

# **Ether2**

**User Manual**

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**Ether2 User Manual, 1.31**

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**This product has been certified to comply with limits for a Class A computing device, pursuant to Subpart J of Part 15 of FCC Rules. It is designed to provide reasonable protection against radio or television communication interference in a commercial environment. Operation of this equipment in a residential area could cause interference with radio or television communication.**

# **Ether2 User Manual**

## **Table of Contents**

<b>About This Manual</b>	<b>3</b>
<b>About Ether2</b>	<b>5</b>
<b>What You Will Need To Get Started</b>	<b>7</b>
<b>Cable Supplies?</b>	<b>8</b>
<b>Ethernet Primer</b>	<b>9</b>
What is Ethernet	9
Where does Ether2 fit in	10
What about Ethernet cables	11
General Recommendations	12
How and where to order cabling supplies	13
<b>Hardware Installation</b>	<b>15</b>
Verifying Ether2 configuration	16
Opening the Macintosh	17
Inserting the Ether2 card	20
Connecting to the Ethernet cable	21
<b>Software Installation</b>	<b>25</b>
Checking the Macintosh System and Finder versions	26
Upgrading the System software	27
Installing the Ether2 software	28
Running the Macintosh over Ethernet	29
Manager2	31
<b>Appendix A - Ether2 Specifications</b>	
<b>Appendix B - Brief Description of Manager2 Statistics</b>	
<b>Appendix C - Warranty Information</b>	
<b>Index</b>	



## **About This Manual**

This manual was designed to assist you in easily installing the Ether2 circuit card into your Macintosh and connecting to an Ethernet cable network. In preparing the manual we assumed that you are familiar with basic Macintosh operations, such as using the mouse.

The manual is divided into several sections.

### **What You Will Need**

The first part of the manual will describe the contents of the Ether2 package and emphasize the preparation and equipment you will need for installation.

### **Ethernet Overview**

This section will provide you with a quick overview of Ethernet in general and how Ether2 will fit into your overall network. The information found here is introductory in content and may be skipped if you are already experienced with Ethernet networks.

### **Hardware Installation**

This part of the manual describes step by step how to install Ether2 into the Macintosh computer. The hardware installation section concludes with instructions for connecting the Macintosh with the Ether2 card to your Ethernet cable.

### **Software Installation**

This section will explain how to install the Ether2 software. Directions on the use of Manager2, Ether2's managerial software which can be used for testing and reporting information related to your Ether2 connection, are also found in this section.

### **Appendices and Index**

Additional information that might be of interest to you such as technical specifications and a quick reference to specific information can be found at the end of this guide.



## **About Ether2**

**Congratulations on your purchase of Ether2, the high-speed Ethernet NuBus card for the Macintosh II family. Ether2 will enable your Macintoshes to communicate with each other or other Ethernet connected computers using the Macintosh's built-in software protocols, TCP/IP or other protocols.**

**The standards supported by the software included with Ether2 will allow your Macintosh to remain connected and useful in almost any environment. Any application that can run over AppleTalk/LocalTalk will run over Ethernet using the Ether2 interface.**

**Additionally, Ether2 includes a managerial program called Manager2. Manager2 provides you with control over Ether2 and your Ethernet environment. The program reports to you information about your Ethernet network that is recorded by Ether2's internal processor.**

## **A Few Notes**

### **Please Read This Manual**

The Ether2 manual contains some very important information about Ether2 and Ethernet networking in general. Please read the manual thoroughly; it's worth the few minutes it will take.

Also, please fill out the warranty registration card and return it to us today. This will help us keep you informed of updates to Ether2 and future products available from Compatible Systems.

### **We Want You To Be Satisfied**

Use Ether2 for thirty days. If you are not completely satisfied with the product you may return it within this time period for a full refund by following the return materials procedures outlined in Appendix B of this manual.

### **Warranty and Service**

Ether2 comes complete with a full one year warranty against manufacturing defects. Following this period, factory service is available.

### **If You Need Help With Ether2**

If you have a question about Ether2 and can't find the answer in this manual, please call us at Compatible Systems using the telephone number listed in the front of this guide or contact your computer dealer. We will be glad to assist you with any questions or problems that you might have.

## **What You Will Need To Get Started**

Before connecting Ether2 please make sure that you have all the items supplied with the Ether2 package and, also, any additional items that are necessary to connect to your Ether2 network.

### **Supplied with Ether2**

Please check the Ether2 shipping package for the following items:

- One (1) Ether2 circuit card
- One (1) User manual
- One (1) 3 1/2" Ether2 Installation disk

### **Needed For Installation**

You will need the following items in order to install Ether2 to your Macintosh and Ethernet cabling.

#### **System Software:**

Due to limitations of earlier releases of the Macintosh System, your Macintosh must be running under System 6.0.3 or later.

#### **To connect to the Ethernet network cable:**

For Thin Ethernet cabling you will need a thin Ethernet connector kit.

