



**SX**  
**Installation Guide**

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Revision 4: includes SXDC8/MX pinouts, MTA timing terminator and driver requirements for SXDC8.

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**FCC Note**

The Specialix SX product has been found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions in this manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their own expense.

**EN 55022: 1994, Class A, Note**

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**WARNING** This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

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**Caution:** the SX is approved for commercial use only.



# About this Guide

This guide describes how to install the SX device driver software and host cards. It also describes the different types of device concentrator you can attach to the SX host cards.

This guide is intended for systems administrators familiar with UNIX and Windows NT operating systems.

To help you attach your equipment to our device concentrators, pin specifications of Specialix ports and cabling examples are provided.

Troubleshooting is contained within the chapter relevant to your operating system.

Notes:

1. The separate SX Configuration Guide is supplied in Acrobat format on the HandyWEB CDROM .

# SX Product Overview

The SX Product Range provides high performance, intelligent, expandable connectivity for 8 to 128 serial devices. The range is optimised for delivering high performance on multi-user systems and remote access server environments.

The product range is aimed at the ever growing serial device market for connecting modems, printers, E-POS devices, industrial control and management, and many other peripheral devices. It specifically addresses the rapidly expanding NT market, but equally well addresses the more established UNIX marketplace.

The SX offers a high performance asynchronous communications system, consisting of an adapter card, (which installs inside the server), and up to four external 8 port SX Device Concentrators with 8 RJ45 RS232 ports, 8 DB25 RS232 ports or 7 DB25 RS232 ports plus 1 RS232 parallel port. Up to 4 adapter cards can be installed per system giving a total of 128 ports.

The SX offers a fully balanced throughput across multiple ports, each configurable up to a maximum of 921.6Kbits/sec., making it ideal for ISP remote access applications as well as SME remote communication applications. Full modem control combined with hardware/software flow control ensure total data integrity even from remote sites.

To ensure exceptional reliability in harsh environments all signals, on every port, are ESD protected as standard.

The SX Product Range is PCI SIG 2.1compliant and NT logo approved.

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# Chapter 1

## SCO Open Server

### 1.1 Contents

- 1.2 *Introduction*
- 1.3 *Installing SX device driver software*
- 1.4 *Installing Host Cards and device concentrators*
- 1.5 *Checking your Configuration Status*
- 1.6 *Installing additional ports*
- 1.7 *Upgrading SX software*
- 1.8 *Removing SX software*
- 1.9 *Troubleshooting*

### 1.2 Introduction

This chapter explains how to install the device driver software for SCO Open Server. It also tells you about installation of host cards and device concentrators (TAs, MTAs or SXDC8s).

---

**Caution**

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***This release labels tty devices `ttya1` to `ttya(N + 1)`. The tty numbering convention used in previous versions of the driver labelled tty devices `ttya0` to `ttyaN`. You are required to remove any previous version of the driver before installing the new version.***

## 1.3 Installing SX device driver software

*The instructions below assume that you will be installing host card(s) and device concentrator(s) with your device driver software.*

1. If you are installing a PCI card, or an ISA card in an ISA machine, go to [Step 3](#); otherwise continue with the next step.
2. If you are installing an ISA card in an EISA machine, reboot your machine and run the EISA Configuration Utility (ECU). Decide which memory address and interrupts you will use (help is provided in [Chapter 4](#)); enter this information in the ECU.

When the ECU entry is finished the machine will reboot.

3. Insert the Specialix CD into the appropriate drive.

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**Caution**

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***It is important that the CDROM is mounted using the method explained below; failure to do so may prevent successful installation of SX device driver software.***

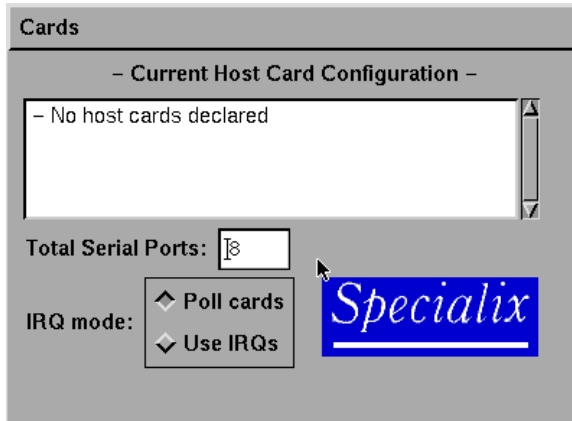
4. Ensure you have super user privileges to mount the CDROM.
5. Create a directory using the command: `mkdir /cdrom`
6. Enter the following command (at the command line):  

```
mount -f ISO9660 -r/dev/cd0 /cdrom
```
7. From the SCO OpenServer Desktop select the 'system administration' folder, (in text mode type 'scoadmin').
8. From SCOadmin select the 'Software Manager' folder.
9. In the software manager select the Software menu and menu item 'Install new'.
10. When prompted to install from your local machine name or another host select your local machine.
11. When prompted for the Media Device, select "Media Images", (this *is* correct for installation of the SX device driver from CDROM).
12. Enter the full path name to the directory containing the driver image on the CD:  

```
/cdrom/drivers/sx/ose5
```
13. When prompted for Full or Partial installation, select 'Full'. It will take a few seconds for the driver files to be installed.

- When installation of driver files is complete, the Specialix SX Configuration window will be displayed:

Figure 1  
Specialix host card configuration window



**Note for software upgrades :**

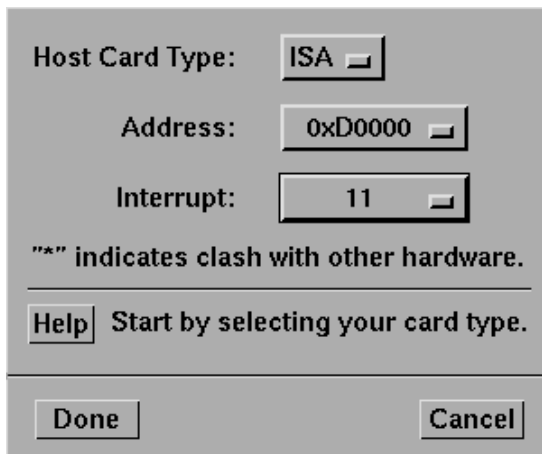
host cards already installed will appear in this window as follows:

PCI cards: with existing configuration information

ISA cards: will *not* be shown as ISA cards are not plug-and-play. You will have to add for a second time the ISA cards to the system; see [Step 16](#).

- If you are installing a PCI card or you are installing device concentrators only, go to [Step 17](#). If you are installing ISA cards, go to the next step.
- If you are installing SX ISA Host Cards (in ISA or EISA machines) select the 'Cards' menu then the 'Add Card' menu item to enter configuration details of the host cards (re-enter information of existing cards if you are upgrading); see screen below.

Figure 2  
Adding an ISA card



Set the address and interrupt parameters to the values you chose at [Step 2.](#), (in Section 1.3). You must avoid clashes of memory and interrupts with other devices.

Note your address setting as you will need to set the same address using switches on the card's surface; (described in Section 1.4, heading '[ISA host cards](#)').

Click on 'Done'.

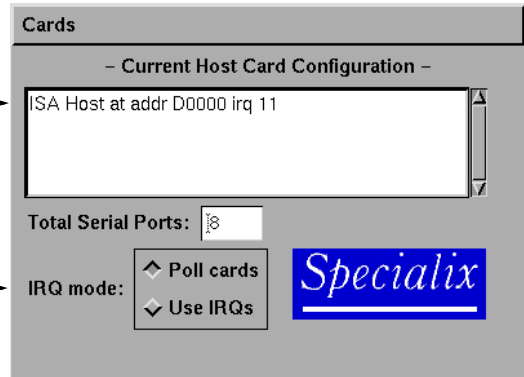
17. Calculate the total number of ports you will have attached to all your SX host cards after this installation. Enter the number of ports to the 'Total Serial Ports' field. Also select either 'Poll cards' or 'Use IRQs', (use the default value of 'Poll Cards' if you are unsure); see diagram below.

Figure 3  
entering port totals  
and IRQ mode

shows ISA card declared to the system at the previous step.

If you are upgrading your software and you have PCI cards already installed they will also be shown here.

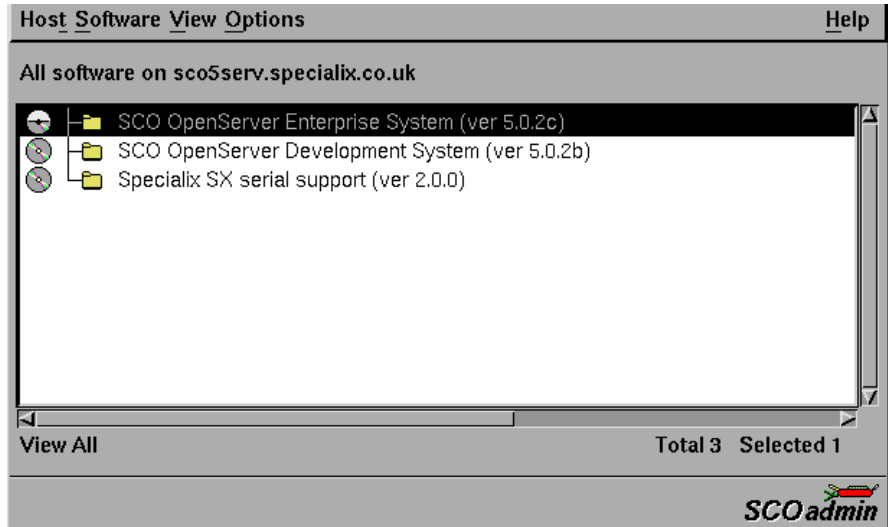
select the 'IRQ' mode for *all* cards, *both ISA and PCI*



18. You have now completed Host Card configuration; you have also declared the total number of serial ports attached to your machine. Save your changes by selecting the 'Cards' menu and the 'Exit' menu item.

Your machine will change device nodes and re-link the kernel. After this a 'Specialix serial support' entry will be added to the software manager.

Figure 4  
Software manager  
screen after  
installation of SX  
software



19. Exit the software manager. Exit SCOadmin.
20. Shutdown your machine.

Once your machine is shutdown you install your cards; see 'Installing Host Cards and device concentrators' below.

## 1.4 Installing Host Cards and device concentrators

### PCI host cards

1. Record the serial and assembly numbers of your host card(s). These numbers are printed on the host card(s). A form is provided for you to record the information; see [Appendix D](#).
2. Insert your card(s) into your machine observing safety and electrostatic precautions.
3. Attach the SX-bus cable to your host card; for help see [Section 5.5](#).
4. Attach your first device concentrator to the other end of the SX-bus cable.
5. Attach your second, third or fourth device concentrators (if you have them).



*Do NOT join together different types of device concentrators:*

*connect SXDC8s only to SXDC8s, MTAs only to MTAs, and TA4s/TA8s only to other TA4s/TA8s.*

For further explanation see [Section 5.4](#).

6. Turn on your machine. It should boot finding and accepting the new PCI host card fitted inside.

**Next steps.** To enable logins on SX ports go to the SX Configuration Guide, [Chapter 1 \(SCO Open Server\)](#).

If you do not require logins no further action is necessary (after installation of SX software and host cards); your ports are ready to send and receive data.

### ISA host cards

Record the serial and assembly numbers of your host card(s). These numbers are printed on the host card(s). A form is provided for you to record this information; [Appendix D \(Hardware Configuration Record\)](#).

1. You have a memory address decided for each card (decided in [Step 2](#) of [Section 1.3](#)). Taking hold of the card(s) select the address using either a 10-way DIL switch or two rotary switches (and jumpers) on the card's surface. A diagram of the card is shown in [Section 4.5](#).

2. Insert your SX host card(s) inside your machine, observing safety and electrostatic precautions.
3. Attach the SX-bus cable to your host card; for help see [Section 5.5](#).
4. Attach your first device concentrator to the other end of the SX-bus cable.
5. Attach your second, third or fourth device concentrators (if you have them).



*Do NOT join together different types of device concentrators:*

*connect SXDC8s only to SXDC8s, MTAs only to MTAs, and TA4s/TA8s only to other TA4s/TA8s.*

For further explanation see [Section 5.4](#).

6. Turn on your machine. It should bootup with the new host card and device concentrators.

**Next steps.** To enable logins on SX ports go to the SX Configuration Guide, [Chapter 1 \(SCO Open Server\)](#).

If you do not require logins no further action is necessary (after installation of SX software and host cards); your ports are ready to send and receive data.

## 1.5 Checking your Configuration Status

To check the configuration status of your machine at any time, use the 'hwconfig' Configuration Utility.

With root privileges, at the command line enter the following:

```
hwconfig
```

Each item of configured hardware will be displayed, with system resources used. From this information you should be able to determine the interrupts that are free.

## 1.6 Installing additional ports

This section explains how to add additional ports into the SX device driver software, with either of the following actions:

- attaching one or more device concentrators to an existing host card, or
- installing another host card with associated device concentrators

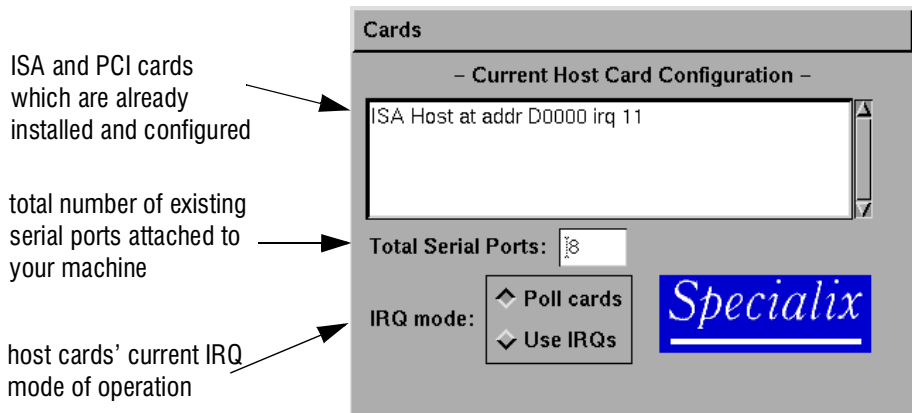
If you are installing PCI cards or you are installing device concentrators only, go straight to [Step 2](#).

1. If you are installing SX ISA Host Cards (in ISA or EISA machines) reboot your machine and run the EISA Configuration Utility (ECU). Decide which memory address and interrupts you will use (help is provided in [Chapter 4](#)); enter this information in the ECU.

When the ECU entry is finished the machine will reboot.

2. From the SCO OpenServer Desktop select the 'system administration' folder, (in text mode type `\scoadmin`).
3. Select the 'Specialix serial' folder and then select 'SX Hardware Configuration'. The Specialix SX Configuration window will be displayed:

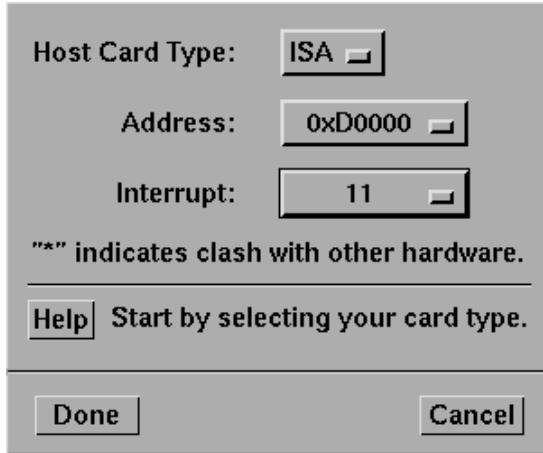
Figure 5  
Specialix host card  
configuration  
window



4. If you are installing a PCI card or you are installing device concentrators only, go to [Step 6](#). If you are installing ISA cards, go to the next step.

5. Select the 'Cards' menu then the 'Add Card' menu item to enter configuration details of the host cards; see screen below.

Figure 6  
Adding an  
ISA card



Set the address and interrupt parameters to the values you chose at [Step 1](#). You must avoid clashes of memory and interrupts with other devices.

Note your address setting as you will need to set the same address using switches on the card's surface; (described in Section 1.4, heading '[ISA host cards](#)'.)

Click on 'Done'.

The 'Current Host Card Configuration' window will be displayed ([Figure 7](#)).

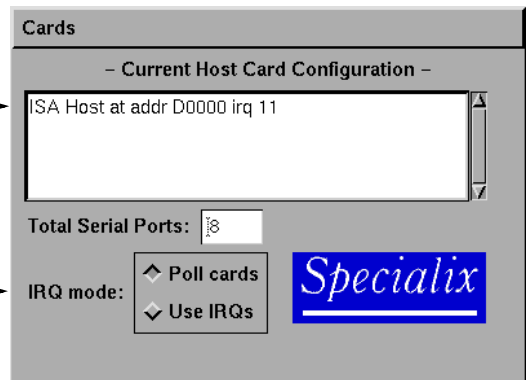
6. Calculate the total number of ports you will have attached to all your SX host cards after this installation. Enter the number of ports in the 'Total Serial Ports' field.

Figure 7  
entering port totals  
and IRQ mode

shows ISA card declared to the system at the previous step

PCI cards are also shown

select the 'IRQ' mode for *all* cards, *both ISA and PCI*



7. If you do not wish to change IRQ mode go to [Step 9](#). The default interrupt value is 'Poll Cards' - use it if you are unsure.
8. If your IRQ mode is currently 'Use IRQs' and you wish to use 'Poll cards', select 'Poll cards'.

If your IRQ mode is currently 'Poll cards' and you wish to use 'Use IRQs' select 'Use IRQs' *except* if you have ISA cards fitted, when there are additional steps:

- a) Highlight the name of the card.
  - b) Select the 'Cards' menu then the 'Edit Card' menu item. You will be presented with the ISA host card configuration window (see [Figure 6](#)).
  - c) For an ISA host card (already fitted) select an interrupt value. Do not select interrupt values already in use by other devices. Do not alter the address setting.
  - d) Click on 'Done'.
  - e) For second or more ISA cards, repeat steps a to c.
  - f) In the 'ISA host card configuration window' select 'Use IRQs'.
9. You have now completed Host Card configuration; you have also declared the total number of serial ports attached to your machine. Save your changes by selecting the 'Cards' menu and the 'Exit' menu item.
  10. Exit the software manager. Exit SCOadmin.
  11. Shutdown your machine.

Once your machine is shutdown you install your cards and/or device concentrators; see:

[Section 1.4 Installing Host Cards and device concentrators](#) (in this chapter)

[Chapter 5 \(Device Concentrators\)](#)

## 1.7 Upgrading SX software

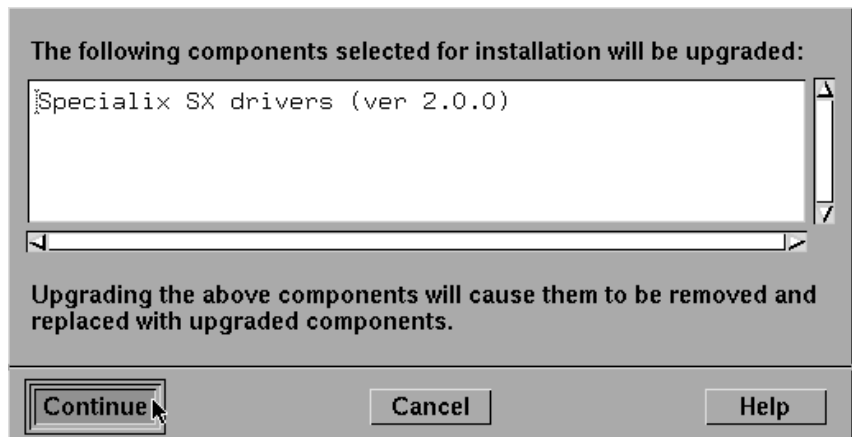
### Caution

***This release labels tty devices  $ttya1$  to  $ttya(N+1)$ . The tty numbering convention used in previous versions of the driver labelled tty devices  $ttya0$  to  $ttyaN$ . You are required to remove any previous version of the driver before installing the new version.***

To upgrade your SX device driver software, do the following:

1. Remove any existing SI/XIO or SX device drivers (see [Section 1.8](#)).
2. Make a record of your hardware (host card and port configuration) information. You will need to re-enter it at [Step 5](#).
3. Refer to [Section 1.3](#) and repeat all steps from [Step 3](#). through to [Step 13](#). You will then be presented with the following dialog box: (figure shows an example driver version number)

Figure 8  
software upgrade  
dialog box



4. Press 'Continue', which will cause the existing Specialix software to be removed and subsequently the new version to be installed.
5. Repeat all steps from [Step 14](#). through to [Step 18](#). (Section 1.3). You will need to re-enter all your hardware information.
6. If had previously configured SX ports for logins, re-enter the port configuration information - see SX Configuration Guide, [Section 1.3 Configuring SX ports](#).

## 1.8 Removing SX software

To remove the previous version of the SX device driver software, log in as root and either, in graphical mode:

1. From the System Administration folder, go into Software Manager. From the software menu, select your existing version of the SX driver. Then choose 'Remove Software'.

or, in text mode:

2. enter the command `custom -r -p Specialix:sixio`

Your machine will remove the software and then re-link the kernel. After this, re-boot your machine.

## 1.9 Troubleshooting

General troubleshooting issues are shown in flow charts below. Error messages are in [Section 1.9.2](#).

Technical Support contact details are listed in [Section B.4](#).

### CHARM interface

When using the character based CHARM interface for installation/modification of cards you **cannot** set the interrupt mode that cards will run in due to a bug in the way the initialisation program interprets toggle button keystrokes. Using the CHARM interface will result in the cards being installed in polled mode, no matter what position the IRQ mode toggle button is in. It is recommended that cards should be installed via the X/Motif interface if they are required to run in interrupt mode.

### changing IRQ mode

Situation: you have an ISA card, you make IRQ selections and you select IRQ mode 'Poll Cards'. On a later occasion you wish to use mode 'Use IRQs'.

Problem: your previous IRQ settings are now lost.

Solution: re-enter an interrupt value for each ISA host card fitted. Then change IRQ mode to 'Use IRQs'. Your new mode should now be saved.

### 1.9.1 Flow charts

The flow charts in this section cover four common problem areas:

- *Machine fails to boot*
- *Cards and/or device concentrators not found*
- *Can't obtain login prompt on terminal*
- *Unable to input data/login messages corrupted*

