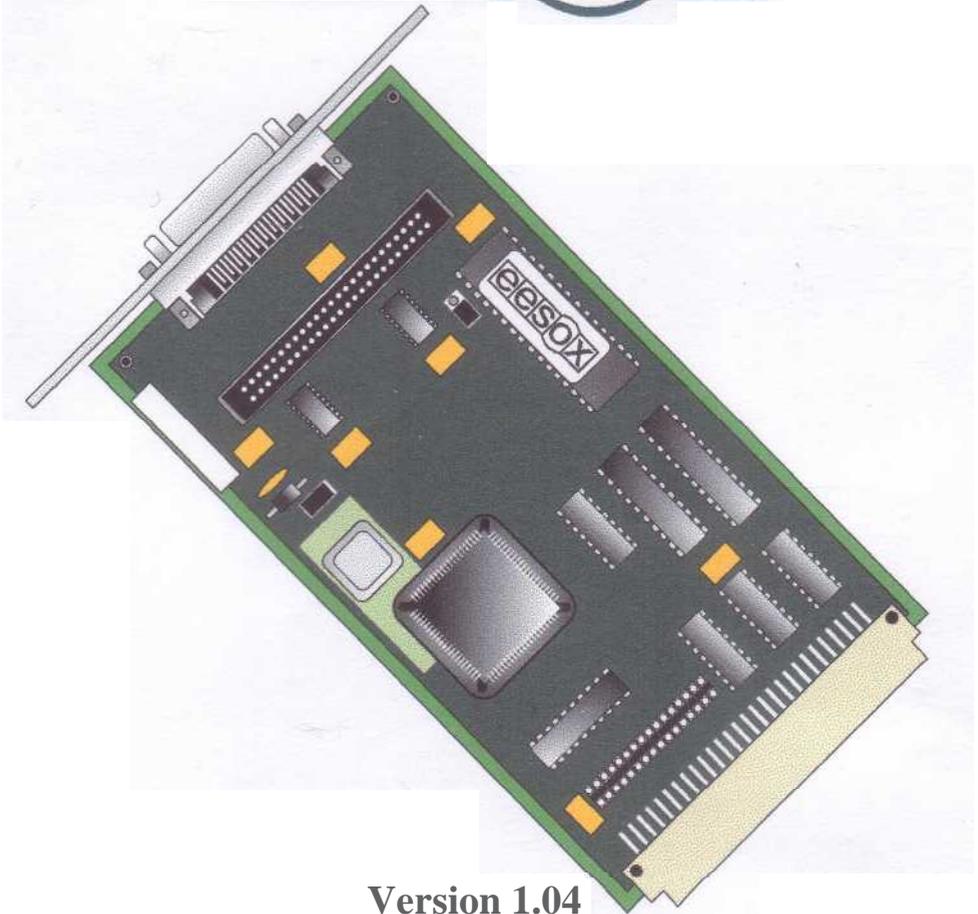


eesox



Version 1.04

'Fast' SCSI-2 Interface

Installation and User Guide

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1

Introduction

Thank you for purchasing an Eesox 'Fast' SCSI-2 interface.

This user guide will help you to install your interface and SCSI devices as well as helping you through using the accompanying software and using specific types of SCSI devices. To simplify the usage of this SCSI interface, the supplied firmware and software has been specifically written to automate much of the configuration of your system and devices.

What is SCSI ?

SCSI is an acronym for 'Small Computers Systems Interface'. Put simply SCSI is a hardware and software standard which allows 2 or more devices to pass data between each other. Typically, with SCSI you can have up to 8 devices, either internal or external, all connected together with a total cable length of up to 7 meters. The SCSI interface itself is treated as any other SCSI device.

SCSI is a widely adopted standard by many manufacturers, thus enabling all manner of devices to be connected to your SCSI interface.

1.1 Standards

This SCSI interface conforms to the following standards:-

- Acorn SCSI driver interface
- EMC conformance tested and approved
- SCSI-2 standard (document No. X3.131-199X)
- 'Fast' SCSI-2 implementation and timings
- SCSI-I backward compatibility
- Single-ended SCSI bus
- Acorn DEBI interface (including DMA)

1.2 System Requirements

The SCSI interface may be used on any of the following Acorn Computers:-

- RISC PC
- A7000 & A7000+
- A5000 t
- A3000 (external 16 bit interface only) t
- A540, A400 & A300 t
- R260 & R140 t

RISC OS 3.0 or later is required. StrongArm compatible.

(t Computer does not support DMA - but SCSI interface will still function)

1.3 Conventions Adopted in this User Guide

Items which are to be typed in from the keyboard are shown in a different type face; each line shown should be completed with a 'Return' or

eg. `*Configure SCSIHostID 7`



This symbol indicates technical reference information and you may skip these parts of the manual if you wish.

1.4 Supported SCSI Devices

The SCSI interface will work with any SCSI-2 device, and should also work with any SCSI-1 & SCSI-3 device. There is no need to make any distinction between them.

The firmware (software in EPROM) and supporting software, directly supports the following devices, thus no additional software is required.

- direct access device (ie. hard discs etc)
- CD-ROM drives
- removable media devices of the above types.

Other devices such as the ones listed below, will require additional control software which should be provided with the SCSI device.

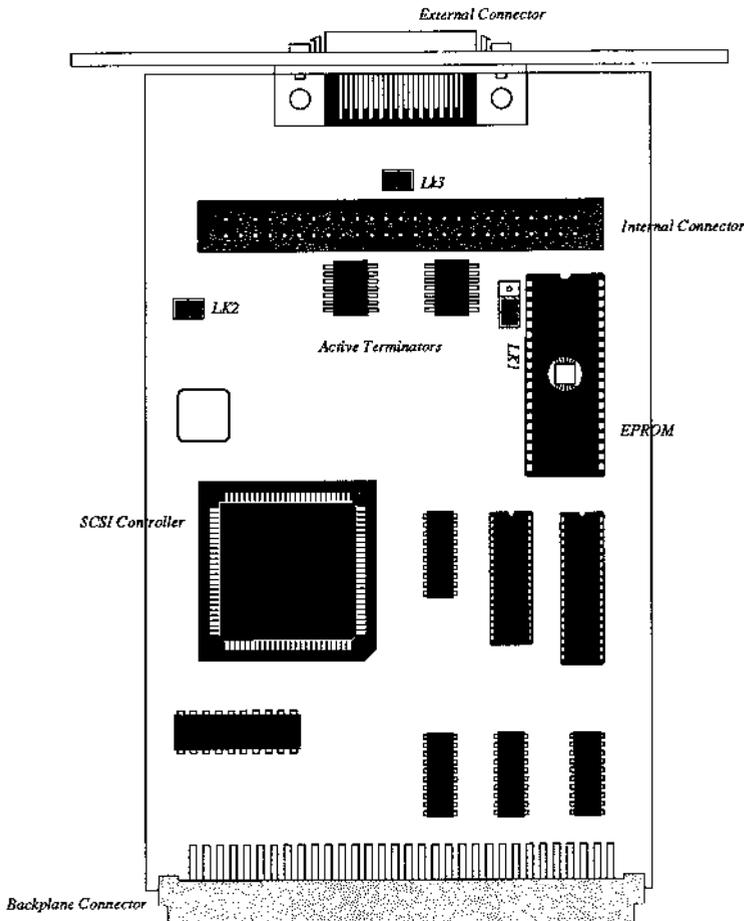
- CD-Recorders
- tape backup devices
- scanners
- printers
- digital cameras

See Chapter 'Using Other SCSI Devices' for further information about specific types of devices.



