



IBM Netfinity ESCON Adapter

Installation Guide

Third Edition (for use with CD version 1.2)

OPTIONS

by IBM

Note: Before using this information and the product it supports, be sure to read the general information under “Notices” on page 221.

Third Edition (July 1999) used with CD Version 1.2

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SAFETY: READ FIRST

Please read the international safety manual included with this adapter prior to attempting any installation.

ABOUT THIS PUBLICATION

This publication provides the information necessary to install and configure the IBM Netfinity ESCON adapter to connect a Netfinity server to an IBM mainframe.

The following terms are used as synonyms for the Netfinity ESCON adapter in this publication and in some software installation screens:

- IBM PCI ESCON Adapter
- PCI ESCON adapter
- ESCON adapter
- adapter

Who Should Use This Publication

This publication is intended for the system administrator of a Netfinity server responsible for configuring the server to communicate with an MVS, VM, or DOS/VSE mainframe.

How to Use This Publication

This publication is organized into distinct chapters based on operating environment. Refer to those chapters specific to the software installed on your server.

What is Included in This Publication

This user's guide contains the following chapters:

Chapter 1. INTRODUCTION - This chapter gives an overview of the Netfinity ESCON adapter implementation.

Chapter 2. INSTALLING THE NETFINITY ESCON ADAPTER - This chapter details installation of the ESCON adapter into a Netfinity server.

Chapter 3. INSTALLING DRIVER SOFTWARE - This chapter details installation of the adapter drivers for Microsoft's Windows NT Server, Novell's NetWare, and SCO UnixWare 7.

Chapter 4. DEFINING THE ESCON CONFIGURATION – This chapter details configuration of the adapter on the ESCON channel.

Chapter 5. MULTI-PATH CHANNEL + – This chapter provides instruction for installing MPC+ software and for configuring MPC transmission groups on the Netfinity Server.

Chapter 6. TCP/IP DIRECT CONNECT – This chapter covers use of the Netfinity ESCON Adapter for point-to-point connections between the mainframe's TCP/IP stack and Microsoft's TCP/IP on a Windows NT Netfinity server. More specifically, this chapter discusses the installation and configuration of TCP/IP Direct Connect (formerly known as VPPA) software.

Chapter 7. COMMUNICATIONS SERVER FOR WINDOWS NT - This chapter discusses installation of Channel Data Link Control into Communications Server for Windows NT (CS/NT) and configuration of CS/NT to use the Netfinity ESCON Adapter.

Chapter 8. SNA SERVER FOR WINDOWS NT - This chapter details installation of the Channel Data Link Service into Microsoft's SNA Server and the configuration of SNA Server to use the Netfinity ESCON Adapter.

Chapter 9. TCP/IP PASSTHROUGH FOR WINDOWS NT - This chapter details the installation and use of TCP/IP Passthrough for Windows NT with the Netfinity ESCON Adapter.

Chapter 10. COMMUNICATIONS SERVER FOR UNIXWARE 7 - This chapter discusses installation of Channel Data Link Control into Communications Server for UnixWare 7 and configuration of CS/UnixWare to use the Netfinity ESCON Adapter.

Chapter 11. NETWARE FOR SAA - This chapter details the configuration of NetWare, NetWare for SAA, and intraNetWare for SAA (v3.0) to use the Netfinity ESCON Adapter.

Chapter 12. TCP/IP PASSTHROUGH FOR NETWARE - This chapter details the installation and configuration of TCP/IP Passthrough for NetWare with the Netfinity ESCON Adapter.

Chapter 13. IMPLEMENTING SAP R/3 – This chapter provides an overview of the System/390 SAP R/3 implementation. It then provides instructions for configuring the appropriate ESCON links to implement the System/390 R3 solution using the Netfinity ESCON Adapter and a Windows NT Netfinity server.

Chapter 14. ADDING AN ADDITIONAL ADAPTER - This chapter covers adding an additional adapter to an existing system.

Chapter 15. MAINFRAME CONFIGURATION - This chapter details how to configure your mainframe for use with the Netfinity ESCON adapter.

Chapter 16. TROUBLESHOOTING – This chapter provides instruction for isolating installation and configuration problems.

Chapter 17. CHLTOOL UTILITY - This chapter details the use of the CHLTOOL utility.

What's New in Version 1.2?

- The MPC+ software has been updated to provide support for multiple read / write sub-channels on multiple ESCON adapters.
- All software has been updated to support use of the same device address in multiple LPARs or systems.
- New UnixWare 7 Data Link Control and Device Drivers are included; providing support for the Netfinity ESCON Adapter in Communications Server for UnixWare 7.
- NetWare 5.0 drivers

What was New in Version 1.1 (released February 1999)?

- The MPC+ software has been updated to add support for Communications Server for Windows NT.
- MPC+ now includes support for TCP/IP Point-to-Point communications. This new support allows full TCP/IP communication (via MPC+) between the Windows NT TCP/IP stack and OS/390 version 2 release 5 and above.
- The Virtual Point-to-Point Adapter has been renamed TCP/IP Direct Connect and has been updated to support a new MPCPTP link type in order to accommodate the new MPC+ capabilities.
- The Data Link Control for Communications Server for Windows NT now provides a “MPC Channel Adapter” device type allowing Communications Server to send traffic over a MPC transmission group.
- An update to the CHLTOOL diagnostic utility enhances the capability of several commands.

Chapter 1. INTRODUCTION

The Netfinity ESCON Adapter is a high performance adapter that enables PCI servers to communicate with mainframe systems through direct channel attachment. The adapter acts as a control unit for Enterprise Systems Connections (ESCON); providing high speed throughput and excellent processing efficiencies for applications that require high-speed connectivity between a Netfinity server and a mainframe.

The Netfinity ESCON adapter can be configured to emulate the architecture of many different device controllers. The ESCON adapter includes an onboard Intel 960 processor. The control unit emulations are implemented directly on the 960 processor allowing the server's CPU to focus on data block transfers and not channel interrupt processing. This efficient, interrupt driven structure is utilized to avoid the CPU overhead incurred by traditional operating system approaches. To further enhance processing efficiency, the on-board data buffering capability allows the adapter to respond to channel activity even when the PCI bus is temporarily busy. Data from the channel can be buffered into on-board memory and made available to the PCI bus when it is available. The use of modular firmware routines allows new implementations to be developed quickly and proficiently. Due to the modularity of the ESCON adapter channel and PCI interface routines can be easily modified to adapt to changing hardware and software requirements. The Netfinity ESCON Adapter is designed to accommodate standardized, mainstream channel applications as well as non-standard applications that use proprietary data transfer protocols.

Server Software

The Netfinity ESCON Adapter has been designed to support a wide variety of software operating environments and communications gateways. Software currently supported includes:

- Communications Server for Windows NT
- Communications Server for UnixWare 7
- Novell's NetWare for SAA
- Microsoft's SNA Server for Windows NT
- TCP/IP Direct Connect (formerly known as Virtual Point-to-Point Adapter) (included on CD-ROM version 1.1 and higher)
- Multi-Path Channel + (MPC+) including MPC Point-to-Point and High Speed Access Services (HSAS) (included on CD-ROM version 1.1 and higher)
- TCP/IP Passthrough for NetWare (included on CD-ROM version 1.0 and higher)
- TCP/IP Passthrough for Windows NT (included on CD-ROM version 1.0 and higher)

Hardware Requirements

The Netfinity ESCON Adapter requires a full-length PCI slot. A maximum of two (2) Netfinity ESCON Adapters are supported in a single Netfinity server. A second slot should be left unoccupied in the server for each Netfinity ESCON Adapter installed. Minimum processor and memory requirements are:

- Intel Pentium 133Mhz Processor
- 64 MB RAM

Software Requirements

Windows NT

The supported releases of software are:

- Windows NT Server version 4.0 with a minimum of Service Pack 3 applied
- Communications Server for Windows NT version 6.0x
- SNA Server version 4.0

For High Speed Access Services using MPC+ the following mainframe operating system is required:

- OS/390 Version 2 Release 4

For MPC Point-to-Point connections using TCP/IP Direct Connect the following mainframe operating system is required:

- OS/390 Version 2 Release 5

NetWare

The supported releases of Novell software are:

- NetWare 5.0
- NetWare 4.11 with a minimum of Support Pack 5 applied
- NetWare for SAA version 4.0
- intraNetWare for SAA version 3.0

Note: TCP/IP Passthrough is currently only supported with NetWare 4.11 Support Pack 5

UnixWare 7

The supported releases of Unixware software are:

- SCO UnixWare 7.1
- Communications Server for UnixWare 7 version 5.0.02

Chapter 2. INSTALLING THE NETFINITY ESCON ADAPTER

Pre-Installation Checklist

This Checklist provides pre-installation considerations, which are prerequisites to actual adapter installation. This checklist will ensure that your site is properly prepared with the proper connection and configuration needed to connect your system to the 9086 ESCON Adapter.

Customer Responsibilities

- Verify equipment against service order, unpack and physically inspect equipment.
- Changes to Mainframe may be required.
- Use Installation Guide and Redbook as reference for these changes (IOCP/HCD, TCP/IP, VTAM)
- Install adapter and cables per Installation Guide.
- Successful diagnostic self-test. (POST)
- Check the IBM Web Site for fixes and software updates at <http://www.pc.ibm.com/support/>.
- Driver install and Configuration setup per Installation Guide.
- Configuration and Maintenance of all system software.
- Training of customer personnel.
- Interface with the technical support center to resolve issues associated with installation

Redbook (SG24-5284) at <http://www.redbooks.ibm.com>

Installation Guide at <http://www.pc.ibm.com/Support>

Fixes and More information at <http://www.pc.ibm.com/support/>

Thank you for ordering IBM NETFINITY's 9086 ESCON Adapter

Requirements

Comments

Requirements	Comments	
<p>Netfinity Hardware Requirements</p> <p>Minimum CPU and Memory Requirements: Intel Pentium 133Mhz Processor 64Meg RAM Full Length PCI slot.</p> <p>Max of 2 ESCON adapters per Netfinity server. For each ESCON adapter an additional slot left unoccupied.</p> <p>Supported in the following Netfinity Servers: 5000, 5500, 5500-M10, 7000, 7000-M10</p>		
<p>Netfinity Software Requirements</p> <p>Windows NT Server version 4.0 with a minimum of Service Pack 3 applied. IBM's Communication Server for Windows NT version 6.0x SNA Server version 4.0 NetWare 5.0 or NetWare 4.11 with a minimum of Support Pack 5 IntraNetWare for SAA version 3.0 NetWare for SAA version 4.0 Check for all additional ESCON fixes that may be required</p>	<p>Refer to the 9086 User's Guide for details on configuring software. Available at: http://www.pc.ibm.com/support/</p> <p>Also: Redbook (SG24-5284) at http://www.redbooks.ibm.com</p> <p>http://www.pc.ibm.com/support/</p>	
<p>Mainframe Software</p> <p>MVS OS/390 Version2 Release 4 (for HSAS using MPC+) Includes VTAM V4.3 TCPIP V3.4 or V3.2.x MVS OS/390 Version2 Release 5 (for MPCPTP) Includes VTAM V4.4 TCPIP V3.4</p>	<p>Refer to the 9086 User's Guide for details on configuring software. Available at: http://www.pc.ibm.com/support/</p> <p>Also: Redbook (SG24-5284) at http://www.redbooks.ibm.com</p>	
<p>ESCON Connection and Cable</p> <p>ESCON connection to mainframe must be supplied. along with ESCON cable</p>	<p>The ESCON cable supported by IBM are:</p> <ul style="list-style-type: none"> - LED (multimode) (3-km max distance) 62.5/125 um - LASER (single-mode) (20km max distance) 50/125 um optical fiber cables 	
<p>TCP/IP / SNA IOCP Definitions for ESCON connections</p> <p>HCD:</p>	<p>TCP/IP: SCTC devices have to be defined for each connection. TCPIP Passthrough, TCPIP Direct Connect, HSAS, MPCPTP require 2-subchannels starting with even address SNA: A 3174 device has to be defined for each PU required, Max of 32 3174 per adapter. HCD: Same as IOCP</p>	<p>Refer to the 9086 User's Guide for details on IOCP definitions. Available at http://www.pc.ibm.com/support/</p> <p>Also: Redbook (SG24-5284) at http://www.redbooks.ibm.com</p> <p>For instructions on HCD: Refer to OS/390 HCD User's Guide</p>
<p>TCPIP Setup:</p>	<p>Network administrator has to supply required information for Mainframe TCPIP profile setup Version 2.4 and higher may require Open Edition expertise. Network administrator has to supply required information for TCP/IP Direct Connect, HSAS, and MPCPTP on server.</p>	<p>Refer to the 9086 User's Guide for VTAM definitions. Available at http://www.pc.ibm.com/support/</p> <p>Also: Redbook (SG24-5284) at http://www.redbooks.ibm.com</p>
<p>VTAM Definitions</p>	<p>Mainframe VTAM have to be setup for use with: IBM's Communication Server of NT. Microsoft SNA Server Novell's NetWare for SAA MPC+ for either CS/NT or MPCPTP will require VTAM definitions.</p>	<p>Refer to the 9086 User's Guide for VTAM definitions. Available at http://www.pc.ibm.com/support/</p> <p>Also: Redbook (SG24-5284) at http://www.redbooks.ibm.com</p>

Adapter Install

ATTENTION! *The ESCON adapter can be damaged by Electrostatic Discharge. Before removing the adapter from its protective static bag, please ensure that you are free of static charge. At minimum, you should ground yourself to the system you are using.*

The ESCON adapter is a full size PCI adapter measuring 12.283 X 4.2 inches, Figure 2-1. The adapter comes pre-configured and is ready to be installed. There are no jumpers or switches that need setting prior to installation.

