

Ariadne Manual

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Ariadne Manual

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1. Introduction

What is the Ariadne?

The ARIADNE is an *Ethernet* networking board for the *Zorro II* expansion bus of Amiga computers. It offers connectors for the Ethernet standards *10BASE2* (*Cheapernet*) and *10BASE-T* (*twisted-pair Ethernet*).

In addition, the ARIADNE features two parallel ports, which can be used with a printer, for example. You can also connect some more Amigas that are not equipped with Ethernet boards, to add them to the network, too.

The ARIADNE comes with ENVOY, Commodore's powerful networking software, enabling you to comfortably network all Amiga models using AmigaOS version 2.04 or above.

About this Manual

This manual tells you how to install the ARIADNE in your Amiga, how to connect to other computers using Ethernet, and also how to install and use the software drivers and ENVOY. It covers the main points of ENVOY installation for the ARIADNE and helps you deal with problems you might encounter.

You will find a general and more in-depth ENVOY explanation in the separate ENVOY manual you received with this package.

Please also have a look at the *ReadMe* file on the installation disk. This file might contain information that has been added after this manual was printed.

2. Package Contents

Please check if the following items are indeed included in your package, and if they are undamaged:

- the ARIADNE board
- an Ethernet 'T' connector
- a terminating resistor
- the ARIADNE installation disk
- the ENVOY manual
- this manual

If you miss something or one of the items seems to be damaged, please contact your dealer or Village Tronic Marketing GmbH directly.

3. A Quick Start

This chapter is meant for advanced Amiga users, to give them some instructions for installing the ARIADNE quickly.

If you have never or only a few times installed an expansion board in your computer, please skip this part and read on on page 5!

3.1 Installing the Board

To install the board, open the computer and place the ARIADNE in an empty *Zorro II/III* slot. Make sure the board is firmly inserted into the slot and the metal slot cover of the ARIADNE is well screwed to the computer.

The ARIADNE offers two different Ethernet standards:

10BASE2 (Cheapernet)

First plug the Ethernet 'T' connector that comes with the board into the BNC connector of the ARIADNE. Then connect the board to the other Ethernet boards present in the network, in whatever order you like. Make sure you are using proper Ethernet cables. After connecting all the boards, you will only have to add terminating resistors to those 'T' connector sockets that have remained empty.

You must not connect any Ethernet cable directly to the ARIADNE, without using a 'T' connector. Do not forget the terminating resistors.

10BASE-T (twisted-pair Ethernet)

Connect the ARIADNE to a *Repeater* by plugging a cable coming from the latter into the *Western* socket of the ARIADNE.

3.2 Software Installation

Software installation is performed using the Commodore *Installer*, which first lets you choose your level of Amiga knowledge between *Intermediate User* and *Expert User*. As an expert, you have more control over which files are copied by the Installer. You can find a list of the files that are copied in appendix A.

In both cases, you will have to set the main parameters of the ENVOY configuration (e.g. a computer's name and address, and the desired networking driver). If you want to learn more about this, you can find more information in the ENVOY installation chapter on page 15, and also in the ENVOY manual, of course.

To access the parallel ports of the ARIADNE, your programs will have to use the *ariadnepar.device*. In most cases, you will be able to configure your software accordingly; if this is not an option, use the *UseAriadnePar* utility. More information about the usage of the parallel ports can be found on page 27.

4. Hardware Installation

The following chapter helps you to install the ARIADNE board in your computer. Please be very careful in this. If you do not want to perform these tasks yourself, your dealer will be glad to help you.

4.1 Installation in an Amiga 2000

For installing the board into an Amiga 2000, you will only need a cross-slit screw driver.

Before you can install the board, you should remove all cables and open the computer. To do so, you will have to remove five screws. Two of these each are located at the sides, close to the bottom of the machine, the last one is located at the back, in the center just below the top of the case. Remember to keep all the screws!

After removing the screws, pull the top of the case towards the front just a little. You will then be able to take it off easily.

Looking into the computer now, you will see the power supply on the right towards the back, one or two disk drives towards the front, and the slots to the left.

To the left front, you should see five identical rows of contact springs. To the back side of the case, seven metal slot covers (five for Amiga and two for PC boards) are fastened with one screw each. One of these covers will be replaced with the slot cover of the expansion board, to fasten the board to the computer.

Before touching the ARIADNE or anything within the computer, please first touch a heating or the computer case for a moment. You could be electrically charged, and in case you would discharge through the computer ICs, they might be damaged. Therefore, touch something grounded before inserting the board.

Now, use the screw driver to unscrew one of the metal covers and remove that cover. Then, push the ARIADNE into the computer from above in such a way that the ARIADNE's metal cover fills the gap you made. You might need some force to tightly push the ARIADNE into the slot. When the board is sitting in the slot tightly, you can fasten its metal slot cover.

Please once again check all cables and the proper positioning of the ARIADNE before closing the computer. When re-fitting the case top to the computer, please make sure no cables are twisted or get stuck. After fastening all five screws, re-attach the cables you removed at the start.

4.2 Installation in an Amiga 3000

For installing the board into an Amiga 3000, you will only need a cross-slit screw driver.

Before you can install the board, you should remove all cables and open the computer. To do so, you will have to remove five screws. Two of these each are located at the sides, close to the bottom of the machine, the last one is located at the back, in the center just below the top of the case. Remember to keep all the screws!

After removing the screws, pull the top of the case towards the front to remove it. If it does not seem to come off easily, try to lower the front of the case top just a little. You cannot lift off the case top, you can only pull it off towards the front!

Looking into the computer now, you will see the power supply on the right towards the back, the built-in hard drive to its left, one or two disk drives towards the right front, and part of the main board to the left (in case you already have a board installed in the computer, you will see that board and not the main board, of course). Where are the slots? You will find them by tilting your head slightly to the left and looking at the vertical board in the middle of the machine.

To the back side of the case, four metal slot covers are fastened with one screw each. One of these covers will be replaced with the slot cover of the expansion board, to fasten the board to the computer.

Before touching the ARIADNE or anything within the computer, please first touch a heating or the computer case for a moment. You could be electrically charged, and in case you would discharge through the computer ICs, they might be damaged. Therefore, touch something grounded before inserting the board.

Now, use the screw driver to unscrew one of the metal covers and remove that cover. Then, push the ARIADNE into the computer from above in such a way that the ARIADNE's metal cover fills the gap you made. You might need some force to tightly push the ARIADNE into the slot. When the board is sitting in the slot tightly, you can fasten its metal slot cover.

Please once again check all cables and the proper positioning of the ARIADNE before closing the computer.

Now, all you still have left to do is closing the computer. When re-fitting the case top to the computer, please make sure no cables are twisted or get stuck. After fastening all five screws, re-attach the cables you removed at the start.

4.3 Installation in an Amiga 4000

For installing the board into an Amiga 4000, you will only need a cross-slit screw driver.

Before you can install the board, you should remove all cables and open the computer. To do so, you will have to remove two screws. These are located at the top of the back of the machine. Remember to keep the screws!

The case top can be lifted off most easily by lifting the back just a little and then pulling it off towards the back.

Looking into the computer now, you will see the power supply on the right towards the back, the built-in hard drive to its left, one or two disk drives towards the right front, and part of the main board to the left (in case you already have a board installed in the computer, you will see that board and not the main board, of course). Where are the slots? You will find them by tilting your head slightly to the left and looking at the vertical board in the middle of the machine.

To the back side of the case, four metal slot covers are fastened with one screw each. One of these covers will be replaced with the slot cover of the expansion board, to fasten the board to the computer.

Before touching the ARIADNE or anything within the computer, please first touch a heating or the computer case for a moment. You could be electrically charged, and in case you would discharge through the computer ICs, they might be damaged. Therefore, touch something grounded before inserting the board.

Now, use the screw driver to unscrew one of the metal covers and remove that cover. Then, push the ARIADNE into the computer from above in such a way that the ARIADNE's metal cover fills the gap you made. You might need some force to tightly push the ARIADNE into the slot. When the board is sitting in the slot tightly, you can fasten its metal slot cover.

Please once again check all cables and the proper positioning of the ARIADNE before closing the computer.

Now, all you still have left to do is closing the computer. When re-fitting the case top to the computer, please make sure no cables are twisted or get stuck. The case top is attached most easily by first pushing it behind the front cover and then lowering the back. After fastening all, re-attach the cables you removed at the start.

5. Network Installation

Now that you have installed the ARIADNE in your computer, this chapter will tell you how to connect it to other Ethernet boards to set up a network.

To network computers together using Ethernet, you will of course need an Ethernet board for each of the computers. You can connect the ARIADNE to all customary Ethernet boards.

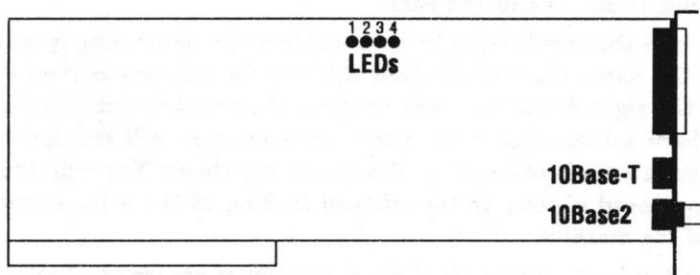


Figure 1: The ARIADNE Ethernet Connectors

The ARIADNE offers two different ways of using your Amiga in an Ethernet network:

1. *10BASE2 (Cheapernet)*
2. *10BASE-T (twisted pair Ethernet)*

The ARIADNE will automatically detect which of these connectors you use, provided the network is properly installed. You cannot use both connectors simultaneously, i.e. you cannot simultaneously connect one ARIADNE to both a *10BASE2* and a *10BASE-T* network.

5.1 Ariadne and Cheapernet

First, plug the Ethernet 'T' connector that comes with the package into the BNC socket of the ARIADNE. The 'T' piece's connectors are then connected to those of other networked boards using an Ethernet coaxial cable, in random order (see figure 2). Remaining unconnected 'T' piece sockets have to be terminated with Ethernet terminating resistors.

Make sure you use proper Ethernet coaxial cables, and that the cable connection is terminated with Ethernet terminating resistors on both ends. Ethernet

coaxial cables are commonly known as RG58; Ethernet terminating resistors have a 50Ω resistance.

The resulting cable connection is used as a data bus by the computers. It *needs* to be terminated on both ends. In this, please note the following:

- You must not directly connect a coaxial cable to the ARIADNE. A 'T' connector always must be connected to the BNC socket of an ARIADNE board.
- The Ethernet cable line must not have open ends. There *always* must be two coaxial cables or one coaxial cable and a terminator connected to any of the 'T' connectors.

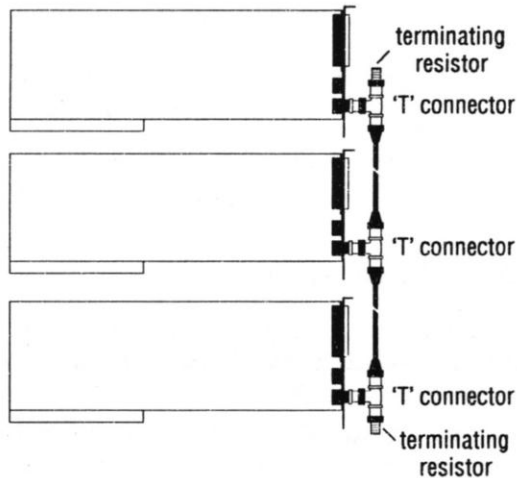


Figure 2: Schematic Illustration of a Cheapernet Setup

This way, you can connect up to 30 machines on a cable of 185 meters maximum length. If you want to bridge longer distances or need to network together more than 30 computers, you will need so-called *Repeaters* to connect multiple cable segments.

You can also include 'T' pieces without connection to a computer in the Ethernet cable line, as some sort of extension piece connecting two cables. This way, you can remove your computer from the network and add it again later, without having to take apart the network.

5.2 Ariadne and 10BASE-T

Using the *Western* socket of the ARIADNE, you can connect it to a *10Base-T* network. A *10BASE-T* network is organised in a star shape, contrary to *Cheapernet*. You will always need a *Repeater* as the central node all computers are directly connected to. The cable that is used is called twisted-pair.

You can use the ARIADNE in a *10BASE-T* network by inserting a special *10BASE-T* cable coming from the central Repeater into the *Western* socket of the ARIADNE.

