FUTURES USER GUIDE

Issue 1

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Contents

Introduction

About this guide

This manual is intended for all users of Datastream Futures service. It focuses on the Commodity and Financial Futures programs, the 250s. It also provides summaries of other related Datastream services that you may use when working with futures. The remainder of this introduction describes:

- What you need to know to use Datastream
- A description of the Program Finder screen
- Conventions and special keys used in Datastream
- Getting help on the futures programs
- Related documentation
- Training and support

What you need to know

In this guide we assume that you are familiar with using the Datastream service and that you know how to log on to the system. For users of Datastream's DSWindows product, we also assume that you are familiar with Microsoft Windows® concepts and procedures. If not, please refer to the Microsoft Windows documentation.

If you are completely new to Datastream, please ask your Customer Services Executive for help with training and appropriate documentation. For general enquiries or problems concerning the Datastream service, please contact your Customer Services Executive or call the Helpline on the telephone number given at the back of this manual.

How to use this guide

This guide is divided into the following sections:

■ **Introduction to futures, page 8**

An introduction to commodity and financial futures, plus defintions and worked examples of 'hedging' and 'speculators'.

■ **Mnemonics for futures contracts**, **page 13**

How to construct mnemonics for financial futures contracts for use in the 250 programs. The section also contains details of futures datatypes and currency conversions.

■ **Date formats in futures programs, page 23**

Descriptions of the various date formats used in the 250 programs.

■ **Futures programs, page 27**

Detailed descriptions of the Datastream 250 programs, including annotated illustrations of the input and output screens, plus explanations of the input and output data.

■ **Futures research using other Datastream services, page 67**

A summary of additional Datastream programs you can use in futures research, such as Graphics and Data Channel programs.

DSWindows Program Finder

The Program Finder screen enables you to access the Futures best suited to your need.

Þ **To access the Datastream futures programs:**

- Either   Type the program code in the Program number field, for example, **250C**
- Or   If you do not know the program code, select from the menu boxes:

    1   The type of request, for example, Graphs

    2   The type of data, that is, Futures

    3   The program you want, for example, High, low, close chart

- Press ENTER to display the program input screen

Program number field

Type of request

Type of data

Programs available
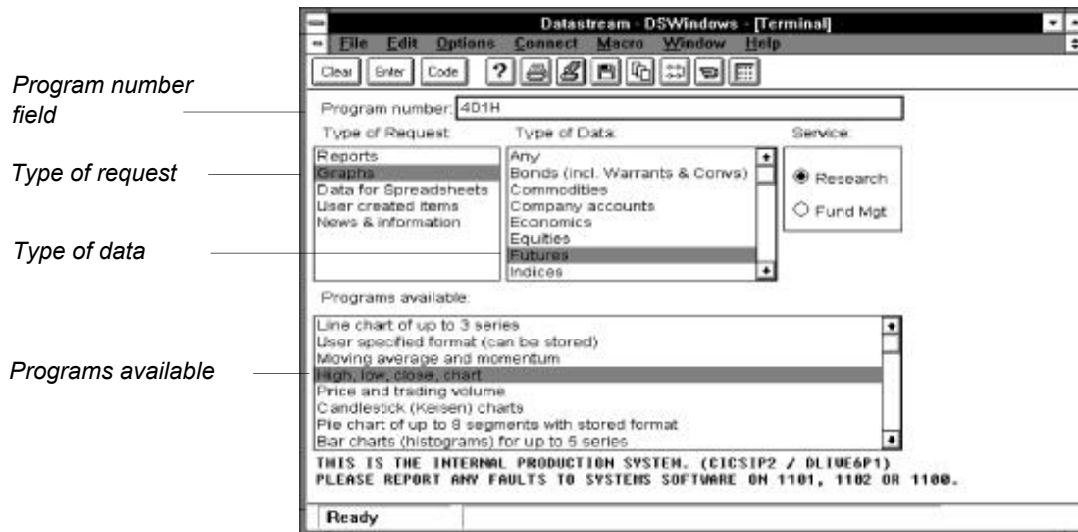
Program Finder screen

Conventions

Keys   In this user guide, the names of keys are shown in small capital letters, for example, ENTER, ALT or ESC. Similarly, the function keys are shown as F1 to F12.

Input data   Text that you must type in is shown using a bold typeface; for example:
                     '...type **250A** and press ENTER.'

Input fields   Input fields are shown in the following typeface: `FIRST DELIVERY DATE`

Screen displays Throughout this user guide, all screen displays are taken from the DSWindows 2.0 environment.

Getting help

Code Lookup

Press F9 when you are using a program to access Code Lookup. This enables you to search for codes and mnemonics and insert them directly into your current input field.

Þ **To view a full list of futures market & contract codes (see page 14):**

Either   Select 'Futures' from the drop-down list box

Or   In the Set Required Code Type dialog box, select 'Futures/options' from the left hand Code Categories list; then select 'Futures' from the right hand list

Help with codes and mnemonics

At the Datastream prompt, type **HELP FUT?** for help on:

■   Constructing futures mnemonics
■   Futures market & contract codes listed by country
■   Discontinued futures listed by exchange

Further information

Related documentation

Other Datastream publications which you may find useful are:

- *Time Series User Guide* - describes the 301 graphics referred to in this guide
- *Graphics User Guide* - describes the 401 programs referred to in this guide
- *Data Channel User Guide* - describes the 900 programs referred to in this guide
- *Datastream Definitions manual* - contains definitions for all terms on Datastream relating to traded futures, including datatypes, models and calculations

Notes to all Datastream users

- This guide is intended for use by all users of the Datastream futures service. Regardless of whether you use DSCOM, DSTERM or DSWindows, the input fields and the functionality of all the programs themselves are identical. The only differences between the three Datastream applications is in the interface (that is, the screen appearance) and the procedures for saving, printing, configuring, annotating and exporting your graphs. See the *DSTERM User Guide (Issue 3)*, the *DSCOM 4.2 User Guide* and the *DSWindows 2.0 User Guide* for further details.
- In DSWindows 2.0, the Datastream prompt has been replaced with the 'Program number' input field in the 'Program Finder' screen - see page 3. All references to the Datastream prompt therefore now refer to the Program number field.

Training and support

Datastream provides a full range of hands-on training workshops, tailored to give you the knowledge, practice and confidence to make full use of the Datastream system. The workshops are constantly reviewed to meet changing market needs and to suit the differing requirements of each country in which the Datastream service is available. Contact your Customer Services Executive for detailed and up-to-date information.

Datastream provides clients with telephone Helpline support for queries on any aspect of using the Datastream system. A list of telephone numbers you can use is given at the back of this guide.

Further assistance

If you have any questions about the Futures service, or about any other Datastream service, please contact your Customer Services Executive using either the Helpline Direct Line number, or the appropriate telephone number from the list at the back of this guide.

Introduction to futures

Overview

The following section gives a brief introduction to financial and commodity futures, and includes:

- A definition of a futures contract
- An introduction to futures markets
- Lists of the major types of commodity and financial futures
- Definitions of 'hedging' and 'speculators'

What is a future?

A futures contract is a commitment to deliver or purchase assets (commodities or securities) at a future date. It is a legally binding commitment to make or accept delivery of:

- A standardised quantity and quality of a commodity3
- At a standardised time and place in the future
- For a price agreed upon today

Futures markets

Because contracts are standardised, and business is open and prices published, futures contracts can subsequently be bought and sold. A futures market provides a means of minimising the risks which accompany price fluctuations in financial markets.

In particular, by providing a continuous flow of price information, the futures markets allow operators to protect an existing situation against any adverse future price changes in price or to speculate.

Futures also provide an opportunity for dealers to hedge against future changes in price. But **hedging** (page 10) is only possible if **speculators** (page 11)are willing to assume this risk and buy or sell these contracts.

Example futures markets include:

- LIFFE   London International Financial Futures Exchange
- LME   London Metal Exchange
- CBOT   Chicago Board of Trade
- MGE   Minneapolis Grain Exchange

Types of future

Futures are generally divided into commodity futures and financial futures.

Commodity futures

These refer to things found in nature, for example, copper. They exclude manufactured products, for example, motor vehicles. Commodity futures are usually classified as:

Hard	Usually metals. Examples include aluminium, nickel and gold
Soft	Examples include coffee, cocoa and orange juice
Energy	Oils and chemicals. Examples include brent crude oil and ammonia
Agricultural	Examples include wheat, barley and live hogs

Financial futures

These are financial instruments, usually classified as:

Currency futures	Examples include Japanese Yen to US Dollars
Index futures	Examples include the FTSE100 and CAC40 index
Interest rates	Usually with a maturity of less than one year. Examples include 1 month LIBORs and 3 month Eurodollar rates
T-Notes/Bonds (medium)	With a maturity of between 1 and 5 years. Examples include 2 year US T-Notes and 5 year German government bonds
T-Notes/Bonds/ Gilts	With a maturity of between 5 and 30 years. Examples include US Treasury bonds (30 years), Japanese government bonds (10 and 20 years) and US T-Notes (10 years)

Hedging and speculators

Hedging

The term 'hedging' applies equally to financial and commodity futures. It describes the act of taking a temporary position in the futures market that is equal and opposite to your cash market position in order to protect the cash position against future loss due to price fluctuation. Program 250G enables you to perform hedging calculations on certain bond contracts (page 39).

