Tally

Programmer’s Application Manual

Barcode and LCP

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Character Sets

Barcode and LCP Printing

Introduction

This User's Manual describes all barcode and LCP sequences and control codes, regardless of your printer's special barcode and LCP implementation (LCP = Large Character Printing).

Be sure to observe the notes in the operator's manual regarding the special barcode/LCP Types implemented in your printer and which of the sequences described here are not available as a result.

Select the Barcode Mode as described in the operator's manual. Selecting this emulation mode automatically selects the corresponding character set.

To print barcode or LCP characters, the following steps must be carried out in most cases:

- Activate barcode
- Activate secured/unsecured mode
  (see section "Secured/Unsecured Mode")
- Transfer barcode and/or LCP header
  (see sections "Barcode Header" and "LCP Header")
- Calculate check number
  (barcode only, see section "Calculate Check Number")
- Transfer barcode and/or LCP data
  (see sections "Barcode Typees" and "LCP Header")
- Deactivate barcode (if necessary)

The following commands are used to print barcode and LCP characters:

SUB	Start Character Barcode header
DLE	Start Character LCP header
EM	Stop Character Barcode and LCP header
DC4	Barcode brackets (start and end characters for barcode data)
SI	LCP brackets (start and end characters for LCP data)
ESC P ... ESC \	Settings for Barcode and LCP

This may cause conflict with other emulations, since the above commands may have different functions in these emulations, for example:

SI	Condensed print
DC4	Reset expanded print
ESC P <n>	Proportional spacing ON/OFF
ESC P	Pica

In barcode mode the barcode sequences have priority.

The barcode interpreter can be switched on or off with the MTPL sequences ESC [? 11 ~ (Barcode ON) and ESC [? 10 ~ (Barcode OFF). The typical transmission procedure **should** take place as follows:

- Barcode Interpreter ON
- Transmit mode specification (barcode header, LCP header, secured/unsecured mode, ...)
- Transmit barcode / LCP
- Barcode OFF

The mode specifications is saved temporarily and must only be sent to the printer once. The specification remains valid until the printer is switched off.

Please note the following explanatory information:

Every sequence description begins with a header in which the function and short form of the sequence of the barcode Types are listed, e.g.:

2/5 Matrix	Type A

The header is followed by the **data structure** in ASCII, hexadecimal and decimal representation with the necessary parameters, e.g.:

ASCII	DC4	start code	n ... n	stop code	DC4
hex.	14	start code	n ... n	stop code	14
dec.	20	start code	n ... n	stop code	20

The **syntax** for the parameters, the start, separate and stop code is represented as follows:

	Figures (n)	Start code	Stop code
ASCII	"0" to "9"	":"	":"
hex.	30 to 39	3A	3A
dec.	48 to 57	58	58

For the parameter (here **n**), a distinction must be made between two types of representation:

- if the parameter is in pointed parentheses, the decimal value must be transmitted
- if the parameter is not in pointed parentheses, the ASCII value must be transmitted

Example:

Parameter representation: **<n>**, with n=0
to be transmitted: dec.0 (hex.00)

Parameter representation: **n**, with n=0
to be transmitted: ASCII "0" (hex.30, dec.48)

Character explanation and symbol descriptions

ⓘ Information/important notes
[ ] Optional, must be not necessarily be transmitted
9 9-needle printer
24 24-needle printer

Special Feature

If you not get the required control codes for Barcode of ASCII code table columns 0 and 1 out of your computer you can use in addition to these Barcode control codes a set of MTPL sequences to generate these control codes by printable ASCII characters. By this measure the Barcode programs will remain fully compatible in spite of the additional MTPL sequences.

Following control codes in Barcode strings can be substituted by the appropriate ANSI sequences:

Control Code	ANSI Sequence (CSI = Hex 9B *or* Hex 1B 5B *or* ESC[ )	Example (Hex)
SUB	CSI 26 Space s	1B 5B 32 36 20 73
EM	CSI 25 Space s	1B 5B 32 35 20 73
DC4	CSI 20 Space s	1B 5B 32 30 20 73
DLE	CSI 16 Space s	1B 5B 31 36 20 73
SI	CSI 15 Space s	1B 5B 31 35 20 73
ANSI sequences with not matching parameters will be ignored.		

These feature is not available with all printers with MTPL emulation.
Special firmware is possibly necessary. Please ask your dealer or representative!

Secured/Unsecured Mode

Unsecured mode	**ESC PSC0 ESC **
Secured mode	**ESC PSC1 ESC **

Data Structure

ASCII	ESC	"P"	"S"	"C"	"0"	ESC	"\"	Unsecured mode
hex.	1B	50	53	43	30	1B	5C	
dec.	27	80	83	67	48	27	92	
ASCII	ESC	"P"	"S"	"C"	"1"	ESC	"\"	Secured mode
hex.	1B	50	53	43	31	1B	5C	
dec.	27	80	83	67	49	27	92	

Description

In **secured mode**, the amount of space the barcode or LCP character requires is "secured". In each line, additional barcode and normal characters can be printed.

These additional characters are printed in the current line and in the following lines without influencing the barcode or LCP character. As a result normal characters can be printed to the right or left of the barcode or LCP character in each line.

In order to guarantee successful barcode and LCP character printing, it is important to insert the correct paper feed commands, so that paper feed is ensured to the end of the barcode and LCP height.

In **unsecured mode**, the paper feed necessary for barcode and LCP printing is automatic and it is not possible to print more than one line with normal characters in the barcode and LCP line.

All characters in the mixed line are printed, so that the bottom edges are aligned in a straight line.

Example 1

```
10  REM LCP unsecured mode
20  LPRINT CHR$(27); "[?11~";
30  REM select unsecured mode
40  LPRINT CHR$(27); "PSC0"; CHR$(27); "\";
50  REM set character size to 5
60  LPRINT CHR$(16); "5"; CHR$(25);
70  LPRINT "Example for "
80  LPRINT CHR$(15); "LCP"; CHR$(15); " unsecured mode"
```

Example 2

```
10  REM LCP secured mode
20  LPRINT CHR$(27); "[?11~";
30  REM select secured mode
40  LPRINT CHR$(27); "PSC1"; CHR$(27); "\";
50  REM set character size to 5
60  LPRINT CHR$(16); "5"; CHR$(25);
70  LPRINT "This is "; CHR$(15); "LCP"; CHR$(15);
80  LPRINT " an ex-"
90  LPRINT "ample    of an"
100 LPRINT "expres-  sion"
110 LPRINT "in the secured mode"
```

Barcode Printing

Barcode Header

Before the data, which contains the barcode information, are transmitted to the printer, the barcode header must be sent. Otherwise the standard parameter values are used (see section "Header Format"). In the header, the printing parameters, the barcode size and the barcode type are defined. This header only needs to be transferred once, unless settings are to be changed or the printer has been turned off.