5.3 The Ariadne LEDs

On the ARIADNE, you will also find four LEDs (see figure 1):

LED1: *Twisted Pair MAU Link Status:* This LED is only used for a *10BASE-T* connection. It is permanently lit if the board is properly connected.

LED2: *Transmit Status:* This LED is lit whenever a packet is sent.

LED3: *Collision:* This LED is lit whenever a collision is detected.

LED4: *Receive Status:* This LED is lit whenever a packet is received.

5.4 Multiple Ariadne Boards in One Computer

You can also use multiple ARIADNE boards in one computer, e.g. for running a gateway between two networks. In this, cabling does not change, configuration will be a little more complicated, however.

As far as the software goes, the network driver *ariadne.device* is able to address up to ten ARIADNE boards in the same computer. For each ARIADNE another *unit* of the *ariadne.device* will be effective: unit 0 for the first board, unit 1 for the second, etc.

In addition, you will have to configure a *complex network* for ENVOY, if multiple network boards are to be used. You can find more information about this in the ENVOY manual.

6. Software Installation

Before you install the software, you should make a copy of the disk. Please note that the copy must have the same name as the the original disk. If necessary, change the name of the copy. Keep the original disk in a safe place.

Please only use the installation scripts if you have not installed an ENVOY network on your computer yet or the old installation will not be needed anymore. Otherwise, these scripts will alter your previous ENVOY installation. Otherwise, read on in the *Installation without Envoy* section.

You will find the installation scripts in the *English* drawer, which in turn can be found in the *Install* drawer.

6.1 Installation with Envoy

You can choose between installing ENVOY and the additional software needed for the ARIADNE on hard disk or on a bootable diskette.

For floppy disk installation, you need to make a copy of your **original** Workbench disk first. Since the installation script will have to delete files from this disk, your should use unmodified copies of the Workbench disk only. Otherwise it may be possible that not enough files can be deleted from this disk, so that there is insufficient free storage space on the disk. After making a copy of the Workbench disk, boot your computer off that disk. Now insert the ARIADNE installation disk and start the *Envoy_to_Floppy* script.

For hard disk installation, just start the *Envoy_to_Harddisk* script.

The installation process is largely self-explanatory. In case you need more information about the questions presented to you by the installation script, please use the help function of the installation program. You will find additional information there. Please read the questions carefully. In particular, remember to assign a unique name and network address to each of your Amigas. The name may consist of a maximum of 31 characters, and must not contain a colon (:), slash (/) or special characters (such as umlauts or accented letters). Also consider the question asking about which ENVOY services are to be activated. If an Amiga is to export its hard disk or even just a single directory to another computer, the respective filing system service has to be activated. If a printer is to be made available to other Amigas, the printer service has to be activated as well.

When the installation procedures are over, your Amiga must be rebooted.

Envoy Installation Results

As a result of the ENVOY installation, you will find a number of new files and directories on your hard disk or Workbench disk.

Most of these are located in the *Envoy* directory. During the installation, you have given instructions about where to place this directory. Within this directory, you will find three more directories, named *Configuration*, *Services* and *Accounts*. In *Configuration*, you can find the programs necessary to configure ENVOY. *Accounts* contains required data about names and groups of network users as well as the *Accounts Manager* program. *Services* holds the *ENVOY-filessystem.service* and *printspool.service* servers as well as the *Services Manager* program belonging to them. Please note that this ENVOY drawer must not be moved or renamed, or else *Services Manager* and *Accounts Manager* will not find their services and accounts anymore.

If upon installation you gave the instruction to automatically start any of the services, you will also find the *Accounts Manager* and *Services Manager* programs in your *WBStartup* drawer. Both programs always need to be running on an Amiga providing other networked Amigas with ENVOY services. The *WBStartup* drawer takes care of starting them automatically.

The *l:EnvoyFileSystem* and *devs:envoyprint.device* files are clients of *filesystem.service* and *printspool.service*, respectively.

The *Networks* directory containing the SanaII drivers was created in the *devs* directory. There, you will find the *ariadne.device* driver for the ARIADNE-Ethernet connection.

In *libs*:, there are four new function libraries required by ENVOY: *accounts.library*, *envoy.library*, *nipc.library* and *services.library*.

Two more Shell programs called *Group* and *Owner* can be found in the *c*: directory.

In *ENVARC*:, another directory called *Envoy* was created. The ENVOY configuration is stored there.

The following files were copied in case older versions were found on your hard disk or Workbench disk:

c:Copy, *c:List*, *c:Mount*, *c:Protect*, *c:SetPatch*,
devs:parallel.device, *devs:printer.device*,
l:port-handler, *Prefs/Printer*.

A First Test

Now that ENVOY has been installed on all computers and they have all been rebooted, as a first test start the *Filesystem Imports* program contained in the *Configuration* drawer of the *Envoy* drawer. This program will open a dialogue window called *Host Request*. In the list of this dialogue window, all the names you assigned to your Amigas should appear now. Check this on all your computers.

In case some names do not appear, check potential error sources, as described in the *Finding Errors* section.

If all names appear, installation of your network is almost complete. Congratulations! The Amigas have successfully found one another and exchanged some data through the network.

Now leave the *Filesystem Imports* program and start the *Filesystem Exports* program on the Amiga that is to provide other Amigas with a directory of any device. Add any directory to the list of *Shared Directories*, assign any name to this directory, and turn on the *No Security* option. Use *Save* to save your changes. Now, reboot this Amiga once again.

When your Amiga has finished rebooting, start *Filesystem Imports* on another Amiga and choose the first Amiga as a host. You will be asked for your name and password. You can enter any text you like in the two text requesters, but you will have to enter something. In the list of *Available Volumes*, the name you just assigned to the other Amiga's directory should appear now. Now select this directory and click on "*Connect ...*". Answer "*No*" to the question "*Would you like this connection to be permanent?*" Following a "*Connection established*" dialogue requester, there will be an icon of the selected name on the Workbench. Using this icon, you can access the other computer's directory just as if the directory on the other computer was a disk in your floppy drive.

If you have not encountered any problems so far, you will find more information about the configuration of ENVOY in the separate ENVOY manual.

Once you have successfully installed ENVOY on your hard disk or floppy disk, all you need to configure ENVOY will be the ENVOY configuration programs found in the *Configuration* drawer.

Repeating the installation in order to correct mistaken answers to questions asked during the installation process usually is not necessary. All necessary changes can be made using the ENVOY configuration programs, too.

In case that up to this point not everything has worked, please check potential error sources as described in the *Finding Errors* section.

6.2 Installation without Envoy

If ENVOY has already been installed *correctly* on your computer, or if you only want to use the ARIADNE with a networking protocol other than ENVOY, for example with *AmiTCP* only, it will be faster and simpler to install the ARIADNE drivers using the *DriversInstallation* script.

This installation script will install the two network drivers *ariadne.device* for Ethernet and *ariadneliana.device* for Liana in the *devs:Networks* directory. The *ariadnepar.device*, which is used to access the parallel ports of the ARIADNE, will be copied to the *devs:* directory. The *UseAriadnePar* und *SanaIIDevStat* programs are copied to directories specified by you.

7. Envoy Configuration

This section helps you through the important steps of a *simple* ENVOY configuration using *ariadne.device*.

Given this information, you will learn how to check and understand the configuration you created running the installation script. You can also correct a faulty configuration by taking the configuration steps presented here.

In case you have some trouble with an ENVOY network, it will be useful to set up a simple configuration first, too. Once this one works, it can be turned into a more complex configuration again step by step.

All the ENVOY configuration programs mentioned here can be found in the *Configuration* drawer within the *Envoy* drawer.

7.1 Network Configuration

The *Network Configuration* program is the most important one. Running it, you can set your computer's network name and address and choose what network hardware to use. You thus ensure data can be exchanged through the network at all.

The program features a number of different configuration pages you can flip through using the browsing symbol found in the upper left corner.

The following illustrations and explanations will demonstrate how to set up a simple configuration.

Host Configuration

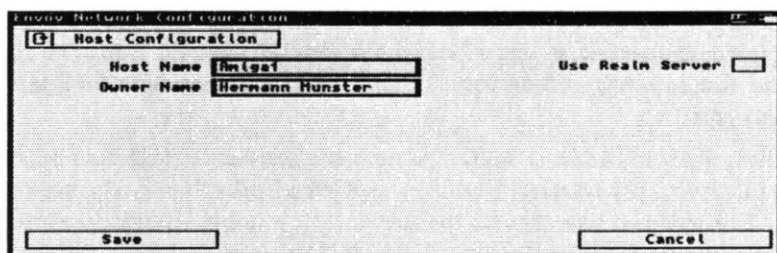


Figure 3: The *Host Configuration* Page

On the *Host Configuration* page, the name of the computer is most important. The name entered in the *Host Name* field must differ from the names of all

other computers connected to the network. The name may have up to 31 characters and must not include a colon. You should also avoid any special characters (e.g. umlauts or accented letters). Please switch off the *Use Realm Server* option.

Device Configuration

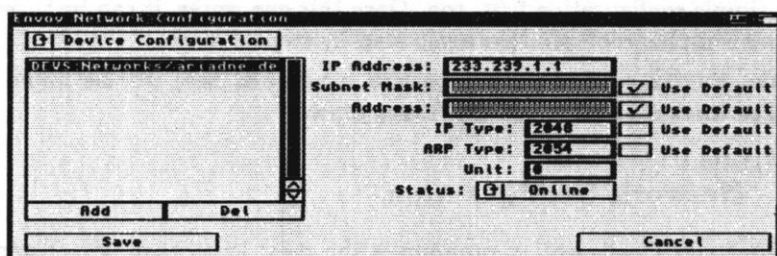


Figure 4: The *Device Configuration* Page

On the *Device Configuration* page you tell ENVOY which SanaII drivers and thus which hardware to use. All network hardware that is to be used with ENVOY will need a SanaII driver as an interface between ENVOY and the hardware. For the ARIADNE this driver is called *ariadne.device* and should be located in the *devs:Networks* directory.

In the left list, you can see the drivers that have already been mounted. In a simple configuration, only the *devs:Networks/ariadne.device* driver should be present there. Remove any other drivers if necessary. In case you want to use a number of different drivers at the same time, you will have to perform a complex configuration as described in the ENVOY manual. You should still set up the simple configuration first, though. It is a prerequisite for the complex configuration.

The first field, *IP Address*, holds the network address of your computer for the current driver. The network address is divided into four parts, separated by dots. The last part usually sets the computer's number within the network, the first three parts describe the network itself. For a simple configuration, the first three parts of the network address need to be identical for all the computers connected to the simple network. The last part, however, has to be different for all computers in the network. In a simple configuration, you could use the network address 233.239.1.1 for the first computer, 233.239.1.2 for the second computer etc., for example.

IP Type should be set for 2048 for *ariadne.device*, *ARP Type* should be set to 2054.

As an important step, be sure to switch the driver to *Status: Online*, or else nothing will happen at all.

Configure the other fields according to the illustration.

Gateway Configuration

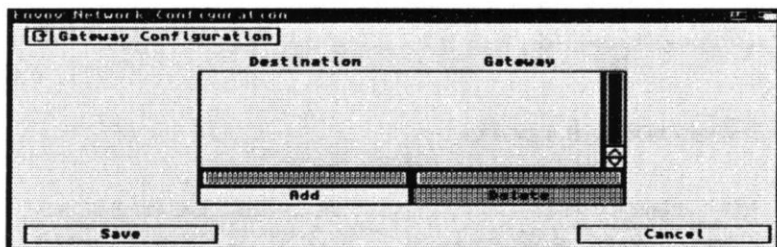


Figure 5: The *Gateway Configuration* Page

For a simple configuration, there is nothing that needs to be entered on the *Gateway Configuration* page.

There are no other pages of the *Network Configuration* program for a simple configuration.

7.2 Services Configuration

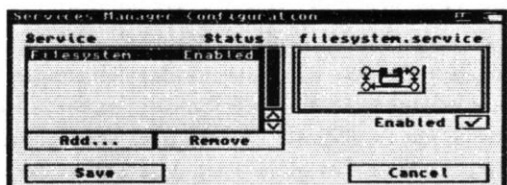


Figure 6: The *Services Configuration* Program

Using the ENVOY configuration program *Services Configuration* you tell *Services Manager* which services ENVOY is to export. As an example, *filesystem.service* is the service used to export directories on your computer to other computers.