Figure 9  
Machine fails to boot

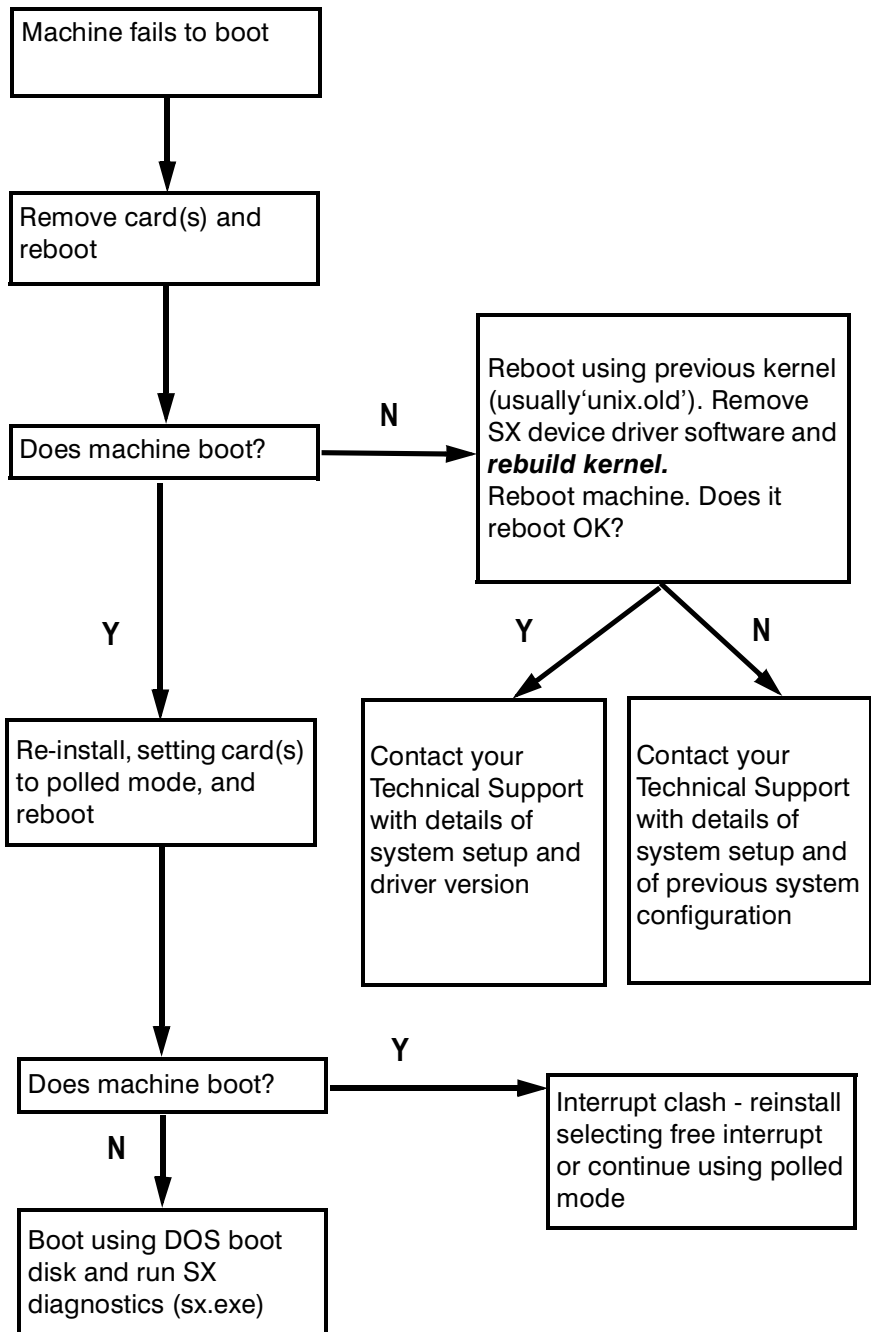


Figure 10  
Cards and/or  
device  
concentrators not  
found

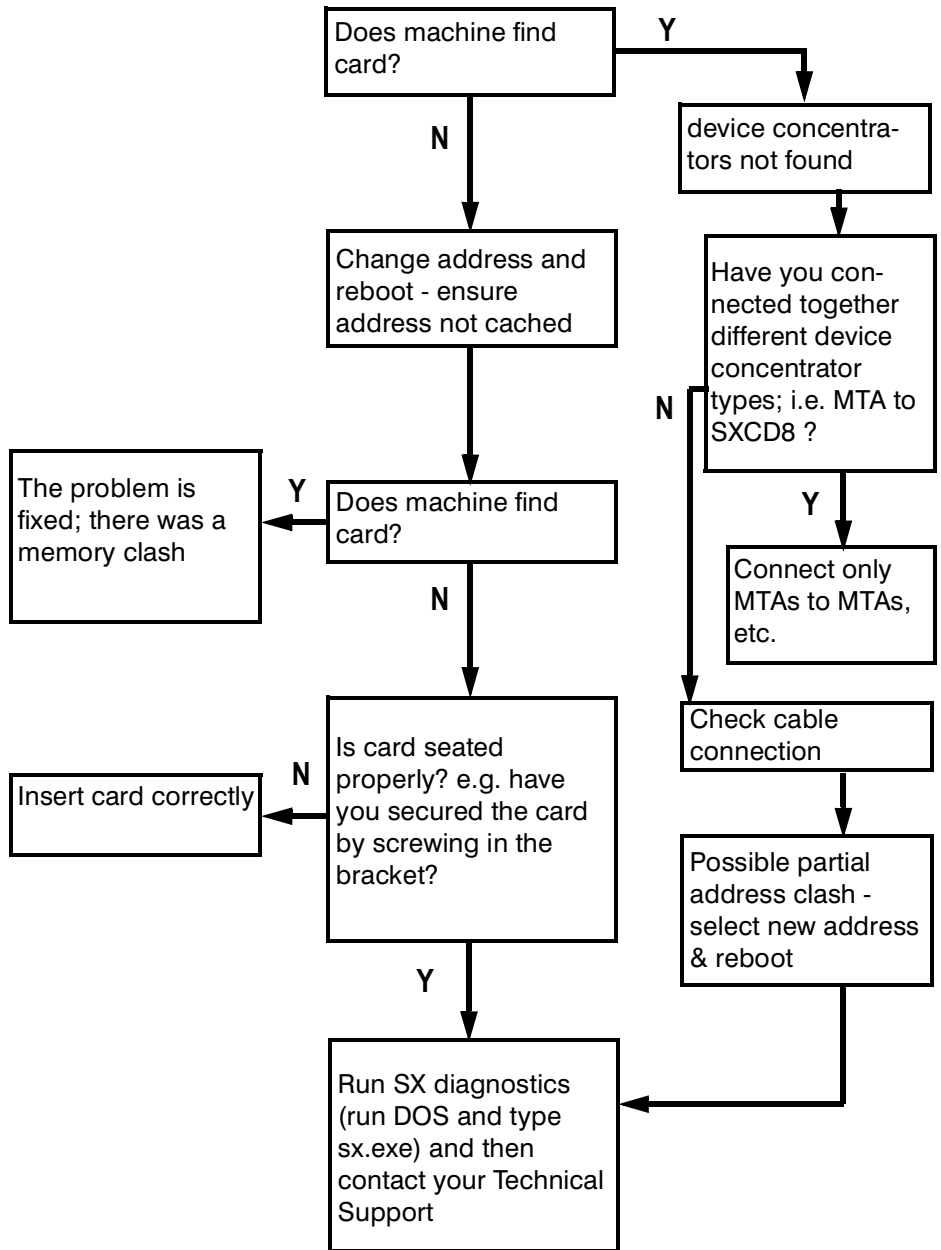


Figure 11  
Can't obtain login  
prompt on terminal

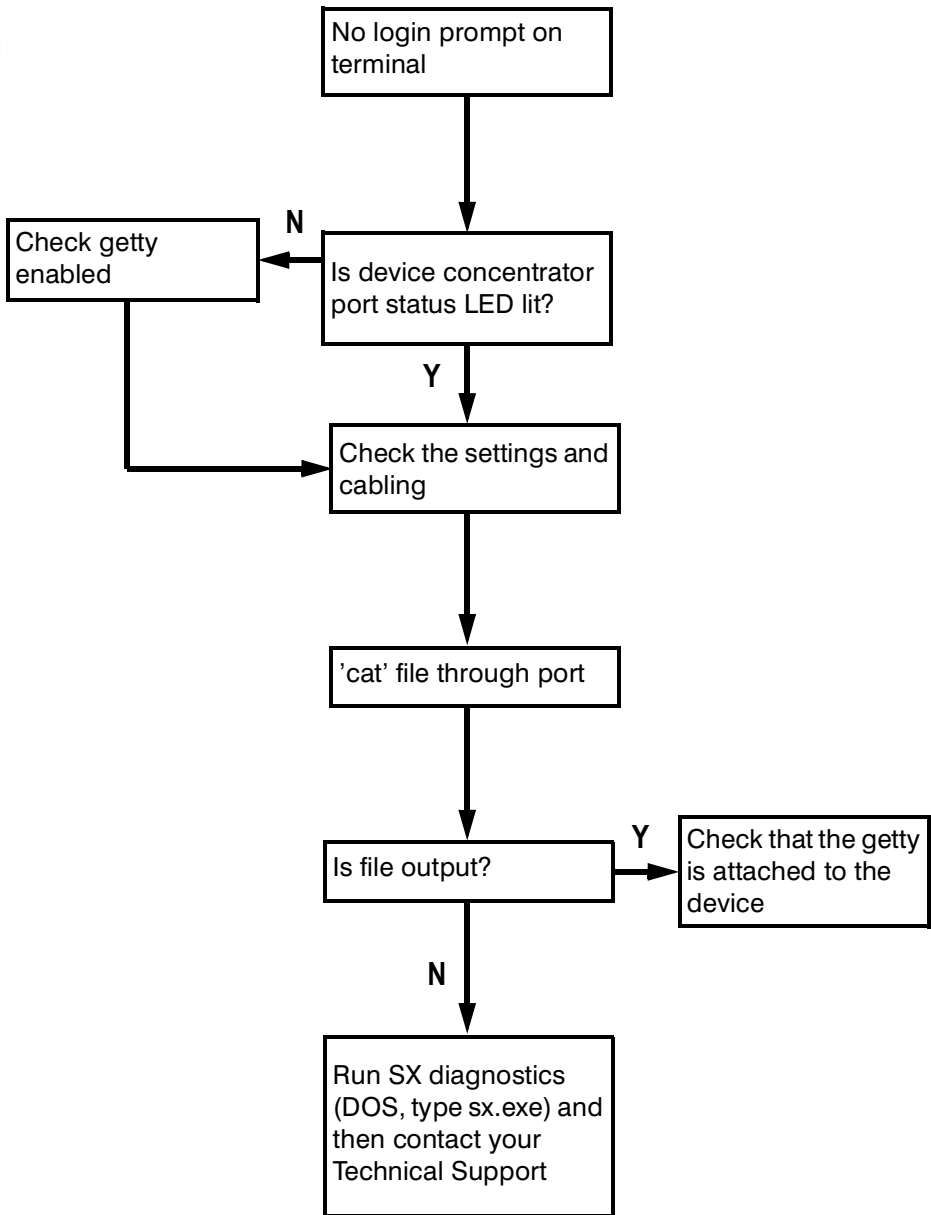
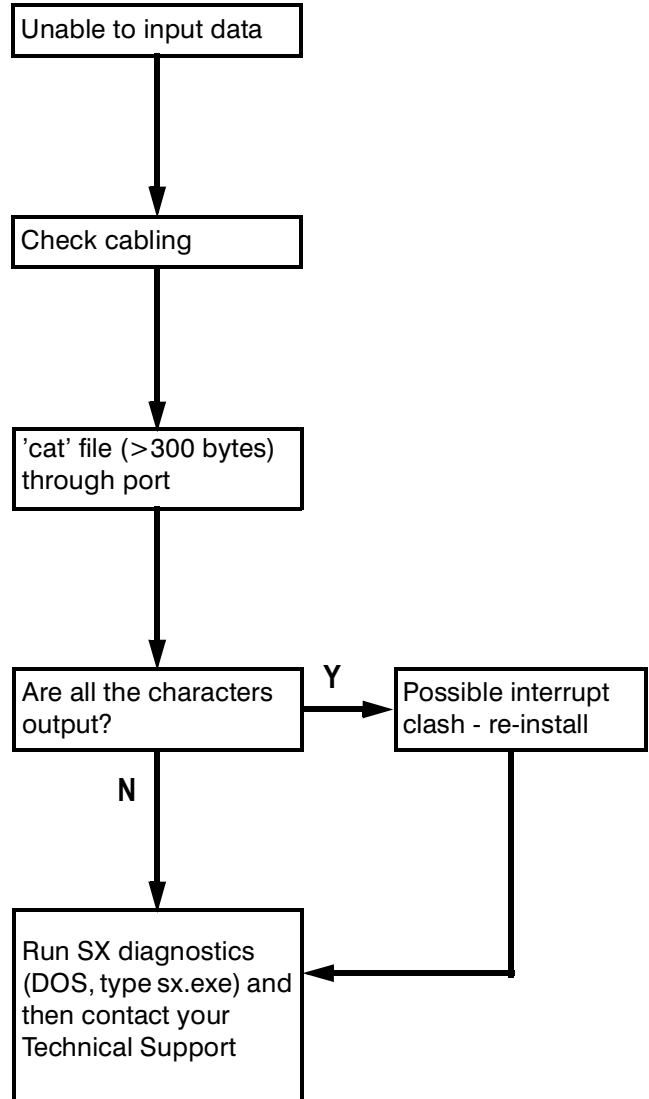


Figure 12  
Unable to input  
data/login  
messages  
corrupted



## 1.9.2 Error Messages

### **Attempted sleep in si\_intr - command requested *n* device *n***

This is a system problem; contact your Technical Support.

### **Card initialisation error**

Your SX hardware has failed to initialise correctly. Test your hardware using the SX Hardware Diagnostics Program.

### **SX: command stack - completing *n* requested *n* device *n***

This is a system problem; contact your Technical Support.

### **SX: Extra ports on card at *<address>* ignored**

The driver has detected more ports than it can support. This means that you have connected more than four device concentrators to the host card. Switch your machine off and remove the surplus device concentrator(s).

### **SX: ISA host card has invalid address - card ignored**

You have installed your host card at an invalid address. Switch your machine off, remove the host card, and set its DIL switch (or rotary switches and jumper) to a new address.

### **SX: ISA host cards cannot share addresses - card ignored**

You have attempted to install two host cards at the same address. Switch your machine off, remove one of the host cards, and set its rotary switches and jumper to a new address.

### **SX: ISA host cards cannot share interrupt levels - card ignored**

You have selected an interrupt already in use by another host card - re-install SX and select a different interrupt or polled mode.

### **SX: Invalid card type - card ignored**

The device driver's configuration table has become corrupted. Re-install the SX device driver software.

### **SX: Invalid interrupt level - card ignored**

You have selected an interrupt level that doesn't exist, or is already being used. Re-install the SX device driver and select a new interrupt or 'polled' mode.

## **Invalid interrupt selected, using 15**

You have selected an invalid interrupt level, so the device driver has selected the default (15) for you.

## **Unknown module type *n***

The device driver does not recognise a device concentrator that you have connected to your system. This is almost certainly a hardware problem. Test your hardware using the SX Hardware Diagnostics Program.

## **SX: Warning SX interrupt handler re-entered**

This is a system problem; contact your Technical Support.

## **WARNING: Host @0xn timer SHUTDOWN No ports detected**

The host card at the specified address has been shutdown by the driver because it reported a zero port count. Shutdown the system and ensure that your Device Concentrators are correctly and securely connected. If the problem persists suspect a hardware fault, use the SX Hardware Diagnostics program to ascertain the problem and seek support from your supplier.

## **WARNING: Host @0xn timer SHUTDOWN**

### **Mixed adapter types not allowed**

The host card at the specified address has been shutdown by the driver because it reported an illegal combination of device concentrator (terminal adapter) types. Shutdown the system and ensure that each host card has only one type of device concentrator connected. If the problem persists suspect a hardware fault, use the SX Hardware Diagnostics program to ascertain the problem and seek support from your supplier.

## **WARNING: Host @0xn timer SHUTDOWN**

### **SXDC not allowed on SI/XIO host**

The SI/XIO host card at the specified address has been shutdown by the driver because it reported an SX Device Concentrator connected. SI/XIO host cards do not support SXDC8s. Shutdown the system and remove SXDC8s from any SI/XIO host cards. If the problem persists suspect a hardware fault, use the SX Hardware Diagnostics program to ascertain the problem and seek support from your supplier.

**WARNING: No active Host Cards**

Either you do not have any host cards installed, or, those that are installed suffer from one or more of the 'Host SHUTDOWN' scenarios above. Ensure you have installed SX hardware and software according the relevant section(s) in the SX Installation Guide. If the problem persists suspect a hardware fault, use the SX Hardware Diagnostics program to ascertain the problem and seek support from your supplier.

**WARNING: No active Terminal Adapters**

At least one host card is active, but the total active *port* count on your SX installation is ZERO ! Ensure you have installed SX hardware and software according the relevant section(s) in the SX Installation Guide. If the problem persists suspect a hardware fault, use the SX Hardware Diagnostics program to ascertain the problem and seek support from your supplier.

# Chapter 2

## SCO UnixWare

### 2.1 Contents

- 2.2 *Introduction*
- 2.3 *Installing SX software and host cards*
- 2.4 *Installing additional ports*
- 2.5 *Upgrading SX software*
- 2.6 *Removing SX software*
- 2.7 *Removing SX host cards*
- 2.8 *Troubleshooting*

### 2.2 Introduction

This chapter explains how to install the SX device driver software, with host cards and device concentrators (TAs, MTAs or SXDC8s) under SCO UnixWare.

### 2.3 Installing SX software and host cards

- 2.3.1 *Installing SX software with a PCI host card*
- 2.3.2 *Installing SX software with an ISA host card in an ISA machine*
- 2.3.3 *Installing SX software with an ISA host card in an EISA machine*
- 2.3.4 *Checking your Configuration Status*

## 2.3.1 Installing SX software with a PCI host card

*This section assumes you will be installing device concentrator(s) with your host card. If you are installing device concentrators at a later time, see [Section 2.4](#).*

Record the serial and assembly numbers of your host card(s). These numbers are printed on the host card(s). A form is provided for you to record this information; [Appendix D \(Hardware Configuration Record\)](#).

1. Switch off your machine. Insert your SX host card(s) inside your machine, observing safety and electrostatic precautions.
2. Attach the SX-bus cable to your host card; for help see [Section 5.5](#).
3. Attach your first device concentrator to the other end of the SX-bus cable.
4. Attach your second, third or fourth device concentrators (if you have them).



*Do NOT join together different types of device concentrators:*

*connect SXDC8s only to SXDC8s, MTAs only to MTAs, and TA4s/TA8s only to other TA4s/TA8s.*

For further explanation see [Section 5.4](#).

5. Switch on your machine.
6. Insert the Specialix CDROM into the drive.

### **Caution**

***It is important that the CDROM is mounted in the following manner. Failure to do so may prevent successful installation of SX device driver software.***

7. Login as root. Create a directory by entering the following command:

```
mkdir /cdrom
```

This command creates a directory over which to mount the Specialix CDROM.

8. Enter the following command :

```
ls -l /dev/cdrom
```

The system should output information such as :

```
brw-rw-rw- 1 root sys 22, 0 Oct 7 14:32 c1b0t010
```

You will use the filename, in this example - c1b0t010, in the next step.

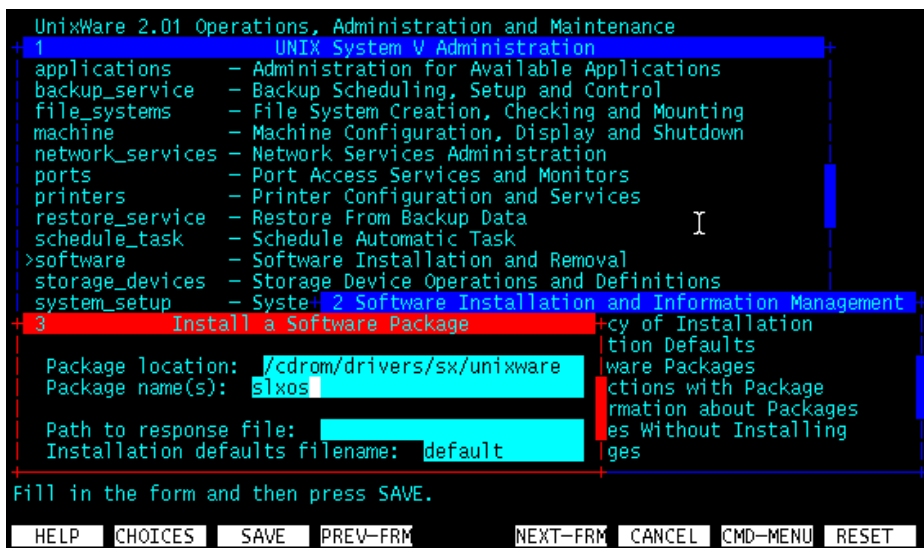
Identify the number one (1) and lowercase 'L' (l); the filename may contain one or both of these characters.

9. Noting the filename determined in Step 8. above, enter the following command:

```
mount -r -F cdfs -o nmconv=c /dev/cdrom/clb0t0l0 /cdrom
```

10. Run sysadm.
11. Install the SX package using the 'Software' option on the sysadm Main Menu; see screen below:

Figure 13  
software  
installation  
screen



The package location is: /cdrom/drivers/sx/unixware

The package name is : slxos

You can overwrite existing Specialix software.

12. Reboot your machine.

The kernel will be rebuilt either as the machine is shutting down or as it reboots depending on the shutdown method used. If the kernel rebuilds after the machine reboots the operating system will automatically reboot again with the new kernel. During bootup the machine also should take into account the configuration of any existing SX cards.

PCI cards are designed to be 'plug and play', so in most cases the machine will configure the card(s) automatically during boot-up.

The installation is now complete.



*You can add ports at a later date by running the 'slxadm' configuration utility; see the SX Configuration Guide, [Section 2.3.9](#).*

To check the configuration status of your machine at any time, use the UnixWare Device Configuration Utility (DCU). An example configuration is shown in [Figure 18](#).

## 2.3.2 Installing SX software with an ISA host card in an ISA machine

*This section assumes you will be installing your device concentrator(s) with your host card. If you are installing device concentrators at a later time, see [Section 2.4](#).*

Record the serial and assembly numbers of your host card(s). These numbers are printed on the host card(s). A form is provided for you to record this information; [Appendix D \(Hardware Configuration Record\)](#).

1. Decide the required memory address for each card. Select the address using the either a 10-way DIL switch or two rotary switches (and jumpers) on the card's surface. Help on both these actions is detailed in '[Chapter 4 ISA host cards](#)'
2. Switch off your machine. Insert your SX host card(s) inside your machine, observing safety and electrostatic precautions.
3. Attach the SX-bus cable to your host card; for help see [Section 5.5](#).
4. Attach your first device concentrator to the other end of the SX-bus cable.
5. Attach your second, third or fourth device concentrators (if you have them).



*Do NOT join together different types of device concentrators:*

*connect SXDC8s only to SXDC8s, MTAs only to MTAs, and TA4s/TA8s only to other TA4s/TA8s.*

For further explanation see [Section 5.4](#).

6. Switch on your machine.
7. Insert the Specialix CDROM into the drive.

### **Caution**

***It is important that the CDROM is mounted in the following manner. Failure to do so may prevent successful installation of SX device driver software.***

8. Login as root. Create a directory by entering the following command:

```
mkdir /cdrom
```

This command creates a directory over which to mount the Specialix CDROM.

9. Enter the following command :

```
ls -l /dev/cdrom
```

The system should output information such as :

```
brw-rw-rw- 1 root sys 22, 0 Oct 7 14:32 clb0t010
```

You will use the filename, in this example - clb0t010, in the next step.

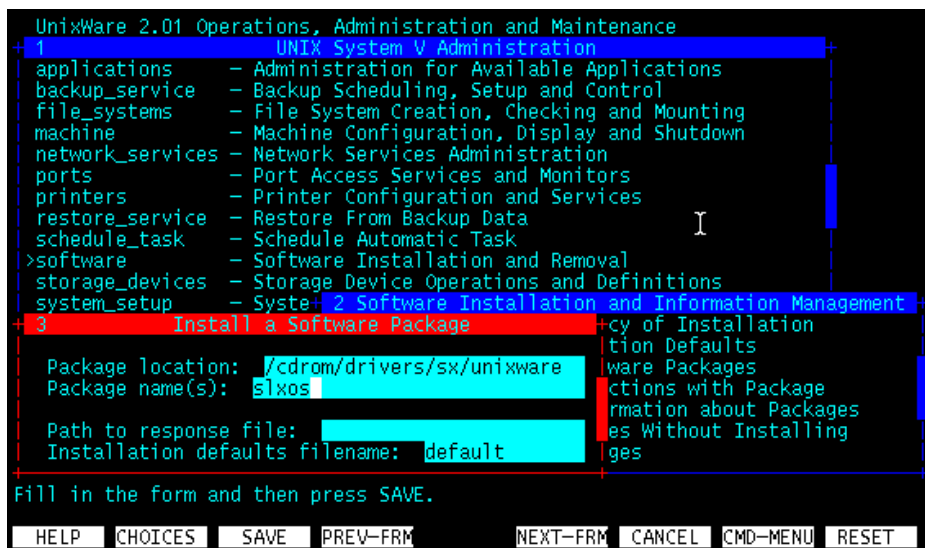
Identify the number one (1) and lowercase 'l' (1); the filename may contain one or both of these characters.

10. Noting the filename determined in Step 8. above, enter the following command:

```
mount -r -F cdfs -o nmconv=c /dev/cdrom/clb0t010 /cdrom
```

11. Run sysadm.
12. Install the SX package using the 'Software' option on the sysadm Main Menu; see screen below:

Figure 14  
software  
installation  
screen



The package location is: /cdrom/drivers/sx/unixware

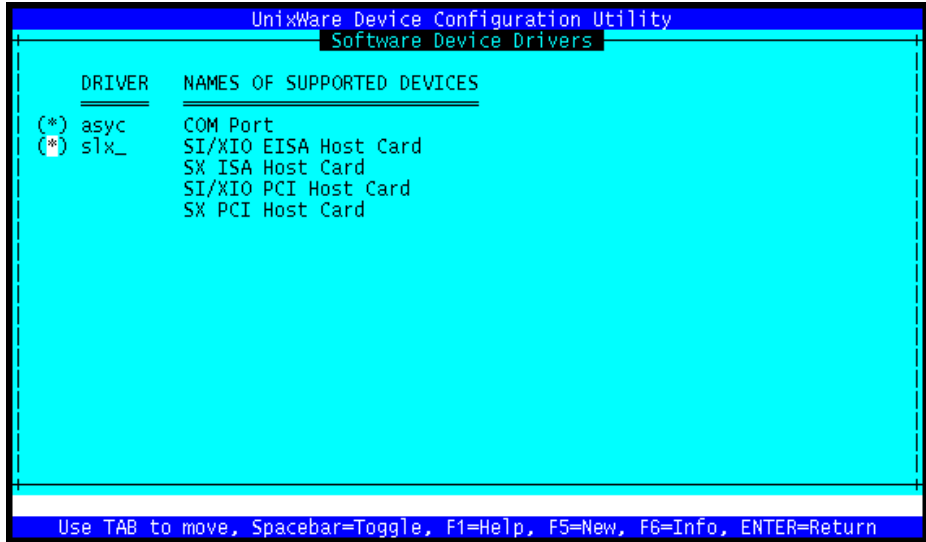
The package name is : slxos

You can overwrite existing Specialix software.

13. Once the software has finished installing, leave the sysadm program and run the UnixWare Device Configuration Utility (DCU).

- From the DCU main menu select 'Software Device Drivers' then 'Communications Cards'; you will be presented with the screen shown below:

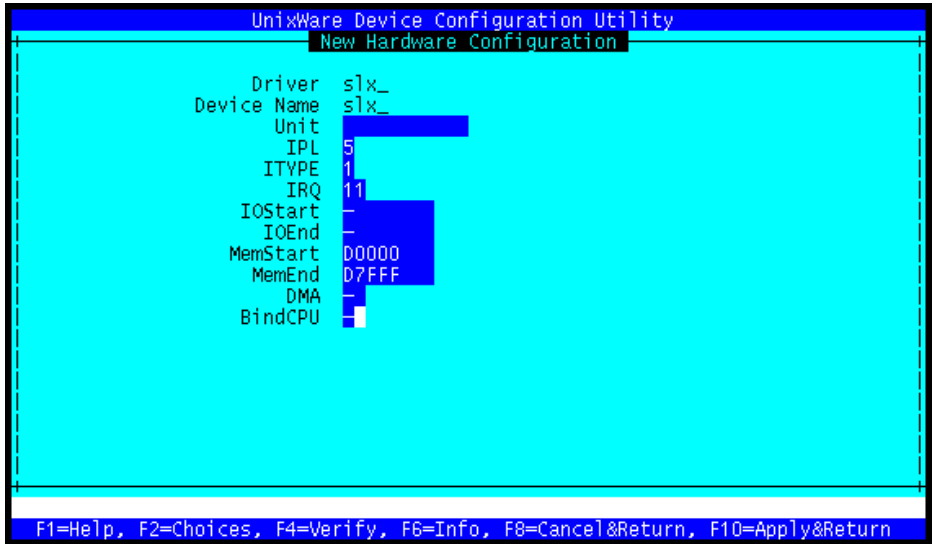
Figure 15  
DCU: selection of  
the Specialix  
communications  
driver



Highlight the asterisk next to the driver named 'slx\_'; this is the driver for all the possible devices (host cards) listed in the right-hand column. You will have at least one of the SX or SI / XIO host cards listed.

- Press F5 (new); you will be presented with the screen shown below:

Figure 16  
DCU: entry of  
ISA card details



For each card, ensure that the memory address you enter via the DCU matches the address selected on the card's DIL switch or rotary switches.

Also, take care when specifying the end address of the card. ISA cards have a 32K memory window. If for example the start address is D0000H the end address should be D7FFFH. Select the interrupt line required for the card, valid interrupts are 9, 10, 11, 12 and 15. If you wish you may choose to run the card(s) in polled mode by leaving the IRQ field blank.

- Reboot your machine.

The kernel will be rebuilt either as the machine is shutting down or as it reboots depending on the shutdown method used. If the kernel rebuilds after the machine reboots the operating system will automatically reboot again with the new kernel.

The installation is now complete.



*You can add ports at a later date by running the 'slxadm' configuration utility; see the SX Configuration Guide, [Section 2.3.9](#).*

To check the configuration status of your machine at any time, use the UnixWare Device Configuration Utility (DCU). An example configuration is shown in [Figure 18](#).