Header Format

Format: **SUB [F] a [n] [;xyz] EM**

[ ] Specification is optional

x, y unregarded at EAN/UPC-Barcode!
For Code 128 and EAN 128 (Type S+T) only the X parameter is valid. This is automatically used for the Y parameter. The Z parameter is not evaluated.

Meaning of the characters:

SUB	(hex.1A, dec.26)		Start header
F			Print feature (see section "Barcode Print Feature F" to select the F codes, page 10)
a	ASCII	a = "A"..."S"	Barcode Types (see section "Barcode Types")
n	ASCII	n = "0"..."90"	Barcode height in n/6 inch. At n="0" the barcode height equals to 1/12 inch.
;	ASCII		Separation character
x	ASCII	x = "0"..."3"	Width of the narrow bar (see section "Barcode width")
y	ASCII	y = "0"..."3"	Width of the narrow space (see section "Barcode width")
z	ASCII	z = "0"..."3"	Ratio of wide to narrow (see section "Barcode width")
EM	(hex.19, dec.25)		End of header

For encoding ASCII values to decimal or hexadecimal values refer to the appendix, "Character Sets".

The default parameter values are the following:

- Unsecured mode (see section "Secured/Unsecured mode")
- HRI OFF, Normal Print, Double Pass (F = SP)
- Barcode Type 2/5 matrix (a = "A")
- Barcode height 1/6 inch (n = "1")
- Narrow bar (x = "0")
- Narrow space (y = "0")
- Ratio of wide to narrow 2 to 1 (z = "0")

When only parts of the header are to be changed, copy the header up to the parameter which must be changed, and then close the header with the end-of-header character. If a header error was detected the total previous features are still active.

The "Barcode brackets" (hex.14, dec.20), initiate and terminate the printing of the barcodes.

If the printer is switched OFFLINE, all defined barcodes are printed out completely. Please not that the barcode remains resident in the background and can be activated again by the barcode bracket. Text justification and centering are both permitted. With activated barcodes these function are not carried out, since they lead to conflicts with the barcodes.

Transparent Barcode / LCP commands

Following control codes in Barcode strings can be substituted by the appropriate MTPL sequences (see also section "Special Feature" on page 5):

Control Code	ANSI Sequence (CSI = Hex 9B or ESC[ )
SUB	CSI 26 Space s
EM	CSI 25 Space s
DC4	CSI 20 Space s
DLE	CSI 16 Space s
SI	CSI 15 Space s
MTPL sequences with not matching parameters will be ignored.	

This sequences may only be used with activated BARCODE.

Barcode Print Feature F for Selection of F-Code

HRI or normal/compressed as well as single or double pass is switched via character F according to the following table.

ASCII Char.	Hex-Value	HRI [2]		Print		Pass [3]		Direction [2]	
		On	Off	Normal	Compr.	Double	Single	Unidir.	Bidir.
SP	20	–	x	x	–	x	–	x	–
!	21	–	x	x	–	x	–	–	x
"	22	x	–	x	–	x	–	x	–
#	23	x	–	x	–	x	–	–	x
$	24	–	x	–	x	x	–	x	–
%	25	–	x	–	x	x	–	–	x
&	26	x	–	–	x	x	–	x	–
‘	27	x	–	–	x	x	–	–	x
(	28	–	x	x	–	–	x	x	–
)	29	–	x	x	–	–	x	–	x
*	2A	x	–	x	–	–	x	x	–
+	2B	x	–	x	–	–	x	–	x
,	2C	–	x	–	x	–	x	x	–
-	2D	–	x	–	x	–	x	–	x
.	2E	x	–	–	x	–	x	x	–
/	2F	x	–	–	x	–	x	–	x
0 [1])	30	–	x	x	–	x	–	x	–
1 [1])	31	x	–	x	–	x	–	x	–

[1]) It is recommended, to avoid using of ASCII Characters 0 and 1 when possible, since they are reserved for future functions.

[2]) **H**uman **R**eadable **I**ndex

[3]) It depends on the used printer type whether the printer performs "Double Pass" with two physical print passes or special print modes (i.e. emphasized).

Barcode Types

A = 2/5 matrix (default)
B = 2/5 industrial
C = 2/5 interleaved
D = Code 11
E = Code BCD matrix
F = Code 39
G = Codabar
H = EAN 8 with HRI
I = EAN 8 without HRI
J = 2/5 matrix (default)
K = EAN 13 with HRI
L = EAN 13 without HRI
M = MSI/modified Plessey
N = UPC A with HRI
O = UPC A without HRI
P = UPC E with HRI
Q = UPC E without HRI
R = Delta Distance (IBM)
S = Code 128
T = EAN 128

All commercial barcodes (for labeling systems) of the H, I, K, L, N, O, P, Q Types can be extended using the barcodes Add-On 2 or Add-On 5 (see section "Add-On Barcodes").

HRI

HRI = **H**uman **R**eadable **I**ndex

HRI characters are centered if enough space is left. If the barcode-printout is smaller than the HRI character field, smaller character density (CPI) is used. Start and stop codes are not printed as HRI; a space character (SP) will be stored.

Barcode Width By specifying an ASCII value from 0 to 3, the barcode width can be defined. This allows ideal adaption to the scanner specifications, particularly for long-range scanners.

Table 1

	Header Parameter	Normal			Compressed[1])		
		9	24	older printer types (e.g.MT230)	9	24	older printer types (e.g.MT230)
Width of the narrow bar	x = 0	0.53 mm	0.54 mm	0.48 mm	0.32 mm	0.33 mm	0.27 mm 3)
	x = 1	0.74 mm	0.67 mm	0.69 mm	0.53 mm	0.43 mm	0.37 mm 3)
	x = 2	1.16 mm	1.09 mm	1.16 mm	0.74 mm	0.65 mm	0.59 mm 3)
	x = 3	1.38 mm	1.30 mm	1.33 mm	0.95 mm	0.88 mm	0.90 mm 3)
Width of the narrow space	y = 0	0.53 mm	0.54 mm	0.48 mm	0.32 mm	0.33 mm	0.27 mm 3)
	y = 1	0.74 mm	0.67 mm	0.69 mm	0.53 mm	0.43 mm	0.37 mm 3)
	y = 2	1.16 mm	1.09 mm	1.16 mm	0.74 mm	0.65 mm	0.59 mm 3)
	y = 3	1.38 mm	1.30 mm	1.33 mm	0.95 mm	0.88 mm	0.90 mm 3)
Enlarge-ment factor	z = 0			2.0 : 1			2.0 : 1 2)
	z = 1			2.5 : 1			2.5 : 1 2)
	z = 2			3.0 : 1			3.0 : 1 2)
	z = 3			3.5 : 1			3.5 : 1 2)

EAN/UPC Barcode
(X, Y = unregarded):

Table 2

	Header Parameter	Normal	Compressed 1)
Enlargement factor	z = 0	1.95 : 1	1.30 : 1
	z = 1	1.60 : 1	0.95 : 1

1) These values are true, if "Compressed Print" is selected in the menu (see print feature [F]).
2) Note: It is recommended to set the bar width equal to the space width (x=y).
3) Printer-dependent reference value.

