NEXUS

Nexus Disc Server Manual

Version 1.31

January 1992

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SJ Research has a policy of continual improvement. Software versions later than those specified below may include additional features or other departures from the information in this manual; these will be described with the installation instructions supplied with any such upgrades. If your Nexus disc server is running older software than the versions given then you should have been sent an upgrade disc and installation instructions with this manual. If this is not the case then please contact the technical support desk at SJ Research. Some features of Nexus disc servers described in this manual differ significantly from earlier releases of the Nexus server software. In addition, existing users of Nexus disc servers are referred to Appendix A on cabling.

Applicability

This manual relates to the following software versions:

Nexus ROM	version 1.02	*The ROM installed in the Nexus disc server*
Nexus Server	version 0.61	*The code the disc server loads from disc when it starts up*
NexusFS	version 1.01	) *Modules installed in the Archimedes computer connected*
NexusFiler	version 0.29	) *to the Nexus disc server*

Determining software versions: ***See Appendix H***

Disclaimer

Software Licence Conditions

All users are bound by our software licence conditions, *as* indicated on the envelope containing your **Nexus Utility Software** disc. The applications !System, !Scrap and !Sysmerge are supplied by SJ Research under licence from Acorn Computers Ltd. This software is supplied subject to your acceptance of the terms of an End User Licence from Acorn Computers Ltd. in respect of this software. The terms of that licence, and full details of the software it relates to, are included as Appendix I of this manual. Your use of the Nexus server supplied will be taken to indicate your acceptance of these licence conditions.

If you are not prepared to accept these licence conditions you must contact SJ Research without delay.

This edition (version 1.31) first published 1992
Minor ammendments: May 1992

Published by SJ Research Limited

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Guidelines for safe operation

The equipment described in this guide is intended for use only as a server for desktop computers. It must not be used for other purposes. It is most important that installation is carried out in accordance with the instructions given in this Guide.

WARNING

This disc server must be earthed.

IMPORTANT

The wires in the mains lead for the disc server are coloured in accordance with the following code:

Green and yellow:	Earth
Blue:	Neutral
Brown:	Live

This equipment is rated: 100VA, 50-60Hz

The voltage rating of your disc server is stated on the rear panel of the server. You should check that this coincides with the local supply voltage. If this is not the case, please contact the Technical Support Desk at SJ Research.

For United Kingdom Users

The moulded plug fitted must be used with the fuse and fuse carrier firmly in place. A 5 amp fuse is fitted in the fuse carrier in the base of the plug. Different manufacturers' plugs and fuse carriers are not interchangeable. Should the fuse carrier be lost, the moulded plug MUST NOT be used. Either replace the moulded plug with another conventional plug wired as described below, or obtain a replacement fuse carrier from SJ Research. In the event of the fuse blowing it should be replaced, after clearing any faults, with a 5 amp fuse.

For All Users

If the socket outlet available is not suitable for the plug supplied, first check that the outlet is not of a mains voltage or frequency outside the range stated on the back of the server. Socket outlets without an earth connection MUST NOT BE USED. Where the mains supply is suitable, a different lead should be obtained or the plug may be cut off and an appropriate plug fitted and wired as noted below. The moulded plug which was cut off **must** be disposed of carefully since it represents an electric shock hazard; for added safety, remove the fuse and discard the fuse holder separately.

As the colours of the wires may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:

The wire which is coloured green and yellow must be connected to the terminal in the plug which is marked by one of the following: the letter E, the safety earth symbol, the colour green, or the colour green and yellow.

The wire which is coloured blue must be connected to the terminal which is marked with the letter N, or coloured black.

The wire which is coloured brown must be connected to the terminal which is marked with the letter L, or coloured red.

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In the interests of continued safe and reliable operation, observe the following guidelines:

Do	*Keep the machine at a room temperature of 5-35 C. (41-95 Fahrenheit) and a relative humidity of 15-90% (non-condensing).*
Do	*Avoid sudden extremes in temperature, exposure to direct sunlight, heat sources (such as an electric fan heater) or rain.*
Do	*Make sure that the equipment is mounted on a suitable rigid flat surface, allowing enough space for air to circulate when it is in use.*
Do	*Keep the original packaging in case you need to transport the server, and avoid bumping or jarring it in transit.*
Do	*Ensure that wires and cables are routed sensibly so that they cannot be snagged or tripped over.*
Don't	*Tug or twist any wires or cables, or use them to hang or lift any of the units.*
Don't	*Spill liquids on the server. If liquid does spill, disconnect the server from the mains power supply immediately and take it to your supplier for assessment.*
Don't	*Drop the equipment or subject it to excessive bumping and jarring.*
Don't	*Obstruct or poke objects through the ventilation openings in the server casing.*

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1: The Nexus Disc Server

Introduction

The Nexus disc server provides Archimedes computers with high-speed access to a central hard disc. This disc is divided into one large shared read-only partition and up to twelve private read/write partitions.

Access to the Nexus disc server from the desktop is achieved via two icons which appear on the bottom left of the screen. You will see that these are drives 4 and 5, drive 4 being the shared partition. From the command line the Nexus filing system is selected by *Nexus, and again the drives are 4 and 5.

Nexus servers have a key switch which controls the main power, and also allows the system manager to select the administration mode, for example to update the shared partition. For normal use the key switch is set to the 'Secure' position, allowing all stations to read from the communal shared partition and to use their own private partition for reading and writing. With the key switch in the 'Admin.' position the shared partition can only be accessed by the station connected to port 1. In this state, the station connected to port I may read from and write to drive 4, for example to install new software.

Nexus disc servers are supplied in 4, 6 and 8 port versions. The 4 port server can be regarded as the 'base' unit, while an 8 port server is simply a 4 port server with the maximum of 2 expansion cards fitted. If your Nexus server has less than 8 ports it can be expanded by adding the additional expansion card(s); however Nexus Routers may offer a more effective way of connecting additional computers to your Nexus server.

Nexus Routers

Nexus Routers allow additional Archimedes computers to be connected to your Nexus disc server, up to a maximum of 12 computers per server. A router connects into one port of the server, and three Archimedes computers then connect into the router. Thus the maximum of 12 computers per disc server can be achieved in three ways:

8 port Nexus disc server plus 2 Routers
6 port Nexus disc server plus 3 Routers
4 port Nexus disc server plus 4 Routers

Cabling to your Nexus server may be simplified by choosing the 4 port option; this option may also offer you more flexibility in moving to a full Nexus network.

In addition, using Nexus standard cable the maximum distance from server to computer is 100m. When using Routers, the Router can be up to 100m from the disc server, and the Archimedes computer can be up to a further 100m from the Router. With Nexus networking, it will be possible to link a Router connected to one Nexus disc server to a Router connected to a second Nexus disc server, with Nexus standard cable, these Router — Router links may also be up to 100m long. Nexus lightweight cable may be used for server — computer and server — Router links of up to 50m, but is not recommended for Router — Router links.

Note that Routers are, in fact, compact microcomputers. As such, they require a low-voltage power supply. This will normally be provided by an adaptor plugged into a convenient mains socket (the adaptor is supplied with the Router).

Nexus Printing

Additional software is available to allow one of the Archimedes computers connected to a Nexus disc server to act as a printer server for all the other Archimedes computers connected to the same Nexus disc server. This allows all the connected Archimedes computers to print to any of the printers connected to this printer server — which might have serial, parallel and LaserDirect printers connected. The printer server software runs as a "background" task, so the server Archimedes computer can continue being used for other purposes. However, the printer server Archimedes computer does require

at least 2Mbytes of memory (or 4Mbytes if its printers include a LaserDirect).

If your Archimedes computers are connected to Econet network as well as to Nexus disc server, transferring printing from Econet to Nexus is likely to bring about a considerable improvement in the efficiency of the Econet network.

Contact SJ Research for further information.

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2: Installing Nexus

Important Note:

If your Nexus disc server was purchased as part of an Acorn "Cluster Group" then the installation, apart from the cabling between the Nexus and the Archimedes computers, will have been done for you. In particular, software will already have been installed on the Nexus disc. In this case, **do not use the** !Install program described below since this sets up a different directory structure from that supplied with Cluster Group units; using !Install will cause this second structure to be added to the first, with unnecessary duplicate copies of the RISC OS Applications Software.

Introduction

As mentioned earlier, the "base" Nexus disc server has four ports fitted; adding two expansion cards provides the maximum of eight ports. Each port is provided by a 9 way " D type" socket on the back of the Nexus server, which can be connected to a single Archimedes computer. Certain ports may, alternatively, be connected to a Router. The ports are numbered from 1 to 8, although clearly not all ports may be installed on your Nexus server.

In order to communicate with the Nexus disc server, each Archimedes computer requires an interface card which plugs into an internal expansion slot (A300 series machines must first be fitted with a backplane), and provides a 4 pin mini-DIN socket on the back of the Archimedes computer. This is then connected to the Nexus server. If you need to install an interface card in your computer, refer to Appendix B. The simplest way of connecting your computer to the Nexus is with a "free" lead directly from the Archimedes computer to one of the ports of the Nexus unit. However, in most situations installing wiring in trunking is to be preferred. Apart from giving a tidier and more robust installation, such wiring, correctly installed, will also lend itself to expansion into a full Nexus network when this becomes available. Appendix A gives some additional information on this option.

For system management, you will need to use the Archimedes computer connected to Port 1 (or port 1 of the Router connected to port 1 of the server, as appropriate), and will need to turn the key into the `Admin' position. In other respects, all ports behave in the same way.

!ReadMe

Your Nexus will have been supplied with a disc labelled Nexus Utility Software. This contains support material for setting up and managing Nexus. In the root directory of this disc is an application called !ReadMe; double clicking on this will outline the installation procedure, including any additions or alterations to the information in this manual.

Managing Nexus

The principal task of the person managing the Nexus disc server is to install the software he or she wants to make available onto the shared partition (drive 4), including deciding how to organise that software on the disc. In this, as in other matters, time spent in initial planning is seldom wasted. However, a number of other tasks may be necessary when first setting up the system and from time to time thereafter. These are:

i) Ensuring that the connected Archimedes computers can access and use the Nexus correctly, and have the latest version of the Nexus software installed.

ii) Deciding how to distribute the space on the Nexus hard disc between the single shared partition and the separate Nexus private partitions.

iii) Updating the Nexus software.

The following section outlines the processes required when you first receive your Nexus; this is followed by notes on some of the stages. However, in some instances full explanations are left until section 4: System Administration.

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Summary of the Installation Process

- O Install Nexus cards in the Archimedes computers. *See Appendix B.*
- O Connect the Archimedes computers to the Nexus Server.

Your Archimedes computer should now be able to access Nexus. Power up the Nexus unit, leaving the key in the Secure position. Power up one of the attached Archimedes computers and (if necessary) enter the Desktop. The two Nexus disc icons will be displayed at the bottom left of the icon bar:

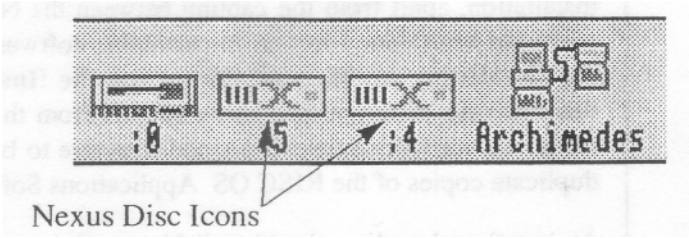

Figure 2.1: Nexus Icon Bar icons

Next you must decide how much space to allow for each of the Nexus Private partitions. If you have fewer than 12 Archimedes computers attached to your Nexus then you must decide whether to allow space for future expansion.

- O Use !PartEdit to check the distribution of disc space between the Shared and Private partitions. Remember to allow space for the Printer Sharer, unless you are absolutely certain you will never wish to install this software. See *Section 4* **under** *!PartEdit.*

You now need to make sure the server has the latest versions of the software required by the Archimedes Nexus cards, and install the software you want to be available to users of your Nexus server.

- O Use the !Install utility to install the SJ Directory structure, the contents of the Archimedes Applications discs and the contents of the RISC OS Extras disc, as required. See *Initial software installation* **in this section. ¤**

Next, make sure that when the Archimedes computers are switched on they load the latest versions of the Nexus software. The efficient operation of the Nexus server may depend on this software being installed, and you are strongly advised to carry out this stage.

- O Configure the Archimedes computers to boot from Nexus. See *Setting up the Archimedes computers* in this section.
- O If necessary, edit the data installed on the Nexus disc server, removing any of the installed applications you don't want to be available. ¤

This is a good point at which to try out the system more thoroughly. Remember to turn the key back to the 'Secure' position before trying to access your Nexus from another station. Also, the other stations need to be made aware of the changes to the shared partition. They should dismount the Nexus :4 disc partition, from the Nexus :4 icon bar menu before making any further use of the Nexus. Alternatively, you might reset the station (Ctrl-Break). Although this is more drastic, it will also make the station follow any changes you have made in the Nexus boot sequence,

- O Add further software to the Nexus shared partition as required. ¤¤

Important warning: Whenever you alter the contents of the shared partition (using the Archimedes computer connected to Port 1 — or to Port lof the Router connected to port 1 of the Nexus disc server, if appropriate — and with the key in the 'Admin.' position) you must dismount this disc (from the Nexus icon bar menu) before returning the key to the 'Secure' position.

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Allocating Space for the Private Partitions

This is done from the main screen in !PartEdit, as described in section 4: System **Administration.** If you have fewer than 12 Archimedes computers attached to your Nexus disc server it is advisable to leave free space to allow for expanding your system at a later date. Similarly we would recommend that you make provision for the Printer **Sharer software** even if you do not intend to use it at present (this only requires a small amount of disc space). The reason for these recommendations is that while it is possible subsequently to allocate free space and/or to re-distribute space between the different private partitions, it is not possible to reclaim any space from the shared partition without re-formatting the whole disc – thereby losing all the data installed on it.

Initial Software Installation

The Utilities disc supplied with your Nexus unit includes an application called !Install. This is intended to help with the initial installation of software onto the shared partition of your Nexus unit, including the the applications from the two Archimedes Applications Discs and the updated modules supplied on the RISC OS Extras disc (for copyright reasons we are not normally able to supply Nexus units with these already installed). It also sets up a possible "skeleton" directory structure for installing software on the Nexus (see fig. 3.1). Very probably you will not wish to have all the software from the Applications discs available to your pupils – we suggest you go through the installation process and then delete the items you do not require. !Install gives three stages of installation; for each you will be asked whether you wish this stage to be carried out:-

i) SJ Boot Sequence and Directory Structure: In general you should answer Yes to this stage. If you do not wish to use the SJ directory structure you can subsequently delete all the directories created except !Boot, !System, Library and (possibly) !Fonts.

ii) Applications Discs: Only answer Yes to this stage if you wish to install the applications from the two Applications discs supplied with your Archimedes computer. As mentioned earlier, you may wish to delete some of these applications subsequently.

iii) RISC OS Extras Disc: Assuming you have a copy of this disc, you should answer Yes to this stage. This will install the latest versions of various Acorn modules onto the Nexus; the Nexus !Boot application will ensure these are loaded automatically into the Archimedes computers whenever they are switched on or reset *(Ctrl-Break).*

If you do not have a copy of the RISC OS Extras Disc you should contact your Acorn dealer, or Acorn Customer Services. In this case you can install these modules once you have obtained a copy of this disc by simply re-running the ! Install application and answering 'no' when asked about the first two stages of installation.