### 2.3.3 Installing SX software with an ISA host card in an EISA machine

*This section assumes you will be installing your device concentrator(s) with your host card. If you are installing device concentrators at a later time, see [Section 2.4](#).*

Record the serial and assembly numbers of your host card(s). These numbers are printed on the host card(s). A form is provided for you to record this information; [Appendix D \(Hardware Configuration Record\)](#).

1. Decide the required memory address for each card. Select the address using either a 10-way DIL switch or two rotary switches (and jumpers) on the card's surface. Details are shown in '[Chapter 4 ISA host cards](#)'.
2. Switch off your machine. Insert your SX host card(s) inside your machine, observing safety and electrostatic precautions.
3. Attach the SX-bus cable to your host card; for help see [Section 5.5](#).
4. Attach your first device concentrator to the other end of the SX-bus cable.
5. Attach your second, third or fourth device concentrators (if you have them).



*Do NOT join together different types of device concentrators:*

*connect SXDC8s only to SXDC8s, MTAs only to MTAs, and TA4s/TA8s only to other TA4s/TA8s.*

For further explanation see [Section 5.4](#).

6. Boot the machine with DOS and run the EISA Configuration Utility (ECU). Select a memory address and interrupt line for each card being installed. Then, "Add" the card(s) to the system (before configuring it), as the ECU cannot auto-detect ISA cards. If you wish, you may choose to run all cards in polled mode by selecting "Do not use interrupts" from the card configuration menu.
7. Switch on your machine.
8. Insert the Specialix CDROM into the drive.

---

**Caution**

***It is important that the CDROM is mounted in the following manner. Failure to do so may prevent successful installation of SX device driver software.***

9. Login as root. Create a directory by entering the following command:

```
mkdir /cdrom
```

This command creates a directory over which to mount the Specialix CDROM.

10. Enter the following command :

```
ls -l /dev/cdrom
```

The system should output information such as :

```
brw-rw-rw- 1 root sys 22, 0 Oct 7 14:32 c1b0t010
```

You will use the filename, in this example - c1b0t010, in the next step.

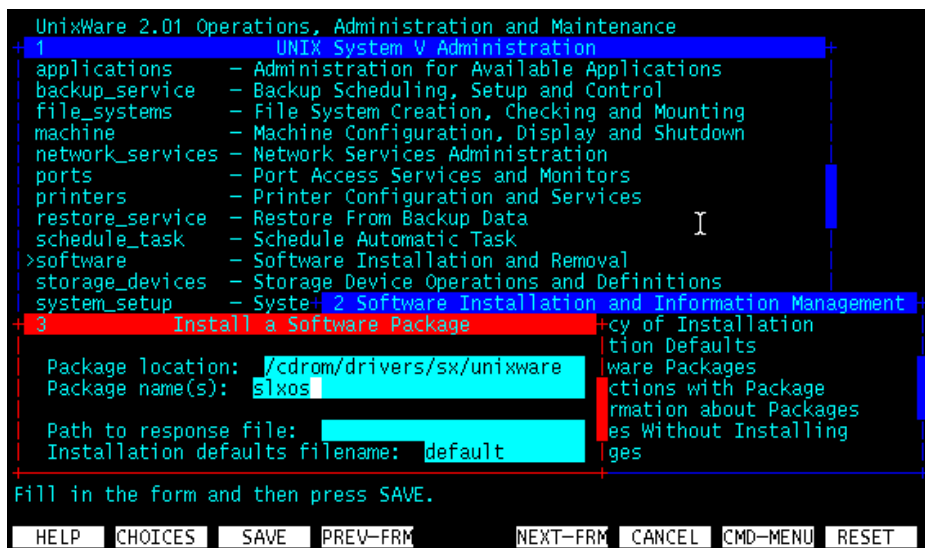
Identify the number one (1) and lowercase 'l' (l); the filename may contain one or both of these characters.

11. Noting the filename determined in Step 8. above, enter the following command:

```
mount -r -F cdfs -o nmconv=c /dev/cdrom/c1b0t010 /cdrom
```

12. Run sysadm.
13. Install the SX package using the 'Software' option on the sysadm Main Menu; see screen below:

Figure 17  
software  
installation  
screen



The package location is: /cdrom/drivers/sx/unixware

The package name is : slxos

You can overwrite existing Specialix software.

14. Reboot your machine.

The kernel will be rebuilt either as the machine is shutting down or as it reboots, depending on the shutdown method used. If the kernel rebuilds after

the machine reboots the operating system will automatically reboot again with the new kernel.

The installation is now complete



You can add ports at a later date by running the 'slxadm' configuration utility; see the *SX Configuration Guide, Section 2.3.9*.

To check the configuration status of your machine at any time, use the UnixWare Device Configuration Utility (DCU). An example configuration is shown in *Figure 18*.

## 2.3.4 Checking your Configuration Status

To check the configuration status of your machine at any time, use the UnixWare Device Configuration Utility (DCU). An example configuration is shown below.

For further information on the DCU see your UnixWare documentation.

Figure 18  
DCU: example  
hardware  
configuration  
screen

	Device Name	IRQ	IOStart	IOEnd	MemStart	MemEnd	DMA
Y	UNKNOWN	-	-	-	-	-	-
Y	3COM Etherlink III 3	10	300	30f	-	-	-
Y	UNKNOWN	-	2fff	2fff	-	-	-
Y	SX PCI Host Card	2	fc00	fc7f	fedefc00	fedefc7f	-
Y	SI/XIO PCI Host Card	2	-	-	feb00000	febfffff	-
Y	slx_	12	-	-	d8000	dffff	-
Y	slx_	11	-	-	D0000	D7FFF	-

(Page Up/Page Down for more)

TAB/arrow=Move, F1=Help, F2=Choices, F4=Verify, F6=Info, F7=Adv, F10=Return

## 2.4 Installing additional ports

This section explains how to add additional ports into the SX device driver software, in either of the following circumstances:

- attaching one or more device concentrators to an existing host card, or
- installing another host card with associated device concentrators.

Carry out the following actions:

1. Refer to [Section 2.3 Installing SX software and host cards](#), and omit the instructions on installing device driver software. Note that the kernel should not rebuild.
2. Refer to SX Configuration Guide [Section 2.3.9 Adding New Ports](#) to update the device driver

To check the configuration status of your machine at any time, use the UnixWare Device Configuration Utility (DCU). An example configuration is shown in [Figure 18](#).

## 2.5 Upgrading SX software

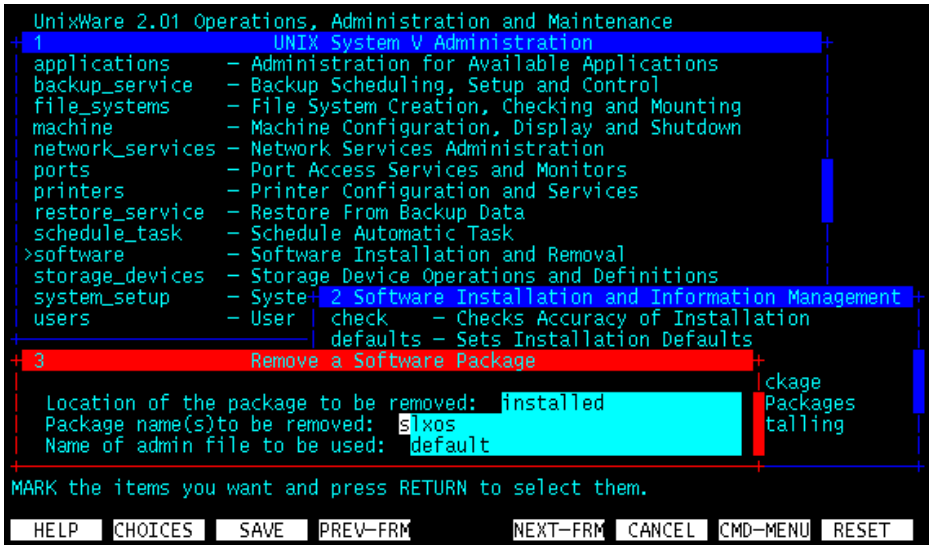
If you need to upgrade your software, do the following:

1. Make a record of your hardware (host card and port configuration) information. You will need to re-enter it at [Step 3](#).
2. Repeat the actions in [Section 2.3 Installing SX software and host cards](#), and omit the instructions on installing host cards and device concentrators. Note that you do *not* need to update the DCU or ECU.
3. Refer to the SX Configuration Guide, [Section 2.3.3 Adding a Port Service](#), to re-enter your port configuration information.

## 2.6 Removing SX software

You remove SX software by selecting selecting 'software' from sysadm Main Menu and then appropriate sub-menu options; see example screen below. Note the package name to remove is called 'slxos'.

Figure 19  
removal of SX  
software



## 2.7 Removing SX host cards

If you remove an SX host card, do as follows:

1. Turn off your machine. Remove the card observing safety and electrostatic precautions.  
Then, either:
2. If you have removed a PCI card, reboot your machine. The machine should detect automatically the missing card and adjust the system configuration accordingly.  
or:
3. If you have removed an ISA host card from an EISA machine, update the EISA Configuration Utility (ECU). This will free up valuable system resources.  
or:
4. If you have removed an ISA card from an ISA machine, update the UnixWare Device Configuration Utility (DCU).

## 2.8 Troubleshooting

General troubleshooting issues are shown in flow-charts below. Error messages are shown in [Section 2.8.2](#).

Technical Support contact details are listed in [Section B.4](#).

### 2.8.1 Flow charts

The flow charts in this section cover four common problem areas:

- *Machine fails to boot*
- *Cards and/or device concentrators not found*
- *Can't obtain login prompt on terminal*
- *Unable to input data/login messages corrupted*

Figure 20  
Machine fails to boot

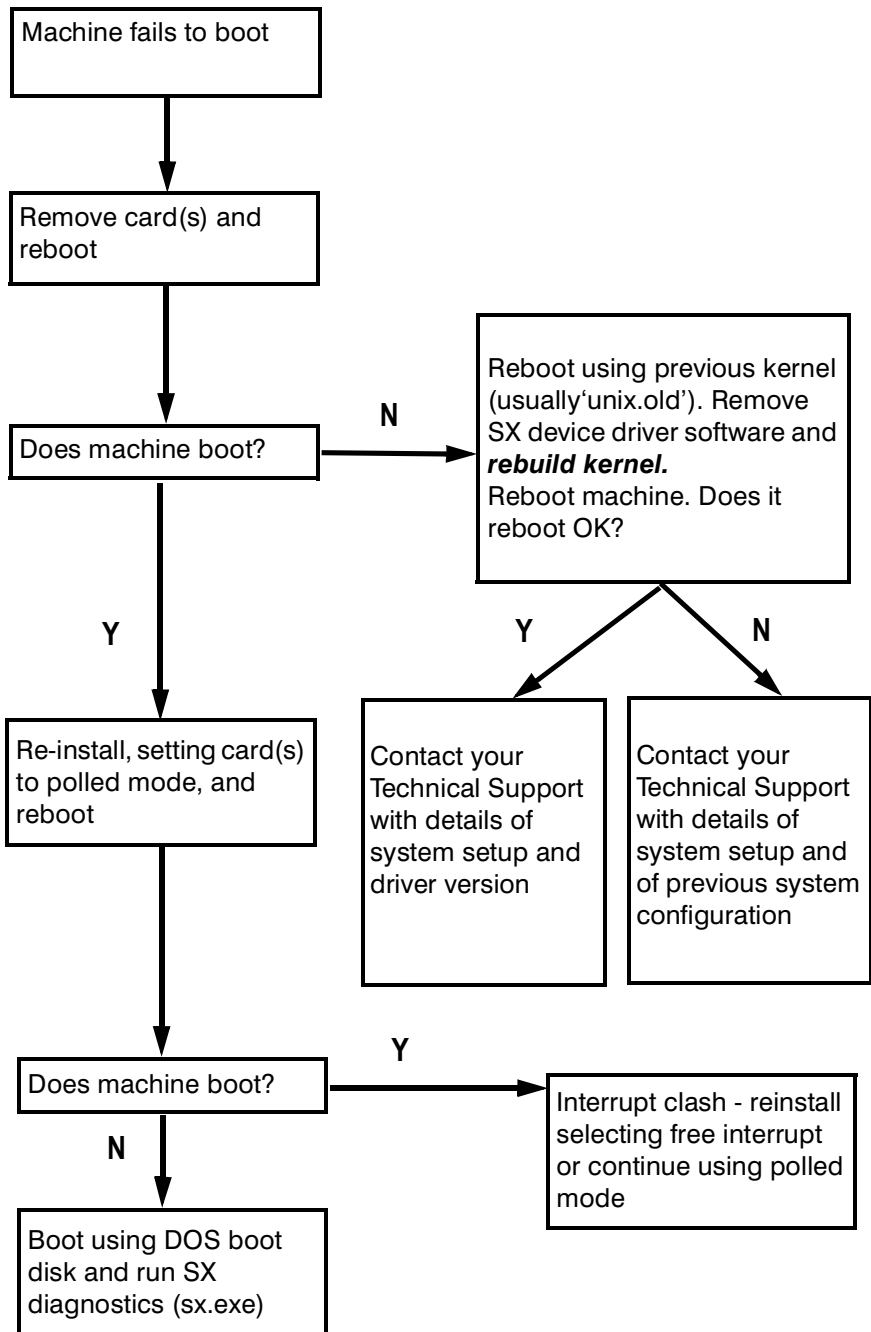


Figure 21  
Cards and/or  
device  
concentrators not  
found

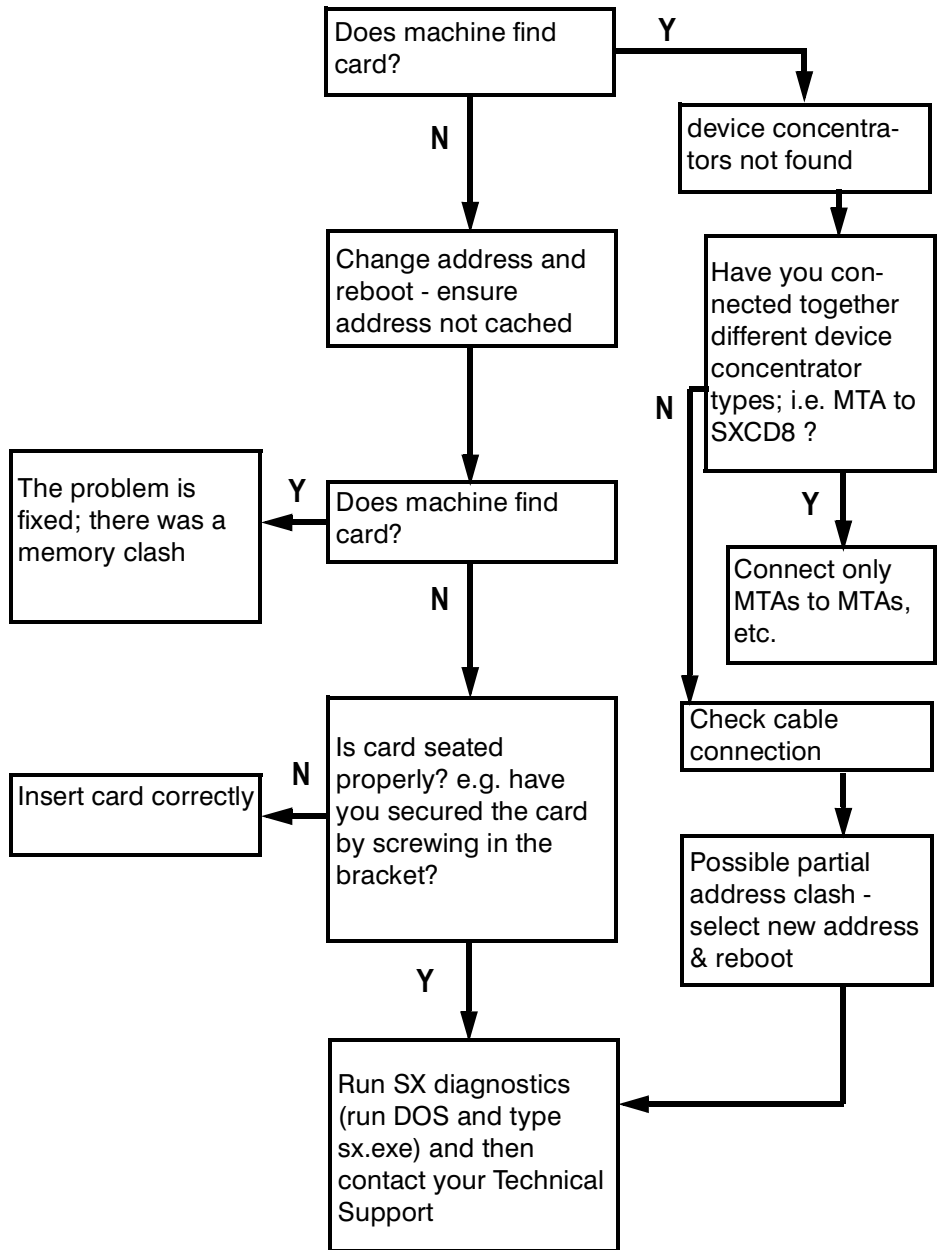


Figure 22  
Can't obtain login  
prompt on terminal

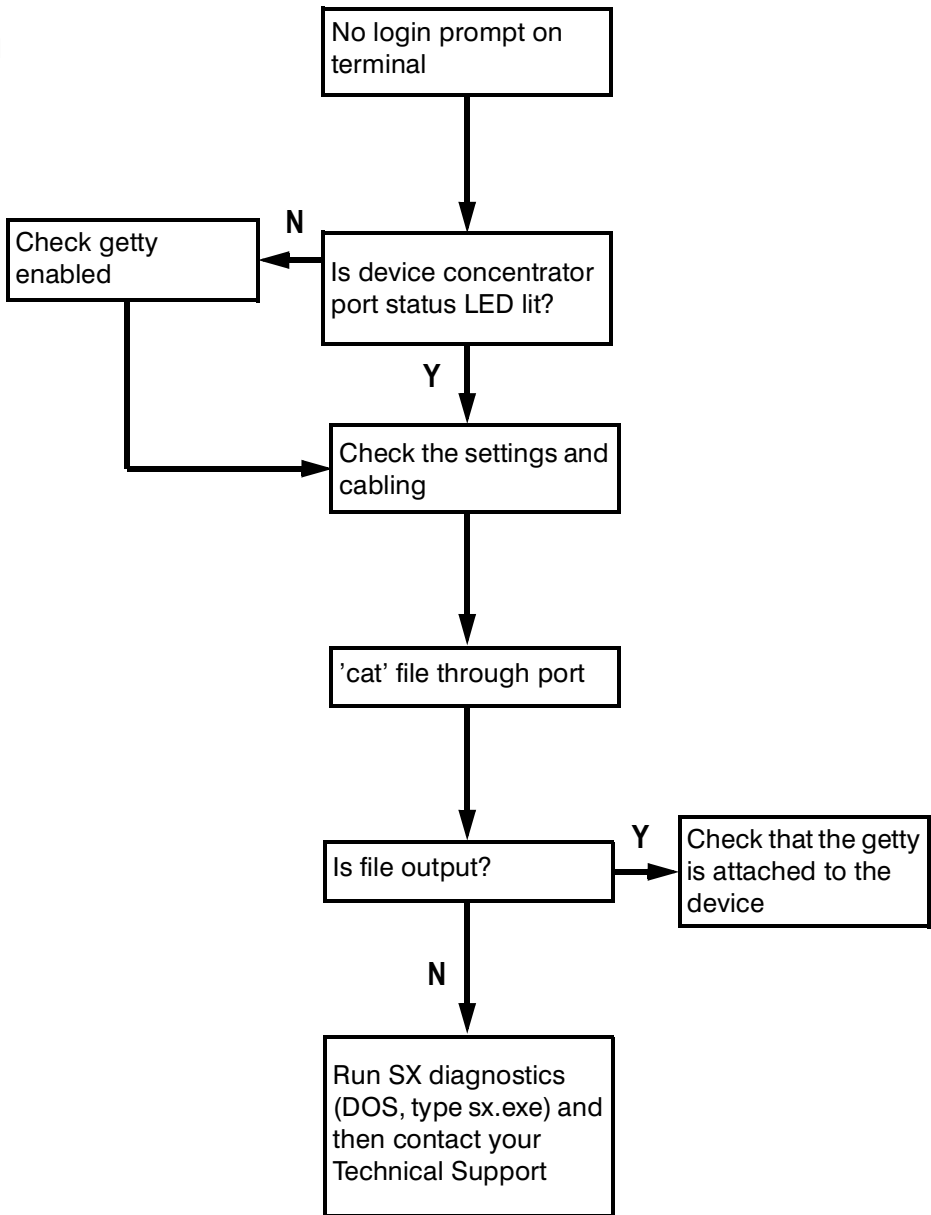
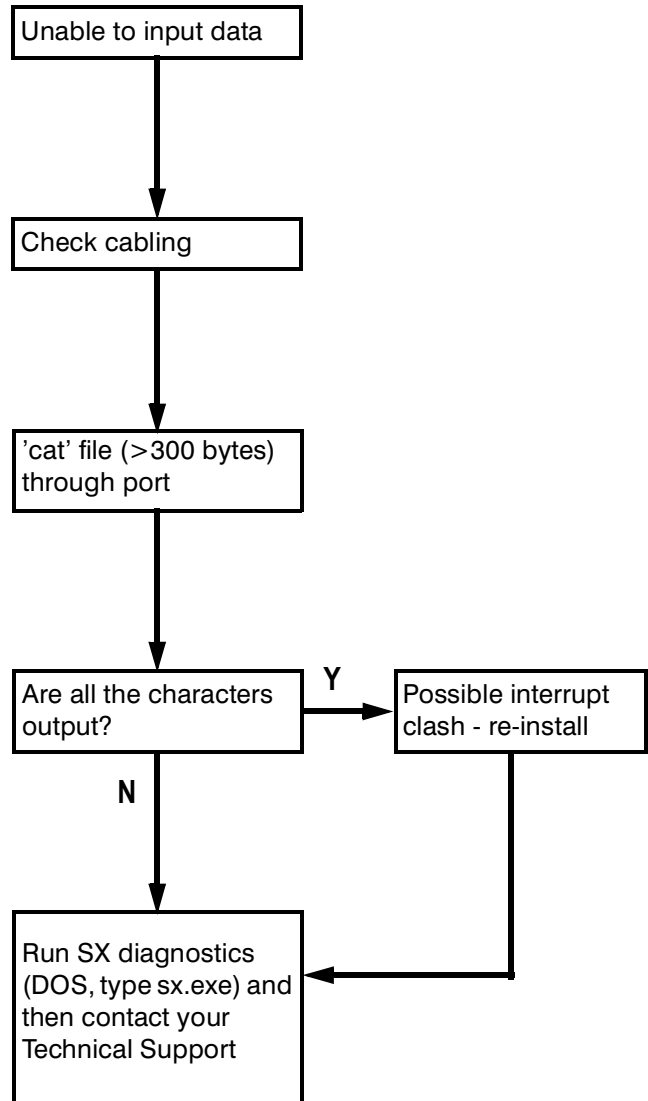


Figure 23  
Unable to input  
data/login  
messages  
corrupted



## 2.8.2 Error Messages

**An attempt has been made to open port  $n$  while a close on that port is in progress.**

- The streams system has called the driver open routine to open a port which it is in the process of closing. This indicates a fault in the implementation of streams within the operating system. Note down the values given in the error message, and the vendor, version and release number of the operating system, and contact your Technical Support.

**Cannot use both polled and interrupt driven host cards in one system. All the cards will be reconfigured to use polled operation.**

- The SX device driver can run in polled mode or interrupt mode, not both at the same time. You have installed one or more host cards running in interrupt mode and one or more host cards running in polled mode. The driver has set all your host cards to polled mode. For ISA host cards, re- install SX, setting all your host cards to the same mode.

**Can't patch interrupt vector number  $n$ .**

- An interrupt level above 15 has been set for a host card. This should not be possible using the standard SX installation and configuration files. Re-install the SX device driver.

**Interrupt handler re-entered! This vector =  $n$ , other vector =  $n$ , this flag =  $n$ , other flag =  $n$ .**

- The interrupt handling software has been called whilst the driver has been processing a previous interrupt. This should not happen as the driver protects itself against this occurring. It may be caused by the operating system using different spl protection levels for streams to the levels used by the SX driver. Note down the values given in the error message, and the vendor, version and release number of the operating system, and then call your Technical Support.

**Message type  $n$  received by write service routine - dumped.**

- This message indicates that an unexpected message has been sent to the device driver service routine. The driver expects all messages to be passed through the `put' routine and expects messages of this type to have been rejected before they reach the service routine. This indicates a fault in the

implementation of streams within the operating system. Note down the value given in the error message, and the vendor, version and release number of the operating system, and then contact your Technical Support.

### **No host cards detected in system.**

- The driver has been unable to detect any host cards. Make sure each host card has been installed and is seated correctly in its slot. If so, check the configuration of each host card. For ISA host cards, check that the DIL switch (or rotary switches and the jumper) have been set to a valid address. If this fails to solve the problem, re-install SX. If the problem still isn't solved, test your host card using the SX diagnostics program.

### **SX: one host card failed to run SX: *n* host cards failed to run.**

- One or more of your host cards have failed to start up correctly. Check that the host card, bus cable and device concentrators are installed securely, that you haven't installed more than four host cards in your machine and that the host card isn't sharing a memory address. If the problem persists, test each host card using the SX diagnostics program.

### **Port *n* has been re-opened, the queue passed to open is the same as for the previous open, but the private data structure pointer has changed. The read queue pointer is at address 0xXXXXX and the private data structure entry should be 0xXXXXX but is now 0xXXXXX. This Unix system may fail soon!**

- The streams implementation on this operating system has changed some of the driver's private data. The driver has tried unsuccessfully to recover and it is possible that the system will crash. Note down the values given in the error message, and the vendor, version and release number of the operating system, and then contact your Technical Support.

### **Startup timeout on ISA host card at base address 0xXXXXX Startup timeout on PCI host card in slot *n*.**

- The identified host card has failed to execute its download code. Check that the host card, bus cable and device concentrators are installed securely, that you haven't installed more than four host cards in your machine and that the host card isn't sharing a memory address. If the problem persists, test each host card using the SX hardware diagnostics program.

**Streams error - asked to close (xprint) queue 0xXXXXX. Private pointer is 0xXXXXX, minimum acceptable level is 0xXXXXX, maximum acceptable level is 0xXXXXX.**

- The driver has detected that the data structures associated with its streams interface have been corrupted. This is an error in the implementation of streams within the operating system. Note down the values given in the error message, and the vendor, version and release number of the operating system, and then contact your Technical Support.

**There are more than 4 host card installed in this machine. Extra host cards will be ignored.**

- The driver will support up to four host cards. It has detected more. Power your system down and remove the surplus host card(s).