For Thick Ethernet cabling you will need a transceiver cable connector.

For Twisted Pair Ethernet cabling you will need an unshielded twisted pair wire that is connected to your 10BaseT compatible twisted pair hub.

**Note** The hardware installation instructions assume that the Ethernet cable network you are connecting to the Macintosh/Ether2 is already in place. The installed Ethernet network cable should be terminated at each end. A connector or transceiver must be available in the location where you will be installing the Macintosh. For twisted pair Ethernet you will need a 10BaseT compatible twisted pair hub for your network.  
(For more information on Ethernet see the section in this manual entitled "Ethernet Overview.")

If you are installing a complete Ethernet network or are unsure how to create a connector or transceiver location for your Macintosh, please refer to the documentation supplied with the manufacturers' networking equipment.

The items that you require for installation should be available from your local computer dealer, a national catalog, or directly from Compatible Systems.

Two national catalogs that carry cabling supplies are:  
Inmac Catalog - (800) 526-9778 or,  
Black Box Catalog - (412) 746-5530.

## **Ethernet Primer**

**Ethernet is a communication method for linking computers together that was developed by Xerox Corporation.**

**In a machine environment, a communication method organizes the way that computers, or other devices like printers, interact on a network by determining when and how the machines should “talk.” In order to understand where Ethernet and Compatible Systems’ products fit into this networking scheme you need to look at the three main components of a network.**

**The three main components of any network are:**

- 1. Network operating system software**
- 2. Protocol software**
- 3. Hardware and driver software**

**In the Apple Macintosh environment, the most commonly used protocol software, called AppleTalk (not to be confused with LocalTalk, the Mac’s built in network), is part of the Macintosh operating system software. The network operating system software is often AppleShare (one side of which is included with later versions of the Mac operating system, and is used with AppleShare and Novell servers), although it can also be TOPS or other software products from other vendors.**

**Our discussion of Ethernet will primarily be concerned with the hardware and driver software component of a network. If you are interested in a complete overview of all LAN (Local Area Network) components, there are many books available on the market that cover the complete subject. If you are planning on installing your own Ethernet network, it will be helpful to you to read one of these books to better understand the subject.**

### **Ethernet Primer (cont.)**

In order to transmit and receive Ethernet communications, the devices on the network must all be attached physically through Ethernet adapters to a common Ethernet cabling system. These two components make up the hardware part of a network.

### **Where Do Ether+ and Ether2 fit in?**

Ether+ and Ether2 are Ethernet adapters which interface to an Ethernet cabling system. There are many uses for an Ethernet connection to a Macintosh, from joining together with other Macintoshes in a standard network configuration to linking to larger computers such as a VAX or a UNIX file server. The similarity between all the different Ethernet configurations for the Macintosh is that they all will require specific software, usually referred to as a driver, to be loaded onto your Macintosh in order to make the connection work.

There are many kinds of drivers that handle different tasks and interact with your computer at different levels. Drivers can fit into any of the three components of networks that are mentioned above. A hardware driver, as you might have guessed, is a program that is loaded onto your computer that allows it to "drive" a hardware device.

The software that is provided with Ether+ or Ether2 can be classified as hardware drivers that tell your Macintosh how to send information through these hardware devices. The kind of information that is sent through Ether+ or Ether2, and how this information is communicated to other devices on the network, is handled by the protocol software and network operating system software that communicate with the hardware driver.

## **Where Does Ether•Route fit in?**

**Ether•Route is a hardware-based gateway/router which provides a connection between an Ethernet network and one or two LocalTalk networks. It handles both the hardware connection between the two types of networks and the software protocol translations necessary. A device which uses the AppleTalk software protocols on either Ethernet or LocalTalk will be able to seamlessly communicate with other devices using those same protocols, regardless of whether they are on Ethernet or LocalTalk.**

**Ether•Route TCP extends the capabilities of the standard model Ether•Route to include support for communications using the TCP/IP software protocols.**

## **What about the Ethernet cables?**

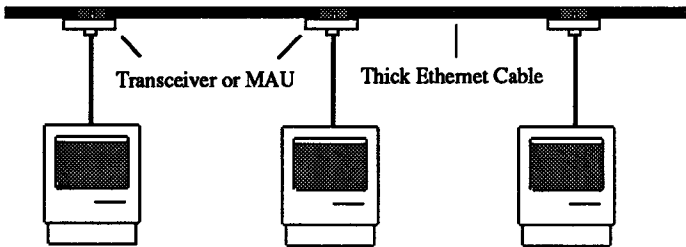
**There are a number of different cabling systems used for Ethernet communications. The three most popular cabling systems include two different kinds of coaxial cable, and twisted pair cable.**