The 'Fast' SCSI-2 Interface

Below is a diagram of Eesox's 'Fast' SCSI-2 Interface, which will help you to identify parts of the interface which are referred to later on in this User Guide.



<i>LK1</i>	EPROM selector. Should not be altered unless instructed to do so.
<i>LK2</i>	Tenn power. SCSI interface provides termination power to the SCSI bus when on.
<i>LK3</i>	Should not be removed.
<i>Internal connector</i>	50 way IDC connector for connecting internal SCSI devices. With polarised boxed header for easy cable insertion and removal.
<i>External connector</i>	50 way high density 'D' type connector (SCSI-2) for connecting external SCSI devices. With cable retention posts.
<i>EPROM</i>	A socketed EPROM which can be replaced with an Eesox approved firmware upgrade. Non approved upgrades will invalidate the licence.
<i>SCSI controller damage</i>	A socketed SCSI controller. Can easily be replaced in event of upgrade. Non approved upgrades will invalidate the licence.
<i>Active Terminators</i>	Active terminators, enabled/disabled by software, see chapter '*commands'.
<i>Backplane connector</i>	Connects the SCSI interface to the computer's backplane.
<i>Reset switch</i>	A protection device, which can prevent damage to the SCSI interface in the event of a faulty device or cable being connected. The switch will automatically reset when the offending article is removed.

3

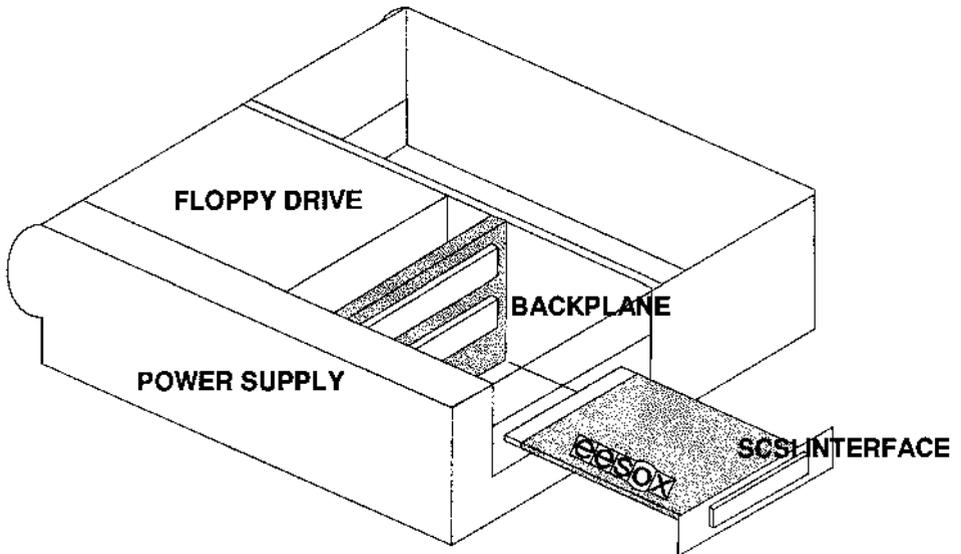
Installation

Installing the SCSI Interface is simple and straight forward. Firstly, you need to identify which computer you have and follow the instructions below for that particular system. Static protection precautions should be observed whilst handling any electronic device.

Once the SCSI interface has been installed read the section in this chapter entitled 'Firmware Auto-Configuration', and the chapter 'Configuration'.

3.1 RISC PC Installation

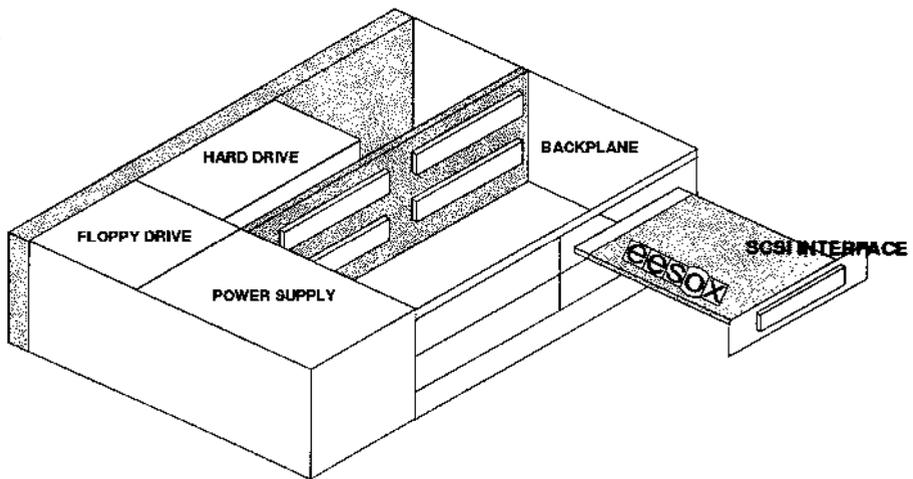
- 1) Switch off the computer and disconnect the mains cable.
- 2) Locate the two fixing lugs at the rear of the machine, rotate 90 degrees and lift upwards to remove them completely.
- 3) Remove the lid by lifting the rear and pulling it backwards.



- 4) Locate the backplane in the machine and find an empty slot to put your SCSI interface into. This SCSI interface will work fastest in slots 0 & 1 (bottom two slots). NB: some RISC PCs are sold without the backplane. If your system does not have one, then a backplane is available separately.
- 5) Remove the blanking panel at the rear of the computer which corresponds to the slot you have decided to use. There are two small screws which must be retained.
- 6) Carefully remove the SCSI interface from its static protective **packaging**. Insert the card through the rear of the slot, and push the interface **connector** into the connector of the backplane. Push firmly to ensure it is fully seated on the connector.
- 7) Screw the interface onto the rear using the two screws removed **from the** blanking panel. Only lightly tighten the first screw, then screw in **the second** screw. Tighten both screws.
- 8) If you have any internal SCSI devices, then connect a **cable from the** internal SCSI connector to your SCSI devices.
- 9) Refit the lid and the locking lugs.
- 10) Reconnect the mains cable and any other cables removed.
- 11) If you have any external SCSI devices to add at this time, then connect an appropriate SCSI cable to the external SCSI connector.
- 12) The SCSI interface installation is now complete. Read section 'Firmware Auto-Configuration' to ensure firmware installation is completed. **and don't** forget to check that you have set termination correctly.

3.2 A5000 Installation

- I) Switch off the computer and disconnect all peripheral cables including the mains cable.



- 2) Turn the A5000 upside down, and undo the 4 screws holding the case in place.
- 3) Turn the A5000 the correct way up, with the rear towards you. Hold the sides firmly and slide the case towards you; remove it completely.
- 4) Locate the backplane inside the A5000 and find a slot which is not used. (Any slot will suffice.) Remove the two screws holding the blanking panel for the chosen slot.
- 5) Carefully remove the SCSI interface from its static protective packaging. Insert the card through the rear slot, and push the interface connector into the connector on the backplane. Push firmly to ensure it is fully seated on the connector.
- 6) Screw the interface onto the rear using the two screws removed from the blanking panel. Only lightly tighten the first screw, then screw in the second screw. Tighten both screws. If there are no other interfaces next to the SCSI interface card you will have a gap so you will require a half width conversion kit to blank off this gap.
- 7) If you have any internal SCSI devices, then connect a cable from the internal SCSI connector to your SCSI devices.
- 8) Refit the case by pushing it back onto the rear of the computer and sliding it all the way to the front (make sure the put you case on the correct way round).
- 9) Turn the A5000 upside down, and refit the 4 screws.
- 10) Turn the A5000 the right way up and reconnect all cables.
- 11) If you have any external SCSI devices to add at this time, then connect an appropriate SCSI cable to the external SCSI connector.
- 12) The SCSI interface installation is now complete. Read section 'Firmware Auto-Configuration' to ensure firmware installation is completed, and don't forget to check that you have set termination correctly.

