EtherLink III Driver for SCO UNIX

Release and Installation Notes

Release 1.3

µIntroduction 2
Installation of the EtherLink III Driver Package 3
Configuring the EtherLink III Driver 4
EISA Configuration 5
MCA Configuration 6
Configuring the EtherLink III Driver with TCP/IP 1.1.3 7
Configuring the EtherLink III Driver with TCP/IP 1.2 10
Configuring the EtherLink III Driver with IPX 13
Configuring the EtherLink III Driver with OSI 16
Configuring the EtherLink III Driver with NetBEUI 18
Common Configuration Section 21
Removing the EtherLink III Driver 25
Using mkdev to Remove the EtherLink III Driver 25
Using netconfig to Remove the EtherLink III Driver 25
Reconfiguring the EtherLink III Driver 27
Using netconfig to Reconfigure the EtherLink III Driver 27
EtherLink III Driver Messages and Errors 28
Tuning the EtherLink III Driver 30
NFS Performance Considerations 30
STREAMS Tuning 30

tc"Introduction**";,1§Introduction**

This manual provides instructions for installing and configuring the EtherLink III UNIX Driver, Release 1.3. The driver supports four versions of the EtherLink III adapter, the 3C579, an EISA adapter, the 3C529, an MCA version of the same adapter, the 3C589, a PCMCIA version of the same adapter, and the 3C509, an ISA version of the same adapter.

The EtherLink III Ethernet driver, Release 1.3, is designed to run under the following versions of SCO operating systems:

UNIX	Release 3.2.2 and 3.2.4
Open Desktop	Release 1.2, 2.0, and 3.0
Open Server	Release 3.0

In addition, the EtherLink III driver can be used with the SCO LLI Protocol stacks listed below. Included in this list are supported versions of each protocol stack:

TCP/IP	Release 1.1.3 and 1.2
OSI/LT-610	Release 1.4.20
NetBEUI	Release 1.0.0
IPX	Release 1.0.1

It is expected that the EtherLink III driver will also run with subsequent releases of the above products as long as SCO keeps the products backwards compatible with existing drivers. If you have an older version of SCO UNIX or of one of the protocol stacks and you would like to use the EtherLink III adapter and its UNIX driver, you must upgrade your software. Contact SCO for upgrade packages.

Whenever an SCO software product is installed, all associated maintenance supplements should also be installed, as directed by product documentation. Before installing the EtherLink III driver package, you must also have the SCO Link Kit installed on your machine.

tc"Installation of the EtherLink III Driver Package**";,1§Installation of the EtherLink III Driver Package**

Under the SCO UNIX system, installation is done through the **custom** utility. Follow the steps outlined below to install the EtherLink III driver package:

1. Reboot the machine.

2. Enter System Maintenance (single-user) mode by typing the root password. The super user has access to all the system files, so be careful not to overwrite, delete, or corrupt any files by accident.

3. At the prompt, type:

   custom

   The main custom menu appears with the Install option highlighted. Select **Install**.

4. The following message prompts you for the product name: Select a Product.
   Choose **A New Product** and press <Return>.

5. The Install menu appears. Select **Entire Product**.

6. You are prompted to insert Distribution Floppy Volume 1. Insert the EtherLink III Driver Installation diskette into drive 0 and press <Return> to continue. The following messages appear:

   Installing custom data files....
   Executing Product Prep Script....
   Creating File lists...

7. You are prompted to insert the EtherLink III Driver Installation Disk, Volume 1. Because it is already in the floppy disk drive, simply press <Return> to continue. The following message appears:

   Extracting files...

   It takes several minutes for the files to be extracted from the EtherLink III Driver diskette. The following messages appear:

   Executing EtherLink III Driver (Release 1.0) Init Script
   Installing the e3E driver

8. You are prompted to press a key to continue. Press any key on the keyboard, and you will see the following message:

   Checking file permissions....

9. Once the file permissions have been checked, you will be returned to the custom Install menu. Select **quit** and press <Return>. Select **yes** and press <Return> to exit.

The driver is now installed in your UNIX filesystem, but it is not yet configured into your UNIX kernel. Before configuring the driver into the kernel, you must first install the protocol stack that will be using the EtherLink III driver, for instance TCP/IP or NetBEUI.

tc"Configuring the EtherLink III Driver**";,1§Configuring the EtherLink III Driver**

Each machine can support from one to four EtherLink III adapters. For each adapter, you must use **mkdev** or **netconfig** to configure the driver. The Maintenance Supplement disk for UNIX System V/386 Release 3.2 contains the **netconfig** utility. You must use the **mkdev** utility to configure the TCP/IP Release 1.1.3 protocol stack; all other protocol stacks require the use of the **netconfig** utility for configuration, including TCP/IP Release 1.2.

Usually when new drivers are installed in the UNIX system, you must concern yourself with choosing an available Interrupt Request Level (IRQ), an available I/O Base Address, and an available Memory Base Address (PCMCIA adapter only). Each device in the UNIX system must have a unique IRQ, I/O Base Address, and Memory Base Address. These typically match jumpered settings on your hardware adapter. However, in the case of the EtherLink III, there are no jumpers on the adapter. For the 3C579 (EISA version) and the 3C529 (MCA version), the IRQ and I/O Base Address values are chosen by the configuration utility provided with your hardware. For the 3C509 (ISA version) and 3C589 (PCMCIA version), you can tell the system to choose available IRQ, I/O Base Address, and Memory Base Address (PCMCIA adapter only) values for you. This will simplify the driver configuration.

If you do choose to select your own IRQ, I/O Base Address, and Memory Base Address values, the current list of devices (and their IRQ, I/O Base Address, and Memory Base Address values) is shown on the console when the system boots. This information is also available in the file, */usr/adm/hwconfig*. Additionally, the operating system reserves interrupt vectors 4, 3, and 7 for com1, com2, and lpt0.

NOTE: The *sio* driver under SCO UNIX uses interrupt vectors 3 and 4. You can assign either of these interrupt vectors to another driver, but if you assign both 3 and 4 to other drivers, you remove the *sio* driver from the Link Kit. On a system running SCO MPX, you cannot link the kernel if the *sio* driver is removed.

For the 3C509 (ISA version) and the 3C589 (PCMCIA version), there might be an IRQ, I/O Base Address, or Memory Base Address conflict with a device or other hardware installed in the computer but not known to the UNIX system. This could happen whether you choose these system resource values or have the system choose them for you. If the adapter does not work correctly and you suspect that there is a system resource conflict, do the following:

1. Boot DOS and run the Configuration and Diagnostic Program that is on the *EtherDisk* diskette that is shipped with the adapter.

2. Select the "Configure Adapter" screen. Select "Auto Configure". The program will probe the devices and other hardware installed in the computer and will select a set of system resource values that do not cause conflicts. Make note of the values chosen.