Example

A farmer expects to harvest 10,000 soyabean bushels in September 1994. By hedging, he can guarantee his income and protect himself against the possibility of falling prices later in the year. Therefore, in June he sells two of his November contracts (each contract equals 5,000 bushels). In September, when prices has fallen, he buys them back at the reduced price to make a net gain. Thus he offsets cash market losses arising from the fall in soyabean prices - see next page.

	Cash position		**Futures position**	
June	Price	$7.00 per bushel	Futures price	$7.25 per bushel
	Crop worth	$70,000	Contract worth	$72,500
Sept.	Price	$6.75 per bushel	Futures price	$6.95 per bushel
	Crop worth	$67,500	Contract worth	$69,500
	Net loss	**$2,500**	Net gain	**$3,000**

The farmer's total income is therefore $70,500, that is, the cash price for the soyabeans ($67,500) **plus** the net gain from hedging ($3,000).

Speculators

These are dealers who assume the risk that the hedger tries to avoid. A speculator buys (or sells) a future on the assumption that the price of the commodity will rise (or fall).

Example

A speculator anticipates an abrupt rise in the price of orange juice following a severe winter in orange-producing areas. The current price of a futures contract for orange juice is $1.30 (Price 1). Several hours later, following an official announcement of a shortfall in orange production, the price has risen to $1.95 (Price 2). The speculator buys at Price 1, waits for the price to rise, and then sells at Price 2 to make a profit.

Price 1	Futures price	$1.30c per pound
	Contract size	15,000 pounds
	Total outlay	$19,500
Price 2	Futures price	$1.95c per pound
	Contract size	15,000 pounds
	Total outlay	$29,250

The speculator therefore makes a profit per contract of $9,750, that is, Price 2 ($29,250) minus Price 1($19,500).

Mnemonics for futures contracts

Mnemonics overview

To run the 250 programs, you need to know the series code or mnemonic for the futures contracts for which you require data.

You can either display the default information for a futures contract (the price), or you can append a datatype to the futures mnemonic to display other information about the contract.

The following pages describe:

- How to construct a futures mnemonic
- How to construct mnemonics for British Government stocks
- Datatypes available for use with futures contracts
- Conversion datatypes for commodity futures
- Currency conversions for futures contracts

Mnemonic formats

Futures mnemonics for use with Datastream programs have the format *XXXYYYY*.

Where   *XXX*   is the market & contract code - see below

   YYYY   is either the delivery date code or the code for
   a continuous series - see below

See overleaf for some example mnemonics.

Note: *London Metal Exchange futures mnemonics have a different format. See overleaf for details.*

Market & contract code

This is a 3-character code specifying both the market or exchange and the type of contract. Example codes include:

CUS   Chicago Board of Trade; US Treasury bonds

KKW   Kansas City Board of Trade; wheat

LCP   London Metal Exchange; copper, grade A

For a full list of codes, see HELP FUT? or Code Lookup.

Delivery date code

This is a 4-character code for the required delivery date of the contract. It has the format *MMYY*. For example, 0994 is the code for September 1994.

Continuous series code

The code to specify a continuous, or perpetual, price series for a futures contract is **CS00**. See page 16 for an explanation of the source data for continuous series.

Note: *Programs 250A and 250C do* **not** *require a delivery date code or a continuous series code.*
   They require only *the 3-character market & contract code.*

London Metal Exchange (LME) futures mnemonics

All LME mnemonics have the format *XXXZZZZ*.

Where *XXX*   is the market & contract code, for example, LAD for aluminium alloy

   ZZZZ   is either CASH for cash prices, or
         3MTH for three month forward prices

Example contract mnemonics

Listed below are some example futures mnemonics:

CUS0994   US Treasury bonds for the CBOT (Chicago Board of Trade), with a contract date of September 1994

IJY0995   Japanese Yen on the US IMM, with a contract date of September 1995

LEY0694   Japanese Yen on LIFFE with a contract date of June 1994

PPK0393   Coffee on the French MATIF exchange, with a contract date of March 1993

CUSCS00   US Treasury bonds on CBOT, as a continuous series

LIECS00   3 month Eurodollar interest rates on LIFFE, as a continuous series

LZZ3MTH   LME zinc, high grade, 3 month forward prices

Alternative futures codes

In addition to the usual Datastream mnemonics and codes, the following alternative codes may be used:

- London Daily Official List Code (SEDOL), preceded by **0** (zero) and the last character omitted
- CEDEL Code
- EUROCLEAR Code, preceded by **EC00**
- Swiss Official List Number, preceded by **V**

Alternative futures codes, continued

- German Official List Number, preceded by **D**
- Dutch Official List Number, preceded by **H**
- London Stock Exchange mnemonic

Continuous series data sources

A continuous series of futures prices (or price-derived datatypes) is formed with a moving source. The nearest deliverable contract forms the first value in the series. Then, when a particular day before the contract month is reached, or when the first day of this contract month is reached, the month ceases trading. At this point, the next deliverable contract becomes the source.

The particular day when a contract ceases trading depends on the financial or commodity future.

Example

1 **CUSCS00**, the CBT-US Treasury bond has a quarterly trading cycle of March, June, September and December

2 During March, June is the source. Prices for the June contract are taken for the continuous series

3 On the first business day in June, September becomes the new source **even if June is still trading**. Prices for the September contract are taken for the continuous series

Note: *See page 18 for definitions of Open Interest (OI) and Volume (VM) datatypes for continuous series.*

Mnemonics for British Government Stocks

Mnemonics for British Government Stocks comprise 6 character codes. In addition to the normal Stock Exchange mnemonics, you can construct mnemonics for both whole number and fractional coupons for all Treasury, Exchequer and Funding issues according to the following rules:

Whole number coupons

These take the following format: *AABBYY*

Where: *AA* = TR for Treasury
       EX for Exchequer
      FD for Funding

   BB =   Coupon

   YY =   Year of the delivery date

Fractional coupons

These take the following format: *ABBFY*

Where: *A* = T for Treasury
      E for Exchequer
      F for Funding

   BB =   Whole number coupon

   F =   Fraction:
            Q   for a quarter
            H   for a half
            T   for three quarters +

   YY =   Year of the delivery date

Examples

Example mnemonics for British Government stocks include:

EX1202   Exchequer 12% 2002

T15H98   Treasury 15.5% 1998

Futures datatypes

This section lists the datatypes available for use with futures contracts data series. See 'Futures definitions' in the *Datastream Definitions manual* for further details.

Description	Datatype	Notes
Price, high	PH	*Highest traded price of the day*
Price, low	PL	*Lowest traded price of the day*
Price, opening	PO	*First traded price of the day*
Price, settlement	PS	*Official closing price issued by the exchange*
Price, APT closing	CA	*For LIFFE contracts only*
Open interest	OI	*For continuous series, this is the sum of all open interest for all contracts*
Value	VU	*Value of the contract; for index futures only*
Volume	VM	*For continuous series, this is the sum of all volumes for all contracts*
Yield	YD	*Yield on the contract; for interest rates, bonds and gilts only*

Note: *If you do not specify a datatype, the program uses 'Price, settlement' as the default.*

London Metal Exchange metals datatypes

The following datatypes are available for use specifically with LME futures contracts:

Description	Datatype	Notes
Official price	OF	*Price after the second ring of the* first *session*
Price, high	PH	*Highest price of the day*
Price, low	PL	*Lowest price of the day*
Turnover	TV	*Daily turnover figure*
Unofficial price	UF	*Price after the second ring of the* second *session*

Note: *All LME prices are expressed in US$/tonne.*

Commodity futures conversion datatypes

Commodity futures have a default unit of measurement (weight or volume). For example, New York Heating Oil (NHO) is measured in US$ **per gallon**.

To specify a new unit of measurement to form the basis of the quotation, use the conversion datatypes for commodity futures. There are 13 conversion datatypes:

Description	Datatype	Description	Datatype
100 kilograms	HK	Soyabean meal (bushel equivalent)	BM
Barrel	BL	Soyabean oil (bushel equivalent)	BI
Corn bushel	BC	Tons (US)	TN
Gallon	GL	Tonnes (metric)	TE
Oats bushel	BC	Troy ounces	TO
Pounds	LB	Wheat bushel	BW
Soyabean bushel	BS		

See 'Futures definitions' in the *Datastream Definitions* manual for descriptions of these datatypes, and a summary of permissible conversion combinations.

Format (*PPCC*)

Use conversion datatypes in combination with any of the **price** datatypes shown on page 18 to form a combined 4-character price and conversion datatype in the above format.

Where: *PP* is the price datatype

CC is the conversion datatype

Example **CSM0995(PHTE)**

This converts CBOT Soyabean meal daily high prices for the September 1995 contract from US$ per ton (imperial) to US$ per tonne (metric), where **(PHTE)** specifies Price High per Tonne.

