.

Similarly, any operation causing action (NOW,THEN,ELSE) on a non-existent position results in the requested action being ignored because it is impossible.
No error message is given, but in this case **Return Code=8** is set.

Variable Input

Variable length input records have 4 bytes of control information, known as the **RDW**, at the front of the record which may be accessed by the user. The first byte of data therefore starts at **POS=5**. Use of the **NORDW** parameter is recommended to inhibit this.

POS=p1 (,p2) (3. as a Parameter with Special Keyword)

Certain data, available to the SELCOPY program, is also of interest to the user. The following **Special Position Keywords** allow user reference to data outside the input or work area, or to special positions within it. (These were previously described as Additional Position Keywords).

These keywords may be used as arguments to any parameter requiring a position, e.g. **POS, FROM, TO, INTO,** and **AT**.

Numeric displacements may be requested on these keywords allowing reference to keyword+n or keyword-n as required, where n is a numeric value.

Variable displacements may also be requested on these keywords if appropriate. e.g. **POS PARM+@A+6-@B**

All **Special POS Keywords** are described in detail below under the following headings:

POS @	POS **FT**	POS **RPL**	POS **UXLINE**
POS **@user**	POS **HEAD**	POS **SEG**	POS **UXLINEREM**
POS **ANY**	POS **L**	POS **SQLCA**	POS **UXLRECL**
POS **CBLNAME**	POS **PARM**	POS **SQLDA**	POS **UXPD**
POS **COMRG**	POS **PCB**	POS **SQLMA**	POS **UXPGNO**
POS **DATE**	POS **PGNO**	POS **STATUS**	POS **UXPW**
POS **DIFF**	POS **RBA**	POS **UPSI**	POS **UXREPLYL**
POS **DSN**	POS **RETSYS**	POS **UXADIFF**	POS **VOLID**
POS **FHDR**	POS **RETCODE**	POS **UXATPTR**	
POS **FNAME**	POS **RETVSAM**	POS **UXDW**	
POS **FSIZE**	POS **RETXV**	POS **UXINCNT**	

POS @

See also:

- Section *Pointers and LRECL - Discussion*.

Refers to the position established in the **last Range test**. i.e. when scanning for a string within a range of positions which is defined by coding **two arguments** on the POS parameter, or **POS=ANY** as defined below.

```
IF POS 50 98 = LONDON         * Set the @ Pointer, if found.
AND POS @+7 NE ROAD           * Use it, with displacement.
AND POS @-3 NE 'MR '
  THEN MOVE 20   FROM @   TO 400
IF POS @+98-79 = XXX          * Use @ Pointer if already set.
  THEN PR   FR @-20           * Use it.
POS @ = X'404040'             * Use @ Pointer   Unconditionally.
                             * Gives   RETCODE=8 if @ not set.
```

Condition tests based on the @ pointer result in **false** if the @ ptr is not set.

Action statements based on the @ pointer are not actioned if the @ ptr is not set. Furthermore, **Return Code 8** is set to highlight the condition.

The @ and @user pointers may be used as integer variables and may be assigned directly.

POS @user

See also:

- Section *Pointers and LRECL - Discussion*.

Refers to the position addressed by the named **user @ pointer**, which may have been established by a **Range test** using the **PTR** parameter or by a direct assignment.

On mainframe, up to 32 user @ pointers with alphanumeric names of length 1 to 4 characters may be set within a SELCOPY job.

On AS/400, UNIX and PC platforms, an unlimited number of user @ pointers with alphanumeric names of any length, may be set within a SELCOPY job.

Apart from name, POS @user operates identically to POS @ described above.

```
  IF P 6,98 = LOND   PTR=@TOWN       * Set @TOWN ptr if found.
    THEN DUMMY                       * @TOWN has been set.
    ELSE @TOWN = 21                  * Set @TOWN default.

  IF P @TOWN,L = XX PTR=@END         * Set @END ptr if found.
    T DUMMY                          * @END has been set.
    L @END = L                       * @END default is POS LRECL.

  PRINT   FR @TOWN,@END              * Use 2 user @ Pointers.
```

The @ and @user pointers may be used as integer variables and may be assigned directly.

POS ANY

May be used on an **IF-type** operation only. It indicates that a scan of the whole record is to be made for the indicated string. If a work area exists, no part of the work area outside the input record is included in the scan.

Note that POS=ANY scans **always start at position 1** and continue for a length equal to 1 plus the current LRECL (which may have been modified by the user) less the length of the string, **regardless** of what **INTO** parameter was used on the last input operation, so beware of the following:

```
  READ CARD  INTO=101   W=2000  * Card is length 80.
  IF POS ANY = XYZ              * Will scan pos 1 to 78 only.
    THEN PRINT                    * Therefore NOTHING printed.
  END                                     * * * *
Data Card with the word XYZ on it.
Another with XYZ on it.
```

Nothing is printed because **POS=ANY** in the above example means **POS 1,78** (i.e. **POS 1,1+L-(string length))**, which commences at position 1, assuming **INTO=1**, and continues only as far as POS 78. Position 101 to 178 are not even checked.

```
   IF  POS  101,101+L-3
```

would work.

POS CBLNAME

--- Mainframe only ---

POS CBLNAME refers to the start of the **CBLNAME** module/phase which has been loaded in for the current SELCOPY execution.

This is useful for checking what defaults are set for your installation, but note that modification of this storage will have **no effect** on the CBLNAME defaults already in place.

Beware

Because the storage at POS CBLNAME is allocated by the system when the module is loaded, attempts to reference storage beyond the length of the loaded module run the risk of causing an **Access Violation**.

POS COMRG

--- VSE only ---

POS COMREG

Please try to **AVOID** the use of **POS COMRG**. It is operating system dependent.

For **VSE only**, refers to the first byte of the **VSE Communications** Region, containing interesting information such as the System Date and Julian Date.

A better way to test today's date of course would be to use **POS DATE**, which has the advantage of being transparent over operating systems.

Details of the contents of the VSE Communications Region may be found in the IBM manual "Systems Control and Services". COMRG may not be used as a destination argument.

```
IF POS COMRG = '07/03/94'                 * Check Today's date.
  THEN MOVE=5   FROM=COMRG+83   TO=77     * Julian date.
```

POS DATE

```
          IF P DATE-2 NE '1994'             * Check Century and year.
            T MOVE 10 FR DATE+20  TO 1001   * Day of Week.
```

Refers to the date and time (at the start of SELCOPY execution only) in **International Standard Date** format. Other date formats are also supplied as defined in the following table.
The DATE Table starts at **POS DATE-28** and ends at **POS DATE+67**.

Keyword	Content	Len	Description
DATE-28	'....'	4	Julian Date in Packed Decimal. (ccyydddF)
DATE-24	'....'	4	Time in unsigned Packed Dec. (0hhmmsst)
DATE-20	'05/22/86 '	9	**American** Std Date.
DATE-11	'22/05/86 '	9	**British** Std Date.
DATE-2	'19'	2	Century.
DATE	'86/05/22 '	9	**International Standard** Date. (yy/mm/dd)
DATE+9	'18:58:59.7 '	11	Time. (hh:mm:ss.t) (Last digit is in tenths of Secs)
DATE+20	'Thursday '	10	Day of Week. (in lower case)
DATE+30	'22nd '	5	Day of Month.
DATE+35	'May '	10	Month of Year. (in lower case)
DATE+45	'1986/'	5	Year.
DATE+50	'142 '	4	Day of Year (Julian date)
DATE+54	'Wk:21 '	6	Week of Year. If 1st Jan is Thurs,Fri,Sat, then 1st Jan is in Week 0. If 1st Jan is Sun,Mon,Tue,Wed, then 1st Jan is in Week 1. Sunday is considered to be **Day 1** of the Week.
DATE+60	'....'	4	No of days since 1st Jan 1900. (Binary)
DATE+64	'....'	4	No of secs since midnight. (Binary)

POS DIFF

```
IF P 101 NE P 201  L=100    * This will set POS DIFF.
  T P 301,400 = ' '         *
  T P DIFF+200 = '*'        * Use of POS DIFF.
  T @D = DIFF               * Save it in an @ptr.
  T SPACE 1                 *
  T PRINT FR 101 L=100      * Field 1.
  T PRINT FR 201 L=100      * Field 2.
  T PRINT FR 301 L=100      * 1st difference highlighted.
```

At the start of a SELCOPY execution, **POS DIFF** is initialized to null.

Subsequently, **POS DIFF** is set automatically by SELCOPY for every **string** compare operation on an IF/AND/OR/THENIF/ELSEIF statement, but remains **unchanged** for Range Tests and arithmetic compares.

After a string compare (field 1 versus field 2), **POS DIFF** will point to a position from the start of **field 1** of the first **difference** found, or will be set to null (cleared) if the compare resulted in equality.

POS DIFF cannot be set by an assignment statement as can an @pointer, but otherwise, is used in the same way as an @pointer. e.g. **@D = DIFF** can be used to save its value and, on AS/400, UNIX and PC platforms, **IF DIFF** may be used to test the value of DIFF.

If one of the fields is shorter than the other, then for the purpose of the compare only, the fill character is used to pad the shorter field up to the length of the longer field. Note that this does **not** affect data in positions that immediately follow the shorter field. If both fields compare equal for the full length of the shorter field, then the compare continues for the residual data of the longer field against the padded area of the shorter field. e.g.

```
IF  4 AT 1  =  10 AT 101   FILL='N'    * Padded string compare.
```

In the above, field 1 at position 1 length 4 is padded with the character **'N'** up to a length of 10 bytes. However, data at positions 5 through 10 remains unchanged.

If field 1 and field 2 are not equal, then POS DIFF points to the start position of field 1 plus the offset of the first difference found. This is true whether the offset falls within the defined length of field 1 or within any padded area that follows. Thus, in the above example, POS DIFF may point to any position between 1 and 10.

POS DSN

The **DSN position** refers to the **Data Set Name** of the last file processed. Data at POS DSN may not be modified.

For MVS

POS DSN is a 44-byte character string, followed by an 8 byte PDS member name or GDG number where appropriate.
In fact, it refers to the start of the **JFCB** which SELCOPY has already read for its own purposes. Other information in the JFCB may also be referenced. e.g. **POS DSN+98** is a 2-byte field of switches indicating the Data Set Organisation.
DSN+98=X'40' => Pysical Sequential, DSN+98=X'02' => Partition Organisation (PDS/PDSe), DSN+99=X'08' => VSAM, etc. **POS DSN+80** is the data set creation date in the format 'YDD'.
'Y' is a 1-byte binary field containing the year from 1900, and 'DD' is a 2-byte binary field containing Julian day of the year.
A comprehensive map of the JFCB may be found in "OS/390 JES2/JES3 Data Areas Volume 3".
For DIRDATA, the name of the member being currently processed can be picked up from the DIRectory record when it is read. This can be recognised with an **IF DIR** statement.

For CMS

POS DSN is the 18-byte **CMS** File Id, consisting of File Name (8), File Type (8), and File Mode (2).
In fact, it refers to offset 8 within the **FSCB** which SELCOPY has built for processing the file.
For DIRDATA, the current CMS File Id is reflected at POS DSN.

For VSE

POS DSN is a 44-byte character string.
For DIRDATA the name of the member being currently processed can be picked up from the DIRectory record when it is read. This can be recognised with an **IF DIR** statement.

For AS/400, UNIX and PC

POS DSN is the full AS/400, UNIX or PC **fileid** including the drive letter (for PC) and directory.
For DIRDATA, POS DSN is the full generic fileid used for input. The name of the member being currently processed can be picked up from the DIRectory record when it is read. As for MVS and VSE, this can be recognised with an **IF DIR** statement.
POS DSN may be changed in a future release of SELCOPY for AS/400, UNIX and PC, to reflect the **current File Id** of a DIRDATA READ, as for SELCOPY on CMS.

POS FHDR

--- AS/400, UNIX, PC only ---

POS FHDR refers to the 128-byte **File Header Record** of a RECFM=MFV (MicroFocus Variable length) file. e.g.

```
read   /some/mf/var/file     recfm=mfv
print from fhdr  l=128  type=d  stopaft=1   * Print the header only.
```

Header records are automatically bypassed for input files, and automatically generated for output files.

RECFM=MFV files written by SELCOPY can be identified by the string **x'5e1c,0202'** at offset x'6C' from the header (POS FHDR+108).

POS FNAME

See also:

- FILE=fileid in this section.

Refers to the 8 byte File Name of the last file processed, for any type of I/O.
Data at this position is for **ACCESS ONLY**, and may not be modified.
FILE=fileid describes how the 8 byte fname is constructed for **AS/400, UNIX** and **PC** fileids.

CAT Files

POS FNAME is particularly useful when using the **CAT** statement for concatenating several input files.
After a read of a file which has others concatenated with it, POS FNAME will refer to the 8-byte **filename** of the file **currently** being processed for input. To refer to the current **Data Set name**, please use **POS DSN**.

DIRDATA

for **CMS, MVS** and **VSE** DIRDATA, POS FNAME only gives the 1st 8-byte token of the file mask provided on the **READ** statement. To access the current **member name**, please refer to **POS DSN** or the **DIRectory** record.

For **PC** DIRDATA, POS FNAME gives the 8-byte filename of the member currently being processed. To access the current **member name** (fileid), please refer to the **DIRectory** record.

POS FSIZE

--- CMS, VSAM, AS/400, UNIX, PC only ---

For **VSAM** and **CMS** input files, **POS FSIZE** refers to a fullword (4 bytes) containing the binary count of the **number of records** held in the last file processed.
For **AS/400, UNIX** and **PC** input files, **POS FSIZE** refers to a 4 byte field containing the binary count of the **number of bytes** held in the last file processed. This value is as supplied by the operating system when SELCOPY **opened** the file for input.

If the file is concurrently open for **update** by other users, **FSIZE** at OPEN time may no longer be true.
SELCOPY will issue a warning message in the Selection Summary if a discrepancy is detected. However, this check is only made if the user's control cards have caused the **whole file** to be read sequentially without any **direct** reads.

```
READ ABC.EXEC.A   REC 4 AT FSIZE TY=B * Read last rec in a CMS file.
IF  4 AT FSIZE TY=B  >  @XYZ          * Compare with variable.
IF  4 AT FSIZE TY=B  =  12            * Compare with fixed val.
IF   POS FSIZE       =  X'0000,000C'  * Same as above.
```

POS FT

--- Mainframe only ---

Refers to SELCOPY's **File Table** for the most recently accessed file.

Most of the File Table is reserved and undeclared in order to avoid release dependencies. The following, however, **is declared** and offsets will be kept constant, or special POS keywords will be introduced.

FT+012	**Storage** Address of **ADABAS Control Block** (4 bytes binary) POS UXATPTR may be used to make use of real storage addresses.
FT+032	**File Name** (8 bytes character) as in **POS FNAME**.
FT+128	**VSAM Key Length** (4 bytes binary)
FT+132	**VSAM Key Position** (4 bytes binary)

POS HEAD

See also:

- POS DATE in this section.

```
IF  POS HEAD+8  =  'REL 9.7'  *  SELCOPY Release  No.
AND POS=HEAD+82 NE 'BG'       *  Partition Id.
OR  POS HEAD+89 =  'JOBABC'   * the  Job Name.
ELSEIF POS HEAD+130 = ' 2'    * Check  Page No.
THEN POS HEAD   = 'REPLACEMENT HEADING REQUIRED BY USER'
THEN P HEAD+160 = '-----------------------------------'
ELSE MOVE   37 AT 200   TO HEAD+20
```

Refers to the first positon of the standard SELCOPY heading which holds information such as today's Date, Time of Day, CMS User Id or Batch Jobname, which may be required for use during execution, and may be **modified** by the user. (**POS DATE** is better for referencing times and dates.)

Note that the format of SELCOPY's heading varies according to **PAGEWIDTH** which is set using the **OPTION** statement.

The underlining for this heading is held in **mainframe** storage at position **HEAD+160** and in **AS/400, UNIX** and **PC** storage at **HEAD+158**. The length of the underline is 132, which may also be modified.
For mainframe, **HEAD-1** and **HEAD+160-1** are the **ASA** characters.
For AS/400, UNIX and PC, **HEAD-1** is the **Form Feed** character X'0C', and **HEAD+132** and **HEAD+290** are **Line Feed (EOL)** characters X'0A' for UNIX and PC, x'25' for AS/400 IFS.

Note that if **HEAD** is used on the **REPORT** card, the SELCOPY standard heading is overwritten **before** executing your control statements.

POS L

POS LRECL

See also:

- LRECL in this section.
- Section *Pointers and LRECL - Discussion*

POS L refers to a position in the work area, or input record if WORKLEN is not supplied, which is equal to the currently stored value of **LRECL**. e.g. If the **last** record read has a Logical RECord Length (LRECL) of 55 and no manipulation of the LRECL value has occurred via use of the LRECL operation word, then **POS L** is equivalent to **POS 55**.

If data is read without a work area, or read into position 1 of the work area (this is default), **POS L** points at the last byte of the input record.
This is useful for variable and undefined record format input records (RECFM=V and RECFM=U) where the LRECL varies.

```
IF POS @ L-4 = XY            * Find XY in latter part of rec.
THEN POS L = X'FF'           * Modify last byte in record.
```

POS=L+n or **POS=L-n** may be coded to reference displacements from the end of the record.
Note that positive displacements require the presence of the **WORKLEN** parameter. If a positive or negative displacement is used to **modify** a position outside the scope of the work area (or input record if no WORKLEN is coded), then Return Code 8 is set by SELCOPY.

LRECL=0

AS/400, UNIX and **PC** platforms typically represent blank lines in RECFM=U format files as just a Line Feed or Carriage Return Line Feed sequence with **zero** length data. Because of this, LRECL may have the default value 0 or may be directly assigned to 0 (when LRECL is used as an operation word). Therefore, even **POS L** with no displacements can fall outside the scope of the input record or work area.

Beware: When testing for blank lines, do not use the following syntax:

```
IF POS 1, LRECL = ' '
```

RECFM=U blank lines have **LRECL=0** and so the test resolves to a **descending** range test which will always test **false**:

```
IF POS 1, 0     = ' '          * Descending range.    (Invalid.)
```

Such tests should be replaced with:

```
IF LRECL AT 1 = ' '
```

This will succeed when LRECL=0 because the padded compare will pad out the short field with the **FILL** character (default FILL character is blank) up to the length of the larger field, in this case 1, for the literal supplied.

POS PARM

For the **CMS user**, POS PARM refers to the parameters on the "SELCOPY" command which invoked the module, and these parameters are tokenised into 8-byte tokens.
The first token will be "SELCOPY " which is followed by whatever parameters were coded on the command.
The first unused token is filled with X'FF's.

```
IF P PARM+8  NE  X'FFFF'     * Check existence of Parm.
T MOVE 8  FR PARM+8  TO 500  * Use it.
```

As for CMS, POS PARM for **AS/400, UNIX** and **PC** systems refers to the string of parameters which may be coded by the user on the command line invoking SELCOPY.
However, unlike the mainframe, the operating system will terminate each parameter with a X'00' character.

These parameters are held in system storage owned by the AS/400, UNIX or PC operating system and should not be overwritten. Suggested code to overcome this is:

```
move 80  fr parm  to 1
tr 80 at 1    x'00' '#'   * Translate to what you want.
pr l=80  ty=d             * Use it for whatever.
```

Any blanks on the command line prior to the first parameter are ignored.
POS PARM points at the first non-blank character. The blanks are in fact present at pos PARM-n where n is the number of blanks keyed in.

For the **MVS and VSE** user, POS PARM points at the data string supplied as the PARM field on the EXEC statement. It is **not** tokenised. The 2 bytes in front of this string hold the length, in binary, of the parm string.

```
IF P PARM-2 GT X'0000'             * Check length of Parm Data.
  T @PLEN = 2 AT PARM-2 TYPE=B     * Pick it up.
  T MOVE @PLEN AT PARM   TO 500    * Use it.
```

Note that the 2-byte length field is not available under CMS.

POS PCB

--- DL1, IMS only ---

Refers to the **PCB** (Program Communication Block) of the last **IMS/DLI** file accessed. The user may then examine fields within this. The **PCB** belongs to **DL1** and therefore may not be used as a destination argument.

```
THEN MOVE 2  FROM=PCB+8  TO=200    * The level feedback.
IF POS=PCB+20 = 'SXXX0002'         * Segment name feedback.
IF POS PCB+10 = X'4040'            * Status code feedback.
```

Fields in DL1's **PCB** may be referenced as:

Keyword	Description	Length	Type
POS **PCB**	Database Name	8	Char
POS **PCB+8**	Seg Level	2	ZonedDec
POS **PCB+10**	Status Code	2	Char
POS **STATUS**	Synonym for PCB+10.		
POS **PCB+12**	Processing Options	4	Char
POS **PCB+16**	Reserved	4	
POS **PCB+20**	Segment Name	8	Char
POS **SEG**	Synonym for PCB+20.		
POS **PCB+28**	Length of Key Feedback Area	4	Binary
POS **PCB+32**	No of Sensitive Segs	4	Binary
POS **PCB+36**	Key Feedback Area	Var	Char

POS PGNO

See also:

- POS UXPGNO in this section.

POS PGNO refers to the 4 byte **Packed Decimal** field used for SELCOPY's **Page Number**.

POS RBA

--- AS/400, UNIX, PC only ---

For disk file I/O, the **current** record RBA (Relative Byte Address) of the **last** input or output file processed, is made available to the user via POS RBA.

For input files, the current record is the last record read, whilst, for output files, the current record is the record that is to be written next, **not** the last record written.

POS RBA refers to the junior 4-bytes of an 8-byte RBA on all systems. Where the operating system supports file sizes in excess of 4 gigabytes, the senior 4-bytes will be non-zero as appropriate. e.g.

```
cvbc  8 at RBA-4 to orec+46   fmt='zz,zzz,zzz,zz9'
```

On input, this can provide a useful mechanism for saving the current RBA, continuing processing on the file, then going back to the saved file position with a direct read by RBA.

POS RETCODE

POS RETCD

Refers to the 4-byte **Binary** field in SELCOPY storage used to hold the current SELCOPY return code.

POS RETCODE allows reference and **modification** to the actual binary value in SELCOPY's storage.

```
CVPC 8 AT 1   TO 100   FORMAT ZZZ9.99
IF   POS RETCODE   = X'0000,0008'
THEN POS RETCODE+3 =        X'07'      * Modify with lit value.

CVCB  6 AT 20  TO 4 AT RETCODE         * Set from user's data.
```

This facility is also available using the **RETCODE** keyword referring to the return code in **decimal**.

```
CVPC 8 AT 1   TO 100   FORMAT ZZZ9.99
IF   RETCODE = 8
THEN RETCODE = 7
```

It is also discussed under **RETCODE**.

POS RETCMS

--- CMS, AS/400, UNIX, PC only ---

POS RETSYS (AS/400, UNIX, PC only)
POS RETXV

See also:

- SYSTEM and CP in this section.

Use of SELCOPY to issue native AS/400, UNIX, PC, CMS and CP commands has created the need to inspect the **Return Code** set by the system.

With the exception of SELCOPY for **PC/DOS** and **MS-DOS**, the System Return Code is stored in a 4 byte binary field in SELCOPY storage and may be tested by referring to **POS RETCMS** (or POS RETSYS for AS/400, UNIX, PC systems) within an IF-type condition test.

POS RETCMS contains the return code from the **last** system command. Unlike SELCOPY's own **RETCODE**, the system return code at **POS RETCMS** does **NOT** remain at the highest encountered but is overwritten every time a system command is executed. This includes CMS I/O for SELCOPY READ, WRITE, etc to CMS files. The RETCMS field should, therefore, be saved in your workarea if it is not tested immediately after your **SYSTEM** command.

Note that the fullword holds the system return code in binary, so it is necessary to use hexadecimal notation in order to check it.

```
IF POS RETSYS = X'0000,001C'           * If the system Retcode = 28.
IF 4 AT RETSYS  TY=B = 28              * A valid alternative.
```

For PC/DOS and MS-DOS, the system command is obeyed, but no Return Code is made available by the system. POS RETSYS will simply be set to 0 by SELCOPY.

RETXV is a synonym for **RETCMS** which is set following an **XV** statement to transfer a **REXX** or **EXEC2** variable between SELCOPY and the controlling environment.

POS RETVSAM

--- VSAM only ---

POS RETVSAM refers to a 4-byte binary field held in SELCOPY storage which is updated by SELCOPY with the 3-byte **VSAM Error Feedback** information from the RPL of the **last** VSAM I/O operation:

1st	byte - always X'00'.
2nd	byte - RPL **Return Code** (Error Class)
3rd	byte - RPL Condition Code - may be non-zero even if no error.

4th	byte - RPL **Error Code** (Error Type).

e.g.

```
READ ABC KSDS   KEY='ZYX'
IF POS RETVSAM+3 = X'04'        * ErrCode 4  - Exceeds highest key.
OR POS RETVSAM+3 = X'10'        * ErrCode 16 - No record found.
  T GOTO NOT-FOUND

IF POS RETVSAM+3 NE X'00'       * Is an alternative.
  T GOTO NOT-FOUND

WRITE XYZ KSDS
IF POS RETVSAM+3 = X'08'        * ErrCode 8  - Duplicate rec.
OR POS RETVSAM+3 = X'0C'        * ErrCode 12 - Sequence error.
  T GOTO NOT-WRITTEN

IF POS RETVSAM+3 NE X'00'       * Is an alternative.
  T GOTO NOT-WRITTEN
```

VSAM Return Codes from **OPEN** are **not** made available in **POS RETVSAM**. If the OPEN is not successful, SELCOPY terminates the run with an error message.

POS RETXV

--- CMS only ---

RETXV is a synonym for **RETCMS** which is set following an **XV** statement to transfer a **REXX** or **EXEC2** variable between SELCOPY and the controlling environment. e.g.

```
IF  POS  RETXV = X'0000,0000'
```

POS RPL

--- DL1, IMS, ADABAS, DB2, VSAM only ---

See also:
Section *DB2 Processing*.

For **VSAM, DB2, IMS, DL1** and **ADABAS**, the RPL position refers to SELCOPY's Request Parameter List for VSAM, or equivalent for the above Database Management Systems. e.g.

```
RD ABC  RRDS REC=8
PRINT  FROM  POS  RPL+04  L=4  TYPE=B    * For VSE RBA.
PRINT  FROM  POS  RPL+64  L=4  TYPE=B    * For MVS RBA.
```

For **DB2**, POS RPL refers to the user information area in the SQL Request Parameter List maintained by SELCOPY for SQL processing. and applies to the **most recently executed** SELCOPY SQL function.
Fields in RPL user information area may be referenced as:

Keyword	Description	Length	Type
POS **RPL**	SQL Verb	8	Char
POS **RPL+8**	SQL Function	8	Char
POS **RPL+16**	Return code	4	Binary
POS **RPL+20**	SQL return code	4	Binary
POS **RPL+24**	CAF return code	4	Binary
POS **RPL+28**	CAF reason code	4	Binary
POS **RPL+32**	Current LRECL	4	Binary
POS **RPL+36**	Max LRECL	4	Binary
POS **RPL+40**	SQLCODE from PREPARE	4	Binary

POS SEG

--- DL1, IMS only ---

Refers to the segment name of the last DLI record processed. This is an 8 byte field held within the PCB used by DL1 for the last DL1 operation on the file concerned. **POS=SEG** will point at the same data as **POS=PCB+20**.
SEG may not be used as a destination argument.

```
IF POS SEG   GT   'RECTYP03'
```

POS SQLCA --- DB2 only ---

See also:
Section *DB2 Processing*.

POS SQLCA refers to the SQL Communications Area for the **most recently executed** SQL statement. Data at this position is for **ACCESS ONLY** and must not be modified.

The SQLCA is an SQL area in which the results of the execution of an SQL statement are reported. In particular it contains the SQL return code **SQLCODE** at offset 12 (X'0C').

For **DB2 Ver 4.1** the format and contents of the SQLCA are described in detail in Appendix C of the IBM document **SQL Reference** (document number SC26-3270). A brief description is given below.
Fields in SQLCA may be refererenced as:

Keyword	Name	Description	Length	Type
POS **SQLCA**	SQLCAID	Block id 'SQLCA'	8	Char
POS **SQLCA+8**	SQLCABC	Block length	4	Binary
POS **SQLCA+12**	SQLCODE	SQL return code	4	Binary
POS **SQLCA+16**	SQLERRML	Error tokens length	2	Binary
POS **SQLCA+18**	SQLERRMC	Error tokens	70	Char
POS **SQLCA+88**	SQLERRP	Product signature	8	Char
POS **SQLCA+96**	SQLERRD1	Internal error code	4	Binary
POS **SQLCA+100**	SQLERRD2	Internal error code	4	Binary
POS **SQLCA+104**	SQLERRD3	Affected row count	4	Binary
POS **SQLCA+108**	SQLERRD4	Timerons value	4	Float
POS **SQLCA+112**	SQLERRD5	Syntax error position	4	Binary
POS **SQLCA+116**	SQLERRD6	Internal error code	4	Binary
POS **SQLCA+120**	SQLWARN0	Warning indicator	1	Char
POS **SQLCA+121**	SQLWARN1	String Truncation	1	Char
POS **SQLCA+122**	SQLWARN2	Nulls eliminated	1	Char
POS **SQLCA+123**	SQLWARN3	Columns > variables	1	Char
POS **SQLCA+124**	SQLWARN4	No WHERE for UPD/DEL	1	Char
POS **SQLCA+125**	SQLWARN5	Invalid DB2 syntax	1	Char
POS **SQLCA+126**	SQLWARN6	Date addition error	1	Char
POS **SQLCA+127**	SQLWARN7	Fraction truncated	1	Char
POS **SQLCA+128**	SQLWARN8	Character substitution	1	Char
POS **SQLCA+129**	SQLWARN9	Arithmetic exceptions	1	Char
POS **SQLCA+130**	SQLWARNA	Invalid name/label	1	Char
POS **SQLCA+131**	SQLSTATE	SQL state code	5	Char

The SQL return code can thus be referenced as:

```
IF  4 AT SQLCA+12  TY B  <>  0          * Test SQLCODE not zero.
```

POS SQLDA --- DB2 only ---

See also:
Section *DB2 Processing*.

POS SQLDA refers to the SQL Descriptor Area for the **most recently executed** SQL statement. Data at this position is for **ACCESS ONLY** and must not be modified.
The SQLDA is used to:

- Inform DB2 of the data type, location and length of the application data areas containing column values when transferring row data to and from DB2.
- Inform the application of the data type, length and name of each column that will be returned as a result of a **SELECT** (set up by the SQL **DESCRIBE** of the SELECT statement).

- Inform the application of the data type, length and name of each column in a given table or view (set up by the SQL **DESCRIBE** of the table or view name).

The SQLDA consists of a 16 byte header followed by a variable number of 44 byte occurrences each describing either a column or an application variable depending on the use of the SQLDA.

For **DB2 Ver 4.1** the format and contents of the SQLDA are described in detail in Appendix C of the IBM document **SQL Reference** (document number SC26-3270).
Fields in SQLDA may be refererenced as:

Keyword	Name	Description	Length	Type
POS **SQLDA**	SQLDAID	Block id 'SQLDA'	8	Char
POS **SQLDA+8**	SQLDABC	Block length	4	Binary
POS **SQLDA+12**	SQLN	Number of SQLVARNs	2	Binary
POS **SQLDA+14**	SQLD	Number in use	2	Binary
POS **SQLDA+16**	SQLVAR1	First SQLVARN	44	Group

The SQLVARNs are not directly addressable with SELCOPY POS keywords. The following table assumes that **SQLVA** has been equated to SQLDA+16+44*(n-1) where n is the number of the column required.
Each SQLVARN has the following layout:

Keyword	Name	Description	Length	Type
POS **SQLVA**	SQLTYPE	Column data type	2	Binary
POS **SQLVA+2**	SQLLEN	Column length	2	Binary
POS **SQLVA+4**	SQLDATA	Address of data	4	Binary
POS **SQLVA+8**	SQLIND	Address of indicator	4	Binary
POS **SQLVA+12**	SQLNAMEL	Length of column name	2	Binary
POS **SQLVA+14**	SQLNAME	Column name (or label)	30	Char

POS SQLMA

--- DB2 only ---

See also:
Section *DB2 Processing*.

POS SQLMA refers to the formatted SQL message area for the **most recently executed** SQL statement. Data at this position is for **ACCESS ONLY** and must not be modified.
Unlike the **SQLCA** and **SQLDA**, the SQLMA is not an SQL control block.

DB2 provides a utility program DSNTIAR which, given an **SQLCA**, produces a formatted text message in an application supplied area. The message is in **VARCHAR** format, i.e. it consists of a 2 byte length field followed by a variable length character field.

When SELCOPY receives a non-zero return code from the execution of an SQL statement it calls DSNTIAR to format the corresponding SQL message into 72 byte lines. Up to 10 lines are supported. A blank line signifies end of message (the 2 byte length refers to the size of the area provided to DSNTIAR by SELCOPY (720 bytes) **not** the amount actually used by DSNTIAR to format the message).
Fields in SQL message may be referenced as:

Keyword	Description	Length	Type
POS **SQLMA**	Message Area Length	2	Binary
POS **SQLMA+2**	Message Line 1	72	Char
POS **SQLMA+74**	Message Line 2	72	Char
POS **SQLMA+146**	Message Line 3	72	Char
POS **SQLMA+218**	Message Line 4	72	Char
POS **SQLMA+290**	Message Line 5	72	Char
POS **SQLMA+362**	Message Line 6	72	Char
POS **SQLMA+434**	Message Line 7	72	Char
POS **SQLMA+506**	Message Line 8	72	Char
POS **SQLMA+578**	Message Line 9	72	Char
POS **SQLMA+650**	Message Line 10	72	Char

POS STATUS

--- DL1, IMS only ---

POS STATUS is supported as a synonym for **POS PCB+10** for the **IMS**/**DL1** user.

POS UPSI

--- VSE only ---

Please try to **AVOID** the use of **POS UPSI**. It is operating system dependent.

For **VSE only**, refers to the **UPSI byte** within the VSE Communications Region. This position could be referenced using the COMRG argument plus a displacement, but it is difficult to remember the correct displacement.

UPSI may not be used as a destination argument.

```
IF POS=UPSI ONES X'C0'
THEN MOVE 3   FR UPSI   TO 1234
```

POS UXADIFF

POS UXADIFF refers to SELCOPY's 4-byte internal **POS DIFF** pointer which holds the **absolute address** (not the position relative to the start of the workarea) of the 1st byte in field 1 which differed from its counterpart in field 2 of the last compare.
On 64-bit COMPAQ Tru64 platforms, this address is an 8-byte field of which POS UXADIFF points to the junior 4 bytes. Note that all binary fields, referenced by a SELCOPY special keyword, are stored in Big Endian format.

If the last compare resulted in **equality**, UXADIFF will be set to **binary zero**.

Thus, the following sequence is possible:

```
==RETRY==
 IF POS 1001 <> POS 2001  LEN 1000
   THEN MOVE 4   FR UXADIFF   TO UXATPTR * Set @ pointer.
   THENIF P @ = 'TRIVIAL'
     THEN MOVE 7 FR @+1000   TO @
     THEN GOTO RETRY
```

Reference to the section discussing the **User Exit** will reveal that **POS UXADIFF** is in fact 4 bytes on from POS UXINCNT, i.e. in the next full-word, so it could also be referenced as **POS UXINCNT+4**, as it was by some users before POS UXADIFF was supported.
Note that other UX fields may be referenced in a similar way.

POS UXATPTR

POS UXATPTR is almost obsolete, but is still used for pointer arithmetic. Do not use POS UXATPTR to save and restore the @ pointer, instead use:

```
@SAV = @        * Save it.
@    = @SAV     * Restore it.
```

POS UXATPTR refers to SELCOPY's 4-byte internal **@ pointer** which holds the **absolute address** (not the position relative to the start of the work area) of the data referenced by **POS @** which will usually be either in the work area, or in the input buffer if the WORKLEN parameter is not used.
On 64-bit COMPAQ Tru64 platforms, this address is an 8-byte field of which POS UXATPTR points to the junior 4 bytes. Note that all binary fields, referenced by a SELCOPY special keyword, are stored in Big Endian format.

If the @ ptr is not set, it will contain binary zeros.

POS UXATPTR is modifiable but **please be careful** to avoid setting it to an invalid address.
If no work area is used, and a different record is current at the time of restoring the @ pointer, then results will be unpredictable.

Example

POS UXATPTR can be used if a real storage address held in control blocks available to SELCOPY requires access. e.g.

```
READ  #27   ADA   FMT='AB,AC,AD.'   * Read an ADABAS DB.
MOVE 4 AT FT+12  TO UXATPTR
@ADA = @                           * @ADA -->  ADABAS Control Block.
```

Reference to the section discussing the **User Exit** for **mainframe** environments, will reveal that **POS UXATPTR** is in fact 4 bytes on from POS UXLRECL, i.e. in the next full-word, so it could also be referenced as **POS** UXLRECL+4, as it was by some users before POS UXATPTR was supported.
Note that other UX fields may be referenced in a similar way.

POS UXDW

--- AS/400, UNIX, PC only ---

POS UXDW refers to a 4-byte internal binary field containing the current **Data Width** as set by the DATAWIDTH option.

POS UXINCNT

(Synonym **UXINCOUNT)** It is occasionally required to use the input record number as data within an output record, or it is required to test it with a "bit" operation (e.g. to check for an even number).

The 4 bytes containing the **Input Record** Number of the prime input file may be tested by referring to **POS UXINCNT** within an IF/AND/OR condition test.
Only the **Prime Input** File may be tested with UXINCNT.
The **UX** indicates that this field is available to **mainframe User Exit** routines.

Note that the fullword holds the record number in binary, so it is necessary to use hex notation in order to check it.

```
IF POS UXINCNT ZEROS=X'0000,0001'   * If Even Recno.
```

If **prime** input uses the **CAT** statement, or the **DIRDATA** option, then **UXINCNT** is reset to 1 at the start of each new **CAT** file or **DIRDATA** member.

POS UXINCNT+4

See also:

- POS UXADIFF in this section.

POS UXLINE

See also:

- POS UXPD in this section.

POS UXLINE refers to SELCOPY's 4-byte internal **Line Number** which is held in **binary** and contains the number of lines already printed on the current page.
If no data has been printed, it will contain X'0000,0000'.

In mainframe SELCOPY, **POS UXLINE+4** refers to another 4-byte binary value which contains the **maximum** number of lines per page, i.e. **PAGEDEPTH**.
In AS/400, UNIX and PC SELCOPY, POS UXPD references this field.

POS UXLINEREM

--- AS/400, UNIX, PC only ---

POS UXLINEREM refers to a 4-byte internal binary field containing the number of **Lines Remaining** on the current page.

POS UXLRECL

Refers to the position of the 4-byte binary number within SELCOPY's storage containing current **LRECL** setting. Unless modified **explicitly**, using an **LRECL=n** statement, this will be the length of the last record read by SELCOPY from any file, (set by SELCOPY).

UXLRECL should not be used as a destination argument because it is not re-examined and used by SELCOPY as it is on return from a User Exit. (SELCOPY uses a register for current LRECL).

Instead Use the **LRECL = n (AT p TYPE x)** statement as a valid way to change SELCOPY's **current LRECL** value which is held in this 4-byte binary field.

Example

It is easy to **set** an @ pointer to a value held as a binary field in the user's work area using the following:

```
@ABC = 2 AT 21  TY=B    * Set from 2 byte binary field at POS 21.
```

But the **reverse** (i.e. setting a 2 byte binary field to a value held as an @ pointer) is not quite so simple, but can be done with the following:

```
LRECL = @ABC
MOVE 2 FR UXLRECL+2  TO 21
```

POS UXLRECL+4

See also:

- POS UXATPTR in this section.

POS UXPD

--- AS/400, UNIX, PC only ---

POS UXPD refers to a 4-byte internal binary field containing the current **Page Depth** as set by the PAGEDEPTH option.

POS UXPGNO

POS PGNO

POS UXPGNO, or its synonym **POS PGNO**, refers to the 4-byte **Packed Decimal** field used within the SELCOPY program to control the **Page Number** printed at the top of each page of printed output.

Note that **POS UXPGNO** will hold the **page number last printed**. If no data has been printed, due to use of **NOPRINT** or **NOPCTL**, it will contain **X'0000,000C'**.
For **TYPE=S PRINT**, unless **REPORT HEAD** is coded, no page number is displayed.

Data at POS UXPGNO **may be modified**, but it is the responsibility of the user to ensure that any modification is made with valid Packed Decimal data.

If you modify it, take into account that SELCOPY **will add 1** to your new value before printing the next page.
Note that no page number is displayed for **TYPE=S PRINT**.

POS UXPGNO may be useful when issuing **JECL** commands to **POWER** for separating different SYSLST streams under VSE.

POS UXPW

--- AS/400, UNIX, PC only ---

POS UXPW refers to a 4-byte internal binary field containing the current **Page Width** as set by the PAGEWIDTH option.

POS UXREPLYL

POS UXREPLYL refers to a 4 byte binary field within SELCOPY's storage containing the length of data received from the last **LOG REPLY** operation.

Initially this field contains zeroes and has a maximum value equal to the length of the last REPLY INTO field.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)   PW000 pw=0 (133)     (OS) VM/CMS=VM05      15.32 FRI 23 NOV 2001    PAGE   1
o ------------------------------------------------------------------------     --------------------    -------- o

o          ** SMXUXREP CTL A ***              L=001 --- 2001/04/29 15:10:58                                          o
             opt w 200  fill=X                  * Fill workarea with character 'X'.

o      1.    rd card                            * String 'REPLY data length is nn'                                     o
       2.    pr fr uxreplyl ty=b len=4          * Initial value of POS UXREPLYL.

o          *        ....,....1....,....2....,....3....,....4....,....5...                                           o
       3.    stack 'This is data to be returned to SELCOPY via LOG REPLY.'   * Put data (length 53) on CMS stack.
       4.    log 'Enter a string for POS UXREPLYL test:'  reply 80 at 101    * Retrieve stacked record into 80 byte field.
o                                                                                                                    o
       5.    lrecl  = 4 at uxreplyl ty=b        * Set lrecl to REPLY data length (Written to 'RECORD LENGTH' column).
       6.    pr fr 101                          * Print LRECL bytes (length of reply DATA).
o      7.    pr fr 101           len=80+20      * Print              length of reply FIELD + 20.                     o
       8.    pr fr uxreplyl ty=b len=4          * Value of POS UXREPLYL following LOG REPLY (binary).
       9.    space 1                            * Print 1 blank line.
o                                                                                                                    o
      10.    cvbc  4 at uxreplyl   to   22  format=z9     * Convert REPLY data length to character.
      11.    pr                 len=23                    * Print   REPLY data length.
o                                                                                                                    o
             end

o                                                                                                                    o
      INPUT   SEL SEL                                                                                      1  RECORD
      RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH
o     -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------     o

          1     1   2                                                                                                 23
o                     0000                                                                                           o
                      0000
          1     1   6 This is data to be returned to SELCOPY via LOG REPLY.                                         53
o         1     1   7 This is data to be returned to SELCOPY via LOG REPLY.                    XXXXXXXXXXXXXXXXXXX     53      o

          1     1   8                                                                                               53
o                     0003                                                                                           o
                      0005

o         1     1  11 REPLY data length is 53                                                                       53      o
                       ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0

o SUMMARY..                                                                                                          o
    SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
    ------      ------      ----     -------  -----           -----   --    ---
o     1             1 READ SYSIN       111    23 U              1                                                    o
      2---11        1

o                                                                                                                    o
           ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **
                                          ** EXPIRY DATE -- 2002/05/21 **
```

Figure 0. LOG REPLY with POS UXREPLYL.

POS VOLID

--- AS/400, UNIX, PC only ---

POS VOLID refers to a 32 byte, blank padded or truncated, character field.

On PC operating systems, this field contains the Volume label of the disk which holds the last file processed by SELCOPY. PC formatted disk types include FAT, FAT32, NTFS, CDFS and HPFS. Return Code 8 is set for any statement using VOLID as a position when the last file read was not from a local or networked disk. e.g. Input from stdin.

On AS/400 and UNIX operating systems, the **hostname** (nodename) of the local machine is supplied at POS VOLID.

```
  SELCOPY/SUN 2.08 at Compute Bridgend - Wales - (pw=94)            2002/08/29 12:32   PAGE   1

       1.   in /usr/cbl/djh/* dir w 99

            if p 30 = .
       2.   t move 6 at volid to 43
       3.   t pr dw=90

           e

      INPUT   SEL SEL                                                                          RECORD
      RECNO   TOT ID.          1         2         3         4         5         6         7         8         9  LENGTH
      -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------
          1     1   3 2002/05/16 12:52:35  100666  .login  .    s01         607  /usr/cbl/djh/.login                  78
          2     2   3 2002/06/11 22:32:20  100777  .cshrc  .    s01      13,260  /usr/cbl/djh/.cshrc                  78
          4     3   3 2002/05/18 22:22:23  100755  .dtprof*.    s01       5,111  /usr/cbl/djh/.dtprofile              82
          5     4   3 2002/08/09 12:40:41  100600  .Xautho*.    s01          97  /usr/cbl/djh/.Xauthority             83
          6     5   3 2002/08/09 12:40:55  100600  .TTauth*.    s01          69  /usr/cbl/djh/.TTauthority            84
          9     6   3 2002/07/03 00:11:34  100777  .dbxrc  .    s01       3,244  /usr/cbl/djh/.dbxrc                  78
                    ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9

 SUMMARY..
    SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
    ------      ------      ----     -------  -----           -----   --    ---
      1            15 READ *          2048  2046 U             15       /usr/cbl/djh/*
      2----3        6

      ** SELCOPY/SUN 2.08.159  Licensed by Compute (Bridgend) Ltd  +44 (1656) 652222 & 656466 **
                                  ** Expiry: 07 Jun 2003 **
```

Figure 0. POS VOLID with DIR.

PRINT

PRT
PR

See also:

- FILE=PRINT and TYPE=x (for Printing) in this section.

PRINT, or its synonyms **PR** and **PRT**, may be used an operation word in itself, and is not treated as a **user label**.
It is discussed under the heading **FILE=PRINT**.

PRRECLEN=NO/YES

--- AS/400, UNIX, PC only ---

```
  OPTION    PAGEWIDTH=100   PRRECLEN=NO
```

The PRRECLEN parameter may be supplied on the **OPTION** statement only. It suppresses the RECORD LENGTH column for output PRINT, giving the same results as seen on the mainframe when PAGEWIDTH is less than 132.
Normally, this heading is not suppressed when PAGEWIDTH is less than 132, as it is on the mainframe.

```
 _________________________
|                         |
|                         |
|             1  RECORD   |
|  9          0  LENGTH   |
|..0....,....0  ------    |
|                  84     |
|                 172     |
|_________________________|
```

Instead, it is shifted left in sympathy with **DATAWIDTH**, such that only 2 blanks separate the scale heading for data and the RECORD LENGTH heading.

The **PRRECLEN** option may be included in SELCNAM, and/or the SELCOPY control cards.

PRT

PRT is a synonym for **PRINT**.

PRTCTL

```
OPT   PRTCTL
PRTCTL   * With no parameters.
```

The **PRTCTL** parameter may be used on the **OPTION** statement to reset the action of a **NOPCTL** which may have been given earlier. Subsequent control cards will then be printed.

Unlike NOPCTL, **PRTCTL** is not supported as a parameter on all varieties of operation words.
For convenience however, **PRTCTL** has been supported as an operation word in its own right, and is not treated as a **user label**.

PTR=@user

See also:

- IF in this section.
- Section *Pointers and LRECL - Discussion*.

```
IF POS 20,77 = 'ABC'   PTR=@FRED
OR POS ANY   =  XYZ    PTR=@JOE
```

The **PTR** parameter may be used on any **IF-type** statement which defines a Range Test.

By default, any successful **Range Test** will set the @ pointer. This may be changed, using the **PTR** parameter, so that a specified **User @ Pointer** is set instead, leaving the standard @ pointer unchanged.

The PTR argument is of the format **@xxxx**, where **xxxx** is any user chosen alphanumeric name.
On mainframe, a maximum of 32 user @ pointers are permitted having names of length 1 to 4 characters. On AS/400, UNIX and PC platforms, an unlimited number of user @ pointers are permitted having names of any length.

PUNCH

PUNCH may be used an operation word in itself, and is not treated as a **user label**. It is discussed under the heading **FILE=PUNCH**.

QUIT

See also:

- CANCEL (Operation Word) in this section.

RANGE=yyyy/mm/dd-yyyy/mm/dd

See also:

- GEN=n in this section.
- PASS=x'nnnn,nnnn,nnnn,nnnn' and SITE='string' in this section.
- Section *CBLNAME & SELCNAM*.

```
OPTION   RANGE=1900/01/01-2001/06/11    RANGE=2028/02/27-2028/03/04
```

Refer to **GEN=n** for creation of random data in a specified **range**.
RANGE and its argument **yyyy**/**mm**/**dd-yyyy**/**mm**/**dd**, may be coded on an **OPTION** statement in the **SELCNAM** file only. It specifies a date window within which the SELCOPY program will function normally.

The password supplied by CBL is based on the information specified on the **SITE** and **RANGE** parameters. If more than one RANGE parameter has been provided by CBL in conjunction with the password, then it is essential that they are **all** coded once in the SELCNAM file on one or more OPTION statements.

If your machine's system date is outside the operational ranges, SELCOPY will terminate with the following message:

```
ERROR 124 (CHECK EXPIRY DATE)
```

Note that, unless the date ranges are already defined in the CBLNAME load module, use of the RANGE option is **mandatory**. Since CBLNAME does not exist for SELCOPY on AS/400, UNIX and PC platforms, a SELCNAM file containing SITE, RANGE and PASS parameters is always required.

Refer to the separate document "SELCOPY Installation Guide" for more details.

RBA=n

--- AS/400, UNIX, PC, VSAM only ---

See also:

- Direct Read for AS/400, UNIX and PC in section *AS/400, UNIX and PC Processing*.

```
RD XYZFIL2     ESDS   RBA=1024
THEN READ XYZ     ESDS       RBA=5 AT 200 TYPE=B
READ /usr/cbl/test/2001q3   LRECL=100  B=400  RECFM=V   RBA=64000
```

The **RBA** parameter, with its associated Relative Byte Address, may be specified on the input statement for **AS/400, UNIX, PC** and **VSAM ESDS** files only. It allows the user to commence processing the input file at a specific record.

RBA is an acronym for **Relative** Byte Address, and is a genuine relative number. i.e. **RBA=0** refers to the first byte of the first record.

The RBA may be supplied as a single **decimal number**, or as a **data field** defined by the **n AT p1** syntax or equivalent. Thus, it is possible to dynamically control the starting point for read by RBA of one of the supported file types, using input data from a secondary card file or from screen input.
The data type of the field may be character, binary or packed decimal and identified as such using parameter TYPE=C, B or P respectively on the input statement. **Default** conversion is **TYPE=P**.

VSAM ESDS

ERROR 544 is given if an RBA requests a relative byte address which exceeds the file size, or **does not point to position 1** of a logical record.

VSAM records are not normally split over Control Intervals (unless spanned) so every Control Interval will start with the beginning of a record. i.e. RBA as a multiple of CISIZE will normally be a valid request.

AS/400, UNIX and PC

The input record format may be **fixed, variable** or **undefined** (but not RECFM=V2 or MFV). If record format is variable, then the **LRECL** parameter is mandatory in order to give SELCOPY a maximum value to improve on its RDW validation. Since LRECL on a read statement implies RECFM=F, **RECFM=V** is also necessary.

KEYLEN and **KEYPOS** parameters may also be coded if the file has a "key" field and is RECFM=V. This information has the affect of further improving SELCOPY's RDW validation.
ERROR 544 is given if an RBA requests a relative byte address which exceeds the file size.

The RBA argument need not point at position 1 of a logical record. The input buffer is filled from the RBA point in the file, and the first full record that follows will be returned, ignoring any partial record that might exist at that RBA. The RBA value set at POS RBA will be that of the record returned, which may well be greater than the RBA requested.

RC_KEYNF=n

--- AS/400, UNIX, PC only ---

```
OPTION   RC_KEYNF=0  * Return Code unchaged. (Default)
OPT   RC_KEYNF=8
OPT   RC_KEYNF=2
```

When a direct read gives a **not found** condition, following a request to read a position beyond the filesize or a non-existent record, then the record "--- KEY/REC NOT FOUND ---" is returned. By default, no return code is set and no indication of the failed read is reported against the selection identifier in the summary.

RC_KEYNF=n, where n is from 0 to 254, may be specified on an OPTION statement in SELCNAM or in the SELCOPY control statements, to define the required return code for the Key Not Found condition. If RC_KEYNF=0 is specified, the return code remains unchanged.

If the argument of the RC_KEYNF option is non-zero, the return code will be set as requested, however, the event will be considered as a RC=8 for the purpose of reporting in the summary for that selection.

RDW

```
READ ABC   RECFM=V   RDW        * Keep the Record Descriptor Word.
```

Unless changed in the **SELCNAM** control file or **CBLNAME** module, **RDW** is the default for **mainframe** SELCOPY whereas **NORDW** is the default for SELCOPY on **AS/400, UNIX** and **PC**.

The **RDW** parameter on an input statement will cause SELCOPY to present to the user the 4-byte Record Descriptor Word of **RECFM=V** input.

NORDW and **RDW** are permitted on **input** statements referencing any type of RECFM. However, for input of **RECFM=F** and **RECFM=U**, they have no effect because no Record Descriptor Word exists for these record formats.
RDW/**NORDW** are **not permitted** on output statements, and if coded will result in an **error message**.

Statistics in the Selection Summary will reflect the **real** maximum LRECL found, which will **include** the 4 bytes for the **RDW**.

Option statement

RDW may also be coded on the **OPTION** statement, in which case it will be effective on all RECFM=V input files, but for that run only.

The CBLNAME/SELCNAM default

NORDW or **RDW** may also be specified as the installation **default** for all executions of SELCOPY by setting a switch in **CBLNAME** or coding NORDW/RDW on an OPTION statement in **SELCNAM**.

Use the **NORDW** parameter on an **OPTION** or **READ** statement to override any **CBLNAME**/**SELCNAM** settings.

READ fname

RD
GET
INPUT
IN

See also:

- DSN= in this section.
- Dynamic Allocation in section *Further Information*.
- Reading DB2 Tables in section *DB2 Processing*.

```
 ____________________________________________________________________
|          |                                                         |
|          | fname/CARD/TAPEnn/DUMMY              * Standard Seq     |
|          | fname     VTOC/DIR/DIRDATA           * Special Seq      |
|          | fname    ISAM/VSAM/KSDS/ESDS/RRDS    * Keyed            |
|          | fname TABLE/SQL=string/n AT p (SSN=) * DB2              |
|          | Fn.Ft.Fm   (DIR/DIRDATA)             * CMS              |
|          | fileid                               * AS/400,UNIX,PC   |
|          | dbname    (#nnn/nnn)  DL1            * IMS/DL1          |
|          | #nnn/nnn    DL1/ADABAS               * IMS/DL1/ADABAS   |
|          |                                                         |
|          |  (DSN=string/n at p1)                * Dynamic allocation |
|          |  (VOL=volser)   (CAT=vsamcat)        * VSE Dynamic alloc |
|          |  (DEV=cuu/TAPE) (SYS=nnn)            * VSE Dynamic alloc |
|          |                                                         |
|          |  (LRECL=n/V/U) (RECFM=F/V/U/FB/VB/V2/MFV)  (TRUNC) (DEFER) |
|          |  (BLKSIZE=n) (INTO=p) (WTO=YES) (STOPAFT=n) (WORKLEN=n)  |
|          |                                                         |
|  READ    |  (BDW/NOBDW) (FILL=x)                * AS/400,UNIX,PC   |
|          |  (KEYPOS=p)  (KEYLEN=n)              * CMS Keyed        |
|          |  (KGE/KEY/STARTKEY=string/n AT p)    * KSDS,CMS,ISAM,ADABAS |
|          |  (UPD)                               * MVS Update-in-place |
|          |  (REC/STARTREC=n (AT p (TYPE=x)))    * RRDS,CMS,ADABAS  |
|          |  (FWD/BWD)  (PASS=string)            * Any VSAM         |
|          |  (RBA/STARTRBA=n (AT p (TYPE=x)))    * ESDS             |
|          |  (FMT='ff.')   (SEQ=dd)   (ISN=n)    * ADABAS           |
|          |  (EXCL)     (CIPHER=s)               * ADABAS           |
|          |  (FMT=) (WHERE=) (UPD=) (SORT=)      * DB2              |
|          |  (NULLS) (VLEN) (PFX) (CHAR) (DB2)   * DB2              |
|          |                                                         |
|          |  (OPEN=RWD/NORWD)   (LABEL=NO)       * Tape             |
|          |  (CLOSE=UNLD/RWD/NORWD)              * Tape             |
|          |  (CLOSE=NOFLUSH/LEAVE)        * VSE ** Card/Dkt         |
|          |  (DEV=device)                        * Disk/Tape        |
|          |  (SYS=n)                             * VTOC/Tape        |
|__________|_________________________________________________________|
```

Strictly speaking, **READ** is a parameter on the **NOW, THEN** or **ELSE** Operation Words, but should be considered here as an operation word itself.
Early versions of SELCOPY treated **READ**, **(INPUT** as it was then), as a true Operation Word, and conditional READ's on a THEN or ELSE were not supported.

File Name (Mandatory)

READ must (except for dynamic allocation) define the **name** of the file from which records are to be obtained. If it is not a standard **sequential** file, the file name must be followed or replaced by a keyword indicating the type of file. The replacement keywords are discussed under the parameter description for **FILE**.

Dynamic Allocation

An alternative way of defining the filename on the **READ** statement is via Dynamic Allocation.
Referencing the full data set name for the required SAM/VSAM file, either as a **literal** or as a **variable** at a specified position in the workarea, removes the necessity to supply an **MVS DD card**, **CMS FILEDEF** or **VSE DLBL** and assignment.

On VSE, it is necessary to indicate to SELCOPY the device on which the SAM file resides (via the **DEV**, **VOL** or **SYS** parameter) or, in the case of VSAM files, the owning catalog (via the **CAT** parameter).

If the **DSN** argument is provided as a **string literal**, then the **fname** parameter may be omitted, allowing it to default to the first qualifier of the dsn.

DB2

READ for DB2 will either generate a dynamic SQL SELECT statement or execute a user supplied **SQL=** SELECT statement to open and then fetch rows of a DB2 table.

Optional Parameters

Other parameters are allowed on the **READ** statement, all of which are enclosed in brackets above indicating **optional**. Some of these may be **omitted** on second and subsequent operations on the same file, but please refer to the individual parameter descriptions for more information on use of the above.

Examples

READ may be conditional on a **THEN** or **ELSE**, and subsequent control cards may cause further reads from the same file, or from other files.

```
READ XYZ   INTO 100   LRECL 147   WORKLEN 2000
READ CARD WORKLEN=2000                  * Default LRECL of 80.
READ DDNAME                             * LRECL not required for MVS.
READ TAPE10   LRECL=217 LABEL=NO OPEN=NORWD
READ '* EXEC A'  DIRDATA                * Generic group of files.
READ GHI ESDS                           * VSAM file in entry sequence.

IF EOF CARD
  THEN  READ XYZ  INTO 400              * Conditional input.
  ELSE  READ GHI                        * Still an ESDS (Mentioned earlier).
```

The Work Area

Refer to the **WORKLEN** parameter for more detail. Use of the **OPTION** statement to provide **WORKLEN** makes it no longer necessary that the first **"logic"** control card in any SELCOPY run is a **READ**.
READ however may still be used to provide **WORKLEN=n**, defining the length of the work area required by the user to manipulate and store data, for example to compare data on two separate files, the use of **INTO** on one or both **READ** statements can prevent data from one file overwriting data from the other.

BLKSIZE parameter

This is **rarely** necessary for **MVS input** files.
For **VSE**, although not normally necessary, it allows minimization of buffer space allocation instead of catering for track capacity of the **SYSRES** device.
The BLKSIZE value quoted **may be greater** than the real blocksize, because it is only used for **input buffer** allocation purposes.

End of File

As soon as **EOF** is reached on any input file which is not processed with **keyed reads**, that file is **closed immediately**. This means that where drive allocation is controlled dynamically at **OPEN** and **CLOSE** time, and the SELCOPY job has multiple input, in particular tape input, the effected drive is released for use by another job.

On certain operating systems, dynamically allocated buffer storage is released at **CLOSE** time, so unless the **WORKLEN** parameter were used, the contents of the input I/O area may be unpredictable or even inaccessable when you are processing after an **IF EOF** test. A **Protection Exception** could even occur if you try to modify storage that is no longer owned.

REC=n (Testing for)

IF REC = 46 is identical to **IF INCOUNT = 46**.
Please refer to the **INCOUNT** parameter for details.

REC=n (Reading by) --- CMS, AS/400, UNIX, PC, VSAM, ADABAS only ---

ISN=

```
THEN READ XYZ   RRDS       REC=5 AT 200 TYPE=C
RD ABC.CMSFILE.A       REC=446     STOPAFT=1
RD \usr\cbl\test\data.2     REC=22     LRECL=80   RECFM=F
```

The **REC** parameter and argument, may be specified on the input statement for **CMS, AS/400, UNIX, PC, VSAM RRDS** and **ADABAS** files only. It allows the user to read the input file directly by specific record number.
For ADABAS, the synonym **ISN** (Internal Sequence Number) is commonly used.

For AS/400, UNIX and PC, the REC parameter is supported for **fixed** record format files only. The **LRECL** parameter, which implies RECFM=F, may be specified to override the 2048 byte record length default.

The record number may be supplied either as an **absolute numeric literal**, or as a **length** of data within the workarea whose position is defined by the **AT** parameter, and whose **data type** is defined by:

TYPE=P	Packed Decimal **(Default)**
TYPE=B	Binary.
TYPE=C	Character,

Therefore, it is possible to dynamically control the record being read using input data from a secondary file, or even interactively from screen input.

When an **absolute number** is supplied as the **REC** argument, it is reasonable to suppose that the operation of reading that specific record will be required **only once**. If **STOPAFT** is not supplied, then a **default STOPAFT=1** will be assumed.

Although **RRDS** is an acronym for **"Relative Record Data Set"**, it is an absolute record number that is used for reading a record. i.e. REC=1 will read the first record, REC=2 reads the 2nd, and so on, for VSAM's **RRDS, CMS** and **ADABAS** files.

If a requested **REC** is **not found** in the file, the job is not terminated and return code remains unchanged, however, a record length 25 is returned containing:

```
--- KEY/REC NOT FOUND ---
```

On mainframe systems, a CBLNAME option may be set to suppress this record so that the data is not overwritten and LRECL is unchanged.
Beware that, following a failed keyed read that returns this record, the LRECL value is updated so that LRECL=25. Therefore, if no special action is updated to modify the LRECL, any subsequent **WRITE** statement will output a record of length 25.
On AS/400, UNIX and PC systems, **RC_KEYNF** may be specified on an OPTION statement in SELCNAM or within the SELCOPY control statements to set a non-zero **return code** for a **not found** condition.

The following example illustrates a simple application: Suppose a file has directory records which each point to the next directory record, and the first is at record 14. We need not worry how large the file is. e.g.

```
  RD LIB.DATA   REC 14                  * Get 1st dir rec.
  PRINT TYPE=M
LOOP
  RD LIB.DATA   REC 2 AT 1   TYPE B     * Read next dir rec.
  PRINT TYPE M    L=100                 * Print 1st 100 bytes.
  IF P 1 NE X'0000'                     * Last entry check.
    THEN GOTO LOOP   STOPAFT=100        * STOPAFT for safety.
  EOJ
```

Other applications may take the REC data from a card file in character numeric format which the user has manually prepared, or interactively off the terminal using TYPE=C.

RECFM=

See also:

- NORDW in this section.
- **NORDW default** in section *CBLNAME & SELCNAM*.
- Changing Record Formats in section *Further Information*.
- RECFM for AS/400, UNIX and PC files in section *AS/400, UNIX and PC Processing*.
- RECFM for CMS files in section *VM/CMS Processing*.
- RECFM=FB/VB Special Meaning in section *VM/CMS Processing*.

```
READ AAA   RECFM=U   LRECL=1166
WRITE BBB  RECFM=F  LRECL=400  BLKSIZE=4000
```

The **RECFM** parameter may be supplied for all operating systems, on a READ or WRITE control statement, to indicate the RECord ForMat of a file. Permitted arguments are:
F for **Fixed** length records.
U for **Undefined** length records.
V for **Variable** length records.
V2 for **Variable** (2-byte RDW) length records. (AS/400,UNIX and PC only)
MFV for **Variable** (MicroFocus) length records. (AS/400,UNIX and PC only)
The arguments **FB** and **VB** are also permitted for Fixed Blocked and Variable Blocked respectively. However, it is not necessary to indicate this to SELCOPY, except in the case of **blocked CMS files**.

SELCOPY processes **Fixed** and **Variable** non-CMS **mainframe** input as **blocked** regardless of control statements or JCL cards. SELCOPY will read a complete block, and use as much as required for each logical record until no data remains in the block. An error message is given if the last logical record is too small.

In a **mainframe** environment, Fixed and Variable **Output** files are only blocked if a **BLKSIZE** parameter is given, either on the SELCOPY control statements, or in the JCL for MVS users.

Standard Variable length records have a **Record Descriptor Word** (RDW) in the 1st 4 bytes of each record. This can be confusing when changing from one record format to another. and the recommended **NORDW** parameter and SELCNAM/CBLNAME option.

Default RECFM

In the event RECFM is not available from any source then:
the default for **Input** files is **RECFM=F** for **mainframe** platforms, and **RECFM=U** for **AS/400, UNIX** and **PC**.
the default for **Output** files for **all** platforms is either the same as that of the **prime input**, or, when LRECL=n is explicitly coded, **RECFM=F** is used.

It is worth noting here that **all VSAM** files are **RECFM=U**, so if RECFM is not coded on output and the prime input is VSAM then output will be **unblocked**.

AS/400, UNIX and PC

RECFM=F

RECFM=F is supported in the same way as on the mainframe. However, **Block size** for the AS/400, UNIX and PC systems has no meaning since all the fixed length records are strung together into what might be considered 1 single block. SELCOPY will treat **RECFM=FB** as RECFM=F taking **LRECL** bytes for each READ statement and present it as a logical record.

RECFM=F Input

When the last record of a **RECFM=F** input file is shorter than the defined LRECL, then the Current LRECL value is set to the real length of data returned, not the full "fixed" length.

RECFM=F Output

ALL short RECFM=F output records are written, padded with the FILL character up to the fixed record length.
If a short last output record is required, then write the output file with **EOL=NO**, which is treated as RECFM=U without End-of-Line characters. e.g.

```
READ ABC   L=100       * An input file of 441 bytes, RECFM=F.
```

```
WR   OUTF  L=100       * Will write 5 RECFM=F recs, all length 100.
WR   OUTU  EOL=NO      * Will write 4 RECFM=U recs of 100, 1 rec of 41.
```

RECFM=V

Although completely foreign to the AS/400, UNIX or PC world, RECFM=V is supported fully in the same way as for mainframe MVS and VSE, for the convenience of processing files ported from the mainframe environment. Exceptions are:

1. Coding RECFM=V without **BLKSIZE=n** on a READ or WRITE statement, is treated as **RECFM=VB**, and the data blocked to the default blocksize of 2048, unlike on the mainframe where unblocked is assumed.
2. The input **FSIZE** reported in the summary will reflect the number of logical records processed, not the number of physical records (blocks), as would be reported on a mainframe CMS system at OPEN time. (This information is not available from an AS/400, UNIX or PC system.)

RECFM=V2

Certain COBOL compilers and SORT utilities on AS/400, UNIX and PC systems operate on files with records consisting of a 2-byte Record Descriptor Word (RDW), followed by actual data. Unlike RDW for standard RECFM=V, these RDW values do not include their own (2-byte) length, but only the length of the data. Specifying **RECFM=V2** on input or output allows SELCOPY to process this type of file in the same way as it processes standard RECFM=V files.

RECFM=MFV

MicroFocus Variable length files may be processed by coding **RECFM=MFV** on the read statement.
Such files have a Header Record which is bypassed by SELCOPY's read, so the first record returned to the user is the first real data record. The Header Record (Length=128) is saved in storage by SELCOPY and made available to the user via the special POS keyword, **FHDR**.

RECFM=U

The most common type of AS/400, UNIX or PC file, RECFM=U is supported in the same way as for the mainframe with the exception that a delimiter is used to terminate records which may be left to default or overridden using the **EOL** parameter.
For PC and AS/400 IFS systems, the standard character sequence CRLF - **Carriage Return** and **Line Feed** (X'0D0A' for PC, X'0D25' for AS/400) is the default. For UNIX systems, the UNIX standard LF (X'0A') is the default.

RECFM=U Input

SELCOPY will accept either standard, whether running on an AS/400, UNIX or PC system, and CR (X'0D') alone is also accepted as a record terminator.

Note that, since the Line Feed character in EBCDIC is x'25', SELCOPY for AS/400 does not automatically recognise the UNIX end-of-line standard of LF (x'0A' ASCII) and so EOL=x'0A' would have to be coded on input. For AS/400 systems, each input record is treated as though it is already in EBCDIC so, for ASCII character data, CVAE ASCII to EBCDIC conversion would be required following the input statement.

In all cases, the terminator string (CRLF, etc) is not returned as part of the record, and is not included in the LRECL set after a READ.

RECFM=U Output

SELCOPY will generate the appropriate record terminator string, for the active operating system, AS/400, UNIX or PC. This however may be changed by use of the **EOL** parameter which may be coded on the WRITE statement.

MVS users should note

RECFM is **not needed on input** files because it is normally known by the Operating System. Unlabelled Tapes, and tapes written by a VSE System, are both exceptions and require RECFM, LRECL and BLKSIZE to be supplied either on the SELCOPY control card, or on the DD card for the file.

Only the above mentioned RECFM arguments may be coded on a SELCOPY control statement. Less common ones such as **RECFM=FBA** should be coded on the DD card:

```
//OUTF DD SYSOUT=E,DCB=RECFM=FBA
```

The **RECFM** information will be merged, taking the SELCOPY control card as higher priority, but without destroying DD card information which is not supplied on the SELCOPY control card.

CMS files with RECFM=FB/VB

In combination with the **BLKSIZE** parameter, **RECFM=FB** or **RECFM=VB** as appropriate may be used on the **READ** or **WRITE** statement to process CMS files (any file mode) using standard **MVS** record format, but **actually blocked**.
No **FILEDEF** with FileMode 4 needed, and native CMS I/O is used.

REM=n

See also:

- DIV=n in this section.

```
NOW    DIV 6 AT  20  BY 2 AT 30   INTO 4 AT 40   REM 5 AT 50
THEN   DIV 4 AT 200  BY 2 AT 30      TYPE=B      REM 4 AT 40
```

Division of **packed decimal** or **binary** data may be achieved with the DIV parameter.

The REM parameter describes where the remainder is stored (if required), its data type being governed by the **TYPE** parameter. If TYPE is not specified then TYPE=P is assumed.

The remainder, and the quotient if the INTO parameter is used, need not be initialised.

REP

See also:

- UPD (Parameter) and UPD fname (Operation Word) in this section.

REPLY=n --- Mainframe, UNIX, PC only ---

See also:

- CP and FILE=LOG in this section.

```
WRITE LOG   'ERROR FOUND - CANCEL/IGNORE ?'   REPLY=6 AT 2236
CP 'Q DASD'  REPLY 900 AT 101                    * Restrict reply to 900 bytes.
THEN LOG   L 20   FROM 100   REPLY 40   INTO 5000
THEN WTO  TYPE B   REPLY 35
```

REPLY may be used when issuing CP commands from CMS and following a **FILE=LOG** for an interactive reply from the user or operator's console.

If the length of the reply area is greater than the length of the reply, the reply will be left adjusted in the reply area and the remainder padded with blanks. A reply of EOB (End-of-Block - a null reply) will result in the whole of the reply area being filled with blanks.

The actual length of the last reply data is stored in a 4 byte binary field referenced by **POS UXREPLYL**.

Note that a **lower case** reply is not translated to upper case by SELCOPY. Use the **UPPER** parameter or the **OR** parameter to force upper case if required.

```
LOG   FROM=20  L 10   REPLY 6  INTO 30
UPPER   6  AT  30                  * Ensure upper case.
```

```
   rd ss50k ksds  upd w 222             * Open for update.
   print  !log                          * The current record.
   log  'Above is 1st rec on file.'     * Literal.

loop
   log ' '   !space 1
   log 'Key in del/delc/ins/next/key for func...'   REPLY 4 AT 200
   p 200 or x'4040,4040'    * force upper case.
   if p 200 = ' '     !t log 'eoj assumed...'  !t eoj
   pr fr 200 l 6
   if p 200 = 'DELC'  !t goto delcrtn
   if p 200 = 'DEL'   !t goto delrtn
   if p 200 = 'INS'   !t goto insrtn
   if p 200 = 'NEXT'  !t goto nextrtn
   if p 200 = 'KEY'   !t goto keyrtn
   pr  'Illegal reply'
   log 'Illegal reply - key in blank for eoj' !goto loop

delcrtn * delete current rec.
   log !pr !del SS50K    !goto loop

delrtn
   log '7 char key to delete...'                    REPLY 7 AT 9
   pr fr 9   l 7
   rd ss50k key 7 at 9  * Read rec whose key matches 7 bytes at pos 9.
   log !pr
   del SS50K            * Delete the current record.
   goto loop

insrtn
   p 1 '* ..,....1....,....2....,....3....,....4....,....5' * dummy data
   lrecl = 46
   log 'Give 7 char new key to insert...'           REPLY 9,15
   pr fr 9   l 7
   INS SS50K            * Insert new record with dummy data.
   pr
   goto loop

nextrtn
   rd ss50k
   pr
   log
   goto loop

keyrtn
   log 'Give 7 char key to read...'                 REPLY 7 INTO 9
   pr fr 9   l 7
   rd  SS50K    key 7 at 9
   pr  !log        !goto loop
```

Figure 0. LOG REPLY Sample Job.

REPORT

R

See also:

- HEAD='string', POS HEAD, PAGEWIDTH and PAGEDEPTH in this section.

```
OPTION     REPORT   HEAD='heading data'   PAGEDEPTH=40    PW=90
OPT       REPORT HEAD=NO
R     H='STOCK FILE SUMMARY OF GROUP 19 ITEMS'   PD 86   PW=72
```

REPORT is both an operation word and a parameter, and may be submitted anywhere within the SELCOPY control cards, either as a statement or as a parameter on the **OPTION** statement.

Its most **appropriate** place for clarity is as a parameter on an **OPTION** statement, together with any other REPORT parameters which are also supported for OPTION.
Again for clarity, **OPTION** or **REPORT** should be the first statement because they are not logic control statements.

Effects of REPORT

Printing of certain SELCOPY-generated information **is inhibited**. i.e the row of dots provided for a counting guide, the input record number, the selection id, the output record number and the record length.

Output from any **PRINT** operation is left adjusted on a **132** byte line, truncated or padded with blanks according to the amount of available data from the input area, (or workarea if **WORKLEN** were coded). The **FROM** parameter on the **PRINT** statement may be used, but output will still be a **132** byte line.

Control cards and Selection Summary totals at end-of-job are **automatically** printed on separate pages and the **page number** reset to 1 for the report.

TYPE parameter ignored

When REPORT is used, the **TYPE** parameter on any subsequent **PRINT** operations is ignored and a **WARNING message** given to this effect.

HEAD parameter

The **HEAD** parameter may be used to change SELCOPY's heading. If **REPORT** is coded without **HEAD**, the whole heading line remains unchanged.

PAGEDEPTH/PAGEWIDTH parameters

PAGEDEPTH (abbreviation **PD)** and **PAGEWIDTH** (abbreviation **PW)** may also be supplied on a **REPORT** card. However, on AS/400, UNIX and PC platforms, PAGEWIDTH will only restrict the width of the header line. The printed report data may be of any length, up to and exceeding the PAGEWIDTH value.