Setting up the Archimedes computers

Relocatable Modules

Many operations on the Archimedes computer are performed by software "blocks" called Relocatable Modules; for example there is a module for managing screen windows, and another for managing the outline fonts used by many applications. Versions of many of these modules are held in ROM in the Archimedes computer. However, in some cases improved versions of the modules have since been written, and the performance of the Archimedes computer can be improved by installing these newer versions in place of the original ones. Many "extensions" to the Archimedes computer (including Applications) require additional modules. For example, Nexus requires a number of Modules, including ***NexusFiler*** and ***NexusFS.*** Copies of these are held in ROM on the Nexus interface card, but in general improved versions will be available in files held on the shared partition of the Nexus disc server. It is strongly recommended

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that these updated modules are installed in the Archimedes computer; this section describes how you can ensure this happens automatically when the computer is first switched on.

The !Boot Application

If you set up your Nexus hard disc as described there will be an application called !Boot in the root directory of its shared drive. This application should be executed automatically when the Archimedes computer is switched on (and also if *Ctrl-Break* is pressed), and ensures that the latest versions of the Nexus modules are installed in the Archimedes computer. It also ensures that the application !Scrap is installed on the Archimedes computers' private Nexus partitions, and sets up a number of system variables to tell the Archimedes operating system where various system resources are located, and where it can find temporary storage space. The Nexus !Boot application is described more fully in **Appendix** C, where you will find information on how you can tailor this application to your own needs.

Configuring the Archimedes computers

To ensure that each station automatically runs the !Boot application when it is switched on the following commands **must** be entered at each Archimedes computer connected to the Nexus disc server:-

```
*Configure FileSystem NEXUS
*Configure Boot
*Configure Language 0
*Configure Dir
```

and possibly also

```
*Configure NexusDrive 4
```

Setting the default language to the Supervisor (language 0) is needed so that the most recent version of the desktop modules – including *NexusFiler – can* be loaded from the Nexus server before they are needed. The last stage of the !Boot application then starts up the Desktop. (See also the entry headed **Nexus Boot** Option in section 4: System **Administration.)**

Nexus Configurations

The Nexus filing system provides two additional configuration commands. You will not normally need to use them when first installing Nexus, unless your Archimedes computer is connected to two Nexus disc servers (or, exceptionally, if an expansion card which you have replaced by a Nexus interface card has left some spurious values stored in the CMOS RAM). They are fully described in Appendix D.

Upgrades

If you are sent a NEXUS Utility Software disc as an Upgrade disc you should not use the !Install utility – refer, instead, to the instructions sent with the upgrade disc.

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3: Using Nexus

... from the Desktop

On the Desktop, Nexus drives appear on the icon bar at the bottom of the screen (see figure 3.1). One drive (Drive 4) is read-only, and will typically be used for applications, fonts and similar data. This drive is available to all the stations connected to the Nexus server. The other drive (Drive 5) is available for both loading and saving programs and data, just like a local hard disc. Each drive 5 is an independent area, which can only be accessed by the station connected to the corresponding port of the server.

When the key switch is in the 'Admin.' position, the shared drive can be updated by the station connected to port 1 (or to port 1 of the router connected to server port 1, if appropriate), but will not be available to any other station until the key is returned to the ` Secure' position. Other stations will, however, usually be able to access their respective drive 5 partitions.

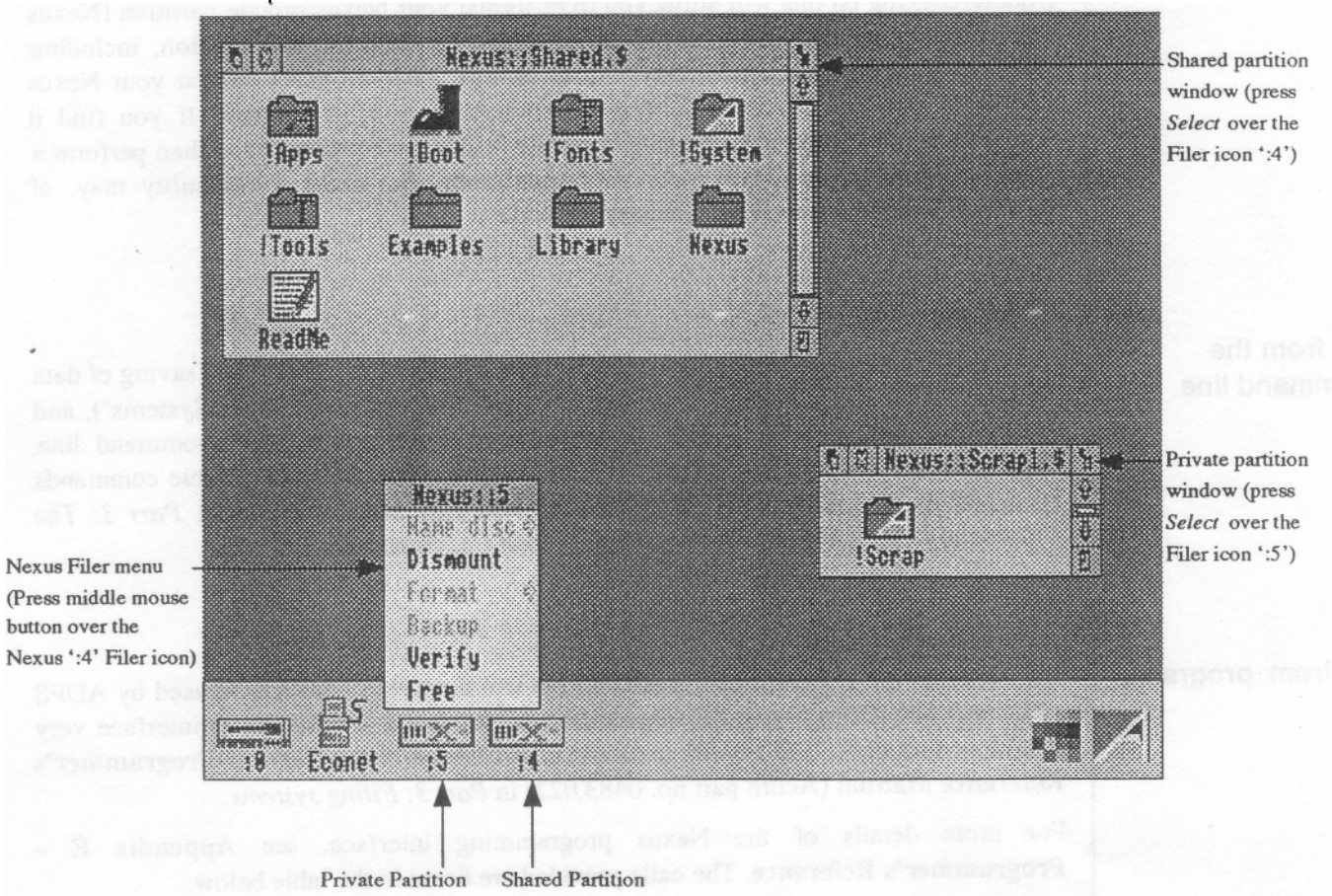

Figure 3.1: Nexus Filer Windows

As with other standard filing systems, clicking the left or right mouse button on top of either of the Nexus icons will open a window displaying the contents of that root directory. If the server cannot be accessed, an error box will appear, indicating what the problem is.

In some circumstances, it is possible for an error while clicking on the Nexus icons to cause the Nexus icons to be removed from the icon bar. This should not happen during normal operation, but if it does the icons can be reinstated by the following procedure. From the command line *(press F12)* or a task window, type

```
*RMReInit NexusFS
*Desktop Desktop NexusFiler
```

Note that this will close any open files on the Nexus filing system, which may lead to

errors from applications which were using them.

Pressing the Menu (middle) button over either of the Nexus icons will produce the Nexus Filer menu for the appropriate drive (see figure 2.1). The only options not " greyed-out" from this menu are Dismount, Verify and Free; currently Verify has no effect, while the other two options are equivalent to the corresponding options in the ADFS filer menu. *[Note: the ADFS version of* **Free** *is different on an A5000.]*

!Scrap

Assuming your Nexus unit has been set up in the recommended way, you will see an application called !Scrap in your Nexus private partition. This application provides temporary storage areas for a number of desktop operations, and for some applications. Using these areas is normally invisible to the user; however it is very important that this application is not deleted or altered. If it is, these processes (which include most printing operations, and transferring files between applications) will lead to errors.

Formatting Drive 5

A utility called Format is provided with your Nexus unit, and will probably be located in the library directory on Nexus Drive 4 (this will probably be called Library). Double-clicking on this will allow you to re-format your Nexus private partition (Nexus drive 5). **This will remove everything currently held on that partition,** including !Scrap. As explained, this is likely to lead to errors. Before you reformat your Nexus Drive 5 you should choose Dismount from its Nexus filer window. If you find it necessary to re-format your Nexus private partition we recommend you then perform a hard reset *(Ctrl-Break)* of your Archimedes computer. The Format utility may, of course, also be accessed from the command line.

... from the' command line

Like ADFS and the RAM filing system, Nexus fully supports loading and saving of data (see the Acorn Archimedes User Guide, in the section entitled 'Filing Systems'), and most operations can be performed without ever needing to use the command line. However, some commands are not available from the desktop: all available commands are listed in the **RISC OS User Guide** (Acorn part no. 0483,036) in *Part 3: The Command Line,* in the section on *'Filing System Commands'.*

... from programs

The Nexus filing system uses the Acorn FileCore module, which is also used by ADFS and the RAM filing system. Consequently, Nexus has a programming interface very similar to that of ADFS. Further details can be found in the RISC OS Programmer's Reference Manual (Acorn part no. 0483,022) in *Part 3: Filing systems.*

For more details of the Nexus programming interface, see Appendix E – **Programmer's Reference.** The calls provided are listed in the table below.

Name	SWI **number**
Nexus_DiscOp	&41B80
Nexus_PoduleSlot	&41B81
Nexus_Drives	&41B82
Nexus_FreeSpace	&41B 83
Nexus_Retries	&41B 84
Nexus_DescribeDisc	&41B85
Nexus_ServerOp	&41B 86
Nexus_DiscOp2	&41B 87
Nexus_EnumerateCards	&41B 88
Nexus_SetFSTimeouts	&41B89
Nexus_ReadFSTimeouts	&41B8A
Nexus_RegisterDriver	&41B 8B
Nexus_RemoveDriver	&41B 8C

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Errors

Few errors are likely to occur when using Nexus from the desktop, although it is easier to generate errors from the command line or from programs. By far the most common error is Disc write protected, which generally indicates you have attempted to write to the Nexus shared partition. For completeness, all possible Nexus errors are included in Appendix F.

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4: System Administration

Introduction

There are two kinds of system management task: re-configuring the way the disc drive is divided between the shared partition and the various private partitions, and updating the shared partition. Of these, the latter is by far the more common, particularly for installing new software; the disc is only very infrequently re-partitioned.

In this chapter, wherever reference is made to the Archimedes computer attached to port 1 of the Nexus disc server the reference should be taken to apply to Archimedes computer attached to port 1 of the Router which is connected to port 1 of the Nexus server, if this is appropriate to how your server is set up.

Starting the server

For normal use, switch on the server by moving the switch from the 'Off to the ` Secure' position. The 'Run' light will flash rapidly for about 20 seconds while the server software is booted from disc, and the light will then settle into a slower flashing pattern. If the 'Run' light does not flash, turn the server off for at least 5 seconds and then switch on again.

Stopping the server

Ensure that all stations using the system have finished writing. To be certain this has happened, each station should quit from all its applications (after saving any files as appropriate) and then either select Dismount from the Nexus drive 5 filer menu or, from the command line (press *F 1 2)* or a task window, type:

```
*Nexus:Dismount 5
```

Now turn the key to the 'Off' position (the disc drive will automatically park its heads).

Front panel lights

On the front of the Nexus server are two lights, the yellow 'Disc' light and the green ` Run' light. Whenever data is read from or written to the hard disc the 'Disc' light will flash. The 'Run' light is used to indicate the various operating modes and error conditions possible in the Nexus server. It should always be flashing, although the pattern of flashing will change according to the mode (or error state) of the Nexus server. (See next section for information on what to do if the 'Run' light is permanently on.)

Server modes

The Nexus server can be in a number of different modes, which are used for different purposes. The 'Run' light on the front of the server indicates which mode the server is in: each mode has a different flashing pattern.

Secure mode

This is the normal operating mode for the server. In this mode, the shared disc can be read by all stations attached to the Nexus server, but cannot be written to by any station. Once the server has been booted, it will remain in secure mode as long as the key is in the 'Secure' position.
The 'Run' light is mainly on, with a regular short flash off.

Administration mode

Administration mode allows the shared disc to be updated. When the server is in this mode, the shared disc can only be accessed by the Archimedes computer attached to port 1 of the Nexus server. This station will be able both to read from and to write to the shared disc. Other stations will not be able to access the shared disc at all, and any attempt to do so will result in the error message `Server in admin mode' (Error &12D82). These stations will, however, be able to access their respective private partitions.

After the server has been booted, it can be placed into administration mode by turning the key switch to the `Admin.' position. It will revert to secure mode when the key is turned back to 'Secure'.

The server indicates administration mode by flashing the 'Run' light with equal on and off periods, approximately once per second.

Privileged mode

— — — —

Privileged mode allows the disc structure to be updated. When the server is in privileged mode, the Archimedes computer attached to port 1 can read from and write to any location on the disc, but no other stations have any access to the server. Any attempt to access the server other than from port 1 (including access to private partitions) will result in the error 'Server in privileged mode' (Error &12D82).

Privileged mode is entered from administration mode by sending a special command from the station attached to port 1 (see Nexus_ServerOp). It can be left either by sending a similar command, which will return the server to administration mode, or by turning the key back to 'Secure', which will return the server directly to secure mode. This mode is used by the *!PartEdit* software to update the partitioning of the disc, and to allow formatting of all partitions from the Archimedes computer attached to port 1.

In privileged mode, the 'Run' light flashes in the same way as in administration mode.

Link boot mode

· · · (initial)

··· ··· ··· (linked)

Link boot mode allows the server to be started by loading in a program from port 1. It is used to start the server when no server program is installed on the disc. The utility *!BootNexus* can then be used to copy an appropriate program to the server — see Appendix G.

Link boot mode is entered by turning the key switch directly from the 'Off' position to the 'Admin.' position. If no data is received within 30 seconds, the server will automatically enter Disc boot mode (see below).

If some data is received within this 30 second period, the server will remain in link boot mode until a program has been loaded and booted by the Nexus server.

Until any data is received the 'Run' light flashes on, briefly, approximately onee per second. After data has been received, but before a program boots, the 'Run' light flashes on briefly in groups of three flashes, again approximately once per second.

Disc boot mode

— — — —

The Nexus server normally starts *via* this mode. When the server is turned on by switching the key from the 'Off' to the 'Secure' position, it initially starts up the hard disc, during which period the 'Run' light flashes rapidly. After about 20 seconds, the disc server automatically enters Disc boot mode. In this mode the server will attempt to locate a server program on the disc; if one is found, it will be loaded and run. If no server software is located, or if it is corrupt, an error pattern is displayed on the 'Run' light.

In disc boot mode, the 'Run' light is mainly on, but flashes off briefly in groups of three flashes, approximately once per second.

Server errors

The server indicates errors by flashing different patterns on the 'Run' light. Errors are indicated by a group of four flashes. The four flashes may be either short or long, and indicate an error number, in binary, with a long flash representing a binary 1. Groups of flashes are separated by a long pause. Currently, the following error patterns may be seen:

···—	Internal error; contact SJ Research
··—·	Server program cannot be found, or is corrupt
··——	Server program corrupt

Note that if the 'Run' light stays on continually then the Nexus processor has "locked up". Use the key switch to turn the unit off; wait 5 seconds and turn it on again. If the fault persists, or occurs other than very infrequently, please contact SJ Research. If the ' Run' light fails to come on at all then the processor is not running — Try turning the server off, waiting 5 seconds and then turning it on again. If this fails to start the server then please contact SJ Research.