For a simple configuration, `filesystem.service` needs to be mounted on both computers. To do so, click the *Add* switch and in the file requester that opens, find the *Services* drawer within the *ENVOY* drawer to choose the `filesystem.service` file.

Here, it is very important to give an absolute path to the `filesystem.service` file. That is, the path needs to contain a colon, as in `SYS:Envoy/Services` or `Work:Envoy/Services`. If an absolute path is missing, *Services Manager* might not be able to find `filesystem.service` anymore at a later stage. You will also have to repeat this procedure any time you move or rename the *ENVOY* drawer. After mounting the service, turn it on using the *Enabled* option.

7.3 Filesystem Exports

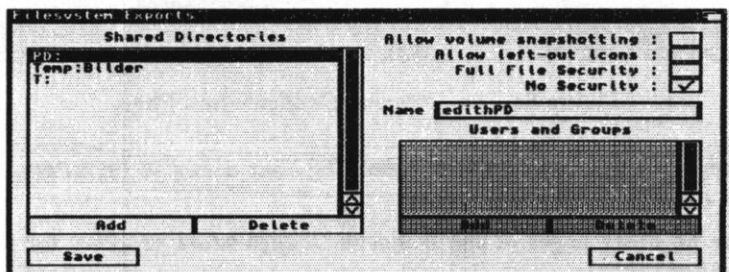


Figure 7: The *FileSystem Exports* Configuration Program

Using the *FileSystem Exports* configuration program, you teach `filesystem.service` the drawers you want to export to other computers.

In case a “*Could not open library accounts.library*” error message appears on starting *FileSystem Exports*, you will have to start *Accounts Manager* first. If this program already is placed in the *WBStartup* drawer, it should have been started during the most recent reboot. Please check the *Accounts Manager* tool types, using *Workbench*. The *GroupDB* tool type has to be set to the path of the *GroupData* file, and the *UserDB* tool type has to be set to the *UserData* file. Both files usually are located in the *Accounts* drawer within the *Envoy* drawer. In case your *Envoy* drawer is the *SYS:Envoy* drawer, for example, the tool types should be set to the following:

```
GroupDB=SYS:Envoy/Accounts/GroupData
UserDB=SYS:Envoy/Accounts/UserData
```

If *Accounts Manager* is not yet running, please start it now. You should then be able to run *FileSystem Exports*.

In the left list, add any directory you want to export. You will have to assign a name to each directory, e.g. you could assign the name *edithPD* to the *PD:* drawer of the computer called *edith*.

At first, use the *No Security* option when activating all the directories, in order to avoid access rights as a potential source of problems.

Now save your changes and reboot your Amigas.

Now, you should be able to import the directories you selected for export in *FileSystem Exports* on the other computer using *FileSystem Imports*.

8. Ethernet

This chapter is meant to shed a little light on the multitude of names and terms surrounding Ethernet.

History

Originally, Ethernet was developed by Xerox in the 70s. They set up a network system capable of 2.94 Mbps, connecting 100 work stations using a cable that was one kilometer in length. This system was called Ethernet after the *light ether* that was once supposed to be the medium light propagates in.

The Xerox Ethernet was so successful that Xerox, DEC and Intel created a 10 Mbps Ethernet standard. This standard is the base for the IEEE 802.3 norm, which today serves as a basis for local networks.

How does Ethernet work?

Ethernet uses the CSMA/CD (*Carrier Sense and Multiple Access with Collision Detection*) principle. This is based on a simple idea:

Whenever a station is ready to send, it listens in to the cable connection. If the connection is busy, the station will wait until it is free, otherwise it will send immediately. If two or more stations try to send data to a free cable simultaneously, there will be a collision. Each of the stations will then stop its attempt to send and waits a random time before repeating the attempt. All stations are able to simultaneously receive the data that has been sent.

The TCP/IP tutorial in the *RFC-1180* has a good description of this:

A good analogy of Ethernet technology is a group of people talking in a small, completely dark room. In this analogy, the physical network medium is sound waves on air in the room instead of electrical signals on a coaxial cable.

Each person can hear the words when another is talking (Carrier Sense). Everyone in the room has equal capability to talk (Multiple Access), but none of them give lengthy speeches because they are polite. If a person is impolite, he is asked to leave the room (i.e., thrown off the net).

No one talks while another is speaking. But if two people start speaking at the same instant, each of them know this because each hears something they haven't said (Collision Detection). When

these two people notice this condition, they wait for a moment, then one begins talking. The other hears the talking and waits for the first to finish before beginning his own speech.

Each person has a unique name (unique Ethernet address) to avoid confusion. Every time one of them talks, he prefaces the message with the name of the person he is talking to and with his own name (Ethernet destination and source address, respectively), i.e., "Hello Jane, this is Jack, ...". If the sender wants to talk to everyone he might say "everyone" (broadcast address), i.e., "Hello Everyone, this is Jack, ...".

Naming Conventions

Ethernet is based on the IEEE 802.3 norm for local networks. This norm defines a number of networking standards running at speeds of 1 to 10 Mbps (million bits per second), using different media. The only ones interesting for the ARIADNE are the 10 Mbps norms, and of these most of all *10BASE2* and *10BASE-T*. The 10 in the name signifies that these are based on 10 Mbps transmission speed. *BASE* symbolises the use of base band transmission, i.e. each signal requires the whole of the cable.

The name *Ethernet* precisely only stands for the *10BASE5* norm. 5 in this gives the maximum cable length of 500 meters. The cable connection is a data bus all stations are connected to. Usually, *10BASE5* uses a cable of about a finger's diameter with fourfold interference isolation, nick-named "*Thick Ethernet*". This cable is similar to a yellow¹ gardening hose that has marks on it in a certain pattern, signifying where branches can be placed. At these marked places, so-called Transceivers, also known as MAU, for Medium Attachment Unit, can be placed "vampire style". There is a multi-line branch cable leading from the Transceiver to the computer, usually ending in a 15 pin Sub-D socket.

There is a cheaper version of *10BASE5*, called *10BASE2* or *Cheapernet*, which is designed for use with a cable of up to 185 meters (hence the suffix 2). This is the most commonly used Ethernet variant and is therefore often mistakenly called "Ethernet" itself. *10BASE2* uses 50 Ω coaxial cables called RG58. These cables are much thinner than Thick Ethernet, and are thus often called "*Thin Ethernet*". *10BASE2* does not require an external Transceiver, the coaxial cables can be directly connected to the Ethernet board, by use of a 'T' piece. The ARIADNE features a *10BASE2* connector.

¹yellow cable is not necessarily demanded by the 802.3 norm, but strongly suggested

The third version is called *10BASE-T*, with 'T' standing for *twisted pair*. As hinted at by the name, *10BASE-T* does not use a coaxial cable, but a cable with lines twisted in pairs, similar to the one used for telephone connections. The plugs (RJ45) of the cables look very similar to the Western plugs of American phones, while featuring more pins. In addition, *10BASE-T* is always set up as a star-shaped topology, with a *Repeater* in its centre. Multiple *Repeaters* can also, depending on the network expansion, be linked by "backbone connections". The ARIADNE also features a *10BASE-T* connector.

9. SanaIIDevStat

The *SanaIIDevStat* program allows for a diagnostic supervision of the network connections. To do so, it displays miscellaneous statistical data and information about the device. You can simply start the program by double clicking its icon, or from the shell. You can specify the following parameters from the Shell or by entering them as *tool types* into the icon:

- DEVICE** Name of the SanaII compatible network driver to examine.
Example: `DEVICE=devs:Networks/ariadne.device`
- UNIT** Driver unit number to examine.
Example: `UNIT=0`
- PUBSCREEN** Name of a public screen to open the *SanaIIDevStat* window on.
- FONT** Name of the text font to use for the *SanaIIDevStat* window.
Example: `FONT=times.font`
- FONTHEIGHT** Height of the text font that is to be used for the window.
Example: `FONTHEIGHT=13`

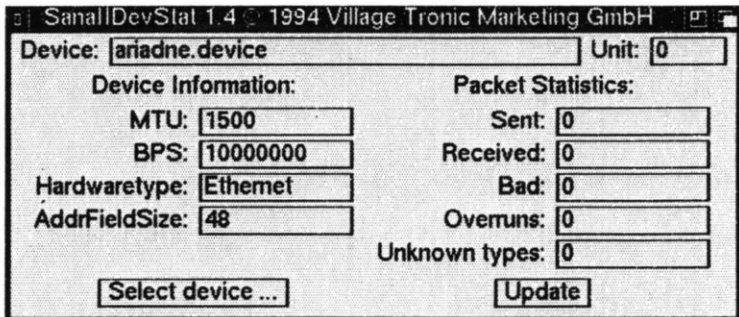


Figure 8: The *SanaIIDevStat* Window

After starting it, the program will open a window. At the top, the name of the examined SanaII device and its unit number will be stated. Below this, you can find general information about the device to the left, and current packet statistics to the right. You can use the *Update* gadget to have the statistical data re-calculated, and choose another SanaII compatible networking device with the *Select device* gadget.

Measurement units used:

MTU	Maximum Transmission Unit – max. unit for transmission, in bytes.
BPS	Bits Per Second – max. transmission speed, in bits per second.
Hardware type	Type of the hardware.
AddrFieldSize	Size of the address field, in bits.
Sent	Number of sent data packets.
Received	Number of received data packets.
Bad	Number of faulty data packets received. Depending on the device, this number may have a slightly different meaning. The <i>ariadne.device</i> will increase this value if a packet that has been received is suspected to be faulty (e.g. if the CRC is wrong).
Overruns	Number of times the receive buffer has been overrun. This number may have a different meaning, depending on the device, too. For the <i>ariadne.device</i> , this value is increased, if there was no spare receive buffer for a packet.
Unknown types	Number of received packets of unknown type.

10. ariadne.device Configuration

Using a configuration file, you can tell *ariadne.device* whether to use the *10-BASE2* or the *10-BASE-T* connector, or if it is supposed to auto-sense the connector that is used.

In case you do not use a configuration file, the ARIADNE will try to automatically sense the connector that is to be used.

If the automatical detection at some stage does not function properly, you can use the configuration file to manually select the desired connector.

Naming

The configuration file is expected to be in the *ENV:Sana2* directory. Its name is made up of the device name, a number and the suffix *.config*. The number is dependent on the unit number of the ARIADNE that is used (as far as the software goes, you could use ten ARIADNE boards in one computer).

The *ariadne.device* thus will process the *ENV:Sana2/ariadne0.config* configuration file for the first ARIADNE, *ENV:Sana2/ariadne1.config* for the second ARIADNE, etc.

Creating a Configuration File

You can create the configuration file with the Shell command *setenv*, for example. Open a Shell and type in the following:

```
setenv Sana2/ariadne0.config 10BASET
```

This will create the file *ENV:Sana2/ariadne0.config*. You can examine its contents by typing:

```
Type env:Sana2/ariadne0.config
```

To have this file copied to the *ENV:* directory upon each reboot of your computer, you will also have to create this file in the *ENVARC:Sana2* directory. For this, use the following two command lines:

```
makedir ENVARC:Sana2
copy ENV:Sana2/ariadne0.config ENVARC:Sana2
```

Configuration parameters

ariadne.device is familiar with the following configuration parameters:

10BASE2 The *10BASE2* connector is to be used.

10BASET The *10BASE-T* connector is to be used.

11. The Parallel Ports

In addition to the Ethernet connectors, the ARIADNE features two more parallel connectors. The first of these is available directly on the slot cover of the ARIADNE, the other one is only available internally and will need another slot cover to make it accessible from the outside. These parallel connectors are used with the *ariadnepar.device*: Unit 0 for the first parallel port, unit 1 for the second.

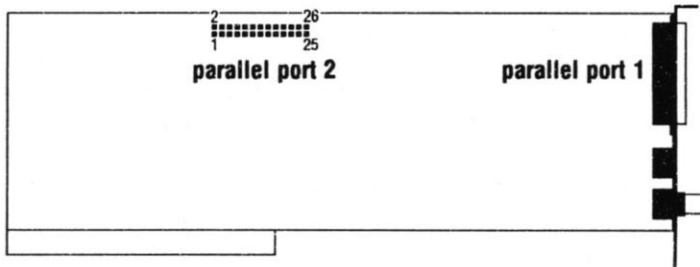


Figure 9: Position of the Parallel Ports on the ARIADNE

The *ariadnepar.device* is compatible to the *parallel.device*, which is used to access the Amiga's built-in parallel port. To use the ARIADNE ports instead of this one, you will have to re-configure your programs for use with the *ariadnepar.device*. Some softwares offer special setup options to do. For exceptions from this rule, the *UseAriadnePar* utility is included, which will be described below.