```
  SELCOPY/WNT 2.07 at CBL - Bridgend UK (Internal Only)                                                2001/11/23 15:44   PAGE   1
o ------------------------------------------------------                                              ----------------   -------- o


o          ** z:\cd\sm200\SMXRPRT2.CTL ***    L=001 --- 2001/11/23 15:44:08  (P24)                                                 o
             option   report   head 'ALL MAINFRAME SELCOPY INSTALLATION MATERIAL ON CD-ROM'  pw=90

o      1.    line 1    stopaft 1              * New page to see effect of our HEAD param.                                          o

       2.    rd  d:\s\200\mfr\install\*  dir   * D: is drive letter of the CD-ROM.
o      3.    plog                             * Output to both PRINT and LOG files.                                                o
```

```
  ALL MAINFRAME SELCOPY INSTALLATION MATERIAL ON CD-ROM          2001/11/23 15:44   PAGE   1
o ------------------------------------------------------         ----------------   --------                                       o

  2001/05/03 11:46:30      r   CBLNAME .ASS          9,590  D:\s\200\mfr\install\CBLNAME.ASS
o 2001/05/03 13:44:10      r   CBLNAME .MAC        161,505  D:\s\200\mfr\install\CBLNAME.MAC                                       o
  2001/05/04 10:51:10      r   CBLNAMEO.ASS         19,281  D:\s\200\mfr\install\CBLNAMEO.ASS
  2001/05/15 16:59:04      r   S200INST.HTM         96,966  D:\s\200\mfr\install\S200INST.HTM
o 2001/05/15 16:33:00      r   S200INST.TXT         89,068  D:\s\200\mfr\install\S200INST.TXT                                      o
  2001/05/17 15:25:56      r   SELC200 .OBJ        182,480  D:\s\200\mfr\install\SELC200.OBJ
  2001/04/19 15:16:32      r   SELCOPLE.OBJ          1,680  D:\s\200\mfr\install\SELCOPLE.OBJ
o 2001/05/16 23:26:00      r   SELCOPQL.OBJ         61,600  D:\s\200\mfr\install\SELCOPQL.OBJ                                      o
  1997/04/25 17:59:00      r   SELCOPQX.DBR         13,200  D:\s\200\mfr\install\SELCOPQX.DBR
  2001/05/03 11:54:54      r   SELCOPY .NMX            475  D:\s\200\mfr\install\SELCOPY.NMX
o 2001/05/16 21:34:22      r   SNF200  .HTM         77,200  D:\s\200\mfr\install\SNF200.HTM                                        o
  2001/05/16 20:54:34      r   SNF200  .TXT         64,663  D:\s\200\mfr\install\SNF200.TXT
  2001/05/07 17:52:24      r   SELCCFTR.BAT          1,782  D:\s\200\mfr\install\CMS\SELCCFTR.BAT
o 2001/05/07 17:51:22      r   SELCCFTR.CMD          2,009  D:\s\200\mfr\install\CMS\SELCCFTR.CMD                                  o
  2001/05/07 17:49:28      r   SELCCJ08.CTL            654  D:\s\200\mfr\install\CMS\SELCCJ08.CTL
  2001/05/07 17:50:20      r   SELCCJ08.XEC          1,055  D:\s\200\mfr\install\CMS\SELCCJ08.XEC
o 1997/04/11 14:22:00      r   SELCGEN .XEC         37,311  D:\s\200\mfr\install\CMS\SELCGEN.XEC                                   o
  2001/05/04 13:15:26      r   SELCMADA.JCL          1,323  D:\s\200\mfr\install\MVS\SELCMADA.JCL
  2001/05/07 18:54:36      r   SELCMDB2.JCL          1,928  D:\s\200\mfr\install\MVS\SELCMDB2.JCL
o 2001/05/04 13:16:10      r   SELCMFTR.BAT          2,698  D:\s\200\mfr\install\MVS\SELCMFTR.BAT                                  o
  2001/05/04 13:16:26      r   SELCMFTR.CMD          2,955  D:\s\200\mfr\install\MVS\SELCMFTR.CMD
  2001/05/03 12:13:18      r   SELCMJ01.JCL          1,835  D:\s\200\mfr\install\MVS\SELCMJ01.JCL
o 2001/05/17 15:23:32      r   SELCMJ02.JCL            829  D:\s\200\mfr\install\MVS\SELCMJ02.JCL                                  o
  2001/05/16 20:30:50      r   SELCMJ06.JCL          1,352  D:\s\200\mfr\install\MVS\SELCMJ06.JCL
  2001/05/16 20:31:06      r   SELCMJ07.JCL          1,733  D:\s\200\mfr\install\MVS\SELCMJ07.JCL
o 2001/05/03 15:29:42      r   SELCMJ08.JCL            956  D:\s\200\mfr\install\MVS\SELCMJ08.JCL                                  o
  2001/05/09 12:06:26      r   SELCVADA.JCL            875  D:\s\200\mfr\install\VSE\SELCVADA.JCL
  2001/05/07 17:54:40      r   SELCVCMS.BAT          2,029  D:\s\200\mfr\install\VSE\SELCVCMS.BAT
o 2001/05/07 18:05:02      r   SELCVCMS.CMD          1,996  D:\s\200\mfr\install\VSE\SELCVCMS.CMD                                  o
  2001/05/09 12:06:02      r   SELCVDL1.JCL            878  D:\s\200\mfr\install\VSE\SELCVDL1.JCL
  2001/05/07 17:53:36      r   SELCVFTR.BAT          3,389  D:\s\200\mfr\install\VSE\SELCVFTR.BAT
o 2001/05/07 17:54:06      r   SELCVFTR.CMD          3,342  D:\s\200\mfr\install\VSE\SELCVFTR.CMD                                  o
  2001/05/09 12:06:56      r   SELCVJ01.JCL            628  D:\s\200\mfr\install\VSE\SELCVJ01.JCL
  2001/05/09 12:07:58      r   SELCVJ02.JCL          1,268  D:\s\200\mfr\install\VSE\SELCVJ02.JCL
o 2001/05/09 12:08:52      r   SELCVJ06.JCL          1,146  D:\s\200\mfr\install\VSE\SELCVJ06.JCL                                  o
  2001/05/09 12:12:20      r   SELCVJ07.JCL          1,077  D:\s\200\mfr\install\VSE\SELCVJ07.JCL
  2001/05/09 12:12:52      r   SELCVJ08.JCL            911  D:\s\200\mfr\install\VSE\SELCVJ08.JCL
```

```
  ALL MAINFRAME SELCOPY INSTALLATION MATERIAL ON CD-ROM          2001/11/23 15:44   PAGE   2
o ----------------------------------------------------          ----------------   --------                                    o

o SUMMARY..                                                                                                                        o
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
   ------      ------      ----     -------  -----           -----   --    ---
o     1            1                                                                                                                o
      2           37 READ *          2048  2046 U              37       d:\s\200\mfr\install\*
      3           37
o                                                                                                                                  o

          ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 **
o                               ** EXPIRY DATE -- 12 JUN 2001 **                                                                   o
```

Figure 0. REPORT for PRINT Output.

RESET

See also:

- REUSE in this section.

RETCODE

RETCD

See also:

- POS RETCODE in this section.

```
CVPC 8 AT 1   TO 100   FORMAT ZZZ9.99
IF   RETCODE = 8                * Testing RC
THEN RETCODE = 7                * Setting RC to decimal value.
THEN MOVE 2 FR 20   TO RETCD+2  * Set RC from binary field.
                                * to a value from user's data.
```

SELCOPY's return code may **set, reset** and **tested** during the SELCOPY execution, as shown above. Running under CMS/DOS, the **Return Code** is passed back at **EOJ** in the same way as for CMS/OS and so may be tested in an EXEC procedure. **RETCD** is a synonym.

Return Code Values

SELCOPY will itself set the return code to a non-zero value when certain error or unusual conditions are encountered during execution.
Normally, the higher the return code, the more serious is the error condition. For instance, **RETCODE=4** simply indicates that the run has completed all required output without having to read the whole of the input file.
The later section on Return Codes, following Error *Messages*, gives full details.

If the Return Code at end-of-job for SELCOPY is non-zero,

```
'*** WARNING ***'
```

message at the end of its control card summary, giving the Return Code value.

Return Code 16

At the end of selection processing, if all **output** totals are still zero, SELCOPY will set **RC=16** provided no return code higher than this has already been set.
It is therefore not possible to test and reset this condition during SELCOPY execution.

Beware of the **CBLNAME** option for the **Output** Totals=Zero RetCode setting which allows a **mainframe** installation defined standard for this.
On your machine, **RC=16** set by SELCOPY may have been downgraded to **RC=3**. You can check this with:

```
READ TINYFILE
IF P 1 = 'IMPOSS DATA'
  T PRINT
```

All output selection totals are zero, (there was only 1), so **RC=16** should be set. If not, you have a modified **CBLNAME**.

Conditional JCL

In **All** Operating Systems, the SELCOPY Return Code is passed back to the system at EOJ, and may be tested within subsequent JCL to give conditional execution of later job steps.

SELCOPY return codes may be tested within a **PC**/**DOS** batch program using the **IF [NOT] ERRORLEVEL** command.
Note that ERRORLEVEL conditions are true if the exit (return) code, passed back from a program run by COMMAND.COM, is **greater than or equal to** the value specified in the IF ERRORLEVEL test.

VSE users, who have other software which cannot handle standard VSE return codes, may set a switch in **CBLNAME** to inhibit SELCOPY's return code, but this should only be used as a temporary solution pending updates to the other software.

RETCODE Example

If a record already exists in a KSDS with a key identical to that of the record used for a **WRITE** or **INS** operation, then **RETCODE=12** is set. Thus we can check for a **Duplicate VSAM record**.

```
READ NEWRECS                 * New records for the KSDS.
WR ABC KSDS
IF RETCODE = 12              * Was it a Duplicate?
  THEN RETCD = 11            * Reset Retcode.
  THEN PR 'Following rec is ***DUPLICATE***'
  THEN PRINT                 * Print the record.
```

RETURN

RET

```
 IF POS 1 NE X'40'
 THEN RETURN                 * Conditional return from sub-routine.
 NOW  RET                    * Return from sub-routine.
 RETURN                      * Return from sub-routine.
```

The RETURN parameter must be used in order to exit or return from a subroutine which was entered via a PERFORM/GOSUB/DO operation.

Control is passed back to the statement immediately following the PERFORM that invoked the sub-routine in the first place.

BEWARE of entering a sub-routine without use of the PERFORM operation, and **BEWARE** also of leaving a sub-routine without use of **RETURN**. The GOTO operation should only be used within a sub-routine to pass control elsewhere within the same sub-routine, or to another subroutine at the same level of nesting.

REUSE

--- VSAM only ---

RESET

```
WRITE ABC   VSAM   PASS=LXYGZZ   REUSE
PUT XYZ   ESDS   RESET
```

It is **essential** that the **VSAM** file has been originally **DEFINED** with the VSAM attribute **REUSEABLE**. (This is done within the **IDCAMS** execution that sets it up.)

When writing a VSAM output file, SELCOPY by default, will add the output records to the end of any existing records on that file, whether the file is **REUSEABLE** or not. Thus no existing data is overwritten.

If it is required that all previously recorded data is to be overwritten, the **REUSE** parameter may be coded on one of the SELCOPY control statements that writes to the file, provided of course that the file has the **REUSEABLE** attribute. This is effectively the same as **deleting** and **redefining** the file in the VSAM catalog, prior to the SELCOPY run.

REVERSE

--- AS/400, UNIX, PC only ---

REV

```
IF POS ANY = 'X' REVERSE              * Find the last X in the current record.
IF POS 1,256 = '\' REV                * Find end of path in a fileid.
IF P  1,21 = 3 AT 201  REV  PTR=@B    * Set @B ptr instead of @ ptr.
IF P  2,91 = XYZ REV PTR=@B  STEP=10  * Go down 10 bytes at a time.
```

The **REVERSE** parameter will cause a range test to be actioned in reverse. i.e. starting at the top end of the range, working backwards.

The range to be scanned, (POS nn,nn), must still be defined in ascending sequence.
As with normal range tests, by default the @ pointer is set if the target is found, otherwise it is cleared. Similarly, **PTR=@abcd** may be coded to set pointer @abcd instead of the regular @ pointer, and **STEP=n** may be coded if a step value other than 1 is required.

RKP=n

--- ISAM only ---

```
WRITE ISCOPY ISAM   KEYLEN=9 L=77 B=770   RKP=1
```

For compatability with MVS terminology, SELCOPY will accept RKP=n which is the relative key position for a blocked ISAM output file. The integer, n, is the displacement relative to the first position of the record. Thus RKP=1 is identical to KEYPOS=2

RKP=0 is valid, indicating the key starts in position 1 of the record, but normally position 1 is reserved for the "deleted" flag which indicates that a record is logically deleted, although still physically present on the file.

If the "deleted" flag overwrites the first byte of the key it becomes impossible to reinstate the record with its correct key as part of an error recovery procedure.

RRDS

--- VSAM only ---

See also:

- **REC** and UPD fname (Operation Word) in this section.
- Section *VSAM Files*.

```
READ  ABC   RRDS
WRITE XYZ   RRDS
```

RRDS indicates that a VSAM file is organised as a **Relative Record Data Set**.
Primarily, this type of organisation is for files which require mostly direct processing.
The **REC** parameter may be used to input a specific record number, and **UPD** used to rewrite it.

All geometry characteristics for the file, input or output, are obtained by SELCOPY from the VSAM control blocks as set up when the VSAM file was originally defined. No geometry parameters are to be coded on the SELCOPY control cards.

MVS environment

This parameter may be omitted altogether and SELCOPY will recognise the file as a VSAM file of the correct type (KSDS/ESDS/RRDS) from the JFCB. Exceptions to this are when the VSAM file is using **Local Shared Resources**, or when proprietary software is used to simulate **VSAM**.

VSE environment

If **VSAM** is coded instead of **RRDS**, the file is first opened assuming a **KSDS**, resulting in a VSAM Error Message on the Operator's console. Failure to open results in SELCOPY re-trying the open as an **ESDS** and finally as an **RRDS**, and normal processing continues.

Note that, under the current release of SELCOPY, variable length RRDS files are unsupported for both MVS and VSE environments.

S=n

See also:

- STOPAFT=n in this section.

SEARCH --- DL1, IMS, ADABAS only ---

SRCH

See also:

- Section *ADABAS Processing*.
- Section *IMS and DL/1 Processing*.
- Comparison Operators in section *Further Information*.

```
READ MYDBASE DL1  SEG=SEGMNAME      SEARCH=FIELD003 EQ 'FIELD DATA'
GN MYDB DLI     SEG=101             SRCH=201        GE  POS=31 LEN=6
RD #3 ADABAS  SEQ=AB  FMT='AB,AN,BB.'  SRCH='SB-data'   'FIELD DATA'
```

For use on **DL1**/**IMS** and **ADABAS** databases only.

For **DL1**, the **SEARCH** parameter indicates that for this particular data base operation, activity is to be restricted to segments that match the segment name given as the argument to the **SEG** parameter, and also match according to the qualification given by the **SEARCH** parameter, its argument, and associated parameters.

The argument of the **SEARCH** parameter must indicate an 8 byte field name, known to DL1 in association with the data base segment mentioned. Thus, to use the SEARCH parameter, you **must have** a **SEG** parameter.

A **numeric SEARCH** argument is assumed to be the position of the required 8 byte field name in the SELCOPY work area, because the 1st byte of a fieldname must be alpha. This field name is passed to DL1 without validation.

A **non-numeric SEARCH** argument is assumed to be a literal field name which is truncated, or padded with blanks on the right, to 8 bytes.

The whole purpose of the SEARCH parameter is to get DL1 to skip along different segments of the same name, looking for the one that matches your requirements by checking the contents of a field within each segment. So far we have identified the field name.

We must next identify the type of comparison we require DL1 to make on the data within the field, i.e. we must give DL1 a **Comparison Operator** indicating our requirement.
SELCOPY will accept any of its standard operators or synonyms or if omitted will assume an equality test.

Following the operator, must be the data you want, compared, either:

1. as a literal, enclosed in quotes if it has embedded blanks, commas etc. If a literal SEARCH data string is coded on a **GU** or **GHU** statement without a STOPAFT parameter, then a **default STOPAFT=1** is assumed. Coding **STOPAFT=n** will override this default.
2. as POS=p LENGTH=n defining a position in the work area and a length.
   P=p LEN=n are valid abbreviations.

If the SEARCH parameter is omitted, the DL1 operation requested will be performed regardless of field contents.

SEG --- DL1, IMS only ---

See also:

- Section *IMS and DL/1 Processing*.

```
READ MYDBASE DL1   SEG=SEGMNAME   SRCH=FIELD003 EQ 'FIELD DATA'
GN   MYDB DLI   SEG=101
```

For use on DL1/IMS files only, the SEG parameter indicates that for this particular data base operation, activity is to be restricted to segments that match the segment name given as the argument to the SEG parameter. (This restriction may be further qualified with a SEARCH parameter.)

The argument to the SEG parameter must indicate an 8 byte segment name, known to DL1 in association with the data base mentioned.

If the argument is numeric, SELCOPY will assume that the required 8 byte segment name is to be found at that position within the SELCOPY work area, and will pass that name to DL1, without validation.

If the argument is non-numeric, it is assumed to be a literal segment name, and names less than 8 bytes are padded out with blanks on the right.

If the SEG parameter is omitted, the DL1 operation requested will be performed regardless of segment type. i.e. If you request "Get Next", you will simply get the next segment, whatever its type.

SEP x

See also:

- Separator Character in section *Further Information*.

```
OPTION   SEP=x
OPT      SEP=NO

READ F2  TAB=SYSIBM.SYSCOLUMNS    CHAR    SEP                      \
         FMT='NAME,TBNAME,TBCREATOR,COLNO,COLTYPE,LENGTH,SCALE'    \
       WHERE="TBNAME='TYPE_TEST'"                                  \
       ORDER='COLNO'
```

On an **OPTION** statement, the **argument** on the SEP parameter overrides the default **Separator Character** used to separate logical SELCOPY control statements supplied on the same physical record.

Exclamation Mark is the **default SEP** character specified in the distributed **CBLNAME**. However, this may have been changed at your installation's CBLNAME load module or **SELCNAM** control file. If **SEP=NO** or **SEP=OFF** is coded, no check will be made for a separator character.

On a **DB2 READ** statement, the SEP parameter will force use of character '|' (X'4F' EBCDIC) as a separator between the requested fields. It has no argument and is only valid when used in conjunction with the **CHAR** parameter. If omitted, all requested fields are returned to the workarea in displayable character format padded with blanks, or the **FILL** character if coded, and separated with a **null** character.

SEQ=dd --- ADABAS only ---

See also:

- Section *ADABAS Processing*.

SITE='string'

See also:

- PASS=x'nnnn,nnnn,nnnn,nnnn' and RANGE=yyyy/mm/dd-yyyy/mm/dd in this section.
- Section *CBLNAME & SELCNAM*.

```
OPTION   SITE='Compute (Bridgend) Ltd - Bridgend UK'
```

SITE and its argument, may be coded on an **OPTION** statement in the **SELCNAM** file only. It specifies the user's company name and location as supplied by CBL for successful execution of SELCOPY.
The argument is restricted to between 20 and 36 bytes in length and replaces the first 36 bytes of the company details in the header record of each SELCOPY printed output page.

The password supplied by CBL for normal operation is based on the information specified on the **SITE** and **RANGE** parameters. Therefore, the SITE argument must match that supplied by CBL **exactly**, respecting **character case** and **embedded blanks**. If not, SELCOPY will terminate with the following message:

```
ERROR 153 INVALID OPTION IN "SELCOPY.NAM" FILE
```

Note that, unless the site details are already defined in the CBLNAME load module, use of the SELCNAM file and SITE option is **mandatory**. Since CBLNAME does not exist for SELCOPY on AS/400, UNIX and PC platforms, a SELCNAM file containing SITE, RANGE and PASS parameters is always required.

Refer to the separate document "SELCOPY Installation Guide" for more details.

SIZE=n --- VSE only ---

```
CALL SUBRTN     SIZE=4000     ENTRY 24     PARM1 P2 P3 P4 P5 ...
EXIT=ASMPHASE   SIZE=12000
```

Used to specify the size, in bytes, of the standard linkage subroutine or User Exit phase used, so that sufficient storage may be reserved for it.
For further information, please refer to the **CALL** or **EXIT** operation words.

Not required for **MVS**, and if supplied, is ignored.
If omitted for **VSE**, the default will be **2048**.

SLEEP --- AS/400, UNIX, PC only ---

SLEEP	n	SECS / SEC * Seconds (default) MINS / MIN * Minutes HRS / HOUR / HOURS / HR * Hours

The **SLEEP** statement provides the user with a capability of waiting on the system timer for a specified duration, and can be useful for a job that periodically checks for an event, such as the receipt of email.

The units of time for the required duration may be specified in seconds, minutes or hours. **SEC** is the default.

```
** g:\cc\slc\ctl\SSSLEEP1 **       L=001 --- 2000/12/28 17:57:22  (P21)
opt w 222  dw=60    noban
  do prtdat
  move 4 at DATE+64   to 201     * Save original "Secs since midnight" value.
=waitloop=
  sleep  11 secs
  do some-rtn        * (Perform some check for an event.)
  if .......         * (  If event not here yet.        )
    t goto waitloop
=gotit=                          * Event has occurred.
  cvdate   NOW   to datecb       * Refresh the POS DATE Control Block with the time NOW.
  do prtdat
         * ....,....1....,....2...
  p 101 = 'Runtime = nnnn seconds.'
  sub  4 at 201 ty=b   fr 4 at DATE+64 ty=b    into 4 at 205 ty=b
  cvbc 4 at 205   to 111   fmt zzz9
  pr fr 101  l=60
  eoj
=prtdat=
  move 19 fr DATE-2  to 1
  cvbc  4 at DATE+64 to 21   fmt 'zzz,zz9'
  p 29 = 'secs since midnight.'
  print      l=60
=ret=
```

Figure 0. SLEEP Sample Job.

SORT=sort-list --- DB2 only ---

ORDER=sort-list
SEQ=sort-list

See also:

- Section *DB2 Processing*.

```
READ  PUPIL  TABLE='SCHOOL.ACORN_PRIMARY'  SORT='AGE ASC,MATHS_SCORE DESC'
```

Sorts the rows of an input DB2 results table, using the fields within the column(s) specified.

SORT specifies, in standard SQL syntax, the **ORDER BY** clause to be applied to this SELECT. This is a list of column sort specifications separated by commas.
Quotes, delimiting the sort-list, are required where more than one column is specified.

Each column sort specification consists of either a column name or number (i.e. the relative number of the column in the SELECT column list) and a sort direction **(ASC** for ascending or **DESC** for descending). The sort direction is optional and defaults to ascending.
If **SORT=** is omitted, the order in which rows are returned is undefined.

Note that SORT= is not permitted if the **UPD** parameter has been specified.

SORTDIR=x --- AS/400, UNIX, PC only ---

SORT

```
opt  sortdir=d     * DIR entries in reverse date order for all DIR/DIRDATA input.
read ABC  dsn="cdg:\*.txt"  dir  sort=n   * Sorted in Name order (file ABC only.)
read ABC  dsn="*.txt"  dir  sort=no       * Unsorted reqd (file ABC only.)
```

For **DIR** or **DIRDATA** input, SORTDIR=x may be coded to request that filenames returned are sorted by "x" where "x" is one of:

S	File size.
P	Path.
E	File Extension.
N	File Name.
D	Date (the file's last-changed timestamp).
0	Unsorted. (Zero)
NO	Unsorted.

By default, all DIR and DIRDATA input is returned unsorted. i.e. in the order returned from the operating system.

The SORTDIR parameter may be coded on the READ statement for the file in question, or on an OPTION statement which will affect all DIR and DIRDATA input.

Use the OPTION statement in the SELCNAM file to affect all DIR and DIRDATA input as an installation standard. SORT=NO may be coded to get unsorted input for a particular file only, when the installation standard has been set to something else in the SELCNAM file.

Note that both Size and Date options will return the DIR entries in descending order.

NOSORT is a synonym for for SORT=NO (unsorted).

SPACE=n

See also:

- PAGEDEPTH and LINE=n in this section.

```
READ STKMAST   LRECL 198   WORKLEN 4000
IF P 20  NE  P 1020   LEN 5        * Current v Previous type.
AND INCOUNT GT 1
  THEN SPACE 4
PRINT TYPE M STOPAFT 3000
MOVE 5 FROM 20 TO 1020             * Store previous type.
```

SPACE=n generates **n** blank lines in **SYSLST, SYSPRINT** or **SLCLST** output. The value **n** may be any number and, if omitted, will default to 1. Therefore, **SPACE** with no argument is treated as **SPACE=1**.

If a SPACE statement causes page overflow (current page depth may be updated using the **PAGEDEPTH** parameter), then printing will continue on the first line of the new page. For example, if 4 lines remain on a page and **THEN SPACE 10** is obeyed, the next data line printed will be on the **first** line of the next page, not on the 7th with 6 preceding blank lines.

Note that if already at the top of a page, possibly as a result of **THEN LINE 1** being actioned, all **SPACE** commands will be ignored. If blank lines **are** required at the top of a page then use **LINE=6** or whatever required, or alternatively print a blank line with **THEN PRINT ' '** followed by whatever spacing is required.

SQL='full SQL statement' --- DB2 only ---

See also:

- Section *DB2 Processing*.

```
READ  SQL='SELECT DISTINCT * FROM CBL.SUPPORT ORDER BY SQNO DESC'  PFX
READ  SQL=100 AT 311   SSN=DB2A   CHAR
DB2   SQL='GRANT UPDATE PRIVILAGES ON CBL.SUPPORT TO USR012'  SSN=CBLA
```

Executes a full SQL statement supplied by the user in standard SQL syntax. The SQL statement is a character string specified as a literal or as a field in the workarea.

READ statement

A DB2 results table may be read by coding an **SQL SELECT** statement on the READ control card.
The first time the READ operation is executed, the table is opened and the first row returned to the workarea. For the second and subsequent executions, SELCOPY reads the next row until end of table, at which time the SELECT statement is closed.

DB2 statement

The DB2 operation executes a general SQL statement. In this case coding **SQL=** is optional.
For any SQL verb, other than SELECT, SELCOPY passes the statement directly to DB2 for execution. For SQL verb SELECT, SELCOPY prepares the statement for execution but does not perform the automatic open and first fetch as for the READ statement.

SSA

--- DL1, IMS only ---

See also:

- Section *IMS and DL/1 Processing*.

```
READ MYDBASE DL1   SSA='SEG00002(FIELD003= XYZ)'
GN   MYDB DLI   SSA=101
```

The **SSA** parameter, **(Segment Search Argument)** is for use on **DL1/IMS** files only, indicating that for this particular data base operation, activity is to be restricted according to the limitations supplied on the SSA parameter.

If the argument is **numeric**, SELCOPY will assume that the SSA is to be found at that position within the SELCOPY work area, and will pass that SSA to DL1, with minimal validation.
If the argument is **non-numeric**, it is assumed to be a **literal SSA**. No padding or truncation is done. So ensure your SSA ends with a "close bracket".

The SSA supplied for IMS/DL1 **must satisfy** IMS/DL1 syntax.

When the SSA parameter is used, the SEG and SEARCH parameters must be omitted. (This information must be contained in the SSA argument).

The SSA may be as complicated as your implementation of DL1 allows, using Command Codes, and multiple Qualification Statements separated by a Boolean Operator.
However, **multiple SSAs are not supported**.

SSN=xxxx

--- DB2 only ---

See also:

- Section *DB2 Processing*.

```
READ  TABLE='CBL.DEVELOPMENT'  FMT='DEPTNO,DEPTNAME,DEPTMGR'  SSN=TEST

DB2  'CREATE VIEW FMSUPP AS SELECT * FROM CBL.CONTRACTS \
                      WHERE LICENCES > 5 WITH CHECK OPTION'  SSN=ADMN
```

SSN= specifies the, up to 4 byte character, DB2 sub-system name to which SELCOPY must be connected to process this statement. If **SSN=** is omitted, SELCOPY uses the default DB2 subsystem defined in **CBLNAME**.

If you specify more than one value for SSN on different control cards or specify a non-default SSN other than on the first SELCOPY SQL control card SELCOPY will issue **ERROR 146** during control card vetting.

STACK

--- CMS only ---

See also:

- Issuing STACK commands in section *VM/CMS Processing*.

```
STACK   LIFO   'Data to go on to CMS STACK'
THEN STACK   FROM 1234 L 80
ELSE STACK   FROM 1234 L 80   LIFO
```

Lines may be put on to the console stack dynamically from within a SELCOPY execution with the **STACK** command.

Data to be stacked may be supplied **as a literal** or **as data** defined by the **FROM** and **LRECL** parameters, as with the CP and CMS statements.

LIFO/FIFO keywords

The keywords **LIFO** (Last In First Out) or **FIFO** (First In First Out) may also be supplied. **Default** is **FIFO**.

NULL/EOF keywords

The keyword **NULL**, or its synonym **EOF**, may be coded on a **STACK** command. The keyword must not be enclosed in quotes otherwise it will be treated as data.

The effect of **NULL** is to stack a **null line** on the **CMS STACK** which when read from the stack will be processed as **End-of-File**.

Remember that SELCOPY's input via the file **CARD/SYSIN** will also normally be taken from the CMS STACK, thus **Looping via the CMS STACK** is therefore a possibility.

Prohibited Use

The use of **STACK** commands at your installation may have been prohibited by your Systems Programmer at install time, in which case the following message is issued.

```
ERROR 115   PRIVILEGED COMMAND (CP/CMS/STACK)
```

Note

If your SELCOPY is invoked from within XEDIT, all your stacked lines will be checked by XEDIT first before passing to CMS. If your CMS command is also an XEDIT command, then XEDIT will not pass it to CMS but process it itself. Avoid this by prefixing your command with **CMS**. e.g.

```
STACK 'CMS COPY   * * A   = = B   (OLDD'
```

START

See also:

- FILE=START (logical) and STARTKEY= in this section.

STARTISN=

See also:

- STARTREC=n in this section.
- Section *ADABAS Processing*.

STARTKEY= --- CMS, AS/400, UNIX, PC, VSAM, ISAM only ---

START=

See also:

- KEY= in this section.
- Section *VSAM Files*.
- ISAM Input - Direct in section *ISAM Files*.
- Direct Read for CMS in section *VM/CMS Processing*.
- Direct Read for AS/400, UNIX and PC in section *AS/400, UNIX and PC Processing*.

```
READ ABC   ISAM         STARTKEY H10700
RD   KEYED.CMSFILE.A      STARTKEY='key data'   KEYPOS=17
RD   c:\cbl\test\keyed.txt    STARTKEY='sq10183'   KEYPOS=11  KEYLEN=7
```

```
THEN READ XYZ   KSDS   STARTKEY  5 AT 200
```

Use of the **STARTKEY** parameter, with its associated generic key, is supported for **CMS, AS/400, UNIX, PC, ISAM** and VSAM KSDS files only. It allows the user to commence processing at the first record whose key is **greater than or equal** to the generic key supplied.
A **generic key** may be any length from 1 up to the defined key length of the input file. If the generic key contains any SELCOPY delimiter, it must be enclosed in quotes.

ERROR 544 is given if a STARTKEY requests a key which is higher than the highest key on the file.

Once a **READ** operation with a **STARTKEY** has been actioned for the first time, it is effectively converted into a straight forward **sequential READ** operation.

In order to change the reading sequence more than once, use the **KEY** parameter on a READ statement which will position the file with a **Direct Read**, giving the first record required. Follow this with a normal sequential READ (unqualified with KEY or STARTKEY) in order to process sequentially from there on.

Alternatively, different STARTKEY parameters may be coded on different READ statements of the same file within the same execution, but remember that each READ **will revert** to a sequential READ after being actioned once.

The generic key may be supplied as a **literal** or as a **length** of data within the workarea whose position is defined by the **AT** parameter. Thus it is possible to dynamically control the starting point for reading a Keyed file using input data from a secondary card file or Console terminal input.

Any **CMS, AS/400, UNIX** or **PC file** used with the STARTKEY parameter must be in key sequence. Since **CMS, AS/400, UNIX** and **PC files** are not defined as "Keyed" files within the Operating System, it is necessary to inform SELCOPY of the position of the key within the input record using the **KEYPOS** parameter (abbreviation KP). Key length is not always required as the length is assumed to be that of the first key supplied. **KEYLEN=n** however is required if the first generic key length used is less than on subsequent keyed reads.

STARTRBA=n

--- AS/400, UNIX, PC, VSAM only ---

See also:

- POS RBA in this section.
- Section *VSAM Files*.
- Direct Read for AS/400, UNIX and PC in section *AS/400, UNIX and PC Processing*.

```
THEN READ XYZ   ESDS   STARTRBA=5  AT 200  TYPE=B
RD XYZFIL2     ESDS   STARTRBA=1024
```

Use of the **STARTRBA** parameter, with its associated Relative Byte Address is supported for **AS/400, UNIX, PC** and **VSAM ESDS** only. It allows the user to commence processing the input file at a specific record, provided the RBA is known. Logically, this operates in a similar way to to the STARTKEY parameter as described above.

The RBA may be supplied as a **number** or as a **length** of data within the workarea whose position is defined by the **AT** parameter and whose data type is defined by the **TYPE** parameter. Thus it is possible to dynamically control the starting point for reading an AS/400, UNIX, PC or ESDS file using input data from a secondary card file or Console terminal input.

RBA is an acronym for **"Relative Byte Address"**, and is a genuine relative number. i.e. STARTRBA=0 will start with the first byte of the first record.

For AS/400, UNIX and PC files only, the RBA argument need not point at position 1 of a logical record. The input buffer is filled from the RBA point in the file, and the first complete record that follows will be returned, ignoring any partial record that might exist at that RBA. The RBA value set at **POS RBA** will be that of the record returned, which may well be greater than the RBA requested.

VSAM records are not normally split over Control Intervals (unless spanned) so every Control Interval will start with the beginning of a record. i.e. STARTRBA as a multiple of CISIZE will normally be a valid request.

ERROR 544 is given if a STARTRBA requests a relative byte address which exceeds file size, or in the case of VSAM ESDS files, **does not point to position 1** of a record.

STARTREC=n

--- CMS, AS/400, UNIX, PC, VSAM, ADABAS only ---

STARTISN=n

See also:

- REC=n (Reading by) in this section.
- Section *VSAM Files*.
- Direct Read for AS/400, UNIX and PC in section *AS/400, UNIX and PC Processing*.

```
THEN READ XYZ   RRDS   STARTREC=5  AT 200  TYPE=C
RD KEYED.CMSFILE.A   STARTREC=46
```

Use of the **STARTREC** parameter, with its associated generic key, is supported for **CMS, AS/400, UNIX, PC, VSAM RRDS** and **ADABAS** input files only. It allows the user to commence processing the input file at a specific **record number**, in a similar way to the **STARTKEY** parameter, described above.

The record number may be supplied as an **unquoted decimal literal**, or as a **field** whose data type is defined by the **TYPE** parameter. Thus it is possible to dynamically control the starting point for reading any of the supported file types using input data from a secondary card file or from screen input.

For AS/400, UNIX and PC input, the REC parameter is supported for **fixed** record format files only.

Although RRDS is an acronym for "Relative Record Data Set", it is an absolute record number that is used for reading a record. i.e. **STARTREC=1** will start with the **first** record, STARTREC=2 with the 2nd record and so on, for both VSAM's RRDS and for CMS files.

ERROR 544 is given if a STARTREC requests a record number which exceeds file size.

STEP=n

```
IF   POS 2001,2999  =  'ABC'   STEP=50
```

The **STEP** parameter is for use on an **IF-type** operation which concerns a **Range Test**.
Scanning a **range** of positions for a string may be restricted by **stepping** up the range with a user specified increment, **STEP=n**, where **n** is numeric.
If **STEP=n** is omitted for a Range Test, **STEP=1** is assumed.

The presence of **STEP=n** on an **IF/AND/OR/THENIF/ELSEIF** statement is sufficient to define the operation as a **Range Test**, regardless of the syntax used to define the range, **Field 1**.

Use in Array Processing

Scanning of an array when the data to be searched for exists at a certain position within each array element can be made highly efficient using a STEP parameter specifying the **array element length**.
In the following example we replace a **keyed read** with a scan of an array which contains every record from a sorted keyed file, although using array processing it doesn't even need to be sorted.

```
 SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)   PW000 pw=0 (133)     (OS) VM/CMS=VM05      15.53 FRI 23 NOV 2001    PAGE   1
o ------------------------------------------------------------------------                          ---------------------    -------- o


o          ** SMXARRAY CTL J ***            L=002 +++ 94/07/27 16:19:50                                                          o
             equ array         101

o                                                                                                                                  o
      1.    rd   CONTROL.FILE   into 7  w 5555

o     2.    do INIT   s 1      * Initialise array etc once only.                                                                   o


o            if p array+6, @a rre+6  =  p 7 len 5   step 44   * Key in pos 7 - len 5                                                 o
      3.      t pr fr @-6  l 44
      4.      l pr         l 33
o                                                                                                                                  o
      5.    gg

o                                                                                                                                  o


          ==INIT==             * Initialise array etc once only.
o           ----                                                                                                                   o
      6.    p 13 = '*!* KEY NOT FOUND *!*'  s 1
      7.    line 1                          s 1
o     8.    @a rre = array                   s 1                                                                                    o

      9.    rd SMXKEYED.in  into @a rre
o                                                                                                                                  o
            if eof SMXKEYED
     10.      t ret
o                                                                                                                                  o
     11.    @a rre = @a rre+44
     12.    goto INIT
o                                                                                                                                  o
```

```
 SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)   PW000 pw=0 (133)     (OS) VM/CMS=VM05      15.53 FRI 23 NOV 2001    PAGE   2
o ------------------------------------------------------------------------                          ---------------------    -------- o
     INPUT   SEL SEL                                                                                                      1  RECORD
     RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH
o    -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------     o
        36     1   3 xxxxx 66666 ------- Detail for 66666 -------                                                                 44
         2     2   3 xxxxx 00000 ------- Detail for 00000 -------                                                                  5
o        3     3   3 xxxxx IIIII ------- Detail for IIIII -------                                                                  5     o
         4     1   4       ##### *!* KEY NOT FOUND *!*                                                                             5
         5     4   3 xxxxx 00000 ------- Detail for 00000 -------                                                                  5
o        6     2   4       0000o *!* KEY NOT FOUND *!*                                                                             5     o
         7     5   3 xxxxx UUUUU ------- Detail for UUUUU -------                                                                  5
         8     6   3 xxxxx CCCCC ------- Detail for CCCCC -------                                                                  5
o                    ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0             o

 SUMMARY..
o  SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN                                                      o
   ------      ------      ----     -------  -----           -----   --    ---
     1             8 READ CONTROL       5     5 U               8       CONTROL.FILE.A1
o    2             1                                                                                                                o
     3             6
     4             2
o    5             8                                                                                                                o
     6----8        1
     9            36 READ SMXKEYED     44    44 U              36       SMXKEYED.IN.A1
o   10             1                                                                                                                o
    11---12       36

o                                                                                                                                  o
          ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **
                                                  ** EXPIRY DATE -- 2002/05/21 **
```

Figure 0. Array Processing.

STOP

See also:

- FILE=STOP (logical), GOTO GET/EOJ/CANCEL/user-label and STOPAFT=n in this section.

STOPAFT=n

STOP=n
S=n

```
WRITE TEMPFIL   L 322   B 3220   STOPAFT=450
THEN PRINT   STOPAFT 100
ELSE GOTO CALCRTN   STOPAFT 44
NOW POS 88 = X'FF'   S=1
PRINT   STOPAFT 398
DO PRINRTN   S 10
THEN LINE=1 S=1
ADD 145   TO 6 AT 2340   S 17
```

The **STOPAFT** parameter may be coded on **any operation** that causes action to be taken. Its argument, 'n', determines the maximum number of times that the action is to be taken, for this control card only. i.e **STOP AFT** er this many.

SELCOPY keeps a count of how many times each selection is actioned. When this count reaches the STOPAFT value for a selection, that particular selection is removed from SELCOPY's list of control statements.
All associated IF AND and OR statements are also removed, provided there are no further THEN statements also associated.
Thus execution speed increases as STOPAFT values are reached.

If all the control cards in a deck include STOPAFT parameters which all take effect, then the run will be **prematurely terminated** because there is nothing left which justifies reading the rest of the input file.
The input record total, printed at EOJ, will therefore only reflect the number of records read, rather the numbers of records in the file.

The STOPAFT parameter only applies to the single selection on which it is coded. Different selections may have different STOPAFT values or none at all.

STOPAFT Defaults

The **Default STOPAFT** value is infinity. Exceptions are:

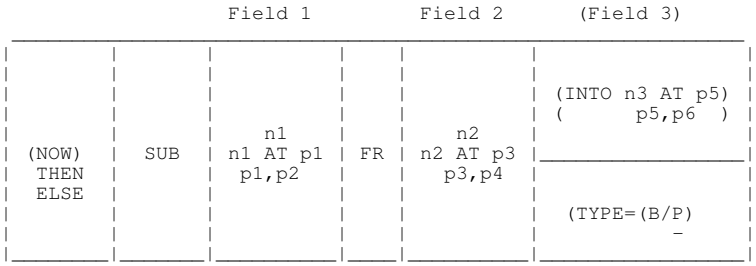
STOPAFT=1	Used on a THEN which is conditional on an **INCOUNT** test, unless **CAT** or **DIRDATA** input exists whether or not it is **prime input**.
STOPAFT=1	Used when a **literal** is supplied as the argument for the REC or KEY parameters on the **READ** operation. It is reasonable to suppose that the operation to read that specific record will be required **only once**.
STOPAFT=50	Used on **FILE=LOG** output to prevent excessive accidental use of the operator's console.
STOPAFT=sss	Used for **PRINT** output, where **sss** is a value coded in **CBLNAME**. If no value is coded, no STOPAFT is implied.

To **override any default** STOPAFT, simply code **STOPAFT=n** explicitly.

SUB=n

See also:

- Packed Decimal Explained in section *Introduction*.
- Section *Mainframe Debugging Aids*.




```
THEN SUB=4 AT=20   FR=8 AT=30        * TYPE=P is default.
ELSE SUB 2 AT 20   FR 4 AT 30 TYPE=B * Binary substraction.
NOW  SUB 14      FROM 8 AT 30        * Subs dec 14 fr p.d. field.
SUB 14             FR 2 AT 6  TY=B   * Subs dec 14 fr binary field.
```

The **SUB** operation will cause **Field 1** to be **subtracted** from **Field 2**, with the result being optionally stored in **Field 3**.

INTO parameter

If an **INTO** parameter is supplied, the result is stored at **Field 3**, otherwise **Field 2** is overwritten.

Literals

A literal, an unquoted decimal number, may be used for either or both source fields if so required. However, a literal value for Field 2 may only be used if an **INTO** parameter is also supplied.

TYPE parameter

Only **TYPE=P** (the default) and **TYPE=B** are supported.
If any other TYPE parameter is coded, **TYPE=P**, the default, is assumed and the operation done assuming **Packed Decimal** for both source and destination.

The TYPE parameter may only be coded **once** on each arithmetic statement.
SELCOPY will accept the **TYPE** parameter either following the source or the destination, but it is applied **to both** source and destination fields.
ERROR 045 is issued if the **TYPE** parameter is coded more than once.

TYPE=B (Binary)

All data is valid for Binary arithmetic, up to a **maximum** length of 4 bytes.

The senior bit (leftmost) defines the sign. Zero is positive, and one is negative, but for a **1-byte** binary field, the value is treated as unsigned and always positive. If an arithmetic operation with a 1-byte destination field has a negative result, then **Return Code 8** is set.

Important Note

Please refer to Section *AS/400, UNIX and PC Processing* which gives details on the two different ways in which a binary field is interpreted outside SELCOPY, depending on the type of machine processor.

Note that TYPE=B arithmetic data cannot be invalid and Binary addition and subtraction are useful for modifying the @ pointer.

TYPE=P (the default)

If **TYPE** is not coded, **TYPE=P** (Packed Decimal) is assumed, having a **maximum** length of 16 bytes, (31 decimal digits and a sign).

If the result of the operation is too large to be held in the destination field, then it will be truncated to fit the destination field length. If truncation involves the loss of significant digits (non-zero), then Return Code 8 is set.

If the data is not valid Packed Decimal, then SELCOPY will set **Return Code 8** in an AS/400, UNIX or PC environment, or, in a mainframe environment, a **Data Exception** will occur. This may result in ERROR 536, indicating an error in **SEL---27** for instance, or it may produce a storage dump, depending on whether your Systems Programmer has enabled SELCOPY's **Abend Trap**.

SUBDIR=n

--- AS/400, UNIX, PC only ---

SUB

```
opt  subdir    * (Default) Recurse into 256 sub dir levels on all DIR/DIRDATA input.
opt  sub=7                 * Recurse into sub dirs to 7 levels.
opt  sub=0                 * Ignore all sub dirs for all DIR/DIRDATA input.
read ABC dsn="g:*.txt" dir nosub  * Ignore all sub dirs for the ABC file only.
read ABC dsn="g:*.txt" dir sub=1  * Only recurse 1 level of sub dirs for file ABC.
```

By default, the number of Sub Directory levels processed for DIR or DIRDATA input is 0, however, the SUBDIR parameter, with an optional numeric argument, may be used to control this.

SUBDIR may be coded either on the READ statement for the file in question, or on an OPTION statement which will affect all DIR and DIRDATA input.

SUBDIR may optionally be coded with a numeric argument to define the number of nested directory levels to be processed. Coding SUBDIR without a numeric argument results in SUBDIR=256 being assumed.

When SUBDIR is coded on an OPTION statement in the SELCNAM file, it will apply to all DIR and DIRDATA input, as an installation standard default, for all SELCOPY jobs.

NOSUB is a synonym for SUBDIR=0.

SUSP

See also:

- FILE=SUSP (logical) in this section.

SYS=n --- VSE only ---

See also:

- DEV=cuu, DSN= and VTOC in this section.

```
READ XXTAPFIL   DEV=TAPE   SYS=22
READ ABC   VTOC   SYS=12                        * CBLVCAT required.
READ VTOC   SYS 4                               * CBLVCAT required.
READ      DSN='VSE.DISK.FILE' SYS=33            * Dynamic Allocation.
READ INDD DSN='VSE.TAPE.FILE' DEV=TAPE SYS=22   * Dynamic Allocation.
```

For VSE users who have a requirement for referencing a tape file without the limitation of having to give it a filename of **TAPEnnn**, the **SYS=nnn**, in conjunction with **DEV=TAPE**, will remove this limitation, and allow any valid VSE filename, up to **8-bytes**.

Users who have the program package, **CBLVCAT**, may interface with it via SELCOPY in order to read **VTOC** entries on their disks.

The SYS parameter indicates a logical unit which must be assigned to the disk whose VTOC is to be read. The argument of the SYS parameter must be numeric.

Dynamic Allocation

Under Dynamic Allocation, **SYS=nnn** is used to reference the disk device, or in conjunction with **DEV=TAPE**, the specific tape device on which the required file resides.

If the **SYS=nnn** parameter is omitted for a **DEV=TAPE** dynamic allocation, then a **dynamic assignment** is made for the first available tape drive.

Note that, with no dynamic allocation, DEV=TAPE without SYS=nnn will default to **SYS000** (i.e. no dynamic assign.)

SYSTEM --- CMS, AS/400, UNIX, PC only ---

CMS
DOS
UNIX

See also:

- Issuing CMS commands in section *VM/CMS Processing*.

```
 ___________________________________________________
|         |                                         |
|         |           n AT p1                       |
|         |          p1  (,p2)                      |
| SYSTEM  |                                         |
|         |             L                           |
| CMS     | FROM=       LEN                         |
|         |          p1 LENGTH n                    |
| DOS     |             LRECL                       |
|         |                                         |
| UNIX    |           'lit'        * In Quotes.     |
|         |_________________________________________|
|         |                                         |
|         | 'lit'                  * In Quotes.     |
|_________|_________________________________________|
```

```
SYSTEM 'ATTRIB -A +R D:\PAYROLL\9605\CHEQ.LST'
CMS    'ERASE * WORK B'
DOS      FROM 80 AT 1001              * After building command in workarea.
UNIX   'RM  ./YOUR.HOME.DIRECTORY/*.WORKFILE'
```

Arguments p1, p2 and n are supported also as @ and @user pointer values or Position Keywords.

For use in **CMS** (with DOS set ON or OFF), **AS/400, UNIX** and **PC environments** only, the **SYSTEM** parameter, or its abbreviations, on a NOW/THEN/ELSE may be used to issue CMS subset, AS/400, UNIX or PC commands at execution time from within SELCOPY.

The system return code set on execution of the command is stored in SELCOPY's **POS RETSYS** (RETCMS) field.

CMS Environment Usage

```
READ   CMS.EXEC.A            * Output from   LISTFILE.
LOG CLEAR   STOPAFT=1        * Clear the screen.
LOG ' ' TIMES 2              * Put 2 blank lines on screen
LOG FR 12                    * Filename to the screen.
POS 1 = 'TYPE '              * The CMS subset command.
CMS FR=1      L=20           * Issue command to CMS.
```

Where it is required to issue a CP command without getting CP's reply coming back to SELCOPY's storage, i.e. in order to get the reply on the screen as normal, it is necessary to issue the CP command through CMS, as in the following:

```
CMS 'CP MSG OPERATOR --- JOB XXX HAS FAILED ---'
CMS 'CP QUERY NAMES'
```

Note that CP commands issued in this way via the CMS command, must have CP as the first argument within quotes, and the command may not use CMS abbreviations or synonyms.

Use of the **CMS** command requires that the SELCOPY MODULE is generated with the option SYSTEM. Otherwise you get a protection exception in low storage. If this occurs, enter the following CMS commands:

```
LOADMOD SELCOPY
GENMOD  SELCOPY (SYSTEM
```

Prohibited Use

The use of **CMS** commands at your installation may have been prohibited by your Systems Programmer at install time, in which case the following message is issued.

```
ERROR 115   PRIVILEGED COMMAND (CP/CMS/STACK)
```

Notes

Certain CMS commands cannot be invoked dynamically by SELCOPY because the command itself involves loading a module into storage currently occupied by SELCOPY. For example, invoking **CMS COPYFILE** will load COPYFILE MODULE on top of the SELCOPY MODULE. COPYFILE will then obey its command and control is returned to SELCOPY which is no longer there. A Program Check will almost certainly result.

Solution

Use SELCOPY's **STACK** command to place the COPYFILE command on the CMS STACK. Thus the COPY will not be invoked until SELCOPY has finished.

TAB=n

--- AS/400, UNIX, PC only ---

TABS

See also:

- TABSIN/TABSOUT and TABLE= in this section.

```
READ   D:\CBL\README.TXT   TAB=08   W 3000
```

TAB, as a synonym for **TABLE** in SELCOPY DB2 processing, is referenced under the heading **TABLE**.

The **TAB** character (X'09') is common to AS/400 IFS, UNIX and PC files. By default, SELCOPY will leave TAB characters unchanged.

However, the **TAB=n** parameter for **input** files may be used to get SELCOPY to expand TAB characters to the required number of blanks in order to line up the next byte of input data at the beginning of the next block of n bytes.
In the UNIX world, a value of **TAB=8** is common practice.

TAB=n for **output** files is not yet implemented.

Notes

If the TAB parameter is coded with no argument, then a default of TAB=08 is assumed. If TAB is omitted, the default is as set by the TABSIN or TABSOUT options.

A worklength **must** be coded on a READ statement with TAB=n otherwise the job is cancelled with **ERROR 578**.

TABLE= --- DB2 only ---

TAB=

See also:

- Section *DB2 Processing*.

```
READ   INTAB  TABLE='SYSIBM.SYSTABLES' SORT='NAME DESC'
READ          TAB=20 AT 33   PFX                * filename DEFAULTF.
INSERT  SUPP  TABLE='CBL.SUPPORT'  FROM 1001
```

Specifies, either as a string literal or as a variable field in the work area, the DB2 table to be read from or written to.

TABLE= is mandatory for DB2 WRITE, INSERT and READ operations, unless the table is referenced via an SQL='SELECT' statement or via an, already defined filename.
If **filename** is omitted for the above operations then DEFAULTF is used.

TABSIN/TABSOUT --- AS/400, UNIX, PC only ---

```
OPTION   HEAD=OFF   TABSIN=10
```

TABSIN=n and/or TABSOUT=n may be coded on an **OPTION** statement, or may be coded as a system default in **SELCNAM**, to define the default TAB settings to be used by SELCOPY for all **RECFM=U** files.

TABSIN=n determines whether SELCOPY will expand **TAB** chars in the data into strings of blanks when reading from a RECFM=U file.
The resulting LRECL value will include any generated blanks.

TABSOUT=n is not yet supported.

TABSOUT=n determines whether SELCOPY will compress strings of blanks in the current record area into TAB characters when writing to a RECFM=U file.

If TABSIN or TABSOUT is omitted, the default value is 0 for both. i.e. No TAB character processing will occur.

THEN

TH
T

The THEN card defines an action to be taken when the previous condition or compound condition is satisfied. (THEN cards following a NOW card are always actioned.)

THEN cards may be preceded by any of the following: IF, AND, OR, THEN, NOW, THENIF, ELSEIF or implied **NOW**.
and may be followed by anything.

You may have as many THEN cards as you require following each other, all of which will be actioned if the preceding condition were true.

```
IF POS 20 = 'ABC'
  THEN MOVE 10 FROM 60 TO 26
  THEN POS 1 = XYZ
  THEN PRINT  TYPE=M  STOPAFT=17
  THEN TAPE15  BLKSIZE=16000
  THEN TAPE16  BLKSIZE=4000
  THEN LINE 1
  TH SPACE 4
  TH CALL subrtn   SIZE=8192
  TH LRECL = L-20
  T GOTO GET   STOPAFT=100
  T EOJ
```

THENIF

THEN IF
T I
TI

For users who require selection based on a number of mandatory conditions which are common, together with one of a number of other conditions, we have the **THENIF** statement.

```
IF  mandatory condition 1
AND mandatory condition 2
AND mandatory condition 3
AND mandatory condition 4
  THENIF condition 5
      OR condition 6
      OR condition 7
        THEN take some action

        ELSE DUMMY * No action for this.

  ELSE take some other action. (1, 2, 3 and 4 are not all    true.)
```

TIMES=n

```
LOG ' '   TIMES=3                        * 3 blank lines on Log.
LOG 'Error found'   TIMES=6              * 6 lines on Log.
```

For repetition of the same operation, the TIMES parameter may be used on THEN/NOW/ELSE statements.

If a **STOPAFT** is used in conjunction with the **TIMES** parameter the STOPAFT needs to be a **multiple** of the TIMES value. If it is not a multiple it is rounded up.
For example, if **PRINT TIMES 6 STOPAFT 6** were coded, the first record would be printed 6 times and then the statement disabled.

TO=n

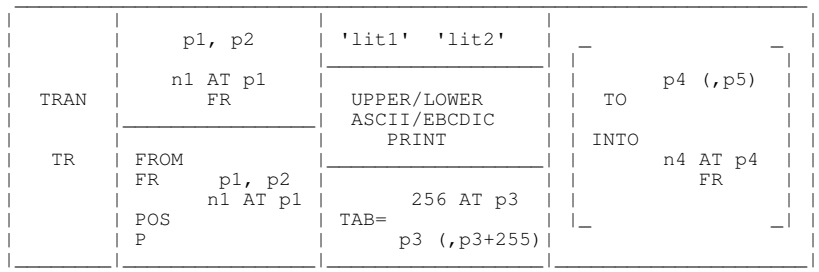
See also:

- POS in this section.

```
MOVE 6   FROM 20   TO 400
THEN CVCP 8 AT 26   TO @ABC AT @+8        * PACK char to p.d.
T CVPC 3 AT 452   TO=L-4   FORMAT=ZZ999   * UNPK to char.
ELSE MOVE 24   FROM=@+2   TO=@+400
```

The argument of the TO parameter defines the position of the start of the receiving field in the record, where the result of the MOVE or conversion is to be stored.
This argument may be a straight forward numeric position, or could be a displacement on a keyword such as the @ pointer, or logical record length, **L**.

TRAN




```
TRAN  2000 AT 1    'ABC'    'XYZ'     * A to X,   B to Y,   C to Z.
TRAN   100 AT 1   X'0A0B0C0D'  'ABCD' * X'0A' to C'A' etc.
TR     @BEG,@END   UPPER              * To UPPER CASE.
TR     @B @B+20    LOWER              * To lower case.
TR     132 AT 2    PRINT              * Ensure printable.
TR     LRECL AT 1    TAB 8001         * User's 256 byte TR table.
```

The TRAN operation actions a byte for byte translate of data within a specified target field.

'Lit1' 'Lit2'

Indicates that every single **character** found in the target field that matches with any individual character in **lit1**, is to be replaced by **(translated into)** the corresponding character from **lit2**.

Literal values, 'lit1' and 'lit2' must be of **equal length**, and must be supplied **within quotes**.

UPPER/LOWER

Indicates that every **alphabetic** character in the target field is to be forced **Upper** or **Lower** case according to the keyword used.
The keywords **UPPER** and **LOWER** are also operation words in their own right.

ASCII/EBCDIC

Indicates that every character in the target field is to be translated from **ASCII** to **EBCDIC**, or vice versa, according to the keyword used to define the required result.
The Parameters **CVAE** and **CVEA** may also be used for ASCII/EBCDIC translation. e.g.

```
TRAN  2000 AT 1   EBCDIC   * Convert ASCII to EBCDIC.
CVAE  2000 AT 1            * Identical action.
```

PRINT

Indicates that every **unprintable** character in the target field is to be replaced with a **Full Stop**, (Period), (X'4B').
The translate table used here is the same as that used for SELCOPY's **TYPE=C** printing.

TAB

Defines a user-built translate table, **length 256**, which is used for translation of the target.

Destination

An **optional** destination field **(replacement target)** may be defined by coding a **TO** parameter, in which case the source field will remain unchanged. (It is copied to the destination and translation takes place there.)

No length definition is required for the destination. It will be the same as the source. e.g.

```
TRAN  2000 AT 1  'ABC'  'XYZ'   TO 6001    * Destn len 2000.
```

If however, a length is provided, e.g. by coding **TO 500 AT 6001**, then the **shorter** length is used for the operation.

TRUNC

```
WRITE OUTDD   TRUNC
WR   TEMP.LISTING.A   TRUNC
```

Output Files

The **TRUNC** parameter on **output** files causes a **RECFM=V** or **RECFM=U** record, (including **VSAM KSDS** and **ESDS** records), to have trailing blanks **truncated**.

Fixed length files remain fixed, regardless of TRUNC or NOTRUNC.

TRUNC may be coded anywhere on any output statement, making it effective on all output statements to that file.

Output Default

TRUNC is default for **CMS, AS/400, UNIX** and **PC**, so if omitted, variable length CMS, AS/400, UNIX and PC output files have blanks truncated anyway. Thus, the **NOTRUNC** parameter would be needed to inhibit truncation.

The exception to this is when **EOL=NO** is coded on the output statement to write raw data on AS/400, UNIX and PC systems. In this case no End of Line characters are written and NOTRUNC becomes default thus preserving any trailing blanks.

NOTRUNC is default for all other variable length output files and so keep their trailing blanks.

Input Files

The **MVS** user, under exceptional circumstances, may wish to disable SELCOPY's check to ensure that the block read has not been truncated on the standard data management read operation. (SELCOPY's normal action on detecting an input block larger than the maximum expected is to report the error and terminate the job with Selection Time Error 501.)

Use the **TRUNC** parameter on the **READ** statement if such truncation is actually required e.g.

```
READ ABC  RECFM=U  L=100  B=100  TRUNC  * Process only 1st 100 bytes.
PRINT  STOPAFT=20                       * Print 1st 20 blocks.
```

TYPE=x (for Data)

See also:

- TYPE=x (for Printing) in this section.

```
RD ABC  ESDS   RBA= 5 AT 100 TYPE P     * Use 5 bytes of Packed
                                      * Decimal for the RBA.
LRECL =   4 AT 1010   TYPE C
ADD 5 AT 20     TYPE B   TO 5 AT 1020
```

The **TYPE** parameter controls the type of numeric data representation on:

- **Arithmetic** operations (ADD/SUB/MULT/DIV)
- Reading by **REC**/**RBA**
- **LRECL**/**@ ptr** assignments

DATA types available:

TYPE B	Binary
TYPE C	Character
TYPE F	Floating Point
TYPE P	Packed Decimal - the **default**.
TYPE Z	Zoned Decimal

The **TYPE** parameter, when used for **Data**, is discussed under the relevant operation, **ADD/SUB/MULT/DIV/REC/RBA/LRECL**, and **not** on the following pages under the **TYPE** heading for printing.

TYPE=x (for Printing)

TY=x

See also:

- TYPE=x (for Data) and REPORT in this section.

```
PRINT        TYPE M     STOPAFT=50
THEN LOG     TY=B     FROM 100   LRECL=50   S=20
ELSE PRINT   TYPE=C
```

The **TYPE** parameter described below controls the type of character representation on output to the **PRINT** and **LOG** files only.

If a **REPORT** card has been supplied, the **TYPE** parameter is ignored, and a warning message is given to this effect.

PRINT types available:

TYPE B	Both Char and Hex: 1 line Char, 1 line Zone, 1 line Numeric.
TYPE C	Character: with unprintables translated to full-stop. **(AS/400, UNIX, PC default)**
TYPE D	Dump: as in a standard System Dump.
TYPE DX	Dump: as in a standard System Dump but with Hex only.
TYPE H	Hex Only: 1 line Zone, 1 line Numeric.
TYPE M	Mixed: Char if printable, else Hex. **(Very popular)**
TYPE MP	Mixed: For predominantly **Packed** Decimal data.
TYPE N	No translation: **(Mainframe default)**
TYPE S	System: straight 133-byte line with ASA char.

The **TYPE** parameter, when used for **Printing**, is discussed in more detail on the following pages.

TYPE=B (for Printing)

Both character format and hexadecimal format. Printable characters appear on the first line, with unprintable characters translated to blanks, but lower case alpha is **not translated** and remains lower case.
The next two lines are in hexadecimal format as for TYPE=H, and the fourth line is left blank. 100 characters of data therefore take **4 printed lines** (assuming default **DATAWIDTH** of 100 bytes).

Note that printable characters are determined by the operating system environment. i.e. **EBCDIC** for mainframe and AS/400 platforms, and **ASCII** for UNIX and PC platforms.

A line of dots in the form:

```
....,....1....,....2....,
```

etc, length matching the **DATAWIDTH** value (default 100), is supplied at the top and bottom of each page of printed output as a **Counting Guide** for assistance in checking positions.

For **mainframe** environments, if lower case alpha is required to be translated to upper case, please ask your Systems Programmer to set the **FOLD Option** in the **UCS Buffer Load**.

The following **mainframe** example is equally applicable to **AS/400**, **UNIX** and **PC** environments.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)    PW000 pw=0 (132)    (OS) VM/CMS=VM05      16.37 FRI 23 NOV 2001    PAGE   1
o ------------------------------------------------------------------------                          ---------------------    -------- o

o          * SMXTYB CTL H *              L=012 +++ 92/02/21 12:09:58                                                                o

      1.  read  cblname.text                 * The CBLNAME used for CMS SELCOPY.
o     2.  print  type=b   stopaft=3                                                                                                  o

o     INPUT   SEL SEL                                                                                                  1  RECORD     o
      RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH
      -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------
o                                                                                                                                  o
          1     1   2  ESD            CBLNAME                                                  00000001                          80
                       0CEC444444014400CCDDCDC40000000A44444444444444444444444444444444444444444FFFFFFFF
o                      25240000000000013235145000001010000000000000000000000000000000000000000000000001                                o

          2     2   2  TXT            CBL - Bridgend UK (Internal Only)    PW000 pw=0 (132)   00000002                          80
o                      0EEE400044034400CCD464C98888984ED44C9A899894D99A54444DEFFF49A7F44FFF5440FFFFFFFF                                o
                       23730000000800013230002994755404 20D9535951306538D000076000076E00D132D00000000002

o         3     3   2  TXT                ./!     DB2ACBLPLAN0                                00000003                          80     o
                       0EEE400344034400000046500000CCFCCCDDDCDF000000000000000000000000000000000FFFFFFFF
                       23730008000800010000B1A000004221323731500000000000000000000000000000000100000003
o                      ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0            o

  SUMMARY..
o  SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN                                                      o
   ------      ------      ----     -------  -----           -----   --    ---
      1            3 READ CBLNAME      80    80 F              11       CBLNAME.TEXT.A5
o                                 *EOF*NOT*REACHED*                                                                                o
      2            3

o ***WARNING***                   4 = RETURN CODE FROM SELCOPY                                                                     o

           ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **
o                                                   ** EXPIRY DATE -- 2002/05/21 **                                                o
```

Figure 0. PRINT TYPE=B (Both Character and Hex).

TYPE=C (for Printing)

TYPE=C	**default** for **AS/400, UNIX, PC PRINT**,
TYPE=N	**default** for **Mainframe PRINT**, and
TYPE=S	**default** for **LOG** if TYPE omitted.

Character format will again give a straight print of printable data, but any unprintable character, is translated to a 'full-stop', as in a core dump, and a **counting guide** is supplied as for TYPE=B.

In a **mainframe** or **AS/400** environment, characters classified as "printable" are those which would print on a 1403 printer

In a **UNIX** or **PC** environment, characters classified as "printable" are those in the range X'20' to X'7E' of the **ANSI** Symbol Set.

The following **mainframe** example is equally applicable to **AS/400, UNIX** and **PC** environments.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)    PW000 pw=0 (132)    (OS) VM/CMS=VM05      16.36 FRI 23 NOV 2001    PAGE   1
o ------------------------------------------------------------------------                           ---------------------    -------- o

o          * SMXTYC CTL N *              L=002 +++ 92/02/21 12:39:00                                                                  o

      1.  read  cblname.text                 * The CBLNAME used for CMS SELCOPY.
o     2.  print  type=c                      * No stopaft=3 - print it all.                                                             o

o     INPUT   SEL SEL                                                                                                  1  RECORD     o
      RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH
      -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------
o         1     1   2 .ESD      ..  ..CBLNAME ........                                      00000001                          80      o
          2     2   2 .TXT ...  ..  ..CBL - Bridgend UK (Internal Only)    PW000 pw=0 (132)  .00000002                          80
          3     3   2 .TXT ...  ..  ......./!.....DB2ACBLPLAN0...............................00000003                          80
o         4     4   2 .TXT ...  ..  ..........................................................00000004                          80      o
          5     5   2 .TXT ..y  ..  ..........................................................00000005                          80
          6     6   2 .TXT ..\  ..  ..................................SELCOPY ................00000006                          80
o         7     7   2 .TXT ...  ..  ..........      ..    ....SELCOPY.NAM                   00000007                          80      o
          8     8   2 .TXT ..&  ..  ..                      ...........j.1.KJ.........1902052100000008                          80
          9     9   2 .TXT ..h  ..  ..20020520*CBLNAME*<<END>>                              00000009                          80
o        10    10   2 .END                          1569623400 010201291                   00000010                          80      o
                      ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0

o SUMMARY..                                                                                                                      o
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
   ------      ------      ----     -------  -----           -----   --    ---
o     1            10 READ CBLNAME      80    80 F              10       CBLNAME.TEXT.A5                                          o
      2            10

o                                                                                                                                o
          ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **
                                                  ** EXPIRY DATE -- 2002/05/21 **
o                                                                                                                                o
```

Figure 0. PRINT TYPE=C - Character with unprintables as "." (dot) - iSeries, UNIX and PC default).

TYPE=D (for Printing)

See also:

- PAGEWIDTH, DUMPALL and DUMPENC in this section.

Dump format will print up to 32 bytes of data per line, depending on the value of **PAGEWIDTH** in SELCNAM or CBLNAME, or set on an **OPTION** statement.

On mainframe, if **PAGEWIDTH** is less than 132, all **TYPE=D** printing will print **X'10'** bytes per line instead of **X'20'**, thus making the whole of the print output line visible when displayed on a standard 80 byte screen.

On AS/400, UNIX and PC platforms, SELCOPY will print as many blocks of X'04' bytes per line as will fit in the page width. Furthermore, if **DUMPALL=NO** (the default) is in effect, then multiple, consecutive print lines containing duplicate data are condensed into a single line indicating the number of lines that have been condensed.
An example of **TYPE=D** print with 16 byte lines may be found in the description of the **PAGEWIDTH** parameter.

The 1st line of output gives Input Record Number, Output Record Number, Selection Id, and the **LRECL** of the record in decimal.

Subsequent lines each give a 4-digit **hex offset**, with up to 32 bytes of data in hexadecimal format, and the same data in character format to the right of it. Within the character data on the right, unprintable data is printed as a 'full-stop'.

By default, the character used to enclose the character data is "*" (asterisk) on mainframe and "|" (pipe) on AS/400, UNIX and PC platforms. On AS/400, UNIX and PC platforms only, this character may be changed using the **DUMPENC="xy"** parameter. The second argument to DUMPENC optionally defines the character to be used to enclose character data when print lines have been condensed.

No counting guide is supplied for TYPE=D printing.

The Dump format is used by SELCOPY when printing the current input buffer after detecting a terminal error.

The following **mainframe** examples are equally applicable to **AS/400, UNIX** and **PC** environments with the exceptions mentioned above.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)    PW000 pw=0 (132)    (OS) VM/CMS=VM05      16.34 FRI 23 NOV 2001    PAGE   1
o ------------------------------------------------------------------------                          ---------------------    -------- o

o          * SMXTYD CTL H *              L=002 +++ 92/02/21 15:46:13                                                                o

      1.  read  cblname.text                 * The CBLNAME used for CMS SELCOPY.
o     2.  print  TYPE=D   stopaft=2          * Using PAGEWIDTH as set in CBLNAME.                                                      o

o     INPUT   SEL SEL                                                                                                                  o
      RECNO   TOT ID.
      -----   --- ---
o         1     1   2            80                                                                                                    o
    0000  02C5E2C4 40404040 40400010 40400001   C3C2D3D5 C1D4C540 00000000 010001A0     *.ESD      ..  ..CBLNAME ........*
    0020  40404040 40404040 40404040 40404040   40404040 40404040 40404040 40404040     *                                *
o   0040  40404040 40404040 F0F0F0F0 F0F0F0F1                                           *        00000001                *          o
          2     2   2            80
    0000  02E3E7E3 40000000 40400038 40400001   C3C2D340 6040C299 89848785 958440E4     *.TXT ...  ..  ..CBL - Bridgend U*
o   0020  D2404DC9 95A38599 95819340 D69593A8   5D404040 40D7E6F0 F0F04097 A67EF040     *K (Internal Only)    PW000 pw=0 *          o
    0040  4DF1F3F2 5D404000 F0F0F0F0 F0F0F0F2                                           *(132)  .00000002                *

o SUMMARY..                                                                                                                          o
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
   ------      ------      ----     -------  -----           -----   --    ---
o     1            2 READ CBLNAME      80    80 F              11       CBLNAME.TEXT.A5                                             o
                                   *EOF*NOT*REACHED*
      2            2
o                                                                                                                                    o
  ***WARNING***                   4 = RETURN CODE FROM SELCOPY

o          ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **      o
                                                   ** EXPIRY DATE -- 2002/05/21 **
```

Figure 0. PRINT TYPE=D (Dump format with PW=133).

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)    (v86,w95)  2001/11/23 16:19   PAGE   1
o ------------------------------------------------------------------  ----------------   --------                                      o

o          * SMXTYD CTL H *              L=002 +++ 92/02/21 15:46:13                                                                o

      1.  read  cblname.text                 * The CBLNAME used for CMS SELCOPY.
o     2.  print  TYPE=D   stopaft=2          * Using PAGEWIDTH as set in CBLNAME.                                                      o

o     INPUT   SEL SEL                                                                                                                  o
      RECNO   TOT ID.
      -----   --- ---
o         1     1   2            80                                                                                                    o
    0000  02C5E2C4 40404040 40400010 40400001     *.ESD      ..  ..*
    0010  C3C2D3D5 C1D4C540 00000000 010001A0     *CBLNAME ........*
o   0020  40404040 40404040 40404040 40404040     *                *                                                                  o
    0030  40404040 40404040 40404040 40404040     *                *
    0040  40404040 40404040 F0F0F0F0 F0F0F0F1     *        00000001*
o         2     2   2            80                                                                                                    o
    0000  02E3E7E3 40000000 40400038 40400001     *.TXT ...  ..  ..*
    0010  C3C2D340 6040C299 89848785 958440E4     *CBL - Bridgend U*
o   0020  D2404DC9 95A38599 95819340 D69593A8     *K (Internal Only*                                                                  o
    0030  5D404040 404DA5F8 F66BA6F9 F55D4040     *)    (v86,w95)  *
    0040  40404040 40404000 F0F0F0F0 F0F0F0F2     *       .00000002*
o                                                                                                                                    o
  SUMMARY..
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
o  ------      ------      ----     -------  -----           -----   --    ---                                                        o
      1            2 READ CBLNAME      80    80 F              12       CBLNAME.TEXT.A1
                                   *EOF*NOT*REACHED*
o     2            2                                                                                                                    o

  ***WARNING***                   4 = RETURN CODE FROM SELCOPY
o                                                                                                                                    o
          ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 **
                                   ** EXPIRY DATE -- 2002/05/21 **
```

Figure 0. PRINT TYPE=D (Dump format with PW=95).

TYPE=DX (for Printing)

--- AS/400, UNIX, PC only ---

Same as **PRINT TYPE=D** print format, but printing only the Hex representation of the data. The Character representation, normally on the right of the Hex, is suppressed.

TYPE=H (for Printing)

Hexadecimal format gives printing of all data in hex.

The first line contains the zone digits of each character, the second line the numeric digits, and the third line is left blank. The counting guide is supplied.

100 characters of data therefore takes 3 lines assuming default **DATAWIDTH** of 100 bytes.

TYPE=M (for Printing)

TYPE=MC

For **AS/400, UNIX** and **PC**, TYPE=M is used for **TYPE=MP**.

Mixture of character format and hexadecimal format, giving greater **readability** and paper **economy**.
The space requirements are the same as for TYPE=H, but any printable characters will be printed on the first line, with a blank in the corresponding position on the second line.

TYPE=M and its synonym **TYPE=MC** will treat **lower case** alpha and certain special characters as printable. If **lower** case alpha is to be treated as unprintable then **TYPE=MP** should be used.

Unprintable data will be printed in TYPE=H, hexadecimal format. Very useful for printing variable length name and address files, or records with a small amount of hex data.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)    PW000 pw=0 (132)    (OS) VM/CMS=VM05      13.30 THU 29 NOV 2001    PAGE   1
o ----------------------------------------------------------------------                          ---------------------    -------- o

o          * SMXTYM CTL N *                  L=001 +++ 92/02/21 21:25:50                                                          o

       1.  read card   w 200
o                                                                                                                                  o
           if in gt 1
       2.    t print '           -----------------------'  times 3   * Sep lines.
o                                                                                                                                  o
       3.  print                         * Original data.
       4.  compress fr 1   to 101        * Some compressed data unprintable.
o      5.  print  TYPE=M   fr 101        * Will use the newly set LRECL.                                                          o

           end
o                                                                                                                                  o

      INPUT   SEL SEL                                                                                                  1  RECORD
o     RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH   o
      -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------
          1     1   3        DATA REC 1 ----- AAAAAAAAAAA ----- (L=71)      EEEEEEEEEENNNNDDD                                  80
o                                                                                                                                  o
          1     1   5 40DATA REC 1 D-0 CA0 D-0 (L=71)4IECNBD4F                                                                  40
                      6A             0 A 0   6       5      8E
o         2     1   2            -----------------------                                                                        80   o
          2     2   2            -----------------------                                                                        80
          2     3   2            -----------------------                                                                        80
o         2     2   3 2222222222          REC 2        THE LAST REC (L=66)       EEEEEND                                        80   o

          2     2   5 I240REC 241THE LAST REC (L=66)4DE0ND(F                                                                   38
o                       94     72                   6  1   E                                                                          o
                      ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0

o SUMMARY..                                                                                                                        o
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
   ------      ------      ----     -------  -----           -----   --    ---
o     1            2 READ SYSIN        80    80 U               2                                                                  o
      2            3
      3----5       2
o                                                                                                                                  o

           ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **
o                                                  ** EXPIRY DATE -- 2002/05/21 **                                                 o
```

Figure 0. PRINT TYPE=M (Mixed - Character and Hex).

TYPE=MP (for Printing)

For **AS/400, UNIX** and **PC**, TYPE=MP is treated as **TYPE=M**.

Mixed with **Packed** Decimal assumed for ambiguous data which could be lower case alpha, special characters or packed decimal data. Special characters that cannot be packed decimal data are printed.

Same format as **TYPE=M**, but lower case character data and special characters are printed in hex, rather than in character.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)    PW000 pw=0 (132)    (OS) VM/CMS=VM05      16.31 FRI 23 NOV 2001    PAGE   1
o ------------------------------------------------------------------------                          ---------------------    -------- o

o          * SMXTYMP CTL N *                L=002 +++ 92/02/22 09:22:57                                                          o

      1.  read  cblname.text                 * The CBLNAME used for CMS SELCOPY.
o     2.  print  TYPE=MP  stopaft=3                                                                                              o

o     INPUT   SEL SEL                                                                                                  1  RECORD     o
      RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH
      -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------
o                                                                                                                                o
          1     1   2 0ESD      01  00CBLNAME 0000000A                                        00000001                        80
                      2         00  01        00001010
o                                                                                                                                o
          2     2   2 0TXT 000  03  00CBL 6 B9888898 UK 4I9A89989 O99A5    PW000 9A=0 41325  000000002                        80
                      2    000  08  01    0  9947554    D 5359513  538D          76   D   D  0
o                                                                                                                                o
          3     3   2 0TXT 003  03  000000.6!00000DB2ACBLPLAN00000000000000000000000000000000000000003                        80
                      2    008  08  010000 1 00000            00000000000000000000000000000001
o                     ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0            o

  SUMMARY..
o  SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN                                                  o
   ------      ------      ----     -------  -----           -----   --    ---
      1             3 READ CBLNAME      80    80 F              11       CBLNAME.TEXT.A5
o                                  *EOF*NOT*REACHED*                                                                             o
      2             3

o ***WARNING***                   4 = RETURN CODE FROM SELCOPY                                                                  o

          ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **
o                                                  ** EXPIRY DATE -- 2002/05/21 **                                                o
```

Figure 0. PRINT TYPE=MP (Mixed - Predominantly Packed data).

TYPE=N (for Printing)

TYPE=N	**default** for **Mainframe PRINT**, and
TYPE=C	**default** for **AS/400, UNIX, PC PRINT**,
TYPE=S	**default** for **LOG** if TYPE omitted.

No conversion is applied. The record is printed in straight character format without a blank line separating records and number of characters per line dictated by the DATAWIDTH value (default 100).

A line of dots in the form:

```
....,....1....,....2....,
```

etc, length matching the **DATAWIDTH** value (default 100), is supplied at the top and bottom of each page of printed output as a **Counting Guide** for assistance in checking positions.

Because nothing is considered unprintable, data is passed unmodified to the printer, so variations depending on the printer hardware in its treatment of unprintable characters may occur. On most **mainframe** printers, this is acceptable.

However, it may be critical to some printers, in particular a printer attached to a **UNIX** or **PC** machine. Such a printer could be used for printing data produced either as a direct result of running UNIX or PC SELCOPY, or by running mainframe or AS/400 SELCOPY and porting the output listing into the UNIX or PC environment with **EBCDIC** to **ASCII** conversion.
In the latter case, additional code may be required to overwrite the unprintable data with blanks before printing, as illustrated in the example below.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)    PW000 pw=0 (132)    (OS) VM/CMS=VM05      16.41 FRI 23 NOV 2001    PAGE   1
o ------------------------------------------------------------------------                           ---------------------    -------- o


o          * SMXTYN CTL N *                L=010 +++ 92/02/22 12:13:53                                                                o

      1.     read  cblname.text
o                                                                                                                                      o
          ==loop==
            ----
o            if pos any  LT  x'40'      * Scan whole rec for an unprintable char.                                                      o
      2.       then pos @  = ' '         * Modify it to blank.
      3.       then goto loop
o                                                                                                                                      o
      4.     print                 * No TYPE coded - so default TYPE=N is used.

o                                                                                                                                      o
     INPUT   SEL SEL                                                                                                  1  RECORD
     RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH
o    -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------   o
         1     1   4  ESD            CBLNAME        È                                        00000001                          80
         2     2   4  TXT            CBL - Bridgend UK (Internal Only)    PW000 pw=0 (132)   00000002                          80
o        3     3   4  TXT                ./!     DB2ACBLPLAN0                                00000003                          80   o
         4     4   4  TXT   ×             ÿ    ¥¥                          ¥                 00000004                          80
         5     5   4  TXT   y                                                                 00000005                          80
o        6     6   4  TXT   \                                      SELCOPY                   00000006                          80   o
         7     7   4  TXT                                  SELCOPY.NAM                       00000007                          80
         8     8   4  TXT   &                                      jûl KJ¡        1902052100000008                          80
o        9     9   4  TXT   h        20020520*CBLNAME*<<END>>                                 00000009                          80   o
        10    10   4  END                          1569623400 010201291                      00000010                          80
                     ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0
o                                                                                                                                      o
  SUMMARY..
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
o  ------      ------      ----     -------  -----           -----   --    ---                                                      o
      1            10 READ CBLNAME      80    80 F              10       CBLNAME.TEXT.A5
      2----3      305
o     4            10                                                                                                                o


o          ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **        o
                                                  ** EXPIRY DATE -- 2002/05/21 **
```

Figure 0. PRINT TYPE=N (No Conversion - Mainframe Default).