Example futures datatypes

Listed below are some examples futures datatypes

T15H98(RY)   Redemption yield of British Treasury 15.5% 1998

CLH0994(PL)   Price, low for September 1994 contract for Live Hogs on the Chicago Mercantile Exchange

IJY0994(OI)   Open interest history of the September 1994 contract for Japanese Yen on the IMM exchange

LAD3MTH(PH)   Price, high for for Aluminium Alloy on the LME, 3 month forward prices

NHO0195(PSBL)   Price, settlement **per barrel** for New York Heating Oil for the January 1995 contract

Note: *When more than one contract appears in an expression created by the user, each contract must have its own datatype designated individually. For example*:

IJY0994(OI)/IJY0994(VM)

divides the open interest history of the IMM Yen contract for September 1994 by the equivalent volume history.

Currency Conversions

To convert futures contracts to a different currency, use the following format:

Format   *XXXYYYY~CC*

Where: *XXX*   is the market & contract code

YYYY   is the delivery date or continuous series code

~   denotes a currency conversion

CC   is the required currency code

Example   **HFC0394~FF**

This converts the Hong Kong Futures Exchange Finance contract for March 1994 from Hong Kong Dollars to French Francs (where **FF** is the currency code).

For a full list of available currency codes, see HELP CC?

Date formats in futures programs

Dates overview

When using the futures programs, you must input date information in the correct format. The required format varies according to the type of input field. The 250 programs use the following date formats:

- Actual dates
- Default dates
- Displacement dates
- Time period dates

Actual dates

Use these to define the actual start/end dates or display dates for a futures program. There are three formats:

Format	Example	Description	Programs
DD/MM/YY	01/06/94	Specifies an actual date	250B, 250G, 250I, 250J, 250K, 250R, 250S
MM/YY	06/94	Implies the first working day of the month.	250G, 250I, 250J, 250K, 250R, 250S
DD	20	Specifies the contract delivery day; this example specifies the 20th of the month	250C

The use of actual dates has the following implications, depending upon the data display frequency:

Daily	The exact date will be used unless it is a weekend, in which case the previous Friday value will be used. If the Friday value is not stored, for example, because of a public holiday, '0' or N/A will be shown.
Weekly	As for daily displays to obtain the correct start day. Thereafter, the same day of the week is used consistently.
Monthly	As for daily displays to obtain the correct start day, when applied to data stored **daily** or **weekly**. Thereafter, the same day of the month is used consistently.
Quarterly	Values are extracted every 3 months, using the conventions for monthly retrieval. To get end of quarter values, use an end of quarter start date.
Annual	Values are extracted every 12 months, using the conventions for monthly retrieval. To get end of year values, use a start date of 31/12/*YY*; to get first working day values for each year, use a start date of 01/01/*YY*.

Default dates

For certain futures programs, default values appear in the date fields of the input screen. Similarly, if end date or second date fields are left blank, today's date is the default. Unless you specify otherwise, the following default dates apply:

Program	Description	Page
250B	First and last contract delivery dates	30
250C	First and last contract delivery dates	33
250G	Term of cash instrument: 3 months; Correlation frequency: weekly Correlation start date: 6 months ago Correlation end date: today	39
250H	Number of years in the range: 5	43
250I	Moving average period: 15 days First display date: 1 month ago Second display date: 3 months ago	45
250J	Start date for the range: 1 year ago End date for the range: today Period A start date: 15 days ago Period B start date: 30 days ago Period C: start date 3 months ago Period A, B, C end dates: today	48
250K	First display date: 3 months ago Second display date: today	51
250S	Start date for regression: 1 year ago End date for regression: today	62

Note: *Default dates are not applicable to programs 250A, 250D and 250R.*

See the relevant input field descriptions for further details.

Displacement dates

Displacement dates (days, weeks, months, quarters, years) allow you to specify a date for a program output relative to the **current date**.

You can use any of the Datastream period codes: **D, W, M, Q, Y**. For example, **–5D**specifies a date 5 working days ago**.**

You can use these period codes in 250G, 250I, 250J, 250K, 250R and 250S.

Time period dates

Time period dates specify the period (days, weeks, months, quarters, years) for displays of output data. Uses include:

- Term of cash instrument   250G
- Moving average period   250I
- Correlation frequency   250G, 250S

You can use any of the Datastream period codes: **D, W, M, Q, Y**. For example, **3M** specifies a three month time period.

You can use these period codes in 250G, 250I, 250R and 250S.

Futures programs

Summary of 250 programs

This section describes how to use the 250 suite of commodity and financial futures programs:

Program	Displays...	Page
250A	Latest available market information for futures contracts	28
250B	Cheapest deliverable gilts or US Treasury Bonds	30
250C	Implied interest rates (financial futures only)	33
250D	Prices or volumes for financial contracts	36
250G	Hedging calculations for a specified financial contract	39
250H	Historic high, low and average values for three series	42
250I	Moving averages and annualised change for any series	44
250J	Current, high and low values over three time periods	47
250K	High, low and average values, plus changes over the period	50
250R	Multiple linear regression analysis for any series	53
250S	Regression and correlation coefficients for any series against a base series or expression	62

250A Market data

Program 250A displays the latest available price, volume and open interest information for all financial and commodity futures for which intra-day prices are available.

Þ **To run program 250A**

Type **250A** in the Program number field and press ENTER.

250A input screen   The 250A input screen appears below. Fill in the single input field and press ENTER:

Market & contract code
eg, LIE for the LIFFE
short Eurodollar interest
rate contract
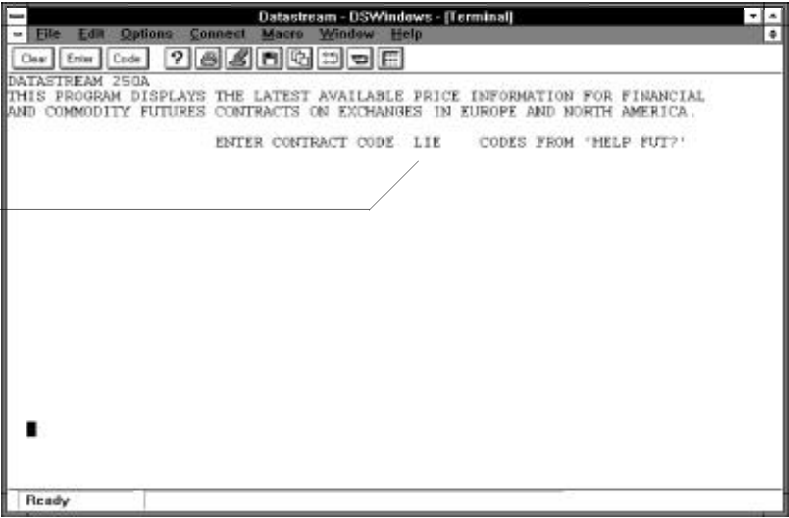
250A input screen

250A input field   `ENTER CONTRACT CODE`   Type a 3-character market & contract code.

See 'Mnemonics for futures contracts', page 13, for further details.

250A output screen   The output screen displays delivery dates for each contract and includes:

- Price data - bid, ask, settlement, open, high and low
- Yield and volume data - if available
- Open interest position - the number of open contracts
- Previous traded prices
- Initial margin for a contract
- Contract size
- Local update times

Þ **To continue**

- Type **1** to refresh (update) the screen, or
- Type **2** to return to the 250A input screen, or
- Type **3** to display any further output screens of information

Contract name

Local update time

Contract delivery dates with associated price, yield and volume data

Open interest position

Previously traded prices

Initial margin

Contract size

Type 1, 2 or 3 to continue

250A output screen

250B Deliverable gilts & Treasury bonds

Program 250B displays Gilts and US Treasury bonds deliverable against an individual contract, and calculates the cheapest instrument to deliver.

Þ **To run program 250B**

Type **250B** in the Program number field and press ENTER.

250B input screen   The 250B input screen appears below. You **must** fill in the 'Contract required' field. All other fields are optional or contain default values. Fill in the field(s) and press ENTER:

Futures mnemonic: LIG or CUS only

Financing interest rate

Interest rate on coupon payment

Key number required

Alternative delivery dates

Instruments displayed in descending sequence of...

Are cash instrument prices to be...

250B input screen

250B input fields

`CONTRACT REQUIRED`

Type the mnemonic for a futures contract. **Only two contract codes are permissible in 250B**. These are:

CUS   CBOT US treasury bonds eg, CUS0694 or
LIG   LIFFE Long gilts eg, LIG0395

See 'Mnemonics for futures contracts', page 13 , for further details.

`DELIVERY DATES TO`
`BE USED`

Any field left blank will revert to the default value. The default values are the first business day of the delivery month, and the last business day of the delivery month. To overwrite either of these, use a *DD/MM/YY* format.

`FINANCING INTEREST RATE`

The default value is the latest 3M/LIBOR rate. You can overwrite this default value if required.

`INTEREST RATE ON COUPON`
`PAYMENTS`

The default value is the Financing Interest Rate, as above. You can overwrite this value if required.

`INSTRUMENTS DISPLAYED IN`
`DESCENDING SEQUENCE OF`

In the first 'Key number required' field, specify a key data item from the list, and type in the key number (**1** to **6**) . Deliverable stocks are listed in descending order of this data item. See the Bonds section of the *Datastream Definitions Manual* for definitions of these data items.

`ARE CASH INSTRUMENT`
`PRICES TO BE`

In the second 'Key number required' field:

Either   To display the latest available prices, type **1**

Or   To alter any price for any instrument, type **2**; when you press ENTER, a list of available instruments and prices appears; you can now alter any of these prices.

