instrument data base configurator

system 6000

8275

user guide

8275 Reference Manual Supplement

The 8275 (VDU) Software is tested and release for use on 386 PC's running DOS 3.x.

The Software (Version 4/4) has been functionally tested with DOS 5.0 and DOS 6.0, and shown to give no problems.

There is, however, a problem when using the Software on 'fast' PC's. 'Fast' is defined as anything faster than a 386SX 16 MHz. The performance of a PC can be checked by using NORTON's SysInfo, if the 'Relative Performance Index' is greater than 16 then the Software will have problems.

The Problem manifests itself as 'lock up's' or Error Messages when either up loading Templates from System 6000 instruments or working interactively on-line with a D300.

If your PC supports the ability to slow the CPU clock down to 8 MHz AT Compatible (using BIOS Set-up) then the product can be used successfully.

April 14, 1994

8275 - INSTRUMENT

DATA BASE CONFIGURATOR

USER GUIDE

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APPENDICES

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MANUALS FOR FURTHER REFERENCE

TCS Programmable Instruments Application Manual (not supplied)

TCS Programmable Instruments Programming Manual (not supplied)

Section 1 GENERAL DESCRIPTION

1.1 Introduction

The TCS 8275 'Instrument Data Base Configurator' package allows the IBM PC XT or PC AT or compatible computer to be used as a programming terminal for the TCS System 6000 range of microprocessor based instruments. The 8275 software can be supplied on standard 5¼ diskettes or double-sided, 720k formatted 3½ diskettes.

As a terminal, connected via the Hand-held terminal port on the front of the instrument, it can function as a simple replacement for the conventional 8260 Hand-held terminal, or, for instruments which have the TCS FORTH Language, it can be used for developing programs, saving programs and loading programs.

1.1.1 FORTH Programming

When a program has been saved from an instrument onto a file, it will allow a permanent copy to be made of a program which has been developed interactively on the instrument. When saved in this manner, the FORTH program is formatted in a standard way to improve readability and to accentuate its structure.

FORTH programs may also be loaded into an instrument from the IBM PC , and the format of a 'saved' FORTH program is compatible with this option.

1.1.2 Saving Parameters

A complete instrument data base can be saved by means of the front panel Hand-held terminal port. This allows the data base to be stored for future reference, printed out etc. A data base can be altered or created and transmitted back to the instrument.

1.1.3 Sending Parameters

A complete instrument data base can be transmitted by means of the front panel Hand-held terminal port. This allows the data base that has to be saved or created to be transmitted to the instrument.

1.1.4 Point Display (6366/6356)

This gives a display of all parameters of loop 1 and loop 2 and 1 set of block parameters. All blocks can be displayed (1 set at a time) by use of the up/down scroll keys. This facility will also allow all block or loop parameters that are displayed, to be programmed.

1.1.5 Point Display (General)

For single loop instruments the complete parameter list will be displayed. For multi-loop instruments the user will be asked for the number of loops/channels to be displayed. This will consequently display the loops/channels plus the instrument parameter list.

1.2 Features and General Description

The IBM PC or Compatible operating under DOS allows the features as described in Section 1.1 to be performed. It can also be configured for auto-boot into the TCS 8275 software on power up. For a complete description of its features, it is recommended that reference is made to the IBM PC or Compatible's User Manual.

Programs and Files can be transferred rapidly between the IBM PC or Compatible and the Epson PX-8 using the RS232C port of each machine.

Section 2 INSTALLATION

2.1 General Requirements

The sequence of events for configuring the IBM computer or compatible is as follows:-

2.1.1 Minimum Hardware Requirements

To run the 8275 software the minimum hardware requirements are as follows :-

a) IBM PC/XT Dual Floppy Diskette System
or IBM PC/AT Dual Floppy Diskette System
or IBM PC/XT or /AT Clone Dual Floppy Diskette System.

b) Monochrome or Colour Monitor (and adaptor card).

c) 512kB of memory (minimum).

d) Parallel/Serial Interface card configured as LPT1/COM1.

e) Optional Second Serial Interface Card configured as COM2.

2.1.2 Printer Option

To print data-bases, FORTH programs etc, a printer is required with the specifications as follows :-

a) 80 column dot matrix printer with parallel interface.

Note :- A serial interface (RS232C) with handshaking facilities can be used if a second Serial Interface card is fitted.

2.1.3 Proven Compatible Machines

The 8275 software has been proven on the following machines:-

IBM PC XT
IBM PC AT/ATX
Tandon PCA 20/30
Tandon PCA 40/40 Plus
Amstrad PC1512/1640
Amstrad PPC 640

2.2 Configuration

It will be necessary to complete all of the following steps to install the VDU software and Editor as follows:-

2.2.1 Configuring a Fixed Disk Based System

a) Power up and ensure the system is in the root directory with the DOS prompt C displayed on the monitor.

b) Locate the TCS VDU disk into drive A and type the following :-

```
A:LOADVDU [Enter]
```

This will create a directory namely ' VDU', and then perform a change directory command which will subsequently move the user into the VDU directory. It will then copy the executable file 'vdu.exe' and the help files into the directory.

c) Remove the TCS VDU disk and locate the Personal Editor 2 disk in drive A and type the following :-

```
A:INSTALL [Enter]
```

This will load each file of Personal Editor 2 into the VDU directory:

d) Remove the Personal Editor 2 disk and store safely. Then type the following:-

```
PE2 \CONFIG.SYS [Enter]
```

This will load the editor and the CONFIG.SYS file which must be edited as follows :-

i) Press the Esc Key, (This initiates Edit mode.)

ii) Use the down arrow key to move the cursor to the bottom of the file. (Until the cursor cannot be moved down further.)

iii) Press F9 (Insert a Line) and type the following :-

```
DEVICE=ANSI.SYS
```

iv) Press the Esc key (Command Mode at bottom of screen) and type the following :-

```
SAVE [Enter]
QUIT [Enter]
```

This will return the system to the DOS prompt C in the VDU directory.

e) Turn off the power (this must be performed to install the edited version of CONFIG.SYS) to the system and connect the printer, if being used, to the parallel port LPT1. Connect the relevant lead, as shown in the appendices, from the serial port of the system i.e. COM1 to TCS instrument i.e. 6366.

f) Turn on the power to the system and wait for the DOS prompt C . Then type as follows :-

CD VDU [Enter]

This changes the user into the VDU directory. Then type as follows :-

VDU [Enter]

This runs the TCS VDU software package.

2.2.2 Configuring a Dual Floppy Diskette Based System

a) Power up with the boot diskettes in the default drive (Drive A) and wait until the DOS prompt is displayed on the screen.

Make back-up copies of the TCS 8275 Diskette at this point and store the originals in a safe place.

b) Locate the PE2 Personal Editor Disk in the second drive (Drive B) and type the following:-

B:PE2 A:\CONFIG.SYS [Enter].

This will load the editor and the CONFIG.SYS file which must be edited as follows:-

i) Press the Esc key. (This initiates Edit mode.)

ii) Use the down arrow key to move the cursor to the bottom of the file.

iii) Press F9 (Insert a Line) and type the following:-

DEVICE = ANSI.SYS

iv) Press the Esc key (Command Mode at the bottom of the screen) and then type the following:-

SAVE [Enter]
QUIT [Enter]

This will return the system to the DOS prompt. Remove the PE2 Disk from Drive B.

c) Turn off the power. At this point, ensure that the relevant lead, as shown in the appendices, is connected to the serial port of the system.

d) Turn on the power to the system and wait for the DOS prompt to appear. This will install the changes made to the CONFIG.SYS file. Remove the DOS disk from Drive A. Place the TCS VDU program disk in Drive A, then type the following:-

```
CD VDU [Enter]
VDU [Enter]
```

This runs the TCS VDU software package.

2.3 Using TCS 8275 With a Dual Floppy Diskette System

Once the 8275 program has been run, remove the program disk from Drive A and insert the Template file disk in Drive A.

This should be kept in Drive A, except on the following occasions:-

i) Prior to using option 0, the Program Disk 1 must be located in Drive A.

When option 0 is exited from, replace the Template Disk in Drive A.

ii) Prior to using option I or option J, Program Disk 2 must be located in Drive A. This is because the overlay programs to allow these two programs to be run reside on Program Disk 2.

Once the overlay program has been loaded and the sub-menus are displayed on the screen as described in Chapter 7 for option I or Chapter 8 for option J, the Templates Disk should be replaced in Drive A.

These program overlays do not remain memory resident when the option is exited. So, this procedure must be followed each time these options are selected.

A user disk should be kept in Drive B, and all user files should be directed onto this disk, e.g. when using option 8 to create a template file, when the prompt is given for the filename, precede the filename with B:.

Section 3 OPERATING MODES

The IBM PC can be used for many applications outside of the 8275 software package. For a complete understanding of these applications it will be necessary to refer to the manuals supplied with the IBM PC. The following paragraphs will therefore only make reference to the 8275 software package.

For further information on 'FORTH' based instruments, see the TCS Programmable Instruments Application Manual and the TCS Programmable Instruments Programming Manual.

3.1 Operation of VDU.EXE

Once the program is running, the main menu will appear on the monitor. The following sections describe the facilities which may be accessed from the VDU menu page.

3.1.1 Instructions On Use

Selecting this option will enter the user into a hierarchical help system. The information displayed in the help pages shown is similar to the operating instructions given in the manual. These help pages are stored in the subdirectory \VDU\HLP in files with the names H*.HLP. To enter the help system, press '0' from the main menu. This will put the root page on the screen, denoted by a welcome message. This page is stored in the file H.HLP. Files stored a further stage down the hierarchy are stored as H1.HLP, H2.HLP, H3.HLP, etc. The user has a number of options when in the hierarchy as follows:-

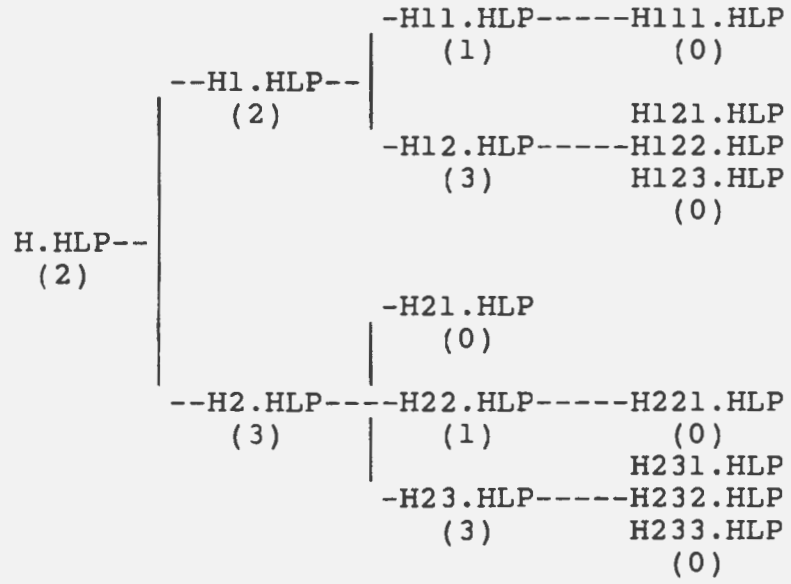
a) '0' will return to the previous stage in the hierarchy (the parent help page). From the root page, it will return to the main menu.

b) '1' to '9' will move a stage further down the hierarchy. If the help page does not exist for the choice the user has made, the position in the hierarchy will remain the same.

At all times, - CTRL-E will return the user to the main menu.

If a help file with the correct name does not exist, then an error message will be returned. If the file doesn't have the correct internal format for a help file, another error message will be returned.

The diagram below depicts a hierarchy of help files. The number allocated to each filename is a numeric character that must be added to the beginning of that help file. This is explained later.



If the user wishes to replace the existing help hierarchy with a different one, the information should first be arranged into a number of help pages, and stored in files with names similar to the above. Any user written Help Files must be placed in the \VDU\HLP subdirectory. One numeric character should then be added to the beginning of each help file. This numeric character will tell the program how many 'children' that help page has. Thus, in the above structure, the help file H23.HLP should have the numeric character '3' added to it. This character should be the first alphanumeric character in the file. All characters before it will not be printed on the screen. All characters after it will be printed on the screen as if the file had been printed using the TYPE command in MS-DOS. Help pages can be more than one page in length, as they are shown to the user several lines at a time. A numeric '0' at the beginning of a help page means it is at a leaf of the hierarchy. Pressing any key when viewing this help page will return the user to the previous help page. Pressing any key (apart from '0') when viewing a file with one child, will result in that child help page being displayed.

3.1.2 Select Baud Rate and Comms Card

This option must be selected when first entering the VDU program, and before communication with TCS instruments is attempted.

Four alternative baud rates are available as follows:-

300
1200
4800
9600

Two alternative Communications Ports are available as follows:-

COM1
COM2

For System 6000 intelligent instruments it is usually convenient to run at 9600 baud with the instrument switches set correspondingly.

The default baud rate is 9600.

Communication can take place over either of the ports. If only one adapter card has been fitted into the IBM PC, then it is likely that this has been set up to be COM1. If two have been fitted, one will be COM1, and the other will be COM2, therefore, they can be selected as shown above.

The default baud rate is 9600 set on COM1.

3.1.3 Enter Terminal Mode

Before entering terminal mode ensure that the baud rate has been set correctly for the instrument and it is connected to the correct port. On most instruments (those without FORTH) the baud rate is restricted to 300 on the 8260 Hand-held terminal port but on certain instrument types (e.g. 6433, 6355) the baud rate can be set to either 300 or to the same as that used for the RS422 data link.

Note: That the baud rate and Comms port must be reset each time VDU is entered. If they are not set, then the following defaults are assumed:-

Baud Rate : 300

Comms Port : COM1

CTRL-E will take the user back to the menu page. When CTRL-E is typed, characters are not sent to the instrument. Thus, it will stay in exactly the same mode as that in which it was left. Also, the current baud rate and comms port that the IBM PC is communicating on will stay unchanged.

CTRL A will run the Automatic Fault Finder. See section 3.3.2 for a full description of this option.

CTRL T will toggle the printer. If it is ON, the output from the instrument will also be printed on a printer. If a printer is not connected, the message:-

Abort, Retry, Ignore?

will appear on the screen. The printer should be connected (to the correct communications port) and the operation retried). If an instrument is in parameter mode, a CR,LF sequence will be inserted between consecutive lines. If the instrument is in programming mode, CR,LF is not inserted. Either a serial printer or a parallel printer may be connected to the IBM for communication with the instruments. If a serial printer is used it should be configured to use the communications port that is not being used by the instruments. The printer is assumed to be connected to LPT1: by default. In this case the file called 'printer.PFL' should not exist. If it does exist, it should be renamed.

If a serial printer is to be connected, one of the following commands should be executed from MS-DOS, depending on which serial adapter port is to be used:-

mode LPT1:=COM1: ; or mode LPT1:=COM2:

As well as this, the file 'printer.PFL' should be set up to hold the printer's configuration:-

baudrate,stopbits,parity,databits,comms port

This file must be set up with the correct configuration. If it has a wrong configuration, or the same communications port has been specified to connect both to instrument and IBM PC, the 'printer.PFL' command is ignored. The CTRL-T option may only be used in terminal mode.

When exiting from terminal mode, the option is turned off. It is not possible to use the CTRL-T option to print out a file. However, option C (see Section 3.1.13) may be used to send a file to a serial printer.

On instruments with FORTH, programming mode is entered by typing CTRL P (holding down the CTRL key and striking'P'), and 8260 Hand-held Terminal mode can then be re-entered by typing CTRL X or CTRL Q for the 6433.

The T100 has a configurator mode which may be entered by typing CTRL K (holding down the CTRL key and striking 'K').

Exiting from the T100 Configurator is achieved by pressing the escape key (see T100 Manual for further details).

VDU will exit this mode automatically if it receives any normal Instrument Hand-held Terminal codes.

When using the IBM terminal to replace the 8260 Hand-held Terminal, some keys have 'special functions' as follows:-

'L' enter +ve or hexadecimal number
'M' enter -ve number
'Q' backspace or query current value
'W' scroll to next parameter
'Z' reset to '?? CMD' prompt

3.1.4 Load a FORTH Program

Selecting this option will load a FORTH program from a file on any disk to the instrument, via the 8260 Hand-held terminal port.

This option will automatically log-on to the instrument for the user, provided the instrument is programmable. If a Non-Programmable instrument is used, an error message will be generated informing the user of the fact.

On selection, the following prompt will appear:-

Enter Filename (default extention .TXT) :

The filename can now be entered in the following format:-

dr:\dir\filename.EXT

Where 'dr' specifies the source drive and 'EXT' the file extension. A path name may also be included to specify the hierarchical directory in which the file is stored. This is standard MS-DOS syntax. If an extension is not included in the filename then a default extension of .TXT is used (to indicate a text file). If the file does not have an extension, then the '.' should be included in the filename, without the extension added. If 'dr' or 'dir' parameters are not specified, then the current drive and directory are used.

At this point the user will be prompted with the following message :-

Please enter your security number xxxxxxx yyy

where :-

xxxxxxx - is the 7 character password generated by VDU.

yyy - is the 3 digit security code to be entered by the user.

The user will be required to supply the instrument security number after the filename has been supplied. If the instrument has no security number, the user will be required to return to Terminal mode, give the instrument a password, and remember the security number.

If the file is loading successfully, the FORTH words will be listed on the screen. If not, an error message will be generated - see Section 3.2.

The user may abort the save at any time by pressing CTRL-E. This will close the input file and return the user to the main menu.

When the operation has been completed the following prompt will appear on the screen:-

Program Has Been Loaded. Press Any Key To Continue.

Pressing any key will return to the main menu, leaving the instrument in programming mode. Entering terminal mode again and typing STORE will load the program from RAM to EEPROM on the instrument.

FORTH programs can be prepared with comments embedded at most points: the loading process strips out any characters between brackets '("...")', and any control characters are converted to spaces. Note, however, that comments CANNOT be nested; any mismatching of brackets will cause an error. This will be reported to the user, with a report of the two lines at which the error occurred.

If whilst loading a FORTH program, the instrument detects a syntax error, then loading will cease, and the instrument will offer the word containing the error as a single line edit with a description of the error type. See the System 6000 Programmable Instruments Programming Manual for diagnosis of errors generated this way.

Any FORTH words which are loaded via the 'VDU' program are appended to any existing program in the instrument, so trying to load an existing word will cause an error. Type 'NEW' in programming mode to clear the User Dictionary, or 'FORGET' to delete words at the end of the dictionary which it is wished to reload.

When using a word-processor to prepare a FORTH program, it is often useful to define a 'Ruler' for tabulating spaces, or to insert page or header information. Although word-processors differ considerably in this respect, such information can usually be inserted within a comment (comments can extend over as many lines as required), so that any special control characters, etc., can be 'hidden' from the instrument.

FORTH programs may only be loaded via the hand held terminal connector. The rear terminal RS422 connection may not be used for this purpose.

3.1.5 Save a FORTH Program

Selecting this option will save a FORTH program stored within the instrument to a file on disk, via the 8260 Hand-held terminal port.