**The two kinds of coaxial cable are referred to as “thick” or “Standard” Ethernet cable, and “thin” or “Cheapernet” cable. The “thick” or “thin” Ethernet refers to the actual size of the coaxial cabling. Almost all of the latest Ethernet sites, and in particular sites with a relatively small number of computers on the network, use the thin cabling because of cost advantages associated with this type of cable. Ether+ and Ether2 support all three types of Ethernet cables.**

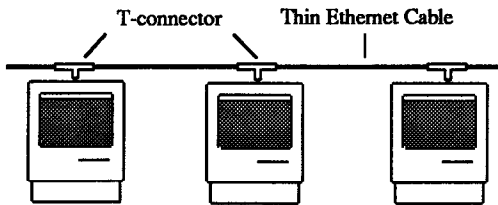
**Devices are connected to both thick and thin Ethernet in what is called a “daisy-chain” configuration. In a thick cable installation there is simply one long cable with adapter connections made along it. In a thin cable installation a number of cable segments are joined with connectors (an adapter is typically attached at each connector) to make the electrical equivalent of one long cable.**

## Ethernet cables (cont.)

In a thick cable installation, the Ethernet adapters are actually connected through short “drop cables” to a “transceiver” (sometimes also called an MAU or Medium Attachment Unit) which provides the physical attachment to the thick main cable that runs throughout the building. The drop cables are 15 wire cables that attach to a 15-pin connector located on Ether+ or Ether2.



Thin Ethernet is usually a black coaxial cable, similar (but not equivalent) to the type of cable used for cable TV. Devices are directly connected to the cable through the use of BNC connectors on the cable end and T-connectors on the Ethernet devices.



Both thin and thick Ethernet networks require that the cable be terminated at both ends of the network. Terminators are necessary to ensure that the network signal does not reflect back onto the network when it reaches the end devices. Terminators should only be used at the end points of a network so that the signal does not become distorted.

Twisted pair Ethernet is based on a different cable configuration from coaxial Ethernet. With twisted pair, each Ethernet adapter is connected through its own length of wire back to a central "hub." Thus, twisted pair Ethernet installations are often referred to as "spoke and hub" or "star" configurations. The popularity of twisted pair Ethernet is due to the fact that twisted pair cable is often already installed in offices as part of the telephone wiring system. However, there are length limitations and issues of cable quality of existing cable which should be carefully considered when considering twisted pair wiring.

When comparing the costs of different cabling systems, it is important to know that the hub is a box containing active electronics. Typical eight port hub prices range from \$1000 to \$2500.

There are two commonly available varieties of twisted pair Ethernet — Synoptics Lattisnet and 10BaseT.

Lattisnet was an early proprietary version of this kind of product and is not recommended for new installations. For existing installations of Lattisnet, Synoptics provides converter modules which will connect to the 15-pin transceiver connector on either Ether+, Ether2 or Ether•Route.

The accepted industry standard for Ethernet over twisted pair is 10BaseT. All new installations should use equipment which adheres to this standard. The twisted pair versions of Ether+, Ether2 and Ether•Route all comply with the 10BaseT standard.

## **General Recommendations**

In general, for small or medium sized networks or network segments (under 30 machines), thin coaxial Ethernet cabling is the least expensive and easiest to install cabling system. Simple networks of 5 to 10 machines can often be installed by someone with some previous LocalTalk network installation experience, although you should expect it to take some homework and some trial and error.

Thick coaxial cable is generally not used for new installations because of the cost of the cable itself, the cost of transceivers, and the difficulty of running the cable.

Twisted pair is a popular alternative to thin coaxial cable in installations where there is useable cable already in existence. Twisted pair will grow even more popular with the acceptance of the 10BaseT standard. However, even in installations where twisted pair already exists, and particularly for small networks, coaxial cable may be significantly less expensive to install due to the cost of twisted pair hubs.

If you are installing a medium sized or larger network (over 10 machines), or are not particularly handy with cabling and electrical equipment, you will save yourself a great deal of time and aggravation by hiring a professional network installation company to run your cabling, test it, and help you set up your network. If you are planning to put new adapters on an existing network, always notify the person within your organization who is in charge of the network.

In general, larger cities will have a number of computer dealers who have personnel trained in network installation. There are also consultants and installers who specialize in local area network installations. Your local Yellow Pages will list Computer Dealers and Computer System Designers and Consultants. It always a good idea to ask dealers and consultants for references specific to the work you want them to perform.

## **How and where to order cabling supplies.**

Both thick coaxial and twisted pair installations are difficult enough to perform that we provide no detailed information on what kind of equipment is needed to perform them. However, the suppliers listed at the end of this section can provide you with more information.