250B output screen The output screens list deliverable stocks for the first delivery date, followed by deliverable stocks for the final delivery date. Deliverable stocks are listed in descending order of the key data item selected. The output screen includes:

- Contract size
- Cash price
- Gross redemption yield
- A conversion factor to convert the deliverable stocks to the specified contract
- Equivalent price
- A cheap/dear comparison against the latest price for the specified contract

Þ   **To continue**

1   Press ENTER to page to the second output screen, and again to return to the input screen.
2   Press PAGE UP and PAGE DOWN to page between the output screens.

Details for the specified contract

Deliverable gilts or US Treasury bonds

Issue size and cash price

Cheap/dear comparison with contract price

Yield; Conversion factor; Equivalent price

250B output screen; last delivery date

250C Implied interest rates

Program 250C calculates the interest rates implied from strips of interest rate futures contracts and straddles of Gilts and US Treasury Bond futures contracts.

Þ **To run program 250C**

Type **250C** in the Program number field and press ENTER.

250C input screen   The 250C input screen appears. You **must** fill in the Contract type field. The other fields are optional or contain default values. Fill in the field(s) and press ENTER:

Market & contract code eg, LIG, LIP or CUS

Interest rate

Alternative delivery dates

250C input screen

250C input fields

`CONTRACT TYPE`

The mnemonic for the future contract. The contract must be of an appropriate type, for example:

CUS for CBOT US Treasury bonds, or
LIG for LIFFE Long gilts

`INTEREST RATE ON COUPON PAYMENTS`

The default value is the previous day's 11:00 AM 3M/LIBOR middle rate fix. You can overwrite this default value if required.

`DELIVERY DAYS IF NOT FIRST AND LAST`

Any field left blank will revert to the default value. The default values are the first business day of the delivery month, and the last business day of the delivery month. To overwrite either of these, use a *DD/MM/YY* format.

250C output screens

The output screens display a list of either CUS or LIG contracts. The examples opposite show LIG (long gilt) contracts:

- The first output screen shows current prices and implied yield values against those prices for first and last delivery dates.
- The second screen lists the cheapest deliverable stocks for first and last delivery dates

Þ **To continue**

1 Press ENTER to page to the second output screen, and again to return to the input screen.
2 Press PAGE UP and PAGE DOWN to page between the output screens.

Contract type

*Contract delivery dates
for rolling contracts*

*Implied yield figures;
first delivery date*

*Implied yield figures;
last delivery date*

```
─                    Datastream - DSWindows - [Terminal]              ▼ ▲
▪ File  Edit  Options  Connect  Macro  Window  Help                   ▲
[Clear][Enter][Code]  ? ⎙ ✎ ⎘ ⎙ ⇄ ⬚ ▤
IMPLIED INTEREST RATE ANALYSIS - LONG GILT CONTRACT
COUPON INVESTMENT RATE : 05.250                       26/07/94    16:15

                  FIRST DELIVERY DATE (DAY 1 OF DELIVERY MONTH)
         PRICE    YIELD    SEP94    DEC94    MAR95    JUN95    SEP95
CASH                       20.608   24.336   16.199   N/A      N/A
SEP94    102-31   8.685             4.191    5.042    N/A      N/A
DEC94    102-16   8.733                      5.841    N/A      N/A
MAR95                                                 N/A      N/A
JUN95                                                          N/A
SEP95

                  LAST DELIVERY DATE (DAY 31 OF DELIVERY MONTH)
         PRICE    YIELD    SEP94    DEC94    MAR95    JUN95    SEP95
CASH                       53.20ᴵ   N/A      15.350   N/A      N/A
SEP94    102-31   8.685             N/A      5.913    N/A      N/A
DEC94    102-16   8.733                      5.065    N/A      N/A
MAR95                                                 N/A      N/A
JUN95                                                          N/A
SEP95


CALCULATIONS BASED ON CHEAPEST DELIVERABLE STOCKS - SEE NEXT PAGE


│ Ready        │
```

250C first output screen (*example data for illustrative purposes only*)

*Cheapest
deliverable stocks*

```
─                    Datastream - DSWindows - [Terminal]              ▼ ▲
▪ File  Edit  Options  Connect  Macro  Window  Help                   ◆
[Clear][Enter][Code]  ? ⎙ ✎ ⎘ ⎙ ⇄ ⬚ ▤
                     CHEAPEST DELIVERABLE STOCKS

              STOCK                           PRICE     RED.YLD
FIRST DATE

SEP94    948608  TREASURY 8       25.09.2009   99.84    8.3313
DEC94    955330  TREASURY 9       13.10.2008   99.76    8.3250
MAR95    955295  TREASURY 8 1/2   16.07.2007  103.86    8.2643
JUN95
SEP95

LAST DATE

SEP94    948608  TREASURY 8       25.09.2009   99.84    8.3313
DEC94    955330  TREASURY 9       13.10.2008   99.76    8.3250
MAR95    955295  TREASURY 8 1/2   16.07.2007  103.86    8.2643
JUN95
SEP95


                                                          ▮


│ Ready        │
```

250C second output screen (*example data for illustrative purposes only*)
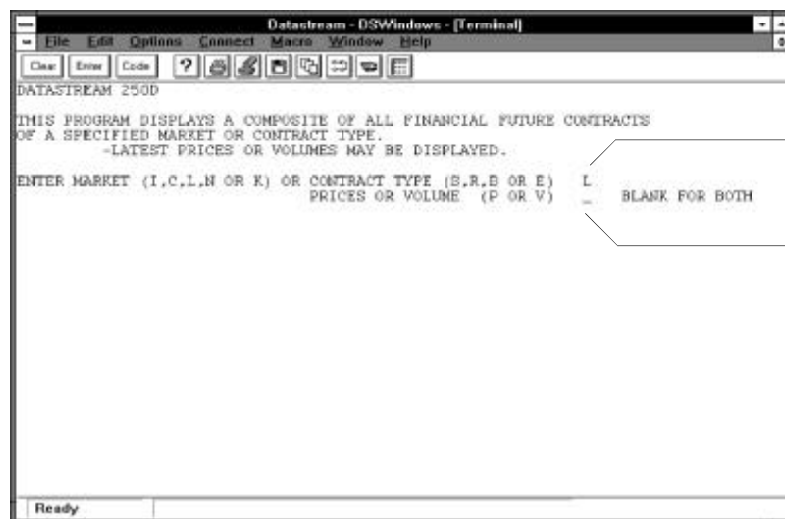
250D Prices & volumes for a market

Program 250D displays a composite of all financial futures contracts for a specified market or contract type, displayed by prices and/or volumes.

Þ **To run program 250D**

Type **250D** in the Program number field and press ENTER.

250D input screen   The 250D input screen appears below. There are two input fields. Fill in the fields and press ENTER:

Market or contract type

Prices or volumes

250D input screen

250D input fields

`ENTER MARKET OR CONTRACT TYPE`

You must specify either a market or a type of contract.

To specify a market, type:

I   for IMM (International Monetary Market)
C for CBOT (Chicago Board of Trade)
L for LIFFE (London International Financial
     Futures Exchange)
N for NYFE and FINEX (New York Futures
Exchange   and Financial Instrument Exchange)
K for KCBT (Kansas City Board of Trade)

To specify a type of contract, type:

S for Stock index
R for Interest rates
B for Bonds/gilts
E for Exchange rates

`PRICES OR VOLUMES`

The default value is blank. This will display both prices and volumes for all contracts for the market you selected. To display:

- Only current prices, type **P**
- Only current volumes, type **V**

250D output screen   The output screen(s) shows all the prices or volumes for the futures contracts covered on Datastream, for the specified market or for the specified contract type.

If you select price and volume data, price data appears on the first output screen and volume data on the second.

Þ   **To continue**

1   Press ENTER to page to the second output screen and return to the input screen.
2   Press PAGE UP and PAGE DOWN to page between the output screens.

Market or contract type

Contract delivery dates

Contract codes

250D output screen

250G Hedging calculations

Program 250G calculates the required number of contracts to hedge a given cash market position for a specified contract or strip of contracts. The program uses conversion factors where applicable. You can also use regression analysis if required.

Þ **To run program 250G**

Type **250G** in the Program number field and press ENTER.

250G input screen   The 250G input screen appears below. You **must** fill in the first three fields. The remaining fields are optional or contain default values. Fill in the fields and press ENTER:

Futures mnemonic or market & contract code

Hedged amount in 000's

Regression request

Correlation frequency: see program 101S

Cash instrument: Datastream code for a bond, gilt or interest rate eg, 728835
Term of cash instrument

Start and end dates

250G input screen

| **250G input fields** | **FUTURES CONTRACT** | The mnemonic for the future contract. This can be either a 3 character market & contract code, or a 7 character contract mnemonic. For example, type: |

CUS for a strip of CBOT US Treasury bonds, or
CUS1294 for a US Treasury bond contract, dated 12/94

HEDGED AMOUNT
The nominal value of the bond or, for an interest rate, the actual cash amount of the deposit. You must type this amount in thousands.

CASH INSTRUMENT
The instrument to be hedged. Type in the Datastream code for the instrument. This **must** be either a gilt, bond or interest rate. The codes for these can be found under 'Bonds direct' on Code Lookup.