3. Boot UNIX and configure the driver using the system resource values chosen by the Configuration and Diagnostic Program. This should eliminate any conflicts.

Before configuring your EtherLink III adapter, you must also know if your adapter is a 3C579 (EISA bus adapter), a 3C529 (MCA bus adapter), a 3C589 (PCMCIA bus adapter), or a 3C509 (ISA bus adapter). The EtherLink III 3C579 EISA adapter can only be installed in EISA computers. The EtherLink III 3C529 MCA adapter can only be installed in MCA (Micro Channel Architecture) computers. The EtherLink III 3C589 PCMCIA adapter can only be installed in computers with PCMCIA slots (usually portable computers). The EtherLink III 3C509 ISA adapter can be installed in either an EISA or ISA computer. If your adapter is a 3C579 EISA adapter, you must follow the directions in the next section, "EISA Configuration", first before configuring the EtherLink III driver with a protocol stack. Also, if your adapter is a 3C509 ISA adapter that has been set up for automatic EISA configuration (by using the 3Com EtherLink III Diagnostic and Configuration Program), follow the directions in

the "EISA Configuration" section. If your adapter is a 3C529 MCA adapter, you must follow the directions in the section after that, "MCA Configuration", first before configuring the EtherLink III driver with a protocol stack.

The four allowable EtherLink III devices are named e3E0, e3E1, e3E2, and e3E3. If you install only one adapter in your machine, you must use the zero-numbered device, e3E0. For the EtherLink III ISA adapter (3C509), device e3E0 will always be associated with the adapter with the lowest Ethernet address, device e3E1 with the adapter with the next lowest, etc. This is true even in the case where an adapter is added to an existing configuration. If the adapter being added has a lower Ethernet address than any of the adapters already installed, the device names of the existing adapters will change so that the devices are in Ethernet address order.

tc"EISA Configuration**";,2§EISA Configuration**

The EtherLink III EISA adapter (3C579) supports the automatic configuration mechanism supplied on EISA computers. All EtherLink III EISA adapters must be configured using this mechanism before the driver can be configured into the UNIX kernel. The EtherLink III ISA adapter (3C509) also has a mode where it behaves like an EISA adapter for configuration purposes. The directions below apply to 3C509 adapters in EISA mode.

First, physically install all EtherLink III EISA adapters; then run the EISA configuration utility supplied with your computer. This utility will recognize all the installed EtherLink III EISA adapters and will assign an unused Interrupt Request Level (IRQ) to each adapter. The utility will also allow you to choose the transceiver type (on-board or external) you wish to use with the adapter.

While running the EISA configuration utility, note in which slot each of the EtherLink III EISA adapters is installed. Also note the IRQ that is assigned to each EtherLink III EISA adapter. This information will be needed later when the driver is configured into the UNIX kernel.

If you ever need to assign a different IRQ to an EtherLink III EISA adapter (for instance, if a conflict is detected when configuring the driver into the kernel), make sure to run the EISA configuration utility again to assign the new IRQ to the adapter.

tc"MCA Configuration**";,2§MCA Configuration**

The EtherLink III MCA adapter (3C529) supports the automatic configuration mechanism supplied on MCA computers. All EtherLink III MCA adapters must be configured using this mechanism before the driver can be configured into the UNIX kernel.

First, physically install all EtherLink III MCA adapters; then run the MCA configuration utility supplied with your computer. This utility will recognize all the installed EtherLink III MCA adapters and will assign an unused Interrupt Request Level (IRQ) and an unused I/O Base Address to each adapter. The utility will also allow you to choose the transceiver type (on-board or external) you wish to use with the adapter.

While running the MCA configuration utility, note the I/O Base Address and IRQ that is assigned to each EtherLink III MCA adapter. This information will be needed later when the driver is configured into the UNIX kernel.

If you ever need to assign a different IRQ or I/O Base Address to an EtherLink III MCA adapter (for instance, if a conflict is detected when configuring the driver into the kernel), make sure to run the MCA configuration utility again to assign the new value to the adapter.

tc"Configuring the EtherLink III Driver with TCP/IP 1.1.3**";,2§Configuring the EtherLink III Driver with TCP/IP 1.1.3**

Before proceeding, verify that the following items are installed:

* SCO TCP/IP, Release 1.1.3
* Link Kit

To install the EtherLink III driver for use with TCP/IP, make sure you are in system maintenance mode. If necessary, reboot your machine, then enter the root password at the prompt. Follow the steps listed below.

1. Type **mkdev e3E** at the command-line prompt (#). You will see the following messages:

   The following LLI drivers are configured:
   No LLI drivers are currently configured.

   The following LLI chains are configured:
   No LLI chains are currently configured.

   Add (configure) or remove the EtherLink III driver or q to quit (a/r/q) :

   Type **a** and press <Return> to configure the driver.

2. The following messages will appear:

   Configuring 3Com EtherLink III board 0
   Installing the e3E driver into the link kit

3. Next, go to the section later in this document titled "Common Configuration Section". When you are done with that section, return to this point.

4. Once the parameters have been chosen for the EtherLink III adapter, you will be asked if you have another EtherLink III card to configure.

   Do you have another e3E board to install?

   If you have just one adapter to install and configure, answer **n** to the question. If you have additional EtherLink III cards to configure, answer **y** and repeat the steps in this section, starting at number 2.

5. Finally, you are asked if you wish to relink the kernel. To save time, wait to relink the kernel until you install all the software that you plan to install at this time. If you choose not to relink the kernel (by entering **n**), you will be returned to the command line.

   If you enter **y** to relink the kernel, a message confirms that choice. Then you see this prompt:

   Do you want this kernel to boot by default? (y/n)

6. Enter **y**. You see several messages, including:

   Do you want the kernel environment rebuilt? (y/n)

7. Enter **y**. This procedure takes a few minutes. When the rebuild is complete, you will be returned to the command line.

   The main part of the driver configuration is now complete. You must now configure TCP/IP so that it will use your driver when the system is rebooted. In order to configure the TCP/IP protocol stack, you must use the **mkdev** utility provided with SCO UNIX.

8. Make sure you are in system maintenance mode. If you've just gone through the previous seven steps, you should still be in system maintenance mode. At the system prompt, type **mkdev tcp** and press <Return>. You will see the following prompt:

```
Which driver(s) will TCP/IP be using:

Please choose one of the following:
        e3A
        e3B
        e3C
        e3D
        e3E
        wdn
        exos
        slip
        token

Enter the name of the driver TCP/IP will be using or
enter q to quit:
```

Type **e3E** and press <Return>. If you enter **q** at this time, the TCP/IP configuration procedure is aborted.

9. The following prompt is displayed:

```
Enter DOMAIN name for e3E [sco.COM]
```

Note that name in the square brackets is an example of the format that you should use to enter the domain name. If the domain name is correct for your machine, simply press <Return>. Otherwise, enter the correct domain name and press <Return>. This message occurs only for the first driver chosen.