11.1 Printing with the Ariadne

Often, the parallel ports are used to connect a printer. Ideally, all programs should be using the *printer.device* for printing, without directly accessing the *parallel.device*. The *printer.device* will perhaps send data on to a printer driver, processing it especially for your printer model. All data is then sent from the the *printer.device* to the *parallel.device*, which will send it all to the printer.

Starting with a particular version of *printer.device*, it is possible to have it send data to any *parallel.device* compatible device. The *printer.device* that is included on the ARIADNE installation disk offers this option. It has been automatically installed during installation.

To use a printer with the parallel connector of the ARIADNE, you just have the *printer.device* send data to the *ariadnepar.device* instead of the *parallel.device*.

To do so, two printer preferences presets are included that will use the *ariadnepar.device*.

The device the printer output is sent to will not be displayed by the *Printer* preferences program, and cannot be changed using its user interface. You will have to load one of our prepared presets, and then re-set your own preferences in the printer preferences program once again, and save them. If you set the *UNIT tool type* in the printer preferences icon or specify that parameter when starting it from the Shell, you will at least be able to set the unit of the device that is to be used for printing.

To tell *printer.device* to use the *ariadnepar.device* for output, do as follows: start the preferences program *Printer* from the *Prefs* drawer of the Workbench. Choose "Open ..." from the *Project* menu. You will see a file requester, which you can use to select and load one of the supplied presets from the *Prefs/Presets* directory on the installation disk. You can now set the remaining printing parameters as you desire, and finally save the setting by using the "Save" gadget.

A tip for experts: Typing type `Env:Sys/Printer.prefs HEX`, you can check whether the *printer.device* really uses the *ariadnepar.device*. At the end of the file, there should be the abbreviation *PUNT*, followed by the text *ariadnepar*. This means that the preferences file for the *printer.device* includes a so-called *PUNT* chunk, specifying the device that is to be used.

11.2 UseAriadnePar

Unfortunately, not all programs can be configured to using the *ariadnepar.device* this way. These programs can be tricked into it by using the *UseAriadnePar* utility. Using this program, you can have each program that is opening the *parallel.device* open the *ariadnepar.device* instead, without the program noticing. Of course the *printer.device* itself can also be fooled that way.

There also is a disadvantage to this method, however: the *parallel.device* cannot be used anymore, as all accesses to the *parallel.device* are redirected to the *ariadnepar.device*. Only when you remove the *parallel.device* replacement again will you be able to use the *parallel.device*, and thus use a printer connected to the internal parallel port of the Amiga.

UseAriadnePar can simply be started by double clicking its icon. You will see a dialogue requester telling you if redirection has been installed or removed.

UseAriadnePar also sets itself up as a *Commodity*. Thus you can also use the *Exchange* program to quit or deactivate it. *Exchange* can usually be found in the *Commodities* drawer of your Workbench. When you start this program,

you will see a list of all currently running commodities. Choose *UseAriadnePar* from this list. Using the "Remove" gadget you can remove *UseAriadnePar*, or you can temporally turn off redirection using the "Active" gadget.

You can specify the following *UseAriadnePar* parameters in the Shell, or enter them as *tool types* into the icon:

UNIT	Using this parameter, you can choose which parallel port of the ARIADNE to redirect to. Unit=0 uses the first parallel port. This is the default as well. Specifying Unit=1, the second parallel port is used. In case you have more than one ARIADNE installed in your computer, you can reach the first parallel connector of the second ARIADNE by using Unit=2, the second by using Unit=3, etc.
INSTALL	This parameter is used to specify that redirection is to be installed. In case it already is installed, nothing will happen.
REMOVE	This parameter is used to specify that redirection is to be removed. In case it already has been removed, nothing will happen.
QUIET	Using this switch, all output and dialogue requesters of <i>UseAriadnePar</i> are turned off.

If neither of the INSTALL and REMOVE parameters is used, redirection will be installed if it had not been installed previously, and removed if it had been installed.

If It Still Won't Work...

There also are some programs that directly access the internal parallel port of the Amiga. This includes scanner software, parallel port SCSI controllers, and digitisers. It is hard to say which particular programs these will be. Even by using *UseAriadnePar*, you will not be able to have these programs use the ARIADNE's parallel ports. Programs that are in this way directly accessing the hardware cannot be redirected.

11.3 The Second Parallel Port

To get to the second parallel port of the ARIADNE from the outside, you will need a slot cover with a 25 pin Sub-D socket mounted on it. The Sub-D socket

must be connected to a 26 pin connector (DIN 41651) suitable for the one on the board. You will be able to buy a slot cover like this from you computer dealer or directly from us.

Please make sure you attach the 26 pin connector to that on the ARIADNE in the right orientation, as otherwise you might cause damage to the device you want to connect to that parallel port!

You will have to connect pin one of the 26 pin connector to pin one of the ARIADNE connector. You can find out the position of pin one of the ARIADNE connector from illustration 9. Pin one of the 26 pin connector usually can be spotted from the cable: one of the cable's lines will have a different colour. This line is connected to pin one. Now attach the connector in a way so that the differently coloured line is pointing *away* from the ARIADNE slot cover.

11.4 Liana

LIANA is the soft and hardware you need to quickly and easily network together two Amigas using the parallel port. The ARIADNE already comes with the *ariadneliana.device*, which can be used to access the ARIADNE's parallel ports. All you will need now is the special LIANA cable and a LIANA device for the second Amiga. LIANA is available for the internal parallel port found on every Amiga model, the parallel ports of the ARIADNE, and those of the *VECTOR Connection* interface board made by HK Computer, Cologne, Germany. All this software is included in the LIANA package available from us.

ARIADNE and LIANA make a beautiful team: Using the ARIADNE, you can include an Amiga in a fast Ethernet network. At the same time the ARIADNE, with its two additional parallel ports, offers you the chance to add two more Amigas, unequipped with Ethernet boards, to the network using LIANA. And still the internal parallel port of your Amiga remains free for continued use with a printer, for example.

12. Finding Errors

In this part of the manual, standard errors and their solutions are described, and many tips for finding errors are given. If you encounter any problems, go through this list, and remove all the sources of errors that are mentioned.

One first tip: when encountering problems, always first try to go back to the most simple installation and configuration, to thus minimise the number of potential error sources.

Also avoid having other, potentially faulty programs disturb ENVOY. For testing, rename your *User-Startup*, and do not start any other programs than *Services Manager* and *Accounts Manager* from your *WBStartup* drawer.

- Make sure the physical network connection is alright. Do you use the right connectors? Is the *10BASE-T* plug properly connected to the socket? For *Cheapernet*, you must use a 'T' connector, and must not directly connect the coaxial cable to the ARIADNE. Have the Ethernet cables been properly connected to the 'T' piece? Is the network terminated on both ends?
- For *Cheapernet*: Have all remaining ends of 'T' connectors been properly terminated? You will need 50Ω terminating resistors to do so, just like the one the ARIADNE comes with. The Arcnet terminators look similar, but use a different resistance!
- Are you using the right cables? The *Cheapernet* cables look exactly the same from the outside as Arcnet cables, but they have a different wave resistance and are called RG58.
- For *Twisted Pair* connections LED1 is always lit. In case it is not lit, data cannot be sent using twisted pair connections.
- ENVOY requires AmigaOS version 2.04 or above. Your Kickstart and Workbench must at least be version 37. Check this by using the *About* or *Version* menu item of the Workbench.
- Have all files been installed on your Workbench disk or hard drive, and are they still there? Check if all the files listed in the *List of Files* section are there.
- Have the *Services Manager* and *Accounts Manager* programs been started, and are they running? The "Could not open library accounts.library" error message usually appears if *Accounts Manager* is not running. If necessary, copy these programs to the *WBStartup* drawer, and start them.

- Almost every change in the ENVOY configuration or that of a SanaII driver will only become effective after a reboot. If necessary, reboot your computer.
- Check the tool types of the *Accounts Manager*: do the *GroupDB* and *UserDB* tool types exist? Are they pointing to existing files? If necessary, create new *Accounts Manager* database files (see ENVOY manual).
- Do the *ENV:Envoy* and *ENVARC:Envoy* directories exist? Do they at least contain the *nipc.prefs* and *services.prefs* files? If this is not the case, better install ENVOY once again. If you want to export directories or a printer, the *efs.config* and *printerezport.config* files must be present, too.
- If exporting a service does not work, delete that service from the list of services in *Services Configuration* and add it again using an absolute file path. Check the service configuration settings, e.g. in *Filesystem Exports*.
- Generally compare the ENVOY configuration on the various computers. If the network address of all computers is not the same in the first three components, the computers will not find one another, except for if you have configured a realm server. Also, the last component of the network address and the name of all the computers in the network must be different. None of the computers' names must include a colon (:), slash (/) or special character (e.g. umlauts or accented letters). When in doubt, use short, simple names.
- Use the *SanaIIDevStat* program to test if packets are sent and received at all. The *Sent* and *Received* counters must not be zero.

For networking connections using the parallel port of the ARIADNE via LIANA, you will find more tips for finding errors in the LIANA manual.

A List of Files

The installation will copy the following files to your hard drive or Workbench disk:

```
c:Group
c:Owner
devs:envoyprint.device
devs:Networks/ariadne.device
devs:Networks/ariadneliana.device
devs:ariadnepar.device
libs:accounts.library
libs:envoy.library
libs:nipc.library
libs:services.library
l:EnvoyFileSystem
SYS:WBStartup/Accounts Manager.info
SYS:WBStartup/Accounts Manager
SYS:WBStartup/Services Manager.info
SYS:WBStartup/Services Manager
```

A drawer called Envoy will be created in a drawer specified by you, containing the following files:

```
Envoy/Configuration/Users.info
Envoy/Configuration/Users
Envoy/Configuration/Services Configuration.info
Envoy/Configuration/Services Configuration
Envoy/Configuration/Printer Import.info
Envoy/Configuration/Printer Import
Envoy/Configuration/Printer Export.info
Envoy/Configuration/Printer Export
Envoy/Configuration/Network Printing.info
Envoy/Configuration/Network Printing
Envoy/Configuration/Network Configuration.info
Envoy/Configuration/Network Configuration
Envoy/Configuration/Groups.info
Envoy/Configuration/Groups
Envoy/Configuration/Filesystem Imports.info
Envoy/Configuration/Filesystem Imports
Envoy/Configuration/Filesystem Exports.info
```

Envoy/Configuration/Filesystem Exports
Envoy/Configuration/Envoy V37 PrintStart
Envoy/Services/Services Manager.info
Envoy/Services/Services Manager
Envoy/Services/printspool.service.info
Envoy/Services/printspool.service
Envoy/Services/filesystem.service.info
Envoy/Services/filesystem.service
Envoy/Accounts/Accounts Manager.info
Envoy/Accounts/Accounts Manager
Envoy/SanaIIDevStat
Envoy/SanaIIDevStat.info

The following files will be created by the installation script:

ENVARC:Envoy/efs.config
ENVARC:Envoy/importprinter.config
ENVARC:Envoy/nipc.prefs
ENVARC:Envoy/printerexport.config
ENVARC:Envoy/services.prefs
Envoy/Accounts/UserData
Envoy/Accounts/GroupData

The following files will be copied by the installation script if there are older versions found on your hard drive or Workbench disk:

c:Copy
c:List
c:Mount
c:Protect
c:SetPatch
devs:parallel.device
devs:printer.device
l:port-handler
SYS:Prefs/Printer
SYS:Prefs/Printer.info

B Technical Specifications

Network drivers

The *ariadne.device* was developed following the specifications set down in the "SANA-II Network Device Driver Specification Rev 2.0" document of 14 February 1994.

The following specifications will be interesting for software developers wanting to use SanaII drivers.

