DS-PC Link

Personal computer interface for
the Thurlby DSA524 digital storage adaptor

Instructions for use

INDEX

1. CONTENTS OF PACKAGE:

a. one 5.25" disk
b. one interface cable
c. one replacement EPROM

2. INTRODUCTION

The DS-PC Link interface package comprises disk based software and an interface cable which links the serial port on the Thurlby DSA524 or DSA511 to the serial port on an IBM compatible personal computer.

The software enables the PC to act as the display device for the DSA and also provides complete control of the DSA from the PC. All of the facilities of the DSA which are available when using an oscilloscope as the display are also available using DS-PC Link, plus some additional ones such as disk storage of waveforms and improved cursor measurement.

This manual only covers those aspects of the operation of the DSA which are specific to DS-PC Link. Frequent references are made in this manual to the main DSA511 or DSA524 operating manual which should therefore be to hand.

3. HARDWARE REQUIREMENTS

The computer must be compatible with an IBM PC, XT, AT, or PS2. It must have at least 256K of RAM and must be fitted with a serial port and an enhanced colour graphics adaptor. Most computers which claim IBM compatibility should prove suitable providing that they are fitted with an enhanced graphics adaptor (EGA) or a graphics adaptor capable of operating in EGA mode (e.g. a VGA adaptor). The software is designed for use with a colour monitor. It can also be used with a monochrome monitor providing that the monitor is capable of displaying colours as shades of monochrome (see Appendix C. section 3).

The software is not compatible with a CGA or MCGA adaptor or with a Hercules graphics adaptor. Future versions of the software may also support computers fitted with a CGA or MCGA adaptor but only in monochrome. The Hercules adaptor will not be supported.

The computer must be operating under MS-DOS or PC-DOS (version 2.0 or above). Other operating systems which provide a full emulation of MS-DOS may also prove suitable.

The DSA must have a firmware level of 2.74 or above. If an oscilloscope is connected, the firmware level can be checked as it is displayed briefly at switch-on and after "set scope" is used. Otherwise the firmware level can be checked by using DS-PC Link, a message is displayed on the opening screen of the program. If the firmware level is below 2.74 the new EPROM provided should be installed (see Appendix B).

The interface cable is intended for an IBM-standard 25-pin serial port. Those users who have computers which are fitted with a 9-pin serial port will need a 9-pin to 25-pin adaptor. Connection must be made to the COM1 serial port.

4. INSTALLING THE SOFTWARE

The software is supplied on a 5.25" 360K disk. A back-up copy of the disk should be made immediately. The master disk should then be stored somewhere safe and all work should be done using the back-up copy.

The disk contains three program files as follows: DSPC524.COM, 524TEXT.MOD, 524GRAPH.MOD. There is also a batch file called DS. BAT.

A working version of the software should be created on another floppy disk or in a suitable directory on the hard disk (if fitted). The batch file DS .BAT is there merely to allow the program to be loaded simply by typing DS instead of having to type DSPC524.

Note that the position of the system file COMMAND.COM must remain in the same position (i.e. on the same disk drive) when the program is run as it was when the computer was "booted". This causes no problem on a hard disk system, but it can cause a problem on a floppy disk system. If DS-PC Link it to be run from the same floppy disk drive as was used to boot the computer, then COMMAND.COM should be copied onto the working DSPC-Link disk.

Note that the software may not operate correctly when a mouse driver program is installed. If the computer loads a mouse driver program automatically on power-up, it may be necessary to modify the AUTOEXEC.BAT or CONFIG.SYS file to prevent this.

5. GETTING STARTED

Commence by plugging the interface cable into the 9-pin connector on the rear of the DSA and into the COM1 serial port connector of the computer. The cable is designed to fit a 25-pin serial port *connector,* if your computer has a 9-pin connector a 9-pin to 25-pin adaptor will be needed.