3.3 **Firmware Auto-Configuration**

The firmware on this SCSI interface (in EPROM) has an auto-configure initialisation sequence the very first time you switch on your computer after installing the interface. This will initialise the SCSI card to a pre-defined state which should allow you to use your interface immediately without having to do anything.

Just switch on your computer and wait for it to complete its boot-up sequence. The SCSI interface should now have installed itself (see below for details) and is ready to be used.

You may now wish to read the chapters 'Using Hard Disc and Removable Drives' and 'Using CD-ROM Drives' to help you get started with these devices.

3.3.1 Checking the Installation

If you are having difficulties you may need to check that the installation is fully completed, which may not be the case if some of the modules have been unplugged by your system.

On the command line (press F12) and type:

```
*help SCSIDriver
*help SCSIResources
*help SCSIIFS
*help SCISupport
```

For each of the above commands you should see some help text. If you get a message 'No help found', then one or more of the modules has been unplugged.

To fix this, you will now need to 're-insert' them by typing the lines:

```
*RMInsert SCSIDriver
*RMInsert SCSIResources
*RMInsert SCSIIFS
*RMInsert SCISupport
```

Switch off the computer, wait 10 seconds, then switch it back on again. This time the firmware should be installed.



3.4 Initialisation Defaults

The auto-eonfigure defaults will be set to the following:-

SCSIHostID	7
SCSITerminators	On
SCSIFSDrive	4
SCSIFSDirCache	32K

If you wish to change any of these, please refer to the chapter 'Configuring the SCSI Interface'.

If you have both internal and external SCSI devices attached you should configure SCSITerminators to 'Off'.

4

Connecting SCSI Devices

Whenever you wish to connect or remove a SCSI device, you must ensure that you do so correctly. Incorrect setup may cause one or more of the devices not to function correctly, giving rise to data corruption.

Remember, whenever connecting or disconnecting SCSI cables, the computer and all other devices must be turned off. Failure to do so may result in damage to one or more of the devices.

4.1 The SCSI Bus



4.1.1 SCSI Devices and Device IDs

SCSI-2 allows for up to 8 individual SCSI devices to be connected together. The 'Fast' SCSI-2 Interface is one of these devices, so you may connect up to 7 other devices.

Each device must be given a unique 'Device ID'. Virtually all SCSI devices allow you to change the device ID. See your device's manual on how to select these. The SCSI interface's device ID can also be changed (see chapter 'Configuring').

The higher device ID values have the highest priority. This means that devices with the higher device ID will perform their tasks before lower priority devices when two devices want access to the bus at the same time. Therefore, SCSI interfaces are typically set to device ID 7, which is the highest priority device. Priority values are only relevant when multiple devices are being used concurrently which may occur with the Eesox SCSI interface, but not with many others. Device IDs can be in any order on the SCSI bus.

4.1.2 Logical Unit Numbers and LUN IDs

Each SCSI device is allowed up to 8 logical units, starting at 0. LUNs are typically used for devices which have several sub-sections. The devices normally allocate the LUNs automatically, but others may allow you to select them manually. All devices must have a logical unit 0.

4.1.3 SCSI Bus and cables

The cables connecting the different devices carry the SCSI bus to all the devices. There is only one bus and all the devices must share it. The cable must therefore form a single continuous length from the first SCSI device to the last SCSI device. Typically, internal SCSI devices are connected via a length of ribbon cable, which has one connector for each device. External SCSI devices usually have two connectors which are looped to each other; a specific SCSI cable can be used to connect to one of these connectors as the input from another device, and another cable can be used as an output to the next device, thus maintaining a single contiguous length.

The maximum length of the SCSI bus (single-ended) is specified as 6 metres, however this is in ideal condition, with ideal cables. The longer the cable the slower the SCSI bus will work (Asynchronous mode only). It is therefore best to keep your cable lengths as short as possible.

4.1.4 SCSI Cards

It is possible to have multiple SCSI cards on the same SCSI bus, as long as they have unique device IDs. (The only reason for doing this would be for the two SCSI cards to communicate with each other as there are no added performance benefits). You can have multiple cards, each with a separate SCSI bus, in which case each SCSI bus can have up to 8 SCSI devices.

Up to 4

SCSI cards can be used on the same computer system.

4.1.5 Initiator and Target Devices

There are two distinct classes of SCSI devices - the initiators and the targets. Each SCSI device must be one of these types and some may be both. However, they can only be in one mode at any one time.

Initiators are devices which send out commands to targets, this being the start of any request. The SCSI interface is an Initiator type device.

Target devices receive commands from an initiator and perform the requested operation. Most peripheral devices are targets, but some may be initiators as well.

Under SCSI (once the target receives and accepts a command) it is the target which takes complete control over the way that the SCSI bus is handled and how/when data

4.2 SCSI ID Denomination

Each SCSI device must have a unique identification number. This number is a combination of the SCSI card ID, device ID and LUN.

The Eesox SCSI interface shows this device identification in the following format:-

C-D-L

where

C = card ID (0 - 3)

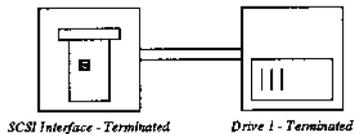
D = device ID (0 - 7)

L = LUN (0 - 7)

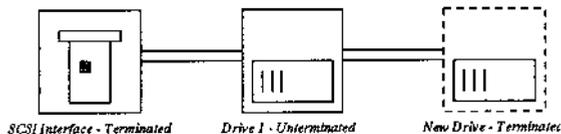
for example: 0-7-0 indicates card 0, device ID 7 and LUN 0.

4.3 Adding SCSI devices to the End of the SCSI Bus

Once the SCSI interface has been installed into your computer system you will want to connect one or more SCSI devices to it.

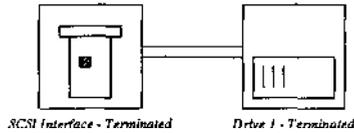


- 1) You will need to know what device IDs are currently in use (the SCSI interface defaults to 7). You can check this either by running the SCSI Director program or typing *devices on the command line.
- 2) Set the device ID of the SCSI device to any value which is currently unused. Refer to the SCSI device's instructions on how to change the device ID.
- 3) The new device will need to be terminated. Refer to the SCSI device's instructions on how to change the termination setting. (Refer to section 4.5 'SCSI Bus Termination' for more information on termination requirements.)
- 4) The device which is currently at the end of the cable needs to have its termination turned off.
- 5) Connect cables from the last device to the new device.
- 6) Set the SCSI card's termination accordingly.

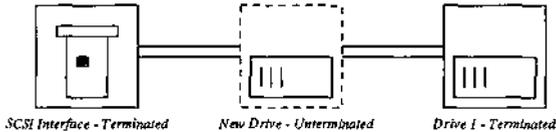


4.4 Adding SCSI devices to the Middle of the SCSI Bus

If you already have a device attached and want to add a new device before the end of the SCSI bus.



- 1) You will need to know what device IDs are currently in use (the SCSI interface defaults to 7). You can check this either by running the SCSI Director program or typing `*devices` on the `eommand` line.
- 2) Set the device ID of the SCSI device to any value which is currently unused. Refer to the SCSI device's instructions on how to change the device ID.
- 3) The new device will need to have termination turned off. Refer to the SCSI device's instructions on how to change the termination setting. (Refer to section 4.5 for more information on termination requirements.)
- 4) Connect the cables to the new device.
- 5) No change to the SCSI card's termination setting are required.