Run Light summary

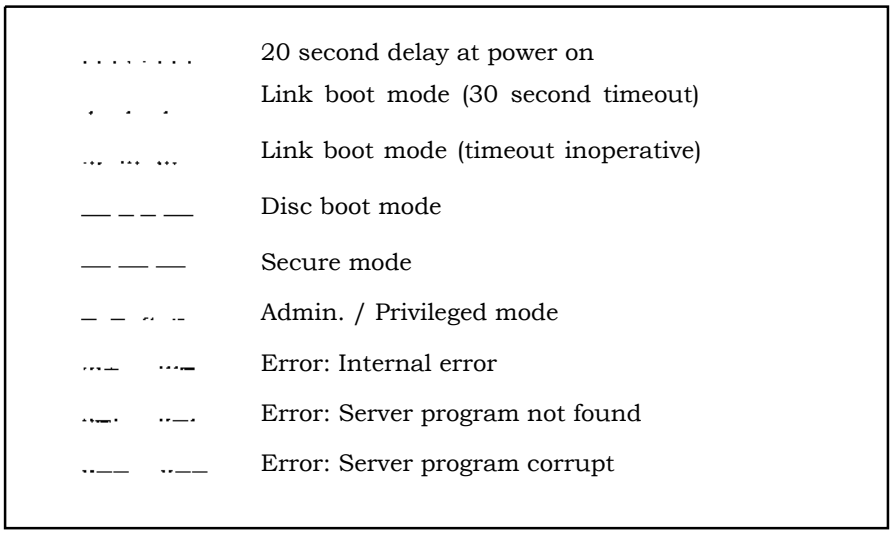

Figure 4.1: Run light summary

Updating the shared partition

To make drive 4 (the shared disc) writeable, enter administration mode by turning the key switch to the 'Admin.' position (see under 'Server modes' above). Attempts to access drive 4 from stations other than the one connected to port 1 will now return the error 'Server in admin mode'. The station connected to port 1 will, however, be able to use the drive just like a local hard disc; software can be copied onto it by dragging between desktop windows in the normal way.

Whenever you alter the contents of drive 4 in any way you must dismount the disc (e.g. by selecting **Dismount** from the :4 Nexus filer menu) before returning the key to the 'secure' position.

Remember to test any software you install, after you have write-protected drive 4 by returning the server to 'Secure' mode. Some packages use temporary directories and files, and will need to be configured to use drive 5 for this purpose. Refer to the installation instructions for each package.

!PartEdit

Introduction

The main purpose of the !PartEdit utility is to allow the manager of the Nexus disc server to distribute the space available on the hard disc between the shared read-only partition and the various private read-write partitions. The information about this space distribution is referred to as the Partition Table, and is stored on a reserved area of the disc. Whenever the space allocation is altered the amended partition table has to be written to the disc, and any affected partitions must be re-formatted. These operations can also be performed within !PartEdit.

Distributing space between the different partitions is earried out in the Partition Editor window, while the other options are available from the !PartEdit menu.

Loading !PartEdit

Warning: Before loading !PartEdit you should quit from all other applications running in your Archimedes computer, and preferably re-boot your machine *(Ctrl-Break).* All other computers connected to the Nexus server should at least dismount both of their Nexus drives.

The !PartEdit application is supplied on the Nexus Utility Software disc, in a directory called **Utilities.** Insert the floppy disc in the Archimedes computer connected to port 1 of the Nexus server, open a directory window onto its root directory and then onto the 2 **Utilities** directory. Double-click on the !PartEdit icon to load the application; it will appear on the icon bar in the usual way. Now ensure that no one else is using the Nexus to unit; ideally any users should dismount both their Nexus drives by choosing that option from each of the Nexus filer windows. Turn the Nexus key to the 'Admin.' position, and press select over !PartEdit's ieon bar icon. The application will be started up,

displaying the Partition Editor window.

Note: While !PartEdit can be installed in any Archimedes computer, trying to start it up will produce an error message unless the Archimedes computer is connected to port 1 and the key is in the 'Admin.' position.

Once !PartEdit has been started you should finish using it and quit the application from its icon bar menu before you return the key to the 'Secure' position.

The Partition Editor Window

The initial appearance of the Partition Editor window will depend on whether your Nexus has 4, 6 or 8 ports. *Figure 4.1* shows the full window for a 4 port Nexus, while *Figure 4.3* shows how this differs for an 8 port unit.

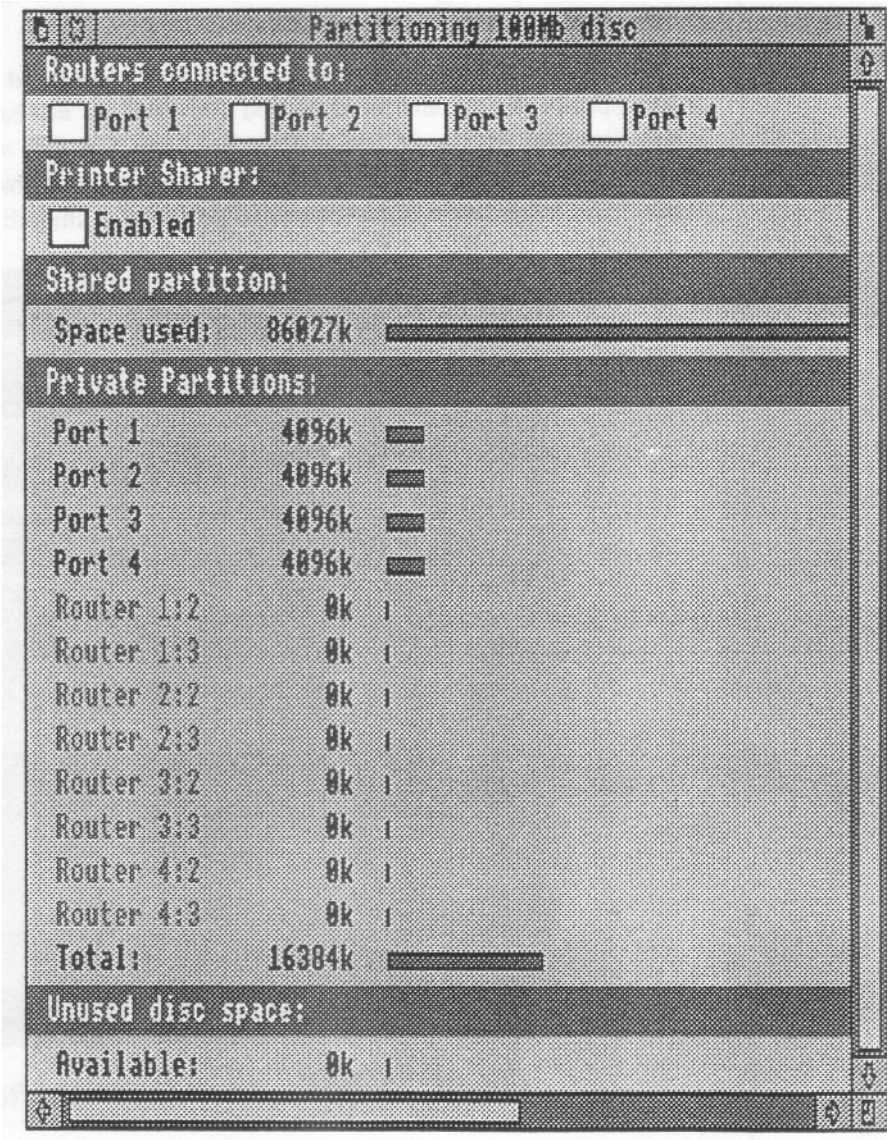

Figure 4.1: !PartEdit - Partition Editor window

PartEdit Options

Routers connected

If you have one or more Routers connected to the Nexus server, you should set the corresponding check box(es) in the top section of the Partition Editor window. As you do so, the Private Partitions section of the window will change, with the partition bars re-ordered and labelled to correspond with the Routers in use – see *Figure 4.2* for an example of this.

Note that it is **essential** that any Routers in use are connected to the ports you have indicated in the PartEdit window. Also, if a Router is connected to port 1 then the Archimedes computer you will have to use for Nexus management will become the one

connected to port 1 of Router 1. When you attach a Router to a port, the disc private partition previously allocated to that port is transferred to port 1 of the Router.

If you have expansion card(s) fitted to your Nexus server (i.e. if you have a 6 port or an 8 port server) then one or both of the boxes for **Port** 2 and Port 4 will be greyed out (see *Figure 4.3).* As usual, you cannot select a greyed-out option.

Printer Sharer

Selecting this check box will cause an area of disc to be allocated for use with the optional printer sharing software (contact SJ Research for details of this product). The printer software requires 16k of disc space. Unless this space is available (i.e. not allocated to any other partition), it will not be possible to enable the printer sharer. As mentioned earlier, we strongly recommend you to enable the printer sharer even if you are not currently using it, since this will avoid the need to re-partition the disc if the printer sharer is subsequently added.

If you have failed to allow space for the printer sharer and subsequently find you need to free space for this purpose then you are strongly advised to do so by reducing the space allocated to one of the private partitions. In this way you will only need to reformat the private partitions (remember that this will lose any data saved on them) rather than having to reformat the shared partition, losing all the data held there.

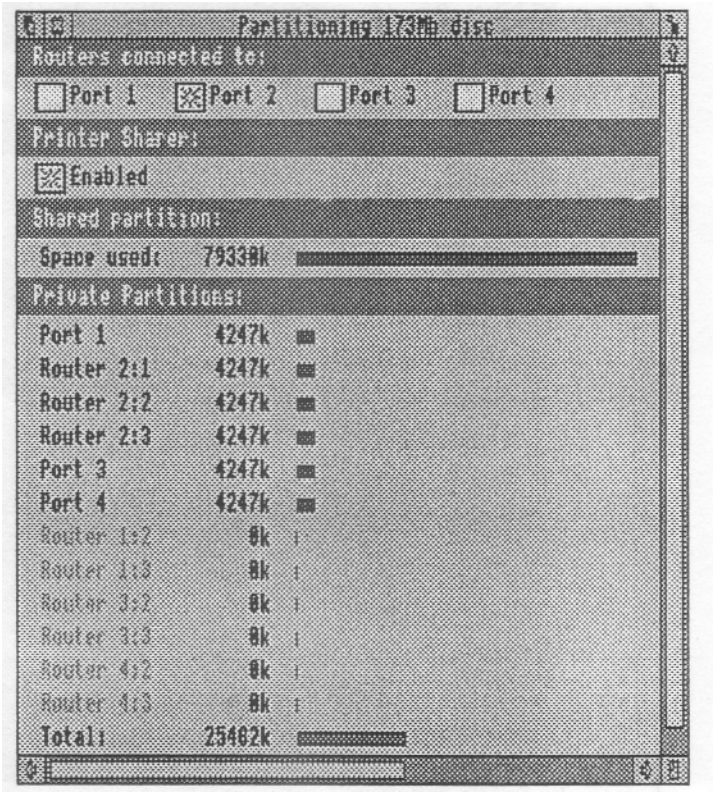

Fig. 4.2: !PartEdit - 4 port Nexus with Router

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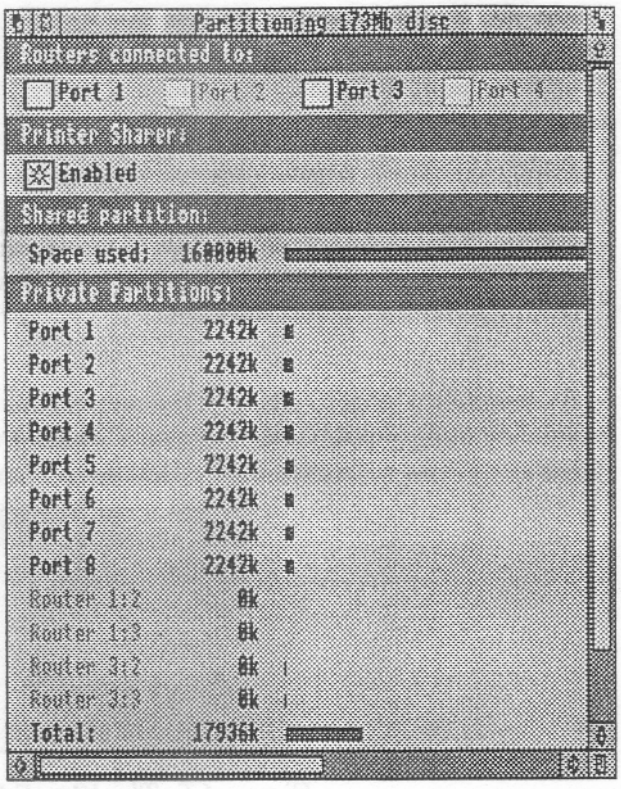

Fig. 4.3: !PartEdit - 8 port Nexus

Partition bars

The partition bars show the space allocated to each partition on the Server. Initially, all the bars are green; if a bar is altered then it will be displayed in red. Consequently, if any of the bars are displayed in red then the altered partition table will have to be written to the disc. In addition, if the space allocated to any private partition is altered then **all** the private partitions will have to be re-formatted. If the space allocated to the shared partition is altered then whole disc (shared and private partitions) will have to be reformatted.

To change the size of a partition, either use the mouse to drag the appropriate bar to the required value, or click over the **size** value. This will open a dialogue box, as shown:

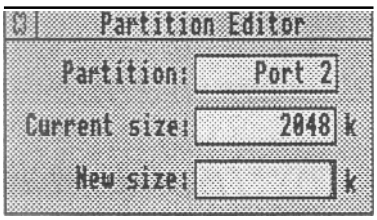

Figure 4.4: Partition bar size dialogue box

into which you can type the desired value. A partition can be disabled by setting its size to OK; otherwise the minimum size for a partition is 8K.

It is possible to set the sizes of the partitions provided for Routers which are not currently in use. These partitions appear at the bottom of the Private Partitions sections of the display, with their labels greyed out. You may wish to allocate space to these partitions if you expect to add Routers (or expansion cards) later, to avoid the need to change the partition sizes then, since this will require you to re-format the disc, destroying all the software, etc. you have installed there. Alternatively, you can ensure there is sufficient **Unused disc space** (bottom section of the window) for such expansion.

Saving the Partition Table

Having set up the space allocations you require, you must save your new partition table values to the Nexus disc. To do this, you access the !PartEdit menu by clicking the middle mouse button while the pointer is within the !PartEdit window. From the menu choose **Save partitions.**

Saving the partition table causes any necessary re-formatting of the disc to take place. As mentioned above, changes to any of the private partitions will require all private partitions to be re-formatted, while a change to the shared partition will require the re-formatting of the entire hard disc (shared and private partitions). All data will be lost from the partitions **you re-format.**

The !PartEdit Menu

As mentioned above, clicking the menu button with the pointer over the !PartEdit window brings up the !PartEdit menu. This has five options, of which Save partitions has already been described. Brief descriptions of the other options follow.

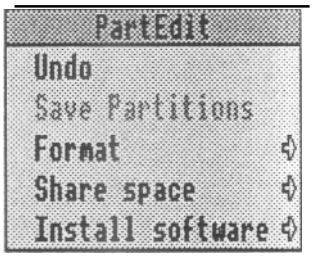

Figure 4.5: The !PartEdit menu

Undo

This causes the Nexus unit to re-read the partition information saved on the disc. This will reset all partition slider bars and the printer sharer and Router switches. All partition bars will turn back to green.