Switch on the DSA and check that the DSA baud rate is set to 1200 baud or above (to set the rate to 9600 baud press Escape and then key in Function 35). Start the program by typing DS on the computer. An opening screen will appear showing the version and issue number of the software, and the copyright details. The message "DSA Comets. link test, please wait" will appear and, after a short while, this should be replaced by the message "Communications established with DSA at 9600 baud. DSA524 2.74" (for example). The baud rate will be the rate set when the DSA was last used, the number after the model identification is the firmware level.

If the firmware is below level 2.74 or if the DSA is the wrong type (e.g. a 511 instead of a 524) the software will not operate properly and the program should be terminated by re-booting the computer. If the program fails to establish communications with the DSA (because the cable is unplugged, or the DSA is not switched on, or the baud rate is set below 1200, for example) a warning will be given and there will be an option to retry or to abort the program.

If communications are established correctly, the option will be provided to increase or decrease the baud rate, or to continue into the program. The choice of baud rate is important and is covered in the next section.

6. CHOOSING *THE* BAUD *RATE*

Because of the large amount of data that has to be transferred every time the waveform display is updated, it is desirable to transmit the data as rapidly as possible. The DSA serial interface supports baud rates between 300 and 38400, but DS-PC Link will not operate below 1200 baud because waveform transmission times become excessive. If the program is started with the DSA set to below 1200 baud it will abort.

The serial ports of an IBM compatible computer operating under MS-DOS are normally limited to a maximum baud rate of 9600. DS-PC Link takes control of the hardware of the computer's serial port (bypassing the BICS) enabling it to operate at any rate between 1200 baud and 38400 baud. Whether a particular computer can satisfactorily operate at the two highest baud rates depends upon its exact hardware and firmware configuration. In practise most computers will operate fully reliably at 19200 baud and many will do so at 38400 baud.

To check the maximum rate that can be used with your computer it will be necessary to perform a simple trial of entering the program at the *highest* baud rate and repeatedly updating the screen by repeatedly pressing the F2 key. If the data communications are working correctly the waveforms will be redrawn identically each time. Data communications errors will be noticeable by occasional spurious aberrations on the waveforms. If this occurs exit the program and restart it using a lower baud rate.

Normally the highest reliable baud rate should be used because this will give the fastest possible display update rate. However, there may be occasions, such as when transmitting data over a long cable or via a modem, when a lower baud rate may be appropriate.

7. BASIC PRINCIPLES OF OPERATION

DS-PC Link provides a waveform display for the DSA. It can also provide control of virtually all of the DSA front panel functions.

On leaving the opening screen the program will progress into the main display and control screen which comprises mixed text and graphics. The waveform display area is a large rectangle on the right-hand side of the screen. The waveforms displayed represent the data currently stored in the Trace A and Trace B memories of the DSA and are exactly as they would appear on the screen of a display oscilloscope if one was connected.

The remainder of the screen is used for providing status information and control for the DSA. The top line indicates the version and issue number of the software (e.g. version 1.10 issue 8348), the acquisition status (i.e. RUN, HOLD or SINGLE) and the date and time at which the displayed waveform data was received from the DSA. The next two lines provide further status information about the settings of the DSA.

The box on the left hand side of the display area provides both status information and control capability for any one of seven groups of functions. These groups are CH1, CH2, Timebase, Trigger, Trace A, Trace B, and Utilities. The group is selected by using the horizontal cursor arrows on the keyboard. The two lines directly below this are used for "prompt" lines associated with each control group function.

The bottom line of the screen lists the main control functions available via the function keys. There are two lines of these which are toggled using the F10 key.

Although the computer can control the USA, the DSA cannot control the computer. Thus an update of the waveform display can only be initiated from the computer keyboard using the F1, F2 and F3 keys (RUN, HOLD and SINGLE). The remainder of the DSA control functions can be operated either from the computer keyboard or from the DSA front panel.

Most of the functions of the DSA operate in exactly the same way as when an oscilloscope is being used as the display. The operation of all of these functions is fully described in the main DSA524 or DSA511 operating manual. There are, however, some functions which operate differently (such as trace position), and there are same extra facilities (such as disk storage of waveforms). The operation of these functions is fully described in this manual.