This option will automatically log-on to the instrument for the user, provided the instrument is programmable. If a Non-Programmable instrument is used, an error message will be generated informing the user of the fact.

On selection, the following prompt will appear:-

```
Enter Filename (default extention .TXT) :
```

The filename can now be entered in the following format:-

```
dr:\dir\Filename.EXT
```

Where 'dr' specifies the source drive and 'EXT' the file name extension. A path may also be included to specify the hierarchical directory in which the file is stored. This is the standard MS-DOS syntax. If an extension is not included in the filename then a default extension of .TXT is used (to indicate a text file). If the file does not have an extension, then the '.' should be included in the filename, without the extension added. If 'dr' or 'dir' parameters are not specified, then the current drive and directory are used.

In this option, no security number need be supplied by the user as the information in the instrument is not being changed.

If the specified file already exists, the user is informed and given the option of aborting the save, or overwriting the existing file.

Saved FORTH programs are expanded into text form, with formatting characters, which takes up considerably more space than the compiled form within the instrument.

The saved program is an ASCII file which can be printed directly, or it can be edited to add comments, etc., and can then be downloaded again.

As the file transfer takes place, the FORTH words will be listed on the screen. If this does not happen, an error message will be generated - see Section 3.2.

The user may abort the save at any time by pressing CTRL-E. This will close the file and return the user to the main menu.

Once the operation has been successfully completed, the following prompt will appear on the screen:-

Do You Wish To Verify The File (Y/N) :

If Y(ES), a second save will take place (and the words will again be listed on the screen) . This time, the dictionary will be stored in the file TMP.TMP. It should therefore be ensured that this filename is not used for any other purpose. When the second save is completed, the two files will be compared. If the comparison is succesful, TMP.TMP will be deleted, and the user will be returned to the main menu. If the file was not verified correctly, TMP.TMP will not be deleted and the following error message will appear on the screen:-

The Verification Has Failed.

The user should now compare the output file with TMP.TMP. This option will show the user the first place at which an error occurred, denoted by a line number.

Forth programs may only be loaded via the hand held terminal connector. The rear terminal RS422 connection cannot be used for this purpose.

3.1.6 Loading and Saving Parameters

This option is used for two purposes, described as follows:-

a) To download parameters into the instrument from the computer.

b) To upload parameters from the instrument to the computer.

The input file specified by the user dictates which of these options is being performed. A TEMPLATE file should be used to upload parameters to the computer (option b) by using a .TPL file, and a DATA file to download parameters from the computer (option a), by using a .DAT file.

This facility is selected using option 5 from the VDU menu. The following prompt will appear on the screen:-

Name Of Input File (default filename .DAT) :

Enter the filename in the format dr:Filename.EXT, omitting 'dr:, or '.EXT' if appropriate, and press RETURN.

If the input file was a TEMPLATE file (used for saving instrument parameters, .TPL) the output file will normally be a Data file, e.g. if the user entered TEST.TPL for the last prompt, the next prompt will be :-

Name Of Output File (default TEST.DAT) :

However, if the input file was a DATA file (.DAT) the output file will normally be a backup file. Therefore, if the user entered TEST.DAT for the last prompt, the next prompt will be:-

Name Of Output File (default TEST.BAC) :

The user has the following options when entering the filename here:-

1) Pressing RETURN : the default name, extension, drive and directory are used.

2) Entering a filename without '.EXT' : the default extension, drive and directory are used.

3) Entering the filename terminated with a dot : the default drive and directory are used; no extension is added.

4) Entering the filename with an extension : the default drive and directory are used.

5) The drive and directory may be specified in the filename in the usual MS-DOS way if necessary.

If the output file already exists the user will be given the option of aborting the save, or overwriting the original file.

The output file when downloading to the instrument will contain the actual parameter values received from the instrument for every parameter sent to it. The file which is being read from might contain the parameter DP 1111 . When this is sent to the instrument it will reply with DP 1112 . It is this received parameter which is placed into the file. Therefore it can be seen that this file could then be used as the 'true' parameter database. It should also be noted that all comments contained within the Input file are transferred to the Output file.

After the working files have been specified, the following prompt will appear:-

1) Link To Instrument Is RS232 (via front panel).
2) Link To Instrument Is RS422 (via rear terminals).
3) Link To Instrument Is RS422 (via front panel) for 637x/8x Series only
   Please Type "1" OR "2" OR "3"

Select the appropriate option and the screen should display the list of parameters returned from the instrument for the duration of the file transfer procedure. If this does not happen, an error message will be printed - see Section 3.3.

Option (3) will only work correctly on the 637x/8x series of instruments. It switches the RS422 ASCII protocol communications through to the RS232 front panel port of the instrument, therefore giving a significantly faster and more secure upload and download of parameters without the necessity of having the computer connected up for RS422 communications.

It should be noted that option (3) does away with the need for two differing template file formats for the two communications paths. However Option (1) will not be usable with any template files generated by the 8275 software for the 637x/8x instruments.

If the rear terminal connection is used, nothing must be plugged into the Hand-held terminal socket on the front panel. If there is, this will disable the RS422 communications (on the rear terminal connector).

The user may abort the transfer at any time by pressing CTRL-E. This will close the input file and return the user to terminal mode.

If a fatal error occurs, the load will be terminated, and an error message will be given, after which the user will be returned to the main menu.

Fatal errors include:-

1) A Brackets error. The user is given the two lines in the input file at which the error occurred. Brackets may not be nested.

2) A Timeout error. Communications could not be made with the instrument at all. The user is given the option of using the Automatic Fault Finder if this happens.

3) Too many Normal errors have occurred in the loadsave operation, and the program could not keep track of all of them. A maximum of 30 Normal errors are allowed in a loadsave operation before it is terminated.

Normal errors include:-

1) The parameter specified was not recognised by the instrument.

2) The value specified was not recognised by the instrument.

If a Normal error occurs, the message:-

file error

will appear on the screen at the appropriate place during the parameter listing. The rest of the line will be ignored in the input file; and a note will be taken of the line number at which the error occurred. A '?' will be put in the output file to keep it compatible for use with a further loadsave operation, if one is necessary.

When the loadsave operation has been completed, an error report will be given of all lines on which Normal errors occurred. These errors can then be corrected, and the loadsave operation retried.

If a Sumcheck error is encountered in the instrument, the message:-

sumcheck error

will appear on the screen at the appropriate place during the parameter listing, and the rest of the line will be ignored in the input file. The parameter save will continue. However, it is suggested that the operation is aborted, the sumcheck failure rectified, and the loadsave operation retried.

It should be noted that both the template and data files are of different formats for the RS232 and RS422 data links. This means that a parameter file saved using one link can only be downloaded again using the same link. Also, the user should check that the correct type of template file is used for the link being used.

3.1.7 Load Instrument Configuration

This facility is used to load an entire intelligent instrument database, and is selected using option 6 on the main menu. It should only be used with the range of programmable instruments.

The instrument should be put into programming mode before a load is attempted. This is performed in terminal mode.

The following prompt will be shown:-

```
Is the instrument a 6433 (Y/N) :
```

This information must be known in order to exit from programming mode in a reliable way, a CTRL-Q is used for the 6433 and CTRL-X is used for all other instruments.

The program first loads a FORTH text file into the instrument, then it exits from programming mode into parameter mode, and finally downloads a parameter database from a DATA file. The parameter download is done via the hand held terminal port, and no option is given to download via the rear terminal connectors.

If the user specifies a text file of TEST.TXT, then a data file of TEST.DAT and a backup file of TEST.BAC will be used during the loadsave operation. If the file TEST.DAT does not exist, the user will be asked to enter the name of the data file (an extension of .DAT is assumed here); however, the backup file will still be named TEST.BAC.

CTRL-E will exit from this option back to the main menu at any stage during the operation.

Note: the file 'TEST' as used above is an example. Any name can be given.

3.1.8 Save Instrument Configuration

This facility is used to save an entire intelligent instrument database, and is selected using option 7 on the main menu. It should only be used with the range of programmable instruments.

The instrument should be put into programming mode before a save is attempted. This is performed in terminal mode.

The following prompt will be shown:-

Is the instrument a 6433 (Y/N) :

This must be known in order to exit from programming mode in a reliable way, as CTRL-Q is used for the 6433 and CTRL-X is used for all the other instruments.

The program first saves a FORTH text file into the instrument, then it exits from programming mode into parameter mode, and finally saves a parameter database to a DATA file using a TEMPLATE file.

If the user specifies a text file of TEST.TXT, then a template file of TEST.TPL is used as the input file and the saved file is called TEST.DAT. However, if there is not a file called TEST.TPL, the program interrogates the instrument it is communicating with to establish its II parameter. From this information, it selects the correct standard template file to use for the parameter save. Here are some examples of standard template file names:-

P351-232.TPL : A template file for transferring data via the hand held terminal port to a 6351 INCREMENTAL CONTROLLER.

P355-232.TPL : A template file for transferring data via the hand held terminal port to a 6355 AUTO TUNING CONTROLLER.

P850-232.TPL : A template file for transferring data via the hand held terminal port to a 6850 SETPOINT PROGRAMMER.

P433-422.TPL : A template file for transferring data via the rear terminal RS422 link to a 6433 PROGRAMABLE SIGNAL PROCESSOR.

If a standard template file for the instrument does not exist, the user is asked for a template filename (a default extension of .TPL is assumed).

CTRL-E will exit from this option back to the main menu at any stage during the operation.

Note:- The file 'TEST' as used above is an example. Any name can be given.

3.1.9 Parameter Template Builder

Selecting option 8 will first display a list of all the template files that exist on the machine. It will split these into three sections:-

1) A list of instruments for which standard RS232 template files exist.

2) A list of instruments for which standard RS422 template files exist.

3) A list of all the template files in the current directory excluding standard template files.

It is not possible to produce a standard template file for the following list of instruments. This is because these instruments are modular in design, therefore the parameters for each block could be different.

a) 6370, 6372, 6380, 6382
b) 6432, 6433
c) 6436, 6437
d) T100

The user is asked:-

Do You Want To Make A Template For A 6432/6433/6436/ 6437/T100 or a 637x/638x Series Block Structured Micro (Y/N)?

If the answer is Yes, the following prompt appears:-

Press:
1) To AutoConfigure Template From the RS232 Link

2) To Manually Configure Template.

a) Auto-configure Option

Selecting option (1) will result in the following prompt:-

> Connect up the RS232 Link to the front panel of the instrument. Press a key when ready.

Followed by:-

> Getting the configuration : Please wait.

If the test is successful, the user will be prompted for a filename to save the template in (a default extension of .TPL is assumed) and asked whether the template is to be an RS232 template (for front panel communications) or an RS422 template (for rear terminal communication). If the file to be used already exists, then the user will be given the option of overwriting or aborting.

b) Manual Template Build Option

If the user wishes to use the Manual Build option, the following list of options will be presented :-

1) 6432
2) 6433
3) 6436
4) 6437
5) 6370/6380
6) 6372/6382
7) T100

Once the instrument option has been selected, a series of prompts will appear, asking for information specific to the instrument option chosen.

For options (1) and (2), the user is prompted for the issue letter of the target instrument. This is because later issues of these two instruments have extra parameters. For the 6432, Issue 4 and later have the extra parameters; for the 6433, Issue 3 and later have the extra parameters. The user is then prompted for the Board Type for each Board that may be fitted to the target instrument. Once a Board Type has been selected, the number of active channels for that Board is requested.

For option (3) the number of active channels is requested.

For option (4) the number of active channels is requested. Then for each active channel, the Transducer Type Code is requested. This is as digit B of the FP parameter of the 6437. According to the transducer type selected, the channel presents either the full parameter set or a reduced parameter set. (See 6437 Technical Manual for further details.)

For options (5) and (6), the user will be prompted to enter the Block Function Type for each Block where multiple Block Functions are available. If the user does not wish to have this block included in the strategy, typing the Enter key will leave the block unassigned. For blocks which have a fixed function, the user will be prompted for whether the block should be included in the strategy or not.

For option (7), the T100 will appear as up to four 6432 instruments. Therefore, the user will be prompted for the instrument type. Then for each instrument configured in the T100, the user will be prompted as in option (1).

CTRL-E may be pressed at any stage during the operation to return the user to the main menu.

In generating a Template File, the Template Build Option paginates the file that it generates, inserting page breaks and Page Numbers at the start of each new page. A page is a maximum of 60 lines, but the pagination process will terminate the page at the end of the preceding block, i.e. a block will not be split over 2 pages.

3.1.10 Instrument Point Display

If this option is selected, the program initially tries to make communication with the instrument (which should not be in programming mode) over the hand held terminal port. If it cannot do this, an error message will be displayed. Otherwise, an instrument menu will appear on the screen as follows:-

INSTRUMENT MENU

1) 6350 Process Controller.
2) 6351 Incremental Controller.
3) 6352 Bushing/Averaging Controller.
4) 6353 Flow Controller.
5) 6355 Auto Tuning Controller.
6) 6358 8 Loop Process Controller.
7) 6360 Process Controller.
8) 6363 Flow Controller.
9) 6366 Programmable Advanced Controller.
0) 6432 Signal Processor.
A) 6433 Programmable Signal Processor.
B) 6434 8 Channel Flow Totalizer.
C) 6850 SetPoint Programmer.
D) Manual Input.

The above menu is a list of all the TCS System 6000 range of instruments supported by the point display option. There are two point display formats used in the above instruments, to cope with the different types of databases stored within them. The 6366 has one point display format, while all the other instruments have the other point display format. The following is a description of each point display. The user need only read the section that is relevant to the instrument being used:-

1) 6350 A single list of parameters stored in the instrument is displayed, starting with the 'II' parameter. This list is continuously updated at about four second intervals. To leave the point display mode, CTRL-E should be pressed. An input window starts at the top of the list, and may be moved around it using the cursor arrows on the keypad (the Num Lock light must be off). The input window may be seen as the two '-' characters on either side of a parameter. To change one of the parameter values in the instrument, position the input window over that parameter and press the 'Ins' key (also on the Numeric Keypad. The current value of the parameter will now be overwritten by stars ('****_'). A value may now be entered using the number on the main keyboard (and capital letters if hexadecimal values are

needed). Do not enter the decimal point position, as this is changed from the DP parameter explicitly, not implicitly while entering a value. When the value has been entered, it should be terminated with a '+' or a '-' character. The 'Enter' key should not be used. After the termination character has been entered, the keyboard will lock up until the value has been entered. This will happen the next time the specified parameter is updated. There may be a delay of up to four seconds before the input window is returned to the screen. If a mistake is used in entering data, the Backspace Key may be used.

2) 6351 Same as the 6350.

3) 6352 Same as the 6350.

4) 6353 Same as the 6350.

5) 6355 There are four separate pages displayed in the 6355 : PG0, PG1, PG2, and PG3. Apart from this, the method of entering data is the same as for the 6350. Because there is more data displayed on the screen, this point display will be slower than the previous ones. If a quicker point display is needed, then option 'D' should be chosen.

6) 6358 There is one instrument block, and seven separate loops displayed in this point display. The method for data entry is the same as for the 6350. A lot of information is displayed, and so the speed will be relatively slow. If a quicker point display is needed, option 'D' should be chosen. If the loop numbers are to be altered on the screen, then a new value should be entered into the LN parameter in the normal way.

7) 6360 Same as the 6350.

8) 6363 Same as the 6350.

9) 6366 This point display is totally different from any other point display in the menu. It displays two loops and one block on the screen. A lot of data is displayed, but if 9600 baud is used for communication, the refresh rate for the parameters is still relatively fast. Moreover, when a parameter value is entered, the program does not lock the keyboard. It enters the parameter directly, and then continues with the screen refresh. CTRL-E

exits from the point display. The up and down cursor arrows scroll the block to be displayed on the screen. The program has been designed to make the block scroll as responsive as possible, but there may be delays during a block scroll.

Data may be entered in two ways : either in Block command mode, or Loop command mode. The current mode is changed by pressing the 'Esc' Key. It should be noted that the parameters displayed in the loops are a subset of those displayed in the blocks. Therefore, any data changed may alter several parameters in different blocks. If in loop mode, enter the loop number (1 or 2), followed by the parameter mnemonic (two alphanumeric characters) and finally the value, terminated by a '+', '-', or 'Enter'. Pressing the 'Enter' key performs the same function as pressing the '+' key. Instructions will appear on the screen as the parameter value is being entered. The 'Backspace' Key will abort the entry. If an error has been found, the following error message will appear on the screen:-

Value Has Not Been Entered.

If the point display is in block mode, values may only be entered into parameters in the current block (changed by pressing the cursor arrows keys). First, enter the parameter mnemonic (two alphanumeric characters). Then enter the value (which must be of the correct length), terminated by a '+' , '-' or the 'Enter' Key. For instance, here are some examples of keypresses which should be used to enter values:-

Value To Be Entered	Keypresses That Should Be Used
999.9	9999+
75-43	7543-
.8768	8768+
-2345	2345-
A2CF	A2CF+

The decimal point is assumed to be in the correct position. The 'Enter' key may be used instead of the '+' key.

When a value is terminated, it is immediately entered into the instrument. However, if a loop parameter was entered, the screen is not updated until the next time the loop is refreshed. If a block parameter was entered, the block is refreshed on the screen immediately.

0) 6432 In this point display, the number of channels to be displayed has to be entered followed by the unique channel address, i.e. 14, 31 etc. Besides these channels, the instrument parameters will also be shown on the screen. It should be noted that the more channels displayed, the slower the refresh rate will be. Once the channels are being displayed on the screen, the user may swap from displaying one channel to another by changing the CN parameter itself. This can be achieved by positioning the input window above the CN parameter of the channel to be removed, pressing the 'Ins' Key, and then pressing for example 22+. In all other respects this point display is similar to the 6350.

A) 6433 Same as the 6432.

B) 6434 The instrument parameters and three channels are displayed on the screen. The update rate will be relatively slow. The method of data entry for this point display is the same as for the 6350.

C) 6850 Same as the 6350.

D) Manual Entry This option allows the user to custom build a point display. In order for the user to do this, the user must first understand the scrolling facility used in the front panel communication with the instrument. This facility can best be seen in terminal mode. With the Caps Lock set , and the program in terminal mode, press 'Z' to get the connected instrument into command mode. Then press 'II' to display the instruments Identifying parameter. This is the first parameter in a list of instrument parameters. This list can be found in the Facts Card for the relevant instrument. Pressing the 'W' key will 'scroll' to the next instrument parameter in the list.

Press it many times, and the entire parameter list will be displayed, value after value. When the end of this list is reached, pressing the 'W' Key will scroll back to the beginning again ('II'). Thus, it can be seen that the list is circular. Instruments like the 6350 have only one parameter list that may be scrolled, but more complex instruments like the 6433 have many lists that may be scrolled. In the case of the 6433, there is one list for every channel in the instrument, in addition to a basic instrument parameter list. The basic list may be scrolled by first accessing parameter 'II'. The channel parameters may be scrolled by first accessing parameter 'CN'. This must then be set to the channel to be scrolled. The 'W' Key will then scroll down the list, eventually returning to the 'CN' parameter. The 'CN' parameter is called the BASE parameter for the loop, because it controls which loop is to be displayed. A loop which has a BASE parameter is called a COMPLEX loop, and a loop which does not have a base parameter is called a SIMPLE loop.