TYPE=S (for Printing)

TYPE=S	**default** for **LOG** if TYPE omitted.
TYPE=N	**default** for **Mainframe PRINT**, and
TYPE=C	**default** for **AS/400, UNIX, PC PRINT**,

TYPE=S (System) printing will bypass all SELCOPY formatting and print a straight **133 byte** print line without preprocessing or translation.
i.e. SELCOPY generated headings and counting guides are **totally suppressed**.

LOG Output

TYPE=S for **LOG** output (this is **default)** to the operator's console or VM/CMS terminal, has a default line length equal to the current value of LRECL. However, the line length may be defined, up to a maximum of 133 bytes in **mainframe** environments, and without limit in **AS/400, UNIX** and **PC** environments, by using **LRECL=n** on the LOG statement.
A different **LRECL=n** may be coded on each **LOG** statement.
No **ASA** character is required for LOG output. If supplied it is logged as data.

PRINT Output

The **TYPE=S** print line length is always 133, and, for **mainframe printing only**, the first character of the line **MUST** be a valid printer control character.
For **MVS** users, this must be an **ASA** character.
For **VSE** users, it may be either an **ASA** control character or a **machine** control character.

PRINT TYPE=S LRECL=n will ignore the **LRECL=n** parameter.
If the input record is less than 133 bytes and, either work area is not specified or defined as being less than 133 bytes, then the length of the print line is equal to the **current LRECL** value.
Use **WORKLEN=n** with **"n"** greater than 133 to avoid this problem.
Note that, unless **REPORT HEAD** is coded, no page number is displayed for **TYPE=S PRINT**.

Mainframe ASA Control Characters

Valid codes are:

1	(one)	Skip	to top of page and print.
+	(plus)	Space 0	lines and print. (Used for overprinting)
b	(blank)	Space 1	line and print.
0	(zero)	Space 2	lines and print.
-	(minus)	Space 3	lines and print.

The **ASA** character is not modified by SELCOPY, but **valid ASA** chars are used to maintain SELCOPY's own internal line count, which may be tested with **IF LINE=n** or examined at **POS UXLINE**.
Invalid ASA characters are treated as blanks and the line count incremented by 1.

ASA character 0 for TYPE=S printing is not affected by the **NOASA0** option. i.e. 0 in position 1 of the TYPE=S print is not stripped nor is a blank line inserted before the data record.

Mainframe System Print Files

System print files, held on disk or tape, may be printed using SELCOPY with no modification to the original layout of the print records. The **TYPE=S** parameter will cause the printed output to appear to have come direct from the program(s) that originally put the information on the system print file.

SELCOPY will still however print its own control statements before printing the system print file, and at end-of-job will print its control totals, but either or both may be suppressed by use of **NOPRINT** or its equivalents.

```
READ TAPE10   RECFM=U     * A system print file on tape.
IF POS 1 = '1'            * ASA for new page ?
  THEN POS 1 = '-'        * Change to triple space and save paper.
PRINT   TYPE S
IF POS ANY = 'ERROR'
  THEN LOG   L=60   STOPAFT=30   FROM=2     * Default is TYPE S.
```

Converting Mainframe Machine Control Characters to ASA

SELCOPY uses **ASA Control Characters** for printing its control cards and summary report. Therefore, in an **MVS** environment, **RECFM=FA** is hard coded into the **DCB**, and may not be modified via JCL.

Unlike VSE, **MVS** will not accept a mixture of ASA and Machine Language control characters. If printer records containing Machine Language control characters are to be read from tape or disk and printed using SELCOPY's **TYPE=S** facility, they must first be converted to ASA format.

Refer to IBM's Reference Card for **Machine control character CCW codes**. (Described under **I/O Command Codes)**.

A simple approach would be:

```
     read xyz     w 444

     if pos 1 = x'89'              Skip to chan 1 after print.
       then pos 1 = x'40'
       then print ty s
       then goto topline

     if pos 1 = x'8b'              Skip to chan 1 immed (no print).
       then p 1,132 = ' '          Ensure data is all blanks.
  ==topline==
       then read xyz
       then pos 1 = x'f1'          ASA skip to chan 1 before print.
       then print ty s
       then gg

     pos 1 = x'40'                 Default to single spacing.
     print ty s
```

Similar code could be used for other M/c Language CCW codes.

UNIX

--- CMS, AS/400, UNIX, PC only ---

See also:

- SYSTEM in this section.

UNPK=n

See also:

- CVPC=n (Packed --> Char) in this section.

UNPKB=n

See also:

- CVBC=n (Binary --> Char) in this section.

UPD (Parameter) --- MVS, VSAM, DB2 only ---

See also:

- UPD fname (Operation Word) in this section.

```
READ  ABC KSDS     UPD
RD    MVSSEQ     UPD
RD    PDSIN   DIRDATA     UPD
READ  INTAB  TABLE='CBL.ADDRESS'  UPD='TELNO,PCODE'  DB2
```

For **VSAM**, **MVS QSAM**, **MVS DIRDATA** and **DB2** input, if a file is to be updated, using the **UPD** operation (the **DEL** or **INS** operations for VSAM), it is necessary to indicate update intentions by coding the **UPD** parameter on the first **READ** statement.

VSAM Inserts

If no actual input is required, and records are only to be inserted, but not in key sequence, a single **READ** operation is still required in order to code the parameter **UPD**, indicating update intentions. **STOPAFT=1** should therefore be used.

Note that **INSerts** which are made **in key sequence** are better (and considerably faster) if the **WRITE** statement is used instead of **INS**, and **no READ** statement used at all for that file.

CMS, AS/400, UNIX, PC and IMS/DL1

Files in these formats may also be updated, but the **UPD** parameter is not necessary. **CMS, AS/400, UNIX** and **PC** files are opened for update anyway, and **DL1** files are governed by the authority of the user as defined in the **PSB** used.

DB2

UPD for DB2 specifies, in standard SQL syntax, the object of the SQL **FOR UPDATE OF** clause. This is a list of column names separated by commas.
This is required if you want to update the current row with a subsequent **UPDATE** operation, in which case a **filename** is required to identify the SELECT statements.
Note that UPD is not permitted if the DB2 table is read-only or if the **SORT=** parameter has been specified.

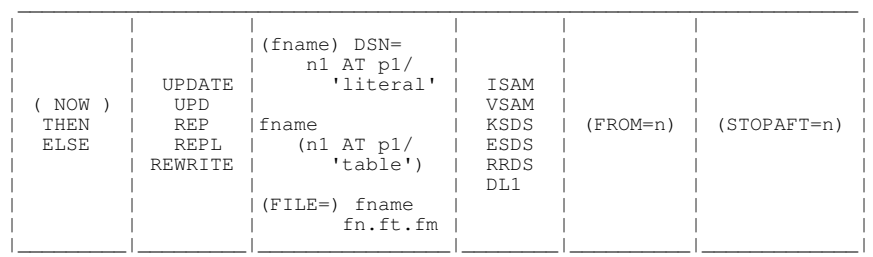
UPD fname (Operation Word)

UPDATE
REP
REPL
REWRITE

See also:

- UPD (Parameter) in this section.
- Section *VSAM Files*.
- Section *IMS and DL/1 Processing*.
- ISAM Update in section *ISAM Files*.

- UPDATE of Current Row in section *DB2 Processing*.



UPD as an operation word is supported for all SELCOPY input with the exception of **VSE SAM**.

The keywords **UPD, UPDATE, REP, REPL** and **REWRITE** are all synonyms meaning re-write the last record read from the stated filename. Thus you may replace a single record without the requirement to rewrite the whole file.

CMS and **MVS PDS** input read with **DIRDATA** may be updated, however files concatenated via the **CAT** statement may not. The following file types are supported:

- **CMS native** files.
- **VSAM** data sets (KSDS, ESDS or RRDS).
- **MVS sequential** data sets.
- **AS/400 IFS** and **Database FS** files.
- **UNIX** and **PC** files.
- **DIRDATA** input streams (data records only) for MVS, CMS and PC.
- **DL1/IMS** files.
- **DB2** tables.
- **ISAM** (Indexed Sequential) files.

For **VSAM** files, **DB2** tables, and **MVS** files the keyword **UPD** must be specified on the first **READ** statement that mentions the file, to indicate an intention to update the file. For all other supported input data, the keyword **UPD** is optional.

Note that it is necessary to tell SELCOPY that a file is a VSAM file once only, on the first mention of that file. And as a VSAM file must be read before it can be updated, it is **never necessary** to mention the keywords VSAM, KSDS, ESDS or RRDS on an UPDATE operation.

The **FROM** parameter may be used to cause data to be written back to the file from a position in the work area other than 1, and the **STOPAFT** parameter may also be used if required.

Length Modification on Update

This is only permitted on a VSAM **KSDS** file. You may use the LRECL=change facility before the update, **but beware** that the LRECL of the current record in storage is also changed by reading from a different file prior to the update.
If the LRECL of the current record exceeds the defined maximum for the **KSDS** file being updated, it is truncated to the maximum and a warning message given to indicate that **truncation occurred** and **Return Code 5** is set.

For all other files, the LRECL of the record **may not change**, so any LRECL change is ignored, and the original record length used for the update.

CMS Example: Consider a file, too large to be processed by a file editor, which requires all records with ':' in position 1 changed to '-'.

```
RD BIGFILE.DATA.D2
IF  P 1 = ':'
  T P 1 = '-'                          * Make the change.
  T UPD BIGFILE.DATA.D2                * Rewrite the record.
  T PR                                 * Print all updated recs.
  T WR  CHANGES.DATA.A1                * Also write a "Changes" file.
  T LOG   STOPAFT=4                    * Log 1st 4 for interest.
```

VSAM Example: A VSAM KSDS file is to have certain records flagged, always in position 27-39 of the record, and normally just a few records at a time, and the keys of the records to be updated are known, so it can be done interactively:

```
RD ABCFIL KSDS   UPD   W=9000   STOPAFT=1   * Dummy read.
LOG 'ENTER KEY TO UPDATE..'   REPLY=6 INTO 2000
IF P 2000 = 'QUIT  '
  T EOJ
RD ABCFIL KEY=6 AT 2000
IF P 1 = '--- KEY/REC NOT FOUND ---'
  T LOG                                * Tell user.
  T GG                                 * Goto Get (to 1st statement).
LOG         L 50   TYPE=C
LOG FR 51   L 50   TYPE=C
LOG 'Update above? Yes/No..'  REPLY 3 INTO 2010
UPPER   3 AT 2010                      * Force Upper case.
IF P 2010 = YES
```

```
T P 27 = '==FLAGGED=='
T UPD ABCFIL
```

UPPER

```
UPPER   80 AT 101                    * To upper case.
TRAN    80 AT 101    UPPER           * Identical to above.
UPPER  @BEG,@END       TO 401
```

The keyword **UPPER** may be used as a parameter on the **TRAN** statement or as an operation word in its own right, causing the field defined by the argument to be converted to **upper case**.

user-label

See also:

- GOTO GET/EOJ/CANCEL/user-label and DO user-label in this section.

UTIME

--- UNIX, PC only ---

See also:

- FILE=fileid in this section.

```
 ____________________________________________________________________________
|          |                          |                                       |
|          |   [ FILE = ]   fileid    |   [ FTIME = ]  'yyyy/mm/dd hh.MM.ss'  |
|  UTIME   |               n1 AT p1   |                     n2 AT p3          |
|          |                p1,p2     |                      p3,p4            |
|__________|__________________________|_______________________________________|
```

```
utime     file='SSUTIME2.tmp'     ftime='2000/12/29 00.33.22'
utime           SSUTIME2.tmp            '2000-12-29    00:33:22' * Extra blanks.
utime           SSUTIME2.tmp            '2000.12.29,00/33/22'
utime           SSUTIME2.tmp             2000/12/29...00:33:22   * No quotes.
```

The **UTIME** statement enables users of SELCOPY on UNIX and PC to **update the Timestamp** of a file. **UTIME** will record the same file timestamp for both the **Access** and **Modification** times.

If the timestamp update on a file fails or the file does not exist, then **RetCode=8** is set. Note that **POS RETSYS**, which reflects the last system return code, is not changed.

The fileid may be supplied in the same format as discussed in **FILE=fileid**.

The format of the timestamp must be in the International Date order, 'yyyy/mm/dd hh.MM.ss', but the punctuation may vary to suit the user or may be omitted altogether.
Any of the separator characters ".:/-, " (excluding the quotation marks) may be used, but beware that comma may only be used if the timestamp is enclosed in quotes. Additional separator characters may be used if preferred.

```
read card   fill  * Or some other file, possibly selcopy's DIR input.
if p 5 ne '/'
  t gg            * (Further selection or modification here perhaps.)
                  * (      e.g. Repairing GMT TZ problems.          )
if p 31,80 ne ' ' reverse ptr=@e      * Find end of filename. Must omit trailing blanks.
  then utime  31,@e      1,19         * Update the timestamp for this file.
end
* ..,....1....,....2....,....3....,....4..
* Reqd Timestamp.                On file.
2000/12/29 00:33:22           g:\abc\xxxxx\some.file
2001/02/09 01.20.38           g:\abc\xxxxx\some.other.file
2001/02/09 01.31.51           g:\abc\xxxxx\file3
```

Figure 0. UTIME Sample Job.

UXxxxxxx

See also:

- POS in this section.

VLEN --- DB2 only ---

See also:

- Section *DB2 Processing*.

```
READ  SQL='SELECT NAME,AGE,TEACHER FROM SCHOOL.ACORN_PRIMARY'  VLEN
```

Indicates that **VARCHAR** columns are to be returned with their 2 byte binary length prefixes. The maximum length is still returned, padded with blanks.

If **VLEN** and **PFX** are omitted, VARCHAR columns are placed in the work area in fields of maximum width, padded with blanks with no 2 byte length prefix.

VLEN is implied if parameter **PFX** is coded.

VOL=volser --- VSE only ---

```
READ ABC DSN='VSE.SAM.FILE'           VOL=SYSWK1   * File on SYSWK1.
READ     DSN='VSE.TAPE.FILE' DEV=TAPE VOL=TPEVOL   * Check Tape unit.
```

VOL indicates the **Volume Serial Number** of the volume holding your dataset for Dynamic Allocation.

For **disk**, this is a way of identifying the device, at the same time as verifying the Volume Serial No, thereby eliminating the requirement for a **DEV** or **SYS** parameter.

For **tape**, this serves only to verify that the correct tape has been mounted by the operator on the dynamically assigned tape drive. **DEV=TAPE** must still be coded.

VSAM --- VSAM only ---

```
READ  ABC   VSAM
WRITE XYZ   VSAM
```

Indicates that the file is of **VSAM** organisation, and is the exact equivalent of saying that the file is a **KSDS**.

MVS environment

This parameter may be omitted altogether and SELCOPY will recognise the file as a VSAM file of the correct type (KSDS/ESDS/RRDS) from the JFCB.
Exceptions to this are: when the VSAM file is using **Local Shared Resources**, or when proprietary software is used to simulate **VSAM**.

VSE environment

SELCOPY first assumes that it is a **KSDS**, and opens it as such. Failure to open results in SELCOPY re-trying the open as an **ESDS** and finally as an **RRDS**.
Error messages on the operator's console are issued by the Operating System for each erroneous assumption. Thus an RRDS would cause two error messages before the third assumption proved correct.
If the **VSAM** file organization type is known, then the keywords **KSDS, ESDS** or **RRDS** should be used instead, thereby eliminating such error messages.

VTOC

--- Mainframe only ---

```
READ ABC   VTOC SYS=12
READ VTOC SYS 4
```

Users who have the program package, **CBLVCAT**, may interface with it via SELCOPY in order to read **VTOC** entries on their disks.

The length of each VTOC entry returned is **140 bytes**.
The first **44 bytes** are the key portion, i.e. the file-id or DSN (data set name), and the remaining **96 bytes** are the data portion of the VTOC record.

All **VTOC** entries are returned, including Format 4, 5 and 6, and unused entries, which have X'04', X'05', X'06' and X'00' in POS 1 respectively.
A typical job to print all active user entries would therefore be:

```
RD VTOC   SYS=3
IF POS 1 GT X'06'
  THEN PRINT   TYPE=B
```

VSE Systems

No DLBL or EXTENT card is required because the **SYS** parameter indicates a logical unit which must be assigned to the disk whose VTOC is to be read. The argument of the SYS parameter must be numeric.
If the SYS parameter is omitted, SYS=0 is assumed, thereby causing the logical unit SYS000 to be accessed.

MVS Systems

The **SYS** parameter is redundant, but it is necessary to provide a **DD card** in the JCL, referencing the disk Volume, for the file name used. e.g.

```
READ ABC   VTOC
PRINT TYPE=M   STOPAFT=20
```

Both VSE and MVS

If the filename used has **VTOC** as the first four characters, the VTOC parameter may be omitted. e.g.

```
READ VTOC27         * Reads MVS VTOC using DD name VTOC27.
READ VTOCFIL  SYS 4 * Reads VSE VTOC using SYS004.
```

Several VTOCs may be combined using the **CAT** statement to concatenate them together, allowing useful scans through online volumes. e.g.

```
READ VTOC1    !CAT VTOC2    !CAT VTOC3
 CAT VTOC4    !CAT VTOC5
IF P 1,44 = 'MY.FILES'     !THEN PRINT   L=100   TYPE=M
```

WHERE=where-clause

--- DB2 only ---

SEARCH=
SRCH=

See also:

- Section *DB2 Processing*.

```
READ  FIXES  TAB='CBL.SUPPORT'  WHERE="PROBLEM LIKE 'ERR%'"

READ   TAB="CBL.CONTACTS"    FMT="CUSTKEY,PERSONNEL"   CHAR  \
     WHERE="CUSTKEY IN (SELECT CUSTKEY FROM CBL.CUSTOMERS    \
                               WHERE COUNTRY = 'USA')"
```

Specifies, in standard SQL syntax, the **WHERE** clause to be applied to this SELECT. If **WHERE=** is omitted no restriction is placed on the rows selected.

WORKLEN=n

W=n

```
OPTION     WORKLEN=22000     FILL=X'00'
READ ABC   LRECL=123   WORKLEN=2000
RD CARD   W 444
```

WORKLEN is optional and may be omitted.

On AS/400, UNIX and PC systems, where no WORKLEN or input data fileid is specified, a default work area of 80 blanks is implied.

The **WORKLEN** parameter can only be used once within any SELCOPY execution. Its recommended place is on an **OPTION** statement, placed before the first **READ** statement. Alternatively, **WORKLEN** may be coded on the first **READ** statement itself.

The **WORKLEN** argument, **n**, defines the length of the work area in which input records are to be processed. By default, it is **initialised to blanks** by SELCOPY, but can be initialised to be filled with any single character by coding **FILL=x** on the **OPTION** statement.

Maximum value is 2,147,483,647 decimal, or the amount of available storage from the environment in which SELCOPY is being executed. On **PC/DOS** systems, the maximum value is 65488 decimal.
Note that **WORKLEN** also has a **minimum value**. You will get an error message if SELCOPY finds that the length of your requested work area is not greater than the value defined or assumed for input **LRECL**.

WORKLEN enables the user to manipulate records within the work area, possibly building a larger record for output, or storing information from the current record for use subsequently.

Records read from different files may be read **INTO** different positions in the work area, thus allowing you to compare data from different files.

```
READ CARD       W 1234
READ ABCD     INTO 101
IF  P 1  <>  P 101  LEN 6       * If keys not equal.
```

If WORKLEN **is omitted**, no work area is used, so input records are processed in their own **I/O buffers**. POS 1 will therefore always refer to position 1 of the current input record (from the file last read in). You will have no way of referencing POS 1 of the previous record read from some other file, or from any file which has reached **EOF**.

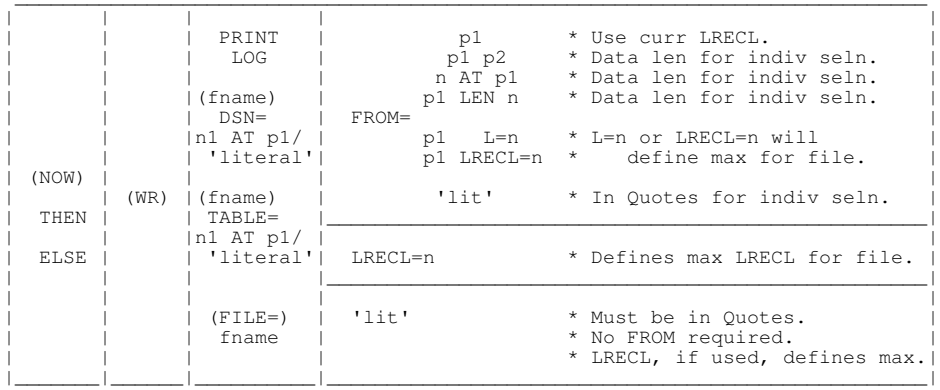
It is reasonable therefore to suggest that, if you have **more than one** input file, or use **IF EOF** processing, it is **worth having a work area**.

WRITE fname

PUT
OUT
WR
OT

See also:

- DSN= and GOTO GET/EOJ/CANCEL/user-label in this section.
- Dynamic Allocation in section *Further Information*.
- Section *DB2 Processing*.




```
WRITE XYZ   LRECL 397   BLKSIZE 3970
WR    OUTDD DSN='MVS.PDS.LIB(PDSMEM  )'
THEN  WRITE DSN='VSE.KSDS.FILE'  CAT=UCAT1             * VSAM assumed.
THEN  WRITE CDEF DSN=20 AT 101  FROM 201  LRECL=133  RECFM=F
```

```
THEN  WRITE PQRST  VSAM   FROM 2800   REUSE   PASS=PURGE
ELSE  WRITE FILE=ABC     FROM 201,280   RECFM=VB   B=4096
```

Strictly speaking, **WRITE** is a parameter on the **NOW, THEN** or **ELSE** Operation Words, but becomes an Operation Word itself when the redundant word **NOW** is omitted.

WRITE causes a record to be written to a named **output** file. Therefore, WRITE **must** be followed by a **file name** except in the following circumstances where file name may be implied:
Dynamic Allocation (DSN=)
DB2 table reference (TABLE=)

File Names

Certain file **keywords** have special meanings. These are fully discussed under the parameter description for **FILE**. They are:

```
LOG   PRINT   PUNCH   TAPEnn              * Special files.

Fn.Ft.Fm                                  * CMS file.

Fileid                                    * AS/400, UNIX or PC file.

DUMMY   JECL   START   STOP   SUSP        * (Logical files.)
```

A numeric filename **#nnn** or **nnn** may be used for **IMS**/**DL1** or **ADABAS** files. Please refer to appropriate section for this and special parameters supported for **IMS**/**DL1** or **ADABAS** files.

Dynamic Allocation

An alternative way of defining the filename on the **WRITE** statement is via Dynamic Allocation.
Referencing the full data set name for the required SAM/VSAM file, either as a **literal** or as a **variable** at a specified position in the workarea, removes the necessity to supply an MVS DD card, CMS FILEDEF or VSE DLBL and assignment.

On VSE, it is not possible to use Dynamic Allocation to **WRITE** to a SAM file on disk. However, Dynamic Allocation may be used to write a SAM file to **TAPE** (via **DEV=TAPE** and, optionally, the **VOL** and **SYS** parameters).

UNIX File Permissions

Output files from SELCOPY have permissions **-rw-rw-rw-** which the user may further restrict by use of the UNIX command **umask**.

Note that if the output file already exists, then the existing permissions are kept, regardless of the **umask** setting. If this is not required, then erase the file first.

DB2

WRITE is a synonym for DB2 **INSERT** of rows into a DB2 table. It is the responsiblity of the user to ensure that the workarea contains data in a suitable format.

Optional Parameters

Parameters allowed on the **WRITE** statement, all of which are enclosed in brackets indicating **optional**, are:

```
         'lit'
(FROM= p1(,p2) )  (LRECL=n/V/U)  (WTO=YES)  (TIMES=n)
       n AT p1
                      (STOPAFT=n)  ('lit')  (DEFER)

(CAT=vsamcat)                           * Dynamic alloc \
(VOL=volser)                            * Dynamic alloc  > VSE only.
(DEV=cuu/TAPE)   (SYS=nnn)              * Dynamic alloc /

(BLKSIZE=n)  (RECFM=F/V/U/FB/VB/V2)     * Tape/Disk only.
(FILL=c)   (NEWBLK=YES)                 * Tape/Disk only.

(ISAM)    (KEYLEN=n)                    * ISAM only.
(CYLOFL=n)  (MSTIND=YES)                * ISAM only.
(KEYPOS=p)                              * Blocked ISAM only.
(KEYFROM=p)                             * Unblocked ISAM only.

(VSAM/KSDS/ESDS/RRDS)                   * VSAM only.
(REUSE)     (PASS=string)               * VSAM only.

(TYPE=N/C/H/M/B/D/S)                    * PRINT/LOG only.
(PAGEDEPTH=n)                           * PRINT     only.
(REPLY=n (INTO=p))                      * LOG only.

(APPEND)   (TRUNC/NOTRUNC)              * CMS only.
```

```
(CLEAR)                                 * CMS only with LOG.

(BDW/NOBDW)                             * AS/400, UNIX and PC only.

(OPEN=RWD/NORWD)      (LABEL=NO)        * Tape only \
(CLOSE=RWD/NORWD/UNLD)  (LTM=YES)       * Tape only  \
(DEV=device/TAPE)                       * Disk/Tape   > VSE only.
(SYS=n)                                 * VTOC/Tape  /
(FAIL=NOCLOSE)                          * Tape/Disk /
```

WRITE is the **default operation** and the word **WRITE** may be omitted altogether. Any unrecognised word is treated as an output file unless it is a single word in which case it is treated as a **user-label**. Thus:

```
          ABC LRECL=80        * Is an implied   WRITE to file   ABC.
```

The above statement causes 1 record to be written to the file called ABC, taking the data for the record from position 1 of the work area or current input area.
The presence of **LRECL=80** is sufficient to prevent **ABC** being treated as a user-label.

The word **ABC** on its own however would **not** be treated as an output file name, but as a **user-label**.
The **GOTO user-label** operation discusses **exceptions** to the single word user-label rule. **Exceptions** resulting in **WRITE file** operations are:
DUMMY LOG PLOG PR PRINT PRT PUNCH and **WTO**.

WTO (Operation Word)

WTO, Write To Operator, is a synonym for **LOG** which logs data to the user's own terminal or the Operator's Console, with or without a **REPLY**.

Please refer to the discussion under **FILE=LOG**.

WTO (Parameter)

See also:

- FILE=LOG in this section.

```
READ TAPE15   RECFM V   LRECL 333   WTO
```

The **WTO** (Write To Operator) parameter indicates that, at **end-of-job**, the input or output record total **for that file** (from all selections) is to be printed on the **operator's console**, together with jobname, date and time.
On **CMS**, **AS/400, UNIX** and **PC**, the information will be displayed on the user's terminal.

WTO may be used on any statement causing file input or output, and may be coded on as many different files as required. A message to the operator will be issued for each different file.

If **WTO** is coded on several statements all referring to the same file, the effect is exactly the same as if coded on any one only.

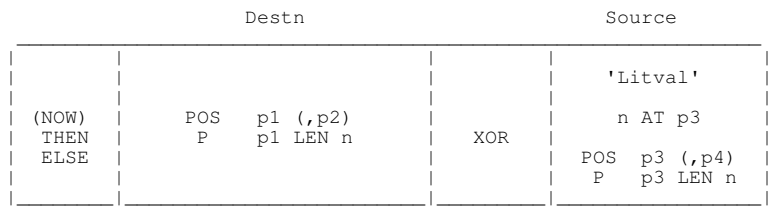
If omitted, the default is that no total is displayed for the operator, but this information is of course available in the Selection Summary on printer output as normal.

WTO=YES may be coded as a synonym for **WTO**.

XOR='string'

See also:

- Bit Modification - OR/XOR/AND in section *Further Information*.



Arguments p1, p2 etc and n are supported also as @ and @user pointer values or Position Keywords.

```
POS 999   XOR   X'FF,FF,FF'        * Reverse all bits.
THEN POS 67  XOR  X'80'            * Reverse first bit of pos 67.
ELSE POS 67  XOR  POS 300 LEN 6    * XOR with data in workarea.
```

Data in the record/work area is logically **XOR'ed** with the string. This is the **EXCLUSIVE OR** function which will cause modification to the record data such that bits in the record corresponding to '1' bits in the 'string' will be **reversed**, thereby changing '1' bits to zeros, and '0' bits to ones.
This is an excellent way to **flick a switch setting** if you do not know which way it is currently set.

Bits in the data corresponding to '0' bits in the 'string' will remain unchanged.

XV func

--- Mainframe only ---

See also:

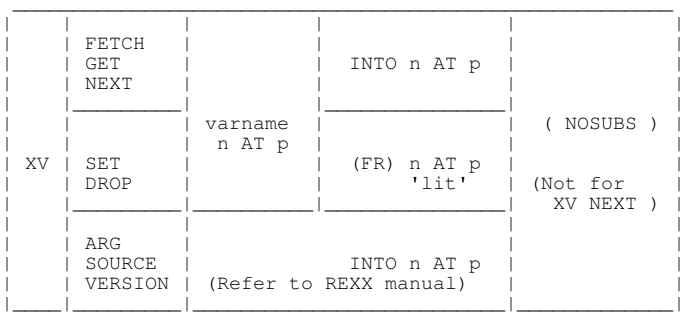
- XV - Transfer Variable in section *VM/CMS Processing*.

```
XV       FETCH   USERVAR    INTO 20 AT 1001
THEN XV  SET     USERVAR2    'ABC'
XV       NEXT    10 AT 1    INTO 30 AT 11
```

The SELCOPY user may **transfer variables** (allowing inspection and **modification)**, between the SELCOPY workarea and the controlling procedure using the **XV** statement.

If maximum lengths are exceeded for **setting** variables then **ERROR 563** is issued. Any length may be used for **getting** variables from the calling environment and blanks are used for padding.

For CMS

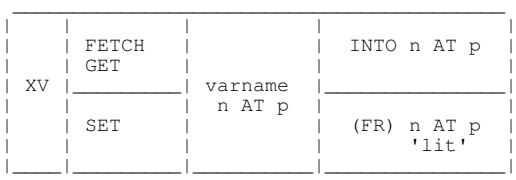


XV gives the ability to inspect and **modify** the contents of a **REXX** variable such as **USERVAR**, or an **EXEC2** variable such as **&USERVAR2**, (where the **& prefix must be omitted)**, but **not EXEC1** variables. **Maximum** lengths: variable **name 31**, **value 32767**. e.g.

```
XV GET PARAM6 INTO 20 AT 201                  * Get value of PARAM6.
XV SET SELCRESULT FR 128 AT 2000              * Set variable for EXEC.
XV SET 10 AT 1 FR 4 AT 222 NOSUBS             * Set variable for REXX.
```

By default, SELCOPY uses the **Symbolic Interface** for setting, dropping and retrieving REXX variables. Coding **NOSUBS** on XV causes SELCOPY to set, drop or retrieve REXX variables using the **Direct Interface**.

For VSE



The **XV** functions **GET** (synonym **FETCH)** and **SET** only are available.

GET allows access, within a SELCOPY run, to **symbolic parameters** set in the preceding **JCL** with VSE's // **SETPARM** statement. e.g.

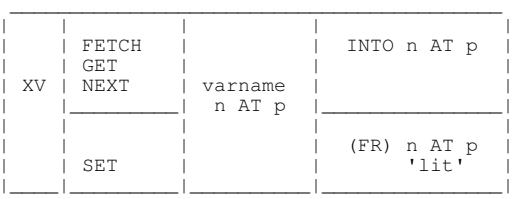
```
// SETPARM USERVAR=ABC,UVAR2='2nd Parm - #2'  * In preceding JCL.
XV GET USERVAR  INTO 20 AT 200                * GET into SELCOPY storage.
```

SET enables a SELCOPY run to create or assign new values to VSE's **symbolic parameters**, which may then be tested in subsequent **JCL** with VSE's // **IF** statement.

```
XV SET USERVAR = 'ABC'                    * Set it in SELCOPY run.
// IF USERVAR EQ ABC                      * Test in JCL.
```

If used, the **NOSUBS** parameter is ignored. **Maximum** lengths: variable **name 07**, **value 50**.

For MVS



Running under **TSO** from a **CLIST** or **REXX** exec, the **XV** functions **FETCH** (synonym **GET)**, **SET** and **NEXT** are supported. Thus, a SELCOPY run may inspect, change or create variables within a **CLIST** or **REXX** exec. If used, the **NOSUBS** parameter is ignored. **Maximum** lengths: variable **name 254**, **value 255**.

Example

The following example, **SSXVM03**, illustrates the **SET** and **NEXT** functions. The **SSXVM03** SELCOPY control statements could be run from a **CLIST** under **TSO**, or from a **REXX** exec under **CMS** or **TSO**. Here, it is run under **TSO** by invoking the **S** clist, at TSO's **READY** prompt, with the single argument, **SSXVM03**, indicating the member name of the control card file. **S** directs **SYSPRINT** to the terminal. **S** and **XVDEMO**, which is similar to SSXVM03, are supplied with the distribution material.

The **PAGE 2** heading, some blank lines and some output lines have been deleted from the report to save space. **(PAGEWIDTH=80** is set in **CBLNAME.)**

```
 READY
S SSXVM03
 SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal)     2001/11/12 13:31   PAGE   1
 ------------------------------------------------     ----------------   --------


          ** SSXVM03 CTL N ***     L=007 --- 2001/11/12 13:30:38  (P24)
                          * XV for MVS - FETCH NEXT
            opt w 222 *            ....,....1... ....,....1....,....2

      1.    p 1 = 'CLIST var NEXT |<--varname-->|<------varval------>|'
                 * ....,....1....,....2....,....3....,....4....,....5.

      2.    p 52 = ' RetCode (Hex) |'
                 *  ...,....6....,....7....,....8....,....9....,....0
      3.    pr                                * Print heading.
      4.    p  1,15 = ' '
      5.                     p 52,66 = ' '

      6.    xv set    xv02   'Var set by XV.'    * Set the var XV02.
      7.    xv set    xvtst  'Testing'           * Set the var XVTST.


          ==loop==
            ----
      8.    xv next   17,29    into 31,50        * Get next CLIST/Rexx var.
      9.    cvbc  4 at retxv    to 55   fmt zzz  * Full zero suppress reqd.

            if p 17,29 = ' ' fill ' '            * If Var Name is all blank.
                           * FILL reqd here to prevent treating as a "Range Test".
     10.      t p 10 = '=EOF='
     11.      l p 10 = '     '

     12.    pr
     13.  goto loop s  83
             * Automatic EOJ when we fall through to here.


     INPUT   SEL SEL
     RECNO   TOT ID.          1         2         3         4         5         6         7
     -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0
         0     1   3 CLIST var NEXT |<--varname-->|<------varval------>| RetCode (Hex) |
         0     1  12                |INCTL        |SSXVM03              |               |
         0     2  12                |OUT          |                     |               |
         0     3  12                |XV02         |Var set by XV.       |               |
         0     4  12                |XVTST        |Testing              |               |
         0     5  12                |SYSISPF      |                     |     8         |
         0     6  12                |SYSDLM       |0                    |    16         |
         0     7  12                |DATATYPE     |                     |     8         |
         0     8  12                |SYSLC        |                     |     8         |
         0     9  12                |SYSUID       |NBJ2                 |    16         |
                                        -- Output Lines 10-71 removed ---
         0    72  12                |SYSCONLIST   |OFF                  |               |
         0    73  12                |SYSSYMLIST   |OFF                  |               |
         0    74  12          =EOF= |             |                     |    20         |
         0    75  12                |INCTL        |SSXVM03              |               |
         0    76  12                |OUT          |                     |               |
         0    77  12                |XV02         |Var set by XV.       |               |
         0    78  12                |XVTST        |Testing              |               |
         0    79  12                |SYSISPF      |                     |     8         |
         0    80  12                |SYSDLM       |0                    |    16         |
         0    81  12                |DATATYPE     |                     |     8         |
         0    82  12                |SYSLC        |                     |     8         |
         0    83  12                |SYSUID       |NBJ2                 |    16         |
         0    84  12                |SYSPROC      |ISPFPROC             |    16         |
                    ....,....1....,....2....,....3....,....4....,....5....,....6....,....7

 SUMMARY..
  SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
  ------      ------      ----     -------  -----           -----   --    ---
     1----7        1
\/\/\/
```

accordingly, as on previous releases. Note that fields to the right of the 2nd date field in the VSE directory record, the **creation date**, will be shifted left by 4 bytes.

On an **OPTION** statement Y2 will force use of a 2-digit year on all subsequent use of **DIR** input.
On a **READ** statement Y2 will force use of a 2-digit year for that logical file only.

If specified on an OPTION statement in **SELCNAM**, then it will become the systemwide default.

Option Y4

Y4 (the **default)** forces use of a 4-digit year for formatted dates on **DIR** input. It should only ever be required if **Y2** is set via an OPTION statement in **SELCNAM**.

ZEROS='string'

ZEROES=

See also:

- Bit Testing - ON/OFF/MIXED in section *Further Information*.

```
IF POS @+19   ZEROS X'30'
AND POS 909   ZEROS=X'0C0C,0C0C'
OR POS 909   ZEROS   POS 3000 LENGTH 4
```

ZEROS is used for **testing a "bit"** or combination of **bits** for zero.
(Use the **AND** logical operator for **setting** bits to zero.)

Data at the specified position will be tested against the argument. The condition is satisfied if there are **zeros** in the data corresponding to **ones** in the argument.
A little confusing at first, but remember: Code **1's in the argument** for the **bits you want tested**.

The above **IF** statement tests a single byte for having bits 2 and 3 both off, i.e. the 3rd and 4th. **(EBCDIC** letters A to I, a to i and **ASCII** letters A to O all satisfy this condition.)

The **AND statement** tests 4 bytes. Each must have bits 4 and 5 off, i.e. the 5th and 6th bits of each byte must be zero. **(EBCDIC** Numerics 0 to 3, letters A to C, J to L, S and T, and **ASCII** Numerics 0 to 3, letters A to C, P to S, a to c, p to s all satisfy this condition, as well as certain special characters.)

The **OR statement** is dependent on data at pos 3000, and is therefore variable.

Further Information

This Section gathers together the smaller topics of further information, and is split under the following headings:

Information on larger topics are given sections of their own.

These are: **VSAM, IMS, DL1, DB2, ADABAS, AS/400, UNIX & PC** and **CMS**.

Nesting of Operation Words

The **THENIF** and **ELSEIF** statements may be nested to a level not exceeding 64 at any one point.

```
IF    condition 1
AND   condition 2
AND   condition 3
   THENIF   condition 4            (Action if 1 2 and 3 all true)
       OR   condition 5
       OR   condition 6
          THEN                     (Action if any of 4 5 6 is true)
          THEN                     ( " )
          THEN                     ( " )
          THENIF    condition  7   ( " )
              AND   condition  8
              AND   condition  9
              OR    condition 10
                 THEN              (Action if 7, 8 and 9 all true,)
                                (       or 10 is true.         )

                 ELSEIF    condition 11
                                (Action for 7-10 failure)
                     AND   condition 12
                        THEN       (Action if  11 & 12 both true)

                        ELSE       (Action for 11 or 12 failure)
                        THEN       ( " )
                        THEN       ( " )

          ELSE   (Action for 4 5 & 6 failure, but 1 2 & 3 success)
          THEN   ( " )

   ELSE          (Action for 1 2 or 3 failure)
   THEN          ( " )
   THEN          ( " )
```

Please ensure that each **ELSE** is matched with the **required IF**, using **ELSE DUMMY** where appropriate.

Abbreviations and Synonyms

For the SELCOPY user who frequently keys in his own control statements, uses them, and then discards them because there are not enough to justify filing, the following abbreviations are supported.
Abbreviated and full length keywords may be mixed at will.

Abbrev/ Synonym	Full Name	Abbrev/ Synonym	Full Name	Abbrev/ Synonym	Full Name
A	AND	IN	READ	PGNO	UXPGNO
ADA	ADABAS	IN=	INCOUNT=	PK=	PACK=
APP	APPEND	INDEXED	ISAM	POS=*	POS @
ASSGN	MOD	INPUT	READ	POS=L	POS=LRECL
B=	BLKSIZE=	INS	INSERT	PR	PRINT
BLK=	BLKSIZE=	IS	ISAM	PRT	PRINT
CARD	PUNCH	ISRT	INSERT	PUT	WRITE
CL=	CLOSE=	ISN	REC	PW=	PAGEWIDTH=
CMS	SYSTEM	IX	ISAM	QUIT	CANCEL
CO=	CYLOFL=	KEQ=	KEY=	R	REPORT
COMRG	COMREG	KEYLOC=	KEYPOS=	RANDOM	GEN
CVA	CVEA=	KF=	KEYFROM=	RD	READ
CVB	CVPB=	KL=	KEYLEN=	REC=	INCOUNT=

CVD	CVBP=	KP=	KEYPOS=	RECSIZE	LRECL
CVE	CVAE=	L	ELSE	REP	UPDATE
CVH	CVCH=	L I	ELSEIF	REPL	UPDATE
DCTY	DIR	L=	LRECL/LENGTH	RESET	REUSE
DD	DIRDATA	LEAVE	NORWD	RET	RETURN
DELET	DELETE	LEN=	LENGTH=	RETCD	RETCODE
DEV=	DEVICE=	LET=	MOD=	RETXV	RETCMS
DIRD	DIRDATA	LI	ELSEIF	REWRITE	UPDATE
DIRECTORY	DIR	LO=	GE=	RKP=n	KEYPOS=n+1
DL/1	DL1	LOW=	GE=	S=	STOPAFT=
DL/I	DL1	MI=	MSTIND=	SEQ=	SORT=
DLET	DELETE	N	NOW	SRCH=	SEARCH=
DLI	DL1	NGT	LE	START	STARTKEY
DOS	SYSTEM	NL	LABEL=NO	STARTISN	STARTREC
E	END	NLT	GE	STOP=	STOPAFT=
EL	ELSE	NOLAB	LABEL=NO	STOP	EOJ
ELSE IF	ELSEIF	NOLABEL	LABEL=NO	SYNC	CHKP
EOD	EODISK	NOREW	NORWD	SYSLOG	LOG
EOJ	GOTO EOJ	NOT	NE	SYSPUNCH	PUNCH
EOM	EOMEMB	O	OR	T	THEN
EQ=	EXACT=	OP=	OPEN=	T I	THENIF
EX=	EQ=	OPT	OPTION	TAB=	TABLE=
EXACT=	EQ=	OPTIONS	OPTION	TABS=	TAB=
F=	FILE=	ORDER=	SORT=	TH	THEN
FMAT=	FORMAT=	OT	WRITE	THEN IF	THENIF
FMT=	FORMAT=	OUT	WRITE	TI	THENIF
FR=	FROM=	OUTPUT	WRITE	TY=	TYPE=
GENERATE	GEN	OUTPUT	WRITE	UNIX	SYSTEM
GET	READ	OUTPUT	WRITE	UNPK	CVPC=
H=	HEAD=	P=	POS=	UNPKB	CVBC=
HD=	HEAD=	PAD=	FILL=	UPD	UPDATE
HI=	LE=	PASS=	PASSWORD=	W=	WORKLEN=
HIGH=	LE=	PASSWD=	PASSWORD=	WHERE=	SEARCH=
I	IF	PD=	PAGEDEPTH=	WR	WRITE
IMS	DL1	PERFORM	DO	WTO	LOG
				ZEROES	ZEROS

Comment Data

* Comments

An asterisk (ECDIC X'5C', ASCII X'2A') in position 1, or in any position which is preceded by a blank and is not enclosed in quotes, defines the start of comment data. The sequence field at the end of the statement defines the end of the comment.

Comment data is ignored by SELCOPY for syntax purposes.

*< Comments Ignoring Sep Character

Any control statement which has an asterisk in **position 1** and a **less than** sign in position 2 (***<** in positions **1,2)** is considered to be wholly comment.

Any **separator** character is ignored, thus multi-statement lines may be commented out with a single change.

*> Comments in Selection Summary

All comment data must commence with an asterisk. However, comments on **action** statements which do not cause file I/O are subject to further inspection.

If the next character is a **greater than** sign, then that comment is stored and reproduced on the **Selection Summary** for that selection id, thus the statement:

```
          THEN P 20 = XYZ    *>Comment data
```

would therefore have the text **Comment data** printed on the summary against that selection id.
An *> comment may be used on a **THEN DUMMY** statement.

Separator Character

To avoid using a whole card for just one SELCOPY statement, a **separator character** is defined to indicate logical end of the SELCOPY control statement. Other logical SELCOPY control statements may then follow on the same physical record.

The separator character is not taken to be part of the record, and is not printed. It is only effective on control cards, and then only on control card data that is **not in quotes**. Data cards remain unchanged.

The **default** separator character is taken from CBLNAME or SELCNAM which are distributed with an **Exclamation Mark** (EBCDIC X'5A', ASCII X'21') as the SEP character, but it must of course be used in character form. e.g.

```
IF P 8 = X'5A'   !THEN GOTO GET
```

will produce:

```
IF P 8 = X'5A'
                  THEN GOTO GET
```

Note that the CBLNAME/SELCNAM **default** may have been **changed** at your installation.

The **SEP** parameter on the **OPTION** statement may be used to temporarily overrule the Separator Character.
If **SEP=OFF** or **SEP=NO** is coded, no check will be made for a separator character.

Continuation Character

Sometimes, it is not possible to fit an entire SELCOPY control statement on a single physical record. To overcome this, the **continuation** character is defined to concatenate consequtive physical records.
Note, however, that in **AS/400, UNIX** and **PC** SELCOPY only, the sum of the lengths of the concatenated statements is limited to the maximum length of a single logical control statement (i.e. 512 bytes).

The continuation character is not taken to be part of the record, and is not printed. It is only effective on control cards, data cards remaining unchanged.

The continuation character is a backslash '\' (EBCDIC X'E0', ASCII X'5C') as the **last character** of a control statement.
Position 1 of the subsequent physical record replaces the continuation character. This process of concatenation is repeated until a physical record is read with no continuation character.

Concatenation of control statements takes place before syntax analysis. This means that continuation characters can be freely inserted at any convenient point in a **long** SELCOPY control statement, including inside literal strings.

Note that coding the continuation character following comment data will continue the comment onto the next record.

Redundant = Sign

The equals sign used to link a parameter with its associated argument is **optional**. For control card syntax purposes, an **equals sign is treated as blank**, in the same way as a comma. Thus the following statements are all valid, and all mean the same thing.

```
IF POS=6,NOT=ABC
IF POS=6 NOT=ABC
IF POS 6   NOT ABC
IF POS = 6   NOT = 'ABC'
IF P 6 NE ABC
```

The **exception** to this is when using the obsolete **asterisk notation** for the @ pointer.

For compatability with old releases, if * is preceded by = then it is not treated as the start of a comment field.

```
IF POS ANY = ABC
  THEN POS=* = XYZ              * valid *
  THEN POS '*' = XYZ            * valid *
  THEN POS @   = XYZ            * valid *
  THEN POS * = XYZ              ** Invalid **

IF POS ANY   XYZ                * valid, Equality assumed *
```

Redundant FILE=

A **READ** or **WRITE** card referencing a file, **does not need** the keyword FILE= or F= provided that the filename used is not also a SELCOPY keyword.

```
READ FILE=XYZ                   * valid *
READ XYZ                        * valid *
READ FILE=FILE                  * valid *
READ FILE                       ** Invalid **

WRITE FILE PQR BLKSIZE 200      * valid *
WRITE PQR BLKSIZE 200           * valid *
WRITE FILE GOTO                 * valid *
WRITE GOTO                      ** Invalid **
```

Redundant NOW

The word **NOW** on an **unconditional statement** may be omitted, provided there is no ambiguity as to whether or not it is a label.

```
NOW WRITE ABC   LRECL 100     * valid, but   NOW unnecessary.
WRITE ABC   LRECL 100         * valid
ABC   LRECL 100               * valid
WRITE ABC                     * valid
WR ABC                        * valid
ABC                             * ABC treated as a label.

MOVE 10 FR 20 TO 50           * valid
GOTO GET                      * valid
```

To fully eliminate the use of **NOW**, and avoid label ambiguity, always precede output file names with **WRITE** or **WR**.

Comparison Operators

See also:

- Section *IMS and DL/1 Processing*.

In particular, the HI= and LOW= parameters have always caused confusion. They are still supported for compatability with earlier releases, but it is recommended that you use GT and LT in preference.

With the exception of the "bit" testing operators, all Operators mentioned here may also be used as the Relational Operator for DL1/IMS which you may supply as a Qualifier for your DL1 request.

Below is a complete list of all "Operators" available for comparison operations within SELCOPY. They may be mixed and interchanged as preferred.

```
EQ     EX    EXACT   =         * Equal to.   (This is default)
                               * May be omitted altogether.

NE     NOT     <>    ^    ^=   * Not Equal to.

LT     <                       * Less Than.

GT     >                       * Greater Than.

LE     <=     NGT    ^>        * Less or Equal to (Not Greater Than).
LE    HIGH     HI             * High limit (Less or Equal to).

GE     >=     NLT    ^<        * Greater or Equal to.
GE     LOW     LO             * Low limit (Greater or Equal to).

ONES                          * Test for bits ON.
```

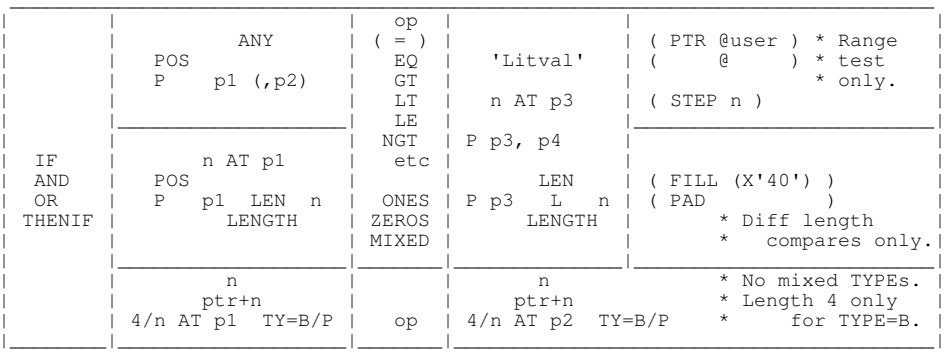
```
ZEROS  ZEROES                 * Test for bits OFF.
MIXED                         * Test for bits MIXED setting.
```

Note: In the above the **^** sign represents a **not sign (EBCDIC X'5F'**, **ASCII X'AA')**.

Some examples of use:

```
IF POS 10   GT '400'   LT '500'
IF P 20 NLT '44'
IF P 40 > P 100   LEN 6
IF P 52 'ABC'                  * If no operator,   EQ test assumed.
IF P 52 = 'ABC'
IF POS 52   ONES= X'F0F0'
```

Data v Data Comparison



Data within the input record area, or work area if used, or from within areas defined by **Additional Position Keywords**, may be compared with other data, for a specified length.

At least one of the fields must be supplied with a length. If only one field has a length, the other field defaults to the same length. The **exception** is when **Field 1** is defined using **p1 p2** syntax indicating a **Range Test**. **Field 2** must then also be supplied with a length.

For full information, including logical arithmentic comparisons on **packed decimal** or **binary** data, then refer to the **IF statement**.

Literals for Arithmetic

Where a number required for an arithmetic operation **(ADD, SUB, MULT** and **DIV)** is known, it can be supplied as an **unquoted decimal literal** (even if TYPE=B is used for the other field) instead of as a length and position.

Negative Literals

Literals for arithmetic **may be signed** with a **+ or -** prefix. If no sign is supplied, a literal is considered positive.

```
ADD 1   TO 4 AT 20           * Adds X'1C' to 4-byte field at pos 20.
MULT 4 AT 20   BY -33        * Multiply Packed Dec by X'033D'
SUB 137   FROM 4 AT 20
DIV   4 AT 20   BY +17  TY=B * Divide Binary.
```

Literals for String Compares

Use of quotes on all **string** literals is **recommended** because, as well as increasing readability, it increases efficiency by eliminating checks for:

- keywords,
- EQU names, and
- numeric validation.

Unquoted string literals are however supported by SELCOPY provided no ambiguity arises, which means that most strings may be coded without quotes, even numeric strings, e.g.

```
IF POS 1 =  123
```

instead of

```
IF POS 1 = '123'
```

When ambiguity is detected, **ERROR 134** is issued and the job is terminated, e.g.

```
IF  4 AT 1  =  5       * Padded Compare?
IF  POS 80  =  L       * Literal 'L' or LRECL value?
```

Literals for PRINT/LOG/Output Files

Literals and data **fields** for output to the **printer**, the **operator's console**, **disk** and **tape** files are supported when supplied as a **quoted** literal, as shown above. Note that other permitted parameters for file output are not included.

Quotes are **always required as delimiters for literals,** even if there are no embedded blanks etc. Thus poor spelling of parameters, or the use of illegal parameters, will not cause the unrecognised word to be processed as a literal. It will be flagged as an error because it is not enclosed in quotes.

Writing Variable Length Data

```
 ________________________________________________________________________
|       |       |       |                                                |
|       |       |       |            p1       * Use curr LRECL.          |
|       |       |       |           p1 p2     * Data len for indiv seln.  |
|       |       |       |          n AT p1    * Data len for indiv seln.  |
|       |       |       |         p1 LEN n    * Data len for indiv seln.  |
|       |       |       |  FROM=                                         |
|       |       |       |         p1   L=n    * L=n or LRECL=n will      |
|       |       | PRINT |         p1 LRECL=n  *    define max for file.  |
| (NOW) | (WR)  |  LOG  |                                                |
|       |       |       |          'lit'      * In Quotes for indiv seln. |
|  THEN |  REP  |       |________________________________________________|
|       |       |(FILE=)|                                                |
|  ELSE |  INS  | fname |  LRECL=n            * Defines max LRECL for file.|
|       |       |       |________________________________________________|
|       |       |       |                                                |
|       |       |       |                                                |
|       |       |       |  'lit'              * Must be in Quotes.       |
|       |       |       |                     * No FROM required.        |
|       |       |       |                     * LRECL, if used, defines max.|
|       |       |       |                                                |
|_______|_______|_______|________________________________________________|
```

If data is written to an output file using the **FROM** parameter, and the data to be written is defined as a **literal** or **field** value, (i.e. the **length** is supplied), then that length is not used as a definition of the maximum **LRECL** permitted on that file. Instead, it is used for that individual statement only. **Variable** and **Undefined** output, use that length, regardless of the **current** LRECL. **Fixed** output, uses that length of data, padded with the **FILL** character, or truncated to its defined **fixed** LRECL.

```
WR ABC   FROM 'LIT VAL'            * To
WR ABC   FROM 50 AT 101            *    use
WR ABC   FROM  101,150             *       non-LRECL
WR ABC   FROM 101 LEN 50           *             length.
```

Care must be taken when writing to disk/tape files (rather than to PRINT or LOG), to avoid the use of **LRECL=n** and **L=n**, instead of **LEN=n** above, in which case the argument **n** is used to define the **maximum** output LRECL for that file, not the length for this individual output statement.

The arguments **p1** and **p2** may be supplied as **@** or **@user** pointer values or as Position **Keywords**.

The argument **n** may be supplied as an unquoted decimal number, an **@** or **@user** pointer value, as a Position **Keyword** or as a combination of these.

Changing Record Formats

See also:

- Example 9 - RECFM=V from Card in section *Examples*.

Normally, it is simple and straight forward to make the output record format different from that of the input file.

Fixed Input

It is only necessary to modify the **LRECL** as required, using the **LRECL** operation word, and then write the output file **FROM** the same position as was used on the **INTO** for the input file.

If the output is variable, SELCOPY will automatically generate the necessary extra 4-byte RDW. (Record Descriptor Word).

For Undefined output, no RDW is required.

Undefined Input

Is exactly the same as for Fixed input except that the input records are already of differing lengths.

Use of the **LRECL** operation word may not even be required.

Variable Input

The **NORDW** parameter on input statements for RECFM=V files will avoid all the problems discussed under this heading. Complications only arise when **input** is **RECFM=V** and the **output is different**. i.e. it is **RECFM=F** or **RECFM=U**. Consider the following,

```
READ @b2 FILEA RECFM=V
PRINT @b7   LRECL=80
WRITE FILEB LRECL=80    * Default is FROM=1.
```

For the real output file, **FILEB**, SELCOPY assumes that the user does not want the **4 byte RDW**, record descriptor word, transferred from the front of the variable length input record, so data for the output record is taken **from position 5** of the input area, (in spite of **implied FROM=1)**.

i.e. SELCOPY will **add 4** to whatever **FROM=n** is supplied, even if it is just left to default, in order to bypass the unwanted 4-byte RDW.

The **PRINT** output is simply printing data from the input or work area, which of course by default is taken from position 1. Thus the 80 bytes printed for each record will contain the first 4 bytes of record descriptor information, i.e. positions 1 to 80 of the input file.

The record written to FILEB will use positions 5 to 84 of the work area, and is therefore **DIFFERENT** from the data printed.

Now suppose we require a fixed length record written out using data from position 40 of the variable input. So we need a **FROM** parameter.

The 4 bytes will **still be stripped off**, in spite of the fact that they are not there (at POS 40). So we must request a **WRITE FROM=36** in order to get data actually written as fixed length from position 40.

```
READ ABC RECFM=V INTO=40
```

then we **WOULD** get the 4 bytes of RDW. (However, it is too late to change the spec for this.)

Thus, to create a Sequential disk file of 80 byte Fixed length records, taken from position 40 of a Variable length format input file, and to print exactly the same data, the required statements are:

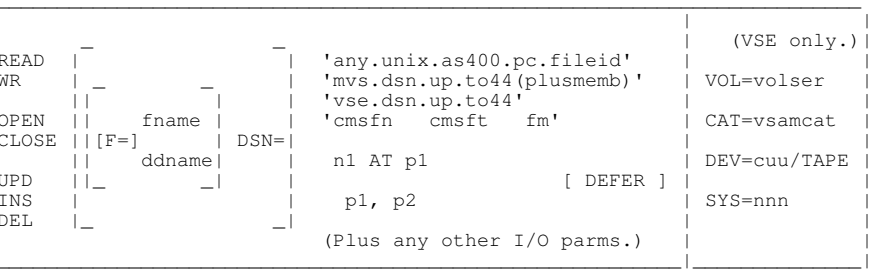
```
READ FILEA   RECFM=V
WR FILEB   LRECL=80   FROM 36
PRINT      LRECL=80   FROM=40
```

Similar problems do not occur in reverse because when writing variable length records from fixed or undefined, the RDW is not there in the first place. SELCOPY will generate it for the RECFM=V output file.

Dynamic Allocation

See also:

- DSN= and FILE=fileid in section *Operation Words, Parameters and Keywords*.




```
READ  A  DSN='SEQUENTIAL.INPUT.FILE'  VOL=SYSWK1     * VSE  SAM assumed.
WRITE B  DSN=44 AT 1001               CAT=UCAT1      * VSE VSAM assumed.

READ  DSN='SYS1.MACLIB'  DIRDATA   * No filename - F=DEFAULTF used.
IF P ANY = 'IHB'
  T PR FR DSN        S=4           * POS DSN still has original meaning.
  T PR               S=4
  T WR   'TEST.OUT'  S=4           * No filename, no DSN= - F=TEST used.
```

Mainframe Environments

A link must be provided between the filenames mentioned to SELCOPY and the physical datasets to which they refer. These are:
DD statements for **MVS** users,
FILEDEF statements for **CMS** users, and
TLBL, DLBL, EXTENT and **ASSGN** statements for **VSE** users.

Alternatively, SELCOPY will dynamically allocate files using a dataset name provided either as a literal or from a position in its work area.

AS/400, UNIX and PC Environments

Unlike mainframe environments, no equivalent link exists for AS/400, UNIX and PC systems, however, SELCOPY itself uses an up to 8-byte filename to represent and distinguish between other fileids.

Dynamic allocation allows the user the oportunity to define the filename that SELCOPY should use for a particular fileid, instead of allowing it to default. (The mechanism used by AS/400, UNIX and PC SELCOPY to generate a default filename from a fileid, is discussed under **FILE=fileid.)**
It also allows the processing of fileids not known to SELCOPY at execution time but provided via a variable field in the work area.

Universal Naming Convention (UNC) format fileids are supported on the DSN argument for networked files. e.g.

```
read innet  dsn='//netserv/documents/y2001q4.accounts'  * A file on    NETSERV Server.
```

The parameters **DIR** and **DIRDATA** may be supplied on an input statement that invokes dynamic allocation to process all files whose fileids match a dynamic mask. Note, however, that use of **UNC** fileids is not supported with **DIR** or **DIRDATA** input.

File Name

If no explicit filename is given, the JCL statements generated by SELCOPY will use the filename **DEFAULTF** (for VSE, **DEFAULT** is used to accomodate its restriction of 7 characters.) This is true whether the DSN is supplied as a literal or as a variable in the workarea.
However, if **DSN=** is also omitted and the DSN argument is provided as a **string literal**, then filename defaults to the first qualifier of the dsn or, for AS/400, UNIX and PC, a sub-string of the dsn based on the fileid format.
Thus, in the above example, the file names **DEFAULTF** and **TEST** are used.

If a filename **is used**, then the keyword **DSN** is mandatory if a dataset name is to be provided for Dynamic Allocation.

```
     READ F=ABC 'DATA.SET.NAME' .
```

For **VSE** there is a further restriction, viz: the **filename** and **DSN=** may only be omitted when the dataset name conforms to **MVS** naming conventions, (consisting of alphanumeric tokens separated by full-stops, where each token may be up to 8 characters, the first of which is alpha), and **in addition** for disk files, the first token does not exceed **7 characters**.

VSE Dynamic Allocation for a TLBL/DLBL that already exists as a temporary user label will overwrite the existing label.

In the above example, writing a 2nd file **test.out2** using the syntax:

```
T WR TEST.OUT2 S=4
```

would cause **ERROR 138** because it is not possible to allocate a 2nd DD stmt called TEST, with a **different** dataset name.
However:

```
T WR ABC  DSN=TEST.OUT2 S=4
```

would be acceptable, where the filename **ABC**, is used for the generated JCL.

All subsequent reference to the **filename** ABC would then use the same dataset name, without having to repeat it.

File Location

For MVS, dynamically allocated files must be existing **cataloged** datasets (for both Input and Output).

For VSE, at least one of **VOL=**, **DEV=** or **SYS=** must be coded when dynamically allocating **non-VSAM** files. Similarly, **CAT=** must be coded for dynamic allocation of **VSAM** cataloged files.

VSE Output Files

VSE **output** is only supported for **VSAM** files. Output for **Sequential** files is not currently supported because VSE still requires **EXTENT** information, even if the file already exists.

Multiple Input Files

If you require to read one file after another in a **mainframe** environment, please be aware of the **CAT** statement which allows concatenation of input files, **easily**.

Users may have as many input files as are required, provided the storage for buffer allocation is available. To have record data from more than one file available at the same time, use **WORKLEN=nnnn** parameter on an **OPTION** statement, or on the first **READ** mentioned, to define a work area. The same work area is then used for all input files.

The **INTO** parameter can then be used on **READ** operations to prevent data from one file overwriting that of another.

Default Output LRECL is taken as the LRECL (max) of the first input file mentioned.

Example 10 - Compare 2 Files in the Examples Section, (2 files compared, and differences highlighted), illustrates a real multiple input application. But first consider:

A "Problem" Example

(Each of the 4 problems is discussed below.)

```
    READ AAA   LRECL=100 WORKLEN=800   * Prime Input file, RECFM=F.
    IF POS 1 = 'X,Y'
  READB                                * Label valid after an IF.
     THEN READ BBB   LRECL=V INTO=101 * LRECL=V means    RECFM=V.
    PRINT FROM 1                       * From 1 is default anyway.
    WRITE CCC   RECFM=V   FROM=101
    IF P 101 NE X'000C'
      THEN GOTO READB
```

1. Because the Prime input file is RECFM=F (Fixed length records, each length 100), SELCOPY will assume that it has to generate a 4-byte **RDW** (Record Descriptor Word) for the Variable length output file, CCC.
   But it is being written from position 101 where a genuine RECFM=V file was read in, so no RDW is needed. Thus, output will end up with two RDWs, the original and SELCOPY's generated one. (It would be correct if either **NORDW** were coded on the **READ BBB**, or if **FROM=105** were coded on the **WRITE CCC** statement.) **NORDW** is the **recommended** solution.

2. When printing, because no length is supplied for the print data, the length used is that of the **last record read**, and this is regardless of where you print FROM. The last record read could of course come from the BBB input file, not the one we are trying to print.
   So we could have data printed from position 1 (file AAA) using the length of the **Variable** length record read off BBB.

3. Similarly, output to the **RECFM=V** file, CCC, will also use the length of the last record read, which **may not be** what is required. So be careful.
   When it is **essential** to read an intermediate file, thereby losing the record length of the previous record read, and the output is variable or undefined, then first save the current LRECL setting in a user @ pointer, and **reinstate** it after the intermediate read.

```
READ MAININ  RECFM=V  W=2222  * Prime Input.
@LSAV = LRECL                 * Save current LRECL value.
READ CARD  INTO 46            * Intermediate file sets L=80.
LRECL = @LSAV                 * Reset LRECL to original.
WR MAINOUT  B=4096            * RECFM=V, same as Prime IN.
```

4. The **Test for EOF** is missing on the BBB file. If we get the wrong value in POS 101 we will always go back to READB which fails to read a record, and so **we loop**.
   EOF on the **Prime** input file will give an **automatic** EOJ, but this is not the case on secondary input files.

   When several input files are in use, you must identify which one is referenced when testing for **end-of-file** or checking **incount**.
   This is achieved by quoting the filename on **IF EOF** and **IF INCOUNT** statements.

```
IF  EOF FILEA
AND EOF FILEB
OR  EOF FILEC
  THEN GOTO END-OF-FILE-ROUTINE

IF INCOUNT > 400   FILE=FILEA
OR INCOUNT > 500   FILE=FILEB
  THEN EOJ
```

   Although not essential, it is recommended that an EOF test is made for all secondary input files immediately after the READ statement.
   Users may have as many input operations as required on the same file, so where many exist it is better to put the READ statement into a subroutine and use **DO** or **PERFORM** for the READ operation with the test for EOF embodied within the subroutine, thus avoiding **Multiple Input Loops**.

Automatic EOJ

If **no IF EOF test** is made for the **Prime** input file, (first mentioned), then **automatic EOJ** will occur immediately on reaching EOF of the prime input file.
The **Return Code** is unchanged.

IF EOF tests made on **non-prime** input files will not influence the Automatic EOJ decision.

Reaching **EOF** on other files will have no effect other than reducing all READ operations on that file to a null operation, just as though a STOPAFT had been reached.
This can sometimes be the cause of **Looping at EOF** .

Forced EOJ

When all **STOPAFT** requirements for **output** statements have been satisfied, **EOJ** is forced automatically **by SELCOPY itself**, thus avoiding the wasteful process of unnecessarily reading on until **EOF** is reached, when **Automatic EOJ** occurs.

Return Code 4 is set if EOJ is forced by SELCOPY.

The message **EOF NOT REACHED** in the Selection Summary is normally associated with **Return Code 4**, but they need not go together.
Return Code 4 simply means that EOJ has been **forced by SELCOPY** because no output selections remain.

Use **WR DUMMY** if a requirement exists to force SELCOPY to continue processing to EOF. e.g. if you require a record count for the file. No actual output is produced for the file **DUMMY**, but it is treated and counted as **output** for the purpose of deciding whether or not to continue processing when all **STOPAFT** parameters have been satisfied.

Selections such as MOVE, ADD, CVxx, etc are **not counted as output** statements because they only manipulate data within the I/O or work area, so **STOPAFT** values still outstanding on these are ignored for the purpose of deciding whether to invoke **Forced EOJ**.

The following are also **not counted as output** for reasons discussed below:

```
CALL   phase/module name
EXIT   phase/module name
GOTO CANCEL
RETCD=nnn
```

CALL and **EXIT** statements may each perform different functions - some providing **input**, some **output**, and some just data manipulation.
SELCOPY cannot identify which type it is, so for safety must default to "data manipulation".
WR DUMMY is therefore **essential** if the only output from a run is via a **CALL** or **EXIT** statement.

GOTO CANCEL is used as a quick easy-to-code method of handling impossible conditions, which in the DP world are all too common.
Having satisfied all **required** output selections, it is wasteful to continue processing the input file, still searching for impossible conditions.

RETCD=nnn is **not counted** as output because in most cases it is used as a safety precaution, and for the occasional time when only a **Return Code** is required from a run, it is acceptable to also include **WRITE DUMMY**.

Processing with no Input File

If a work area is defined using **WORKLEN** on the **OPTION** statement, then it is permissable to run SELCOPY without having an input file.

For AS/400, UNIX and PC SELCOPY, a default work area of 80 bytes is provided when no input file is present. Therefore, even coding **WORKLEN** on the **OPTION** statement is unnecessary.

```
OPTION   W 66

  LOG 'No Input file'   !PRT 'No Input file'
  P 1 = 'XYZ'

LOOP
  GEN 10 AT 4     TYPE C         * Generate random character data.
  WR DISKOUT   LRECL 86  B=860  RECFM FB  FILL X'00'  TIMES 3
  GOTO LOOP   STOPAFT 999

      *  Will terminate after writing 3000 records to DISKOUT.
```

When control drops through after the last statement, the run is terminated immediately, without the normal automatic looping through the control statements again waiting for **EOF** on the input file. Thus, **GOTO EOJ** is not necessary.

Execution via VSE Console

See also:

- Section *VM/CMS Processing*.

In a **VSE environment**, SELCOPY Control Statements may be input via the Console using:

```
   R      RDR,PAUSEF
n    // LIBDEF PHASE,SEARCH=IJSYSRS.lib
n    // EXEC SELCOPY
```

or alternatively by submitting a job in the normal way with an **UPSI** setting of X'C1' (for Console Input):

```
// JOB ABC
// UPSI   11000001
// LIBDEF PHASE,SEARCH=IJSYSRS.lib
// EXEC SELCOPY
```

Console input is recognised when // **EXEC SELCOPY** is entered via the operator's console, or the **UPSI** byte is set to 1100 0001. However, in view of the disruption this may cause to normal operation of the computer system, it is not recommended as normal practice, unless you are running a virtual VSE machine off a terminal using VM/CMS.

Control Statements are input in the same format as on cards, except that each 'card' is terminated by an EOB character, the END button, the ENTER key or RETURN key, depending on the type of keyboard.

When input is via the console, SELCOPY will action a **READ CARD** operation by taking input from the console.

Input consisting only of an **EOB** of **END** is treated as End of File, either of the Control Statements, or of Data if input is via **CARD**.

When SELCOPY detects a **syntax error**, the error message is displayed on the console as well as on the printer, and the **control card in error is ignored**.

For users who notice errors which were syntactically valid, and therefore accepted, the **CANCEL** statement may be used. This is a statement which causes SELCOPY to go immediately to end-of-job. **QUIT** is a synonym. The user must then execute SELCOPY again in order to retry.

SYSIN for MVS and CMS

SELCOPY control statements may be read from any QSAM dataset with any RECFM, blocked or unblocked.

The length allowed for SELCOPY control statements is equal to the LRECL of the SYSIN control card input, up to a maximum of **256 bytes**.

For **RECFM=V** input, the LRECL value includes a 4-byte Record Descipter Word (RDW) so the maximum control statement length will be the lesser of the allocated maximum LRECL minus 4, or 252 bytes. The RDW is ignored by SELCOPY syntax checking.

Similarly, any **sequence numbers** that exist in the last 8 bytes of the record are included in the LRECL value and reduce the control card length maximum value accordingly. Note that sequence numbers are also ignored by SELCOPY syntax checking.

Use of RECFM=U, RECFM=V or RECFM=VB will save disk space for both the MVS and CMS user. In particular, use of RECFM=V will make significant savings for the CMS user who uses

```
"FILEDEF SYSIN  DISK  SELCxxx CTL A".
```

The file, **SELCxxx CTL A**, does not waste disk space by storing all the blanks associated with **RECFM=F**.

When **READ FILE=CARD is** used with card input data from the control statement file (following an END statement), the CARD file has the same DCB attributes as the SYSIN file. Unlike control statements, the CARD file data can be longer than 256 bytes.

Any SELCOPY output file, where geometry is not available from either the DCB or an output statement, will inherit its DCB attributes from the prime input file. This is still true when the prime input is SYSIN CARD data.

ENQ/DEQ for PDS Output

MVS sequential output files which are written to a PDS, Partitioned Data Set, with the **DISP=SHR** attribute are protected from simultaneous update by two users writing separate members to the same PDS.

SELCOPY's use of the **ENQ/DEQ** facility provided by MVS, forces the 2nd user to wait until the 1st has completed. Note that this does not prevent use of **update-in-place** on multiple members of the same PDS during the same SELCOPY execution.

The primary 8-byte name used for the ENQ is **"SPFEDIT "**, while the secondary name used is the Data Set Name itself.

Output to a PDSE, **Partitioned Data Set Extended** , is not subject to the same restriction and so multiple members of the same PDSE may be open for output simultaneously.

Note

SELCOPY does **not permit** more than 1 member of the same PDS to be open for output at the same time. If a user attempts to **write** to multiple members of the same PDS, then system **Abend 138** occurs. This prevents any posible corruption of the PDS directory.

Non-simultaneous output to multiple members can be achieved using **OPEN/CLOSE** of the current member before writing to the next.

Monitor MVS Operator STOP command

Under **MVS**, SELCOPY regularly checks whether the operator has issued a **STOP** command (synonym P) to terminate processing and, when a **STOP** command is detected, SELCOPY will terminate the run in an orderly fashion, giving **ERROR 566** and setting **Return Code 44** .

This has the advantage of maintaining the Selection Summary containing valuable information which is lost if a **CANCEL** had been issued by the operator.

Bit Testing - ON/OFF/MIXED

See also:

- Bit Modification - OR/XOR/AND in this section.

SELCOPY supports the full range of both **Bit Testing** and **Modification**.

More than one bit may be tested at a time within a data field of length 1 to 256. In fact, with the test for **MIXED** bit settings you **must** test more than one bit.

The string you supply for the test, also referred to as the **mask**, may be a literal of any length that will fit on a control card, using the **EQU** facility if required, or may be defined using the **POS=p LENGTH=n** syntax up to a maximum length of 256 bytes.

It is perhaps worth mentioning here that **Bit** nomenclature may vary between different publications. All refer to a byte having 8 bits, but some refer to these 8 bits as **bits 1 through 8**, whereas others refer to the same bits as **bits 0 through 7**.
Here we will refer to the 1st, 2nd, 3rd, etc, starting at the senior (left most) bit, the X'80' bit.

Testing for bits ON

This is achieved with the ONES parameter. You may want to test the setting of a binary switch, or check that a field is numeric.

```
IF POS 20 ONES X'80'             * Test 1st bit (Bit 0) of position 20.
IF POS 20 ONES X'40'             * Test 2nd bit.
IF POS 20 ONES X'20'             * Test 3rd bit.
IF POS 20 ONES X'08'             * Test 5th bit.
IF POS 20 ONES X'01'             * Test 8th bit (Bit 7).
```

Each test on position 20 is on a single bit. i.e. the mask has only one bit on. The zero bits in the mask indicate that we are not interested in the setting of these bits in the data at position 20 being tested. If we required to test the X'40' bit and the X'20' bit of position 20 for both being on, the mask we would use is X'60'.

Numeric testing becomes possible with the **ONES** parameter. In the following:

```
IF POS 55 ONES X'F0F0 F0F0 F0F0 F0F0'   * Check 8 bytes for EBCDIC numeric.
```

We test 8 bytes of data starting at position 55. For the condition to be true, every byte must have the first four bits ON. The junior 4 bits of each byte are not tested, so the characters X'FA' through X'FF' would pass this test even though they are not one of the EBCDIC numeric characters, X'F0' through X'F9'. Thus, the above test does **not guarantee** valid EBCDIC numeric data, although it is a very good approximation.

Testing for bits OFF

This is done with the **ZEROS** parameter. Again more than one byte may be tested by supplying a longer string or mask.

The bits to be tested are defined by '1' bits in the mask. i.e. the same technique as for the ONES parameter, but this time they indicate a test for **zero bits** in the data position. e.g.

```
IF POS 30 ZEROS X'01'            * Is it an even EBCDIC number?
```

will test the junior bit of position 30 for zero. If it is zero, the condition is true. For binary or character data this then indicates that the EBCDIC number is even.