10. The following message appears:

```
Interface e3E0 IP address [132.147.160.1]
```

Note that the number in the square brackets is an example of the format that you should use to enter the IP address (four decimal numbers separated by periods).

Enter the IP address for the EtherLink III adapter and press <Return>.

11. You will then see the following prompt:

```
Does Interface e3E0 use a broadcast address of all 0's [y/n]
```

If your TCP/IP network uses broadcast addresses of all 0's, enter **y** and press <Return>; if the broadcast address on the network is all 1's, enter **n** and press <Return>. It's important that all machines on your TCP/IP network agree on a common broadcast address. For more information, see the appropriate sections about broadcast address parameters in the TCP/IP Release and Installation Notes.

12. The following message appears:

Interface e3E0 broadcast address [132.147.255.255]:

The broadcast address varies depending on the IP address that you specified previously. If this address is correct, press <Return>. Otherwise, enter the correct broadcast address and press <Return>.

13. Next, you see this message:

Interface e3E0 netmask [255.255.0.0]:

If the netmask is correct, press <Return>. Otherwise, enter a different number for the netmask, and press <Return>.

14. You are then returned to the SCO TCP/IP Ethernet Driver Configuration menu. If you have more than one EtherLink III adapter or other Ethernet adapters to configure under TCP/IP, select the correct type and enter the required information for that driver at each of the prompts. When all drivers are configured, enter **q** to quit. When the TCP/IP configuration is complete, the following message is displayed:

TCP/IP Driver Configuration Completed.

See Chapter 1 of the *SCO TCP/IP Administrator's Guide* for more information about TCP/IP configuration and setup. The most helpful sections are "Setting Interface Parameters", "Local Subnetworks", and "Internet Broadcast Addresses".

The EtherLink III driver should now be completely configured into the SCO UNIX kernel, and TCP/IP should be set up to use the EtherLink III adapter. Be sure to follow the steps needed to set up your TCP/IP network in the *SCO TCP/IP Release and Installation Notes*. You should now reboot your kernel by typing **init 0** at the system prompt.

NOTE: If you install the LLI driver package after you install the EtherLink III driver, and you are using TCP/IP Release 1.1.3, the LLI driver package will overwrite a needed TCP/IP configuration file. You must save this file (*/usr/lib/mkdev/tcp*) first before installing the LLI driver disk, install the LLI driver package, then copy your saved version back to */usr/lib/mkdev/tcp*.

tc"Configuring the EtherLink III Driver with TCP/IP 1.2**";,2§Configuring the EtherLink III Driver with TCP 1.2**

Before proceeding, verify that the following items are installed:

* SCO TCP/IP, Release 1.2 (or later)
* Link Kit

To configure TCP/IP Release 1.2 for the EtherLink III adapter, follow these steps:

1. Make sure you are in system maintenance mode. If necessary, reboot your machine, then enter the root password at the prompt.

2. At the system prompt, type **netconfig**, then press <Return>. The following menu appears:

```
Currently configured chains:
 1. sco_tcp->lo0
        sco_tcp         SCO TCP/IP for UNIX
        lo0             SCO TCP/IP Loopback driver

Available options:
 1. Add a chain
 2. Remove a chain
 3. Reconfigure an element in a chain
 q. Quit

Select option:
```

3. To select the Add a Chain option, type **1**, then press <Return>. The following menu appears:

```
Num   Name          Description
 1.   sco_tcp       SCO TCP/IP for UNIX

Select top level of chain to Add or q to quit:
```

4. The list of products that can be configured as the top of a chain will depend on which software you have currently installed on your system. Select the option that corresponds to **sco_tcp**. The following menu is displayed:

```
Add chain : sco_tcp->
Num   Name          Description
list of network drivers

Select next level of chain to Add or q to quit:
```

The list of drivers depends on the software currently installed. If you have installed the EtherLink III driver package on your machine, you should see the **e3E0** device (the list should always show the next available device). Choose the number corresponding to the EtherLink III device and press <Return>.

5. You will now see the following prompt, asking you to confirm the selected product chain.

```
Add chain sco_tcp->e3E0 (y/n):
```

6. If the displayed product chain is correct, type **y**, then press <Return>. If the chain is incorrect, type **n**, then press <Return> to return to the **netconfig** main menu. You can then either quit **netconfig**, or add a different chain of products.

   The following messages appear while the selected chain is being configured:

```
Adding: sco_tcp->e3E0
Configuring 3Com EtherLink III board 0
Installing the e3E driver into the link kit
```

7. Next, go to the section later in this document titled "Common Configuration Section". When you are done with that section, return to this point.

8. When you have responded to all the EtherLink III driver-specific prompts, **netconfig** will prompt you for TCP/IP-specific information:

```
Installing SCO TCP/IP over e3E0

Please enter the following information in order to configure e3E0
Enter the internet address of this interface:
Enter the netmask for this interface (default: 255.255.0.0):
Does the interface use a broadcast address of all 1's? (y/n) (default: y):

Enter the broadcast address for this interface
                                        (default: 132.1.255.255)
```

9. Once you have entered the parameters for your TCP/IP setup, you will be asked to confirm your choices. You will then see the following message and prompt:

```
Adding host <hostname> to /etc/hosts

0 Pseudo ttys are currently configured, do you want to:

                1. Add Pseudo ttys
                2. Remove Pseudo ttys

Select an option or enter q to quit [q]:
```

10. If you would like to add pseudo ttys, add them now. Once this step has been completed, you will see the following message:

```
TCP/IP Configuration Complete

Currently configured chains:
 1. sco_tcp->lo0
        sco_tcp         SCO TCP/IP for UNIX
        lo0             SCO TCP/IP Loopback driver
 2. sco_tcp->e3E0
        sco_tcp         SCO TCP/IP for UNIX
        e3E0            3Com EtherLink III Ethernet Driver, board 0

Available options:
 1. Add a chain
 2. Remove a chain
 3. Reconfigure an element in a chain
 q. Quit

Select option:
```

11. If you wish to add another chain, select option **1** and repeat the **netconfig** procedure. After you configure all the drivers that you want on your system, enter **q** to quit **netconfig**.

12. Finally, you are asked if you wish to relink the kernel. To save time, wait to relink the kernel until you install all the software that you plan to install at this time. If you choose not to relink the kernel (by entering **n**), you will be returned to the command line.