All values are only valid when a new colour ribbon is used. They change depending on the degree of wear:

- narrow bar: approx. -0.05 mm
- narrow space: approx. +0.05 mm.

The **Code EAN 128**, as the **EAN/UPC**, is based on module widths. Therefore only the X parameter is valid for this type. This parameter is also used for the Y parameter (narrow bar width). The Z parameter has no meaning. In combination with the normal/condensed feature, 8 widths result (see table 1).

Error Code

Wrong characters in a control code or in a barcode test (e.g. an undefined character in a certain barcode Type) cause the barcode error sign to be printed.

Code 2/5 Matrix — Type A

Syntax

	Figures (n)	Start code	Stop code
ASCII	"0" to "9"	":"	":"
hex.	30 to 39	3A	3A
dec.	48 to 57	58	58

Data Structure

ASCII	DC4	Start code	n ... n	Stop code	DC4
hex.	14	Start code	n ... n	Stop code	14
dec.	20	Start code	n ... n	Stop code	20

Example

```
10 REM  code 2/5 matrix barcode
20 LPRINT CHR$(27);"[?11~";
30 LPRINT CHR$(26);" A3;111";CHR$(25);
40 LPRINT CHR$(20);":123:";CHR$(20);
50 LPRINT CHR$(27);"[?10~"
```

Code 2/5 Industrial — Type B

Syntax

	Figures (n)	Start code	Stop code
ASCII	"0" to "9"	":", "<" or ">"	";", "=" or "?"
hex.	30 to 39	3A, 3C or 3E	3B, 3D or 3F
dec.	48 to 57	58, 60 or 62	59, 61 or 63

Data Structure

ASCII	DC4	Start code	n ... n	Stop code	DC4
hex.	14	Start code	n ... n	Stop code	14
dec.	20	Start code	n ... n	Stop code	20

Example

```
10 REM  code 2/5 industrial barcode
20 LPRINT CHR$(27);"[?11~";
30 LPRINT CHR$(26);" B3;111";CHR$(25);
40 LPRINT CHR$(20);":123;";CHR$(20);
50 LPRINT CHR$(27);"[?10~"
```

Code 2/5 Interleaved — Type C

Syntax

	Figures (n)	Start code	Stop code
ASCII	"0" to "9"	":" or "<"	";" or "="
hex.	30 to 39	3A or 3C	3B or 3D
dec.	48 to 57	58 or 60	59 or 61

Data Structure

ASCII	DC4	Start code	n ... n	Stop code	DC4
hex.	14	Start code	n ... n	Stop code	14
dec.	20	Start code	n ... n	Stop code	20

Example

```
10 REM  code 2/5 interleaved barcode
20 LPRINT CHR$(27);"[?11~";
30 LPRINT CHR$(26);" C3;111";CHR$(25);
40 LPRINT CHR$(20);":123;";CHR$(20);
50 LPRINT CHR$(27);"[?10~"
```

Due to the "interleaved mechanism", data stream (n ... n) should only be transferred as even number e.g.:
not: 398 **but:** 0398

If odd count of numbers are transferred the printer adds a leading zero to the printed barcode.

Code 11 Type D

Syntax

	Figures/Characters (n)	Start code	Stop code
ASCII	"0" to "9" and "-"	":"	":"
hex.	30 to 39 and 2D	3A	3A
dec.	48 to 57 and 45	58	58

Data Structure

ASCII	DC4	Start code	n ... n	Stop code	DC4
hex.	14	Start code	n ... n	Stop code	14
dec.	20	Start code	n ... n	Stop code	20

Example

```
10 REM  code 11 barcode
20 LPRINT CHR$(27);"[?11~";
30 LPRINT CHR$(26);" D3;111";CHR$(25);
40 LPRINT CHR$(20);":123:";CHR$(20);
50 LPRINT CHR$(27);"[?10~"
```

Code BCD Matrix — Type E

Syntax

	Figures (n)	Start code	Stop code
ASCII	"0" to "9"	":"	":"
hex.	30 to 39	3A	3A
dec.	48 to 57	58	58

Data Structure

ASCII	DC4	Start code	n ... n	Stop code	DC4
hex.	14	Start code	n ... n	Stop code	14
dec.	20	Start code	n ... n	Stop code	20

Example

```
10 REM  BCD-matrix-code barcode
20 LPRINT CHR$(27);"[?11~";
30 LPRINT CHR$(26);" E3;111";CHR$(25);
40 LPRINT CHR$(20);":123:";CHR$(20);
50 LPRINT CHR$(27);"[?10~"
```

Code 39 Type F

Syntax

	Numbers/Character (n)	Start code	Stop code
ASCII	"0" to "9", "A" to "Z" and "$", "%", "*", "+", "-", ".", "/"	not fixed, recommended: "*"	not fixed, recommended: "*"
hex.	30 to 39, 41 to 5A and 24, 25, 2A, 2B, 2D, 2E, 2F	2A	2A
dec.	48 to 57, 65 to 90 and 36, 37, 42, 43, 45, 46, 47	42	42

Data Structure

ASCII	DC4	Start code	n ... n	Stop code	DC4
hex.	14	Start code	n ... n	Stop code	14
dec.	20	Start code	n ... n	Stop code	20

Example

```
10 REM  code 39 barcode
20 LPRINT CHR$(27);"[?11~";
30 LPRINT CHR$(26);" F3;111";CHR$(25);
40 LPRINT CHR$(20);"*123*";CHR$(20);
50 LPRINT CHR$(27);"[?10~"
```

CODABAR Type G

Syntax

	Numbers/Character (n)	Start code	Stop code
ASCII	"0" to "9", "A" to "D" and "$", "+", "-", ".", "/", ":"	not fixed, recommended: "a" to "e" and "n", "t", "*"	not fixed, recommended: "a" to "e" and "n", "t", "*"
hex.	30 to 39 and 24, 2B, 2D, 2E, 2F, 3A	61 to 65 and 6E, 74, 2A	61 to 65 and 6E, 74, 2A
dec.	48 to 57 and 36, 43, 45, 46, 47, 58	97 to 101 and 110, 116,42	97 to 101 and 110, 116,42

Data Structure

ASCII	DC4	Start code	n ... n	Stop code	DC4
hex.	14	Start code	n ... n	Stop code	14
dec.	20	Start code	n ... n	Stop code	20

Example

```
10 REM  codabar barcode
20 LPRINT CHR$(27);"[?11~";
30 LPRINT CHR$(26);" G3;111";CHR$(25);
40 LPRINT CHR$(20);"*123*";CHR$(20);
50 LPRINT CHR$(27);"[?10~"
```