**XPRINT message type *n* received by write service routine - dumped.**

- This message indicates that an unexpected message has been sent to the device driver service routine. The driver expects all messages to be passed through the `put' routine and expects messages of this type to have been rejected before they reach the service routine. This indicates a fault in the implementation of streams within the operating system. Note down the value given in the error message, and the vendor, version and release number of the operating system, and then contact your Technical Support.

**Xprint port *n* has been re-opened, the queue passed to open is the same as for the previous open, but the private data structure pointer has changed. The read queue pointer is at address 0xXXXXX and the private data structure entry should be 0xXXXXX but is now 0xXXXXX. This Unix system may fail soon!**

- The streams implementation on this operating system has changed some of the driver's private data. The driver has tried unsuccessfully to recover and it is possible that the system will crash. Note down the values given in the error message, and the vendor, version and release number of the operating system, and then contact your Technical Support.

**WARNING: Host *n* SHUTDOWN - invalid adapter(s).**

- The identified host card has been shutdown by the SX device driver because it reported that it has detected more than one type of device concentrator (terminal adapter) connected. Mixing different types of device concentrators is not allowed.

Note that this error will cause a subsequent “Host n not running - ignored.” error.

### **Host *n* not running - ignored.**

- The identified host card has failed to execute correctly, or has been shutdown by the SX device driver for one of the following reasons :
- An SI/XIO host card has detected that an SXDC8 device concentrator is connected. SI/XIO host cards do not support SXDC8s.
- A Host Card has detected that it has more than one type of device concentrator connected. Mixing different types of device concentrator is not allowed.

Note that this error will cause a subsequent “One host card failed to run” error.

### **WARNING: ISA card not found at address : 0XXXXXX**

- The SX device driver has been unable to verify that an SX ISA Host Card is installed with the address settings defined by the DCU.



# Chapter 3

## Windows NT

### 3.1 Contents

- 3.2 *Introduction*
- 3.3 *Installing SX Device Driver Software*
- 3.4 *Installing Host Cards and Device Concentrators*
- 3.5 *Installing Additional Ports*
- 3.6 *Upgrading SX Software*
- 3.7 *Removing SX Software*
- 3.8 *Troubleshooting*

### 3.2 Introduction

This chapter describes how to install the SX device driver software under Microsoft Windows NT. It also tells you about installation of host cards (multi-port serial adapters) and device concentrators (TAs, MTAs or SXDC8s).

The SX Windows NT driver will support a maximum of four host cards, which may be combinations of either ISA or PCI host cards. Each card can support up to 32 ports giving a maximum of 128 ports per machine. Once installed, the SX ports provide the same functionality as the standard COM ports.

## 3.3 Installing SX Device Driver Software

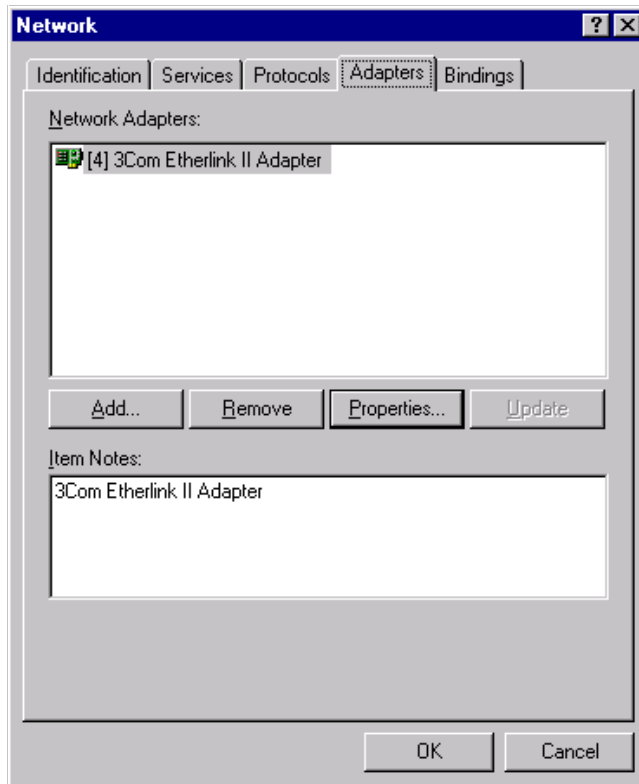
### Caution

If you have an older version of the SX NT driver you must remove it *before* installing the new version; see [Section 3.7 Removing SX Software](#). Do *not* use the Windows NT 'Upgrade' button.

The device driver software is installed using the Network program in the Control Panel application.

1. Activate the Control Panel application by selecting Settings in Start Menu.. Select the Network icon.
2. Select the Adapters tab and select the Add... button in the Adapters dialog box.

Figure 24  
Windows NT  
Network Adapters  
Screen



3. Select **Have Disk...** from the Select Network Adapter dialog box.

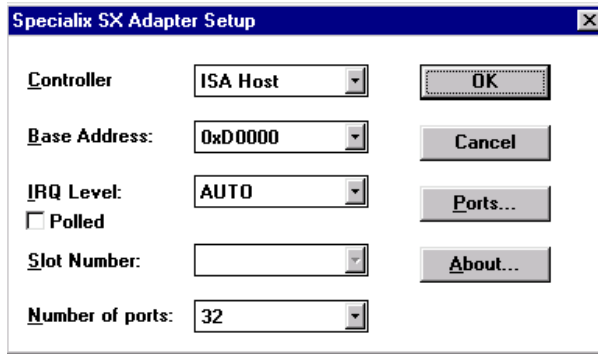
4. Insert the SX CDROM into the appropriate disk drive, enter the following path in the dialog box:

(cd drive:) \drivers\sx\winnt\

select **OK**

5. The dialog box titled **Select OEM Option** displays **SX Adapter** - select **OK**. The SX software will now be copied to the hard disk after which the Specialix SX Adapter Setup dialog box will be automatically selected:

Figure 25  
SX Adapter Setup  
dialog box



If you are installing an **ISA host card**, specify the Controller, Base Address, IRQ Level, and Number of ports.

The *Auto* interrupt option will assign the first available interrupt. If you have reserved in the BIOS an IRQ specifically for ISA cards, then select that IRQ number from the list. The

*Auto* option will not automatically use that reserved IRQ.

If installing a **PCI host card**, specify Controller and Number of ports.

All card types also support a polled mode where the card is checked periodically by the SX driver. Polled mode is an alternative to the IRQ level setting and is useful when the range of available interrupts is restricted.



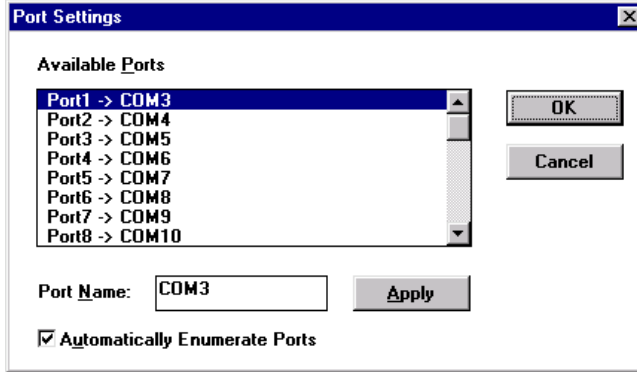
*Windows NT* has a utility 'Windows NT Diagnostics' which shows interrupts in use.

Selecting the **About...** button will display the version of software you are running.

### 3.3.1 Renaming ports

SX ports are assigned the standard COM prefix. The port number assigned to the first SX port will depend on the number of COM ports already installed. If you want to rename your ports, select the **Ports...** button. The following dialog box will be displayed:

Figure 26  
Port Settings  
dialog box



In this example, two COM ports are already installed, so the first SX port is named COM3.

To rename all ports, select Automatically Enumerate Ports. Next, select the first SX port and type in the required port name (e.g. SX1, or COM1). Then select **Apply**. The new port name will be applied to each port.

Whichever port you rename, if Automatically Enumerate Ports is enabled, all following ports will be renamed as well.

To rename an individual port, repeat the process but with the Automatically Enumerate Ports feature disabled.

Select **OK** to return to Adapter Setup. Select **OK** again to return to Network Settings.

Repeat the procedure for each host card you intend to install. This time, however, select the new item **Specialix SX Adapter** instead of **<other> Requires disk from manufacturer** or **Have Disk....** You won't be asked to install the software again.

When you have specified your host card(s) select **OK** to exit Network Settings. You will be asked if you want to restart your operating system. Select the option which allows you to shut down your machine. Now go to the next section 'Installing Host Cards and Device Concentrators'.

## 3.4 Installing Host Cards and Device Concentrators

The next stage is to install your host card(s) and device concentrator(s), so exit Windows NT and switch your machine off.



*In Windows NT, SX host cards are called 'Specialix multi-port serial adapters'.*

### 3.4.1 PCI cards

1. Record the serial and assembly numbers of your host card(s). These numbers are printed on the host card(s). A form is provided for you to record the information; see [Appendix D](#).
2. Insert your card(s) into your machine observing safety and electrostatic precautions.
3. Attach the SX-bus cable to your host card; for help see [Section 5.5](#).
4. Attach your first device concentrator to the other end of the SX-bus cable.
5. Attach your second, third or fourth device concentrators (if you have them).



*Do NOT join together different types of device concentrators:*

*connect SXDC8s only to SXDC8s, MTAs only to MTAs, and TA4s/TA8s only to other TA4s/TA8s.*

For further explanation see [Section 5.4](#).

6. Reboot your machine.



*Once installed, your host cards may be reconfigured through Control Panel >Network >Adapters. Select the required card from the list of installed Network Adapters (see [Figure 24](#)) and then select Properties. The Specialix SX Adapter Setup dialog box will be displayed (see [Figure 25](#)).*

### 3.4.2 ISA host cards

Record the serial and assembly numbers of your host card(s). These numbers are printed on the host card(s). A form is provided for you to record this information; [Appendix D \(Hardware Configuration Record\)](#).

1. Decide the required memory address for each card. Select the address using either a 10-way DIL switch or two rotary switches (and jumpers) on the card's surface. Help on both these actions is detailed in '[Chapter 4 ISA host cards](#)'
2. Insert your SX host card(s) inside your machine, observing safety and electrostatic precautions.
3. Attach the SX-bus cable to your host card; for help see [Section 5.5](#).
4. Attach your first device concentrator to the other end of the SX-bus cable.
5. Attach your second, third or fourth device concentrators (if you have them).



*Do NOT join together different types of device concentrators:*

*connect SXDC8s only to SXDC8s, MTAs only to MTAs, and TA4s/TA8s only to other TA4s/TA8s.*

For further explanation see [Section 5.4](#).

6. Reboot the machine.



*Once installed, your host cards may be reconfigured through Control Panel >Network >Adapters. Select the required card from the list of installed Network Adapters (see [Figure 24](#)) and then select Properties. The Specialix SX Adapter Setup dialog box will be displayed (see [Figure 25](#)).*

## 3.5 Installing Additional Ports

This section explains how to add additional ports into the SX device driver software, with either of the following actions:

- attaching one or more device concentrators to an existing host card, or
- installing another host card with associated device concentrators.

Carry out the following actions:

1. Select Control Panel >Network >Adapters. Select the required card from the list of installed Network Adapters (see [Figure 24](#)) and then select Properties. The Specialix SX Adapter Setup dialog box will be displayed (see [Figure 25](#)).
2. Follow the same instructions as in [Section 3.3](#), changing the necessary fields.
3. Reboot your machine.

## 3.6 Upgrading SX Software

If you need to upgrade your software, do the following:

1. Make a record of your hardware (host card and port configuration) information. You will need to re-enter it at [Step 3](#).
2. Remove your existing Specialix software; see [Section 3.7](#). Do *not* use the Windows NT 'Upgrade' buttons.
3. Install the new version of SX software; see [Section 3.3](#). During installation re-input the configuration details of your existing host cards and ports.

## 3.7 Removing SX Software

To remove the SX device driver you must remove all Specialix adapters (host cards).

1. To remove an adapter, activate the **Control Panel** application in the Main window or Start menu. Select the **Network** icon.
2. Select an SX adapter in the Adapters dialog box and click on the **Remove** button.
3. Click on 'Yes' to remove the card. With the last adapter, SX will also be removed.

## 3.8 Troubleshooting

General troubleshooting issues are shown in flow charts below. Error messages are listed in [Section 3.8.2](#). Technical Support contact details are detailed in [Section B.4](#).

### 3.8.1 Flow charts

This section contains flow charts, detailing possible problems with the SX NT driver:

- *Machine fails to boot*
- *NT operating system fails while loading*
- *SX NT driver or other driver fails to boot*
- *After installation SX ports do not work*
- *SX NT driver fails during normal operation*

Figure 27  
Machine fails to boot

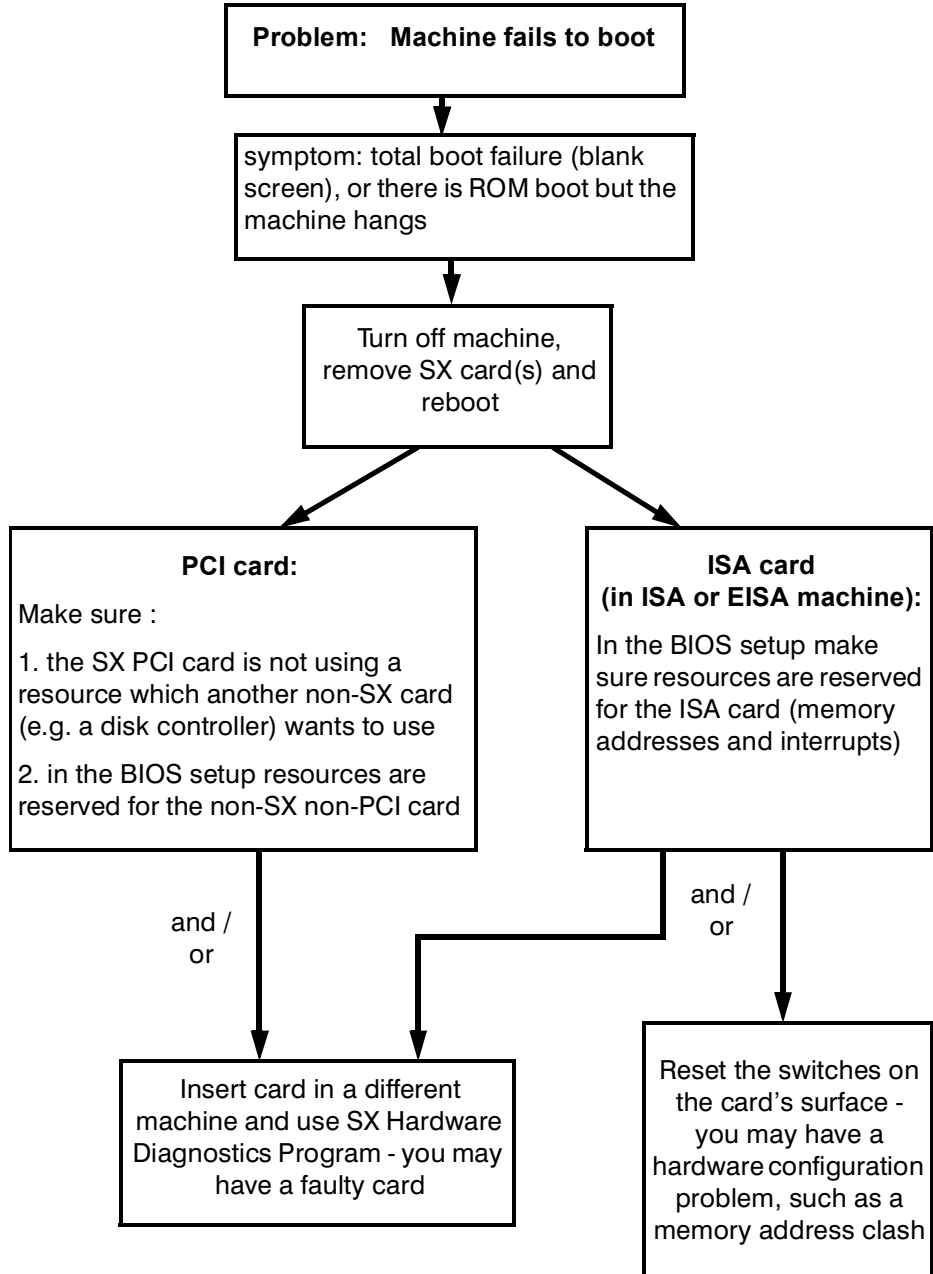


Figure 28  
NT operating  
system fails while  
loading

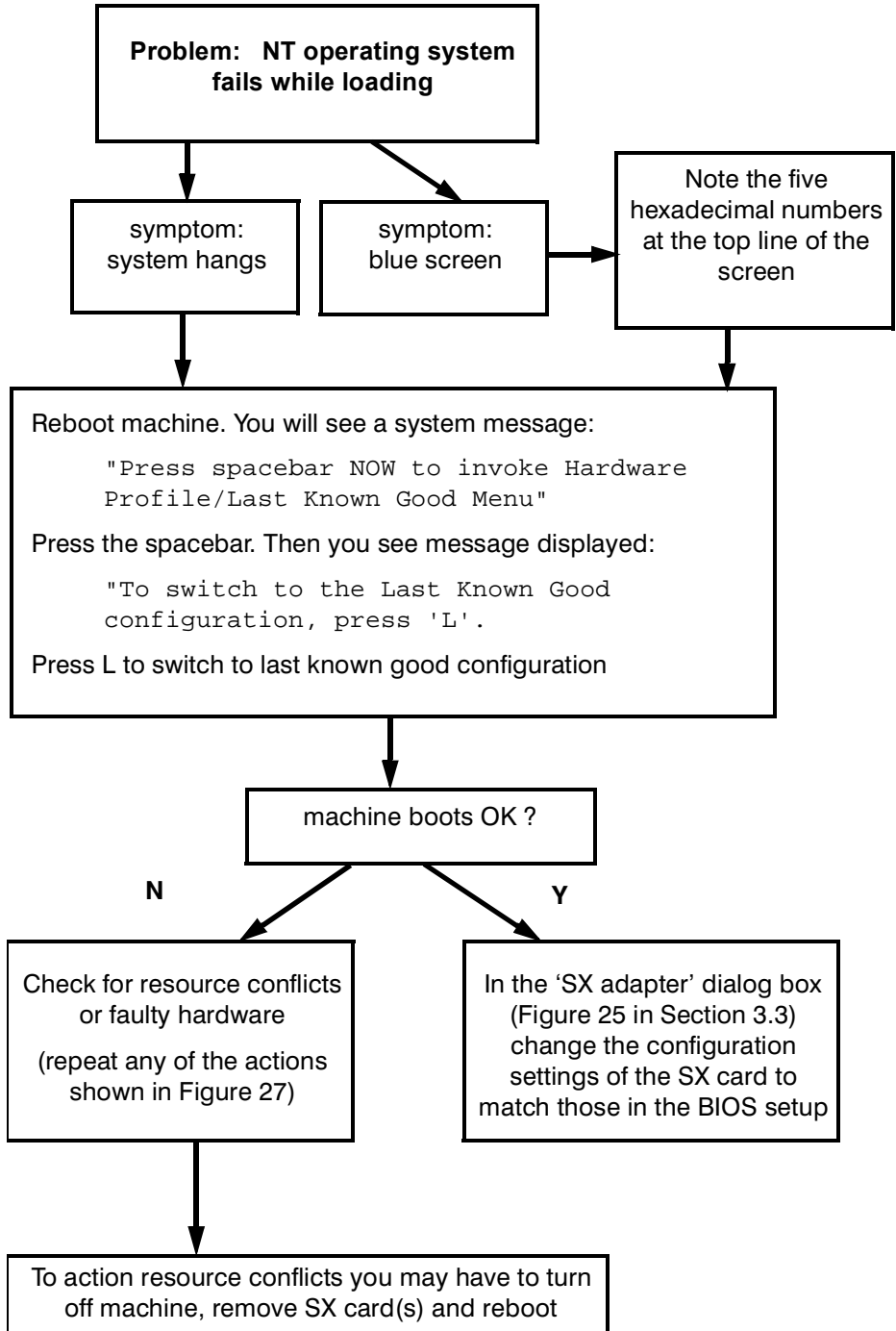


Figure 29  
SX NT driver or  
other driver fails to  
boot

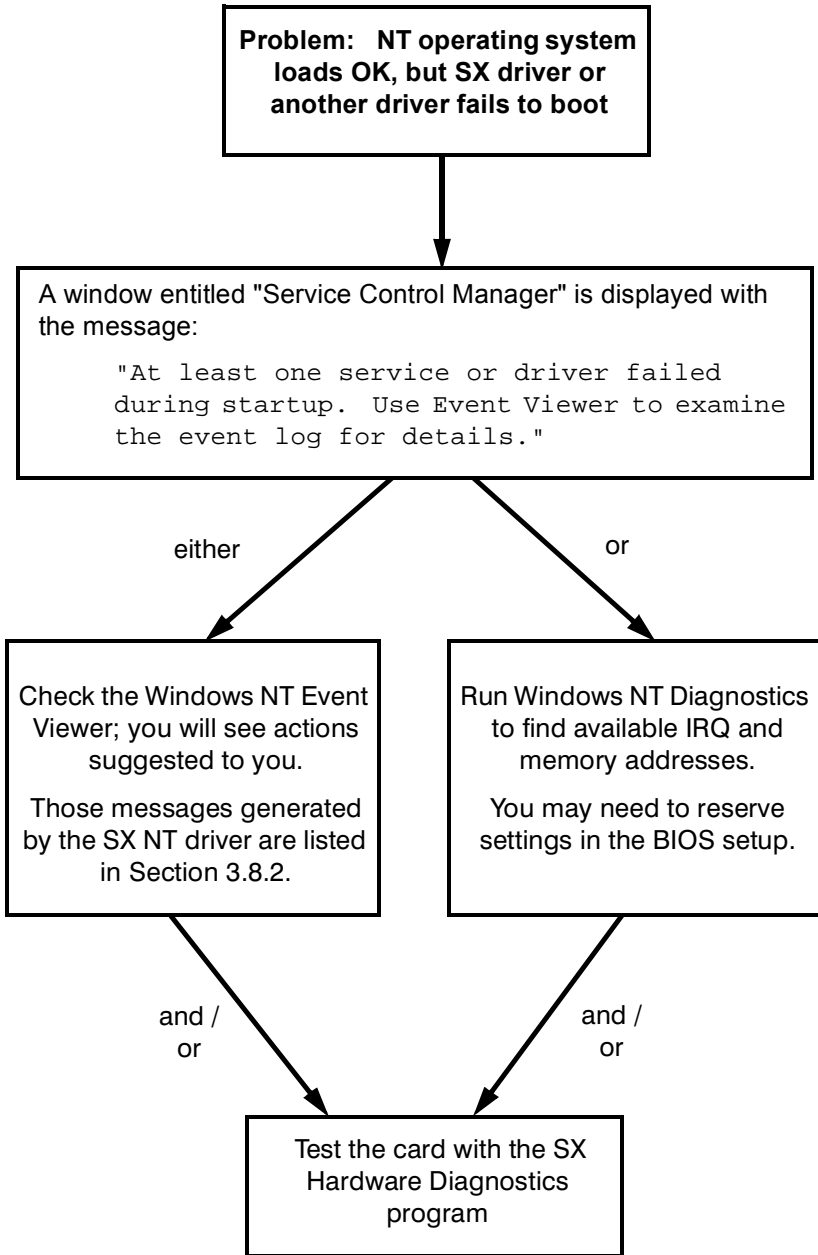


Figure 30  
After installation  
SX ports do not  
work

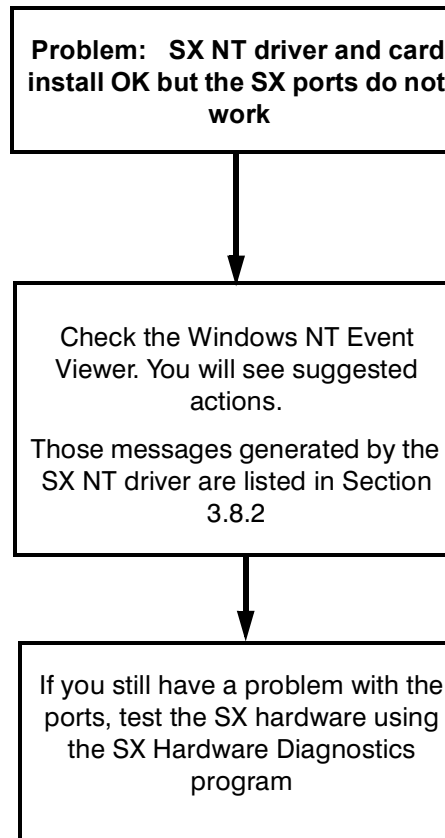
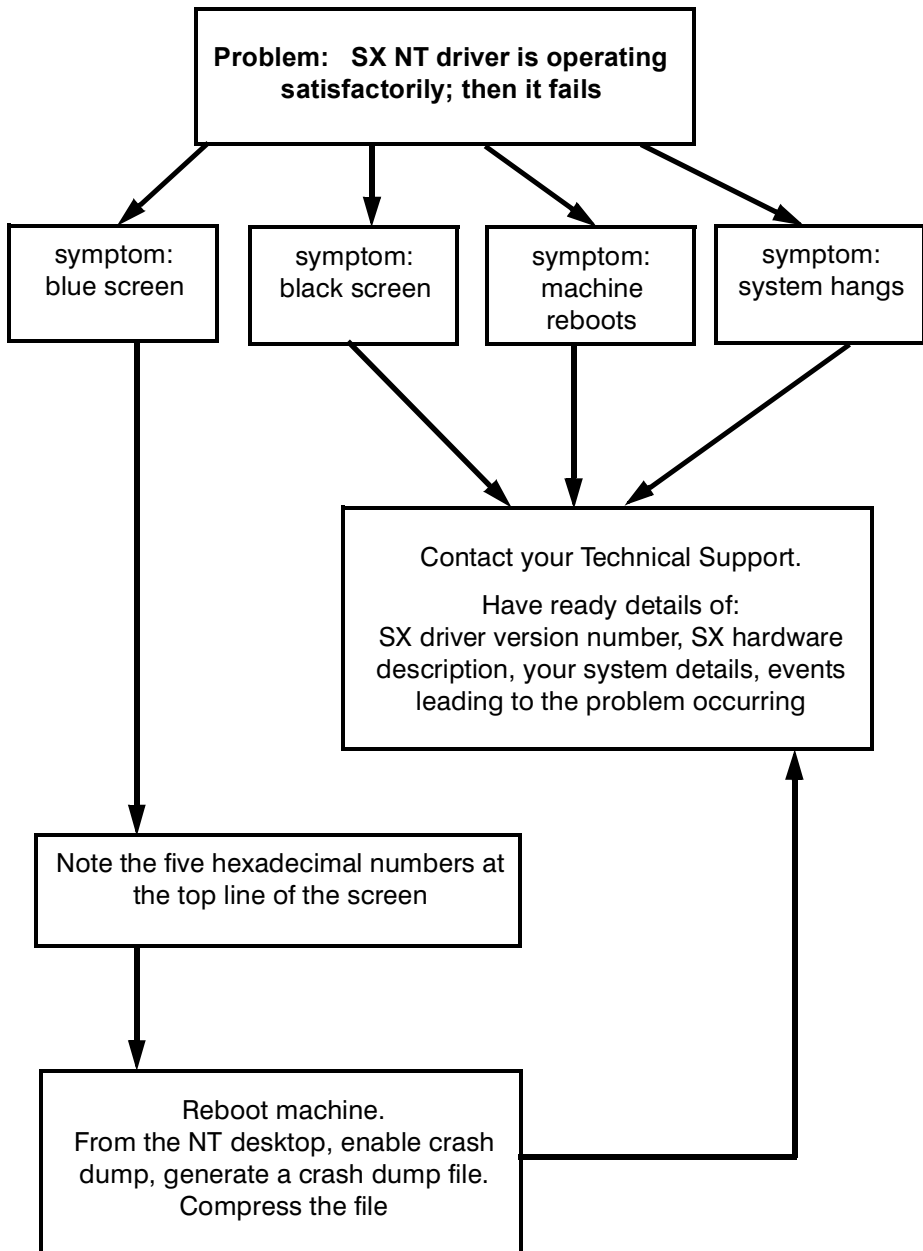


Figure 31  
SX NT driver fails  
during normal  
operation



## 3.8.2 Error Messages

As a general note, if you have problems at any stage check the Windows NT Event Viewer.