Hardware type: S2_WireType_Ethernet = 1

Packet types: Packet type numbers for Ethernet are assigned by:

Xerox Corporation
Xerox Systems Institute
475 Oakmead Parkway, Sunnyvale, CA 94086
Attn: Ms. Fonda Pallone
(408) 737-4652

Some known packet type numbers:

Decimal	Hex	Description
0	0000-05DC	IEEE 802.3 size entry
2048	0800	TCP/IP - IP
2054	0806	TCP/IP - ARP
32821	8035	TCP/IP - RARP
32923	809B	Appletalk
33011	80F3	AppleTalk AARP (Kinetics)
33100	814C	SNMP
33079	8137-8138	Novell, Inc.

Multicast: Supported.

Broadcast: Supported.

Connectors

The ARIADNE features the following five connectors:

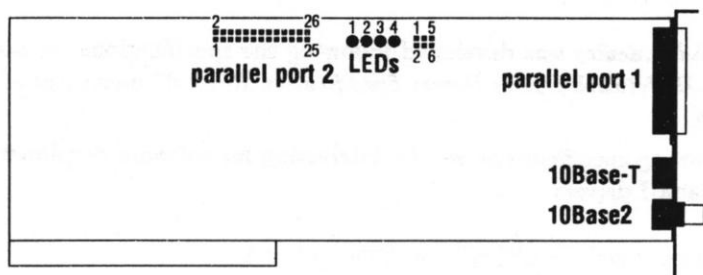


Figure 10: Connectors on the ARIADNE

25 pin Sub-D socket First parallel port (port 1), accessed by *ariadnepar.device* unit 0 for the first ARIADNE, *ariadnepar.device* unit 2 for the second ARIADNE, etc. Pin layout given below.

BNC socket For *10BASE2/Cheapernet* connection, using a 'T' connector and 50Ω coaxial cables (RG58).

8 pin Western socket For *10BASE-T/Twisted Pair* connection, using an 8 pin Western plug and twisted pair cables.

25 pin connector, internal Second parallel port (port 2), accessed by *ariadnepar.device* unit 1 for the first ARIADNE, unit 3 for the second ARIADNE, etc. Pin layout given below.

6 pin connector, internal For connecting four control LEDs, which are connected parallel to the LEDs already found on the ARIADNE. LEDs are connected via GND and share V_{cc} as their common connection. Pin layout given below.

Pin layout of the LED connector

Pin	Signal	Description
1	LED1	Twisted pair MAU link status
2	LED2	
3	V_{cc}	Collision
4	LED3	
5	V_{cc}	Receive status
6	LED4	

Pin layout of the parallel connectors

Signal	Pin layout Amiga 25 pin Sub-D socket	Pin layout Ariadne port 1 25 pin Sub-D socket	Pin layout Ariadne port 2 26 pin connector
STROBE	1	1	1
D0	2	2	3
D1	3	3	5
D2	4	4	7
D3	5	5	9
D4	6	6	11
D5	7	7	13
D6	8	8	15
D7	9	9	17
ACK	10	10	19
BUSY	11	11	21
POUT	12	12	23
SEL	13	13	25
+5Volts	14	14	2
NC	15	15	4
RESET	16	16	6
GND	17	17	8
GND	18	18	10
GND	19	19	12
GND	20	20	14
GND	21	21	16
GND	22	22	18
GND	23	23	20
GND	24	24	22
GND	25	25	24
NC	—	—	26

C Glossary

10BASE2 — Also known as *Cheapernet*. This is a networking standard for transmission speeds of 10 Mbps, on a 50 Ω coaxial cable of up to 185 meters in length, called RG58. A maximum of 30 stations can be connected. This norm is defined in section 10 of the ISO/IEC 8802-3:1990 (ANSI/IEEE std. 802.3). ARIADNE connection is done using the BNC socket.

10BASE5 — This networking norm for transmission speeds of 10 Mbps uses a 50 Ω coaxial cable of up to 500 meters. It is based on the original Ethernet norm by DEC, Intel and Xerox. A maximum of 100 stations can be connected. This norm is defined in section 8 of the ISO/IEC 8802-3:1990 (ANSI/IEEE std. 802.3). *10BASE5* is not directly supported by the ARIADNE.

10BASE-T — Also known as *Twisted Pair Ethernet*. This networking norm for transmission speeds of 10 Mbps using a cable with pairwise twisted lines uses direct connections between a *Repeater* and the computer. There are no definitions for the maximum number of stations involved. The maximum cable length is 100 meters. This norm is defined in sections 13 and 14 of the IEEE standards 802.3i-1990 (Addition to ISO/IEC 8802-3:1990 (ANSI/IEEE std. 802.3)). ARIADNE connection is done using the Western socket.

802.3 — IEEE standard 802.3 describes a whole number of networking norms for various speeds and media.

Arcnet — A networking hardware. Arcnet cables and terminators are not compatible to Ethernet, even though they look similar.

Ariadne — Character from Greek mythology: Ariadne, daughter of Minos, helps Theseus find his way out of the Labyrinth, escaping from the Minotaurus. She gives him a roll of thread he unrolls on his way through the Labyrinth, so that he can find his way back to the entrance.

ARP — Address resolution protocol. A mechanism allowing to assign a logical address to a hardware address.

Bit — A single binary digit (1 or 0).

Cheapernet — See *10BASE2*.

Coaxial cable — Type of cable with especially good interference protection. *Cheapernet* uses coaxial cables with a wave resistance of 50 Ω , known as RG58.

CSMA/CD — “Carrier Sense and Multiple Access with Collision Detection”. The Ethernet transmission system. All stations receive simultaneously, but only one may send without causing a collision.

Device — On the one hand, devices can be physical devices, on the other hand they can be the software representation of a physical device, e.g. in the form of so-called device drivers.

Envoy — Commodore networking software.

Ethernet — General term for a number of networking norms defined in IEEE Standard 802.3.

Filesystem — A filesystem contains files that are stored in a certain way.

Hardware address — A number that is set by the hardware of a networking adaptor. For *Ethernet*, each of the stations must have a different hardware address.

Host — Another name for a computer that is part of a network.

IEEE — “The Institute of Electrical and Electronics Engineers”. A global organisation of electrical engineers and computer scientists, with its headquarters in the USA. Except for funding of research and information exchange between its members, the IEEE is much concerned with creating technical standards. The name is pronounced “*I triple E*”, by the way.

Installer — Commodore standard installation program.

Login — Process during which users identify themselves to the computer by entering their name and password.

Mbps — “Million bits per second”. Speed unit for data transmission.

Parallel port — A connector that is transmitting data in Bytes (8 bits), contrary to serial ports, which transmit data bit by bit. The ARIADNE features two parallel ports: one directly accessible on the slot cover, the second available as an internal connector which can optionally be connected to a second slot cover featuring a parallel socket.

Path — A path contains the name of the drive, the directory and the sub-directories defining the position of a file.

Repeater — A device necessary to expand the physical network topology by connecting multiple cable segments. Ethernet allows for a maximum of four Repeaters on a path between two stations. If a Repeater is receiving data from one of its connections, it will send it on to all its other connections.

In a *10BASE-T* network, the Repeater is the central point of the star-shaped topology.

RFC — “Request for Comment”. RFCs are texts that usually describe standards concerning the Internet. For example, *RFC-1180: “A TCP/IP Tutorial”* is an introduction to *TCP/IP*.

Sana-II — Standard for software drivers of networking hardware, defined by Commodore.

Shell — Command line oriented user interface of the Amiga.

‘T’ connector — The ‘T’ connector is attached to the BNC socket of the ARIADNE. To the two connectors of the ‘T’ piece that are still unused, a coaxial cable each or a coaxial cable and a terminating resistor are connected.

TCP/IP — The TCP/IP networking software. The general term TCP/IP usually means all protocols and standard programs (e.g. ftp, telnet) that are related to the special protocols TCP (*Transmission Control Protocol*) and IP (*Internet Protocol*).

Terminating resistor — Also known as *terminator*. If a cable is used as a bus system featuring a carrier signal, both ends of the cable have to be terminated with a resistor in order for the signal to be properly detected. *10BASE2* uses 50 Ω resistors as terminating resistors.

Tool types — Parameters that can be entered into an icon by using the “Information” menu item of the Workbench. These will control the program the icon belongs to.

Twisted pair — “Cable with pairwise twisted lines.”. See *10BASE-T*.

Wave resistance — Physical propriety of a cable, important for correct data transmission.

Western socket — The *10BASE-T* connector of the ARIADNE is an 8 pin Western socket.

Western plugs — These plugs are used to connect *10BASE-T* cables, they are called RJ45.

Zorro — The Amiga expansion slots are called *Zorro* slots. The Amiga 2000 features *Zorro II* slots, the Amiga 3000 and Amiga 4000 models feature the more recent *Zorro III* slots, which are downwards compatible with *Zorro II*. The ARIADNE is a *Zorro II* board and can thus be used in all Amigas that offer *Zorro II* or *Zorro III* slots.

D Contact Address

If you have problems or questions about the software, please first try to find a solution by using this manual and the ENVOY manual. If this is impossible, first contact the dealer that sold you this product. If they cannot help you either, please contact the following address:

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THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

PHYSICS 311

LECTURE 1

LECTURE 1: INTRODUCTION

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Envoy



Installation Manual for the Commodore Networking Software

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1. General Issues

The powerful Commodore networking software *Envoy* is offering an easy-to-use and comfortable user interface for networked Amigas with operating system version 2.04 or above. It will work with any hardware supporting Commodore's *SANA II* standard.

Using *Envoy*, it is possible to use filesystems (hard disks, CD-ROMs, etc.) of all other Amigas present in the network. Printing through the net is possible, too. Thanks to the peer to peer concept, all the Amigas in the net possess equal rights. Each of the Amigas may offer services, as well as accept them.

More and more software is supporting *Envoy*. This includes freely distributable software, too. Using Stefan Becker's *ToolManager*, for example, you can start programs on other computers. The *Universal Message System (UMS)* by Martin Horneffer and various other authors allows sending electronic mails through the network.

2. Software Installation

The *Envoy* software is distributed on disk. First, you should make backup copies of all disks. Keep the original disks in a safe place. The copies should be write protected, too. The copies should have the same names as the original disks. Therefore, you might have to rename the copies. From now on, you should only work with the copies.

If you have already installed another networking software, you should delete it now in its entirety, except for the *SANA II* driver, to avoid conflicts between the different filesystems.

The *Envoy* disk only includes the Ethernet (A2065) and ArcNet (A2060) board drivers developed by Commodore. You will thus have to copy the *SANA II* driver for your hardware to your Workbench into the **DEVS:Networks/** directory in advance. This might be done by hand with the **Copy** command, or using a separate installation script.

Envoy installation is performed using the Commodore Installer program. The software needs to be installed on every single Amiga in the network before the network can be used.

During installation, various libraries, devices and device drivers *Envoy* cannot work without will be copied to the system disks or hard drive. Furthermore, configuration files will be created that could be put together manually and copied to the right places only with a lot additional effort.

2.1. Floppy Disk Installation

At least one of the Amigas linked to the network should be equipped with a hard drive to make serious work possible. Still, it is very much possible and useful to connect floppy disk only systems to the network. These computers can then take advantage of the peripherals of the other computers.

For floppy disk installation, you should first make a copy of the original Workbench disk. In this, it is important that you use the original Commodore system disk (2.04, 2.1 or 3.0, depending on what operating system version you use). It is not recommended to install *Envoy* onto a custom, modified Workbench disk, as the installation script will have to delete some files from that disk to make room for the *Envoy* software. It

is very likely that on a modified Workbench disk not enough room can be made, resulting in problems.

Now, you should reset the computer, and then boot off the copied Workbench disk. When ready, floppy disk installation can be performed by double clicking the "Install Floppy" icon on the "EnvoyInstall" disk.

The steps made now are similar to those of hard disk installation. Some of these steps will not appear, though, since floppy disk systems usually are not suited for exporting filesystems or printers. Therefore, these options will not be offered.

2.2. Hard Disk Installation

To install *Envoy* on a hard drive, you will have to start the Installer using the "Install Hard Disk" icon on the "EnvoyInstall" disk.

In this, you will first have to choose your level of user experience on the Amiga. It is not possible to choose the "Novice User" level here, as some input from the user will be needed during installation in any case.