    If you enter **y** to relink the kernel, a message confirms that choice. You will then see this prompt:

    Do you want this kernel to boot by default? (y/n)

13. Enter **y**. You see several messages, including:

    Do you want the kernel environment rebuilt? (y/n)

14. Enter **y**. This procedure takes a few minutes. When the rebuild is complete, you will be returned to the command line. Be sure to reboot your system so that your configuration changes will take effect.

tc"Configuring the EtherLink III Driver with IPX**";,2§Configuring the EtherLink III Driver with IPX**

Before proceeding, verify that the following items are installed:

* SCO IPX/SPX, Release 1.0 (or later)
* Link Kit

To configure IPX/SPX for the EtherLink III adapter, follow these steps:

1. Make sure you are in system maintenance mode. If necessary, reboot your machine, then enter the root password at the prompt.

2. At the system prompt, type **netconfig**, then press <Return>. The following menu appears:

```
No chains configured:

1. Add a chain
2. Remove a chain
3. Reconfigure an element in a chain
q. Quit

Select option:
```

3. To select the Add a Chain option, type **1**, then press <Return>. The following menu appears:

```
Num   Name        Description
 1.   sco_tcp     SCO TCP/IP for UNIX
 2.   sco_ipx     SCO IPX/SPX for UNIX

Select top level of chain to Add or q to quit:
```

4. The list of packages that can be at the top of a **netconfig** chain will depend on which software has been installed on your system. Select the number associated with **sco_ipx** (in this case number **2**) and press <Return>. The following menu is displayed:

```
Add chain : sco_ipx->
Num   Name        Description
list of network drivers

Select next level of chain to Add or q to quit:
```

The list of drivers depends on the software currently installed. If you have installed the EtherLink III driver package on your machine, you should see the **e3E0** device (the list should always show the next available device). Choose the number corresponding to the EtherLink III device and press <Return>.

5. You will now see the following prompt, asking you to confirm the selected product chain:

```
Add chain sco_ipx->e3E0 (y/n):
```

6. If the displayed product chain is correct, type **y**, then press <Return>. If the chain is incorrect, type **n**, then press <Return> to return to the **netconfig** main menu. You can then either quit **netconfig**, or add a different chain of products.

The following messages appear while the selected chain is being configured:

```
Adding: sco_ipx->e3E0
Configuring 3Com EtherLink III board 0
Installing the e3E driver into the link kit
```

7. Next, go to the section later in this document titled "Common Configuration Section". When you are done with that section, return to this point.

8. When you have responded to all the EtherLink III driver-specific prompts, **netconfig** begins configuring the specified chain of products. You will see a series of messages indicating the process of the configuration.

```
Installing SCO IPX/SPX over e3E0

Changing Streams resources needed for IPX/SPX ... done.
Installing drivers into link kit ... ipx ipxe nvt spx xecho done.
Copying files ... done.
Saving etc/gettydefs in /usr/lib/ipxrt/save ... done.
Editing etc/gettydefs ... done.
```

9. **netconfig** will prompt for the name to be assigned to the server. By convention, this name should be the same as the machine name reported by **uname**.

```
Enter NVT SERVER NAME [Calvin]:
```

Accept the default by pressing <Return> or enter a valid server name.

10. **netconfig** will prompt for the Service Advertising reply delay.

```
Enter SAP REPLY DELAY (1 to 300) [300]:
```

Accept the default by pressing <Return> or enter a number between 1 and 300.

11. **netconfig** will prompt for the internal network number. This number must be unique for every machine on all sub-networks.

```
Enter INTERNAL NETWORK NUMBER (8 hex digits):
```

Enter a valid hex number up to 8 digits long.

12. **netconfig** will prompt for the network number. This must be different from the internal network number. It is common to all machines on a given sub-network.

```
Enter NETWORK NUMBER (8 hex digits):
```

Enter a valid hex number up to 8 digits long.

13. **netconfig** displays the following menu to select the LAN type:

```
Available LAN TYPES:
        1. ETHERNET_II
        2. ETHERNET_802.3
        3. TOKEN_RING
Select option [2]:
```

Select either 1 or 2, depending on your LAN configuration.

14. **netconfig** displays the following menu to select the protocol number:

```
Available PROTOCOL NUMBERS:
        1. 1 to FF
        2. DEFAULT (-2)
Select option [2]:
```

Choose the SAP value that IPX/SPX will use in communicating over Ethernet.

15. **netconfig** displays the following output indicating that the chain has been assembled:

```
IPX/SPX Configuration Complete..

Currently configured chains:

1. sco_ipx->e3E0
      sco_ipx       SCO IPX/SPX for UNIX
      e3E0          3Com EtherLink III Ethernet Driver, board 0

Available options:
      1. Add a chain
      2. Remove a chain
      3. Reconfigure an element in a chain
      q. Quit
Select option:
```

16. If you wish to add another chain, select option **1** and repeat the **netconfig** procedure. After you configure all the drivers that you want on your system, enter **q** to quit **netconfig**.

17. Finally, you are asked if you wish to relink the kernel. To save time, wait to relink the kernel until you install all the software that you plan to install at this time. If you choose not to relink the kernel (by entering **n**), you will be returned to the command line.

    If you enter **y** to relink the kernel, a message confirms that choice. You will then see this prompt:

    ```
    Do you want this kernel to boot by default? (y/n)
    ```

18. Enter **y**. You see several messages, including:

    ```
    Do you want the kernel environment rebuilt? (y/n)
    ```

19. Enter **y**. This procedure takes a few minutes. When the rebuild is complete, you will be returned to the command line. Be sure to reboot your system so that your configuration changes will take effect.

For more information about configuration parameters for IPX, refer to the SCO IPX/SPX Release Notes.

tc "Configuring the EtherLink III Driver with OSI**";,2§Configuring the EtherLink III Driver with OSI**

Before configuring the EtherLink III driver under the OSI protocol stack, be sure that the following items are installed:

* SCO Retix OSI, Release 1.4.20 (or later)
* Link Kit

Refer to the Release and Installation Notes that are packaged with the SCO/Retix OSI software for more information.

To install the EtherLink III driver for use with the OSI protocol stack, make sure you are in system maintenance mode. If necessary, reboot your machine, then enter the root password at the prompt. Follow the steps listed below.

1. Type **netconfig** at the command-line prompt (#). You will see the following messages:

```
Available options
  1. Add a chain
  2. Remove a chain
  3. Reconfigure an element in a chain
  q. Quit
Select option:
```

Type **1** and press <Return> to configure the OSI protocol stack and the EtherLink III driver. The following menu appears:

```
Num   Name          Description
 1.   lt610         Retix OSI LT-610 Lower Layers

Select top level of chain to Add or q to quit:
```

2. The list of products that can be configured as the top of a chain will depend on which software you have currently installed on your system. Select the option that corresponds to **lt610**. The following menu is displayed:

```
Add chain : sco_ipx->
Num   Name          Description
list of network drivers

Select next level of chain to Add or q to quit:
```

The list of drivers depends on the software currently installed. If you have installed the EtherLink III driver package on your machine, you should see the **e3E0** device (the list should always show the next available device). Choose the number corresponding to the EtherLink III device and press <Return>.