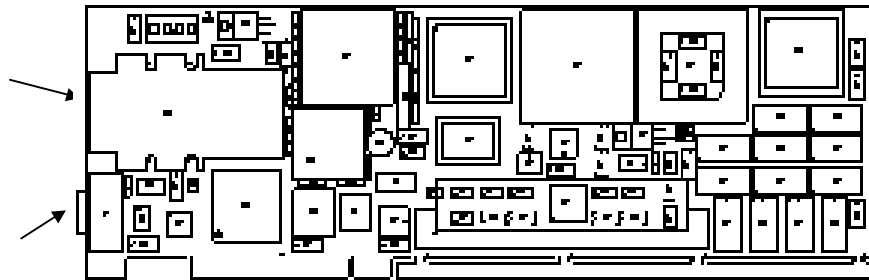


Figure 2-1. Netfinity ESCON Adapter

The following steps should guide you through a successful installation of the adapter.

Step

1. Ensure the Netfinity server is powered down. The ultimate assurance of this fact is to remove the power cable from the rear of the system.
2. Remove the system cover.
3. Determine an available slot for installation of the adapter. The adapter requires a full-length PCI slot.
4. Remove the adapter from its protective anti-static bag. As shown in Figure 2-1, the adapter has two connectors at the card edge; a standard ESCON connector (top) and a serial port connector (bottom). Remove the wrap plug shipped in the ESCON connector and save it for diagnostic purposes.
5. Insert the adapter into the chosen PCI bus slot. Make sure the adapter is fully inserted in the slot. Place a screw through the top of the mounting bracket and securely fasten to the system chassis.
6. Replace the system cover.
7. Plug the ESCON channel cable directly into the top connector. Ensure the cable end is fully inserted into the socket. You should hear a click as the connector locks into place. The serial port is for diagnostics and is not used during normal operation.

Note: *IBM supports the following ESCON cable:*

- LED (multi-mode) (3km max distance) 62.5/125 um
- LASER (single-mode) (20km max distance) 50/125 um optical fiber cables

8. The following label was included with the option and contains important information that will be needed if service is required:

IBM Netfinity ESCON Adapter

To be serviced by trained and authorized personnel only

Place service call on Machine Type & Model 9086 - 001

When calling for service, please reference machine

type "9086" and model 001 for this adapter.

IBM USA Service Personnel only: For assistance call the IBM Network Support Center: Phone: 1-800-426-2472

IBM International Service Personnel: For assistance call your local support number. **Phone number:**

Attach the label to the front of the server in such away that it will not block airflow into the server, but will still be readily visible.

9. Reinstall the power cable, if removed in step 1, and power on the system.

If your system does not boot successfully or does not power on, ensure that you have followed these steps or refer to the appropriate manuals for your particular system referring to adapter installation and power up related troubleshooting.

Chapter 3. INSTALLING DRIVER SOFTWARE

The Netfinity ESCON Adapter includes drivers for Microsoft's Windows NT Server, Santa Cruz Operation's UnixWare 7, and Novell's NetWare. This chapter discusses installation of the drivers. Please refer to the section appropriate to your operating environment.

Windows NT Server

The PCI ESCON Adapter driver is always required and provides basic connectivity between the ESCON adapter and Windows NT. The following step-by-step procedure will install the driver into your Windows NT Server.

Step

1. From the Windows NT Server Control Panel, open Network (Figure 3-1).



Figure 3-1. Network ICON on Control Panel

2. From the **Adapters** tab on the **Network** screen, click on the **Add** button (Figure 3-2).

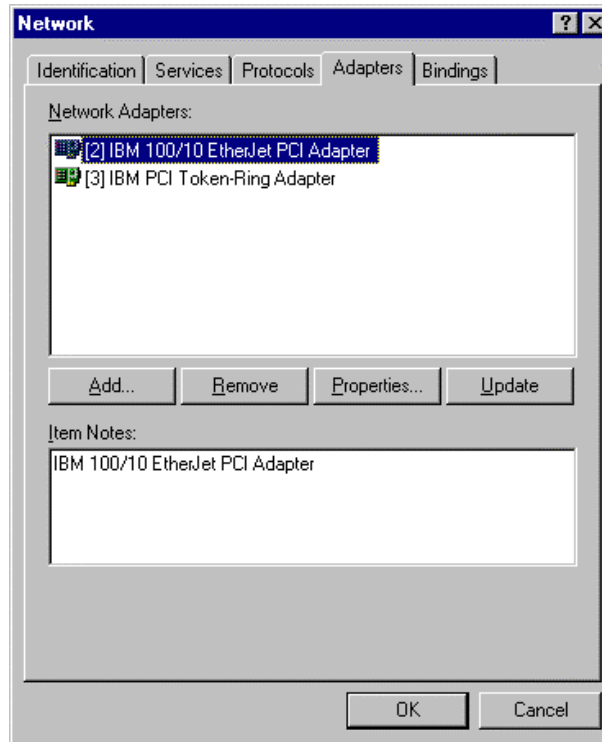


Figure 3-2. Network Screen

3. From the **Select Network Adapter** screen (Figure 3-3), click the **Have Disk...** button.

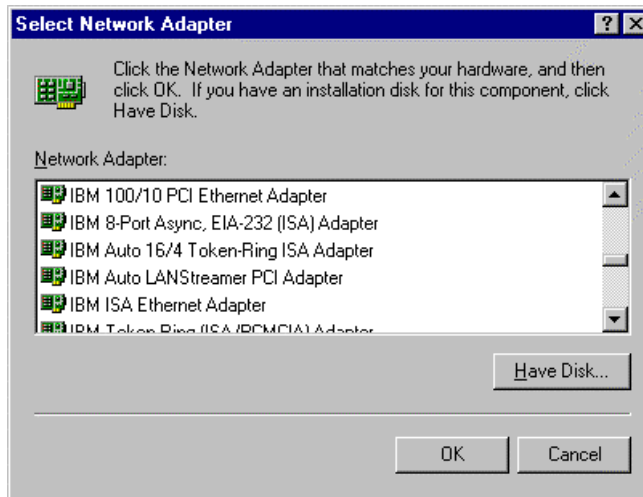


Figure 3-3. Add Network Adapter

4. The **Insert Disk** screen is displayed (Figure 3-4).

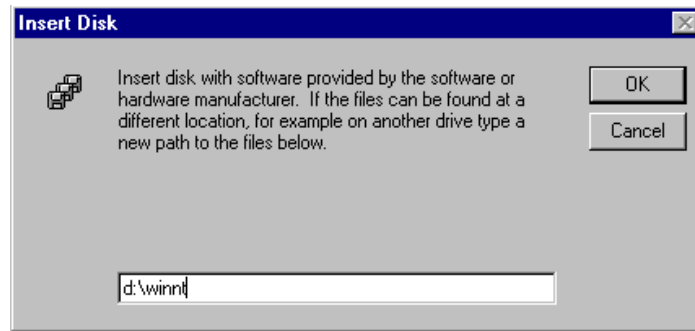


Figure 3-4. Insert Disk Dialog Box

With the CD inserted into the CD-ROM drive point to the **WINNT** directory by entering "**D:\WINNT**" where D is the CD-ROM's drive letter and press **OK**.

5. The **Select OEM Option** dialog box will be displayed (Figure 3-5). Highlight/select the IBM PCI ESCON Adapter and click **OK**.

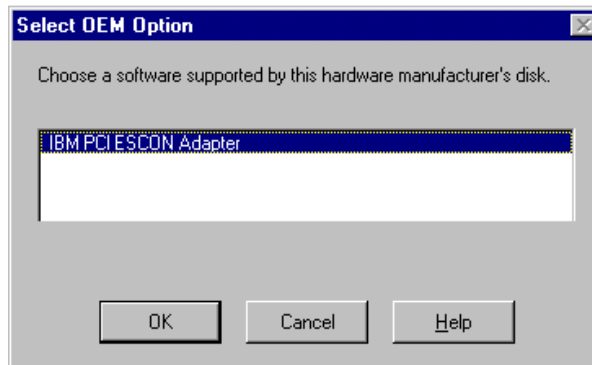


Figure 3-5. Select OEM Option Screen

6. The system installs the adapter driver and returns an ESCON configuration screen (Figure 3-6). You may define your ESCON configuration now or you may define it at any time following installation. Chapter 4 describes the ESCON Configuration process in detail.

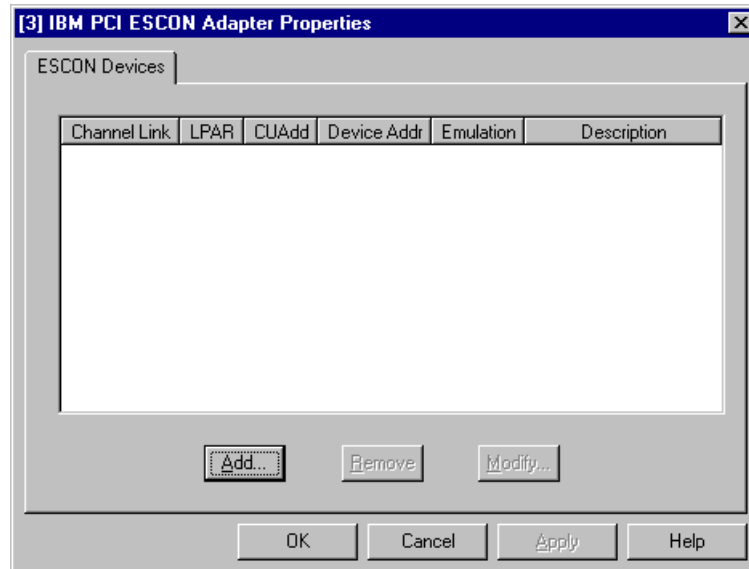


Figure 3-6. ESCON Adapter Properties

7. To complete installation click **OK**. You will be returned to the **Network** dialog. The IBM PCI ESCON Adapter will now appear in the list of network adapters (Figure 3-7).

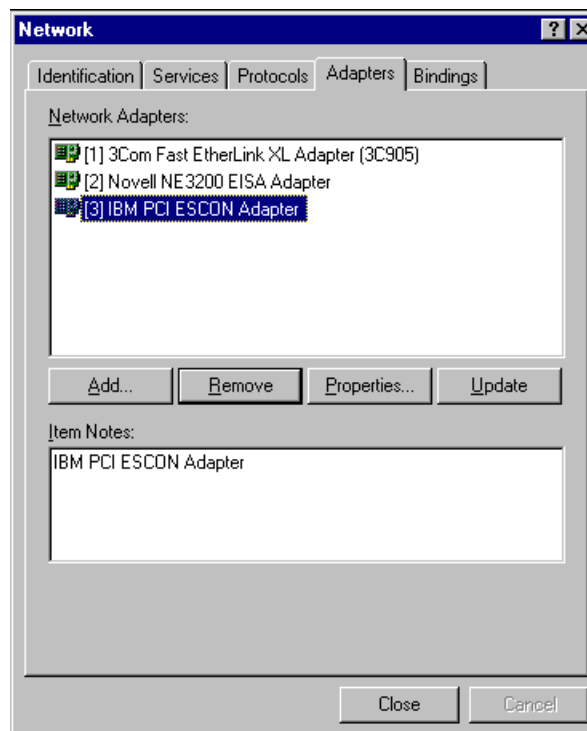


Figure 3-7. Network Settings with Netfinity ESCON Adapter

UnixWare 7

This section describes installation of the Netfinity ESCON Adapter drivers into UnixWare 7.

Included in the ESCON Adapter installation kit is a CD-ROM containing software to support the adapter. The following step-by-step procedure assumes you are using the standard CDE desktop provided with UnixWare 7 as well as the SCOadmin application.

STEP

1. Verify FMOD_RESERVE in the Dynamically Loadable Module Parameters is set high enough. Communications Server for UnixWare 7 (CS/UnixWare) and the Netfinity ESCON Adapter drivers cannot both be installed unless FMOD_RESERVE has been increased above the default (50) set by UnixWare 7.

To view FMOD_RESERVE, invoke the System Tuner in SCOadmin (Figure 3-8).

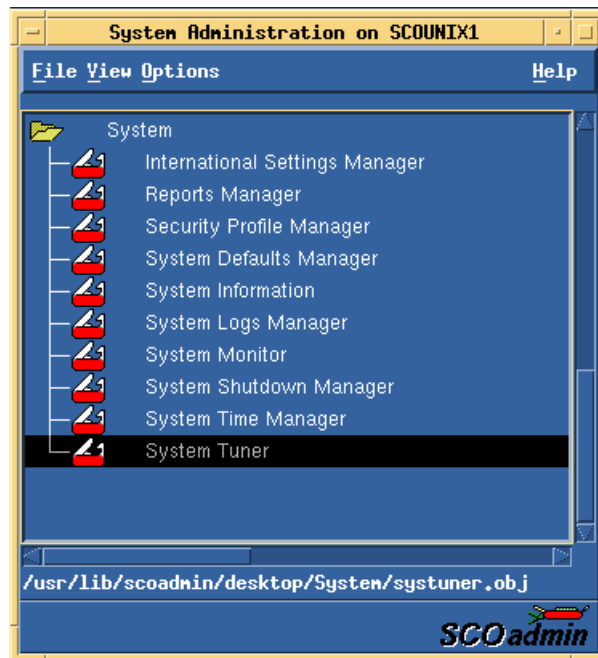


Figure 3-8. System Tuner in SCOadmin

In the System Tuner, select Dynamically Loadable Module (DLM) Parameters and set FMOD_RESERVE to 100 (Figure 3-9).