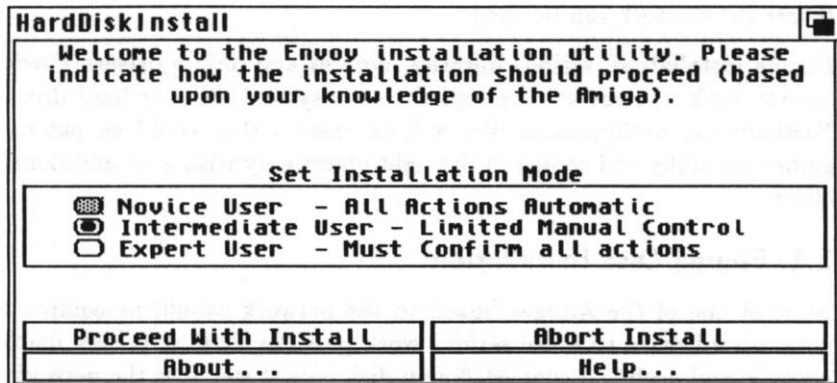


Fig. 1: Installer startup message during hard disk installation

In case *Envoy* had already been installed once, it will be possible to update that version. However, it is recommended to delete all parts of the old installation (the *Envoy* drawer as well as all files present in `ENVARC:envoy`) prior to re-installation, and to perform a complete new installation then. Problems arising from mixing various versions, which usually are hard to track down, will be avoided this way.

Now, you will be asked to choose which destination drawer to have *Envoy* installed in. The script will create an **Envoy** subdrawer there.

If the computer *Envoy* is being installed on right now is to offer services to other computers, the *Services Configuration Manager* will have to be installed. For access rights supervision, the *Accounts Manager* is needed. Therefore, it is recommended and necessary to have both programs started, if the computer is to export filesystems or a printer to the network. The installer script will copy both programs into the **WBStartup** drawer, to have them available upon each reboot.

Now, you will be asked about what to export. You can choose from the printer and a number of filesystems, such as hard drive, CD-ROM, etc. These settings can comfortably be changed later, using the *Services Configuration Manager*.

There are two different ways of using *Envoy*. The first one is in a simple network, consisting only of Amigas linked using the same networking hardware. The other option is a complex network made up of various physical networks using different hardware. To configure such a network, a very profound knowledge of networking techniques will be necessary. This manual will deal with the simple case first. In case *Envoy* is to be used in a complex network, as found in universities, for example, you should consult the respective professional literature, as well as an experienced network administrator, for best results. However, there is a simple description of complex network configuration in chapter 9.

Now it is time to select the *SANA II* driver that determines what hardware *Envoy* is used with. This driver should be installed at least now. The steps necessary for this are described separately in the respective hardware manual.

Each and every computer in the network will have to have a unique name (i.e. different from all other names). If you network together an Amiga 2000 and an Amiga 1200, for example, the names "A2000" and "A1200" would seem useful. The name may be up to 30 characters long, and must not include any special characters or symbols (e.g. a colon). This name should be entered now.

In addition, each of the computers in the network will need a unique number now. Numbers may range from 1 to 254. In this, you will have

to remember that certain *SANA II* drivers will require special values. Please see the respective *SANA II* driver manuals.

The driver can be selected now. You will then have to answer some more questions regarding the driver (packet type number for IP packets, packet type number for ARP packet, and unit). These values you will find in the documentation for the respective *SANA II* drivers.

3. Remarks

Envoy is installed now. The major portion of the software can be found in the **Envoy** drawer on the Workbench disk, or partition, respectively. Some files are to be found in other places, though. The most important of these are the *Accounts Manager* and the *Services Manager*. These two programs should be placed in the **WBStartup** drawer on Amigas offering services, so that they are started automatically. This is necessary for *Envoy* to work flawlessly. In the **Envoy** drawer there are three more drawers:

- **Configuration:** In this drawer, there are all programs necessary for *Envoy* configuration. This will be explained in detail in section 3.1. The configuration files are stored mainly in the **ENV:envoy** and **ENVARC:envoy** drawers. Still, there are configuration files in the **Accounts** drawer, too. The file path to these files is set in the *Accounts Manager* tool types.
- **Services:** Here, you will find the *Services Configuration Manager* and the services belonging to it. The *Services Configuration Manager* should also be present in the **WBStartup** drawer on systems offering services. In case additional services are installed, such as the “ums.service” belonging to the freely distributable program *UMS*, for example, they should be copied to the respective drawer, too. Using the *Services Configuration Manager*, you can then activate the new service.
- **Accounts:** The **Accounts Manager** and the configuration files belonging to it can be found here. On systems offering services, the *Accounts Manager* and the *Services Configuration Manager* should be present in the **WBStartup** drawer.



Fig. 2: Accounts drawer, holding the Accounts Manager

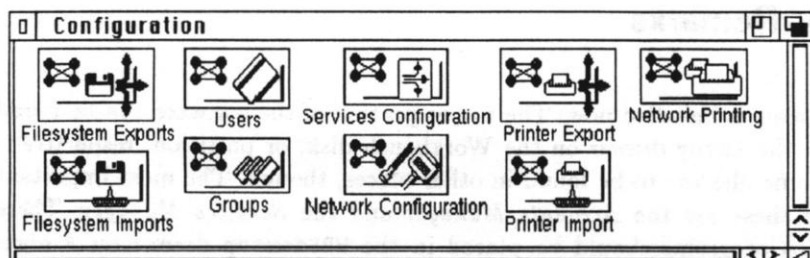


Fig. 3: Configuration drawer, holding various programs

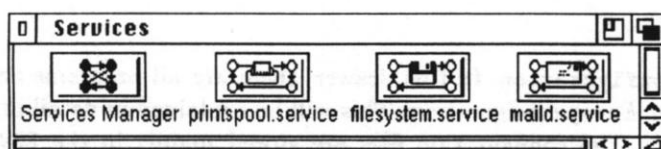


Fig. 4: Services drawer, holding various programs
(maild.service only present after installing our mail package)

3.1. Software Configuration

Installation is complete now. *Envoy* will only have to be configured now. All programs needed for this are found in the **Envoy/Configuration** drawer.

4. Access Levels

By setting access levels, it is possible to limit the access rights of the various users. This way, the right to use the printer can be granted to a certain group of persons only, for example. It is also possible to have only certain persons access certain filesystems.

4.1. The Accounts Manager

During installation, the *Accounts Manager* was automatically copied to the **WBStartup** drawer of the Workbench disk or partition. The *Accounts Manager* will thus be automatically started upon booting the machine. This is reasonable as running the *Accounts Manager* will allow using and altering access levels in the first place. If the *Accounts Manager* has successfully been started, you can use the *Users* and *Groups* programs to create, edit and delete groups and users.

Furthermore, you will be able to use the *Accounts Manager* tool types to define a number of different database files for groups and users. For this, it will be necessary for you to assign the full file path of these databases to the **GroupDB** and **UserDB** tool types.

In case the user or group database has become unusable for any reason, or if you want to create a new one, you should use the *Accounts Manager* with the **InitDB** option to create a new database including the user "Admin" only. Utilizing the **UserDB** option, the database name for the new file can be set. The same can be done for groups using the **GroupDB** option. This usually should not be necessary, though. The databases that are required have been automatically created upon installation already. The box below shows the Shell input necessary for newly creating the user database while giving a new name for that user database:

```
Process 1> "Accounts Manager" InitDB UserDB=Users GroupDB=Groups
```

Remember to make the *Accounts Manager* find the newly created file by properly setting the tool types.

If you want to remove the *Accounts Manager*, simply double clicking its icon will be sufficient. Please note that you will not receive any notification of having exited the program.

4.2. Users

After *Envoy* installation, there is only one user, the system administrator, on each of the computers offering services. This user is called "Admin", with the password being "Admin", too. The password will not even necessarily be asked for at first. It is recommended not to delete this user, but to change the password, and to make it a necessary input. This way, unauthorized access will be avoided.

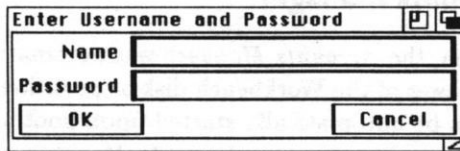


Fig. 5: Login requester, featuring the input fields
Name and Password

On computers exporting nothing, there is no user database at all. This option has been set during installation already. As described in section 4.1, however, you might create a database manually. In this case, you will have to make the *Accounts Manager* be activated automatically upon booting the system, by copying it to the **WBStartup** drawer. It is important as well that the tool types of the program are properly set, so that it can find the configuration files it needs.

Using the *Users* program, additional users can be introduced, or existing ones can be altered. After starting, you will of course have to log in first, using the name and the password of the network administrator, since the network administrator is the only person able to create new users. Standard users may only edit their own password using *Users*, and even this can be prohibited.

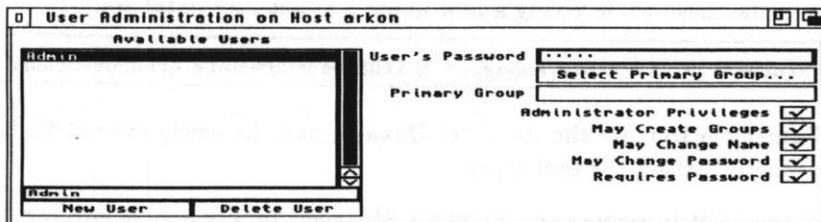


Fig. 6: The Users program

On first start, you will thus only be able to log in as user "Admin".

When a network administrator is logged in, he can use "Add" to add new users to the list, and "Delete" to remove them again.

Using the symbols on the right, some parameters affecting the currently selected user can be controlled:

- **User's Password:** This is the password the user must identify with. For obvious reasons, it will not be displayed openly.
- **Select Primary Group:** Using this gadget, a group the user primarily belongs to can be selected. The effects of this will be explained in detail in section 8.
- **Administrator Privileges:** Users with these privileges are network administrators, and may introduce new users, change passwords, etc. At least one of the users should have these privileges.
- **May Create Groups:** Setting this tickbox gadget, a user is enabled to use the *Groups* program to create new user groups.
- **May Change Name:** Setting this gadget, users are allowed to alter their names.
- **May Change Password:** Setting this gadget, users are allowed to alter their passwords.
- **Requires Password:** The user will need to identify using the password. Users not requiring a password should only be allowed very limited access, since otherwise anyone may do much damage.

Using the menu, it is possible to log on another computer or as another user on the same computer.

4.3. User Groups

With the *Groups* program, user groups can be created to group together any number of users. This can be very useful if you want to give identical privileges for filesystem or printer access to a larger group of users at once.

After the obligatory login, the left list will display the existing groups. The right one will display the members of the currently selected list.

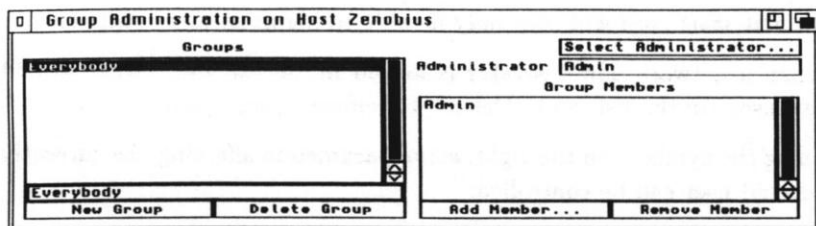


Fig. 7: The Groups administration program

You can now (as long as you have the privileges) add or delete groups. This is done using the “New Group” or “Delete Group” gadgets.

Of course you will then also have to add users to these groups. One of the users in a group can be made administrator of that group, and thus receives the privilege to add users to the group, or remove them from it. This is done using the “Add Member” and “Remove Member” gadgets. “Add Member” will open a selection window offering all the users created in “Users”. You will then be able to choose one of them.

It is recommended to create at least one group including all the users. The name “everybody” comes to mind for this one.

Using the menu, it is possible to log on another computer or as another user on the same computer.

5. Filesystems

5.1. Export

Before one computer can access the filesystem of another one, the filesystems must be made accessible to the network by using the “Filesystem Exports” program. This can only be done if the service has already been activated. Please see section 7.2 for this. Usually, the service should have been activated already during installation.

