

AMIGANET USER MANUAL

REV. 1.4 JAN. '90

HYDRA SYSTEMS UK

Congratulations on your purchase of AMIGANET!

We naturally feel that you have made the right choice, not least because AMIGANET subscribes to ETHERNET, a major World Standard maintained by the IEEE Corp. What this means is that, with AMIGANET Hardware, you have inter-Network connectivity with the leading products in Networking, and that you will be able to track major developments in Networking Software.

Jaye

Thank-you for flying with HYDRA SYSTEMS.

ABOUT AMIGANET

AMIGANET is an ETHERNET Network System for the Commodore AMIGA range of microcomputers and workstations. It was designed and is manufactured in the UK, and continues HYDRA SYSTEMS' involvement since 1982 in the Networking of CBM products.

There are Networks currently available for the AMIGA of varying architectures, speeds and abilities. AMIGANET uses the fastest affordable technology; Ethernet, running at 10MBaud, operates from 4 to 1000 times faster than the other available Network protocols.

AMIGANET is the only Ethernet system to offer Amiga-to-Amiga (peer to peer) communication, and Amiga File Servers.

AMIGANET is, and we intend that it will always remain, the least expensive high-end Network System option for the AMIGA.

AMIGANET - SYSTEM OVERVIEW

AMIGANET employs the widely used, Industry-Standard Ethernet architecture, which now occupies a substantial position in the PC Network world. AMIGANET is compatible with Ethernet Version 2, and is fully compliant with IEEE Standards 802.3 Types A and B, which refer to Ethernet and 'Cheapernet' respectively. Cheapernet employs the same hardware and design standards as Ethernet, but has a built-in Net Transceiver. It therefore requires no Computer-to-Net Transceiver cable; Cheapernet can also use a much cheaper form of co-axial cable (hence the name), resulting in dramatically reduced installation costs. There are no compromises involved using Cheapernet, merely a reduction of (the upper limits of) distance and numbers of attached computers.

An illustration of the savings using AMIGANET in Cheapernet Mode: an Ethernet Transceiver, its connecting cable, and a short Ethernet segment will cost about the same as the AMIGANET Board.

The AMIGANET design philosophy adopted at the outset was to enable virtually instantaneous movement of Data of varying types between any of the Amiga products. Image movement between Amigae naturally has a high priority, and full Network File support is provided as one of a number of Network services. In simple terms, the purpose of the Network is to allow inter-computer communication, and Data and Resource sharing; subject to Access permissions, any Computer on the Net can access any other Screen, Storage Device or Printer on the Network as if it were physically attached locally. The cost savings resulting from centralised printing and Hard-Disc sharing can be substantial, and the ability to share Files is fundamental to modern Database design.

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This Manual accompanies Revs. 1.1 and 2.0 of the Amiganet Local Area Network product for the Commodore Amiga range of Microcomputers.

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TYPOGRAPHICAL CONVENTIONS

The following conventions are used in this manual:

BOLD TYPE	emphasises a new category, or important piece of info.
UPPER CASE	indicates a command, although you can give a command in either upper or lower case.
< > <id>	enclose generic expectations; for example, if you see it means an identifier is expected at this position.
[]	surround items that are optional.
{ }	surround optional items that can be repeated; eg. {<item>} is equivalent to [<item> [<item>]...]
Note:	Read this part if no other.
CAUTION:	indicates a procedure which, if handled carelessly, could lead to loss of data.

This documentation is not right-justified; the author resisted the temptation to have the computer 'clean it up' at a keystroke, because it appears to him that such justified text can have an unnatural visual feel, an irregularity of eye-movement-rhythm, which after a while manifests itself as a physical effect rather like wearing glasses for the first time, or perhaps the wrong glasses, making the text uncomfortable to read.

(9)

HARDWARE OVERVIEW AND CAVEATS

AMIGANET Hardware is available in several forms, tailored mainly on the basis of end-user cost. The fully-loaded version, preferable for any serious work (such as File Service, or any centralised high traffic service), ~~was 16K~~ 16 Kbytes of buffer memory and a 16-bit data path, assisted by a DMA sequencer with a 16 Mbyte address range.

The AMIGANET DMA process is able to move data directly to or from any memory location in your AMIGA, for example directly into Video RAM. For this version of the hardware, we have concentrated on technical elegance and delivered horsepower, rather than build cost. Notwithstanding, the maximum-spec. board has a sensible price; at the same time we offer detuned versions for cost-sensitive applications.

To define the position of your AMIGANET Board in the hierarchy of Networking hardware, for those of you who need to relate to horsepower, Network cards usually boast 8 Kbytes of memory, an 8-bit data path, and no onboard DMA ability. 16 Kbytes is described as an 'Enhancement'.

The base-line AMIGANET board, a low cost Education special, has a similar fit to Novell, Western Dig. and other mainstream LAN Cards. A quicker version has 16 Kbytes, 16-bit paths, and DMA. All of the variants are available enclosed, for attachment to A500 computers.