Code EAN 8 with HRI — Type H

Syntax

	Figures (n)	Check Number (c)	Start code	Separation code	Stop code
ASCII	"0" to "9"	Calculation see section "Check Number Calculation"	":"	":"	":"
hex.	30 to 39		3A	3A	3A
dec.	48 to 57		58	58	58

Data Structure

ASCII	DC4	Start code	nnnn	Separation code	nnnc	Stop code	DC4
hex.	14	Start code	nnnn	Separation code	nnnc	Stop code	14
dec.	20	Start code	nnnn	Separation code	nnnc	Stop code	20

Example

```
10 REM  code EAN 8 with HRI
20 LPRINT CHR$(27);"[?11~";
30 LPRINT CHR$(26);" H3;111";CHR$(25);
40 LPRINT CHR$(20);":0123:4567:";CHR$(20);
50 LPRINT CHR$(27);"[?10~"
```

Code EAN 8 without HRI — Type I

Syntax

	Figures (n)	Check Number (c)	Start code	Separation code	Stop code
ASCII	"0" to "9"	Calculation see section "Check Number Calculation"	":"	":"	":"
hex.	30 to 39		3A	3A	3A
dec.	48 to 57		58	58	58

Data Structure

ASCII	DC4	Start code	nnnn	Separation code	nnnc	Stop code	DC4
hex.	14	Start code	nnnn	Separation code	nnnc	Stop code	14
dec.	20	Start code	nnnn	Separation code	nnnc	Stop code	20

Example

```
10 REM  code EAN 8 without HRI
20 LPRINT CHR$(27);"[?11~";
30 LPRINT CHR$(26);" I3;111";CHR$(25);
40 LPRINT CHR$(20);":0123:4567:";CHR$(20);
50 LPRINT CHR$(27);"[?10~"
```

Code EAN 13 with HRI — Type K

Syntax

	Figures (n)	Check Number (c)	Start code	Separation code	Stop code
ASCII	"0" to "9"	Calculation see section "Check Number Calculation"	":"	":"	":"
hex.	30 to 39		3A	3A	3A
dec.	48 to 57		58	58	58

Data Structure

ASCII	DC4	Start code	nnnnnnn	Separation code	nnnnnc	Stop code	DC4
hex.	14	Start code	nnnnnnn	Separation code	nnnnnc	Stop code	14
dec.	20	Start code	nnnnnnn	Separation code	nnnnnc	Stop code	20

Example

```
10 REM  code EAN 13 with HRI
20 LPRINT CHR$(27);"[?11~";
30 LPRINT CHR$(26);" K3;111";CHR$(25);
40 LPRINT CHR$(20);":0123456:789012:";CHR$(20);
50 LPRINT CHR$(27);"[?10~"
```

Code EAN 13 without HRI — Type L

Syntax

	Figures (n)	Check Number (c)	Start code	Separation code	Stop code
ASCII	"0" to "9"	Calculation see section "Check Number Calculation"	":"	":"	":"
hex.	30 to 39		3A	3A	3A
dec.	48 to 57		58	58	58

Data Structure

ASCII	DC4	Start code	nnnnnnn	Separation code	nnnnnc	Stop code	DC4
hex.	14	Start code	nnnnnnn	Separation code	nnnnnc	Stop code	14
dec.	20	Start code	nnnnnnn	Separation code	nnnnnc	Stop code	20

Example

```
10 REM  code EAN 13 without HRI
20 LPRINT CHR$(27);"[?11~";
30 LPRINT CHR$(26);" L3;111";CHR$(25);
40 LPRINT CHR$(20);":0123456:789012:";CHR$(20);
50 LPRINT CHR$(27);"[?10~"
```

Code MSI / modified Plessey — Type M

Syntax

	Figures (n)	Start code	Stop code
ASCII	"0" to "9"	":"	";"
hex.	30 to 39	3A	3B
dec.	48 to 57	58	59

Data Structure

ASCII	DC4	Start code	n ... n	Stop code	DC4
hex.	14	Start code	n ... n	Stop code	14
dec.	20	Start code	n ... n	Stop code	20

Example

```
10 REM  code MSI/plessey modified
20 LPRINT CHR$(27);"[?11~";
30 LPRINT CHR$(26);" M3;111";CHR$(25);
40 LPRINT CHR$(20);":0123;";CHR$(20);
50 LPRINT CHR$(27);"[?10~"
```

Code UPC A with HRI — Type N

Syntax

	Figures (n)	Check Number (c)	Start code	Separation code	Stop code
ASCII	"0" to "9"	Calculation see section "Check Number Calculation"	":"	":"	":"
hex.	30 to 39		3A	3A	3A
dec.	48 to 57		58	58	58

Data Structure

ASCII	DC4	Start code	nnnnnn	Separation code	nnnnnc	Stop code	DC4
hex.	14	Start code	nnnnnn	Separation code	nnnnnc	Stop code	14
dec.	20	Start code	nnnnnn	Separation code	nnnnnc	Stop code	20

Example

```
10 REM  code UPC A with HRI
20 LPRINT CHR$(27);"[?11~";
30 LPRINT CHR$(26);" N3;111";CHR$(25);
40 LPRINT CHR$(20);":012345:678901:";CHR$(20);
50 LPRINT CHR$(27);"[?10~"
```

Code UPC A without HRI — Type O

Syntax

	Figures (n)	Check Number (c)	Start code	Separation code	Stop code
ASCII	"0" to "9"	Calculation see section "Check Number Calculation"	":"	":"	":"
hex.	30 to 39		3A	3A	3A
dec.	48 to 57		58	58	58

Data Structure

ASCII	DC4	Start code	nnnnnn	Separation code	nnnnnc	Stop code	DC4
hex.	14	Start code	nnnnnn	Separation code	nnnnnc	Stop code	14
dec.	20	Start code	nnnnnn	Separation code	nnnnnc	Stop code	20

Example

```
10 REM  code UPC A without HRI
20 LPRINT CHR$(27);"[?11~";
30 LPRINT CHR$(26);" O3;111";CHR$(25);
40 LPRINT CHR$(20);":012345:678901:";CHR$(20);
50 LPRINT CHR$(27);"[?10~"
```

Code UPC E with HRI — Type P

Syntax

	Figures (n)	Check Number (c)	Start code	Stop code
ASCII	"0" to "9"	Calculation see section "Check Number Calculation"	":"	":"
hex.	30 to 39		3A	3A
dec.	48 to 57		58	58

Data Structure

ASCII	DC4	Start code	nnnnnnnc	Stop code	DC4
hex.	14	Start code	nnnnnnnc	Stop code	14
dec.	20	Start code	nnnnnnnc	Stop code	20

Example

```
10 REM  code UPC E with HRI
20 LPRINT CHR$(27);"[?11~";
30 LPRINT CHR$(26);" P3;111";CHR$(25);
40 LPRINT CHR$(20);":01234567:";CHR$(20);
50 LPRINT CHR$(27);"[?10~"
```