4.5 SCSI Bus Termination

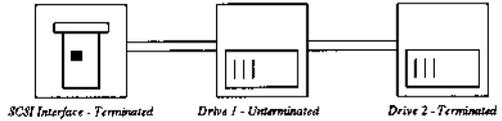
Please read this section carefully as many people get SCSI termination wrong. This mistake will affect the performance or at the worse, cause reliability or data corruption problems.

Simply speaking, the SCSI bus is a continuous length of cable which must be terminated at both ends. Having termination in the middle of the bus may cause problems. The SCSI interface itself is simply another SCSI device which also has the ability to provide termination. (see Chapter 'Configuring the SCSI Interface').

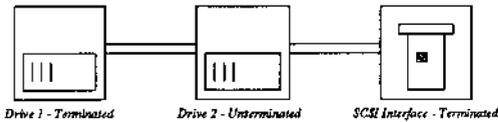
If you have only internal SCSI devices or only external devices, the SCSI interface will be at the end of the SCSI bus and must be terminated. If, however, you have at least one internal device and at least one external device, then the SCSI interface is in the middle of the SCSI bus and must not be terminated.

There are basically three different termination situations as shown below.

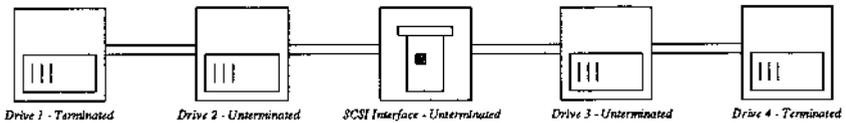
1) External SCSI Devices only



2) Internal SCSI Devices only



3) Internal and External SCSI Devices



Note how the SCSI Interface is either at the end of the SCSI Bus or in the middle.

Whenever adding to or changing the SCSI bus, check that all of the other devices have the correct termination settings.



Using Hard Discs and Removable Drives

This SCSI interface will automatically detect and use any SCSI hard disc or removable type device that has been initialised for use with an Acorn or DOS filing system. There is no need to change or configure any parameters.

To initialise a new hard disc or removable drive's media, you will need to run the SCSI Director application. Firstly you may want to format the device (this is usually optional with SCSI drives), then partition the device. After the partitioning is complete the drive will be useable immediately, and an icon for each partition created will appear. See chapter 'SCSI Director' for more information.

SCSIFS has five different icons for your devices...



Hard Disc
RISC OS



Removable Drive
RISC OS



Hard Disc
DOS



Removable Drive
DOS

Each icon displayed on the icon bar represents a SCSIFS drive which can be accessed from the command line or by other applications, or by clicking on the icon itself. These drives are assigned in the following order:-

4 - 7, 0 - 3

This is in keeping with Acorn's operating system. Normally, hard disc drive icons are assigned before removable icons, as a removable icon may alter position depending upon the partitioning.

5.1 Hard Discs

A hard disc icon is used for each valid partition on a non-removable type device. These icons will appear automatically, with the name of the partition under the icon. If an icon does not appear, then either the device cannot be seen by the SCSI bus, or the device is not partitioned to be used under RISC OS or DOSFS.

5.2 **Removable** Media Devices

Removable media devices are handled slightly differently to non-removable devices.

Each removable media device will be assigned at least one icon. When the device is fully ready, with its media (eg. the cartridge) inserted, you will see one removable icon for each valid RISC OS or DOSFS partition. When the drive is empty there will be a single, removable, empty icon and the name under the icon will be 'empty'. Whenever you insert or remove a cartridge the icons will change automatically and accordingly as described above. This means that the number of icons may vary depending upon the number of partitions on the media currently inserted.

Removable media devices are also treated differently to non-removable devices; more like floppy discs. Whenever a directory viewer is opened, and the media is removed, this directory viewer remains open. If you then attempt to access this device the operating system will automatically request you to insert the correct media again.

53 **SCSIFS Filer**

The SCSIFS Filer is responsible for displaying the drive icons and providing some menu options.

5.3.1 **Icons**

The drives are numbered from 0 - 7, and will be displayed on the icon bar from right to left. (NB. However, the first icon will be drive 4, unless you have more than 4 partitions active).

53.2 **Menu**

Each icon will have a menu (middle mouse button over the icon). The menu will allow you to alter various parameters.



5.3.3 Title Bar

The title bar informs you which drive number this icon has been assigned to. (eg. SCSI:4 indicates it is drive 4).

5.3.4 Name Disc

Name Disc allows you to type in a new name for the partition. Doing so will automatically dismount that partition.

5.3.5 Dismount

Closes all opened files on this partition. It will also close any open directory viewers for the partition.

5.3.6 Share

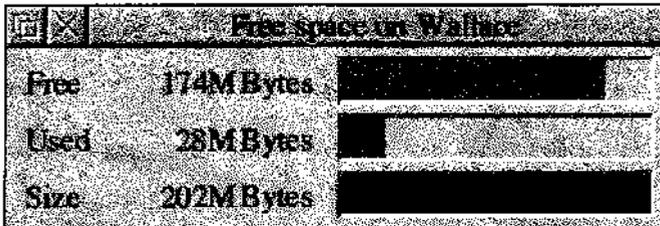
Share leads to a sub menu with three share options. This is only available if an Acorn Access Compatible Network is installed. The 'share protected' and 'share unprotected' options allow other users over Acorn Access to read/write to this partition. The share flags are stored in the partition thus, every time it is loaded, the device will be shared accordingly.

5.3.7 Verify

Verify is not currently available from the icon. Use SCSI Director to verify your devices.

5.3.8 Free

Displays a window showing the amount of free space available, the amount of space currently used for the partition and the size of the partition.





Using CD-ROM Drives

Everything you need to start using your CD-ROM drive is contained on the SCSI interface. All you need to do is to connect a SCSI-2 CD-ROM drive (*NB. SCSI-1 drives will require a separate driver*) and then configure the total number of CD-ROM drives on your system (including IDE and parallel port drives).

To Configure the number of CD-ROM drives type:

```
*configure CDROMDrives x
```

where x is the number of CD-ROM drives.

You will now need to re-boot your machine for these changes to take effect.

You may also want to set the CD-ROM buffers, which can be done from clicking on the menu over the CD icon. We recommend setting buffers to a value of approx:

- 16K * number of drives

any larger is simply a waste of memory as CDFS will not be using it. You could use a smaller size if you are short on memory, although you may see a drop in performance.

For more information about how to use CDFS, please read the CDFS manual provided on the SCSI Director floppy disc.



7



Other SCSI Devices

With other types of SCSI devices, you will need additional software to be able to use them fully. The SCSI Interface's firmware provides the low level access, with a standard Aern SWI interface, by means of which these applications can communicate with the device.

You can see what devices are attached, and what type they are by using the command '`*Devices`', or using SCSI Director.

CDWriters

CDWriters usually can be used as CD-ROM readers, if they report themselves as type CD-ROM, in which case they can be used as any normal CD-ROM drive.

To use a CDWriter to create CD-ROM discs, you need specific software such as Eesox's 'CDScribe'.

Scanners

Scanners require specific software. Check that you get this software when you purchase any scanner. Some scanners and software are known to have minor SCSI problems that can usually be solved by setting various device configuration options (see chapter SCSI Director).

Tape Systems

Tape systems are typically used as backup storage. Tape systems usually identify themselves as 'sequential-access' devices. You require specific software to be able to access these devices.

Others

There are many other SCSI devices available. However, many of these are very specific and you must ensure that full software support is available for these devices under RISC OS before purchasing any of them.