REGRESSION (Y/N)
Regression is not normally used for cash market instruments where there are conversion factors to the nominated contract. But for cash instruments where there are **no** conversion factors, you **must** use regression. In this case, type **Y**.

TERM OF CASH INSTRUMENT
The term for the instrument to be hedged, in days, months or years. You need only use this field when hedging an interest rate. The default value is 3 months (**3M**). For example, type **90D** for a 90 day term.

CORRELATION FREQUENCY
Typically weekly (**W**) or monthly (**M**). See program 250S for details, page 62.

START DATE
The start date default is 6 months ago (**–6M**).

END DATE
The end date default is today (blank).

To overwrite the default dates, use either actual dates or displacement dates. See 'Date formats in futures programs' on page 23 for details.

250G screen output   The output screen displays all the trading contracts of the specified type and includes:

- Details of the cash instrument used
- Price of the contract, and the value in 000's US Dollars
- Number of contracts to hedge the cash position
- Regression coefficient, if requested. A coefficient greater than 1 indicates that the change in bond price will be proportionately greater than the corresponding change in futures price
- Volatility ratio, if regression analysis is requested

Þ **To continue**

- Type **Y** to return to the input screen, or
- Type **N** to return to the Program Finder screen

Amount hedged;
cash instrument used;
regression period

Contracts currently trading:

Price

Value

Number of contracts required

Regression coefficient and volatility ratio

Type Y or N to continue

250G output screen

250H High/low/average data over a year

Program 250H calculates values for up to three time series and displays:

- High, low and average values, plus deviation from the average. It calculates values for each calendar year up to a maximum of 5 years previously
- Change in value over one month, three months and a year

Program 250H can access any time series, including futures contracts or user-created time series. It is equivalent in function to programs 28A and 301A.
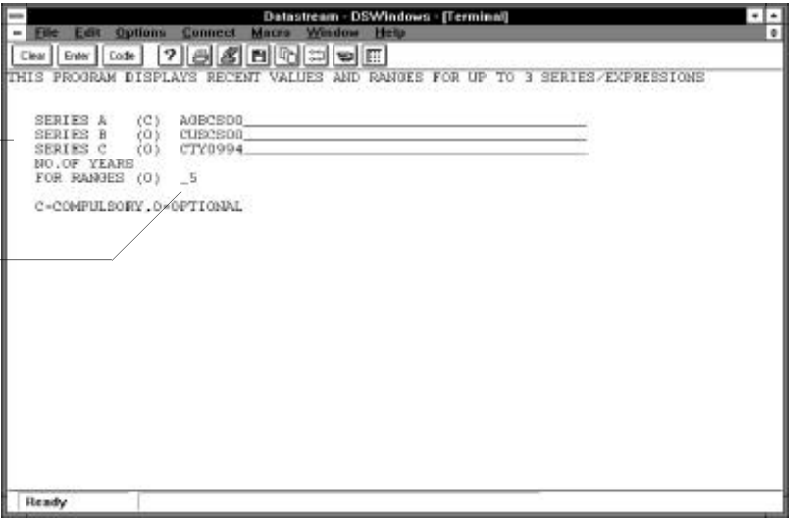
Þ **To run program 250H**

Type **250H** in the Program number field and press ENTER.

250H input screen

The 250H input screen appears below. You **must** fill in the Series A field. All other fields are optional or contain default values. Fill in the field(s) and press ENTER:

Futures mnemonics, or other time series

Number of years in output display

250H input screen

250H input fields

`SERIES A (C)`
`SERIES B (O)`
`SERIES C (O)`

The mnemonic for a futures contract (or any time series). Series A is a compulsory field; series B and C are optional. See page 13 for mnemonic details of futures mnemonics.

`NO. OF YEARS FOR`
`RANGES`

Type the number of years for which you require data. The maximum range, and default value, is 5 years.

250H output screen

The output display may extend over one or two screens. It includes recent changes in value plus high, low and average values for each year requested.

Þ **To continue**

1 Press ENTER to page to the second output screen and return to the input screen.
2 Press PAGE UP and PAGE DOWN to page between the output screens.

Names of time series

High, low and average values: last 12 months

High, low and average values: previous years

Change in value over 1 month, 3 months and 1 year

250H output screen

250I Moving average

Program 250I calculates the moving average and annualised percentage change for futures contracts (or any list of time series, including stored lists). It also displays current values, and historical values at two other specified dates. It is equivalent in function to programs 28B and 301B.

Þ   **To run program 250I**

Type **250I** in the Program number field and press ENTER.

250I input screen   The 250I input screen appears below. You **must** fill in the 'List of series/expressions' field. All other fields are optional or contain default values. Fill in the field(s) and press ENTER:

Futures mnemonics, or other time series, separated by commas

Moving average period

1st and 2nd display dates

Expression incorporating stored list code

250I input screen

250I input fields	`LIST OF SERIES/` `EXPRESSIONS`	Type the mnemonics for one or more futures contracts (or any time series), separated by commas. You can also use a 300B list mnemonic, or any other valid stored list. See the *Equity Research User Guide* for details.
	`EXPRESSION FOR` `STORED LIST`	You can use this field to modify the output by incorporating the futures mnemonics in the first field into an expression (or formula)**.**

Use **X** to represent each futures mnemonic. Output data is then calculated according to the expression, with each futures mnemonic replacing **X**. For example

- **X(PH)–X(PL)** calculates the difference between daily high and low prices for LME metals futures
- **X–LIG0391** calculates the cash basis for a list of deliverable gilts

If the field is left blank, then the list will be processed in the normal way.

|	`MOVING AVERAGE` `PERIOD`	Type a time period over which the moving average is calculated. The default period is 3 months (**3M**). For example, **15D** calculates a 15 day moving average. See 'Time period dates' on page 26 for further details.
	`1ST DISPLAY DATE`	The first display date default is one month ago (**–1M**). You can overwrite the default dates if required.
	`2ND DISPLAY DATE`	The end date default is today (blank). You can overwrite the default dates if required.

See 'Actual dates' and 'Displacement dates' on pages 24 and 26 for further details.

250I output screen   For each futures contract specified on the input screen, the output screen includes:

- Actual current values
- Current moving average values for each mnemonic
- Moving average values at the first and second display dates
- Annualised percentage change from the first and second display dates

Þ **To continue**

Press ENTER to return to the input screen. (Depending on the length of the list, output may extend over more than one screen.)
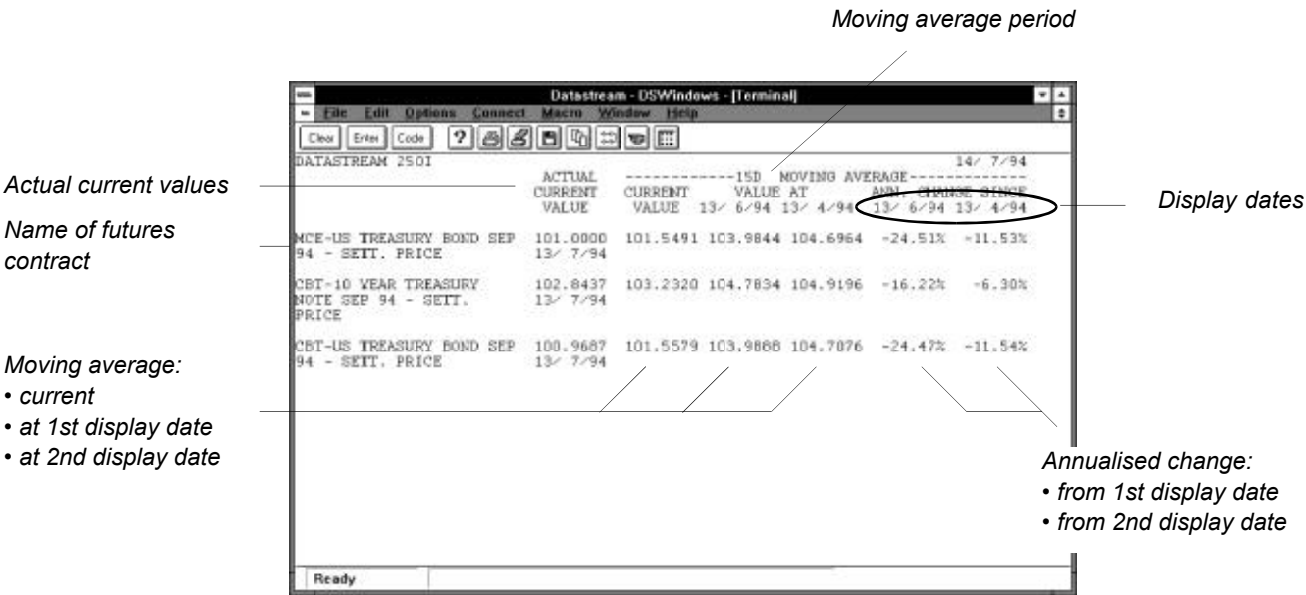
250I output screen

250J Changes & ranges for a series

Program 250J displays current, high and low values for futures contracts over a specified range of time, plus changes in value over three periods within this range (actual or percentage, dependent on the type of data). It is equivalent in function to programs 28C and 301C.

Þ **To run program 250J**

Type **250J** in the Program number field and press ENTER.