Code UPC E without HRI — Type Q

Syntax

	Figures (n)	Check Number (c)	Start code	Stop code
ASCII	"0" to "9"	Calculation see section "Check Number Calculation"	":"	":"
hex.	30 to 39		3A	3A
dec.	48 to 57		58	58

Data Structure

ASCII	DC4	Start code	nnnnnnnc	Stop code	DC4
hex.	14	Start code	nnnnnnnc	Stop code	14
dec.	20	Start code	nnnnnnnc	Stop code	20

Example

```
10 REM  code UPC E without HRI
20 LPRINT CHR$(27);"[?11~";
30 LPRINT CHR$(26);" Q3;111";CHR$(25);
40 LPRINT CHR$(20);":01234567:";CHR$(20);
50 LPRINT CHR$(27);"[?10~"
```

Code Delta distance (IBM) Type R

Syntax

	Figures/Characters (n)	Start code	Stop code
ASCII	"0" to "9" and "A" to "F"	"F"	"D"
hex.	30 to 39 and 41 to 46	46	44
dec.	48 to 57 and 65 to 70	70	68

Data Structure

ASCII	DC4	Start code	n ... n	Stop code	DC4
hex.	14	Start code	n ... n	Stop code	14
dec.	20	Start code	n ... n	Stop code	20

Example

```
10 REM  code delta distance (IBM) without HRI
20 LPRINT CHR$(27);"[?11~";
30 LPRINT CHR$(26);" R3;111";CHR$(25);
40 LPRINT CHR$(20);"F0123D";CHR$(20);
50 LPRINT CHR$(27);"[?10~"
```

Code 128 Type S

Syntax

	Figures/Characters (n)	Start code	Stop code
ASCII hex. dec.	see table section "Description"	none	none

Data Structure

ASCII	DC4	n ... n	DC4
hex.	14	n ... n	14
dec.	20	n ... n	20

Description

While many barcode styles are limited to numbers, Code 128 can encode numbers, letters, and other symbols commonly found on keyboards, such as @, # and %. The Code 128 barcode is like three barcodes in one. The three barcode styles are called Code A, Code B, and Code C. Each barcode style is designed to encode certain types of data in the most compact way.

Code A encodes uppercase alpha, numeric and control codes.

Code B encodes upper and lower case alpha and numeric codes.

Code C encodes digits in pairs.

A single *Code 128* barcode may consist of all three Code 128 barcode styles A, B and C. The printer chooses the styles which result in the most compact Code 128 barcode for the data to be encoded. Thus, the user needn't be concerned about choosing the correct barcode styles as this is done automatically.

The ">" (greater than) symbol is a special character prefix. If a character with decimal value less then 32 needs to be encoded (i.e., a control character), then send a ">" followed by the character that is decimal 64 higher then the control code character.

Control characters are conflicting with DC4, SUB ... these characters are encoded by using the ">" sign following a number that is 64 dec. higher than the control character.

Example

If you need to print a Carriage Return (hex.0D, dec.13), as part of a barcode, you need to send ">M" (13 + 64 = 77, see character set table to verify that decimal 77 equals the capital letter "M"). This substitution process can be carried out throughout the range of decimal values, i.e., ">d" (decimal 100) equates to the dollar symbol (decimal 36). If the greater-than symbol itself must be transmitted, send ">0" (the 0 will not be part of the printed data).

The Code 128 barcode style selection can also be done manually. This is done by adding a style selection character to the beginning of the barcode data. Choose code A, B, or C from the table of special characters below:

Special Character	Code 128
">0"	30 (">")
">1"	95
">2"	96
">3"	97
">4"	98
">5"	99 (Code C)
">6"	100 (Code B)
">7"	101 (Code A)
">8"	102

When a style selection has been made, character data will be translated from the selected code style to the *Code 128* repesentation. The translation table on the following page summarizes this:

Code 128 translation table

Wert	Code A	Code B	Code C
0	Space	Space	00
1	!	!	01
2	"	"	02
3	#	#	03
4	$	$	04
5	%	%	05
6	&	&	06
7	‘	‘	07
8	(	(	08
9	)	)	09
10	*	*	10
11	+	+	11
12	‘	‘	12
13	hyphen	hyphen	13
14	period	period	14
15	/	/	15
16	0	0	16
17	1	1	17
18	2	2	18
19	3	3	19
20	4	4	20
21	5	5	21
22	6	6	22
23	7	7	23
24	8	8	24
25	9	9	25
26	:	:	26
27	;	;	27
28	<	<	28
29	=	=	29
30	>	>	30
31	?	?	31
32	@	@	32
33	A	A	33
34	B	B	34
35	C	C	35

Wert	Code A	Code B	Code C
36	D	D	36
37	E	E	37
38	F	F	38
39	G	G	39
40	H	H	40
41	I	I	41
42	J	J	42
43	K	K	43
44	L	L	44
45	M	M	45
46	N	N	46
47	O	O	47
48	P	P	48
49	Q	Q	49
50	R	R	50
51	S	S	51
52	T	T	52
53	U	U	53
54	V	V	54
55	W	W	55
56	X	X	56
57	Y	Y	57
58	Z	Z	58
59	[	[	59
60	\	\	60
61	]	]	61
62	^	^	62
63	_	_	63
64	NUL	‘	64
65	SOH	a	65
66	STX	b	66
67	ETX	c	67
68	EOT	d	68
69	ENQ	e	69
70	ACK	f	70
71	BEL	g	71

Wert	Code A	Code B	Code C
72	BS	h	72
73	HT	i	73
74	LF	j	74
75	VT	k	75
76	FF	l	76
77	CR	m	77
78	SO	n	78
79	SI	o	79
80	DLE	p	80
81	DC1	q	81
82	DC2	r	82
83	DC3	s	83
84	DC4	t	84
85	NAK	u	85
86	SYN	v	86
87	ETB	w	87
88	CAN	x	88
89	EM	y	89
90	SUB	z	90
91	ESC	{	91
92	FS	|	92
93	GS	}	93
94	RS	~	94
95	US	DEL	95
96	FNC3	FNC3	96
97	FNC2	FNC2	97
98	SHIFT	SHIFT	98
99	CODEC	CODEC	99
100	CODEB	FUNC4	CODEB
101	FNC4	CODEA	CODEA
102	FNC1	FNC1	FNC1

Codes 96 through 102 do not have corresponding ASCII character translations; these may be encoded using the special character table above.

Example

```
10 REM  code 128
20 LPRINT CHR$(27);"[?11~";
30 LPRINT CHR$(26);" S3;111";CHR$(25);
40 LPRINT CHR$(20);"ABCD0123";CHR$(20);
50 LPRINT CHR$(27);"[?10~"
```

EAN 128 Type T

Syntax

	Figures/Characters (n)	Start code	Stop code
ASCII hex. dec.	see Code 128	none	none

Data Structure

ASCII	DC4	n ... n	DC4
hex.	14	n ... n	14
dec.	20	n ... n	20

Description

The only difference between both types of barcodes is the initial sequence.
Code 128 starts with Code A, Code B or Code C followed by character information.
Barcode EAN 128 requires the code FNC1 between Startcode and character information.
The Code 128 translation table remains valid. The checksum of EAN 128 is calculated using Code 128 algorythm.