3. Now that the chain has been specified, the following messages will appear:

```
Configuring 3Com EtherLink III board 0
Installing the e3E driver into the link kit
```

4. Next, go to the section later in this document titled "Common Configuration Section". When you are done with that section, return to this point.

5. You will now resume normal OSI installation as described in the SCO Retix/OSI installation guide. Be sure to answer **yes** when asked if you would like to relink the kernel so that the driver will be configured into the kernel.

tc "Configuring the EtherLink III Driver with NetBEUI**";,2§Configuring the EtherLink III driver with NetBEUI**

Before proceeding, verify that the following items are installed:

* NetBEUI, Release 1.0.0 (or later)
* Link Kit

NOTE: The instructions below assume you are installing LAN Manager over NetBEUI. If you are installing LAN Manager over TCP/IP, follow the instructions in the SCO *Microsoft LAN Manager for UNIX Systems, Release and Installation Notes*. If you are using TCP/IP Release 1.1.3, you must also use the instructions found in an earlier section in this document, "Configuring the EtherLink III Driver Under TCP/IP 1.1.3". Likewise, if you are using TCP/IP Release 1.2, you must use the instructions found in the section, "Configuring the EtherLink III Driver Under TCP/IP 1.2."

To configure LAN Manager over NetBEUI, make sure you are in system maintenance mode. If necessary, reboot your machine, then enter the root password at the prompt. Then follow these steps:

1. At the system prompt, type **netconfig**, then press <Return>. The following menu appears:

```
No chains configured:

1. Add a chain
2. Remove a chain
3. Reconfigure an element in a chain
q. Quit

Select option:
```

2. To select the Add a Chain option, type **1**, then press <Return>. The following menu appears:

```
Num  Name      Description
1.   lmxc      Microsoft LAN Manager Client for UNIX Systems
2.   lmxs      Microsoft LAN Manager Server for UNIX Systems

Select top level of chain to Add or q to quit:
```

   In the example shown above, both the LAN Manager Client and LAN Manager Server are installed. If only one or the other application is installed, only one is listed.

3. Type the number that corresponds to the LAN Manager component you want to install. To configure LAN Manager Client, type **1**, then press <Return>. To configure LAN Manager Server, type **2**, then press <Return>.

   The rest of the prompts show the string lmxc, which corresponds to LAN Manager Client. If you are configuring the LAN Manager Server, then the string lmxs appears instead.

The following prompt appears:

```
Add chain : lmxc->

Num  Name          Description
1.   nbe NetBEUI

Select next level of chain to Add or q to quit:
```

4. To select the NetBEUI transport, type the number corresponding to **nbe** (in this case **1**), then press <Return>. The following prompt appears:

```
Add chain : lmxc->nbe->

Num       Name      Description
list of network drivers

Select next level of chain to Add or q to quit:
```

The list of drivers depends on the software currently installed. If you have installed the EtherLink III driver package on your machine, you should see the **e3E0** device (the list should always show the next available device). Choose the number corresponding to the EtherLink III device and press <Return>.

Once you have chosen the EtherLink III device and pressed <Return>, you will see the following prompt, asking you to confirm the selected product chain:

```
Add chain lmxc->nbe->e3E0 (y/n):
```

5. If the displayed product chain is correct, type **y**, then press <Return>. If the chain is incorrect, type **n**, then press <Return> to return to the **netconfig** main menu. You can then either quit **netconfig**, or add a different chain of products.

The following messages appear while the selected chain is being configured:

```
Adding: lmxc->nbe->e3E0
Configuring 3Com EtherLink III board 0
Installing the e3E driver into the link kit
```

6. Next, go to the section later in this document titled "Common Configuration Section". When you are done with that section, return to this point.

7. When you have responded to all the EtherLink III driver-specific prompts, **netconfig** begins configuring the specified chain of products. You will see a series of messages indicating the process of the configuration.

After **netconfig** configures the chain, the following prompt appears:

```
Do you want to start the LMX Client every time you go multiuser (y/n)
```

8. If you want LAN Manager Client to start every time you leave system-maintenance mode, enter **y**, then press <Return>. Otherwise, enter **n**, then press <Return>.

The following messages appear:

```
Currently configured chains:

1. lmxc->nbe->e3E0
```

```
    lmxc        Microsoft LAN Manager Client for UNIX Systems
    nbe NetBEUI
    e3E0        3Com EtherLink III Ethernet Driver, board 0

Available options:
    1. Add a chain
    2. Remove a chain
    3. Reconfigure an element in a chain
    q. Quit
Select option:
```

9. If you wish to add another chain, select option **1** and repeat the **netconfig** procedure. After you configure all the drivers that you want on your system, enter **q** to quit **netconfig**.

10. Finally, you are asked if you wish to relink the kernel. To save time, wait to relink the kernel until you install all the software that you plan to install at this time. If you choose not to relink the kernel (by entering **n**), you will be returned to the command line.

    If you enter **y** to relink the kernel, a message confirms that choice. Then you will see this prompt:

    ```
    Do you want this kernel to boot by default? (y/n)
    ```

11. Enter **y**. You will see several messages, including:

    ```
    Do you want the kernel environment rebuilt? (y/n)
    ```

12. Enter **y**. This procedure takes a few minutes. When the rebuild is complete, you will be returned to the command line.

The LAN Manager Administrator's Guide lists all possible entries and values for the Microsoft NetBEUI tunable parameters, including default options. The guide also contains definitions and descriptions of these parameters.

tc "Common Configuration Section";,1§Common Configuration Section

This section describes the part of the configuration procedure that is common to all the protocols described above. Come to this section when directed to by the configuration procedure for the protocol with which you are configuring the driver. When done with this section, return to the point where you were when instructed to come to this section.

1. First, you see this message:

```
                    3Com EtherLink III Setup

The setup procedure for the 3Com EtherLink III adapter is dependent on
whether it is an ISA bus adapter (3C509), an EISA bus adapter (3C579),
an MCA bus adapter (3C529), or a PCMCIA bus adapter (3C589).  You must
know which EtherLink III adapter type you have in order to configure the
adapter correctly.

Is this an MCA (Micro Channel Architecture) bus computer? (y/n/q)
```

   If you are using an MCA bus computer, answer **y** to the question; if your computer has an ISA, EISA, or PCMCIA bus, answer **n** and skip to step 4.