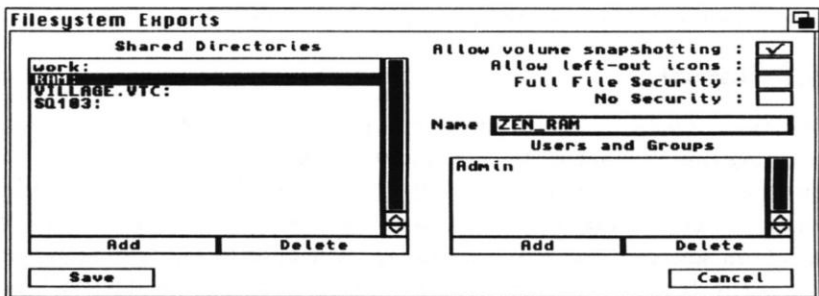


Fig. 8: The Filesystem Exports program

Using the “Add” gadget, more exported directories are added to the list. The “Delete” gadget will remove them from the list. It is not recommended to export removable media (e.g. diskettes). *Envoy* accesses filesystems using the volume name, not the device name.

Using the gadgets on the right, some parameters affecting the currently selected exported filesystem can be controlled:

- Allow volume snapshotting: This tickbox controls whether the other computers connected to the network may change the icon of the exported filesystem.
- Allow left-out icons: This tickbox controls if on other computers files can be left out that are left out on the local Amiga.
- Full File Security: Here, user privilege management for every single file is activated. More of this in section 8.
- No Security: User privilege management is turned off entirely. This means that anyone can access any file, without limits.

- Name: Here, the volume name of the exported filesystem is displayed the way it will appear on the other computers in the network.
- Users and Groups: Unless you turn off user privilege management entirely, the users and user groups allowed to access the filesystem are entered here. In case of "Full File Security", privileges are checked on each single access, otherwise authorized users are granted unlimited access.

"Save" will save the configuration. Clicking on "Cancel", you can leave the program without changing the previous configuration.

5.2. Import

It is now possible to use filesystems from other computers. This is done utilizing the *Filesystem Imports* program. After starting this program, the computer to import from will have to be selected. This selection can be altered using the "Select Host" gadget later. When a computer has been selected, you will have to log on it by entering your name and password. If you are running without user privileges, you can just enter anything here. Otherwise, you will find more information in section 4.

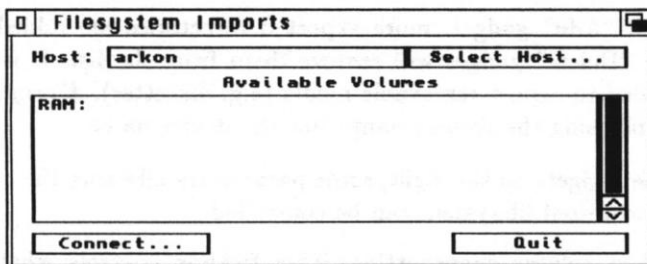


Fig. 9: The Filesystem Imports program

A list of the filesystems the selected computer exports will be displayed now. In case no filesystems are available to the user that is logged on, you will see a "none available" message.

Using "Connect", a connection to the selected filesystem is made. A dialogue window will appear now, allowing to set the connection type. You can avoid making a connection by clicking "Cancel". In case a permanent connection is to be established, answer "Yes", otherwise "No".

A permanent connection is established on every reboot of the computer. This is done through *Filesystem Imports* creating a DOS driver file that is placed in the **DEVS:DOSDrivers** directory of Workbench 2.1 or above, or **WBStartup** otherwise. This DOS driver is then mounted automatically on every reboot. You can also move the DOS driver into another directory (e.g. **Storage/DOSDrivers**). This way, it will not be mounted automatically, but can be started by simply double clicking its icon. You thus avoid starting the configuration program. It is also very useful to be able to change the name of the driver, to adjust the device name to your own liking.

If the connection is not wanted to be a permanent one, it will just be established without creating a driver file.

The filesystem used for imported devices is **L:EnvoyFileSystem**. This filesystem does allow access privileges (see section 8), but does not support all the standard ROM filesystem's features. For example, file notification (automatic notification of programs once a file has changed) or record locking (locking of parts of a file, as often needed with database management programs) is not supported yet.

An existing connection can only be removed by rebooting the computer or using the **Assign Shell** command with the **DISMOUNT** option.

Now, the icon of the imported filesystem will appear on the Workbench, and a dialogue window will tell you about the connection having been established successfully. The program is exited by clicking the "Quit" gadget.

6. Printer

Using *Envoy*, it is very simple to use the printer of another computer through the network. Thus, there is no need anymore for unplugging and replugging, or transporting files if you just want to print from another computer.

6.1. Export

To make a printer accessible from the network, you will have to start *Printer Exports* on the computer the printer is connected to. This can only be done if the respective service has already been activated. For this, see section 7.2. Usually, that service should have been activated upon installation already.

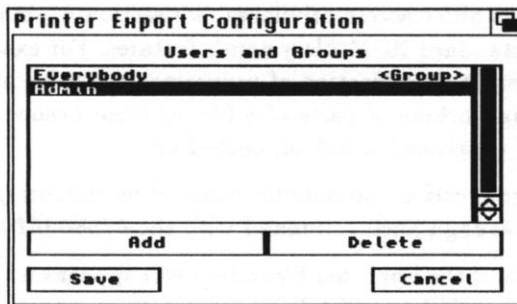


Fig. 10: The Printer Export Configuration program

Now, a list of all the users and user groups to be able to access the printer will be displayed. Using "Add", you can add more users, "Delete" will remove them. You can find more about user privileges in section 4. Please note that unfortunately you cannot turn off access privileges when exporting a printer.

6.2. Import

Using *Printer Imports* you can choose what printer in the network to print on. For this, you can first select the computer offering the printer you want to use, in the selection window already known from *Filesystem Imports*. Login using name and password are done the same way, too.

“Save” will permanently save your selection. “Use” will activate the settings without saving them. Using “Cancel” you can leave the program without performing any changes.

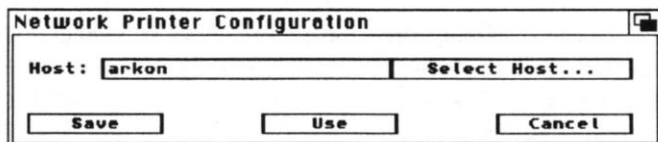


Fig. 11: The Network Printer Configuration program

The actual redirection of printer output is done in the *Network Printing* program. The “Install” gadget will permanently redirect printer output to the network printer. “Remove” will turn this setting off, so that printing will be done using the local printer again, if there is one.

You will have to remember setting the proper printer driver on the local computer, too. The driver needs to be suitable for the printer you finally print with.

To make printing redirection work, *Envoy* needs some special device drivers and recent versions of a number of system programs, which have already been copied to the right places during installation.

7. General Configuration

This chapter deals with the *Network Configuration* and *Services Configuration* programs. Using these programs, you can change values that have been set already during installation. It still can be necessary to alter these settings. This option should be limited to experienced *Envoy* users, though. Usually, it is not necessary to change any of these values. If you still do it, hard to find errors might occur.

7.1. Network Parameters

Configuration using the *Envoy Network Configuration* program is divided into three sections you can choose from by clicking the cycle gadget in the top left corner. This way, the following sections will appear:

7.1.1. Host Configuration

Here, the name of the computer and its user can be set. The "Use Realm Server" gadget is only used in complex networks, and will therefore be explained in detail in section 9. With a simple installation, this gadget should not be selected.

7.1.2. Device Configuration

Here, the *SANA II* device driver parameters are set, i.e. those dealing with communication with the hardware. With *Envoy*, various network technologies can be used combinedly. The list on the left contains all the device drivers belonging to the hardware that is used. Using "Add", more drivers can be added to the list. "Remove" will delete items from the list. An example network combined of different hardwares will be further explained in section 9.

This manual only describes *Envoy* configuration using one type of hardware. If you want to use different hardwares at the same time, you should consult the respective professional literature, or read section 9. A 'simple' complex network will be described there.

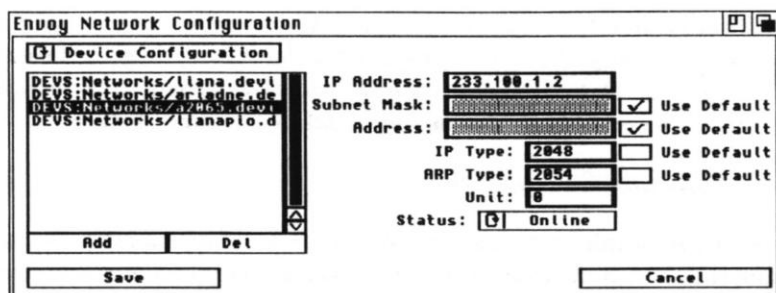


Fig. 12: The Network Device section

Using the fields on the right, the parameters of the currently selected device driver are set.

- **IP Address:** Here you can find the Internet address of the computer. It is made up of four bytes (values from 0 to 255) that are given in decimals, each separated by a point. This address has to be unique within all the network. Some *SANA II* drivers limit the choice of addresses. Please consult the respective documentation.
- **Subnet Mask:** This and the next field are only used in complex networks (see section 9). You can thus activate the “Use Default” gadget to work with useful default values.
- **Address:** see IP Address.
- **IP Type:** The values in this and the next two fields depend on the *SANA II* driver. Therefore, please consult the respective documentation. The “Use Default” gadget does not work in the current version of *Envoy*, and thus should not be selected. It is important to have IP Type and ARP Type (see below) set to the same values for all the computers within the network.
- **ARP Type:** see IP Type.
- **Unit:** When a number of network hardware of the same type (e.g. two A2065s) have been installed in the machine, the different unit numbers have to be given here. You will find more about this in your respective network hardware manual.

- **Status:** Here you can choose if the device driver should really be used. Usually, this will be the case, so that this cycle gadget should be set to "Online". If the network hardware is going to be removed from the computer, you should switch to "Offline" before.

7.1.3. Gateway Configuration

The settings of this section are relevant only for complex networks, and should thus be left unchanged. When setting up complex networks, please read section 9. Using "Save", the current configuration is saved. "Cancel" will exit the program without changing the previous configuration.

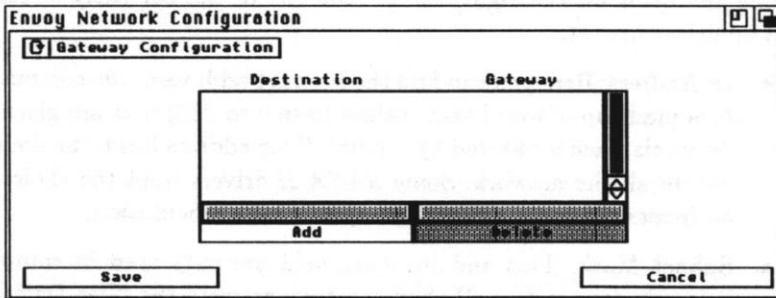


Fig. 13: The Gateway section

7.2. Services

The *Services Manager Configuration* program is used to select the services *Envoy* knows, and to choose which of them are activated. Configuration of the services is done in separate programs. For this, see sections 5 and 6.

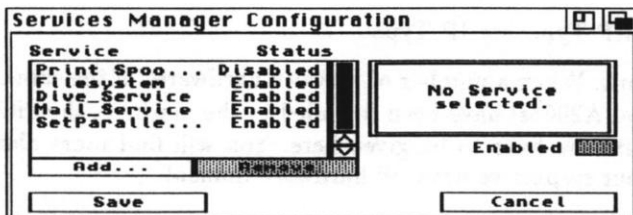


Fig. 14: The Services Manager Configuration program

On the left side of the window, there is a list of all the services known to *Envoy*. Next to the name, the service status is given. “Enabled” means a service is activated. “Disabled” denotes a service that has been turned off. That status is changed using the “Enabled” tickbox gadget.

New services are added to the list by clicking the “Add” gadget or by using the mouse to drag the icon of a service over the field meant for this and dropping it (‘drag and drop’). The services usually are placed in the **Envoy/Services** drawer. “Remove” can be used to remove services again.

Envoy comes with two services. The *filesystem.service* controls the exchange of filesystems and must be activated if filesystems are to be exported, as in section 5. The *printspool.service* controls printing through the network. For this, see section 6.

Using “Save”, the current configuration is saved. “Cancel” will exit the program without changing the previous configuration.

8. User Privileges and the ENVOY Filesystem

If you selected “Full File Security” in *Filesystem Exports*, this will have a major influence on the filesystem. Each file will then be assigned an owner and a group. The owner will be the user who has created the file, and the group will be the group that has been selected as that user’s primary group (see section 4). These two settings can only be altered by the owner of the file. This is done using the Shell commands **Owner** and **Group** that have been copied to C: during installation.