Format

Moving sideways from this option brings you to a sub-menu. The contents of this window will depend on the position of the pointer when you clicked *Menu*. The possible sub-menus are shown:-

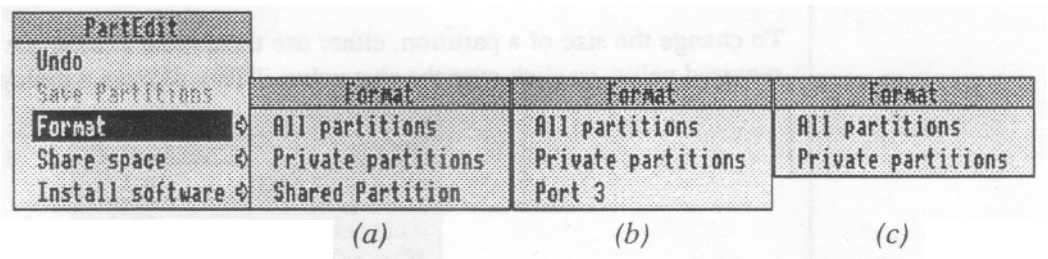

Figure 4.6: !PartEdit menu - the Format sub-menu

The first two options are always the same; Clicking *Select* on All partitions re-formats the shared partition and all the private partitions (i.e. the entire disc except for the area used for the Nexus server program and the information about the partition sizes and Nexus printing). All **information held on the** disc will **be** lost. Clicking on Private partitions will cause all the private partitions to be re-formatted, with the loss of all data held on those partitions.

If you originally clicked *Menu* with the pointer over the top section of the Partition Editor window then you will obtain the menu shown in *Fig. 4.6a.* Here, the third option allows you to re-format the shared partition without affecting any of the private partitions. Again, **all data held on the shared partition of the** disc will be lost.

Clicking *Menu* over the **Private Partitions** section of the Partition Editor window gives you the menu shown in *Fig. 4.6b;* the third line of the menu will depend on which line of the menu the pointer was over when *Menu* was clicked. This option allows a single private partition to be re-formatted without affecting anything else on the disc. In the

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case illustrated, the *Menu* button was clicked while the pointer was over the line of the Partition Editor window relating to size of the private partition for **Port** 3.

If *Menu* is pressed when the pointer is below the Private Partitions section of the window (i.e. with the pointer over the Unused disc space section) then there will only be two options in the Format sub-menu, as shown in *Fig. 4.6c.*

Share Space

This brings up a window listing the partitions included in the Private Partitions section of the !PartEdit window (as mentioned before, the contents of this section of the window will depend on whether the Nexus has 4, 6 or 8 ports, and whether any Routers are attached). A typical Share Space window is shown below:-

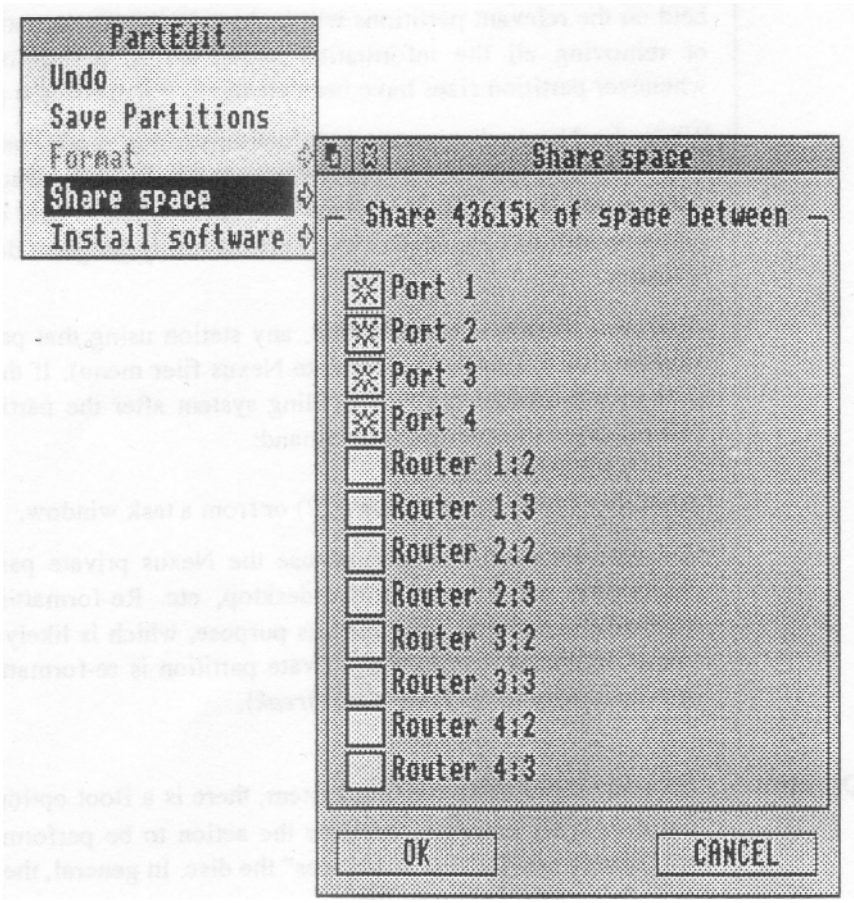

Figure 4.7: !PartEdit Menu – the Share space option window

Within this window you select the option boxes corresponding to the partitions to which you wish to allocate space. Clicking select over the OK box then distributes the available free space equally between these partitions and returns you to the Partition Editors window. If you wish, you can then make further adjustments to the space allocations. As before, you **must** finally go back to the !PartEdit menu and choose Save Partitions.

Install Software

This option installs a copy of the Nexus server program from floppy disc onto the Nexus hard disc. The server program is held on a special area of the disc, from where it is used to start up the server automatically (see 'Disc boot mode' above).

When this option is selected, a dialogue box will be opened, showing the version of software the server is running, and the version available on the floppy disc. Only continue with the installation if the version on the floppy disc is later than that found on the hard disc. (!PartEdit will warn you if you attempt to install a version of the software which is older than the version currently on the Nexus hard disc.)

Your Nexus server will have been supplied with a copy of the server program installed on its hard disc. However, you may need to use this option to install future improved versions of the server program, or if the hard disc has to be replaced, or if the server program is somehow corrupted. In this last (very unlikely) event you will first have to use the !BootNexus utility to start the Nexus server, this is described in Appendix G.

Whenever you install a new version of the server software you should turn the server off, wait a few seconds and then turn it on again (to the 'Secure' position of the key switch) to force the server to load and use the updated software.

Formatting Discs

Whenever you format partitions on your Nexus hard disc, all information previously held on the relevant partitions will be lost. Formatting a partition is the quickest method of removing all the information stored on it. Re-formatting must be carried out whenever partition sizes have been changed. Formatting a partition is irreversible.

While the Nexus disc server is in administration mode, partitions can be re-formatted from the Archimedes computer connected to port 1, using the !PartEdit program as described above. While the Nexus is in secure mode a user can re-format his or her own private partition by means of the Format utility program described in section 3: Using **Nexus.**

Before a partition is re-formatted, any station using that partition should dismount the relevant disc (from the appropriate Nexus filer menu). If this is not done, the user will have to re-initialise the Nexus filing system after the partition has been re-formatted. This is done by entering the command:

```
*RMReInit NexusFS
```

from the command line (press *F12)* or from a task window.

As explained earlier, in normal use the Nexus private partitions are used to provide temporary work space for the desktop, etc. Re-formatting a private partition will remove the structures used for this purpose, which is likely to lead to errors occurring. If an Archimedes computers' private partition is re-formatted it is generally advisable for the machine to be reset *(Ctrl-Break).*

Nexus Boot Option

Like any other FileCore filing system, there is a Boot option associated with the Nexus hard disc. This option determines the action to be performed with the application (or file) !Boot when the filer first "sees" the disc. In general, the options available are:

0 Off, i.e. no action
1 Load (only applicable to a file)
2 Run (file or application)
3 Exec (file only)

With the Nexus server it is essential that the Shared hard drive has its boot option set to 2, otherwise the Nexus boot sequence described elsewhere will not operate. Although your Nexus server will have been supplied with the correct boot option set, it may subsequently need to be re-set; for example, re-formatting the shared partition will set its boot option to 0. The boot option can only be reset from the station connected to port 1, and with the key in the Admin.' position. From the command line *(F12)* enter:-

```
*NEXUS
*MOUNT 4
*OPT 4,2
```

As with any alterations to the shared partition, you should dismount the disc before returning the key to the 'Secure' position.

Note that it is also possible for users to set a boot option for the private partition they are connected to. However, it is unlikely to be appropriate to set the boot option on the private partitions to anything other than 0.

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Naming Discs

Your Nexus server is supplied with the shared disc named as Shared, and with the private partitions named as Scrap1, Scrap2, etc. It is possible to use the FileCore NameDisc command to change these names. To change the name of the shared partition **to** *AdminDisc,* from the station connected to port I, and with the key in the 'Admin.' position. you would go to the command line *(F12)* and enter:-

```
*NEXUS: NAMEDISC 4 AdminDisc
```

The maximum length allowed for a name is 10 characters; spaces aren't allowed, and will be treated as marking the end of the name.

Users can change the name of their private partition in the same way. This may have undesirable side effects, so it may be advisable not to inform them of the fact.

Note that many operations make explicit reference to disc names. For example when an application is first "seen" its !Boot file probably sets up a system variable to define the action to be taken to a Run file of its associated file type; e.g. for a Sprite file the system variable concerned and its setting might be is:

```
Alias$RunType_FF9 Run Nexus::Shared.$.!Apps._.!Paint
```

In this case, if the name of the Nexus shared partition is subsequently changed, the system will no longer be able to find the disc Nexus::Shared and so double-clicking on a Sprite file will generate an error message.

Rear Panel Lights

The rear panel of your Nexus server has a number of small LEDs, one red and one green for each port or group of ports. As shown in *Figure 4.8,* the groupings are marked on the back of the Nexus; for an 8 port Nexus there is one group of 5 ports, plus three individual ports:

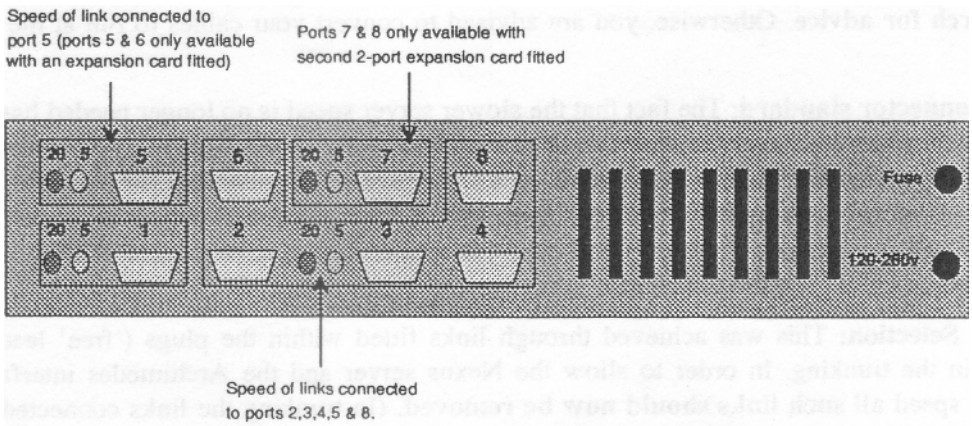


Figure 4.8: Nexus Server - Rear Panel

With the current implementation, under normal circumstances all of the green LEDs (marked '20') should always be on. Please contact SJ Research if this is not the case. *[Note: in a very few circumstances Nexus ports will have to continue to run at the slower speed of 10Mbits/s (indicated by neither light being on); ports should only be run at this rate after consultation with SJ Research's Technical Support desk.]*

Appendix A: Nexus Cable Installation

Since the introduction of the Nexus disc server, we have carried out extensive further research into Nexus cabling. This has shown that our original specifications were highly conservative. Using appropriate cable, the distance from a Nexus server to an Archimedes computer, from a Nexus to a Router, from a Router to an Archimedes computer or (with Nexus networking) from a Router to a Router can be up to 100m; thus an Archimedes computer connected via a Router can be up to 200m from its Nexus disc server. The cable recommended for connections, Nexus Standard Cable, is a high performance cable, which is rather heavier and less flexible than the cable we have supplied previously (it is a form of IBM Type 1 cable); however, it is no more expensive. To simplify its installation, we supply purpose-made socket faceplates and mounting boxes. The design of these is such that it is a simple task to replace a socket box by a Router, to extend your Nexus wiring at a later date. This cable should be used wherever possible. It offers the best performance, and will be suitable for full Nexus networking in the future.

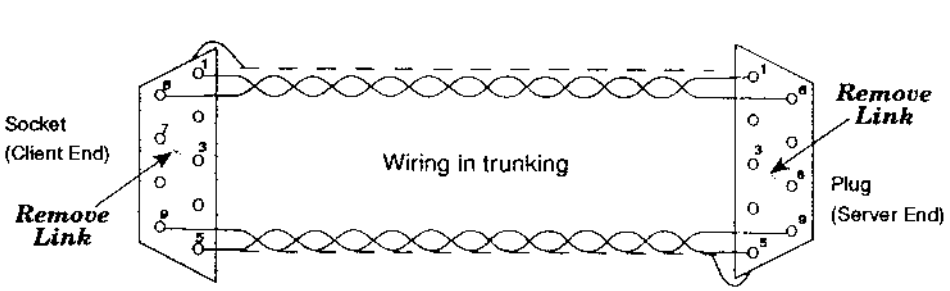
Where users are certain they will not need to extend their Nexus wiring, and this heavier cable cannot be accommodated, alternative cables are available for shorter cable runs. Alternatively, Archimedes computers can be connected directly to the Nexus server by 'free' leads of appropriate lengths. The new cabling options for Nexus are fully described in the Nexus Cabling Guide. If you do not have a copy of this, please contact the Technical Support Desk at SJ Research.

Important Notes for Existing Nexus Users

Previous issues of the Nexus disc server manual have referred to running ports on the Nexus unit at a lower speed (10MHz instead of the normal 20MHz) when using leads of over 10m, and whenever cable is installed in trunking. We have now found that with the cable we then supplied the server can run at full speed (20MHz) over cable runs of up to 50m. We now strongly recommend that all server ports should always be run at 20MHz. **If you have used this cable for any cable runs of over 50m then you should contact the Technical Support desk at SJ Research** for advice. Otherwise, you are advised to convert your cables to run at the higher speed, as described below.

New connector standard: The fact that the slower server speed is no longer needed has allowed us to upgrade the sockets fitted to the Nexus interface cards which have to be installed in the Archimedes computers. The old 8 pin mini-DIN connector has been superseded by a 4 pin mini-Din connector. This is more robust, easier to locate and gives a more reliable connection. If you have any interface cards with the old 8 pin connectors you should contact SJ Research to arrange for these (and their associated leads) to be upgraded free of charge to the new 4 pin standard.

Speed Selection: This was achieved through links fitted within the plugs (`free' leads) or in the plugs/sockets fitted in the trunking. In order to allow the Nexus server and the Archimedes interface cards to operate at the higher speed all such links should now be removed. (In trunking the links connected pins 3 and 8 at the Nexus end, and connected pins 3 and 7 at the Archimedes computer's end — see diagram below. With 'free' leads, pin 3 was linked to pins 7 and 8 inside the `D' type plug.) Having removed all links, re-connect your system and check the small LEDs on the back of your Nexus server. Each of the small green LED should be 'On', showing all ports to be running at 20MHz.