Example

```
10 LPRINT CHR$(27);"[?11~";
20 LPRINT CHR$(26);" T3;111";CHR$(25);
30 LPRINT CHR$(20);"1234ABCD";CHR$(20);
40 LPRINT CHR$(27);"[?10~"
```

Add-On Barcodes

UPC and EAN barcodes (commercial barcodes) can be extended with Add-On barcodes.

The following barcodes can be extended with Add-On barcodes:

Barcode Types H, I, K, L, N, O, P and Q

In the data formats the numbers are generally given in the sequence they are printed from left to right in the barcode, i.e. in the case of the EAN13 code, the 13. figure is transferred first and the 1. figure last. For the formats for the Add-On barcodes, the printer expects the check number as the first figure. This is not printed in the barcode. The following numbers (2 or 5) are printed from left to right in Add-On barcode.

Example 1

EAN13 barcode with HRI and Add On 2 extention

Format: DC4:nnnnnnn:nnnnnn**:cnn**:DC4

```
10 REM  code EAN 13 with add-on-2 extention
20 LPRINT CHR$(27);"[?11~";
30 LPRINT CHR$(26);" K3;111";CHR$(25);
40 LPRINT CHR$(20);":0123456:789012:012:";CHR$(20);
50 LPRINT CHR$(27);"[?10~"
```

Example 2 EAN13 barcode with HRI and Add On 5 extention

Format: DC4:nnnnnnn:nnnnnn**:cnnnnn**:DC4

```
10 REM  code EAN 13 with add-on-5 extention
20 LPRINT CHR$(27);"[?11~";
30 LPRINT CHR$(26);" K3;111";CHR$(25);
40 LPRINT CHR$(20);":0123456:789012:012345:";CHR$(20);
50 LPRINT CHR$(27);"[?10~"
```

Check Number Calculation

The following barcode types must be given a check number for transfer to the printer:

- Type H and I (EAN 8)
- Type K and L (EAN 13)
- Type N and O (UPC A)
- Type P and Q (UPC E)

The check number (c) is transferred after the barcode information (n). For the "EAN" type, this is printed as the last figure in the HRI data line. For the "UPC" type, the check number is not printed in the HRI data line.

The commercial barcodes can be extended with the following user-specific additional barcodes (see also section "Add-On Barcodes"):

- Add-On 2 barcode
- Add-On 5 barcode

Here the check number (c) is transferred before the barcode information (n).

EAN 13

12 numbers are transferred for the EAN 13 code. The 13. digit represents the check number. The even figures of the information have a factor of "3", the uneven figures a factor of "1". Counting begins from the left. The resulting cross sum is divided by 10. The remaining figure is subtracted from the modul (10). If the remainder is "0", the check number is also "0".

Example

Information	4	0	1	2	3	4	5	6	7	8	9	0	1
Factor	1	3	1	3	1	3	1	3	1	3	1	3	
Product	4	+ 0	+ 1	+ 6	+ 3	+ 12	+ 5	+ 18	+ 7	+ 24	+ 9	+ 0	
Cross sum	89												

10 (modul) - 9 (remainder) = 1 (check number)

For remainder "0" the check number is also "0".

EAN 8

7 numbers are transferred for the EAN 8 code. The 8. digit represents the check number. The even figures of the information have a factor of "3", the uneven figures a factor of "1". Counting begins from the left. The resulting cross sum is divided by 10. The remaining figure is subtracted from the modul (10). If the remainder is "0", the check number is also "0".

Example

Information	4	0	1	2	3	4	6	2
Factor	3	1	3	1	3	1	3	
Product	12 +	0 +	3 +	2 +	9 +	4 +	18	
Cross sum	48							

10 (modul) - 8 (remainder) = 2 (check number)

For remainder "0" the check number is also "0".

UPCA

11 numbers are transferred for the UPCA code. The 12. digit represents the check number. The even figures of the information have a factor of "3", the uneven figures a factor of "1". Counting begins from the left. The resulting cross sum is divided by 10. The remaining figure is subtracted from the modul (10). If the remainder is "0", the check number is also "0".

Example

Information	4	0	1	2	3	4	5	6	7	8	9	3
Factor	3	1	3	1	3	1	3	1	3	1	3	
Product	12 +	0 +	3 +	2 +	9 +	4 +	15 +	6 +	21 +	8 +	27	
Cross sum	107											

10 (modul) - 7 (remainder) = 3 (check number)

For remainder "0" the check number is also "0".

UPCE

For the UPCE barcode type, 7 numbers are transmitted. The 8. digit is the check number. The uneven figures of the information have a factor of "3", the even figures a factor of "1". Counting begins from the left. The resulting cross sum is divided by 10. The remaining integer value is subtracted from the modul (10). The result is transmitted as the check number (c).

Example

Information	0	1	2	3	4	5	6	5
Factor	3	1	3	1	3	1	3	
Product	0 +	1 +	6 +	3 +	12 +	5 +	18	
Cross sum	45							

10 (modul) - 5 (remainder) = 5 (check number)

For remainder "0" the check number is also "0".

Add-On 5

6 numbers are transmitted: check number (c) + 5 information items (n). The uneven figures of the information have a factor of "3", the even figures a factor of "1". Counting begins from the right. The resulting cross sum is divided by 10. The remaining integer value is subtracted from the modul (10). The result is transmitted as the check number (c).

Example

Information	3	8	6	1	0	4	
Factor		3	9	3	9	3	
Product		24 +	54 +	3 +	0 +	12	
Cross sum		93					

3 (remainder) = 3 (check number)

The check number is not printed in the clear data line (HRI).

Add-On 2

3 numbers are transmitted: check number (c) and 2 informations (n).
The check number results from the remaining integer value of modul (4).

Example 1

Information	0	0	4
Remainder (0)	└──	0	

Example 2

Information	2	0	6
Remainder (2)	└──	2	

Example 3

Information	3	9	9
Remainder (3)	└──	3	

Example 4

Information	1	0	9
Remainder (1)	└──	1	

The check number always lies between "0" and "3"; it is not printed in the HRI line.

US Postnet Barcode

US Postnet Barcode ESC [1 SP p

Data Structure

ASCII	ESC	"["	"1"	SP	"p"
hex.	1B	5B	31	20	70
dec.	27	91	49	32	112

Description

After receiving this sequence numeric characters from 0 (hex. 30) to 9 (hex. 39) are interpreted as barcode figures. Other Alpha characters are ignored. Control characters from hex.00 (dec.9) to hex.1F (dec.31) terminates this barcode mode.