Testing for bits MIXED

Testing for a Mixture of bit settings is achieved with the **MIXED** parameter.

Consider a Packed Decimal field, length 4, starting at position 41, and ignore the fact that we can code:

```
IF 4 AT 41  TYPE=P  <  0         * If packed decimal value is negative.
```

The sign for the field is held in the junior 4 bits of the last byte. i.e. position 44. Positive numbers will have X'C' or X'F', while negative numbers will have X'D'.

We do not know the content of the senior 4 bits of position 44, so are not able to make a straight equality test. The bit representations for hex C, F and D respectively are 1100, 1111 and 1101. Hex D is the only one with a mixture of bit settings in the last two bits.

Thus if we supply a mask of **'0000,0011'** which is X'03' in SELCOPY terms, we have a **negative packed decimal test**. e.g.

```
IF POS 44 MIXED X'03'            * If Packed Decimal is negative.
  THEN GOTO PD-NEG
```

Bit Modification - OR/XOR/AND

As with bit testing, the string or mask may be one or more bytes in length.

Set bits ON

For the **OR** parameter, the '1' bits in the mask force '1' bits in the data. Zeros in the mask are passive.

Flick bits

For the **XOR** parameter, the '1' bits in the mask cause the corresponding bits in the data to be reversed. Zeros in the mask are passive.

Set bits OFF

AND is the exception to the rule - **zero bits** in the mask **will zeroize** the corresponding bits in the data. **One bits** in the mask are **passive** and cause no change to the data.

```
POS=44 @b3 OR=X'0F'           * Force +'ve PD sign.
THEN POS=44 @b3 AND=X'FD'     * Force it back to neg.
ELSE POS 20 @b3 XOR=X'80'     * Flick 1st bit on/off.
```

Note that in the above example to force a negative PD sign, it will **only work if** the preceding statement to force it positive has already been actioned first.
Consider the value X'2C' which is ANDed with X'FD'. The result is X'2C', the same. But X'2F' would become X'2D' when ANDed with X'FD'.
Remember that Hex C and F both represent valid Positive signs in the junior 4 bits of the junior byte of a packed decimal field.

Selection Summary Format

See also:

- FILE=PRINT Output Fname in section *AS/400, UNIX and PC Processing*.
- WARNING Messages at EOJ in section *Messages*.

At the end of every SELCOPY execution a Selection Summary is printed, unless it is suppressed by use of the **NOPTOT** or **NOPRINT** command in the control statements.

Print and Selection Summary output is written to **DDNAME SYSPRINT** for MVS and CMS, and **SYSLST** for VSE. On AS/400, UNIX or PC systems, the output listing is, by default, written to file **SELC.LST** on the current directory on the current disk. However, it may be redirected to a different directory and fileid via the Environment variable **SLCLST**.

The information supplied is often useful to confirm to the user that the expected result has actually been achieved. The information provided is as follows:

SEL-ID

The a SELection IDentifier is a unique number allocated to each control statement which causes action. It is also printed to the left of the control statements when they are listed at the beginning of the run.

If several consecutive Selection Id's all have the same number of successful actions, they

```
"nn---nn",

4---12
```

would indicate that Selections 4 through 12 all achieved the same number of hits.
However, if the number of hits is greater than 999,999 then the contents of the SEL-ID field would be merged with the selection

total making the report unreadable. In this case only the first selection in the range is printed.
Placing a comment starting '*>' on any NOW/THEN/ELSE statement, thus causing the comment to be printed in the summary block, will ensure that the selection identifier is not combined with others when it is reported in the summary.

SEL-TOT

The SELection TOTal gives the number of hits for that selection id. If the action for that id is to **read a file**, and the user's end-of-file processing causes additional attempts to read it after EOF is reached, then this total remains unchanged.

Conversely, an output file operation which fails for some reason, (maybe an out-of-sequence key on a VSAM load), will still have its total updated, but a separate error message and Return Code will alert you to the problem.

Consecutive Selection Id's with matching Selection Totals greater than 999,999, will result in only the first Id being displayed under the SEL-ID heading.

Selection Totals above the decimal value 2,147,483,647 (hex 7FFF,FFF) are displayed as **+2.1G+**.

FILE, BLKSIZE and LRECL

FILEname, BLock SIZE and Logical RECord Length are only reported for selections concerning a real file.
For Variable and Undefined files, the **LRECL** value is the maximum encountered during this run, so if not all the file was processed this may not reflect a true figure.
Where the information is available from the operating system (such as MVS), the **BLKSIZE** quoted here is the operating system's maximum acceptable value for that file. Otherwise it is the maximum encountered in this run.

For **VSAM** files, the BLKSIZE column will indicate the **Maximum Permitted LRECL** as specified in the **IDCAMS DEFINE**.

For **DIR** or **DIRDATA** input, values reported are for **member data**, not the directory.

RECFM

The record format of each file is displayed as either **F, V** or **U** immediately following the LRECL value, indicating **Fixed, Variable** or **Undefined** respectively. For F and V files, an additional **B** for Blocked may also be reported. For V files, an additional **S** for Spanned may be reported.

For **DIR** or **DIRDATA** input, values reported are for **member data**, not the directory.

Error and Warning Messages

These are left adjusted to eliminate the frustration of having to view right when editing the SELCOPY print file on the popular 80 char wide screens. To avoid overwriting of other information, the message may be dropped to the next line of the report.

With the abend trap on, **ABTRAP ON**, an abend which occurs on an **IF arithmetic test** will display the Selection Id of the statement following the offending IF statement. (An IF statement does not have a SEL-ID.) e.g.

```
***WARNING*** (SEL<<<10)        88 = RETURN CODE FROM SELCOPY
```

This indicates that the IF statement in question immediately precedes SEL-ID **10**.

FSIZE

If the information is available, the **File SIZE** is reported as the the number of records held in a file at the time the file was opened. (For mainframe, this information is currently only provided on VSAM and CMS files.)
For **CMS** RECFM=VB or FB, FSIZE it indicates the number of CMS records i.e. blocks, each of which may contain several records. The message

```
nnn=***CONFLICTING***FSIZE*AT*OPEN*
```

may accompany SELCOPY's calculated File Size.
Unlike CMS, for **AS/400, UNIX** and **PC** RECFM=VB, FSIZE indicates the number of logical records processed, not the number of blocks.

CI

CI is a shortening of **CISIZE** for VSAM files and indicates the Control Interval Size. On earlier releases this value was displayed under the BLKSIZE column.
It is therefore apparent from the summary that if a VSAM file has a **MaxLRECL** (displayed in the BLKSIZE column) that is greater than **CISIZE**, then the file may contain **Spanned VSAM Records**.

If SELCOPY encountered any spanned records during its processing of the file then the **LRECL** column will contain a value which is also in excess of the CISIZE. (The **LRECL** column will contain the length of the **largest** record encountered.)

DSN

This field reports the input or output Data Set Name. For **MVS QSAM**, **MVS VSAM**, **VSE SAM** and **VSE VSAM** files, the real Data Set Name (up to 44 chars) is reported.
For **AS/400, UNIX** and **PC files**, the real **fileid** is displayed.
For **CMS files**, the real CMS name, **Fn Ft Fm** is reported under this heading with intermediate blanks replaced with a fullstop. e.g.

```
          ABC.EXEC.A1   instead of      ABC      EXEC     A1
```

VOL/CAT

For **VSE** only, the **VOLume Serial Number** of sequential files, or the **VSAM CATalog** ddname (filename on the DLBL for the catalog) of VSAM files, is reported.
For **MVS** and **CMS** users, this column will be suppressed.

```
 _____________________________________________________________________________________________
|                                                                                             /
|   SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)    PW000 pw=0 (132)    (OS) VM/C\
| o ------------------------------------------------------------------------               /
|                                                                                           \
|                                                                                           /
| o          ** SMXSUM CTL N **             L=006 --- 2001/04/26 15:31:43                 \
|             * Used operationally, AND as an example of Seln Summary in SELC manual.     /
|            equ outdd    SMXCTL.ALL.P1  * Output file name - CMS format.                 \
| o          equ hrec     101            * Header rec for output file.                   /
|                                                                                           \
|                                                                                           /
| o      1.    read 'SMX*.CTL.N'  dirdata    w 2222   * Some of these used for manual.    \
|                           * Note that Worklen value used as max input Blksize.          /
|            * p L+1,100 = ' '   * Clear prev rec residue - not reqd for RECFM=V out.     \
| o      2.    p hrec =   '** SMXCTL ALL **   (Output from SMXSUM.CTL)'        s=1        /
|        3.    move 19  fr date-2  to hrec+72-19          s=1   * e.g. 2001/04/25 14:08:31  \
|        4.    outdd  fr hrec,hrec+72-1                   s=1   * Write Header Record.      /
| o                                                                                         \
|                                                                                           /
|              if dir            * If it's a DIRectory record. (These are length 81.)      \
| o      5.      t outdd fr ' ' times 4   * Prefix each file with 4 blank records.         /
|            *   t lrecl = 72              * Kill RETCD=5 for DIR recs trunc'd to 72.      \
|            *    Above line commented out to give examble of RC=5.                       /
| o      6.      t p 66 = '*******'       * For use when scanning output.                 \
|        7.      t print   s 3            * Print 1st 3 DIR records.                      /
|                                                                                           \
| o                                                                                         /
|        8.    wr outdd  L=72  recfm v    * Write all records to Back-Up file.            \
|                                                                                           /
| o                                                                                         \
|       INPUT   SEL SEL                                                                     /
|       RECNO   TOT ID.          1         2         3         4         5         6      \
| o     -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,./
|           1     1   7 SMXAND   CTL      N4  1991/06/16 15:17:35       12       72 V    *\
|           2     2   7 SMXCALL  CTL      N4  1992/03/02 14:30:52       11       72 V    */
| o         3     3   7 SMXCVCH  CTL      N2  1992/05/28 16:43:40       17       72 V    *\
|                     ....,....1....,....2....,....3....,....4....,....5....,....6....,./
|                                                                                           \
| o SUMMARY..                                                                               /
|    SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN          \
|    ------      ------      ----     -------  -----           -----   --    ---          /
| o     1           282 READ SMX*               81 U              21       SMXTYN.CTL.N4  \
|       2----3        1                                                                   /
|       4             1 WR   SMXCTL       72    72 U             367       SMXCTL.ALL.P1  \
| o                               *RECORDS*TRUNCATED*                                     /
|       5            84 WR   SMXCTL       72    72 U             367       SMXCTL.ALL.P1  \
|                                 *RECORDS*TRUNCATED*                                     /
| o     6            21                                                                   \
|       7             3                                                                   /
|       8           282 WR   SMXCTL       72    72 U             367       SMXCTL.ALL.P1  \
| o                               *RECORDS*TRUNCATED*                                     /
|                                                                                           \
|   ***WARNING***                 5 = RETURN CODE FROM SELCOPY                              /
| o                                                                                         \
|            ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656/
|                                                 ** EXPIRY DATE -- 2002/05/21 **         \
|_____________________________________________________________________________________________/
```

Figure 0. Selection Summary.

Pointers and LRECL - Discussion

The term **pointer**, used within this this discussion, includes:

LRECL

The current **Logical Record Length**.

The @ Pointer

The standard **@ Pointer**, set by default (if **PTR=@** xxxx not specified) on a **Range Test**.

User @ Pointers

In mainframe SELCOPY, up to 32 **user @** pointers may be set within any SELCOPY job, simply by coding **PTR=@ xxxx** on an **IF**/**AND**/**OR** range test, or by use of an **@ xxxx** assignment, where **xxxx** is any alphanumeric name, length 1 to 4 characters.

Note that although the maximum length for the name is only 4 characters, a longer and more meaningful name could be used by assigning an **EQU** ated name. e.g.

```
  EQU  @LENGTH_OF_FIELD1  @VAR1
  EQU  @CBLNAME_OFFSET    @VAR2
```

In AS/400, UNIX and PC SELCOPY, an unlimited number of **user @** pointers with names of any length may be set in the same way as the mainframe version.

Combination

A combination based on the **addition**/**substraction** of any of the above and any numeric literal. Examples of this are:

```
@A    =    @B+@C-@A+20
print  fr 22     length    @END-@BEG
move   fr    LRECL-@A, LRECL     to 2001
if     pos    @beg+@disp,    @beg+@len  = 'XYZ'
if     4 at 22 type b  =    @ABC-@DEF+13-L
```

Pointers may be used as positions or lengths in most operations, interchangably, thereby giving the essential facility of having **Variable positions and lengths**.

Pointers are interpreted as variable **numbers**, which, depending on context, are treated as either **positions** or **lengths**. It is therefore possible to use a pointer to reference a position, then use the **same pointer** as a length, and vice versa. e.g.

```
  @FRED = 4
  MOVE @FRED   FROM @FRED   TO 101   * Moves 4 bytes from pos 4 to pos 101.
  MOVE LRECL FROM 1  TO  LRECL+1     * Duplicate whole record.
```

Range Tests

A **Range Test**, (often referred to as a **scan)**, is recognised when the first field of an **IF type** statement is defined using **POS p1,p2** type syntax, and the second field (to the right of the comparison operator) defines a character string.

The syntax **POS ANY** is also supported, and signifies a **Range Test**, scanning the whole of the current record, but assuming that the READ did not use the **INTO=n** parameter to place it elsewhere in the work area, other than **INTO=1**.

Pointer Assignment - Indirect

LRECL

The **LRECL** variable is automatically set to the length of the most recent record **READ** from any input file. If no record has been read, LRECL will default to 80, or the length of the work area if smaller.

@ Pointers

One of these is **always** set (or made null) automatically by SELCOPY every time a **Range Test** is actioned. Which pointer gets set is controlled by the **PTR=@** xxxx parameter on the IF statement defining the Range Test, having a default of **PTR=@**.

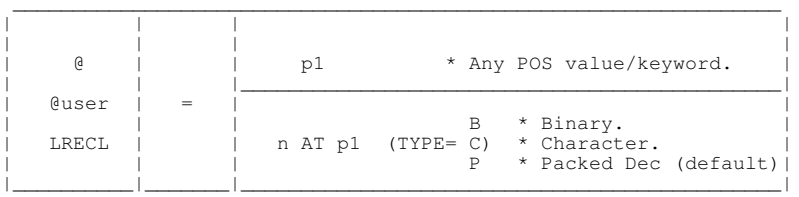
Successful Range Test

The (coded or implied) **pointer** is set to the position of the first occurrence in the range that satisfies the comparison. Subsequent use of this pointer as a position or length argument will then use this value until the pointer is changed by another Range Test or by a direct assignment.

Failed Range Test

The (coded or implied) **pointer** is set to **null**. Subsequent use of this pointer as a position or length argument gives the following:
IF type statements will return false,
THEN type statements will be ignored and **RC=8** set.
A range test will **always fail** if **p1 > p2** .

Pointer Assignment - Direct



e.g.

```
   @        =         20
  @ABC      =       6 AT 20     * Defaults to TYPE=P
  @XYZ      =       @XYZ-@ABC-6
LRECL       =       4 AT 94   TYPE=B
   @        =       UXLINE
  @X        =       0         * AS/400, UNIX and PC only.
  @L        =       LRECL     * Save current LRECL (before READ of next record).
```

In the above, **p1** may be any valid **POS** argument, such as **@+1**, **L-22**, **@ABCD+46**, **@A+@B-@C+22**, **2023** or any numeric value. For SELCOPY on **mainframe** platforms only, an attempt to assign zero or a negative value will result in **RC=08** and the pointer set to null.

The **pointer** may then be used as a **position** argument on any parameter requiring a position, or as a **length** argument on any parameter requiring a length. i.e. the same pointer may be used for both. e.g.

```
@FRED = 4
MOVE @FRED   FROM @FRED   TO 101   * Moves 4 bytes from pos 4 to pos 101.
```

POS arguments such as **DATE, HEAD, PARM** and **DSN** however are not acceptable as **lengths** because the resultant absolute address is not within the record/workarea, making any offset from the start of the record/workarea unpredictable.

Duration of Pointers

Apart from the direct and indirect assignments discussed above, all pointers remain unchanged throughout a SELCOPY execution.

But **BEWARE** of using two or more input files **without a WORKLEN** parameter, because a Pointer setting could for example be set at position 12 of the input record for File A, then when you read File B, the Pointer is still pointing at File A's input area which is no longer available. Avoid this by using **WORKLEN=n**.

LRECL / @ = 0

On **AS/400, UNIX** and **PC** systems, blank lines typically have a length of zero. Therefore, support has been extended to allow direct assignment of LRECL and @ pointers to the value zero. Furthermore, @ pointers may be assigned to any value outside the range of the work area or input record buffer (including negative values). Currently, this is only supported in SELCOPY for AS/400, UNIX and PC.

Pointer Value testing

The **IF**/**AND**/**OR** statement allows easy checking of the position referenced by an **@ pointer**, or the value held as the current **LRECL**.

	n		n
IF	L+nnn		L+nnn
AND	LRECL+nnn		LRECL+nnn
OR	@+nnn	op	@+nnn
THENIF	@user+nnn		@user+nnn
ELSEIF			
	4 AT p TYPE=B		4 AT p TYPE=B

e.g.

```
IF              @A              >             L
IF             @A-6             =            @B
IF              @               =          @ABC+22
IF            LRECL             >            42
IF         4 AT 22 TY=B         >          @xyz-17
```

The comparands, which for @ pointers are stored as absolute storage addresses, are considered as positions relative to position 1 of the **workarea** for the comparison, so it is possible therefore to compare **@ABC** with **LRECL**, both of which will be considered numeric values.

If for instance, the current record length is **80**, and **@ABC** points to position 60 of the workarea, or position 60 of the current input record, then **@ABC** is considered to have the **value 60**, and the following condition test will result in **true**.

```
IF @ABC = LRECL-20            * Is true. (60 = 80-20)
```

Testing for @ pointer set/unset

By default, any unset @ pointer has a value **zero**. In mainframe SELCOPY, testing an @ pointer against the comparand zero is sufficient to determine whether an @ pointer is **not set**.

```
IF @ABC =  1                  * If @ABC --> POS 1 in Work Area.
IF @ABC =  0                  * If @ABC is not set.
IF @ABC <> 0                  * If @ABC is set.
```

However, in **AS/400, UNIX** and **PC** systems, an @ pointer may be assigned the value zero and, therefore, testing an @ pointer for zero to mean **not set** is not specific enough. In SELCOPY for these systems only, an @ pointer should be tested against the keyword **NULL** to establish **not set**. e.g.

```
IF @ABC =  NULL               * If @ABC is not set (AS/400, UNIX and PC only).
```

Outside the workarea

This is valid for @ pointers which have been set to point at special positions such as **POS HEAD, FNAME, DSN, DATE**, etc. or, for AS/400, UNIX and PC, @ pointers which may have been set to **any** position at all.
Whether these positions are above or below the workarea is a function of dynamic storage management which may change with later releases of operating systems, so **Negative** comparands must therefore be allowed, and the comparison made **arithmetically**. i.e. **-2** is lower than **-1** which is lower than **0**, thus:

```
IF @HHH > 0                   * If @HHH is set.    May be WRONG.
```

If **@HHH** points at the SELCOPY heading, **POS HEAD**, and if this exists in storage below the workarea, then when it is adjusted to become a number, (relative to the start of the workarea), it will be large and **negative**. i.e. not greater than zero. The test will then **fail**, in spite of the fact that **@HHH** is actually set to a valid position. The test should be:

```
IF @HHH <> 0                  * Must check for    NOT EQUAL.
```

Pointer Usage Considerations

When an operation, involving data in the input area, is based on an offset to an @ pointer, (POS=@-512 or POS=@ABC+688), the actual position calculated may fall outside the logical record (or work area if WORKLEN used). For AS/400, UNIX and PC platforms only, this may include @ pointers without offsets because @ pointers may be **directly** assigned to values that fall outside the logical record or work area. In either of these cases, the following may occur:

- Where a position or range of positions fall **entirely** outside the the logical record or work area:
  1. For **IF type** statements, **false** is returned.
  2. For all other types of statement, the action requested is not taken, but **Return** Code 8 is set.

- Where a range of positions begins within the logical record or work area but ends outside it:
  1. An **IF type** operation or an **Output** statement (e.g. **PRINT, WRITE)** is executed successfully. However, the range is truncated at the last position of the input record or workarea. e.g.

```
OPT WORKLEN=500  FILL='X'  * Initialise a 500 byte workarea filled with char X.
@ABC = 491                 * @ABC set to position 10 bytes before workarea end.
PRINT FROM @ABC  LEN=100   * 100 byte print truncated to 10 bytes.
```

  2. For all other types of statement, the action requested is not taken, but **Return** Code 8 is set.

@ pointers that are set to special positions outside the work area (e.g **POS DATE**, etc.) or set to an absolute address via the **UXATPTR** field, are not subject to the above restrictions and all types of operation are executed normally.

However, if an operation references one or more positions in storage which are **Fetch Protected** then a PROTECTION EXCEPTION occurs. (For mainframe systems, use **OPTION ABTRAP=ON** to get SELCOPY to terminate quietly, or better still, set it as default in CBLNAME or SELCNAM.)

Where permitted, care should be taken when updating storage outside the input record/work area as unpredictable results may occur.

Setting a Pointer from an Address Constant

POS UXATPTR refers to SELCOPY's 4-byte internal **@ pointer** which holds the **absolute address** (not the position relative to the start of the work area) of the data referenced by **POS @**, which will usually be either in the work area or in the input buffer if the WORKLEN parameter were not used.
If the @ pointer is not set, UXATPTR will contain binary zeros.

POS UXATPTR is modifiable. e.g.

```
ADD  2 AT 11  TO 4 AT UXATPTR  TY=B    * Add a 2 byte binary value to @.
```

But be careful to avoid setting it to an invalid address.

This facility can be used to access a real storage address held in control blocks available to SELCOPY. e.g.

```
READ  #27   ADA   FMT='AB,AC,AD.'      * Read an ADABAS DB.
POS UXATPTR = 4 AT FT+12               * Set @ pointer.
@ADA = @                               * @ADA --> ADABAS Control Block.
```

Better examples for each of the mainframe operating systems would be

MVS

```
POS UXATPTR = X'0000,0010'   !@ACVT = @      * --> Address of CVT.
POS UXATPTR = 4 AT @ACVT     !@CVT  = @      * --> Communications Vector Table.
POS UXATPTR = 4 AT @CVT+1252 !@UCBA = @      * --> 1st UCB in chain.
PRINT  FR @UCBA   TYPE=D   L=80              * Print in Dump format.
```

VSE

```
POS UXATPTR   = X'0000'                      * Zeroise first half of address.
POS UXATPTR+2 = 2 AT COMRG+64  !@PUBT = @    * --> PUB Table.
IF POS @PUBT,@PUBT+2048 = X'FF'  STEP=8      * Search for the end.
  T PR FR @PUBT,@-1  TYPE=D                  * Print in Dump format.
```

CMS

```
  POS UXATPTR = X'0000,0644'   !@ADT  = @      * --> Address of 1st ADT
==LOOP==
  IF  0       = 4 AT @ADT TY=B !T EOJ          * If no more.
  POS UXATPTR = 4 AT @ADT      !@ADT  = @      * --> Next Active Disk Table.
  PRINT  FR @ADT  TYPE=D   L=80                * Print in Dump format.
  GOTO LOOP
```

Getting a Pointer Value into Workarea

```
  4 AT 20  TY=B  =  @ABC
```

is currently not supported.

The content of SELCOPY's current **LRECL** setting may be referenced at **POS UXLRECL** and this is always an absolute number in binary.

We can therefore set **LRECL** to any **@ pointer** that references an offset in the work area and then copy its numeric binary value wherever we want it. e.g.

```
LRECL = @ABC                  * Set SELCOPY'S LRECL to required value.
POS 20 = 4 AT UXLRECL         * Assign this value to user storage.
```

The **CVBC** or **CVBP** operations could also be used to convert the number into **character** or **packed decimal** format respectively.

@ Pointer Example

See also:

- Example 10 - Compare 2 Files in section *Examples*.

```
 ____________________________________________________________________________
|                                                                            /
|   SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)    PW000 pw=0 (132)    (OS)\
| o ------------------------------------------------------------------------        /
|                                                                                   \
|                                                                                   /
| o          ** SMXPTR CTL N ***            L=007 --- 2001/11/23 17:09:44     *cmt*  \
|                                                                                   /
|                                                                                   \
| o      1.    rd CARD          w 222                                               /
|        2.    print  ty mc                                                        \
|                                                                                  /
| o      3.    @BEG = 1                                                           \
|                                                                                  /
|                                                                                  \
| o          ==LOOP==                                                            /
|              ----                                                              \
|        4.    @LEN = 1 at @BEG    type b      * Length byte at start of field.      /
| o      5.    print    fr @BEG+1 len @LEN-1   * Print the field excluding len byte. \
|        6.    @BEG = @BEG+ @LEN               * Point to next len byte.             /
|                                                                                    \
| o            if @BEG < lrecl                                                      /
|        7.                      t goto LOOP                                       \
|                                                                                  /
| o                                                                                \
|        8.    space 1                                                           /
|                                                                                  \
| o                                                                                /
|            e                                                                   \
|                                                                                /
| o                                                                              \
|       INPUT   SEL SEL                                                         /
|       RECNO   TOT ID.          1         2         3         4         5         6 \
| o     -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0./
|                                                                                    \
|           1     1   2 0Mr John Doe122a Haversham House0Park Hill Way0CARDIFF1Wales /
| o                     C           4                    E             8       1      \
|           1     1   5 Mr John Doe                                                   /
|           1     2   5 22a Haversham House                                         \
| o         1     3   5 Park Hill Way                                              /
|           1     4   5 CARDIFF                                                     \
|           1     5   5 Wales   CF03 6DD                                           /
| o         1     6   5                                                            \
|                                                                                  /
|                                                                                  \
| o         2     2   2 0Mr Joe Bloggs016 Tiny Court0BRISTOL1Avon    BR19 2DF       /
|                       E             E             8       1                      \
|           2     7   5 Mr Joe Bloggs                                              /
| o         2     8   5 16 Tiny Court                                              \
|           2     9   5 BRISTOL                                                    /
|           2    10   5 Avon    BR19 2DF                                          \
|/\/\/\
```

CBLNAME & SELCNAM

The SELCOPY default run-time environment parameters are defined in the **CBLNAME** phase/load module, the **SELCNAM** editable text file or both.

CBLNAME Overview

CBLNAME is a loadable phase/module containing system default options.

AS/400, UNIX and PC

The CBLNAME module does not exist on **AS/400, UNIX** and **PC** platforms so SELCNAM must be configured.

Mainframe

A loadable phase/module with the name **CBLNAME**, **must be available** to SELCOPY at every execution, providing installation standards and defaults.

The separate document, **"SELCOPY Installation Guide"**, gives full information on how to set up the CBLNAME phase/loadmodule either by manually editing and updating the **source data** for the assembly of CBLNAME (for advanced users), or by issuing the CBLNAME macro with system defaults as parameters. It also references SELCOPY procedures, supplied by CBL, which recreate the CBLNAME source deck from the live CBLNAME phase/load module. This may be useful for existing users who may have lost their CBLNAME source.
This document and the CBLNAME source, CBLNAME macro and other related control files are supplied with the Distribution Material and via CBL's web site at http://www.cbl.com .

CAUTION: Users of **CBLVCAT** also use CBLNAME to set up default values for this product. Therefore, care must taken that these options, and any other required options that may already exist, are maintained when updating CBLNAME. Also beware of overwriting an existing CBLNAME object with the skeleton provided on the SELCOPY distribution material.

Installation specific licence details (company name/location, operational date ranges and password) which are required for normal SELCOPY execution, may be coded in the CBLNAME module. However, it is recommended that they are supplied in the SELCNAM data set described below. Other CBLNAME options available are discussed later in this section.

SELCNAM Overview

See also:

- OPTION, PASS=x'nnnn,nnnn,nnnn,nnnn', RANGE=yyyy/mm/dd-yyyy/mm/dd and SITE='string' in section *Operation Words, Parameters and Keywords*.

SELCNAM is an editable plain text file that may also contain system default options.

AS/400, UNIX and PC

Since the CBLNAME module does not exist on **AS/400, UNIX** and **PC** platforms, this file is **mandatory** and must be filed as **SELCOPY.NAM** on the current directory, on the same directory as the **SELCOPY.EXE** file, or on a directory in the **PATH**. The current directory is checked first. It is read and actioned for every single execution of SELCOPY. Thus, any OPTION parameter in it will be applied universally.

Mainframe

On **mainframe** platforms, use of SELCNAM is recommended as it is the vehicle by which future new SELCOPY default options will be defined. For **VSE**, existence of a SELCNAM data set is **mandatory** (refer to **Important Note** below).

It is a convenient method of defining current system default options for SELCOPY and is an alternative to changing the CBLNAME phase/load module. Furthermore, any option specified in SELCNAM will override the equivalent option field of CBLNAME. It is, therefore, a more simple method of setting and maintaining system default parameters.

However, because SELCNAM cannot control all system options, CBLNAME **must still be available** to SELCOPY at execution time.

SELCNAM may exist as one of the following:
For MVS, it may be cataloged as a physical sequential data set or as a member of a PDS/PDSE.

For VSE, as a SAM file only.
For CMS, as a minidisk file only.

Mainframe SELCOPY will process SELCNAM as follows:

1. If the filename 'SELCNAM' already exists via a DD, DLBL or FILEDEF statement, then SELCOPY will process control statements from this data set.
2. If the SELCNAM DSN is specified in the SELCOPY extension field of CBLNAME , then SELCOPY will attempt to dynamically allocate it with the filename 'SELCNAM' for subsequent control card processing.
   VSE users should also have the volume on which the DSN is defined, specified in the **CBLNXVOL field** of CBLNAME .
3. If no default DSN exists in CBLNAME, then SELCOPY will attempt to allocate the filename 'SELCNAM' to the data set 'SELCOPY.NAM'.
   For **VSE**, SELCOPY will assume the data set resides on volume **SYSWK1**.
   For **CMS**, dynamic allocation takes place for the file 'SELCOPY NAM *'.
4. If no SELCNAM DSN is found, then no SELCNAM control file is processed and all SELCOPY environment options are determined by the **CBLNAME** module only.

Important Note

For SELCOPY on **VSE** only, failure to OPEN the SELCNAM data set will result in error message **"4301I NO FORMAT 1 LABEL FOUND"** and the job cancelled. Therefore, the SELCNAM data set **must** exist, even if it is empty.

SELCNAM has the same format as a normal SELCOPY control card file, where the only control cards permitted are **OPTION** statements. If an option is duplicated, the last one processed is effective. The only exception to this is the **RANGE** option which may be repeated to define multiple date ranges that are cumulative and mandatory for SELCOPY's password processing.
With the exception of **OPTION HEAD** and **OPTION REPORT HEAD**, any supported user option may be coded in the SELCNAM file and will override the equivalent option field in CBLNAME. e.g. **OPTION SEP=';'** in SELCNAM will override the default separator character in CBLNAME field **CBLCSEP** (supplied by CBL containing the character **'!'**).

/* in pos 1,2 of any record in SELCNAM will terminate SELCOPY's checking for further option statements. Thus the file may contain additional comment records, without incurring any processing overhead.

In addition to the standard options, installation dependent licensing information may also be provided via the **SITE**, **RANGE** and **PASS** options which were introduced in SELCOPY for AS/400, UNIX and PC platforms and later in SELCOPY Release 9.8P for mainframe. If company name/location, operational date range(s) and password are not coded in **CBLNAME**, then these options and their arguments are **mandatory** for successful execution of SELCOPY.

SITE parameter

The **SITE** parameter and its argument defines the user's site name and is restricted to between 20 and 36 bytes in length. It replaces the first 36 bytes of the CBLNAME **CBLHEAD** field, which is reflected in the header record of each SELCOPY printed output page, and is one of the fields upon which a user's operational password is calculated.

RANGE parameter

The **RANGE** parameter and its argument **yyyy**/**mm**/**dd**-**yyyy**/**mm**/**dd** defines the date window within which the SELCOPY program will function normally. If the machine's system date is outside this date window, SELCOPY will terminate with **ERROR 124** (CHECK EXPIRY DATE).
If more than 1 RANGE parameter has been provided by CBL in conjunction with your password, then it is essential that they are all coded once in the SELCNAM file on 1 or more OPTION statement.

PASS parameter

The **PASS** parameter and its 8-byte hexidecimal string argument **x'0123,4567,89ab,cdef'** is the unique product password key supplied by CBL, which matches your **SITE** and **RANGE** arguments.

Note that the options **SITE**, **RANGE** and **PASS** may **only** be coded in the SELCNAM file and are **illegal** in normal SELCOPY control card input.

```
** Sample SELCNAM file **
opt site='Company Name - Location'
opt range=1900/01/01-2001/06/11  * Operational date window.
opt pass=x'0123,4567,89ab,cdef'
 * SITE, RANGE and PASS parameters are    mandatory if the licensing
 * information supplied by CBL does not already exist in    CBLNAME.
 * With the exception of OPTION HEAD, other user OPTION statements may
 * also be coded in the SELCNAM file.  These will override those
 * specified in CBLNAME.      e.g.
opt pw= 94  pd=86  eof=/*  sep=!
opt rdw                         * nordw is default for AS/400, UNIX and PC.
opt nordw                       * rdw   is default for MVS,VSE,CMS.

/*  All data below this eof record is ignored. (Not even read in.)
  Thus any installation specific data, comments etc, may be appended
  to the SELCNAM file without runtime overhead.
```

CBLNAME Options

Heading Line

It is a contractual obligation that **Company Name - Location** of the host site is recorded in the CBLHEAD field of the CBLNAME module. **Unless specified on the SITE parameter in SELCNAM, the first 36 bytes of this field must contain the company name and location information as supplied by CBL.**
The content of this field is written to the automatic heading line which appears at the top of each page of printed output produced by SELCOPY. Note that, if the licence details are specified on the SITE parameter in SELCNAM, then it will overwrite the first 36 bytes of the header field.
The maximum length of CBLHEAD is 55 bytes. Therefore, different headings are still possible by varying the content of positions 37 to 55.

Page Depth

See also:

- PAGEDEPTH in section *Operation Words, Parameters and Keywords*.

Page Depth may be changed from default of 58 for MVS, or System Linecount for VSE, to a preferred value by changing the CBLCLINE field.
Users of the other CBL products should note that **CBLVCAT, CBLDOC** and **SELUPD** already use this field for page depth.

Page Width

See also:
PAGEWIDTH in section *Operation Words, Parameters and Keywords*.

Page Width may be changed from a default of 133 bytes, including the **ASA** character, to a value between 72 and 160, by changing the CBLCPW field, but the actual I/O command for printing is still restricted to 133 bytes, so data may be lost.

Separator Character

The Separator Character is used to separate logical SELCOPY control statements which are supplied on the same physical control record, and it is taken from a byte in CBLNAME called **CBLCSEP**.
CBLNAME is always distributed with an **Exclamation Mark** in CBLCSEP as **default**. A value of X'00' indicates **SEP=OFF**.
The CBL products **SELUPD** and **CBLVTOC** also use CBLCSEP, so changing its CBLNAME default could impact other work.
The **SEP** parameter on the **OPTION** statement may be used to temporarily overrule the Separator Character.

Default DB2 SubSystem and Plan Names

The CBLCDB2S character field length 4, and CBLCDB2P character field length 8, may be altered to reference a user specified DB2 subsystem and plan name as default for SELCOPY DB2 processing. CBLNAME is distributed with **CBLCDB2S DC CL4'DB2A'** and **CBLCDB2P DC CL8'CBLPLAN0'**.

Default VSE I/O Buffer Size

VSE I/O buffer size may be set, by changing the CBLSBUFS field, to prevent SELCOPY from allocating up to device capacity of the default disk device for its I/O buffers. When it is known that no file exceeds a blocksize of 8000, for example, it is worth restricting the default buffer size in this way.

Default MVS No of I/O Buffers

See also:
BUFNO in section *Operation Words, Parameters and Keywords*.

For **MVS** systems, the default number of buffers used by SELCOPY for its QSAM Input and Output may be set with the CBLNAME fields **CBLSBUFI** and **CBLSBUFO**.

Note that the **BUFNO=n** parameter and its associated **CBLNAME** default are ignored for **VSAM**.

System Determined BLKSIZE for MVS

The **X'08'** bit of **CBLSREL**, the Release Dependencies flags in **CBLNAME**, may be set on to cause invocation of **System Determined BLKSIZE** for MVS users with **SMS**.

Empty MVS VSAM Files

See also:
Section *VSAM Files*.

An option is provided to give **MVS** users controlled processing of a **DEFINED**, but **empty**, VSAM file, in the same way as under the **VSE** Operating System. **AT THEIR OWN DISCRETION**, MVS users may set **CBLSREL** to force SELCOPY to treat VSAM RC=160 as an Empty File.

CLOSE=RWD for VSE Input Tapes

The CBLSUSR2 switch may be altered to cause the default action for VSE Input tapes to be CLOSE=RWD instead of CLOSE=UNLD.

Default VSE Disk Device Type

This can be useful at an installation where mixed disk devices are available. This default would normally be set to the smallest of the disk devices available. If not set, the default disk device is the same as SYSRES.

Minimum Return Code

A Return Code **Minimum** significant value may be coded instead of the default minimum of zero. Any Return Code that is below this minimum is automatically suppressed and replaced with zero for passing back to the operating system. **However**, SELCOPY's listing output summary will still show the correct value.

Abend Trap ON or OFF

See also:
Section *Mainframe Debugging Aids*.

This switch is effective for both VSE and MVS, and controls the action taken in an abnormal end situation.

ICCF and CMS/DOS Jobs off Terminal

Under **VSE**, or under **CMS** with **DOS ON**, when SELCOPY is invoked via the terminal, by default SELCOPY reads its Control Cards from that same device.
For most **ICCF** and some **CMS** users, this is not the desired default.

A CBLNAME setting can force Control Card Input to be taken from a **Card File**, not off the Console or Terminal.
This option is for VSE jobs initiated off the Console, or **VSE procedures**.
Having set this option in CBLNAME, to **override** it for a specific job, it is only necessary to set **UPSI** 11000001 (X'C1' for Console Input).

NORDW default

See also:
NORDW in section *Operation Words, Parameters and Keywords*.

The **X'20'** flag of **CBLSUSR2** in **CBLNAME** may be set to cause **OPTION NORDW** to be the installation default.

This will cause all **RECFM=V** input files to be processed without presenting the 4-byte **Record Descriptor Word** to the user in the input area, or work area.

Suppress VSE CLOSE on Failure

The CBLSFAIL field is specifically for the **VSE user** who may wish to prevent dynamic updating of catalog entries being triggered automatically by the CLOSE SVC when SELCOPY closes its files after detecting an error condition.

Unsuitable for MVS because files are automatically closed by the system if left unclosed by the program.

Error Messages on Operator's Console

These can be undesirable in certain busy operating areas, so a switch in CBLNAME allows them to be controlled.

X'00'	Suppress Nothing.
X'01'	Suppress **Control Card** Errors only.
X'02'	Suppress **Select Time** Errors only.
X'03'	Suppress **Both types** of error.

Release Dependencies

Different releases of IBM software may use different control blocks or different codes.

X'80'	MVS/IMS Release less than 1.2
X'40'	VSE/VSAM used in CMS is less than Rel 3.1

Max BLKSIZE for VSE FBA Disks

See also:
BLKSIZE=n and DEV=cuu in section *Operation Words, Parameters and Keywords*.

Files on **FBA disks** (3310/3370/9332,9335), are checked against a SELCOPY defined constant of **16384 bytes**, representing the arbitrarily chosen maximum **BLKSIZE** for FBA disks.
If the CBLSFBAM field is non-zero, it will be used to replace SELCOPY's 16384 constant.
SELCOPY's default may be reduced or increased, but the **Maximum** value permitted is **AL2(32760)** (X'7FF8'), a restriction imposed by standard Logical IOCS.

Default STOPAFT for PRINT output

Installations may limit the amount of output to the **PRINT** file by coding a non-zero value here. This limit will only be effective on **PRINT output** statements that **do not** contain a **STOPAFT** parameter.
The **Maximum** value permitted is **AL2(32767)**. However, beware of making it **too low**, because some genuine jobs could require a large print output.

Suppress KEY/REC NOT FOUND data

A switch bit in **CBLSUSR1** in **CBLNAME** may be set **ON** to suppress the generation of a 25-byte record containing

```
"--- KEY/REC NOT FOUND ---"
```

in the I/O area or work area after failure of a **direct read** for VSAM, CMS, ISAM, IMS/DL1 or ADABAS data management.

If this option is chosen, it will suppress

```
"--- KEY/REC NOT FOUND ---"
```

being generated for **all** direct reads on **all** the above data management types, so the user will have to test the appropriate return code.

Quoted Filenames for CMS

If the filename for **CMS I/O** is provided in quotes, then, contrary to the SELCOPY standard, the name is made **Upper** Case before passing to CMS. However, it is sometimes intentional that a CMS filename is in lower or mixed case. i.e. simply to hide the file from the non-expert user.
This switch disables the upper casing when a CMS filename is provided in quotes.

Suppress Return Code for VSE/SP2

A switch bit in **CBLSUSR2** may be set ON to suppress the Return Code for VSE/SP2 and above, in spite of the fact that the operating system can handle it. SELCOPY will then either end normally with a **VSE EOJ** macro or abnormally with a **VSE CANCEL** macro, as it did under original DOS.
Certain VSE installations with OEM products which do not recognise VSE return codes require this non-standard action but its use is not recommended.

Force VSE CANCEL if DL1 Error

A switch bit in **CBLSUSR2** in CBLNAME may be set ON to **force VSE CANCEL** if SELCOPY is invoked by DL1 under VSE, and an error condition is detected.
Note however that VSE DL1 Rel 1.8 will accept Return Codes from SELCOPY, so this switch is not required.

Datacom DL1 Transparency

Installations using this proprietary product are required to set a flag in **CBLSREL** indicating that the product is installed.

Return Code=16 option in CBLNAME

See also:
RETURN CODES set by SELCOPY in section *Messages*.

When all output selection totals are zero, SELCOPY's standard action is to set **RC=16** to alert the user of a potential problem. However, the **CBLSRC16** byte may be set to an installation defined value which controls the **Return Code** value when all output totals are zero. It may be set to any value up to 254, or inhibited altogether.

VSE DL1/MPS Flag

In certain VSE environments, when the MPS version of DL1 is invoked (DLZMPIxx or DLZCTRL), communication problems can arise with regard to SELCOPY's inspection of DL1 storage in order to establish the LRECL of the last segment read. (A Fetch Protection exception can occur). A switch in CBLUSR2 may be set which will default all segment lengths to 512 bytes. If MPS/DL1 is not being used, then this switch is ignored and segment lengths are established in the normal way.

Century 50/50 Split Flag

SELCOPY will detect a **Y2000 Enabled** operating system and trust its date information.
For **Non-Y2000 Enabled** operating systems, the system date is determined based on a 50/50 split, treating the years 01-49 as being in the 21st century, and the years 50-99 as being in the 20th century. A switch in CBLCSW1 may be set to force use of the **50/50** technique regardless of the capabilities of the operating system.
This switch has only been introduced as an additional safety feature. It is not anticipated that its use will ever be required.

Mainframe Debugging Aids

SELCOPY should never dump, but it is unrealistic to leave out this section. It is not intended as a full reference for dump analysis, but we do hope that, as a guide, it may assist you in some areas.

In an abend situation, depending on the Operating System, the JCL used, and whether SELCOPY's **Abend Trap** is enabled (via **CBLNAME** setting or **ABTRAP=YES**/**NO** on an **OPTION** statement), a storage dump is produced on **SYSLST** or **SYSUDUMP**, or in a CMS environment you just return to CMS with a single line error message.

Any part of storage may have been overwritten so the information below is not always true. Also, the error may have occurred outside SELCOPY, in which case the registers displayed are not SELCOPY's.

All **registers** and **displacements** quoted below are **release dependent**, and subject therefore to change without prior notice. Every effort however will be made to avoid inconvenience to the user.

The **Abend Trap** option in SELCOPY will suppress the storage dump produced by the system in abend situations, and instead give the user more readable diagnostics, and it is recommended that this option is taken at install time, for all operating systems, by setting the appropriate "bit" in **CBLNAME**, because when the Abend Trap is enabled it is normally much easier to find the cause of the problem.

The Abend Trap should only be **disabled** when the problem is such that a conventional dump is needed by CBL for investigation.

Code **ABTRAP=NO** on an **OPTION** statement, in order to disable the Abend Trap on a temporary basis.

ABEND Trap Set ON

Program Check Interrupt handling for **MVS, VSE** and **CMS** is provided, but interrupts are only trapped and handled by SELCOPY if the CBLNAME option for **Abend Trap** is set **ON**.

Selected areas of storage are printed instead of the normal full dump of the **whole of storage**, which is not only wasteful of paper if it is printed, but is also wasteful of system resources, whether printed or not.

Selection Id

The offending Selection Id is usually all that is needed in order to establish why an arithmetic operation has failed. This is readily available, printed at the bottom of the SELCOPY Selection Summary, alongside the **Return Code 88** message.

If an abend occurs on an **IF arithmetic test**, the Selection Id (SEL-ID) of the statement following the offending IF statement is displayed, prefixed with less than signs (<<<). This is because an IF statement does not have a Selection Id of its own.

File Name Last Used

The full Selection Summary is printed, together with the failing Selection Id, which gives immediate access to information on **all files** used.

Arithmetic Exceptions

Arithmetic errors, often only due to an uninitialised work area, may therefore be diagnosed more easily by the user, knowing the failing selection id, without having to contact technical staff.

Diagnostic Information

In addition to normal output, the following information is also supplied on the **SYSPRINT**/**SYSLST** output:

```
SELCOPY ABEND PROCESSING....          PSW........ Addr. @b3 R0       R1 @b2 etc
```

This is immediately followed by a **TYPE=D** (Dump Format) print of SELCOPY's Abend Control Block which contains:

8 bytes -	Character constant **' AB S/A '**
8 bytes -	PSW at time of Interrupt. (Both VSE and MVS)
64 bytes -	Registers 0 through 15 at time of Interrupt. (Both)
8 bytes -	VSE PSW at time of Interrupt. (X'00's for MVS)

4 bytes -	VSE Abnormal Termination Code. (X'00's for MVS) Refer to IBM's manual "Supervisor and I/O Macros" (GC33-5373). Some Abend Codes for VSE (in hex) are: • 19 Operator replied CANCEL or EOB to I/O ERR. • 1A An I/O Error has occurred. • 20 Program check, e.g. a Divide exception. • 22 Phase not found. • 23 Cancel macro issued. • 24 Cancelled due to Operator intervention. • 27 Undefined Logical Unit.
4 bytes -	Reserved. (X'00's)

SELCOPY WORK AREA.... (UP TO 4096)

If a Work Area is in use, the above message is printed and is immediately followed by a **TYPE=D** (Dump Format) print of the first 4096 bytes of SELCOPY's Work Area.
Register 10 above should contain the absolute address of this work area.

***** SELECTION TIME ERROR 536 *** *** SYSTEM ABEND INTERCEPTED *****

The above message gives an error number to identify the condition.

MOST RECENT INPUT BLOCK (PRINTED FROM I/O BUFFER)....

If an input I/O buffer exists the above message is printed and is immediately followed by a **TYPE=D** (Dump Format) print of the whole of the most recently used input I/O buffer. No truncation occurs.

***** WARNING *** 88 = RETURN CODE FROM SELCOPY (SEL--nnn)**

A high Return Code is given, as before, but additionally, the Selection Id of the offending, or at least the last active, SELCOPY statement is given in brackets. If this information is not available at the time, the selction id is omitted.

Finally, the **Selection Summary** is printed in full, as on an execution which completed normally.

ABEND Trap Set OFF

Selection Id

Even with the Abend Trap OFF, finding the selection-id of the operation SELCOPY is currently obeying is often all that is required to point to the source of the problem. **Register 3** will point at the beginning of a control block for the current selection (a THEN, ELSE or NOW card), and at **a displacement of X'60'** on this address you will find a half-word (2 bytes) containing the **Selection-id** in hex.

File Name

The **file name** last used or currently being used by SELCOPY is another possible source of debugging information. **Register 4+X'20'** will often point at this 8 byte file name.

Selection Summary

Because the Abend Trap is switched OFF, no Selection Summary can be printed. The system has taken control and does not return to SELCOPY.

Arithmetic exceptions

See also:

- ADD=n, SUB=n, MULT=n and DIV=n in section *Operation Words, Parameters and Keywords*.

The packed decimal arithmetic operations **ADD, SUB, DIV** and **MULT** can go wrong for various reasons, giving a Decimal Data Exception. The data on a record may have invalid characters.

Even if you have already located the **selection-id**, it may still be too much to believe that something is wrong. The following information may then be of assistance:

No INTO=n (i.e. no dest. field.) **INTO=F3** (i.e. dest. field.)

Op Wd	R8 (Len)	R7	R9
ADD	F1 F2	A(F1)	A(F2)*
SUB	F1 F2	A(F1)	A(F2)*
MULT	F1 F2	A(F2)	A(F1)*
DIV	F1 F2	A(F1)*	A(F2)

Op Wd	R8 (Len)	R7	R9
ADD	F3	A(F3)*	A(F2)
SUB	F3	A(F3)*	A(F2)
MULT	F1 F2	A(F2)	A(F1)
DIV	F3 F2	A(F1)	A(F2)

Rn - Register n Fn - Field n A - Address * - A(result)

The **"machine"** length is always 1 less than the actual length, and is stored in a single hex digit. i.e. it will only take up 4 "bits" (half a byte). Thus together, the two lengths only take up 1 byte, the **junior** (right most) byte of **Register 8**. The other 3 bytes of R8 will be zero.

```
ADD  4 AT 20   TO  6 AT 30
```

Reg 7 will point at position 20 of the work or I/O area.
Reg 8 will contain X'0000 0035' (M/c lengths 3 and 5).
Reg 9 will point at position 30 of the work or I/O area.

In the case of a **DIVIDE INTO**, SELCOPY will use its own work area of 16 bytes for the temporary destination, and the destination machine length in **R8** will not be set.

When totally convinced that all data is valid and correct, remember that with decimal arithmetic, when a result is too large for the destination field, the decimal data exception does not occur until the destination field has overflowed. Thus the data in the dump will appear to be valid.

Decimal data exception may also occur on a **MULT** operation where the destination field is of insufficient length.

Under CMS

For versions of VM prior to VM/ESA, to look at storage in a program that has just abended you may use the **CMS DEBUG** facilities which are described fully in the CMS Command and Macro Reference.
In later releases of VM, the functions provided by the DEBUG subcommands are available using **CP DISPLAY** , **TRACE** and **PER** - Refer to CP General User Commands.

Avoiding Loops

See also:

- Looping on GU in section *IMS and DL/1 Processing*.

The missed **IF EOF** statement can cause a loop. **EOF** tests do not **have** to follow a READ operation. They may go anywhere, but beware of a **GOTO** which can cause SELCOPY to bypass the EOF test, resulting in an infinite EOF loop, This is discussed more fully under the **EOF** statement and also in the section on Multiple Input Files.

Beware too of getting the **last record doubled**:

```
READ FILEA
WRITE FILEB        * Last record  written    ** TWICE **
IF EOF FILEA
  THEN PRINT       * Print last record.
  THEN GOTO EOJ
```

For safety and readability, **EOF tests** should be **immediately after** the READ operation.

The SELCOPY Query Desk

Your installation's Technical Representative has access to the **"SELCOPY Query Desk"**, so if the above information is insufficient, please pass the problem on, so that it may be referred to us by post, fax, e-mail or telephone as preferred.

ISAM Files

ISAM Input -Sequential

ISAM (Indexed Sequential Access Method) files have **all geometry** details of input files held in the VTOC entry, under both **VSE** and **MVS**.

It is necessary to indicate that an input file has indexed sequential organisation by coding the **ISAM** parameter on the READ card. The correct DCB (Data Control Block) for MVS or DTF (Define The File) for VSE is then generated by SELCOPY.

Fixed blocked, unblocked, and for MVS, variable ISAM is supported. Only the **Record data** is available within the input area. Thus, **Key data** is only available to the user if embedded within the record data, which for **blocked** ISAM is obligatory.

ISAM files may be read sequentially, starting at the beginning of the file, or from a record defined by the **STARTKEY** parameter whose argument may be a literal representing the key of the first record to read, or a numeric length followed by an AT parameter defining the position in the work area holding the required START key.

```
READ ABC @b3 ISAM         * Normal read from start of file.
READ ABC @b3 ISAM  @b3 STARTKEY 'DEP029'
READ ABC @b3 ISAM  @b3 STARTKEY 6 AT 4000
```

ISAM Input - Direct

Records may be read off an ISAM file directly **by KEY** (the **full key** must be specified) thus allowing rapid processing of scattered records. e.g.

```
READ ABC @b3 ISAM  @b3 KEY 'DEP029'
READ ABC @b3 ISAM  @b3 KEY 4 AT 2980
```

Direct reads, where the **KEY** argument is a literal, automatically have **STOPAFT=1** assumed, so an **EOJ** statement is not needed to prevent loops if no other input exists.

```
READ ABC  @b3 KEY 'DEP004'
PRINT
EOJ       * May be omitted.
```

ISAM Update

ISAM records read may be updated with **UPDATE** (synonym **REWRITE)**:

```
READ ABC @b3 ISAM
IF P 27 = X'4040'
THEN  P 27 = X'000C'         * Force valid Packed decimal.
THEN UPD ABC                 * Rewrite last record read.
```

Any format ISAM file may be updated. It is always the **last record read** that is updated, but no change may be made to the **key** or **record length**.

ISAM Output - Blocked

Blocked ISAM must have the key of each logical record embedded within the record data, so a **KEYPOS** parameter must be coded on at least one card that mentions that output file.

```
READ CARD @b3 W 300
PRINT
WRITE ABC @b3 ISAM @b3 KEYLEN 4 @b3 KEYPOS 2 @b2 L=188 B=1880
END
X0123 this is 1st data record, with key of 0123.
X0222 2nd data record.... etc...
```

ISAM Output - Unblocked

By definition, the key used for accessing an unblocked ISAM record is stored externally. It is not part of the record.

If the user requires the contents of this key to be repeated in the record then the choice is his, but from the Access Method's point of view it is simply data. Thus it is reasonable to say that for unblocked ISAM it is not possible to define the key as having a position within the record.

Thus, for an **unblocked ISAM output** file, the parameters **KEYPOS, KP, KEYLOC** and **RKP** (Relative Key Position) are all treated as **illegal** and the run is terminated with an error message to that effect.

KEYLEN Param

For ISAM output, the user **must** supply **KEYLEN** or **KL** (the key length) to SELCOPY, as well as the data to be used for creating the externally stored key. Also the data required for the record (taken from POS=1 if no FROM=n is used) must be supplied together with its length, **LRECL**.

KEYFROM Param

The **KEYFROM=n** or **KF=n** parameter allows the user to define the position within the record or work area from which the key is to be taken.
This is **similar** to the **FROM=n** parameter which defines the start position in the input record or work area, from which data is to be used for the output record.

```
  READ CARD
  WR DISK INDEXED   KEYLEN=4   LRECL=20   FROM=15   KEYFROM=11
  END
DATA CARD 0001Data starts at pos 15, after key at pos 11.
DATA CARD 0002<----DATA--L=20---->
....,....1....,....2....,....3....,....4....,....5....,....6
```

Beware of the **other similarity**. As with the FROM parameter, the **KEYFROM** parameter may have a different argument on each WRITE, and if omitted the default technique as described below is used. So if you do use the KEYFROM parameter, and you reference the same ISAM file on more than one output statement, it is **essential** that **KEYFROM** is coded **on every one**.

KEYFROM Omitted

If the KEYFROM parameter is omitted, the key and record data **must be** arranged in the SELCOPY input area (or work area if WORKLEN=n is used), so that the first (KL) bytes are the key and the record area also, then it is the user's responsibility to move it there.

```
  READ CARD
  WR DISK  INDEXED   KEYLEN=4
  END
0001THIS IS 1ST DATA REC
0002DATA FOR 2ND REC
```

The above will create an unblocked indexed sequential file with a key length of 4 and data length of 80. LRECL was not mentioned on the READ, so defaults to 80. LRECL not mentioned on the WRITE, so defaults to same as input file, 80. BLKSIZE not mentioned on the now card so defaults to LRECL for that file, 80, and is therefore unblocked.

Four bytes at the beginning of the input record are used for the key. 80 bytes are then required for that data portion of the output record, but only 76 are left. The data portion is therefore padded out with 4 blanks (the default FILL character, because it was not mentioned) at the right hand end to make it up to eighty bytes.

Note that in the above example, the key data is not repeated within the record data, so when the file is later read, the key is not available. To get **key data included** in the record:

```
  READ CARD   INTO 5   WORKLEN 160
  MOVE 4   FR 5   TO 1
  WRITE DISK   ISAM   KEYLEN 4
  END
0001THIS IS 1ST DATA REC
0002DATA FOR 2ND REC
```

TSO Usage

Just by issuing a few **ALLOCs**, (for SYSIN, SYSPRINT plus any input/output files necessary), we can execute SELCOPY straight from the **TSO READY** prompt or from an **ISPF Command Line**.

Users who have access to a TSO screen may like to actually key in the following statements in order to verify the ease of getting simple ad hoc jobs to work.

Let's consider printing the first 6 records from any data set. For our example we'll use CBLNAME.ASSEMBLE.

We must first issue ALLOC statements to our own terminal for **SYSIN** (our control statements) and **SYSPRINT** (our output listing).

```
alloc sysin     dsn(*)
alloc sysprint  dsn(*)
```

Next issue an ALLOC for our input file using the name **INDD**.

```
alloc indd      dsn(cblname.assemble)          reuse  shr
```

We can now invoke SELCOPY, by simply issuing the command **SELCOPY**. The system will find the program SELCOPY if it is on the link list, otherwise we should code **lib.name(SELCOPY)** to say where it resides.

SELCOPY will read from **SYSIN** which we have set to our own terminal. Therefore all commands that follow are treated as SELCOPY's control cards, until a /* card is encountered.

We then key in our control cards followed by a /*, using the separator character to combine them all onto one line, and watch the output listing appear on **SYSPRINT** which we have allocated to our screen.

```
SELCOPY
read INDD  !print  stopaft 6   !/*
```

Our next test will print the first 2 records from the first 4 members of a **PDS**. SYSIN and SYSPRINT are already ALLOC'd, so just ALLOC for the PDS:

```
alloc pdsin     dsn(partitioned.data.set.nam)  reuse  shr
SELCOPY
read PDSIN  dirdata
if dir  !a in > 4  !t eoj
if data !a in > 2  !t flag eomemb  !t space 2  !t gg
print   !/*
```

TSO Example 1 - S CLIST

The following **live example** illustrates use from **TSO's READY** message, using the **S CLIST** (provided on the distribution CD as **S TSO)** to invoke SELCOPY, taking its control cards from parameter 1.

Using the command **'S TERM'**, the CLIST allocates both **SYSIN** and **SYSPRINT** to the user's terminal. This type of invocation is ideal for one-off jobs to investigate, for instance, the layout of files, or for simple fixes as shown in the following example.

We wish to read all members of a PDS with the dataset name, 'prefix. **ABCD'**, which happens to contain JCL. Where the JCL calls the program **IEWL**, replace it with a call to the program **XXXX**. This, of course, is not a real program name but serves as an example.

```
 READY
alloc f(abcd) dsn(abcd) reuse shr

 READY
s        term

 /* to end - Enter SELCOPY control cards ...
rd abcd dirdata upd!if p any = 'IEWL'!t p @ = 'XXXX'!t upd abcd!t pr

 SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal)
 -----------------------------------------------

      1.  RD ABCD DIRDATA UPD

                              IF P ANY = 'IEWL'
      2.                                      T P @ = 'XXXX'
      3.                                                 T UPD ABCD
      4.                                                          T PR
/*


     INPUT   SEL SEL
     RECNO   TOT ID.          1         2         3         4         5
     -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....
         3     1   4 //LKED     EXEC  PGM=XXXX, ???REGION=4M,
         2     2   4 //LKED     EXEC  PGM=XXXX, ???REGION=4M,
         8     3   4 //LKED     EXEC  PGM=XXXX,                        ???REGION=
                     ....,....1....,....2....,....3....,....4....,....5....,....

 SUMMARY..
  SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
  ------      ------      ----     -------  -----           -----   --    ---
     1            46 READ ABCD         800    80 FB              3       DJH.ABCD
     2             3
     3             3 UPD  ABCD         800    80 FB              3       DJH.ABCD
     4             3


          ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +4
                                                 ** EXPIRY DATE -- 2002/05/21
 READY
 ____.____1____.____2____.____3____.____4____.____5____.____6____.____7____.____
                                                 ** EXPIRY D SCROLL ===> HALF
 READY                                                      MAIN ==> UNLOCKED
 ===>
```

The above example is perfectly good for a controlled example, but has certain short-comings if we consider changing a more commonly used string.

1. There is no check to ensure that we don't update directory records. If an attempt was made then SELCOPY would terminate with **ERROR 565**. However, the **IF DIR/IF DATA** syntax can be used to easily distinguish the two types of record.
2. Only the first occurence of the string within each record will be modified. A few additional statements could create a loop to overcome this problem.

An easier and better (in that it eliminates the deficiencies above) way to achieve the same update would be to use a **REXX** exec called **SCANPDS**, which is also provided on the **SELCOPY** distribution tape.

```
SCANPDS ddname string1 string2
```

where

ddname	is the ALLOC for the input PDS,
string1	is the string to scan for,
string2	if provided is used to overwrite string1, wherever found, and update that PDS member record.

```
SCANPDS abcd IEWL XXXX
```

SCANPDS is shown in full later in this section.

TSO Example 2 - CLIST

The following **CLIST** for **TSO**

illustrates a very simple usage of SELCOPY under **TSO** for printing the first **&STOP** records from a **PDS** member, at the same time restricting the length of the record printed to **&LMAX** bytes.

SYSIN is alloc'd as a temporary dataset and built using **PUTFILE SYSIN** statements which use the **&SYSIN** variable which is first set with the required SELCOPY control statement.

This ALLOC for **SYSIN** could be changed to **DSN(*)** to have SELCOPY read your control statements from your terminal as you key them in. If you try this, remember that **QUIT** will get you out of trouble, instructing SELCOPY to abandon reading control cards and terminate the job immediately without attempting to process anything.

SYSPRINT is alloc'd to the user's terminal so the output is available for inspection immediately. It could of course go to a disk dataset or to **SYSOUT** for later editing or printing.

SELCOPY control statements are all in **lower case** to assist in identifying them. **&STOP** and **&LMAX** will of course be replaced by the CLIST command processor with your supplied parameters or the CLIST defined default value.

The **read indd** statement is not a variable here, but could become so by changing it to **read &INDD** and modifying the CLIST to set a default value for it, or better setting up a separate CLIST. Then you would be able to read any dataset for which an **ALLOC** exists, including **VSAM** files.

A CLIST to read your **IMS data base** can then be the next step.

```
EDIT       DJH.ISPCLIB(SELCPRTD) - 01.00                Columns 00001 00072
Command ===>                                              Scroll ===> PAGE
****** ***************************** Top of Data ******************************
000001 /** SELCPRTD - SELCOPY Print TYPE=D - L=002 - 2001/11/19 10:07:40 **/
000002
000003 PROC 1   MEMB STOP(11)  LMAX(LRECL)
000004 CONTROL NOMSG NOLIST
000005 FREE F(SYSIN,INDD)
000006 CONTROL   MSG
000007
000008 ALLOC F(SYSIN)    SPACE(1) TRACKS  RECFM(F,B) LRECL(80) BLKSIZE(3120)
000009 ALLOC F(SYSPRINT) REUSE DSN(*)
000010 ALLOC F(INDD) SHR REUSE DSN('CBL.SMAN.CTL(&MEMB)')
000011
000012   OPENFILE SYSIN OUTPUT                  /** Prepare SYSIN **/
000013 SET &SYSIN=&STR(     option pw=79 nopctl               )
000014    PUTFILE SYSIN
000015 SET &SYSIN=&STR(     read indd                         )
000016    PUTFILE SYSIN
000017 SET &SYSIN=&STR(     print  type d   s=&STOP  l=&LMAX   )
000018    PUTFILE SYSIN
000019   CLOSFILE SYSIN                         /** SYSIN set up  **/
000020
000021 CALL 'CBL.LINKLIB(SELCOPY)'
000022
000023 FREE  F(SYSIN)
000024 ALLOC F(SYSIN)  REUSE    DSN(*)
000025
****** **************************** Bottom of Data ****************************
PF13=HELP      14=SPLIT    15=END      16=RETURN   17=RFIND    18=RETRIEVE
PF19=UP        20=DOWN     21=SWAP     22=LEFT     23=RIGHT    24=CURSOR
```

Figure 0. CLIST for TSO.

TSO Example 2 - in action

Below is an example of running the above **CLIST** from TSO's **READY** message, but it could also be run from within ISPF.

The **SELCPRTD** CLIST is invoked here using its fully qualified name enclosed in quotes, without specifying the mandatory parameter 1.
Alternatively, it could have been abbreviated to **EXEC (SELCPRTD) 'AA'** which would also eliminate the IKJ56700A message.

The optional **&STOP** keyword parameter is not provided, so it will default to **11** as defined on the **PROC** statement of the CLIST. However, because only 2 records exist on member **AA**, only 2 records are printed.

TYPE=D, Dump format, is chosen because, with **pagedepth=80** in effect, only 16 bytes per line are printed, thus keeping it all on 1 line of the screen.

```
 READY
 exec 'djh.ispclib(selcprtd)'
  IKJ56700A ENTER POSITIONAL PARAMETER MEMB -
 AA
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal)    2001/11/19 12:16   PAGE   1
  ------------------------------------------------    ----------------   --------
      INPUT   SEL SEL
      RECNO   TOT ID.
      -----   --- ---
          1     1   2            80
    0000  5C40E3C5 E2E340C6 C9D3C540 C1C14060     ** TEST FILE AA -*
    0010  40D9C5C3 40F140D6 C640F24B 40404040     * REC 1 OF 2.    *
    0020  40404040 40404040 40404040 40404040     *                *
    0030  40404040 40404040 40404040 40404040     *                *
    0040  40404040 40404040 F0F0F0F1 F0F0F0F3     *        00010003*
          2     2   2            80
    0000  5C40E3C5 E2E340C6 C9D3C540 C1C14060     ** TEST FILE AA -*
    0010  40D9C5C3 40F240D6 C640F24B 404DD3C1     * REC 2 OF 2. (LA*
    0020  E2E35D40 40404040 40404040 40404040     *ST)             *
    0030  40404040 40404040 40404040 40404040     *                *
    0040  40404040 40404040 F0F0F0F2 F0F0F0F3     *        00020003*

  SUMMARY..
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
   ------      ------      ----     -------  -----           -----   --    ---
      1             2 READ INDD       6160    80 FB             2       CBL.SMAN
 .CTL(AA)                              CBLM05
      2             2


   ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 *
                         ** EXPIRY DATE -- 2002/05/21 **
  READY
```

Figure 0. TYPE=D Output to TSO screen.

The wrapped line, (the dataset name & VOLID), in the selection summary above is an irritation which may be eliminated by running your TSO session under Session Manager.

TSO Example 3 - CLIST

Example 3 is a simple sophistication of the first, increasing the flexibility of the mandatory positional parameter, which we will rename from **&MEMB** to **&DSNAME**, and introducing 2 more CLIST keyword parameters, **&TYPE** and **&INPARM**.

SELCOPY's **Print TYPE** is passed to the **CLIST** using the parameter, **&TYPE**. A useful improvement because SELCOPY's **TYPE=D** (Dump format) is not always the most appropriate. Refer to the **TYPE** parameter for details of other print types.

Instead of a **member name** of a **PDS** being the mandatory parameter passed, the whole data set name is required, which may be either a standard sequential data set, or indeed a member of a PDS (by coding the member name in brackets after the dsname). Quotes will be required if the fully qualified dsname is used.

The 2nd CLIST is therefore named **SELCPRT**. It is invoked below using its minimum name, just **SELCPRT**, but all 5 parameters are specified.

The optional **&INPARM** keyword parameter on the CLIST allows additional keywords to be passed to SELCOPY on its **READ** statement. In this case we want the keyword **DIR** to tell SELCOPY that it is the **directory** of the **PDS** that we wish to read.

TYPE=C, Character format is chosen because unprintable data is translated to full-stops.

```
 EDIT       DJH.ISPCLIB(SELCPRT) - 01.00                  Columns 00001 00072
 Command ===>                                               Scroll ===> PAGE
 ****** ***************************** Top of Data ******************************
 000001 /** SELCPRT - SELCOPY Print - L=003 - 2001/11/19 10:31:00 **/
 000002
 000003 PROC 1   DSNAME    INPARM('pass=x')  STOP(11)  LMAX(lrecl)  TYPE(d)
 000004 CONTROL NOMSG NOLIST
 000005 SMPUT \C.S TSOOUT CLEAR\          /* If running under Session Manager */
 000006 CONTROL   MSG NOLIST
 000007
 000008 ALLOC F(SYSIN)    REUSE SPACE(1) TRACKS  RECFM(F,B) LRECL(80) BLK(3120)
 000009 ALLOC F(SYSPRINT) REUSE DSN(*)
 000010 ALLOC F(INDD) SHR REUSE DSN(&DSNAME)
 000011
 000012   OPENFILE SYSIN OUTPUT                       /** Prepare SYSIN **/
 000013 SET &SYSIN=&STR(     option pw=80 nopctl               )
 000014    PUTFILE SYSIN
 000015 SET &SYSIN=&STR(     read indd   &INPARM               )
 000016    PUTFILE SYSIN
 000017 SET &SYSIN=&STR(     print  type=&TYPE  s=&STOP  l=&LMAX   )
 000018    PUTFILE SYSIN
 000019   CLOSFILE SYSIN                          /** SYSIN set up completed **/
 000020
 000021 CALL 'CBL.LINKLIB(SELCOPY)'
 000022
 000023 ALLOC F(SYSIN) REUSE DSN(*)
 000024 FREE  F(INDD)
 ****** **************************** Bottom of Data ****************************


 PF13=HELP     14=SPLIT    15=END      16=RETURN   17=RFIND    18=RETRIEVE
 PF19=UP       20=DOWN     21=SWAP     22=LEFT     23=RIGHT    24=CURSOR
```

Figure 0. Another TSO CLIST.

TSO Example 3 - in action

The command:

```
selcprt   ispclib  inparm(dir)    type(c)  s(999)  l(100)
```

was issued from TSO's **READY** message, this time under control of **Session Manager**, although IBM's Session Manager for this example is not a requirement.

selcprt	invokes the CLIST **SELCPRT** which is listed above. It expects at least 1 positional parameter defining the input data set name.
ispclib	is that dsname. Because it is not in quotes, the user's prefix, in this case **DJH**, is applied, so the data set **DJH.ISPCLIB** will be allocated with a file name of **INDD** (line 10 of the EXEC).
inparm(dir)	causes line 15 to have **dir** substituted for the word **&INPARM** so the SELCOPY statement becomes **read indd dir** or more accurately, **READ INDD DIR** because the CLIST command processor would have translated all input to upper-case. (Use the **ASIS** parameter on CLIST's **CONTROL** statement to keep lower case as it is.) Note that we can cheat by using SELCOPY's **line-end** character, (!) to give an extra statement. e.g. **inparm('dir !prtctl *')** Quotes will only be required if the string contains blanks.
type(c)	simply translates into **TYPE=C** on line 17.
s(999)	is recognised by the CLIST command processor as **STOP(999)** and affects line 17. Any parameter name may be abbreviated on a CLIST provided no ambiguity results.
l(100)	overrides the default of **LRECL** for the **LMAX** parameter. Thus **L=100** is generated instead of **L=LRECL**.

The screen ouput below was produced:

```
 SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal)    2001/11/19 13:03   PAGE   1
 ------------------------------------------------    ----------------   --------
     INPUT   SEL SEL
     RECNO   TOT ID.          1         2         3         4         5
     -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....
         1     1   2 DJH     .........................DJH
         2     2   2 S       ....
         3     3   2 SELCPRT ....
         4     4   2 SELCPRTD.........................NBJ
         5     5   2 SS      .........................DJH
         6     6   2 STERM   ................. ......DJH
         7     7   2 SUPERZAP................. ......DJH
         8     8   2 VV      .........................DJH
         9     9   2 VVIDCAMS.........................DJH
                     ....,....1....,....2....,....3....,....4....,....5....,....

 SUMMARY..
  SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
  ------      ------      ----     -------  -----           -----   --    ---
     1             9 READ INDD      23476   222 VB              9       DJH.ISPC
     2             9


  ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 *
                        ** EXPIRY DATE -- 2002/05/21 **
 READY



 ____.____1____.____2____.____3____.____4____.____5____.____6____.____7____.____
                        ** EXPIRY DATE -- 2002/05/21 **       SCROLL ===> HALF
 READY                                                        MAIN ==> UNLOCKED
 ===>
```

Figure 0. TYPE=C Output to TSO screen.

Because the above was run under **Session Manager**, no line wrap occurs. Users can scroll right and left to view as required.

Note that:

```
TSO selcprt   ispclib  inparm(dir)    type(c)  s(999)  l(100)
```

would allow the above to be run from any **ISPF** session panel such as **EDIT**.

TSO Example 4 - SCANPDS

In this instance, the **REXX** lanuage, instead of a CLIST, is used to invoke SELCOPY.

SCANPDS is a SELCOPY job which enables the TSO user to **search** for, and optionally **update-in-place**, data strings within **all members** of a PDS.

This is achieved simply by keying in a **single command line** from the TSO READY message, or from within ISPF EDIT.

To search through a PDS whose data set name is **ABC.TEST.PDS**, printing all records which contain the string **'XYZ'** prefixed with the appropriate member name, key in the following:

```
alloc    PDSIN   reuse  shr  dsn(ABC.TEST.PDS)
scanpds  PDSIN  XYZ
```

To **change** all occurences of **'XYZ'** to **'PQR'** in the same library:

```
scanpds  PDSIN  XYZ  PQR
```

If update-in-place is not required, then the input file may be several partitioned data sets, all concatenated together by the ALLOC statement.

Limitations of SCANPDS

- Neither the search or replace string may contain blanks.
- Replacement strings which **differ** in length from the search string will not cause trailing data in the record to be shifted left or right to allow for the difference. Thus a replacement string which is longer than the search string will just overwrite following data. (For update-in-place, **no change to record length** can be made.)

Bonus Point

You also can get SCANPDS to work on **VSAM files**, just by changing your ALLOC.

```
/* SCANPDS.REXX Scan PDS Membs ***     L=005 +++ 93/04/08 22:00:20

Scan all members of a PDS or concatenation of PDSs for string1, and
                          optionally overlay with string2 and UPDATE.
   1st arg:  ddname    The ALLOC for ddname must already exist.

   2nd arg:  string1   The string to scan for.

   3rd arg:  string2   If provided, used to overwrite string1,
                       (regardless of length difference), wherever
                       found, and update that PDS member record.

   4th arg:  stopaft   Terminate after this many hits. Default 9999999.

   5th arg:  output destination.  Defaults to user's terminal.
                       1 digit taken as SYSOUT class.
                       2-8 digits taken as DEST parm using SYSOUT=B. */

parse arg   ddname   string1  string2     stopaft  printdest    rest
if string1 = ""  ³  rest <> ""
  then do
       say "Format:"
       say "              PDS      string1   string2     stopaft   print"
       say "  SCANPDS   ddname   (to find) (to over-      nnn     class"
       say "           for input               write)   records    or  "
       say "             file                                     destn"
       exit 22222
       end
if stopaft = "" ³ stopaft = 0  then stopaft = 9999999
upper  ddname printdest
             "ALLOC F(SYSIN)    REUSE",
                    "SPACE(1,1) TRACKS RECFM(F,B) LRECL(80) BLK(800)"
if printdest = ""
  then        "ALLOC F(SYSPRINT) REUSE DSN(*)"
  else if length(printdest) = 1
         then "ALLOC F(SYSPRINT) REUSE SYSOUT("printdest")"
         else "ALLOC F(SYSPRINT) REUSE SYSOUT(B) DEST("printdest")"


WWA. = "";  i = 0   /* Build a temp SYSIN file in WWA. array */    /***/
if string2 = ""   then upd = ""
call ww   "nopctl !opt w 777  !equ hd1 501   !equ membsave 601       "
call ww   "  rd" ddname upd "dirdata   into 11                      "
call ww   "  if dir !a in = 1     !t do newpds   * New PDS.         "
call ww   "  if dir !t move 8 fr 11 to 1 !t gg   * New memb.        "
call ww   "            * Only left with DATA records.              "
call ww   "  if p 11,L+11-1 = '"string1"'  * Scan Record for string. "
call ww   "    t dummy  !l gg                                        "

if string2 <> ""           then do            /* If UPDATE reqd */
call ww   "=loop=                                                    "
call ww   "  p @  = '"string2"'             * Overwrite string1.     "
call ww   "  if p @+1 ,L+11-1 = '"string1"' * If further occurrences. "
call ww   "    t goto    loop                                        "
call ww   "  upd" ddname "from 11          * Update the record.      "
                         end
call ww   "  if p 1 ne p membsave len 8    * 1st occurrence in memb. "
call ww   "    t move  8 fr  1 to membsave                           "
call ww   "    t space 1                   * Space between membs.    "
call ww   "  pr fr 1,L+11-1                                          "
call ww   "  gg stopaft="stopaft "         * If limit reached.       "
call ww   "  space 1                                                 "
call ww   "  pr '** Scan Terminated - STOPAFT="stopaft" reached **'  "
call ww   "  eoj                                                     "
call ww   "=newpds=                                                  "
call ww   "  p hd1+11 = '**' s    1                                  "
call ww   "  move 44 fr dsn   to hd1+14,hd1+14+44+4                  "
call ww   "  i p hd1+14,hd1+14+44 = ' '  !t p @+1 = '**'             "
call ww   "  space 3 !pr fr hd1, @+3                                  "
call ww   " =ret=                                                    "
"EXECIO * DISKW SYSIN (STEM WWA. FINIS)"

"CALL 'CBLDHX.TEST.LOAD(SELCOPY)'";  rr = rc        /* Invoke SELCOPY */
"ALLOC F(SYSIN) REUSE DSN(*)";       exit rr

ww: i = i+1;  parse arg line;  wwa.i = line;  return     /* Subrtn */
```

The User EXIT (Obsolete)

Since the introduction of the **CALL** statement, which uses standard linkage, the **User Exit** facility has become **effectively obsolete**. Please refer to the description of the **CALL** statement for any special processing that may be required.