9 way D-type connections

1 Tx+ (output)
2 5V in (input)
3 0V
4 5V out (output)
5 Rx+ (input)
6 Tx- (output)
7 *not 10 grant (output)*
8 *not 10 request (input)*
9 Rx- (input)

Note: *The function of pin 8 (server end) is now redundant*
The function of pin 7 (client end) is no longer supported

Figure A.1: Converting trunking cabling from 10MHz to 20MHz operation

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Appendix B: Hardware Installation

Interface cards To allow Archimedes computers to communicate with the Nexus disc server, each machine requires an interface card. Currently four types of card exist; all types are fitted internally.

The A3000 Nexus interface cards should be fitted by an Acorn authorised dealer. Take your A3000 computer (in its original packaging) to an Acorn dealer who will install it for you. The dealer may make a charge for this service.

The following notes are provided for those who wish to install the interface cards themselves. However, you should also read carefully any instructions supplied with the cards.

When installing an interface in an A3000, make sure that all the pins fit into the socket of the main board. Three types of interface are currently available for the A3000: the standard interface, the fast interface, and the fast interface with user port.

The remaining interface card fits into a standard podule slot in A300, A400, A540 and A5000 series Archimedes computers. (See the Application Note ***Determining Version Numbers*** in *Appendix H* for information on the Interface Card ROM version numbers.) However, the A300 series machines require a podule backplane to be fitted first. These can be obtained from:

I.F.E.L.
36 Upland Drive
Plymouth
Devon
PL6 6BD
Tel: (0752) 847286

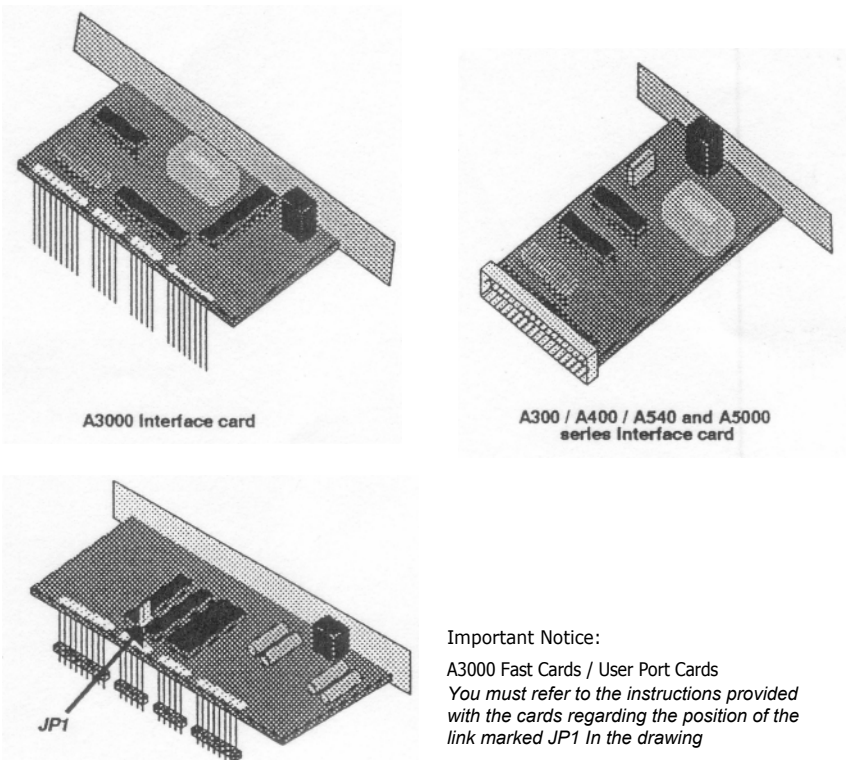

Figure B.1: Nexus Interface Cards

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When fitting a card into an A300 series Archimedes computer (once the backplane has been installed), spacers must be fitted between the panel of the interface card and the Archimedes computer's case. These spacers are not required on any other machine.

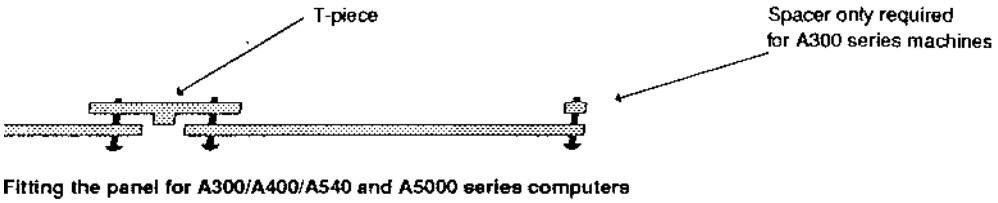

Figure B.2: Interface card mounting

Routers and Connector Socket Boxes

These are supplied with full installation instructions. Please contact the Technical Support desk at SJ Research if you require a copy of these instructions. You should read the Nexus Cabling Guide, also available from the Technical Support desk, before incorporating Routers into your installation.

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Appendix C: The Nexus Boot Sequence

A boot sequence is a series of operations which take place automatically when a machine is powered on (or reset); this process is used to set the machine into a required initial state. With Archimedes computers, one of the machine configuration options is **Boot.** If this option is turned on, when the computer is powered on (or *Ctrl-Break* is pressed) it will access an application [1] called **!Boot[2] on** its configured filing system. This is why the Archimedes computers connected to your Nexus should be given the following configuration (as described in section 2: Installing Nexus):-

*Configure Filesystem Nexus
*Configure Boot
*Configure Language 0
*Configure Dir

and possibly

*Configure NexusDrive 4

(the need for the third of these commands will be explained later).

The Nexus boot sequence has a number of functions:

- It makes sure the client machine has the latest versions of the Nexus modules loaded.
- It informs the Archimedes operating system of the temporary workspace available on Nexus drive 5.

and generally

- It informs the operating system of the presence of the !System directory (where various "resource" modules common to a number of applications are located) and of the !Fonts directory on Nexus. Many applications will expect to know about these areas, and informing the system of the directories on Nexus will prevent applications trying to load resources from less efficient storage devices, such as floppy disc or the Econet.
- It loads other updated modules, and possibly commonly used extra modules.
- It makes the operating system examine a number of commonly used applications, so that it knows about them and their associated file types. (For example, if a user saves a file from !Draw it will be displayed with the familiar Draw icon. Next time a machine is turned on the system will only be able display the file's icon correctly once it has found out about the file types associated by !Draw – which it normally does by examining the application the first time it sees it.

and possibly

- it loads applications the system manager wants to be available on the Archimedes computer.

The Nexus boot sequence looks fairly complex; this is for three reasons:

1) The sequence has to load new copies of the Nexus modules, but these are actually used whenever information is loaded from Nexus into the "client" Archimedes computer, and so are needed while the boot sequence is running. This is why the boot sequence is controlled by a machine code program.

2) Some of the new modules are used by the desktop; hence these must be installed before the Archimedes computer enters the desktop. This is why the Archimedes computer has to be configured to Language 0 (which represents Supervisor mode, i.e. no language) to execute the Nexus boot sequence correctly. These operations are performed by the PreDesktop file.

3) Other operations, such as starting up applications, need to be carried out on the desktop. These are performed by the DeskStart file.

Notes:

1 !Boot may be a file rather than an application

2 On an Econet, the file/application accessed by an Arehimedes eomputer will be ealled !Armboot rather than !Boot (! Boot is "reserved" for BBCs / Masters).

See the RISC OS User Guide for more information.

A number of the operations within the boot sequence could, in fact, be performed at either stage.

Thus the Nexus !Boot sequence is implemented through an application called !Boot which is found in the root directory of Nexus drive 4. If you open the directory for this application you will see:

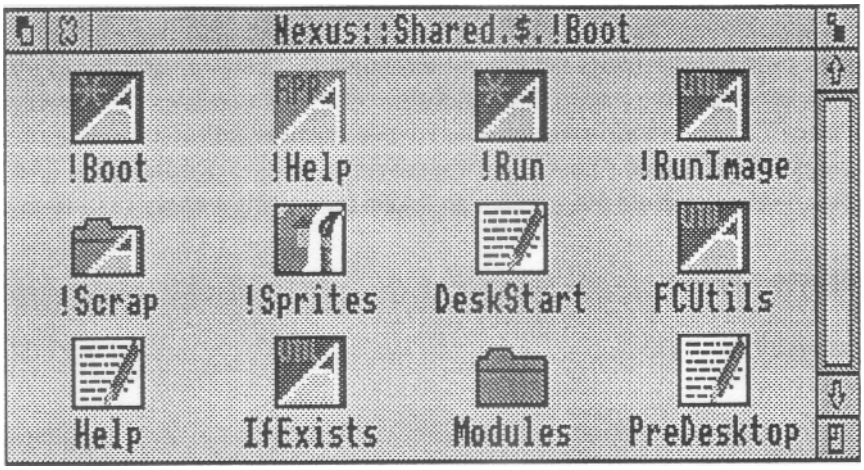

Figure C.1: The Nexus !Boot application

The actual boot process in controlled by two of the text files:

PreDeskTop	Contains instructions to be carried out before entering the Desktop
DeskStart	Contains instructions to be carried out on entering the Desktop.

To modify your boot action you simply edit the contents of these files; wherever possible you should alter DeskStart in preference to PreDesktop.

The contents of these two files are shown here, with some blank lines removed to save space.

File **PreDeskTop:**

```
|PreDesktop for Nexus Release Disc
|On entry <Boot$Disc>=This Disc <Boot$Dir>=This Directory (both full pathnames) |
Created: REC/ARBS 13 Aug 1991
|Updated: 02 Jan 1992
/<Boot$Dir>.IfExists -f <Boot$Disc>.!System.!Boot then Run <Boot$Disc>.!System.!Boot
/<Boot$Dir>.IfExists -f <Boot$Disc>.!Fonts.!Boot then Run <Boot$Disc>.!Fonts.!Boot
Set Alias$LoadModule RMEnsure %0 %1 RMLoad System:Modules.%2|mRMEnsure %0 0 RMReInit
%0|mRMEnsure %0 %1 Error You need %*3 %1 or later
Set Alias$LoadSJModule RMEnsure %0 %1 RMLoad <Boot$Dir>.Modules.%2|mRMEnsure %0 0 RMReInit
%0|mRMEnsure %0 %1 Error You need %*3 %1 or later
|Set an alias to cover the change from the word 'line' to 'port'
Set Alias$LineNumber PortNumber|mEcho Warning: The 'LineNumber' utility is now called '
  PortNumber'
SetMacro Nexus$LineNumber <Nexus$PortNumber>

Set Nexus$Type0 1
Set Nexus$Typel 1
RMEnsure NexusStdDriver 0 Set Nexus$Type0 0
RMEnsure NexusFastDriver 0 Set Nexus$Typel 0
If Nexus$Type0 = 0 AND Nexus$Typel = 0 Then Set Nexus$Type0 1
If Nexus$Type0 = 1 Then LoadSJModule NexusStdDriver 0.06 NexusStdD Nexus driver
If Nexus$Typel = 1 Then LoadSJModule NexusFastDriver 0.10 NexusFastD Nexus Fast Card driver
Unset Nexus$Type0
Unset Nexus$Typel

RMEnsure    FileCore       2.02 Run <Boot$Dir>.FCUtils -q
LoadSJModule NexusFS       1.01 NexusFS                 NexusFS
LoadSJModule NexusFiler 0.29 NexusFiler                 NexusFiler
```

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```
|The following line can be used to remove the Nexus icons from the icon bar
|RMKill NexusFiler

|************************************************
|Enter commands for loading of your own modules here
|************************************************
|LoadModule Econet      5.50 Econet                 Econet
|LoadModule HourGlass   2.08 Hourglass              HourGlass
|LoadModule NetFiler    ?.?? NetFiler               NetFiler    ~ NB Do not load NetFiler 0.24
|LoadModule NetFS       5.59 NetFS                  NetFS
```

File **DeskStart**

```
| DeskStart for Nexus Release Disc
 On entry <Boot$Disc>=This Disc <Boot$Dir>=This Directory (both full pathnames)
Created: REC/ARBS 13 Aug 1991
| Updated: 07 Jan 1992
| Set Run$Path - NB No library on Nexus
Set Run$Path ,<Boot$Disc>.Library.,%.
/PortNumber

| Set Work$Disc, and set up scrap files
Set Work$Disc             Nexus::5.$
Copy <Boot$Dir>.!Scrap    <Work$Disc>.!Scrap ~C~V~Q~RF
Run                       <Work$Disc>.!Scrap
Set Printer$Temp          <Wimp$ScrapDir>.PTemp
Set Printer$Scrap         <Wimp$ScrapDir>.PScrap
|Set Spark$Scrap           <Wimp$ScrapDir>

| Set Aliases for Filer_OpenDir, Filer_CloseDir and Filer_BootDir
If RiscOS$Version <202 Then Set Alias$Filer_OpenDir Set Alias$OpenDir %Filer_OpenDir %*0|m
OpenDir |mUnset Alias$OpenDir
If RiscOS$Version <202 Then Set Alias$Filer_CloseDir Set Alias$CloseDir %Filer_CloseDir %*0|m
CloseDir|mUnset Alias$CloseDir
If RiscOS$Version > 201 Then Set Alias$Filer_BootDir Filer_OpenDir %*0|mFiler_CloseDir %*0|m
If RiscOS$Version < 202 Then Set Alias$Filer_BootDir Filer_CloseDir %*0|mFiler_OpenDir %*0|m

| Load Nexus modules
LoadSJModule NexusPrint          1.01 NexusPrint           NexusPrint
Set User$Port 1
RMEnsure NexusUserPort 0 Set User$Port 0
If User$Port = 1 Then LoadSJModule NexusUserPort 1.02 NexusUserP Nexus User Port
Unset User$Port
| Load other modules, as required
|LoadModule SharedCLibrary        3.75 CLib                Shared C Library
|LoadModule NetPrint              5.30 NetPrint            NetPrint
|LoadModule NetStatus             2.06 NetStatus           NetStatus
|LoadModule BroadcastLoader       0.99 BroadCast           Broadcast Loader
|LoadModule BroadcastLoaderUtils  0.99 BrdLdrUtil          Broadcast Loader Utils

|Start the Printer Sharer software on a given port, if required
|If <Nexus$PortNumber> = 1 Then Run <Boot$Disc>.Nexus.!Sharer

| Boot application directories, if required
/<Boot$Dir>.IfExists -f <Boot$Disc>.!Apps.!Boot then Run <Boot$Disc>.!Apps.!Boot
```

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```
| "See" the contents of a directory, if required
|  Filer BootDir <Apps$Dir>  |
*************************************************************

| From this point on you can add your own commands for execution at boot up.

| Open root directory and start applications

 Filer OpenDir <Boot$Disc>
```

Notes

System Variables

The !Boot application sets up a number of system variables; these are partially for its own use (so it isn't run more than once), but may be of use elsewhere. They are:

RiscOS$ Version: The RISC OS version number, converted to an integer — so version 2.00 becomes 200, etc.

Boot$Disc: The full pathname of the disc !Boot has been run from. This can be used to provide a full path name to anywhere on the disc. For example, if your applications were in a directory Nexus::4.$.!Apps._ then you might set up a system variable to point to this directory as:

```
Set App$Dir <Boot$Disc>.$.!Apps._
```

(note you should never rely on the drive number, :4, in a path description since — for example — you might at some time have two Nexus disc servers connected to the same Archimedes computer, whereupon one shared drive would be Nexus::4 and the other would be Nexus::6). If you set up a variable App$Dir in this way then its value would still be correct if you were to re-name the Nexus disc.

This variable could also be used for checking whether a computer had been booted from Nexus, ADFS or Econet.