2. You must be using MCA adapters (3C529). You will now be asked a series of questions related to your adapter. It is extremely important that the information you provide here matches the configuration you have set up with your MCA configuration utility. The next prompt you will see is:

```
You must be using MCA bus adapters (3C529).

You should first run the MCA configuration utility supplied with the
computer to configure all the installed EtherLink III adapter(s).
For each adapter, note the I/O Base Address and the Interrupt Request
Level (IRQ) assigned to the adapter.  You will need to supply this
information during the setup procedure.

You must now enter the I/O Base Address assigned to the
adapter.  If the I/O Base Address is already in use and
you decide to use a different one, remember to re-run
the MCA configuration utility to change the adapter's
I/O Base Address setting to the new value.

Enter I/O base address (200..4e00) or 'q' to quit:
```

   Enter the value of the I/O Base Address for the adapter. Be sure this value matches the value you have set up with your MCA configuration utility.

3. Once the I/O Base Address has been specified, you will be asked for the Interrupt Request Level:

```
You must now enter the Interrupt Request Level assigned
to the adapter.  If the IRQ is already in use and you
decide to use a different one, remember to re-run the
MCA configuration utility to change the adapter's IRQ
setting to the new value.

Enter IRQ (3 5 7 9 10 11 12 15) or 'q' to quit:
```

   Enter the value of the Interrupt Request Level for the adapter. Be sure this value matches the value you have set up with your MCA configuration utility. Once you have specified the Interrupt Request Level, skip to step 18.

4. You will now be asked if you are using an EISA adapter (3C579) or an ISA adapter (3C509) in EISA mode.

Is this an EISA bus adapter (3C579 or 3C509 in EISA mode)? (y/n/q)

If you have a 3C579 adapter or a 3C509 adapter in EISA mode, answer **y** to the question; if your adapter is a 3C589 or a 3C509 in ISA mode, answer **n** and skip to step 7.

5. You will now be asked a series of questions related to your adapter. It is extremely important that the information you provide here matches the configuration you have set up with your EISA configuration utility. The next prompt you will see is:

You should first run the EISA configuration utility supplied with the computer to configure all the installed EtherLink III EISA adapter(s). For each adapter, note the slot in which the adapter is installed and the Interrupt Request Level that is assigned to the adapter. You will need to supply this information during the setup procedure.

You must now enter the number of the slot in which the adapter is installed.

Enter a slot number between 1 and 15 or 'q' to quit:

Enter the slot number where the adapter resides and press <Return>.

6. Once the slot number has been specified, you will be asked for the Interrupt Request Level:

You must now enter the Interrupt Request Level assigned to the adapter. If the IRQ is already in use and you decide to use a different one, remember to re-run the EISA configuration utility to change the adapter's IRQ setting to the new value.

Enter IRQ (3 5 7 9 10 11 12 15) or 'q' to quit:

Enter the value of the Interrupt Request Level for the adapter. Be sure this value matches the value you have set up with your EISA configuration utility. Once you have specified the Interrupt Request Level, skip to step 18.

7. You will now be asked if you are using a PCMCIA adapter (3C589).

Is this a PCMCIA bus adapter (3C589)? (y/n/q)

If you have a 3C589 adapter, answer **y** to the question; if your adapter is a 3C509 in ISA mode, answer **n** and skip to step 12.

8. You will now be asked a series of questions related to your adapter. The next prompt you will see is:

For each PCMCIA bus adapter, you must specify the slot in which the adapter is installed. There are also four parameters which you may need to supply: the Interrupt Request Level, the I/O Base Address, the Memory Base Address, and the Transceiver Type. However, because the adapter can be configured automatically, you can choose not to specify configuration parameters and let them be chosen for you. An available Interrupt Request Level, I/O Base Address, and Memory Base Address will be selected, and the driver will automatically select the transceiver based on which connector the network is attached to. If you wish to automatically configure the adapter, answer yes at the appropriate prompt.

You must now enter the number of the slot in which the adapter is installed.

```
Enter a slot number between 1 and 8 or 'q' to quit:
```

Enter the slot number where the adapter resides and press <Return>. PCMCIA slots are numbered starting with 1.

9. You are now asked if you want to automatically configure the adapter:

```
Automatically configure the EtherLink III adapter? (y/n/q)
```

If you would like the adapter to be configured automatically, then answer **y** to the question. If you would like to the adapter to use a specific Interrupt Request Level, a specific I/O Base Address, or a specific Memory Base Address, or if you would like the adapter to use a transceiver different from the default, then answer **n**. If you answer **y** for automatic configuration, skip to step 18.

10. If you have not chosen automatic configuration, you will see the next three prompts:

```
Enter IRQ (3 5 7 9 10 11 12 15) [10] or 'q' to quit:
Enter I/O base address (200..3e0) [300] or 'q' to quit:
Enter memory base address (c8000..dc000) [c8000] or 'q' to quit:
```

In each case, your choices are shown in parentheses; the default value is shown in square brackets. If you would like to use the default, press <Return> at each prompt, and the defaults will be used. At any time, if you wish to stop the EtherLink III configuration, type **q** and press <Return> at the prompt.

11. Now you will be asked if you are using the coax transceiver:

```
Are you using the coax transceiver? (y n) [n] or 'q' to quit:
```

Answer **y** if you will connect the adapter to the network using the cable with the round BNC connector. Answer **n** if you will connect the adapter to the network using the cable with the 8-pin RJ-45 connector. Now skip to step 18.

12. For ISA (3C509) adapters, you are asked the following question:

```
For each ISA bus adapter, there are three parameters which you
may need to supply: the Interrupt Request Level, the I/O Base
Address, and the Transceiver Type. However, because the adapter
can be configured automatically, you can choose not to specify
configuration parameters and let them be chosen for you. An
available Interrupt Request Level and I/O Base Address will be
selected, and the driver will automatically select the transceiver
based on which connector the network is attached to. If you
wish to automatically configure the adapter, answer yes at the
next prompt.

Automatically configure the EtherLink III adapter? (y/n/q)
```

If you would like the adapter to be configured automatically, then answer **y** to the question. If you would like to the adapter to use a specific Interrupt Request Level or a specific I/O Base Address, or if you would like the adapter to use a transceiver different from the default, then answer **n**. If you answer **y** for automatic configuration, skip to step 18.

13. If you have not chosen automatic configuration, you will see the next two prompts:

```
Enter IRQ (3 5 7 9 10 11 12 15) [10] or 'q' to quit:
Enter I/O base address (200..3e0) [300] or 'q' to quit:
```

In each case, your choices are shown in parentheses; the default value is shown in square brackets. If you would like to use the default, press <Return> at each prompt, and the defaults will be used. At any time, if you wish to stop the EtherLink III configuration, type **q** and press <Return> at the prompt.

14. Next you will be asked if you are using a combination adapter (3C5X9-COMBO). Combination adapters have both an on-board coax and an on-board TP transceiver:

    Are you using a combo adapter (3C5X9-COMBO)? (y n) [n] or 'q' to quit:

    Answer **y** if you are using a combination adapter. If you answer **n**, skip to step 17.