8

Configuring the SCSI Interface

The Eesox 'Fast' SCSI-2 Interface has several user-definable configuration options as listed below. Most of these values are stored in CMOS memory, so that they can be initiated as soon as the computer is switched on and can be changed with the appropriate *Command. This Chapter describes the options and usage of each. These options can also be set up within SCSI Director.

8.1 SCSIHostID

This option allows you to change the device ID that the host (ie. the SCSI interface) uses. The value can be anything from 0 - 7 but is usually left at 7, (which has the highest priority), unless you have two or more SCSI1 interfaces on the same SCSI Bus. (see Chapter 'Connecting SCSI Devices' for more information about device IDs).

This value can only be configured to a device ID that is not currently in use. The new value is set immediately and all SCSI devices attached are reset.

8.2 SCSTerminators

This option switches the active terminators on or off. You must set this value correctly for the SCSI devices attached. (see section 4.5 'SCSI Bus Termination for more details). This value will take effect immediately.

8.3 SCISIFSDrive

This option informs SCISIFS which drive number to use as the default drive number. It can be any value from 0 - 7, but usually it is set to 4 (ie. the first SCSI drive). This value, when used alongside other operating systems' configurations, can allow your system to boot from any SCSI drive. You will need to re-boot for the new value to take effect.

Therefore, to boot from the first SCSI drive, type:

```
*configure SCSIIFSDrive 4
*configure FileSystem SCSI
*configure Boot
*SCSI
*Mount 4
*opt 4,3
```

(usual value, sets partitions boot option)

8.4 SCSIIFSDirCache

This option configures the amount of memory allocated to storing directory information. The larger the amount the faster the operating system can find information. However, there is a limited amount of information that the operating system can store, so setting this value too large will only result in the wastage of memory. The default value is 32K, which is usually sufficient. If you are short on memory then 16K will be adequate or, at a pinch, 8K. 64K, or higher, will give you better performance. This value can be set to anything from 0K - 255K. You will need to re-boot for the new value to take effect.

8.5 SCSIBootDelay

This option configures the amount of delay induced when the machine is started; this can be useful to allow devices time to spin up and become ready. Some devices may lock up the SCSI bus if accessed before they are fully spun up and ready. Setting a delay can prevent these problems. Any value from 0 to 7 can be specified, this value is multiplied by 5 seconds, thus a maximum delay is 35 seconds. A value of 0 specifies no delay.

8.6 SCSIIFSCache

This option configures the amount of cache that SCSIIFS will use for all direct access devices. A cache can greatly improve the performance of devices, especially the slower ones. The value specified is any value in the range from 0 to 33024K (ie. 32MB). A typical value is usually in the range of 2048K to 8192K depending upon the amount of spare memory you have.

WARNING! When you specify a cache value, you should always either shutdown, dismount the drive or wait for all SCSI activity to stop before switching off or removing a cartridge. This is essential to prevent data being lost! SCSIIFS will write unwritten data left in the cache in the background, long after the filer operation has finished. Be careful.

9

*Commands

All *commands can be typed in from the command line (press F12) or from a task window (press CTRL + F12). You do not need to type the '*' on each command; it is used in the manual simply to remind you that the commands have to be typed from the '*' prompt (command line).

9.1 *Devices

*Devices displays a list of SCSI devices that are available on the SCSI bus. This command is very useful for checking to see if a device is present or working.

Device	Type	Capacity	Vendor	Product	Revision
0-0-0	Optical Memory	634 Mbytes	MATSHITA	PD-1 LF-1000	A109
0-0-1	CD-ROM	Unknown	MATSHITA	PD-1 LF-1000	A109
0-1-0					
0-2-0					
0-3-0					
0-4-0					
0-5-0					
0-6-0	CD-ROM	Unknown	TOSHIBA	CD-ROM XM-6201TA	1030
0-7-0	Host		Eesox	Fast SCSI-2 Card	1.03
*					

Each device ID has one or more entries. However, if there is no device on this device ID then the information for that particular device will be empty. There are times when *devices will not be able to display the information for a particular device, typically when the device is busy doing other long commands, such as formatting. When a device is found, this command will automatically check for any logical units, and will only display information if a LUN is found.

The heading for each indicates:

Device

This is the combined card, device ID and LUN value for the designated device. (See section 4.2 'SCSI ID Denomination').

Type

This is the type of peripheral a device reports itself as. This is not always accurate as, for example, some scanners return 'processor.' 'Unknown indicates a type which has not been defined under the SCSI-2 specification.

Capacity

The amount of storage capacity available on a device. This may be reported as 'unknown' if the device is not ready, the media not inserted, the device does not support the capacity command or the device is faulty.

Vendor

This is typically the name of the manufacturer of the device.

Product

This is typically the model name of the device.

Revision

This is the device's firmware revision level.

NB. The Eesox 'Fast' SCSI-2 interface also reports itself as a device on the list as it is just another device.

9.2 *SCSIStatus

This command displays the current status of the SCSI software. It should return

SCSIDriver : Functioning

If there was some unresolvable error, then it will return an error code and possibly a small explanation of the cause.

Use this command to check that the low level driver is still functioning.

9.3 Configuration Commands

All configuration commands are set by using the `*Configure <command>`. The current settings of any of these commands can be read by typing `*Status <command>`. Typing the `*Status` on its own displays all of the computers' settings including these. Refer to chapter 8 'Configuring the SCSI Interface' for specific values and parameters.

9.3.1 SCSIHostID

```
    syntax: *Configure SCSIHostID n
           *Status SCSIHostID
```

9.3.2 SCSTerminators

```
    syntax: *Configure SCSTerminators on | off
           *Status SCSTerminators
```

9.3.3 SCSEFSDrive

```
    syntax: *Configure SCSEFSDrive n
           *Status SCSEFSDrive
```

9.3.4 SCSEFSDirCache

```
    syntax: *Configure SCSEFSDirCache n[K]
           *Status SCSEFSDirCache
```

9.3.5 SCSIBootDelay

```
    syntax: *Configure SCSIBootDelay n
           *Status SCSIBootDelay
```

9.3.6 SCSEFSCache

```
    syntax: *Configure SCSEFSCache n[K]
           *Status SCSEFSCache
```

9.4 SCSI Filing System Commands

These commands are provided by the filing system. Only the commands specifically added by SCSI FS are listed here. All other filing system commands are provided by RISC OS and are documented in your computer's manual.

9.4.1 *SCSI

`*SCSI` is used to change the current filing system to the SCSI1 filing system.

10



SCSI Director

SCSI Director is an all-in-one application for controlling, setting up and testing your SCSI devices. This is a simple to use desktop application.

SCSI Director has been designed to work entirely in 'background' mode. This means that long and lengthy operations, such as formatting, will proceed as normal, but you will still be able to use your computer for other tasks at the same time.

SCSI Director can be copied to your computer's hard disc into a suitable directory. On a RISC PC, the Apps directory is the most suitable location.

To load SCSI Director, simply double click on the !SDirector Icon.

10.1 Main Window

Click on the SCSI Director icon on the icon bar to open the main window. This window contains a list of SCSI devices attached to the SCSI bus.