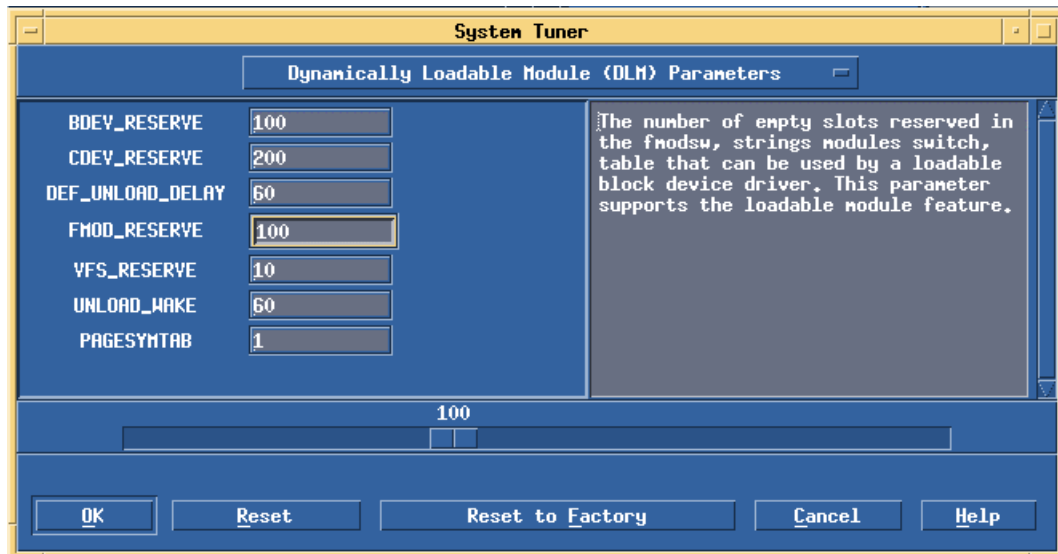


Figure 3-9. DLM Parameters

Click Ok to rebuild the UnixWare kernel and re-boot the system.

2. The Netfinity ESCON Adapter Software CD must be mounted before you can install the ESCON Adapter software. In SCAdmin run the File System Manager (Figure 3-10).



Figure 3-10. Invoke File System Manager

Select Add Mount Configuration and then Local... on the Mount pull-down menus of the File System Manager (Figure 3-10).

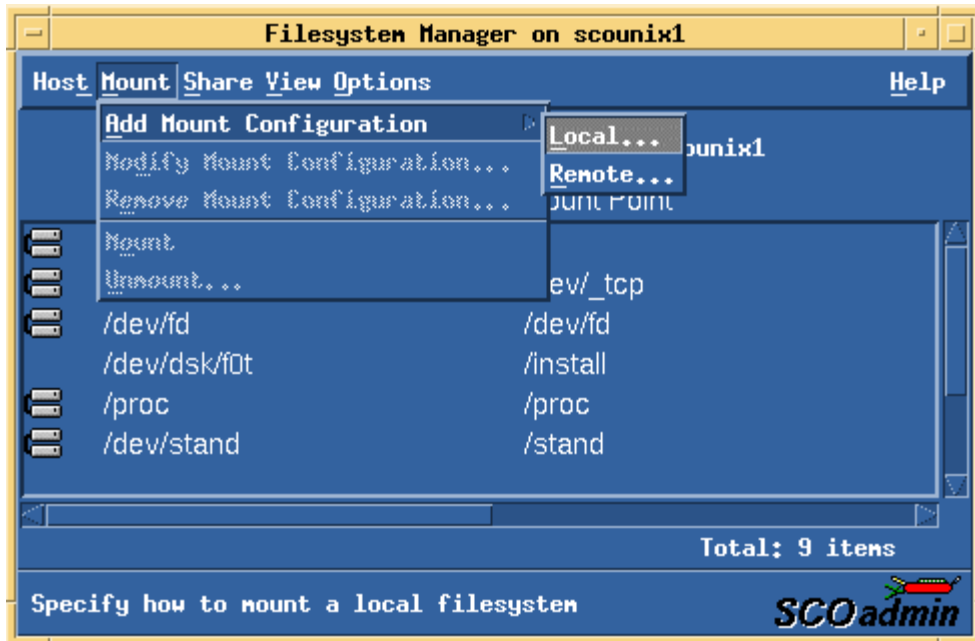


Figure 3-11. Adding a Mount Configuration

Select the CD-ROM device file from the list of available devices (Figure 3-12).

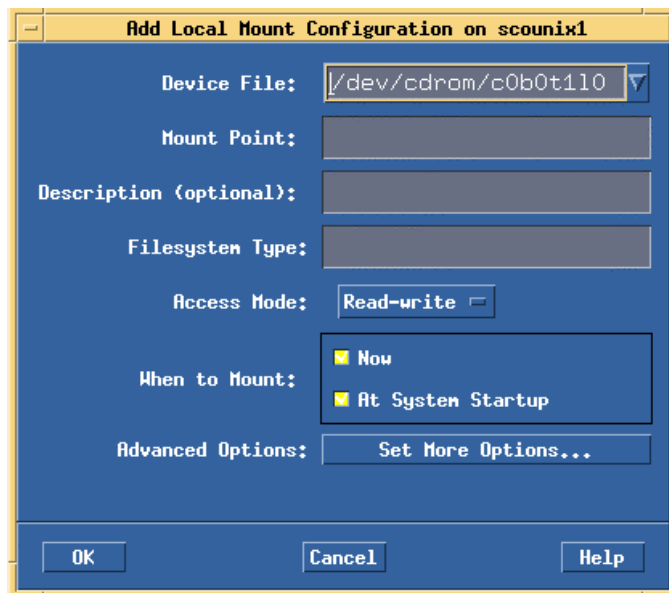


Figure 3-12. CD-ROM Device File

When you click on the Mount Point field, you will be instructed to insert the CD into the drive (Figure 3-13). Once the drive is ready click **Continue**.

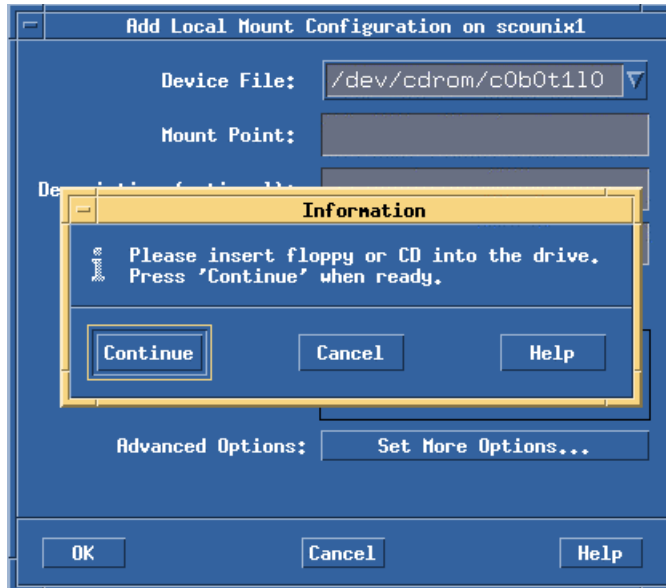


Figure 3-13. CD-ROM Mount Request

Type in a directory name to be used as the Mount Point ('CD1', for example) for the device (Figure 3-14).

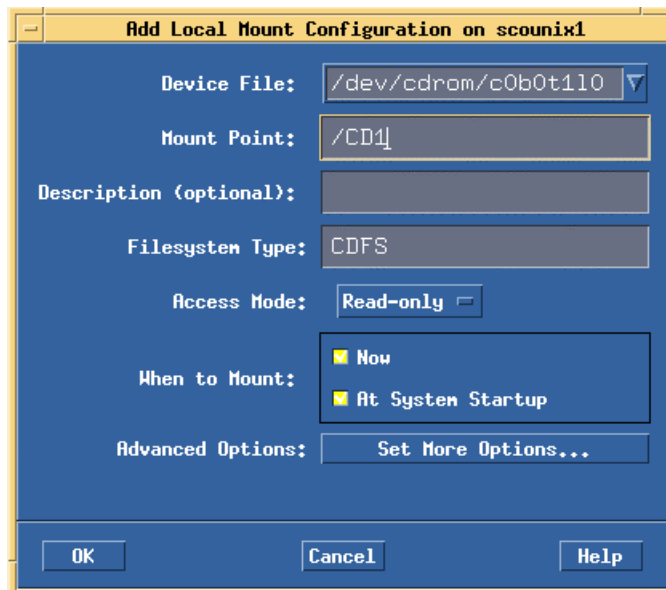


Figure 3-14. Mount Point Named 'CD1'

Click **OK** complete the mount. A read-only folder named with the Mount Point ('CD1') will now be available in the File Manager (Figure 3-15). You may close the File System Manager and SCAdmin.

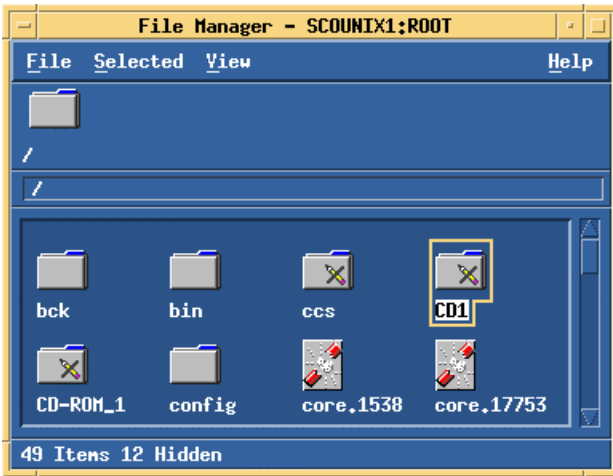


Figure 3-15. File Manager Showing CD-Rom Mount Point

3. Open a dtterm session and enter the **pkgadd** command as shown in Figure 3-16. 'CD1' is the name of the mount point specified in step 2.

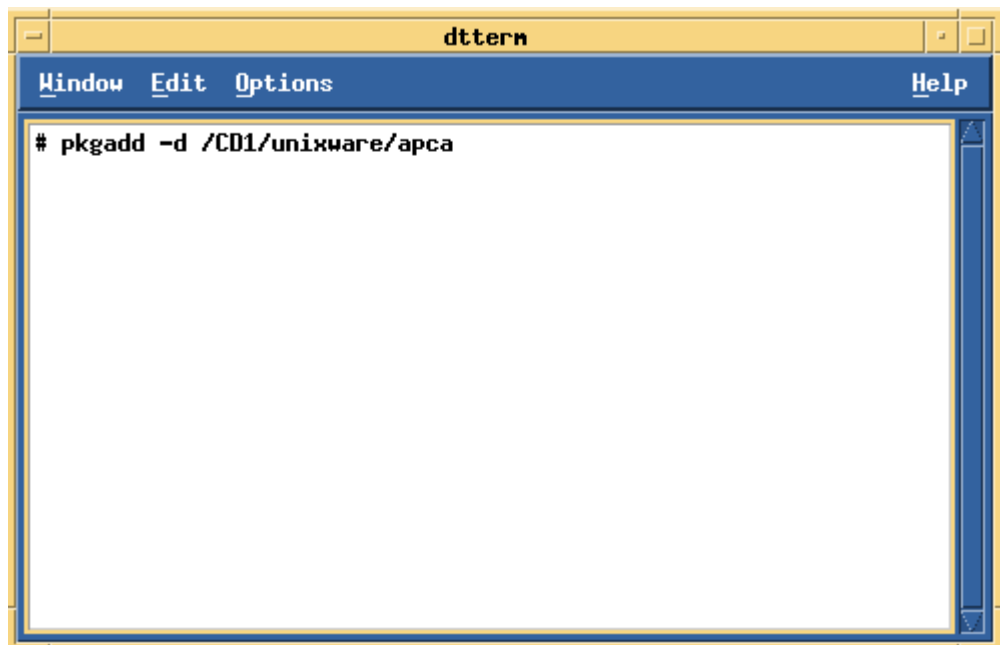


Figure 3-16. Adding Netfinity ESCON Adapter Software

The package installation will now start. Confirm the installation by pressing ENTER in response to the Select Packages prompt (Figure 3-17).

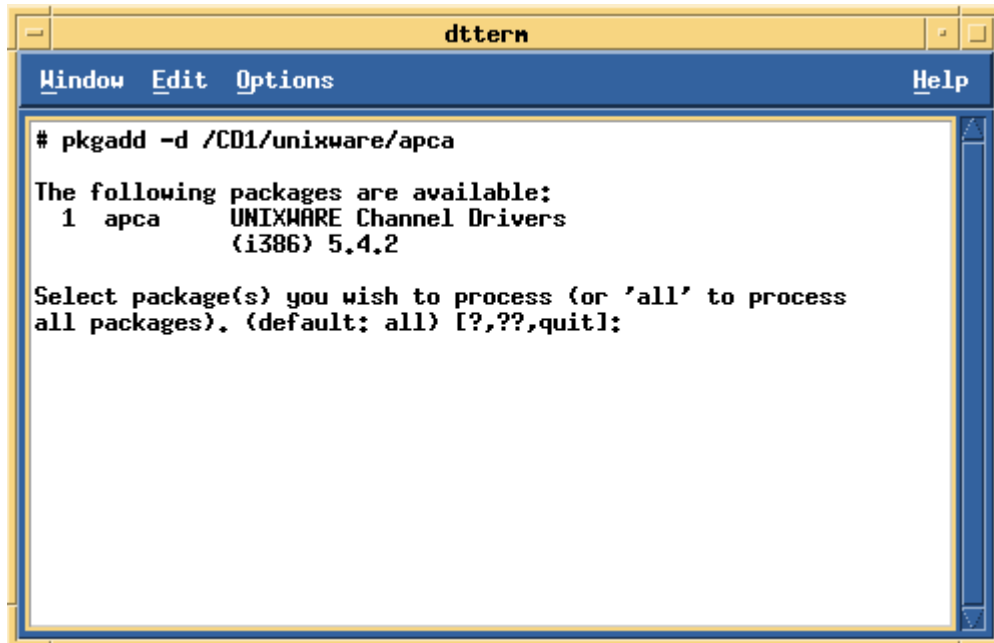


Figure 3-17. Confirm Package Installation

The software will be installed. You will receive an installation complete message when the process finishes (Figure 3-18).