Typical value would be Nexus::Shared.$

Boot$Dir: A pointer to !Boot's directory, for use within the application only — should not be used elsewhere. Typical value is &.!Boot

Boot$PreDesktop: Indicates that the PreDesktop file has been executed; in this case it will be set to Done. Otherwise it will be Unset.

Boot$DeskStart: Indicates that the Desktop has been entered with the instruction to execute the file DeskStart. Note that this variable does not indicate that DeskStart has been executed correctly. The value of this variable will be **Done;** it will not be set if the command to enter the desktop has not been given.

File PreDeskTop

This starts by running the !boot files for the applications !System and !Fonts on the disc indicated by Boot$Disc (i.e. on the Nexus shared partition), if they are there. This makes the "host" computer aware of the System and Fonts resources available on the Nexus shared partition.

The file then sets up two aliases, LoadModule and LoadSJModule to simplify RMEnsuring any modules which may be required. LoadModule is used for ensuring Acorn modules (from System:Modules) while LoadSJModule will look for SJ modules within the boot application; this second alias should not be used outside the !Boot application. This is followed by a "fix" for a change in the name of one of our utilities from LineNumber to PortNumber.

The file then loads the driver module appropriate to the Nexus card in the machine, and new versions of the NexusFS and NexusFiler modules. There is also an optional line which will remove the Nexus icons from the icon bar; the I at the start of this lines is the

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equivalent of a REM in BASIC — it is treated as a comment and ignored by the operating system. If you don't want the Nexus icons to appear on the icon bar you simply remove the I from the start of this line.

Provision is made for loading of newer versions of some of the Acorn modules, as appropriate to your environment. Copies of these modules would need to be in !System.Modules (installing the RISC OS Extras disc, as described in section 2: **Installing Nexus** will copy these modules into !System on Nexus). Note that at this stage you **must** RMEnsure any modules which need to be present before you enter the desktop; this will include any new Filer modules - but Econet users should note that the version of NetFiler provided on the RISC OS Extras disc (version 0.24) should never be loaded; indeed it is a wise precaution to delete this version from the !System area.

File DeskStart

This starts by including the directory Library on the Nexus shared disc in the run path. In accordance with Acorn guidelines, this is preferred to defining a Library on Nexus. The command PortNumber runs a utility (from the directory Library on the Nexus shared disc) which sets up a system variable **Nexus$PortNumber** indicating the Nexus port to which the station is connected. This variable can then be used to boot the Nexus printer sharer software on one station only.

The file then copies the !Scrap (temporary work space) application onto the computer's private partition, runs that application and sets up the Printer$Scrap and Printer$Temp variables to make sure the printer drivers use the !Scrap areas for their workspace. There is also a commented-out line for setting !Spark's work space to the !Scrap area; if you use !Spark then you should remove the I from the start of this line.

Next, some useful aliases are set up. Those for Filer_OpenDir and Filer_CloseDir are to allow system variables to be used in those commands. [Without these aliases, entering the command

```
*Filer_OpenDir <Impression$Dir>
```

on versions of RISC OS prior to 2.02 (i.e. prior to that supplied with the A5000) will cause an error, since the operating system version of Filer_OpenDir on these computers will not expand the system variable `Impression$Dir`. The Aliases for these commands get round this problem.] The Filer_BootDir command allows the filer to "see" a directory without leaving a window open onto it. Suppose you have a set of utility applications in directory Nexus::Shared.$.!Tools._ You may wish the window manager to see these applications, so it can learn about their associated file types from the applications' !Boot files, without leaving a window open onto that directory. The command

```
*Filer_BootDir <Boot$Disc>.!Tools._
```

will have the required effect.
Unfortunately, different versions of RISC OS process Filer_OpenDir and Filer_CloseDir commands in different ways, hence the complexity needed to set up this alias.

Next some additional Nexus modules are loaded (as required), and provision is made for loading additional (Acorn) modules.

The next stage provides for auto-booting the printer sharer. Remove the I at the start of this line to bring this into operation. Clearly you may wish to change the port number of the Nexus on which this software will be installed — this is the 1 in the line:

```
If <Nexus$PortNumber> = 1 Then Run <Boot$Disc>.Nexus.!Sharer
```

Also, if `you` have installed the !Sharer application somewhere other than in the Nexus directory in the $ directory of the Nexus shared disc you will have to amend this line (after <Boot$Disc>) appropriately.

The !Apps.!Boot and !Tools.!Boot files are then run (if they exist) to make the the filer " see" the applications in those two areas. Additional commands can be added here. Finally, a window is opened onto the root directory of the Nexus shared disc

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Appendix D: Nexus Configuration Commands

The first of these commands allows you to set the amount of memory of memory a client Archimedes computer reserves for caching Nexus directory information; if your Archimedes computers have more than 1Mb of memory then increasing this value may improve the speed of operation of your Nexus. The second command is possibly only relevant where an Archimedes computer has two Nexus interface cards fitted, allowing access to two Nexus servers.

*Configure NexusDirCache

Reserves an area of RAM for the directory cache.

Syntax

```
*Configure NexusDirCache <size> [K]
```

Parameters

`<size>` kilobytes of memory reserved (0 to 63)

Use

*Configure NexusDirCache reserves an area of memory for the directory cache. Directories are stored in the cache to save reading them from the disc; this speeds up disc operations and reduces disc wear. A value of 0 selects a default value which depends on RAM size.

Example

```
*Configure NexusDirCache 16K
```

*Configure NexusDrive

Sets the drive selected at power on.

Syntax

```
*Configure NexusDrive <n> <n>
```

Parameters

Drive number (4 to 7)

Use

*Configure NexusDrive sets the number of the drive which will automatically be selected on power on. Since Nexus servers offer two disc drives, the most common values are 4 and 5. The default value is 4.

Note that in the current implementation of the Nexus filing system, drives 6 and 7 correspond with drives 4 and 5 of a second Nexus server where two Nexus interface cards are fitted to an Archimedes computer.

If two interface cards are fitted, then drives 4 and 5 correspond with the higher numbered interface card (the internal expansion slot in the case of the A3000).

If the Archimedes computer is configured to boot from the Nexus filing system, then this command selects which drive is used to boot the computer.

Example

```
*Configure NexusDrive 5
```

Related commands

```
*Configure FileSystem
*Configure Boot
```

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Appendix E: Nexus Programmer's Reference

Introduction

The pages that follow describe the low level user interface to the Nexus filing system.

In this appendix, references to the **Programmer's Reference Manual (PRM)** relate to the **RISC OS Programmer's Reference Manual** published by Acorn Computers Ltd., Issue 1 (published 1989), Acorn part number 0483,022. It is assumed anyone wishing to program Nexus has access to a copy of the PRM. In particular, Nexus provides a FileCore filing system, and the section of the PRM relating to FileCore will generally be applicable to Nexus.

For completeness, all Nexus SWIs are included here. However, some of these calls are only intended for use within the Nexus modules and are not fully documented.

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Nexus_DiscOp (SWI &41B80)

Performs various operations on a disc

On entry

R1 bits 0 to 3 = reason code
bits 4 to 7 = option bits
bits 8 to 31 = bits 2 to 25 of pointer to alternative disc record, or zero
R2 disc address (bits 29 to 31 contain the drive number)
R3 pointer to buffer
R4 length in bytes

On exit

R1 preserved
R2 disc address of next byte to be transferred
R3 pointer to next buffer location to be transferred
R4 number of bytes not transferred

Interrupts

Interrupt status is undefined

Fast interrupts are enabled

Processor mode

Processor is in SVC mode Not

Re-entrancy

re-entrant

Use

This SW1 calls FileCore_DiscOp (SW1 &40540) after first setting R8 to point to the FileCore instantiation private word for Nexus.

The reason code (in bits 0 to 3 of RI) determines which of the following disc operations is performed:

Value	**Meaning**	**Uses**	Updates
0	Verify	R2,R4	R2,R4
1	Read sectors	R2,R3,R4	R2,R3,R4
2	Write sectors	R2,R3,R4	R2,R3,R4

Other reason code are ignored, but not faulted.

Note that the disc address should be on a sector (256 bytes) boundary.

If two Nexus interfaces are fitted, then drive numbers 6 and 7 refer to the lower numbered interface card (the external expansion slot in the case of an A3000).

For more information, see the **Programmer's Reference** Manual, in the section on *FileCore.*

Related SWIs

FileCore_DiscOp (SWI &40540), Nexus_DiscOp2 (SW1 &41B87)

Related vectors

None

91.10.11: SJ - GDH(06)

Nexus_PoduleSlot (SWI &41B81)

Returns the podule slot number in which the Nexus interface card is fitted

On entry	
On exit	R3 podule slot number
Interrupts	Interrupt status is undefined Fast interrupts are enabled
Processor mode	Processor is in SVC mode
Re-entrancy	SW1 is re-entrant
Use	This call returns the podule slot number in which the Nexus interface card is fitted. If more than one card is fitted to the machine, then the slot number returned will be that of the highest positioned interface card. This call is provided for compatibility with earlier versions only. It will be removed in a future version of the Nexus filing system. The SW1 Nexus_EnumerateCards should be used in preference.
Related SWIs	Nexus_EnumerateCards (SW1 &41B88)
Related vectors	None

91.10.11: SJ - GDH(06)

Nexus_Drives (SWI &41B82)

Returns information on the Nexus filing system's drives

On entry

On exit

R0 default drive
R1 number of floppy drives (always returns 0)
R2 number of hard disc drives

Interrupts

Interrupt status is undefined

Fast interrupts are enabled

Processor mode

Processor is in SVC mode Not defined

Re-entrancy

This SWI calls FileCore_Drives (SWI &40542), after first setting R8 to point to the FileCore instantiation private word for Nexus.

More information can be found from the Programmer's Reference Manual, in the section on *FileCore.*

Related SWIs

FileCore_Drives (SWI &40542)

Related vectors

None

91.10.11: SJ - GDH(06)

Nexus_FreeSpace (SWI &41B83)

	Returns information on a disc's free space
On entry	R0 pointer to disc specifier (null terminated)
On exit	R0 total free space on disc R1 size of the largest object that can be created
Interrupts	Interrupt status is undefined Fast interrupts are enabled
Processor mode	Processor is in SVC mode Not
Re-entrancy	defined
Use	This SW1 calls FileCore_FreeSpace (SWI &40543), after first setting R8 to point to the FileCore instantiation private word for Nexus. More information can be found from the Programmer's Reference Manual, in the section on *FileCore.*
Related SWI s	FileCore_FreeSpace (SWI &40543)
Related vectors	None

91.10.11: SJ - GDH(06)

Nexus_Retries (SWI &41B84)

Returns information on the retry level and internal error count

On entry

On exit

R0 retry level
R1 internal error count

Interrupts

Interrupt status is undefined

Fast interrupts are enabled

Processor mode

Processor is in SVC mode

Re-entrancy

Not defined

Use

This call returns the retry level set by Nexus_SetFSTimeouts, and also the number of internal communications errors that have occurred since the Nexus filing system was last reinitialised.

This call is provided for compatibility with earlier versions only. It will be removed in a future version of the Nexus filing system. The SW1 Nexus_ReadFSTimeouts should be used in preference.

Re|ated SW| s

Nexus_SetFSTimeouts (SWI &41B89)

Nexus_ReadFSTimeouts (SWI &41B8A)

Re|ated vectors

None

91.10.11: SJ - GDH(06)

Nexus_DescribeDisc (SWI &41B85)

Returns a disc record describing a disc's shape and format

On entry

R0 pointer to disc specifier (null terminated)
R1 pointer to 64 byte block

On exit

Interrupts

Interrupt status is undefined

Fast interrupts are enabled

Processor mode

Processor is in SVC mode Not

Re-entrancy

defined

Use

This SW1 calls FileCore_DescribeDisc (SWI &40545), after first setting R8 to point to the FileCore instantiation private word for Nexus.

More information can be found from the Programmer's Reference Manual, in the section on *FileCore*.

Related SW|s

FileCore_DescribeDisc (SWI &40545)

Related vectors

None

91.10.11: SJ - GDH/06

Nexus_ServerOp (SWI &41B86)

Performs various operations on the server

On entry

R0 bits 0 to 7 = argument
bits 8 to 27 = reserved (must be zero)
bits 28 to 31 = option bits
R1 bits 0 to 7 = parameter
bits 8 to 31 = reserved (must be zero)
R2 retry level
R7 card specifier

On exit

R0 error status (always zero)
R1 result

|nterrupts

Interrupt status is undefined

Fast interrupts are enabled

Processor mode

Processor is in SVC mode Not

Re-entrancy

re-entrant

Use

This call is used to obtain status information from the Nexus server, and to send some commands to the server. The information returned by the Server is dependent upon the argument and the parameter.

Argument	Meaning
0	Re-read partition table
1	Read expansion card status
2	Read physical drive size
3	Read partition status
4	Set/read privilege mode status
5	Read line number
6	Read server version number

The option bits in R0 have the following meanings:

bit 31 = 1 R7 specifies the interface card to use

bit 31 = 0 The highest numbered interface card is used
bit 30 = 1 R2 specifies the number of retries to use
bit 30 = 0 No retries are used
bit 29 = 1 R7 specifies the (FileCore) drive number, the corresponding interface card will be used
bit 29 = 0 Otherwise
bit 28 = 1 Bits 27 and 28 specify the server partition to be used, rather than the value of R1
bit 28 = 0 Otherwise
bit 27 = 1 (Only valid if bit 28=1) Use the server partition number corresponding to the File Core drive number held in R7
bit 27 = 0 Otherwise

Related SWIs

None

Re|ated vectors

None

Descriptions of the call for the different arguments follow:

91.10.11: SJ - GDH(06)

Nexus_ServerOp 0 (SWI &41B86)

Re-read partition table

On entry

R0 bits 0 to 7 = 0

On exit

Use

This call forces the server to re-read the partition table from the disc drive. This is used by the !PartEdit application to force the server to use the newly defined partition sizes.

This call requires the server to be in privileged mode (see 'Server modes'), and is only valid when sent from a station connected to port 1 of the server.

Errors

Insufficient privilege to force partition table reread

91.10.11: SJ - GDH(06)

Nexus_ServerOp 1 (SWI &41B86)

On entry

Read expansion card status

R0 bits 0 to 7 = 1

On exit

R1 bit 0 = 1 if expansion card A present (lines 5 and 6)
bit 1 = 1 if expansion card B present (lines 7 and 8)

Use

This operation returns a word indicating the presence or absence of the two expansion cards which can be fitted to the server.

Errors

91.10.11: SJ - GDH(06)

Nexus_ServerOp 2
(SWI &4 1B 86)

Read physical disc size

On entry

R0 bits 0 to 7 = 2

On exit

R1 size of hard disc drive in kilobytes

Use

This operation reads the physical size (in kilobytes) of the hard disc drive fitted to the Nexus server. This operation is used by !PartEdit to determine the total space available.

Errors

91.10.11: SJ - GDH(06)

Nexus_ServerOp 3 (SWI &41B86)

Read partition status

On entry

R0 bits 0 to 7 = 3
R1 bits 0 to 7 = drive number

On exit

R1 partition status

Use

This operation returns the status of the specified partition. The drive number specified should be the drive number as known to the Nexus server (i.e. drive 4 or 5, not drive 6 or 7). The status word returned contains the following information:

R1 bits 0 to 23 = size of partition in kilobytes
bits 24 to 31 = partition status

The status may be 0 (disabled), 1 (read only in secure mode), or 2 (read/write).