The USER EXIT may be given control on a **NOW, THEN** or **ELSE** card at any point within the SELCOPY control statements. e.g.
THEN EXIT=phasenam SIZE=8000 ENTRY=16
It is also given control at **EOF**, for clean-up prior to **EOJ**.

The **SIZE** parameter is ignored for **MVS users**. For **VSE** users it is used to allocate the correct amount of storage for the exit phase before loading it. **SIZE** is expressed as a decimal number of bytes, and if omitted will **default to 2048** for VSE.

The **ENTRY** parameter is optional. If coded, control is passed to the **EXIT** routine at a displacement of **n** bytes (decimal). If omitted, **ENTRY** displacement 0 is used.

Conventions

1. The USER EXIT must be written in BAL, and must reside as a separate phase on a core-image or load library.
2. All registers must be restored to their original values on returning to SELCOPY from the user exit.
3. No storage may be modified other than that owned by the USER EXIT phase, the input logical record area or work area, and certain of the address constants supplied by SELCOPY in the parameter list.
4. Return to SELCOPY must be to the address supplied in register 14.
5. All code must be self-relocating or run under an operating system with a relocating loader.
6. On entry to the user exit, reg 15 will hold the address of the beginning of the user exit, reg 14 will hold the return address and reg 1 will point at a list of 7 fullwords as follows:

<table>
<tr><th></th><th>Hex Disp</th><th>Content - Each entry length 4</th></tr>
<tr><td></td><td>00</td><td>Action Code - Set by SELCOPY as..
<table>
<tr><td>X'00000000'</td><td>New Record Available.</td></tr>
<tr><td>X'00000004'</td><td>Same Record Available.</td></tr>
<tr><td>X'00000010'</td><td>EOF reached - No Record supplied.
Always passed to exit at EOJ.</td></tr>
</table>
Action Code - Set by USER EXIT as..
<table>
<tr><td>X'00000000'</td><td>- Continue with next Selection.</td></tr>
<tr><td>X'00000004'</td><td>- Continue with next Selection, but when the next record is to be read, suppress the read and use same record again.
Action Code 4 is Not Reset by SELCOPY.</td></tr>
<tr><td>X'00000008'</td><td>- GOTO GET bypassing remaining selections.
Action Code 8 is reset to 0 by SELCOPY.</td></tr>
<tr><td>X'0000000C'</td><td>- GOTO EOJ immediately. (X'10' entry still occurs)</td></tr>
</table></td></tr>
<tr><td></td><td>04</td><td>Address of Work Area containing logical record. Contains zero if WORKLEN=n not used.</td></tr>
<tr><td></td><td>08</td><td>Length of Work Area containing logical record.</td></tr>
<tr><td></td><td>0C</td><td>Address of Record Available. Will be the same as Addr of workarea if WORKLEN used. May be modified if no workarea is used. The modified value will be used on return to SELCOPY.</td></tr>
<tr><td>UXLRECL</td><td>10</td><td>Length of logical record available. (It is these 4 bytes that SELCOPY refers to when POS UXLRECL is used.) For Variable input, this includes the 4 bytes reserved for IOCS. Changes made during a USER EXIT will reflect SELCOPY's LRECL value on return.</td></tr>
<tr><td>UXATPTR</td><td>14</td><td>Address of Last Successful POS ANY selection within the logical record. Contains 0 if no hit was made. This full-word is SELCOPY's @ POINTER, and may be modified as required.</td></tr>
<tr><td>UXINCNT</td><td>18</td><td>Input Record Count for Prime input. This field is refreshed and updated (not just updated) every time a record is read off the prime input file, so changing it is a waste of time.</td></tr>
<tr><td>UXADIFF</td><td>1C</td><td>Address of first byte in field 1 which differs from its counterpart in field 2 of the last compare. This full-word is SELCOPY's DIFF pointer.</td></tr>
</table>

Example of User EXIT

The following is an example of a USER EXIT illustrating how to catalog and use it in a later SELCOPY run. For brevity, nothing elaborate is done but it is worth noting that the user exit could, if required, contain input and output files of its own.

```
  // JOB SELX-CAT --- Catalog a User Exit for use in SELCOPY ---
  // OPTION CATAL,NODECK
   PHASE SXSEQ,+0
  // EXEC ASSEMBLY
  UX       TITLE 'SELCOPY USER EXIT PHASE FOR SEQUENCING'
* This SELCOPY User Exit will overwrite the last 8 bytes
* of the current input record with a character format
* sequence number. (1st 5 leading zeros blanked out.)
* The number starts at 1, for the 1st time through, and is
* incremented by 1 for each pass through this exit routine.
  USEREXIT START 0
           STM   14,12,12(13)        Save registers.
           LR    12,15               Set up base register.
           USING USEREXIT,12
           LR    11,1                Addr of Exit Inf supplied by SELC.
           USING EXITINF,11
           LM    3,8,UXACTION
           LTR   3,3                 Action Code.
           BNZ   EOF
* Drops through here for normal entry. i.e. Action Code of zero
* indicating that an input record is available for processing.
           AR    6,7                 Set R6 at pos L+1 of record.
           S     6,=F'8'             Set R6 at pos L-7 for new seq no.
           AP    SEQ,=P'1'
           MVC   0(8,6),=X'4020202021202020'
           ED    0(8,6),SEQ+4
  EXIT     LM    14,12,12(13)        Restore registers.
           BR    14                    Return to SELCOPY.

  EOF      EQU   *                   End of File entry.
           B     EXIT     No special action for EOF entry - just exit.
  SEQ      DC    PL8'0'              Sequence number store.
           LTORG

  EXITINF  DSECT         User Exit Information.
*                       ======================
  UXACTION DS    F   Action Code:    00 = Normal - Record to process.
  *                                  04 = As for 00, but re-use this rec.
  *                                  08 = GOTO GET.
  *                                  12 = GOTO EOJ.
  *                                  16 = EOF - No record supplied.
  UXAWREC  DS    F   Address of Work area.
  UXWRECL  DS    F   Length of Work area.
  UXACIR   DS    F   Addr of Current Input Record, CIR.     (May be modified if no W/a.)
  UXLRECL  DS    F   Logical record length of CIR.          (May be modified)
  UXALSPA  DS    F   Addr of Last Successful POS=ANY in CIR (May be modified)
  UXINCNT  DS    F   Record count of    Prime Input file.
           END
  /*
/* At this point you would have any    INCLUDE statements for the
/* Linkage Editor that are required by your user exit routine.
/* In this example none are necessary.
/* No    ENTRY card is needed because SELCOPY will load the phase
/* into storage and simply branch and link to the beginning of it.
/* (Job Control will bypass all    /* cards, not even printing them)
  // EXEC LNKEDT
  /&
  // JOB SELX-RUN         --- Example of use of User Exit ---
  // EXEC SELCOPY
       READ  CARD
       EXIT SXSEQ   SIZE=512         * Default SIZE is 2K.
       PUNCH                         * Punch out a resequenced deck.
       PRINT                         * And print it.
       END
  1st data card.
  2nd, etc, etc......
  /*
  /&
```

Mainframe Machine Requirements

Computer Type

SELCOPY may be used on any **IBM mainframe** (or equivalent) computer, that supports 370, System 390 or z-Series architecture.

Control Program

The Control Program must be a disk resident z/OS, OS/390, z/VM, VM/ESA or VSE/ESA supervisor, but there are no restrictions on supervisor options chosen or omitted. For example, it does not have to be a multi-programming supervisor.

Main Storage

Each release of SELCOPY varies in size, normally increasing as extra facilities are introduced. The following details are **guidelines** which at the time of writing include a certain margin for expansion.

SELCOPY will execute in a **partition of 128K**, supporting card input, punch output and printer output.

At execution time, VSE code is used for SELCOPY's internal control blocks when running MVS, and vice versa when running VSE. Thus in many applications, no additional dynamic storage will be required.

Each additional tape or disk file requires its own storage of approximately **2 x BLKSIZE (in bytes)** for buffers, plus an **extra 512** bytes for system control blocks.

Each SELCOPY Control Card requires **128 bytes** of storage, plus the length of any strings involved.

VSE Users

SELCOPY obtains storage dynamically at execution time, initially from the partition's free storage area until all used, then from the **GETVIS area**, so the use of **SIZE=AUTO** is also acceptable.

Note that for input files, because blocksize does not have to be specified, SELCOPY will allocate two I/O areas of a **default size** catering for device capacity, which may well be **unnecessarily large**. (Refer to **BLKSIZE parameter** for full details of default values.)

If SELCOPY is running in **virtual storage**, the operating system will have to **'fix'** that amount of storage for its I/O area before every read operation, which can be **very inefficient if** storage belonging to another partition has to be **paged out** first, before the read starts. After the read, the other partition will cause its storage to be **paged back in**, thereby causing the phenomenon known as **'thrashing'**.

Thrashing can be reduced by coding a **smaller default** buffer size in the **CBLNAME** phase, or alternatively by coding a **BLKSIZE** parameter on the READ card.
Note however, that if a small CBLNAME default is used, jobs with large input blocksizes will need a **BLKSIZE** parameter on the READ card.

MVS Users

Using **GETMAIN**, SELCOPY will only take the amount of storage it needs for its own control blocks, and MVS Data Management Routines will take care of buffer allocation for all I/O.

Peripheral Devices

For **MVS** users there is full device independence.

For **VSE** users, all 360/370 card readers, printers and magnetic tape drives are supported. Disk drives supported on VSE are detailed under the **DEV** parameter.

Number of Phases/Modules

See also:

- Section *CBLNAME & SELCNAM*.

SELCOPY is supplied as 1 single module with the name **SELCOPY**. i.e. a **Phase** in VSE terminology, or **Load Module** in MVS terminology.

Users of DB2 will also require CBL modules SELCOPQL and SELCOPQX DBRM (Data Base Request Module), both supplied as part of the SELCOPY distribution material.

The **CBLNAME** module (or **TEXT** file for CMS) is also required, but remains constant over different releases of SELCOPY.

The **SELCOPLE** module is required for users who wish to CALL modules that require Language Environment at run time.

Certain non-CBL modules such as **SELCOPDL** (for IMS/DL1), **SELCOPAD** (for ADABAS), and any **User Exit** or **CALLed** module, may also be required, but also remain constant over different releases of SELCOPY.

Installation

Refer to the separate document **"SELCOPY Installation Guide"** for details of the SELCOPY installation procedure.

ZAP Material

Corrections to known problems are supplied to your Technical Representative on a separate document, known as a **Zap List** , as part of the standard Distribution Material, and from time to time during the life of each release of the product.

Zaps are numbered in ascending sequence starting at 01. Please note that they are all considered to be errors, and as such will be **implemented unconditionally** in the next release.

The last digit of the SELCOPY Release number serves only to indicate the ZAP level. For instance, SELCOPY Rel 9.61 differed from Rel 9.60 in as much as zaps 1 through 3 had been applied.

VSAM Files

This section is intended as an overview of VSAM file processing within SELCOPY. Please refer to the description of individual parameters in the body of this manual for full details.

VSAM is an acronym for **Virtual Storage Access Method** which supports:

KSDS	Key Sequence Data Set.
ESDS	Entry Sequence Data Set.
RRDS	Relative Record Data Set.
LDS	Linear Data set (MVS only.)

Note: The current release of SELCOPY does not support the **LDS** organisation.

The SELCOPY user may:

- **Read** KSDS, ESDS or RRDS sequentially, Forwards (default), or Backwards, **BWD**.
- **Reverse** direction of reading a **KSDS** sequentially.
- **Read** KSDS directly, by key.
- **Read** ESDS directly, by RBA.
- **Read** RRDS directly, by Record Number.
- **Update** (rewrite, replace) records on any VSAM file.
- **Delete** records, for KSDS and RRDS only.
- **Insert** records, for KSDS and RRDS only.
- **Write** new records to a KSDS, ESDS or RRDS file, which for an empty file is effectively the same as creating it.
- **Write** new records, overwriting all previous records, to any KSDS, ESDS or RRDS file.

e.g.

```
WRITE  ABC KSDS       * Key Seq Data Set
READ   XYZ ESDS       * Entry Seq Data Set
UPD    ABC RRDS       * Relative Record Data Set
DEL    ABC KSDS       * Delete current record. (last read)
INS    ABC KSDS       * Insert a record.

READ   ABC VSAM       * KSDS assumed for MVS.
WRITE  ABC VSAM       * KSDS/ESDS/RRDS attempted in order for VSE.
```

The IDCAMS DEFINE

Every VSAM file used within SELCOPY **must already** be defined, with all its attributes, in the VSAM catalog. **(Both Input and Output.)**

The IBM supplied program **IDCAMS** is used for the **DEFINE**.

No special attributes are required for processing with SELCOPY, except the **REUSE** attribute if the SELCOPY **REUSE** parameter is required.

VSAM Managed SAM Files

SAM (Sequential Access Method) files, managed by VSAM, are available in a **VSE** environment. Such files are effectively the same as ordinary VSE Sequential files, and are **not to be confused** with VSAM files.

They are not VSAM files. They are simply defined within the VSAM space and managed by VSAM.

SAM files within VSAM are to be processed with traditional sequential I/O, and as such may be blocked and have any **RECFM** (Record Format). Users should not code **VSAM** or **ESDS**.

If they **are given** the attribute **VSAM** or **ESDS**, then SELCOPY will attempt to process them as standard ESDS files.

Usually, this will fail with a **VSAM OPEN Error** because the file is unlikely to be on a volume which **is owned** by the VSAM Catalog. In this case, SELCOPY returns **ERROR 77**.

Otherwise, if the OPEN is successful, the file will be read as **RECFM=U**, (Undefined length records), which of course is **Unblocked** and almost certainly **not** what is required.

VSAM Operations

READ (Synonyms RD IN INPUT)

Will read any **VSAM** file, (KSDS, ESDS or RRDS), sequentially, **forwards (the default)**, or Backwards, **BWD**.

The direction of reading a **KSDS** sequentially may be reversed.

Direct reads may be made for any:

- KSDS, by key.
- ESDS, by RBA.
- RRDS, by Record Number.

WRITE (Synonyms WR PUT OUT OUTPUT)

Will write new records to any VSAM file, which for an empty file is effectively the same as creating it. Note that VSAM will only write records to the end of an ESDS file.

WRITE will also write new records, overwriting all previous records, to any VSAM file. (The **REUSE** parameter).

New **KSDS** records may be written (i.e. inserted) into an existing KSDS using the **WRITE** statement, provided the records are written in **key sequence**.
WRITE does not use Update mode as it is effectively loading the file which gives it **significant speed advantages**.

Use WRITE instead of INS

Never use INS when **WRITE** will do the same job, particularly on high volume or frequent jobs. **INS** is **only required** if update mode is essential in order to issue **DEL** and **REP** statements, or if it is not possible to **sort the inserts** into key sequence before the update.
Sorting and **writing** to VSAM is significantly more efficient than **inserting**.

UPDATE (Synonyms UPD REP REPLACE REWRITE)

Will update records on any VSAM file.

INSERT (Synonym INS)

Will insert records, for **KSDS** and **RRDS** only, regardless of sequence.

DELETE (Synonym DEL)

Will delete records, for KSDS and RRDS only.

VSAM Parameters

See also:

- POS RETVSAM in section *Operation Words, Parameters and Keywords*.
- **Suppress KEY/REC NOT FOUND data** in section *CBLNAME & SELCNAM*.
- VSAM Output LRECL in this section.

VSAM parameters are described briefly here. Please refer to the alphabetic Parameter section which may give a fuller description.

KSDS, ESDS, RRDS or VSAM Parameter

For VSE, one of the parameters KSDS, ESDS, RRDS or VSAM must be mentioned on the **first** use of a VSAM file, otherwise **ERROR 118** will be issued on any subsequent use of the file which does mention KSDS, ESDS, RRDS or VSAM.

```
READ  ABC   ESDS
```

For MVS, these parameters may be omitted. SELCOPY will recognise that the file is VSAM from the DD statement.

BWD Parameter

Use the **BWD** parameter to read **VSAM** files backwards. The facility is available for all types of VSAM file, **ESDS** and **RRDS** as well as **KSDS**.

For a **KSDS**, the direction of sequential input may be reversed as required, but the direction keyword, **FWD**/**BWD**, then becomes mandatory on all input statements for that **KSDS**.

```
READ  ABC   KSDS   BWD
IF P 20 = SOMETHING
  THEN READ ABC   FWD
  THEN DO SOMETHING
```

UPDATE Parameter

In order to use the **UPDATE** statement on a VSAM file it is necessary to declare that the file is updateable using the **UPDATE** or **UPD** parameter on the first **READ** statement that mentions the file:

```
READ ABC   VSAM   UPD
```

REUSE Parameter (Synonym RESET)

By default, for **ESDS** and **RRDS** files, all output records are written **following** any existing data. Thus, if a file is not empty, and you write to it, records are just added on to the end.
For a **KSDS** new records are written to their correct place in the file according to their key. Duplicates are not written and a return code is set.

To **clear the file at OPEN** time, so that previous data on it is overwritten, the **REUSE** parameter, synonym **RESET**, may be coded on any one of your SELCOPY control statements that mentions the file. This is effectively the same as deleting and redefining the file using **IDCAMS**.
However, the file **must** have been defined (via IDCAMS) with the **REUSE** attribute.

```
WRITE ABC  KSDS    REUSE   PASS=AZQD
WR LEDGAAA  ESDS   RESET       * RESET is a synonym for REUSE.
```

STARTKEY Parameter (synonym START)

KSDS input files are normally read **sequentially**, starting with record 1, unless a **KEQ, KGE**, or **STARTKEY** parameter and argument are supplied.
STARTKEY and its argument indicates **sequential** processing but starting from the designated key.

The argument may be a **literal** of any length up to the defined key length, or it may be a number indicating the length of the generic key, followed by an **AT** parameter whose argument indicates its position in the work area.

```
READ ABC KSDS   STARTKEY='generic-key'
READ ABC KSDS   STARTKEY 6 AT 2200    BWD
```

KEQ Parameter (Synonym KEY)

KSDS input files may be read directly by specifying the exact generic key required with the **KEQ** parameter, (Synonym **KEY)**.
Its argument is as defined above for STARTKEY.

A "Record Not Found" condition is given if a record does not exist in the file with a **KEY EQUAL** to the argument, for the length of the argument.

A **normal** read, following a **KEQ** read, will return the next record in sequence.

```
READ ABC KSDS   KEQ='Literal'     * Default    STOPAFT=1.
READ ABC KSDS   KEY=4 AT 2200     * No default STOPAFT.
```

KGE Parameter

Same as **KEQ** for a **KSDS** only, except that if an equal key does not exist, the **next highest** is returned.

```
READ ABC KSDS   KGE='Literal'     * Default    STOPAFT=1.
READ ABC KSDS   KGE=4 AT 2200     * No default STOPAFT.
```

STARTREC Parameter

RRDS input files are normally read **sequentially**, starting with record 1, unless a **REC**, or **STARTREC** parameter and argument are supplied.
STARTREC and its argument indicate **sequential** processing, but starting from the designated record number. This argument must be a decimal number which either represents the actual record number required, or indicates the length of a field which holds the record number. An **AT** parameter would then indicate the position where the field is to be found, and a **TYPE** parameter (default TYPE=P for Packed decimal) indicates its data type. **STARTREC=1** would start at the first record.

```
READ ABC RRDS   STARTREC=66
READ ABC RRDS   STARTREC=4 AT 2200 TYPE C
```

REC Parameter

RRDS input files may be read directly by specifying the exact REC required with the **REC** parameter. Its scope is the same as defined above for STARTREC.

```
READ ABC RRDS   REC=4096
READ ABC RRDS   REC=4 AT 2200 TYPE B
```

STARTRBA Parameter

ESDS input files are normally read **sequentially**, starting with record 1, unless an **RBA** or **STARTRBA** parameter and argument are supplied.
STARTRBA and its argument indicate **sequential** processing, but starting from the designated RBA, **Relative Byte Address**. This argument must be a decimal number which either represents the actual RBA required, or indicates the length of a field which holds that number. An **AT** parameter would then indicate the position where the field is to be found, and a **TYPE** parameter (default TYPE=P for Packed decimal) indicates its data type. **STARTRBA=0** would start at the first record.

```
READ ABC ESDS   STARTRBA=4096
READ ABC ESDS   STARTRBA=4 AT 2200 TYPE B
```

RBA Parameter

ESDS input files may be read directly by specifying the exact RBA required with the **RBA** parameter. Its scope is the same as defined above for STARTRBA.

```
READ ABC ESDS   RBA=4096
READ ABC ESDS   RBA=4 AT 2200   TYPE B
```

PASSWORD Parameter

VSAM files which are passworded may have the password supplied on a SELCOPY control statement instead of having the operator given the option to key it in on the console.

As with other strings, the password must be enclosed in quotes if it contains any of the SELCOPY delimiters.

Maximum length of a VSAM password is 8 bytes. If this length is exceeded, SELCOPY will truncate it to 8 bytes before passing it to VSAM, and will NOT give you an error message. Short passwords are padded with blanks.

```
READ FILE=ABC VSAM PASSWORD=XNCRTYKM
WRITE FILE=XYZ KSDS PASS=PURGE
```

LRECL Parameter

Normally never required, the **LRECL** parameter can however have a special significance for **output**.

RECFM Parameter

Normally never required, the RECFM parameter can however have a special significance for output.

VSAM use of LRECL/RECFM

VSAM's KSDS and ESDS files may have records of any length up to the maximum as decided by the user when he defined the file in the VSAM catalog.

The user may have defined the **average record** length as **equal** to the **maximum**, but this **is NOT** treated by VSAM as a guarantee that records are RECFM=F.

It is perfectly valid to have just one record which is one byte shorter than the rest for instance. VSAM expects the user program, (in this case SELCOPY), to supply a length for each individual record written, which of course is then made available to any program subsequently reading that file.

- KSDS and ESDS records are NEVER "FIXED Format" -

- They may have records which are **ALL** the same length -

- But this **DOES NOT MEAN** that the file is **RECFM=F** -

===== KSDS and ESDS are both RECFM=U =====

Thus VSAM has simplified data management for **KSDS** and **ESDS** from a **RECord ForMat** point of view such that KSDS and ESDS files have exactly the same record format: Records may be of any length up to the defined maximum, and VSAM maintains its own record control information at the top end of each **CI (Control** Interval), all transparently to the user program.

Recent releases of VSE/VSAM and MVS/DFP support a new type of VSAM file organisation, the **Variable Length RRDS** (VRDS). The current release does **not** support this form of RRDS.
When using VSAM RRDS files with the current release the following applies.

- RRDS files are ALWAYS FIXED Format -

Each record must be **equal in length** to the **Maximum LRECL** in the IDCAMS DEFINE.

SELCOPY will therefore pad or truncate as necessary before passing an **RRDS** record to VSAM for writing.

VSAM Input LRECL

For **VSAM** input, SELCOPY will request VSAM to read a record, and VSAM will pass a record back to SELCOPY stating its length.

This happens regardless of any **LRECL** or **RECFM** that may have been given to SELCOPY by the user on the SELCOPY control cards.

So the SELCOPY user need **never code LRECL** or **RECFM** for a VSAM **input** file.

VSAM Output LRECL

For **RRDS** output, SELCOPY will ensure that records go to VSAM at their correct "fixed" length, whatever the user requests.

For **KSDS** and **ESDS**, which are effectively RECFM=U, VSAM expects a length to be specified by the calling program (SELCOPY) **for each individual record**.

In order to give SELCOPY users the full benefit of VSAM's flexibility with regard to record lengths, the following special interpretations of **LRECL** and **RECFM** for VSAM **output files** are available.

Omitting both, i.e. using **the Default**, is recommended as detailed in interpretation 3 below.

The **5 interpretations** are:

1. If **RECFM=F** is coded for a VSAM output file, and LRECL not mentioned, the output LRECL used is the maximum value as defined in the VSAM catalog for that file for all records written, regardless of the length of input records from other files. Truncation, or padding with the FILL character, occurs as appropriate.
   Don't forget that the **FILL** character is **not used if** the work area is big enough to supply all the data required.
2. If **LRECL=n** is coded, and RECFM is not mentioned, the decimal value, n, is used as the LRECL for all output records to that file during this SELCOPY execution. i.e. the equivalent of **RECFM=F** has been assumed by default, and output will be

fixed length. Short records are padded, and long records are **truncated** to the LRECL value.
Beware that if different values of "n" are used on different output statements to the same file, in the same execution, then it is the last one encountered which will take effect and be used **for all records** written to the file during that execution.
Note that further records may be added to the file later, with a different LRECL, written by other programs or SELCOPY executions, provided the LRECL does not exceed the defined maximum.

3. If both **RECFM and LRECL are omitted**, (the **DEFAULT option** which is **recommended)** or **LRECL=U** or **RECFM=U** is coded, SELCOPY will write records to that file equal in length to the current record in the input or work area at that time. This length is equal to the length of the last record read by SELCOPY, regardless of what position in the work area it was read into, or what position it is being written from, or what file it came from.
Note that you may use the **THEN LRECL=nnn** control statement to modify the LRECL of the current input record. e.g.

```
  READ CARD
  LRECL = 20                  * Reduce LRECL from 80 to 20.
  WRITE ABCFIL KSDS           * Default is RECFM U.
  END                         * Data cards follow.
111111 data card 1
222222 data card 2 etc...
```

If the current input record is Variable, the 4 byte RDW is stripped off, passing only the data portion of the record to VSAM. (e.g. restoring a VSAM file from a back-up tape which is a variable blocked file.)

```
  READ TAPE11 RECFM VB        * No need to reduce LRECL.
  WRITE ABCFIL KSDS           * 4 byte RDW will be stripped off.
  END                         * END card not really required.
```

4. If **RECFM=V** or **LRECL=V** is coded on a VSAM output file, **(Please avoid this option)**, the record is written out normally, but will include a 4-byte RDW (Record Descriptor Word) containing the length information as is normal for RECFM=V on SAM (Sequential Access Method) files. VSAM, of course, will take no notice of the RDW, treating it as just another 4 bytes of data.
If the input file is fixed or undefined, SELCOPY will **actually generate** the required 4 bytes, prefixing them to the input record, thus producing a record length of LRECL+4 for the output file. If input is RECFM=V then SELCOPY will fail to to strip off the redundant 4-byte RDW.

5. If **both LRECL=n** and **RECFM=V/U** are coded on a VSAM output file, the record is written out as defined for the RECFM parameter. The value "n" supplied on the LRECL parameter is simply used as a maximum value for output records. However, long records are not truncated. An error message is given, and the run is terminated.

Direct Processing after EOF

Processing after EOF, both direct and sequential, will be allowed to continue provided the following conditions are met:

An **IF EOF** test exists for the file.

At least 1 **Direct** READ statement exists for it.

Empty VSAM files for MVS

Loss of function in SELCOPY was reported (CBL Ref: SQ4363 - 88/05/13), by a VSAM user upgrading from VSE to XA.

When an **Empty VSAM** file is processed under **MVS**, SELCOPY reports a **VSAM OPEN Error** and terminates the job with **ERROR 077** instead of giving simple **EOF**, as it does under **VSE**, thus users cannot concatenate VSAM files for back-up due to the risk of one of them being empty.

Under **MVS**, the VSAM Return Code for OPEN of an empty VSAM file is 160 (decimal), which has 17 possible reasons, including **"Empty File"**.

Regrettably, 160 is a blanket return code covering what appears to be a generic group of errors conditions mainly associated with conflicting attributes. There are 17 such conditions:
41, 44, 47, 48, 54, 68, 72, 80, 88, 136, 140, 144, 164, 188, 192 197, 198.

SELCOPY is only able to identify the return code 160, which is a little too ambiguous to be treated automatically as meaning **empty** data set. SELCOPY therefore terminates.

Of the 16 remaining rc's, 5 are for output only, 4 refer to options not used by SELCOPY, and 1 is eliminated by code in SELCOPY.

The remaining 6, (viz: 41, 68, 164, 188, 197 and 198) would appear to be rather esoteric, so the exception would appear to be 72, **Empty** Data Set, which at the discretion of the user, could be ignored.
(c/f **PL24281** for the **DFSORT** program which caters for empty VSAM data sets by checking for rc=160.)

Approximate Solution

An option is therefore provided in **CBLNAME** to give **MVS** users controlled processing of a **DEFINED**, but **empty**, VSAM file, in the same way as under the **VSE** Operating System.

AT THEIR OWN DISCRETION, therefore, MVS users may set the CBLNAME field **CBLSREL** to force SELCOPY to treat VSAM RC=160 as an Empty File.

VSAM Example

See also:

- Example 8 - VSAM Dump/Restore in section *Examples*.

IMS and DL/1 Processing

The IBM databases, **DL1** for VSE users, and **IMS** for MVS users, may be accessed, updated or created using SELCOPY. In this instance, SELCOPY is **invoked by DL1**, and when it finishes it returns control to **DL1**.

Several DL1 files may be processed together, as well as having input and output of all other types of files within the same execution of SELCOPY.

Communication between **SELCOPY** and **DL1** is via an IBM supplied standard **Interface Module** which must be available to SELCOPY at execution time.

For MVS

IBM's DL1/IMS Interface Module is automatically supplied by IBM in load module form so can be invoked by its IBM name **ASMTDLI** or **PLITDLI** , depending on whether the user's PCB is set up for Assembler or PL1.

SELCOPY will always assume that these modules are available.

For VSE

IBM's DL1/IMS Interface Module is only supplied by IBM in **object** form, so must be link edited to a load library under the phase name **SELCOPDL**, which must then be available to SELCOPY at execution time.

SELCOPDL is not supplied with SELCOPY because this code is owned by IBM and supplied by IBM together with the other licenced DL1 material.

Refer to the **SELCOPY Installation Guide**, (a separate document), for full details.

Execution

The DL1 program is executed in the normal fashion, with the application program quoted as **SELCOPY**.

For VSE, the SELCOPY control cards follow the DL1 parameter card in the SYSIPT stream, while for MVS the SELCOPY control cards are as normal on SYSIN.

DL1 files mentioned in the SELCOPY control cards must have the keyword **DL1** (or synonym) following the file name to differentiate it from sequential files which may of course be processed in the same run.

For MVS

```
//stepname EXEC PGM=DFSRRC00,PARM='DLI,SELCOPY,psbname'
//SYSIN DD *
  READ FILE=dbdname DLI
  WRITE FILE=SEQDISK
```

For VSE

```
// EXEC DLZRRC00,SIZE=300K
DLI,SELCOPY,psbname
  READ FILE=dbdname DLI
  PRINT STOPAFT=10
/*
```

In the above, JCL defining files used is omitted. **DLBL** or **DD** cards for **VSE** or **MVS** respectively are required.

Note that it is permitted to set up a **DBD** which has an explicit **DD1NAME** instead of the default of the same as the DBNAME. In such cases, a **DLBL** or **DD** statement is required for the **DD1NAME**, as well as one for the **DBNAME**.

Terminology

PSB

Program Specification Block. This is the name quoted on the DL1 parameter card or PARM field which refers to a loadable phase/module held on a program load library. Thus, **only one PSB** is available to SELCOPY at execution time.
PSBs are normally linked into a program load library by your installation's Systems Programmer or DBA.

The PSB is loaded in by DL1, not SELCOPY. You supply DL1 with the PSB name to be used by specifying it for **VSE** on the **DLI parameter** card which precedes the SELCOPY control cards, or for **MVS** in the **PARM** list.

SELCOPY will accept a PSB set up for **Assembler, COBOL** or **PL/1**.

PCB

Program Communications Block. This is another control block supplied by DLI. It may be one of many, and within each **PCB** is stored the name of a **DBD** (Data Base Descriptor). i.e. the name of the Descriptor which defines the processing options you are allowed on this Data Base. (For example, you may find that you are not allowed to update the Data Base.)

POS PCB and POS SEG (described in the reference section of this manual) allow you to refer to the PCB of the last DL1 file processed. Thus you can test the status information returned to SELCOPY by DL1.

DBD

Data Base Descriptor. The DBD is a control block, held in the PSB, which defines the extent of the view of a data base to be made available for this access and the type of update authority on it.

Usually, a PSB will contain many DBDs, each one referencing a different data base, or viewing a different subset of the same data base.
Thus several DBDs may all have the same DB name.

A separate DBD is required for each data base that a program requires to access during its execution. For example, if you have a PSB holding DBD control blocks for DB names A, B, C and D, this PSB may be used to run a SELCOPY on one, or any combination, of these data bases. (Different programs may all use the same PSB.)

The filename quoted on SELCOPY's READ control card must be the same as the DB name in one of the DBDs defined in the PSB. So in other words, the SELCOPY file name is the **DB name** (Data Base name).

The DBD that suits your requirements may exist in several PSB's. Normally however, the same DBD name in a different PSB is there to protect the data base from accidental corruption by the inexperienced user, who of course will have no knowledge of the name of the PCB that holds a DBD with update authority.
A separate PSB may also be used to hold DBDs with full authority on a data base, while all other PSBs with DBDs for the same data base will inhibit access of certain confidential segments.

When the PSB has more than one DBD for the same Data Base, SELCOPY will automatically use the **first DBD** encountered with the correct DB name.

To force SELCOPY to use the 2nd or 3rd DBD in the PSB, the file name (DB name) given to SELCOPY must be followed by the required number. e.g.

```
READ  DBASEXYZ 3   DL1   SEG=XYZAA01     * Used 3rd DBD.
```

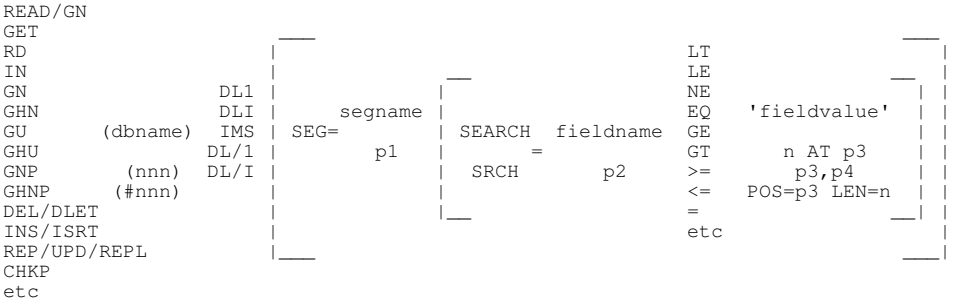
Special Position Keywords for DL1/IMS

The following special arguments for the SELCOPY **POS** keyword are supported:

POS PCB	Refers to the DL1 PCB for the most recently executed I/O statement.
POS STATUS	Refers to the DL1 Status Code for the most recently executed I/O statement.
POS SEG	Refers to the DL1 Segment Name for the most recently executed I/O statement.

These POS arguments are described in detail in the reference section of this manual.

Syntax without SSA



Brackets are **not allowed** in SELCOPY syntax. All brackets, vertical bars and underscore characters are provided only to indicate

choice of options.
The terms **p1, p2** etc indicate position parameters, e.g. **123** or **@abcd** etc.

Function Codes

Any standard DL1 function code may be passed to SELCOPY as an operation word, including DLET and REPL, provided you have the authorisation to do so.

It is however the user's responsibility to ensure that the necessary information to allow SELCOPY to build an SSA is also supplied, and that the current position in the DL1 file does not conflict with the hierarchical requirements of the operation.

Please beware of the common error of inserting a record in the wrong place in a file. Your new segment will be inserted after **the last segment read** from your data base.

If the operation word is **GET**, or one of its synonyms, SELCOPY will generate a DL1 function code of **GN**.

Data Base name

All DL1 operations must mention either **dbname**, or #nnn, or both. i.e. the data base must be identified, which in SELCOPY terminology is the file name.
The **dbname** must follow immediately after the function code.

Non-First DBD Access

See also:

- DL1 Example 6 - Replace in section *IMS/DL1 Examples*.

Users who require to use the 2nd, 3rd or nth **DBD** within a **PSB** for their required Data Base may indicate this by coding **#nnn** or simply **nnn** immediately following the DB name on the **READ** card for a DL1 Data Base. e.g.

```
READ DBXYZ #12   DL1
GN   DBXYZ 4     IMS
```

Because a specific DBname is used, all DBD's with a different data base name are ignored. So the **#12** used above will take the 12th occurrence of a DBD with a data base name **matching the name** specified, **DBXYZ** in this case. ERROR 534 is issued if a 12th occurrence does not exist.

The **#nnn** notation may be used with different values of #nnn for the **same data base** name in the same execution of SELCOPY for asynchronous processing. Example 6 at the end of this section.

```
GN   ABC #1  DL1  SEG=AA01         * Just root segs.
GN   ABC #2  DL1                  * All segs.
GHU  ABC #3  DL1  SEG=X   SRCH=Y GE 'Z'
UPD  ABC #3  DL1                  * Replace seg after mods.
```

Numeric Data Base name only

A very interesting extension of the use of **#nnn** for a DL1 file is in the **absence of** a DBname. e.g.

```
READ 17   DLI
GN #0017  DL/I
```

Because the DBname is NOT mentioned, all DBD's are considered eligible, and therefore the 17th DBD encountered will be the one used, regardless of its name.

Leading zeros may be used if required, and the **# sign** may be supplied or omitted, however, any **IF EOF** test for that file must quote SELCOPY's generated filename which is in the format **#9999**. e.g.

```
READ 17   DLI
IF EOF  #0017                     * Correct.
IF EOF  17                        * Will fail with   ERROR 523
```

The DL1 keyword

The keyword, **DL1**, or one of its synonyms, must be mentioned on the first reference to a DL1 data base.

Keywords supported are: **IMS, DL1, DLI, DL/I** and **DL/1**.

The **DL1** keyword must follow immediately after the dbname, or its associated number if used.

SEG=segname or SEG=n

The keyword, **SEG**, is used to restrict an operation to a particular segment type only.

The **segname** may be supplied as an 8 byte literal indicating the DL1/IMS segment name. All DL1/IMS Segment Names are always of length 8 bytes, so short segment names will be padded with blanks to ensure an 8 byte name. Quotes around a **segname** literal are therefore unnecessary.
A **common error** is to put brackets around it instead of quotes. Brackets are **ILLEGAL** as part of the argument for the SEG argument. (Brackets are only used with the **SSA parameter)**.

If the **SEG** argument is a valid **decimal number**, it is assumed to be a position within the work area defining the start of an **8 byte** field containing the **Segment Name**.

SEARCH

The keyword, **SEARCH**, is used to further **qualify** the segment required. You may then drastically reduce the number of segments which satisfy your call to DL1.

If the **SEARCH** or **SRCH** parameter is used, it is mandatory to also supply a **SEG** parameter and argument.

The first SEARCH argument is the **fieldname**, always **length 8**, by definition.
If the fieldname supplied is **numeric**, it is assumed that it refers to a position in SELCOPY's work area, and 8 bytes commencing there are used as the fieldname.
This **fieldname** must be one of those **defined in the DBD**, Data Base Descriptor, for the particular **segment** mentioned on the SEG parameter.

All segments of that segname will have a field of that "fieldname". Only **the contents** of the field will vary.

So it is necessary to supply another argument, a **field-value**, to define the contents required in that field, or to be more accurate, to define the limit which will satisfy the requirements for that field based on the **Relational Operator** which may precede it.

Relational Operator

This may be any of the SELCOPY defined comparison operators, or any synonym as detailed under the section *Comparison Operators*.

If **omitted**, the Relational Operator, **EQ**, is assumed.

Fieldvalue

This may be supplied in either of two ways:

1. If **fieldvalue** is supplied **as a literal**, its position and length is known by SELCOPY, and the POS=n and LEN=n parameters should not be coded.
   The length of the literal is restricted to what can be coded on a single SELCOPY control card, because continuation cards are not supported. However, the **EQU** facility may be used to ease this problem.
2. If the field value is to be supplied at execution time in the SELCOPY workarea, the **POS=n** and **LEN=n** parameters are required to define it.
   The **LEN** or **LENGTH** parameter is **mandatory**, because **fieldvalue** is treated as a generic key.
   The **LEN** parameter may define any length up to 255 bytes, which is DL1's current maximum.

Syntax with SSA

For the DL1 expert, the **SSA (Segment Search Argument)** parameter may be used with a single argument. SEG and SEARCH parameters are **not allowed** because this information is contained within the SSA which must of course be supplied in DL1/IMS format.

If the **SSA** argument is **numeric**, it is assumed to point at a position in the workarea where a complete SSA has been built by the user.

Otherwise, it is assumed that the argument itself is the **SSA** supplied as **a literal**. Remember that blanks, commas and asterisks in the data require that the literal be enclosed in quotes.

In either case it is essential that the SSA is in **strict accordance** with the **rules of DL1**.

For example, **you may only use** the Comparison Operators supported by your version of DL1/IMS, which will not necessarily cover the SELCOPY range as defined under **Comparison Operators**.

Multiple SSA's for a single function are not supported. A separate SELCOPY operation, which implies a separate call to DL1 is required for each SSA.

Record Length

See also:

- MPS Usage in this section.

Variable length Segments in DL1 may be processed. As with fixed length segments, the length of the last Segment read becomes the current setting of SELCOPY's internal **LRECL** value, which you may inspect or reference via **POS UXLRECL**. The LRECL value is stored there as a binary full-word (4 bytes).

Note that the **LRECL** value is updated on reading the next record **from any file**.

The logical record length, **LRECL**, of a DL1 segment is not formally returned to the calling program, SELCOPY, after a DL1 read function. SELCOPY has to work it out. In certain environments, typically in **VSE** systems, this involves accessing storage that may not be owned by SELCOPY, so SELCOPY has to return an **estimated** LRECL.

In circumstances where it has been impossible for SELCOPY to ascertain the **LRECL** of a segment, the **same** LRECL as the previous segment or record read (from any file) is used. i.e. the LRECL value remains **unchanged**.

If no previous record has been read, **LRECL=17** is set as an arbitrary default. To prevent this, you may modify the current setting of **LRECL** by use of the **THEN LRECL=n** command prior to the **READ**, or after the **READ** if **WORKLEN=n** is coded.

Work Area

The functions **ISRT, REPL** and **DLET** all require that a SELCOPY work area is present. This is effected by coding **WORKLEN=n** on an **OPTION** statement or on the prime input statement.

A work area is not always necessary, but within DL1 applications it is, more often than not, a requirement for the user's own purposes.

SELCOPY requests DL1 to read the segment data directly into the user's work area, if one is specified. Thus, provided **WORKLEN=n** is coded, regardless of what SELCOPY estimates for the segment LRECL, the user always gets the correct data in his work area, moved there **by DL1**, and is able to adjust LRECL as required with an appropriate **THEN LRECL=n** statement.

If **WORKLEN** is not coded, segment data is read into a buffer provided by SELCOPY and the **LRECL** value may only be adjusted downwards.

If an IMS/DL1 segment is read using **READ INTO=n** syntax, and it is required to delete that segment, then the **DEL FROM=n** syntax must be used, so that verification of the **key field** may be made.

STATUS Codes

DL1 will always return a **2-byte Status Code** in the PCB at **POS PCB+10** after any DL1 operation. Thus any residual status from a previous operation is always overwritten.
A Status Code of 2 blanks indicates total success.

Note that **POS STATUS**, or **P STATUS**, is a synonym for **POS PCB+10**.

Refer to IBM's **DL1 Reference Card** which lists all Status Code meanings.

STATUS=GB

Always indicates **End-of-File**, so SELCOPY **checks automatically** for **STATUS=GB** after every sequential read operation on a data base. If true, then SELCOPY will automatically internally flag this file (data base) as having reached EOF. If this is the **prime** input file, and no **IF EOF** test exists for it, then SELCOPY will automatically go to EOJ.

Thus, it is **a waste of time** to test for STATUS=GB on the prime input file. It will **never** succeed, so you must use the **IF EOF** syntax, if additional processing **is required** at end of file.

Testing for STATUS=GB on secondary input data bases will of course be valid, although **IF EOF DBASE2** would still be a better, more readable method.

When the input data base is numeric, testing for EOF must quote the filename in SELCOPY's generated format. e.g.

```
GN  3  DL/I
IF EOF   #0003
```

STATUS in Selection Summary

Any non-blank IMS/DL1 **STATUS** code, with the exception of **GB**, is reported in the Selection Summary for each individual selection.
Thus it is possible to ascertain the status codes returned on each individual selection in the event of problems.

MPS Usage

In certain VSE environments, when the MPS version of DL1 is invoked, the system is unable to supply SELCOPY with the LRECL of the last segment read.
To overcome this, a CBLNAME switch in CBLUSR2 may be set which will default all segment lengths to 512 bytes.

Where MPS is not used, then this switch is ignored and segment lengths are established in the normal way.

ERROR Checking

Not all non-blank Status Codes are error conditions. For example, some indicate only that a hierarchical boundary has been crossed in order to obtain the current record.
The Status Code in such cases is available to the user at **POS PCB+10** and normal processing continues.

Essential Checks

Other non-blank Status Codes may indicate a minor error condition such as **STATUS=GE** which occurs with a **Record-not-found** condition after a GNP statement.

It is then **essential to check** the returned DL1 status code at **POS PCB+10**.
But do not forget that **STATUS=GB** never comes back to the user. It is handled automatically by SELCOPY.

RETCODE=8

If **no reference** has been made to **POS PCB**, then **Return Code 8** is set, to alert the inexperienced DL1 user to the fact that a minor **STATUS** Error has been returned (at least once) from DL1.

If POS PCB **is referenced**, in any of the SELCOPY control cards, then DL1 operations resulting in a minor error condition will have no special action taken by SELCOPY, on the assumption that the user is handling it.
i.e. Return Code 8 is not set.

RETCODE=44

If a **serious error** is encountered, e.g. when an update is attempted on a Data Base using a PCB which does not have the necessary authority in its PROCOPT (Processing Options), the job is immediately terminated with an error message and **Return Code 44** is set.

CHKP Calls

CHKP calls for DL1 apply to **all data bases** in use. The data base name is ignored for **CHKP** calls, so any data numeric base name that is not used for real I/O may be used. e.g.

```
CHKP #0     DL1                    * Checkpoint all accessed databases.
CHKP #999   DL1
```

In the Selection Summary, no matter which number is specified, the database is always reported as **#0000**.

Note the difference in spelling of the **VSE** command **CKPT**, which is used for writing checkpoint records to ordinary sequential files on tape or disk.

The **Checkpoint Id** (length 8) is taken from position 1 of the input or work area.

Use of CHKP causes SELCOPY to attempt to use the I/O PCB, which is only made available if **CMPAT=Y** is coded in the **PCBGEN**.
If CMPAT=Y is not coded, then CHKP calls result in **STATUS=AD**.

Different DBD for same DB

See also:

- DL1 Example 6 - Replace in this section.

Often the requirement exists to read sequentially through a data base, occasionally going back within the same data base using a **GHU** command in order to update a segment, and then continuing with the sequential processing from where it left off.

The use of 2 different **DBD's** for the same database is naturally the ideal method for this exercise, keeping the latest position for sequential processing in **db #1**, while updates are done using **db #2**.

See Example 6 at the end of this section.

Printing

See also:

- DL1 Example 8 - Generalised Print in this section.

When a **THEN PRINT** statement is obeyed by SELCOPY, **FROM=1** is the default, so it will print data from position 1 of the input area, (or work area if **WORKLEN=n** were coded).
Not from the position in the workarea into which the last segment was read, using the **INTO=n** parameter.

The **length** of the data printed will be equal to the length of the **last input** record or segment, regardless of what file it was read from.

WORKLEN=n is normally coded for DL1 processing, also, **multiple** input files are commonplace with DL1, so confusion can easily arise.

An example of this confusion is when a card file **(LRECL=80)** is read into position 1 of the work area, followed by a **56 byte** segment from a DL1 file read into **position 200**, followed by a **THEN PRINT** statement.

The data printed will be the first **56 bytes** from **position 1**, i.e. from the card last read, using the DL1 segment length.
To get the DL1 record, **THEN PRINT FROM=200** is needed.

Direct Processing after EOF

Processing after EOF, both direct and sequential, will be allowed to continue provided the following conditions are met:

An **IF EOF** test exists for the file.

At least 1 **Direct** READ statement exists for it.

Looping on GU

Beware of **Infinite Loops** when using **GU calls** to DL1/IMS.

SELCOPY will **never get End-of-File** indication from a **Get Unique** call, so it will never terminate the job.
This happens because the basic philosophy of SELCOPY is that it loops back to the beginning of your control statements, in order to read the next sequential (?) record, and continues with this technique until the input file is exhausted.
When one of your input statements is a Get Unique, provided the segment exists, DL1 will always succeed, SELCOPY will always loop back, and your run will never be terminated.

To avoid this looping, **GOTO EOJ** or **EOJ** must be coded.

```
  GU DBASE1 IMS   SEG AAAAASEG   SRCH XXXFIELD EQ P 900 LEN 7
  PRINT
  GU DBASE1 DLI   SEG BBBBBSEG   SRCH YYYFIELD EQ 'FLD DATA'
  PRINT TYPE B   L 100
  EOJ                 * This line is ** ESSENTIAL **
```

IMS/DL1 Examples

1. DL1 Example 1 - Read
2. DL1 Example 2 - Read using SSA
3. DL1 Example 3 - Unload/Load
4. DL1 Example 4 - Delete
5. DL1 Example 5 - Insert
6. DL1 Example 6 - Replace
7. DL1 Example 7 - Use of Work Area
8. DL1 Example 8 - Generalised Print

DL1 Example 1 - Read

See also:

- DL1 Example 8 - Generalised Print in this section.

The following example reads Root Segments only and prints the first 20. You do of course have to know the **segment name** of your root segment using this method.

```
  GET ABCFILE DL1  SEG=ABCROOT         * Get next Root Segment.
  PRINT STOPAFT=20                     * Print in char only.
```

DL1 Example 2 - Read using SSA

Reads and prints segments, driven by a card file containing the SSA's required, only 4 in this case. Any file could be used instead of the card file, with selection and manipulation to reformat into valid SSA's, using standard SELCOPY. **End-of-job** occurs at EOF of the prime input file, the card reader.

```
  READ CARD   INTO 2001   WORKLEN 2080
  GU ABCFILE DL1   SSA=2001            * Using SSA read off card.
  IF POS=STATUS   NE   X'4040'         * DL1 Status Code at PCB+10
    T PRINT   'BAD DL1 STATUS CODE'
    T PRINT   FR 2001   L 80           * The SSA data.
    T GOTO GET                         * Go process next record.
  PRINT   TYPE=B                       * Print in both char and hex.
  END   * End of SELCOPY ctl cards - The    CARD file of SSA data follows.
ABCSEGXX(ABCFLDXX= FDVAL1)
ABCSEGYY(ABCFLDYY= FIELDVALYY)
ABCSEGAA(ABCA  = VAL3)
ABCSEGWW(ABCFLDWW> VALUE4)
```

DL1 Example 3 - Unload/Load

We will first **unload** the data base in a format designed for **reloading** it later. The first 8 bytes of each record written will contain the **Segment Name**, position 9 will be blank (waseteful, but simplifies reloading) and position 10 onwards will contain the **segment data**.

Different segments have different lengths, so the unloaded data is best written as **RECFM=VB**, blocked to a high value. SELCOPY will automatically generate the required **RDW** (Record Descriptor Word) holding its length.

```
  RD DBDXXX IMS   INTO 10   W=2000     * Read   all segments.
  MOVE 8   FR PCB+20   TO 1            * The segname from DL1's PCB.
  LRECL = L+9                          * Add 9 to current LRECL.
  WR TAPEDD   RECFM=VB BLKSIZE=32000   * Download to a flat file.
```

To **reload** the data base is simple. Conveniently the tape records already have a blank following the segname so pos 1-9 can be used as an **SSA**. (Blank denotes the end of an SSA).

The **current** LRECL is **wrong**, but does not require changing because **DL1** knows the record length of each segment type and always takes the correct length required.

```
  RD TAPEDD   RECFM=VB NORDW   W=2000  * Read tape file. (Don't return RDW.)
  ISRT DBDXXX DLI   FROM=10   SSA=1    * Insert record using SSA in Pos 1.
```

DL1 Example 4 - Delete

Delete selected Child Segments of the type XXCHILD2, from the DataBase XXDBD, which have a zero value in position 20-23 of that Segment.

```
    GET XXDBD  DLI   SEG=XXROOT  W=2000
                                 * Read ROOT Segment, the parent.
  ==LOOP==                         * This is a SELCOPY label.
    GHNP XXDBD SEG=XXCHILD2        * Get next child within parent (HOLD).
    IF P PCB+10  <>  X'4040'       * DLI Status   should be checked.
      T GOTO GET                   * GET is an implicit label, meaning
                                 * the first SELCOPY control stmt.
    IF POS 20 =  X'0000,000C'      * Check for Packed decimal zero.
      T DLET XXDBD                 * Delete the last Segment read.
    GOTO LOOP                      * Unconditional.
```

DL1 Example 5 - Insert

We require to insert 2 child segments into a DataBase, using a card file with:

cc 01-08	**Root** Segment Name to which the child belongs
cc 09-16	**Child** Segment Name of insertion,
cc 17-80	**Data** for the **new child** segment.

End-of-job will occur when SELCOPY tries to read a 3rd card from the card reader, which in this case is the prime input file.

Note that **POS STATUS**, or **P STATUS**, is a synonym for **POS PCB+10** which is where DL1 returns a status code for the last operation.

```
  READ CARD   WORKLEN 2222

  GHU DBDXXX  SEG=1  INTO 1000  DL1  * Position the DataBase, and Hold.
  IF P STATUS  <>  '  '              * MUST ALWAYS test the status code.
    THEN GOTO STAT-ERR

  ISRT DBDXXX  SEG=9  FROM=17        * Insert data for this segment name.
  IF P STATUS NE X'4040'
    THEN DO STAT-ERR

  GOTO GET                           * To get the next card.


  ==STAT-ERR==
    PRINT 'STATUS ERROR ON FOLLOWING REC:'
    PR  FR PCB   L 40                * Contents of PCB, including status.
    PR           L 80                * Print the card data from position 1.
    SPACE 2                          * Space 2 lines on print output.
   =RET=

  END
ROOTNAMEAAAAASEGdata data data....
ROOTNAM2BBBBBSEGdata2 data2 data2....
```

DL1 Example 6 - Replace

Read every segment in the data base, and if any non-root segment contains the word "OVERDUE", then **update** (i.e. replace) the root segment for that child with "X" as a flag in position 76.

```
READ XXDB #1   DL1   W=2000        * GN to read all Segments.

IF POS PCB+8 = '01'                * If Level 01 (Root).
  THEN MOVE  8 FR SEG TO 501       * Save the Root name.
  THEN MOVE 44 FR 1   TO 511       * Save the Root key.
  THEN GOTO GET

IF POS ANY = 'OVERDUE'             * Check all child segs.
  THEN GHU XXDB #2   INTO 801   SEG=501   SRCH=KEYNAME = 44 AT 511
                       * Direct read of root without disturbing
                       * sequence of GN on #1 access.
  THEN POS 801+76-1 = 'X'          * Set X flag in root seg.
  THEN UPD XXDB #2   FROM 801      * Update Root seg.
       *=*   The word    UPD is a synonym for    REPL.
```

DL1 Example 7 - Use of Work Area

Read a complete data base, and print all Root segments with no **"C"** or **"D"** children.

The **EQU** statement is used for improved readability of the logic used in the control statements.

```
equ rootsave   pos 2001                * Last Root seg save area.
equ rootlen         100                * Length of a Root seg.

gn DBASE1  dli     w 4444

if pos pcb+8 = '01'                    * New Root seg.
or eof
  ti rootsave len rootlen  <>  ' '     * If a Root seg is pending.
    then pr   fr rootsave   l=rootlen  * Print previous Root seg.

if eof     !then goto eoj

if pos pcb+8 = '01'                    * New Root seg.
  then move rootlen   fr 1 to rootsave * Save this Root.
  then goto get

if pos pcb+20 = 'CCCC0001'             * Segment Name.
or pos pcb+20 = 'DDDD0001'             * Segment Name.
  then rootsave len rootlen = ' '      * Ignore Root seg saved, because
                                     * it has C or D child segs.
```

DL1 Example 8 - Generalised Print

Quick Print of IMS/DL1 Data Base

We will print a sample of a DL1/IMS Data Base, together with **Segment names** and **Level numbers**, restricting the print to the first 50 segments.

For clarity, we will space a line on the print every time we hit a **Root Segment** which is identified by a Level number of 01 in the PCB feedback area.

Fields in DL1's **PCB** may be referenced using SELCOPY's positional keywords:

Keyword	Description	Length	Type
POS **PCB**	Database Name	8	Char
POS **PCB+8**	Seg Level	2	ZonedDec
POS **PCB+10**	Status Code	2	Char
POS **STATUS**	Synonym for PCB+10.		
POS **PCB+12**	Processing Options	4	Char
POS **PCB+16**	Reserved	4	
POS **PCB+20**	Segment Name	8	Char
POS **SEG**	Synonym for PCB+20.		
POS **PCB+28**	Length of Key	4	Binary
POS **PCB+32**	No of Sensitive Segs	2	Binary
POS **PCB+36**	Key Feedback Area	Var	Char

We will use a work area (automatically initialised to blanks by SELCOPY) which is larger than the largest record, and read segments (records) into position 101.

But segments shorter than 100 bytes may have residual data still in the work area from the last segment. This must be cleared with blanks before printing.

POS LRECL in SELCOPY refers to the last byte of the current input record assuming it was read into position 1, but in our case, we read our record into a position 100 bytes further on, so **LRECL+100** is the last byte of the current record. It is therefore position **LRECL+101** which needs to be blanked. **L+101** is a valid abbreviation.

After moving in the Segment Name and Level no to the front of the work area, we will print it, restricting the print length to 200 and spacing one line first if we have a root segment to print. In spite of the restriction of L=200 on the PRINT command, it is still the **true segment length** of each individual segment which is printed on the right hand side of the SELCOPY report.

The Status Code is not checked because EOF is handled automatically by SELCOPY as well as any major error conditions.

SELCOPY Control Cards

```
read DBNAME   DL1   into 101   w 2222  * Work area length 2222.

pos L+101,200 = ' '                   * Blank out residual data.
move 2   fr pcb+8   to 1              * Segment Level No.
move 8   fr seg     to 10             * Segment Name.

if pos pcb+8 = '01'                   * Is it a Root Segment?
  t space 1                           * Extra blank line.
  t p 20 = '*=* ROOT SEGMENT OF DB xxxxxxxx *=*'
  t move 8   fr pcb   to 43           * Data Base name.
  else pos 20,80 = ' '

print   L 200   s 50                  * First 50 segs, length 100.
```

Notes:
SELCOPY treats lower case as upper case unless in 'quotes'.
Some common abbreviations are:

rd read	**w** worklen	**fr** from	**l** lrecl	**b** blksize	**t** then
pr print	**p** pos	**ty** type	**s** stopaft	**li elseif**	**ti** thenif

Change **t space 1** to **t line 1** to force a new page.
You could also display the Processing Options. Use **POS PCB+12**.

DB2 Processing

Introduction

For MVS users the IBM Relational Database Management System **DB2** may be accessed using SELCOPY.

DB2 data is defined and manipulated by executing **Structured Query Language (SQL)** statements.

SELCOPY uses **Dynamic SQL** to allow you to define the SQL statements you want to execute at run time. For example you can:

- Create and drop DB2 databases, tables, views, indexes etc.
- Read, update and delete rows in tables and views.
- Insert rows into tables and views.

Several DB2 tables may be processed together, as well as having input and output of all other types of files within the same execution of SELCOPY.

The design of the SELCOPY interface to SQL data has the following objectives:

- To integrate as far as possible SQL processing with existing SELCOPY syntax.
- To support straightforward access to tables and views as though they were traditional files. This allows the inexperienced or occasional SQL user to get at SQL data with the minimum of fuss. In this case SELCOPY generates and executes SQL statements on behalf of the user.
- To support the execution of SQL statements provided by the user either coded on SELCOPY control cards, built dynamically in the SELCOPY work area, or read from a file. This gives the experienced user full access to SQL functionality through SELCOPY and allows the use of existing SQL statement code in SELCOPY programs.

Concepts and Terminology

DB2

A Relational Database Management System (RDBMS). It operates as an **MVS subsystem**.

- DB2 runs in its own address spaces independently of any application using its services.
- There can be multiple DB2 subsystems running in a given MVS host. Each one manages its own set of databases and can be individually started and stopped by the operator.
- Each DB2 in an MVS system has a unique identifier called the **subsystem name (SSN)**. This name is 1 to 4 characters in length.

CAF (Call Attachment Facility)

The component of DB2 which allows other programs to connect to and use the services of DB2 subsystems. CAF consists of a number of modules supplied by IBM with DB2.

SELCOPY communicates with DB2 using **CAF**.

SQL (Structured Query Language)

A standardized language for defining and manipulating data in a relational database.

SQL statements must be transformed into sequences of internal DB2 operations before they can be executed. This transformation process is known as **preparation** or **binding** and produces an **operational form** of the SQL statement.

Static SQL

Static SQL statements are embedded in application programs written in a programming language like COBOL, PL/1, Assembler or C. These statements are **prepared** before the application runs with the **BIND** command.

Applications using static SQL for all their database access are restricted to the types of processing specified in the source code. However certain static SQL statements are provided simply to allow the dynamic preparation and execution of other SQL statements. These are the ones SELCOPY uses.

Dynamic SQL

Dynamic SQL statements are **prepared** during the execution of the application. They are passed to DB2 as character strings. The use of dynamic SQL gives maximum flexibility for the application in that the nature of the database accesses can be chosen at run time.

Application Plan

Contains the **operational form** of the static SQL statements in an application program. It is stored in the catalog of the DB2 subsystem(s) which the application will use at run time. All DB2 applications must have a plan.

Base Tables

Objects which contain the data in a relational database. They are defined with the **CREATE TABLE** statement as an ordered set of **columns** each with a specified **data type** (e.g. character, decimal, binary integer, floating point number etc.).

Data is held in a table as an unordered set of **rows**. Each row consists of an ordered set of **data values**, one for each of the columns defined for the table.

It is often useful to think of a **row** in a **table** as a conventional **record** in a **file** but with an implicitly defined **record layout** (namely the column specification for the table). SELCOPY exploits this idea to integrate SQL processing with its normal file handling syntax.

Results Table

A temporary table constructed at run time by the Relational Database Manager when executing a **SELECT** statement.

The **SELECT** statement specifies the **results table** as a set of rows and columns derived from one or more base tables.

Applications retrieve data from the relational database by **FETCHing** rows from a **results table** defined by a **SELECT** statement. **SQL** provides no way of reading the rows of the base tables directly.

View

A named SELECT statement. The SELECT statement associated with the view name is stored in the database and is effectively executed whenever the view is referenced. Since a view defines a results table consisting of rows and columns, it can be used for retrieval just like a base table. With certain restrictions a view might also be useable for **INSERT**, **UPDATE** and **DELETE** operations.

DB2 Catalog

A set of tables maintained within each DB2 subsystem to describe the data under its control. Catalog tables are just like any other database tables and authorised users can execute SQL statements to look at the data in them. For example, the names of all the tables (including the catalog tables) in a DB2 subsystem are stored in the **SYSIBM.SYSTABLES** table.

Execution

In order to execute SELCOPY successfully using DB2 access you must:

1. Ensure that the DB2 Call Attachment Facility (CAF) Modules are available for SELCOPY to load. The CAF modules are supplied with DB2 in the **SDSNLOAD** library (this library was called **DSNLOAD** prior to version 3 of DB2).

   If your installation places the DB2 load libraries in the MVS Link List then the CAF modules will be available to all MVS address spaces. If not then you will need **STEPLIB** DD cards in your SELCOPY job (or in your TSO logon procedure if running under TSO) pointing to the DB2 load libraries. For example:

```
//stepname EXEC PGM=SELCOPY
//STEPLIB  DD DISP=SHR,DSN=db2hlq.SDSNEXIT      DB2 Exit Library
//         DD DISP=SHR,DSN=db2hlq.SDSNLOAD      DB2 Load Library
//         DD DISP=SHR,DSN=cbl.loadlib          SELCOPY Load Library
//SYSPRINT DD SYSOUT=*
//CBLSQLOG DD SYSOUT=*                          SQL log file
//SYSIN    DD *
  READ   TAB='MY.TABLE'  SSN=MYDB
  PRINT  STOPAFT=22
```

2. Identify the DB2 subsystem(s) you wish to access. This is described below in the section **Identifying the DB2 Subsystem**. Any DB2 you access must be active.

3. Ensure that each DB2 subsystem you wish to access contains the SELCOPY Application **Plan**. Binding the SELCOPY Plan is described in the **SELCOPY Installation Guide** document.

4. To obtain a log message file describing SELCOPY SQL activity you need to add a **CBLSQLOG** dd card to your SELCOPY JCL (or allocate dd name **CBLSQLOG** if running under TSO). The DCB characteristics of this file are RECFM=F(B), LRECL=133. More information on the **CBLSQLOG** file is given below in the section *The CBLSQLOG log file*.

Identifying the DB2 Subsystem

Before any SQL commands can be processed, an application must **CONNECT** to a particular DB2 subsystem. A task can be connected to only one DB2 subsystem at a time.

SELCOPY makes it very easy to connect to a DB2 subsystem automatically:

- If you want to access your site default DB2 then you do not have to mention a DB2 subsystem name at all. It is defined during installation in CBLNAME.
- You can use the **OPTION** control statement to specify the subsystem name. For example:

```
opt ssn=DB2P
```

- Otherwise code the **SSN** parameter on your SELCOPY SQL control card. For example:

```
rd sql='SELECT * FROM SYSIBM.SYSTABLES ORDER BY NAME' ssn=DB2P
```

If you wish to use a DB2 subsystem other than the default you must declare it on the first SELCOPY SQL control card.

If you specify more than one value for SSN on different control cards or specify a non-default SSN other than on the first SELCOPY SQL control card SELCOPY will issue an error during control card vetting:

```
*** ERROR 146 *** DB2: DIFF SSN/PLAN
```

Running a SELCOPY in Different DB2 Subsystems

When migrating a SELCOPY control file from one environment to another (e.g. from test to production) you may well need to change the DB2 subsystem.

If the subsystem name was coded on an operation statement, for example:

```
rd tab=my.tab order=1 ssn=DB2A
```

then it is generally inconvenient to have to change it when the SELCOPY is to run in a different environment.

Here are two ways to overcome this problem:

Using Multiple CBLNAME modules

SELCOPY picks up the default DB2 subsystem name from CBLNAME.

Include a different CBLNAME module in the STEPLIB concatenation of the job which executes SELCOPY for DB2 in each environment. This will ensure that SELCOPY runs with the appropriate DB2 subsystem.

The following code fragment shows part of a cataloged procedure which uses this technique:

```
//SELCDB2   EXEC PGM=SELCOPY,REGION=&RGN
//STEPLIB  DD DISP=SHR,DSN=MY.&ENV..SELCOPY.LOADLIB
//*                       contains appropriate CBLNAME
//         DD DISP=SHR,DSN=MY.SELCOPY.LOADLIB
//*                       contains SELCOPY and SELCOPQL
//         DD DISP=SHR,DSN=DSN410.SDSNEXIT
//         DD DISP=SHR,DSN=DSN410.SDSNLOAD
//SYSPRINT DD SYSOUT=&SOUT
//CBLSQLOG DD SYSOUT=&SOUT
//SYSIN    DD DISP=SHR,DSN=MY.&ENV..SELCOPY.CNTL(&MBR)
//*                       contains your SELCOPY control file.
```

Using An Option Control File

You can define the SELCOPY DB2 subsystem using the **OPT** control statement.

Define a separate PDS member containing your options for each environment and concatenate it ahead of the SELCOPY control file on SYSIN. This will allow you to use a standard set of options in each environment.

The following code fragment shows part of a cataloged procedure which uses this technique:

```
//SELCDB2   EXEC PGM=SELCOPY,REGION=&RGN
//STEPLIB  DD DISP=SHR,DSN=MY.SELCOPY.LOADLIB
//         DD DISP=SHR,DSN=DSN410.SDSNEXIT
//         DD DISP=SHR,DSN=DSN410.SDSNLOAD
//SYSPRINT DD SYSOUT=&SOUT
//CBLSQLOG DD SYSOUT=&SOUT
//SYSIN    DD DISP=SHR,DSN=MY.&ENV..SELCOPY.CNTL(OPTIONS)
//*                       contains your SELCOPY options for this
//*                       environment including ssn=.
//         DD DISP=SHR,DSN=MY.&ENV..SELCOPY.CNTL(&MBR)
//*                       contains your SELCOPY control file.
```

Concurrent Read Limit

In this release there is a limit of **8 concurrently OPEN** SQL SELECT statements in one SELCOPY execution. This limit is independent of the concurrent INSERT limit.

You can process more than 8 SELECT statements in one run but only by either **implicitly** or **explicitly** closing them to maintain the concurrency limit.

SELECT statements are **implicitly** closed when **End Of File** is reached. They can be **explicitly** closed with the **CLOSE** operation.

Concurrent Insert Limit

In this release there is a limit of **8 concurrently OPEN** SQL PREPARED INSERT statements in one SELCOPY execution. This limit is independent of the concurrent SELECT limit.

You can process more than 8 PREPARED INSERT statements in one run but only by **explicitly** closing them to maintain the concurrency limit.

PREPARED INSERT statements are **explicitly** closed with the **CLOSE** operation.

Using Statement Continuation

SQL statements are typically quite long (up to 32K is supported).

If you want to specify your SQL statements as literal strings you may need to use the SELCOPY statement continuation feature.

For example you can code something like this:

```
DB2       'CREATE TABLE tablename                \
                  LIKE  tablename                \
                  IN DATABASE databasename       \
                  AUDIT CHANGES'
```

When defining an SQL statement as a literal string the string must be:

- delimited with either single or double quotes.
- if longer than one line must be continued with the SELCOPY line continuation character BACKSLASH (\).
- if it contains the string delimiter these must be doubled.

Special Position Keywords for DB2

The following special arguments for the SELCOPY **POS** keyword are supported:

POS SQLCA	Refers to the SQL Communication Area for the most recently executed SQL statement.
POS SQLDA	Refers to the SQL Descriptor area for the most recently executed SQL statement.
POS SQLMA	Refers to the SQL Message area for the most recently executed SQL statement.
POS RPL	Refers to the SQL Request Parameter List for the most recently executed SQL statement.

These POS arguments are described in detail in the reference section of this manual.

The CBLSQLOG log file

See also:

- SELCOPY SQL Messages in section *Messages*.

Detailed information about SELCOPY SQL processing can be listed by allocating a file with dd name **CBLSQLOG**. In particular SQL error messages are displayed in full when a bad SQL return code is received.

This file has DCB characteristics RECFM=F(B), LRECL=133. It can be allocated to SYSOUT, to a sequential file or to a member of a partitioned dataset.

If you do not want this log information then simply do not allocate file **CBLSQLOG**.

Examples of the CBLSQLOG file are shown below.

DB2 Example 1: Normal SQL Execution

The following listings show the SELCOPY output and the CBLSQLOG listing for a successful execution of SELCOPY using SQL to do reads, updates and inserts to a DB2 table.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)                          OS JOB=NBJ       13.55 MON 26 NOV 2001    PAGE   1
o ------------------------------------------------------                                          ---------------------    -------- o


o          ** CBL.S980.QL.SYSIN(SQLDOC01) *** L=001 +++ 2001/11/26 13:54:40 (NBJ)                                                 o
                      * Demonstrate CBLSQLOG for normal execution.

o          equ sqlcode sqlca+12             * SQL return code.                                                                    o
           opt w 4096

o      1.    rd  f1 tab=p390.float_test2 pfx  upd=fpreal * Read for update.                                                       o
       2.    pr from 1 ty d

o            if   pos 1  =  X'41200000'              * Test column value.                                                        o
       3.       t pos 1 mod X'40200000'              * Change column value.
       4.       t upd f1                             * Update the row.
o                                                                                                                               o
       5.    ins f2 tab=p390.float_test  pfx          * Copy to another table.

o                                                                                                                               o
      INPUT   SEL SEL
      RECNO   TOT ID.
o     -----   --- ---                                                                                                           o
          1     1   2            28
    0000  40200000 41200000 00000000 00004120   0000FFFF 40404040 40404040              * ....................            *
o         2     2   2            28                                                                                            o
    0000  41200000 41200000 00000000 00004120   0000FFFF 40404040 40404040              *....................             *
          3     3   2            28
o   0000  41200000 41200000 00000000 00004120   0000FFFF 40404040 40404040              *....................             *   o
          4     4   2            28
    0000  41200000 41200000 00000000 00004120   0000FFFF 40404040 40404040              *....................             *
o         5     5   2            28                                                                                            o
    0000  41200000 41200000 00000000 00004120   0000FFFF 40404040 40404040              *....................             *

o SUMMARY..                                                                                                                     o
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
   ------      ------      ----     -------  -----           -----   --    ---
o     1            5 READ F1                 28 U               5       P390.FLOAT_TEST2                                     o
      2            5
      3            4
o     4            4 UPD  F1                 28 U               5       P390.FLOAT_TEST2                                     o
      5            5 INS  F2                  0 U               0       P390.FLOAT_TEST

o                                                                                                                               o
          ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **
                                          ** EXPIRY DATE -- 2002/05/21 **
```

The above SELCOPY execution produced the following CBLSQLOG file:

```
               *** CBL Dynamic SQL Interface Version 2.00 ***
                   ------------------------------------
  CBLS010I 13:55:07 CBL Dynamic SQL Interface is started. Date: 2001-11-26

  CBLS000I 13:55:08 (Sel 1) Connected to DB2 Version 4.1.0
                    Subsystem:DB2A             Plan:CBLPLAN0
                         User:NBJ      Current SQLID:NBJ

  CBLS004I 13:55:08 (Sel 1) OPEN  SELECT cursor F1

           SELECT *
             FROM P390.FLOAT_TEST2 FOR UPDATE OF FPREAL

  CBLS004I 13:55:08 (Sel 5) OPEN  INSERT cursor F2

           INSERT INTO P390.FLOAT_TEST (FPREAL,FPFLOAT,FPREALN,FPFLOATN) VALUES(?,?
                 ,?,?)
  CBLS013I 13:55:09 (Sel 4) UPDATE statement generated:

           UPDATE P390.FLOAT_TEST2 SET FPREAL=?  WHERE CURRENT OF C1


  CBLS005I 13:55:09 (Sel 1) End Of File on SELECT cursor F1

  CBLS006I 13:55:09 (Sel 1) CLOSE SELECT cursor F1
                    Prepare and OPEN           DB2 CPU=  000000.136568 seconds.
                      Rows  Fetched=5          DB2 CPU=  000000.011710 seconds.
                      Rows  Updated=4          DB2 CPU=  000000.007628 seconds.
                    Update Prepares=1          DB2 CPU=  000000.070036 seconds.
                                     Total DB2 CPU=  000000.225942 seconds.

  CBLS006I 13:55:09 (Sel 5) CLOSE INSERT cursor F2
                      Rows Inserted=5          DB2 CPU=  000000.015281 seconds.
                    Insert Prepares=1          DB2 CPU=  000000.271560 seconds.
                                     Total DB2 CPU=  000000.286841 seconds.

  CBLS001I 13:55:09 (Sel 1) Disconnected from DB2 Subsystem DB2A
                               Total connection DB2 CPU=  000000.517701 seconds.