It is now possible for the user to design a point display. Select option D on the point display menu. Then enter the number of blocks to be displayed (between one and eight). For a simple instrument, this should only be one (although there is not a trap to stop displaying the same loop twice). For a more complex instrument like a 6433 or a 6366, the user must choose how may loops are to be displayed. There is a trade off here between the amount of information represented on the screen and the rate at which that information is refreshed. When this information has been entered, the program will prompt as follows:-

Enter initial Parameter in Block 1 :

This must be a two character alphanumeric mnemonic. If the loop you have decided to display is a SIMPLE loop, then any parameter in the loop may be chosen as the initial parameter, although the 'II' parameter will give more clarity. When the loop is displayed, the list will simply be scrolled down, and the parameters in the list displayed on the screen. If a COMPLEX loop has been chosen, then the BASE parameter MUST be chosen as the initial parameter and an initial value set for it. For example, in the 6433, an initial value of 22 in the BASE parameter 'CN' would display that loop

and not any other. In the case of the 6366, its COMPLEX loop has two BASE parameters. These are 'BT' and 'BN'. 'BT' must be chosen as the initial parameter in the block, but both 'BT' and 'BN' must be set up with initial parameters. The program will prompt for this as necessary. The program will also position the loops in the order in which they were entered from left to right. Once all the initial parameters and necessary initial values have been entered, the point display will be started. If an error was made entering a parameter mnemonic, an error message will be returned. The mode of entry for data under this option is the same as the 6350.

The following is a list of BASE parameters for different instruments:-

Instrument	BASE Parameters
6355/65	PG
6358	LN
6356/66	BT BN
6432/3	CN
6434/5/6/7	CN

be in programming mode) over the hand held terminal port.

This option quits from the program back to MS-DOS The RS232 link is closed including all files that were used. CTRL-E performs the same function if pressed from the main menu.

3.1.12 List Directory

This option gives the user the option of listing different groups of files in the default directory (VDU). After pressing 'B' in the main menu, the following menu is displayed:-

Which of the following files do you wish displayed:-

1) All Program Files.
2) All Template Files.
3) All Data Files.
4) All Data Backup Files.
5) All executeable files.
6) All help files.
7) All files.

Press the digit corresponding to the filenames to be listed. The relevant files are distinguished by their extensions, which are the following:-

1) .TXT
2) .TPL
3) .DAT
4) .BAC
5) .EXE
6) .HLP

If the list of files is too long (especially if all files are too be shown) the directory will start to scroll off the top of the screen. The space bar can be used to temporarily stop the listing. Pressing the space bar again will recommence it. Pressing CTRL-E during a listing will return the user to the main menu.

3.1.13 List File

This option is selected by pressing 'C' from the main menu. It allows the user to list a file on the screen and will return an error message if the file does not exist. The file is listed a page at a time. A key must be pressed to scroll the next page of the file. CTRL-E may be pressed to return the user back to the main menu at any point during a listing. A default extension is not assumed when the filename is asked for. However, as is usual when running programs under MS-DOS the default drive and directory may be left out.

3.1.14 Copy File

This option is selected by pressing option 'D' from the main menu. The user is prompted for an input file and an output file. This option will copy the input file to the output file. If the input file does not exist an error message will be returned. If the output file exists the option to overwrite will be given. CTRL-E may be pressed at any time to return to the main menu. Extra terminating NULLs are not added to the output file, and the two files can be compared to be exactly the same. Default extensions are not assumed, but the current drive and directory may be assumed to be the default values.

3.1.15 Compare File

This option is selected by pressing option 'D' from the main menu. Two input filenames are asked for. The first will be referred to as FILE A and the second will be referred to as FILE B. The two files are compared as they are read . If a difference is not found in the two files, the message:-

The Two Files Are Exactly The Same.

will appear on the screen. Typing any key will return the user to the main menu.

If a difference is found between the two files, the line with the error is displayed, together with the next four lines. Both FILE A and FILE B are displayed for the user to examine the difference.

This option can be used in various modes during program development as follows:-

a) If a FORTH program is saved, and verified, and an error in verification is shown, this option can be used to see how serious the error is.

b) If a file is transferred to an EPSON PX-8, it can be retrieved and compared, to see that errors have not occurred during communication.

c) If files are copied as backups, and the user isn't sure whether one file is a direct copy or a backup of another, this option can be used to detect if there is a difference. The user should then be able to deduce which file is the most up to date version.

3.1.16 Transfer File to Epson PX-8 (RS232)

This option will first prompt for the name of a file to be read from. The drive and directory need not be entered if the current one is to be assumed. The default extension is not assumed. If the file cannot be found, a relevant error message will be given.

This option can use either the same port on the IBM PC or compatible as is used to communicate with the instruments, or a different port, to transfer a file from the IBM PC or compatible to an Epson PX-8. The correct lead must be used to connect the two machines, as shown in Appendix C or D. The same protocol must be used at either end of the communication link. This will probably be different to the protocol used to communicate with the instruments. Therefore the default values will have to be changed. This is transparent to the user, as on exit from this option, the values that the user has set up to communicate with the instruments will be restored. On entry to this option, the user must first configure the RS232 port with the desired values. Default values are given, and if desired these can be changed. The program CONFIG.COM may be used on the Epson to set up the default values to match those of the IBM PC or compatible.

The transmission speed may be set to slow or fast on the configuration menu. This is not compatible with any parameter that may be set in the Epson. It introduces a delay between sending each character if the speed is set to slow. If the speed is set to fast, a delay is not introduced.

The number of data bits may be set to seven or eight. The corresponding value must be set on the Epson but the following should be noted:- If an ASCII file is to be sent, transmission can be performed using only seven bits of data. Therefore, only seven bits should be used. However, if special non-ASCII characters have been included in the file, as can be the case in .TXT files written for the 6445 Micro-Supervisor (using the EMIT function), eight data bits must be used. This is to correctly send non-ASCII characters with codes over 127.

When the options have been correctly set, the file can then be transmitted across the RS232 link. This option supports software Xon/Xoff and handshaking protocol.

The file is terminated with an ASCII.SUB (CTRL-Z), which is a signal to the Epson that communication has finished. During communication, all ASCII.EOL characters are translated to the sequence (ASCII.CR ; ASCII.LF) . This is necessary because the IBM PC or compatible compacts its files by compressing (ASCII.CR ; ASCII.LF) to (ASCII.EOL).

The Epson cannot interpret ASCII.EOL to be an End Of Line Character. As the file is transferred, it is printed on the screen. TERM.COM must be used by the Epson to receive the data and the file will be printed on its screen as well. CTRL-E may be pressed at any time during the transfer to terminate the transfer and return to the main menu.

3.1.17 Transfer A File From Epson PX-8 (RS232)

This option will first prompt for the name of a file to be written to. The drive and directory need not be entered if the current one is to be assumed. No default extension, however, is assumed. If the file already exists, the user will be asked whether to overwrite it or not.

This option can either use the same port as is used to communicate with the instruments, or a different one , to transfer a file from the Epson PX-8 to the IBM PC or compatible. The correct lead must be used to connect the two machines, as shown in Appendix C or D. The same protocol must be used at either end of the communication link. This will probably be different to the protocol used to communicate with the instrument. Therefore the default values will have to be changed. This is transparent to the user, as on exit from this option, the values that the user has set up to communicate with the instruments will be restored. On entry to this option, the user must first configure the RS232 port with the desired values. Default values are given, and if desired these can be changed. The program CONFIG.COM may be used on the Epson to set up the default values to match those of the IBM PC or compatible.

The transmission speed may be set to slow or fast on the configuration menu but is not used when files are being received.

The number of data bits may be set to seven or eight. The corresponding value must be set on the Epson but the following should be noted:- If an ASCII file is to be sent, transmission can be performed using only seven bits of data. Therefore, only seven bits should be used. However, if special non-ASCII characters have been included in the file, as can be the case in .TXT files written for the 6445 Micro-Supervisor (using the EMIT function), eight data bits must be used. This is to correctly send non-ASCII characters with codes over 127.

When the options have been correctly set, the file can then be transmitted across the RS232 link. After a while a timeout will occur if data is not received. After the first character is received, the timeout becomes shorter, to give the user a response to an error situation. During

communication, all characters received are printed to the screen. The program TERM.COM must be used to transmit data from the Epson. This will terminate file transfer with an ASCII.SUB (CTRL-Z). The IBM PC or compatible will recognise this as the end of file marker, consequently terminate receive mode, and close the file that has been written to. CTRL-E may be used at any time to terminate the receive, and close the file that has been written to and return the user to the main menu.

3.1.18 Bell ON/OFF on Error

The initial default value for this is ON. Every time an error occurs, the bell will sound. However, if the program is being run in a quiet environment, then it may be necessary to switch the bell off. This option simply shows the current status of the bell, and allows the user to change it.

3.2 Error Messages Associated With VDU

The VDU program incorporates a comprehensive help system for use when an error occurs. When a fatal error occurs, control is passed to an error handler. This will give an error message, and if called for, extra help on the fault encountered can be given. In certain cases, the Automatic Fault Finder can be used to trace where the error is. This section is not meant as an in depth analysis of all the errors which can occur in the system but rather just a listing of them, to show the resolution to which errors are distinguished. If an error does occur during use of the package, help will given by the program itself by pressing the '?' (query) Key. The list of errors is as follows:-

Too Many Characters Entered In A String Name.

Output File Could Not Be Opened.

Input File Could Not Be Found.

Program Input File Was Not Found.

Program Output File Could Not Be Created.

MisMatching Brackets Found In The Input File.

Sumcheck Error Found In The Instrument.

The Instrument Did Not Reset Properly To ?? CMD.

An Invalid Reply Was Received From The Instrument.

TimeOut Error While Waiting For Communication On The RS232 Link.

Error While Writing To The Output File.

TimeOut Error ; Wrong Sequence Received.

Xoff TimeOut ; No Xon Subsequently Received.

Correct Baudrate Could Not Be Found.

The Verification Has Failed.

Temporary File Not Found.

Temporary File Not Created.

RS422 Timeout While Waiting For Communication.

Invalid Reply From The Instrument On The RS422 Line.

Incorrect File Termination During A Loadsave Operation.

Too Many Errors Were Found In The Input File During A Loadsave Operation.

Help File Does Not Exist.

Help File Does Not Have The Correct Format.

3.3 Useful Information About the VDU Instrument Configuration Program

3.3.1 The Line Editor

The VDU program has its own line editor similar to the DOS plus editor. This can be used while any filename or input string is being entered. It cannot be used during single character input:-

Del	: forward delete.
BackSpace	: backwards delete.
Cursor left	: move backwards across the entered string.
Cursor right	: moves forwards across the entered string.
Ins	: Toggles insert mode for insertion of character
CTRL-E	: Exits back to main menu from any point in the line
Enter Key	: Enters the string and stores it in the editors circular buffer
Cursor up	: Recall previously entered string.
Cursor down	: Recall next string in circular buffer.

The following points should be noted:-

a) The circular buffer holds ten strings (of up to 30 characters each) all of which are initialized to NULL when the VDU program is entered.

b) Insert mode is the default mode for entering data.

c) When the Enter Key is pressed, the new string is added to the buffer automatically unless the string is NULL.

d) CTRL-E does not add the string to the buffer.

e) The VDU line editor is entirely separate from the DOS-plus line editor (if being used) and does not interfere with it.

3.3.2 The Automatic Fault Finder

This facility is used when Communications TimeOut errors occur when communicating with the instrument on either the RS232 port or the RS422 port. It can be entered either from appropriate places within the error handler, or from terminal mode. Terminal mode is used only for the RS232 communications with the instrument, therefore only the RS232 part of the Automatic Fault Finder is accessible from Terminal Mode.

If the Automatic Fault Finder was entered during RS232 communications, it will check to see if the instrument is either in the correct mode (programming or parameter) or if it has the correct baud rate set. If either is incorrect, a remedy will be given. If communication cannot be established at all, comprehensive help will be given as to possible causes for the Fault.

If the Automatic Fault Finder was entered during RS422 communications, it will check to see if the instrument is using the correct protocol (ASCII or Binary), the baud rate is correct, or whether the correct Group and Unit addresses have been set. If any of these are incorrect, a remedy will be given. If more than one Unit address is connected to the line, the Automatic Fault Finder will give a list of all those that it finds (not necessarily all addresses will be found, but the first one will definitely be given). If Communication cannot be established at all, then compehensive help will be given as to the possible causes of the Fault.

3.3.3 Connections to the Instruments

During all communication to the instruments, the IBM PC or compatible is considered to be the Master and the Instrument the slave. On the RS232 link, continuous transmission from the instrument occurs, therefore only one instrument may be connected. However, on the RS422 link, instruments must be addressed which means that more than one instrument may be connected along the same link. The only restriction being that they must all have unique addresses, and a suitable line driver (e.g. D240) must be available to support the fan out.

If a group of instruments are connected to another computer via their RS422 port (Maxi Vis, for instance) the IBM PC or compatible must NOT be connected onto the RS422 line with it. This is because MaxiVis, or any other connection, would have to be a Master to communicate with the instruments, and so collisions would inevitably occur. To communicate with the IBM PC or compatible, the group of instruments must be isolated from the other computer, or each instrument in turn should be removed from its working rack and placed in a test rack to which special connections must be made for communication with the IBM PC or compatible.

Section 4 FILE FORMATTING

4.1 Parameter Files Created by Saving

All parameter files created by saving are of the same format as the template files, and are thus formatted correctly for loading back to the relevant instrument. Files created this way will include any comments that were in the template files.

4.2 Creating a Parameter File using a Word Processor or Editor

4.2.1 File Format for Loading Parameters

Parameters should be entered as the appropriate 2, 3 or 5 character mnemonic (depending upon whether RS232 or RS422 format is being used, see Section 4.3) followed by a space and the data.

The data consists of 4 characters, a space, and a load character. The load character depends upon the type of data.

The three different load characters that can be used, and the type of data they are used with are as follows:-

a) '+' for +ve data e.g. HR 3000 +

b) '-' for +ve data e.g. LR 2500 -

c) ' ' for hexadecimal data e.g. ST 2400

The exception to this is Tags. To allow all possible ASCII characters in a tag, the format is the mnemonic, followed by a space, the ' character and the 4 tag characters. There is no load character in this case.

4.2.2 File Format for Saving Parameters

The file format for saving parameters is very similar to that for loading parameters, the only difference being that instead of the data field after each mnemonic, there is a question mark, which indicates that the parameter is not to be changed.

Typical entries in the parameter file might be:-

```
ST ?
HR ?
LR ?
IT ?
```

Note:

The question mark takes the place of both the data and the load character.

The BCMD ?? prompt must be Selected when using the 6356/66 via the Hand-held terminal port when Block parameters are being accessed.

```
BT AI+   e.g. selects Analogue Input Block of 6356/66
BN 1+    e.g. selects Relative Block 1
ST ?     e.g. interrogates the parameter ST
HR ?     e.g. interrogates the parameter HR
BT 3T+   e.g. selects 3 Term Block of 6356/66
BN 2+    e.g. selects Relative Block 2
ST ?     e.g. interrogates the parameter ST
XP ?     e.g. interrogates the parameter XP
```

For further information on loading parameters see Section 4.3.3.

The RS422 link does not need this format, because of the different way in which multi-channel instruments are addressed, see Section 3.5.1 'pseudo-command' GU, and the 5 character mnemonic used on the 6356/66 shown as follows:-

```
GU00      e.g. sets UID to 00
AI2HR ?   e.g. selects Analogue Input Block, Relative
               Block 2 and polls the parameter HR
3T1XP ?   e.g. selects 3 Term Block, Relative Block 1,
               and polls the parameter XP.
```

4.3 Parameters and Comments in a File

Parameters can be entered into the file in several ways and comments added accordingly. Parameters entered into the file must either be formatted for RS 232 transmission via the front panel port or via the multi-loop RS 422 port on the rear terminals.

4.3.1 Parameters Formatted for the RS232 Port

Mnemonics of parameters formatted for the RS232 port are as used on the Hand-held terminal, although the data is not. The format of the data after the mnemonics is described in Section 4.2.1. On multi-loop instruments, the relevant loop or channel specifier parameter must be present to transmit the relevant parameters, e.g. to alter the ST parameter in block 2 channel 3 of a 6432 the entries in the file would be:-

```
CN 23 +

ST 2000 +
```

4.3.2 Parameters Formatted for the RS422 Port

For single loop instruments, the format is exactly the same as RS232 format.

For instruments which have multiple Unit addresses, it is necessary to change the UID so that the whole data-base can be accessed via the RS422 port.

To enable access of different Unit addresses within an instrument, a pseudo-command is provided. By entering GU followed by a space and the new GID and UID the parameters within that Unit address will be accessable. A load character after GU is optional.

For instruments with more than one channel per Unit address a 3 character mnemonic is used. This consists of the channel number followed by the parameter as per RS232 format.

e.g. to alter the ST parameter in block 2 channel 3 of a 6432, the entries in the file would be:-

```
GU 01
3ST 2000
```

(Block 1 is GU00, Block 2 is GU01 etc.)

Accessing the block parameters in a 6356 or 6366 is achieved using a 5 character mnemonic for each parameter.

e.g. To access setpoint block 2, parameter HR, the mnemonic used would be SP2HR.

If a file is being created for a 6356/66 which has loop 2 disabled it is necessary to reset the UID too (using GU) before accessing the block parameters.

4.3.3 Entering Parameters into a File

Parameters can be entered in a long column, or several may be on the same line, with at least one space between them.

For example, block 1 channel 1 of an analogue input block in a 6432/3 might be entered as follows:- (RS232 format).

```
CN 11+
ST 2000
HR 9999+
LR 0000+
HA 8000+

LA 1000+
```

or it could be entered as follows:-

```
CN 11+ ST 2000  HR 9999+ LR 0000+ HA 8000+ LA 1000+
```

either way is perfectly acceptable, and each has its advantages and disadvantages.

Putting one parameter on each line has the advantage that an invalid command will not affect the rest. There is also a lot more room for comments. The disadvantage is that the file can be very long, making it less easy to read.

4.3.4 Comments in the File

Positioning of comments within a file is very flexible. It does not matter where the comments go provided they start with an open bracket and finish with a close bracket. There is no restriction on the number of lines taken up by a comment. For reasons of tidiness, however, it is preferable to positon comments after parameters on a line. This ensures that parameters line up in columns after a save parameter operation.

4.3.5 RS232/RS422 File Compatibility

Since single-loop instruments do not use the GU pseudo-command, parameter files for RS232 transfer may be used for RS422 transfer. However, the reverse may not always be true, as the load character can appear at any place within the value digits in a data file.

Parameter files for multi-loop instruments are not compatible, since the mnemonics used are totally different.