8. CONTROLLING DIGITISING

Digitising is controlled by the function keys F1 (RUN), F2 (HOLD) and F3 (SINGLE).

In RUN mode, digitising is repeated continuously, a new digitising being commenced almost immediately after each pair of traces has been transferred to the computer. The horizontal resolution is-limited to 50 words per division in this mode (see Appendix A. "The Waveform Display"). Both traces are updated simultaneously.

When set to HOLD the digitising memories of the DSA are frozen and the display is updated again at full resolution (see Appendix A). Trace A is updated first followed by Trace B. The F2 key can also be used to initiate an update of the waveform display at any time.

When in HOLD a single digitising can be initiated by using SINGLE. When this has been completed the display is updated with the new contents of the trace memories at full resolution.

When RUN mode is initiated from the computer the RUN/HOLD function of the DSA is not set to RUN. Instead digitising is repeated continuously by means of the computer automatically initiating a series of single digitisings.

Note that update of the display cannot be achieved using the RUN/HOLD or SINGLE keys on the front panel of the DSA. Using these keys will control the digitising of the DSA but will not cause any data to be transferred to the computer. To transfer the data, use F2 (HOLD/REDRAW) on the computer.

9. CONTRCLLING THE DSA SETTINGS

Control of any of the DSA settings is achieved by first selecting the appropriate control group (Ch1, Ch2, Tmb, Trg, TrA, TrB, or Utl) using the horizontal cursor arrow keys on the computer. The control box area will then contain a menu of control functions relevant to that group.

The required function is selected by using the vertical cursor arrow keys. For each function a prompt appears near the bottom of the screen explaining which keys perform which action.

The status of the DSA settings for each control group is displayed within each control box. Thus the settings status can be checked fully by keying through the boxes. To avoid the need to do this too often, the most important information (trace source, volts per division, time per division, search mode status and trigger delay) is also permanently displayed at the top of the screen.

The on-screen status display is only updated when a change is initiated from the computer. If a change to the DSA settings is made from the DSA front panel, a status update request must be made from the computer by using the F4 key. To avoid accidental changes being made to the DSA settings, the DSA can be placed in "locked" mode using the shifted F5 key. This locks-out the DSA front panel keys. In "locked" mode the REM (remote-only) lamp on the DSA front panel illuminates and an L symbol appears after the words DSA Status on the second line of the display. When in "unlocked" mode the L is replaced by a ? as a reminder that the status information currently displayed could be incorrect.

Note that whenever a function which is normally controlled by a rotary control on the DSA is set from the computer, the rotary control becomes inoperative. To make it operative again, the key next to the control must be pressed (once if the lamp above the key is on, or twice if the lamp is off).

10. CONTROLLING THE INPUT CHANNELS

(See also the section "CHI and CH2" in the main DSA manual)

ON/OFF: See the section "Digitising Memories" within the main DSA manual. V/DIV and COUPL: See the section "CHI and CH2" within the main DSA manual.

DSK: This function enables the contents of the digitising memories for CHI or CH2 to be saved as a disk file. The default disk drive for storage of these files can be selected as A, B or C. The file must be given a name of up to 8 characters. Do not add an extension since the extension .DSC is added automatically. A path specification can be inserted before the filename if storage on a disk drive other than the default disk drive or in another directory is required.

Each disk file can also store the date and time of the acquisition, the volts/div and time/div, and up to 80 characters of text as a comment. The "Info" option on the disk function enables this information to be entered, edited, or observed.

When a disk file is recalled, it is loaded into the digitising memory for the current channel (files stored from CHI can be recalled to CH2 and vice versa). RUN mode is cancelled and ON/OFF for that channel is set to OFF. The contents of the file are then displayed exactly as if the data had been acquired into the digitising memory in the normal way. RUN mode can be restarted and digitising can be performed on the other input channel without affecting the recalled data.