  CBLS009I 13:55:09 CBL Dynamic SQL Interface is stopped
                    GETMAINs  issued=16      Storage=13696   HWM=13496
                    FREEMAINs issued=16      Storage=13696
                                  Total Interface CPU=  000000.652977 seconds.
```

DB2 Example 2: Run Time Error RC=8

The following listings show the SELCOPY output and the CBLSQLOG listing in an example where an attempt is made to update a decimal column with invalid decimal data.

No **SQLCA** test was coded on any control card, so SELCOPY sets **RC=8** in response to a bad SQL return code.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)                    OS JOB=NBJ       15.29 MON 26 NOV 2001    PAGE   1
  ------------------------------------------------------                   ----------       ---------------------    --------

           ** CBL.S980.QL.SYSIN(SQLDOC02) *** l=001                    (P390)

                        * Demonstrate rc=8 for bad SQL return code.

           opt w 4096

       1.    rd  f1 tab=p390.type_test pfx  upd=ttdec  * Read for update.
       2.    pos 13 mod X'FFFFFFFF'                   * Modify with invalid data.
       3.    upd f1                                   * Try the update.

             if  retcd=8                              * Test SELCOPY return code.
       4.        t eoj                                * Finish if rc=8.


  SUMMARY..
     SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
     ------      ------      ----     -------  -----           -----   --    ---
       1             1 READ F1                76 U               1       P390.TYPE_TEST
                            *EOF*NOT*REACHED*
       2             1
       3             1 UPD  F1                76 U               1       P390.TYPE_TEST
                          (***01 RETCD=8***)
       4             1
  ***WARNING*** (SEL----3)        8 = RETURN CODE FROM SELCOPY

           ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **
                                                  ** EXPIRY DATE -- 2002/05/21 **
```

The above SELCOPY execution produced the following CBLSQLOG file:

```
               *** CBL Dynamic SQL Interface Version 2.00 ***
                   ---------------------------------------
  CBLS010I 15:29:32 CBL Dynamic SQL Interface is started. Date: 2001-11-26

  CBLS000I 15:29:33 (Sel 1) Connected to DB2 Version 4.1.0
                    Subsystem:DB2A             Plan:CBLPLAN0
                         User:NBJ      Current SQLID:NBJ

  CBLS004I 15:29:33 (Sel 1) OPEN  SELECT cursor F1

           SELECT *
             FROM P390.TYPE_TEST FOR UPDATE OF TTDEC

  CBLS013I 15:29:36 (Sel 3) UPDATE statement generated:

           UPDATE P390.TYPE_TEST SET TTDEC=?  WHERE CURRENT OF C1


  CBLS003E 15:29:37 (Sel 3) Non-zero SQL Return code  -310
                    Function=UPDATE     Cursor=F1
                    SQL verb=SELECT     Table=P390.TYPE_TEST

           DSNT408I SQLCODE = -310, ERROR:  DECIMAL HOST VARIABLE OR PARAMETER 001
                    CONTAINS NON-DECIMAL DATA
           DSNT418I SQLSTATE   = 22023 SQLSTATE RETURN CODE
           DSNT415I SQLERRP    = DSNXRIVB SQL PROCEDURE DETECTING ERROR
           DSNT416I SQLERRD    = -340  0  0  -1  0  0 SQL DIAGNOSTIC INFORMATION
           DSNT416I SQLERRD    = X'FFFFFEAC'  X'00000000'  X'00000000'
                    X'FFFFFFFF'  X'00000000'  X'00000000' SQL DIAGNOSTIC
                    INFORMATION

   Fname: F1          RecNo: 0000001  *** I/O area contents *** (Sel 3)
  +------------------+---------------+-----+-----+------------------------------+
  |   Column Name    |  Column Type  | Ind | VLen|            Value             |
  +------------------+---------------+-----+-----+------------------------------+
  |TTINT             |INT            |0    |     |1                             |
  |TTSINT            |SMALLINT       |0    |     |2                             |
  |TTDEC             |DEC(7,2)       |0    |     |....                          |
  |                  |               |     |     |FFFF                          |
  |                  |               |     |     |FFFF                          |
  |                  |               |     |     |Error - Invalid decimal data  |
  |TTCHAR            |CHAR(8)        |0    |     |Char                          |
  |TTVCHAR           |VARCHAR(30)    |0    |5    |Vchar                         |
  |TTFLOAT           |FLOAT          |0    |     |+0.11000000000000000E+01      |
  |TTREAL            |REAL           |0    |     |+0.21999998E+01               |
  +------------------+---------------+-----+-----+------------------------------+

  CBLS006I 15:29:37 (Sel 1) CLOSE SELECT cursor F1
                    Note: End of SELECT not reached.
                    Prepare and OPEN           DB2 CPU=  000000.144730 seconds.
                      Rows  Fetched=1          DB2 CPU=  000000.014294 seconds.
                                         Total DB2 CPU=  000000.236700 seconds.

  CBLS001I 15:29:37 (Sel 1) Disconnected from DB2 Subsystem DB2A
                            Total connection DB2 CPU=  000000.241607 seconds.

  CBLS009I 15:29:37 CBL Dynamic SQL Interface is stopped
                    GETMAINs  issued=9       Storage=13328   HWM=13328
                    FREEMAINs issued=9       Storage=13328
                                  Total Interface CPU=  000000.402349 seconds.
```

DB2 Example 3: Run Time Error with SQLCA Test

The following listing shows the SELCOPY output in an example where an attempt is made to update a decimal column with invalid decimal data.

This example is the same as Example 2 except that this time a test is made of the SQLCA. The SQL return code is at offset 12 (decimal) in the SQLCA.

When an SQLCA test is present on any control statement SELCOPY does not set **RC=8** in response to a bad SQL return code. It is up to the user to decide what happens in this case.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)                          OS JOB=NBJ       15.36 MON 26 NOV 2001    PAGE   1
o ------------------------------------------------------                                          ---------------------    -------- o


o          ** CBL.S980.QL.SYSIN(SQLDOC03) *** l=001                       (P390)                                                  o

                       * Demonstrate SQL return code test using SQLCA+12.
o                                                                                                                                 o
          equ sqlcode sqlca+12             * SQL return code.
          opt w 4096
o                                                                                                                                 o
       1.    rd  f1 tab=p390.type_test pfx  upd=ttdec  * Read for update.
       2.    pos 13 mod X'FFFFFFFF'                    * Modify with invalid data.
o      3.    upd f1                                    * Try the update.                                                         o

             if 4 at sqlcode ty b <> 0      * Test the SQL return code.
o      4.       t retcd=1001               * Set bad return code.                                                               o
       5.       t eoj

o            end                                                                                                                  o


o                                                                                                                                 o
  SUMMARY..
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
o  ------      ------      ----     -------  -----           -----   --    ---                                                    o
      1             1 READ F1               76 U               1       P390.TYPE_TEST
                             *EOF*NOT*REACHED*
o     2             1                                                                                                           o
      3             1 UPD  F1               76 U               1       P390.TYPE_TEST
      4----5        1
o                                                                                                                                 o
  ***WARNING***                1001 = RETURN CODE FROM SELCOPY

o          ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **  o
                                          ** EXPIRY DATE -- 2002/05/21 **
```

The above SELCOPY execution produces exactly the same CBLSQLOG file as Example 2, with the exception of timestamps and low order digits of the timing figures.

SELCOPY SQL I/O Area format

SQL accepts and returns data by **column** rather than by **record**. Although all columns for a row are passed to and from DB2 in the same operation, the following considerations which apply to SQL data do not apply to other file access methods such as VSAM:

- Each column data area is individually addressable (the columns for a row do not have to be contiguous in the I/O area)
- Each column may have an **indicator variable**. This is a 2 byte binary field used to:
  - Specify the null value. A negative value of the indicator variable specifies the null value. A -2 null indicates a numeric conversion or arithmetic expression error in the SELECT list of an outer SELECT statement.
  - Record the original length of a truncated string.
  - Indicate that a character could not be converted.
  - Record the seconds portion of a time if the time is truncated on assignment to a host variable.

  This field does not need to be contiguous with the column data area.
- SQL supports variable length character columns of various types. The length is held in a 2 byte prefix which **is** contiguous with the character data.
- The format of columns can be changed as they pass between the application and DB2. For example the application can request that floating point columns be converted to decimal, or varying length character strings converted to fixed length.

In order to make SQL processing as similar as possible to other record based access methods, SELCOPY adopts the following conventions for the placement of columns in the I/O area:

- Starting from the first position in the I/O area (as defined by the user with the INTO or FROM keyword or, by default, position 1) column data areas are contiguous, of maximum possible length for the given column datatype (so column truncation errors should never happen) and placed in the order which SQL defines them in the SQLDA.
- If the **VLEN** option was used variable length character data types have their 2 byte prefix. Otherwise VARCHAR columns are converted to CHAR.
- If the **NULL** option was used nullable columns have their 2 byte indicator contiguous with the column data area and **preceding** it in the I/O area.

Keeping track of where column data is in the I/O area can be a problem. The SQLDA defines where DB2 gets or puts column data. The SQLDA for the most recently executed SQL statement is available at **POS SQLDA**.

The **addresses** in the SQLDA should not be used to locate column data directly since they may point to an internal SELCOPY buffer. However the **offsets** calculated as the difference between these address and that in the **first** SQLVARN of the SQLDA can be used when added to your **INTO** or **FROM** value.

Generating SELCOPY EQU statements

A generally useful technique to handle the I/O area layout problem is as follows:

- Write a SELCOPY which **PREPARES** an appropriate SELECT statement with the **DB2** operation (**Example 4: Accessing the SQLDA)**.
- Process the SQLDA to generate SELCOPY **EQU** statements which describe the I/O area layout and save them in a dataset (**Example 5: Processing the SQLDA**).
- You can now include these **EQU** control cards in any SELCOPY which uses the same set of columns (in the same order and with the same combination of **VLEN** and **NULLS** parameters).

DB2 Example 4: Accessing the SQLDA

See also:

- POS SQLDA in section *Operation Words, Parameters and Keywords*.

This example shows the printing of the SQLDA after a SELECT statement has been **PREPARED** with the **DB2** command. Note that the SELECT has not been OPENed.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)                          OS JOB=NBJ       15.42 MON 26 NOV 2001    PAGE   1
o ------------------------------------------------------                                          ---------------------    -------- o


o          ** CBL.S980.QL.SYSIN(SQLDOC04) *** L=002 (P390) 97/04/24 10:11:19                                                    o

                      * Demonstrate SQLDA print after preparing a SELECT.
o                                                                                                                              o
          opt w 4096

o      1.    db2 sql='select * from dsn8410.emp'      pfx  * Prepare a SELECT.                                                 o
       2.    lrecl= 4 at sqlda+8 ty b                      * Get SQLDA length.
       3.    pr  from sqlda   ty d                         * Print the SQLDA.
o                                                                                                                              o

      INPUT   SEL SEL
o     RECNO   TOT ID.                                                                                                          o
      -----   --- ---
          0     1   3           632
o   0000  E2D8D3C4 C1404040 00000278 000E000E   01C40006 000DF238 00000000 0005C5D4     *SQLDA   .........D....2.......EM*           o
    0020  D7D5D640 40404040 40404040 40404040   40404040 40404040 40404040 01C0000C     *PNO                           .{..*
    0040  000DF23E 00000000 0008C6C9 D9E2E3D5   D4C54040 40404040 40404040 40404040     *..2.......FIRSTNME             *
o   0060  40404040 40404040 01C40001 000DF24C   00000000 0007D4C9 C4C9D5C9 E3404040     *         .D....2<......MIDINIT   *           o
    0080  40404040 40404040 40404040 40404040   40404040 01C0000F 000DF24D 00000000     *                       .{....2(....*
    00A0  0008D3C1 E2E3D5C1 D4C54040 40404040   40404040 40404040 40404040 40404040     *..LASTNAME                     *
o   00C0  01C50003 000DF260 000DF25E 0008E6D6   D9D2C4C5 D7E34040 40404040 40404040     *.E....2-..2;..WORKDEPT         *           o
    00E0  40404040 40404040 40404040 01C50004   000DF265 000DF263 0007D7C8 D6D5C5D5     *            .E....2...2...PHONEN*
    0100  D6404040 40404040 40404040 40404040   40404040 40404040 0181000A 000DF26B     *O                         .a....2,*
o   0120  000DF269 0008C8C9 D9C5C4C1 E3C54040   40404040 40404040 40404040 40404040     *..2...HIREDATE                 *           o
    0140  40404040 01C50008 000DF277 000DF275   0003D1D6 C2404040 40404040 40404040     *    .E....2...2...JOB          *
    0160  40404040 40404040 40404040 40404040   01F50002 000DF281 000DF27F 0007C5C4     *               .5....2a..2"..ED*
o   0180  D3C5E5C5 D3404040 40404040 40404040   40404040 40404040 40404040 01C50001     *LEVEL                        .E..*         o
    01A0  000DF285 000DF283 0003E2C5 E7404040   40404040 40404040 40404040 40404040     *..2e..2c..SEX                  *
    01C0  40404040 40404040 0181000A 000DF288   000DF286 0009C2C9 D9E3C8C4 C1E3C540     *         .a....2h..2f..BIRTHDATE *
o   01E0  40404040 40404040 40404040 40404040   40404040 01E50902 000DF294 000DF292     *                    .V....2m..2k*          o
    0200  0006E2C1 D3C1D9E8 40404040 40404040   40404040 40404040 40404040 40404040     *..SALARY                       *
    0220  01E50902 000DF29B 000DF299 0005C2D6   D5E4E240 40404040 40404040 40404040     *.V....2...2r..BONUS            *
o   0240  40404040 40404040 40404040 01E50902   000DF2A2 000DF2A0 0004C3D6 D4D44040     *             .V....2s..2...COMM  *         o
    0260  40404040 40404040 40404040 40404040   40404040 40404040                       *                                 *

o SUMMARY..                                                                                                                    o
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
   ------      ------      ----     -------  -----           -----   --    ---
o     1            1 DB2                                                                                                       o
      2----3       1

o                                                                                                                              o
          ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **
                                          ** EXPIRY DATE -- 2002/05/21 **
```

The above SELCOPY execution produced the following CBLSQLOG file:

```
               *** CBL Dynamic SQL Interface Version 2.00 ***
                   ------------------------------------
  CBLS010I 15:42:18 CBL Dynamic SQL Interface is started. Date: 2001-11-26

  CBLS000I 15:42:19 (Sel 1) Connected to DB2 Version 4.1.0
                    Subsystem:DB2A             Plan:CBLPLAN0
                         User:NBJ      Current SQLID:NBJ

  CBLS007I 15:42:20 (Sel 1) DESCRIBE SELECT   SQL Code=0

            select *
              from dsn8410.emp
                                    DB2 CPU=  000000.210549 seconds.

  CBLS001I 15:42:21 (Sel 1) Disconnected from DB2 Subsystem DB2A
                            Total connection DB2 CPU=  000000.215581 seconds.

  CBLS009I 15:42:21 CBL Dynamic SQL Interface is stopped
                    GETMAINs  issued=7       Storage=13192   HWM=13192
                    FREEMAINs issued=7       Storage=13192
                              Total Interface CPU=  000000.345688 seconds.
```

DB2 Example 5: Ctl Cards for generating EQU statements

The following control statments are in **SSDB2EQU CTL** on the DM file.

```
** g:\ss\SSDB2EQU.CTL ***          L=003 --- 97/04/27 17:31:55    (P21)
*                          CBL.SSC.CTL(SSDB2EQU) on P390A.
*  (See also:  SSDB2LD.CTL for generating DB2 LOAD Utility control cards
*              for loading a DB2 table which was unloaded by SELCOPY.
*  )
* Generate SELCOPY EQU cards which describe the layout of a row of
* data as returned by SELCOPY from an SQL SELECT.
* Output to OUTDD.  e.g.

*        --- SELCOPY EQU stmts gen'd by SSDB2EQU ---    1997/04/26 16:06
* SELECT *  FROM DSN8410.EMP
                                * Extnl Intnl                 Indicator
                                *  Len   Len   Data Type         Var
                                *  ---   ---   ---------        -----
equ RECORD_NUMBER      XX+00000 *zzz11 zzzz4  INTEGER
*qu DATE               XX+00011 *   nn    10  DATE    (BEWARE: keyword)
equ TIME               XX+00021 *   nn     8  TIME
equ TIMESTAMP          XX+00029 *   nn    26  TIMESTMP
equ CHAR8              XX+00055 *   nn     8  CHAR
equ NUCHAR8            XX+00065 *   nn     8  CHAR              NULLS
equ NVCHAR8            XX+00075 *   nn     8  CHAR              NULLS
equ VARCHAR18          XX+00083 *   nn    18  VARCHAR
equ NUVARCHAR18        XX+00105 *   nn    18  VARCHAR           NULLS
equ NVVARCHAR18        XX+00127 *   nn    18  VARCHAR           NULLS
equ FLOAT4             XX+00147 *   nn     4  FLOAT(21)
equ NUFLOAT4           XX+00164 *   nn     4  FLOAT(21)         NULLS
equ NVFLOAT4           XX+00181 *   nn     4  FLOAT(21)         NULLS
equ FLOAT8             XX+00196 *   nn     8  FLOAT(53)
equ NUFLOAT8           XX+00222 *   nn     8  FLOAT(53)         NULLS
equ NVFLOAT8           XX+00248 *   nn     8  FLOAT(53)         NULLS
equ DECIMAL7_2         XX+00272 *   nn     4  DECIMAL(07,02)
equ NUDECIMAL7_2       XX+00283 *   nn     4  DECIMAL(07,02)    NULLS
equ NVDECIMAL7_2       XX+00294 *   nn     4  DECIMAL(07,02)    NULLS
equ INTEGER            XX+00303 *   nn     4  INTEGER
equ NUINTEGER          XX+00316 *   nn     4  INTEGER           NULLS
equ NVINTEGER          XX+00329 *   nn     4  INTEGER           NULLS
equ SMALLINT           XX+00340 *   nn     2  SMALLINT
equ NUSMALLINT         XX+00348 *   nn     2  SMALLINT          NULLS
equ NVSMALLINT         XX+00356 *   nn     2  SMALLINT          NULLS

* L=002 97/04/26 - mods - djh -
* L=001 97/04/23 - written - jge -

 noprint                      * Don't print control cards.      ***
equ OUTDD CBLSQPUN   * Output DD name.
equ orec           1 * Output record.
equ onam           5 * Data element name.
equ ofn           24 * "File" (view) name.
equ opos          27 * The nnnnn offset on XX, defining the pos reqd.
equ oast          33 * The asterisk defining start of comment.
equ olenx         34 * Data Length external (in I/O area).
equ oleni         40 * Data Length internal to DB2.
equ otyp          47 * Data Type.
equ onul          65 * NULLS indicator present.

equ base    4 at 201 * Abs addr of 1st byte of data.
equ wk3          211 * Work field, len 3.
equ h1           301 * Heading/Footing for output file.
equ cardwk       401 * Used for printing input cards.
equ cardin       501 * SELECT statement read from card into here.
opt worklen    22000       pw=80

  p h1 = "*        --- SELCOPY EQU stmts gen'd by SSDB2EQU ---"
```

```
  move 16 at date-2  to h1+72-16  !wr OUTDD fr h1           * Heading.

  @c = cardin
==loop2==         * Read in the DB2 SELECT stmt.  (May be multi-card.)
  rd card   into @c  !if eof card  !t goto loop2e
  p cardwk = '* '   s=1
  move L at @c  to cardwk+2,cardwk+79
  wr OUTDD fr cardwk,cardwk+79  * Echo the SELECT stmt as comments.
  @c = @c+ L  !goto loop2
==loop2e=

  p oast = '* Extnl Intnl                 Indicator' !wr OUTDD fr orec
  p oast = '*  Len   Len   Data Type         Var    ' !wr OUTDD fr orec
  p oast = '*  ---   ---   ---------        -----  ' !wr OUTDD fr orec

  db2  sql = cardin, @c-1         vlen  nulls    * Prepare the view.
                         * #################    * Modify as reqd.

  @n = 2 at sqlda+12 ty=b        * Number of SQLVARNs in SQLDA.
  @v =      sqlda+16             * Point to first VAR entry.
  move 4 at sqlda+16+4  to base  * Abs addr of 1st byte of data.



==loop1==                                                        ***
        *...,....1...,....2...,....3...,....4...,....5...,....6
  p orec='equ db2_variable_nam18 XX+nnnnn *   ?? zzzz9  data_type'  s=1
            *...,....1....,...
  move  18 fr @v+14  to onam            * Column name.

  do nulls      * EQU for Nulls indicator required?
  do datatyp    * Set comment details - length and data type.

  sub    base     fr 4 at @v+4  ty=b    * Get offset of this col.
  cvbc   4 at @v+4  to 5 at opos        * XX+nnnnn.

  wr OUTDD fr orec,orec+71              * The EQU card.
  if @n > 1
    then @n =@n-1  !then @v =@v+44
    then goto loop1
==loop1e=

  eoj   * Only 1 set of equates at a time.



==datatyp==     *** Interpret the SQLTYPE value ***
  pos         @v+1 and x'fe'        * Don't need odd/even indicator.
  cvbc   2 at @v+0  to 3 at wk3
  if p wk3 = '500'   !then p otyp,otyp+17 = 'SMALLINT'
  li p wk3 = '496'   !then p otyp,otyp+17 = 'INTEGER'
  li p wk3 = '484'   !then p otyp,otyp+17 = 'DECIMAL(nn,nn)'
  li p wk3 = '480'   !then p otyp,otyp+17 = 'FLOAT(nn)'
  li p wk3 = '472'   !then p otyp,otyp+17 = 'VARGRAPHIC (LONG)'
  li p wk3 = '468'   !then p otyp,otyp+17 = 'GRAPHIC'
  li p wk3 = '464'   !then p otyp,otyp+17 = 'VARGRAPH'
  li p wk3 = '449'   !then p otyp,otyp+17 = 'n/a'
  li p wk3 = '456'   !then p otyp,otyp+17 = 'VARCHAR (LONG)'
  li p wk3 = '452'   !then p otyp,otyp+17 = 'CHAR'
  li p wk3 = '448'   !then p otyp,otyp+17 = 'VARCHAR'
  li p wk3 = '392'   !then p otyp,otyp+17 = 'TIMESTMP'
  li p wk3 = '388'   !then p otyp,otyp+17 = 'TIME'
  li p wk3 = '384'   !then p otyp,otyp+17 = 'DATE'
  el                       p otyp,otyp+17 = '*unknown*'
                                             * ....,....1...,..
  if p wk3 = '480'  * Float.
    thenif  2 at @v+2 = x'0004' !then p otyp+6='21'
                                else p otyp+6='53'
  if p wk3 = '484'  * Dec.
    then cvbc      1 at @v+2  to 2 at otyp+08
    then cvbc      1 at @v+3  to 2 at otyp+11
    then div       1 at @v+2  by 2      ty=b
    then add  1 to 1 at @v+2            ty=b
    then cvbc      1 at @v+2  to oleni fmt='zzzz9'
  else   cvbc      2 at @v+2  to oleni fmt='zzzz9'
 =ret=




==nulls==
  if  4 at @v+8  ty=b  >   4 at @v+4  ty=b
  or  4 at @v+8  ty=b  = 0
    t p onul = '     '          * If no Indicator var.
  el  p onul = 'NULLS'
 =ret=
end
SELECT *
      FROM
           SYSIBM.SYSTABLES
```

Executing this SELCOPY produces the SELCOPY **EQU** control cards shown below.

Positions of columns and indicator variables are equated as offsets on **XX** which needs to be equated to the start of the required I/O area by the user.

DB2 Example 5: Output file

```
  *        --- SELCOPY EQU stmts gen'd by SSDB2EQU ---    2001/11/26 16:52
o * SELECT *                                                                  o
  *       FROM
  *            DSN8410.EMP
o                                 * Extnl Intnl                Indicator    o
                                  *  Len   Len   Data Type        Var
                                  *  ---   ---   ----------       -----
o equ EMPNO              XX+00000 *   ??     6  CHAR                        o
  equ FIRSTNME           XX+00008 *   ??    12  VARCHAR
  equ MIDINIT            XX+00020 *   ??     1  CHAR
o equ LASTNAME           XX+00023 *   ??    15  VARCHAR                     o
  equ WORKDEPT           XX+00040 *   ??     3  CHAR              NULLS
  equ PHONENO            XX+00045 *   ??     4  CHAR              NULLS
o equ HIREDATE           XX+00051 *   ??    10  DATE              NULLS      o
  equ JOB                XX+00063 *   ??     8  CHAR              NULLS
  equ EDLEVEL            XX+00073 *   ??     2  SMALLINT          NULLS
o equ SEX                XX+00081 *   ??     1  CHAR              NULLS      o
  equ BIRTHDATE          XX+00084 *   ??    10  DATE              NULLS
  equ SALARY             XX+00096 *   ??     5  DECIMAL(09,02)    NULLS
o equ BONUS              XX+00109 *   ??     5  DECIMAL(09,02)    NULLS      o
  equ COMM               XX+00122 *   ??     5  DECIMAL(09,02)    NULLS
```

Ctl Cards for generating LOAD statements

A second SELCOPY control card file, **SSDB2LD CTL** is supplied on the Distribution Master for generating control statements for the DB2 LOAD Utility.
This is a faster method of loading a table than using INSERT statements via SQL, because the LOAD Utility interfaces directly with DB2.

Direct READ of DB2 Tables

DB2 provides the **SELECT INTO** SQL statement which allows the reading of a results table, containing at most one row, without having to OPEN a SELECT cursor, FETCH the row and CLOSE the SELECT cursor.
This enables applications to do direct reads of DB2 tables similar to VSAM Keyed Reads or IMS Get Uniques.

Unfortunately, the **SELECT INTO** SQL statement cannot be dynamically prepared. **This is a DB2 restriction** (at least in all DB2 releases through to 5.1).

Since SELCOPY uses dynamic SQL, the **SELECT INTO** statement is not available to SELCOPY DB2 users. Direct reads can be done with SELCOPY but only by using OPEN, FETCH and CLOSE. The overheads of the OPEN and CLOSE make this processing much less efficient than a corresponding static SQL application using **SELECT INTO**.

For example, the following direct read of the EMP table using static SQL:

```
SELECT * INTO :EMPREC FROM DSN8410.EMP WHERE EMPNO='528671'
```

must be implemented in SELCOPY as:

```
rd    emprec  SQL="SELECT * FROM DSN8410.EMP WHERE EMPNO='528671'"  into 101
close emprec        * Explicit CLOSE required since EOF not reached.
```

SELCOPY SQL Error Handling

See also:

- POS RPL and POS SQLCA in section *Operation Words, Parameters and Keywords*.

Various sorts of error can occur when trying to process SQL data with SELCOPY:

- DB2 connection errors.
- SQL OPEN errors.
- SQL EXECUTE errors (the SELCOPY DB2 operation)
- SQL FETCH (READ), UPDATE, INSERT and DELETE errors.

The component of SELCOPY which manages the access to DB2 data maintains the user information area at **POS RPL**. This area contains various return and reason codes describing the status of the most recent DB2 action.

In addition, SELCOPY provides access to the **SQLCA** which SQL uses to inform applications of the status of the previous SQL call.

DB2 Example 6: DB2 Connect Failure

If the connection to DB2 fails SELCOPY terminates the execution unconditionally. The user cannot regain control in this circumstance. SELCOPY issues **ERROR 556** . The reason for the failure will be listed in the CBLSQLOG file (if it was allocated).

The following example shows the SELCOPY listing produced when trying to connect to a DB2 subsystem not defined to MVS:

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)                          OS JOB=NBJ       15.52 MON 26 NOV 2001    PAGE   1
o ----------------------------------------------------                                            ---------------------    -------- o

o          ** CBL.S980.QL.SYSIN(SQLDOC05) *** L=001 (P390) 97/04/24 10:11:19                                                        o

                         * Demonstrate connect error (DB2 subsystem invalid).
o                                                                                                                                   o
           opt w 4096

o      1.    rd  f1 tab=p390.type_test ssn=DB2B        * Read table in ssn DB2B.                                                  o
       2.    pr  ty d                                  * Print the row.

o                                                                                                                                   o

                    *** SELECTION TIME ERROR 556 ***   F=F1       - DB2: CONNECT FAILED
o                                                                                                                                   o
  SUMMARY..
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
o  ------      ------      ----     -------  -----           -----   --    ---                                                      o
      1             1 READ F1                  0 U               0       P390.TYPE_TEST
                                   *EOF*NOT*REACHED*
o     2             0                                                                                                                o

  ***WARNING*** (SEL----1)       44 = RETURN CODE FROM SELCOPY
o                                                                                                                                   o
                      ******** JOB ABNORMALLY TERMINATED ********

o          ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **        o
                                                   ** EXPIRY DATE -- 2002/05/21 **
```

The above SELCOPY execution produced the following CBLSQLOG file:

```
                *** CBL Dynamic SQL Interface Version 2.00 ***
o                   --------------------------------------                                                                          o
  CBLS010I 15:52:25 CBL Dynamic SQL Interface is started. Date: 2001-11-26

o CBLS002E 15:52:25 (Sel 1) Call Attachment error                                                                                   o
                    DB2 subsystem name:DB2B Plan:CBLPLAN0
                    CAF rc=12          reason=00F30006
o                                                                                                                                   o
  CBLS011E 15:52:25 (Sel 1) SELCOPQL has issued return code 108 X'6C'
                    Function=CONNECT    Cursor=
o                   A DB2 Call Attachment Facility error has occurred.                                                              o

  CBLS009I 15:52:25 CBL Dynamic SQL Interface is stopped
o                   GETMAINs  issued=3       Storage=12384   HWM=12384                                                              o
                    FREEMAINs issued=3       Storage=12384
                                  Total Interface CPU=  000000.046941 seconds.
```

DB2 Example 7: DB2 OPEN Failure

If an OPEN fails for a SELECT or prepared INSERT then SELCOPY terminates the execution unconditionally. The user cannot regain control in this circumstance. SELCOPY issues **ERROR 557** . The reason for the failure will be listed in the CBLSQLOG file (if it was allocated).

Here is an example of a SELECT which names an invalid table:

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)                          OS JOB=NBJ       16.02 MON 26 NOV 2001    PAGE   1
o ----------------------------------------------------                                             ---------------------    -------- o


o          ** CBL.S980.QL.SYSIN(SQLDOC06) *** L=001 (P390) 97/04/24 10:11 (P390)                                                    o

                        * Demonstrate open error (table name invalid).
o                                                                                                                                   o
           opt w 4096

o      1.    rd  f1 tab=sysibm.systable                * Read table.                                                                o
       2.    pr  ty d s 10                             * Print the row.

o                                                                                                                                   o

                    *** SELECTION TIME ERROR 557 ***   F=F1       - DB2: OPEN FAILED
o                                                                                                                                   o
  SUMMARY..
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
o  ------      ------      ----     -------  -----           -----   --    ---                                                        o
      1             1 READ F1                  0 U               0       SYSIBM.SYSTABLE
                                  *EOF*NOT*REACHED*
o     2             0                                                                                                                 o

  ***WARNING*** (SEL----1)       44 = RETURN CODE FROM SELCOPY
o                                                                                                                                   o
                      ******** JOB ABNORMALLY TERMINATED ********

o          ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **        o
                                                   ** EXPIRY DATE -- 2002/05/21 **
```

The above SELCOPY execution produced the following CBLSQLOG file:

```
                *** CBL Dynamic SQL Interface Version 2.00 ***
o                   --------------------------------------                                                                          o
  CBLS010I 16:02:51 CBL Dynamic SQL Interface is started. Date: 2001-11-26

o CBLS000I 16:02:52 (Sel 1) Connected to DB2 Version 4.1.0                                                                          o
                    Subsystem:DB2A              Plan:CBLPLAN0
                         User:NBJ      Current SQLID:NBJ
o                                                                                                                                   o

  CBLS004I 16:02:52 (Sel 1) OPEN  SELECT cursor F1
o                                                                                                                                   o
           SELECT *
             FROM SYSIBM.SYSTABLE
o                                                                                                                                   o
  CBLS003E 16:02:52 (Sel 1) Non-zero SQL Return code  -204
                    Function=OPEN       Cursor=F1
o                   SQL verb=SELECT     Table=                                                                                      o

           DSNT408I SQLCODE = -204, ERROR:  SYSIBM.SYSTABLE IS AN UNDEFINED NAME
o          DSNT418I SQLSTATE   = 42704 SQLSTATE RETURN CODE                                                                         o
           DSNT415I SQLERRP    = DSNXOTL SQL PROCEDURE DETECTING ERROR
           DSNT416I SQLERRD    = -500  0  0  -1  0  0 SQL DIAGNOSTIC INFORMATION
o          DSNT416I SQLERRD    = X'FFFFFE0C'  X'00000000'  X'00000000'                                                              o
                    X'FFFFFFFF'  X'00000000'  X'00000000' SQL DIAGNOSTIC
                    INFORMATION
o                                                                                                                                   o
  CBLS001I 16:02:52 (Sel 1) Disconnected from DB2 Subsystem DB2A
                              Total connection DB2 CPU=  000000.026828 seconds.
o                                                                                                                                   o
  CBLS009I 16:02:52 CBL Dynamic SQL Interface is stopped
                    GETMAINs  issued=5       Storage=12456   HWM=12456
o                   FREEMAINs issued=5       Storage=12456                                                                          o
                                  Total Interface CPU=  000000.178259 seconds.
o                                                                                                                                   o
```

RC=8 Suppression

See also:

- POS SQLCA in section *Operation Words, Parameters and Keywords*.
- DB2 Example 2: Run Time Error RC=8 and DB2 Example 3: Run Time Error with SQLCA Test in this section.

For DB2 operations and row based I/O (READ, UPDATE, DELETE and INSERT) the user can control bad return codes.

By default SELCOPY sets **RC=8** if it receives a bad SQL return code. However, if the user has coded an **SQLCA test** anywhere in the SELCOPY control card file, then SELCOPY assumes that the user is going to take responsibility for **all** SQL return code checking (except as mentioned above for CONNECT and OPEN).

You can test the SQL return code after any row based operation or DB2 operation. The **SQLCODE** is at offset 12 in the **SQLCA**.

If an SQL return code other than 0 or 100 is received then the formatted SQL message describing the problem is in the **SQLMA**.

SQL Warnings from PREPARE

Since SELCOPY uses dynamic SQL, user SQL statements processed by SELCOPY must first be **PREPAREd**. This requires an additional SQL PREPARE statement to be executed on behalf of the user by SELCOPY.

SELCOPY issues a PREPARE when:

- Opening a SELECT or INSERT cursor.
- Processing the first UPDATE WHERE CURRENT OF or DELETE WHERE CURRENT OF for a SELECT cursor following OPEN, COMMIT or ROLLBACK.
- Processing the first INSERT for an INSERT cursor following OPEN, COMMIT or ROLLBACK.
- Performing EXECUTE of an immediate SQL statement (the **DB2** operation).

As for all other SQL return codes, the SQLCODE returned by PREPARE can be:

- Zero for successful execution.
- Positive for successful execution with a warning.
- Negative for failed execution.

Enhanced processing of PREPARE warnings

If a **positive** SQLCODE is returned from a PREPARE associated with a user SQL statement then it is saved at **POS RPL+40** and the prepared statement is executed. **POS SQLCA** refers to the execution of the prepared statement **not** the PREPARE.

If a **negative** SQLCODE is returned from the PREPARE then the user SQL statement is **not** executed and **POS SQLCA** refers to the PREPARE.

The formatted SQL message associated with the positive SQLCODE is output to the SQL log (CBLSQLOG file) with message id **CBLS003W**.

POS RPL+40 represents the last PREPARE SQLCODE associated with the **most recently executed** SELCOPY SQL function. It is not reset to zero for SQL calls that do not require a PREPARE.

If the user has **not** coded a test of the **SQLCA** anywhere in the SELCOPY control card input file then return code 8 is set whenever a SELCOPY SQL operation is executed for which the **most recent PREPARE** returned a positive SQLCODE. This is done even if the user's SQL statement was executed with SQLCODE=0.

If the user wants to test the SQLCODE from PREPARE and not continue under certain warning conditions then **POS RPL+40** should be tested and an SQL **ROLLBACK** issued if the positive return code is not acceptable. If it is not clear from the DB2 documentation whether the positive SQLCODE is issued as a result of the PREPARE or of the execution of the prepared statement then both **POS SQLCA+12** and **POS RPL+40** should be tested.

Example

```
read    C1   sql="SELECT col FROM tab FOR UPDATE OF col"
pos 1   'new col value'
update  C1
if 4 at SQLCA+12 type b < 0
or 4 at SQLCA+12 type b = 535
or 4 at RPL+40   type b = 535  * Don't tolerate +535.
   then db2 "ROLLBACK"         * Backout update.
   then eoj
```

SELCOPY SQL Statement Types

The SQL statements executed by SELCOPY are classified into 2 types, **IMMEDIATE** and **PREPARED**. These are defined as follows:

IMMEDIATE

This type of SQL statement is completely processed by DB2 in one invocation. The success or otherwise of the operation is indicated in the SQL return code.

There is no data transfer between SELCOPY and DB2 (apart from the SQL statement itself and the return code). The statement must contain within itself the explicit names of any DB2 objects referenced and explicit values for any data items.

SQL statements in this category are those begining with the following SQL Verbs:

ALTER	Modify a DB2 object definition.
COMMENT	Add comments to the DB2 Catalog.
COMMIT	Commit changes since last SYNCH point.
CREATE	Create a DB2 object.
DELETE	A SEARCHED delete of rows from a table.
DROP	Destroy a DB2 object.
EXPLAIN	Obtain access path information.
GRANT	Grant DB2 privileges.
INSERT	Insert row(s) into a table.
LABEL	Add a label to the DB2 Catalog.
LOCK	Request a lock on a table.
REVOKE	Revoke DB2 privileges.
ROLLBACK	Undo changes since last SYNCH point.
SET	Set the value of certain DB2 identifiers.
UPDATE	A SEARCHED update of rows in a table.

PREPARED

This type of SQL statement establishes an environment for row-based data management operations against DB2 tables. As such it is similar to dynamic allocation of a traditional dataset with the rows playing the role of dataset records.

Since **PREPARED** statements behave in many ways like traditional datasets, they can be operated on with the usual type of SELCOPY syntax. OPEN, CLOSE, READ, WRITE, UPDATE and DELETE all have a meaning in this context similar to traditional dataset organisations.

Prepared SQL statements use the following two SQL verbs:

SELECT	The SELECT statement defines a Results Table. Once the SELECT statement has been prepared and opened, rows can be fetched (read) one at a time. The current row can be deleted or updated. For update, changes are only allowed to columns which were specified in the FOR UPDATE OF clause of the SELECT statement. **Note** There are also IMMEDIATE forms of UPDATE and DELETE (called 'searched' forms) which define the rows to be updated or deleted in terms of a search condition. These forms can affect many table rows in one execution and do not need a prepared SELECT statement to establish a current row.
INSERT	The prepared form of the INSERT statement allows new rows to be added one at a time to a table (or view). **Note** There is also an IMMEDIATE form of the INSERT statement which can insert a single row into a table or copy multiple rows from one table into another.

Reading DB2 Tables

SQL SELECT statements identify a results table, the rows of which can be READ (FETCHed), UPDATEd and DELETEd. Rows CANNOT be INSERTed into a SELECT results table. You must use the INSERT statement.

There are 3 types of SELCOPY READ operation for SQL:

Read Type 1
SELCOPY generates an SQL SELECT statement using READ parameters.

Read Type 2
An SQL SELECT statement is coded in full by the user.

Read Type 3
The next row from a Type 1 or Type 2 SQL SELECT statement is read by referring to the **file name** specified on the original Type 1 or Type 2 READ.

READ - Type 1

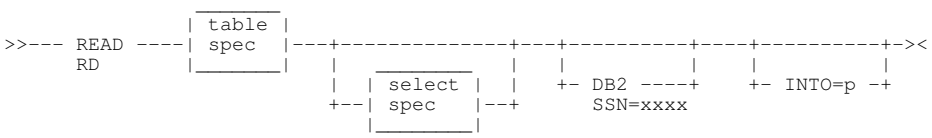
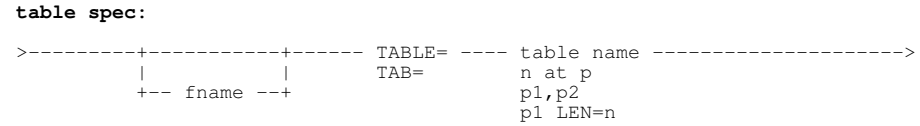
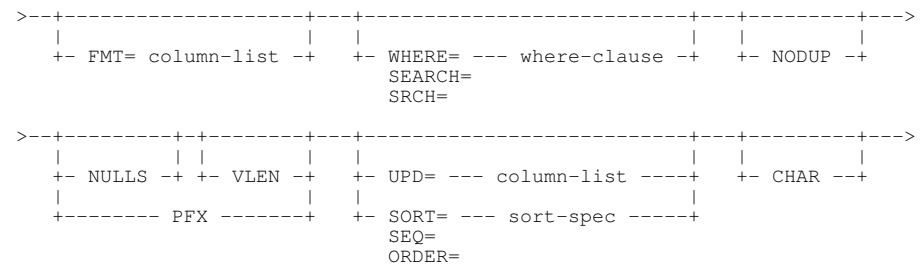


table spec:



select spec:



Example

```
READ   TABLE='SYSIBM.SYSTABLES'  DB2   sort='NAME'
PRINT   type=M s=22
```

The first time this READ operation is processed SELCOPY will:

- Generate the SELECT statement,
- prepare and open it and
- read the first row.

For the second and subsequent executions SELCOPY reads the next row until end of table at which time the SELECT statement is closed, and the whole job terminated because no **IF EOF** test exists.

Parameters

fname
is the optional logical file name associated with the SELECT statement.
If **fname** is not supplied then **DEFAULTF** is used.
If 2 or more files accessed in a SELCOPY run have fname omitted then the following control card error is issued:

```
ERROR 138   INVAL/DIFF DSN FOR FNAME
```

TABLE=table-name
specifies the table to be read. It can be specified as a literal or as a field in the work area.
Synonym for the **TABLE=** keyword is **TAB=**.

DB2
optionally indicates a DB2 table.

SSN=xxxx
optionally indicates the (1-4 character) name of the DB2 subsystem to which SELCOPY must be connected to process this statement. If **SSN=** is omitted the default DB2 subsystem defined in **CBLNAME** is used.

FMT=column-list
optionally specifies, in standard SQL syntax, the list of columns to select. If **FMT=** is omitted all columns are selected.

WHERE=where-clause
optionally specifies, in standard SQL syntax, the **WHERE** clause to be applied to this SELECT. If **WHERE=** is omitted no restriction is placed on the rows selected.
Synonyms for the **WHERE=** keyword are **SEARCH=** and **SRCH=**.

UPD=column-list
optionally specifies, in standard SQL syntax, the object of the SQL **FOR UPDATE OF** clause. This is a list of column names separated by commas. Required if you want to update the current row with a subsequent **UPDATE** operation (in

which case an **fname** is required to identify the SELECT statement). If **UPD=** is omitted updates are not allowed.
UPD= and SORT= are mutually exclusive.

SORT=sort-list
optionally specifies, in standard SQL syntax, the **ORDER BY** clause to be applied to this SELECT. This is a list of column sort specifications separated by commas. Each column sort specification consists of either a column name or number (i.e. the relative number of the column in the SELECT column list) and a sort direction **(ASC** for ascending or **DESC** for descending). The sort direction is optional and defaults to ascending. If **SORT=** is omitted, the order in which rows are returned is undefined. Synonyms for the **SORT=** keyword are **SEQ=** and **ORDER=**.
UPD= and SORT= are mutually exclusive.

PFX
is a synonym for coding both the **NULLS** and **VLEN** keywords.
VARCHAR columns are placed in the I/O area in fields of maximum width with a 2 byte length prefix. All columns which can accept NULL values have a 2 byte indicator variable preceding them in the I/O area.

NULLS
optionally indicates that you want **NULL indicator variables** to be returned in the I/O area as well as the column data for columns that can accept NULL values. The indicator variable is a 2 byte integer set to -1 if the column value is null. If requested it immediately precedes the column data in the I/O area.
If **NULLS** and **PFX** are omitted indicator variables are not present in the I/O area.

VLEN
optionally indicates that you want **VARCHAR** columns to be returned with their 2 byte length prefixes. The maximum length is still returned, padded with blanks.
If **VLEN** and **PFX** are omitted VARCHAR columns are placed in the I/O area in fields of maximum width, padded with blanks with no 2 byte length prefix.

CHAR
optionally indicates that you want all data returned in displayable character format. SELCOPY will pad all fields with blanks, or the **FILL** character if coded, and separate them with the null character. If **SEP** is coded, then fields are separted with the character **'|'** (X'4F' EBCDIC).
Binary, packed decimal and floating point columns are converted so that all data in the I/O area is returned in **external** (printable) format.
If **CHAR** is omitted then all data values are returned in internal format.

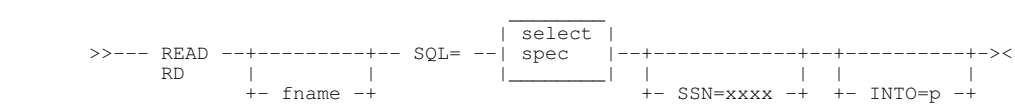
Note
If the CHAR option is used on the READ, and UPD is used later for the same fname, then the contents of the fields to be updated must be in DB2's internal format. This restriction applies to the current release of SELCOPY and will probably be removed in later releases.

SEP
optionally specifies that fields should be separated with the '|' character (X'4F' EBCDIC). SEP is only valid when used in with the **CHAR** parameter.

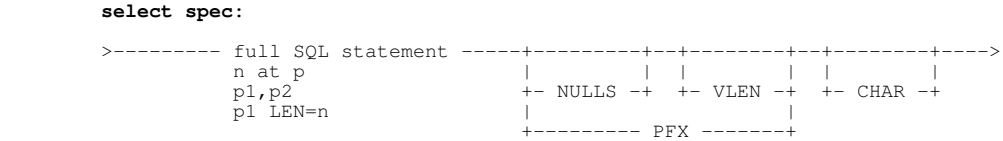
NODUP
optionally indicates that you want **NO DUPlicate** rows returned. This generates a **SELECT DISTINCT** SQL statement.

INTO=p
optionally places the input in the work area starting at position **p**. If **INTO=** is omitted the input is placed in position 1.

READ - Type 2



select spec:



Example

```
READ   SQL='SELECT * FROM SYSIBM.SYSTABLES ORDER BY NAME'
PRINT  type=M s=22
```

The first time this READ operation is processed SELCOPY will:

- Prepare and open the SELECT statement and
- read the first row.

For the second and subsequent executions SELCOPY reads the next row until end of table at which time the SELECT statement is closed.

Parameters

Same as for **READ - Type 1** except for:

SQL=
The **SQL=** parameter identifies the SELECT statement string. It can be specified as a literal, as a field in the work area using the normal SELCOPY forms.

READ - Type 3

```
>>--- READ ----- fname ---------+----------+->< 
      RD                        |          |
                                +- INTO=n -+
```

This form of the READ operation is used to read the next row from an open SQL SELECT statement which was specified on another control card with file name **fname**.

UPDATE of Current Row

```
>>--- UPD ------ fname ---------+----------+->< 
                                |          |
                                +- FROM=p -+
```

See also:

- UPD fname (Operation Word) in section *Operation Words, Parameters and Keywords*.
- The DB2 Operation in this section.

Example

```
READ    EMP     SQL='SELECT EMPNO,WORKDEPT,SALARY           \
                    FROM DSN8230.EMP                        \
                    FOR UPDATE OF SALARY'
IF      POS 7 = 'E11'
        THEN ADD 1000 TO 6 AT 10 * Give WORKDEPT 'E11' a pay rise.
        THEN UPD EMP             * Do the update.
```

While an SQL SELECT statement is being processed the current row can be updated (if the user has the authority) with the **UPD** operation. Note that you can only update one table with this operation and it must be the first table mentioned in the FROM clause of the SELECT statement.

Notes

This form of UPDATE only applies to the current row of an open SELECT SQL statement. You can also use the **Searched** form of UPDATE by using the **DB2** operation.

If the CHAR option is used on the READ, and UPD is used later for the same fname, then the contents of the fields to be updated must be in DB2's internal format. This restriction applies to the current release of SELCOPY and will probably be removed in later releases.

Parameters

fname
is the logical file name of the SELECT statement for which the current row is to be updated.
The names of the columns to be updated must have been quoted on the original SELECT statement in the **FOR UPDATE OF** clause. For a **READ Type 1** this is done using the **UPD=** parameter. For a **READ Type 2** the **FOR UPDATE OF** clause must be specified by the user in the SQL SELECT statement.

The table updated will be the first (or only) table mentioned in the FROM clause of the SELECT.

FROM=p
optionally takes the output from the work area starting at position **p**. If **FROM=** is omitted the output is taken from position 1.
The updated column values will be taken from the same **relative** positions in the I/O area into which they were read by the previous READ.

DELETE of Current Row

```
>>--- DEL ------ fname ---------------------><
```

See also:

- DEL fname in section *Operation Words, Parameters and Keywords*.
- The DB2 Operation in this section.

Example

```
READ    EMP     SQL='SELECT WORKDEPT FROM DSN8230.EMP'
IF      POS 7 = 'E11'
        THEN DEL EMP          * Delete when WORKDEPT='E11'
```

While an SQL SELECT statement is being processed the current row can be deleted (if the user has the authority) using the **DEL** operation. Note that you can only delete frome one base table with this operation. If the SELECT involves more than one table then only rows from the first table mentioned in the FROM clause of the SELECT statement will be deleted.

Note

This form of DELETE only applies to the current row of an open SELECT SQL statement. You can also use the **Searched** form of DELETE by using the **DB2** operation.

Parameters

fname
is the logical file name of the SELECT statement for which the current row is to be deleted.
Only rows from the first (or only) table mentioned in the FROM clause of the SELECT statement will be deleted.

Prepared INSERT

```
>>--- INSERT ----+---------+------ TABLE= --- table name ---------------->
      ISRT       |         |       TAB=       n at p
      INS        +- fname -+                  p1,p2
      WRITE                                   p1 LEN=n
      WR
      PUT


>---- DB2 ----------+--------------------+--+----------+-----------------><
      SSN=xxxx      |                    |  |          |
                    +- FMT= column-list -+  +- FROM=p -+
```

Example

```
READ    LOADFILE          * Read sequential file
INSERT  'MY.TAB' DB2      * Insert a row into MY.TAB
```

The SELCOPY INSERT operation for DB2 INSERTs a row into a DB2 table. It is the user's responsibility to ensure that the I/O area contains data in a suitable format.

Note

An fname defined for a SELECT cannot be used for INSERT and an fname defined for INSERT cannot be used for READ, UPDATE or DELETE.

On first reference to an INSERT, SELCOPY generates an SQL statement using the table (or view) name and the optional FMT parameter. The form of the SQL statement generated is:

```
INSERT     INTO    table_name   fmt
           VALUES(?, ... ?)
```

Parameters

fname
optionally associates a logical file name with the INSERT statement.
Required if no table name supplied in which case **fname** must refer to a previously defined (and OPEN) SQL INSERT statement.

TABLE=table-name
specifies the table into which rows are to be inserted. It can be supplied as a literal or as a field in the work area. Required unless the **fname** parameter is present and refers to a previously defined (and OPEN) SQL INSERT statement.
TAB= is a synonym for **TABLE=**.

DB2
indicates that this is a DB2 table. Required unless the **SSN=** parameter is present.

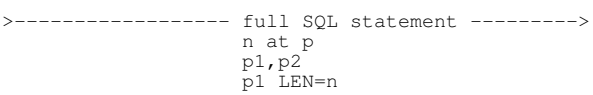
SSN=xxxx
optionally indicates the (1-4 character) name of the DB2 subsystem to which SELCOPY must be connected to process this statement. If **SSN=** is omitted the default DB2 subsystem defined in **CBLNAME** is used.

FMT=column-list
optionally specifies, in standard SQL syntax, the list of columns to INSERT. If **FMT=** is omitted SELCOPY will obtain a list of all the columns in the table and use this list in the generated SQL INSERT statement.

FROM=p
optionally takes the output from the work area starting at position **p**. If **FROM=** is omitted the output is taken from position 1.

The DB2 Operation

SQL spec:



See also:

- POS RPL in section *Operation Words, Parameters and Keywords*.

Example

```
DB2     SQL="DELETE FROM DSN8230.EMP WHERE WORKDEPT='E11'"
```

The **DB2** operation is used to execute a general SQL statement provided by the user in full SQL syntax. This SQL statement can be defined to SELCOPY in a number of ways as described in the **SQL=** parameter below.

SELCOPY determines the SQL verb for the statement (the first word in the string).

If it is a SELECT then SELCOPY prepares it for execution but does not do the automatic open and first FETCH as on the READ statement. This means that the SQLDA is available to describe the I/O area which would be used if the SELECT were executed. Otherwise SELCOPY passes it to DB2 for execution.

Note

The SQL verb for the most recent SQL statement is available in the user information area at **POS RPL**.

Parameters

SQL=Full SQL statement
identifies a character string in standard SQL syntax. It can be specified as a literal or a field in the work area using the normal SELCOPY forms.

SSN=xxxx
optionally indicates the (1-4 character) name of the DB2 subsystem to which SELCOPY must be connected to process this statement. If **SSN=** is omitted the default DB2 subsystem defined in **CBLNAME** is used.

ADABAS Processing

Installation

The phase/load module, **SELCOPAD**, must have been previously linked to a program Load Library which is available to SELCOPY at execution time.
SELCOPAD is the ADABAS interface module, **ADAUSER** , which is supplied with ADABAS, or your in-house interface replacement.
SELCOPY will call the phase/load module, **SELCOPAD** , with an ADABAS parameter list, for all commands it passes to ADABAS.

ADALINK controls the **DBID** of the database processed by SELCOPY (Refer to ADABAS documentation.)

Commands

The ADABAS Data Base may be processed using the **READ, WRITE**, and **INS**, commands, or any synonym. For ADABAS, **WRITE** is treated as a synonym for **INS**.

DEL and **UPD** commands are currently not available. The current implementation of ADABAS support does not support a **READ HOLD** facility, so all update functions are effectively disabled.

The **READ** and **INS** commands must be immediately followed by a number indicating the required file. Leading zeroes are optional. Also permitted is a leading hash-sign.

The keyword **ADA** or **ADABAS** must follow next to indicate that it is an ADABAS data base rather than a DL1 PCB number.

Any ADABAS function requires the existence of a Workarea. i.e. the **WORKLEN** parameter, or its synonym **W**, must have been used on the first input type control statement. This workarea must be large enough to accomodate the data retrieved.
Later releases will either make WORKLEN optional, or allocate a workarea automatically.

FORMAT='string'

FMAT=p1,p2
FMT

The keyword **FORMAT, FMAT** or **FMT** must always be present to indicate the fields and spacing requirements. The FORMAT argument must adhere strictly to the rules of ADABAS. String literals arguments must be enclosed in quotes if commas are included. Syntax is not checked by SELCOPY.

```
READ 000027  ADA     FMT='AB,AC,AD.'
READ #022    ADABAS  FMAT=8 AT 101
READ #6      ADABAS  FORMAT=@ABC,@DEF
```

FORMAT=ALL

FORMAT=ALL may be used to get all fields included. Only the first occurrence of Multiple Fields and Periodic Groups will be included. **ALL** is a keyword and **must not** be enclosed in quotes.

```
READ #027  ADA   FMT=ALL
```

SEQ dd

The **SEQ** parameter and its argument, dd, may be included to cause sequential processing in ascending sequence of the ADABAS Descriptor, dd.

SEQ=dd is mutually exclusive with **ISN=n**.

Record Length Returned

After an ADABAS input function, the Current LRECL value is set to the **compressed record length**.

BEWARE - a print statement will use the length of the current record if you do not code **L=n** on it, and this might be much larger than you expect.

Later releases may set the current LRECL value to the length of the expanded data retrieved for the FORMAT used, but meanwhile, please code **PRINT L=nnn**, or explicitly set the current record length with an **LRECL statement** prior to printing.

```
READ 27  ADA  INTO 10  FMT='AB,AC,AD.'  SEQ=AB   W 200
LRECL = 40                               * Set to reqd value.
IF POS 3 = XYZ
  THEN PRINT  TYPE M   S=10   L=40       * Or do both.
```

ADABAS Control Block

ADACB, the ADABAS Control Block is accessible via a field held in SELCOPY's File Table (at POS FT+12). Because its absolute storage address is held as a 4 byte binary number, we must move the address to **POS UXATPTR**, thereby setting the @ pointer, in order to reference it.

```
read #22  adabas  format=all
  ** Set @ADA to point to the standard ADABAS Control Block **
move  4 fr ft+12  to uxatptr  stopaft 1
@ADA = @                      stopaft 1
   * So the 4 byte    ISN last used *
   * can be found at    POS @ADA+12 *
```

Please refer to your ADABAS documentation from Software AG for details of other information held in the ADABAS Control Block.

ISN=n

The **ISN** parameter, plus numeric argument, allows reading a record with a specified **Internal Sequence Number**.
ISN is a synonym for **REC**, and has all the same options. Please refer to the **REC** parameter description for full details.

Note that a default **STOPAFT=1** is applied to such reads where the ISN specified is a literal.

```
READ #7  ADABAS   ISN=497   FMT='AB.'              * Default S=1.
READ #7  ADA   ISN=4 AT 100 TYPE=B   FMT='AB.'     * No STOPAFT.
READ #7  ADA   ISN=6 AT 450 TYPE=C   FMT='AB.'     * Char len 6.
```

ISN=n is mutually exclusive with **SEQ=dd**.

LRECL=n

For ADABAS input, LRECL=n indicates size of Record Buffer to be passed to ADABAS for a read operation. This may not exceed 32K-1. If not coded, the size of the input buffer is taken as the smaller of 22000, or the size of the workarea less whatever **INTO** value is used.

STARTISN=n

The **STARTISN** parameter allows reading a record with a specified Internal Sequence Number, and thereafter reading in **logical** sequence.

STARTISN is a synonym for **STARTREC**, with all the same options. Please refer to the **STARTREC** parameter description for full details.

```
READ #7  ADA  STARTISN=497   FMT='AB,AC.'    W 2200
PRINT  L=50  S=10
```

KEY

See also:

- KEY= in section *Operation Words, Parameters and Keywords*.

The **KEY** parameter for ADABAS, plus argument, allows reading a record with a specified key which matches the Descriptor Field coded on the **SEQ** parameter.
A default **STOPAFT=1** is applied where the KEY specified is a literal.
Note the **EQU statement** which allows the abbreviation of repetitive coding.

```
EQU   SQFMT   SEQ=BB  FORMAT='AB,AN,BB,BH,BN,BZ.'
RD #7  ADA   KEY='ABCD '      SQFMT         * Default S=1.
RD #7  ADA   KEY=5 AT 280     SQFMT         * No STOPAFT.
```

STARTKEY

The **STARTKEY** parameter, synonym **START**, plus argument, allows sequential reading which **starts** with a record having a specified key which matches the Descriptor field coded on the **SEQ** parameter.
Subsequent action of READ STARTKEY operations will return the next sequential record in SEQ=dd sequence.

SEQ=dd must also be coded.

There is no default STOPAFT associated with STARTKEY.

```
EQU   SQFMT      SEQ=BB  FORMAT='AB,AN,BB,BH,BN,BZ.'
RD #7  ADA   STARTKEY=5 AT 280  SQFMT       * No default STOPAFT.
RD #7  ADA   STARTKEY 'ABC  '   SQFMT       * No default STOPAFT.
```

SEARCH

See also:

- Syntax without SSA in section *IMS and DL/1 Processing*.

The **SEARCH** parameter, synonym **SRCH**, for ADABAS is supported in the same way as for the **DL1** data base, but without the Relational Operator.

The **SEQ** parameter is optional when **SEARCH** is used. If **SEQ** is omitted, the selected fields are returned **unsorted**, in **ISN** sequence.

If **SEQ=aabbcc** is coded, the selected fields for each ISN are returned after sorting the ISNs into the sequence **aabbcc**, where **aa, bb** and **cc** are ADABAS Key Field names. 1, 2 or 3 ADABAS Key Field names may be used.

Note that, because **ADABAS** storage is used for holding the resulting **ISN List**, if a **SEQ** parameter is coded it becomes necessary for ADABAS to obtain the full list in storage for sorting.
Thus, **ADABAS Error 001** (Insufficient Storage) could be encountered if the number of **ISNs** satisfying the **SEARCH** argument requires more storage than has been allocated to ADABAS when initiated.

```
EQU   SEQFMT1           SEQ=AB  FORMAT='AB,AN,BB.'
RD #7 ADA   SEQFMT1   SRCH=200 'XYZZ009526TTT'
```

SRCH=200 above is assuming position 200 onwards in the workarea to have been set up with a valid **Search Buffer** for ADABAS.

```
RD #7 ADA   SEQFMT1   SRCH='sb data.'   'field values lit'
RD #7 ADA   SEQFMT1   SRCH='sb data.'   POS 4001 LEN=22
RD #7 ADA  FMT 'AA,BB.'  SRCH=200       POS 4001 LEN=22
```

Changing SEARCH data has no effect until **EOF** is reached on the previous search.

EXCL

The **EXCL** parameter, if coded on one or more statements referencing an ADABAS file, indicates that Exclusive Control is required for that file.

PASS

The **PASS** parameter, if coded, has an 8-character argument which is the password to be used. The **PASS** parameter need only be coded once for each passworded file.

CIPHER

The **CIPHER** parameter, if coded, has an 8-character argument which is the cipher code to be used. The **CIPHER** parameter need only be coded once for each ciphered file.

Direct Processing after EOF

Processing after EOF, both direct and sequential, will be allowed to continue provided the following conditions are met:

An **IF EOF** test exists for the file.

At least 1 **Direct** READ statement exists for it.

AS/400, UNIX and PC Processing

AS/400, UNIX and PC Environments

SELCOPY is currently available on the following platforms:

- IBM PC or equivalent - DOS 3.3 upwards.
- IBM PC or equivalent - WINDOWS 2000/NT/95/98/ME.
- IBM PC or equivalent - OS/2 2.1 upwards.
- SUN Sparc UNIX - Solaris 2.x upwards.
- DEC Alpha - Digital UNIX 3.2 upwards.
- IBM RS6000 - AIX UNIX 4.1 upwards.
- HP PA-Risc - HP/UX 10.10 upwards.
- IBM AS/400 - OS/400 4.x upwards.

SELCNAM (Mainframe CBLNAME Equivalent)

See also:

- OPTION in section *Operation Words, Parameters and Keywords*.

Since **CBLNAME** does not exist for SELCOPY on AS/400, UNIX and PC platforms, presence of a SELCNAM file is **mandatory**.

Whereas mainframe SELCOPY can interrogate CBLNAME for the SELCNAM data set name, this is obviously not possible for AS/400, UNIX and PC SELCOPY. Therefore, SELCNAM must be filed as "SELCOPY.NAM" on the current directory, on the same directory as the **SELCOPY** executable file, or on a directory in the **PATH**. The current directory is checked first.

Note that **SELCOPY.NMX** is a skeleton SELCNAM file supplied with the SELCOPY product and should be used for creating your site's **SELCOPY.NAM**.

SELCOPY.NAM is read and actioned for every single execution of SELCOPY. Thus, any OPTION parameter in it will be applied universally. It is used to provide **mandatory** installation dependent licensing information and any installation default options that are required.

Because it is a simple editable text file containing only SELCOPY **OPTION** statements and comments, it can be set up and maintained very easily.

/* in pos 1,2 of any record in SELCOPY.NAM will terminate the checking for further option statements. Thus the file may contain additional comment records, without incurring any processing overhead, for the user's convenience.

Processing of SELCOPY.NAM continues up to 222 records. Any options specified in records beyond this point are ignored.

The mandatory licensing parameters are:

```
SITE='Your Installation Name - Location'
RANGE=yyyy/mm/dd-yyyy/mm/dd        * (Operational date range.)
PASS=x'YourLicencePassword'        * (Hexadecimal notation.)
```

OPTION statement parameters, that may be supplied in the SELCOPY.NAM file, are discussed under **OPTION**. Note that, if an option is duplicated, the last one processed is effective.

A sample SELCOPY.NAM file is:

```
** SELCOPY.NAM **         L=001 --- 95/12/02 23.50.00      (P01)
   * Comments and blank lines allowed, as on any SELCOPY control stmt.

 Opt  site='Compute (Bridgend) Ltd - Bridgend UK'
 OPT range=1902/05/08-2002/06/09   RANGE=2004/02/27-2004/03/02
 Opt range=2028/02/27-2028/03/02
 Opt  pass=x'0123,4567,89ab,cdef'

 OPT DW=60  PW=20+60+6+6  PD=86   * Portrait printing.
 * opt dw=100 pw=132        pd=58   * Landscape printing.
/*  All data following this /* EOF rec is ignored. (Not even read in.)
Thus, you may have any further comment data you like.
```

FILE=PRINT Output Fname

See also:

- Command Line Options in this section.

The Environment Variable **SLCLST** may be set to override the fileid for SELCOPY's print output, which by default is **SELC.LST** on the current directory on the current drive. e.g.

```
set  SLCLST=d:\tmp\s.lst
```

This may be used to send **PRINT** output to the file **d:\tmp\s.lst** for every SELCOPY execution on a PC operating system.

Similarly, for AS/400, your preferred adaptation of the following 3 statements may be included in your user profile:

```
ADDENVVAR PATH   '/home/yourdir:/home/cbl/selcopy'    /* To find SELCOPY.NAM */
ADDENVVAR SLCLST 's.lst'           /* Default is: 'SELC.LST' on current dir. */
CHGCURDIR        '/home/yourdir'   /* Or wherever is required.               */
```

SELC.LST and environment variable SLCLST may in turn be overridden by use of the Command Line Parameter **-lst**.

AS/400 native printer file

The AS/400 has several separate FileSystems, 2 of which are:

1. The DataBase FS.
2. The IFS (Integrated File System) - the UNIX look-alike.

SELCOPY's FILE=PRINT output is written to the file defined by the environment variable, SLCLST, which SELCOPY will default to SELC.LST on the current directory on the IFS (Integrated File System). You may adjust SLCLST to whatever IFS file you require, including an absolute or relative path.

To direct SELCOPY's FILE=PRINT output to a native PRINT file on the AS/400 DataBase File System, (not on the IFS), you simply set the envvar, SLCLST, to refer to your required printer via a Printer Spool File.

Note

Use of ***FCFC** (First Char Forms Control, for ASA Ctl Chars) is **essential** when you issue the AS/400's command, CRTPRTF, to **CReaTe** a PRinTer File. Other parameters may then be set as reqd, using the **CHanGe** a PRinTer File command. e.g.

```
CRTPRTF CBL/PRINTER4  CTLCHAR(*FCFC)    CHLVAL((1 (1)) (2 (20)) (3 (30)))

CHGPRTF CBL/PRINTER4  TEXT('CBL Line Printer with ASA Ctl Chars.')
CHGPRTF CBL/PRINTER4  DEV(CBLPRT)   PAGESIZE(10 160 *ROWCOL)   OVRFLW(10)
CHGPRTF CBL/PRINTER4  DEV(CBLPRT)   PAGESIZE(88 160 *ROWCOL)   OVRFLW(88)
CHGPRTF CBL/PRINTER4  LPI(9)   CPI(20)   PAGRTT(0)    FRONTMGN(0.5 0.75)
CHGPRTF CBL/PRINTER4  RPLUNPRT(*YES ' ')   MAXRCDS(22200)  HOLD(*YES)
```

Command Line Parameters

Parameters which are passed to SELCOPY on the command line are used to generate EQU statements. e.g.

```
SELCOPY        abcd.fil   dd\xyz.dat                              (UNIX & PC)
CALL SELCOPY ('abcd.fil' 'dd\xyz.dat')                            (AS/400)
```

will generate the pseudo control cards:

```
EQU %1   abcd.fil
EQU %2   dd\xyz.dat
```

and then continue to read further (genuine) control statements from the default standard input file, **STDIN**, which may be from the terminal, or from a file if redirection of input were used. e.g.

```
SELCOPY        abcd.fil   dd\xyz.dat       <g:\cc\selccomp.ctl     (UNIX & PC)
CALL SELCOPY ('abcd.fil' 'dd\xyz.dat'     '<   cc/selccomp.ctl')   (AS/400)
```

Users should bear in mind that the EQU statement is not aware that the argument is a **filename**, so it will be uppercased if it is not enclosed in quotes.
Case sensitive parameters, such as filenames, on the command line must therefore be enclosed in quotes. e.g.

```
selcopy    './inp.tst.file'    '/tmp/output.tst.file'
```

Note that **AIX** and **SUN** UNIX operating systems will strip a single set of quotes from around each command line input parameter. Therefore, in order to specify quoted strings to SELCOPY, the above example would have to read:

```
selcopy   "'./inp.tst.file'"  "'/tmp/output.tst.file'"
```

or

```
selcopy   '"./inp.tst.file"'  '"/tmp/output.tst.file"'
```

Command Line Options

Certain execution options may be passed to SELCOPY on the command line. If specified, they **must** appear before the first **!** denoting the start of SELCOPY command line control cards.

-ctl fileid

The default action of SELCOPY to read its control cards from STDIN may be overridden by use of the command line argument -ctl fileid, where fileid is the name of the control statement file prefixed with a relative or absolute path as required. STDIN is then free to be used as a regular file on **READ FILE=STDIN** for piped input.

```
SELCOPY        abcd.fil   dd\xyz.dat   -ctl g:\cc\selccomp.ctl     (UNIX & PC)
CALL SELCOPY ('abcd.fil' 'dd\xyz.dat' '-ctl    cc/selccomp.ctl')   (AS/400)
```

Note

The command line options, -ctl, -lst and -log, must be followed by a fileid argument. The option and its argument may be separated with any number of blanks and/or an '=' sign. For compatibility with syntax on other products, it is also acceptable to altogether omit separator characters between the option keyword and its argument. e.g. -ctlFileid.

-lst fileid

The default action of SELCOPY to write its PRINT output to the file SELC.LST on the current directory, or to the fileid specified by the environment variable SLCLST, may be overridden by use of the command line argument -lst fileid, where fileid is the name of the required listing file prefixed with a relative or absolute path as required.

```
SELCOPY        -ctl g:\cc\selctest.ctl      -lst g:\cc\selctest.lst     (UNIX & PC)
CALL SELCOPY ('-ctl    cc/selctest.ctl'    '-lst    cc/selctest.lst')   (AS/400)
```

Refer to note in **-ctl fileid** above.

-log fileid

The default action of SELCOPY to write its LOG output to the terminal may be overridden by use of the command line argument -log fileid, where fileid is the name of the output log file prefixed with a relative or absolute path as required.

-V (uppercase)

The command line option -V returns information about SELCOPY relating to platform, release number and build level. SELCOPY writes the information to **stderr** which, by default, is directed to the user's terminal, then terminates without any further processing. All other command line arguments are ignored. e.g.

```
SELCOPY/OS2 2.08 at CBL - Bridgend UK (Internal Only)        2002/08/21 16:10
          Build Level=152 2002/08/15 02:18 (Latest change).
```

Command Line Control Cards

SELCOPY control cards may be supplied on the command line.

To differentiate between Command Line Parameters and Command Line Control Cards, the 1st non-blank character must be the Seperator Character, which by default is an exclamation mark. e.g.

```
SELCOPY  !rd c:abcd.fil  !wr m:\dd\xyz.dat s=22  !/*
```

For the UNIX **csh** shell, a blank should inserted following or an escape character coded before the **!** separator character.

If the /* indicating end of control cards is not supplied, SELCOPY will then continue to read further control cards from STDIN, off the terminal until a /* (with no preceding blanks) is keyed in, or read from the redirected **stdin** file. e.g.

```
SELCOPY  !equ IN1 abc.fil  !equ IN2 xyz.fil  <selccomp.ctl
```

If no **FILE=CARD** is specified on a prior input statement, then **end** or its abbreviation **e** may be used instead of /* to indicate end of SELCOPY input statements.

Command line invocation of SELCOPY may use a combination of parameter arguments, (each resulting in an EQU statement), and normal SELCOPY statements (preceded by the SEP char). e.g.

```
selcopy     a.fil   pr,s=1    !in %1 !%2  !/*
```

means:

```
selcopy !in a.fil  !pr,s=1               !/*
```

Fileids

All fileids are preserved with their original case settings as coded on the control card.

Directory separators within fileids may be represented using slash '/', commonly used for PC fileids; and/or backslash '\', used for UNIX fileids. SELCOPY executing on any AS/400, UNIX or PC system will accept fileids with either form of directory separator or a combination of both.

```
read    c:\accounts/2002/q1inv.txt
read    //fileserv/manuals/user_guide
```

Fileids that contain blanks or special characters should be enclosed in quotes.

```
read   'C:\Program Files\Scan It! Publisher\Install Setup.txt'
```

Beware

All EQUate arguments are uppercased, unless enclosed in quotes. Thus the sequence:

```
equ indd   payroll.master.file   recfm=f l=3072
read indd
```

will result in reading the file PAYROLL.MASTER.FILE instead of the file required. However, the sequence:

```
equ indd  'payroll.master.file'  recfm=f l=3072
read indd
```

will result in reading the correct file.

Use of a UNIX **Symbolic** Link, to set up an alias for the file as a separate additional directory entry, is an alternative:

```
ln -s   payroll.master.file   PAYROLL.MASTER.FILE
```

but this has the risk of reading the same file under 2 different names if any references are inconsistent. It is therefore not recommended as a long term solution.

AS/400, UNIX and PC I/O

Default **buffer** size for AS/400, UNIX and PC SELCOPY input and output is 2048. If a different buffer size is required, code **BLKSIZE=n** on the READ or WRITE statement to override the default.

For output **LRECL**, the following error message:

```
** WARNING ** (SEL--nnn)      nnn INVALID LRECL CHANGES IGNORED
```

is suppressed on AS/400, UNIX and PC versions of SELCOPY.

It is effectively redundant because: RC=8 is flagged for that selection in the summary, together with the total of such occurrences, and at the bottom of the summary, the warning is highlighted with the message:

```
** WARNING ** (SEL--nnn)        8 = RETURN CODE FROM SELCOPY
```

SELCOPY **UNIX** and **AS/400** (IFS) output files have file permissions **-rw-rw-rw-** which the user may further restrict by use of the UNIX command **umask**.
Note that if the output file already exists, then the existing permissions are kept, regardless of the **umask** setting. If this is not required, then erase the file first.

RECFM for AS/400, UNIX and PC files

The default input RECord ForMat for AS/400, UNIX and PC SELCOPY is Undefined **RECFM=U**. This conflicts with SELCOPY on IBM mainframe MVS, VSE and CMS, where **RECFM=F** is assumed as the default input record format.

On output, RECFM defaults to the same as the prime input file. However, if **LRECL=n** is coded for the output file, then **RECFM=F** (Fixed) is implied, as on the mainframe.
Note that **RECFM=F** and **RECFM=V** on output will not generate End-of-Line characters.

RECFM=F

RECFM=F is supported in the same way as on the mainframe. However, **BLKSIZE** for AS/400, UNIX and PC systems has no meaning because all the fixed length records are strung together into what might be considered 1 single block. SELCOPY will take LRECL bytes for each READ statement and present it as a logical record.

Input

When the last record of a **RECFM=F** input file is shorter than the defined LRECL, then the Current LRECL value is set to the real length of data returned, not the full "fixed" length.

Output

ALL short RECFM=F output records are written, padded with the FILL character (default is blank) up to the fixed record length. If a short last output record is required, then write the output file with **EOL=NO**, which is treated as RECFM=U without End-of-Line characters.

RECFM=V

Although completely foreign to the AS/400, UNIX and PC world, RECFM=V is supported fully in the same way as for mainframe MVS and VSE, for the convenience of processing files ported from the mainframe environment. Exceptions are:

1. Coding RECFM=V without BLKSIZE=n on a READ or WRITE statement, is treated as **RECFM=VB**, and the data blocked to the default blocksize of 2048, unlike on the mainframe where unblocked is assumed.
2. The input FSIZE reported in the summary will reflect the number of logical records processed, not the number of physical records (blocks), as would be reported on a mainframe CMS system at OPEN time. (This information is not available from an AS/400, UNIX or PC system.)

It is recommended that you use the **NORDW** parameter in order to hide the RDW (Record Descriptor Word). NORDW may also be set in the SELCNAM (SELCOPY.NAM) file.

Please note that mainframe **CMS** processing of RECFM=VB is different from that of MVS and VSE.

RECFM=V2

Certain COBOL compilers and SORT utilities on AS/400, UNIX and PC systems operate on files with records consisting of a 2-byte Record Descriptor Word (RDW), followed by actual data. Unlike RDW for standard RECFM=V, these RDW values do not include their own (2-byte) length, but only the length of the data. Specifying **RECFM=V2** on input or output allows SELCOPY to process this type of file in the same way as it processes standard RECFM=V files. e.g.

Input

```
in     rcfm-v2.fil   into 5  recfm=v2  RDW  * RDW to override default of NORDW.
write  m:rcfm-u.tmp  fr   5  recfm=u        * Kills 2-byte RDW, generates CRLF or LF.
cvch  2 at 5  to 1            * Get readable RDW.
pos 5 = '  '                  * To separate prefix from data.
lrecl = l+4                   * Account for extra 4 bytes for hex prefix.
print                         * Data Record with hex prefix giving length.
```

Output

```
read   ascii.fil              * Normal file, with LF or CRLF delimiters.  (RECFM=U)
write  rcfm-v2.fil  recfm=v2  * LF/CRLF is stripped, and a 2-byte RDW generated.
```

RECFM=MFV

MicroFocus Variable length files may be processed by coding **RECFM=MFV** on the read statement.
Such files have a Header Record which is bypassed by SELCOPY's read, so the first record returned to the user is the first real data record. The Header Record (Length=128) is saved in storage by SELCOPY and made available to the user via the special POS keyword, **FHDR**. e.g.

```
in  microfoc.fil  recfm=mfv           * Header Rec (Len=128) is bypassed.
if eof
  t pr ty=d   l=128  fr FHDR   s=1    * Header Record.
el  pr    l=60                s=22  * Data Record.
```

RECFM=U

This is the most common type of AS/400, UNIX or PC file and is supported in the same way as for the mainframe with the exception that the delimiter used to terminate records may be left to default or overridden using **EOL=xxx**, whereas on the mainframe the End-of-Line delimiter is not required because each line is a separate physical record.
For PC and AS/400 IFS systems, the standard character sequence CRLF - **Carriage Return** and **Line Feed** (X'0D0A' for PC, X'0D25' for AS/400) is the default. For UNIX systems, LF (X'0A') alone, the UNIX standard, is the default.

Note that, by default, TAB characters (X'09') which may be contained within the data of RECFM=U files are left unchanged by SELCOPY. However they may be expanded using the **TAB=n** parameter.

Input

SELCOPY will accept either EOL standard, whether running on an AS/400, UNIX or PC system, and CR (X'0D') alone is also accepted as a record terminator. In all cases, the terminator string (CRLF etc) is not returned as part of the record, and is not included in the LRECL value following the READ. Special action taken by SELCOPY on AS/400 RECFM=U ASCII input is detailed below.

Output

SELCOPY will generate the appropriate record terminator string, for the active operating system (AS/400, UNIX or PC.)
This may be changed by use of the **EOL** parameter which may be coded on the WRITE statement.

Direct Read for AS/400, UNIX and PC

See also:

- KEY=, STARTKEY=, RBA=n, STARTRBA=n, REC=n and STARTREC=n in section *Operation Words, Parameters and Keywords*.
- Direct Read for CMS in section *VM/CMS Processing*.

Records in AS/400, UNIX and PC disk files may be read directly via a key field, relative byte address from the start of the file or by record number, using the input parameters **KEY** (or KGE), **RBA** and **REC** respectively.

With the exception of reading by record number (REC), which is supported for use with RECFM=F only, direct reads may be executed on files having **fixed**, **variable** or **undefined** record format but **not** RECFM=V2 or MFV.