The screenshot shows a window titled "Esox SCSI Director - SCSI Devices". It contains a table with the following data:

Device ID	Type	Capacity	Description
0-3-0		202.8 Mb	MAXTOR LXT-2135 SUN0207
0-4-0		Unknown	TOSHIBA CD-ROM XM-5701TA
0-7-0		n/a	Esox Fast SCSI 2 Card

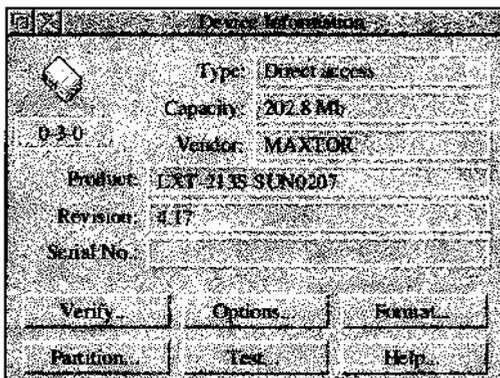
The devices are displayed in device ID order, with the lowest device IDs at the top. The capacity of each device is displayed. If, however, the capacity is 'unknown', this indicates that the device is either not ready, the media is not present, the device does not support 'read capacity' or, possibly, the device is faulty.

When a device that has been seen before is removed from the SCSI bus, the information for this device will be displayed in red.

Use 'Select' on any of the device information areas to display the device's details and options window. This window displays standard device information, but has specific options for the type of device being used.

10.2 Using Direct Access Devices

'Direct Access' devices are, typically, hard disc drives or cartridge drives used for storing data. They can be either non-removable or removable. SCSI Director knows the difference between the removable and non-removable drives and uses different icons accordingly. However, they are the same type of SCSI device and are treated identically under SCSI Director.

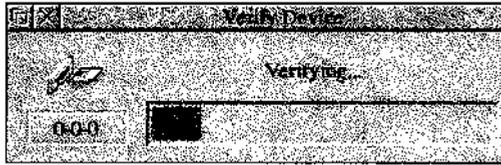


Revision: shows the drive's firmware revision number. (sometimes even useful).

Serial No: Not all drives support this feature, so it may be blank.

10.2.1 Verify

Verify is used to check that all the sectors on the drive are reliably readable and that the drive is functioning correctly.



Verifying will commence immediately. The progress bar will indicate how much of the drive has been verified.

Verifying will proceed in the background until complete or until you select the 'close window' icon. Any verify errors will display a user message. A 'media error' usually means the drive needs to be reformatted.

10.2.2 Options

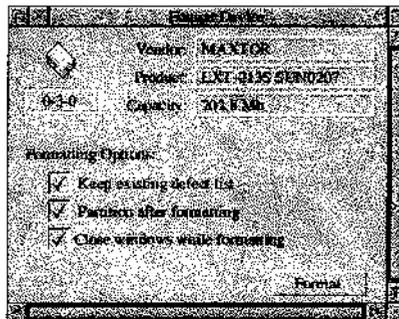
Allows you to specify various device options. This item is not currently available.

10.2.3 Format

Format will attempt to format the drive. All drives must be formatted otherwise they cannot be used. However, most devices are supplied pre-formatted, so this function is not always required.

(WARNING! Formatting will destroy all data on the drive specified. Make sure you select the correct drive.)

Formatting can be used to remove/map out 'defects' from the recording medium or to alter the logical shape of the drive. As drives get old they can be prone to many defects so, by backing up your data and re-formatting the drive, you may be able to extend the life of the drive.



Keep existing defect list - When selected any new defects found whilst formatting are added to the defect list and are subsequently mapped out. By de-selecting this option you start a format with no defects, and only defects found on this format are added to the defect list.

Partition after formatting - When selected formatting will proceed as normal but, when complete, the partition window is opened automatically allowing you to create your RISC OS partitions etc.

Close windows while formatting - Simply closes down all non-essential SCSI Director windows while formatting is in progress with only the format progress indicator left on the screen.

Formatting times vary considerably and may take several hours on some devices. Where possible SCSI Director will format in the background, which allows you to use your computer while formatting. If the SCSI device allows, a format progress bar will indicate progress but many older devices do not support this feature.

Warning! You should avoid interrupting formatting as this will render the drive completely unusable. You will have to re-format the drive should this happen.

10.2.4 Partition

Partitions are used to split the storage area of a device into separate sections, which can be used by either RISC OS or DOSFS/PC cards. You may have up to 8 partitions of any type, in any combination, on the one storage device. A maximum of 8 partitions can be used on any system at any one time.

RISC OS 3.6 or later allows partitions up to 4Gb in size, but earlier versions only allow 512Mb maximum partition size.

DOS "Fat 16" (as used by DOSFS) partitions allow up to 2Gb partitions. If you are creating a DOS partition then make this the first partition as PC card software, such as PC Pro, can only use the DOS partition at the start of a SCSI device. SCSI Director will allow you to create a DOS partition at any location, as well as a second partition. This partition would only have a limited use as, perhaps, a backup location for your DOS data, which the PC card cannot access directly.

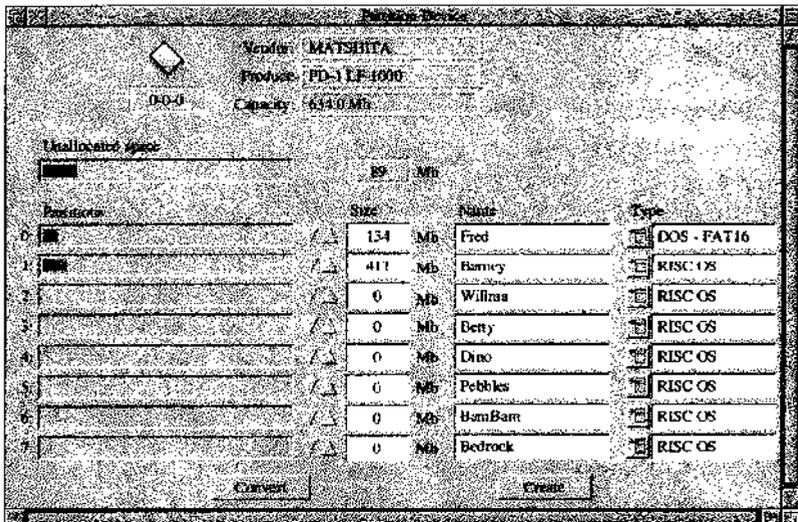
NB. Windows 95 can also use a different system known as "FAT 32", which can use larger capacities than 2Gb. However, DOSFS does not understand this type of format. If you need to use "FAT 32", you will need to get your Windows 95 system to format the SCSI disc.

The Eesox SCSI card will recognise the first partition on any 'Acorn' or 'PC' formatted drive. If you have a device that has previously been formatted/partitioned using a different SCSI card then you will need to convert the device to the Eesox format before other partitions can become available. This is achieved by selecting 'Convert' on the partition window.

Each partition should be given a unique name, otherwise RISC OS may become confused. SCSI Director provides random default partition names which can be changed, if required, by altering the "Messages" file inside the "!SDirector" application directory. You can add new names following the conventions used, and remember to alter the "PartBlocks:" label to the correct number of entries.

WARNING! Partitioning will destroy all data on the drive specified, please make sure you select the correct drive and partition details.

If you want a partition greater than 4Gb, select the option in the preferences.



When you first open this window a suggested partitioning is provided but you may alter this to whatever you require.

To create a new partition simply decided on the size of partition 0, 1, 2... etc, for as many partitions as you wish. The size can be selected by either dragging the slider bars, using the up and down arrows or by typing the actual size required (in Mb). The 'Unallocated space' slider bar at the top of the window indicates how much space on the drive has not yet been allocated to your partitions.

Under the 'Type' heading is a button which, when selected, will allow you to choose whether the partition is for use on RISC OS or for DOS/PC cards.

Once you are happy with the partition sizes, select the partition names and alter these if you so wish. Now press the 'Create' button on the bottom right of the partition window. This will create the partitions and destroy any previous data on this drive.

NB. it is not possible to extend or add partitions without destroying all other partition information.