When using a DSA524 this facility enables full 4096 word records to be saved rather than the 1024 word records which are saved when using the indexed waveform memories. Remember that what is being saved is not the waveform as displayed on the screen, but is the raw contents of the digitising memory' unaffected by the operation of the trace controls or search/magnify function.

To abandon a disk file and return to digitising from the input channel, set ON/OFF back to ON.

OFFSET: (See also the section "CHI and CH2" in the main DSA manual)
Offset can have any value between 100 and -100. The value is equivalent to a percentage of the rotation (clockwise or anticlockwise) of the DSA offset rotary control. The total offset range is greater than ±8 divisions and is typically ±8.5 divisions. Thus an offset of 12 is equivalent to about one division.

The PgUp and PgDn keys increment and decrement in steps of 10 (just under 1 division) while the + and - keys perform the same function in steps of one. The Home key sets zero offset while the End key allows any value to be entered.

11. CONTROLLING THE TIMEBASE

T/DIV: See the section "Setting the Timebase" in the main DSA manual. Note that the slowest timebase speed that can be set with this function is 100ms/div except when ROLL is turned on.

ROLL: (See also the section "Roll Mode Operation" in the main DSA manual) In Roll mode the program operates in a totally different way because the screen must be updated continuously in order to provide a "rolling" display. When in Roll mode, data is transferred from the DSA continuously and therefore no control of the DSA settings is possible.

When Roll is selected from the menu, six options are provided. The PgUp and PgDn keys allow the timebase speed to be set within the range 500ms/div to 200mins/div (note that 200ms/div is not available). The Ins key places the DSA into roll mode RUN, any key then pressed will cause it to pause. The Home key stops the roll, redraws the screen with dot-joining (if active), and re-enables other functions such as Search and Cursors. The End key terminates roll mode and resets the timebase to its setting before roll mode was entered.

Note that dot-join is not operative during roll mode Run, and that no roll mode Single is available.

SEARCH: DSA524 only - see the section "Memory Search" within the main manual.

The Search mode operates slightly differently from that of the DSA when using an oscilloscope display. The PgUp, PgDn and Home keys select Compress, Magnify and Scan modes respectively. In Compress mode, a window is available which shows which section of the memory will be drawn when Scan mode is selected, this is called the Scan Window. In Scan mode, a window is available which shows which section of memory will be displayed when Mag mode is selected, this is called the Mag Window. The Scan and Mag Windows are represented by bright areas of the screen.

In order to move the Scan or Mag Windows it is necessary to turn on "window mode" using the Ins key. With window mode on, the horizontal arrow keys no longer select the control menus but instead move the position of the Scan or Mag Windows. To return to normal control, window mode must be turned off by pressing the Ins key again.

The "Memory Bar" above the waveform display area provides a graphical indication of the Search status. The full length of the bar represents the whole 4096 words of the digitising memory. The filled-in section of the bar represents the 1024 words of the Scan Window, and the vertically lined section represents the 102 words of the Mag Window.

The number displayed below the SEARCH status indicator represents the start position of the display in the Memory Bar and has values between 0 and 3100 in SCAN mode or 0 and 900 in MAG mode.

To turn search mode off and return both windows to their zero positions, press the End key.

MAG: DSA511 only - see the section "Display Magnify" in the main manual.

The Magnify mode operates slightly differently from that of the DSA when using an oscilloscope display. The PgUp key turns Mag mode on and the PgDn key turns it off. The 102 word block of the memory which is to be magnified is selected via a moveable window called the Mag Window. The Mag Window is represented by a bright area of the screen.

To move the Mag Window it is necessary to turn on "window mode" using the Ins key. With window mode on, the horizontal arrow keys no longer select the control menus but instead move the position of the Mag Window. To return to normal control, window mode must be turned off by pressing the Ins key again..

The "Memory Bar" above the waveform area shows the position of the Magnify window. The number displayed below the MAG status indicator represents the start position of the magnify window and has values between 0 and 900.