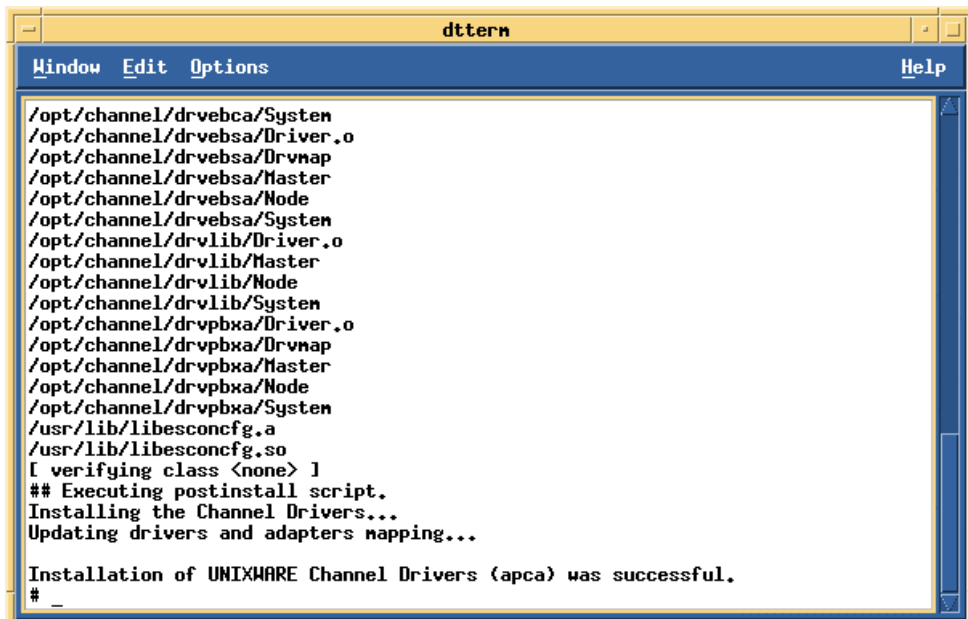


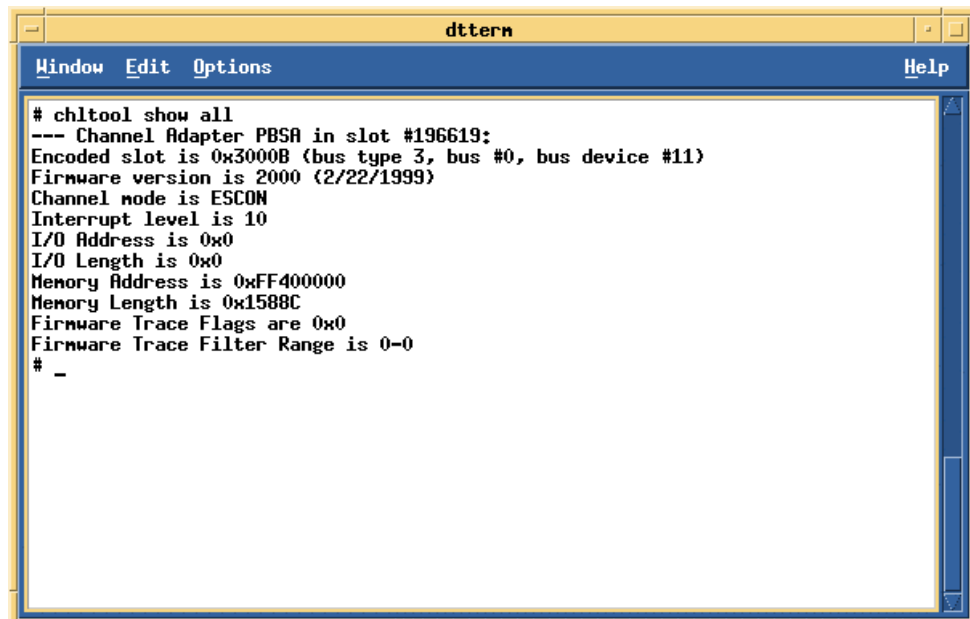
Figure 3-18. Installation Complete

4. To remove the CD from the drive you will need to re-invoke Filesystem Manager and perform either an **U**nmount or a **R**emove Mount Configuration task.

The Netfinity ESCON Adapter drivers have been installed in the **'/opt/channel'** folder. Adapter utilities are installed in **'/opt/channel/bin'**. Assuming you are using the standard UnixWare 7 CDE desktop, the following two lines may optionally be added to the root's dtprofile (**/.dtprofile**) to include **'/opt/channel/bin'** in the default path:

```
PATH=$PATH:/opt/channel/bin
export PATH
```

At this point the system must be shutdown and re-booted. Once the system has restarted you may issue a **'chlttool show all'** command to confirm installation (Figure 3-19).



```
dttern
Window Edit Options Help
# chlttool show all
--- Channel Adapter PBSA in slot #196619:
Encoded slot is 0x3000B (bus type 3, bus #0, bus device #11)
Firmware version is 2000 (2/22/1999)
Channel node is ESCOM
Interrupt level is 10
I/O Address is 0x0
I/O Length is 0x0
Memory Address is 0xFF400000
Memory Length is 0x1588C
Firmware Trace Flags are 0x0
Firmware Trace Filter Range is 0-0
# -
```

Figure 3-19. Successful Adapter Install

NetWare

NetWare 5 Driver Installation

This section describes installation, loading, and unloading of the ESCON adapter's drivers on a NetWare 5 Server.

Included in the installation kit is a CD-ROM containing software to support the adapter. The following procedure assumes your Netfinity server has the CDROM driver (CDROM.NLM) loaded.

STEP

Note: *NetWare for SAA/intraNetWare for SAA and COMMEXEC must both be down before installing the drivers. Unload NetWare for SAA/intraNetWare for SAA by typing **SAADOWN** at the system console prompt. Type **CSDOWN** to bring down COMMEXEC.*

1. The ESCON adapter's drivers and support programs are installed using Novell's installation utility, **INSTALL**. To invoke **INSTALL** type the following command on the NetWare system console:

LOAD NWCONFIG

NWCONFIG will display a menu of **Installation Options** (Figure 3-20).

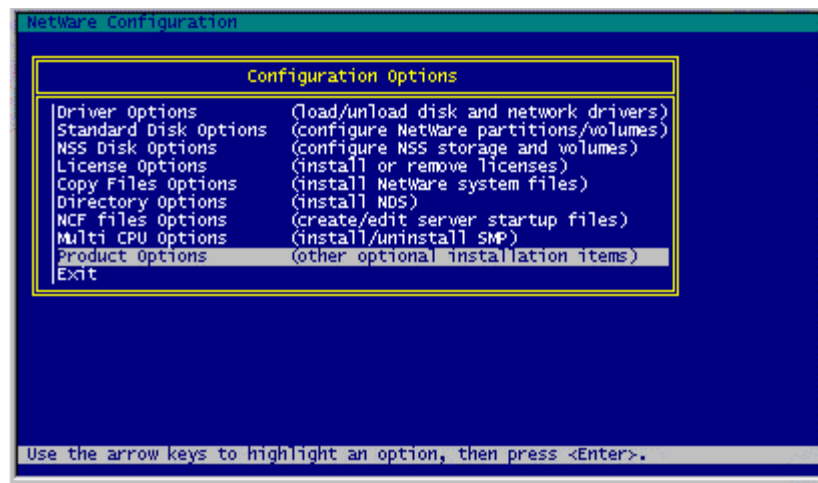


Figure 3-20. Main Menu

- Choose the menu selection “**Product options**” and press **ENTER**. Figure 3-21 will display.

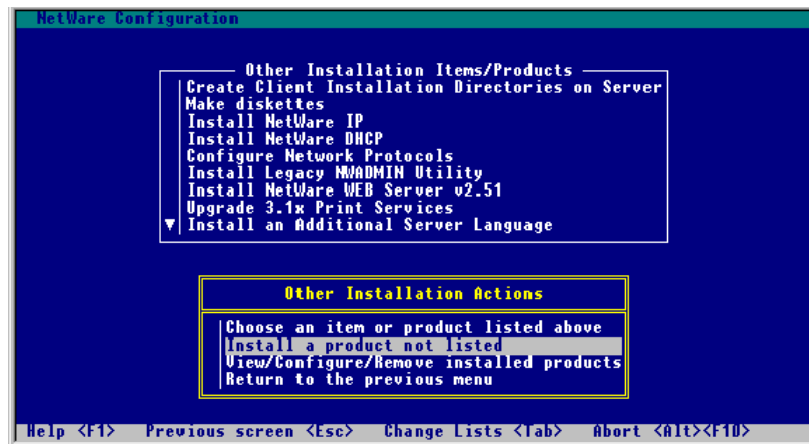


Figure 3-21. Product Options

- Select “**Install a product not listed**” and press the **ENTER** key. A pop-up box (Figure 3-22) will appear allowing you to specify a drive to be used for installation. Press **F3** to enter the path of your CD.

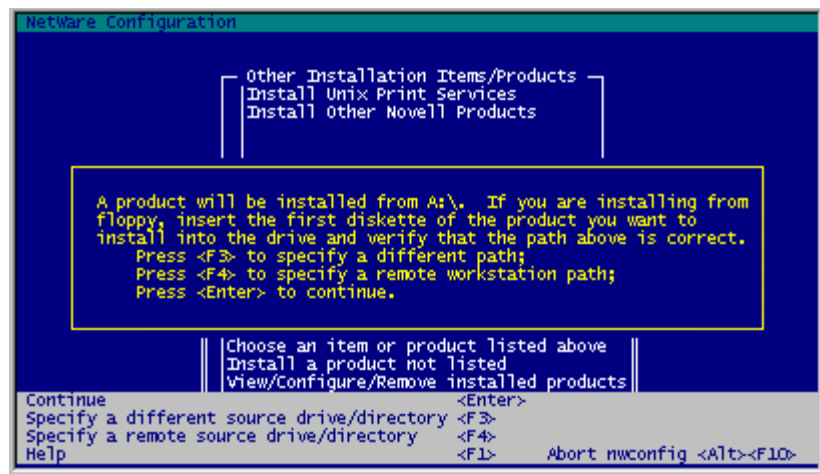


Figure 3-22. Drive Selection Pop-Up

- A pop-up window appears prompting you for a directory path (Figure 3-23). Enter “ibmescon:\ netware” where “ibmescon” is the volume ID of the installation CD.

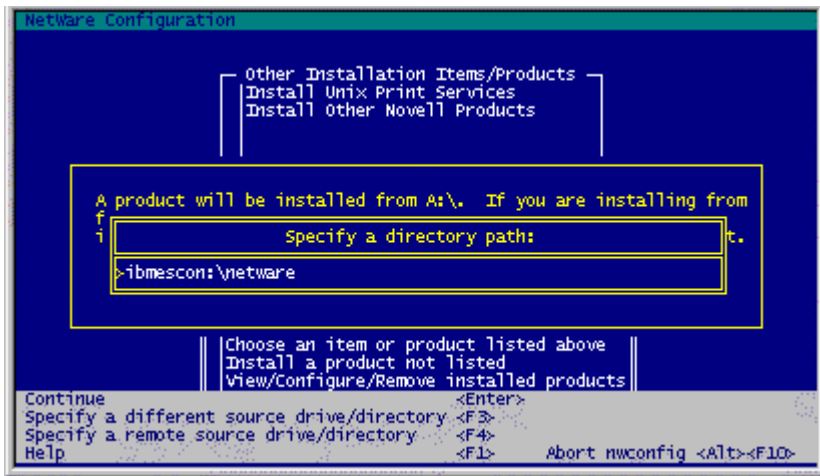


Figure 3-23. Specify a Directory Path

6. A window (Figure 3-24) will appear asking for installation confirmation. Several installation options will be presented. The option to install on the current server will be highlighted. Press the **ENTER** key to accept the option to **"Install on this server"**.

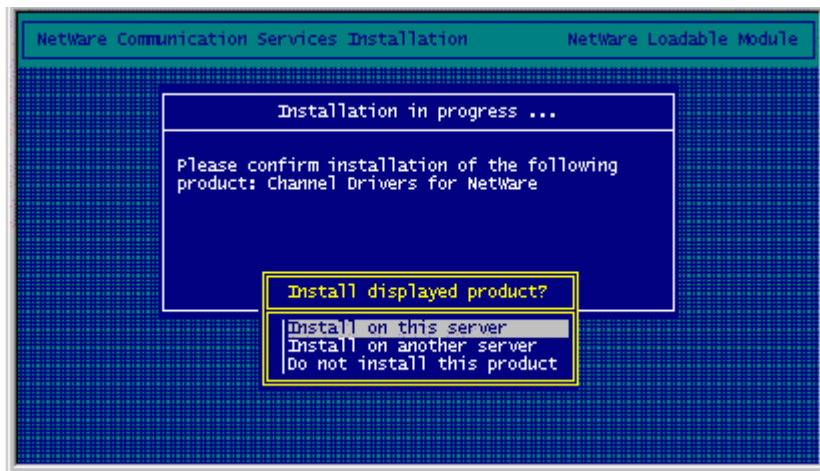


Figure 3-24. Installation Confirmation

7. The installation program will then copy driver and support files into the appropriate sub-directories of the SYS: volume. A status window will show progress (Figure 3-25); periodically updating with names of files being copied.