**Message:** "Another driver on the system, which did not report its resources, has already claimed the interrupt used by the board."

**Cause:** Another driver/card in the system is preventing the SX board from registering an interrupt with NT.

**Remedy:** Alter the SX card interrupt to another value.

**Message:** "There are more ports on the SX board than are configured."

**Cause:** The number of ports found on the SX board is greater than that set with the configuration dialog.

**Remedy:** Increase the number in the config dialog, or remove ports.

**Message:** "The hardware locations for the SX board could not be translated to something the memory management system could understand."

**Remedy:** None. Contact your Technical Support.

**Message:** "The SX family board %1 is not present."

**Cause:** A board specified in the config dialog was not found.

**Remedy:** Alter config dialog, or install card. If not successful, test card hardware with Dos Diagnostics.

**Message:** "The hardware resources for the SX board are already in use by another device."

**Cause:** Either the memory address, or the interrupt specified in the config dialog is already being used by something else.

**Remedy:** Alter memory and interrupt in config dialog. (TIP: use NT diagnostics to determine free memory and interrupts)

**Message:** "Not enough memory was available to allocate internal storage needed."

**Cause:** Internal error.

**Remedy:** None

**Message:** "No Parameters subkey was found for user defined data. This is

odd, and it also means no user configuration can be found."

**Cause:** Items missing from the NT registry.

**Remedy:** Remove driver and reinstall.

**Message:** "Too many SX boards"

**Cause:** More boards specified and found, than supported by the driver (maximum 4)

**Remedy:** Reduce number of boards with config dialog.

**Message:** "The bus type for the SX board is not recognizable."

**Cause:** Possible problems with the registry.

**Remedy:** Specify the correct bus type.

**Message:** "The bus type for the SX board is not available on this computer."

**Cause:** Config dialog has specified a SX board bus type not present on the system.

**Remedy:** Adjust the board type using config dialog.

**Message:** "User configuration for SX board is invalid."

**Cause:** Values specified by the config dialog not understood by the driver.

**Remedy:** Check and adjust using config dialog

**Message:** "No symbolic link information found for SX board."

**Cause:** No information found in the registry for the board.

**Remedy:** Remove driver and reinstall it.

**Message:** "SXDCs are not supported by this host card."

**Cause:** User has an SXDC8 connected to an old host card that does not support SXDC8s.

**Remedy:** Remove the SXDCs or obtain a newer host card.

**Message:** "There is a mixture of module types attached to the SX host card."

**Cause:** User has an SXDC8 and an MTA connected to a host card.

**Remedy:** Remove either the MTAs or the SXDC8s.

# Chapter 4

## ISA host cards

### 4.1 Contents

- 4.2 *Introduction*
- 4.3 *Memory addresses*
- 4.4 *Interrupts*
- 4.5 *Installing ISA Host Cards*

### 4.2 Introduction

This chapter explains memory addresses and interrupts for SX ISA host cards. It also tells you how to select memory addresses using switches and headers on the card's surface.

Memory addresses are set on the surface of the host card *and* in the software. The settings on the card match those in the software. Interrupts are set in the software only.

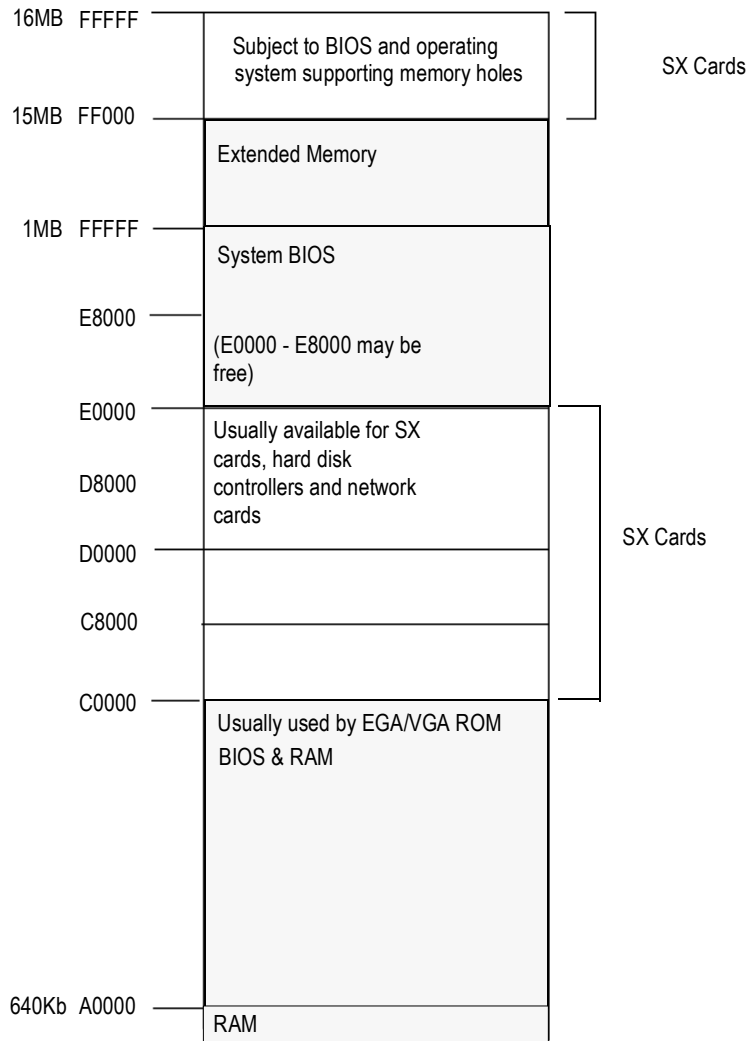


*In Windows NT, SX host cards are called 'Specialix multi-port serial adapters'.*

## 4.3 Memory addresses

- Specification** The SX ISA card default memory address is 0D0000. The card can be addressed in any free, non-cached, 32Kb window on a 32Kb boundary below 16Mb.
- Install below 1MB** Modern computers generally have more than 16MB of memory installed but will require that you configure your card below 1MB (in the C0000 to DFFFF range; see [Figure 32](#)). We recommend that you use the SX default address of D0000 (and for your first card if you are installing more than one card). For multiple SX cards use other free addresses in this range. Note that addresses C0000 and C8000 are often used by an ethernet controller.
- Memory holes** Some machine BIOS software allows the configuration of a memory hole between 15 and 16MBs; see your BIOS documentation. Once you have created a memory hole you may configure your SX ISA cards in this 15-16MB range; see [Figure 32](#).
- Caching** On some machines, the free address space above 1Mb may be cached. In such cases, you will only be able to configure the card in this space if caching can be switched off in the required segment.

Figure 32 Memory address availability on the ISA bus.



## 4.4 Interrupts

Care should be taken in the selection of interrupts. Selection of an interrupt that is already being used by another device will cause installation to fail and you will have to re-install SX (except Windows NT where you do not need to re-install SX; you reconfigure using the *SX Adapter Setup dialog box*).

Under most supported operating systems, SX host cards can use interrupt 9, 10, 11, 12 or 15, or they can be polled.

Check which interrupts are already being used on your system, particularly by other ISA bus adapters, like SCSI controllers, VGA cards and network cards. If none of the supported interrupts are free, you can either set your card(s) to be polled, or you could try to reconfigure a clashing device to use a different interrupt.

Most operating systems provide a method to show interrupts in use. Refer to the relevant section in this Guide for your operating system:

<b>SCO Open Server</b>	<b>SCO UnixWare</b>	<b>NT</b>
<a href="#">Section 1.5</a>	<a href="#">Section 2.3.4</a>	<a href="#">Section 3.3</a>

## 4.5 Installing ISA Host Cards

The contents of this section are:

[\*Layout of ISA host card\*](#)

[\*Decide the Base Address\*](#)

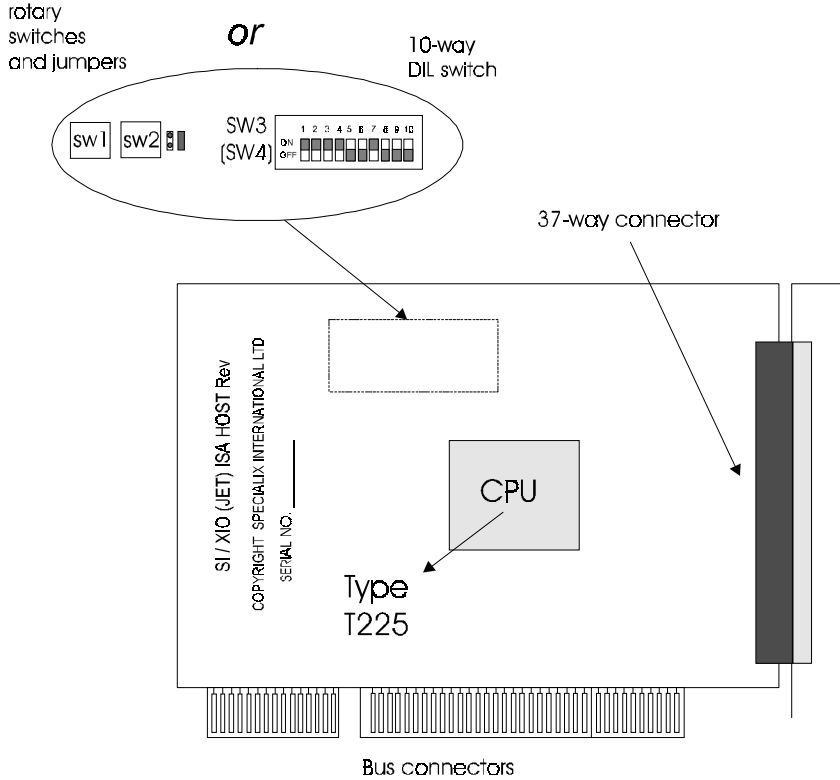
[\*Set the Base Address\*](#)

[\*10-way DIL switch\*](#)

[\*Hex Rotary Switches and Header\*](#)

**Layout of ISA host card** The layout of an ISA card is shown below:

Figure 33  
ISA host card



**Decide the Base Address** To find an available base address for your ISA card consider the base address and occupied address range for each ISA device already installed in your system and the requirements of your SX host card(s). You must find a base address for each of your SX ISA Host Cards.

**Set the Base Address** When you have decided the base address for each ISA Host Card, set the required memory address for each card using switches on the card surface. You have two ways of setting the base address of an ISA Host Card, depending on which type of components are fitted to your card:

either: 10-way DIL switch

or a pair of rotary hex switches, and a pair of headers

The position of these switches and headers is shown in *Figure 33*.

## 10-way DIL switch

The 10-way DIL switch is marked on the card as either Switch 3 or Switch 4. The switch has ten actuators, which can be in either the ON or OFF positions (see diagram below). ON = 0 OFF = 1 (in binary). The memory address is expressed in hexadecimal e.g. 0x0D0000 but entered into the card in a binary form, i.e. OFF or ON (for 1s and 0s respectively).

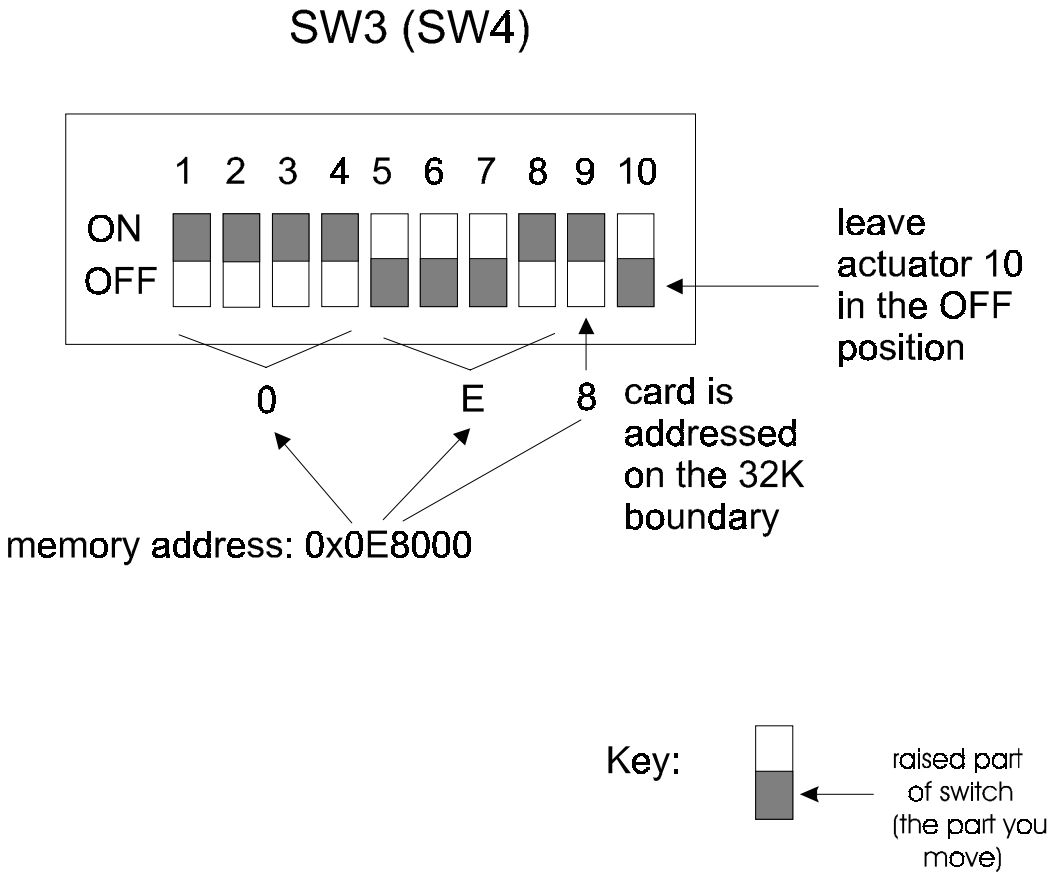
The functions of the actuators on Switch 3 (4) are as follows:

Actuator Number(s)	Function
1-4	set the value of the most significant nibble of the address of the card in memory. (e.g ON, ON, ON, ON (equates to binary 0000) for the nibble 0 in 0D)
5-8	sets the value of the second most significant nibble of the address of the card in memory. (e.g OFF, OFF, ON, OFF (equates to binary 1101) for the nibble D in 0D)
9	addresses the card on the 0K boundary (the OFF position, equal to a value of '0' in the memory address) or the 32K boundary (the ON position, equal to a value of '8' in the memory address). In the memory address see the number which follows the letter, e.g. 8 in 0x0E8000; this value can only be either 0 or 8
10	ensure actuator is in the 'OFF' position (factory default setting)



In a second example to set the address 0E for a card addressed on the 32K boundary adjust the actuators 1 through to 9 as shown in the diagram below:

Figure 35 10-way DIL switch: card at 0E, on the 32K boundary



The full memory address set in the above example is 0x0E8000.

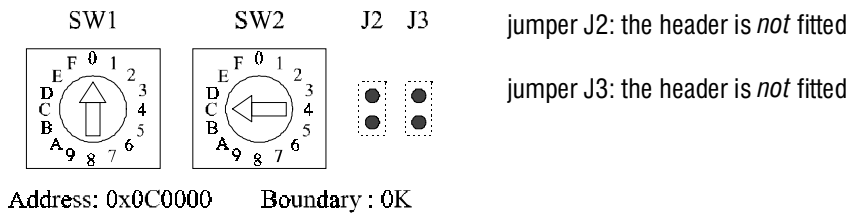
## Hex Rotary Switches and Header

If your ISA card is fitted with a pair of hexadecimal rotary switches and two jumpers (pairs of posts); the function of these components is as follows:

Component	Function
SW1	sets the value of the most significant nibble (e.g. 0 in 0D) of the address of the card in memory.
SW2	sets the value of the second most significant nibble (e.g. D in 0D) of the address of the card in memory.
J2	addresses the card on the 0K boundary (header <i>not</i> fitted, value of '0' in the memory address) or the 32K boundary (header fitted, value of '8' in the memory address). In the memory address see the number which follows the letter, e.g. 8 in 0x0E8000; this value can only be either 0 or 8.
J3	ensure header is not fitted (factory default setting)

For example, to set address 0C for a card on the 0K boundary adjust the rotary switches as shown below:

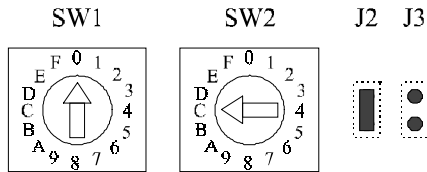
Figure 36  
the hex rotary  
switches and  
headers



In this first example you will have set address 0x0C000.

In a second example, to set address 0C for a card addressed on the 32K boundary place a header on jumper J2 as shown below. The rotary switches stay in the same position as the previous example.

Figure 37  
the hex rotary  
switches and  
headers



Address : 0x0C8000    Boundary : 32K

jumper J2: the header *is* fitted. The header is 0.1" (inch) and is not supplied.

jumper J3: the header is *not* fitted

In this second example you will have set address 0x0C8000.

To install your device concentrators (TAs, MTAs or SXDC8s) go to [Chapter 5 \(Device Concentrators\)](#).

# Chapter 5

## Device Concentrators

### 5.1 Contents

- 5.2 *Introduction*
- 5.3 *Types of device concentrator*
- 5.4 *Mixing device concentrator types*
- 5.5 *Attaching device concentrators to a host card*
- 5.6 *Fixing device concentrators together*
- 5.7 *Wall Mounting*

### 5.2 Introduction

This chapter explains about the different types of device concentrators (TA, MTA and SXDC8), and how to use them.

Once you have attached your device concentrators you can record your port configuration information in the form provided at [Appendix C](#).

For cabling advice and pin assignments on Specialix ports, refer to [Appendix A](#).

## 5.3 Types of device concentrator

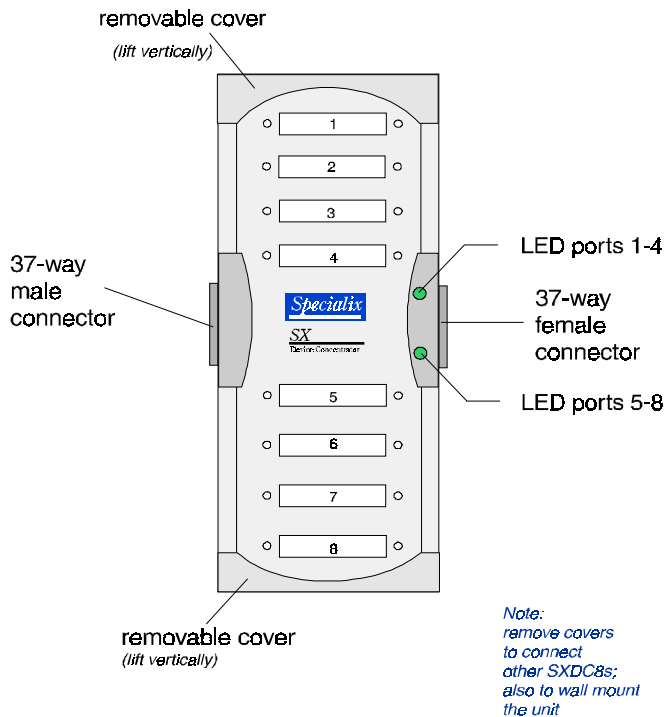
There are three types of device concentrators:

1. [SXDC8](#)
2. [MTA](#)
3. [TA4 and TA8](#)

MTA, TA4 and TA8 are sometimes referred to as ‘terminal adapters’.

### SXDC8

Figure 38  
SXDC8



#### CAUTION:

You must only connect SXDC8s to other SXDC8s (as well as the host card);

*do NOT connect it to MTAs or TA4/TA8s.*

See [Section 5.4](#) for further explanation.

*Figure 38* shows an SXDC8 fitted with DB25 connectors. It is also available with RJ45 connectors. For pin-outs of both connectors, the protocols supported and connection examples see [Appendix A](#).

Figure 39  
parallel port logo



### SXDC8 PARALLEL PORT

The SXDC8 is available with a parallel port (DB25); if you have this version you will see the logo in *Figure 39* marked on the SXDC8 casing. The parallel port is port 1 (one).

Where port 1 is a parallel port, the adjacent serial ports (2, 3 and 4) have reduced functionality; see *Section A.4*.

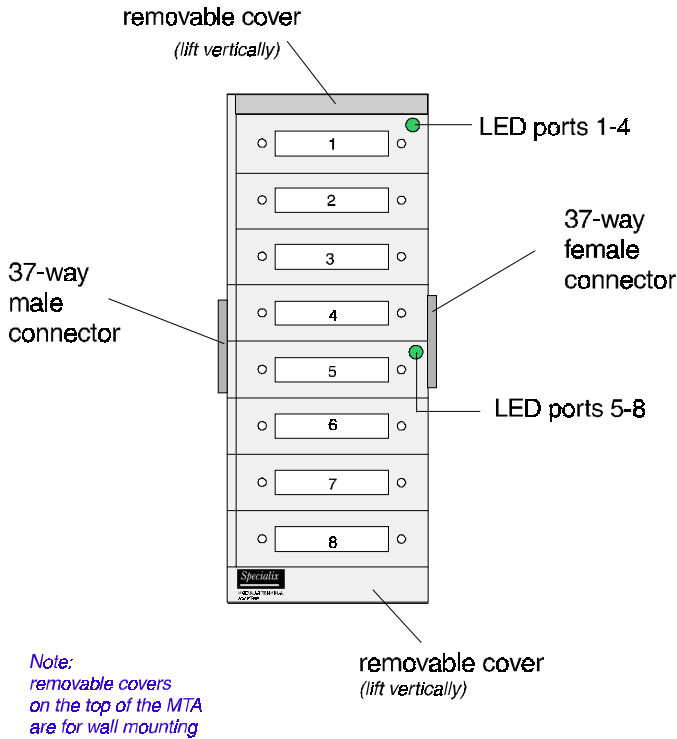
## 5.3.1 Driver Release Levels

In order for the SX Device Concentrators to operate correctly the following releases of operating system device drivers must be installed. These or later releases can be found on the Specialix HandyWEB CDROM or are available from the Specialix Web site ([www.specialix.co.uk](http://www.specialix.co.uk), [www.specialix.com](http://www.specialix.com)).

Operating System	Minimum driver release
Windows NT 4 / 3.51	3.0.0
SCO OpenServer 5.0.x	2.0.0
SCO UnixWare 2.x	3.0.0
SCO UnixWare 7	3.0.0
SCO UNIX v3.2.4	9.0.1
DOS Diagnostics	5.0.0

## MTA

Figure 40  
MTA



### CAUTION:

You must only connect MTAs to other MTAs ((as well as the host card));

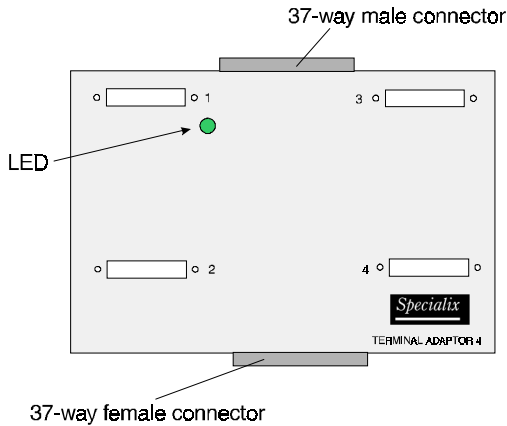
*do NOT connect it to SXDC8s, or TA4/TA8s.*

See [Section 5.4](#) for further explanation.

[Figure 40](#) shows an MTA fitted with DB25 connectors. It is also available with RJ45 connectors. For pin-outs of both connectors and connection examples see [Appendix A](#).

## TA4 and TA8

Figure 41  
TA4



**CAUTION:**

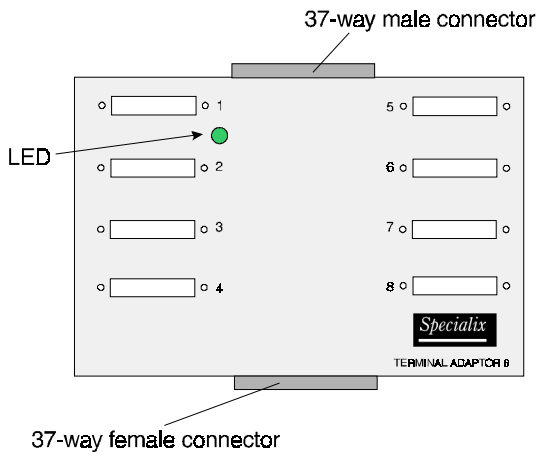
You must only connect TA4s to TA4s and TA8s (besides the host card);

*do NOT connect it to SXDC8s, nor to MTAs.*

See [Section 5.4](#) for further explanation.

*Figure 41* shows a TA4 fitted with DB25 connectors. For the pin-outs of this connector and connection examples see [Appendix A](#).