15. Now you will be asked if you are using the on-board coax transceiver:

    Are you using the on-board coax transceiver? (y n) [y] or 'q' to quit:

    Answer **y** if you will connect the adapter to the network using the round BNC connector on the backplate of the adapter. If you answer **y**, skip to step 18.

16. Now you will be asked if you are using the on-board TP transceiver:

    Are you using the on-board TP transceiver? (y n) [y] or 'q' to quit:

    Answer **y** if you will connect the adapter to the network using the 8-pin RJ-45 connector on the backplate of the adapter. Answer **n** if you will connect the adapter to an external transceiver using the 15-pin AUI connector. Now skip to step 18.

17. Now you will be asked if you are using the on-board transceiver:

    Are you using the on-board transceiver? (y n) [y] or 'q' to quit:

    Answer **y** if you will connect the adapter to the network using the 8-pin RJ-45 connector (TP adapters) or the round BNC connector (coax adapters) on the backplate of the adapter. Answer **n** if you will connect the adapter to an external transceiver using the 15-pin AUI connector.

18. Now return to the point where you were when instructed to come to this section.

tc "Removing the EtherLink III Driver";,1§Removing the EtherLink III Driver

If you should want to de-configure the EtherLink III driver, there are two methods depending on how it was originally configured. Basically, if you configured the driver using **mkdev**, you must use **mkdev** to remove it. Likewise, if you used **netconfig** to configure the driver, you must use **netconfig** to remove it. The only transport protocol that would be configured using **mkdev** is TCP/IP Release 1.1.3; all other protocol stacks use **netconfig**.

tc "Using **mkdev** to Remove the EtherLink III Driver**";,2§Using mkdev to Remove the EtherLink III Driver**

To remove the EtherLink III driver if it has been configured under TCP/IP Release 1.1.3, make sure you are in system maintenance mode. If necessary, reboot your machine, then enter the root password at the prompt. Follow the steps listed below.

1. Type **mkdev e3E** at the command-line prompt (#). You will see the following messages:

   The following LLI drivers are configured:

Board	Interrupt	I/O Addr	RAM Addr
e3E0	10	300-30f	0-0

   Add (configure) or remove the EtherLink III driver or q to quit (a/r/q) :

   Type **r** and press <Return> to remove the driver.

2. The following messages will appear:

   Removing e3E0....

3. You are then asked if you wish to relink the kernel. You must relink the kernel and reboot your system in order for the changes to take effect.

tc "Using **netconfig** to Remove the EtherLink III Driver**";,2§Using netconfig to Remove the EtherLink III Driver**

To remove the EtherLink III driver, make sure you are in system maintenance mode. If necessary, reboot your machine, then enter the root password at the prompt. Then follow these steps:

1. At the system prompt, type **netconfig**, then press <Return>. The following menu appears:

   Currently configured chains:
   list of configured chains

   Available options:
   1. Add a chain
   2. Remove a chain
   3. Reconfigure an element in a chain
   q. Quit

   Select option:

2. To select the Remove a Chain option, type **2**, then press <Return>. The following menu appears:

   Currently configured chains:
   list of configured chains

   Select a chain to remove ('q' to quit):

3. The list of chains depends on which protocol stacks you have configured. Type the number that corresponds to the chain you want to remove (the chain that shows the **e3E*n*** driver), then press <Return>.

   netconfig will then prompt you to confirm the removal. Answer **y** and press <Return>. Once the chain has been removed, **netconfig** will ask if you would like to relink the kernel. You must relink the kernel and reboot your system in order for the changes to take effect.

tc "Reconfiguring the EtherLink III Driver";,1§Reconfiguring the EtherLink III Driver

If you used **netconfig** to configure the EtherLink III driver, you can reconfigure the driver without removing it and then configuring it again. All protocol stacks except TCP/IP Release 1.1.3 use **netconfig**.

tc "Using **netconfig** to Reconfigure the EtherLink III Driver**";,2§Using netconfig to Reconfigure the EtherLink III Driver**

To reconfigure the EtherLink III driver, make sure you are in system maintenance mode. If necessary, reboot your machine, then enter the root password at the prompt. Then follow these steps:

1. At the system prompt, type **netconfig**, then press <Return>. The following menu appears:

   Currently configured chains:
   list of configured chains

   Available options:
   1. Add a chain
   2. Remove a chain
   3. Reconfigure an element in a chain
   q. Quit

   Select option:

2. To select the Reconfigure an Element in a Chain option, type **3**, then press <Return>. The following menu appears:

   Currently configured chains:
   list of configured chains

   Select a chain to reconfigure ('q' to quit):

3. The list of chains depends on which protocol stacks you have configured. Type the number that corresponds to the chain you want to reconfigure (the chain that shows the **e3E*n*** driver), then press <Return>. The following menu appears:

   These elements support reconfiguring:
   list of elements in the chain that support reconfiguring

   Select an element to reconfigure ('q' to quit):

3. The list of elements depends on the chain you have selected. Type the number that corresponds to the element you want to reconfigure (the **e3E*n*** driver), then press <Return>.

   netconfig will then prompt you to confirm the reconfiguration. Answer **y** and press <Return>. You will then be prompted for the new driver configuration. These prompts are the same as the prompts issued when the driver is initially configured. Once the driver has been reconfigured, **netconfig** will ask if you would like to relink the kernel. You must relink the kernel and reboot your system in order for the changes to take effect.

tc "EtherLink III Driver Messages and Errors"**;,1§EtherLink III Driver Messages and Errors**

The EtherLink III driver can issue several messages; their meaning is explained here.

1. 3Com EtherLink III unit = *nn* not present

   This message is printed on the console if an EtherLink III adapter was configured (for instance, with **mkdev** or **netconfig**), but no board was physically detected in the system. If an adapter has not been installed in your machine, install one. If you have already installed an EtherLink III adapter in your machine, shut your system down (with **init 0**), power off the machine, remove the EtherLink III adapter, then reinstall it.

2. 3Com EtherLink III unit *nn* not present in at I/O base address *xx*

   This message is printed to the console if the EtherLink III adapter (3C529) was configured (with **mkdev** or **netconfig**) with an incorrect I/O Base Address. Bring your machine to system maintenance mode. Deconfigure the EtherLink III adapter (refer to the section in this manual, "Removing the EtherLink III Driver"). Reconfigure the driver with the protocol you wish, this time specifying the correct I/O Base Address. The correct I/O base address can be found by running the MCA configuration utility supplied with your computer.

3. 3Com EtherLink III unit *nn* not present in slot *xx*

   If the EtherLink III adapter was configured as an EISA board, the system administrator specified an incorrect slot. To remedy the problem, shut down your system (with **init 0**), power off the machine, and make sure the EtherLink III adapter is physically installed in the slot specified in the error message (*xx*). If you move the adapter, run the EISA configuration program supplied with your machine to ensure that the adapter is configured correctly.