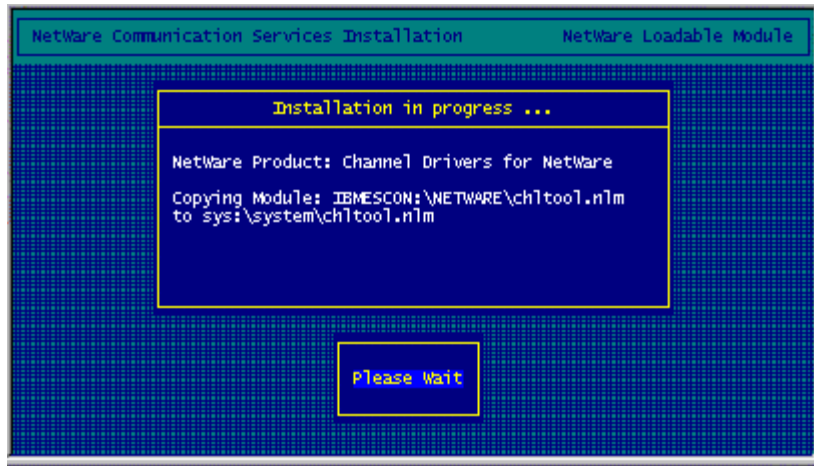


Figure 3-25. Installation in Progress

When the installation is complete, NWCONFIG will display a completion message (Figure 3-26).

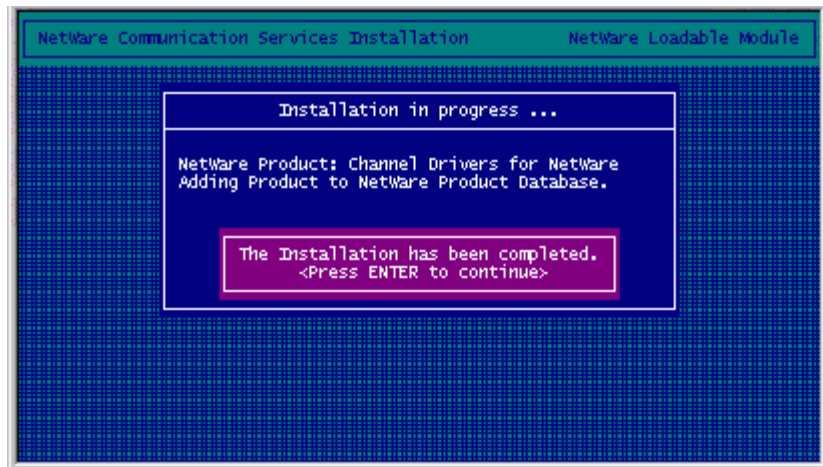


Figure 3-26. Installation Complete

8. Press the **ENTER** key to return to the Install Products screen (Figure 3-27). You may confirm the drivers are installed by highlighting **View/Configure/Remove installed products** and then press the **ENTER** key.

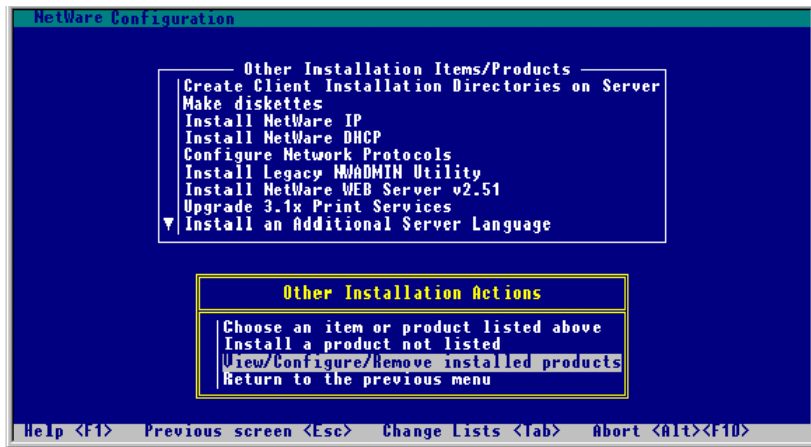


Figure 3-27. Install Products Screen

- The Channel Drivers for NetWare will be listed in the **Currently Installed Product** list (Figure 3-28).

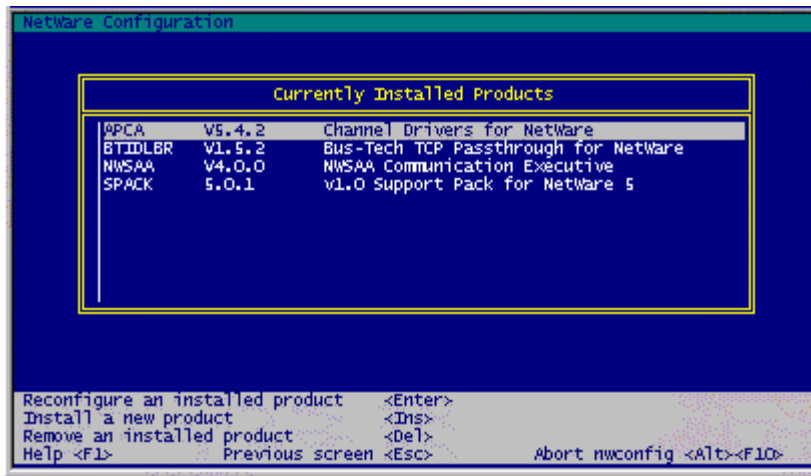


Figure 3-28. Currently Installed Products

NetWare 4.11 Driver Installation

This section describes installation, loading, and unloading of the ESCON adapter's drivers on a NetWare 4.11 Server.

Included in the installation kit is a CD-ROM containing software to support the adapter. The following procedure assumes your Netfinity server has the CDROM driver (CDROM.NLM) loaded.

STEP

1. Insert the CD into the CD-ROM drive of your Netfinity server. Using the keyboard and monitor attached to the server, mount the CD by entering the following command on the NetWare system console:

CD MOUNT IBMESCON

***Note:** NetWare for SAA/intraNetWare for SAA and COMMEXEC must both be down before installing the drivers. Unload NetWare for SAA/intraNetWare for SAA by typing **SAADOWN** at the system console prompt. Type **CSDOWN** to bring down COMMEXEC.*

2. The ESCON adapter's drivers and support programs are installed using Novell's installation utility, INSTALL. To invoke INSTALL type the following command on the NetWare system console:

LOAD INSTALL

INSTALL will display a menu of **Installation Options** (Figure 3-20).

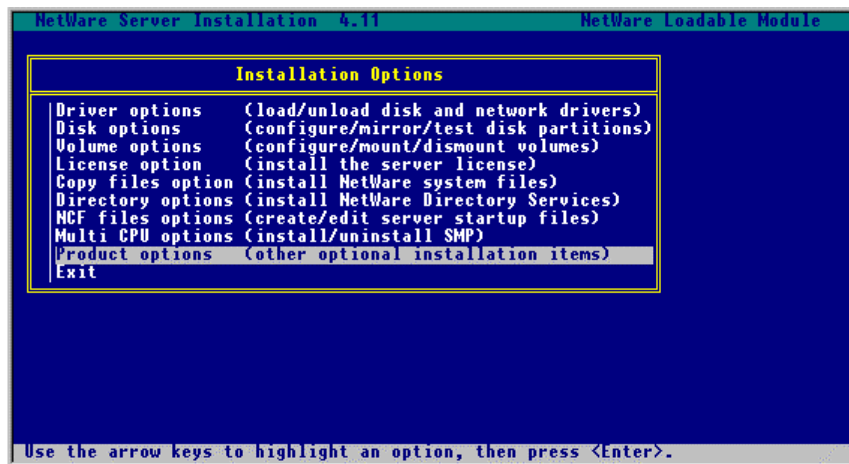


Figure 3-29. Main Menu

- Choose the menu selection “**Product options**” and press **ENTER**. Figure 3-21 will display.

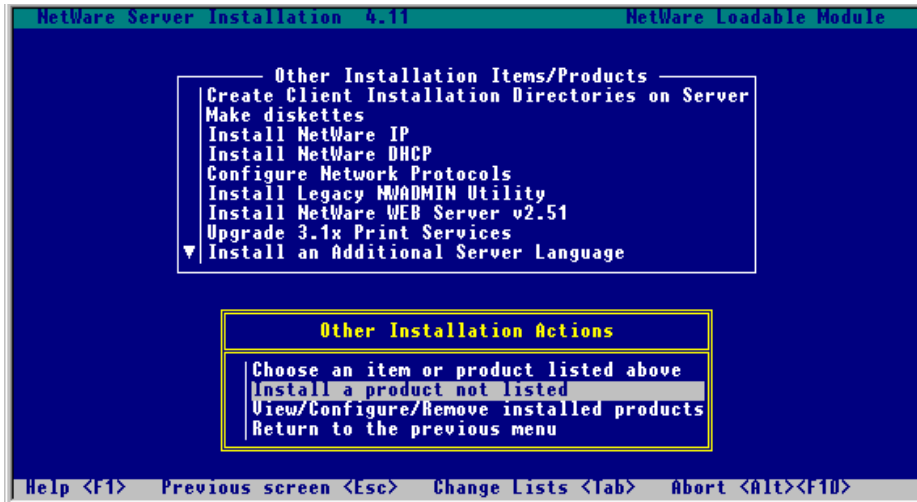


Figure 3-30. Product Options

- Select “**Install a product not listed**” and press the **ENTER** key. A pop-up box (Figure 3-22) will appear allowing you to specify a drive to be used for installation. Press **F3** to enter the path of your CD.

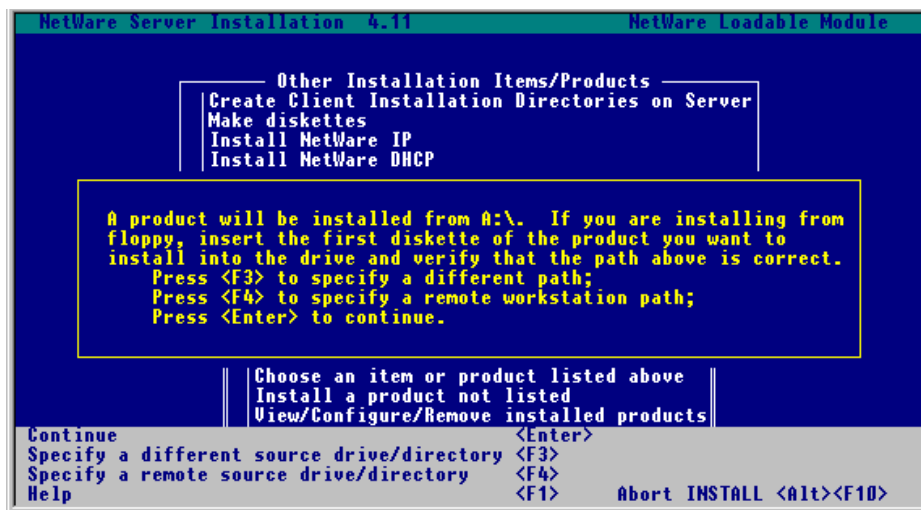


Figure 3-31. Drive Selection Pop-Up

5. A pop-up window appears prompting you for a directory path (Figure 3-23). Enter "ibmescon:\netware" where "ibmescon" is the volume ID of the installation CD.

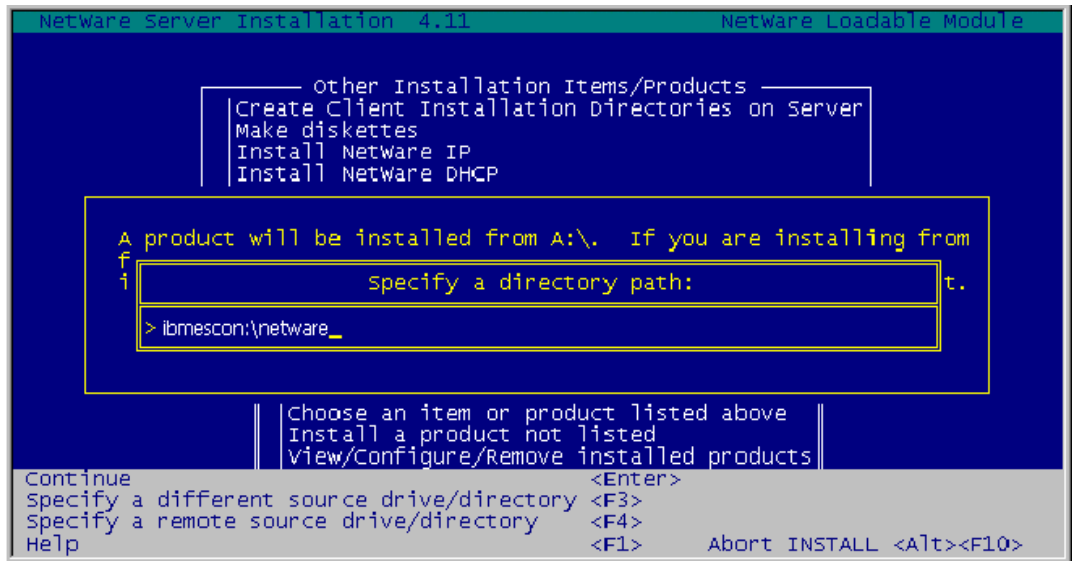


Figure 3-32. Specify a Directory Path

6. A window (Figure 3-24) will appear asking for installation confirmation. Several installation options will be presented. The option to install on the current server will be highlighted. Press the **ENTER** key to accept the option to "Install on this server".