Section 5 COMPATIBILITY WITH THE 8261 (EPSON PX-8)

5.1 Hardware Compatibility

The hardware and operating systems are totally different and consequently are not compatible.

5.2 Software Compatibility

The 8275 software cannot be used on the Epson PX-8.

5.3 File Compatibility

Files generated on the Epson PX-8 using the 8271 issue 3 software are fully compatible with the 8275 software. These files can be transferred to and from the Epson PX-8 and the IBM PC or compatible (see Sections 3.1.16 and 3.1.17).

Section 6 DATA SECURITY PROCEDURE

For maximum data-security the following procedure should be used when transfering files from the computer to the instrument or making backups of files.

6.1 Autoexec.Bat (Verify On)

The autoexec.Bat file should be edited to contain the following statement:-

```
Verify On
```

This will verify that each file written to a disk can be read back successfully. For a full explanation of this command, see the MS-DOS/PC-DOS users manual.

6.2 Saving a FORTH Program

When performing this operation, the verify file option should always be used. A full explanation of this is given in Section 3.1.5.

6.3 Load a FORTH Program

When loading a FORTH program a level of security is achieved by default. As the ASCII file is transmitted to the instrument, it will be compiled. Therefore, if during compilation an error is detected an error will be thrown up, i.e. Existing Word Edit Error.

6.4 Saving Parameters

When saving parameters, the operation should be performed twice. The first time the true filename should be allocated to the Output file and the second time a temporary file should be used. The 'Compare File' option should then be selected to verify the security of the file (see Section 3.1.15).

6.5 Loading Parameters

When loading parameters via the HHT (RS232) port, a level of security is achieved by default. When using the RS422 port, the data security check is achieved by means of a BCC character. After loading parameters the Output file should be viewed for error messages. If the output file does not contain error messages, the transfer can be considered successful, otherwise another attempt must be made to load parameters.

6.6 Save instrument Configuration

When saving the instrument configuration (only used via the HHT port) the the operation should be performed twice. The first time the true filename should be allocated to the Output file and the second time a temporary file should be used. The 'Compare File' option should then be selected to verify the security of the file (see Section 3.1.15).

6.7 Load Instrument Configuration

When loading the Instrument Configuration (only used via the HHT port) a level of security is achieved by default as for Sections 6.3 and 6.5.

6.8 Media Backups

Each file should be backed up by means of floppy disks and a printout as follows:-

6.8.1 Floppy Disk Backup

It is recommended that each file should be backed up by means of 1 master and two backups. The master should then be stored in a separate place to the backups.

6.8.2 Printout of Files

Each file should be printed and stored with the master disk.

SECTION 7 8275 VDU EXTENSION FOR THE 6445/6255

7.1 Introduction

The VDU Extension for the 6445/6255 used in conjunction with the 8275 VDU package allows the IBM PC XT or PC AT or compatible computer to be used as a programming terminal for the 6445 Micro-Supervisor and the 6255 Communications Multiplexer Instruments in the TCS System 6000 range.

The package, connected via the Front Panel RS232 port of these instruments offers the user full Database Configuration and Backup facilities.

7.1.1 Database Configuration

In configuring the database of an instrument, the configuration information is read from a file and programmed into the instrument. The configuration information for a 6445 consists of SETUP data for the RS232 ports on the Back Panel Connector of the instrument, a list of INO instrument numbers and types which the 6445 is required to talk to, and a list of pseudo parameters for any/all pseudo instruments to be configured in the 6445 database. For a 6255, only the INO and type information is required.

7.1.2 Database Backup

In Backing up the Database, all relevant information is read from the instrument and stored in a file.

7.2 Installation

7.2.1 Files Required

One file is required , and must be installed in the same directory and on the same drive (usually drive C:) as the main 8275 VDU package. This file is I6455.LOD. With this file present, the main menu of the VDU package will present the following option:-

I. 6445/6255 Database Configuration

When this option is selected the extension package menu will appear.

7.2.2 Other Files

Because this extension to the VDU package is not template driven, no default files are needed.

7.3 Operation

7.3.1 VDU MENU for 6445

All features of the extension package may be directly accessed from the main menu of the extension package.

On entering the extension program, the following menu is presented:-

```
                VDU MENU for 6445

        Select One Of The Following:

        0) EXIT to VDU.

        1) Save the parameters.

        2) Load the parameters.

        3) Terminal Mode.
```

a) EXIT to VDU

If this option is chosen, then the extension program is exited and the menu of the main VDU package will be displayed. The comms settings will be as they were before the extension program was invoked.

b) Save the Parameters

When this function is selected, the following is displayed:-

```
          This saves the
          data to a file

       Enter the filename
         (FILENAME.PRM)
```

The filename may be any valid DOS filename. The extension part of the filename may be left blank, in which case the default extension of .PRM will be used. It should be noted that pathnames will not be accepted.

If when a filename is given, there already exists a file with that name, the existing file will be renamed to FILENAME.BAC and a new file of FILENAME.EXT will be created.

At this point, the user may type <Control E> to exit from the option. This will return to the extension menu.

This option allows the complete database configuration to be saved to disk.

As this option performs it's task, a series of messages will be displayed to indicate to the user what task it is currently performing. These messages are :-

The Instrument is Now Being Interrogated
Setup Section
Configuration Section
Pseudo Parameter Section

During the 'Setup Section', the configuration of the RS232 back panel communications ports of the 6445 is being read and stored to file. This corresponds to the ?SETUP Forth word. For details of this refer to the 6445 Technical Manual.

During the 'Configuration Section', the configuration of the 6445 or 6255 database is being read and stored to file. This corresponds to the ?CFIG Forth Word. For details of this, refer to 6445 and 6255 Technical Manuals.

During the 'Pseudo Parameter Section', all parameter values for each Pseudo Instrument in the database configuration are being read and if valid values are read, they are stored to file.

It should be noted that the 'Setup Section' and 'Pseudo Parameter Section' are not performed if the instrument being backed up is a 6255.

When this option has been completed, it returns directly to the menu described in section 7.3.1.

If during this option, a communications breakdown occurs, the communications error diagnostic facility is offered as described in section 7.3.2.

c) Load the Parameters

When this option is selected, the user is prompted to enter the logon security code. This is a 3 digit number, which is not echoed on the screen when entered. (For full details of logon procedures refer to the TCS 6445 Technical Manual.) The option will not continue with it's function until the correct logon code has been entered. If the user cannot remember his code, then the option to return

to the menu by typing <Control E> is given. This is done for security purposes, so that unauthorised personnel are prevented from corrupting the current configuration of a 6445.

With the 6255, no security measures of this kind are available.

When the logon code has been successfully entered, the following is displayed:-

```
      This uses a file
    to set the parameters

     Enter the filename.
       (FILENAME.PRM)
```

The same limitations apply to the entry of filenames as described in 7.3.1b.

As this option performs its task, a series of messages will be displayed as follows:-

```
The Instrument is now being configured
Setup Section
Config Section
Setext Section
```

As each record is read from the file, a '.' character is output to the screen, so a number of '.' characters will appear inbetween the above messages .

In the 'Setup section', checks are made to ensure that the information contained in this section of the file is of the same issue as that of the instrument into which it is being programmed. This is done because there are certain incompatabilities between issue 1 and issue 2 of the 6445 Micro-Supervisor Software. So, if an issue conflict occurs, the following message will be displayed :-

```
Issue Conflict - 6445 is issue x file is for
issue y
Error in input file, skipping SETUP section
```

Where x is the software issue of the instrument being programmed and y reflects the issue for which the information in the file is intended.

If a Syntax error occurs, the following message will be displayed:-

Error in input file, skipping SETUP section

These errors will force the Function to immediatly skip to the next section.

In the 'config section', checks are performed to ensure that each record is syntactically correct (refer to section 7.4 for details of syntax) and that the ranges of any numeric values are okay, e.g. INO is between 0 and 127 inclusive, instrument type is a valid TCS instrument supported by the 6445/6255 instruments etc.

If such an error occurs, the following message will be displayed:-

Syntax/Range error in

followed immediately by the text in which the error has been detected. When such an error occurs, the record is discarded and the next record is read from the file. This means that errors in the configuration section of the file will not stop the remainder of the file from being loaded into the instrument and that all errors in a configuration will be highlighted together.

In the 'setext section', if a Syntax error occurs, the following message is displayed:-

Fatal error in input file
End of Input File
Hit Any Key

The process then terminates immediately.

Should the parameter value be programmed into the instrument and the instrument does not accept the parameter (be it range error, instrument INO not a pseudo instrument, etc), then the following message will appear:-

Input file error in pseudo Inst. x
parameter no. y error z

Where x is the INO number of the instrument in the database whose parameter is in error, y is the parameter number in error, and z is the error code returned by the Forth SETEXT operation. (For details of these error codes see the 6445 Technical Manual or TCS Programmable Instruments Programming Manual). When this type of error occurs, it is reported and the next parameter record is read from the file.

d) Terminal Mode

When this option is selected, the standard logon message is displayed, and from this point, any character typed on the keyboard is transmitted to the instrument, and any characters received from the instrument are echoed on the screen. This behaves in the same manner as the programming mode of option 2 of the main VDU package.

<Control E> exits from here to the menu.

7.3.2 Communications

a) Setting Up

The baudrate, parity, comms port, etc can be selected by the main VDU package. These settings are then used by the 6445/6255 extension package.

b) Communication Failure

Throughout the extension program, there are checks to ensure that communication is well established. If there is a communications breakdown at an important time, then the current process will be terminated and the following message will be displayed:-

There has been a communications error.
The line is now being analysed.....

The message will go on to suggest the possible faults, but this cannot be very precise.

c) Communications Failure Messages

The possible messages are :-

The instrument is not on, not connected OR not a 6445. Please check these possible faults.

The instrument makes no response. Check that it is connected, turned on and that it is a 6445.

The error in communication has now been resolved Check for intermittent faults on the line.

An option is given to continually retry communicating with the instrument. This will be useful whilst attempting to establish communication. It is advisable to ensure that the instrument is connected to the stated comms port.

7.4 File Formats

NOTE:

When editing files for use with the 6445 database configurator using PE2, the PE2 command SET BLANKCOMPRESS OFF must be typed on the PE2 command line. If this is not done, Syntax errors will be generated when the file is subsequently loaded into the instrument using this software.

The syntax of files to be downloaded as a configuration should be as follows:-

7.4.1 Comments

Comments must be placed within matching pairs of round brackets. Comments may appear only at the start of a line and must be the only item on that line. They should not appear within data elements, although provision has been made for them to appear in the config section. Comments must appear between each section of the file.

7.4.2 Setup Section

The Setup section must occupy the following format:-

a) 6445 Issue 2 Format

For issue 2 6445 units the format is:-

```
Line l
Baud rate b
Stop bits s
Parity pppp
Character length c
X-on/X-off ee
Logon dd
```

Where:-

```
l is a valid line (3 or 4)
b is a valid baudrate : See 6445 Technical
                        Manual for list of
                        valid baudrates.
s is a valid number of stop bits (1 or 2)
pppp is a valid parity setting (None, Even, Odd)
c is a valid character length in bits (7 or 8)
ee is one of Enabled or Disabled
dd is one of Enabled or Disabled
```

A number of these record blocks may appear in a file but they must be separated by a blank line.

b) 6445 Issue 1 Format

For issue 1 6445 units the format is:-

```
pppppp
Baud rate bbbb
Stop bits s
Parity pppp
Character length c
```

Where:-

```
pppppp is one of 'Printer' or 'Console'
bbbb is a valid baudrate : as in (a)
s - see (a)
pppp - see (a)
c - see (a)
```

The same rules apply here as for (a) with regard to the number of these records in a file.

7.4.3 Config Section

The config section must start with a comment and must take one of the following forms:-

a) 6445 Format

The config section for the 6445 consists of a number of records of the following format:-

Characters 1 to 4 must be 'INO='

Followed by up to 3 numeric digits within the range 0 to 127

Followed by spaces

Character 9 must be one of 'P' or 'R' to indicate Pseudo or Real

Character 16 must be a '£' character

Followed by a valid TCS system 6000 instrument number as supported by the 6445

If the instrument number is either 6432 or 6433 it must be followed by a '/' which must be followed by one of 'AI', 'AO', 'DI', or 'DO'.

Otherwise if the instrument number is not 6432 or 6433 but the instrument is Pseudo in the database, it must be followed by a '/', followed by 'DP=', followed by a numeric digit in the range 0 to 3.

More than one record may occupy a single line, however if they do then each record must occupy 26 characters, padded with spaces where neccessary.

b) 6255 Format

The config section for the 6255 consists of a number of records of the following format:-

Characters 1 to 6 must be '<INO>='

Followed by upto 3 numeric digits in the range 0 to 127

Characters 10 to 14 must be 'TYPE='

Character 15 must be '£'

This must be followed immediately by a valid TCS system 6000 instrument number supported by the 6255.

If the instrument number is either 6432 or 6433 this must be followed by the character '/' which must be followed by one of 'AI', 'AO', 'DI' or 'DO'.

As in section 7.4.3 a) more than one record may occupy a line and then the same rules apply.

7.4.4 Pseudo Parameter or SETEXT Section

The psuedo parameter or setext section must start with a comment and must take the following form:-

Each block of parameters must follow the following rules:-

They must start with the line
'Pseudo Instrument'
This must occupy a line on its own

Following this must be the line
'INO x'
where x is a valid instrument number within the range 0 to 127

Following this is a blank line

Followed by a header line as follows:-

'no.| decimal Hex <-value'
This must again be followed by a blank line

Following this may be any number of lines of the following format:-

'xxx ddddd £hhhh'

where xxx is a valid parameter number, 0 to 128 being the maximum range

ddddd is the value which the parameter is to take in decimal notation

£hhhh is the value which the parameter is to take in hexadecimal notation

This block must be terminated by a blank line, and all parameter information must be on individual lines.

Any number of blocks may appear in the file.

The Decimal value ddddd is the value which is actually programmed into the 6445. The £hhhh value is given for information purposes only.

7.5 Example Files

7.5.1 6445 Database Configuration Example

An example of a 6445 issue 2 database configuration is:-

(This is the setup section)

```
Line 3
Baud rate 9600
Stop bits 1
Parity Even
Character length 8
X-on/X-off Disabled
Logon Disabled

Line 4
Baud rate 9600
Parity Even
Character length 7
X-on/X-off Enabled
Logon Enabled
```

(This is the config section)

```
INO=0   Pseudo £6350/DP=1 INO=1   Pseudo £6360/DP=2
INO=3   Pseudo £6432/AO   INO=4   Pseudo £6432/DO
INO=5   Pseudo £6432/DI   INO=6   Pseudo £6432/AI
INO=36  Real   £6366
```

(This is the pseudo instrument parameter section)

```
Pseudo Instrument
INO  0

no.| decimal  Hex  <-value

0    13568     £3500
6    6         £0006

Pseudo Instrument
INO 1

no.| decimal  Hex  <-value

0    13824     £3600
6    6         £0006
```

Pseudo Instrument
INO 3

no.	decimal	Hex	<-value
0	17184	£4320	
7	8	£0008	
16	8	£0008	
24	8	£0008	
32	8	£0008	
40	8	£0008	
48	8	£0008	
56	8	£0008	
64	8	£0008	
72	8	£0008	

Pseudo Instrument
INO 4

no.	decimal	Hex	<-value
0	17184	£4320	
1	24	£0018	
16	8	£0008	

Pseudo Instrument
INO 5

no.	decimal	Hex	<-value
0	17184	£4320	
3	16	£0010	
16	8	£0008	

Pseudo Instrument
INO 6

no.	decimal	Hex <-value
0	17184	£4320
5	0	£0000
16	8	£0008
24	8	£0008
32	8	£0008
40	8	£0008
48	8	£0008
56	0	£0000
57	0	£0000
58	0	£0000
59	0	£0000
60	0	£0000
61	0	£0000
62	0	£0000
64	0	£0000
72	0	£0000

7.5.2 6255 Database Configuration Example

An example of a 6255 database configuration file is as follows:-

(This is the config section)

<INO>=0 TYPE=£6350	<INO>=1 TYPE=£6351
<INO>=2 TYPE=£6352	<INO>=3 TYPE=£6353
<INO>=4 TYPE=£6355	<INO>=5 TYPE=£6356
<INO>=6 TYPE=£6358	<INO>=7 TYPE=£6360
<INO>=8 TYPE=£6363	<INO>=9 TYPE=£6365
<INO>=10 TYPE=£6366	<INO>=11 TYPE=£6432/AI
<INO>=12 TYPE=£6432/AO	<INO>=13 TYPE=£6432/DI
<INO>=14 TYPE=£6432/DO	<INO>=15 TYPE=£6433/AI
<INO>=16 TYPE=£6433/AO	<INO>=17 TYPE=£6433/AI
<INO>=18 TYPE=£6433/DI	<INO>=19 TYPE=£6433/DO
<INO>=20 TYPE=£6434	<INO>=21 TYPE=£6435
<INO>=22 TYPE=£6436	<INO>=23 TYPE=£6437

SECTION 8 8275 VDU EXTENSION FOR THE D300

8.1 Introduction

The 'VDU Extension For The D300' used in conjunction with the vdu package allows the IBM PC XT or PC AT or compatible computer to be used as a programming terminal for the TCS D300.

As a terminal connected via the Hand-held terminal port on the front of the instrument, it can function as a replacement for the 8263 Hand-held terminal, or, it can be used to configure or backup the instrument.

8.1.1 Point Display

All the parameters from channels 0-4 may be displayed on one screen. These may be altered by moving the cursor and overtyping the value, or by entering the parameter mnemonic and value in the terminal box.

8.1.2 Loading and Saving Parameters

A complete instrument data base can be saved or transmitted by means of the front panel Hand-held terminal port. Thus a data base may be stored for reference, created using a word processor, altered or transmitted to an instrument.

8.1.3 Linearisation Tables

There is a simple editor designed to help create or alter a linearisation table. A table may be taken from a file or from an instrument, it can then be altered and verified for correctness, and the corrected version may be loaded into the instrument or saved in a file.

8.1.4 On-Line Facts Card

When in terminal mode or in the point display, there is an on-line facts card which will reveal the meaning of the parameter currently selected.

8.1.5 General Features

The extension program lies beneath the main 8275 VDU program. All the features in the VDU package may therefore be used by exiting from the extension program into the VDU package.

The extension program operates through a system of menus, each of which gives a clear guidance to the operations. Throughout the program CTRL-E is used to immediately terminate the current process and to return to the previous menu.

8.2 Installation

8.2.1 Files Required

One file is required, and must be installed in the same directory and on the same drive (usually drive C:) as the main 8275 VDU package. This file is I6386.LOD. With this file present, the main menu of the VDU package will present the following option:-

J. D300 Database Configuration

When this option is selected the extension menu will appear.

8.2.2 Other Files

Some menus will prompt for filenames. There are a number of default filenames which will be assumed if no filename is given. The default files are as follows:-

P300-232.TPL - a template file which requests the complete data base.
P300-232.LNR - a linearisation table.