For a thin coaxial installation you will need the following:

1. Coaxial cable of type RG 58/U. This is the only kind of coaxial cable that can be used for thin Ethernet. Do not try to use other cable types. Always buy the cable cut to length with BNC male connectors already attached. Attaching connectors yourself is definitely not recommended. Buy your cables from a reputable supplier. Bad cables, or cables with connectors attached incorrectly, can be difficult to detect without expensive test equipment.
2. BNC Tee connectors, one per adapter. The tee connector should have two female ends and one male end.
3. BNC 50 Ohm terminating plugs, two per network. One of these plugs must be attached at each end of the network. Make sure that they are 50 Ohms and not some other value, otherwise problems will result.

### **Installation Notes:**

- The maximum length of a thin coaxial cable segment is 607 feet.
- The minimum distance between adapters is 1.5 feet.
- No more than 30 adapters are allowed per cable segment.
- Repeaters are available which will link cable segments together.

There are several national mail-order suppliers which specialize in supplying data communications equipment and cabling supplies. These suppliers can provide thin coaxial cable with connectors already attached. Both suppliers have expert technical support people available to help you with cabling problems over the phone.

**Black Box Corporation**

PO Box 12800  
Pittsburgh, PA 15241

Order Line:	412-746-5530	8:00 A.M. to 8:00 P.M. EST
Technical Support:	412-746-5151	8:00 A.M. to 8:00 P.M. EST

**Inmac**

2465 Augustine Drive  
PO Box 58031  
Santa Clara, CA 95052-8031

Technical Support            800-526-9778

Note: Inmac has regional sales offices, you can get the number of the one nearest you from the number above

## **Ether2 Hardware Installation**

This section of the manual will describe how to install the Ether2 circuit card into your Macintosh II and connect to the Ethernet network. In summary, the steps for installation are:

1. Open the Macintosh II computer.
2. Insert the Ether2 circuit card into the expansion slot.
3. Close the Macintosh II computer.
4. Connect your Ether2 card to the Ethernet cable.

### **Opening the Macintosh Computer and Preparing the Expansion Slot**

To open a Macintosh II type computer you will need a Phillips-head screwdriver.

1. Turn off the Macintosh computer and any peripheral devices that might be attached to it.

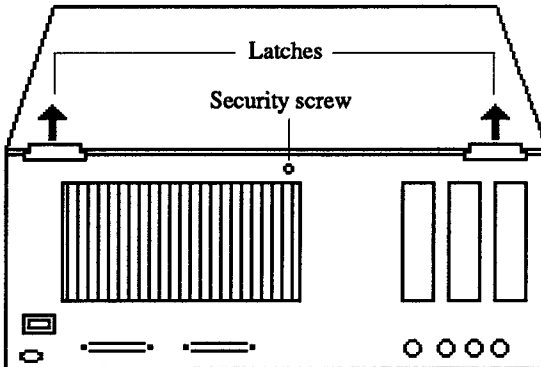
**WARNING!** Please be sure that the power to your Macintosh computer and all peripheral devices is turned off before attempting to install any circuit card into the computer.

If your computer has been in use for an extended time before powering down, please wait a few minutes before continuing with the installation to allow the electrical components to cool down.

2. Remove the lid from the computer
  - Use the Phillips screwdriver to remove the security screw that is located at the top center of the computer's rear panel.

## Opening the Macintosh Computer (cont.)

- From the front of the computer, wrap your fingers around the rear corners of the case.
- Pull up on the latches as you lift up on the back of the lid. (Note: Earlier Macintosh II models might require you to press in on their latches while you lift.)
- When you feel the lid release, lift it up and toward you until it is completely off the case, and set it aside.



(Back of the Macintosh)

3. Touch the metal part of the power supply case to discharge any static electricity that might be built up on your clothes or body.
4. Select the expansion slot that you will use for the Ether2 circuit card.

The Ether2 circuit card may be installed in any expansion slot, but you should try to select a slot where the outside cables will not interfere with other cables connected to the computer.

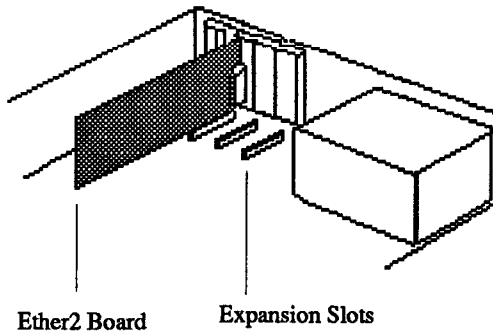
5. Remove the cover plate that is behind the expansion slot that you have chosen. This is done by pushing the plate out with your thumb. You should keep this plate for future use.

Your Macintosh computer is now prepared for the installation of the Ether2 circuit card.

### Inserting the Ether2 Circuit Card

1. Hold the Ether2 card by the top of the metal bracket and the top of the card's other end. (Be careful not to touch the pins on the bottom edge of the card.)
2. Align the card over the expansion slot that you have chosen. Position the card so that the connector on the bottom of the card aligns directly over the slot and that the rear edge aligns with the tab on the inside of the back panel.
3. Place one hand on the top of the card, directly over the connector area. Push down firmly on the card until it is fully seated in the slot.