You may use this sequence in every emulation. The printer can print barcode in NLQ and LQ. If draft print quality (DPQ) is selected the printout is performed in NLQ.

The character (e.g. CR = carriage return, hex. 0D), which terminates barcode mode will neither be printed nor carried out. A tab command (hex.09, dec.9) is carried out in this barcode.

```
10 REM  US postnet barcode
20 LPRINT CHR$(27);"[?11~";
30 LPRINT CHR$(27);"[1 p";"1234567";CHR$(13);
40 LPRINT CHR$(27);"[?10~"
```

Large Character Printing (LCP)

Before you can transfer the LCP data (Large Character Printing) data to the printer, the LCP header must be sent. The LCP header is made up of a series of max. 5 characters. In the header, the printing parameters and the LCP character size are defined. This header only needs to be transferred once, unless settings are to be changed or the printer has been turned off.

LCP Header

Format: DLE [!] n EM

[ ] optional, does not need to be transmitted

Character meaning:

DLE	(hex.10, dec.16)	start character
!	ASCII	bidirectional printing (if transferred)
n	ASCII n = "2"..."99"	enlargement factor
EM	(hex.19, dec.25)	end character

with the help of the header, the enlargement factor is fixed to the original size. A character in LCP mode with the size n occupies a horizontal space for n normal character, depending on the selected character distance. At a character distance of 10 characters/inch and an enlargement factor of 6, the LCP font width is 6/10 inch.

The height of a LCP character is n times 1/12 inch. It is independent of the selected line spacing. The LCP characters are printed, so that their lower edges lie flush with the next available ground line. The result is that only the upper edges of characters with an uneven enlargement factor can lie flush with the line.

LCP Data

The existence of a LCP header does not mean that all subsequent characters are printed in LCP size. The LCP mode must be begun and it must end with the LCP brackets SI (hex.0F, dec.15). All characters inside these brackets are printed as LCP characters. The LCP mode is ended by all characters from hex.00 to hex.1F.

LCP characters can be printed with character densities 10, 12, 15, 17.1 and 20 cpi. If there is a LCP line overflow, the printing procedure is automatically started. All characters which caused the overflow are then printed as normal characters.

Refer to the section "Secured/Unsecured Mode" at the front of the Manual for detailed description of the secured/unsecured mode.

Data Structure

ASCII	SI	n ... n	SI
hex.	0F	n ... n	0F
dec.	15	n ... n	15

n = all printable characters (> hex.1F, dec.31)

Example

```
REM Example Character Densities
OPEN "lpt1:" FOR RANDOM AS #1
WIDTH #1,  255
PRINT #1, CHR$(27); "[?11~";
PRINT #1,  CHR$(16); "4"; CHR$(25);
PRINT #1, CHR$(27); "[6w"; :REM 15CPI
PRINT #1, CHR$(15); "LCP ";CHR$(15);
PRINT #1, CHR$(27); "[5w"; :REM 12CPI
PRINT #1, CHR$(15); "LCP ";CHR$(15);
PRINT #1, CHR$(27); "[4w"; :REM 10CPI
PRINT #1, CHR$(15); "LCP ";CHR$(15);

PRINT #1, STRING$ (5, 10);

END
```

LCP Character Set US-ASCII	**ESC P L S 0 1 ESC **
LCP Character Set German	**ESC P L S 0 2 ESC **

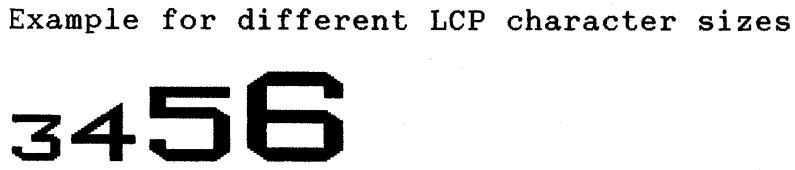
Data Structure

ASCII	ESC	"P"	"L"	"S"	"0"	"1"	ESC	"\"	character set US-ASCII
hex.	1B	50	4C	53	30	31	1B	5C	
dec.	27	80	76	83	48	49	27	92	
ASCII	ESC	"P"	"L"	"S"	"0"	"2"	ESC	"\"	character set german
hex.	1B	50	4C	53	30	32	1B	5C	
dec.	27	80	76	83	48	50	27	92	

Various Examples

Example 1

```
10  LPRINT "Example for different LCP character sizes"
20  LPRINT CHR$(27); "[?11~";
30  LPRINT CHR$(27); "PSC0"; CHR$(27); "\";
40  REM set character size to 3
50  LPRINT CHR$(16); "3"; CHR$(25);
60  LPRINT CHR$(15); "3"; CHR$(15);
70  REM set character size to 4
80  LPRINT CHR$(16); "4"; CHR$(25);
90  LPRINT CHR$(15); "4"; CHR$(15);
100 REM set character size to 5
110 LPRINT CHR$(16); "5"; CHR$(25);
120 LPRINT CHR$(15); "5"; CHR$(15);
130 REM set character size to 6
140 LPRINT CHR$(16); "6"; CHR$(25);
150 LPRINT CHR$(15); "6"; CHR$(15);
160 LPRINT CHR$(27); "[?10~"
170 END
```



Example 2

```
REM Example 2 for unsecured printing
OPEN "lpt1:" FOR RANDOM AS #1
WIDTH #1, 255
PRINT #1, CHR$(27); "[?11~";
PRINT #1, CHR$(27); "PSCO"; CHR$(27); "\";
PRINT #1, CHR$(16); "5"; CHR$(25);
PRINT #1, "Example for ";
PRINT #1, CHR$(15); "LCP"; CHR$(15);" unsecured mode";
PRINT #1, CHR$(10); CHR$(13);
END
```

Example 3

```
REM Example 3 for secured printing
OPEN "lpt1:" FOR RANDOM AS #1
WIDTH #1, 255
PRINT #1,  CHR$(27); "[?11~";
PRINT #1, CHR$(27); "PSC1"; CHR$(27); "\";
PRINT #1, CHR$(16); "5"; CHR$(25);
PRINT #1, "Example for ";
PRINT #1,  CHR$(15); "LCP"; CHR$(15);
PRINT #1, " secured"; CHR$(10); "mode";
PRINT #1, STRING$(5, 10);
END
```

Example 4 Unsecured Mode, vertical spacing with various enlargement factors

Legend

A – a single line Feed (1/6")

B – Factor 6 character; heigth $6\times\frac{1}{12} \cong 3\times\frac{1}{6}$ LF

C – Factor 7 character; height $7\times\frac{1}{12}$ additional space is added to gain a full Line Feed

D – Factor 4 character; height $4\times\frac{1}{12} \cong 2\times\frac{1}{6}$ LF

E – Factor 5 character; height $5\times\frac{1}{12}$ additional space is added to gain a full Line Feed

▲ – start, actual print (cursor)-position

● – end, actual print-position

Description The room will be occupied to fit the highest character in one line. Characters which will not meet the 1/6" grid *) are adding additional space to fill the room to the next possible line.