10.2.5 Test

Allows you to perform various tests on the device.

Self Diagnostics - Asks a device to perform a self test and report any known problem. It will return with either PASSED or FAILED. This function is useful to ensure that a drive is at least functional!

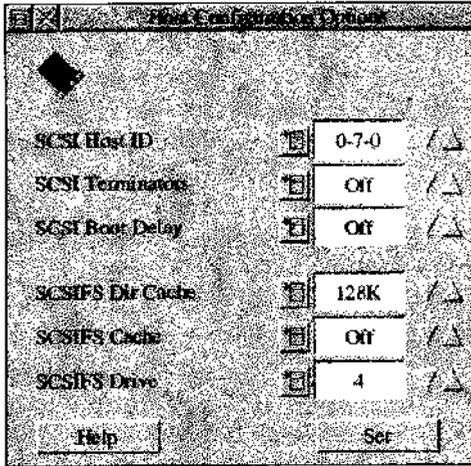
Buffer Read - Performs a read test on the devices buffer and returns a performance figure. This tends to indicate the maximum transfer rate which the device can sustain. Occasionally this command may fail if the device does not support buffering or does not support the command.

10.2.6 Help

Provides help information on this window and how to handle the specific type of device.

10.3 Host Configuration Options

Select "Options" on the host information window to bring up the Host Configuration Options window. These options can be used to alter how the host SCSI card works; the options are the same as the configuration commands, but you can set them from within SCSI Director.



Use the up and down arrows to change the values, or use the menu button on the left to provide suitable options.

Look at chapter 8 'Configuring the SCSI Interface' for details on what each of these options do.

When you have selected the correct values, press the set button and this will close the window and configure the values. Some values will take effect immediately while others will only take effect on the next re-boot.

If you want to cancel any changes, click the "close window" box.

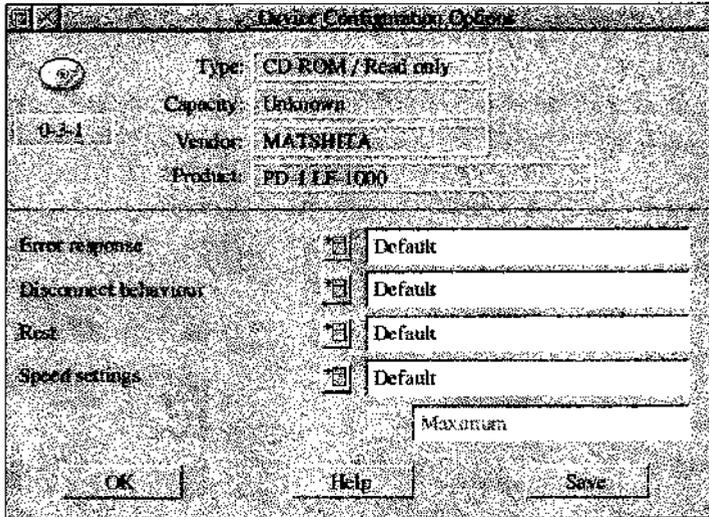
10.4 Device Configuration Options

Select "Options" on the device information window to bring up the Device Configuration Options window. These options can be used to alter how the device works and interacts on the SCSI bus.

Unlike other SCSI cards, SCSI Director sets these options for a specific SCSI device, and not for a particular device ID. This means that if you change the device ID, and have a second device of the same type, the configurations still apply without having to set them up again. Also, if you change to a different device on the same device ID, you will not be setting inappropriate values for the new device.

In order for the configuration values to be set each time you start-up, SCSI director must be seen in the boot-up sequence. On a RISC PC copying !SDirector to the 'Apps' directory is recommended. On other machines, put !SDirector in a directory that opens on start-up, or put a line in the boot file to run !SDirector.

The configuration for each type of device is stored within !SDirector, with the manufacturers name and product name forming part of the destination filename.



When opened this window will reflect the current saved configuration for the device. If no configuration for the device is known then all values will be set to 'Default', which means that the SCSI cards default values will be used, and !SDirector will not attempt to modify them.

Use the menu next to each value to modify the values.

10.3.1 OK

Closes the window and configures the values shown.

10.3.2 Help

Opens a help text window giving an explanation of each option available.

10.3.3 Save

Closes the window, saves the configuration and configures the values shown. These values will then be used the next time you start your computer.

10.3.4 Error Response

This modifies the way that the SCSI driver handles the 'Request Sense' message returned by a device. This option should not be modified unless a particular device and software requires it, otherwise the device may not work correctly with other software.

Auto retry on Unit Attention - The SCSI driver will perform its own 'Request Sense' command, and if the sense is 'Unit Attention' then the driver will automatically send the SCSI command which caused the condition again. 'Unit Attention' is often generated when a device's media has been changed.

Report Unit Attention - The SCSI driver will perform its own 'Request Sense' command and, if the sense is 'Unit Attention', then the driver will report the error message 'Target error - unit attention'. Specific software may require this error message to detect media changes etc.

Report Check Condition as error - The SCSI driver will not perform its own 'Request Sense' command, but will return the error message 'Check Condition'. Any software supporting this device must then perform its own 'Request Sense' command to determine the exact error condition.

10.3.5 Disconnect Behaviour

This modifies the way that the SCSI device works and interacts with other SCSI devices on the SCSI bus.

Allow disconnect/reconnect - Informs the SCSI driver to allow devices to disconnect and reconnect as required. A device may disconnect if it currently cannot handle any more data and this allows other devices to gain access to the SCSI bus in the meantime.

Inhibit disconnect/reconnect - Informs the SCSI driver to prevent devices from disconnecting. This can be useful for some devices that do not disconnect/reconnect correctly, or when a device cannot withstand being interrupted, such as some CDWriters.

Disable LUN support - Informs the SCSI driver to prevent the device from using LUNs. A device which cannot use LUNs cannot use disconnect/reconnect either. This is very useful for some devices that may appear 2-8 times (one device ID with 2-8 logical units) when they clearly should not. Many scanners suffer from this problem.

10.3.6 Reset Handling

Used to alter the way that a 'device reset' command is handled by the SCSI1 driver. This should not be modified unless a particular device requires it, as SCSI1 director uses the reset command.

Allow device reset - Informs the SCSI driver to allow devices to disconnect and reconnect as required. A device may disconnect if it cannot handle any more data, and this allows other devices to gain access to the SCSI bus in the meantime.

Prevent device reset - Can be used to circumvent problems caused when software issues this command but cannot handle the consequences. This can often be a problem with scanning software.

10.3.7 Speed Type

Used to select whether the device uses "Asynchronous" or "Synchronous" transfer mode. Asynchronous is usually slower, although is more reliable under difficult conditions and if using longer cable lengths. Synchronous can be faster but can cause data errors under poor conditions.

Asynchronous - Selects the asynchronous transfer mode. All SCSI devices support this mode.

Synchronous - Selects the synchronous transfer mode - the speed of which can be selected using the icon below, under the speed value. Not all devices can support this, although synchronous will only be used if the card can negotiate this with the device.

Maximum - When set the SCSI1 card will negotiate the fastest speed that the card and the device can both use.

xxMB/sec - Negotiates a xxMB/sec transfer rate or the fastest the the SCSI1 device can handle up to this speed.

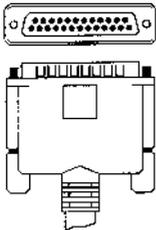
11

SCSI Cables and Connectors

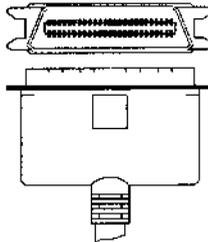
There are many types of cable connectors used with SCSI devices that can make identification difficult. You should always use good quality cables and, where possible, keep the lengths of cables down to a reasonable size. Long cables of poor quality can lead to data corruption and poor performance.