If a filename is given without an extension then a default extension will be used. In all cases the default extension is indicated, but it will be one of the following:-

.TPL for a template file
.DAT for a data file
.BAC for a backup file
.LNR for a linearisation table file

The use of these files will be explained later.

8.3 Operation

8.3.1 VDU MENU for D300

The extension program consists of several levels which are selected by a series of menus. The structure of these is as follows:-

On entering the extension program the following menu will be presented:-

```
                VDU MENU for D300

            Select One of the Following:

            0) EXIT to VDU.

            1) Point Display/Terminal Mode.

            2) Linearisation Table Display.

            3) Upload/Download Operations.
```

a) EXIT to VDU

If this is chosen then the extension program is exited and the main VDU menu will be displayed. The comms settings will be as they were before the extension program was invoked.

b) Terminal Mode/Point Display

The following is displayed;

```
   1. Terminal Mode OFF

   2. Point Display OFF

   Enter 1 AND/OR 2 to
   toggle the choices.
   THEN HIT <RETURN>

   Use CTRL-E to exit
   this and further menus
```

This option allows direct communication with the instrument via a terminal emulator and/ or displays all the instrument parameters. There is also the on-line facts card present.

The facts card may be used at any time by pressing '?'. It will give details of the last parameter accessed.

On entering this option, a choice of terminal mode or point display is given. These are selected by selecting the relevant number. The two options may be chosen together. Having made the selection, <ENTER> must be hit.

There are three possibilities:-

(i) Terminal Mode Only

In this mode only the terminal display is shown. One may communicate with the instrument by entering data using the keyboard. There is a two line display area which represents the 8263 Hand-held Terminal and a further eight lines showing previous displays.

CTRL-E returns to the previous menu.

(ii) Point Display Only

Here only the point display appears. A table of parameters is displayed. The parameter values are systematically entered, as they are read from the instrument. The complete table will take about 20 seconds to be completed. Once the table has been uploaded, it may be altered. This is done by moving the cursor using the arrow keys then hitting <INS> to go into entry mode, then entering the data followed by <ENTER>.

Whilst data is not being entered the values of the parameters are being updated on a cyclic basis.

CTRL-E returns to previous menu.

(iii) Both Options Selected

The point display is displayed as before. The terminal display is also present. When the point display is complete a menu is displayed giving the choice of entering data in the terminal window or entering it in the point display window, using a cursor:-

Select Method
of Entry
<C>ursor or
<T>erminal

The <INS> key is used to toggle between display mode and entry modes in both cases.

If the terminal option is selected then when in entry mode data may be changed as if using the 8263 Hand-held Terminal. When in display mode the point display is continually updated.

If the cursor option is selected then operations proceed exactly as if there were only the point display present.

CTRL-E will select the menu offering the choice of terminal or cursor entry modes.

(c) Linearisation Table Display

This section is designed to deal with the user defined linearisation tables. A table may be loaded from a file or an instrument, it may be altered and checked for errors, and it may be dumped to an instrument or written to a file.

The menu is as follows:-

A table may be taken
and sent to a file,
or a D300.

Choose to upload
1) from D300,
2) from a file, OR
3) Create a new table

The file format is the same as that of the linearisation table in the data files, and so files saved in this section may be added to data files (see next section).

On entering this option a menu will be displayed asking where the table is to come from.

(i) From A D300

If this is selected then the choice of tables D, E or F will be given:-

LINEARISATION TABLE

There are three user
defined tables, D-F.

Enter one of these,
or use CTRL-E to
exit.

The table will be displayed on the screen.

(ii) From A File

A filename will be requested:-

LINEARISATION TABLE
LOADING A FILE.

Enter the filename.
(FILENAME.LNR)

The default filename is P300-232.LNR. The default extension is .LNR. If the file requested is not found the request for a filename will be repeated. The file is then read and displayed on the screen.

CTRL-E will exit to the previous menu.

(iii) Create a New Table

This option will display the table with all values set initially to zero.

Having entered the table, it may now be altered and/or downloaded. There is a simple editor to make alterations easier.

Edit values shown
using cursor keys,

<A> analyses table
<I> insert a line
<D> delete a line
<S> save the table
CTRL-E to quit

The cursor keys may be moved to any data element. The data may be overwritten directly by entering all four digits. If less than four digits are entered then <ENTER> must be used to terminate the entry.

(iv) Insert a line

A line may be inserted by hitting 'I'. This will duplicate the current line and shift all subsequent lines down. The last line is thus lost.

(v) Delete a line

A line may be deleted by hitting 'D'. All subsequent lines are shifted up, and the final line is duplicated.

(vi) Analyse the Data

The table may be analysed at any point by hitting 'A'. The analysis does the following:-

a) Finds an X value = 0000,
b) Finds an X value = 9999,
c) Tests all consecutive pairs of X values between 0000 and 9999 for being out of sequence.

Any errors found are displayed.

(vii) Save a table

The table may be saved using 'S'. When this is selected, the option to save to a file or dump to an instrument is given:-

```
The table may be
written to a file or
to the instrument.

1) File

2) Instrument
```

If a file is selected then the file name is required. The default is P300-232.LNR the default extension is .LNR

If the file exists then there will be the option to overwrite.

If an instrument is selected then the table letter will be requested (D,E,F).

When the output has been selected, the data is analysed and any faults are displayed. At this stage the user is asked to confirm the save.

After the save, the table is displayed for further alteration.

CTRL-E returns to the previous menu.

(d) Upload/Download Operations

(i) Files Used

On entering this option, there will be a request for the input file. The default input file is P300-232.TPL, the default extension is .DAT. If the file does not exist a retry is expected or CTRL-E to exit.

Next the output file is requested. The default filename is the same name as the input file but with a different extension. This is generated as follows:-

If the input extension is .TPL then the output extension is .DAT, If the input is .DAT then the output is .BAC.

Any other input extension will generate an output extension of .BAC.

There are three types of file used. A template file has the extension .TPL and is used for requesting the value of the selected parameters, in order to backup the instrument data base. A data file (.DAT)is a file that contains the value of selected parameters and is used to configure the instrument data base.

A backup file (.BAC) contains parameter values, and is created when configuring the instrument, by taking the actual values of the parameters returned from the instrument.

These three types of files have the following hierarchy:-

A .TPL file requests parameter values, which are then saved in a .DAT file.

A .DAT file sends values to the instrument. The actual values in the instrument are saved in a .BAC file.

Thus it is the selection of the input file that determines whether the operation is a load or a save operation.

(ii) Messages, Display and File Output

The input file is analysed for syntax errors. If any errors are found, a message is printed on the screen '**file error** and a '?' is placed in the output file instead of the faulty data. Syntax errors include having unidentifiable parameters, or wrong parameters for the current channel.

Any messages sent by the D300 are displayed on the screen but not in the output file.

Any comments in the input file are placed in the output file, and the format of the output file is kept the same as the input file.

When the end of the input file is reached a message reports this, together with the line numbers on which any errors occurred.

If more than 30 errors occur the process is terminated and the errors are reported.

Each data element is placed on a new line on the screen. No comments are displayed.

8.3.2 Communication

a) Setting Up

The baudrate, parity etc. is set by the software and cannot be changed. The communications port, however, can be selected by the main VDU program.

b) Communication Failure

Throughout the extension program, there are checks to ensure that communication is well established. If there is a breakdown in communication at an important time then the current process will be terminated and a message will be displayed:-

There has been a communications error.
The line is now being analysed.....

The message will suggest the possible faults, but this cannot be very precise.

c) Communication Failure Messages

The possible messages are:-

> The instrument is not on, not connected OR not a D300. Please check these possible faults.
>
> The instrument makes no response. Check the instrument type (D300) and all connections.
>
> The error in communication has now been resolved.
>
> The instrument has a Check Sum Error, but is now communicating correctly.

An option is given to continually retry the instrument. This will be useful whilst trying to establish communication. It is advisable to ensure that the instrument is connected to the stated comms port!

8.4 File Formats

8.4.1 Template and Data Files

a) Template Files

The syntax of these files should be as follows:-

(i) Comments are placed within round brackets, there should be no nested brackets. Comments may appear anywhere except data within elements.

(ii) The channel number must be set before any data is requested. This is done by the mnemonic 'CN x' where x represents a valid channel number. After the channel is set data is requested by a data element, which is a four character sequence as follows:-

Characters 1 and 2 form the two character mnemonic for the parameter. Character 3 must be a space. Character 4 must be a '?'.

Linearisation tables are requested by the sequence 'An ?' where n is D, E, or F according to the table of interest.

i.e. AD ?

This request may appear anywhere in the file.

(b) Data Files

Data files have the same syntax as template files with additions for data entry. These are as follows:-

Having selected the channel number data is entered by an eight character sequence:-

Character 1 and 2 the parameter mnemonic
Character 3 a space
Character 4 the load character i.e. > + or -
Characters 5 to 8 four data characters
i.e. IT >2000

Note that there should be no decimal points or commas.

Linearisation tables are in exactly the same format as .LNR files (see later) but are preceded by the table name and load character:-

i.e. 'AD +' 'AE +' or 'AF +'

8.4.2 Backup Files

These are identical to data files. They are generated by the software from the input data file, and so the format of the .BAC file will be the same as that of the input file.

8.4.3 Linearisation Table Files

a) Comments

Comments must be within round brackets. Brackets may not be nested and must start as the first character on the line.

Consecutive comments are not allowed.

b) Data

Data must be entered as a twelve character sequence starting as the first character on the line, as follows:-

Characters 1 and 2 this is the point number (for reference only).

Character 3 space

Character 4-7 four digit x value.

Character 8 space

Characters 9-12 four character y value.

i.e.

00 0000 0100

01 0010 0200

02 0030 0300 . etc

There should be no more than 32 points. If there are less than 32 points, a termination character '*' should be used at the end of the data.

When the table is read, the missing points will be assigned values of 0000 0000.

8.5 Example Files

8.5.1 Template File (.TPL)

This is an example of a template file including comments, and demonstrating layout possibilities.

```
(Template file to extract instrument parameters)

(channel 0) CN 0

   FN ? RO ?  PS ?
   PH ? HL ? LL ?

(channel 1) CN 1 IT ? IH ?  IL ? IP ? TH ? TL ? HL ? LL
? BK ? SK ?

   CN 2
   IT ?
   IH ?
   IL ?
   IP ?
   TH ?

(remember that
comments may be
split over more than one line)

(linearisation table D)
AD ?

(channel 3)
CN 3
IT ?

(end of file)
```

8.5.2 Data Files (.DAT)

The difference between data files and template files is that the data files contain values.

(data file to set channel 1 and linearisation table E)

```
CN 1
IT >2000 IH +0010 IL +0000
IP >E400

AE +
00 0000 0000
01 1111 1000
02 2222 2000
03 3333 3000
04 4567 4000
05 5678 5000
06 6789 7000
07 7889 8000
08 8989 9000
09 9500 9500
10 9999 9999
*
```

(remember if less than 32 points are entered, then a '*' character must be placed on the very next line)

8.5.3 Backup Files (.BAC)

The backup files are generated by the software. If an error is found in the input file a '?' is placed in the backup file. All the data which is incorrect in the input file is ignored, except the linefeeds. Hence if a large block of data is incorrect then a large space, preceeded by a '?' will be found.

(comments are carried over from the input files)

```
CN 1 ?
```

(that was a bad data section)

```
CN 2
IT >2000
```

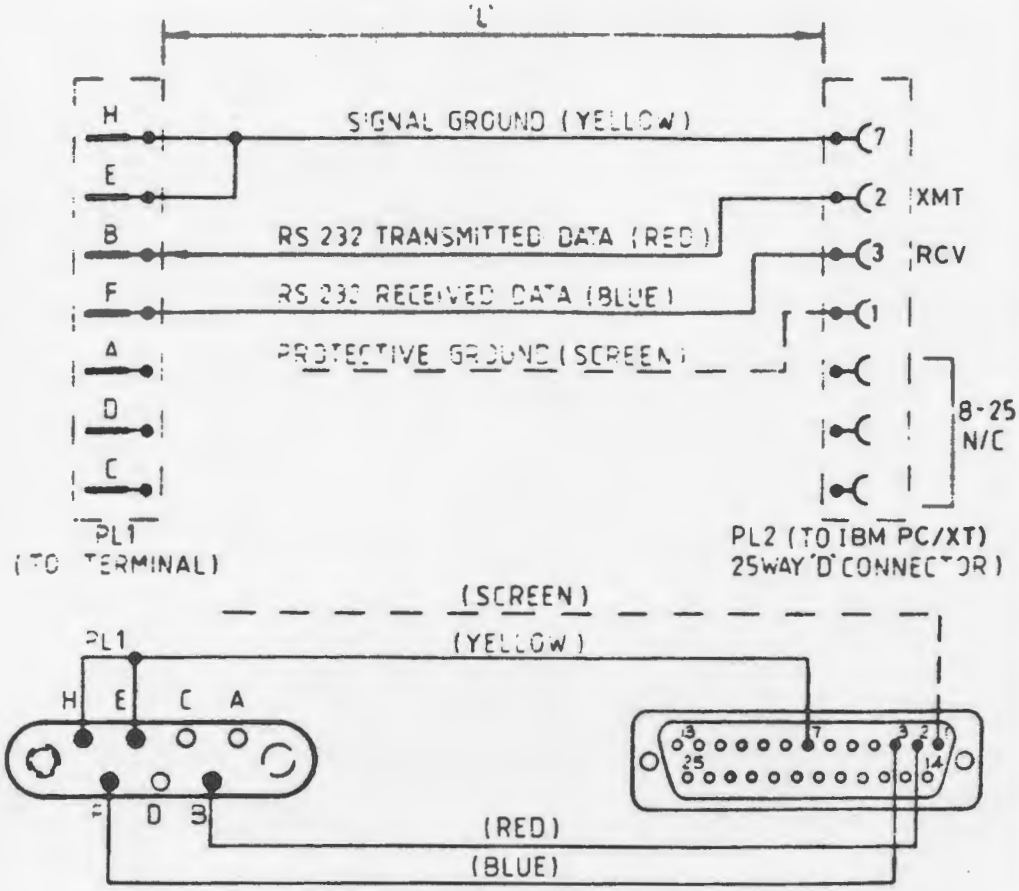
(end of file)

8.5.4 Linearisation Table Files (.LNR)

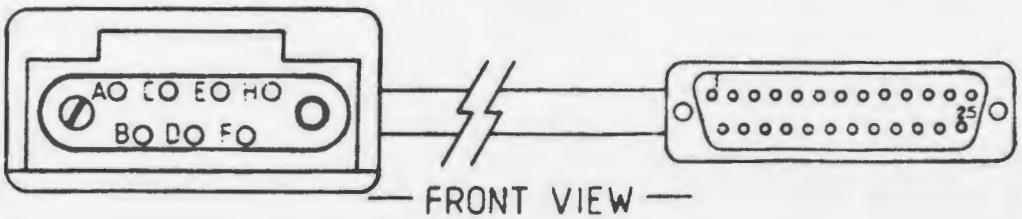
This is an example of a .LNR file.

```
(linearisation  table  8.73)
00 0000 0000
01 1000 1000
(comments may go after the  data)
02 2000 2002
03 3000 3008
04 4000 4030
05 5000 5080
06 6000 6030
07 7000 7015
08 8000 8004
09 9000 9001
10 9999 9999
*
(comments in  .LNR files must come after data or they
must start as the first character on a line)
```

GENERAL DRAWING PRACTICE TO BS 308/BS 3939		LS	DATE
DO NOT SCALE	THIRD ANGLE PROJECTION	1	28-4-87



— REAR VIEW —



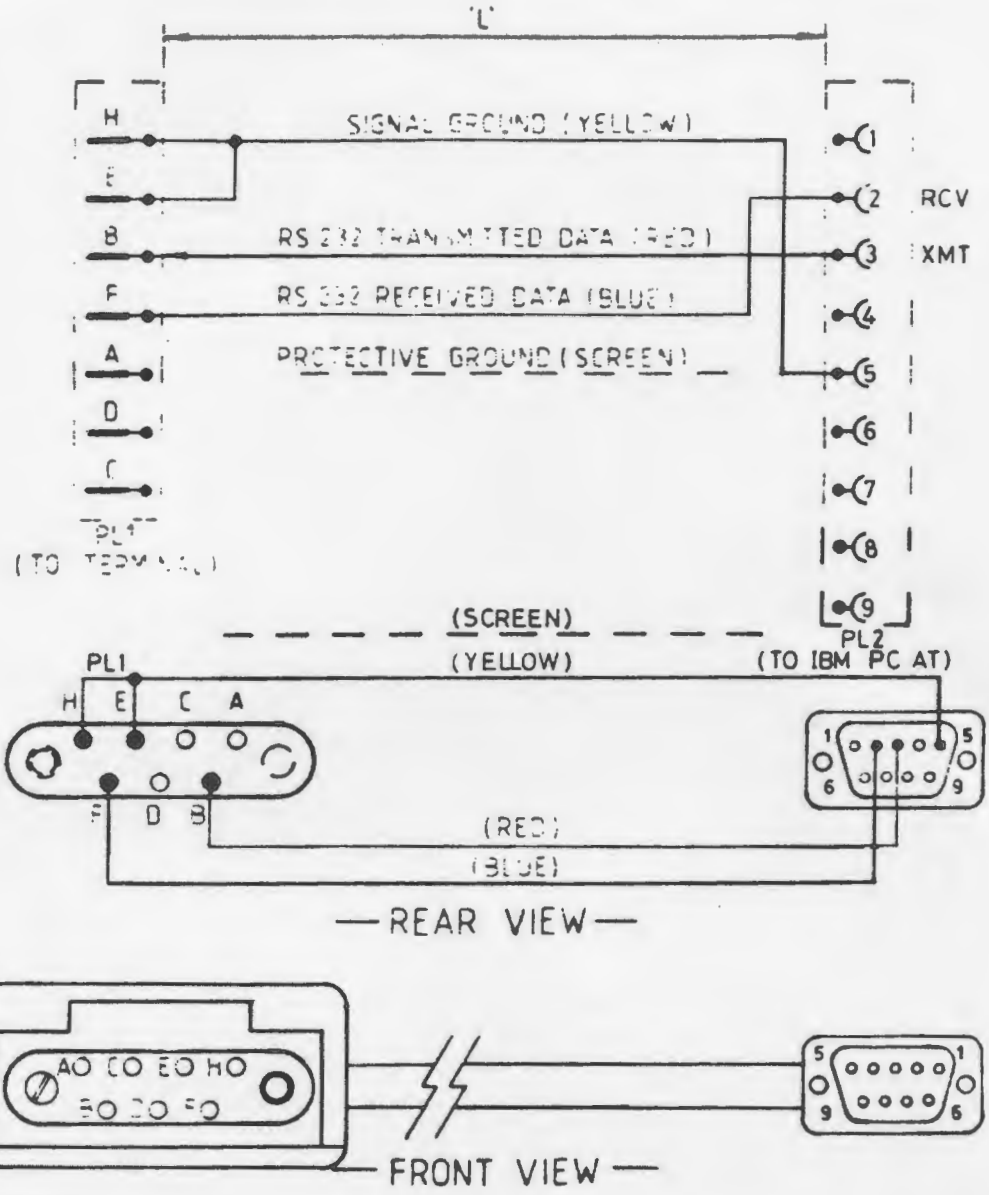
— FRONT VIEW —

NOTE:
DIMENSION L DENOTED BY SUFFIX NUMBER WHICH IS INCREMENTED BY 001 FOR EACH METRE LENGTH. DEFAULT LENGTH IS 3 METRES.