*) this value may change due to actual line density setting.

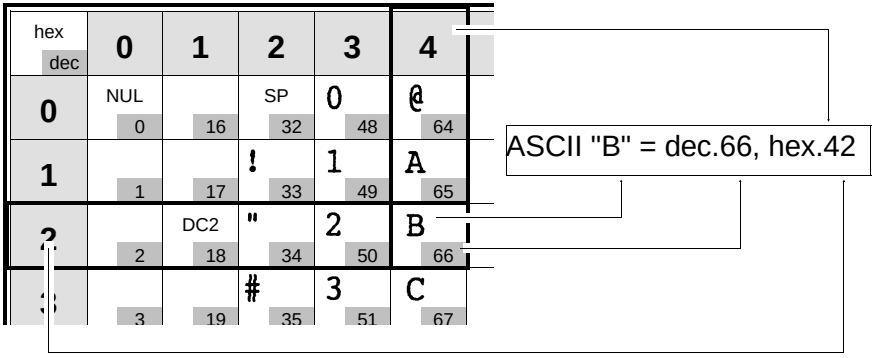
Appendix

Character Sets

The following symbol sets are available in the barcode mode.

The LCP symbol sets can only be selected via Escape sequences. The OCR-A and OCR-B fonts can be selected via control panel or by Escape sequences, which correspond to the selected emulation mode. The codes hex.A0 up to hex.FE correspond to the selected character set.

The following example shows you how to find the hexadecimal value for a character from the character set table.



LCP Character Set, german

hex / dec	0	1	2	3	4	5	6	7
0	NUL 0	16	32	48	64	80	96	112
1	1	17	! 33	1 49	A 65	Q 81	a 97	q 113
2	2	18	" 34	2 50	B 66	R 82	b 98	r 114
3	3	19	# 35	3 51	C 67	S 83	c 99	s 115
4	4	20	$ 36	4 52	D 68	T 84	d 100	t 116
5	5	21	% 37	5 53	E 69	U 85	e 101	u 117
6	6	22	& 38	6 54	F 70	V 86	f 102	v 118
7	7	23	' 39	7 55	G 71	W 87	g 103	w 119
8	8	24	(40	8 56	H 72	X 88	h 104	x 120
9	9	25	) 41	9 57	I 73	Y 89	i 105	y 121
A	10	26	* 42	: 58	J 74	Z 90	j 106	z 122
B	11	27	+ 43	; 59	K 75	Ä 91	k 107	ä 123
C	12	28	, 44	< 60	L 76	Ö 92	l 108	ö 124
D	13	29	- 45	= 61	M 77	Ü 93	m 109	ü 125
E	14	30	. 46	> 62	N 78	↑ 94	n 110	ß 126
F	15	31	/ 47	? 63	O 79	← 95	o 111	ä 127

LCP Character Set, US-ASCII

hex / dec	0	1	2	3	4	5	6	7
0	NUL 0	16	32	48	64	80	96	112
1	1	17	! 33	1 49	A 65	Q 81	a 97	q 113
2	2	18	" 34	2 50	B 66	R 82	b 98	r 114
3	3	19	# 35	3 51	C 67	S 83	c 99	s 115
4	4	20	$ 36	4 52	D 68	T 84	d 100	t 116
5	5	21	% 37	5 53	E 69	U 85	e 101	u 117
6	6	22	& 38	6 54	F 70	V 86	f 102	v 118
7	7	23	' 39	7 55	G 71	W 87	g 103	w 119
8	8	24	(40	8 56	H 72	X 88	h 104	x 120
9	9	25	) 41	9 57	I 73	Y 89	i 105	y 121
A	10	26	* 42	: 58	J 74	Z 90	j 106	z 122
B	11	27	+ 43	; 59	K 75	[91	k 107	{ 123
C	12	28	, 44	< 60	L 76	\ 92	l 108	| 124
D	13	29	- 45	= 61	M 77	] 93	m 109	} 125
E	14	30	. 46	> 62	N 78	↑ 94	n 110	~ 126
F	15	31	/ 47	? 63	O 79	← 95	o 111	ä 127

OCR-A Character Set (Code Page 437)

hex / dec	0	1	2	3	4	5	6	7
0	NUL 0	16	32	0 48	@ 64	P 80	` 96	p 112
1	1	17	! 33	1 49	A 65	Q 81	a 97	q 113
2	2	18	" 34	2 50	B 66	R 82	b 98	r 114
3	3	19	# 35	3 51	C 67	S 83	c 99	s 115
4	4	20	$ 36	4 52	D 68	T 84	d 100	t 116
5	5	21	% 37	5 53	E 69	U 85	e 101	u 117
6	6	22	& 38	6 54	F 70	V 86	f 102	v 118
7	7	23	' 39	7 55	G 71	W 87	g 103	w 119
8	8	24	(40	8 56	H 72	X 88	h 104	x 120
9	9	25	) 41	9 57	I 73	Y 89	i 105	y 121
A	10	26	* 42	: 58	J 74	Z 90	j 106	z 122
B	11	27	+ 43	; 59	K 75	[91	k 107	{ 123
C	12	28	, 44	< 60	L 76	\ 92	l 108	| 124
D	13	29	- 45	= 61	M 77	] 93	m 109	} 125
E	14	30	. 46	> 62	N 78	^ 94	n 110	~ 126
F	15	31	/ 47	? 63	O 79	_ 95	o 111	127

OCR-B Character Set (Code Page 437)

hex / dec	0	1	2	3	4	5	6	7
0	NUL 0	16	32	0 48	@ 64	P 80	` 96	p 112
1	1	17	! 33	1 49	A 65	Q 81	a 97	q 113
2	2	18	" 34	2 50	B 66	R 82	b 98	r 114
3	3	19	# 35	3 51	C 67	S 83	c 99	s 115
4	4	20	$ 36	4 52	D 68	T 84	d 100	t 116
5	5	21	% 37	5 53	E 69	U 85	e 101	u 117
6	6	22	& 38	6 54	F 70	V 86	f 102	v 118
7	7	23	' 39	7 55	G 71	W 87	g 103	w 119
8	8	24	(40	8 56	H 72	X 88	h 104	x 120
9	9	25	) 41	9 57	I 73	Y 89	i 105	y 121
A	10	26	* 42	: 58	J 74	Z 90	j 106	z 122
B	11	27	+ 43	; 59	K 75	[91	k 107	{ 123
C	12	28	, 44	< 60	L 76	\ 92	l 108	| 124
D	13	29	- 45	= 61	M 77	] 93	m 109	} 125
E	14	30	. 46	> 62	N 78	^ 94	n 110	~ 126
F	15	31	/ 47	? 63	O 79	_ 95	o 111	127

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