INSTALLATION CAVEAT

When installing Network Boards in A2000 computers, it is necessary to check the Revision No. of one of the components on the Motherboard. On a small series of A2000 boards, commonly referred to as 'the four layer version', there is a DataBUS-buffer control PAL which prevents DMA transfers between Expansion slots. This is U5, a 20L8 PAL which can be found next to, and in-line with, the 3rd of 5 Expansion slots. The PAL will cause problems if you have Expansion slot resident Memory boards, not including the Co-Processor-slot-mounted 0.5 Mbyte board.

The Bad News Part No. is 380 715-1. The Good News is that the later revision part, 380 715-2, is supplied with A2090X Hard Disc Controllers so it is, in theory, in general circulation. The Bad News is that you will not be able to make a copy of it. If you have the -1 part in your A2000, proceed directly to your Amiga dealer; do not pass GO. This is a known design oversight, and the part should be available as a spare at around £5.00. Responsible dealers ought to be carrying a few in stock; as a last resort contact HYDRA SYSTEMS. If you have PALASM, PLAN, or similar software, you can blast your own from the 380 715-2 listing in the AMIGA Tech. Ref. Manual.

IMPORTANT READ THIS IMPORTANT READ THIS IMPORTANT READ THIS IMPORTANT

******* BOARD POSITIONS *******

At the time of writing, User feedback indicates that the A2000 Expansion Bus continues to cause problems with Expansion Boards. The bugs in Revs. 4.3, 6.0 and 6.1 motherboards have been adequately documented elsewhere; You may qualify for CBM upgrade of these revisions in cases of continuing difficulty. There are also specific problems caused by Expansion products that do not adhere to the published Expansion Bus specifications. For these reasons, it may be necessary to ignore installation advice given later, and install ANET Boards in any slot that will allow successful operation of the system.

SECTION ONE

INSTALLING THE HARDWARE

The Network hardware is available in two forms; one is a Printed Circuit Board which fits into one of the Expansion slots of an Amiga 2000 or it's derivatives, and the other is a moulded enclosure of the same profile and colour as an Amiga 500 series computer.

If you are unable to identify which is which, get help now before you break something.

There is only one Option choice to be made prior to fitting an AMIGANET Board to your System: are you installing Ethernet or Cheapernet? Find the (only) bank of Option Links on the Board, and ensure that all six shorting links are resident on the correct bank of pins.

AMIGANET is shipped with Option links set for Cheapernet; this may save you the job of opening an A500 AMIGANET enclosure to inspect the Board.

If there are no Option links fitted, you don't need them; you have been supplied with a single-purpose rather than a dual-purpose Board (i.e. Ethernet or Cheapernet).

AMIGANET 2000 *Too long*

To install the hardware in an Amiga 2000, you will need a special tool called a screwdriver; remove the FOUR screws at the lower left and right sides of the main enclosure, and ONE screw at the top middle of the rear panel, taking care not to confuse this screw with adjacent, similar, non-cover-retaining screws. Slide off the cover.

Once inside, fight the temptation to burrow around looking for the 68000. It really is there, it is big and funky looking, but you won't need to locate it for the purpose of this exercise.

HOW TO CHOOSE A SLOT: there is a Co-processor slot on the motherboard right next to the disk drives which, even if unoccupied, you should ignore. Choose a convenient empty slot from the block of FIVE identical slots on the backplane, some of which may already be occupied by other boards. AMIGANET can live in any one of these five slots, but it will be happiest in the right-most slot, closest to the disk drives.

Curious owners (most Amigii) may check the last item in this section for the Technical Explanation, and the Caveat on the preceding page.

Having chosen your slot, remove the rear blanking plate in-line with that slot. Holding the Network Board in the mating position, incline it down a couple of inches (50.8 mm.) at its rear, and push the Ethernet socket(s) through the rear opening towards the outside world.

Then lower the Board into the guide rails in the 2000, levelling it as it is lowered, until finally pressing it home with the palm of your hand into the edge connector on the motherboard. You may require more force than you imagined would be necessary, but it is impossible to put the Board into the wrong type of slot. Now replace the backplate screw, the A2000 cover, and its screws. If you lack confidence in yourself or in our product, or if you are so enthusiastic that you can't wait to get wired to a Real Network, you can leave the cover till later. Just don't stand the Monitor on the plug-in Boards.

Now repeat the process with the other machine(s). (It is presumed that you have other Network Sites - a Network of ONE is incredibly fast but not very practical.)

SECTION ONE

AMIGANET 500

The installation procedure for an A500 Network Board is somewhat simpler; just place the unit on the left of the A500 and wait for them to mate. This normally takes place under conditions of darkness; if you are in a hurry you can help the process along by pushing them gently together, making sure that plug and edgeconn are aligned.

CABLES NO longer Supplied ^{WIRES}

When all the Network Boards are installed, either connect the computers to each other with the supplied Cheapernet BNC cables, using the BNC socket(s) protruding from the rear of each machine, or attach an Ethernet Transceiver Drop Cable between each Board's 15-pin D-type connector and its respective MAU (Media Access Unit).