Figure 42  
TA8



**CAUTION:**

You must only connect TA8s to other TA8s and TA4s (besides the host card);

*do NOT connect to SXDC8s, or MTAs.*

See [Section 5.4](#) for further explanation.

*Figure 42* shows a TA8 fitted with DB25 connectors. For the pin-outs of this connector and connection examples see [Appendix A](#).

## 5.4 Mixing device concentrator types

*This section explains about mixing different types of device concentrator (TA, MTA and SXDC8) on a connection to a single host card.*

You must connect only the same type of device concentrator with a single SX host card; e.g. connect only SXDC8s on the first host card, and only MTAs on the second host card. These connection rules are shown in the following sub-sections:

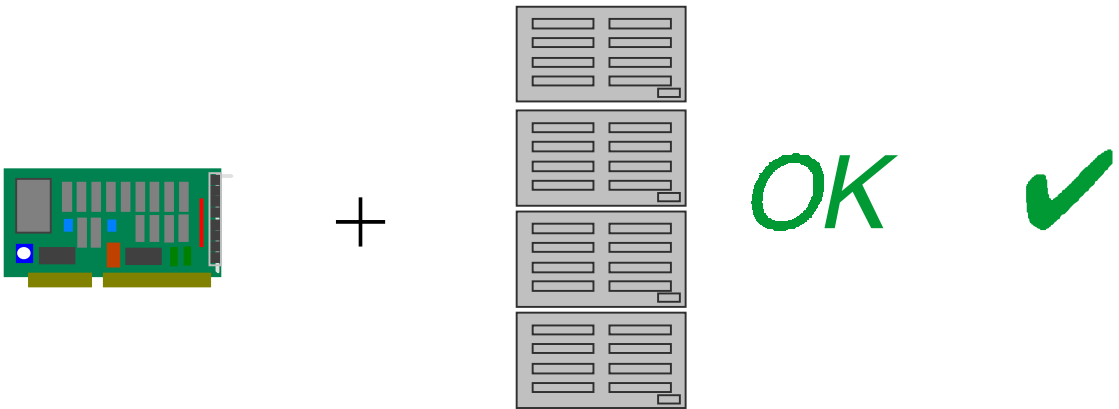
- [5.4.1 Single SX Host Card with TA8s \(or TA4s\)](#)
- [5.6.3 Joining TA4s and TA8s](#)
- [5.4.3 Single SX Host Card with SXDC8s](#)
- [5.4.4 Multiple SX host cards with mixed device concentrator types](#)
- [5.4.5 Single SX host card with mixed device concentrator types](#)

### 5.4.1 Single SX Host Card with TA8s (or TA4s)

In [Figure 43](#) the SX host card is connected to TA8s. This topology will work. Note that connection to TA4s will work also.

Each host card will support a maximum of 32 ports, either from TA8s or a combination of TA8s and TA4s. If you connecting only TA4s, you are permitted only four TA4s to a single host card (making 16 ports).

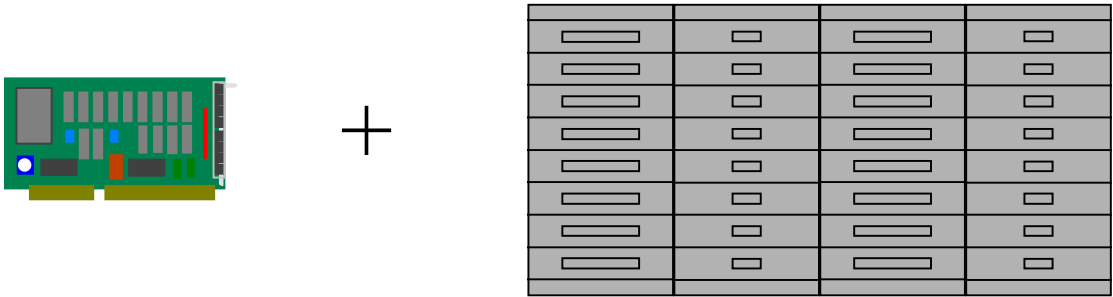
**Figure 43**      SX Host Card with four TA8s



### 5.4.2 Single SX Host Card with MTAs

In *Figure 44* the SX host card is connected to MTAs. This topology will work. Note that you can connect a maximum of four MTAs to one host card (32 ports per card).

Figure 44 SX Host Card with MTAs

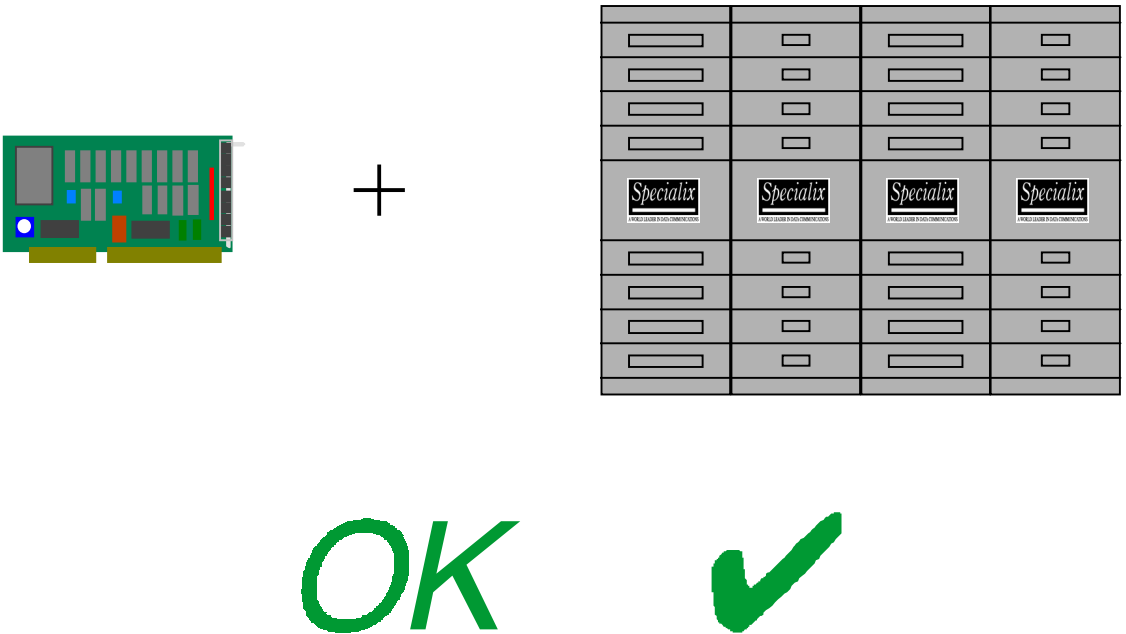


OK ✓

### 5.4.3 Single SX Host Card with SXDC8s

In *Figure 45* the SX host card is connected to SXDC8s. This topology will work. Note that you can connect a maximum of four SXDC8s to one host card (32 ports per card).

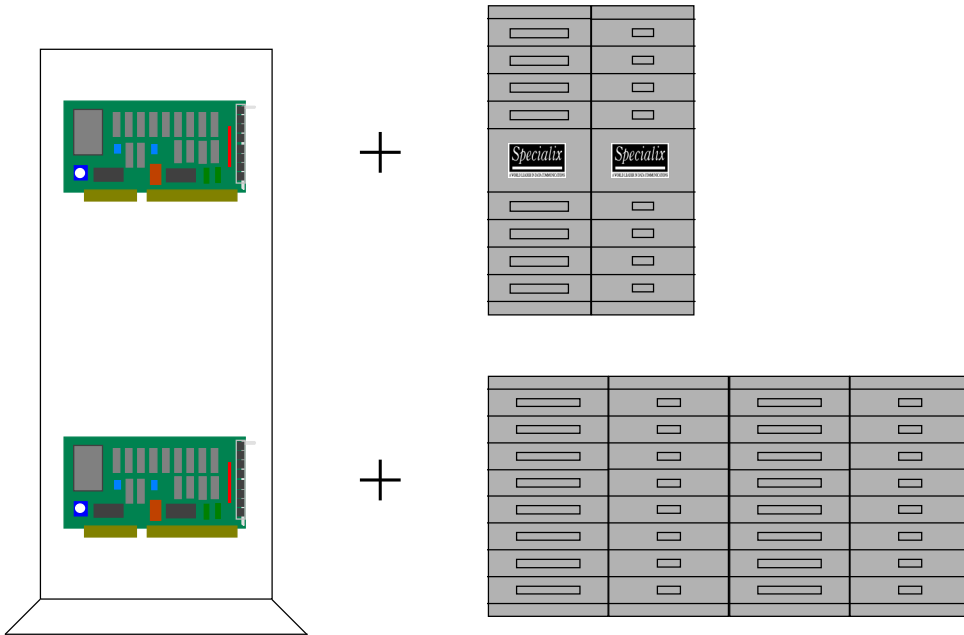
Figure 45 Single SX Host Card with SXDC8s



### 5.4.4 Multiple SX host cards with mixed device concentrator types

In *Figure 46* there are two SX host cards in one machine. One host card is connected to MTAs; the other host card is connected to SXDC8s. This topology will work.

Figure 46 Multiple SX host cards with mixed device concentrator types



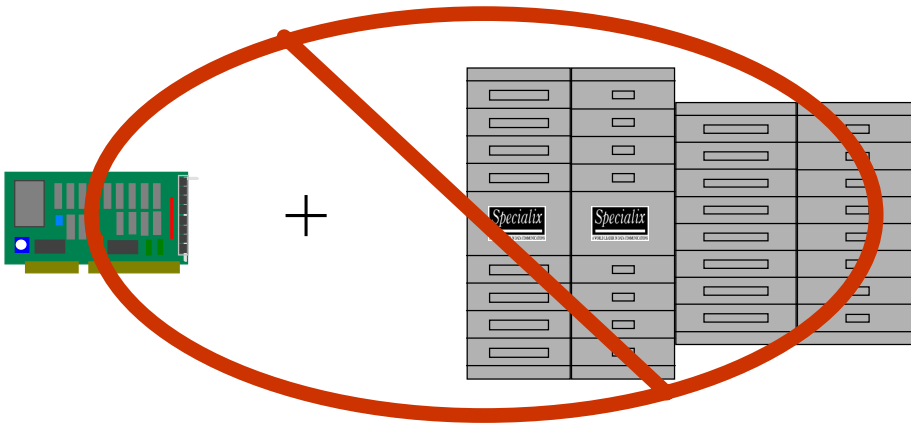
OK



### 5.4.5 Single SX host card with mixed device concentrator types

In [Figure 47](#) there is a single SX host card connected to MTAs and SXDC8s. This topology will *NOT* work because the device concentrator types are mixed.

Figure 47 Single SX host card with mixed device concentrator types



**NOT  
ok**

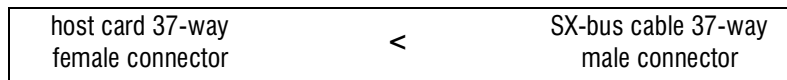


## 5.5 Attaching device concentrators to a host card

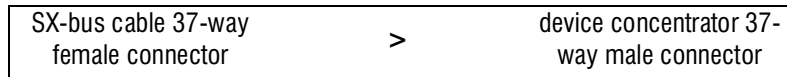
*The instructions below detail the physical attachment of device concentrators to a host card. They do not explain how to configure the SX device driver software; if necessary, refer to the chapters in this Guide specific to your operating system.*

Device concentrators are connected to an SX host card via the SX-bus cable. This cable is terminated at each end with a 37-way connector.

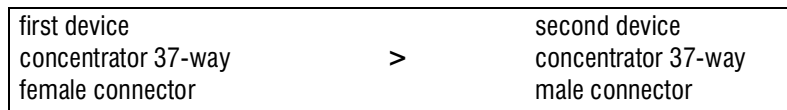
1. switch off your machine.
2. connect the SX-bus cable to your host card using the 37-way connector pair, as follows:



3. attach your device concentrator to the SX-bus cable using the 37-way connector pair, as follows:



4. attach your second device concentrator to the first device concentrator using the 37-way connector pair, as follows:



*connect SXDC8s only to SXDC8s, MTAs only to MTAs, and TA4s/TA8s only to other TA4s/TA8s.*

5. if you have third device concentrator connect it to the second device concentrator using the same type of connector pair as in [Step 4](#).
6. if you have fourth device concentrator connect it to the third device concentrator using the same type of connector pair as in [Step 4](#).
7. you may wish to fix your device concentrators together using brackets/links for a more stable connection; if so refer to [Section 5.6](#).

## 5.6 Fixing device concentrators together



*Do NOT join together different device concentrator types:*

*connect SXDC8s only to SXDC8s, MTAs only to MTAs, and TA4s/TA8s only to other TA4s/TA8s.*

---

**WARNING**

---

Do NOT connect and disconnect device concentrators while your machine is powered on. To do so will damage electronic circuitry and be a safety hazard.

This section contains the following subjects:

*[Section 5.6.1 Joining SXDC8s](#)*

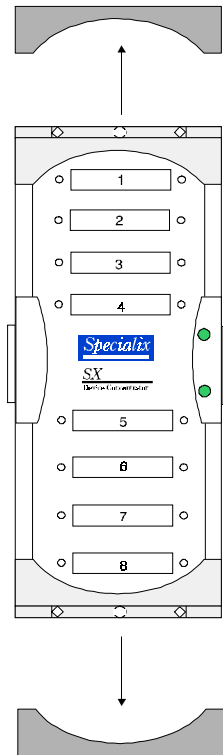
*[Section 5.6.2 Joining MTAs](#)*

*[Section 5.6.3 Joining TA4s and TA8s](#)*

### 5.6.1 Joining SXDC8s

Figure 48 Steps for joining SXDC8s

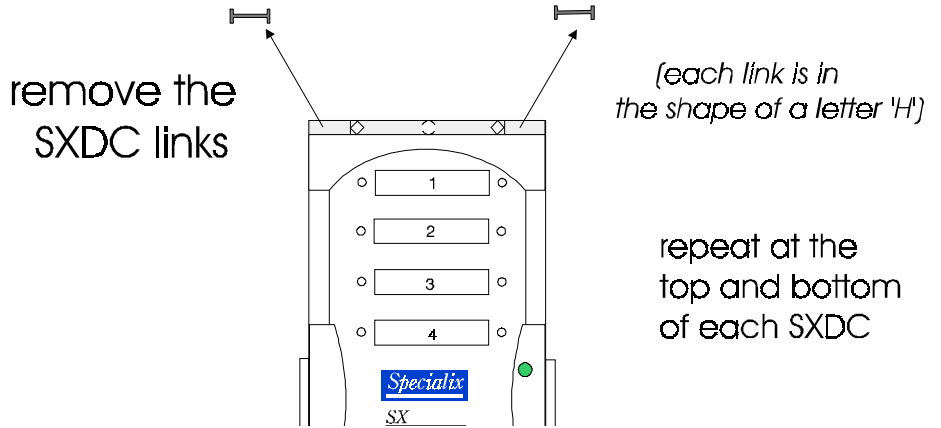
step a



remove cover  
*(unclip by sliding vertically)*

remove cover  
*(unclip by sliding vertically)*

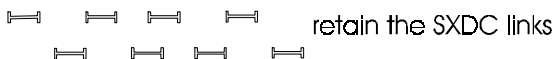
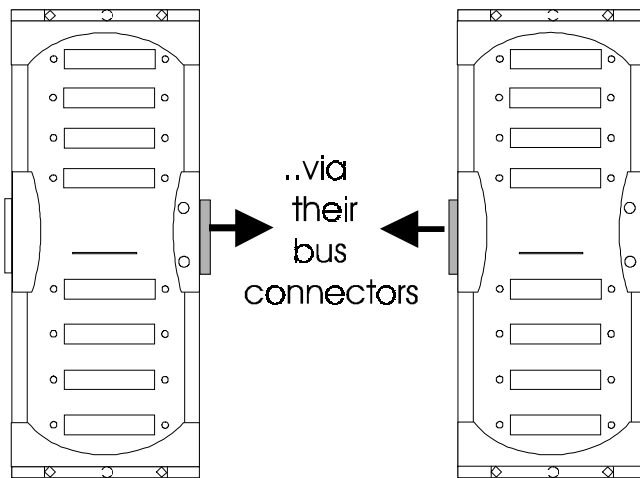
**step b**



**step c**

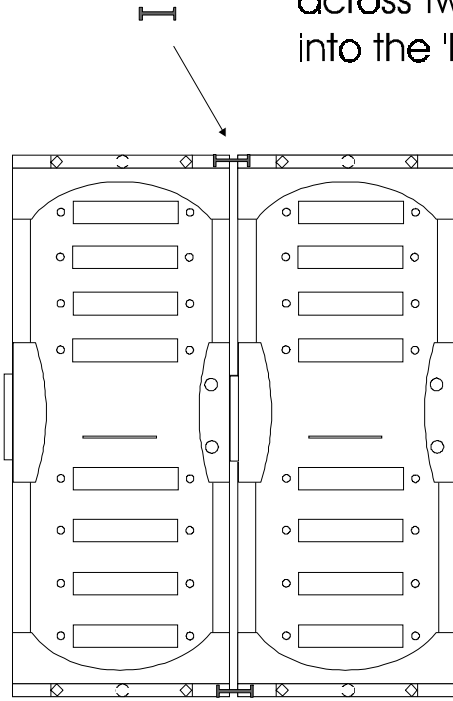
Push the SXDC8.....

.....into the other SXDC8



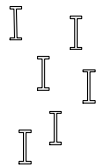
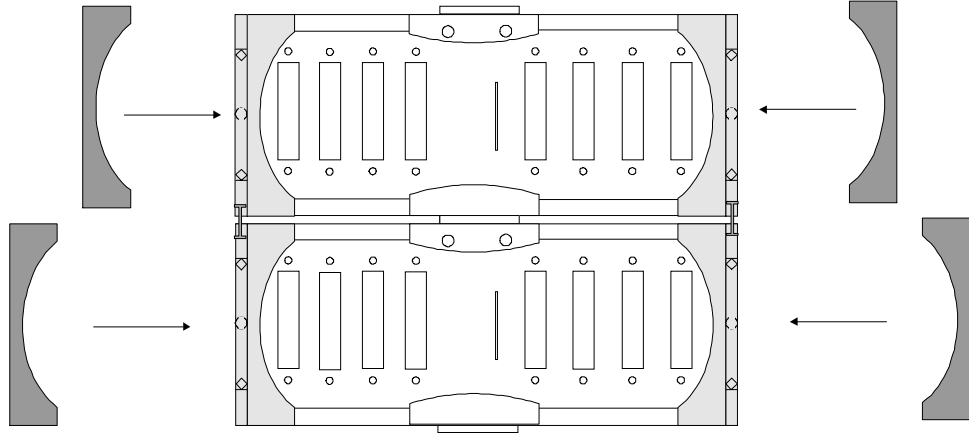
step d

insert one SXDC link  
across two SXDCs,  
into the 'H' shaped apertures



repeat insertion of  
another SXDC link  
(see above)

**step e**

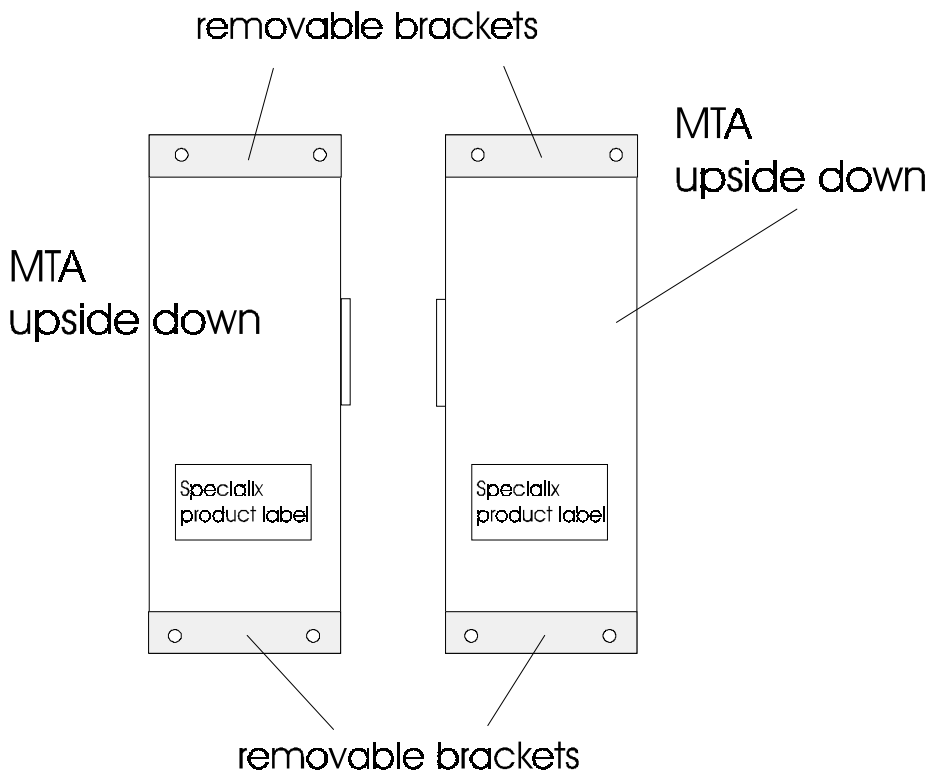


spare SXDC links  
for connecting  
other SXDCs

## 5.6.2 Joining MTAs

Figure 49 Joining together MTAs

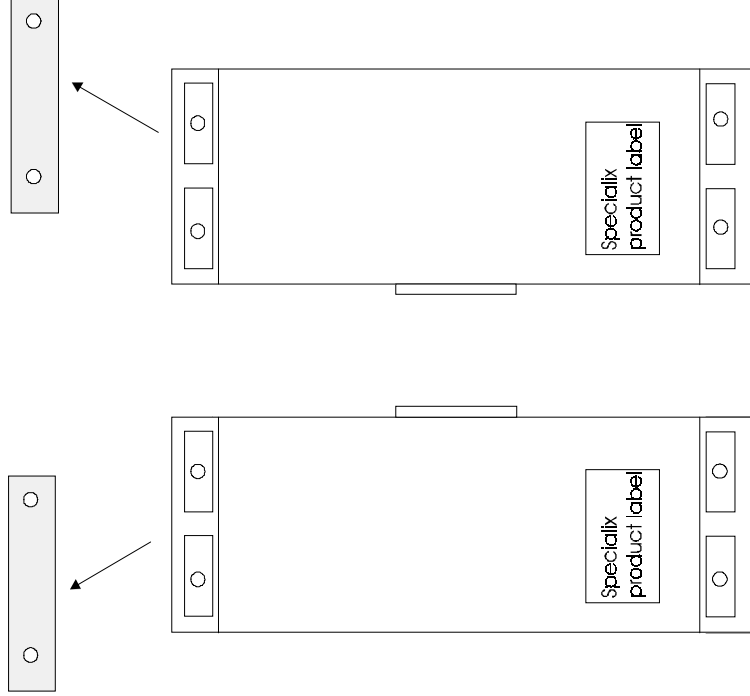
step a



**step b**

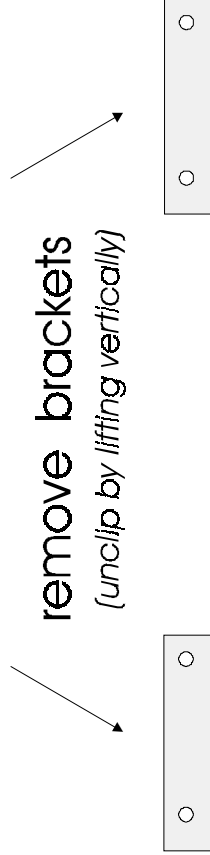
**remove brackets**

*(unclip by lifting vertically)*

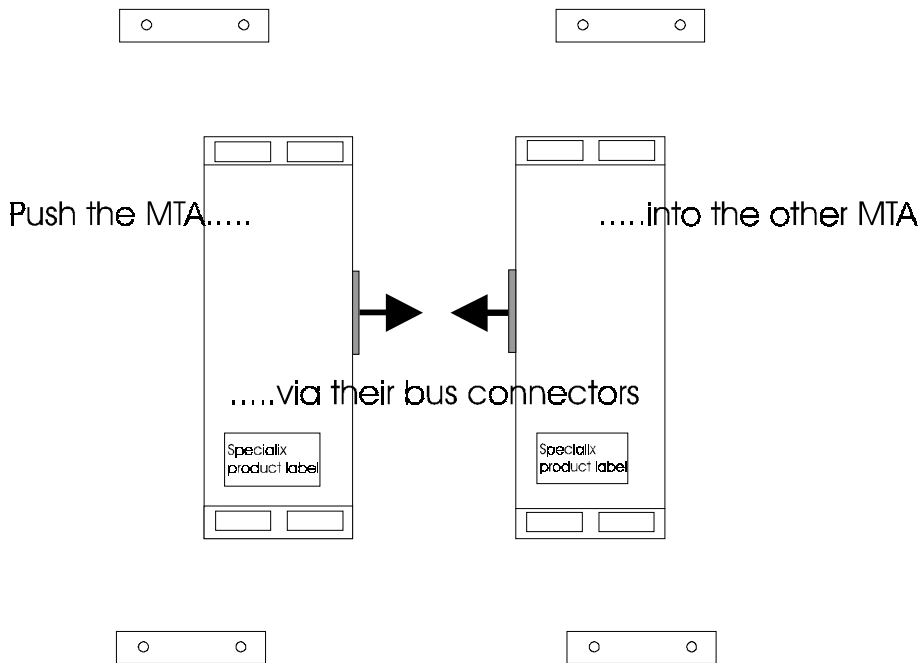


**remove brackets**

*(unclip by lifting vertically)*



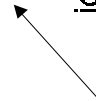
step c



**step d**



join together  
the two MTAs  
with a single bracket



join together  
the two MTAs  
with a single bracket



two unused  
brackets

### 5.6.3 Joining TA4s and TA8s

Whether you are joining the same type of device concentrator (e.g. TA4s to TA4s) or mixing TA4s and TA8s the method is the same:

1. Push together units via their 37-way connectors; see [Figure 41](#) and [Figure 42](#).
2. Join them together using supplied brackets.

## 5.7 Wall Mounting

**SXDC8.** Remove the two top covers; at each end of the unit you will find a wall mounting hole inserted through the chassis - see [Figure 48 step a](#).

**MTA.** Turn the MTA upside down. Remove the two bottom covers; at each end of the unit you will find a single wall mounting hole inserted through the chassis - see [Figure 49 step b](#).

**TA4 and TA8.** You *cannot* wall mount either the TA4 or the TA8.

# Appendix A

## Port Specifications & Cabling

### A.1 Overview

This appendix contains pin specifications for the different types of connector you will find on the SXDC8 device concentrator. It also shows pin and signal connections when you are attaching modems, PCs and other devices.