DRAWN I.C.	MATERIAL	SCALE N.T.S	DIMS. IN M.M. APPLY OVER FINISH (EXCEPT FOR PAINT AND LACQUER)
CHECKED AJ			GENERAL TOLERANCE X = ± 0·4, X.X = ± 0·2, X.X X = ± 0·1; HOLES < Ø 7mm -0·02 +0·07
DESIGN APPROVAL	FINISH	ASSEMBLED ON 8265/XT HHT	TITLE: INTERFACE CABLE, IBM PC/XT TO H.H.T. INPUT SOCKET.
MANF. APPROVAL IN			DRAWING NUMBER LA 079562 C *** SHT 1 OF 1 SHTS

TCS TURNBULL CONTROL SYSTEMS LTD

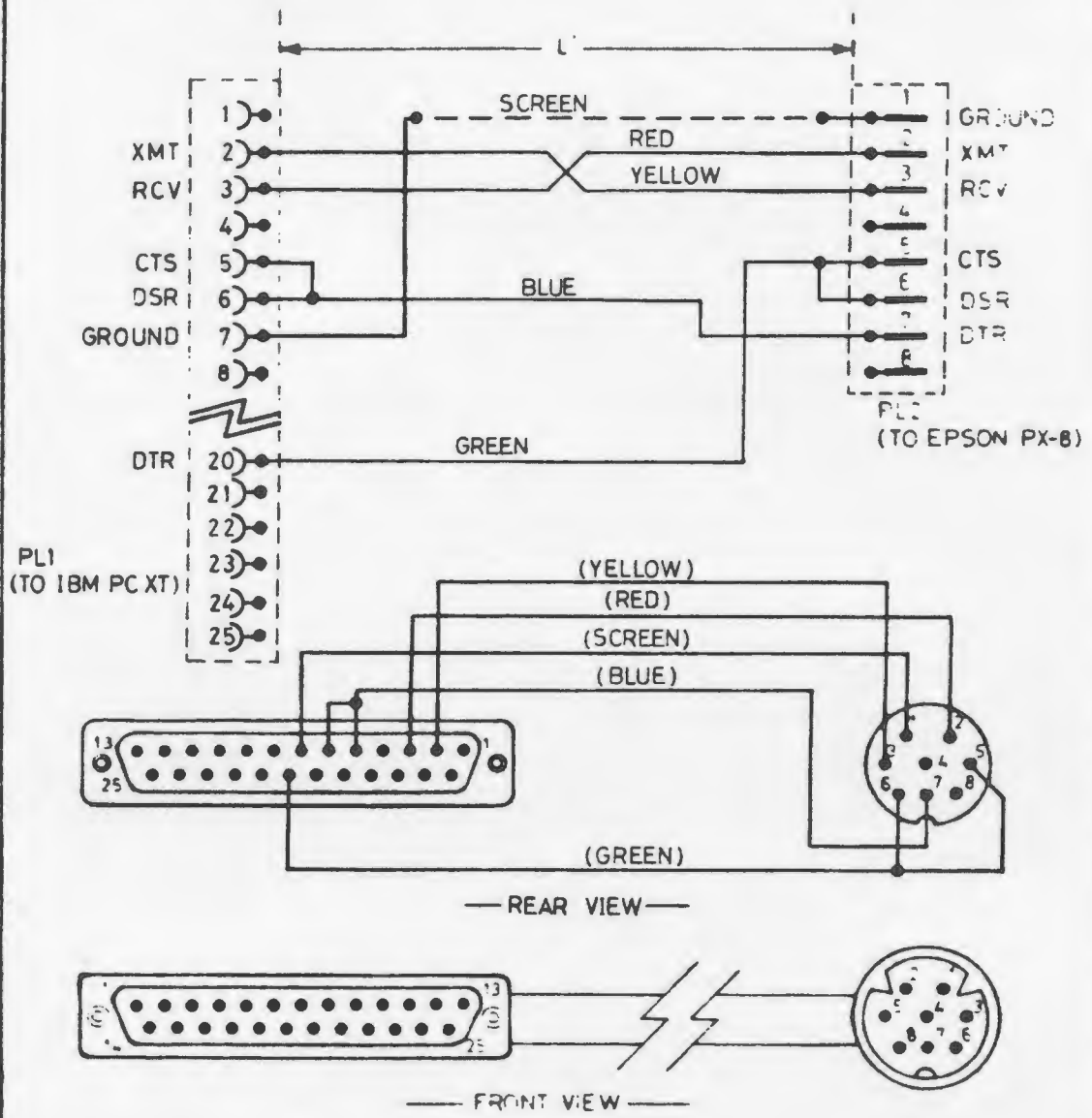
GENERAL DRAWING PRACTICE TO BS 308/BS 3939		L S S	DATE
DO NOT SCALE	THIRD ANGLE PROJECTION	1	28-4-87



NOTE:
DIMENSION L DENOTED BY SUFFIX NUMBER WHICH IS INCREMENTED BY 001 FOR EACH METRE LENGTH. DEFAULT LENGTH IS 3 METRES.

DRAWN I.C.	MATERIAL	SCALE N.T.S	DIMS. IN M.M. APPLY OVER FINISH (EXCEPT FOR PAINT AND LACQUER)
CHECKED			GENERAL TOLERANCE X = ± 0·4, X.X = ± 0·2, X.XX = ± 0·1; HOLES < Ø 7mm -0·02 +0·07
DESIGN APPROVAL	FINISH	ASSEMBLED ON 8265/AT HHT	TITLE: INTERFACE CABLE, IBM PC AT TO H.H.T. INPUT SOCKET.
MANF APPROVAL TN			DRAWING NUMBER LA 079563 C *** SHT 1 OF 1 SHTS
TCS TURNBULL CONTROL SYSTEMS LTD		EI	

GENERAL DRAWING PRACTICE TO BS 308/BS 3939		SS	DATE
DO NOT SCALE	THIRD ANGLE PROJECTION	A	29-4-87
		1	8·5·87

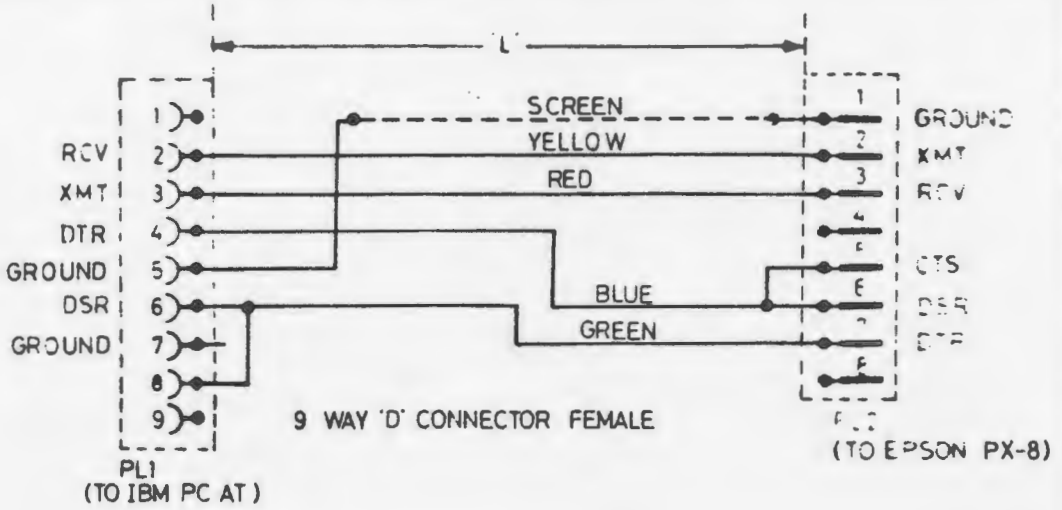


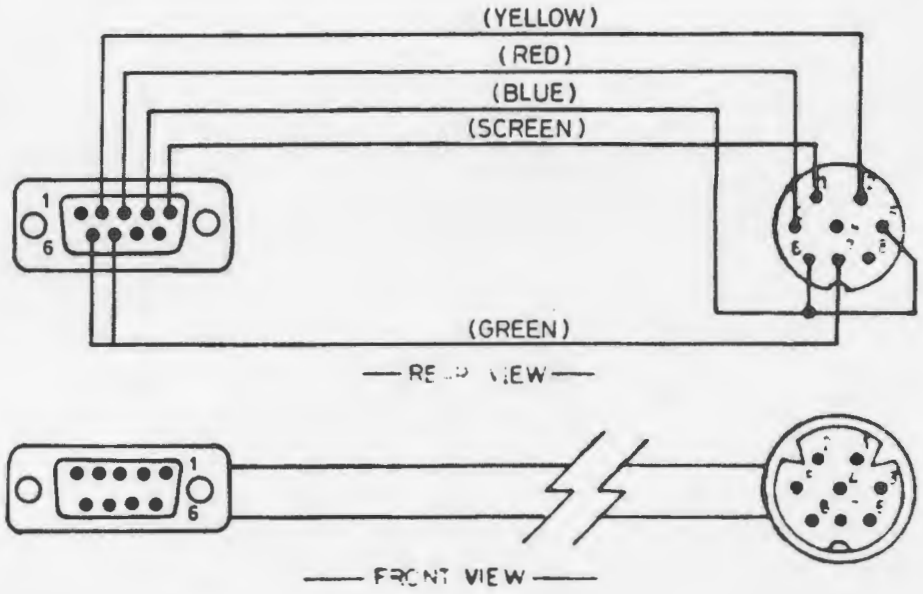
NOTE: DIMENSION 'L' DENOTED BY SUFFIX NUMBER WHICH IS INCREMENTED BY 001 FOR EACH METRE LENGTH. DEFAULT LENGTH IS 3 METRES.

DRAWN I.C.	MATERIAL —	SCALE NTS	DIMS. IN M.M. APPLY OVER FINISH (EXCEPT FOR PAINT AND LACQUER)
CHECKED			GENERAL TOLERANCE X = ± 0·4, XX = ± 0·2, XXX = ± 0·1; HOLES < ⌀ 7mm -0·02 +0·07
DESIGN APPROVAL	FINISH —	ASSEMBLED ON 8265/ XT EPSON	TITLE: DATA TRANSFER IBM PC/XT TO EPSON PX-8
MANF APPROVAL TN			DRAWING NUMBER LA 079564 C*** SHT 1 OF 1 SHTS

TCS TURNBULL CONTROL SYSTEMS LTD

GENERAL DRAWING PRACTICE TO BS 308/BS 3939	S/S	DATE
DO NOT SCALE | THIRD ANGLE PROJECTION	A	29-4-87
	1	8·5·87





NOTE DIMENSION 'L' DENOTED BY SUFFIX NUMBER WHICH IS INCREMENTED BY 001 FOR EACH METRE LENGTH. DEFAULT LENGTH IS 3 METRES.

DRAWN I.C.	MATERIAL —	SCALE NTS	DIMS. IN M.M APPLY OVER FINISH (EXCEPT FOR PAINT AND LACQUER)
CHECKED			GENERAL XX ± 0.2 HOLES ⌀ 7mm
DESIGN APPROVAL	FINISH —	ASSEMBLED ON 8265/AT EPSON	TOLERANCE XXX ± 0.1 -0.02 +0.07
MANF APPROVAL			TITLE DATA TRANSFER IBM PC AT TO EPSON PX-8
TCS TURNBULL CONTROL SYSTEMS LTD	EI		DRAWING NUMBER LA 079565 C XX XX — SHT 1 OF 1 SHTS

APPENDIX E

This table shows a list of template files supplied on the 8275 disk 2. All parameters are fully commented and each file contains a reference header.

FILE TITLE	MODULE(s) COMMON TO FILE	FUNCTION SAVE PARAMETERS VIA:
P350-232.TPL	6350	Front Panel HHT Port
P351-232.TPL	6351	" " " "
P352-232.TPL	6352	" " " "
P353-232.TPL	6353	" " " "
P355-232.TPL	6355,6365	" " " "
P358-232.TPL	6358	" " " "
P360-232.TPL	6360	" " " "
P363-232.TPL	6363	" " " "
P366-232.TPL	6366,6356	" " " "
P434-232.TPL	6434	" " " "
P435-232.TPL	6435,6436,6437	" " " "
P850-232.TPL	6850	" " " "
P350-422.TPL	6350	Rear Terminals RS 422 Port
P351-422.TPL	6351	" " " " "
P352-422.TPL	6352	" " " " "
P353-422.TPL	6353	" " " " "
P355-422.TPL	6355,6365	" " " " "
P358-422.TPL	6358	" " " " "
P360-422.TPL	6360	" " " " "
P363-422.TPL	6363	" " " " "
P366-422.TPL	6366,6356	" " " " "
P434-422.TPL	6434	" " " " "
P435-422.TPL	6435,6436,6437	" " " " "
P850-422.TPL	6850	" " " " "

APPENDIX F

(Order no: INT082 Customer name: 6433 Application Example

Project title: Combustion Control

file ref Z006 free memory 3646 bytes
Programmer name: J.S.Halliday

Modification Record

Iss.	Modification	CP No	Date	Approval [sign]	Disc Ref
A	Provisional	-	13/09/83	JSH	PROJ001
1	Update timing info		14/02/84		PROJ003

Module code: 6433/0/05/10/18 Serial no: INT 082/1/1/1/83

Industry: - Application: Cross Limited [Lead/Lag]

Description:

Fully metered cross limited [lead/lag] combustion control scheme featuring single loop controlers on fuel and air for maximum integrity, and the 6433 for cross-coupling.

Facility is provided for excess air trim from an oxygen controller.

Input/Output summary:

An.In
- 2 Measured Flows
- 1 Combustion Demand
- 1 Ratio Trim

An.Out
- 2 Remote Setpoints

Dig.In
- 2 Pressure Low inputs [Air & Fuel]

Dig.Out
- 1 Fuel Low Alarm

```
)

: AIRDEM        (Airdem: Outputs limited air demand from the greater
                of combustion demand and fuel-limit-to-air)
        1 1 GETAN       (input combustion demand)
        6 4 GETAN       (read fuel-limit-to--air)
        5 2 GETAN       (read bias)
        -               (subtract bias from fuel-limit-to-air)
        MAX             (select the greater)
        6 1 SETAN       (output limited air demand)
;

: FUELDEM       (Fuel demand: Outputs limited fuel demand from the
                smaller of combustion demand and air-limit-to-fuel)
        1 1 GETAN       (input combustion demand)
        6 3 GETAN       (read air-limit-to-fuel)
        5 3 GETAN       (read bias)
        +               (add bias to air-limit-to-fuel)
        MIN             (select the smaller)
        6 2 SETAN       (output limited fuel demand)
;

: EXSAIR        (Excess Air: Outputs air setpoint from air demand,
                as modified by excess air trim, and computes
                normalised air flow)
        1               (read nominal air/demand ratio)
        1 4 GETAN       (input ratio trim % )
        100             (% normalising factor)
        /               (divide by normalising factor)
        +               (add normalised trim to nom. air/demand ratio)
        1 25 GETPAR     (get air flow High Range to normalise to %)
        100
        /               (divide by 100)
        *               (multiply by nett ratio)
        DUP             (save for later)
        6 1 GETAN       (read limited air demand)
        *               (multiply by air/fuel ratio)
        2 1 SETAN       (output air flow setpoint)
        1 2 GETAN       (input measured air flow)
        SWAP            (swap top two stack entries)
        /               (divide measured flow by nett air demand ratio)
        5 2 SETAN       (output normalised air flow)

: FUELRAT       (Fuel ratio: outputs fuel flow setpoint and computes
                normalised fuel flow)
        5 1 GETAN       (read air/fuel ratio setpoint)
        100
```

```
        1 25 GETPAR       (get air flow High Range to normalise to %)
        /                 (divide into 100)
        *                 (multiply by air/fuel ratio)
        DUP               (save for later)
        6 2 GETAN         (read limited fuel demand)
        SWAP              (swap top two stack entries)
        /                 (divide fuel demand by air/fuel ratio)
        2 2 SETAN         (output fuel flow setpoint)
        1 3 GETAN         (input measured fuel flow)
        *                 (multiply by air/fuel ratio)
        6 4 SETAN         (output normalised fuel flow)
;

: MAIN          (Main task scheduling loop; executed at power-up)
        BEGIN             (begin loop)
          AIRDEM          (task 1: air demand computation)
          FUELDEM         (task 2: fuel demand computation)
          EXCSAIR         (task 3: excess air ratio trim)
          FUELRAT         (task 4: fuel ratio computation)
        REPEAT            (loop back to BEGIN)
;
```

APPENDIX G

(Template File Title : P432-232.TPL

Template Function : Fetch Parameter DataBase

Communication Standard : RS232C via Front Panel of Module
[Cable Assy No LA 079562C/LA 079563C]

Module Type : 6432/33

Order No :
Project Title :
File Ref :
Iss :
Module Code :
DataBase Configuration as follows :
)

Customer Name :
Application :

Date :
Module Serial No :

(INSTRUMENT IDENTITY	)	II ?
(CHANNEL SCAN + BOARD TYPE	)	S1 ?
(CHANNEL SCAN + BOARD TYPE	)	S2 ?
(CHANNEL SCAN + BOARD TYPE	)	S3 ?
(CHANNEL SCAN + BOARD TYPE	)	S4 ?
(S5 - S8 ARE FOR 6433 ONLY	)	
(CHANNEL SCAN + PSEUDO BOARD TYPE	)	S5 ?
(CHANNEL SCAN + PSEUDO BOARD TYPE	)	S6 ?
(CHANNEL SCAN + PSEUDO BOARD TYPE	)	S7 ?
(CHANNEL SCAN + PSEUDO BOARD TYPE	)	S8 ?
(6432 OPERATING STATUS	)	MD ?
(ANALOGUE INPUT CHANNELS	)	
(BLOCK No 1 / CHANNEL No 1	)	CN 11 +
(CHANNEL STATUS	)	ST ?
(HIGH RANGE	)	HR ?
(LOW RANGE	)	LR ?
(HIGH ALARM	)	HA ?
(LOW ALARM	)	LA ?
(ALARM ROUTING	)	AR ?
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?