IF YOU USE CHEAPERNET YOU MUST PLUG IN A 50 OHM TERMINATOR AT EACH END OF THE CABLE SYSTEM, TOTAL TWO PER SYSTEM. THIS IS NOT DISCRETIONARY.

(These terminators are supplied with your AMIGANET Boards.)

If the Network Board has two BNC sockets fitted; they are connected in parallel and you may 'daisy-chain' the Sites by connecting one cable 'in' and one cable 'out'. If there is only one socket fitted, you must use a BNC 'T' connector, which plugs onto the Network Board and which provides two sockets for cable connection.

Even if there are two sockets on the Board, some discretion must be used concerning the method of attachment; using 'daisy chaining', there might be some disruption to Network activity if it is necessary to remove or replace a Site on the Net, during the time that the two cables are removed and re-joined. AMIGANET is tolerant of this kind of interruption, but Application program timeouts could be triggered, giving rise to possible program failure or breakout, or at the least some form of halt to proceedings, with appropriate Screen warnings via Requesters. If this is likely to be a regular event, or if the Network Manager or responsible person cannot control the conditions and timing of the operation, then it is essential to use 'T' connectors, which allow the machine to be disconnected from the Network without breaking the cable route even momentarily.

Why the right-most slot for my latest acquisition ?

This slot has the highest DMA Request priority, as defined by the DMA arbitration circuitry within the AMIGA; this DMA Request, however, can only be arbitrated while no DMA is active. AMIGANET's DMA process behaves responsibly towards other DMA devices (such as the Hard Disc Controller) and will not hog the Bus to the exclusion of other processes, but this might not be the case for other boards. Ethernet runs at an instantaneous rate of around 1MByte/sec, and its communications arrive unpredictably, so AMIGANET can reasonably expect to be given the highest DMA priority. The HD Controller, for example, can wait around for a few milliseconds with no difficulty.

In practice, within the AFS protocols there is a flow-control mechanism which makes it impossible to overload an AMIGANET Site that is denied convenient DMA access; however, this will lower throughput capacity, and therefore operating speed. For other implementations of Operating Systems using AMIGANET Boards, such as TCP/IP, flow control may not be used, which makes the slot issue more sensitive.

An easy way to summarise these factors is this:

Put the AMIGANET Board in the slot nearest to the disk drives.

SECTION TWO

INSTALLING THE SOFTWARE

In order to use AMIGANET, you must first install the Network Driver and Fileserver Software: the first step is to install the Driver programs and their associated Data Files at every machine on your Network; the second is to install the date and time services on some machines, and File or other servers where appropriate.

The AMIGANET Software includes a number of Data and Code Files, which must be installed in standard directories on your System disc. The AMIGANET Installation disc contains a program that will copy the relevant Files into these directories automatically.

The Installation process will create a new directory called SYS:ANET on your System disc. If you need to have a different name for this directory, install the System by hand and add an ASSIGN command to your S:startup-sequence File, such as ASSIGN ANET: different-directory. Most users will not need to do this.

CAUTION: If you are installing AMIGANET onto a floppy disc machine, make sure that you have a backup of the original Workbench disc that came with your Amiga, and of the environment that you normally use.

The actual INSTALL program you should use for a particular computer depends on the number and type of disc drives attached to that machine. To install the AMIGANET software, perform the following steps:

1. Boot the Amiga System using a COPY of Workbench, or a COPY of your favourite Amiga working environment.
2. Make sure that you have enough room on your System disc for the AMIGANET Files to be installed. You will require at least 320 disc blocks (160 kilobytes) of space for the Rev. 1.4 Software as shipped. The installation can be tailored subsequently, by deletion of any unnecessary services, and this will reduce the space requirement. To check whether you have enough space on the disc, select the System Boot-Disc Icon with a single-click of the mouse, and then choose the 'info' option from the 'Workbench' menu. The box labeled 'Number free' details the number of free disc blocks. If this is less than 320, you must delete some Files from your System disc. For instance, if you have any drawers containing PC emulation related Files, and you don't have a PC card in your Amiga, then these items will be suitable for deletion.
3. For Hard Disc Systems, insert the Installation disc in any floppy drive, say DF1:. Dual-drive Systems should have the Installation disc inserted in drive DF1:, leaving the System disc in drive DF0:.

Systems that only have one drive should have the Installation disc inserted into that drive, but the user should be prepared to swap the System and Installation discs around during the Installation process. This is a particularly tedious process, and you might prefer to use the RAM Disk to copy all the AMIGANET System Files to your SYS disc.

4. Double click on the AMIGANET disc Icon. A Workbench window will appear on the screen.
5. For Hard and dual-drive Systems, locate the 'Install' Icon in the new Workbench window and double-click on it. For single-drive Systems, double-click on the 'Install-Single' Icon instead.