The appendix does not detail SX loopback connector specifications; these are shown in [Section B.3.4](#).

#### Pin specifications:

- [RS232 DB25 Ports \(Female\) DCE](#)    [Section A.2](#)
- [RS232 DB25 Ports \(Male\) DTE](#)    [Section A.3](#)
- [Reduced functionality RS232 DB25 Ports](#)    [Section A.4](#)
- [Parallel DB25 Port](#)    [Section A.5](#)
- [RS232 RJ45 ports](#)    [Section A.6](#)

#### Connection examples:

- for Direct (1:1) connections, see mini-Table of Contents at [Section A.7.1](#).
- for Structured Cabling Systems, see mini-Table of Contents at [Section A.13.1](#).

## A.2 RS232 DB25 Ports (Female) DCE

These ports provide a full RS232 interface for serial devices. The female DB25 connectors are wired as RS232 Data Communications Equipment (DCE).

Use a straight through cable to be used when connecting to DTE devices such as terminals. When connecting to other DCE devices, such as modems, a crossover cable must be used. See [Section A.7.1 Example Connections](#) for guidance.

The RS232 DB25 DCE serial pinouts are:

Table 1  
RS232 DB25  
(female) pin-outs

Pin	Circuit	Direction	Function
1	P/GND	-	Connect to case
2	RXD	Input	Receive Data
3	TXD	Output	Transmit Data
4	RTS	Input	Transmit Hardware Flow Control
5	CTS	Output	Receive Hardware Flow Control
6	DSR	Output	Data Set Ready
7	S/GND	-	Connect to logic 0V
8	DCD	Input	Data Carrier Detect
20	DTR	Input	Data Terminal Ready
22	RI	Input	Ring Indicator

Notes:

1. P/GND means Protective (Chassis) Ground
2. S/GND means Signal Ground

These ports have **surge suppression**. This feature enables the ports to absorb high static discharges and surges.

## A.3 RS232 DB25 Ports (Male) DTE

These ports provide a full RS232 interface for serial devices. The male DB25 connectors are wired as RS232 Data Terminal Equipment (DTE).

You can use straight (pin 1 to pin 1, etc.) connections to Data Communications Equipment (DCE) such as modems. When connecting to other DTE devices, such as terminals, a crossover cable or device must be used. See [Section A.7.1 Example Connections](#) for guidance.

The RS232 DB25 DTE serial pin-outs are:

Table 2  
RS232 DB25  
(male) pin-outs

Pin	Circuit	Direction	Function
1	P/GND	—	Connect to case
2	TXD	Output	Transmit Data
3	RXD	Input	Receive Data
4	RTS	Output	Receive Hardware Flow Control
5	CTS	Input	Transmit Hardware Flow Control
6	DSR	Input	Data Set Ready
7	S/GND	—	Connect to logic 0V
8	DCD	Input	Data Carrier Detect
20	DTR	Output	Data Terminal Ready
22	RI	Input	Ring Indicator

Notes:

1. P/GND means Protective (Chassis) Ground
2. S/GND means Signal Ground

These ports have **surge suppression**. This feature enables the ports to absorb high static discharges and surges.

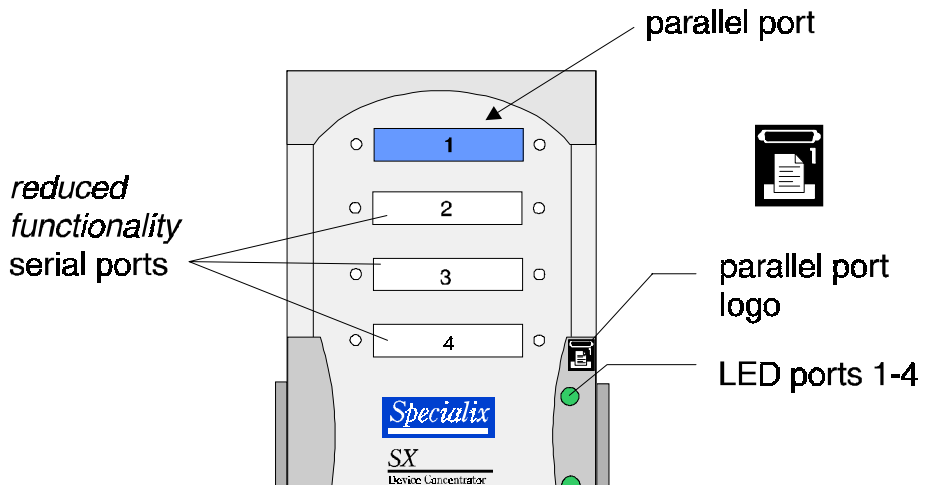
## A.4 Reduced functionality RS232 DB25 Ports

You may have an SXDC8 fitted with a parallel port. If so your SXDC8 will have a label indicating a parallel printer; see [Figure 50](#). The parallel port is port 1; for pin-outs see [Section A.5](#).

### Caution

**when port 1 is a parallel port, the three adjacent serial ports - ports 2, 3 and 4 - have reduced functionality. These three serial ports do not support the Ring Indicator (RI) or (DTR) signals. For pin-outs see [Table 3](#).**

Figure 50  
SXDC8 with  
parallel port



Serial ports 5 thru' 8 have the normal functionality of Specialix DB25 connectors; to check pin specifications see [Section A.2](#).

The parallel port and all the serial ports (both reduced and normal functionality) have surge suppression capability. This feature allows the ports to absorb high static discharges and surges.

The pin-outs of the reduced functionality serial ports are:

Table 3  
pin-outs of ports  
2, 3 and 4  
(where port 1 is a  
parallel port)

<b>Pin</b>	<b>Circuit</b>	<b>Direction</b>	<b>Function</b>
1	P/GND	-	Connect to case
2	RXD	Input	Receive Data
3	TXD	Output	Transmit Data
4	RTS	Input	Transmit Hardware Flow Control
5	CTS	Output	Receive Hardware Flow Control
6	DSR	Output	Data Set Ready
7	S/GND	-	Connect to logic 0V
8	DCD	Input	Data Carrier Detect

## A.5 Parallel DB25 Port

This single DB25 (port 1 on the SXDC8) port provides a Centronics-type interface for Parallel printers. Parallel cables use a straight 25-way connection.

These ports have **surge suppression**. This feature enables the ports to absorb high static discharges and surges.

Table 4 Parallel pin-outs

Pin	Circuit	Direction	Function
1	STROBEN*	Output	PSTROBE
2	D0	Output	DATA 1
3	D1	Output	DATA 2
4	D2	Output	DATA 3
5	D3	Output	DATA 4
6	D4	Output	DATA 5
7	D5	Output	DATA 6
8	D6	Output	DATA 7
9	D7	Output	DATA 8
10	PACKN*	Input	ACK
11	PBUSY	Input	BUSY
12	PPE	Input	PE
13	PSLCT	Input	SLCT
14	AUTOFDXT*	Output	AUTOFEED
15	PERRORN*	Input	FAULT
16	PINITN*	Output	INPUT PRIME
17	PSLINN*	Output	SLCT IN
18	GND	—	GROUND
19	GND	—	GROUND
20	GND	—	GROUND
21	GND	—	GROUND
22	GND	—	GROUND
23	GND	—	GROUND
24	GND	—	GROUND
25	GND	—	GROUND

\* = Active low

## A.6 RS232 RJ45 ports

The shielded RS232 RJ45 ports comply with the RS232 specification.

For help on cabling, see [Section A.7.1 Example Connections](#). The examples include structured cabling environments.

There is additional information on structured cabling systems; see [Section A.13 Structured Cabling Systems](#).

The pin-outs are shown in [Table 5](#).

Table 5  
shielded RJ45  
pin-outs

Pin	Circuit	Direction	Function
1	DCD	Input	Data Carrier Detect
2	DSR	Output	Data Set Ready
3	DTR	Input	Data Terminal Ready
4	S/GND	—	Signal Ground
5	TXD	Output	Transmit Data
6	RXD	Input	Receive Data
7	CTS	Output	Clear To Send
8	RTS	Input	Request To Send
Shield	P/GND	—	Protective (Chassis) Ground

Notes:

P/GND means Protective (Chassis) Ground

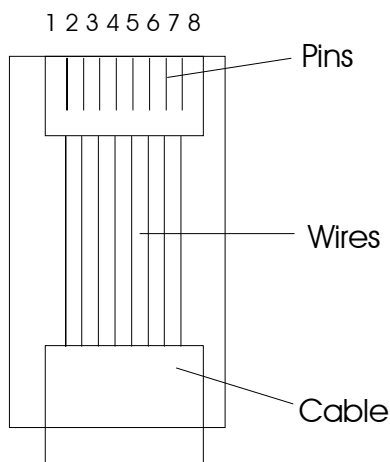
S/GND means Signal Ground

## A.6.1 Pin locations RJ45 connector

The pins in the RJ45 socket are located at the top, with pin 1 on the left (see [Figure 51](#)).

Viewing the RJ45 plug from above (with the clip underneath), the pins are numbered as follows:

Figure 51  
Pin locations  
RJ45 connector



These ports have **surge suppression**. This feature enables the ports to absorb high static discharges and surges.

## A.7 Direct (1:1) Connections

This section describes direct (1:1) connections (definition below) and shows you connection examples. For structured cabling systems, go to [Section A.13 Structured Cabling Systems](#).

### Definition of a Direct (1:1) connection:

a single length of cable joins the Specialix device and your equipment; there is *no* structured cabling system or any other connection in-between.

### Notes:

1. Some user equipment need additional signals on the connector. These may not be supported by the Specialix device or your cable. The normal way to overcome this is to loopback - on your equipment - one of the output lines to the required input. Refer to the documentation supplied with your equipment, or the supplier of the equipment, for information on which loop-backs, if any, are required.
2. Other than a specific requirement at your equipment (as in note 1), do not connect unused pins on either connector.
3. On the DB25 connector, Protective Ground (P/GND) is pin 1. On the RJ45 connector, Protective Ground (P/GND) terminates on the connector and so does not have a pin number.

### A.7.1 Example Connections

In this section we show example connections between Specialix ports and the following devices:

#### Terminals

Terminals (slow speed or using software flow control) [Section A.8.1](#)

Terminals (faster speed or using Hardware Flow Control) [Section A.8.2](#)

**Terminals**

Terminal Connection using the modem device, [Section A.9.1](#)  
Without hardware flow control:

Terminal Connection using the modem device, [Section A.9.2](#)  
With hardware flow control:

**Modems**

direct (1:1) connections: [Section A.10.1](#)

**PCs (DB9 connectors)**

direct (1:1) connections [Section A.11](#)

**Serial Printers**

with software flow control [Section A.12.1](#)

with hardware flow control [Section A.12.2](#)

# A.8 Terminals

## A.8.1 Terminals (slow speed or using software flow control)

For a standard terminal operating at slow speeds, or using software flow control, a simple 3-pin connection can be used:

Specialix device				Terminal			
DB 25 Female (DCE)				DB 25			
	RXD	2	<-----	2	TXD		
	TXD	3	----->	3	RXD		
	GND	7	-----	7	GND		

Specialix device				Terminal			
DB 25 Male (DTE)				DB 25			
	TXD	2	----->	3	RXD		
	RXD	3	<-----	2	TXD		
	GND	7	-----	7	GND		

**Notes:**

1. Some terminals need additional signals on the connector. These signals may not be supported by the Specialix device, or your cable. The normal way to overcome this is to loopback one of the output lines from the terminal into the required input. Refer to the documentation supplied with your terminal, or the supplier of the terminal, for information on which loop-backs, if any, are required.
2. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND), at *either* your equipment *or* the Specialix device (but not both). P/GND will reduce interference in noisy environments.

## Terminal connections (slow speed or using software flow control)

### continued:

with a Specialix RJ45 connector and - on a direct (1:1) connection (no structured cabling system present):

Specialix device			Terminal	
RJ45			DB25	
RXD	6	<-----	2	TXD
TXD	5	----->	3	RXD
S / GND	4	-----	7	S / GND

### Notes:

1. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair (STP) cable. Connect P/GND at *either* your equipment *or* the Specialix device (but not both). P/GND will reduce interference in noisy environments.

## A.8.2 Terminals (faster speed or using Hardware Flow Control)

For a terminal operating at speeds faster than 9600 baud, or for a terminal which cannot use xon/xoff flow control, the following connections are required:

Specialix device				Terminal
DB25 Female (DCE)				DB25
RXD	2	<-----	2	TXD
TXD	3	----->	3	RXD
RTS	4	<-----	4 or 20	RTS/ DTR
*CTS	5	----->	5	*CTS
GND	7	-----	7	GND

:

Specialix device				Terminal
DB25 Male (DTE)				DB25
TXD	2	----->	3	RXD
RXD	3	<-----	2	TXD
*RTS	4	----->	5	*CTS
CTS	5	<-----	4 or 20	RTS/ DTR
GND	7	-----	7	GND

Notes:

1. \* asterisk denotes that you should connect these pins only if input (from the Terminal to the Specialix device) flow control is required.
2. the pins used for hardware flow control may vary from terminal to terminal, but RTS (pin 4) on the Specialix device port must be connected to the pin on the terminal which indicates that the terminal buffer is full.
3. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND), at *either* your equipment *or* the Specialix device (but not both). P/GND will reduce interference in noisy environments.

4. Some terminals need additional signals on the connector. These may not be supported by the Specialix device, or your cable. The normal way to overcome this is to loopback one of the output lines from the terminal into the required input. Refer to the documentation supplied with your terminal, or the supplier of the terminal, for information on which loop-backs, if any, are required.

## Terminals (faster speed or using Hardware Flow Control)

**continued:**

with a Specialix RJ45 connector - on a direct (1:1) connection (no structured cabling system present):

Specialix device			Terminal	
RJ45			DB25	
RXD	6	<-----	2	TXD
TXD	5	----->	3	RXD
RTS	8	<-----	4 or 20	RTS or DTR
*CTS	7	----->	5	*CTS
S/GND	4	-----	7	S/GND

Notes:

1. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair (STP) cable. Connect P/GND at *either* your equipment *or* the Specialix device (but not both). P/GND will reduce interference in noisy environments.
2. \* asterisk denotes that you connect CTS to CTS only if input flow control (from the Terminal to the Specialix device) is required.

## A.9 Terminal Connection *using the modem device*

### A.9.1 *Without hardware flow control:*

Using the modem device on a local connection, you can ensure that the login process is killed when the terminal is switched off. This is achieved by wiring RTS or DTR on the terminal to DCD on the Specialix device port:

Specialix device				Terminal	
DB25 Female (DCE)				DB25	
RTA	RXD	2	<-----	2	TXD
	TXD	3	----->	3	RXD
	GND	7	-----	7	GND
	DCD	8	<-----	4 / 20	RTS / DTR

Specialix device				Terminal	
DB25 Male (DTE)				DB25	
RTA	TXD	2	----->	3	RXD
	RXD	3	<-----	2	TXD
	GND	7	-----	7	GND
	DCD	8	<-----	4 / 20	RTS / DTR

#### Notes:

1. Some terminals need additional signals on the connector. These may not be supported by the Specialix device, or your cable. The normal way to overcome this is to loopback one of the output lines from the terminal into the required input. Refer to the documentation supplied with your terminal, or the supplier of the terminal, for information on which loop-backs, if any, are required.
2. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND), at *either* your equipment *or* the Specialix device (but not both). P/GND will reduce interference in noisy environments.

## Terminal Connection *using the modem device*

*Without hardware flow control*

**(continued)**

with a Specialix RJ45 connector - on a direct (1:1) connection (no structured cabling system present):

<b>Specialix device</b>				<b>Terminal</b>	
<b>RJ45</b>				<b>DB25</b>	
RXD	6	<-----	2	TXD	
TXD	5	----->	3	RXD	
S / GND	4	-----	7	S / GND	
DCD	1	<-----	4 /	RTS /	
			20	DTR	

Notes:

1. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair (STP) cable. Connect P/GND at *either* your equipment *or* the Specialix device (but not both). P/GND will reduce interference in noisy environments.

## Terminal Connection *using the modem device*

### A.9.2 *With hardware flow control:*

Using the 'modem device' on a local connection, you can ensure that the login process is killed when the terminal is switched off. This is achieved by wiring RTS on the terminal to DCD on the Specialix device port:

Specialix device				Terminal	
DB25 Female (DCE)				DB25	
RXD	2	<-----	2	TXD	
TXD	3	----->	3	RXD	
RTS	4	<-----	20	DTR	
GND	7	-----	7	GND	
DCD	8	<-----	4	RTS	

Specialix device				Terminal	
DB25 Male (DTE)				DB25	
TXD	2	----->	3	RXD	
RXD	3	<-----	2	TXD	
CTS	5	<-----	20	DTR	
GND	7	-----	7	GND	
DCD	8	<-----	4	RTS	

#### Notes:

1. The above examples assume that DTR on the terminal is being used for hardware flow control.

If you are using RTS on the terminal as the hardware flow control pin, connect DTR on the Terminal to DCD on the Specialix device, and connect RTS on the terminal to either RTS or CTS on the Specialix device (RTS if Specialix connector is female (wired as DCE); CTS if Specialix connector is male (wired as DTE)).

2. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND), at *either* your equipment *or* the Specialix device (but not both). P/GND will reduce interference in noisy environments.

3. If your terminal still needs additional signals on the connector, note that these signals may not be supported by the Specialix device, or your cable. The normal way to overcome this is to loopback one of the output lines from the terminal into the required input. Refer to the documentation supplied with your terminal, or the supplier of the terminal, for information on which loop-backs, if any, are required.

## Terminal Connection *using the modem device*

*With hardware flow control:*

**(continued)**

with a Specialix RJ45 connector - on a direct (1:1) connection (no structured cabling system present):

<b>Specialix device</b>			<b>Terminal</b>	
<b>RJ45</b>			<b>DB25</b>	
RXD	6	<-----	2	TXD
TXD	5	----->	3	RXD
RTS	8	<-----	20	DTR
S / GND	4	-----	7	S / GND
DCD	1	<-----	4	RTS

Notes:

1. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair (STP) cable. Connect P/GND at *either* your equipment *or* the Specialix device (but not both). P/GND will reduce interference in noisy environments.
2. The above example assumes that DTR on the terminal is being used for hardware flow control.

If you are using RTS on the terminal as the hardware flow control pin, connect DTR on the Terminal to DCD on the Specialix device, and connect RTS on the terminal to RTS on the Specialix device.

# A.10 Modems

## A.10.1 direct (1:1) connections:

Specialix device				Modem	
DB25 Female (DCE)				DB25	
RXD	2	<-----	3	RXD	
TXD	3	----->	2	TXD	
RTS	4	<-----	5	CTS	
CTS	5	----->	4	RTS	
DSR	6	----->	20	DTR	
GND	7	-----	7	GND	
DCD	8	<-----	8	DCD	
DTR	20	<-----	6	DSR	

Specialix device				Modem	
DB25 Male (DTE)				DB25	
TXD	2	----->	2	TXD	Modem
RXD	3	<-----	3	RXD	
RTS	4	----->	4	RTS	
CTS	5	<-----	5	CTS	
DSR	6	<-----	6	DSR	
GND	7	-----	7	GND	
DCD	8	<-----	8	DCD	
DTR	20	----->	20	DTR	

Notes:

1. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND), at *either* your equipment *or* the Specialix device (but not both). P/GND will reduce interference in noisy environments.

## Modems; example connections,

### continued:

with a Specialix RJ45 connector and a direct (1:1) connection to the modem (no structured cabling system):

Specialix device			Modem		
RJ45			DB25		
RXD	6	<-----	3	RXD	
TXD	5	----->	2	TXD	
RTS	8	<-----	5	CTS	
CTS	7	----->	4	RTS	
DSR	2	----->	20	DTR	
S/GND	4	-----	7	S/GND	
DCD	1	<-----	8	DCD	
DTR	3	<-----	6	DSR	

### Notes:

1. At the modem, signal RXD is received data from the PSTN; signal TXD is transmitted data to the PSTN.
2. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair (STP) cable. Connect P/GND at *either* your equipment *or* the Specialix device (but not both). P/GND will reduce interference in noisy environments.

# A.11 PCs (DB9 connectors)

## example connections:

Specialix device				PC	
DB25 Female (DCE)				DB9	
TXD	3	----->	2	RXD	
RXD	2	<-----	3	TXD	
CTS	5	----->	8	CTS	
RTS	4	<-----	7	RTS	
GND	7	-----	5	GND	
DTR	20	<-----	4	DTR	
DSR	6	----->	6	DSR	

Specialix device				PC	
DB25 Male (DTE)				DB9	
TXD	2	----->	2	RXD	PC
RXD	3	<-----	3	TXD	
RTS	4	----->	8	CTS	
CTS	5	<-----	7	RTS	
GND	7	-----	5	GND	
DSR	6	<-----	4	DTR	
DTR	20	----->	6	DSR	

Note:

1. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND), at *either* your equipment *or* the Specialix device (but not both). P/GND will reduce interference in noisy environments.
2. if your PC is fitted with a DB25 connector, use the same DB25 pin-outs as for modems, shown in [Section A.10 Modems](#)

## PC, example connections,

(continued):

Specialix device				PC	
RJ45				DB9	
TXD	5	----->	2	RXD	
RXD	6	<-----	3	TXD	
RTS	8	<-----	7	RTS	
CTS	7	----->	8	CTS	
S / GND	4	-----	5	S / GND	

1. If your PC is fitted with a DB25 connector, use the same DB25 pin-outs as for modems, shown in [Section A.10 Modems](#)
2. We assume you are connecting your PC directly to the Specialix device (no structured cabling system).
3. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair (STP) cable. Connect P/GND at *either* your equipment *or* the Specialix device (but not both). P/GND will reduce interference in noisy environments.

# A.12 Serial Printers

## A.12.1 with *software* flow control

Specialix device				Printer	
DB25 Female DCE				DB25	
RXD	2	<-----	2	TXD	
TXD	3	----->	3	RXD	
GND	7	-----	7	GND	

Specialix device				Printer	
DB25 Male DTE				DB25	
TXD	2	----->	3	RXD	
RXD	3	<-----	2	TXD	
GND	7	-----	7	GND	

Notes on both examples:

1. In addition to the signals shown, you may connect Protective Ground (P/GND), at *either* your equipment *or* the Specialix device (but not both). P/GND will reduce interference in noisy environments.
2. Some printers require additional pins to be held high (connected). Check your printer's documentation and follow any instructions.

## Serial Printers; example connections,

with *software* flow control

**(continued)**

with a Specialix RJ45 connector and a direct (1:1) connection to the printer (no structured cabling system present):

Specialix device			Printer	
RJ45			DB25	
RXD	6	<-----	2	TXD
TXD	5	----->	3	RXD
S/GND	4	-----	7	S/GND

Notes:

1. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair (STP) cable. Connect P/GND at *either* your equipment *or* the Specialix device (but not both). P/GND will reduce interference in noisy environments.
2. Some printers require additional pins to be held high (connected). Check your printer's documentation and follow any instructions.

## Serial Printers, example connections, continued:

### A.12.2 with *hardware* flow control

Specialix device				Printer	
DB25 Female DCE				DB25	
RXD	2	<-----	2	TXD	
TXD	3	----->	3	RXD	
RTS	4	<-----	20	DTR	
GND	7	-----	7	GND	

Specialix device				Printer	
DB25 Male DTE				DB25	
TXD	2	----->	3	RXD	
RXD	3	<-----	2	TXD	
CTS	5	<-----	20	DTR	
GND	7	-----	7	GND	

Notes:

1. Printers have independent hardware flow control, using their DTR pin. Check your printer is doing the same.
2. In addition to the signals shown, you may connect Protective Ground (P/GND), at *either* your equipment *or* the Specialix device (but not both). P/GND will reduce interference in noisy environments.
3. Some printers require additional pins to be held high (connected). Check your printer's documentation and follow any instructions.

## Serial Printers; example connections,

with *hardware* flow control

(continued)

with a Specialix RJ45 connector and a direct (1:1) connection to the printer (no structured cabling system present):

Specialix device				Printer	
RJ45				DB25	
RXD	6	<-----	2	TXD	
TXD	5	----->	3	RXD	
RTS	8	<-----	20	DTR	
S/GND	4	-----	7	S/GND	

Notes:

1. The printer has independent hardware flow control, using its DTR pin. Check your printer is doing the same.
2. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair (STP) cable. Connect P/GND at *either* your equipment *or* the Specialix device (but not both). P/GND will reduce interference in noisy environments.
3. Some printers require additional pins to be held high (connected). Check your printer's documentation and follow any instructions.

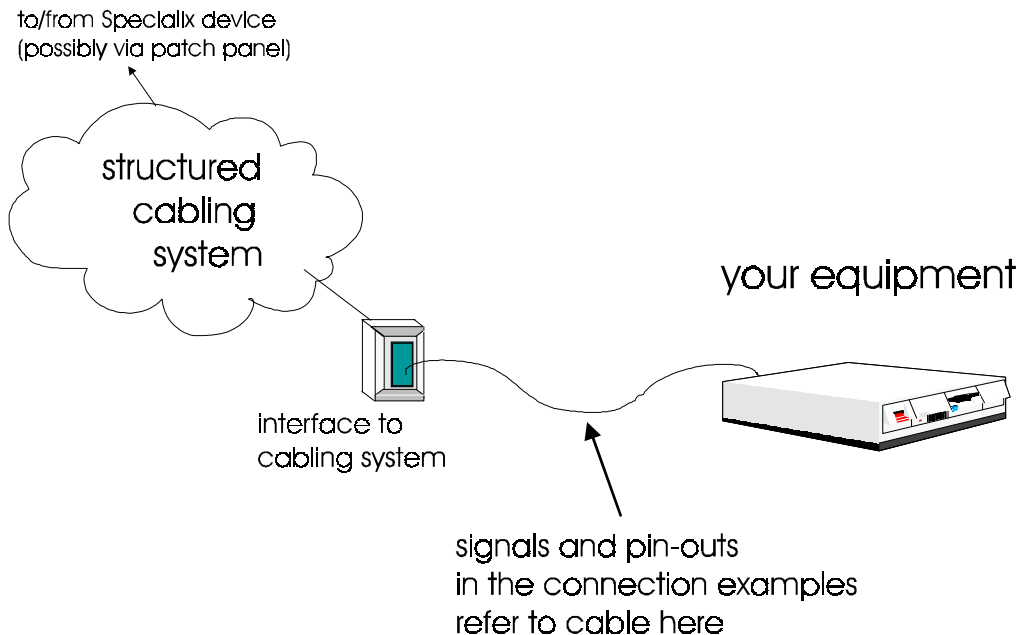
## A.13 Structured Cabling Systems

This section details structured cabling systems. For direct (1:1) connections, go to [Section A.7 Direct \(1:1\) Connections](#).