(BLOCK No 1 / CHANNEL No 2	)	CN 12 +
(CHANNEL STATUS	)	ST ?
(HIGH RANGE	)	HR ?
(LOW RANGE	)	LR ?
(HIGH ALARM	)	HA ?
(LOW ALARM	)	LA ?
(ALARM ROUTING	)	AR ?
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?
(BLOCK No 1 / CHANNEL No 3	)	CN 13 +
(CHANNEL STATUS	)	ST ?
(HIGH RANGE	)	HR ?
(LOW RANGE	)	LR ?
(HIGH ALARM	)	HA ?
(LOW ALARM	)	LA ?
(ALARM ROUTING	)	AR ?
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?
(BLOCK No 1 / CHANNEL No 4	)	CN 14 +
(CHANNEL STATUS	)	ST ?
(HIGH RANGE	)	HR ?
(LOW RANGE	)	LR ?
(HIGH ALARM	)	HA ?
(LOW ALARM	)	LA ?
(ALARM ROUTING	)	AR ?
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?
(BLOCK No 1 / CHANNEL No 5	)	CN 15 +
(CHANNEL STATUS	)	ST ?
(HIGH RANGE	)	HR ?
(LOW RANGE	)	LR ?
(HIGH ALARM	)	HA ?
(LOW ALARM	)	LA ?
(ALARM ROUTING	)	AR ?
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?

(BLOCK No 1 / CHANNEL No 6)	CN 16 +
(CHANNEL STATUS)	ST ?
(HIGH RANGE)	HR ?
(LOW RANGE)	LR ?
(HIGH ALARM)	HA ?
(LOW ALARM)	LA ?
(ALARM ROUTING)	AR ?
(CHANNEL TAG CHARS. 1-4)	1T ?
(CHANNEL TAG CHARS. 5-8)	2T ?
(BLOCK No 1 / CHANNEL No 7)	CN 17 +
(CHANNEL STATUS)	ST ?
(HIGH RANGE)	HR ?
(LOW RANGE)	LR ?
(HIGH ALARM)	HA ?
(LOW ALARM)	LA ?
(ALARM ROUTING)	AR ?
(CHANNEL TAG CHARS. 1-4)	1T ?
(CHANNEL TAG CHARS. 5-8)	2T ?
(BLOCK No 1 / CHANNEL No 8)	CN 18 +
(CHANNEL STATUS)	ST ?
(HIGH RANGE)	HR ?
(LOW RANGE)	LR ?
(HIGH ALARM)	HA ?
(LOW ALARM)	LA ?
(ALARM ROUTING)	AR ?
(CHANNEL TAG CHARS. 1-4)	1T ?
(CHANNEL TAG CHARS. 5-8)	2T ?
(DIGITAL INPUT CHANNELS)	
(BLOCK No 2 / CHANNEL No 1)	CN 21 +
(BLOCK STATUS)	ST ?
(ALARM MASKING BITS)	AM ?
(CHANNEL TAG CHARS. 1-4)	1T ?
(CHANNEL TAG CHARS. 5-8)	2T ?
(BLOCK No 2 / CHANNEL No 2)	CN 22 +
(CHANNEL TAG CHARS. 1-4)	1T ?
(CHANNEL TAG CHARS. 5-8)	2T ?
(BLOCK No 2 / CHANNEL No 3)	CN 23 +
(CHANNEL TAG CHARS. 1-4)	1T ?
(CHANNEL TAG CHARS. 5-8)	2T ?

(BLOCK No 2 / CHANNEL No 4	)	CN 24 +
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?
(BLOCK No 2 / CHANNEL No 5	)	CN 25 +
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?
(BLOCK No 2 / CHANNEL No 6	)	CN 26 +
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?
(BLOCK No 2 / CHANNEL No 7	)	CN 27 +
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?
(BLOCK No 2 / CHANNEL No 8	)	CN 28 +
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?
(ANALOGUE OUTPUT CHANNELS	)	
(BLOCK No 3 / CHANNEL No 1	)	CN 31 +
(CHANNEL STATUS	)	ST ?
(HIGH RANGE	)	HR ?
(LOW RANGE	)	LR ?
(HIGH OUTPUT LIMIT	)	HO ?
(LOW OUTPUT LIMIT	)	LO ?
(PRIME VARIABLE VALUE	)	OP ?
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?
(BLOCK No 3 / CHANNEL No 2	)	CN 32 +
(CHANNEL STATUS	)	ST ?
(HIGH RANGE	)	HR ?
(LOW RANGE	)	LR ?
(HIGH OUTPUT LIMIT	)	HO ?
(LOW OUTPUT LIMIT	)	LO ?
(PRIME VARIABLE VALUE	)	OP ?
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?

(BLOCK No 3 / CHANNEL No 3	)	CN 33 +
(CHANNEL STATUS	)	ST ?
(HIGH RANGE	)	HR ?
(LOW RANGE	)	LR ?
(HIGH OUTPUT LIMIT	)	HO ?
(LOW OUTPUT LIMIT	)	LO ?
(PRIME VARIABLE VALUE	)	OP ?
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?
(BLOCK No 3 / CHANNEL No 4	)	CN 34 +
(CHANNEL STATUS	)	ST ?
(HIGH RANGE	)	HR ?
(LOW RANGE	)	LR ?
(HIGH OUTPUT LIMIT	)	HO ?
(LOW OUTPUT LIMIT	)	LO ?
(PRIME VARIABLE VALUE	)	OP ?
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?
(BLOCK No 3 / CHANNEL No 5	)	CN 35 +
(CHANNEL STATUS	)	ST ?
(HIGH RANGE	)	HR ?
(LOW RANGE	)	LR ?
(HIGH OUTPUT LIMIT	)	HO ?
(LOW OUTPUT LIMIT	)	LO ?
(PRIME VARIABLE VALUE	)	OP ?
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?
(BLOCK No 3 / CHANNEL No 6	)	CN 36 +
(CHANNEL STATUS	)	ST ?
(HIGH RANGE	)	HR ?
(LOW RANGE	)	LR ?
(HIGH OUTPUT LIMIT	)	HO ?
(LOW OUTPUT LIMIT	)	LO ?
(PRIME VARIABLE VALUE	)	OP ?
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?

(BLOCK No 3 / CHANNEL No 7	)	CN 37 +
(CHANNEL STATUS	)	ST ?
(HIGH RANGE	)	HR ?
(LOW RANGE	)	LR ?
(HIGH OUTPUT LIMIT	)	HO ?
(LOW OUTPUT LIMIT	)	LO ?
(PRIME VARIABLE VALUE	)	OP ?
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?
(BLOCK No 3 / CHANNEL No 8	)	CN 38 +
(CHANNEL STATUS	)	ST ?
(HIGH RANGE	)	HR ?
(LOW RANGE	)	LR ?
(HIGH OUTPUT LIMIT	)	HO ?
(LOW OUTPUT LIMIT	)	LO ?
(PRIME VARIABLE VALUE	)	OP ?
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?
(DIGITAL OUTPUT CHANNELS	)	
(BLOCK No 4 / CHANNEL No 1	)	CN 41 +
(BLOCK STATUS	)	ST ?
(ALARM MASKING BITS	)	AM ?
(DIGITAL OUTPUT STATES	)	DS ?
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?
(BLOCK No 4 / CHANNEL No 2	)	CN 42 +
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?
(BLOCK No 4 / CHANNEL No 3	)	CN 43 +
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?
(BLOCK No 4 / CHANNEL No 4	)	CN 44 +
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?
(BLOCK No 4 / CHANNEL No 5	)	CN 45 +
(CHANNEL TAG CHARS. 1-4	)	1T ?
(CHANNEL TAG CHARS. 5-8	)	2T ?

```
(  BLOCK No 4 / CHANNEL No 6          )     CN 46 +
(  CHANNEL TAG CHARS. 1-4             )     1T ?
(  CHANNEL TAG CHARS. 5-8             )     2T ?

(  BLOCK No 4 / CHANNEL No 7          )     CN 47 +
(  CHANNEL TAG CHARS. 1-4             )     1T ?
(  CHANNEL TAG CHARS. 5-8             )     2T ?

(  BLOCK No 4 / CHANNEL No 8          )     CN 48 +
(  CHANNEL TAG CHARS. 1-4             )     1T ?
(  CHANNEL TAG CHARS. 5-8             )     2T ?


(  END OF FILE )
```

```
( Template File Title : P432-422.TPL

  Template Function : Fetch Block Parameter DataBase

  Communication Standard : RS422 via Rear connector

  Module Type : 6432/33

(
Order No :                                  Customer Name :
Project Title :                             Application :
File Ref :
Iss :                                       Date :
Module Code :                               Module Serial No :
DataBase Configuration as follows :
)


(   INSTRUMENT IDENTITY                     )     1II ?

(   CHANNEL SCAN + BOARD TYPE               )     1S1 ?

(   CHANNEL SCAN + BOARD TYPE               )     1S2 ?

(   CHANNEL SCAN + BOARD TYPE               )     1S3 ?

(   CHANNEL SCAN + BOARD TYPE               )     1S4 ?

(   S5 - S8 ARE FOR 6433 ONLY               )

(   CHANNEL SCAN + PSEUDO BOARD TYPE        )     1S5 ?

(   CHANNEL SCAN + PSEUDO BOARD TYPE        )     1S6 ?

(   CHANNEL SCAN + PSEUDO BOARD TYPE        )     1S7 ?

(   CHANNEL SCAN + PSEUDO BOARD TYPE        )     1S8 ?

(   6432 OPERATING STATUS                   )     1MD ?


(     ANALOGUE INPUT CHANNELS               )     GU 00

(   BLOCK No 1 / CHANNEL  No 1              )

(   CHANNEL STATUS                          )     1ST ?
(   HIGH RANGE                              )     1HR ?
(   LOW RANGE                               )     1LR ?
(   HIGH  ALARM                             )     1HA ?
(   LOW ALARM                               )     1LA ?
(   ALARM ROUTING                           )     1AR ?

(   CHANNEL TAG CHARS. 1-4                  )     11T ?
(   CHANNEL TAG CHARS. 5-8                  )     12T ?
```

(BLOCK No 1 / CHANNEL No 2)	
(CHANNEL STATUS)	2ST ?
(HIGH RANGE)	2HR ?
(LOW RANGE)	2LR ?
(HIGH ALARM)	2HA ?
(LOW ALARM)	2LA ?
(ALARM ROUTING)	2AR ?
(CHANNEL TAG CHARS. 1-4)	21T ?
(CHANNEL TAG CHARS. 5-8)	22T ?
(BLOCK No 1 / CHANNEL No 3)	
(CHANNEL STATUS)	3ST ?
(HIGH RANGE)	3HR ?
(LOW RANGE)	3LR ?
(HIGH ALARM)	3HA ?
(LOW ALARM)	3LA ?
(ALARM ROUTING)	3AR ?
(CHANNEL TAG CHARS. 1-4)	31T ?
(CHANNEL TAG CHARS. 5-8)	32T ?
(BLOCK No 1 / CHANNEL No 4)	
(CHANNEL STATUS)	4ST ?
(HIGH RANGE)	4HR ?
(LOW RANGE)	4LR ?
(HIGH ALARM)	4HA ?
(LOW ALARM)	4LA ?
(ALARM ROUTING)	4AR ?
(CHANNEL TAG CHARS. 1-4)	41T ?
(CHANNEL TAG CHARS. 5-8)	42T ?
(BLOCK No 1 / CHANNEL No 5)	
(CHANNEL STATUS)	5ST ?
(HIGH RANGE)	5HR ?
(LOW RANGE)	5LR ?
(HIGH ALARM)	5HA ?
(LOW ALARM)	5LA ?
(ALARM ROUTING)	5AR ?
(CHANNEL TAG CHARS. 1-4)	51T ?
(CHANNEL TAG CHARS. 5-8)	52T ?

(BLOCK No 1 / CHANNEL No 6	)	
(CHANNEL STATUS	)	6ST ?
(HIGH RANGE	)	6HR ?
(LOW RANGE	)	6LR ?
(HIGH ALARM	)	6HA ?
(LOW ALARM	)	6LA ?
(ALARM ROUTING	)	6AR ?
(CHANNEL TAG CHARS. 1-4	)	61T ?
(CHANNEL TAG CHARS. 5-8	)	62T ?
(BLOCK No 1 / CHANNEL No 7	)	
(CHANNEL STATUS	)	7ST ?
(HIGH RANGE	)	7HR ?
(LOW RANGE	)	7LR ?
(HIGH ALARM	)	7HA ?
(LOW ALARM	)	7LA ?
(ALARM ROUTING	)	7AR ?
(CHANNEL TAG CHARS. 1-4	)	71T ?
(CHANNEL TAG CHARS. 5-8	)	72T ?
(BLOCK No 1 / CHANNEL No 8	)	
(CHANNEL STATUS	)	8ST ?
(HIGH RANGE	)	8HR ?
(LOW RANGE	)	8LR ?
(HIGH ALARM	)	8HA ?
(LOW ALARM	)	8LA ?
(ALARM ROUTING	)	8AR ?
(CHANNEL TAG CHARS. 1-4	)	81T ?
(CHANNEL TAG CHARS. 5-8	)	82T ?
(DIGITAL INPUT CHANNELS	)	GU 01
(BLOCK No 2 / CHANNEL No 1	)	
(BLOCK STATUS	)	1ST ?
(ALARM MASKING BITS	)	1AM ?
(CHANNEL TAG CHARS. 1-4	)	11T ?
(CHANNEL TAG CHARS. 5-8	)	12T ?
(BLOCK No 2 / CHANNEL No 2	)	
(CHANNEL TAG CHARS. 1-4	)	21T ?
(CHANNEL TAG CHARS. 5-8	)	22T ?
(BLOCK No 2 / CHANNEL No 3	)	
(CHANNEL TAG CHARS. 1-4	)	31T ?
(CHANNEL TAG CHARS. 5-8	)	32T ?

(BLOCK No 2 / CHANNEL No 4	)	
(CHANNEL TAG CHARS. 1-4	)	41T ?
(CHANNEL TAG CHARS. 5-8	)	42T ?
(BLOCK No 2 / CHANNEL No 5	)	
(CHANNEL TAG CHARS. 1-4	)	51T ?
(CHANNEL TAG CHARS. 5-8	)	52T ?
(BLOCK No 2 / CHANNEL No 6	)	
(CHANNEL TAG CHARS. 1-4	)	61T ?
(CHANNEL TAG CHARS. 5-8	)	62T ?
(BLOCK No 2 / CHANNEL No 7	)	
(CHANNEL TAG CHARS. 1-4	)	71T ?
(CHANNEL TAG CHARS. 5-8	)	72T ?
(BLOCK No 2 / CHANNEL No 8	)	
(CHANNEL TAG CHARS. 1-4	)	81T ?
(CHANNEL TAG CHARS. 5-8	)	82T ?
(ANALOGUE OUTPUT CHANNELS	)	GU 02
(BLOCK No 3 / CHANNEL No 1	)	
(CHANNEL STATUS	)	1ST ?
(HIGH RANGE	)	1HR ?
(LOW RANGE	)	1LR ?
(HIGH OUTPUT LIMIT	)	1HO ?
(LOW OUTPUT LIMIT	)	1LO ?
(PRIME VARIABLE VALUE	)	10P ?
(CHANNEL TAG CHARS. 1-4	)	11T ?
(CHANNEL TAG CHARS. 5-8	)	12T ?
(BLOCK No 3 / CHANNEL No 2	)	
(CHANNEL STATUS	)	2ST ?
(HIGH RANGE	)	2HR ?
(LOW RANGE	)	2LR ?
(HIGH OUTPUT LIMIT	)	2HO ?
(LOW OUTPUT LIMIT	)	2LO ?
(PRIME VARIABLE VALUE	)	20P ?
(CHANNEL TAG CHARS. 1-4	)	21T ?
(CHANNEL TAG CHARS. 5-8	)	22T ?

(BLOCK No 3 / CHANNEL No 3	)	
(CHANNEL STATUS	)	3ST ?
(HIGH RANGE	)	3HR ?
(LOW RANGE	)	3LR ?
(HIGH OUTPUT LIMIT	)	3HO ?
(LOW OUTPUT LIMIT	)	3LO ?
(PRIME VARIABLE VALUE	)	3OP ?
(CHANNEL TAG CHARS. 1-4	)	31T ?
(CHANNEL TAG CHARS. 5-8	)	32T ?
(BLOCK No 3 / CHANNEL No 4	)	
(CHANNEL STATUS	)	4ST ?
(HIGH RANGE	)	4HR ?
(LOW RANGE	)	4LR ?
(HIGH OUTPUT LIMIT	)	4HO ?
(LOW OUTPUT LIMIT	)	4LO ?
(PRIME VARIABLE VALUE	)	4OP ?
(CHANNEL TAG CHARS. 1-4	)	41T ?
(CHANNEL TAG CHARS. 5-8	)	42T ?
(BLOCK No 3 / CHANNEL No 5	)	
(CHANNEL STATUS	)	5ST ?
(HIGH RANGE	)	5HR ?
(LOW RANGE	)	5LR ?
(HIGH OUTPUT LIMIT	)	5HO ?
(LOW OUTPUT LIMIT	)	5LO ?
(PRIME VARIABLE VALUE	)	5OP ?
(CHANNEL TAG CHARS. 1-4	)	51T ?
(CHANNEL TAG CHARS. 5-8	)	52T ?
(BLOCK No 3 / CHANNEL No 6	)	
(CHANNEL STATUS	)	6ST ?
(HIGH RANGE	)	6HR ?
(LOW RANGE	)	6LR ?
(HIGH OUTPUT LIMIT	)	6HO ?
(LOW OUTPUT LIMIT	)	6LO ?
(PRIME VARIABLE VALUE	)	6OP ?
(CHANNEL TAG CHARS. 1-4	)	61T ?
(CHANNEL TAG CHARS. 5-8	)	62T ?