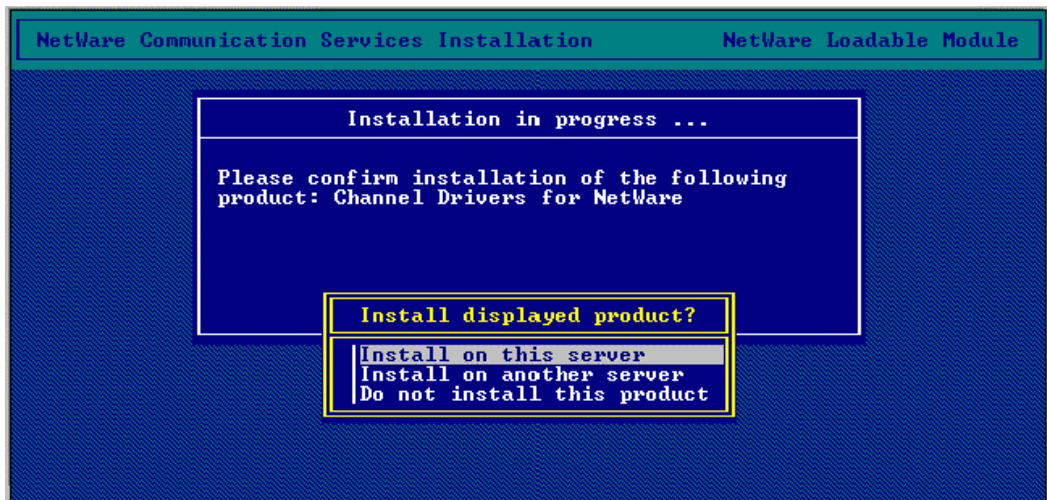


Figure 3-33. Installation Confirmation

7. The installation program will then copy driver and support files into the appropriate sub-directories of the SYS: volume. A status window will show progress (Figure 3-25); periodically updating with names of files being copied.

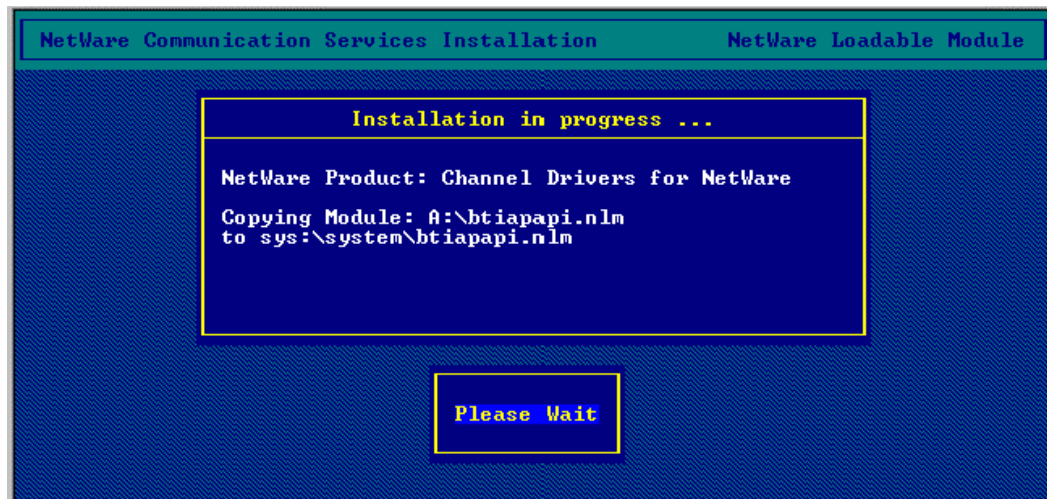


Figure 3-34. Installation in Progress

When the installation is complete, INSTALL will display a completion message (Figure 3-26).

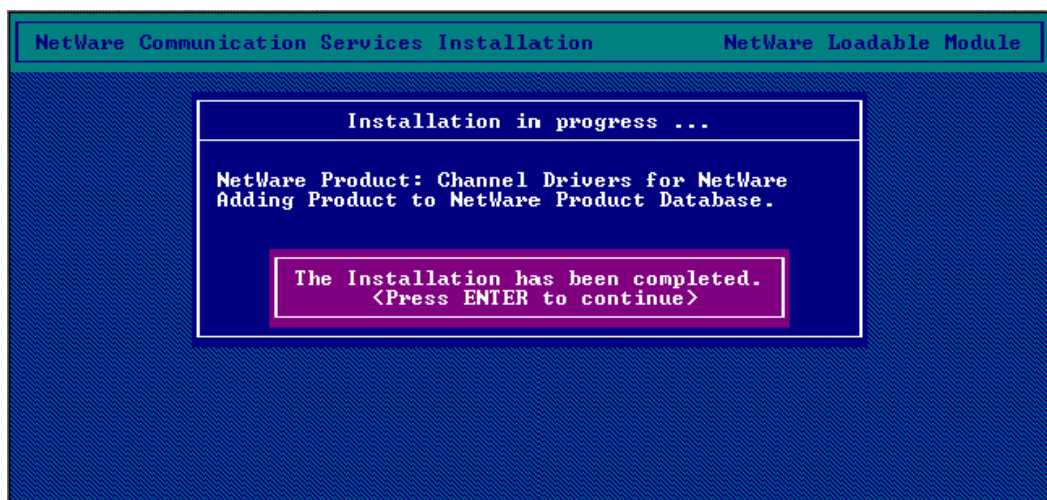


Figure 3-35. Installation Complete

8. Press the **ENTER** key to return to the Install Products screen (Figure 3-27). You may confirm the drivers are installed by highlighting **View/Configure/Remove installed products** and then press the **ENTER** key.

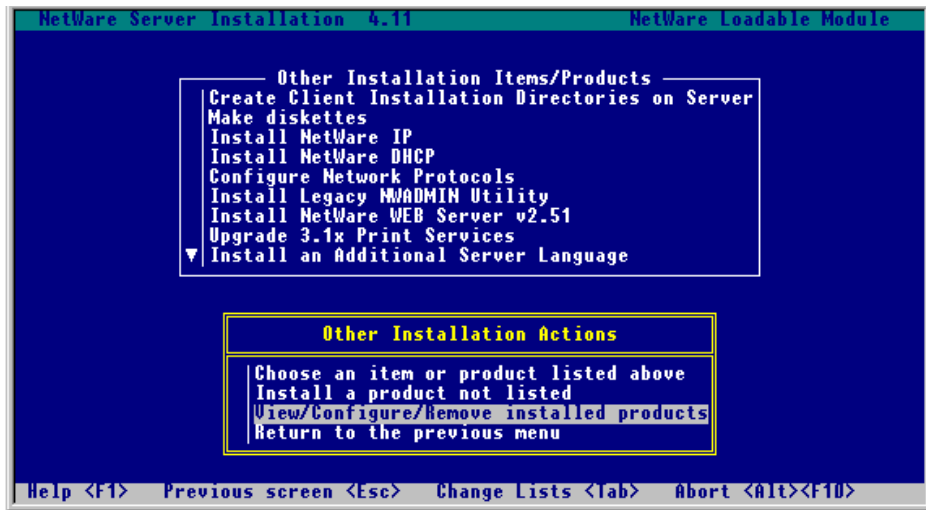


Figure 3-36. Install Products Screen

9. The Channel Drivers for NetWare will be listed in the **Currently Installed Product** list (Figure 3-28).

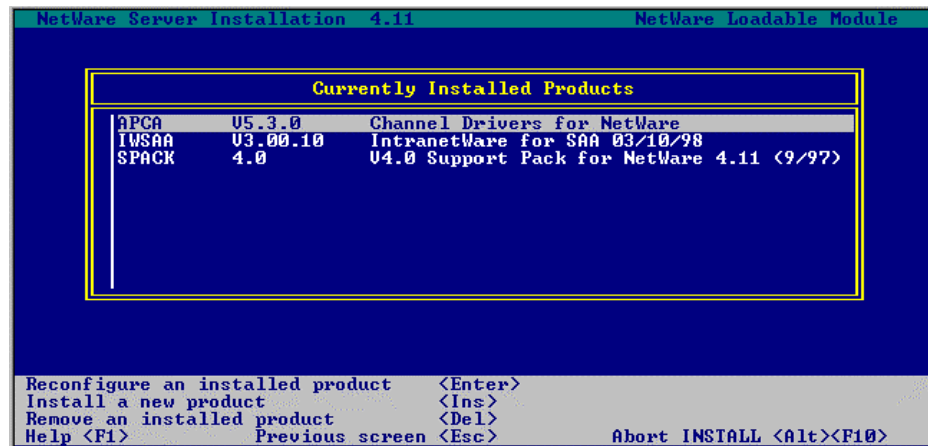


Figure 3-37. Currently Installed Products

10. Once you are satisfied the installation has been successful, the following command will dismount the CD:

CD DISMOUNT IBMESCON /PURGE

Loading the Drivers

There are three NetWare Loadable Modules (NLMs) used with the Netfinity ESCON Adapter:

PBXAAPI.NLM - ESCON Adapter Application Interface NLM

ESCONCFG.NLM - An optional ESCON configuration NLM

BTIPBXA.NLM – ESCON Adapter Driver

The ESCON adapter driver (BTIPBXA.NLM) must be loaded once for each Physical Unit (PU) defined to NetWare for SAA and once for each connection defined to TCP/IP Passthrough.

ESCONCFG.NLM is used to load the adapter with your ESCON configuration. A command line argument for ESCON Configuration (ESCONCFG) identifies the configuration file to load (see Chapter 4 beginning on page 41).

There are no command line options for PBXAAPI.NLM. The correct load order for all three NLMs is:

LOAD PBXAAPI

LOAD ESCONCFG

LOAD BTIPBXA (May be loaded multiple times)

There are several command line arguments required on the ESCON adapter driver (BTIPBXA) load statement. These are:

- ***SLOT=n***
- ***UNIT=xx***
- ***FRAME=3174 / 8232***
- ***PU=2.0 / 2.1***
- ***NAME=name***

where ***SLOT=n*** indicates in which hardware slot the adapter is installed for this load statement. This is a required parameter with no default value.

where ***UNIT=xx*** indicates the path index number in the ESCON configuration for the device used by this connection. This is a required parameter with no default value. This number (***xx***) must have a corresponding ***Indexxx*** statement in the ESCON configuration (see page 41). For TCP/IP Passthrough Connections, it must be the first of a pair of devices defined in the ESCON configuration and must be even. It is always 2 digits.

where ***FRAME=3174 / 8232*** indicates the frame type this connection will be using. For NetWare for SAA support, specify ***FRAME=3174***. The default value if this parameter is omitted is ***3174***.

where *PU=2.0 / 2.1* specifies the type of VTAM Physical Unit to be used for this mainframe connection. The default value if this parameter is omitted is *2.0*.

where *NAME=name* defines a unique name to this connection. This parameter must match the Logical Adapter Name parameter defined in both the NetWare for SAA Data Link Adapter definition and the Dependent PU Profile definition that will use this adapter for its mainframe connection. This is a required parameter with no default value.

Updating AUTOEXEC.NCF

Adapter drivers (NLMs) may be loaded manually at the NetWare system console. However, to ensure that the driver is loaded before any NetWare for SAA PU Profiles are loaded, it is recommended that drivers be loaded by AUTOEXEC.NCF. AUTOEXEC.NCF may be updated using either EDIT.NLM or INSTALL.NLM. Refer to Novell's documentation for complete instructions on editing text files from the server's console.

To load the ESCON adapter driver, add the appropriate LOAD statement(s) to your AUTOEXEC.NCF:

LOAD BTIPBXA SLOT=*n* UNIT=*xx* FRAME=3174 PU=2.1 NAME=*name*

If you are using NetWare for SAA, be sure to place the adapter LOAD statement(s) prior to the "LOAD COMMEXEC" statement in your AUTOEXEC.NCF file. The following example shows correctly formatted adapter LOAD statements. A complete AUTOEXEC.NCF for NetWare for SAA can be found on page 43.

```
.  
. .  
.  
Load PBXAAPI  
Load ESCONCFG ESCON1.CFG  
Load BTIPBXA Slot=2 Unit=01 Frame=3174 PU=2.1 Name=ESCON1  
Load BTIPBXA Slot=2 Unit=02 Frame=3174 PU=2.1 Name=ESCON2  
.  
.  
Load COMMEXEC
```

The first time BTIPBXA.NLM is loaded, a message similar to the following will be displayed on the system console:

Loading Module BTIPBXA.NLM
ODI Channel Driver for xxxx
Version x.xxx month day, year

The second and subsequent times a driver is loaded, the following message will be displayed on the system console:

Loading module BTIPBXA.NLM
Previously loaded module was used re-entrantly

Unloading the Driver

Adapter drivers are re-entrant and may have been loaded several times, once for each mainframe host connection. However, if the driver is unloaded, all host connections will be terminated at once. It is not possible to unload a driver for a single connection. Make sure that all NetWare for SAA PU Profiles using the adapter driver are unloaded before unloading the driver itself.