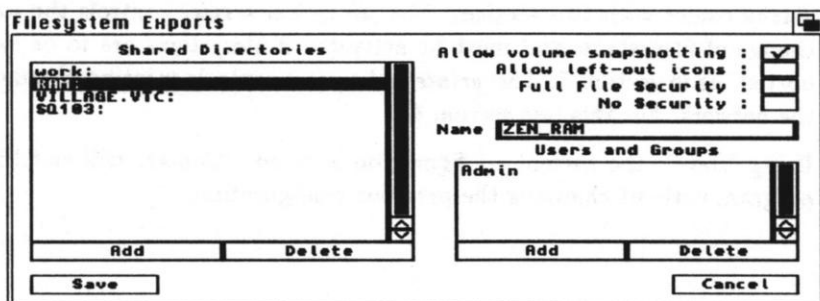


Fig. 15: The Filesystem Exports program

In addition to this, each file is assigned eight more protection bits. Four each (**rwd**) of these relate to the the members of the group the file belongs to, or all other users. The original bits relate to the file owner. The protection bits can be changed using the Shell command **Protect**, which has the two new options **GROUPFLAGS** and **OTHERFLAGS**. Files that were created before activating “Full File Security” do not have any owner. They thus belong to everybody. System administrators may continue to access any file as if they owned them.

Group bits and their significance

Bit	Significance when set
r	File may be read
w	File may be written
e	File may be executed
d	File may be deleted

For the owner of a file, the standard protection bits apply. When somebody else tries to access that file, it will first be checked whether they belong to the same group as the file. If this is so, the group bits apply, otherwise the 'other' bits.

The standard filesystem does not know these protection bits, and thus does not respect them yet. When working with the filesystem directly (without using *Envoy*), they will be neglected. Therefore, it might be useful to import a local filesystem using *Envoy*. The same filesystem will be mounted twice then, once with and once without the protection bits. This unsatisfactory state cannot be changed yet.

9. ENVOY in Complex Networks

Although it is possible to use *Envoy* in so-called complex networks, this was not the general aim of *Envoy* development. This topic is so complicated that this manual can only scratch the surface. You will find more information on the *Envoy* disk in the `developer/doc` directory and, most of all, in professional literature¹.

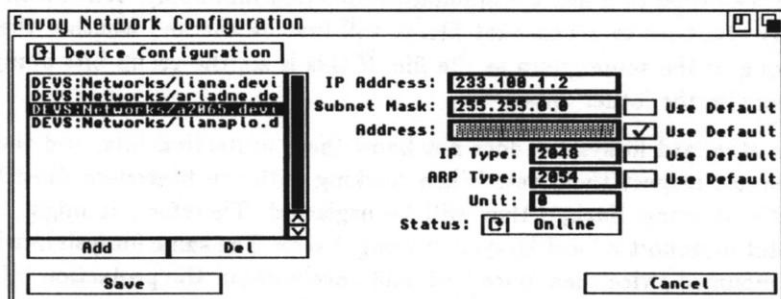


Fig. 16: Device Configuration section for a complex network

If *Envoy* is used to connect a number of Amigas using identical networking hardware, this chapter is not needed. If you intend to mix various hardwares and/or link the Amigas to an existing heterogeneous network, however, this chapter might be of some help. It can by no means be a complete documentation for the topic, as this would fill volumes.

9.1. Realms

For complex networks, so-called *realms* have to be used to link a number of physical networks into one logical network. In this, one of the Amigas has to work as a realm server. On all the Amigas, the respective selection gadgets therefore need to be activated in the *Network Configuration* program. Two more input fields will appear now, in which a name for the logical network ("Realm Name") and the address of the realm server ("Server Address") must be set. As mentioned, one of the Amigas in the network must function as the server. On all the other Amigas, the IP address of that server must be given in the "Server Address" field.

¹ e.g. 'Internetworking with TCP/IP', Volume I, by Douglas Comer (ISBN 0-13-468505-9), or similar works

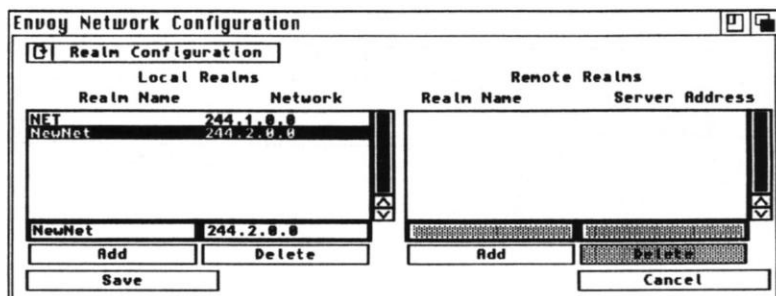


Fig. 17: The Realm section for a complex network

For relatively small networks, it seems useful to only use one realm. When networks start to grow, though, they should be divided into smaller logical segments, and thus, more realms.

On the server, there is another configuration page in the *Network Configuration* program, called "Realm Configuration". At "Local Realms", all the physical networks belonging to the realm need to be given.

When using multiple realms, all the other realms and the addresses of their servers must be given at "Remote Realms".

9.2. IP Addresses, Subnet Masks, etc.

In a simple network, IP address selection is relatively simple. Each of the computers is assigned a unique address. For hardware that does not support ARP, the less significant bits of the IP address need to be identical to the hardware address in this.

In a complex network, on the other hand, there are subordinate networks (Subnets) affecting the proper choosing of an IP address. To make the right choice, you will have to know the structure of an IP address. If the Amigas are to be integrated into an existing network, the addresses will be assigned by the network administrator. Otherwise, you may choose the addresses yourself.

Depending on how large the various networks are, you will have to decide which class of addresses to use.

Bits				Class
32	24	16	8	
0 Network ID	Host ID			A
1 0 Network ID		Host ID		B
1 1 0 Network ID			Host ID	C
1 1 1 1 Host ID				D

The host ID may be divided into more internal subordinate networks utilizing the Subnet mask. This is necessary when using different hardwares, for example. For each hardware, a separate Subnet is needed. When different hardwares are installed on one computer, this computer is assigned multiple IP addresses and can serve as a gateway between the various subordinate networks.

Set bits in the Subnet mask signify the thus marked part of the IP addresses as belonging to a certain physical network. For example, a mask of 255.255.0.0 means that the first 16 bits are used to denote the physical network. It is recommended to have the network and host bits located next to each other.

For a host address, not all of the bits may be set or unset, since these combinations are reserved for special purposes.

The address of an entire net is given by just leaving all the bits of the host address unset.

9.3. Gateways

Each of the computers in a network must know how to reach computers in other physical networks. Using the *Network Configuration* program, the respective settings can be performed on the "Gateway" page.

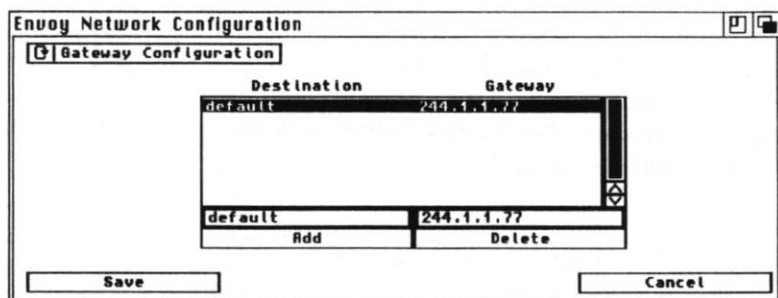


Fig. 18: The Gateway section for a complex network

As “Destination”, the address of a network or “default” is given. “Gateway” then sets the IP address of a computer in the own physical network able to contact computers in other networks and thus able to function as a gateway.

When “default” is given instead of an actual network as “Destination”, all packets meant for other networks are sent to the gateway address.

9.4. An Example

Here is a little example for a complex network, to illustrate the description above. After consulting some professional literature, you should then be able to set up your own complex network.

In the example network, there are three computers. An Amiga 4000 is connected to an Amiga 1000 using AmigaLink, and to an Amiga 2000 using ArcNet. Therefore, the Amiga 4000 must serve as a gateway in order for the Amiga 1000 being able to access the Amiga 2000, and vice versa. IP address selection is limited by the preset hardware addresses².

Computer	A4000		A2000	A1000
Hardware	ArcNet	AmigaLink	ArcNet	AmigaLink
Device	a2060	amoksana	a2060	a2065
HW address	77	2.3	88	1.7

² For ArcNet boards, the hardware address can be set using DIP switches, for AmigaLink, it is preset in the ROM

In this example, a Subnet mask of 255.255.0.0 has been used, meaning that 16 bits each are available for network and host. The 244.1.0.0 network was assigned to the ArcNet network, the 244.2.0.0 network to the AmigaLink network. The realm for all the Amigas is called "NET", with the Amiga 4000 being used as the realm server, of course.

Computer	A4000		A2000	A1000
IP address	244.1.1.77	244.2.2.3	244.1.1.88	244.2.1.7
Subnet mask	255.255.0.0	255.255.0.0	255.255.0.0	255.255.0.0
Use realm	yes		yes	yes
Realm server	yes		no	no
Realm name	NET		NET	NET
Server address	244.1.1.77		244.1.1.77	244.2.2.3
Default gateway	---		244.1.1.77	244.2.2.3
Local realms	NET 244.1.0.0		---	---
Local realms	NET 244.2.0.0		---	---
Remote realms	---		---	---

A. Developers' Documentation

For programmers, the necessary (English) documentation can be found in the **Developer** drawer on the “EnvoyInstall” disk. As mentioned in earlier chapters, there are a number of freely distributable programs supporting *Envoy*. Some of these programs come with their source code, too. You might find some inspiration for *Envoy* usage in your own programs from these.

B. Known Bugs

There still are a few bugs in the current *Envoy* versions that are annoying but usually will not disturb software usage, as long as you know how to circumvent them.

In this appendix, the known bugs are listed, with suggestions of how to circumvent them. In future *Envoy* versions, Commodore will hopefully have removed these errors.

- Many configuration settings only become effective after rebooting the computer. Therefore, if something does not work instantly, it is recommended to reboot all the computers in the network.
- The password gadget in the login dialogue window does not function properly. Once you made a typing mistake, passwords usually are not identified as valid anymore, even after correction. In this case, just quit and restart the offending program. You can then enter the right password anew.
- The gadgets meant to activate the default settings in the *Network Configuration* program do not work. All the time, the values in the text gadgets next to them are used.
- *Envoy* will only work with certain *SANA II* drivers if the IP address is in parts identical to the hardware address of the network adaptor used. This is because ARP is only used for Ethernet. Therefore it might be necessary to find out the hardware address of the network adaptor you use, and then use the *Network Configuration* program to change the IP address in a way that it is identical to the hardware address in the last bits.

C. Glossary

Administrator	System manager. The person responsible for configuration and installation as well as maintaining the network. The administrator has unlimited access rights to all files.
ArcNet	A network hardware. The Zorro II board manufactured by Commodore is called A2060. For the Amiga 500, there was the A560.
ARP	Address Resolution Protocol. A mechanism enabling you to assign a hardware address to a logical address. <i>Envoy</i> only supports ARP for Ethernet networks so far.
Device	Logical device. A software image of a physically present device.
Electronic mail	Opposite to standard mail, electronic messages are not written on paper and sent by mail, but created, sent and read using a computer.
Ethernet	A network hardware. The Zorro II board manufactured by Commodore is called A2065.
Filesystem	On a filesystem, there are files. These are arranged in a certain way. Examples: <code>DH0:</code> , <code>CD0:</code> , etc.
Hardware address	A value preset by the network adaptor hardware. For some adaptors, that address can be changed using DIP switches or similar.
Host	Name for the computer offering services.
IP address	A number made up of four bytes, which must be unique for each of the computers in the network. That number usually is given in a form that has the bytes in decimals, separated by a point. Example: 137.239.0.6.
Login	Procedure in which the user identifies himself to the computer, entering his name and password.

Network	Connection of any number of computers in any way, enabling them to share several peripheral devices.
SANA II	Commodore-defined standard for network hardware drivers.
Tool types	Arguments that are entered into the program icon using the "Information" item of the Workbench menu. They will then accordingly influence the start of the program.
User privileges	If a number of persons work with one computer, it usually is necessary to protect one user's files from the other user's accesses. User privileges set the rights a certain user has after logging on.
Zorro	Expansion slot of the Amiga models 2000, 3000 and 4000.