BLOCK No 3 / CHANNEL No 7	
CHANNEL STATUS	7ST ?
HIGH RANGE	7HR ?
LOW RANGE	7LR ?
HIGH OUTPUT LIMIT	7HO ?
LOW OUTPUT LIMIT	7LO ?
PRIME VARIABLE VALUE	70P ?
CHANNEL TAG CHARS. 1-4	71T ?
CHANNEL TAG CHARS. 5-8	72T ?
BLOCK No 3 / CHANNEL No 8	
CHANNEL STATUS	8ST ?
HIGH RANGE	8HR ?
LOW RANGE	8LR ?
HIGH OUTPUT LIMIT	8HO ?
LOW OUTPUT LIMIT	8LO ?
PRIME VARIABLE VALUE	80P ?
CHANNEL TAG CHARS. 1-4	81T ?
CHANNEL TAG CHARS. 5-8	82T ?
DIGITAL OUTPUT CHANNELS	
BLOCK No 4 / CHANNEL No 1	
BLOCK STATUS	1ST ?
ALARM MASKING BITS	1AM ?
DIGITAL OUTPUT STATES	1DS ?
CHANNEL TAG CHARS. 1-4	11T ?
CHANNEL TAG CHARS. 5-8	12T ?
BLOCK No 4 / CHANNEL No 2	
CHANNEL TAG CHARS. 1-4	21T ?
CHANNEL TAG CHARS. 5-8	22T ?
BLOCK No 4 / CHANNEL No 3	
CHANNEL TAG CHARS. 1-4	31T ?
CHANNEL TAG CHARS. 5-8	32T ?
BLOCK No 4 / CHANNEL No 4	
CHANNEL TAG CHARS. 1-4	41T ?
CHANNEL TAG CHARS. 5-8	42T ?
BLOCK No 4 / CHANNEL No 5	
CHANNEL TAG CHARS. 1-4	51T ?
CHANNEL TAG CHARS. 5-8	52T ?

```
(  BLOCK No 4 / CHANNEL No 6                    )
(  CHANNEL TAG CHARS. 1-4                       )     61T ?
(  CHANNEL TAG CHARS. 5-8                       )     62T ?

(  BLOCK No 4 / CHANNEL No 7                    )
(  CHANNEL TAG CHARS. 1-4                       )     71T ?
(  CHANNEL TAG CHARS. 5-8                       )     72T ?

(  BLOCK No 4 / CHANNEL No 8                    )
(  CHANNEL TAG CHARS. 1-4                       )     81T ?
(  CHANNEL TAG CHARS. 5-8                       )     82T ?

(  END OF FILE  )
```

APPENDIX H

(
Template File Title : P366-232.TPL

Template Function : Fetch Parameter DataBase

Communication Standard : RS232C via Front Panel of Module
[Cable Assy No LA 079562C/LA 079563C]

Module Type : 6356/6366

Special Instructions : Ensure that the instrument is in the Block Parameter Mode. This is achieved by selecting Option 2 of the VDU program and obtaining the ?? BCMD prompt.
)

(
Order No :
Project Title :
File Ref :
Iss :
Module Code :
DataBase Configuration as follows :
Customer Name :
Application :
Date :
Module Serial No :
)

(General Purpose Block	)	BT GP +
(Relative Block No 1	)	BN 1 +
(Block status	)	ST ?
(Instrument identity	)	II ?
(Loop 1 program mnemonic	)	L1 ?
(Loop 2 program mnemonic	)	L2 ?
(Background program	)	BG ?
(Analogue input block	)	BT AI +
(Relative block No 1	)	BN 1 +
(Block status	)	ST ?
(Analogue input high range	)	HR ?
(Analogue input low limit	)	LR ?
(Relative block No 2	)	BN 2 +
(Block status	)	ST ?
(Analogue input high range	)	HR ?
(Analogue input low limit	)	LR ?
(Relative block No 3	)	BN 3 +
(Block status	)	ST ?
(Analogue input high range	)	HR ?
(Analogue input low limit	)	LR ?

(Analogue Output Block	)	BT AO +
(Relative block No 1	)	BN 1 +
(Block status	)	ST ?
(Analogue output high range	)	HR ?
(Analogue output low range	)	LR ?
(High ouput limit	)	HL ?
(Low ouput limit	)	LL ?
(Digital input block	)	BT DI +
(Relative block No 1	)	BN 1 +
(Block status	)	ST ?
(Exclusive-OR mask	)	XM ?
(Digital output block	)	BT DO +
(Relative block No 1	)	BN 1 +
(Block status	)	ST ?
(Write mask	)	WM ?
(Digital output states	)	DS ?
(Setpoint block	)	BT SP +
(Relative block No 1	)	BN 1 +
(Block status	)	ST ?
(Setpoint high range	)	HR ?
(Setpoint low range	)	LR ?
(Setpoint high limit	)	HL ?
(Setpoint low limit	)	LL ?
(Local setpoint	)	SL ?
(Setpoint bias	)	SB ?
(Setpoint rate limit	)	RL ?
(High absolute alarm limit	)	HA ?
(Low absolute alarm limit	)	LA ?
(High deviation alarm limit	)	HD ?
(Low deviation alarm limit	)	LD ?
(Relative block No 2	)	BN 2 +
(Block status	)	ST ?
(Setpoint high range	)	HR ?
(Setpoint low range	)	LR ?
(Setpoint high limit	)	HL ?
(Setpoint low limit	)	LL ?
(Local setpoint	)	SL ?
(Setpoint bias	)	SB ?
(Setpoint rate limit	)	RL ?
(High absolute alarm limit	)	HA ?
(Low absolute alarm limit	)	LA ?
(High deviation alarm limit	)	HD ?
(Low deviation alarm limit	)	LD ?

(Ratio block	)	BT RB +
(Relative block No 1	)	BN 1 +
(Block status	)	ST ?
(Ratio setting high limit	)	HR ?
(Ratio setting low limit	)	LR ?
(Ratio setting	)	RS ?
(Ratio trim	)	RT ?
(Ratio bias	)	RB ?
(Relative block No 2	)	BN 2 +
(Block status	)	ST ?
(Ratio setting high limit	)	HR ?
(Ratio setting low limit	)	LR ?
(Ratio setting	)	RS ?
(Ratio trim	)	RT ?
(Ratio bias	)	RB ?
(PID control block	)	BT 3T +
(Relative block No 1	)	BN 1 +
(Block status	)	ST ?
(Proportional band constant	)	XP ?
(Integral time constant	)	TI ?
(Derivative time constant	)	TD ?
(Feed-forward term	)	FF ?
(Relative block No 2	)	BN 2 +
(Block status	)	ST ?
(Proportional band constant	)	XP ?
(Integral time constant	)	TI ?
(Derivative time constant	)	TD ?
(Feed-forward term	)	FF ?
(Manual output station block	)	BT MS +
(Relative block No 1	)	BN 1 +
(Block status	)	ST ?
(High velocity / Rate limit	)	HV ?
(Low velocity / Rate limit	)	LV ?
(High output limit	)	HL ?
(Low output limit	)	LL ?
(Output tracking value	)	OT ?
(Relative block No 2	)	BN 2 +
(Block status	)	ST ?
(High velocity / Rate limit	)	HV ?
(Low velocity / Rate limit	)	LV ?
(High output limit	)	HL ?
(Low output limit	)	LL ?
(Output tracking value	)	OT ?

(Display and control block	)	BT DC +
(Relative block No 1	)	BN 1 +
(Block status	)	ST ?
(Bargraph 1 data source	)	1B ?
(Bargraph 2 data source	)	2B ?
(Bargraph 3 data source	)	3B ?
(Digital display data	)	DD ?
(Enable status word	)	ES ?
(Front panel switch mask	)	SM ?
(Relative block No 2	)	BN 2 +
(Block status	)	ST ?
(Bargraph 1 data source	)	1B ?
(Bargraph 2 data source	)	2B ?
(Bargraph 3 data source	)	3B ?
(Digital display data	)	DD ?
(Enable status word	)	ES ?
(Front panel switch mask	)	SM ?
(Alarm block	)	BT AB +
(Relative block No 1	)	BN 1 +
(Block status	)	ST ?
(High value alarm limit	)	HV ?
(Low value alarm limit	)	LV ?
(High alarm limit	)	HL ?
(Low alarm limit	)	LL ?
(Alarm hysteresis	)	AH ?
(Relative block No 2	)	BN 2 +
(Block status	)	ST ?
(High value alarm limit	)	HV ?
(Low value alarm limit	)	LV ?
(High alarm limit	)	HL ?
(Low alarm limit	)	LL ?
(Alarm hysteresis	)	AH ?
(Constants block	)	BT CB +
(Relative block No 1	)	BN 1 +
(Block status	)	ST ?
(Constant 1	)	1K ?
(Constant 2	)	2K ?
(Constant 3	)	3K ?
(Constant 4	)	4K ?
(User status word	)	US ?
(Relative block No 2	)	BN 2 +
(Block status	)	ST ?
(Constant 1	)	1K ?
(Constant 2	)	2K ?
(Constant 3	)	3K ?
(Constant 4	)	4K ?
(User status word	)	US ?

```
(   Filter lead/lag block                    )     BT FB +

(   Relative block No 1                      )     BN 1 +
(   Block status                             )     ST ?
(   Filter gain                              )     XK ?
(   Lead time constant                       )     1T ?
(   Lag time constant                        )     2T ?
(   Feed-forward/output bias                 )     FF ?

(   Relative block No 2                      )     BN 2 +
(   Block status                             )     ST ?
(   Filter gain                              )     XK ?
(   Lead time constant                       )     1T ?
(   Lag time constant                        )     2T ?
(   Feed-forward/output bias                 )     FF ?


(   Delay block                              )     BT DB +

(   Relative block No 1                      )     BN 1 +
(   Block status                             )     ST ?
(   Maximum delay time                       )     DT ?

(   Relative block No 2                      )     BN 2 +
(   Block status                             )     ST ?
(   Maximum delay time                       )     DT ?


(   Totalisation block                       )     BT TB +

(   Relative block No 1                      )     BN 1 +
(   Block status                             )     ST ?
(   Flow scaling factor                      )     FS ?
(   Flow total                               )     FT ?

(   Relative block No 2                      )     BN 2 +
(   Block status                             )     ST ?
(   Flow scaling factor                      )     FS ?
(   Flow total                               )     FT ?


( End of file )
```

```
( Template File Title : P366-422.TPL

  Template Function : Fetch Block Parameter DataBase

  Communication Standard : RS422 via rear connector of Module

  Module Type : 6356/6366
)

(
Order No :                                  Customer Name :
Project Title :                             Application :
File Ref :
Iss :                                       Date :
Module Code :                               Module Serial No :
DataBase Configuration as follows :
)

(   GROUP AND UNIT ADDRESS                  )     GU 00

(   General Purpose Block                   )
(   Block status                            )     GP1ST ?
(   Instrument identity                     )     GP1II ?
(   Loop 1 program mnemonic                 )     GP1L1 ?
(   Loop 2 program mnemonic                 )     GP1L2 ?
(   Background program                      )     GP1BG ?


(   Analogue input block number 1           )
(   Block status                            )     AI1ST ?
(   Analogue input high range               )     AI1HR ?
(   Analogue input low limit                )     AI1LR ?

(   Analogue input block number 2           )
(   Block status                            )     AI2ST ?
(   Analogue input high range               )     AI2HR ?
(   Analogue input low limit                )     AI2LR ?

(   Analogue input block number 3           )
(   Block status                            )     AI3ST ?
(   Analogue input high range               )     AI3HR ?
(   Analogue input low limit                )     AI3LR ?


(   Analogue Output Block                   )
(   Block status                            )     AO1ST ?
(   Analogue output high range              )     AO1HR ?
(   Analogue output low range               )     AO1LR ?
(   High ouput limit                        )     AO1HL ?
(   low ouput limit                         )     AO1LL ?


(   Digital input block                     )
(   Block status                            )     DI1ST ?
(   Exclusive-OR mask                       )     DI1XM ?
```

(Digital output block)	
(Block status)	DO1ST ?
(Write mask)	DO1WM ?
(Digital output states)	DO1DS ?
(Setpoint block number 1)	
(Block status)	SP1ST ?
(Setpoint high range)	SP1HR ?
(Setpoint low range)	SP1LR ?
(Setpoint high limit)	SP1HL ?
(Setpoint low limit)	SP1LL ?
(Local setpoint)	SP1SL ?
(Setpoint bias)	SP1SB ?
(Setpoint rate limit)	SP1RL ?
(High absolute alarm limit)	SP1HA ?
(Low absolute alarm limit)	SP1LA ?
(High deviation alarm limit)	SP1HD ?
(Low deviation alarm limit)	SP1LD ?
(Setpoint block number 2)	
(Block status)	SP2ST ?
(Setpoint high range)	SP2HR ?
(Setpoint low range)	SP2LR ?
(Setpoint high limit)	SP2HL ?
(Setpoint low limit)	SP2LL ?
(Local setpoint)	SP2SL ?
(Setpoint bias)	SP2SB ?
(Setpoint rate limit)	SP2RL ?
(High absolute alarm limit)	SP2HA ?
(Low absolute alarm limit)	SP2LA ?
(High deviation alarm limit)	SP2HD ?
(Low deviation alarm limit)	SP2LD ?
(Ratio block number 1)	
(Block status)	RB1ST ?
(Ratio setting high limit)	RB1HR ?
(Ratio setting low limit)	RB1LR ?
(Ratio setting)	RB1RS ?
(Ratio trim)	RB1RT ?
(Ratio bias)	RB1RB ?
(Ratio block number 2)	
(Block status)	RB2ST ?
(Ratio setting high limit)	RB2HR ?
(Ratio setting low limit)	RB2LR ?
(Ratio setting)	RB2RS ?
(Ratio trim)	RB2RT ?
(Ratio bias)	RB2RB ?
(PID control block number 1)	
(Block status)	3T1ST ?
(Proportional band constant)	3T1XP ?
(Integral time constant)	3T1TI ?
(Derivative time constant)	3T1TD ?
(Feed-forward term)	3T1FF ?

(PID control block number 2)	
(Block status)	3T2ST ?
(Proportional band constant)	3T2XP ?
(Integral time constant)	3T2TI ?
(Derivative time constant)	3T2TD ?
(Feed-forward term)	3T2FF ?
(Manual output station block number 1)	
(Block status)	MS1ST ?
(High velocity / Rate limit)	MS1HV ?
(Low velocity / Rate limit)	MS1LV ?
(High output limit)	MS1HL ?
(Low output limit)	MS1LL ?
(Output tracking value)	MS1OT ?
(Manual output station block number 2)	
(Block status)	MS2ST ?
(High velocity / Rate limit)	MS2HV ?
(Low velocity / Rate limit)	MS2LV ?
(High output limit)	MS2HL ?
(Low output limit)	MS2LL ?
(Output tracking value)	MS2OT ?
(Display and Control block number 1)	
(Block status)	DC1ST ?
(Bargraph 1 data source)	DC11B ?
(Bargraph 2 data source)	DC12B ?
(Bargraph 3 data source)	DC13B ?
(Digital display data)	DC1DD ?
(Enable status word)	DC1ES ?
(Front panel switch mask)	DC1SM ?
(Display and Control block number 2)	
(Block status)	DC2ST ?
(Bargraph 1 data source)	DC21B ?
(Bargraph 2 data source)	DC22B ?
(Bargraph 3 data source)	DC23B ?
(Digital display data)	DC2DD ?
(Enable status word)	DC2ES ?
(Front panel switch mask)	DC2SM ?
(Alarm block number 1)	
(Block status)	AB1ST ?
(High value alarm limit)	AB1HV ?
(Low value alarm limit)	AB1LV ?
(High alarm limit)	AB1HL ?
(Low alarm limit)	AB1LL ?
(Alarm hysteresis)	AB1AH ?
(Alarm block number 2)	
(Block status	AB2ST ?
(High value alarm limit)	AB2HV ?
(Low value alarm limit)	AB2LV ?
(High alarm limit)	AB2HL ?
(Low alarm limit)	AB2LL ?
(Alarm hysteresis)	AB2AH ?

(Constants block number 1	)	
(Block status	)	CB1ST ?
(Constant 1	)	CB11K ?
(Constant 2	)	CB12K ?
(Constant 3	)	CB13K ?
(Constant 4	)	CB14K ?
(User status word	)	CB1US ?
(Constants block number 2	)	
(Block status	)	CB2ST ?
(Constant 1	)	CB21K ?
(Constant 2	)	CB22K ?
(Constant 3	)	CB23K ?
(Constant 4	)	CB24K ?
(User status word	)	CB2US ?
(Filter lead/lag block number 1	)	
(Block status	)	FB1ST ?
(Filter gain	)	FB1XK ?
(Lead time constant	)	FB11T ?
(Lag time constant	)	FB12T ?
(Feed-forward/output bias	)	FB1FF ?
(Filter lead/lag block number 2	)	
(Block status	)	FB2ST ?
(Filter gain	)	FB2XK ?
(Lead time constant	)	FB21T ?
(Lag time constant	)	FB22T ?
(Feed-forward/output bias	)	FB2FF ?
(Delay block number 1	)	
(Block status	)	DB1ST ?
(Maximum delay time	)	DB1DT ?
(Delay block number 2	)	
(Block status	)	DB2ST ?
(Maximum delay time	)	DB2DT ?
(Totalisation block number 1	)	
(Block status	)	TB1ST ?
(Flow scaling factor	)	TB1FS ?
(Flow total	)	TB1FT ?
(Totalisation block number 2	)	
(Block status	)	TB2ST ?
(Flow scaling factor	)	TB2FS ?
(Flow total	)	TB2FT ?

(End of file)

APPENDIX I 8275 Data Base Configurator - Revision History

Software part number :- RD 079570 issue 4, release 1

The table below shows the modification history of the 8275 software:-

SOFTWARE ISS.	SOFTWARE REL	DATE	COMP. SYSTEM	STORAGE MEDIUM	REMARKS
1	1	08/05/87	IBM PC XT or AT	5¼" Floppy disk	Initial release.
2	1	01/06/88	"	Two 5¼ inch floppy disks	a) D300 support added. b) 637x/8x series Template Builder option added plus upload/download with RS422 comms via RS232 port. c) 6432/33 extra Cn parameters added in Template Builder. d) 6436/37 Template Builder option added. e) 6445/6225 Database configuration facility added. f) HELP files put into sub-directory. g) READ-ME file added.
3	1	28/09/88	"	Two 5¼ inch floppy disks or one 3½ inch floppy disk	a) T100 Template Builder option added. b) T100 configuration Logon facility added. c) Bugs fixed. d) Pagination facility included in Template Builder. e) New Template Header Block included in Template Builder Builder.
4	1		"	"	

APPENDIX J 8275 Template Files - Revision History

Software part number :- RD 079613 issue 4, release 1

The table below shows the modification history of the 8275 Template files software:-

SOFTWARE ISS.	SOFTWARE REL	DATE	COMP. SYSTEM	STORAGE MEDIUM	REMARKS
1	1	11/05/87	IBM PC XT or AT	5¼" Floppy disk	Initial release.
1	2	25/09/87	"	"	)Bracket missing from most files corrected
2	1	01/06/88	"	"	a) D300 Templates added. b) 637x/8x series Template Blocks added in directory \VDU\BLK. c) 637x/8x default clean files added. d) Missing bracket added in file P358-422.TPL.
3	1	28/09/88	"	Two 5¼ inch floppy disks or one 3½ inch floppy disk	a) Standard Template files paginated and new Header Block added. b) T100 Blocks for Template Builder added in directory \VDU\BLK. c) 6432/6433 Blocks for Template Builder added in directory \VDU\BLK. d) 6436/6437 Blocks for Template Builder added in directory \VDU\BLK.
4	1		"	"	

MANUAL ISS.	MANUAL REV	DATE	PAGE	AMENDMENT
1	A	05/87		Initial release for issue 1/1 software.
2	A	06/88		Issue 1/A Manual supplied with a separate set of issue 2/A amendments detailing the differences between issue 1/1 and 1/2 software
3	A	09/88		Issue 1/A Manual supplied with a separate set of issue 3/A amendments detailing the differences between issue 1/1 and 3/1 software
4	A	11/88		Issue 1/A Manual completely revised to include the issue 2/A and 3/A amendments. Main changes include:-

ISS.	DATE	ISS.	DATE
1	08/05/87		
2	01/11/88		

TECHNICAL MANUAL AMENDMENT RECORD SHEET

DRAWN : VT	MANUAL TITLE : Data Base Configurator Users Guide (IBM)
CHECKED :	
APPROVED :	PRODUCT CODE : 8275
TURNBULL CONTROL SYSTEMS LTD.	DRAWING NO. ZZ 079572 C005 / SHT 1 OF 1 SHTS