Errors

Partition disabled
Drive number out of range
Partition number out of range
Invalid attribute setting
Server in admin mode
Internal error: bad result from get.partn.info

91.10.11: SJ - GDH(06)

Nexus_ServerOp 4
(SWI &41B86)

Set/read privilege status

On entry

R0 bits 0 to 7 = 4
R1 bits 0 to 7 = 0 Clear privileged mode
= 1 Set privileged mode
= 255 Read privilege status

On exit

R1 privilege status (1 = privileged, 0 = not privileged) (
for argument 255 only)

Use

This operation allows the server to be put into privileged mode, and to return to administration mode. It also allows the privilege status to be read.

This operation can only be used in administration mode, from the station connected to line 1 of the Nexus server.

Privileged mode enables access to absolute disc, and enables the re-read partition table operation.

Errors

Not in privileged mode
Already in privileged mode
Bad argument to set privilege
Insufficient privilege to change server mode

91.10.11: SJ - GDH(06)

Nexus_ServerOp 5
(SWI &41B86)

Read port number

On entry

R0 bits 0 to 7 = 5

On exit

R1 port number to which station is attached

Use

This operation returns the port number of the station which makes the call.

This operation is supported only by server versions 0.54 and later.

Errors

91.10.11: SJ - GDH(06)

Nexus_ServerOp 6
(SWI &41B86)

Read server version number

On entry

R0 bits 0 to 7 = 6

On exit

R1 server version number

Use

This operation is used to read the version of server code in use in an attached Nexus server. It is used by the utility *NexusVers.

This operation is only supported by server versions 0.60 upwards.

Errors

No reply from server (versions 0.54 to 0.59)

Bad argument to miscellaneous functions call (versions 0.51 and earlier)

91.10.11: SJ - GDH(06)

Nexus_DiscOp2
(SWI &41B87)

Access disc partitions without using FileCore.

On entry

Similar to Nexus_DiscOp (SW1 &41B80):-

R0 drive number
R1 bits 0 to 3 = reason code
bits 4 to 7 = option bits
bits 8 to 31 = bits 2 to 25 of pointer to alternative disc record, or zero
R2 disc offset in bytes (**n.b. no drive number**)
R3 pointer to buffer
R4 length in bytes R7
card specifier

On exit

As for Nexus_DiscOp (SW1 &41B80); i.e.

R1 preserved
R2 disc address of next byte to be transferred
R3 pointer to next buffer location to be transferred
R4 number of bytes not transferred

|nterrupts

Interrupt status is undefined

Fast interrupt status is undefined

Processor mode

Processor is in SVC mode

Re-entrancy

Not re-entrant

Use

This SWI allows access to non-FileCore based partitions. It functions in a similar way to Nexus_DiscOp, but does not call FileCore_DiscOp. It also allows access to a partition which has become corrupt.

RO specifies a drive number as used by the Nexus server. This may include partition 255 (absolute disc) if the server is in privileged mode. (This facility is used by !PartEdit to format all partitions, and to write the partition table and server code to disc).

R7 specifies which card should be accessed. In the current implementation, R7 = 0 is always valid, and indicates that the highest numbered interface card should be used. Increasing values of R7 step through decreasing podule slots.

Related SWIs

Nexus_DiscOp (SWI &41B80)

Related vectors

None

91.10.11: SJ - GDH(06)

Nexus_EnumerateCards (SWI &41B88)

Return information on installed Nexus interfaces.

On entry

R0 Podule from which to search

On exit

R0 Zero if final card enumerated; otherwise
R0 Next card from which to search
R1 Podule number
R2 Podule MEMC base address
R3 CMOS RAM address for this podule
R4 Card type

|nterrupts

Interrupt status is undefined

Fast interrupt status is undefined

Processor status

Processor is in SVC mode

Re-entrancy

Not re-entrant

Use

This SW1 can be used to determine the number and types of Nexus interfaces fitted to the machine. Currently the following card types are defined:

0	Standard interface
1	Fast interface, no user port
2	Fast interface, with user port

RO will contain 0 on exit if no further interfaces can be found.

Related SWIs

Nexus_PoduleSlot (SWI &41B81)

Related vectors

None

91.10.11: SJ - GDH(06)

Nexus_SetFSTimeouts (SWI &41B89)

Set the timeout parameters used by the Nexus filing system

For SJ software internal use only

Nexus_ReadFSTimeouts (SWI &41B8A)

Read the timeout parameters used by the Nexus filing system

For SJ software internal use only

Nexus_RegisterDriver (SWI &41B8B)

Registers a Nexus interface driver with the NexusFS module

For SJ software internal use only

Nexus_RemoveDriver (SWI &41B8C) _

Removes a Nexus interface driver module.
For SJ software internal use only

91.10.11: SJ - GDH(06)

Appendix F: Nexus Errors

Introduction

The integrity of any information transmitted between a Nexus disc server and an Archimedes computer is checked. When data corruption occurs, data will automatically be re-sent a number of times. (The maximum number of retries is one of the parameters controlled by Nexus_SetFSTimeouts; the default value is 4.) If, after re-sending the data, it is still corrupted, or if the Nexus server detects any errors, an error message will be returned by the Nexus filing system.

For completeness, all the errors which can be generated by the Nexus modules are included here. Some of these are "internal" to the Nexus software and should not be seen by users.

Filing system errors

Bad drive number **(Error &12D01)**

A drive number has been used which is not valid. Drive numbers 4 and 5 are valid when one interface card is fitted to the Archimedes computer, and drives 4 to 7 when two interfaces are fitted.

Unmapped drive **(Error &12D02)**

This error indicates an inconsistency in an internal table used by NexusFS. It should not be observed in normal use of the system, and should be reported to Si Research.

Server not listening **(Error &12D03)**

No reply from server **(Error &12D04)**

These errors indicate that the Archimedes computer was unable to communicate with the server: in the first case, data could not be sent to the server, in the second, no data was received from the server when expected. These errors may indicate that the lead connecting the Archimedes computer to the server has become disconnected.

Incorrect checksum (header) **(Error &12D05)**

Invalid function code **(Error &12D06)**

Incorrect checksum (data) **(Error &12D07)**

Unexpected packet (data) **(Error &12D08)**

Unexpected packet (error) **(Error &12D09)**

Bad error packet **(Error &12D0A)**

These errors indicate various conditions that may arise during transmission and reception of data. They should not be seen during normal operation, and should never appear consistently. These errors may indicate that the retry level set by Nexus_SetFSTimeouts is too low.

Attempt to **remove non-existent driver** **(Error &12D0B)**

See Nexus_RemoveDriver (SWI &41B8C) in Appendix E.

No driver installed for Nexus interface **(Error &12D0C)**

This error will occur if an attempt is made to access a Nexus interface card for which no driver module is loaded. Two driver modules currently exist: NexusStdDriver is suitable for use with standard Nexus interface cards (including **all** A300, A400, A540 and A5000 series cards); NexusFastDriver is suitable for use with the Nexus fast interface and user port cards (available for the A3000 computer only).

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If no suitable driver module is loaded, it will not be possible to access Nexus servers through the relevant interface.

Invalid reason code in ServerOp **(Error &12D0D)**

Invalid argument for ServerOp **(Error &12D0E)**

See Nexus_ServerOp (SWI &41B86) in Appendix E.

Invalid card specifier **(Error &12D0F)**

See Nexus_DiscOp2 (SWI &41B87) and Nexus_ServerOp (SWI &41B86) in Appendix E.

No Nexus expansion cards fitted **(Error &12D10)**

This error will be given if an attempt is made to load the NexusFS module into an Archimedes computer which is not fitted with a Nexus interface card.

NexusFS internal error (Error &12D00)

Contact SJ Research.

Server errors

Server errors are not currently reported with individual error numbers, but with error numbers which indicate the class of error which has occurred:

Internal error	**Error &12D81**
Sector range error	**Error** &12D82
Bad argument	Error &12D82
Write protected	**Error &12D83**
SCSI error	**Error &12D84**
Bad function code	**Error &12D85**
Privilege violation	**Error &12D86**
Link error	**Error &12D87**

However, the error messages generated will often give more information. All such messages are listed below. Note that a number of these are internal errors and will not be generated directly by users' programs.

Error &12D81

Bad slave link number

Error &12D82

Partition disabled
No privilege to access absolute disc
Drive number out of range
Partition number out of range
Invalid attribute setting
Server in admin mode
Internal error: bad result from get.partn.info
Invalid number of blocks in request
Invalid starting block in request
Too many blocks to write
Bad block size during write
Bad Device Number
Bad argument to set privilege
Undefined MiscOp code
Bad argument to miscellaneous functions call

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Error &12D83

Disc write protected

Error &12D84

SCSI **error #nnnn** *where* **nnnn** *is a hexadecimal number*
possible errors are:

#00xx	Status (error) code xx
#xxFF	RSS error: status was xx
#xxFD	Unrecognised status: status was xx

Error &12D85

Abort **received**
Non-data function code during write
Bad sublink
Bad function code

Error &12D86

Insufficient privilege for copy command
Insufficient privilege to force partition table read
Not in privileged mode
Already in privileged mode
Insufficient privilege to change server mode
Server in privileged mode

Error &12D87

Link error #nnnn *where* **nnnn** *is a hexadecimal number*
Possible errors am:

#0001	Timeout
#0002	Header CRC error
#0003	Data CRC error
#0004	Too big

Errors #0011 to #0014 are also possible; these are equivalent to #0001 to #0004 but are generated by Routers.

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Appendix G: The !BootNexus Application

As mentioned in section **3: System** Management under *Server modes – Link boot mode,* this application can be used to boot the Nexus server if the server is unable to find the server program on the hard disc, or if this program has been corrupted in some way. This should be a highly exceptional event.

The application found on the Nexus Utility Software disc, in directory $.Utilities. Should you need to use the program, it will have to be run on the station connected to port 1. If the failure of the Nexus server is preventing you from booting up this Archimedes computer then turn on the computer with the shift key held down. This will over-ride the normal boot option. If this leaves the computer in supervisor mode (blank screen with a * prompt) enter *Desktop to go onto the desktop.

Open a directory viewer onto the $.Utilities directory on the floppy disc. Turn off the Nexus server (if necessary). After waiting for a few seconds, turn the key directly from ` Off' to 'Admin.'. Pause, briefly, until the server has entered Link Boot mode (indicated by the 'Run' light flashing briefly once per second). You then have 30 seconds in which to double-click on the !BootNexus utility's icon. This will boot the Nexus server from the server program held in the !BootNexus utility.

As soon as the server has booted, you need to run the !PartEdit utility (also in directory $.Utilities on the floppy disc) and use the Install Software option to put a copy of the server onto the Nexus hard disc. As soon as you have done this you should turn the server off, wait the usual few seconds, and turn it on again (to the 'Secure' position). This time the server should boot from the disc.

Important Warning: The server program booted by this application is not a full version of the Nexus server, you should never continue to use your Nexus unit with this server program, but should always re-install and re-boot the full server program as described above.

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Appendix H: Application Notes

Determining Version Numbers

Nexus Server

A utility NexusVers will be found in directory Dollar.ArthurLib on the floppy disc marked NEXUS Utility Software. (A copy of this utility may have been installed in the Library directory on drive 4 of your Nexus server.) Double-clicking on this will tell you the version of the Nexus Server program. If double-clicking on this utility leads to a *Link timed out* (or similar) error message then you are using an old version of the Nexus Server code.

Nexus Modules

`*Help Modules will` give you a list of all of the modules currently in the Archimedes computer, with their version numbers and dates (from the desktop, pressing the *F12* key will allow you to enter this command). The modules you are interested in are, and the versions which should be found, are:

```
    NexusFiler       0.29     (29 Aug 1991)
    NexusFS          1.01     (06 Dec 1991)
    Nexus Driver     0.06     (29 Aug 1991)
 or.Nexus Driver     0.10     (29 Aug 1991) Fast interfaces
    NexusPrint       1.01     (09 Dec 1991)
```

and, if you have an interface with User Port:

```
     Nexus User Port 1.02     (29 Aug 1991) Podule Hardware
```

Also, on A300, A400 and A3000 series Archimedes computers, check the entry for FileCore; on these machines this should read

```
    FileCore         2.01     (15 Sep 1988) [Patched]
```

The NexusPrint module may not appear in the list; this will not matter if you do not intend to use the Printer Sharer facilities of your Nexus system. In addition, it is possible that later versions of some or all of these modules will be released during the currency of this manual; a higher numbered version of any module should not give any cause for concern.

It is possible to obtain the help string for a single module by entering, for example,

```
*HELP NexusFS
```

However, to obtain help about the Nexus Driver modules in this way you would have to enter:

```
*HELP NexusStdD
```

or `*HELP NexusFastD`

as appropriate.

!Boot.!Help

The !Boot application contains an application called !Help which will identify the version numbers of the various SJ Modules held within that application. To use this, open a directory display of the Nexus shared disc, move the pointer over the !Boot icon and press **Menu.** Moving into the Application !Boot sub-menu, one of the options is Help; choosing this will run the !Help utility, giving you the relevant version numbers.

Nexus Server ROM

The version number of this ROM can only be found by examining the ROM inside the server, contact the Technical Support desk at SJ Research (quoting the Nexus server serial number from the back of the server) before opening the server to determine the version number, since this information is recorded at SJ Research.

Nexus Interface Card ROM

Entering `*Podules will` give the version number of this ROM. Note that MOO series machines, and any machine fitted with RISC OS 3 (including the A5000) will require ROM version 0.27 or later. If you have older Archimedes computers and an upgrade to

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R1SC OS 3 becomes available for them, you will also need to upgrade the Nexus interface card ROM. Nexus Upgrade ROMs for these cards will be available 'at cost' from SJ Research. More recent cards have been supplied with the new ROM - check with the Technical Support Desk at SJ Research before ordering new ROMs.

Changes in this release

Some of the changes detailed under *"Implementation"*, and several of those listed under *"Structure"*, do not apply to **systems supplied** as part of an Acorn Cluster Offer.

Nexus Software

Support for Version 1.00 (and higher) of Nexus printing software

Code re-written to improve performance

Additional SWIs
Nexus interface driver code now in separate modules (NexusStdD and NexusFastD)

Support for Routers (!PartEdit also changed to support Routers)

Implementation

While these changes are not integral to the Nexus software, it is strongly **recommended that they** are made on all systems.

!Scrap used to provide temporary workspace (instead of !WorkArea).

Library directory on Nexus::4 now called Library (instead of ArthurLib).

No Library set on Nexus; instead Nexus::4.$.Library is added to **Run$Path** (used to have, in effect, a *Lib Nexus::4.Library command).

Nexus::4 now called :Shared (instead of NexusDisc4).

Nexus::5 partitions now called :Scrapl, etc (instead of :Privatel etc).

Nexus boot sequence extensively changed; now entirely effected within the !Boot application. Additional features include setting a system variable for R1SC OS version and providing the aliases for LoadModule, Filer_OpenDir, Filer_CloseDir and Filer_BootDir; see descriptions above.

Additional utilities PortNumber and NexusVers provided (described elsewhere).

!Tools.!Boot and !Apps.lBoot now both check whether the !Boot application has been run (by testing for one of the system variables !Boot sets up); if not they set the aliases for Filer_OpenDir and Filer_CloseDir described in the notes on the !Boot application. They also set the system variables Apps$Dir and Tools$Dir respectively.

Structure

The following changes are more **cosmetic in nature;** we suggest they are applied to all systems but accept that they lie within the discretion of the local system manager.

The structure of the Nexus::4.$ directory has been simplified; in particular, the "dummy applications" !Demos, !Games and !RiscOS have been removed.

The icon for the "dummy application" !Apps has been changed.

The "dummy application" !Utilities has been re-named !Tools, and its icon has been changed.

A new directory **Nexus::4.$.Nexus** has been added to hold Nexus software. At present this is only used for the Nexus printer sharer software.