RATE: The Rate function operates differently from the rate function of the DSA when using an oscilloscope display. Only Slow and Normal display update rates are available. Slow mode adds an extra delay of about 2 seconds between display updates. There is no Fast rate.

Do not use the Rate control on the DSA front panel. In particular do not select Fast rate as this will cause unpredictable operation.

INTERP: DSA524 only - see the section "Sine Interpolation" in the main manual. AVG: DSA524 only - see the section "Average" in the main manual.

Note that slow-mode averaging, whereby the display continues to be updated while averaging takes place, is not available.

12. CONTROLLING THE TRIGGER SECTION

SOURCE, MODE, SLOPE, COUPL: See the section "Trigger" in the main DSA manual.

LEVEL: Level can have any value between 100 and -100. The value is represents a percentage of the rotation (clockwise or anti-clockwise) of the DSA level control. The total level range is greater than +4.5 divisions and is typically ±4.8 divisions. Thus a level value of 18 is typically equal to 1 division.

The PgUp and PgDn increment and decrement in steps of 10 (about 0.5 division) while the + and - keys perform the same function in steps of one. The Home key sets zero level while the End key allows any value to be entered.

EDLY: (Event Delay) DSA524 only - see the section "Trigger" of the main manual.

TDLY: (Time Delay) (see also the section "Trigger" of the main DSA manual.

The Time Delay figure is also displayed permanently on the top status line, and if the trigger position is within the digitising memory (pre-trigger delay) it is indicated by a small T within the "Memory Bar". If the trigger point is before the start of the memory (post trigger delay) the T is positioned just outside of the bar.

The PgUp and PgDn keys increment and decrement in steps of 10 divisions while the + and - keys perform the same function in steps of one division. The Home key sets zero delay while the End key allows any value to be entered.

13. CONTROLLING THE TRACES

SOURCE: See the section "Trace A and Trace B" in the main DSA manual. This function provides the four functions CH1 (or CH2), SAVE(NN), RCL(NN) and OFF.

DSK: This function enables the contents of the Trace A or Trace B memories to be saved as disk files. This facility is in addition to the indexed waveform memories which are accessed via the SOURCE function.

The default disk drive for storage of these files can be selected as A, B or C. The file must be given a name of up to 8 characters. Do not add an extension since the extension DST is added automatically. A path specification can be inserted before the filename if storage on another disk drive or in another directory is required. Do not add an extension since the extension DST is added automatically.

When a disk file is recalled, RUN mode is cancelled and the data is loaded into the trace memory for the current trace (files stored from Trace A can be loaded into Trace *B* and vice_ versa). RUN mode can then be restarted and the DSA can continue to be used in the normal way.

To abandon a disk file use the SOURCE function to select CHI (or CH2), RECALL(NN) or OFF.

GAIN: (see also the section "Trace A & Trace *B"* in the main DSA manual)
Gain can have any value between 100 and 0. The value represents the gain level as a direct percentage. Thus a gain figure of 25 would reduce the waveform amplitude by a factor of four (to 25%). Note that this differs from the DSA front panel control "Gain Variable" which is limited to the range 100% to 20%.

The PgUp and PgDn keys increment and decrement in steps of 10 while the + and - keys perform the same function in steps of one. The Home key sets normal calibrated gain (100%) while the End key allows any value to be entered.

POSIT: The Position controls on the front panel of the DSA only affects the position of the traces when they are being displayed on an oscilloscope screen. When using a computer, the trace positions can only be controlled from the computer.

To adjust the position of the traces on the computer screen it is *necessary* to enter "adjust" mode by pressing the Ins key. When in "adjust" mode all activity is suspended and the trace position can be moved up or down using the + and - keys. When the required new trace position has been set, pressing the End key will return to normal operation with the trace being shifted to the new position.

The range of the Position function is 100 to -100 where 24 represents about one division. The PgUp and PgDn keys increment and decrement in steps of 24 while the + and - keys perform the same function in steps of one. The Home key sets normal "home" position (0000).