250J input screen
The 250J input screen appears below. You **must** fill in the List of series/expressions field. All other fields are optional or contain default values. Fill in the field(s) and press ENTER:

Futures mnemonics, or other time series, separated by commas

Start and end dates for range

Start and end dates for time periods within the range

Expression incorporating stored list code

Nearest value? fields


```
                        Datastream - DSWindows - [Terminal]
   File  Edit  Options  Connect  Macro  Window  Help

   Clear  Enter  Code   ?

THIS PROGRAM DISPLAYS LATEST VALUES AND CHANGES FOR A LIST OF SERIES/EXPRESSIONS

LIST OF SERIES/EXPRESSIONS (C)   CFCCS00.CLBCS00.CKICS00_____
(SEPARATED BY COMMAS)            _____

EXPRESSION FOR STORED LIST (O)   _____

                                                 DATE FORMATS
                                                 -------------
                                                 DD/MM/YY,MM/YY OR
PERIOD FOR RANGE         FROM  -1Y_____  TO (O)  13/07/94  EG. -5D,-3M ETC.

CHANGE A: PERIOD  -1M__  ENDING ON (O)  13/07/94  OR NEAREST VALUE(Y OR N)  Y
CHANGE B: PERIOD  -3M__  ENDING ON (O)  13/07/94  OR NEAREST VALUE(Y OR N)  Y
CHANGE C: PERIOD  -1Y__  ENDING ON (O)  13/07/94  OR NEAREST VALUE(Y OR N)  Y
C-COMPULSORY,O-OPTIONAL

 Ready
```

250J input screen

250J input fields

LIST OF SERIES/
EXPRESSIONS

Type the mnemonics for one or more futures contracts (or any time series), separated by commas. You can also use a 300B list mnemonic, or any other valid stored list. See the *Equity Research User Guide* for details.

EXPRESSION FOR STORED
LIST

You can use this field to modify the output by incorporating the futures mnemonics in the first field into an expression (or formula). See the equivalent 250I input field for details, page 45.

PERIOD FOR RANGE

Type in a start and end date for the range of time:
- The 'From' default date is 1 year ago (**–1Y**)
- The 'To' default is yesterday, in *DD/MM/YY* format

You can overwrite the default dates if required. See 'Date formats in futures programs' on page 23 for further details.

CHANGE A: PERIOD
CHANGE B: PERIOD
CHANGE C: PERIOD

For each time period, type:
- The start date; the defaults are:
  Change A   15 days ago (**–15D**)
  Change B   30 days ago (**–30D**)
  Change C   3 months ago (**–3M**)
- The end date default is yesterday, in *DD/MM/YY* format

You can overwrite the default dates if required. See 'Date formats in futures programs' on page 23 for further details.

NEAREST VALUE (Y/N)

For series where data is normally time lagged eg, some economic statistics, you can take a value nearest to the **actual** end date. The change period is then relevant to this adjusted end date. For example:
- Specify an end date of 30/09/94, and type **Y** to accept the nearest value. An equivalent end September value is available for a daily series if an actual 30/09/94 value is unavailable.
- An industrial production index is available up until June '93. By entering **Y**, the change will be computed for this index over the latest year available (in this case, from June '92 to June '93) and the display will reflect this calculation.

250J output screen   For each futures contract specified on the input screen, the output screen includes:

- Latest, high and low values achieved over the time range
- Change in value (percentage or actual, depending on the data) over each of the three time periods

Þ   **To continue**

Press ENTER to return to the input screen. (Depending on the length of the list, output may extend over more than one screen.)

Details of each time period

Name of futures contract

Latest, high and low values

Change in value over time periods

250J output screen

250K Data for a series at specific dates

Program 250K displays:

- High, low and average values over a specified period
- Actual values for the start and end dates of the period
- Changes in value, actual or percentage, over the period

It is equivalent in function to programs 28D and 301D.

Þ **To run program 250K**

Type **250K** in the Program number field and press ENTER.

250K input screen   The 250K input screen appears below. You **must** fill in the List of series/expressions field. All other fields are optional or contain default values. Fill in the field(s) and press ENTER:

Futures mnemonics or other time series

1st and 2nd display dates
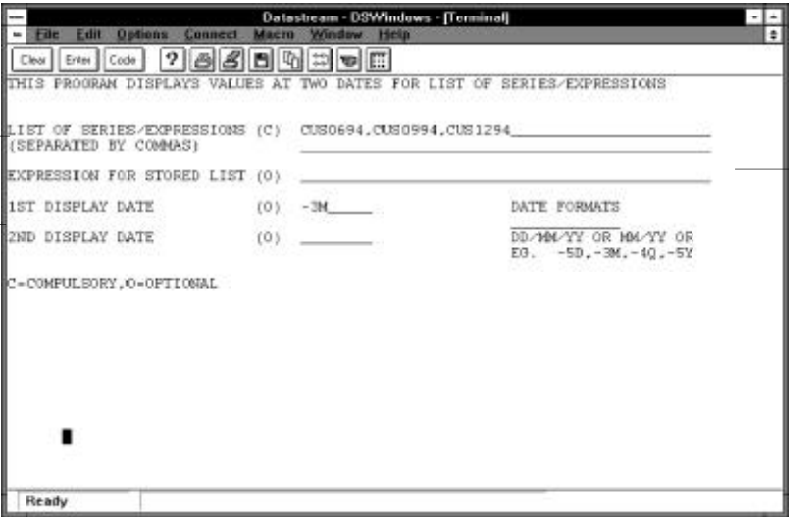
Expression incorporating stored list code

250K input screen

250K input fields

`LIST OF SERIES/EXPRESSIONS`	Type the mnemonics for one or more futures contracts (or any time series), separated by commas. You can also use a 300B list mnemonic, or any other valid stored list. See the *Equity Research User Guide* for details.
`EXPRESSION FOR STORED LIST`	You can use this field to modify the output by incorporating the futures mnemonics in the first field into an expression (or formula). See equivalent 250I input field for details, page 45.
`1ST DISPLAY DATE`	The default first display date is 3 months ago (**–3M**). You can overwrite the default dates if required.
`2ND DISPLAY DATE`	The default end date is today (blank). You can overwrite the default dates if required.
	See 'Actual dates' and 'Displacement dates' on pages 24 and 26 for further details.

250K output screen   For each mnemonic, the output screen includes:

- ■   Actual values on the first and second display dates
- ■   Percentage change over the period
- ■   High, low and average values over the period

Þ   **To continue**

Press ENTER to return to the input screen. (Depending on the length of the list, output may extend over more than one screen.)

Change over the period

Name of futures contract

Values at:
- *1st display date*
- *2nd display date*

High, low and average values over the period

250K output screen

250R Multiple linear regression analysis

Program 250R performs a linear regression on two or more variables using the method of ordinary least squares. You can specify up to three different regression equations. This program is equivalent in function to 301R.

The example here examines the relationship between the value of the FTSE100 index (the dependent variable) and the futures contracts on the FTSE100, the futures contracts on the S&P index, and the spreads between them (the independent variables).

Þ **To run program 250R**

Type **250R** in the Program number field and press ENTER.

250R input screen

The 250R input screen appears below. Type in **at least** two variables in the variable fields (V01 to V18) and a common frequency for the variables. Then specify the time range, a dependent variable, and the independent variables for up to three regression equations. Fill in the fields and press ENTER:

Variable fields

Common frequency for variables

Regression equations:

• Time range

• Dependent variable (V01 to V18)

Dependent variables (V01 to V18)

250R input screen

250R input fields

`ENTER VARIABLES`

These are the variables (data series) you can use in the regression equation. You can enter up to 18 variables. Any series codes or expressions may be used. Functions can also be included in the series or expressions.

In addition to the standard rules, on Datastream 250R only, variables may be 'back referenced' using the format V*nn*. For example, to reuse the V01 entry in another input field, you can type **LAG#(V01,12M)** in the V02 entry field.

`COMMON FREQUENCY`

You must specify the frequency at which your variables are to be retrieved. Choose a frequency that is the same as the series that holds the lowest frequency data. For example, if one variable is stored monthly and one daily, the common frequency must be monthly.

`TIME RANGE`

Enter the start and end dates for the regression period. You must enter a start date, but the end date is optional and defaults to the latest date common to all the series. This is particularly useful when you are unsure of the last collected value for all the series entered. Use the format *DD/MM/YY*, even if you select a quarterly or yearly common frequency. See 'Actual dates' on page 24 for further details.

`DEP VAR`
(dependent variable)

You can define a maximum of three regression equations. Each equation must have one dependent variable, for example **V01**.

`INDEPENDENT`
`VARIABLES`

For each regression equation, you can enter up to 12 independent variables, separated by commas, for example, **V02,V03,V04**.

| **250R output screen** | Program 250R displays the results of the standard statistical tests used in regression analysis, including: |

- Corrected R-squared (R^2) value
- F-value
- Standard error
- Durbin-Watson statistic
- Autocorrelation
- P-squared value
- Mean of dependent variable

- Standard deviation of dependent variable
- Regression coefficient
- Standard error of coefficient
- T-value for independent variables
- Correlation with the dependent variable
- Regression coefficient with highest correlation

The main output screen is shown below. For explanations of the output fields, see page 58.