To unload the ESCON adapter driver from memory, type the following command on the server system console:

: UNLOAD BTIPBXA

Chapter 4. DEFINING THE ESCON CONFIGURATION

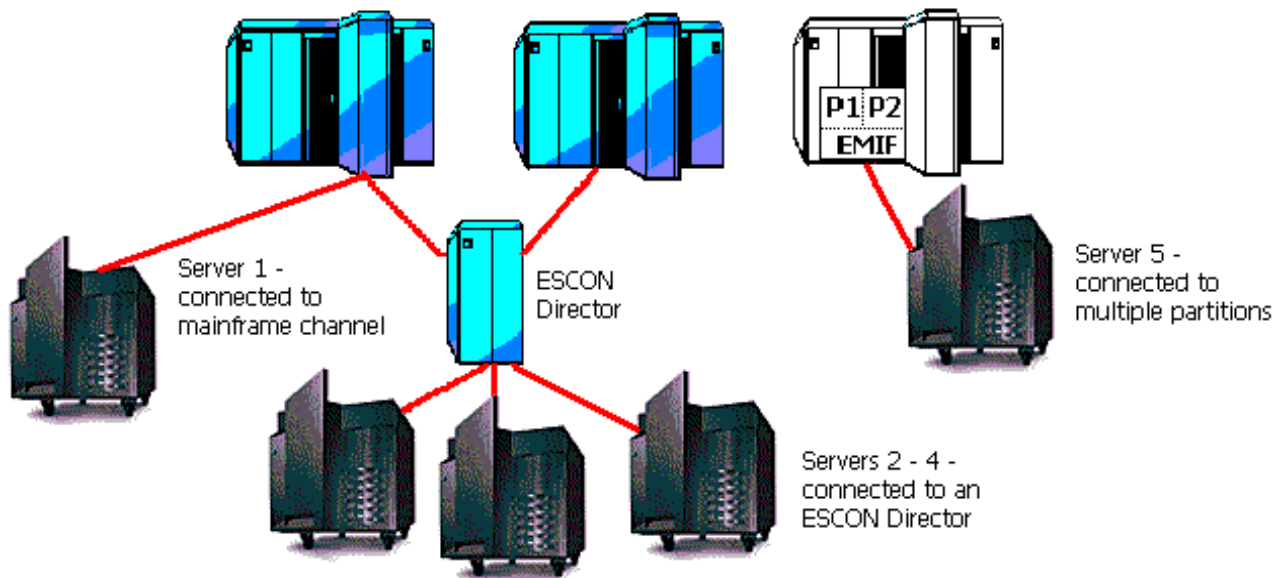


Figure 4-1. ESCON Attached Controllers

Overview

ESCON controllers, including Netfinity servers attached with an ESCON adapter, can be connected to the mainframe in more than one fashion. As shown in Figure 4-1, Server 1 is attached directly to one of the mainframe's ESCON channels. Assuming the mainframe is running a single Logical Partition (LPAR), this is simplest option for connecting to the mainframe. However, connecting the server directly to a mainframe's ESCON channel in this fashion imposes two restrictions:

1. Only a single server can be attached to a mainframe's channel.
2. The server can only communicate directly with that single mainframe.

An ESCON director overcomes these restrictions by attaching multiple "downstream" servers and by supporting multiple ESCON interfaces to multiple mainframes. Again referring to Figure 4-2, Servers 2 - 4 are connected to the director which is then connected to two ESCON channels, one on each of two mainframes.

Some mainframes also support multiple, Logical Partitions (LPARs) running on a single system; logically making the system appear as multiple computers. The ESCON Multiple-Image Facility (EMIF) can be used in those environments to allow sharing of ESCON channel paths across partitions. In Figure 4-1, a single channel path defined between the mainframe and Server 5 can be shared by both LPAR P1 and LPAR P2 using EMIF.

Finally, using both Directors and EMIF, it is possible for a single ESCON server to communicate with multiple Logical Partitions (LPARs) running on multiple mainframes, using multiple ESCON channels.

Because the ESCON adapter may be connected to multiple mainframes and Logical Partitions (LPARs), it is necessary to configure the adapter in order to define how the unit will appear to each of the mainframes and/or logical partitions (LPARs).

The following information may need to be configured for each logical connection that is to be supported across the physical ESCON cable:

Logical Partition Address (LPAR) – This is a hexadecimal number ranging from 0-F identifying the logical partition (LPAR) ID of the partition this connection is to communicate with. This parameter is only required if EMIF is enabled for this channel (in other words the channel path id (CHPID) statement includes the SHARED parameter in the IOCDS). For BASIC mode or LPAR mode non-EMIF, set this field to zero (0). If EMIF is enabled this number must match the LPAR ID assigned in the Logical Partition Definition (LPDEF) frame which appears in LPAR mode after a power on / reset. In LPAR mode the CPU ID contains the LPAR ID as it's fourth character. If running the VM operating system, the "QUERY CPUID" command will display the CPU ID. The fourth character of the CPU ID is the LPAR ID.

Channel Link Address – The Channel Link Address is the address of the ESCON director port that connects to the mainframe you want to communicate with. The value range is from 01-FE hexadecimal. In Figure 4-2 the mainframe uses a link address of '02' to communicate with Server 1. Server 1 uses a link address of '01' to communicate with the mainframe. In this example, the CH Link Address in the adapter configuration is set to '01'.

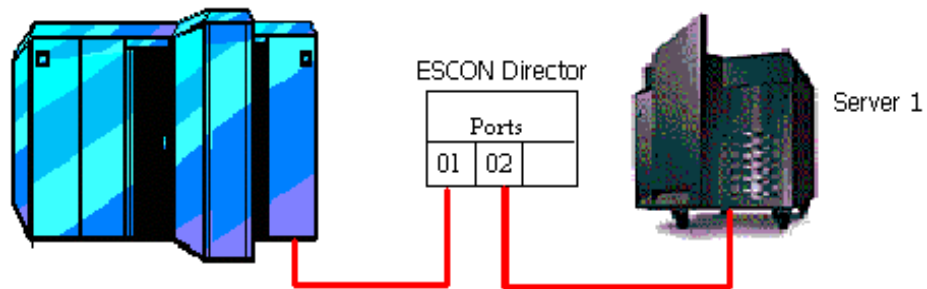


Figure 4-2. Channel Link Addressing

If no director is used, the channel sub-system will assign an arbitrary LINK address (usually 01) for the server to communicate with the mainframe. To ensure the mainframe always selects '01' you should assign '02' to the channel adapter in the IOCDS. Code the LINK parameter in the CNTLUNIT macro in the I/O Configuration Data Set (IOCDS) to be '02' as shown in the following example:

```
CNTLUNIT . . . ,LINK=(02) , . . . .
```

Then set the channel link address to '01' in the adapter's configuration.

Control Unit Address (CUAdd) – This is the control unit address that the LPAR will use to communicate with the controller and the controller will use to identify itself to the LPAR. Control Unit Address is a hexadecimal number ranging from 0-F. This number must match that coded in the CUADD parameter of the CNTLUNIT macro in the IOCDS. Note that CUADD is an optional field in the IOCDS and defaults to zero (0) if not coded.

Device Address (Base Device Address) – The Sub-Channel or Physical Unit (PU) address for the device, ranging in value from 00-FF hexadecimal. This address should match that coded in the UNITADD parameter of the CNTLUNIT macro in the IOCDS. Sub-channel addresses must be unique across any one adapter.

For MPC+ at least two device addresses must be configured for each MPC transmission group. These device addresses must be coded as UNIT=SCTC in the CNTLUNIT macro in the IOCDS.

For IBM Communications Server (non-MPC+), NetWare for SAA, or Microsoft SNA Server a device address must be configured for each PU configured in the gateway that will use the ESCON adapter. These device addresses must be coded as UNIT=3174 in the CNTLUNIT macro of the IOCDS.

For TCP/IP Direct Connect (non-MPC+) two adjacent device addresses must be defined for each connections. These device addresses must be coded as UNIT=SCTC in the CNTLUNIT macro in the IOCDS.

For TCP/IP Passthrough two adjacent device addresses must be defined for each connection. These device addresses must be coded as UNIT=3088 or UNIT=CTCA in the CNTLUNIT macro in the IOCDS. The first address of the pair must always be even numbered; for example: 12-13, 8A-8B, etc.

Emulation Type – The Netfinity ESCON Adapter provides several types of device emulation in firmware. This parameter defines which type emulation is to be used for this device. Valid types include “MPC” for devices to be used with MPC+ for Windows NT or TCP/IP Direct Connect, “3174” for non-MPC SNA PUs, and “Generic” for TCP/IP Passthrough connections.

The remainder of this chapter discusses how to modify the configuration parameters for your Netfinity ESCON Adapter. The next section is specific to servers based on Microsoft's Windows NT. The section following that, on Page 36, is specific to servers using NetWare, either 3.12 or 4.11. Please refer to the appropriate section.

Windows NT ESCON Configuration

ESCON configuration parameters can be viewed and set through the Windows NT system Control Panel. From the main screen of Control Panel double click the **Network** Icon (See Figure 4-3).



Figure 4-3. Windows NT Control Panel

The **Network** configuration screen (Figure 4-4) will appear.



Figure 4-4. Network Configuration Screen

Select the **Adapters** tab to display the list of installed network adapters (Figure 4-5). The IBM PCI ESCON adapter should be included in the list.

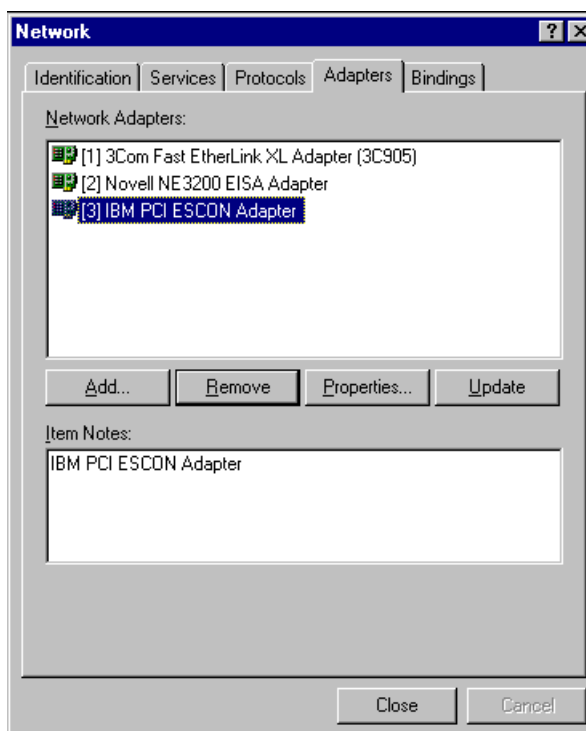


Figure 4-5. Network Adapters List

Selecting the ESCON adapter and clicking **Properties** will bring up the ESCON Configuration Screen (Figure 4-6).

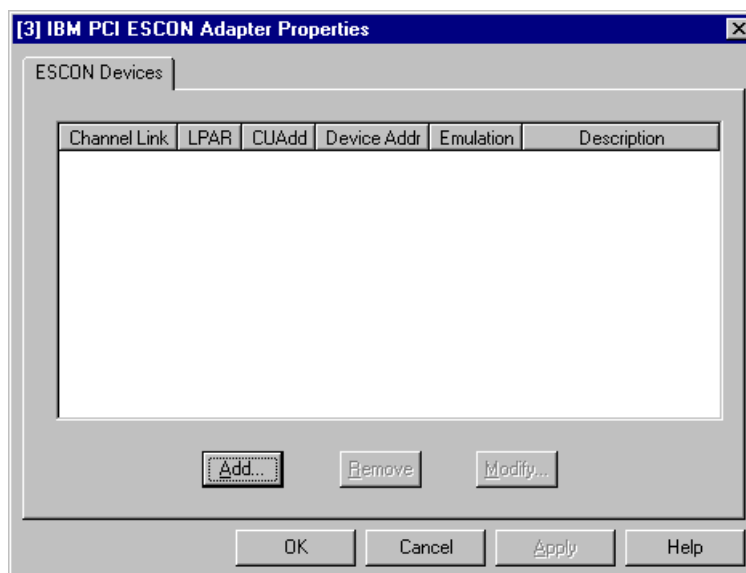


Figure 4-6. ESCON Configuration Screen

To define a new device click **Add...**



Figure 4-7. Add ESCON Device

Complete the Channel Link Address, LPAR, CUAdd, Base Device Address and Emulation Type fields in the **Add ESCON Devices** dialog according to the descriptions of these fields found on pages 32-33 of this chapter. If your mainframe is configured with ESCON Multiple Image Facility (EMIF) and this CHPID is defined on the mainframe as shared, then check the **CHPID is shared** check box. Enter the number of devices you wish to define. For example, to create device A0 and A1, enter 2. Optionally enter a **Description** to be associated with this device.

Press **Add** to add the device(s) to the ESCON configuration file. The ESCON Adapter Properties dialog will re-display, now showing the new devices (Figure 4-8).