**Don't force the card into the slot. If the card seems difficult to insert, pull it out and try again. Don't wiggle the card from side to side to insert it. Wiggling the card puts unnecessary stress on the card and slot and you may damage the connector pins.**



You can test to see if the card is properly connected by lifting the card gently. If it resists and stays in place, it's connected.

### **Closing the Macintosh Computer**

Your Ether2 circuit card is now installed. You may now close the Macintosh computer.

1. Tip the front of the lid down onto the front edge of the computer's case.
2. Lower the back of the lid onto the case and press firmly on the back corners until you hear the rear latches snap into place.
3. Replace and tighten the security screw.

You are now ready to connect your Macintosh/Ether2 to your network.

### **Connecting Your Macintosh to the Ethernet Cable**

In order to support the three types of Ethernet cables (Thick, Thin and 10BaseT Twisted Pair) Compatible Systems supplies two different types of Ether2 circuit cards, "Ether2" and "Ether2 Twisted Pair".

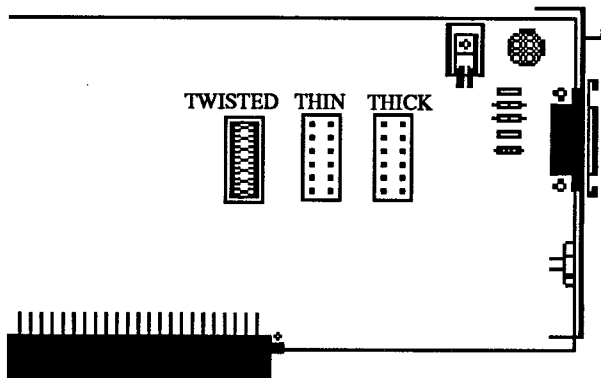
The "Ether2" circuit card supports both thick and thin Ethernet. The "Ether2 Twisted Pair" circuit card supports both thick and 10BaseT twisted pair Ethernet. It is easy to identify these different cards by examining the connectors on them. "Ether2" has a BNC connector for connecting to thin Ethernet. "Ether2 Twisted Pair" has an RJ 45 eight pin modular plug (like a phone jack) for connecting to unshielded twisted pair cable. Please make sure that you have the correct Ether2 card before proceeding with the installation.

## Reconfiguring the Ether2 Circuit Card

At some time it may become necessary for you to reconfigure your Ether2 circuit card. If you have an "Ether2" circuit card, you may configure your card to run over thin or thick Ethernet. If you have an "Ether2 Twisted Pair" circuit card you may configure your card to run over twisted pair or thick Ethernet. Only one connection may be configured to be active at a time.

In either case, the two jumper sockets for configuring the Ether2 circuit card are located directly on the card (See diagram below). The socket with a jumper pack installed designates the active connector port. The sockets will be marked on the card as "THICK", "TWISTED" or "THIN".

Unless specified when ordered your "Ether2" circuit card will be preset for thin Ethernet or your "Ether2 Twisted Pair" circuit card will be preset for twisted pair Ethernet. The active configuration will have the jumper pack installed.



If you need to reconfigure the Ether2 card, simply remove the jumper pack from its present location and install it into the socket that designates your network cable type. Use a small flat-bladed screwdriver and apply a light prying motion on alternate sides of the jumper pack to remove it from the socket. Then reinstall the jumper pack into the correct socket by applying equal pressure on the top of the pack until all the jumper pack's legs sink into the socket. Take care not to bend or break any of the jumper pack legs when removing or installing the pack.

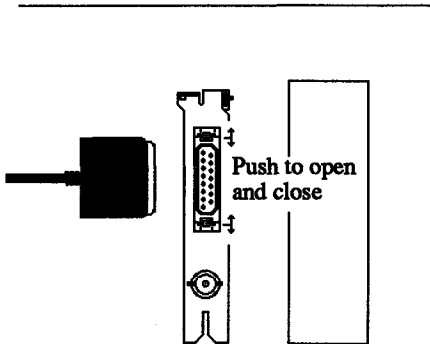
## Connecting to Thick Ethernet

To connect your Macintosh to a thick or standard Ethernet network simply plug one end of the transceiver cable into the transceiver connector located on the back panel of the Macintosh at the Ether2 port. Then, plug the other end of the transceiver cable into the transceiver that is connected to the thick Ethernet network.

The detailed steps for installation are:

1. Power down your Macintosh computer.
2. Plug one end of the male 15-pin transceiver cable into the 15-pin transceiver connector on the back of the Ether2 circuit card. Secure the cable by sliding the locking guide on the sides of the connector (See Diagram Below).
3. Plug the other end of the 15-pin transceiver cable into the transceiver on the Ethernet cable. The cable should install to the transceiver in a similar manner to step 2, but please check the documentation supplied with the transceiver to verify the installation instructions.