Durbin-Watson statistic;
Autocorrelation;
Mean of dependent variable

Corrected R^2 value;
F-value;
Standard error

Variables

Regression coefficient;
Standard error of coefficient;
T-value for independent variables

P-squared value;
Standard deviation of dep. variable

Regression coefficient with highest correlation;
Correlation with the dependent variable

Additional request fields


```
 ═                        Datastream - DSWindows - [Terminal]              ▼ ▲
 ▬  File  Edit  Options  Connect  Macro  Window  Help                        ▼

 Clear  Enter  Code   ?  ⬛ ⬛ ⬛ ⬛ ⬛ ⬛ ⬛ ⬛
DATASTREAM 250R      EQUN.1      PERIOD:  1/ 2/94 TO   1/ 7/94      DAILY      22/ 7/94

CORRECTED R-SQ =  1.000          DURBIN-WATSON = 0.75
       F-VALUE = 5818.32    AUTO CORRELATION = 0.624                 P-SQUARED =       1.00
STANDARD ERROR =   1.30  DEP VAR(V02): MEAN =    3153.3             STD.DEV. =    148.656

IND VAR   REG COEFF     STD ERROR    T-VALUE    CORRELATION       REG. COEFF. WITH
                         OF COEFF.                WITH DEP VAR    HIGHEST CORRELATION
  CON          5.787       0.12       46.444                         V03  -1.00
  V01          0.986       0.05       20.763        0.998            V01  -1.00
  V03          0.012       0.04        0.276        0.990            V01  -0.69
  V04         -0.996       0.02      -56.134       -0.022            V06  -1.00
  V05        -15.186       9.29       -1.634        0.686
  V06         15.187       9.29        1.635        0.717
              16.562       9.30        1.781       -0.190

DO YOU REQUIRE:THE CORRELATION MATRICES OF THE COEFFICIENTS          YES_
               THE TABLE OF RESIDUALS                                NO__
               A DESCRIPTION OF THE VARIABLES                        NO__

 Ready
```

250R main output screen

Þ **To continue**

- Press ENTER to return to the input screen, or
- Fill any of the additional request fields
    - Type **YES** in the Correlation matrices field to display tables of correlation between the coefficients and the variables (8 variables maximum)
    - Type **YES** in the Table of residuals field to display the actual variable and an estimate of the dependent variable generated by the regression and the residuals
    - Type **YES** in the Description of the variables field to display a list of the variables used in your equation

The correlation matrices output screen is shown below. For field explanations, see page 61.

Analysis of variance: source of variation

Correlation matrix of regression coefficients
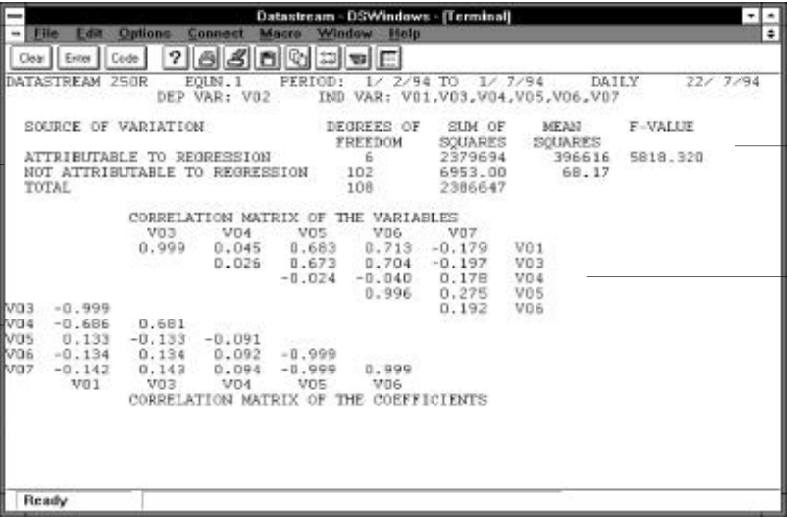
Degrees of freedom; Sum of squares; Mean squares; F-value

Correlation matrix of the variables

250R output screen; correlation matrices

The table of residuals output screen is shown below. For field explanations, see page 61.

Date

Actual values of dependent variable

Estimates of dependent variable

Residuals

Residuals as a percentage of the estimated dependent variables

250R output screen; table of residuals

The description of variables output screen is shown below.

Description of variables; the dependent variable is listed first

250R output screen; description of variables

250R output fields

Main screen   `CORRECTED R SQ.`   The method for fitting a regression lie is known as the method of 'least squares' fit. R squared (R^2) is a measure of the precision of a least squares fit. It measures the extent to which change in the dependent variable is explained by changes in the independent variable(s).

The value of R^2 always lies between 0 and 1. The closer this value lies to 1, the stronger the relationship between the variables. A value of 1 indicates a perfect positive relationship, whereas a zero indicates that the independent variables contribute nothing to the explanation of the variability of the dependent variable.

Corrected R^2 indicates the calculation has been corrected for the number of degrees of freedom (in this case the number of independent variables in the equation). Consequently, R^2 may increase or decrease when a new independent variable is added to the equation, depending on the size of the T-value (see T-value).

`DURBIN-WATSON`   The Durbin-Watson *d* statistic detects the presence of autocorrelation. Autocorrelation may be positive, negative or zero. You must consult a table of Durbin-Watson values to check levels of significance. In general:

If autocorrelation is zero, *d* would be approximately 2.
If positive, *d* would lie within a range 0 to 2
If negative, *d* would lie within a range 2 to 4.

`F-VALUE`   This is the ratio of mean squares. It is used to test the significance of all the variables in the equation. It also appears in the analysis of variance table. You must consult a table of F-values to check levels of significance.

AUTOCORRELATION

This is the autocorrelation coefficient, which is calculated from the residuals of the regression equation, with a one period time-lag. Ideally, there should be no autocorrelation present, where the coefficient will be zero. You must consult a table of Durbin-Watson values to check levels of significance.

P-SQUARED

P^2 compares the forecast predicted by the equation, that is, the estimate of the dependent variable, with the 'naive' forecast that the previous period's value is unchanged.
- If estimated Y is a 'better' forecast of the actual value of Y than the naive one, then P^2 will lie between 0 and 1
- If worse, P^2 will be negative, implying that using the equation for forecasting purposes would not be a useful exercise

STANDARD ERROR

The standard error of the estimate provides a measure of the absolute dispersion of the Y (dependent variable) values about the fitted line. It is expressed in the same units as the dependent variable and is analogous to the standard deviation calculation for a single variable.

DEP VAR: MEAN STD.DEV.

The mean and the standard deviation of the dependent variable.

REG. COEFF.
(regression coefficient)

This is the regression coefficient. It can be either a positive (+) or negative (−) value. It indicates the relationship of an independent variable to the dependent variable. Additionally, if the standard error of the coefficient (see below) is smaller than the regression coefficient, then the independent variable has an effect on the dependent variable that is not due purely to chance (see also T-value).

STD. ERROR OF COEFF.
(standard error of the regression coefficient)

This is the standard error of the regression coefficient. As the regression coefficient is estimated statistically, the standard error gives an estimate of where that coefficient may actually lie (see also T-value).

Main screen, continued

`T-VALUE`

This is the regression coefficient divided by its standard error. It indicates the significance of each independent variable in explaining the dependent variable.

In general, any T-value greater than $+2$ or -2 is acceptable. An independent variable with a low T-value can be removed from the equation without greatly increasing the standard error of the estimate.

`CORRELATION WITH DEP. VAR.`
(correlation with dependent variable)

This is an estimate of the degree of association between each independent variable and the dependent variable. The value of the coefficient is always in the range of $+1$ to -1, where:

- $+1$ indicates a perfect positive relationship between the two time series
- Zero indicates there is no relationship between them
- -1 indicates an inverse relationship

`REG COEFF. WITH THE CORRELATION`
(regression coefficient with the highest correlation)

This is derived from the correlation matrix of the coefficients. See the first additional request field, page 56.

Correlation matrices screen

`SOURCE OF VARIATION`	This is a convenient method of presenting the sum of the squares of the dependent variable into that part which is The sum of squares of the dependent variable is explained by regression, and that part which is not.
`DEGREES OF FREEDOM`	This is equivalent to the number of observations minus one. The degrees of freedom attributable to regression is equal to the number of independent variables.
`SUM OF SQUARES` `MEAN SQUARES`	The sum of squares of the dependent variable, and the sum of squares divided by the number of degrees of freedom.
`F-VALUE`	The ratio of mean squares. You must consult a table of F-values to check levels of significance.
`CORRELATION MATRIX` `OF THE VARIABLES`	The matrix of correlations between each independent variable, up to a maximum of eight variables.
`CORRELATION MATRIX` `OF THE COEFFICIENTS`	The matrix of correlations between the regression coefficients of the independent variables. High correlation between the independent variables may indicate collinearity. If present, you can reduce or eliminate collinearity by dropping the independent variable which accounts for it from the equation.

Table of residuals screen

`TIME PERIOD`	Date of values for the dependent variable.
`DEP VAR` (dependent variable)	Actual values of the dependent variable.
`ESTIMATE OF DEP VAR`	Estimates of the dependent variable generated by the regression.
`RESIDUAL`	Residuals of the dependent variable (actual values minus the values estimated by the regression procedure).
`RESIDUAL %`	Residuals of the dependent variable as a percentage of the estimated values of the dependent variable.