11.1 Connector Types

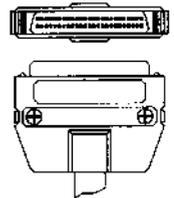
Below is a diagram with some of the more common types of connectors used in SCSI systems. Some cables may have one type of connector on one end and another type on the other. This is usually perfectly adequate as long as there are the same number of pins on both ends.



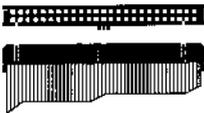
25 Way 'D' Type



50 Way Centronics

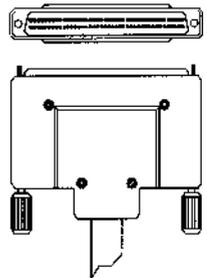


SCSI-2 or
High Density 50 Way 'D' Type



50 Way IDC

Not drawn to scale



High Density 68 Way 'D' Type

11.1.1 50 Way IDC

These connectors are typically used for connecting devices internally to systems. A 50 way ribbon cable is used for the cable. Ribbon cables are not the best quality but, as the lengths are usually kept short, they can be used effectively.

These cables are not usually used as external cables because long lengths of ribbon cable have a high resistance, and transmit and absorb EMC interference.

11.1.2 50 Way Centronics

These look rather like a large printer connector and are widely used for external cabling on many SCSI devices as they provide all the necessary pinouts. The cabling and connectors should be shielded to provide good, clean signals.

11.1.3 SCSI-2 / High Density 50 Way 'D' Type

This type of connector is replacing the older 50 Way Centronics types, as they are more compact. The cabling and connectors should be shielded to provide good clean signals. The Eesox 'Fast' SCSI-2 Interface uses a female SCSI-2 connector on the exterior ready for a standard male SCSI-2 cable to be connected.

11.1.4 25 Way 'D' Type

This type of connector was used by some older devices to save cost. These were adequate when devices used to be slow, but are not suitable for modern high performance SCSI environments. The cabling and connectors should be shielded to provide good, clean signals.

It is best to avoid using these type of cables altogether. However, if this is not possible, you should make sure that any devices requiring 25 pin connectors are placed at the far end of the SCSI bus. Taking a cable from a 50 Way to 25 Way back to 50 Way simply loses 25 signal lines, if a high performance SCSI device is expecting 50 clean lines but only gets 25, it may not function correctly or reliably.

11.1.5 High Density 68 Way 'D' Type

Looks virtually identical to the SCSI-2 connectors apart from being wider to accommodate the extra pinouts. Do not confuse these connectors with the SCSI-2 connectors and count the pins if necessary. These connectors are sometimes mistakenly called SCSI-3 connectors but they are "Wide" SCSI connectors used in "Wide" SCSI-2 and SCSI-3 bus systems.

It is possible to obtain SCSI-2 to 68 Way 'D' type cables. These will allow the connection of a "Wide" SCSI device to a "Narrow" SCSI bus, the wide SCSI device will still function correctly but will only work in "Narrow" mode.

11.2 Using the Cables

Always use the retainers on the connectors to ensure a good contact. Make sure that none of the pins are bent or damaged. Frequently check that cables are in good condition, and are not bent, kinked or broken. Slightly damaged cables may appear to be working, but could lead to unexpected errors.

11.3 Cable Lengths

The maximum length of the entire SCSI cable is specified at 6 Metres by the SCSI specifications, but this may only be achievable under ideal conditions with superior quality cables.

11.4 SCSI Cabling - Technical



The following cable requirements apply to a 'single ended' SCSI bus (as used by Eesox's 'Fast' SCSI-2 Interface).

The characteristic impedance of the cable should be no less than 90 ohms and no greater than 140 ohms.

A minimum conductor size of 0.08042mm (28AWG) should be used to minimise noise effects and ensure proper distribution of terminator power.

To minimise discontinuities and signal reflections, cables of different impedances should not be used on the same bus.

To minimise discontinuities due to local impedance variation, a flat ribbon cable should be spaced at least 1.27mm (0.050 in) from other cables, any other conductor or the cable itself when the cable is folded.

A 50-conductor flat cable, or 25-signal twisted pair cable should only be used.

A stub length of no more than 0.1 meters is allowed off the mainline interconnection within any connected equipment or from any connected point.

A SCSI bus requires 50 lines - of these, only 18 lines carry any active signal, but each of these signals requires a 'ground' reference value from which the voltage difference can be measured, and is carried on another other 18 lines. The lines are spaced, or twisted, to minimise noise from the other signals. Therefore, each signal actually has two lines. On systems that only use 25 pins, the reference values are tied to ground. This has two effects: 1) the ground signal can become very noisy and 2) a system expecting 36 lines has the additional 18 reference signals floating. These floating signals prevent devices from seeing a signal change or causing unwanted signal changes - either of which will cause data errors.

12

Trouble Shooting

If you are experiencing problems then carefully work through the information below step by step.

Nothing appears to be working

1) on the command line type `*podule s`

You should see a line similar to :-

Expansion card 0: Eesox 'Fast' SCSI-2 Interface card

If not check the following:-

- The SCSI1 interface is fully pushed into the podule baekplane
- The podule backplane is fully pushed onto the motherboard
- LK 1 on the SCSI1 interface is correctly set (see Chapter 'The 'Fast' SCSI-2 Interface')

No SCSI devices appear

1) On the command line type:

```
*help SCSIDriver
*help SCSIResources
*help SCIFS
*help SCISupport
```

For each of the above commands you should see some help text. If you get a message 'No help found' then one or more of the modules have been unplugged.

To fix this, you will need to 're-insert' them by typing the line:

```
*RMInsert SCSIDriver
*RMInsert SCSIResources
*RMInsert SCIFS
*RMInsert SCISupport
```

Switch off the computer, wait 10 seconds then switch it back on again.

2) On the command line type:

```
*SCSIStatus
```

You should see a message :-

```
SCSI Driver      : Functioning
```

If not, make a note of the error code and check SCSI termination and cabling.

3) On the command line type:

```
*Devices
```

You should see a list of your currently connected devices. See Chapter ' *Commands' for further details on this information. If any devices are missing, or have reported incorrect information check the SCSI termination and thoroughly check all cables.

Again type:

```
*SCSIStatus
```

to check that " *Devices" did not cause any errors. If so check SCSI termination and cables.

Device is present but does not appear to work

1) Run the SCSI Director application.

- See Chapters 5, 6 & 7 to ensure that the device is one that can be used directly without further software requirements.
- If a "direct access" or "read only / CD-ROM drive" type is there then a 'Capacity' value is displayed. If not, check that the drive has media inserted and that the drive knows about the media.
- Perform the Tests and check that the drive passes the "Self Diagnostics". If this fails then the drive may be faulty.

No Icons appear for the device

1) Direct access devices

- does the device contain a valid RISC OS or DOSFS partition?
- is the drive ready and spun-up?

2) CD-ROM drive and CD Writers

- has CDFSDrives been configured correctly?
- is CDFS fully loaded?

3) Other devices

- the SCSI card does not provide icons for any other types of devices so you require specific driver software for these.

Occasionally the system hangs up

- 1) This is usually caused by incorrect SCSI termination. See Chapter 'Connecting SCSI devices'.
- 2) Also check that cables are in good condition and that there are no bent pins etc. See Chapter 'SCSI Cables and Connectors'.
- 3) There could be many causes not related to the SCSI interface.

If you still cannot solve the problems, please contact Eesox for further technical support.



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