ADDB: (Trace A only) See the section "Trace A & Trace B" in the main DSA manual.

INV: (Trace B only) See the section "Trace A & Trace B" in the main DSA manual.

A=A*B: (DSA524 only) See the section "A=AxB" in the main manual.

14. CONTROLLING THE UTILITIES

Select the section "Utilities" using the horizontal cursor keys.

BAUD: This function changes the baud rate of the DSA and changes the baud rate of the corresponding serial port on the computer accordingly. The baud rate can be set anywhere between 1200 baud and 38400 baud.

AVERAGE: (DSA524 only) - See also the section "Average" in the main manual. This allows the number of averages for the RUN AVERAGE function to be set to any number between 2 and 255. Once set it is retained within the non-volatile memory of the DSA but no record of it is kept within DS-PC Link.

15. CURSOR MEASUREMENT

Pressing the F5, key enables the cursor measurement mode and suspends all other activity.

With cursors enabled, measurements of absolute and relative voltage, time difference and equivalent frequency can be made. The cursors are vertical lines with cross bars which track the waveforms. Measurements can be made on both traces simultaneously. The cursors are moved using the horizontal arrow keys, these auto-repeat and the cursor movement speeds up if they are held depressed.

To cancel cursor measurement mode press the F5 key again. This restores normal operation.

16. PRINTING THE WAVEFORM DISPLAY

The waveforms displayed on the screen can be converted to hard copy using a dot-matrix printer. The printer must be compatible with EPSON graphics commands including *quad-density* bit mapping. To print out the traces press Shift and F3.

The output is sent to the parallel port LPT1.

17. PLOTTING THE WAVEFORM DISPLAY

The waveforms displayed on the screen can be sent to an HP-GL compatible digital X-Y plotter connected to the computer. Pressing the shifted F4 key automatically sets digital plotting on the DSA (cancelling analogue plotting if this was previously set) and then initiates a plot. The output is sent to the parallel port LPT1.

See the section "Plot" in the main DSA manual. APPENDIX A. THE WAVEFORM DISPLAY AREA

The area is divided into 10 horizontal and 8 vertical main divisions. The total display area is 10.24 divisions by 8.53 divisions. Each major division is further divided into five. A grid of lines similar to an oscilloscope graticule is displayed. This can be toggled on or off using the shifted function key F2.

The waveform display is made up of 512 pixels horizontally by 256 pixels vertically. The display resolution is 50 pixels per horizontal division and 30 pixels per vertical division

The waveform display represents the *contents* of the Trace A and Trace *B* memories of the DSA. When in RUN mode only every other word from each of the trace memories is transferred from the DSA to the computer. These two sets of 512 words are simultaneously plotted directly onto the screen.

When the program is set to HOLD or when the display is updated using SINGLE, all 1024 words from each trace memory are transferred. These 1024 words are compressed into 512 horizontal points by drawing pairs of words at the same horizontal position. Trace A is transferred first followed by Trace *B.* Note that the F2 key can be used to update the waveform display with the current contents of the 1 A trace memories at any time. The F2 key has no effect upon the status of the DSA apart from setting RUN back to HOLD.
The program defaults to a dot-joined display whereby each word is represented by a vertical line joining each point to that of the next word. This system slows down the display update rate because of the extra screen drawing involved. Dot-joining can be toggled on or off using the shifted F1 function. Without dot joining the display can be difficult to interpret when the vertical separation between words is large.

When using an EGA screen in colour the display area outline is drawn in white, the grid in blue, trace A in green and trace B in red. The text is drawn in white, red, yellow and green.

Note that although it is possible to use a monochrome monitor, the graphics adaptor must be operating in EGA colour mode and not in EGA monochrome mode.

APPENDIX B. FITTING A REPLACEMENT EPROM

The firmware is contained in a single 256K bit EPROM. To change the EPROM dismantle the case as follows:

1. Remove power from the DSA by removing the AC line cord.

2. Invert the unit and pull the tilt stand into the raised position (this relieves the pressure on the front feet). Remove the four long screws that pass through the feet using a size 0 posidrive screwdriver or similar.