This completes the installation for your Macintosh/Ether2 onto a Thick Ethernet. Please proceed to next section for instructions on installing the Ether2 software.



## Connecting to Thin Ethernet

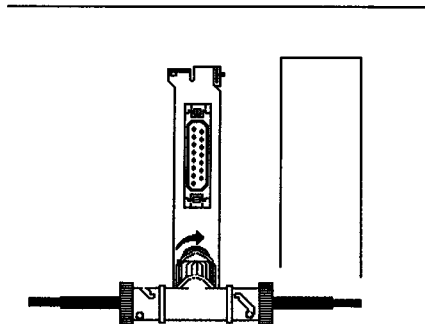
In order to connect your Macintosh/Ether2 to a thin Ethernet cable, you will need to connect a T-connector onto the BNC connector located on the back of the Ether2 circuit card.

Remember, to be sure that the T-connector is connected to the thin Ethernet cable on both sides that extend out from the Ether2 circuit card. If your Macintosh is to be the last device on the Ethernet network, then one end of the T-connector will be connected to the thin Ethernet cable and the other end will have a network terminator installed. This should be done by your network administrator before connecting the T-connector to the Ether2 port.

Step by step instructions for installation onto a thin Ethernet network are:

1. Power down your Macintosh computer.
2. Install the T-connector onto the BNC connector on the back panel of the Ether2 circuit card. Twist the T-connector securing sleeve clockwise in order to lock the connector into place (See Diagram Below).

This completes the installation for your Macintosh through Ether2 onto a Thin Ethernet network. Please proceed to the next section for instructions on installing the Ether2 software.

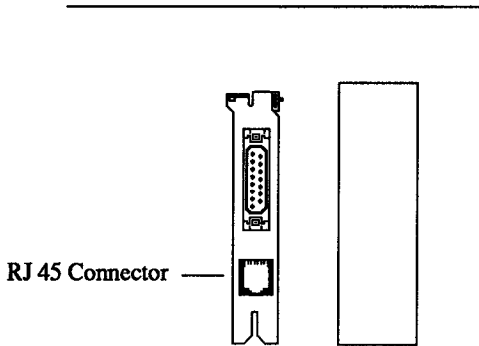


## Connecting to Twisted Pair Ethernet

To connect your Macintosh/Ether2 to a twisted pair Ethernet network simply plug in the twisted pair cable that is run from your twisted pair hub into the RJ 45 connection on the "Ether2 Twisted Pair" card. (See figure below.)

Please make sure that the twisted pair hub that you use to control your network is designed for the IEEE 10BaseT specifications. The documentation provided with the hub should provide this information along with other useful information on this type of network.

This completes the installation for your Macintosh/Ether2 onto a twisted pair Ethernet. Please proceed to the next section for instructions on installing the Ether2 software.



## **Ether2 Software Installation**

This section will run you through the basic steps for installing the Ether2 software. Before you install the Ether2 software you should:

- Make sure you have the equipment you need. Refer back to the “What You Will Need” section at the beginning of this manual.
- Make backup copies of the software disk included with Ether2.
- Check to see that your Macintosh is running under System 6.0.3 or later and Finder 6.1 or later.

### **Making a Backup Copy**

In order to avoid losing information contained on the Ether2 disk, please make a backup copy of the disk. You should store the original disk in a safe place and use your backup copy for the actual installation.

### **Installing The Ether2 Software**

1. Start the Macintosh using the Ether2 Installation disk.
2. Double-click on the Installer icon.
3. The Ether2 Installer will allow you to install EtherTalk v.1.22 (Phase I), EtherTalk v.2.0.1 (Phase II) or both. You should check with your network administrator to verify whether your workstation should be running EtherTalk Phase I or Phase II. The default installer script is to install EtherTalk v.1.22 (Phase I), but you can customize your installation by selecting the customize button.

## **Installing The Ether2 Software (continued)**

4. Once you select the installation options that you want, the program will take a few seconds to make sure that the drive you've selected has enough space for the software. If your hard disk doesn't have enough space you will be notified with a dialog box. You will have to quit the installation and remove some files to make more disk space available. After you free up the necessary disk space, start with Step 1 above to proceed with the installation.
5. After selecting the option for your computer, click the "Install" button.
6. After all the software is copied the Installer will notify you that the installation is complete. You should then reboot your Macintosh and continue onto the next procedure, installing the Manager2 software program.