Direct READ statements may be combined with standard sequential READ statements. If after a direct READ, a sequential READ statement is actioned for a file, the next sequential record is returned. i.e. The direct read will leave the file positioned correctly following the record read. Thus, EOF would be returned for a sequential read if the preceding direct read gave the "--- KEY/REC NOT FOUND ---" condition after a request to read at or beyond the filesize.

RECFM=V

For RECFM=V direct input, use of the **LRECL** parameter is mandatory to define a maximum record length for SELCOPY's RDW detection and validation. Similarly, it is recommended that the buffer size, controlled by the **BLKSIZE** parameter, be at least double the LRECL value in order to improve the RDW validation.
Note, however, that use of too large a buffer size for direct reading causes additional, unnecessary I/O. Also, since specifying **LRECL** on input implies RECFM=F, **RECFM=V** must also be specified.

Where used on RECFM=V direct read input, the KEYPOS or RKP parameter is based on the position or offset within the data portion of the record, disregarding the RDW. This is true whether the **RDW** or **NORDW** option is in effect. Thus, the KEYPOS (or RKP) arguments do not require any change if the file is copied to a file of different record format, or if the user changes the NORDW option to RDW.

The **NOBDW** option may be coded when it is known that the input file does not have a Block Descriptor Word at the start of each logical block to simulate a mainframe RECFM=V file. By default, it is assumed that valid BDWs exist and logical records within a block will be processed individually. If NOBDW is coded, the check for a valid BDW will be bypassed, so if BDWs do actually exist, then each BDW encountered will cause that complete block to be processed as an individual record, which on a keyed file (KP=n and KL=n coded) would almost certainly result in a Key Sequence Error.

KEY/KGE - READ by KEY

Standard AS/400, UNIX and PC file I/O functions do not support record keys. However, provided a key field exists in every record of the disk file and the key field is in ascending sequence with no duplicates, any record may be read directly by quoting the required key. The **KEYPOS** parameter must be specified on input to indicate to SELCOPY the start position of the key field within the data records. The **KEYLEN** parameter is used to define the length of the key field which would otherwise default to the length of the first key supplied on **KEY** (or **KGE)**.
Note that the **RKP** (Relative Key Position) parameter may be used instead of KEYPOS, where RKP=n is equivalent to KEYPOS=n+1.

SELCOPY uses a "Binary Chop" technique to locate the RBA of the start of the record requested by the keyed read. A sequential scan of the file is **not** required.
The relative byte address of the last record read is stored at **POS RBA**.

RBA - READ by Relative Byte Address

A record in any disk file may be read directly by specifying its RBA (Relative Byte Address) from the start of the file.

The input buffer will be filled from the RBA point in the file, and the first complete record that follows will be returned, ignoring any partial record that might exist at that RBA. The RBA value set at **POS RBA** will then be that of the record returned, which may well be higher than the RBA requested.

Although reading by RBA does not involve a key field, if one exists and the file is RECFM=V, then the **KEYLEN** and **KEYPOS** parameters may be specified to further improve SELCOPY's RDW validation.

REC - READ by Record Number

Supported for RECFM=F input only, any disk file may be read by specifying the required record number.

LRECL may be specified on the input statement to override the 2048 byte default.
Note that specifying LRECL on input implies RECFM=F if no RECFM parameter is also specified.

SELCOPY first calculates the start RBA of the required record as a product of the requested record number minus one and the LRECL value (i.e. RBA=(REC-1)*LRECL), then reads a block of data at this address presenting LRECL bytes to the user.
The relative byte address of the last record read is stored at **POS RBA**.

Binary Field Interpretation

SELCOPY will interpret all binary fields with the most significant (high order) byte being the leftmost of the field. This is typical of HP PA-Risc, IBM AS/400, RS/6000 and 370/390 mainframe architecture where a binary field may be referred to as being **Big Endian**.

Because of this, the user should be careful when analysing and performing arithmetic operations on binary fields created as a result of programs executed via an INTEL (or equivalent) or COMPAQ ALPHA microprocessor. These processors utilize instruction sets based on an architecture, where the least significant (low order) byte occupies the leftmost byte of the field, and the most significant (high order) byte occupies the rightmost. These types of binary field may be referred to as being **Little Endian**.

All of SELCOPY's user accessable binary fields are held in Big Endian format. (e.g. **POS UXINCNT**, **POS UXLRECL)**.

%ENVVAR% for literals or File names

Any string enclosed in % signs is treated as a system environment variable, and is replaced with the string currently set for that system envvar.

If the envvar does not exist, substitution is governed by the **ENVFAIL** option.

Translation of system Environment Variables may be switched on and off using the **ENVVAR** (default) and **NOENVVAR** options.

An override of a system environment variable may be achieved with an **EQU** statement using the envvar's name enclosed in percent signs. Only 1 substitution token may be given, unless enclosed in quotes. If quotes are used, they do NOT form part of the substitution data, unless they themselves are enclosed in quotes. e.g.

```
equ %TMP%    M:\some.dir\dir2     * Valid.
equ %TMP%    M:\some dir\dir2     * Invalid. (Contains a blank.)
equ %TMP%   "M:\some dir\dir2"    * Valid.
equ %TMP%  '"M:\some dir\dir2"'   * Valid.   (Includes the " signs.)
```

The %ENVVAR% replacement is performed on all control card input, regardless of the literal or filename being enclosed in quotes. e.g.

```
read %TMP%\dup\abc.da
print  'The Env Var, HOSTNAME, is set to "%HOSTNAME%"'  s=1
print  '-%NON_EXISTENT_ENVVAR%-'  * Will just print '--'.
```

Note

Use of an EQU name as a pseudo environment variable is a convenient method for getting EQU substitution within a quoted string. e.g.

```
equ  %UFIL%      'ssupd02.tmp'    * Base file for Update-in-Place tests.
system 'cp  /p21/g/cc/slc/u.mst  %UFIL%'  s=1    * For UNIX.
system 'copy             u.mst  %UFIL%'  s=1    * For PC.
read %UFIL%   l=70   defer        * Defer open until file is read.
if eof %UFIL%
  t goto eoin
pr              * .... etc, etc ....
```

Note

OS/400 also supports environment variables natively. e.g.

```
ADDENVVAR  SLCLST  '/home/cbl/selc.lst'
CHGENVVAR  PATH    '/etc:/usr/selcopy:/home/cbl:/usr/whatever'
```

ASCII/EBCDIC Differences

Tests to determine a **numeric** on the mainframe, such as:

```
IF POS 20  GE '0'
```

will give a true (i.e. wrong) result for **non-numerical** data on a UNIX or PC system, where data is stored in ASCII instead of EBCDIC.

For EBCDIC, numerics (X'F0'-X'F9') are **>** alpha characters.
For ASCII, numerics (X'30'-X'39') are **<** alpha characters.

Similarly,
For EBCDIC, UpperCase Alpha chars are **>** LowerCase.
For ASCII, UpperCase Alpha chars are **<** LowerCase.

However, use of the **ASC** or **EBC** parameter on any operation that involves a string literal indicates to SELCOPY that the literal should be treated as being in ASCII or EBCDIC format respectively, regardless of the native coding convention of the host machine. e.g.

```
p 1 = 'ABC' asc    * Will set pos 1,3 to x'414243'
p 1 = 'ABC' ebc    * Will set pos 1,3 to x'C1C2C3'
```

Use of **CVAE** and **CVEA** must also be given attention. If you switch platforms, then you must reverse CVAE and CVEA.

For jobs which may be run on both mainframe and AS/400, UNIX or PC platforms, the following syntax may be used to check the environment:

```
if ' ' = x'40'
  then do ebcdic-rtn     * Blank is X'40' for IBM Mainframe.
  else do  ascii-rtn     * Blank is X'20' for AS/400, UNIX or PC.
```

AS/400 automatic ASCII to EBCDIC conversion

Uniquely for the AS/400, SELCOPY will automatically convert a RECFM=U file to EBCDIC if x'0D0A' ASCII Carriage Return Line Feed sequence is encountered in the 1st record.

Without this, an ASCII text file, read on the AS/400, would look like garbage because the data is treated as though it is already in EBCDIC. Furthermore, since **ASCII** characters CR and LF are held as x'0D' and x'0A' respectively and SELCOPY for AS/400 scans for **EBCDIC** CR and LF held as x'0D' and x'25' respectively, only the CR character (x'0D') would be recognized. The x'0A' for the LF (linefeed) would just be treated as data for the next record.

Note

RECFM=U ASCII files that have the UNIX standard end of line protocol, LF (x'0A'), are not automatically converted to EBCDIC. To process these types of file, **EOL=X'0A'** should be specified on the input control statement, followed by a **CVAE**, convert ASCII to EBCDIC, statement.

The APPEND Parameter

AS/400, UNIX and PC output files may use the **APPEND** parameter, which will append output records to the end of any existing data that might already be on that file. **APP** is a valid abbreviation.

This parameter **may not** be used for the **PRINT** file.

The TRUNC/NOTRUNC Parameter

AS/400, UNIX and PC output files with **RECFM=U** or **RECFM=V**, by **default** have trailing **blanks truncated** before being written. Thus a blank record is reduced to length 0.
To prevent this, use the **NOTRUNC** parameter.

TRUNC or **NOTRUNC** may be coded on any file, but are ignored if not RECFM=U or RECFM=V.

Issuing AS/400, UNIX and PC/DOS Commands

The keywords **DOS** and **UNIX** are provided as synonyms for the **SYSTEM** command, allowing commands to be issued dynamically to the operating system at SELCOPY execution time.

The command may be supplied to SELCOPY as a **literal**, (which must be enclosed in quotes), or as a **variable** in the work area.

Consider the following example where a user requires to erase all files from the c: and d: disk partitions which have file extension '.tmp' and have not been updated today:

```
read  cd:*.tmp   dir   w 1000   * Input directory entries.
pos 501 = 'erase '  s 1         * DOS command in work area.
pos L+1, 100 = ' '              * Blank residual input data.
if  10 at 1 < date-2            * Compare file date with current.
  then move 40  from  60 to 511 * Fileid after command in work area.
  then plog     from  50 at 501 * Log command to user terminal.
  then dos      from  50 at 501 * Execute DOS command.
```

VM/CMS Processing

DOS ON or OFF ?

SELCOPY is transparent to Operating Systems, so may be run under VM/CMS in either a VSE or MVS environment.

Because SELCOPY always processes CMS files using **native CMS** I/O routines, it makes no difference whether DOS is ON or OFF, regardless of disk type, FBA or otherwise, but it is **recommended** that SELCOPY is run in **Native CMS mode**, having issued **SET DOS OFF**.

VSE files on VSE disks (provided they are CKD, not FBA) and MVS files on MVS disks may be read by SELCOPY with DOS OFF.

VSAM files, on any disk type, VSE or MVS, may be processed (including update) by SELCOPY with DOS OFF.

SET DOS ON is required **only** for:

1. Files on an attached mini disk, which is on an **FBA** device owned by a **Guest VSE** Operating System.
   (On an attached **CKD** (Count Key Data) disk, VSE files may be accessed by SELCOPY in **native CMS** mode (i.e. **MVS mode)**. Similarly, genuine CMS files on an FBA device may be accessed in native CMS mode.)
2. Processing **VSE DLI** files under CMS.

With **DOS ON**, SELCOPY may still be invoked from a **MODULE**, provided the SELCOPY module is re-gen'd with:

```
LOADMOD   SELCOPY
GENMOD    SELCOPY (ALL
```

The **(ALL)** option tells the system that the module may be loaded regardless of the DOS setting.

However, with **DOS ON**, SELCOPY will (as expected) use a **DOS FETCH** to load in any additional modules, such as **CBLNAME** and any **CALL** 'd subroutines. But sadly, CMS does not consider a **DOSLIB** (which has been GLOBAL'd) to be eligible for inclusion in the search chain for DOS FETCH SVCs, so CBLNAME will not be found.

The good news is: if prior to the invocation of the SELCOPY module with DOS ON, a **CMS FETCH** command is issued, then the **GLOBAL DOSLIB** is added to the search chain, so when SELCOPY issues its **DOS FETCH**, CBLNAME or whatever will be found in the **DOSLIB**.

```
SET DOS ON
FETCH CBLNAME
SELCOPY
```

Native CMS I/O

CMS files are processed by SELCOPY using native CMS I/O routines, **(FSREAD** and **FSWRITE)**, whether DOS is ON or OFF. If SELCOPY finds that it is running under CMS, it will use **CMS I/O on CMS files**.

(For **Batch** files on your **guest system**, SELCOPY will use VSE or MVS data management macros depending on the setting of the DOS switch.)

CMS Filename Notation

See also:

- CMS File Mode 4 in this section.

There are three ways of telling SELCOPY that you require to read or write a CMS file. Each way will achieve the same result, using **native CMS I/O**.

1. The first is the **standard way** of providing SELCOPY with a **file name** of up to 8 characters, the first being alphabetic. i.e. identical to the method used for VSE and MVS batch processing.
   In this case you should supply a **FILEDEF** command to CMS, (a **DLBL** if running with DOS ON), which, prior to execution of SELCOPY, will link the logical file name to a real CMS file of the type **Fname Ftype Fmode**.

   You may omit the **FILEDEF**, in which case CMS will assume a real CMS file name of **fname FILE A1**.
2. The CMS file name consists of three parts: **Fn** (File name), **Ft** (File type) and **Fm** (File mode), where File mode indicates the disk on which the file resides.
   This name uniquely defines the file to CMS, and it may be supplied to SELCOPY as a single word by separating the 3 part name with **full-stops**, leaving no embedded blanks. e.g.

   ```
   PROFILE.EXEC.A
   ```

File mode (Fm) **may be omitted**, in which case **default** will be **'*'** for input files, and **'A1'** for output files.

3. Thirdly, by delimiting the 3 part name with blanks, (as many as you like), and enclosing the whole thing in quotes. It is allowed to have blanks between the quotes and the file name too. Thus, **STACK** ed data, which has been **tokenised**, does not lose its integrity when truncated to 8 bytes. e.g.

```
' PROFILE8 EXEC D5 '
```

As for method 2, File mode (Fm) **may be omitted**,

All CMS files, except File Mode 4, are processed by SELCOPY using native CMS I/O, **FSREAD** and **FSWRITE**, regardless of notation used.

It is recommended that methods 2 and 3 are used only for quick, one-off jobs. From the readability point of view, it is better to use a **FILEDEF** for your CMS file, and refer to it within SELCOPY by its logical filename. SELCOPY will still process the file using native CMS I/O.

When method 2 or 3 syntax is used for CMS file names, then later reference to that file may be made using just the first token. e.g.

```
READ ABC.DATA.H1          * Defines   ABC as   ABC.DATA.H1
READ ABC                      * Refers to ABC.DATA.H1
IF EOF   ABC                  * Refers to ABC.DATA.H1
IF INCOUNT  ABC    GT 10      * Refers to ABC.DATA.H1
```

CMS File Mode 4

See also:

- RECFM=FB/VB Special Meaning in this section.

Special treatment is given to the processing of a file in the CMS environment if a **FILEDEF** exists for it, and it has a **File Mode of 4**. All I/O on that file will be performed using standard **MVS Data Management**, instead of using CMS's FSREAD and FSWRITE logic.

This means that a standard **blocked** MVS file, even with genuine Variable length records, which is held in a CMS environment as a CMS file, may be processed as a true **MVS file under CMS**. This also holds good for **RECFM=FB** and **RECFM=VB** files, for both input and output. Not just disk - tape too. Opportunities include **CMS blocked Back-Up** .

Note that it is necessary to inform SELCOPY of the **LRECL, BLKSIZE** and **RECFM** on the FILEDEF or within the SELCOPY control cards, because this information is not held by CMS within its **FCB**, File Control Block.

RECFM for CMS files

See also:

- RECFM=FB/VB Special Meaning in this section.
- RECFM= in section *Operation Words, Parameters and Keywords*.

Unlike the traditional **SAM** (Sequential Access Method) files on a Batch system, which have a choice of **3** different Record Formats, there are only **2 for CMS**:

RECFM=F

RECFM=F (the 1st type) is the same for both **Batch** (VSE and MVS) and **CMS** files, indicating that the RECord ForMat is Fixed length. All records are the same length.

However, standard **CMS** files are **not blocked**, and there is therefore no requirement to code **BLKSIZE** for a standard CMS **RECFM=F** file. All internal data management such as blocking is handled by **CMS**, for CMS files.

If **BLKSIZE** is coded, (say in preparation for later use in a Batch environment), SELCOPY will ignore it, unless accompanied by **RECFM=FB** which has a special meaning for SELCOPY.

RECFM=U

RECFM=U (the 2nd type) in CMS terminology is referred to as **RECFM=V**. The CMS terminology of **RECFM=V differs markedly** from the **RECFM=V** of Batch files.

CMS RECFM=V indicates that the records are not necessarily the same length, and may vary between 1 and the LRECL value, but unlike Batch files, the **RDW** (the 4-byte Record Descriptor Word) is not part of the record, and data commences in position 1 instead of position 5.

In other words, **CMS** allows the user to forget about the fact that record lengths must be stored with the records in order to block them together.
CMS handles the problem transparently to the user. Thus records may be considered to be of **undefined** length, i.e. exactly the same as **RECFM=U** for Batch files.

For this reason, **RECFM=V** and **RECFM=U** for a standard **CMS** file are treated as **synonymous** by SELCOPY, unless coded as **RECFM=VB** which has a special meaning for SELCOPY.

The SELCOPY **Selection Summary** always refers to variable length CMS files as **RECFM=U**, a necessary distinction because genuine **Batch RECFM=V** files may have been processed in the same run.

Remember that RECFM=F/V/U have their conventional meaning for files on a mini disk belonging to a **Guest** operating system such as MVS or VSE.

Input RECFM=U

No **LRECL** or **BLKSIZE** is required. CMS handles whatever blocking is required, and the maximum **LRECL** is made available to SELCOPY so that buffers can be allocated correctly.

Output RECFM=U

This is not as easy. The file does not yet exist, so CMS cannot tell SELCOPY anything. If you do not tell SELCOPY the **maximum LRECL** to expect, then an assumption of **800** is made for **output buffer size**.

If the **default** output buffer size of **800** is insufficient, output records are truncated and **RC=5** issued, (Output LRECL larger than output blocksize).
In this case, use **BLKSIZE=nnnn** to override the default buffer size of **800**, or alternatively code **LRECL=nnnn, RECFM=U**, where **nnnn** is not less than the maximum record size expected.
Coding **LRECL=nnnn** alone (without the **RECFM=U)** would result in **RECFM=F** being used, which is the RECFM **default** if LRECL=nnnn is explicitly coded.

RECFM=FB/VB Special Meaning

Output to a CMS file (any file mode) in standard **MVS** record format, but **actually blocked**, may be achieved by specifying **RECFM=FB** or **RECFM=VB** as appropriate on the **WRITE** statement, together with **BLKSIZE=nnn**.

If a file exists on a **CMS disk** as a genuine CMS file, but the data within that file is in standard **MVS** record format, **RECFM=FB** or **RECFM=VB**, then the file may be processed using its MVS record format by specifying **RECFM=FB** or **RECFM=VB** as appropriate on the **READ** statement, without the requirement that a **FILEDEF** with FileMode 4 exists for the file.

Native CMS I/O is used for such files, unless a **FILEDEF** with FileMode 4 exists for the file, in which case CMS's simulated **MVS Data Management** is used.

Lower Case Commands

All parameter input to SELCOPY is accepted in upper case, lower case, or even a mixture of case settings. Literals enclosed in quotes remain unchanged.

Note that the Case Setting for SELCOPY's parameter card input is controlled by the FILEDEF for SYSIN.

FILEDEF SYSIN TERM	defaults to Upper case and all data read off SYSIN is forced Upper Case by the system.
FILEDEF SYSIN TERM (LOWCASE	will prevent the system from making any modification to the Case Setting of SYSIN data.

The SELC EXEC supplied on the distribution tape uses the LOWCASE option.

SELC EXEC

See also:

- Lower Case Commands in this section.

This is the EXEC procedure which sets up the environment for a SELCOPY execution in native CMS mode. It is supplied on the Distribution Tape as illustrated below, but **may be tailored** to fit each installation.

It assumes that DOS is already set off, so if DOS is in frequent use, it is recommended to insert the statement **SET DOS OFF** at the start.

The listing file, SYSPRINT, written by SELCOPY for FILE=PRINT output, is directed to &1 &2 &3 (parameters 1, 2 and 3), which if omitted defaults to **SELC LISTING A1** and makes it the obvious candidate for tailoring the &3 default to your preferred work disk.

Note that the **LOWCASE** option is coded on the SYSIN file which is where SELCOPY reads its control cards. .

```
***** SELC EXEC G *****    +++     L=036 +++ 89/09/29 01:01:37 +++
&CONTROL OFF NOMSG
&STACK HT
&IF .&1 EQ .   &1 = SELC
&IF .&2 EQ .   &2 = LISTING
&IF .&3 EQ .   &3 = A1
* GLOBAL TXTLIB SELCOPY  --- Not reqd for Rel 8.20 and above ---
FILEDEF SYSPRINT DISK   &1  &2  &3
FILEDEF SYSIN    TERM  (LOWCASE
&STACK RT
SELCOPY
&EXIT &RETCODE
```

SELCCTL EXEC

SELCCTL EXEC is very similar to **SELC EXEC**, the main difference being that **SYSIN** is taken from a **CMS file** instead of from the **TERM** device.

On invokation, **&1** is used to identify the **fname** of a CMS file with a filetype of **CTL**. Thus, it is suitable for use in conjunction with the sample **CTL files** on the distribution tape, along with **SELCCTL EXEC** itself.

REXX users may find **SELCCTL** a better technique than using **QUEUE** to stack control cards prior to invoking SELCOPY with SELC EXEC.

```
* SELCCTL EXEC H *        LEVEL 005 +++ 94/07/28 18:50:19

* This will invoke SELCOPY using control cards from
* the CMS file   &1 CTL *   instead of from the TERM device.
* Convenient when running from a REXX exec which has to use QUEUE.

&CONTROL OFF NOMSG
&STACK HT
&IF .&1 EQ .   &1 = SELC
&IF .&2 EQ .   &2 = LISTING
&IF .&3 EQ .   &3 = A1
&IF  &2 EQ CTL &EXIT 22222

FILEDEF SYSPRINT DISK   &1  &2  &3
FILEDEF SYSIN  DISK  &1 CTL *
&STACK RT
SELCOPY
&EXIT &RETCODE
```

Read CMS File - Print and Log

Below is a simple example of an **EXEC** procedure which reads a CMS file putting selected records to the LISTING file, and to the user's TERMinal:

```
&STACK * SMXTYB EXEC H *     --- LEVEL=nnn ---
FI INDD DISK    SMPMGG DOC *
&BEGSTACK
   read indd     STARTREC=21       * Data from the SELCOPY Manual.
    * "read SMPMGG.DOC" used in example instead of "read INDD".
   IF P ANY = 'synon'              * Lower case must be in quotes.
     then print  type=b  stopaft=3
     t log    s 3
&END
&STACK
EXEC SELC   &0
&EXIT &RETCODE
```

The printer output file, **SMXTYB LISTING P**, is illustrated within the discussion of the **TYPE** parameter earlier.
The **LOG** output appeared on the author's screen at the time it was run. Also the FILEDEF and EXEC command because &CONTROL was not OFF.

```
  +++ R(00004) +++
```

is given because the input file was not exhausted before the **STOPAFT** was reached on both PRINT and LOG.

The procedure **SELC EXEC** is described above.

The APPEND Parameter

CMS output files may use the **APPEND** parameter, which will append output records to the end of any existing data that might already be on that file. **APP** is a valid abbreviation.

This parameter **may not** be used for the **PRINT** or **PUNCH** files.

The TRUNC/NOTRUNC Parameter

CMS output files with **RECFM=U**, (i.e. not fixed length), by **default** have trailing **blanks truncated** before being written. Thus a blank record reduces to one byte.

Certain files should not be truncated. For example, truncation of a DOSLIB will cause loss of storage initialization (the blanks) when a program is loaded from that library. To prevent this, use the **NOTRUNC** parameter.

TRUNC or **NOTRUNC** may be coded on any file, but are ignored if not RECFM=U, (CMS RECFM=V).

XV - Transfer Variable

```
XV       FETCH   USERVAR    INTO 20 AT 1001
THEN XV  SET     USERVAR2    'ABC'
```

For the **CMS** user, the **XV** statement may be used to Transfer Variables between **SELCOPY** and **REXX** or **EXEC2** control files.

The **Common Variable Interface**, available for both **REXX** and **EXEC2**, is used by SELCOPY for the **XV** statement but this interface is **not available** for **EXEC1**, so your top EXEC **must not** be in EXEC1.

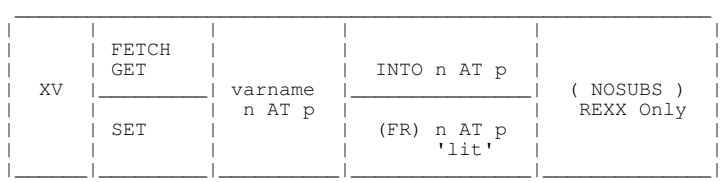
XV gives the ability to examine the contents of an **EXEC2** variable such as **&USERVAR**, or a **REXX** variable such as **USERVAR**.

Such variables may also be dynamically **modified** during the SELCOPY execution, allowing subsequent use (after SELCOPY has terminated) within the most recently invoked **REXX** or **EXEC2** (not EXEC1) before SELCOPY was given control.

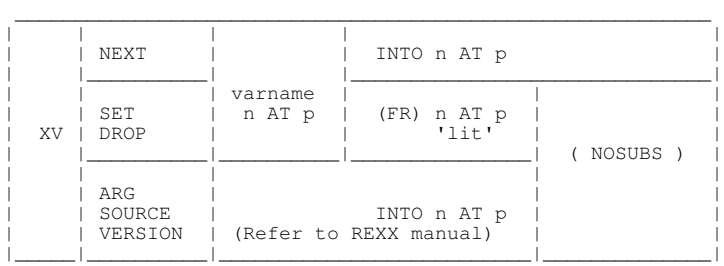
Note that if **SELCOPY** is invoked via the **SELC EXEC**, then SELC EXEC **needs to be** in **EXEC1** otherwise variables will be transferred to and from the **SELC EXEC** which is not what you want.

REXX and EXEC2

(not EXEC1)



REXX only



NOSUBS on XV forces use of the **Direct Interface** for SELCOPY REXX variable interpretation. This causes **no substitution** or **case translation** to take place on the variable name.
Details on the Direct and Symbolic Interfaces, and a list of the Return codes from REXX are contained in the REXX manual, together with a description of action taken by the REXX only functions. Refer to **SHVBLOCK** in the REXX/VM Referencs manual.

RC=128 from **REXX**, (invalid function), should never occur because SELCOPY has validated the function code.

The **& prefix** for names of **EXEC2** variables, **must be omitted**.

The CLEAR parameter

```
READ PROFILE.EXEC.A
LOG CLEAR    STOPAFT=1    * Clear the screen.
IF POS ANY EQ 'SET'
THEN LOG                  * Write to the screen.
```

The **CLEAR** parameter on an output statement to the file **LOG, (WTO** or **TERM)**, will clear the screen of the user's terminal. For a teletype terminal, the parameter is ignored.

No data is transferred to the terminal - the screen is just cleared.

If the screen is already full, or if it contains highlighted data, the terminal will enter the **"HOLDING"** state before the clear operation takes place. Otherwise the clearing takes place immediately.

Issuing CMS commands

Use of the **CMS** parameter allows **CMS Subset** commands to be issued at execution time from within SELCOPY.

The command may be supplied to SELCOPY as a **literal**, (which must be enclosed in quotes), or as **FROM=nnn L=nnn** in a similar way to the PRINT statement.

Consider the following example where a user requires to log the first 4 lines of many files on his screen, but he also wants the file names logged as well, and a few space lines between files:

```
READ @b2 CMS.EXEC.A         * The output of   L * * A2(EXEC
LOG CLEAR   S=1             * Clear the screen.
LOG ' ' TIMES 2             * Put 2 blank lines on screen.
LOG FR 12                   * Filename to the screen.
POS 01 MOD 'TYPE '          * The CMS subset command.
POS 30 MOD ' 1 4 '          * Only want to TYPE 1st 4 records.
CMS FR=1 L=34               * Issue command to CMS.
```

Where it is required to issue a **CP command** without getting CP's reply coming back to SELCOPY's storage, i.e. in order to get the reply on the screen as normal, it is necessary to issue the CP command **through CMS**, as in the following:

```
CMS 'CP MSG OPERATOR ** JOB XXX HAS FAILED **'
CMS 'CP QUERY NAMES'
```

Note that CP commands issued in this way via the CMS command, **must have CP** as the first argument within quotes, and the command may **not use CMS abbreviations** or synonyms, and the whole command must be enclosed in quotes.

Prohibited Use

The use of **CMS** commands at your installation may have been prohibited by your Systems Programmer at install time, in which case the following message is issued.

```
ERROR 115   PRIVILEGED COMMAND (CP/CMS/STACK)
```

Issuing STACK commands

```
STACK   'ERASE ABC EXEC A'   LIFO
THEN STACK   80 AT 2001
ELSE STACK NULL
```

Use of the **STACK** parameter allows data to be placed on the CMS **STACK** for subsequent input.

LIFO/FIFO keywords

The keywords **LIFO** or **FIFO** may also be supplied, having their normal CMS meaning. **Default** is **FIFO**.

NULL/EOF keywords

The keyword **NULL**, or its synonym **EOF**, may be coded on a **STACK** command. The keyword must not be enclosed in quotes otherwise it will be treated as data.

The effect of **NULL** is to stack a **null line** on the **CMS STACK** which when read from the stack will be processed as **End-of-File**.

Remember that SELCOPY's input via the file **CARD/SYSIN** will also normally be taken from the CMS STACK, thus **Looping via the CMS STACK** is therefore a possibility.

Prohibited Use

The use of **STACK** commands at your installation may have been prohibited by your Systems Programmer at install time, in which case the following message is issued.

```
ERROR 115   PRIVILEGED COMMAND (CP/CMS/STACK)
```

Issuing CP commands

See also:

- CP in section *Operation Words, Parameters and Keywords*.

The **CP parameter** with DOS set ON or OFF, allows CP commands to be issued within a SELCOPY execution.

The command may be supplied to SELCOPY as a **literal**, (in quotes), or by other syntax defining position and length.

```
READ   SOME.FILE.A   W=9999
CP 'QUERY RDR ALL'   REPLY 2000 AT 1001    STOPAFT 1
CP FROM 1    L 20    INTO 9000,9999        STOPAFT 1
```

The **REPLY** (synonym **INTO)** parameter is **optional**. If omitted, the CP reply is placed in the work area starting at POS 1, otherwise it goes where the INTO directs.

The **length of** the **CP** reply may be restricted, or allowed to default to extending to the end of the work area.

The **CP** command is discussed more fully in the alphabetic section of the manual under **CP** parameter, detailing: Return Codes. Getting CP's reply to the TERMinal.

Prohibited Use

The use of **CP** commands at your installation may have been prohibited by your Systems Programmer at install time, in which case the following message is issued.

```
ERROR 115   PRIVILEGED COMMAND (CP/CMS/STACK)
```

Last Command issued

CMS users will get the **last command issued** via the terminal printed as part of the **SELCOPY heading**. **SMX SMXCMS01**, the command issued to generated the example below, appears in the heading line.
The CMS command is truncated to **16 characters**.

When you have several EXEC procedures using SELCOPY, each one producing a **SELC LISTING A**, which you could require submitted for real printing, it can be very useful to have an indication of which CMS command caused its creation.

This feature is **suppressed if REPORT** is in effect with a **HEAD** parameter.

```
  SELCOPY REL 2.00 AT CBL - Bridgend UK (Internal Only)      smx smxcms01      (OS) VM/CMS=VMNBJ     13.51 THU 29 MAY 2003    PAGE   1
o ----------------------------------------------------                                                 ---------------------    -------- o


o          ** SMXCMS01 CTL A ***              L=001 --- 2003/05/29 13:47:35                                                          o
           opt   w 1000

o      1.  pr fr head   l=133  * Print the header record.                                                                            o


o     INPUT   SEL SEL                                                                                                  1  RECORD     o
      RECNO   TOT ID.          1         2         3         4         5         6         7         8         9         0  LENGTH
      -----   --- --- ....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0....,....0  ------
o         0     1   1 SELCOPY REL 2.00z66 CBL - Bridgend UK (Internal Only)      smx smxcms01      (OS) VM/CMS=VMNBJ     1     80      o
                      3.51 THU 29 MAY 2003    PAGE   1
                      ....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8....,....9....,....0
o                                                                                                                                     o
  SUMMARY..
   SEL-ID      SELTOT      FILE     BLKSIZE  LRECL           FSIZE   CI    DSN
o  ------      ------      ----     -------  -----           -----   --    ---                                                      o
      1            1

o                                                                                                                                     o
           ** ** ** ** ** ** ** SELCOPY IS LICENSED BY COMPUTE (BRIDGEND) LTD  +44 (1656) 652222 & 656466 ** ** ** ** ** ** **
                                                  ** EXPIRY DATE -- 2004/07/20 **
```

Figure 0. CMS Last Command.

Direct Read for CMS

See also:

- KEY=, STARTKEY=, REC=n and STARTREC=n in section *Operation Words, Parameters and Keywords*.
- Direct Read for AS/400, UNIX and PC in section *AS/400, UNIX and PC Processing*.

By Record Number

The following example illustrates a simple application: Suppose a library type file has directory entries which each point to the next one, and the first is at record 14. We need not worry how large the file is.

```
        RD LIB.DATA   REC 14                        * Get 1st dir rec.
        PRINT TYPE=M
      ==LOOP==
        RD LIB.DATA  REC 2 AT 1  TYPE B             * Read next dir rec.
        PRINT TYPE M   L=100                        * Print 1st 100 bytes.
        IF P 1 NE X'0000'                           * Last entry check.
        THEN GOTO LOOP   STOPAFT=99                 * STOPAFT for safety.
        EOJ
```

Other applications may take the REC data from a card file in character numeric format which the user has manually prepared, or interactively off the terminal using TYPE=C.

By Key

Because **CMS files** are not defined as "Keyed" files within the CMS Operating System, it is necessary to inform SELCOPY of the position of the key within the input record using the **KEYPOS** parameter (abbreviation KP).
Key length is not always required as the length is assumed to be that of the 1st key supplied. **KEYLEN=n** however is required if the 1st generic key length used is less than on subsequent keyed reads.

Any **CMS file** used with the KEY parameter must be in key sequence, and this is the user's responsibility.

SELCOPY will then take advantage of the fact that the file is in sequence when searching for a record with a specified key. Thus, even on a very large file, the access time is surprisingly fast.

Because only certain records are read in order to find the one needed, it is no guarantee that your file is perfectly sequenced just because SELCOPY found the requested records without an error. It is **still possible** to have out of sequence records in the file that were never read.

A simple example is:

```
RD PARTNO.DESC  KP=1  KEY='P27X938'   * KEYLEN=7 implied.
PRINT
EOJ   * Not really necessary, Default STOPAFT=1 on Key Lit.
```

Direct Processing after EOF

Processing after EOF, both direct and sequential, will be allowed to continue provided the following conditions are met:

An **IF EOF** test exists for the file.

At least 1 **Direct** READ statement exists for it.

SELCRDR - Read off RDR Queue

Really, the **only difference** from the usual CMS execution of SELCOPY is the **FILEDEF** for the input file, **INDD**, which results in input coming from the READER queue. For this reason, it is necessary to **SPOOL** the reader as is required by the user. Here it is set to read all classes, but the CMS manual will give full information on the SPOOL command.

Note that printer files, which are read off the READER queue, will lose the ASA char from position 1. Thus you get a 132 byte record instead of 133.

```
* SELCRDR EXEC * (Skeleton)
* Use SELCOPY to scan a file off the RDR queue, highlighting any
* error messages on the TERM device, plus a hard copy of them.
CP SPOOL READER   CLASS *   NOCONT HOLD EOF
FILEDEF INDD   READER   (RECFM U  LRECL 133
&BEGSTACK
  READ INDD  INTO 2  W 2222  * Leave pos 1 for generated ASA char.
    * (Could put code here to generate ASA and write to CMS file.)
  IF P 13 = 'INVALID'            ** Check for common errors
  OR P 23 = 'CANCEL'             ** at installation dependent
  OR P 47 = 'ERROR '             ** positions.
     T WR LOG L 80 S 10      * Log errors on TERM.
     T WR ERR.LISTING.A      * Also write to Hard Copy file.
&END
&STACK
EXEC SELC
&EXIT &RETCODE
```

SELCCKD - Read Guest VSE/MVS File (with DOS OFF)

The **SELCCKD EXEC** is supplied on the Distribution tape:

```
/** SELCCKD EXEC ***             L=001 +++ 95/04/06 19:08:48          */

  arg  mode  dsn  rdparms
  if   mode             = ''   then exit 11111
  if         dsn         = ''   then exit 22222

 'SET CMSTYPE HT'

 'FI CMSIN' mode 'DSN' dsn

 'MAKEBUF'
  queue 'rd CMSIN' rdparms '** SELCCKD EXEC reading DSN='dsn
  queue 'print  s=22   ty=d  l=80'
  queue 'wr  x.x.b  s=100   !/*'
 'EXEC SELC'; rr = rc
 'DROPBUF';   exit rr

                          *** Documentation ***
Format:
 SELCCKD   mode  full.dsn   <readparms>

           mode     file mode of linked disk that contains the dsn.
                    If omitted, RC=11111 issued.

        full.dsn    full data set name, including full-stops.
                    If omitted, RC=22222 issued.

        readparms   RECFM=xx, LRECL=nn, (BLKSIZE=nn) to appear on
                    SELCOPY's read statement.
                    Normal SELCOPY defaults apply.
e.g.
 SELCCKD  l  payroll.master           * Assumes LRECL=80 RECFM=F.
 SELCCKD  o  cbl.testk l=200 recfm=vb * Read a var blocked file.


Reads:  Any Sequential file off an attached CKD disk.

Writes: SELC LISTING   - 1st 22  records, length 80, dump format.
        X X B          - 1st 100 records, recfm v, length as orig.
               (You could insert an extra line here to write a few
                records to the screen. e.g. queue 'LOG STOPAFT=6').
```

```
Assumptions:
        That your PROFILE EXEC, or some equivalent, has already
        set up LINK and ACC of required disks,
  e.g.
       CP LINK VSE  340 340 R
       ACC          340 L
       CP LINK VSE  341 341 R
       ACC          341 O

L=001 95/04/06 - written to replace orig SELCGFIL - jge
```

SELCFBA - Read Guest FBA (DOS ON)

The **SELCFBA EXEC** is supplied on the Distribution tape.

The command **SET DOS ON** is **required** for processing **Seq Files** on an **FBA (Fixed Block Architecture)** minidisk owned by **VSE**.

On a standard DOS system **(not VSE)**, a **DEV** parameter must be supplied for each file with a device type not the same as **SYSRES**.

For input files from a VSE disk, whether running VSE or MVS, the **RECFM=F** and **LRECL=80** will be default unless explicitly supplied. This information is not held in the VSE VTOC entry.

The VSE print filename is **IJSYSLS**, in keeping with VSE naming conventions.

Card input is always taken from the **STACK** unless your installation Systems Programmer has set **CBLNAME** to prevent this assumption. If this is the case, it is necessary to issue the command **SET UPSI 11000001** (X'C1' for Console Input) in order to revert to STACKed input.

The following EXEC reads and prints from a file held on a VSE FBA mini disk, linked and accessed as the F disk. With DOS ON, the Ret Code is still supplied when running under CMS.

```
/** SELCFBA EXEC ***             L=004 +++ 95/04/06 19:06:03          */

  arg  mode  dsn  rdparms
  if   mode              = ''   then exit 11111
  if         dsn         = ''   then exit 22222

 'SET CMSTYPE HT'; 'SET DOS ON'; 'SET DOSPART 120K'

/* Fetch a non-existent phase so CMS acknowledges existence of DOSLIB */
 'GLOBAL DOSLIB SELCOPY';  'FETCH NOTHING (ORIGIN 20000 '

 'ASSGN SYS007' mode
 'DLBL  CMSIN         CLEAR'
 'DLBL  CMSIN ' mode 'DSN' dsn       '(SYS007'

 'ASSGN SYSIN   UA'
 'ASSGN SYSLST   A'
 'DLBL  IJSYSLS  A CMS SELC LISTING   (SYSLST'

 'MAKEBUF'
  queue 'rd CMSIN' rdparms '** SELCFBA EXEC reading DSN='dsn
  queue 'print  s=22   ty=d  l=80'
  queue 'wr  x.x.b  s=100   !/*'
 'SELCOPY'; rr = rc                  /* Run from module with DOS ON */
 'DROPBUF'; 'SET DOS  OFF';   exit rr
```

The format is as follows:

```
  SELCFBA   j  cbl.fba.test  l=130 recfm=fb
```

where,

`j`	is the disk letter of the attached FBA Guest disk.
`cbl.fba.test`	is the DSN of the file being read.
`l=200 recfm=fb`	is the geometry of the file to be used by SELCOPY.

SELCVSAM - CMS with VSAM

The **SELCVSAM EXEC** is supplied on the Distribution tape, and is used to read a **VSAM** file from a Guest disk, which may be **CKD** or **FBA**.

Note that **VSAM OPEN ERROR X'B4'** is usually caused by mis-spelling of the file or catalog name. No file geometry is required because SELCOPY obtains this from VSAM.

```
/** SELCVSAM EXEC ***        LEVEL 007 +++ 95/04/06 18:50:56        */

  arg  mode  dsn  ddname
  if   mode             = ''   then exit 11111
  if         dsn        = ''   then exit 22222
  if              ddname = ''   then ddname = 'IJSYSUC'

  'SET  CMSTYPE HT'
  'DLBL CMSIN CLEAR'
  'DLBL CMSIN' mode 'DSN' dsn   '(VSAM CAT' ddname

  'MAKEBUF'
  queue 'read CMSIN  vsam  ** SELCVSAM EXEC reading DSN='dsn
  queue 'print  s=22   ty=d  l=80'
  queue 'wr  x.x.b  s=100   !/*'
  'EXEC SELC'; rr = rc
  'DROPBUF';   exit rr
```

The format is as follows:

```
  SELCVSAM   j  cbl.vsam.test  ucat1
```

where,

j	is the disk letter of the attached Guest disk.
cbl.vsam.test	is the DSN of the VSAM file being read.
ucat1	is the filename on the DLBL for the required catalog.

It is of interest here to note that, if you are able to access your guest disk as **READ**/**WRITE**, then there is nothing to stop you from **updating** or **writing** to any VSAM file on that guest disk using SELCOPY, running from a CMS userid with DOS OFF.

CMS Update-in-Place

See also:

- CMS use of DIRDATA in this section.

When you use the SELCOPY control card **UPDATE fname**, the last record read off **fname** will be rewritten, with any modifications that you may have made to the current record in storage before issuing the update.

Update for CMS is almost identical to VSAM, and is discussed in more detail under the **UPDATE parameter**, with an example.

VSAM and/or IMS/DLI files may be updated with SELCOPY under CMS, but the disk of course **must be in R/W mode**.

Example

A very large library of source program code, a CMS file, needs modification to the directory date to force reorganisation. Record 1 of the file holds a pointer to the Directory record as a 2 byte binary record number at position 38. In the Directory record, position 107 contains a date in YYMMDD format which must be changed to set the Day number to zero. The year is 94, so we can verify this before the update.

- **XEDIT** says it's too large
- **EXECIO** says the lrecl is greater than 256
- **COPYFILE** says insufficient disk space (Also it takes too long)

To fix it quickly with **SELCOPY**, just key in:

```
 l lib1 usrlib b ( alloc
 FILENAME FILETYPE FM FORMAT LRECL       RECS     BLOCKS
 LIB1     USRLIB   B1 F       8192       8200      16400
 R;
 selc
 read lib1.usrlib.b
 read lib1.usrlib.b   rec = 2 at 38   ty b
 if p 107 '94'
  then p 111 '00'
  then update   lib1.usrlib.b
  then log   fr 101  len 50   type b
  then stop
 else goto cancel

    INPUT   SEL SEL
    RECNO   TOT ID.            1         2         3         4         5
    -----   --- ---    ....,....0....,....0....,....0....,....0....,....0
 0      2     1   5         940700  USRLIB      Q       W     48
                      000000FFFFFF00EDCDCC0E0100DE00040EA0B000FF05000022
                      000010940700014743 92CF09018E005A3F63710048FF000009
 R;
```

Note that **UPDATE in place** with **SELCOPY** can also be done on a **generic group** of file names, such as *** EXEC D**.

CMS use of DIR input

The **DIR** (Directory) parameter may be used to **READ** the directories of **CMS** minidisks.

SELCOPY will reformat the **FST data** for each CMS file matching the supplied file mask, and return **81 bytes** of data as follows:

```
....,....1....,....2....,....3....,....4....,....5....,....6....,....7....,....8.

A987     EXEC     A6  1998/09/04 13:16:13       49       72 V        2 CBL1A  R/W
XYZABCD  LST      A1  2000/08/20 18:13:52       44       88 F        4 CBL1A  R/W
```

The following is a simple application:

```
  READ    '* * *'    DIR
  IF POS 1 19 = ZAP          * If ZAP mentioned in Fn or Ft.
    THEN LOG
  IF POS 1 = POS 10  LEN 8   * If Fname same as Ftype.
    THEN WR FNFT.DUP.A
```

The file **DIRINT CTL** on the distribution media gives a sample of SELCOPY control cards for CMS Directory input. Basically, it does a **GOTO GET** on all standard type files and displays the rest. It may help you to find the files you intended to delete, but never actually did.
Some useful **EQU** statements are also supplied with it.

CMS use of DIRDATA

See also:

- DIRDATA in section *Operation Words, Parameters and Keywords*.
- Selection Summary Format example in section *Further Information*.

The **DIRDATA** (Directory + Data) processing of SELCOPY may be used to read the directories of **CMS** minidisks, **plus** data records from the file for each directory entry in turn. Thus input will be of the form:

```
  File 1 - Reformatted FST record,       LRECL=81.
           Data record 1 of File 1.      LRECL=whatever it is.
           Data record 2 of File 1.
           Data record 3 of File 1.
           Data record 4 ... etc, till EOF of File 1.
  File 2 - Reformatted FST record,       LRECL=81.
           Data record 1 of File 2.      LRECL=whatever it is.
           Data record 2 of File 2.
  File 3 - Reformatted FST record,       LRECL=81.
           ..... and so on till no files left .....
```

The reformatted **FST** data for each CMS file matching the file mask is the same format **81 bytes** as above for **DIR** input.

UPDATE-in-Place on the **data** records is allowed, but **please be careful**.
Directory records of course, may not be updated.

For example, the following will update all EXEC files on the A and D-disks which mention EXEC ABCRTN, changing the ABC to XYZ.

```
  READ    '* EXEC A'    DIRDATA
   CAT    '* EXEC D'    DIRDATA

  IF DATA  !AND POS ANY = 'EXEC ABCRTN'
    THEN P @+5 = 'XYZ'
    THEN UPD   '* EXEC A'       * Meaning the CAT of EXECs on A + D.
    THEN PRINT  FR DSN   L 18   * Fn Ft Fm of modified CMS file.
    THEN PRINT                  * Modified record.
```

FLAG with DIRDATA

See also:

- FLAG in section *Operation Words, Parameters and Keywords*.

```
 ________ ________ ____________________________________________________________
|        |        |                                                            |
|        |        |  EOM                                                       |
| (NOW)  |        |  EOMEMB              * For CMS/MVS/VSE/PC DIRDATA inp.     |
|  THEN  |  FLAG  |          (STOPAFT=n)                                       |
|  ELSE  |        |  EODISK              * For CMS DIRDATA only.               |
|        |        |  EOD                                                       |
|________|________|____________________________________________________________|
```

When reading both DIRectory and DATA records **(DIRDATA)** for a generic group of **CMS** files, the **FLAG** statement may be used to bypass a member or disk on the next read of the **DIRDATA** input file.

CMS with IMS/DLI

In the same way as any other program may be executed under CMS, the DLI program may also be invoked.

The following may help to provide a guideline for DLI processing on your own machine. It assumes disks **LINKed** and **ACCessed** appropriately.

```
***** SELCDLI EXEC H *****      LEVEL nnn
*         Invoke DL/I under CMS
* Assuming all the VSE disks are LINKed and ACCessed.....
SET DOS ON    B (VSAM
ASSGN SYSCLB  B
DLBL IJSYSCL  B DSN   CORE IMAGE LIBRARY WITH PSB  (SYSCLB

ASSGN SYSCAT  D
DLBL IJSYSCT  D DSN   YOUR VSAM MASTER CATALOG     (SYSCAT

ASSGN SYS002  C
DLBL IJSYSUC  C DSN   YOUR VSAM USER CATALOG       (SYS002

ASSGN SYS001  C
DLBL XXXXD    C DSN   THE INPUT FILE DATA          (SYS001
DLBL XXXXI    C DSN   THE INPUT FILE INDEX         (SYS001

ASSGN SYSLST  P
DLBL IJSYSLS  P CMS   SELC LISTING  (SYSLST
DLBL DLIPRIN  P CMS   DLI  LISTING  (SYSLST

ASSGN SYSIPT P
DLBL IJSYSIN  P CMS   DLI  SYSIPT   (SYSIPT
* Above is DLI's SYSIPT data - a single card file containing the
* DLI parm data in the format:   DLI,SELCOPY,psbname

&STACK READ dbdname DLI
&STACK PRINT STOPAFT=100
&STACK /*
* Above is SELCOPY's input, via the Stack.

GLOBAL DOSLIB     DLI SELCOPY CBLNAME
* Above may be required depending on what programs are where.

SET UPSI 00000010
FETCH DLZRRC00 (ORIGIN 20000 START
&EXIT &RETCODE
```

CMS Distribution Material

Please remember that the sample procedures on the Distributed CD-ROM are not all for CMS only. **MVS** and **VSE** users will also find some files of interest, e.g. **SELCCOMP** and the **CTL** files.

The following are **sample EXEC** procedures, and **CTL** files found in the **S/rel/MFR/SAMP** directory of the product CD-ROM (where **rel** is the release of mainframe SELCOPY supplied on the CD-ROM, e.g. 200). We trust that these may be of assistance to you, but must state that they are provided as a guide only, and CBL disclaims responsibility for their accuracy. CMS files included are:

SELCOPY sample EXEC procedures and CTL files:

SELCMEMO CMSUSER	
DIRCMS CTL	EQU's for SELCOPY's FST
DIRINT CTL	Read '* * *' DIR
GS009 CTL	VSAM Back-up 6 files.
GS012 CTL	JCL Modification - All Systems
GS015 CTL	IMS/DL1 Generalised Print.
SELCERAS CTL	ERASE files

SELC EXEC	Discussed above.
SELCCKD EXEC	Read Guest CKD File.
SELCCTL EXEC	For use with **REXX**.
SELCCOMP EXEC	Compare 2 files. (Example 10)
SELCSKEL SELCCOMP	Skeleton SELCCOMP Ctl Rtn.
SS800700 SELCCOMP	Sample SELCCOMP Ctl Rtn.
SELCFBA EXEC	Read Guest FBA File.
SELCGEN EXEC	Generate: SELCOPY MODULE A, SELCOPY DOSLIB A, SELCOPY TXTLIB A, MVS/VSE LE files, and MVS BIND deck for DB2.
SELCLL EXEC	List files bases on date range.
SELCPAGE EXEC	Count pages, check ASA.
SELCPUR EXEC	Selective PURGE off RDR queue.
SELCREAD EXEC	Create CMS files from the distribution mast.
SELCSCAN EXEC	Scan CMS files for string.
SELCTEXT EXEC	Manipulate TEXT file for L.E.
SELCTXTV EXEC	View of TEXT file data.
SELCTYP EXEC	Formatted print of CMS file.
SELCVSAM EXEC	Read Guest VSAM file.

SELCOPY sample TSO procedures and CTL files (MVS):

S TSO	CLIST Invoke SELC using CTL file.
SCANPDS TSO	REXX Scan for/update string in PDS.
SLIST TSO	CLIST Simple file list to term.
SSDB2EQU CTL	Generate SELC EQUs to map rows of DB2 table.
SSDB2LD CTL	Generate ctl statements for DB2 LOAD.
XVDEMO CTL	Transfer Variables example.
SSDIRM08 CTL	Formatted DIR list of PDS libraries.
SSDIRM10 CTL	DIR of PDS + 1st 100 recs of each memb.

Please check the level **L=nnn** identification on the first record of these files to see if changes have occurred.

EXAMPLES

The examples in this section are intended to provide the user with guidance in the use of SELCOPY and are not a complete catalogue of all its capabilities.

JCL is omitted in most examples to save repetition.

Example 1 - Card Reformatted to Print

Including **VSE JCL**:

```
// EXEC SELCOPY
    READ CARD            * Selective print of Link Edit data.
    IF POS 1  <>  X'02'  * Eliminate all the "hex" records.
      THEN PRINT
    END
data cards
/*


// EXEC SELCOPY
    READ CARD            * Selective print of VSE JCL.
    EOF ))               * Use )) to recognise EOF instead of /* or /&
    IF P 1 = '/'
      THEN PRINT
      THENIF  P 1 = '/&'
        THEN LINE 1      * New page after printing /&
    END
data cards including /* and /& cards.
))
```

Including **MVS JCL**: Consider the simple card to print with editing. The input data is to be re-formatted as follows:

CARD COLUMN	PRINT POSITION
20-23	1-4
49-51	10-12
1-19	20-38
30-35	50-55

```
// EXEC PGM=SELCOPY
//SYSPRINT DD SYSOUT=A
//SYSIN DD *
    READ CARD   WORKLEN 180
    MOVE 4 FROM 20   TO 101
      THEN MOVE  3 FROM  49   TO 110
      THEN MOVE 19 FROM   1   TO 120
      THEN MOVE  6 FROM  30   TO 150
      THEN PRINT   FROM 101   LRECL 55
    END       * End of Control Statements - Data follows:
Data goes here.
/* (Optional for MVS users.)
```

To restrict printing to only those cards having '20' in position 70, and 'A' in position 80, simply replace the **MOVE 4 FROM 20 TO 101** with:

```
    IF  POS 70 = '20'
    AND POS 80 = 'A'
      THEN MOVE 4   FROM=20   TO=101
```

Example 2 - Tape Copy and Print

This job is useful for printing out the JCL cards included in, for example, a software distribution tape (where the software is in the form of loader-format cards). As a by-product, a copy tape is written.

```
READ  TAPE1     LABEL=NO * Default LRECL of 80 is assumed.
WRITE TAPE2     LABEL=NO * Default LRECL same as input.

IF POS 1 <> X'02'        * Print all non-Loader cards.
  THEN PRINT STOPAFT=200
IF POS ANY = 'REL'       * Print first 30 Release numbers.
  THEN PRINT       S  30
```

Example 3 - Tape Format, Copy & Print

It is necessary to rearrange a tape file where each record consists of:

1. An account number (10 bytes),
2. Four packed decimal fields (3 bytes each)
3. A display-numeric field (4 bytes).

Each of the packed fields is to be moved one field to the left, the first being over-written. The display-format field is to be 'packed' to packed decimal format and placed in the fourth decimal field.
In addition, any record with a value of 5000 or greater in the first field (after alteration) is to be printed in pounds-pence format.

The file consists of 260 byte blocks, and has standard labels.

```
// JOB REORGANISE AND PRINT.
// TLBL TAPE1,'INPUT'
// TLBL TAPE2,'OUTPUT'
// ASSGN SYS001,X'380'
// ASSGN SYS002,X'381'
*  Standard assignments for card and printer assumed.
// LIBDEF PHASE,SEARCH=IJSYSRS.CBL
// EXEC SELCOPY

  READ  TAPE1    LRECL=26   WORKLEN=222
  MOVE  9 FR 14   TO 11
  CVCP  4 AT 23   TO  3 AT 20        * Convert Char to Packed Dec.
  POS 23 = '0000'
  WRITE TAPE2    BLKSIZE=260

  IF POS 11  >=  X'05,00,0C'         * Commas opt'l in hex data.
    THEN CVPC  3 AT 11   TO 111  FORMAT='ZZZ.99 CR'
    THEN CVPC  3 AT 14   TO 125  FORMAT='ZZZ.99 CR'
    THEN CVPC  3 AT 17   TO 149  FORMAT='ZZZ.99 CR'
    THEN CVPC  3 AT 20   TO 153  FORMAT='ZZZ.99 CR'
    THEN PRINT  LRECL=66 FR 101
/*
```

Example 4 - Use of GOTO

A magnetic tape with a logical record length of 38, and a block size of 3610, holds two different types of of record.

1. A header record, always numeric in positions 1 and 2.
2. A transaction record, always has 'Z' in position 1.

The file is in ascending sequence of header records, but many header records may have the same number in positions 1 and 2.

It is required to select only the header records containing '81' in positions 1 and 2, together with their associated 'Z' records, writing them to tape with an output blksize of 380.

At the same time we require a print of all the '81' Header records that were selected.

```
  READ  TAPE10   LRECL=38* Don't need to give BLKSIZE.
  IF POS 1  <>  '81'
    THEN GOTO GET        * Go back to first READ card.
==LOOP2==                * This is a user-label.
  WRITE TAPE11   BLKSIZE=380
  IF POS 1  <>  'Z'
    THEN PR   STOPAFT=222* Useful to set limit for printing.
                       * (in case we make a mistake.)
  READ TAPE10            * No need to repeat LRECL.
  IF POS 1  >=  '82'
    THEN GOTO EOJ
  GOTO LOOP2             * Prevent the automatic GOTO GET.
```

The **THEN GOTO GET** will cause looping around the first **READ** statement until we find a record with 81 in position 1. On finding it, control will drop through to **LOOP2**, our main loop.

Because "Z" is lower than numerics, checking position 1 for greater or equal to "82" will never be satisfied by a transaction record. So we keep looping around until either we get to End-of-file, or we find a record with 82 or more in position 1.

Example 5 - Variable to Fixed Length

A very large financial organisation holds a tape record for every one of its customers. Each record holds 40 bytes of fixed information for the customer in the first part of the record, and variable information at the end. The average record length is 600 bytes.

Most requests only concern **fixed data** at the beginning of the record. Thus variable length transaction data is being processed and passed time and time again unnecessarily.

It was decided that an abbreviated master file would be set up to give a **quick turn around** on **fixed data** requests only.

Using SELCOPY to do this reduces the data to one tenth of its size. Less **inter-record gaps** are required so the tape length is less than one tenth its original size, as is the time taken to process it.

```
READ TAPE   RECFM=V      *    NORDW could be used here.
WR TAPE1  LRECL=40   BLKSIZE=32000   RECFM=F
```

Note that SELCOPY will automatically strip off the 4 bytes of RDW (Record Descriptor Word) information when copying from variable to fixed length records.

However, if the **NORDW** parameter were coded on the READ statement, (this is the **recommended technique)**, then the RDW is suppressed and the 1st 4 bytes of the input area would contain user data (not RDW).

Example 6 - DA Disk to Tape & Print

A manufacturing company keeps a keyed Direct Access (DA) order file, which has a 4 byte field in position 108 indicating the type of material ordered.

They have an access routine that organises the data in blocks of 10 records, each record being 726 bytes long. Control information concerning overflow and other house-keeping detail is kept in the key, and deleted records have X'FF' in position 1 of the logical record.

Complaints have revealed a serious fault in material type 7381, so all deliveries of this material made in February and March 1987 must be traced.

It is known that none of these records will have been deleted. In fact none of the orders for this material during the whole of 1987 should have been deleted.

The date is held in 'DDMMYY' format commencing in position 498 of the record.

SELCOPY will accept **keyed sequential input** , for both VSE and MVS, ignoring the key in front of each block. (The standard IBM sequential access method does this.)

The following control statements will then select those records required.

```
READ  ORDERS  LRECL=726

IF POS 108  NE  '7381'             * Not Equal required material.
OR POS 502  <>  '87'               * Not Equal required Year.
  THEN GOTO GET                    * Ignore if these.

        * Now left with only those records
        * for material '7381' during 1987.

IF  POS 500   >= '02'   <= '03'    * The month.
AND POS   1   <> X'FF'             * Not deleted.
  THEN WR TAPE1   BLKSIZE=1452     * Re-Block.

IF  POS   1   =  X'FF'
  THEN PRINT   TYPE=M              * Print if deleted.
```

The selection to the printer is included in case some records **were deleted**. If so, the **TYPE=M** (mixed) print format will give total definition of the record because unprintable characters are printed in hex.

Example 6a - Sequential Disk to VSAM

It is required to change the organisation of a file from Sequential to Key Sequence VSAM format. Records are 120 bytes long, with a key in positions 10-16. We **do not need** to know the input blocksize.

Assuming the new VSAM file has been **DEFINE** 'ed via **IDCAMS**, the SELCOPY control cards required, excluding JCL, are:

```
READ SEQIN   LRECL 120
WRITE NEWMAST KSDS       * No Geometry info required for VSAM.
```

Because it is such little effort, it is usually worth including an extra statement or two which will print just a few of the records being copied. Why not print the **first 6** records copied, and the **first 22** header records copied. So the control cards become:

```
READ SEQIN  LRECL 120

WRITE NEWMAST   KSDS     * No Geometry info required.
PRINT      STOPAFT=6
GOTO GET   STOPAFT=6     * Don't print Header rec twice.

IF POS 5 = 'H'           * Header record indication.
  THEN PRINT   STOPAFT=22
```

Example 7 - Use of @ Pointer

Match 2 Files out of Sequence

A file of JCL statements, **OLDJCL**, needs modification to numerous **DSN** fields, all of which are on the first line of the **DD** card. The file **REPJCL** contains just DD cards which are in any sequence, and any match of any DD name in **OLDJCL** must be substituted with the appropriate record from **REPJCL**. Other records are to remain unchanged, and the file **NEWJCL** is to be created.

SELCOPY treats lower case as upper case unless in 'quotes', the Exclamation Mark is a **Line End** Character, and the following abbreviations are used:

w	worklen	**p**	pos	**l**	lrecl	**t**	then	**fr**	from	**wr**	write

```
//SELC5BLD JOB (0414OSVBT00),CLASS=A,
//               MSGCLASS=X,MSGLEVEL=(1,1)
//ALTER   EXEC PGM=SELCOPY
//SYSPRINT  DD SYSOUT=*
//OLDJCL    DD DSN=SELC5.OS.JCL(P7077),DISP=SHR
//REPJCL    DD DSN=SELC5.DSN.JCL3,DISP=SHR
//NEWJCL    DD DSN=SELC5.OS.JCL(P7077A),DISP=SHR
//SYSIN     DD *

option         w=80000                  * Large workarea.
equ ARRAY         4001                  * Store area for REPJCL recs.
equ ARRAYEND     79900                  * End of array.

@ = ARRAY                               * Set @ ptr to start of array.


==LOOP1==     * Once only * Read whole of Base Data Set into an array.
  read REPJCL   into @                  * Read into array elem.
  if eof REPJCL
    then @END = @                       * Save ptr to end of array.
    then goto LOOP1E                    * Go read 2nd file.

  @ = @+80                              * Add 80 to @ ptr.
  if @ > ARRAYEND                       * If array is full.
    then goto cancel
  goto LOOP1
 =LOOP1E=             * LOOP1 end *



==LOOP2==       *(Main Loop)*
  read OLDJCL                           * Read 2nd input file.
  if eof OLDJCL      !t eoj             * Go to successfull End-of-Job.

               * Match this OLDJCL record against all REPJCL records
               * using substitute record for output where appropriate.
  if p ARRAY+2,@END  =  8 at 3  step=80 * Scan for DDNAME match.
    then wr NEWJCL   fr @-2             * If same DD, use Substitute.
    else wr NEWJCL   fr 1               * Write out orig record.
  goto LOOP2                            * To read next record.
 =LOOP2E=             * LOOP2 end * (Unreferenced label.)
```

In the above **SELCOPY** control cards, use is made of both the standard **@ pointer** and a **user @ pointer** which for convenience we have chosen to call **@END**.

The @ ptr is invaluable in giving a fixed reference point to a previously undefined position in your work area. It can be set either explictly by the assignment **@ = 20** for instance, or implicitly by a successful range test. e.g. **IF P 20 30 = ABC STEP=1** where STEP indicates the increment over the range for each subsequent compare. (STEP=1 is actually the default and needn't be coded)

Offsets may be obtained by coding @+n or @-n, where n is the offset required.

Example 8 - VSAM Dump/Restore

First, let us consider **Dumping** the VSAM file to tape. Because VSAM's **KSDS** and **ESDS** records may be of any length between 1 and the defined maximum, they are treated by SELCOPY as **Undefined** length input records **(RECFM=U)**.

However, writing such records to tape would mean that they would be unblocked, which is rather wasteful, so we must change the RECFM on output to Variable Blocked, which will be much more efficient.

SELCOPY will generate the necessary 4 bytes of RDW (Record Descriptor Word) in front of each record.

MVS users may omit RECFM and BLKSIZE on SELCOPY control cards, but they must then be coded on the **DD card** for the tape in the **JCL** instead.

```
READ ABC KSDS                       * The VSAM input file.
WRITE TAPE10 RECFM=V @b2 BLKSIZE=32000
```

Now let us consider **Restoring** the same file from tape, back to a VSAM file.

If this is a file of some importance, it is **unlikely** that it would have been defined as **REUSABLE**. It is therefore necessary to erase and re-DEFINE it before the Restore operation. If you forget to do this, your restored data will simply be appended on the end of any existing data. In the case of a KSDS, probably all records will have a **key sequence error** and you will notice immediately, but for ESDS and RRDS it will all look satisfactory, but you would have doubled your data.

On the **Restore**, SELCOPY will strip off the 4 byte RDW from each input record before passing it to VSAM.

VSE users will probably need the BLKSIZE parameter on the input card as it is so large, and probably exceeds their installation standard (in **CBLNAME)**.

```
READ TAPE10          * RECFM=V BLKSIZE=32000 needed for VSE.
WR ABC @b2 KSDS
```

A Few Words of Caution:

Never trust any Back-up job suite until you have used the Restore part of it and proved it to your

*** FULL SATISFACTION ***

In order to put a little interest into this otherwise very boring example, let us consider that on the restore the user requires to zeroise **every** Packed Decimal field in **every record**.

Very conveniently, these are all together from positions 5 to 2626 inclusive, but **very inconveniently**, they all **vary in size**.

The job then becomes:

```
   read TAPE10      * RECFM=V BLKSIZE=32000 needed for VSE.
   @BEG = 4                                * Start position for loop.
==LOOP==
   if  p @BEG,2616   ones x'0c'   ptr @END   * Scan for X'nC' or X'nD'.
     t p @BEG,@END-1  =   x'00'   pad x'00'  * Set to X'00' except last byte.
     t p @END         =   x'0c'              * Zero in sign pos.
     t   @BEG = @END+1                       * Start scan from next pos.
     t goto LOOP

   write ABC  ksds
```

A much **more sophisticated** VSAM Back-Up example follows:

Back-Up 6 VSAM Files to 1 Tape File

Problem:
Back-up 6 small VSAM files to a single tape volume without the usual multi-file volume difficulties and dangers.

Solution:
Use SELCOPY to prefix a one-byte file identifier to each record and write all files to **the same tape** file, one after the other.
Write **RECFM=V** output, **blocked to device capacity, 32760**. The overhead of 5 bytes for each record (4 for RDW and 1 for File Id) is more than compensated by the large blocksize. Use of **NORDW** on the restore suppresses the RDW from the input area.
Omitting JCL for defining files, the SELCOPY control cards are below.

Notes:
SELCOPY treats lower case as upper case unless in 'quotes', the Exclamation Mark is a **Line End** Character, and valid abbreviations used are:

rd	read	**w**	worklen	**fr**	from	**l**	lrecl	**b**	blksize	**t**	then

pr	print	**p**	pos	**ty**	type	**s**	stopaft	**li**	elseif	**ti**	thenif

VSAM is specified throughout for simplicity, but the same principle works for any file. **RECFM, LRECL** and **BLKSIZE** would be needed for VSE, but not for MVS and CMS as the operating system supplies this, as does VSAM.

Back-Up

```
equ LMAX   4000               * Maximum record length.
read F1  ksds   into 102   w=LMAX+110                        * GS009 DOC *
 cat F2  esds                 * INTO effective on all CAT's.
 cat F3  ksds                 * 2nd char of filename used as identifier.
 cat F4  esds
 cat F5  rrds
 cat F6  vsam                 * More CAT statements can be added.

move 1  fr fname+1 to 101     * Set File Identifier (2nd char of filename).
lrecl = L+1                   * Add 1 to record length of current record.
wr TAPE10  recfm=v  b=32760  fr=101
do PRINTIT                    * Print sample of data backed up.
goto get                      * GET is implicit label - 1st ctl stmt.

==PRINTIT== * Subrtn only coded for additional info on printer *
  if p 6  ne  p 101  len 1            * same File Id No?
    t p 1 = 'File x --- started.'  s 1
    t move 1 fr 101 to 6              * Save File Id No.
    t space 2  !t pr  l 30            * Print file id msg.
  if p 101 = '1' !t pr fr 101 ty=b s=3 * Print 1st 3 recs, Both char+hex.
  li p 101 = '2' !t pr fr 101 ty=b s=3 * and the same for F2
  li p 101 = '3' !t pr fr 101 ty=b s=3 * and F3
  li p 101 = '4' !t pr fr 101 ty=b s=3 * etc.
  li p 101 = '5' !t pr fr 101 ty=b s=3
  li p 101 = '6' !t pr fr 101 ty=b s=3
 =ret=                        * Return to statement following DO PRINTIT.
```

Restore All Files

```
rd TAPE10   recfm v    nordw    blksize=32760
lrecl = L-1                   * Reduce record length.
if p 1 = '1' !t wr F1   ksds   fr 2
li p 1 = '2' !t wr F2   ksds   fr 2
li p 1 = '3' !t wr F3   esds   fr 2
li p 1 = '4' !t wr F4   esds   fr 2
li p 1 = '5' !t wr F5   rrds   fr 2
li p 1 = '6' !t wr F6   vsam   fr 2
```

Restore Just One File

```
rd TAPE10   recfm v    nordw    blksize=32760
if p 1 lt '3'  !t goto get    * GET is implicit label - 1st ctl stmt.
if p 1 gt '3'  !t eoj         * Force eoj when finished with file 3.
lrecl = L-1
write F3   esds   fr 2
```

Example 9 - RECFM=V from Card

A card file consists of variable length data with an unspecified number of **leading** and **trailing** blanks on each record (card). Records with an **asterisk** in position 1 of the record are to be ignored.

It is required to set up a disk file of variable length format, blocked to 4096 bytes, with all leading and trailing blanks removed.

We will use **TRUNC** to eliminate **trailing** blanks, and use a **range test** to set the @ pointer to the 1st non-blank, writing our record from there.

Note that **LRECL=80** on the **WRITE** statement for a **RECFM=V** output file will define the **maximum** value which is **allowed** for that file, not the absolute length to be used for that particular WRITE statement.

```
  READ CARD   W 1000
  IF P 1 = '*'                      * If comment card.
    THEN GOTO GET                   * Bypass it.
  IF P 1,80 NE ' '                  * Scan for 1st non-blank.
    THEN WRITE DISKOUT  FROM @   RECFM=VB  LRECL=80 BLKSIZE=4096  TRUNC
                                    * Rec not written if all blanks.
  END
       CARD1
2ND DATA CARD - TRAILING BLANKS ONLY
*...,....1....,....2....,....3....,.          (Comment card)
           THIRD ** ** LEADING BLANKS TOO
*          ....,....1....,....2....,....3     (Comment card)
     4TH etc.
```

The above control cards will produce a single disk block, consisting of the four records which were read off card.
Data lengths are 5, 36, 30 and 8, but the record lengths on disk will be
9, 40, 34 and 12 respectively.
This is because **four bytes** will be prefixed to the data for the variable length **Record Descriptor Word**, required by the data management routines for **RECFM=V**. The block will also have a **4-byte** descriptor word at the front making the total block length 99 bytes.

Alternative Technique

To create variable length records of any size we will use reserve the first 4 bytes of the input record for a 3 byte number followed by a 1 byte code which is blank or "W".

If the code is blank, the 3 byte number indicates the position into which the data from this input record is to be stored, and no output is to take place.

If the code is "W", output is to take place immediately using the 3 byte number as the length of the new record. Data used is to be whatever is stored in the work area at the time.

For convenience, if position 1 is "*" we will treat the input record as comment and ignore it.

```
  EQU INREC     3001
  RD CARD   W 3080      INTO INREC
  IF P INREC = '*'    !T GG          * THEN GOTO GET - Ignore it.

  LRECL=3 FROM INREC   TY C          * Set length of current rec.
  IF P INREC+3 = 'W'
    THEN DISKOUT   RECFM=V   B=4096
    ELSE MOVE 50  FR INREC+4  TO L   * 'L' is pos in work area
                                   * set by LRECL command above.
  END
* Start of data for generating Var Length File.
001 This data will be moved to POS 1 of work area
051 and this will fill positions 51 to 100
101 and so on for positions 101 to 150
148W --- Cause record to be written, Length 148 + 4 (for RDW) = 152.
042W --- Write another - same data - but shorter.
087 This data used to modify 50 bytes, starting at POS 87.
137W --- Record will be written length 141
137W --- Write this one twice.
```

POS 1 of the Workarea becomes **POS 5** of the resulting output record because a 4-byte RDW (Record Descriptor Word) is automatically generated for the variable length record to indicate its length.

Example 10 - Compare 2 Files

This example is **included on the Distribution Tape** in machine readable form, and will have been made available for SELCOPY users by your Technical Representative who installed the product.

It not only illustrates use of SELCOPY, it is a **Utility Program** in itself.

Two input files are compared, record by record, and the first **nnn** records with differences are processed by **LOOP-CHAR**, which generates asterisks, printed underneath every position in the record where a difference occurs.

```
            74P97YVH4B43P7Z4XG973498Y14TUX35498H43QUOCQB9TCM#TV0XU1XN1CBV317B
            74P97YVH4B43P724XG973498Y14TUX35498H43QUOCQB9TCM#TVOXU1XN1CBV317B
                        *                                   *

                This gives a VERY CLEAR DEF1NITI0N of sma11 differences
                This gives a VERY CLEAR DEFINITION of small differences.
                                        *    *       **           *
```

The compare length may be set at a fixed absolute length using an EQUated name, **LLL**, at the beginning of the SELCOPY control statements. Alternatively **LLL** may be set to the keyword **LRECL**, meaning use the actual record length of each record pair compared. **LLL** is often useful to restrict the compare to 72 bytes for example, ignoring seq nos.

Similarly, the number of record differences tolerated is controllable using the EQUated name, **DIFFMAX**. Having discovered say 20 records that differ, why waste time churning through the whole file ?

For **CMS** users, these EQU values may be supplied as parameters **&LLL** and **&STOP** to the EXEC procedure.
MVS and **VSE** users should edit the EQU cards as required. i.e. use a decimal number or **LRECL** instead of &LLL, and a decimal number instead &STOP.
Also delete the word **&STACK**, and remove the **&BEGSTACK** line. (However, if left there, &BEGSTACK is treated as a label and ignored.)

It is assumed that record lengths will not exceed 64K bytes. Any **RECFM**, record format, and any file type is allowed. e.g. A **VSAM** may be compared with a **CMS** file, but you would have to change the input control statement to indicate VSAM.

If input records are of different lengths, the shorter of the two is padded with blanks. Thus a variable length record, length 1, containing a blank, is considered **equal** to a fixed length record length 1234 which is all blank.

User's Own Control Routine to Vet Differences

The machine readable copy of **SELCCOMP** provided on the Distribution Tape has been updated to **LEVEL=025**, providing **far greater flexibility**.

Relatively small changes have enormously increased its usefulness. Briefly, code has been added to allow the user to supply a **personalised Control File** of SELCOPY statements which govern how differences are treated.

The Control File simply returns with an action code set to **BYPASS1, BYPASS2, ACCEPT, RETRY** or **DIFF**, after making its own adjustments to the records being compared.

Just think how often comparisons must be aborted due to 1 extra blank record.

This is no longer a problem. Indeed, much more complicated **acceptable** differences can be easily eradicated, resulting in:

```
=== EQUAL COMPARE ===
```

together with a summary of how many records were bypassed etc.

The input record data starts at POS REC1 and POS REC2, so take care to **avoid** checking **POS 6** instead of **POS REC1+5**.

The **@ pointer** is also set to the position in **rec1** of the 1st difference encountered. Use **POS @-rec1+rec2** to refer to the same position in **rec2**.

A sample user's control file called **DEMO** follows:

```
* DEMO SELCCOMP H *    LEVEL 001 +++ 87/10/27 02:00:06

demo
  if p rec1+3 = ' '             !t p action = bypass1  !t ret
  if p rec2+3 = ' '             !t p action = bypass2  !t ret
  if p rec1 '*' !a p rec2 '*'   !t p action = accept   !t ret
  if p rec2,rec2+80 = 'X28 '    !t p action = bypass2  !t ret
  if p rec2+47 = x'0000,000f'
   t p rec2+50 = x'0d'          !t p action = retry    !t ret
==ret==
```

Limitations

The standard SELCOPY print width of 100 bytes of record data makes it less readable for records longer than 100, which take more than 1 line.
Extra code is required in such cases, (not included), for highlighting the differences by printing the first 100 bytes from each file plus the third line for highlights, followed by positions 101-200 of of each file plus differences, etc.

SELCOPY Control Cards used by SELCCOMP

Don't be put off by the fact that the file on the Distribution Tape has the SELCOPY code wrapped up in CMS control cards. It is very easy to **knock out the CMS code**, and then run it under **VSE** or **MVS**.