SECTION TWO

6. The installation process will now start copying Files from the AMIGANET disc to your System disc. You should expect the following Files (plus other Files, depending on Rev. level) to be copied from your Installation disc to directories on the System disc:

DIRECTORY	FILE	DESCRIPTION
C:	STARTNET	Activates your computer on the Net.
	REMOTEMOUNT	Used to access other computers' disc drives or other facilities.
	TIME	Gets current date and time from the Network.
	CHAT	Allows you to 'chat' to other users.
	WHO	Lists the Site addresses and names of all the users who are currently active on the Network, and where you can access services that you need.
DEVS:	amiganet.device	AMIGANET System File used to access the Network hardware.
L:	AFS-server	AMIGANET System Files here:
	AFS-handler	
	anet-dateserver	
	anet-services	
	anscreen-server	
ANET:services	anscreen	AMIGANET Network service File used by CHAT.
ANET:mountfiles	SPL	Mountfile used to access remote printers.
	RH0	Example mountfile for accessing a remote disc.
	TUBE	Mountfile for high-speed data tube.
ANET:blibs	LexLib	AMIGANET library File.
	CommonLib	AMIGANET library File.
	AnotherLib	AMIGANET library File.

TUBE?
Remote Run?

When the process is complete, find the ANET Drawer in the Workbench screen; you may need to clear and reload the window from the SYS disc Icon. Position the ANET drawer to suit your taste. Now Snapshot.

You are now ready to test the System. Turn the pages to USING AMIGANET. If you prefer the simple life, click 2 on ANET and STARTNET Icons.

If the installation has been performed correctly, the AMIGANET Logo and Copyright message will appear for a moment. You are now on-line.

SECTION TWO

INSTALLING AND DISABLING SERVICES

Having completed the initial Software Installation, which installs all of the available services by default, you should go on to verify the installation of the date and time server. The purpose of this server is to provide machines without battery backed up clocks with an automatic date and time setting service. It also serves to synchronise all the computers on the Network. This can be extremely important for certain types of Database operation.

The date and time service should be left installed only on computers with battery backed up clocks, such as an Amiga 2000, or A500 with added RT Clock option. You should select a number of these machines to provide the service, two to three should be sufficient. This means that you should disable most of the 'andate' services on the Network. Note that it must be guaranteed that at least one of these servers is on-line first (for daily start-up), or permanently, if other machines are to reliably access the date and time service.

Disabling Existing Services:

There is a task (program) that is responsible for handling requests from the Network for the services provided by your machine. To determine which services it can provide to other Network users, this task checks the ANET/services directory for the list of services.

Disabling a service, therefore, is just a matter of deleting its service File from the ANET/services directory. This can be done from the CLI, or from the Workbench by discarding the services' Icon or by moving the Icon into a spare drawer, i.e. out of the Services drawer.

To subsequently re-enable this service, you should copy its service File back from the Installation disc's ANET/services directory, or drag the relevant Icon back out of the Trashcan into the Services window.

For instance, to prevent Network users from accessing a particular Site's discs and peripheral devices, you need to disable the machine's Fileservice. You do this by deleting the File 'AFS' from the Site's services directory. This also releases about 25k of memory.

To prevent users talking to you via the CHAT facility at your computer, you should disable the screen service. The service File for CHAT is called 'anscreen'.

If a Site providing the date and time service has a problem with its clock (for example, when its batteries are discharged), you can disable the service by deleting the File 'andate'.

NOTE: if the Network is already active (STARTed) at the Site in question, the service(s) disablement will not be effective until the computer is re-booted.

SECTION THREE /A

USING AMIGANET

This chapter details the Operating Modes of the AMIGANET System. In particular, it covers the following topics:

Starting up and running the Network.

Using the Network services.

Sharing Files via the Network.

Printing on the Network printers.

Talking to other users on the Network.

Listing current users of the Network.

INTRODUCTION TO AMIGANET O/S

The AMIGANET Operating System software provides a sophisticated interface between the Network hardware and the AmigaDOS Operating System. There are various elements of this interface, and it is worth understanding some of the functions.

At the lowest level, the 'amiganet.device' provides a normal Amiga device interface to the Network Board. This is a very low level interface providing primary physical movement of Data in blocks.

The Data arriving via the Network at a particular computer consists mainly of messages for different processes within the machine. These must be carefully routed for use within the File System, and passed onto the correct process. For this reason, user programs should never read or write to the 'amiganet.device', but instead communicate with the Network via the AMIGANET System libraries.

Any computer which is capable of providing a service to other computers on the Network will be running a copy of the Network Services task. This task is responsible for accepting service requests from Network users. When a request appears that matches a service name given in the ANET/services directory, the Net Services task starts up a new task which will handle the service requested. Commonly used services remain resident in memory (as long as the Amiga is powered) once they are started for the first time, and the Net services task keeps track of where these tasks are.

There are a number of services supplied as standard with AMIGANET. Among these are the date and time service, the screen communications service and the AMIGANET File System (AFS). These services, and the way in which they are used, are described in later sections of this manual. You may have other services installed on your Network such as a Print Spooler, or TCP/IP support, which will have their own documentation.

AMIGANET has been designed to cope with problems such as disconnection of the Network cabling. If this situation occurs, a window will pop-up on your screen to announce this condition. You should examine the cable and connectors (and possibly the users) to make sure that the Network connections are all in order, and that there has been no break in, or damage done, to the cable. When the problem has been resolved, Network operations should continue from where they were interrupted.