### Notes:

1. In the connection examples which follow, the signals shown refer to the connection at the end of the cabling system to which your equipment is attached - see [Figure 52](#). At the other end of the cabling system, where the Specialix device is attached, we assume - and recommend - you use a straight-through RJ45 cable to connect our Specialix device to the cabling system.

Figure 52 structured cabling system environment



2. *Within* (inside) the structured cabling system, we presume you use straight-through cabling, i.e. pin 1 to pin 1, pin 2 to pin 2, etc.
3. Some user equipment need additional signals on the connector. These may not be supported by the Specialix device, or your cable. The normal way to overcome this is to loopback - on the your equipment - one of the output lines to the required input. Refer to the documentation supplied with your equipment, or the supplier of the equipment, for information on which loopbacks, if any, are required.
4. At each end of the cable, you must terminate all pairs of wires on connector pins. An unconnected wire will receive electromagnetic radiation and possibly create interference in the cable.
5. If you have wiring other than shown in the connection examples, and DCD is an input on your equipment, ensure that it is **not** connected to DCD in the Specialix device.
6. On the RJ45 connector, Protective Ground (P/GND) terminates on the connector and so does not have a pin number.

## A.13.1 Example Connections

In this section we show example connections between Specialix ports and the following devices:

### **Terminals**

structured cabling system  
Terminal Connection  
using the modem  
device

*[Section A.13.2](#)*

*[Section A.13.3](#)*

### **Modems**

structured cabling system

*[Section A.13.4](#)*

### **PCs (DB9 connectors)**

structured cabling system

*[Section A.13.5](#)*

### **Serial Printers**

structured cabling system

*[Section A.13.6](#)*

## Terminals, example connections:

### A.13.2 structured cabling system

With a structured cabling system, use the example below to connect any type of terminal. The pins and signals refer to the end of the cabling system to which the terminal is attached - see [Figure 52](#). We have shown the signals of a Wyse 60 terminal; for any other type of terminal, refer to the terminal's documentation.

Interface to cabling system			Terminal	
RJ45			DB25	
RXD	6	<-----	2	TXD
TXD	5	----->	3	RXD
RTS	8	<-----	20	DTR
CTS	7	----->	5	CTS
DSR	2	----->	6	DSR
S/GND	4	-----	7	S/GND
DCD	1	<-----	4	RTS
DTR	3	<-----		
		(n/c)		DCD

#### Notes:

- In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair cable. Connect P/GND at *either* your equipment *or* the interface to cabling system (but not both). P/GND will reduce interference in noisy environments.
- Meaning of ' | ':* the DCD and DTR signals to the interface to the cabling system originate/terminate jointly on the RTS pin at the terminal.
- The DCD pin at the terminal is not connected (n/c); (devices other than the Wyse 60 may require that the DCD pin is held high).
- At the end of the cabling system to which the Specialix device is attached, use a straight-through cable.
- The minimum connection requirement is the RXD/TXD, TXD/RXD, RTS/RTS or DTR, CTS/CTS (if input flow control required) and S/GND signals (Interface to Cabling System/Terminal). The other pins may be connected (as in our example) to ensure minimum interference from unconnected pins.
- For general advice on structured cabling systems, see [Section A.13 Structured Cabling Systems](#).

## Terminal Connection *using the modem device*

**example connections:**

### A.13.3 structured cabling system:

Interface to cabling system			Terminal		
RJ45			DB25		
RXD	6	<-----	2	TXD	
TXD	5	----->	3	RXD	
RTS	8	<-----	20	DTR	
CTS	7	----->	5	CTS	
DSR	2	----->	6	DSR	
S / GND	4	-----	7	S / GND	
DCD	1	<-----	4	RTS	
DTR	3	<-----			
		(n / c)		DCD	

Notes:

1. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair (STP) cable. Connect P/GND at *either* your equipment *or* the interface to the cabling system (but not both). P/GND will reduce interference in noisy environments.
2. The above example assumes that DTR on the terminal is being used for hardware flow control. If you are using RTS on the terminal as the hardware flow control pin, connect DTR on the Terminal to DCD and DTR on the interface to the cabling system, and connect RTS on the terminal to RTS on the interface to the cabling system.
3. *Meaning of ' | ':* the DCD and DTR signals at the interface to the cabling system originate/terminate jointly on the RTS pin at the terminal.
4. The minimum connection requirement is the RXD/TXD, TXD/RXD, RTS/DTR, S/GND and DCD-DTR/RTS signals (Interface to Cabling System/Terminal). The other pins may be connected (as in our example) to ensure minimum interference from unconnected pins.

## Modems, example connections:

### A.13.4 structured cabling system

with a structured cabling system present, the example below is shown at the modem end - see [Figure 52](#); (use a straight-through cable at the Specialix device end).

Interface to cabling system				Modem	
RJ45				DB25	
RXD	6	<-----	3	RXD	
TXD	5	----->	2	TXD	
RTS	8	<-----	5	CTS	
CTS	7	----->	4	RTS	
DSR	2	----->	20	DTR	
S/GND	4	-----	7	S/GND	
DCD	1	<-----	8	DCD	
DTR	3	<-----	6	DSR	

#### Notes:

1. At the modem, signal RXD is received data from the PSTN; signal TXD is transmitted data to the PSTN.
2. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair (STP) cable. Connect P/GND at *either* your equipment *or* the interface to cabling system (but not both). P/GND will reduce interference in noisy environments.
3. For general advice on structured cabling systems, see [Section A.13 Structured Cabling Systems](#).

## PC, example connections:

### A.13.5 structured cabling system

Interface to cabling system				PC	
RJ45				DB9	
TXD	5	----->	2	RXD	
RXD	6	<-----	3	TXD	
RTS	8	<-----	7	RTS	
CTS	7	----->	8	CTS	
S / GND	4	-----	5	S / GND	
DCD	1	<-----	1	DCD	
DSR	2	----->	6	DSR	
DTR	3	<-----	4	DTR	

1. If your PC is fitted with a DB25 connector, use the same DB25 pin-outs as for modems, shown in Section [A.13.4](#)
2. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair (STP) cable. Connect P/GND at *either* your equipment *or* the interface to cabling system (but not both). P/GND will reduce interference in noisy environments.
3. The minimum connection requirement is the TXD/RXD, RXD/TXD, RTS/RTS, S/GND and CTS/CTS signals (Interface to Cabling System/Terminal). The other pins may be connected (as in our example) to ensure minimum interference from unconnected pins.
4. For general advice on structured cabling systems, see [Section A.13 Structured Cabling Systems](#).

## Serial Printers, example connections:

### A.13.6 structured cabling system

With a structured cabling system present, the example below is shown at the printer end; (use a straight-through cable at the Specialix device end).

Interface to cabling system				Printer	
RJ45				DB25	
RXD	6	<-----	2	TXD	
TXD	5	----->	3	RXD	
RTS	8	<-----	20	DTR	
CTS	7	----->	5	CTS	
DSR	2	----->	6	DSR	
S / GND	4	-----	7	S / GND	
DCD	1	<-----	4	RTS	
DTR	3	<-----			
		( n / c )		DCD	

Notes:

1. *Meaning of ' | '*: the DCD and DTR wires at the cabling system originate/terminate jointly on the RTS pin at the printer.
2. The DCD pin at the printer is not connected (n/c); (other printers may require that the DCD pin is held high).
3. The minimum connection requirement is the RXD/TXD, TXD/RXD, RTS/DTR and S/GND connections (Interface to Cabling System/Printer). The other pins may be connected (as in our example) to ensure that there is minimum interference from unterminated pins.
4. In addition to the signals shown in the examples above, you may connect Protective Ground (P/GND) if you have shielded twisted-pair (STP) cable. Connect P/GND at *either* your equipment *or* the interface to cabling system (but not both). P/GND will reduce interference in noisy environments.
5. The printer is using its DTR pin for hardware flow control. Check your printer is doing the same.
6. For general advice on structured cabling systems, see [Section A.13](#)

# Appendix B

## Hardware Problems & Diagnostics

### B.1 Contents

- [B.2 SX Bus Timing Problems](#)
- [B.3 Hardware Diagnostics Program](#)
- [B.4 Technical Support](#)

### B.2 SX Bus Timing Problems

Timing problems may occur on the SX BUS between the SX host card and older versions (revision (Rev) level of F, G and H) of the MTA (Modular Terminal Adapter). Fitting a bus terminator to the last MTA in the chain fixes this timing problem.

*Note: There are no timing problems with the TA (Terminal Adapter). However, only the TA4 (part no. 00-35000) and TA8 (part no. 00-36000) Terminal Adapters work with the new SX host cards.*

The SX BUS timing problem effects the flow of information between your SX host card and revision (Rev) levels F, G or H MTAs. The normal symptom is that the port hangs or locks up. If using the customer diagnostics you may also see failure of the SX Bus Test.

*Note: This problem does not occur with the older style SI/XIO host cards; (Z280-based host cards).*

The revision (Rev) level is shown on the underside of the MTA, for example 'Level IB'. The first letter signifies the revision level, in this example 'I' (letter I). If there is no level indication on your MTA, your product was manufactured before revision F.

## B.2.1 Corrective Actions for MTAs with revision levels F, G and H

Should you experience a timing problem call your local Specialix support centre. If necessary, they will supply you with a bus timing terminator which should be fitted to the vacant bus connector on the last MTA in the chain.

Alternatively you may send your MTAs with revisions F, G and H to Specialix for modification. The repair time will be between 5 and 10 working days.

## B.3 Hardware Diagnostics Program

### B.3.1 Introduction

The SX Hardware Diagnostics program enables you to pinpoint and diagnose faults with your SX host cards and device concentrators (TAs, MTAs or SXDC8s).

You will find the Diagnostics program on the HandyWEB CD.

### Before you start...

---

**Caution**

---

***Specialix host cards and device concentrators must only be installed or removed whilst your machine is switched off. Failure to observe this procedure may cause damage to your equipment and will invalidate your warranty.***

The diagnostics must be run under DOS. If you can't run DOS on your machine, you will have to re-install your host card(s) in a machine that can.

Make sure that each host card to be tested has at least one device concentrator (of any type) attached.

You will need to make up at least one loopback connector for the external loopback test. Specifications for loopback connectors vary according to the type of port. See the Section '[Section B.3.4 Loopback Connectors](#)'.

Though not essential, the diagnostics are best run on a colour monitor.

## B.3.2 To run the diagnostics:

1. Boot your machine under DOS.
2. Insert the HandyWEB CD into the appropriate disk drive.
3. Copy the Diags directory (/drivers/sx/diags/) onto your hard disk (or any other writeable disk).

---

### Caution

---

***The diagnostics will not run from the CDROM; the program can run only from writeable media.***

4. From your hard disk, go to the directory where you have placed the hardware diagnostics program. Enter the command `sx`
5. Select which host card you want to test (you will be prompted).
6. Select which device concentrator you want to test (if more than one device concentrator is connected to the card, you will be prompted to make a selection). If you have an MTA, you will be asked to select type of module (module = group of four ports; ports 1- 4 are the first module, ports 5-8 are the second module).

The customer tests will run automatically on the host card followed by the device concentrator. The various tests are as follows:

### RAM/Bus Tests (and others)

The program carries out a number of tests on RAM, interrupt, bus and other areas (see screen). As each test is completed, PASS or FAIL will be displayed.

### External loopback test

The program pauses at the External Loopback test. You will need a loopback connector to do this test; see [Section B.3.4](#) for details.

Fit the loopback connector to port 1\* (see [note: \\*](#) below) of the device concentrator and press F2. The first port will be tested; watch messages at the bottom of your screen.

**note: \*** . if your MTA or SXDC8 has a parallel port fitted in port 1, the Parallel port will be ignored by the diagnostics, and the loopback connector should be fitted to port 2.

When you see the message 'test completed' or 'connect loopback' the program is ready for you to move the existing loopback connector onto the next port.

*Do not move the loopback connector until you see one of the above messages.*

Move the loopback connector onto the next port; the test will begin on this next port automatically.

The external loopback test assumes a FAIL condition unless you test *all* of the ports.

## LED test

The diagnostics pause again before the LED test; (if you have opto-isolated ports fitted in your MTA go now to the Section '[Opto-isolated ports](#)' below).

The LED test is carried out on the led or leds on your device concentrator. The number and location of leds depends on the type of device concentrator you are testing; see [Section 5.3](#) for help.

The LED test prompts you (at the bottom of the screen): 'MODULE LED OFF (Y)ES OR (N)O'. Look at the LED; if it has gone off (out) press Y.

The test then prompts you: 'MODULE LED GREEN (Y)ES OR (N)O'. Look at the same LED; if it is displaying green press Y.

Repeat the test for the second (bottom) LED (second LED only if your adapter is an SXDC8 or MTA).

## SI bus test

(for MTA and SXDC8 types of device concentrator only). The program will pause before this test. Press F2 then fit a loopback connector to the port. See the pass or fail message.

## Completion of tests

When all the tests have been completed, you can either press F1 to exit the diagnostics, or press ESC until you reach the host card or device concentrator menus to select another host card or device concentrator for testing.

If you find a fault with a host card or device concentrator, contact your Technical Support immediately.

## Opto-isolated ports

*This section applies only to the LED test where you have opto-isolated ports fitted on your MTA.*

Opto-isolated modules have five leds per module (one module led and four port leds). If your MTA is fitted with two opto-isolated modules (i.e. all eight ports are opto-isolated) you will have a total of ten leds on the MTA.

You will need the opto-loopback connector to do the LED test; (same connector you used on the [External loopback test](#)).

The leds on opto-isolated modules are tested as follows:

**first module  
(ports 1 to 4)**

The LED test prompts you (at the bottom of the screen): 'MODULE LED RED (Y)ES OR (N)O'. Look at the module LED (for ports 1 to 4); if it is displaying RED press Y.

The test then prompts you: 'MODULE LED GREEN (Y)ES OR (N)O'. Look at the same LED; if it is displaying green press Y.

Insert an RJ45 opto-isolated loopback plug in port 1.

The test prompts you (at the bottom of the screen): 'PORT LED RED (Y)ES OR (N)O'. Look at the LED; if it is displaying RED press Y.

The test then prompts you: 'PORT LED GREEN (Y)ES OR (N)O'. Look at the same LED; if it is displaying green press Y.

The test prompts you: 'REMOVE LOOPBACK PLUG. PORT LED OFF (Y)ES OR (N)O'. Remove the loopback plug from port 1. Look at the LED for port 1; if it has gone off (out) press Y.

Insert the loopback plug into port 2.

The port led test will be repeated on port 2. The test will prompt you with the same questions as for port 1. The test will wait for your response to each message before proceeding.

After testing port 2, move the loopback plug to port 3.

Test ports 3 and 4 using the same method as described for ports 1 and 2.

After testing port 4, the test will proceed to the second module (ports 5 to 8).

**second module  
(ports 5 to 8)**

The test will begin with the prompt you: 'MODULE LED GREEN (Y)ES OR (N)O'. Look at the LED for ports 5 to 8; if it is displaying green press Y.

The remainder of the prompts and tests are repeated in the same order as the *first module (ports 1 to 4)*; insert/remove the loopback plug in the same order.

After testing ports 5 to 8, the led test on that one MTA is complete.

### B.3.3 Troubleshooting

If during the interrupt test the Diagnostics program locks up, return to the DOS prompt and type

```
sx -xi
```

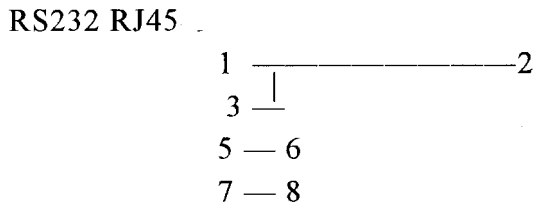
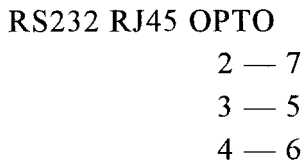
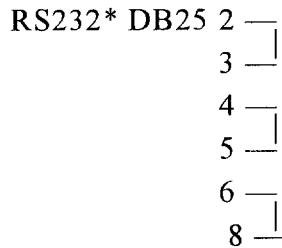
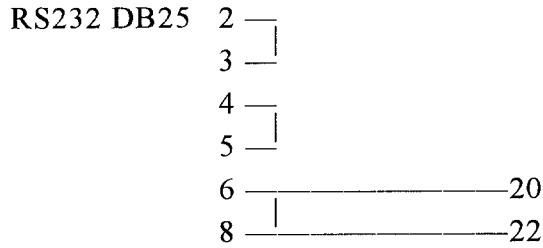
Note the single space after the x (in `sx`) and *before* the minus sign (-).

This command will run the program without the interrupt test.

### B.3.4 Loopback Connectors

Specifications for loopback connectors vary according to the type of port, and are shown below.

Figure 53  
Loopback  
connectors



Note: RS232\* indicates a parallel port.

Figure 54  
loopback  
connectors  
(continued)

RS422 DB25	2 —	—6
	3 —	—8
	4 —	—20
	5 —	—22
	14 —	—10
	16 —	—18
	13 —	—21
	19 —	—23
RS423 DB25	2 —	—6
	3 —	—8
	4 —	—20
	5 —	—10
	14 —	—22
	16 —	—23

## B.4 Technical Support

*If you bought your SX from a registered Specialix supplier*, you must contact their Technical Support department; they are qualified to deal with your problem.

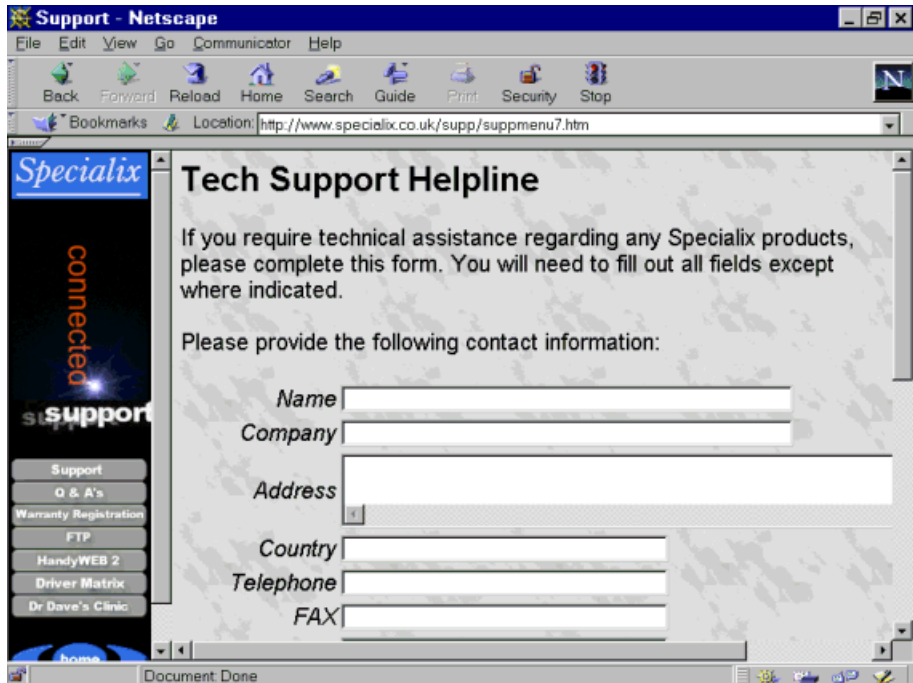
*If you are a registered Specialix supplier*, and bought your SX from Specialix, contact Specialix Technical Support at these offices listed below.

In addition to describing your problem, please have ready - or send - as a minimum: your name, company, country, phone and fax numbers and the name of the Specialix product.

If you contacting Specialix directly and you have an internet connection, please send details of your problem to Technical Support using the form shown in Figure 33. You will find the form on the Specialix web site in the 'Support' area.

For information on **repairs**, see Section B.4.1.

Figure 55  
Website Support  
form



## Europe

### United Kingdom

Specialix Europe Ltd.  
3 Wintersells Road  
Byfleet Surrey KT14 7LF  
UK

Telephone: +44 (0) 1932 792555 (Support)  
+44 (0) 1932 792592 (Main Switchboard)

Facsimile: +44 (0) 1932 792600

e-mail: [support@specialix.co.uk](mailto:support@specialix.co.uk)

ftp site: [ftp.specialix.co.uk](ftp://ftp.specialix.co.uk). Use your e-mail address for your password.

web site: [www.specialix.co.uk](http://www.specialix.co.uk)

**France**

Specialix Ltd.  
13 Avenue Morane - Saulnier  
78140 Velizy  
FRANCE  
Telephone: +33 (1) 34 63 0670  
Facsimile: +33 (1) 34 65 38 60

e-mail, ftp and www contact details, as for UK.

**USA**

Specialix Inc.  
745 Camden Avenue #129  
Campbell  
CA95008-4146  
USA  
Telephone: +1 (408) 378-7919  
(Freephone): +1 (800) 423-5364 (USA only)  
Facsimile: +1 (408) 378-0786

US support is open from 7am Pacific (10am Eastern) time until 5pm Pacific (8pm Eastern) time.

E-mail: [support@specialix.com](mailto:support@specialix.com)

World Wide Web: [www.specialix.com](http://www.specialix.com)

**Asia****China**

Specialix Pte Ltd.  
Suite A308, Long Bo Office Building  
No 3 Nan Li Shi Road  
Xi Cheng District  
Beijing 100037  
China

Telephone: +86 (10) 6802 4870

Facsimile: +86 (10) 6802 4869

Email: [spx@public.bta.net.cn](mailto:spx@public.bta.net.cn)

**Singapore**

Specialix (Asia) Pte Ltd.  
Yu Li Industrial Building

No 37 Lor 23 Sims Avenue #04-01/03  
Singapore 388371

Telephone: +65 749 1700

Facsimile: +65 749 2003

Email: support@specialix.co.uk

## B.4.1 Repairs

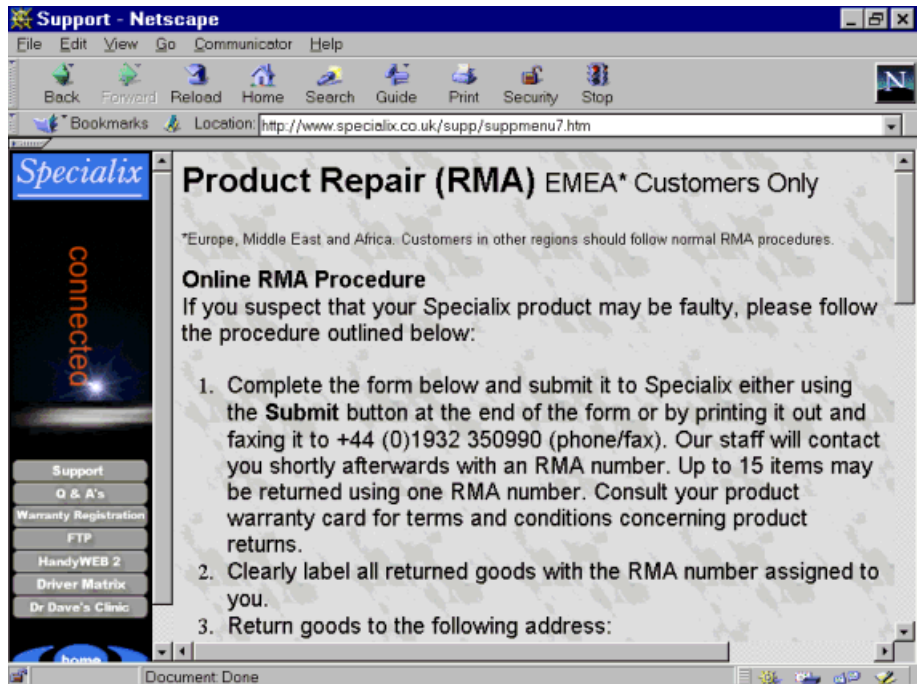
Before sending an item for repair you must contact your Specialix supplier. If however you bought your product directly from Specialix, contact Specialix at the numbers listed below:

Europe,	phone	+44 1932 345207
	fax:	+44 1932 350990
	e-mail:	RMA@specialix.co.uk

USA, Asia, Australia      contact the offices shown in the Technical Support section

Customers in Europe, Middle East and Africa can use a website form to submit repair details; an example of the form is shown below. This form is on the Specialix website, web site, [www.specialix.co.uk](http://www.specialix.co.uk) or [www.specialix.com](http://www.specialix.com), in the 'Support' area.

Figure 56  
Website  
RMA form





# Appendix C

## Standards Compliance

### SXDC8

The SXDC8 will meet or exceed the requirements of the following standards:

#### Safety

BSEN60950

CSA NRTL/C

IEC 950

UL1950, CSA C22.2 No. 950

In CB Format

#### Emissions

FCC class A

EN50081-2

#### Immunity:

EN50082-1

## JET PCI host card

The SX PCI host card will meet or exceed the requirements of the following standards:

### Technical

PCI Local Bus Specification 2.1 (June 1995)

### Emissions

FCC class A  
EN50081-2

### Immunity:

EN50082-1

## SX ISA host card

The SX ISA host card will meet or exceed the requirements of the following standards:

### Emissions

FCC class A  
EN50081-2

### Immunity:

EN50082-1

## **MTA, TA8, TA4**

These products will meet or exceed the requirements of the following standards:

### **Emissions**

FCC class A  
EN50081-2

### **Immunity:**

EN50082-1



# Appendix D

## Hardware Configuration Record

### D.1 SX Host Cards

Use the table below to record the serial number and revision level of each host card you install. These numbers are printed on the surface of the cards; (e.g. see [Figure 33](#)).

Host Card Model	Serial Number	Revision Level
(1)		
(2)		
(3)		
(4)		

### D.2 Device Concentrators

Use the table below to record the type, serial number and revision level of each device concentrator. The serial number and revision level are on a label on the back of the unit.

TA/MTA/SXDC8 Model	Serial Number	Revision Level
(1)		
(2)		
(3)		
(4)		
(5)		

---

<b>TA/MTA/SXDC8 Model</b>	<b>Serial Number</b>	<b>Revision Level</b>
(6		
(7)		
(8		
(9)		
(10)		
(11)		
(12)		
(13)		
(14)		
(15)		
(16)		

# Appendix E

## Feedback

### E.1 Introduction

We welcome your comments on this guide.

Please send us your views, by post or fax, to any Specialix office worldwide. (see details in Section C.10 Technical Support). Send it for the attention of Documentation Feedback, c/o Technical Support. Use a photocopy of this page.

Alternatively, you can send us an e-mail, at:

`docfeedback@specialix.co.uk`

We will endeavour to incorporate your comments in the next edition.

### E.2 Comments

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**Document: SX, Installation Guide**

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