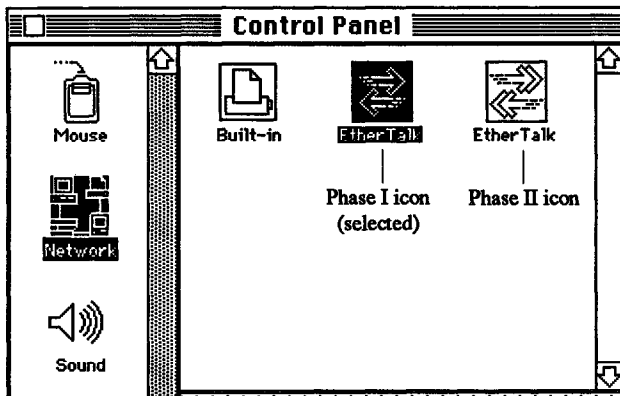
To install the Manager2 software on your hard disk simply drag the Manager2 icon onto your drive when you are in the Macintosh Finder.

## **Running the Macintosh Over Ethernet**

After the software is installed, you will want to restart the Macintosh from your regular startup disk. When the Macintosh is successfully booted up, your Macintosh/Ether2 installation is complete. To begin use of the Ethernet interface:

1. Select the "Control Panel" under the Apple Menu.
2. In the Control Panel, scroll down the Icon menu until you reach the Network Icon.

3. Select the Network icon and, depending upon whether or not you installed both EtherTalk Phases, two or three icons will appear. One icon will be called "Built-In" and one or two icons called "EtherTalk". (See diagram below)
4. If you installed both EtherTalk Phase I and II, you will have two different icons called EtherTalk. The icon labeled EtherTalk which has a single arrow is EtherTalk Phase I. The icon labeled EtherTalk which has a double arrow is EtherTalk Phase II. Of course, if you only installed one Phase of EtherTalk you will only see one EtherTalk icon.



Your Macintosh is now ready to send and receive AppleTalk packets over the Ethernet network. To test your installation use the Manager2 software that is included with your Ether2 package (See the section of this manual entitled Manager2) or use your Macintosh to communicate over the network. With Ether2 providing the physical interface for Ethernet, your Macintosh can take advantage of other third party software to communicate to a variety of devices and protocols.



## **Manager2 - Managerial Software Included With Ether2**

Manager2 is a software program that will allow you to keep track of information about Ether2, your Macintosh and your Ethernet network.

Among the information and resources that Manager2 provides is:

- Loopback testing for testing your Macintosh/Ether2 connection.
- Display of Ethernet network statistics and errors.
- The ability to change your Ether2 Ethernet address.

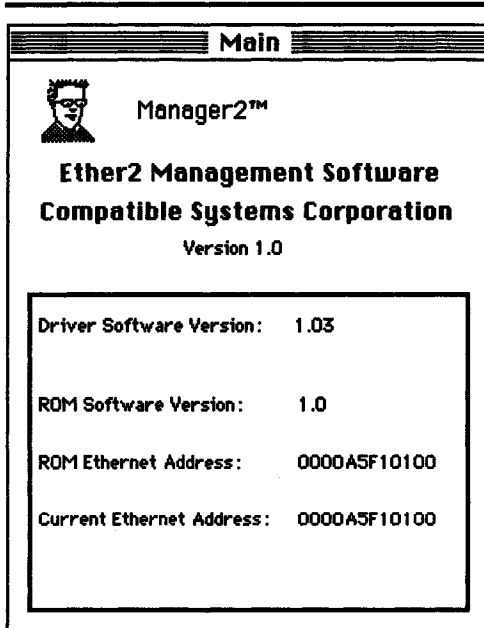
Below is a screen shot of the Manager2 startup screen. As you can see Manager2 provides pull down menus for displaying information. Below you will find a section describing each menu and the different options that the menus provide.

### **Ethernet Options**

Under the **Ethernet** pull down menu Manager2 has three different options; **Set Address**, **Network Statistics**, **Network Errors**. Each of these options are explained briefly below.

#### **Set Address**

Every Ether2 circuit card is shipped with a unique Ethernet Address Number. This Ethernet Address Number is preset to be a unique number in order to avoid conflicts with other devices on the network. In some installations the network administrator might want to change the preset address.



The Set Address option will display two addresses, the preset Hardware Ethernet Address Number of your Ether2 circuit card and the Current Ethernet Address that the Ether2 circuit card is using. The preset Hardware Address Number of Ether2 will remain the same number that was set at the time of manufacture. In most cases, the Current Ethernet Address will be the same number as the Hardware Ethernet Address. The Current Ethernet Address will only change if you exercise the option that the Set Address screen allows you.

**Caution:** Do not change the Ethernet Address unless you have notified your network administrator. Conflicts in Ethernet Addresses can cause network problems that are difficult to trace. The preset Hardware Ethernet Address Number used by Ether2 is a unique number assigned by the IEEE (The Institute of Electrical and Electronics Engineers) and will not conflict with any other Ethernet Address Number.

### **Network Statistics**

The internal processor chip on the Ether2 circuit card is available to generate statistics about the Ethernet network activity. These statistics are available to you through the **Network Statistics** option under the Ethernet menu. The statistics generated may be useful to your network administrator or Compatible Systems Technical Support.