SECTION THREE /B

STARTING AMIGANET

AMIGANET can be started in three different ways: from the Workbench, from the CLI, or automatically, following a power-on or re-boot.

Starting the Network from the Workbench:

It is assumed that the Software is installed; to start using the Network, double-click on the ANET Icon in the Workbench window, and then on the STARTNET Icon when it appears. The AMIGANET Logo, Ethernet address, and Copyright message will appear for a moment to confirm successful Ignition, and your Amiga will become active on the Network. STARTNET mounts and initialises all the necessary devices, checks the table of Users and their aliases, and activates the Network Board.

Starting the Network from the CLI:

You can start the Network from the CLI by using the command 'startnet'. Startnet will be confirmed by the previously described message, which will remain on the screen until overwritten by CLI activity. This is useful for those who miss the twelve digits of the Ethernet address at Logo time, as you might need to use the address for mount listings. When using an address, you may ignore leading zeros.

Starting the Network Automatically:

The Network can be activated automatically at your Site whenever you turn the computer on, or re-boot it, if you include the command 'startnet' in your S:startup-sequence File.

When you have started the Network using one of these three methods, and have received the AMIGANET startup confirmation message, you may begin to use the Network services described here:

Using the Date and Time Server:

AMIGANET operates a Network-wide Date and Time service which can be accessed by any Amiga on the Network. Its main function is to set automatically the time and date on machines that do not have Real-Time clocks. It also ensures that your Site operations will be synchronised with the other computers on the Network. To execute this function, you issue a special CLI command, TIME, which is provided by the AMIGANET software. This command will take additional arguments; see the Command Definitions for a description of your options. Apart from resetting your local clock, TIME will display the current Network Date and Time on your screen. The format used for the display is the same as that used by AmigaDOS: <weekday> DD-MMM-YY HH:MM:SS, so that half-past eight in the evening on Saturday, September 10th looks like:

Saturday 10-Sep-88 20:30:00

This command can also be added to your S:startup-sequence File, so that you do not need to type it each time you re-boot your computer.

NOTE that you must add this command after the STARTNET command.

Users should also note that computers with synchronised clocks will complete Workbench activity with Remote Files more quickly. (This effect is less significant when the Fast Filing System is used.)

SECTION THREE /C

Sharing Files and resources Via The Network:

Users on the Network can be allowed access to the disc drives of other computers, as if the discs were connected to their own computer. To access another Site's disc drive, you must first 'mount' it on your Amiga. This can be done from the Workbench or from the CLI; to mount a disc, you must first modify a File in the ANET/mountfiles directory. This File will define the Networked disc that you wish to access.

Mountfile Contents:

An example mountfile is provided, called 'RH0' (Remote Hard disc 0). This was placed in the ANET/mountfiles directory during the Software Installation process, and you should duplicate and modify this File to create your own specific mountfile. The format of the File is similar to an entry in the standard AmigaDOS mountlist, and is as follows:

```

Handler      =          L:afs-handler
Resident
StackSize    =          1000
GlobVec      =          0
Priority      =          5
Startup      =          serialnumber/AFS
Startup      =          SYS:

```

When you edit this example File to suit your own requirements for disc access, you need only alter the last two 'Startup' lines.

DO NOT alter the lines above, these two.

The first 'Startup' line refers to the Site at which you wish to make disc accesses. For instance, if you wished to access an Amiga with an ETHERNET address of 'AE4742004C27', the line would simply read:

```
Startup = "AE4742004C27/AFS"    NOTE the quotes.
```

The second part of the line, separated from the first by the slash, refers to the service at that machine. Whenever you access another Amiga, it will be called 'AFS', for AMIGANET File Service. The second 'Startup' line refers to the device that you wish to access at the Remote Site;

```

For instance,  to access the first hard disc, you would use    'DH0:'
                to access the System disc, you would use      'SYS:'
                to access the first floppy drive you would enter 'DF0:'

```

and so on. To access the entire System disc of the Remote machine AE4742004C27, you would use the following lines:

```

Startup = "AE4742004C27/AFS"    Quotation marks are needed for
Startup = SYS:                  syntax when ser/no.s are used.

```

As the second 'Startup' line refers to AmigaDOS devices in general, you may access a Remote machine's parallel port via 'PAR:', or its serial port via 'SER:'. For example, the following lines would access the serial port of Amiga AE47420004B8:

```

Startup = "AE47420004B8/AFS"
Startup = SER:

```

SECTION THREE /C

Accessing Remote Discs via the CLI:

You can create mountfiles via the CLI; however, if you don't copy the mountfile's associated '.info' File, you will not be able to access the Remote File System from the Workbench. If you do copy the '.info' File, remember to set its default tool to 'C:REMOTEMOUNT', via the Workbench 'info' command. You can alter the mountfile with any standard ASCII editor that you may be familiar with, such as ED. Once you have edited the File to your satisfaction, you can then use the CLI command REMOTEMOUNT to mount the Remote disc on your System.