3. Turn the unit the normal way up and carefully lever the top section of the case upwards so that it slides out of the side panel mouldings.

4. If the DSA is fitted with an IEEE-488 interface board, this must be removed by removing the polarised connector, removing the two rear panel fixing screws, and unclipping the board from the nylon PCB pillar.

5. The EPROM is located at the rear of the unit on the right hand side (when viewed from the front) it will have a label on it marked with the version number. Carefully lever the EPROM out of its socket.

6. Fit the new EPROM into the socket taking great care not to bend any pins in the process. The EPROM must be fitted with the indent facing towards the front panel. CHECK THE ORIENTATION ! Reverse orientation could damage the EPROM when power is applied.

7. Reassemble the unit by reversing steps 2 to 4. IMPORTANT !

The new firmware may use some different RAM locations from the old firmware. For this reason it is essential that the battery-backed RAM is cleared after the firmware has been changed. Note that clearing the RAM will cause the contents of the indexed waveform memories and program memory to be lost

To clear the RAM use function 78 (press FUNCTION(NN) followed by key 7 followed by key 8). Press any key other than ESCAPE, the unit will spend several seconds performing a sequence of operations during which the front panel lamps will flash erratically. If an oscilloscope is connected, its display will then *show* "DSA511 CLEARED" or "DSA524 CLEARED". The DSA is then ready for use.

APPENDIX C. SORTING OUT ANY PROBLEMS

1. If the opening screen does not appear

The opening screen is a text screen and should appear whatever type of display adaptor is fitted. If it does not:

1. Check that the computer operating system is MS-DOS or PC-DOS version 2.0 or above.
Check that the batch file D5 .BAT is loading the main program correctly (e.g. DSPC524).
Check that all three main program files (one .COM and two MOD files) are all present in the same directory.

2. If the message "Failed to establish communications with DSA. Check equipment" appears on the opening screen.

Check that the correct cable is plugged into both the DSA and the COM1 port of the computer. Check that the DSA is switched on, and that its baud rate is set to at least 1200 baud (use Function 36 to set 9600 baud).

3. If the main screen appears, but is not correctly drawn.

This means that the display adaptor of the computer is not working correctly. Note the following points:

The display adaptor must be operating in EGA colour mode.
Any display adaptor that can not be operated in EGA colour mode can not be used. This includes the IBM MDT, CGA and MCGA display adaptors and the Hercules graphics adaptor.
Even if a monochrome monitor is attached, the display mode must still be EGA colour.
If a monochrome monitor is being used, it must be one capable of representing colours by shades of monochrome. Many EGA monochrome systems use only a two level intensity monitor, this type can not be made to operate in EGA colour mode.
The program will automatically switch an auto-switching graphics adaptor into the correct mode. Non auto-switching graphics adaptors which do not have EGA colour mode set as the default will have to be set to EGA colour mode before the program is loaded.
4. If the traces are drawn with errors.
This is likely to be caused by data reception errors on the serial communications link when the baud rate has been set to 19200 or 38400. Try reducing the baud rate to 9600 using the SET BAUD function from the Utilities menu.
Alternatively, the fault could be caused by the existence of some memory resident program which makes extensive use of interrupts such as a mouse driver program. Ensure that no such programs are loaded.

5. If the disk function fails when Save/Recall/Directory is used.

This is caused by the COMMAND.COM system operating file no longer being in the same position (i.e. on the same disk drive) as it was when the computer was booted. This can occur if the computer is booted from a floppy disk. If the software is to be run from the same disk drive as was used to boot the computer, copy the COMMAND.COM file onto the DSPC-Link working disk.

6. If the program will not terminate properly.

The program requires the communications link to remain established, therefore the DSA must not be switched off or the cable disconnected before the program is terminated.
The working disk must be present when the program is terminated.

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