Directory !System.Modules.RiscOS is no longer provided. All Acorn modules will now be located in **!System.Modules.** For the present, all SJ modules are located within the !Boot application.

Example datafiles are now held in sub-directories of Nexus::4.$.Examples (previously

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in Nexus::4.S.!Apps._.Datafiles).

Clearly the directories into which the !Install software will copy the software from the Appsl and Apps2 discs has changed *as a* consequence of these other changes. The new locations are given in the application note relating to the Nexus directory structure.

S J dummy applications

If the SJ "Install" program is used then the Nexus shared partition will be set up with two dummy applications, !Apps and !Tools. These simply provide areas in which software is held on the disc; i.e. they are similar to other directories. They are set up as applications for two reasons:

o They can be given an Icon which distinguishes them from other directories.
o They will appear amongst the first entries in the parent directories.

The structure of these dummy applications (with some files omitted for clarity) is as shown:-

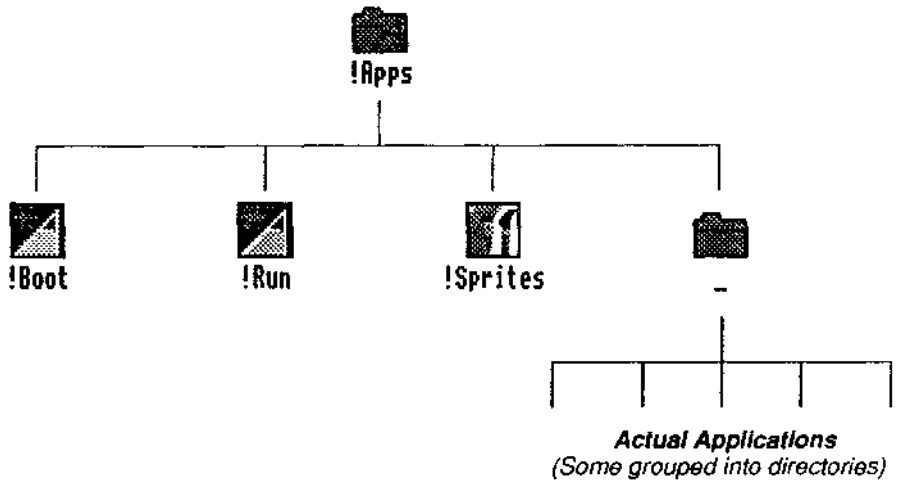

Figure H.1: SJ Dummy Application structure

The !Boot file is there so that when the window manager first sees the dummy application it is forced (by a Filer_BootDir command, as described in the notes on the SJ boot sequence) to examine the contents of the directory _ in which the actual applications are found. This leads it to find out about the file times and icons associated with those applications.

The !Run file simply performs a Filer_OpenDir of the directory _ (the underscore character). This makes the dummy application behave like a normal directory; double clicking on it simply opens a window onto its "contents" (although it will be seen that these are actually the contents of the directory _ within the application)

!Sprites contains the icon sprite for the dummy application.

The !SysMerge Utility

This utility (© Acorn Computers Ltd.) will be found in the directory $.Utilities on the NEXUS Utility Software floppy disc. It is provided to simplify the management of the ! System application. !System should be the location of the latest versions of the various Acorn modules. Some of these modules will be later versions of modules held in ROM in the computer, while others will provide additional facilities. When you obtain a new piece of software on floppy disc, it is very likely to come with a !System application on (one of) its disc(s). This will contain versions of the Acorn modules **relevant to that particular piece of software** which were the latest versions available when **it was**

written. Rather than have a number of different !System applications associated with different pieces of software on your Nexus, you should maintain a single !System containing the latest versions of all modules your software requires. !SysMerge makes it simple for you to achieve this. When you are installing a new piece of software which has its own !System application with it you simply:

i) Start the !SysMerge application by double-clicking on it

ii)Drag the icon of the !System application on the Nexus shared partition into the ! SysMerge's window

iii)Insert the floppy disc containing the application's !System, open a window onto it, and drag the icon for its !System into !SysMerge's window

If any of the modules in the application's !System are not already present in the Nexus !System, or are more recent than the version in the Nexus !System, then those modules will be copied into the Nexus !System, replacing the older module where appropriate. Clearly you will need to be on the station attached to port 1 of the Nexus, and have the key in the 'Admin.' position, to carry out this updating.

Note that the modules will be installed in a directory Modules within the !System application. Note also that the !Install program from the NEXUS Utilities Disc (described in section 2: Installing Nexus) copies a number of modules from the RISC OS Extras disc into the ! System on the Nexus shared partition.

Sizes of Scrap Partitions

Clearly this is likely to depend on the total disc space available, and on local circumstances. If the Scrap partitions are only going to be used for wimp operations then it's worth remembering that the largest file which can be created is limited by the available memory in the machine attached to the Nexus unit; thus an application running in a 2MByte Archimedes computer cannot create a scrap file larger than 2MBytes; in practice the maximum will be rather smaller, because of the memory required for the application itself and for various system resources. However, it is possible that an application could create a temporary work file larger than this maximum. If your Nexus disc is large enough to allow 2Mbytes per machine this should prove ample for almost any 'scrap' purpose.

On the other hand, you may wish to use the Nexus private partitions for data storage; in this case you should try to allocate more space to them. Note that the private partitions do not all have to be the same size. If you are running the Nexus printer sharer software, and spooling the print jobs to Nexus::5 then you should certainly allow extra space to the private partition of the port which will be running the despooler, to allow for the storage required by the print queue. Similarly, if you had a scanner attached to one station you might wish to allocate extra memory to its private partition to allow captured images to be held there temporarily. The Nexus private partitions should not generally be used for permanent or long-term storage of files. This is because any files held on a private partition are vulnerable to accidental or deliberate damage.

The SJ Nexus Directory Structure

Assuming you have chosen to install the SJ directory structure, the root directory of the Nexus shared partition will be as illustrated in *Figure H.2:*

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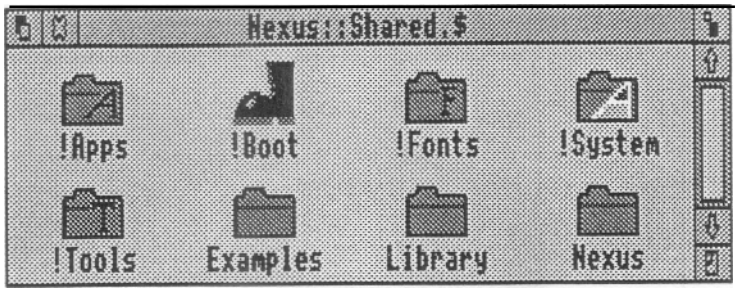

Fig. H.2: Nexus Shared Disc - SJ root directory structure

If you have also chosen to install the software from the two R1SC OS Applications discs then the software will be installed as shown:

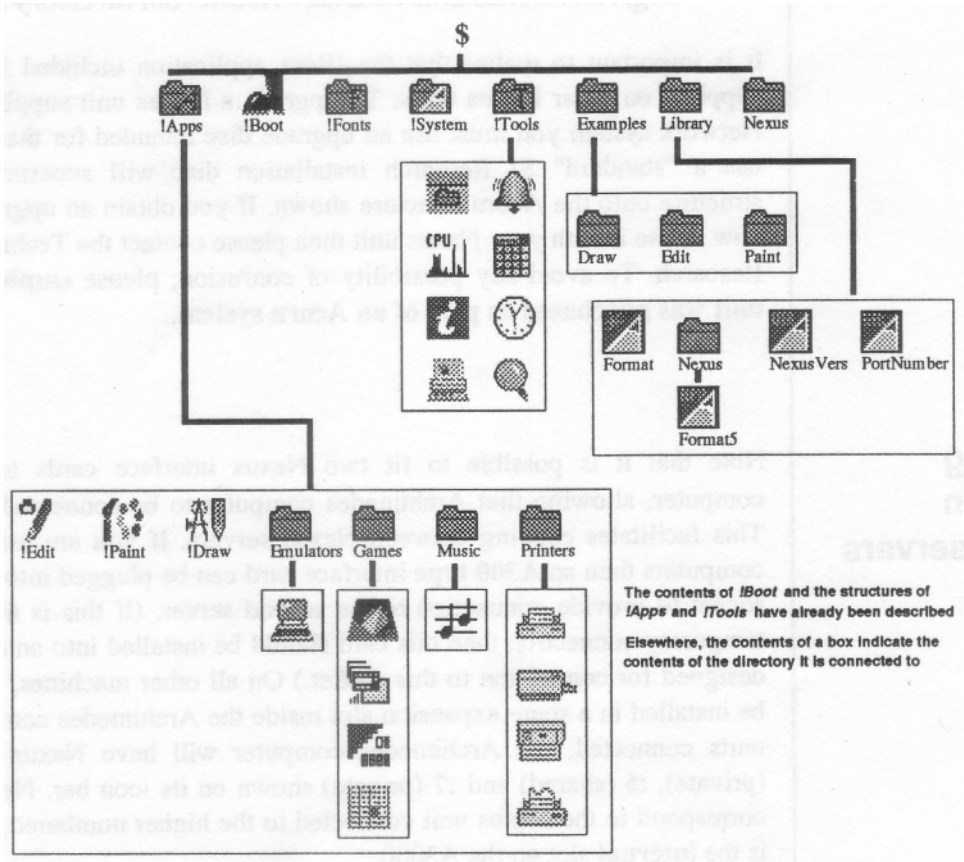

Figure H.3: Nexus Shared Disc - SJ software installation

You may well wish to delete some of these applications once they have been installed!

The Acorn Cluster Directory Structure

Note that all Nexus disc servers supplied under the Acorn Cluster Offer and as a part of the Acorn Networking Packs have been supplied with a directory structure and software already installed. The directory structure is the same on all such units, and a full description of that structure and of the organisation of the installed software accompanies the unit. The root directory of the Nexus server will be as shown in *Figure H.4:*

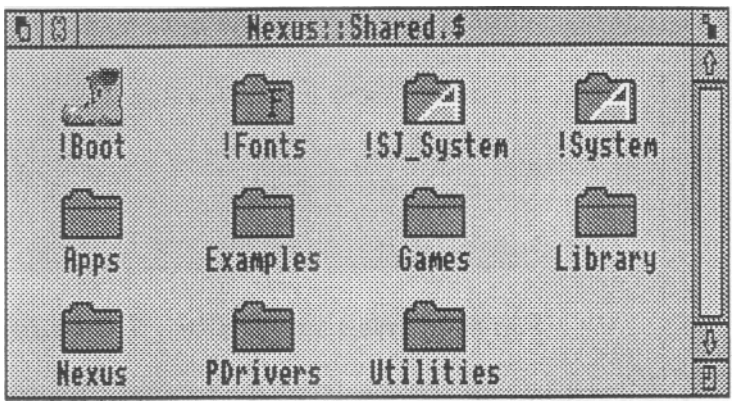

Fig. H.4: Nexus Shared Disc - Acorn root directory structure

It is important to realise that the !Boot application included here is different to that supplied on other Nexus units. To upgrade a Nexus unit supplied as part of an Acorn Network system you must use an upgrade disc intended for that purpose; attempting to use a "standard" SJ Research installation disc will superimpose the SJ directory structure onto the Acorn structure shown. If you obtain an upgrade disc and are unsure how to use it with your Nexus unit then please contact the Technical Support desk at SJ Research. To avoid any possibility of confusion, **please emphasise that your Nexus unit was purchased as part of an Acorn system.**

Copying between Nexus servers

Note that it is possible to fit two Nexus interface cards to a single Archimedes computer, allowing that Archimedes computer to be connected to two Nexus servers. This facilitates copying between Nexus servers. If you are using Archimedes A3000 computers then an **A300 type** interface card can be plugged into the **external** expansion socket to provide connection to the second server. (If this is intended as other than a temporary connection then this card should be installed into an external expansion case designed for connection to this socket.) On all other machines, the second card should be installed in a spare expansion slot inside the Archimedes computer. With two Nexus units connected, the Archimedes computer will have Nexus drives :4 (shared), :5 (private), :6 (shared) and :7 (private) shown on its icon bar. Note that drives :4 and :5 correspond to the Nexus unit connected to the higher numbered expansion slot – which is the **internal** slot on the A3000.

By opening windows onto the two private partitions you can copy from one to the other. Remember you will need to be connected to port 1 on the Nexus disc server to which you are copying, and that the key on this server will need to be in the 'Admin.' position. To avoid possible errors, make sure the key of the Nexus server you are copying from is not in the 'Admin.' position.

Copying between servers may be complicated where the disc partition you are copying to has the same name as the partition you are copying from. When you click on one of the Nexus icons, the Nexusfiler module uses the disc name of the appropriate partition to open a window onto that partition. This will generate an error if the partition's name is the same as that of a Nexus partition the filer has already seen; unless you have re-named the partitions on your Nexus servers then the shared partition on each server will be named **Shared.** To avoid this difficulty in copying, we suggest you proceed as follows:-

i) Shut down any applications which are in use on the Archimedes computer which is being used for the copying, and dismount all the Nexus drives (from their Icon bar menus).

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ii) Connect the two Nexus servers to the two ports of the computer.

iii) Reset the computer (Ctrl—Break).

iv) Check that you know which Nexus server you are copying to. Turn its key to the " Admin." position. Make sure that the key of the other server is in the "Secure" position.

v) Press F12 to obtain the command line prompt. Assuming you are copying to Nexus drive 6, enter the following commands:

```
*Nexus
*Namedisc 6 Temp
*Dismount 6
```

and press the Return key to get back to the desktop. (If you are copying to a drive other than 6 then use the appropriate drive number in the Namedisc and Dismount commands.)

vi) Click on the appropriate Nexus icons (probably :4 and :6) to open windows onto the drives you are copying to and from; perform your copying in the normal way by dragging files from one window to the other.

vii) Dismount the destination drive (from its Icon bar menu).

viii) Press F12 to obtain the command line prompt. Rename the destination disc to its original name and dismount it, as follows:

```
*Nexus
*Namedisc 6 Shared
*Dismount 6
```

varying the commands *as* required - see stage (v).

ix) Return the key of the destination server to the "Secure" position.

Remember:

Whenever the contents of a Nexus shared partition are altered, the disc **must** be dismounted (by choosing **Dismount** from the appropriate Nexus filer menu) before the key is returned to the 'Secure' position.

Important Note: *If you are using an A3000 computer fitted with a Nexus Fast interface card or a Nexus Fast User Port interface card for the copying then you will need to load an additional driver module for the Nexus standard card connected to the external expansion slot. Once. you have performed stages (i) to (iii) above, proceed as follows:*

a) Click on the Nexus :4 icon to open a window onto that drive.

b) While holding down one of the Shift keys, double—click on the ***!Boot*** *icon. This will open a window onto that application. Now double—click on the Modules folder icon in this window, to open a new window onto the Modules directory.*

c) In the Modules directory window you will find a file called NexusStdD. Double—click on its icon to load the driver for the Nexus Standard interface card (the card you have attached to the external expansion slot must be a "Standard" interface card).

d) Dismount the Nexus :4 drive from the appropriate icon bar icon.

Now continue the copying from stage (iv) in the earlier instructions.

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Appendix I: Acorn Computers Ltd.

Software End User Licence

Software:

This licence relates to the following software:

!System v 0.49

including CLib v 3.75, Colours v 0.52, FPEmulator v 2.80, IRQUtils v 0.12, HourGlass v 2.02 and Sound2 v 1.13

!Sysmerge v 1.02

!Scrap v 0.52

including such later versions as may be released by Acorn Computers Ltd.

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