For instance, if the mountfile is called 'sales', you would issue the command:

```
REMOTEMOUNT SALES:
```

It is not absolutely necessary to add a colon at the end of the name. When the Remote disc has been mounted, you can access it in the same fashion as a disc drive directly connected to your System. That is to say, all the standard CLI commands, LIST, COPY, RENAME, CD, ASSIGN, and so on, will operate correctly on it.

For instance, after using the command 'REMOTEMOUNT JAY:' where 'JAY' is a mountfile in ANET/mountfiles, you can copy the File 'MYFILE' from your current directory to 'JAY:' by typing 'COPY MYFILE TO JAY:MYFILE'.

You may use a Remote directory as the default path to run programs from by typing, for example, ASSIGN C: JAY:C. The CLI then looks in the 'C' directory of 'JAY:' whenever you type a command; if it finds the command there, it executes it.

Accessing Remote Discs via the Workbench:

If you intend to access Remote File Systems via the Workbench, the following approach to creating new mountfiles can be used:

1. Enter the ANET/mountfiles directory via the Workbench.
2. Duplicate the File 'RH0' (or any other previously altered mountfile). This is done via the standard Workbench mechanism of selecting the File with a single-click of the mouse, and choosing the 'Duplicate' option from the 'Workbench' menu.
3. Rename this new duplicate File with the name that you wish the Remote disc to be called. This can also be done by first selecting the File, and then choosing the 'Rename' option from the 'Workbench' menu. You should choose a name that is fairly short (three to fifteen characters), as it will be displayed as the label for a disc Icon on the Workbench background. If you enter any spaces in the name, you will need to place quotation marks around all references to this Remote disc when using it from the CLI. Life will be made easier if you use dashes '-' for any required spacing effect. Good examples might be:

RH1

JANET

RT-LIBRARY

ACCOUNTS

SECTION THREE /C

4. Double-click on a CLI Icon. Run ED ANET:/MOUNTFILES/NEWNAME. (Use CD to get to the ANET/MOUNTFILES directory if you don't like using the CLI. Check that you get there and can see your new File with DIR. Load ED using the command ED YOUR-NEW-NAME. The case of the text is not important.) See Introduction to the Amiga manual Appendix B for ED commands
5. Edit the last two 'Startup' lines in accordance with the previous mountfiles description. When you have finished, save the File and exit from ED with ESC SA, ESC Q.
7. You should now check the new mountfile's 'default tool'. To do this, select the mountfile Icon with a single-click, then choose the 'Info' option on the 'Workbench' menu. A (full screen) requester will then be displayed. Locate the 'Default Tool' box, and verify that it contains C:REMOTEMOUNT. If not, select the box with the mouse, delete its existing contents, enter the legend 'C:REMOTEMOUNT', and press the RETURN key. Finally, select the 'Save' box at the bottom left of the requester; the new version will now be stored.
8. If you have already started the Network, double-click on the new mountfile Icon to mount the Remote disc. A new disc Icon should now appear on the screen, with the same name as the Filename that you gave the mountfile. If the operation fails, a message will be displayed in the Workbench Title bar. This can happen if the File 'default tool' was not set correctly.
9. When the above process has been correctly executed, you will be able to access the Remote disc as if it were physically connected to your Amiga; that is, double-clicking on its Icon on your screen will open a window onto its contents, and double-clicking on its program Files will run those programs in your Amiga. All the standard Workbench functions, such as RENAME, DUPLICATE, and DELETE, are executable.

Accessing Remote Discs Automatically:

You may mount Remote discs automatically, rather than double-clicking on the mountfile Icons, or using the REMOTEMOUNT command within the CLI, by including the REMOTEMOUNT command in your S:startup-sequence. For instance, if you always need to access the Remote disc referred to by the mountfile PARTS-LIBRARY, you would add the following line to the S:startup-sequence File:

REMOTEMOUNT PARTS-LIBRARY:

This line should be added after the STARTNET command in the File. If the Remote File System cannot be located (the relevant Site may not be currently active), the startup-sequence will abort. If you don't want this to happen every time the Remote File System is not available, include the line 'FAILAT 30' in the S:startup-sequence File, just before the line containing the REMOTEMOUNT command.

SECTION THREE /D

Printing Files on Remote Printers:

You can print Files from your Amiga on any Remote Amiga's printer. This is achieved by the standard method of sending the Files to the Amiga printer device PRT: (either directly, or from word-processing packages or other applications). Use the CMD command available with 1.3 Workbench to redirect the output from the PRT: AmigaDOS device to the AMIGANET SPL: AmigaDOS device. This differs from the standard printer device, which will send its output to either of the Serial and Parallel AmigaDOS devices on the Amiga.

To specify which printer on the Network you wish to use, you must edit the File 'SPL' (which will create the device SPL: when mounted). This File is found in the ANET/mountfiles directory. To edit the File, follow the instructions in previous sections on using the Remote File System (you don't need to copy RH0, just edit the File SPL).