250S Regression and correlation against a base

Program 250S is a straight-line regression program which regresses a base series against a supplied list of series or expressions. The program is equivalent in function to 301S.

The example here examines the regression correlation between a LIFFE September 1994 Long Gilts future and a series of gilts.

Þ **To run program 250S**

Type **250S** in the Program number field and press ENTER.

250S input screen   The 250S input screen appears below. You **must** specify the base series, and **at least** one independent variable data series. Fill in the fields and press ENTER:

250S input screen

Base series

Independent time series

Stored list item numbers

Start and end dates

Correlation frequency

Linear or logarithmic values

Coefficients sort order

250S input fields

BASE SERIES

This is the data series or expression against which the regression and correlation coefficients are calculated.

ENTER SERIES, EXPRESSION OR LIST CODE

You may enter up to 10 series codes or expressions individually, or a list mnemonic in any of the standard Datastream formats eg, **GILTS**.

FOR STORED LIST ONLY

If you use a stored list, you can regress a maximum of 100 series. Specify the range of item numbers required, for example, **75** to **150**.

START/END DATES

The default start date is one year ago (**–1Y**). The default end date is today (blank). You can overwrite the default dates if required. See 'Actual dates' and 'Displacement dates' on pages 24 and 26 for further details. overwrite the default dates if required.

CORRELATION FREQUENCY

The frequency for the regression calculations can be:
D   for daily
W   for weekly
M   for monthly
Q   for quarterly
Y   for yearly.
At least 4 values must be available within the time space chosen to provide enough data for calculation of the correlation coefficient.

LIN OR LOG VALUES (linear or logarithmic regression)

- **LIN**, the default, performs a regression calculation on the actual values stored.
- Type **LOG** to perform a regression on the logarithm of the changes in series values.

SORT ORDER FOR COEFFICIENTS

The display may be sorted into correlation coefficient sequence by typing:
A   for ascending order
D   for descending
U   for unsorted

250S output screen   Program 250S displays

- Details of the base series
- Independent time series listed according to the coefficients sort order
- For each independent time series: the last value; regression coefficient; standard error; correlation coefficient; and R^2. See 250R output fields for details, page 58.

Þ   **To continue**

Press ENTER to return to the input screen. (Depending on the length of the list, output may extend over more than one screen.)

Base series details

Independent time series, sorted as specified

Last value; Regression coefficient; Standard error

R^2

Correlation coefficient

250S output screen

250S output fields

`LAST VALUE`

The last value for the independent variable (or time series) which was extracted and used in your calculation.

`REGRSN COEFF`
(regression coefficient)

The regression coefficient may be either positive or negative, indicating how the independent variable relates to the dependent variable (or base series).

If the standard error (see below) is small in comparison to the regression coefficient, the independent variable is having an effect on the base series that is not due purely to chance.

`STD ERROR`
(of the regression coefficient)

The standard error of the regression coefficient provides a measure of the reliability of the regression coefficient (see above).

`CORR COEFF`
(correlation coefficient)

The correlation coefficient measures the relationship between the base series and the independent time series. The value of the coefficient is always in the range of +1 to –1, where:

- +1 indicates a perfect positive relationship between the two time series
- Zero indicates there is no relationship between them
- –1 indicates an inverse relationship

`R SQUARED`

R squared (R^2) is an indicator of the precision of a least squares fit. It measures the extent of the change in the dependent variable which is explained by changes in the independent variable(s). R^2 lies between zero and +1, where +1 indicates a perfect positive relationship.

Additional futures research

Other Datastream services

In addition to the dedicated futures programs, the 250s, you can research futures data using many other Datastream services, for example, to:

- Produce graphs of futures data
- Produce statistical reports
- Create your own futures lists
- Download data into your spreadsheets

This section describes briefly how you might use these other services.

Producing graphs of futures data

Datastream's Graphics service comprises 20 programs (the 401s) to display historical financial data in graph form. You can use futures data with most of the graphics programs. Possible uses include:

■ Displaying a price history line graph for a given contract (401A)

■ Displaying bar graphs of trading volumes for given contracts (401G). See example opposite

■ Displaying daily high, close, open and low values for a given contract as a candlestick graph (401M)

■ Displaying the price oscillation graph for a future (401O). The oscillation is given by:

$$\frac{(Price\ high - Opening\ price) + (Closing\ price - Price\ low)}{2*(Price\ high - Price\ low)}$$

■ Displaying daily high, low and settlement prices and volume (401V)

■ Displaying the relationship between cash and futures series (401X) using expressions created using program 300A. See example opposite

Note: *You cannot use futures data with 401B (price relative chart), 401E (redemption yield difference), 401K(pie chart) and 401N (yield curve).*

For detailed information on the Graphics programs, please refer to the *Graphics User Guide*.
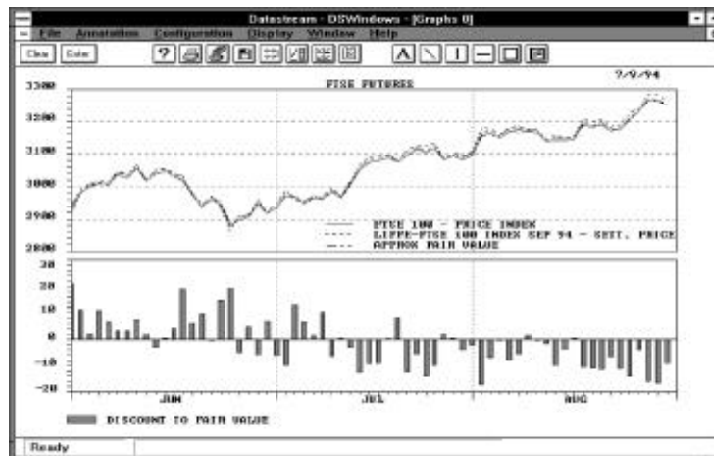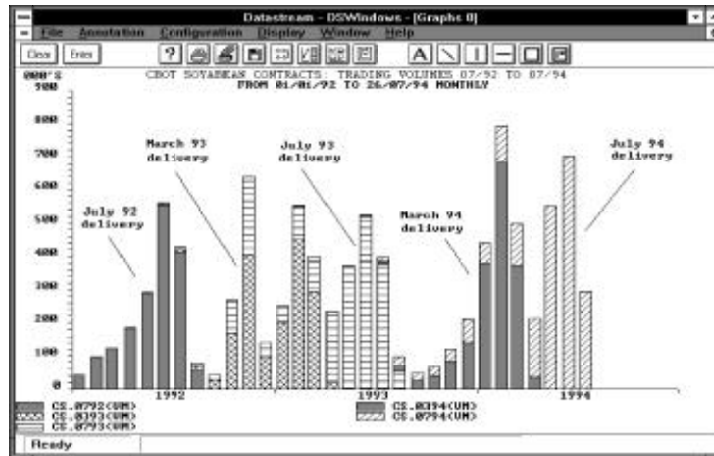
401X example graph; combined line and bar graphs showing the relationship between the FTSE 100 index, the index futures contract and the contract fair value, for June to August 1994

401G example graph: composite bar graph, showing monthly

Producing statistical reports

The Datastream futures programs are designed to output tables of statistical data. Consequently, you will have little need to use Datastream's Times Series Analysis service. This comprises nine programs (the 301s), but six of these programs are directly equivalent to 250 programs. In particular, the following are equivalent:

250H	*and*	301A		250K	*and*	301D
250I	*and*	301B		250R	*and*	301R
250J	*and*	301C		250S	*and*	301S

However, possible uses for the remaining programs include:

- Displaying actual values for futures contracts (301V)
- Designing and storing your own output format to display actual values, for example, price high and price low, for a series of contracts on a specified date (301X and 301Y)

For detailed information on the 301 programs, please refer to the *Time Series Analysis User Guide*.

Creating your own futures lists

Datastream program 300B enables you to create, maintain and review a list of futures contracts (or any data series). These lists can be used in certain 250 programs (250I, 250J, 250K and 250S) and 301 programs, and also Data Channel. Using 300B, you can create a list containing:

- Futures contract mnemonics
- Futures contract mnemonics with a following datatype, for example, NJO0994(PH)
- Futures contract mnemonics with a currency conversion, for example, HFC0394~FF
- *Ennn* codes, used to identify expressions created on program 300A

The 300 suite of programs are documented fully in the *Time Series Analysis User Guide*. Please refer here for details.

Downloading data into your spreadsheets

You can use Datastream's Data Channel programs (the 900s) to download data for futures and futures lists to a file on your PC. You can use datatypes to specify which type of information you require. You can then use this data in, for example, your Microsoft Excel spreadsheet, or in any other package. The following futures datatypes are available for use in Data Channel:

Description	Datatype
Base or start date	BDATE
Price, APT closing	CA
Default datatype	DEF
Datastream mnemonic	MNEM
Name	NAME
Open interest	OI
Price, high	PH
Price, low	PL
Price, opening	PO
Price, settlement	PS
Type of instrument	TYPE
Value	VU
Volume of contracts	VM
Yield	YD
Instrument default applied	X

For detailed information on Data Channel, please refer to the *Data Channel User Guide*.

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