4. 3Com EtherLink III unit *nn* not present in PCMCIA slot *xx*

   No EtherLink III PCMCIA adapter (3C589) was detected in the slot specified in the error message (*xx*). To remedy the problem, either place the adapter in the correct slot or reconfigure the adapter (with **mkdev** or **netconfig**) with the correct slot number. Bring your machine to system maintenance mode. Deconfigure the EtherLink III adapter (refer to the section in this manual, "Removing the EtherLink III Driver"). Reconfigure the driver with the protocol you wish, this time specifying the correct slot number.

5. 3Com EtherLink III unit *nn* not configured

   with correct interrupt level, should be *xx*

   This message is printed to the console if the EtherLink III adapter (3C579 or 3C529) was configured (with **mkdev** or **netconfig**) with an incorrect interrupt request level. Bring your machine to system maintenance mode. Deconfigure the EtherLink III adapter (refer to the section in this manual, "Removing the EtherLink III Driver"). Reconfigure the driver with the protocol you wish, this time specifying the correct Interrupt Request Level, *xx*.

6. 3Com EtherLink III unit *nn* configured for TP transceiver, which is not available.

This message is printed if the EtherLink III adapter was configured (with **mkdev** or **netconfig**) to the use the on-board TP transceiver, which is not available on the particular adapter that has been installed as unit *nn*. Bring your machine to system maintenance mode. Deconfigure the EtherLink III adapter (refer to the section in this manual, "Removing the EtherLink III Driver"). Reconfigure the driver with the protocol you wish, this time specifying the correct Transceiver Type.

7. 3Com EtherLink III unit *nn* configured for coax transceiver, which is not available.

This message is printed if the EtherLink III adapter was configured (with **mkdev** or **netconfig**) to the use the on-board coax transceiver, which is not available on the particular adapter that has been installed as unit *nn*. Bring your machine to system maintenance mode. Deconfigure the EtherLink III adapter (refer to the section in this manual, "Removing the EtherLink III Driver"). Reconfigure the driver with the protocol you wish, this time specifying the correct Transceiver Type.

8. EtherLink II unit *nn*: ERROR: Cannot allocate static input buffers

At boot time, the EtherLink III driver attempts to allocate some static STREAMS buffers. If the allocation fails, this message is issued to the console. To remedy the problem, increase the number of 2048-byte STREAMS buffers on your machine. See the section on "STREAMS Tuning" in this manual.

9. EtherLink III unit *nn*: ethernet address = *xx:xx:xx:xx:xx:xx*

This message is issued when the driver is first opened after the system is booted. It indicates successful initialization. The Ethernet address is printed for your information.

tc "Tuning the EtherLink III Driver**";,1§Tuning the EtherLink III Driver**

It is difficult to anticipate how each customer will use their EtherLink III adapters - whether there will be heavy Ethernet traffic with larger messages, for instance if NFS is used, or smaller packet sizes or lighter load. Depending on your system use, you may get error messages about system resources, and it may be possible to "tune" your UNIX kernel so the system will work more efficiently. SCO provides System Administrator Guides for each transport protocol; be sure to read about system tuning for your installed protocols as well.

tc "NFS Performance Considerations**";,2§NFS Performance Considerations**

NFS produces a heavier load on the Ethernet because NFS messages are by default 8192 bytes long. In order to send 8192 bytes across the Ethernet, the NFS message must be broken up into 1500-byte packets, then reassembled at the destination machine. If you have NFS installed on a variety of machines, some slower and some faster, the slower machines may not be able to keep up with the faster machines. You may see the following messages:

WARNING: NFS server <*remote machine*> not responding, still trying
WARNING: NFS server <*remote machine*> ok

If these messages appear often, it will impact NFS performance. One way to get around this is to limit the size of NFS messages. This is done in the **mount** command. Typically, you would mount an NFS filesystem with the command below:

mount -f NFS <*remote sys*>:<*remote dir*> <*local dir*>

If your NFS connection seems to time-out too often, unmount the NFS filesystem, and remount it using the **rsize** and **wsize** parameters:

mount -f NFS,rsize=*nnn*,wsize=*nnn* <*remote sys*>:<*remote dir*> <*local dir*>

where *nnn* can be 1024, 2048, or 4096. This tells the NFS system to limit its message size to 1024, 2048, or 4096 bytes respectively.

tc "STREAMS Tuning**";,2§STREAMS Tuning**

The EtherLink III driver is written as a STREAMS driver; it communicates with the upper-level protocols using STREAMS buffers. Depending on how you use your system, it may be possible to occasionally run out of STREAMS buffers. The STREAMS buffer pool is allocated at boot time, and the number of buffers is set when the kernel is built. Typical symptoms of inadequate STREAMS buffer space include the following: lost connections for no reason; processes that communicate over the network hang; and programs that communicate over the network suddenly malfunction.

If you suspect a problem with STREAMS buffers, it's easy to find out if they might be the cause of some problem. Log in as superuser, and at the system prompt, type **crash**. At the ">" prompt, type **strstat**. You will be shown a table of STREAMS resources shown below:

ITEM		CONFIG	ALLOC	FREE	TOTAL	MAX	FAIL
streams		128	74	54	223974	87	0
queues		512	416	96	639691	512	4
message blocks		2395	345	2050	9340864	472	0
data block totals		1916	345	1565	8951113	470	30945
data block size	4	64	56	8	225934	62	30945
data block size	16	384	14	368	1182442	39	0
data block size	64	256	50	204	6890580	84	0
data block size	128	576	141	433	450002	182	0
data block size	256	304	60	244	188631	100	0
data block size	512	88	12	76	76	13	0
data block size	1024	52	0	52	1	1	0
data block size	2048	180	12	168	12	12	0
data block size	4096	12	0	12	13435	7	0

Count of scheduled queues: 0

To exit the **crash** utility, type **q** at the ">" prompt. On the left-hand side of the **strstat** output, notice the data block size *nn* figures. These represent the STREAMS buffers. If any of these system parameters show failures (on the right-hand column), you may want to increase the number of that specific size of STREAMS buffers.

As an example, the **strstat** output above shows failures for data block size 4. To increase the number of 4-byte STREAMS buffers (for instance from 64 to 128), make sure you are in system maintenance mode. At the system prompt, type **configure** and press <Return>. You will see a list of parameter types that you can change. Select the number associated with **Streams Data**.

Be sure to leave all other STREAMS parameters intact by pressing <Return>, until you see the following prompt:

```
NBLK4: number of 4 byte stream buffers
The current value is: 64 (normally 32)          New value is:
```

Type **128** and press <Return>. Then at the next prompt, type **q** to quit. You will be asked to confirm your changes:

```
Would you like to update the system configuration files with
your changes? (y/n)
```

Answer **y** and press <Return>. You will then be given instructions on how to relink the kernel. Once the kernel has been relinked and the system rebooted, your changes will take effect.