In the same way that you might specify a Remote Disc, you must specify the location of the printer on the first 'Startup =' line, and the logical device that the printer is attached to on the second line. For instance, if you wished to use the printer attached to the parallel port of the machine known as AE4742005678, the two startup lines would read:

```
startup = "AE4742005678/AFS"
startup = PAR:
```

Or, if the printer is attached to the serial port of Amiga AE4742004D24, you would alter the two startup lines to:

```
startup = "AE4742004D24/AFS"      NOTE that you should not use the PRT:
startup = SER:                    device for the 2nd startup line.
```

When you have altered this File, change its 'default tool' to C:REMOTEMOUNT in the same way as described for the Remote File System. Whenever you wish to start using the Remote printer, you now simply double-click on the SPL File in ANET/mountfiles, and the Remote printer will be available for use.

You may start a Print service with the CLI command 'REMOTEMOUNT SPL:'

Rather than double-clicking on SPL, or typing 'REMOTEMOUNT SPL:' each time you wish to use the Network printer, you could add the entry:

```
REMOTEMOUNT SPL: to your S:startup-sequence File.
```

Again, you must place this entry after the line containing the STARTNET command. Once you have added this line, your Amiga will automatically send all printer output over the Network to the Remote printer.

Once SPL: has been mounted, all output to PRT: will print on the Remote printer that you have specified in the mountfile. For instance, the command: 'TYPE report TO PRT:' prints the contents of the File 'report' on the Remote printer. Alternatively, you can specify the SPL: device directly, as in 'TYPE report TO SPL:' to achieve the same effect.

If you subsequently wish to add and use a local printer at your Amiga, you should use CMD to un-direct PRT: output.

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A simpler way of adding a local printer, but a less efficient one, would be to alter the first startup line to include your own Site's Network serial number. The inefficiency here results from sending your printer output around the AMIGANET Operating System and back to yourself, rather than sending it directly to your local printer.

For instance, if your Network serial number is AE4742002C41, and the printer is connected to the serial port on your Amiga, the startup lines should read as follows:

```
startup = "AE4742002C41/AFS"
startup = SER:
```

SECTION THREE /E

Listing Other Users on the Network:

To obtain a list of other users currently using the Network, use the CLI command WHO. This will provide information on the Ethernet Site address and alias of each user currently active on the Network, and on which services are being provided at each Site.

WHO allows you to examine a particular computer on the Network; you may define the Site you wish to interrogate either by its Ethernet Address, or by its operator's alias. Refer to the Command Definitions for the options and Syntax of WHO, and the following CHAT and TUBE.

Talking to Other Users on the Network:

AMIGANET provides a simple CLI command, CHAT, that allows you to send messages from one Network Site to another. This command uses the screen communications service of the target computer to display your messages.

CHAT will accept anything that you type and pass it directly to a screen window at the defined Remote Site, until you enter a full-stop (period) on a line by itself. Messages can be as long as you like. To prevent possible abuse of the facility, the originating Ethernet address appears in the window title bar.

For example: you wish to send a message to a user known as 'alan';

```
CHAT @alan
Please turn the printer on and enable spooler service.
```

About the TUBE:

This is a high-speed unidirectional interactive 'pipe' mechanism, designed for the purpose of passing real-time data at a high rate between AMIGANET sites. A site can open a TUBE to another site, which will then start a task to handle TUBE input. A dialogue will need two TUBEs, one originating at each site. Some degree of co-operation is necessary between sites; it is necessary to ensure that the target computer is on-line (verify with WHO) and that the TUBE is mounted at that site. It could be mounted automatically from a requesting site using the AMIGANET command REMOTERUN, but it is more likely that computers using the TUBE will be operating in a controlled environment as part of a co-operating process, and will be configured by the application Software appropriately.

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OPERATION of the TUBE:

The AmigaDOS device TUBE is a device that allows one program to send information to another co-operating program. For a very simple example, perform the following steps:

Start two CLI screens.

In one CLI, mount the handler by typing 'remotemount tube'.

Enter 'type <anyfile> tube:anyname'.

In the other CLI enter 'type tube:anyname'.

This will have the same result as entering 'type <anyfile>' directly in a CLI. In this example you will have passed information via the TUBE between two processes within the same computer.

The next step is to create a mountfile entry, say, SAMPLE, in anet:mountfiles, either directly or by modifying an existing mountfile. The entry will be anet:mountfiles/sample, and will look like this:

```
handler = l:afs-handler
resident
globvec = 0
stacksize = 1000
startup = "AE4742001008/afs"      (your Ethernet target address here.)
startup = tube:
```

Ensure that the defined target site is on-line, that you have used the correct address, and that TUBE has been 'remotemounted' at that site.

At the local site enter: 'remotemount sample'.

Then enter 'type <filename> sample:99'.

At the target site enter 'type tube:99'.

You will see the content of 'filename' appear in the CLI of the target computer, the data having been transferred via AMIGANET.

The TUBE is uni-directional, and you must not read and write to an individual example. Open another TUBE in the other direction if you wish to exchange data both ways, such as for handshaking or program dialogue. Having remotemounted a TUBE referencing a particular site, it will then be possible to pass multiple streams of data, each defined by the suffix after the colon e.g. 99 or fred or potrzebie.