### **Network Errors**

The internal processor chip on the Ether2 circuit card can generate information about Ethernet Network Errors. These errors are available to you through the **Network Errors** option under the Ethernet menu. The statistics generated may be useful to your network administrator or Compatible Systems Technical Support.

## **Test**

### **Loopback Test**

The Loopback Test allows you to test your Ether2 connection in order to assure that it is sending and receiving network packets correctly. There are three tests that the Loopback Test will run. The first two tests check the internal operation of the Ether2 circuit card. The third test will actually send a packet out to the network to check the complete connection. In order to run all three Loopback tests you must be connected to the network. If you are not connected to the network when you run the third Loopback test a message will be displayed informing you to connect to the network and then to rerun the test.

### **Reset Statistics**

This option will reset the error and statistic charts that Manager2 displays.



# Appendix A

## Ether2 Specifications

### Size:

Controller card for Macintosh II. 11 x 4 inches.

### Connections:

BNC connector to IEEE 802.3 10BASE2 (thin Ethernet)

DB15 connector to IEEE 802.3 MAU interface (thick Ethernet)

RJ 45 connector to IEEE 10BASE-T (twisted pair Ethernet)

### Current

At +5 volts 2 amps (maximum)

At +12 volts Only used if external transceiver is connected.  
Refer to transceiver documentation for 12V  
current requirements.

### Main Components:

Ethernet controller DP8390

Ethernet interface DP8391

RAM 16Kbytes, static, 100ns

ROM 32Kbytes



## **Appendix B**

### **Brief Description of Manager2 Statistics**

#### **Network Statistics**

<b>Receives:</b>	Packet received by the Ethernet Network Interface Chip (NIC) and stored in the Ether2 on-board receive buffer.
<b>Transmits:</b>	Packet successfully transmitted by the NIC.
<b>Transmit Requests:</b>	Packet put in the Ether2 on-board transmit buffer and NIC set to transmit.
<b>Resets:</b>	NIC was reset. This typically happens after a NIC receive buffer overflow.

#### **Network Errors**

<b>CRC Error:</b>	The packet received did not match the packet transmitted. Packet dropped. A large number of these errors per the number of packets received usually points to a cabling problem.
<b>Frame Error:</b>	The incoming packet did not end on a byte boundary. A large number of these errors points to a network hardware or cabling problem.
<b>Missed Packets:</b>	A packet couldn't be received because the receive buffer ring was full.

## **Network Errors (cont.)**

<b>unexp_rst:</b>	A reset interrupt occurred on the NIC.
<b>re_int:</b>	A receive error occurred. Typically a CRC or Frame Error.
<b>te_int:</b>	A transmit error occurred. Typically too many collisions trying to transmit a packet.
<b>ow_int:</b>	The receive buffer ring was full when a packet arrived.
<b>cntovflw_int:</b>	The NIC signalled that its error counters needed to be read. Not really an error.
<b>dma_int:</b>	Not used in Ether2.
<b>txto_in:</b>	A transmit interrupt was not received after the NIC was set to transmit.
<b>txto_wrt:</b>	Same as above.
<b>txon_ovflw:</b>	A transmit request occurred while the receive buffer ring was full.
<b>txin_ovflw:</b>	Same as above.
<b>txwrt_ovflw:</b>	Same as above.

## **Appendix C**

### **Terms and Conditions of Purchase**

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# Index

AppleTalk 5, 12, 29

BNC connector 11, 16, 23

Cable Supplies 8

Cheapernet *See* Ethernet, thin

Control panel 29

Driver, software 10, 11, 28

## Ether2

hardware 8, 15-23

information 3, 5-6, 10-11

network 13-15

configure 16-17

software 25-33

specifications A1

supplied with 7

## Ethernet

address 31-33

connect 5, 15, 21-23

driver 28

errors 31-33

interface 5, 13, 30

network 5-6, 8, 10, 13, 15-16, 31, 33, 36

overview 9-15

configure 16-17

speed 14

statistics 31-33

thick 8, 11-12, 20-21, 24

thin 8, 11-12, 20, 22-24

twisted pair 8, 11-12, 20, 22-24

Ethertalk 12, 29

IEEE 32

Installer 27-29

LAN (Local Area Network) 9  
LocalTalk 5, 13, 14  
Loopback test 31, 33

MAU (Medium Attachment Unit) 11

Macintosh

- finder 26, 27
- install 7, 13, 16-19, 21-23
- interface 10, 34
- network 11, 13-15, 20, 30, 31, 35
- system 7, 26-28

Manager2 3, 5, 30-33

Network *See* Ethernet, network

Reconfiguring Ether2 16-17

Reset Ether2 33

Set address 31-32

Standard Ethernet *See* Ethernet, thick

TCP/IP 5

T-connector 12, 20-23

Terms and conditions of purchase B

Transceiver 12, 20, 21

Unix 10

VAX 10

Warranty 6, B

Xerox Corporation 9