At the time of compiling this manual, the version supplied on your Distribution Tape is as follows:

```
&TRACE
***** SELCCOMP EXEC ***** (Example 10) LEVEL 038 +++ 97/02/28 15:48:36
*           Copyright: Compute (Bridgend) Ltd, 1985 --> 1993.

*     Compare 2 files.          ** Highlighting Differences **
*                                      _____________________
*                                     |                     |
*             SELCOPY ctl stmts for:  | VSE, MVS and CMS    |
*                                     |_____________________|

*                 (See SELCOPY manual under "Example 10" for discussion)
```

```
*                                    (See EOF for CBL update history)

*     ___________________                                              ***
*    |                   |
*    |     For CMS       |
*    |___________________|

* SELCCOMP
*    &1 &2 &3    &4 &5 &6      &7        &8            &9          &10
*    In file1    In file2    Compare   STOPAFT      Fname of    The LRECL
*                            Length    for diffs    Ctl File     of blkd
*                                                     File         CMS
*                                                  Ft=SELCCOMP    input.
*                                                    Fm = *
*                                                  (or 0 for
*                                                  no Ctl file)

*      Output:       TERMinal          (1st  4 diffs)
*                "SELCCOMP LISTING P"  (1st &8 diffs)

*               Plus files you may write in the SELCCOMP Control File.


********************** USE OF &9 SELCCOMP ***************************
*                                                                     *
*    &9 SELCCOMP *    is a CMS file consisting of SELCOPY statements
*                     which gets included as part of the SELCOPY
*                    control statements.  You may have different Control
*                   files for different compare operations, each with
*                  its own unique tolerances.
*                Every time a difference is found, control is passed
*             to the SELCCOMP control file, allowing checking to be done.
*    SELCSKEL SELCCOMP H   is a skeleton    Ctl File. (supplied on tape)
*    SS800700 SELCCOMP H   is a sample User Ctl File. (supplied on tape)

*    POS REC1    refers to the start of the current record from File 1.
*                You may then reference POS REC1+28 etc as reqd.
*    POS REC2    refers to the start of the current record from File 2.
*    POS @       refers to the 1st byte in REC1 different from REC2.

**   POS ACTION  will originally contain:
*                DIFF    -  records are different. Flagging will occur.

*    POS ACTION  may be modified to:
*                ACCEPT  -  treat the records as equal.
*                BYPASS1 -  read file 1, and retry comparison.
*                BYPASS2 -  read file 2, and retry comparison.
*                RETRY   -  try comparison again (after your changes)
*                DIFF    -  if left unchanged, differences are reported.
** For Example:

*    XXXXXX   * Don't forget the mandatory label, naming your rtn *
*      if  p rec1 = ' '
*      and p rec1+1 = p rec1 len 100
*        then p action = BYPASS1   !then ret    * bypass blank lines.

*      if  p rec1+7 = p rec2+7  len 73
*        then p action = ACCEPT                 * accept this diff.

*      RET    * Don't forget the mandatory RETURN *

* ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** *

*     _________________________                                        ***
*    |                         |
*    |     For DOS and OS      |
*    |_________________________|

* Delete all CMS commands from   "CMS code1"   to  "CMS code end1"

* Modify  "&BEGSTACK" to " "
* Modify  "&STACK"    to " "
* Modify  "&LLL" and "&STOP" to reqd numeric values.
* Delete  "&INDD1" and "&INDD2"  EQU statements.

* Note that CMS code also occurs at the end of this file.

* Delete all CMS commands from   "CMS code2"   to   End of File.



****************************** CMS code1 ********************************
SET CMSTYPE HT

     ** Check existence of both input files **
&IF &INDEX LT 6  &EXIT 66666
&IF &4 EQ =   &4 = &1
&IF &5 EQ =   &5 = &2
&IF &6 EQ =   &6 = &3
STATE &1 &2 &3
&IF &RETCODE NE 0    &EXIT &RETCODE
STATE &4 &5 &6
&IF &RETCODE NE 0    &EXIT &RETCODE

     ** Length for the data compare - default whole record **
```

```
&LLL = LRECL
&IF &INDEX GT 6  &LLL = &7

     ** Stop after so many differences **
&STOP = 20
&IF &INDEX GT 7  &STOP = &8

     ** User's Control File **
                      &PARAM9 = DUMMYRTN
&IF &INDEX  GT 8      &PARAM9 = &9
&IF &PARAM9 EQ 0      &PARAM9 = DUMMYRTN
&IF &PARAM9 EQ DUMMYRTN  &GOTO -P9DUN

MAKEBUF
LIST &9 SELCCOMP * (STACK
&IF &RETCODE NE 0    &EXIT &RETCODE
&READ VARS &PARAM9 &FT9 &FM9
DROPBUF
-P9DUN

     ** LRECL for blocked CMS input files **
        * Use PASS=X as dummy param if not reqd.
              &LVAL = PASS=X
&IF &INDEX GT 9  &LRECL = LRECL
&IF &INDEX GT 9  &LVAL  = &10


VMFCLEAR    - Clear Screen -
SET CMSTYPE RT
&TYPE SELCOPY - Compare files ...... &1 &2 &3 ...... &4 &5 &6
&TYPE ** ** Compare Length = &LLL ....... STOPAFT = &STOP diffs.
&IF &PARAM9 NE DUMMYRTN  &TYPE ** ** Using &PARAM9 &FT9 &FM9 ctl file.
&IF &PARAM9 EQ DUMMYRTN  &TYPE ** ** NO user written ctl file in effect.
SET CMSTYPE HT
MAKEBUF
** ** ** ** ** ** ** ** ** * CMS code end1 ** ** ** ** ** ** ** ** ** **

******************** SELCOPY Control Statements ***********************

&STACK  EQU INDD1      ' &1 &2 &3 '    * Input file 1.
&STACK  EQU INDD2      ' &4 &5 &6 '    * Input file 2.
&STACK  EQU GEOMINFO     &LRECL &LVAL  * Geometry info for input files.
&STACK  EQU LLL          &LLL      * The length reqd to be compared.
&STACK  EQU DIFFMAX      &STOP     * STOPAFT for differences.
&STACK  EQU USERRTN      &PARAM9   * The User's Routine or DUMMYRTN.

&BEGSTACK -EOS
  nop      ** SELCCOMP EXEC **
equ recerr     001 * 2 byte packed dec - Total Records Different.
equ byterr     003 * 4 byte packed dec - Total Bytes   Different.
equ eqtot      007 * 4 byte packed dec - Total Records EQUAL.
equ keeptot    011 * 2 byte packed dec - Total Records ACCEPTed.
equ retrytot   013 * 2 byte packed dec - Total Records RETRY'd.
equ byp1tot    015 * 2 byte packed dec - Total Records BYPASS1.
equ byp2tot    017 * 2 byte packed dec - Total Records BYPASS2.

equ 1st-diff   019 * 4 byte store of UXATPTR - 1st difference in REC1.
equ action     023 * 8 byte store of User Routine's action code.
equ flags      101 * Flag Line, len 100, with Asterisks for diffs.

equ rec1      1001 * Record data from File 1.  lmax 66000
equ rec2     67001 * Record data from File 2.  lmax 66000



  option   w=133000  *** Huge work area allows comparison of CMS module
                       * files with enormous lrecl values.
                       * Comparison will be over full record length.
  pos recerr x'000C' stopaft=1   * Initialise Rec Error count. (Once)
  p   eqtot  x'0000 000c'  s=1   * and Rec Eqality Total.
  p   byterr x'0000 000c'  s=1   * and Byte Error Count.
  p  keeptot x'000c'       s=1   * and ACCEPT Count.
  p retrytot x'000c'       s=1   * and ACCEPT Count.
  p  byp1tot x'000c'       s=1   * and BYPASS1 Count.
  p  byp2tot x'000c'       s=1   * and BYPASS2 Count.

==userbyp1==    * User wishes to bypass File 1 record.
  read indd1  into rec1   geominfo    * GEOMINFO for LRECL=n RECFM=xx
                                      * Only needed for DOS or VSE.
  if eof indd1   !then goto eoindd1
  @l en1 = lrecl                * Store LRECL of this rec in a user
 tr.

  if p action = bypass1  !t goto userretry

==userbyp2==    * User wishes to bypass File 2 record *
  read indd2 geominfo   into rec2      * GEOMINFO FOR LRECL=n RECFM=xx
                                       * GEOMINFO only needed for DOS.
  if eof indd2   !then goto eoindd2
  @l en2 = lrecl                  * Store LRECL of File 2 record.

      @l max = @l en2              * Assume rec from File2 is larger.
  if  @l en2 < @l en1              * If 2nd record is smaller..
    t lrecl = @l en1              * Use larger LRECL (File 1).
    t @l max = @l en1              * Use larger LRECL (File 1).
```

```
  if @l en1 < LLL                * If LEN2 smaller than LLL.
    t p rec1+ @l en1,rec1+LLL-1 = ' '  * Blank out rec2 up to length LLL.
  if @l en2 < LLL                * If LEN2 smaller than LLL.
    t p rec2+ @l en2,rec2+LLL-1 = ' '  * Blank out rec2 up to length LLL.

==userretry==  * User wishes to retry comparison after user mods made *
  p action = 'DIFF    '
                                                 * * * *** * * *
  if   p rec1  =  p rec2    len LLL       * * *   The big  IF   * * *
                                                 * * * * * * * *

==useraccept==  * User wishes to accept diffs without flagging them *
    t add 1   to 4 at eqtot          * Increment Equality Total.
    then goto get                    * If both records compare OK,
                                     * then back to the first READ.



*= = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =*
** ONLY drop through to this code for records with DIFFERENCES ***
*= = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =*

  @  = diff     * Initialise to 1st byte different in rec 1.
  move 4   fr uxatptr   to 1st-diff        * Save @  ptr for use later.

     * * * *
  do userrtn    *** USERRTN is EQUated, either to the User's Rtn, or
     * * * *      * to DUMMYRTN which does nothing, just returns.

  if p action = diff                !t dummy * for efficiency
  li p action = retry
     t add 1 to 2 at retrytot s=999  !t goto userretry
  li p action = accept
     t add 1 to 2 at keeptot  s=999  !t goto useraccept
  li p action = bypass1
     t add 1 to 2 at byp1tot  s=999  !t goto userbyp1
  li p action = bypass2
     t add 1 to 2 at byp2tot  s=999  !t goto userbyp2
  l  log '--- Unrecognised ACTION set by UserRtn in SELCCOMP ---'
     t goto cancel

** Difference must be reported ***
  add 1    to 2 at recerr           * Increment error count.
  line=1  stopaft=1                 * Top of page for print output.
        * But we will restrict this report to just 1 line, 100 bytes.
  if @l en1 < 100 !t @l p1 = @l en1 !l @l p1 = 100    * Set print length.
  lrecl = @l en1                        * To get correct len on listing.
  print  fr rec1  type=m    l @l p1  * Print the line from File 1.
  log    fr rec1 l=59  ty c   s 4   * Log only 1st 4 differences.
       * Must log TY=C to convert unprintables into full-stops,
       * and TY=C only allows room for 59 bytes of data on the screen.
  if @l en2 < 100 !t @l p2 = @l en2 !l @l p2 = 100    * Set print length.
  lrecl = @l en2                        * To get correct len on listing.
  print  fr rec2 type=m     l @l p2  * Print the line from File 2.
  log    fr rec2 l 59  ty c   s 4   * Log 1st 4 differences.

** Now underline with asterisk every byte that differs ***
        * Length to be checked must be LLL to keep diffs byte count.
        * Length to be asterisked is restricted to 100 bytes.
  p flags len 100  = ' '  * Clear flag line.
  @  = rec2-1             * Initialise @  Pointer just in front of REC2.
  lrecl = @l max          * Needed when LLL is equated to LRECL.

==loop-char==
  if p @+1 ,rec2+LLL-1  ge   x'00'    * Next character of record.
    thenif   p @   ne   p @- rec2+rec1    len 1
        then do flagit                * Flag it as different.
        then goto loop-char
        else goto loop-char

** Print Flag Line **
  if p flags len 100   =  ' '    * If flag line was not set.
    t p flags = '1ST DIFF ENCOUNTERED AT ... POS=nnnnn OF RECORD.'
              * ....,....1....,....2....,....3....,..
    t @  = rec1-1
    t sub 4 at uxatptr   fr 4 at 1st-diff   type b    * Binary subtract.
    t cvbc  4 at 1st-diff    to 5 at flags+32         * Binary --> Char.
  pr  fr flags   l 100              * Print the flag line.
  log fr flags   l 59  ty c  s 4    * Log the flag line.
  log ' '   s 4             * Blank line to separate diffs.
  space 1                   * Blank line on printer.
  goto get   stopaft=diffmax        * After highlighting differences.
           * Drop through on reaching DIFFMAX, the Error count limit,
  goto eofboth          * Terminate further checking.

==flagit==  * Sub-rtn *
  add 1   to 4 at byterr       * Must add 1 to Byte Err count.
  if   @  < rec2+100            * If within 1st 100 bytes of REC2.
    then p @- rec2+flags = '*'  * Flag it as different.
==ret==


==eoindd1==     * This is the EOF we expect to arrive at first.
  read indd2    into rec2           * Should get EOF on this one too.
```

```
  if eof indd2  !t goto eofboth  !l pr 'EXTRA RECS ON INDD2'
  add 1    to 2 at recerr             * Increment error count.
  goto eofboth


==eoindd2==     * Should never get here if files match.
  print 'EXTRA RECS ON INDD1'
  add 1    to 2 at recerr             * Increment error count.


==eofboth===
  p rec1,rec1+99 = ' '                * Blank out 100 bytes
  p rec1    = 'ACCEPT: nnn RECS  RETRY: nnn RECS    BYP'
              *  ....,....1....,....2....,....3....,....4
  p rec1+40 = 'ASS1: nnn RECS  BYPASS2: nnn RECS'
              *  ....,....5....,....6....,....7...

  if p keeptot  ne x'000C'
  or p retrytot ne x'000C'
  or p byp1tot  ne x'000C'
  or p byp2tot  ne x'000C'
     t cvpc 2 at keeptot  to rec1+08 format 999
     t cvpc 2 at retrytot to rec1+25 format 999
     t cvpc 2 at byp1tot  to rec1+46 format 999
     t cvpc 2 at byp2tot  to rec1+65 format 999
     t pr   l 75   fr rec1
     t log  l 75   fr rec1
                              **
  p rec1,rec1+99 = ' '                * Blank out 100 bytes
  p rec1 =  'DIFF:   nnn RECS  (nnnnn BYTES )    z,zzz,nnn RECS EQUAL'
           * ....,....1....,....2....,....3....,....4....,....5....,..
  p rec1+50 ' EQUAL    ( OFz,zzz,nnn )'
  cvpc 4 at eqtot   to rec1+36   format 'Z,ZZZ,999'
  cvbc 4 at uxincnt to rec1+64   format 'Z,ZZZ,999'

  if pos recerr = x'000C'
    t p rec1  =   ' == == == FILES MATCH == == == '

    else cvpc 2 at recerr  to rec1+8  format 999
    t    cvpc 4 at byterr  to rec1+19 format zz999
    t    retcode = 777              * Pass return code to user.

  pr   l 75   fr rec1
  log  l 75   fr rec1
  eoj                            ** Cause end of job **

dummyrtn  * Invoked if UserRtn is not used.
==ret==   * It does nothing - just returns.

******** End of SELCOPY Ctl Stmts, apart from optional User Rtn ********

* If User's own special Routine is required, it should go HERE.
* (For CMS users, it is automatically inserted with code below.)

* Your rtn must have its own name as a label on the 1st record.
* Your rtn must end with a RETURN statement.



****************************** CMS code2 ******************************
         **** Non CMS users should delete to CMS code end2 ****
-EOS
&IF &INDEX LT 9  &GOTO -ENDSELC
&IF &PARAM9 EQ DUMMYRTN   &GOTO -ENDSELC
   EXECIO * DISKR &PARAM9 &FT9 &FM9 (FINIS FIFO
   &IF &RETCODE EQ 0  &GOTO -ENDSELC
      DROPBUF
      &EXIT &RETCODE
-ENDSELC &END
&STACK

EXEC SELC &0
&SRC = &RETCODE
DROPBUF
&EXIT &SRC

************************** CMS code end2 ******************************

* 97/02/28 L=038 - FILE1 short rec residue prob fixed - jge
* 96/10/22 L=037 - Remove '1ST DIFF ENC.. ' bug - nbj
* 95/04/05 L=036 - POS DIFF used plus minor mods - jge
* 93/02/13 L=035 - rec 290 bug fixed - p1,p2 treated as range test - djh
* 92/01/27 L=034 - remove len 256 restrictn - djh -
* 90/10/19 L=033 - correct ERROR 031 - djh -
* 90/09/08 L=032 - support CMS blocked with &10 - djh -
* 90/05/31 L=031 - @  ptr set for User Rtn - djh -
* 89/10/20 L=030 - FI to FILEDEF,  CLS to VMFCLEAR.
* 88/06/21 L=029 - ?
* 88/01/21 L=027 - minor cosmetics - djh - (used in Rel 8 Manual)
* 87/12/08 L=026 - minor changes - djh -
* 87/10/27 L=025 - used in Rel 8.01 Distribution Tape.
* 85/07/04 L=012 - used in Rel 6 SELCOPY Manual.
```

MESSAGES

Copies of this section and of the **Control Statements Summary** are available in **machine readable** format on the product distribution master.

CONTROL CARD Errors

The following Errors can occur during processing of the **Control Cards**.

Once **10 errors** have been detected and reported, processing of **Control Cards** is discontinued and the input stream flushed.

Console Message

Unless inhibited by the **CBLNAME** option, details of the **first** error encountered are displayed on the Operator's console, or user's terminal in a **CMS** environment, in the following format:

```
SELCOPY REL 8.03  PARAM CARD ERROR 007 JOBNAME=job-name 23.39 MON 08 FEB 88
```

Return Code

Under **MVS, CMS** and most **VSE** systems the Return Code is then set to 52, and passed back to the Control Program. Subsequent action will depend on the conditional JCL used, e.g. the **COND** parameter of the next **EXEC** card for MVS, **ON** statement for VSE, and **&IF** statement for CMS.

001 - UNSUPPORTED FOR THIS PLATFORM
A control word or parameter has been encountered which is valid on versions of SELCOPY for other platforms, but not on this one. Normally, such occurrences are tolerated and silently ignored. However, in this case, logic problems may arise which will need attention. e.g.
Use of: EOL='string' on SELCOPY for the IBM mainframe.
Use of: EXIT modname when not on an IBM mainframe.

002 - Pgm Logic Conflict - Ring CBL

003 - RESRVD

**004 - * * * * JOB ABNORMALLY TERMINATED * * * *
This is always preceded by at least one other error message.

005 - PARAM ARGUMENT REQD
Check your keyword parameters for missing arguments. Could SELCOPY have processed the argument you supplied as another keyword?

006 - INVALID PAGE GEOMETRY
The geometry specified for printer output is not within reasonable limits. **PAGEDEPTH=10** is minimum page depth.

007 - INVALID NUMERIC PARAM
A numeric parameter was expected. May be missing non-numeric or may exceed 2,129,999,999. Action: If the reason for the error is not obvious, eliminate abbreviations, use EQ instead of = (or nothing) for the comparison operator.

008 - UNSUPPORTED IF TYPE
An **IF** requires a **POS/INCOUNT/EOF/LINE/RETCODE** parameter.

009 - POS/LEN/REC/STEP=0 HAS NO MEANING

010 - NO CONDITION PARAMETER
An argument for a comparison operator, possibly a default equality test, is expected but not found. Action: as Error 7.

011 - NO STRING ARGUMENT FOUND
Action: as Error 7.

012 - STRING EXCEEDS MAX LENGTH

013 - FILE NAME NOT RECOGNISED
Possibly mis-spelling on an **IF EOF fname** or **IF INCOUNT fname.** Try it with **"IF EOF FILE=FILENAME".**
Or use of a **Reserved Word** as a label. e.g. **ELSE.**

014 - NO INPUT FILE
See also:

OPTION in section *Operation Words, Parameters and Keywords*. **SCardIn=SYSIPT** description in the **CBLNAME** macro.

The OPTION statement may be used for processing without an input file.
Note that **VSE** procedures must be cataloged with **DATA=YES** to allow **SYSIPT** input.

015 - NO THEN FOR ABOVE IF
If it's only the **ELSE** part you require, use **"THEN DUMMY"** first.

016 - END CARD REQD FOR CARD INPUT
This is to separate your control cards from your card input data.

017 - UNSUPPORTED SEQUENCE OF STATEMENTS
See also: Section *Operation Words, Parameters and Keywords*.

018 - UNSUPPORTED GOTO
See also: Section *Control Statement Syntax Summary*.

019 - JCL FOUND BEFORE /* ON SYSIPT
SELCOPY control cards do not start with '// ' in positions 1-3. This could well be JCL for the next job, hence the error message.

020 - POS/LRECL/FROM/INTO EXCEEDS WORKLEN
For some reason, the WORKLEN parameter used is too small. e.g. if **WORKLEN=190** is used, then POS 200 cannot be tested. If **READ INTO=n** is used, a WORKLEN is reqd.

On certain input files, such as **VSAM and ISAM**, **most CMS** files, and **most MVS** files, SELCOPY is able to obtain the record length, (or at least the maximum), immediately after opening the file.
In such cases, if the record length, plus any value coded for the **INTO** parameter, exceeds the length requested for the work area, then ERROR 20 is issued.

VSE users reading sequential files cannot have this check made during control card processing, and must therefore run the risk of ERROR 546 at execution time.
However, if the INTO parameter is not used, records too large are processed in the **I/O** buffer instead of in the Work Area. But please note that this **could cause problems** if the user sets a switch in what is considered to be the Work Area, but in reality is only an I/O buffer which gets totally lost when the next record is read. So do not be too mean with WORKLEN.

Note that **DIRECTORY** input is assumed to have a maximum LRECL of 256, and any value supplied by the operating system is ignored, thereby overcoming the problem of Load Libraries which have enormous LRECL values defined for member data. Thus for DIR input, if WORKLEN is used, it must exceed 256.

021 - LOWEST LINE/INCOUNT=1, RETCD=0
Testing for **LINE** and **INCOUNT** cannot be less than 1. However, testing for **RETCODE=0** is permitted.

022 - TYPE PARAMETER NOT RECOGNISED
See also: **TYPE** TYPE=x (for Data) and TYPE=x (for Printing) in section *Operation Words, Parameters and Keywords*.

023 - CHECK SYSIN/SYSIPT
Occurs **for VSE** if SELCOPY cancels with SYSIPT still assigned to disk or tape, not the card reader.

Occurs **for MVS** if DD card for SYSIN is missing or if LRECL for SYSIN exceeds 80.

024 - RESRVD

025 - TAPE CONTROL NOT RECOGNISED
Occurs on OPEN and CLOSE parameters for controlling Rewind etc.

026 - INPUT/OUTPUT CONFLICT
The same name for an input and output file is only allowed for UPDATE.

027 - UNSUPPORTED STRING NOTATION
You could have a quote missing, or an invalid hex character in a hex string. e.g. letter O instead of zero. Blanks and commas are allowed in hex strings, and ignored.

028 - BLKSIZE EXCEEDS MAX FOR OUTPUT DEVICE
The BLKSIZE value may be influenced by a variety of influencing factors. See also: BLKSIZE=n (for Input) in section *Operation Words, Parameters and Keywords*.

029 - RESRVD

030 - FNAME OR DSN TOO LONG OR MISSING
When the DSN parameter is used on a READ or WRITE statement, and a filename is also coded, the DSN argument is used as the physical fileid, and the filename is used for later reference to that DSN. e.g.

```
READ INFIL DSN=C:\PATH\DIR\ETC\ABCDEFGH.XYZ
IF  EOF INFIL
  THEN DO TOT_RTN
```

The "Filename", as opposed to the "DataSetName", is restricted to 8 bytes. For VSE systems, it is restricted to 7 bytes. Note that "Filename" in this context is a logical entity allowing the user to refer easily to a physical file, whose name may not even be known at Control Card time. e.g.

```
READ  INFIL  DSN = 44 AT 1001
```

The DSN, "DataSetName", provides the real name of a physical file held on your machine, and is restricted by SELCOPY to 255 bytes, as well as being restricted by your machine's architecture.

031 - EQU STMT ARG MISSING/INVAL
The EQU statement must have at least 2 words following it. The first is equated to all the rest. Similarly, the EQU name may not be repeated as one of the substitution arguments. (e.g. EQU AA2 XXX AA2).

032 - UNSUPPORTED LRECL PARAM

033 - LABEL MAY ONLY BE STD/NO
This refers to LABEL as a parameter for a VSE tape file.

034 - PCB NOT FOUND FOR IMS/DL1
See also: **Error 534** in section SELECT TIME Errors. Section *IMS and DL/1 Processing*.

An IMS/DL1 file is to be processed, but the DB name given on the SELCOPY control card (READ or ISRT etc) was not found in the list of PCB's passed to SELCOPY by IMS/DL1.

035 - JECL COMMAND INVALID (VSE only)
See also: FILE=JECL in section *Operation Words, Parameters and Keywords*. **Error 535** in section SELECT TIME Errors.

An invalid JECL command for **VSE POWER** has been detected by SELCOPY and therefore not issued to POWER.

036 - FILE=SUSP MUST HAVE FILE=START ELSEWHERE

037 - ONLY ONE FILE=START IN MULTIPLE THEN CLAUSE

038 - UNSUPPORTED DEV FOR CKPT OR ISAM

039 - ONLY ONE CKPT FILE SUPPORTED

040 - DL1 SEG/FLD GT 8 OR INVAL
DL1/IMS Segment Names and Field Names may not exceed 8 alphanumeric characters, and the first must be alpha.

041 - UNRECOGNISED DEV PARAM

042 - I/O LIT MUST BE IN QUOTES / FROM MISSING
It is mandatory to enclose literals in quotes if they are to be written to a file, even if they have no blanks or commas etc. Otherwise bad spelling of a legal parameter could be processed as a literal.

A missing **FROM** parameter can also cause this message.

043 - PARTITION TOO SMALL
In a virtual environment, check your SIZE parameter. Check BLKSIZE and WORKLEN parameters used. Progressively simplify your run until you isolate the problem.

044 - NULL STRINGS NOT SUPPORTED

045 - UNRECOGNISED PARAMETER
The offending data will be underlined with asterisks. Note that the cause could involve the preceding parameter which may have taken the next parameter keyword as its argument.

046 - FILL CHAR MUST BE LENGTH 1

047 - ISAM/VSAM START KEY NOT FOUND
The generic key requested on a START parameter was not found in the FILE mentioned. Check your key data, length etc.

048 - RESRVD

049 - N AT P OR POS PARAM REQD

050 - F=START INVAL WITH READ INTO

051 - TO/AT PARAM REQD

052 - FROM/AT PARAM REQD

053 - FIELD EXCEEDS RECORD LIMIT

054 - RESRVD

055 - VSAM START KEY TOO HIGH

056 - FAIL PARAM NOT RECOGNISED

057 - EXIT PHASE GT STATED SIZE
If no SIZE parameter were given, default storage allocated for a User Exit is 2048 bytes.

058 - RESRVD

059 - FORMAT / INTO / N AT P REQD
On a **CVxx** statement, the destination length could not be established.

060 - UNSUPPORTED FORMAT TYPE

061 - RESRVD

062 - UNPK/CVB EXCEEDS 8 BYTES

063 - KEYPOS PARAM REQD

064 - NO KEYLEN PARAM FOR ISAM OUTPUT

065 - ILLEGAL KEY LENGTH

066 - WORKLEN NOT GT LRECL
Note that the LRECL used for this comparison is obtained from the system at OPEN time. In the case of VSAM, it is the **defined maximum** which is held in the catalog entry. (Defined by the user with **IDCAMS.)** This value may in fact be larger than the largest record currently held on the file.

Note that **DIRECTORY** input is assumed to have a maximum LRECL of 256, and any value supplied by the operating system is ignored, thereby overcoming the problem of Load Libraries which have enormous LRECL values defined for member data. Thus for DIR input, if WORKLEN is used, it must exceed 256.

067 - EOF CHARS MUST BE LENGTH 2
This applies to VSE users only, when using the EOF statement (not parameter) to change End-of-file indication to their own chosed 2 characters. Remember you also need a "Programmer Logical Unit" for this facility. (SYSnnn).

068 - @ NOTATION MUST BE PRECEDED BY RANGE TEST

069 - LENGTH PARAM REQD
Data v Data comparison has no default length. **L, LEN,** or **LENGTH=n** must be supplied.

This error can also be given on a DL1/IMS statement which has a qualifier using a field-value held in the work area at the POS indicated.

070 - FIXED BINARY DATA LENGTH EXCEEDS 4

071 - F=filename - OPEN FAILURE - CHECK DD/DLBL
Often due to bad spelling, or DD/DLBL card missing altogether. A **DD card** is required for both **SYSIN** and **SYSPRINT**, as well as for each file processed.

072 - DDNAME EXISTS WITH DIFF DSN

073 - DYN DSN OR DB2 TABNAME UNRESOLVED
The positions referenced by the DSN= for Dynamic Allocation, or TAB= for DB2 processing, is invalid.

074 - RANGE NOT ASCENDING (SEE REV PARAM FOR REVERSE SCANS)
If a backward scan is required, use the REVERSE parameter. e.g.

```
IF POS 20,80 = '/' REVERSE   * Scan backwards from 80 to 20.
```

075 - UNSUPPORTED LENGTH PARAM
The argument to LENGTH must be numeric. You can't use any of the special Positional Keywords.

076 - IMS/DL1 SEG GT WORKLEN
Length of segment exceeds WORKLEN, or exceeds the default IMS/DL1 buffer size of 8192 if no workarea specified.

077 - VSAM OPEN FAILURE
See also: Section *VSAM Files*.

The most common cause for this problem is bad spelling of dataset name (VSAM Error 128) or Catalog name (VSAM Error 180), or the required JCL was missing altogether (DD or DLBL card).

Also caused by trying to read a **VSAM Managed SAM** file as VSAM.

078 - AT PARAM REQD

079 - UNKNOWN DATA TYPE

080 - ARITH/CONV LENGTH EXCEEDED
See also: ADD=n, SUB=n and CVxx=n Conversion Synonyms in section *Operation Words, Parameters and Keywords*.

Examples of this are:
Binary field greater than 4
Packed Decimal GT 16 (8 in certain cases),
Character Numeric GT 256.

081 - BY PARAM REQD
on a DIV statement. (Divide).

082 - DUPLICATE LABEL/EQU
Also get ERROR 082 if an EQUated name is used as a label, and vice versa.

083 - UNRECOGNISED FAIL PARAM

084 - UNSUPPORTED RECFM PARAM

085 - DESTINATION LENGTH TOO SMALL
See also: MULT=n and DIV=n in section *Operation Words, Parameters and Keywords*.

This can occur on a **MULT** or **DIV** statement. Note that absence of this error message at Control Card interpretation time does not guarantee that the destination field is large enough. SELCOPY at that time does not know the number of leading zeros contained in the source fields.

086 - CAT MUST FOLLOW READ CARD

087 - CAT FILENAME CAN ONLY BE USED ONCE

088 - PASSWORD ARGUMENT MISSING

089 - RESRVD

090 - RESRVD

091 - CMS FILE NAME INVALID

092 - CMS DISK NOT ACCESSED

093 - CMS ENV REQD
The commands **CMS, CP** and **STACK** are for use in the **CMS environment** only.

094 - RANGE REQD
The **GEN** statement requires a **RANGE** parameter to define the limits of the values for random data generation. It is either missing or invalid.

095 - COMMAND MISSING FOR JECL/CMS/CP/STACK/DB2
The commands **CMS, CP** and **STACK,** for use in a CMS environment, must have an argument which defines the CMS or CP command or the data to be STACKed. The same is true for the **DB2** command in an MVS environment. The command needs to be in quotes, or use **FROM=n AT p** when a position in the workarea is required.
The **JECL** command, for VSE only, is the exception which is still permitted to default to **FROM=1 LEN=LRECL.**
Use the **NULL** parameter on the **STACK** command to stack a null line.

096 - CALL EXCEEDS 16 PARAMS
The **CALL** statement is limited to 16 parameters.

097 - INS/DEL ONLY ON KEYED FILE
Only KSDS (VSAM), RRDS (VSAM), DL1/IMS and ADABAS files may use INSert and DELete.

098 - RESRVD

099 - INVALID FILE/DBD NUMBER
A numeric file identifier was expected for a DL1/IMS or ADABAS data base. It should immediately follow the READ, GN, ISRT etc function for the file, and be in the format of **#nnn** or **nnn** without the hash sign.

100 - INVALID BLKSIZE
The argument for the BLKSIZE parameter may only be a straight numeric such as **4000**, an EQUated numeric, or one of the keywords **SAME, MAX** or **UNB** as described under the BLKSIZE parameter.

101 - NO UPD ON SEQ FILE
The UPDate function is not supported on all Sequential files.

102 - RECFM=U INPUT LRECL NOT EQUAL TO BLKSIZE
LRECL and BLKSIZE are both coded on a RECFM=U input statement, but the values differ.

103 - RESRVD

104 - OPEN=RWD/NORWD ONLY
See also: OPEN fname in section *Operation Words, Parameters and Keywords*.

VSE tape rewind control at file open time may only be **RWD** or **NORWD**.

105 - CLOSE=RWD/NORWD/UNLD ONLY
See also: CLOSE fname in section *Operation Words, Parameters and Keywords*.

VSE tape rewind control at file close time may only be **RWD**, **NORWD** or **UNLD**.

106 - ADABAS FMT REQD OR INVALID

107 - ADABAS SEQ REQD FOR KEYED READ

108 - RESRVD

109 - RESRVD

110 - NO DIRECT READ ON CAT
The **STARTKEY** and other direct read params cannot be used with **CAT** files.

111 - MARC FUNCTION INVALID

112 - XV FUNCTION INVALID

113 - XV LITERAL NOT APPROP

114 - EQU NESTING EXCEEDED
This error should not occur, please contact the SELCOPY query desk.

115 - PRIVILEGED COMMAND (CP/CMS/STACK)
Only issued at **CMS** installations where **CP, CMS** or **STACK** commands have been issued illegally.

116 - RESRVD

117 - SEP CHAR INVALID

118 - DSORG CONFLICT
Data Set Organisation conflicts with that coded on a previous statement for the same file. In an MVS environment, **ERROR 118** may also be issued if a **VSAM** file is read without coding the **VSAM** keyword.

119 - FLOAT FRACT GT 9 DIGITS
A floating point integer or fraction exceeds 9 digits.

120 - TOO MANY MARC FILES

121 - FLAG ARG INVALID
Permitted arguments for the **FLAG** statement, (used with **DIRDATA** input), are **EOM/EOMEMB,** and **EOD/EODISK** only.

122 - RESRVD

123 - VSE PARTN LT (AUTO,340K) FOR LIBR
Use of the **LIBR** program, for library processing under VSE/SP2 or later, requires at least 340k of free storage within the partition area. Specify at least **SIZE=(AUTO,340K)** on the **EXEC** statement.

124 - CHECK EXPIRY DATE
The SELCOPY expiry date has been reached and the product will no longer function until the replacement product from CBL is installed.

125 - USER @ PTR NAME GT 4
Applicable to mainframe SELCOPY only, user @ pointer may only have names from 1 to 4 characters. e.g. @ABCD is maximum length.

126 - GT 32 USER @ PTRS
Applicable to mainframe SELCOPY only, a maximum of 32 @user pointers are supported in the current release.

127 - OFFSET ILLEGAL ON PTR ASSIGNMENT
No offset may be used on an @ or @user pointer when it is being assigned a new value.

128 - INVALID PTR ARGUMENT
The argument for the **PTR** parameter on an **IF/AND/OR** statement may only be **@** or **@xxxx** where xxxx is any user @ pointer name.

129 - PTR/STEP/FILL REQS 2 LENGTHS

130 - FILL ILLEGAL FOR SCAN
The FILL/PAD character for range tests is not appropriate because only 1 length is used for the compares over the specified range.

131 - STOPAFT ARG INVAL/MISSING
If **STOPAFT** or **S** is coded then an argument must be supplied. Often caused when **TYPE=S** is coded on a statement for which TYPE is not valid.

132 - FWD/BWD AMBIGUITY
A **VSAM** read operation has been requested without specifying a direction.
BWD has already been used on a previous **READ,** so a direction keyword is mandatory on **all** subsequent reads.

133 - TYPE=B ARITH COMPARE NOT LEN=4

134 - AMBIGUOUS: STRING / ARITH COMPARE
Quotes required on field 2 numeric literal if it's a string, or **TYPE=B** on field 1 if it's an arithmetic variable.

135 - TYPE=B OR P ONLY FOR ARITH COMPARE

136 - TYPE CONFLICT ON ARITH COMPARE

137 - INVALID PTR COMBINATION
The expression **@A+@B+@C-@D+22** can be evaluated to a position in the work area on the assumption that all elements can be treated as positions in the work area. But an expression such as **@A+DATE+HEAD+6** must be invalid as **DATE** and **HEAD** are both known to be absolute addresses outside the work area.

138 - INVAL/DIFF DSN FOR FNAME

139 - VSE LABEL FUNC ERROR
This error should not occur, please contact the SELCOPY query desk.

140 - VSE VOL/CAT ARG INVALID

141 - VSE VOL/DEV/SYS REQD FOR DYN ALLOC

142 - VSE VOL NOT FOUND/MOUNTED

143 - VSE DYN ASSIGN FAILED

144 - TRAN TAB NOT LEN 256

145 - TRAN LITERALS INVAL/DIFF LEN

146 - DB2: DIFF SSN/PLAN
Only one set of DB2 SSN/PLAN values are allowed in an execution of SELCOPY.

147 - RESRVD

148 - DB2: TAB/FMT/SORT/SRCH/UPD ON 1 STMT - OMIT HERE
For DB2, SELCOPY's filename is a logical "view" of the data base, according to the Table Name **(TAB=),** the selected fields/columns **(FMT=),** the order **(SORT=),** the conditions where data is required **(SRCH=)** and the fields/columns which may be updated **(UPD=).** Only 1 statement may define the FILE (view). Other references to the same FILE (view) must be made using only the **FNAME,** thereby identifying the file.

149 - RESRVD

150 - RESRVD

151 - WORKLEN TOO LARGE FOR M/C
Maximum is 65502 for PC DOS and MS-DOS. Just below 64K (65536).

152 - NO PARM DATA FOR %1 %2 ETC
Control statement reference to %1, etc. requires that SELCOPY is invoked with parameters on the command line. e.g.

```
selcopy  payroll.mst  tmp.out
```

will interpret %1 in the ctl cards as payroll.mst and %2 as tmp.out.
An EQU statement is generated for each argument (parameter). e.g. In the above invocation:

```
EQU %1  payroll.mst
EQU %2  tmp.out
```

Use quotes around the %1 in your control stmts if the EQUated interpretation is not reqd.

153 - INVALID OPTION IN "SELCOPY.NAM" FILE
This error may occur if any of the following are not true:
- ◊ The **SITE** argument has maximum length 36, minimum length 20.
- ◊ The **PASS** argument must be length 8.
- ◊ The **RANGE** argument must be in the format: **RANGE='yyyy/mm/dd-yyyy/mm/dd'**
- ◊ The **PASS** argument, (provided by CBL for each installation), must match with the SITE and RANGE arguments used.

154 - INVALID CONTMAX OR ALREADY SET
The CONTMAX argument is not a valid positive decimal number, or the CONTMAX buffer has already been allocated, due to encountering a continuation record symbol.

155 - BAD COMMAND LINE SYNTAX FOR REDIRECTED INPUT
For operating systems that do not support redirection of standard input via the command line syntax using the < sign, SELCOPY will examine the command line arguments and interpret <fname as redirection of standard input in the same way as on UNIX or PC. e.g.

```
selcopy  < ctlcards.fil
selcopy  </home/fred/selcopy/select01.ctl    arg1 arg2 .. etc also allowed.
selcopy  arg1 arg2  <yourctl.fil  !opt pagewidth=94 !* Plus any other stmts.
```

Note that yourctl.fil will be processed AFTER your command line stmts.

156 - OPEN FAILED FOR INC FILE

An INC (include) statement, or a redirection of standard input, has failed to open the specified file. Try coding the full path if the file is not on the current directory. On certain systems, it is also required that you have read authority (permissions) for the file.

157 - ILLEGAL OPERATOR FOR NULL PTR TEST
EQUAL (EQ, EX, EXACT, =) and NOT EQUAL (NE, NOT, <>, ^, ^=) are the only valid operators for @ pointer IF NULL tests. All other operators are illegal.

158 - FILEID CONFLICT POSSIBLE DUE TO CASE DIFFS
The DSN (Data Set Name, or Fileid) supplied on an I/O statement is equal to a previously mentioned DSN apart from case. On UNIX platforms, this would represent different files, but on DOS, OS2 and Windows it represents different file control blocks which operate on the same file. Error 158 will protect jobs which are moved to a platform with different case sensitivity. If all references are intended for the same file, please amend the names to match. If however, you really want different case settings on the same name, then use the DSN parameter to define the data set name in conjuction with an arbitrary unique filename for each variant.

159 - TAB IS A SYNONYM FOR TABLE, NOT TABS
The keyword TAB is a synonym for TABLE, reserved for use on a DataBase. For defining the "Tab Character Interval", use the keyword TABS.

160 - SYSTEM ENV VAR IS NULL AND ENVFAIL=CANCEL IS SET
The system Environment Variable used has not been set prior to the invocation of SELCOPY, and the SELCOPY option ENVFAIL=CANCEL is set.

161 - ONLY ENVFAIL=SAME|NULL|CANCEL|'string' IS SUPPORTED
An invalid argument has been specified for OPTION ENVFAIL.

162 - SLCCALL.DLL NOT FOUND
See also: **Error 163** in this section.

On Windows environments, the failure to find the SLCCALL.DLL runtime library does not get an error message from the system and the job simply terminates having done nothing. ERROR 162 is therefore provided by SELCOPY to alert the user to the problem. See also ERROR 163.

163 - SLCCALL NOT IN SLCCALL.DLL
The SLCCALL.DLL exists, but does not contain the "slccall()" function. Check your slccall.c and slccall.h source code and your link for creating the SLCCALL.DLL file.

164 - BUFFER OFLOW ON CONTN REC
The buffer size for continuation cards has been exceeded. The default value is 4096, which may be changed by use of OPTION CONTMAX=nnn provided no continuation records have already been encountered. OPTION CONTMAX=nnn may only be used once. Note that use of continuation records in SELCNAM will prevent later use of OPT CONTMAX.

165 - VSE SPECIFIED SYS NO IS NOT ASSIGNED
The SYS=nnn coded on the SELCOPY I/O control statement is unassigned in the VSE system. Omit the SYS=nnn param to allow SELCOPY to dynamically allocate a SYS number, or use an ASSGN statement in the JCL, or use VOL=volser or DEV=cuu instead of SYS=nnn.

166 - SORT ORDER CODE (S,P,E,N,D.) FOR DIR/DIRDATA IS MISSING/INVALID
For DIR or DIRDATA input, SORT=x may be coded to request that filenames returned are sorted by: Size, Path, Extn, Name, or Date. (S,P,E,N,D.) The Size and Date options are returned in reverse order.

167 - RESRVD

SELECT TIME Errors

Error Messages 501 to **999** cause immediate **termination** of the SELCOPY execution because they concern Allocation or Selection Time errors, which can only occur **after** all Control Cards have been processed successfully.

The error may be caused by a failure in storage allocation, but is more often a failure at **Selection Time** while executing the user's control statements. It does not necessarily imply a user error.

Whenever possible, **Select Time Errors** are accompanied by a complete print, in **TYPE=D** (Dump) format, of the input block, **(not the record)**, in which the error was detected. If the block in error was too large for the input buffer, SELCOPY will print only what it was able to read in.

Console Message

Unless inhibited by the **CBLNAME** option, details of the error encountered are displayed on the Operator's console, or user's terminal in a **CMS** environment, in the following format:

```
SELCOPY REL 9.70 SELECT TIME ERROR 502 JOBNAME=job-name 00.01 FRI 22 MAR 96
```

Return Code

Under **MVS, CMS** and most **VSE** systems the Return Code is then set to 48 for an Allocation error, or to 44 for a Select Time error, and passed back to the Control Program. Subsequent action will depend on the conditional JCL used, e.g. the **COND** parameter of the next **EXEC** card for MVS, **ON** statement for VSE, and **IF** statement for CMS.

501 - F=filename - BUFFER TOO SMALL FOR INP BLK
SELCOPY has found an input block larger than the input buffer. For **VSE**, check that the default input buffer size for your installation, as defined in CBLNAME, is large enough. If not, override it with a **BLKSIZE** parameter on the **READ** card, but first check the description of how the default input buffer size is calculated, especially for FBA devices. You will find it in the BLKSIZE parameter description. For **MVS**, check **BLKSIZE** value on all possible sources, the SELCOPY control statements, the **JCL**, and the **Tape Header Label** or disk **DSCB** (VTOC label). For both, if still in doubt, adjust the x'a0' value below as reqd and run:

```
read dubious  recfm=u  blksize=32760       * Max valid blksize.
if  pos uxlrecl GT x'0000,00a0'            * If LRECL > 160
  then print  stopaft=1
```

502 - F=filename - INP BLK NOT MULT OF LRECL
See also:

◊ BLKSIZE=n in section *Operation Words, Parameters and Keywords*.

A block has been read whose length is not a multiple of the logical record length. This logical record length is as specified in the **LRECL** parameter of the **READ** card, or is set at 80 by default if no LRECL parameter were supplied.

A **Dump format** print of the **block** in question is given with this error message. Please check that the data in it is what you expect, and not from another file.

VSE users should check if their installation uses **dynamic file management** software that intercepts the standard IBM OPEN routine. If so, please establish if the problem still occurs with the other software disabled, and then contact CBL or the other supplier accordingly.

MVS users should check the length of the input block displayed. If it is exactly 1 byte greater than the BLKSIZE expected, it is because the physical block is indeed at least 1 byte greater than was indicated.

503 - F=filename - OUTPUT LRECL TOO LARGE
The logical record length for an output record is greater than the block size which was specified or assumed by **default** (only 800 for CMS) for the output file. This can only occur with **variable or undefined** length output files.
The Selection Summary report shows details of the default values used. Code **BLKSIZE=n** to indicate the maximum output block size expected.

504 - JOB ABNORMALLY TERMINATED
This message is always preceded by one of the other selection-time error messages.

505 - F=filename - VAR INPUT BLKSIZE DISCREPANCY
See also: **ERROR 502** in this section.

This message is issued for RECFM=V input (Variable length records) only. The first 4 bytes of the record, the Block Descriptor Word, always has the length of the block stored within it. It is therefore an error when the blocksize recorded in the Block Descriptor Word of a variable block just read in, is not equal to the physical length of that block.
A **Dump format print** of the **block** in question is given with this error message. Please check that the data in it is what you expect, and not from another file, e.g. the wrong tape was mounted.
For disk files, it usually means that your input file was either never successfully written, or has since been overwritten. i.e. you are reading residual data from another file.
VSE users should check for **dynamic file management** software.

506 - F=filename - ZERO LRECL ON VAR INPUT
The RDW (Record Descriptor Word), indicating the logical record length of a RECFM=V record, contains zero. Not a common error condition. Check the printout of the block in question. It's in Dump format.

507 - F=filename - IS INPUT - STATUS BYTE ERROR (VSE only)
This message occurs when an error is detected in the **Indexed Sequential** file being used as input. It is likely that part of the file has been corrupted in which case the file will have to be re-created. A 'PDUMP' of the associated IS input DTF is supplied which will assist in a detailed investigation.
Displacement X'1E' within the DTF is the Status Byte:

X'80'	Permanent read error.
X'40'	Wrong length record.
X'10'	No record found.
X'04'	Duplicate found.

508 - F=filename - OPERATOR CANCELLED ON TAPE INPUT ERROR (VSE only)
This message only occurs with **VSE** tape input. A permanent input error was detected and the operator given the option to accept, bypass or cancel. If the operator had replies **accept**, the block in question is automatically displayed in dump format on SYSLST.

509 - PART'N TOO SMALL FOR ALLOC'N
See also: BLKSIZE=n in section *Operation Words, Parameters and Keywords*.

SELCOPY has not been able to obtain sufficient storage to complete its allocation of I/O buffers.
This is often as a result of upgrading to a larger capacity disk drive, where SELCOPY is forced to allocate larger buffers to cater for a maximum size disk input record.
Check that the default input buffer size, in CBLNAME, at your installation is not too large. If so, over-ride it with a BLKSIZE parameter on the INPUT card. Otherwise, re-run in a larger partition.

510 - F=filename - DIRECTORY FORMAT NOT RECOGNISED
The input file processed did not have standard library format, or data within the Directory was found to be corrupted.

511 - CYLOFL TOO LARGE FOR DEVICE
By definition it is essential that a minimum of two tracks per cylinder are available for prime data.

512 - F=filename - MUST OMIT KP,KEYPOS,KEYLOC FOR UNB ISAM
See also:

◊ KEYFROM=n in section *Operation Words, Parameters and Keywords*.
◊ ISAM Output - Unblocked in section *ISAM Files*.

Unblocked ISAM output files do not have a key within the record data. They may have a copy of the key in the record data, but this is still not a "key". The KEYFROM parameter should be used.

513 - CANCELLED BY PGMR
A selection has been satisfied which caused action to be taken on a **'THEN GOTO CANCEL'** operation.

514 - IS OUTPUT - INDEX OR PRIME FULL
The most common occurrence of this error message is when an **ISAM** file is restored on to a different disk device, which has a different number of tracks per cylinder. If the allocation for the index extent under VSE is the same as on the previous device, the index will either be too small or too large. Too large is merely wasteful; too small gives this error.

515 - IS OUTPUT - PERM I/O ERROR
Re-submit the **ISAM** job using a different disk drive, a different disk pack, or both.

516 - IS OUTPUT - BLK EXCEEDS TRACK CAPACITY
Ensure your track capacity calculations took into account that **ISAM** blocks are keyed. This introduces a fixed overhead regardless of the length of the key. After that, the keylength must also be subtracted.

517 - IS OUTPUT - EOF FAILURE
Insufficient space in the **ISAM** prime area to clear the buffers and write an EOF record at CLOSE time. Allocate a little more space and resubmit.

518 - RESRVD

519 - KP/KEYPOS/KEYLOC/RKP REQD FOR BLK ISAM
For blocked ISAM output files, one of the above parameters is mandatory, so that ISAM can be told where to find the key within the record. Note that this is the position within the record, NOT the position within the SELCOPY work area.

520 - TOO MANY ELSE CARDS
More ELSE statements encountered than SELCOPY is able to keep track of for matching purposes. The level of nesting may not exceed 64 at any one point.

521 - UNMATCHED ELSE CARD
Matching of IF, THEN, ELSE, THENIF and ELSEIF cards has resulted in one or more ELSE cards left over.

522 - LABEL ON GOTO NOT FOUND
All control statements have been processed, and a GOTO "user-label" reference has not been resolved. Check the spelling on "user-label" cards and on GOTO cards.

523 - F=filename - FILENAME ON EOF/INCOUNT NOT FOUND
An **IF EOF** test has mentioned a filename that has not been used on any INPUT operation. Check the spelling.

524 - NO OUTPUT FILE PRESENT
No output file has been mentioned; not even to the printer. Usually this occurs when users require selection totals only. If no output goes anywhere, what is the point of running it? The pseudo output file, DUMMY, could be used if you just want to count records.

525 - F=filename - DEVICE CAPACITY EXCEEDED (VSE only)
A blocksize or logical record length for output has been requested explicitly, or implied **by default**, which is greater than the capacity of the device to which it is directed. No attempt would have been made to process, or even OPEN the file. Use **DEV** param if SYSRES device type is different from that of your file. The **CBLNAME** Phase controls default DEV type.

526 - F=filename - OUT BLK NOT MULT OF OUT LRECL
The output blocksize requested is not a multiple of the output LRECL. Note that the output LRECL, if not stated, defaults to the LRECL of the first input file mentioned.

527 - F=filename - VSAM - I/O ERROR

A VSAM GET or PUT has failed. VSAM has returned an **RPL Error Code** which is displayed in **decimal** in SELCOPY's Selection Summary, against the file name in question.

This error code is also displayed on the Operator's Console by the VSAM data management routine that returned it. SELCOPY has merely copied this Error Code on to its selection summary for your convenience. e.g. Error Code X'1C' (decimal 28) means that the disk space available for VSAM's use is full.

For MVS a full explanation of these error codes may be found in IBM's "DFSMS/MVS Macro Instructions for Data Sets".

For VSE a full explanation of these error codes may be found in IBM's "VSE/ESA Messages and Codes", under the heading "AMS Codes and Messages".

The appropriate IBM **Handbook** summarises this information, in the **RPL** (Request Parameter List) Control Block table.

528 - GOSUB NESTING EXCEEDED
You are allowed to invoke subroutines using the **GOSUB**/**PERFORM**/**DO** operations from within such a subroutine. Such nesting of subroutines is restricted to 32 levels. The most common cause for this error condition is exiting from a subroutine on a GOTO instead of via a RETURN.

529 - UNMATCHED RETURN
SELCOPY is trying to execute a RETURN statement, but has no information on where to return. You have possibly entered a subroutine on a GOTO, or control has dropped through into the subroutine, instead of via a GOSUB. (PERFORM and DO are synonyms for GOSUB.)

530 - VTOC READ ERROR
An I/O error has occurred while reading a **VTOC** entry. There are numerous possible causes for this, and further information will be obtained by running **CBLVCAT (LISTVTOC)** itself on the disk in question. The VTOC reading feature of SELCOPY is only available to installations having the licenced product **CBLVCAT**.

531 - F=filename - KEQ SEQ ERR ON CMS INPUT
A **Keyed** read of a CMS file, assuming the file to be in key sequence on a field within the record defined by the supplied **KEYPOS** parameter, has resulted in finding the file out of sequence. Check your KEYPOS, or check your file.
Note that when this error message **does not occur**, it is **still not** a guarantee that the file is in **correct** key sequence. It only means that during its search algorithm, SELCOPY did not find any conflict in key sequence.

532 - DEV UNSUITABLE FOR ISAM/CKPT

533 - RESRVD

534 - DL1 - PCB NOT FOUND IN PSB
An IMS/DL1 file is to be processed, but the DB name (Data Base name) given on the SELCOPY control card (READ or ISRT etc) was not found in the list of PCB's passed to SELCOPY by IMS/DL1.

The list of PCB's is built by DL1 according to the contents of the PSB (Program Specification Block) which is user generated and resides on a load library. The PSB is loaded in by DL1, not SELCOPY. Thus you give DL1 the PSB name required by specifying it on the DLI card which precedes the SELCOPY control cards.
Any combination or all DB names defined within the chosen PSB may then be processed in the same execution of SELCOPY.

Note that the **first PCB** found, which matches the DB name supplied as the SELCOPY filename, is the one used, unless the syntax **READ dbname #nnn DLI** is used.

535 - JECL STATEMENT INVALID (VSE only)
This error message is issued at run time, usually after the JECL statement has been rejected by POWER. A limited amount of validation of the JECL statement is provided by SELCOPY, but this is by no means complete.

SELCOPY does however take special action to prevent the user from coding LST=SYSnnn because this can cause a system hang up. All SELCOPY's print goes out via SYSLST which is the default for a JECL command. Thus, using LST=SYS018 for example, is not reasonable. You must allow JECL to default to LST.

Refer to IBM literature on POWER JECL statements for full information.

536 - * SYSTEM ABEND INTERCEPTED *****
See also: Section *Mainframe Debugging Aids*

The Abend trap in SELCOPY is **enabled**, and has intercepted a **Program Interrupt** for MVS or CMS, or an **Abend** condition for VSE. Diagnostic information is printed in dump format for use in debugging.

Not all installations using SELCOPY will have SELCOPY's **Abend Trap** enabled, but your technical representative will have the necessary details.

537 - F=filename - CMS READ ERROR nnn
"nnn" indicates the return code passed back to SELCOPY from FSREAD. Refer to IBM documentation on FSREAD in "CMS Command and Macro Reference".
It is unusual for CMS to have a genuine read error. The most common reason for this error message is that you are reading from a R/O disk which has recently been updated by the user who has it R/W. All you have to do is to **re-ACCess** the disk. This error also appears if the generic mask of a CMS **DIRDATA** READ matches no files.

538 - F=filename - CMS WRITE ERROR nnn

"nnn" indicates the return code passed back to SELCOPY from FSWRITE. Refer to IBM documentation on FSWRITE in "CMS Command and Macro Reference".
As with reading, genuine write errors are unusual. The most likely causes are:

012	Disk is R/O.
013	Disk is full.
016	APPending Variable records to a Fixed length file.

539 - F=filename - CMS CLOSE ERROR nnn
Unusual - if you get this, try processing the same file with a different program. It may be a genuine I/O error.

540 - FBA DCTY READ ERROR

541 - UNEXPECTED DL1 STATUS CODE
You will only get this message when you have requested a simple "GN" function call, and **IMS/DL1** has returned a status other than End-of-file or Crossing Hierarchical Boundaries. All the status information will be displayed for you in the SELCOPY summary print.

Other function calls **do NOT** have the status code checked by SELCOPY. It is your responsibility.

542 - F=filename - @ PTR NOT SET FOR I/O
A Read **INTO** @ or a write **FROM** @ cannot be actioned because the @ pointer is not set. (Either the last **range** test failed, or no range test has ever been made.)

543 - PART'N TOO SMALL FOR ALLOC'N
See also: BLKSIZE=n in section *Operation Words, Parameters and Keywords*.

SELCOPY has not been able to obtain sufficient storage to complete its allocation of I/O buffers.
Check that the default input buffer size (in CBLNAME) at your installation is not too large. If so, over-ride it with a BLKSIZE parameter on the INPUT card.
Ensure **SIZE** parameter on EXEC card for VSE sytem is large enough. Otherwise, re-run in a larger partition.

544 - F=filename - KEY/REC/START NOT FOUND
The **KEY, REC** ord number or **RBA** defining the first record to process is too high or invalid.
Note that **RBA must** point at the first byte of a VSAM ESDS record.

545 - F=filename - KEY NOT AVAIL FOR I/O
The **KEY, REC** ord number or **RBA** defining the record to process is to be taken from storage which is currently unavailable.
e.g. READ ABC KSDS KEY=4 AT L+200 where L+200 exceeds work area.

546 - F=filename - LRECL EXCEEDS WORK AREA
See also: **ERROR 20** in section CONTROL CARD Errors.

The record just read exceeds the length of the Work Area. Processing cannot continue without the work area because an **INTO** parameter is used, either on this, or on some other **READ** statement.

547 - PARMLIST FOR CALL UNRESOLVED
The **CALL** statement has been given one or more parameters to be passed to a subroutine which cannot be resolved. e.g. the parameter being based on the @ Pointer or **L** (current LRECL) variable, resulting in an address outside permitted storage limits.

548 - RESRVD

549 - F=filename - REC/WORK AREA OVERLAPPED
A record is to be read into or written from a position in the Work Area resulting in overlap. This may be caused by the position being based on the @ Pointer or **L** (current LRECL) variable, which of course cannot be checked until execution time.

550 - COMPRESS/EXPAND FAILED
Either overlap exists on source and destination areas, or a logic error has occurred on **EXPAND**.

551 - F=filename - ADABAS: OPEN FAILED
Check DBID in **ADALNK**.

552 - F=filename - ADABAS: BAD RETCODE

553 - F=filename - ADABAS: "LF" FAILED

554 - F=filename - ADABAS: CLOSE FAILED

555 - RESRVD

556 - F=filename - DB2: CONNECT FAILED

557 - F=filename - DB2: OPEN FAILED

558 - F=filename - DB2: CLOSE FAILED

559 - F=filename - DB2: DISCONNECT NOT CLEAN

560 - F=filename - LAST USED INP FILE NOT DIRDATA
A **FLAG** statement has requested **EOD** or **EOM** on **DIRDATA** input, but the last input file processed did not have **DIRDATA** specified.

561 - VSE LIBR BAD RETCODE
Use of **DIR** or **DIRDATA** input on a **VSE/SP2** library resulted in a bad Return Code from the VSE Librarian, **LIBR**. LIBR's Return Code is given in the Selection Summary for the file in question.

562 - POS UXLRECL MODIFIED WITHOUT USE OF LRECL STMT

563 - XV NAME/VAR EXCEEDS MAX
The XV statement refers to a variable name or value whose length exceeds the permitted maximum for the operating system.

564 - JECL DATA MODIFIED
Part of the data for a VSE **JECL** command has been overwritten while outside SELCOPY's control.

565 - F=filename - CANNOT UPDATE DIR ENTRY

566 - STOP COMMAND ISSUED BY MVS OPERATOR

567 - CALLED RTN NOT FOUND

568 - CALLED RTN ISSUED STOP RUN
A COBOL routine CALLed from SELCOPY has abended or issued a **STOP RUN** so that control is not passed back to SELCOPY. COBOL **GOBACK** should be used to return control to the calling program.

569 - RESRVD

570 - OPEN FAILURE - CONSOLE INPUT (LOG REPLY)
Input is required from the operator's console, but SELCOPY was unable to open the TERM device. Possible on AS/400 and UNIX systems where the pathname for the controlling terminal cannot be established.

571 - F=filename - OPEN FAILURE - CHECK DD/DLBL
Often due to bad spelling, or DD/DLBL missing altogether.
For **ISAM**, this could be failure on initial SETL to BOF (Beginning of File), i.e. empty.

572 - F=filename - DD/DLBL EXISTS WITH DIFF DSN

573 - F=filename - DYN DSN OR DB2 TABNAME UNRESOLVED
The positions referenced by the DSN= for Dynamic Allocation, or TAB= for DB2 processing, is invalid.

574 - F=filename - DYN ALLOC FAILED

575 - F=filename - CLOSE STMT FAILED

576 - F=filename - IMS/DL1 SEG GT WORKLEN

577 - F=filename - VSAM OPEN FAILED
The most common cause for this problem is bad spelling of dataset name (VSAM Error 128) or Catalog name (VSAM Error 180), or the required JCL was missing altogether (DD or DLBL card).

578 - F=filename - WORKLEN REQD FOR TAB=N USAGE
For **AS/400**, UNIX and PC versions of SELCOPY only. Expansion of TAB chars to spaces on RECFM=U input file requires that a work area is defined. e.g.

```
RD ABC.FIL  TAB=8  WORKLEN=512
```

On MVS, VSE and CMS, error 578 will never be issued as TAB character expansion is not supported for the mainframe.

579 - INVALID PACKED DECIMAL DATA
Check the length of the packed decimal field. The junior nibble of the junior byte must be a valid sign. x'C' for positive, or x'D' for negative are the standards, but x'A' to x'F' are all valid. (All positive except x'B' and x'D'.) All other nibbles in the field must be in the range x'0' to x'9'.

580 - INSUFF FILE HANDLES
For PC DOS, MS-DOS and Windows platforms only. Insufficient File Handles exist to satisfy the requested number of input and/or output files, and SELCOPY was not able to extend this number dynamically. e.g. The FILES=nnn statement in a DOS CONFIG.SYS file was too small.

581 - F=filename - LRECL ON RECFM=V INPUT RDW EXCEEDS CODED LRECL
A variable length input record has been read, where the value obtained from the RDW (the actual length) exceeds the LRECL value coded on the input statement.

582 - F=filename - DCB GEOM MISMATCH FOR PDS OR DISP=MOD/SHR FILE

For z/OS and OS/390 platforms only. An output PDS, PDSE or data set with DISP=MOD or DISP=SHR, has been found to already have existing values for RECFM, LRECL and BLKSIZE which conflict with the value(s) coded on the WRITE statement.

583 - RESRVD

584 - F=filename - OUTPUT DSN ALREADY OPEN UNDER DIFF FNAME
A request to open a file for output has been given, but the file refers to a DSN which is still open for input or output under a different filename. This may overwrite your input data. Update the job to use the **CLOSE** statement for the first file before actioning the WRITE statement for the second file. Alternatively, the **UPDATE** statement may be used if appropriate.

585 - RESRVD

586 - RESRVD

587 - RESRVD

588 - RESRVD

589 - RESRVD

590 - RESRVD

591 - CMS FILE NAME INVALID

592 - CMS DISK NOT ACCESSED
Either an input file is on a CMS disk which is not accessed, or an output file is on a CMS disk which is not accessed R/W.

700 - NOT YET RELEASED
A proposed new facility has been used, which is not yet operational.

999 - EXPIRY DATE EXCEEDED
Check that the **IPL** date is correct. Check that the correct private job or step **library** is in use. Check that the SELCOPY **release** number on your error report is the one you expect. The expiry date of the version of SELCOPY that you are using is printed at the end of every
SELCOPY print output.

SELCOPY SQL Messages

The **CBLSQLOG** file contains messages reporting SELCOPY SQL activity. Each message has an 8 character identifier of the form **CBLSnnnx** where **nnn** is the message number and **x** is a severity indicator:

I	Informational
W	Warning
E	Error.

Messages are timestamped and may consist of multiple logical records.

The messages are:

CBLS000I	DB2 connection.
CBLS001I	DB2 disconnection.
CBLS002E	DB2 Call Attachment Facility error. This message is issued when SELCOPY gets a bad return code when attempting to attach to a DB2 subsystem. The default DB2 subsystem and plan names are in CBLNAME. The DB2 subsystem can also be coded on a SELCOPY control card with the **ssn** parameter. Typical causes of this error are: • The DB2 subsystem does not exist. • The DB2 subsystem is not active. • The plan named in CBLNAME is incorrect or **BIND** has not been run for the plan in the given subsystem.
CBLS003E	SQL error. Issued when SQLCODE is not 0 or 100. This message also contains the fully translated DB2 message text associated with the SQLCODE. For row based operations the current contents of the I/O area is listed by column name.
CBLS004I	SQL OPEN. Describes the SQL SELECT or INSERT statement which has been opened for row based I/O.
CBLS005I	SQL End of File. Issued when a read gets SQLCODE=100.
CBLS006I	SQL CLOSE. Statistics for the SELECT or INSERT are displayed.
CBLS007I	SQL EXECUTE. For SQL statements which are executed directly with the SELCOPY **DB2** operation this message is issued to print the SQL statement and report the SQL return code.
CBLS008I	--- Not Used ---

CBLS009I	SELCOPY SQL interface stopped. This message is issued at the end of SELCOPY SQL processing. It lists run statistics for storage and cpu usage.
CBLS010I	SELCOPY SQL interface started.
CBLS011E	SELCOPY has received a bad return code from the SQL interface.
CBLS012W	Input truncation warning. Issued if the I/O area is too small to contain the requested data.
CBLS013I	Generated SQL statement. For **UPDATE** and **DELETE** of the current row of an open SELECT SELCOPY must generate an appropriate SQL statement. This message displays the SQL statement SELCOPY generates.
CBLS014E	SELCOPY SQL interface start error. This message is issued if any of the DB2 attachment modules (DSNALI, DSNHLI2, DSNTIAR) failed to load. The most likely cause of this problem is that the DB2 **SDSNLOAD** library is not available (via STEPLIB or the link list).

WARNING Messages at EOJ

To the Operator

```
SELCOPY REL x.xx  **EXPIRES yyyy/mm/dd**    JOB=jjjjjjjj    hh.mm day dd mmm yy
```

will be issued to the Operator's Console on each execution of SELCOPY during the 30 day period prior to the end of its operational date range, giving the expiry date, jobname and and the current timestamp.

This warning is **not** given on the **SYSLST**/**SYSPRINT** file, and the Return Code remains unchanged.

To the Programmer

The following **WARNING** messages can be given in SELCOPY's Selection Summary, on the **SYSLST**/**SYSPRINT** file. Some will be highlighted with the flag ***** WARNING ***** in front of the message. They do not necessarily imply a user error.

*EOF*NOT*REACHED*

The above message is given against all input files which have not been processed to End-of-File.

This warning message is normally associated with a **Return Code 4**, but please note that the **RC=4** is only set when it is **SELCOPY's decision** to terminate the run.
For instance, if the control logic results in a **GOTO EOJ** being actioned, the above message is printed if EOF has not been reached, but no return code is set.

Return Code unchanged.

*RECORDS*TRUNCATED*

SELCOPY has been requested to write a record whose length exceeds the defined maximum LRECL of the output file. The record is written at the maximum permitted length, and the above message is given against the output file in the Selection Summary.

Return Code 5 is set.

FILE*NOT*FOUND

This message will be displayed in the summary, below the file statistics of the input file in question, which failed during the OPEN routine.

Return Code 8 is set.

nnn=***CONFLICTING***FSIZE*AT*OPEN*

A VSAM or CMS file has been read sequentially until **EOF** was reached, and no direct reads were made. However, the **File Size, nnn**, which was obtained from the operating system at **OPEN** time, conflicts with SELCOPY's count of the number of input records.

For **VSAM** files, the most likely cause is that the file is already in use by an **on-line** system which has inserted or deleted records, but not yet closed the file.
Should this not be the case, please **VERIFY** the file.

Return Code unchanged.

nnn= ***NEG* FSIZE*AT*OPEN***

Similar to "Conflicting FSIZE" above, but the system value is negative, indicating some irregularity, possibly corruption of the VSAM Catalog or CMS FCB.

Return Code unchanged.

NOTE.... 'SYSIPT' IS STILL ASSIGNED TO DISK

--- VSE only ---

In a VSE environment, it is possible for a previous user of the machine to leave SYSIPT assigned to a disk extent. SELCOPY reads your control cards via SYSIPT, so even though you have supplied valid control cards via the card reader, which is the normal assignment for SYSIPT, your job may cancel when it reads invalid control cards from the disk extent.

Return Code unchanged.

nnn INVALID LRECL CHANGES - IGNORED.

It is illegal to set the size of the current logical record to **zero**, to a **negative** value, or to a value **larger than** the size of the work area (if WORKLEN used) or current input record area.
The value 'nnn' gives a total of LRECL modifications ignored. Note that the selection totals printed previously will reflect the number of modifications attempted, not the number that succeeded.

Return Code 8 is set.

nnn DUP/SEQ *ERRORS*

During sequential loading of a VSAM or ISAM file, **nnn** records were **rejected** due to having a key which duplicates an existing record, or being out of sequence, i.e. having a key less than that of the previous record written.

The Selection Total for the file reflects the number of records that SELCOPY was instructed to write - not the number that were successfully written.

Return Code 12 is set.

nnn MASK LENGTHS TRUNCATED TO 256

During execution, an **IF** operation involving a mask-type operation used an @ or @user variable to define the length and the length exceeds 256 bytes.

Return Code 6 is set.

nnn = RETURN CODE FROM SELCOPY (SEL--nnn)

If the Return Code passed back by SELCOPY is non-zero, the above error message is issued on the printed output after the Selection Summary. Where appropriate, the first **Selection Id** causing this Return Code is also reported in the format **(SEL--nnn)**.

Use of **NOPRINT** or **NOPTOT** will not suppress this message which is also given on systems where RetCode cannot be tested in subsequent JCL.

Return Code displayed.

TAPE ERRORS for VSE

See also:

- FILE=TAPEnn in section *Operation Words, Parameters and Keywords*.

PERM TAPE ERROR - ACCEPT/BYPASS/CANCEL.....

When a VSE Tape Error condition is detected, the operator is interrogated with the above message on the console. He is required to key in one of the indicated replies:

ACCEPT	Accept the block as is, and use it.
BYPASS	Bypass the block, read the next one.
CANCEL	Cancel the job. Error 508 is issued.

NO DATA TRANSFERRED - OPTION RESET TO BYPASS

If the operator replies ACCEPT, the request is passed on to VSE, but it is still possible to fail to get any data. In such cases the above message is given.

RETURN CODES set by SELCOPY

See also:

- **Force VSE CANCEL if DL1 Error** in section *CBLNAME & SELCNAM*.
- RETCODE, POS RETCODE and IF RETCODE in section *Operation Words, Parameters and Keywords*.

When SELCOPY detects an error condition while running under any operating system, a return code is set, and displayed in the following format, and where appropriate, the first **Selection Id** causing this Return Code is also reported in the format **(SEL--nnn)**, which can be very useful:

```
***WARNING*** (SEL--nnn)       nnn = RETURN CODE FROM SELCOPY
```

A **Minimum Return Code** may be set using a field in the **CBLNAME** load module/phase. Any Return Code that is below this minimum is automatically suppressed and replaced with zero.

Under operating systems where the return code can be tested, e.g. OS, MVS, VSE Rel 2.1 and CMS (with DOS ON or OFF), SELCOPY will terminate normally, allowing the user to process the Return Code within his JCL or equivalent.

Under operating systems where the return code cannot be tested, e.g. DOS, DOS/VS and early VSE, if the Return Code is less or equal to 16, termination is normal, with no indication of a problem except for the ***** WARNING ***** on the summary.
If the Return Code is greater than 16, SELCOPY will terminate with a CANCEL macro, which will flush subsequent steps from the reader until the next // **JOB** card is encountered.
The **exception is DL1** processing, where it is necessary to return control to **DL1**, which is the Calling Program in this case.

Note that you are able to **test and modify** the Return Code during a SELCOPY execution by use of the **RETCODE** parameter.

All SELCOPY generated Return Codes used are listed below:

RC=00	**Clean run.** No abnormal conditions encountered. End-of-File has been reached on the input file and at least one output selection has been made.
RC=04	**EOJ decided by SELCOPY.** The job has been terminated by SELCOPY because all output selections have been satisfied by reaching their **STOPAFT** values. **Return Code 4** is set to alert the user to the fact that it was a SELCOPY's decision to discontinue processing. This action is taken even though **End-of-file** has not been reached on the prime input file, so the ***EOF*NOT*REACHED*** warning will be seen on one or more summary lines. Note that if a **GOTO EOJ** statement is actioned, then **RC=4** is **not set** because it is a deliberate action on the part of the user, rather than a SELCOPY decision. When **NOPTOT** or **NOP** is in effect, if EOF has not been reached, then **RC=4** is passed back to the system, but it **is not reported** on the **SYSLST**/**SYSPRINT** summary.
RC=05	**Truncation has occurred.** When a user reads a record of length "n", and wishes to write to another file, which is defined as variable or undefined length, and has a maximum permitted length of less than "n", then previous releases of SELCOPY gave ERROR 503 meaning the output record is too large. However, in cases where the output file is **defined** as such, (e.g. on a VSAM file), or when the user has explicitly coded **RECFM=U LRECL=22,** it is reasonable to assume that this is what the user wants. In such cases the output record is truncated and ERROR 503 is suppressed. But as a precaution, a warning message, **TRUNCATION HAS OCCURRED,** is printed on the summary, and a Return Code of 5 is set.

	For example, a **CMS** output file may not have **LRECL** coded, and the default of 800 as a maximum was insufficient.
RC=06	**Misleading result possible.** 1. When an input file is of variable length, and **no work** area has been allocated, it is possible to instruct SELCOPY to test conditions at a position that may or may not exist depending on the length of the current input record. Thus, on short records, where the tested position does not exist, the standard SELCOPY action is to return false. i.e. to fail the test, which of course in most cases is exactly what the user requires. The problem arises when the test is looking for **inequality** on a position that does not exist. e.g. **IF POS 164 NE 'X'** In this case SELCOPY will return **failed** because position 164 does not exist. But it can be argued that if pos 164 does not exist then it must be **not equal** to 'X', therefore the condition is true. Hence the confusion. Hence the Return Code of 6. 2. When a bit mask for a **ONES, ZEROS** or **MIXED** test has its length defined by an @ or @user pointer whose value exceeds 256, then the test uses only the first 256 bytes of the mask.
RC=08	**Minor Error** condition: 1. Invalid **LRECL** modification. Often because the **TYPE** parameter is omitted when the value for the new LRECL is taken from data in the workarea using **n AT p** syntax and the data type is **B** inary or **C** haracter. 2. Move outside the record or work area limits. 3. Invalid data for **CVxx** operation. For CVxC, scan for a string of **'*'s** which is used to fill the destination field of the CVxC. 4. The @ Pointer used when **not set**, or with a displacement resolving to an invalid address. e.g. **WRITE fname FROM @ABC-14,** when the @ABC pointer is set at POS 3, writes no data to **fname**, and **RC=8** is set to indicate the error. 5. DL1/IMS returned a **Not Found** condition but no reference is made to **POS PCB**, which means that DL1's status code is never checked. 6. Current LRECL of a **RECFM=V** input record is 4, and a RECFM=U file is to be written. When the 4-byte RDW is stripped off the record is length 0, making it impossible to write. 7. An arithmetic function resulted in overflow of a **packed decimal** destination field forcing truncation of significant (non-zero) digits.
RC=12	**Duplicate** or **Sequence error** On **VSAM** or **ISAM** output, check for presence of **REUSE** parameter. Check that **KEYPOS** is correct. IDCAMS uses a displacement from the start of the record, while SELCOPY uses a position within the record. (0 for IDCAMS = 1 for SELCOPY)
RC=16	**Output Totals all zero** - nothing selected. When all output selection totals are zero, (often due to having an empty input file), and **GOTO EOJ** has **not** been actioned, **RC=16** is set to alert the user of a potential problem. **Beware** The Return Code set by SELCOPY for Zero Output is an installation **defineable** value. The **CBLSRC16** byte in **CBLNAME** may be set to a non-zero value in order to control the **Return Code** value to be passed back to the system when all output selection totals are zero. Check how your system is set up by reading and printing an empty card file: **READ CARD** **PRINT** **END** **/*** (No data cards.) **RC=16**, or more precisely the Return Code value held in CBLSRC16 in the CBLNAME module, is suppressed if **GOTO EOJ** has been actioned.
RC=40	**EOF processing** - Terminal error.
RC=44	**Selection Time** - Terminal error. This includes **ERROR 513**, cancellation by user when a **GOTO CANCEL** statement is actioned. **ERROR 566**, MVS Operator has issued **STOP** command.
RC=48	**Allocation Time** - Terminal error.
RC=52	**Control Card interpretation** - Terminal error.

	If not accompanied by a **Control Card Error** then check for a **CANCEL** operation word, where **GOTO CANCEL** was intended.
RC=88	**MVS Program Interrupt** or **VSE System Abend** See also: Section *Mainframe Debugging Aids*. Because **ABTRAP=ON** is in effect, either set on an **OPTION** statement or by default from **CBLNAME**, the standard System action which produces a full storage dump has been intercepted by SELCOPY. Instead, partial dumps of storage are printed by SELCOPY and the job is terminated. **ERROR 536** is issued by SELCOPY and the job is quietly terminated with Return Code 88.