To achieve the same result with a C program we can use the following code, assuming that TUBE and SAMPLE have been remotemounted:

At the local site:

```
FileHandle fh = Open("SAMPLE:yourname",mode_newfile);
```

```
Write(fh,mybuffer,mybufferlen);
```

```
...
```

```
...
```

```
Close(fh)
```

NOTE: You must use upper case Open, Close Read, etc., NOT Unix-style lower case commands.

At the target site:

```
FileHandle fh = Open("TUBE:yourname",mode_oldfile);
```

```
Read(fh,mybuffer,mybufferlen);
```

```
...
```

```
...
```

```
Close(fh)
```

SECTION FOUR

COMMAND DEFINITIONS

This section details the exact syntax, scope, and options of AMIGANET commands. Simple examples are given where appropriate, and the commands are described in plain terms.

Command	WHO	
Template	"ADDRESS,ALL"	
Example 1:	who	Finds the current status of all the sites in the file anet:addresses.
Example 2:	who @fred	Finds out if there is an alias fred on the Net, and if so returns the Ethernet address of fred.
Example 3:	who @fred all	As above plus returns all services available at that site.

Description This command returns current status information about computers/users on the Network and the services that are available at those sites. The enquiry is made based on parameters read from the local File anet:addresses. This File must therefore be constructed at least once to contain all user addresses and aliases, and be kept up to date. It could be maintained on a central disc and down-loaded periodically, to ensure that all users have consistent information. If the local copy is altered after STARTNET, for example via a down-load, changes will not be valid until a re-boot.

The information returned by WHO is in the following format:

```
[*/] <address> [alias1] [alias2] [alias3] ....
```

```
service ....
```

```
service ....
```

The * at the start of the line denotes that the site is on-line.

Command	CHAT	
Template	"ADDRESS"	This argument is required.
Example 1:	chat @SALES	Talks to the computer operated by the user with the alias SALES.
Example 2:	chat AE4742000023	Talk to site as number. No quotes.

Description This command instructs the service anscreen at the target site, opening a small window at that site. Text entered locally will be passed to this remote window until a period (.) is entered on a line by itself, or CTRL \.

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Command	TIME	
Template	"ADDRESS"	This argument is optional.
Example 1:	time @SALES	Gets the time and date from the site of a user with the alias SALES.
Example 2:	time AE4742000023	Gets the time and date from the site numbered. No quotes necessary.
Example 3:	time	Gets the time and date from the first computer detailed in the File anet:addresses that is found to have an active andate service.

Description This command sets the local site to the time and date found as above. If no donor site is specified, the command will poll all sites in the anet:addresses File sequentially. It will therefore execute faster if a donor is specified. If the donor of your choice cannot be guaranteed to be on-line at all times, enter all the andate serving sites at the beginning of the File.

Command	REMOTERUN	
Template	"ADDRESS,SILENT,,,,,"	The ADDRESS argument is reqd., SILENT is optional.
Example 1:	remoterun @Bilbo list	Causes LIST to be run in a window at Bilbo's computer.
Example 2:	remoterun AE4742000023 silent sys:demos/animations/robo	will cause the Robo Demo to be loaded on the computer designated, but without bringing up a window.

Description This command is used typically to run a command at a remote machine. It could be that the computer is unattended temporarily, or it might perhaps be operating in a hazardous environment, the operator preferring to action events from a distance.

If the command is run normally, a window is opened on the target site to take the output of the program. If the SILENT switch is used, the output from the command is discarded.

If the command has more than seven arguments, they must all be enclosed by quotes; i.e. remoterun @site "delete f1 f2 f3 f4 f5 f6 f7 f8 f9"

SECTION FOUR

Command **REMOTEMOUNT**

Template "DEV" Argument required.

Example: remotemount RH0 Will cause the remote device described by the File anet:mountfiles/RH0 to be mounted at the local site.

Description The command attempts to mount a remote device according to its definition in the directory anet:mountfiles.

The mountfile has the following form:

<p>HANDLER <filename> [RESIDENT] [GLOBVEC n] [STACKSIZE n] [PRIORITY n] STARTUP "string" STARTUP "string"</p>	<p>The filename given after the keyword HANDLER is the File that contains the handler code. The keyword RESIDENT tells remotemount that code is shareable. This means in the case of the remote File handler AFS-handler that, tho you may have, for example, three remote File handlers running, the actual code is only in memory once. Warning: the RESIDENT keyword only works on code that is pure. Most programs are not pure.</p>
---	--

The keyword GLOBVEC tells remotemount about how to run the program. If n = 0 then we have our own global vector and we will be a BCPL prog. If n = -1 then we are probably a C program and use a shared global vec.

The keyword STACKSIZE describes the size of the stack in bytes in which the program runs.

The keyword PRIORITY describes what priority the handler is to run at.

The keyword STARTUP is followed by a string which is passed onto the handler. You may specify more than one startup string. Remoterun expects the argument following the keyword startup to be a string, therefore, if the string starts with a number or contains spaces, it must be enclosed in double quotes.

The only user-changeable entries are the startup keywords for the remote filehandler AFS-handler, which can be made by copying the example File RH0 and editing as appropriate.

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