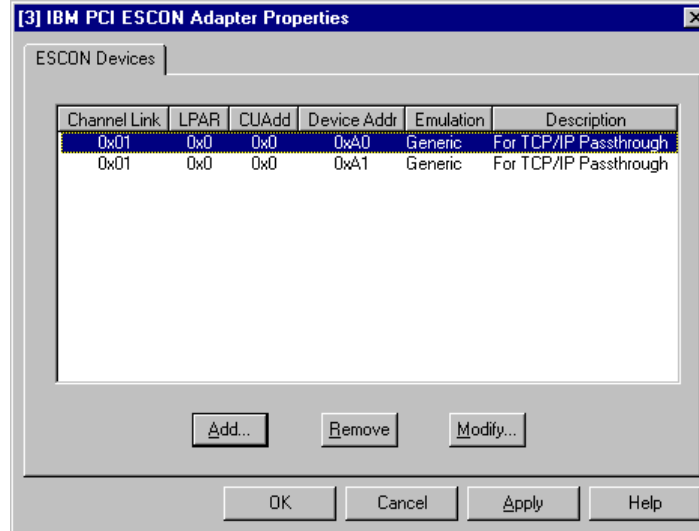


Figure 4-8. Newly Created ESCON Devices

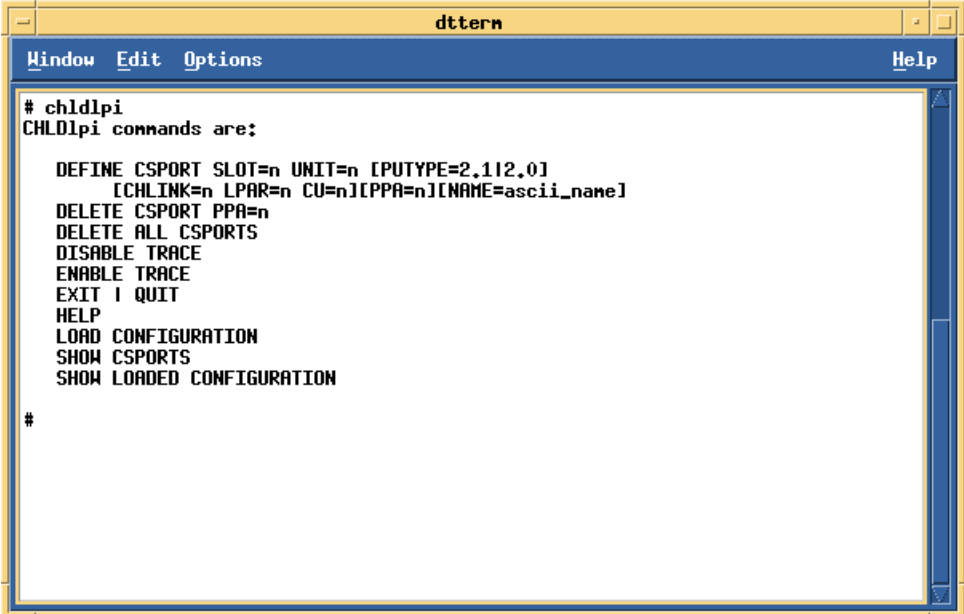
To remove a previously defined device, highlight the device and then click **Remove**. To edit a previously defined device, simply click **Modify**.

To save a newly created configuration, click **OK**.

NOTE: *ESCON configuration changes do not take effect until the Server has been hard RESET (or Power Off and Power On).*

UnixWare 7

The **chldlpi** utility, found in the '**opt/channel/bin**' folder, is used to define ESCON ports in UnixWare 7 for use by CS/UnixWare; including ESCON configuration details, Physical Unit Type (2.0 or 2.1), Port Name, and Port Number. Typing **chldlpi** on the UnixWare command line with no parameters will display a list of sub-commands provided by the utility (Figure 4-9). You must define at least one port before attempting to configure the ESCON Adapter in **x snaadmin**.



```
# chldlpi
CHLDLpi commands are:

  DEFINE CSPORT SLOT=n UNIT=n [PUTYPE=2,112.0]
    [CHLINK=n LPAR=n CU=n][PPA=n][NAME=ascii_name]
  DELETE CSPORT PPA=n
  DELETE ALL CSPORTS
  DISABLE TRACE
  ENABLE TRACE
  EXIT | QUIT
  HELP
  LOAD CONFIGURATION
  SHOW CSPORTS
  SHOW LOADED CONFIGURATION

#
```

Figure 4-9. chlecfg Commands

DEFINE CSPORT is the **chldlpi** command used to add new ports to the ESCON configuration. Parameters supported by Define CSPORT include:

SLOT - The encoded slot number of the Netfinity ESCON Adapter. The **chlnfo** command will display the encoded slot number for all ESCON adapters in the system (Figure 4-10).

UNIT - The Device Address

PUTYPE - The PU type (2.0 or 2.1) to be supported by this device. If not coded, the default is type 2.1.

CHLINK - The Channel Link Address for the device.

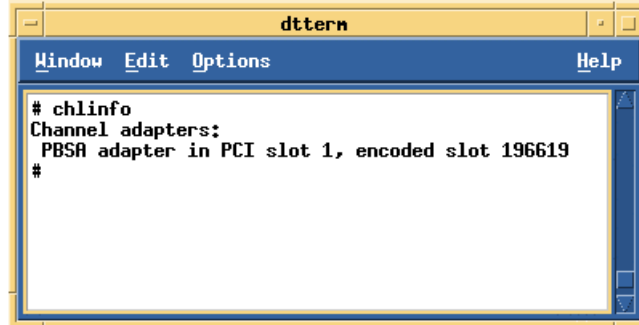
LPAR - The Logical Partition Identifier for the device.

CU - The Control Unit Address for the device.

PPA - An optional port number to be assigned to this port. If not coded, **chldlpi** will automatically assign the next available number.

NAME - An ascii character string to be appended to 'csport' to create a unique port name. If not coded, chldlpi will use the port number to generate a unique name. For example: 'csport001'.

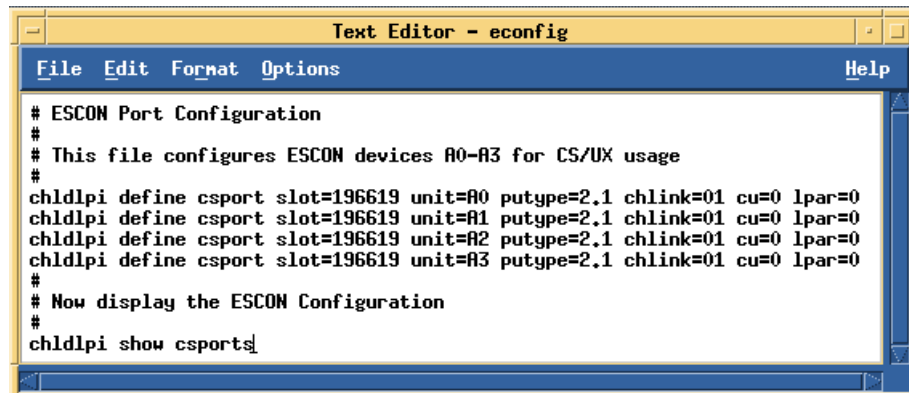
For a more complete description of TYPE, CHLINK, LPAR, CU, and UNIT please refer to the '**Overview**' section at the beginning of this chapter.



```
# chlinfo
Channel adapters:
PBSA adapter in PCI slot 1, encoded slot 196619
#
```

Figure 4-10. chlinfo Displays Encoded Slot

Ports may be defined by entering individual chldlpi commands one at a time through the command line or they may be stored in a data file and executed as a command procedure. Figure 4-11 shows a data file named 'econfig' which defines four ESCON ports to the adapter in encoded slot 196619 and then displays the adapter's complete ESCON configuration.



```
# ESCON Port Configuration
#
# This file configures ESCON devices A0-A3 for CS/UX usage
#
chldlpi define csport slot=196619 unit=A0 putype=2.1 chlink=01 cu=0 lpar=0
chldlpi define csport slot=196619 unit=A1 putype=2.1 chlink=01 cu=0 lpar=0
chldlpi define csport slot=196619 unit=A2 putype=2.1 chlink=01 cu=0 lpar=0
chldlpi define csport slot=196619 unit=A3 putype=2.1 chlink=01 cu=0 lpar=0
#
# Now display the ESCON Configuration
#
chldlpi show csports
```

Figure 4-11. Sample ESCON Port Configuration Command File

Figure 4-12 shows the results of executing 'econfig' on a dtterm command line.


```

dttern
Window Edit Options Help
# /opt/channel/econfig
csport PPA #1 added: name=csport1 encodedSlot=196619 unit=A0 putype=2.1 cu=0 chlink=1 lpar=0
csport PPA #2 added: name=csport2 encodedSlot=196619 unit=A1 putype=2.1 cu=0 chlink=1 lpar=0
csport PPA #3 added: name=csport3 encodedSlot=196619 unit=A2 putype=2.1 cu=0 chlink=1 lpar=0
csport PPA #4 added: name=csport4 encodedSlot=196619 unit=A3 putype=2.1 cu=0 chlink=1 lpar=0

CSPort configuration:
-----
csport  chlink  lpar  cu  unit  putype  slot  name
#001    01      0     0   A0    2.1    196619  csport1
#002    01      0     0   A1    2.1    196619  csport2
#003    01      0     0   A2    2.1    196619  csport3
#004    01      0     0   A3    2.1    196619  csport4
-----
# -

```

Figure 4-12. Results of Executing Sample Configuration File (econfig)

Once you have defined (or modified) the port configuration, you must load it into the dlp. **chldlpi load configuration** will load current port definitions for each Netfinity ESCON Adapter it finds in the system. **chldlpi show loaded configuration** will display all configured/loaded csports (Figure 4-13).

```

dttern
Window Edit Options Help
# chldlpi load configuration
chldlpi: number of initialized PPA: 4
# chldlpi show loaded configuration

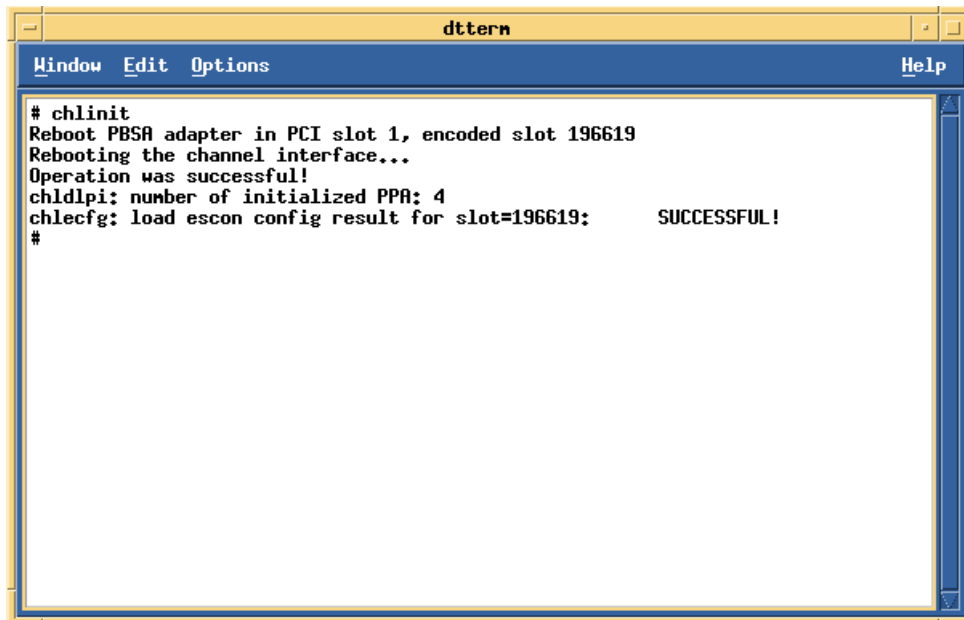
Active PPA configuration:
-----
PPA  Name      Slot  Unit  Index  Init  LastErr
001  csport1    196619  A0    01     N     0
002  csport2    196619  A1    02     N     0
003  csport3    196619  A2    03     N     0
004  csport4    196619  A3    04     N     0
-----
# -

```

Figure 4-13. Re-initializing ESCON Adapter

Finally, to activate the newly defined configuration in the adapter's firmware, you must reset the ESCON adapter. This is accomplished by executing the command **chlnit** (see).

Note: Re-initializing the ESCON adapter takes approximately 1 minute. Do not be alarmed when the chlnit command does not complete immediately.



```
dttern
Window Edit Options Help
# chlnit
Reboot PBSA adapter in PCI slot 1, encoded slot 196619
Rebooting the channel interface...
Operation was successful!
chldlpi: number of initialized PPA: 4
chlecfg: load escon config result for slot=196619: SUCCESSFUL!
#
```

Figure 4-14. Re-initializing the ESCON Adapter

NetWare ESCON Configuration

Configuring the Netfinity ESCON Adapter in NetWare is a two-step process. First, you must create an ESCON configuration file and store it on a directory that can be accessed by AUTOEXEC.NCF during NetWare startup. Second, you must include a NetWare LOAD command to process the configuration file each time NetWare is brought up.

Creating a Configuration File

A single configuration file is used to configure all Netfinity ESCON Adapters installed in your server.

To assist in creating configuration files, a sample configuration file is provided on the CD. Once adapter drivers have been installed, the sample configuration file (“ESCON.CFG”) will be stored in the adapter’s sub-directory on the system volume (“SYS:CHANNEL”).

The contents of ESCON.CFG are:

```
; Sample ESCON Configuration Definition
; This file is read by ESCONCFG.NLM.
; The syntax for ESCONCFG is as follows:
;   Load ESCONCFG.NLM filename
;
;
; The syntax for each entry is as follow:
; Indexii=Subchannel,EmulationType,CULogicalAddress,ChLinkAddress,CHLogicalAddress
;
; ii is an assigned path index number (x'01' – x'41')
; Subchannel is the device address (00-FF) as assigned in the mainframe
; EmulationType is ether 3174 or Gen.
;   Use 'Gen' for all Emulation Types other than 3174.
; CULogicalAddress is the Control Unit Logical Address (0-F)
; CHLinkAddress is the Channel Link Address (01-FE)
; CHLogicalAddress is the Channel Logical Address or LPARS (0-F)
;
; Samples entries:

Index01=01,3174,1,01,1
Index02=02,3174,1,01,1
Index04=04,Gen,1,01,1
Index05=05,Gen,1,01,1
```

As shown, each entry in the configuration file must follow the format:

Index*ii*=*dd*,*yyyy*,*n*,*xx*,*z*

where:

ii = **Path Index**

uu = **Device Address**

yyyy = **Emulation Type**

n = **CU Address**

xx = **CH Link Address**

z = **LPAR**

A complete description of these fields may be found on pages 32 through 33 of this manual. **Path Index** is a hexadecimal number between x'01'-x'41' and must be unique within the server. TCP/IP Passthrough uses two consecutive devices the first of which must be even numbered. In the example above both Index04 and Index 05 will be used for a TCP/IP Passthrough connection.

Once the configuration has been defined, save the configuration file to a directory where it can be accessed by AUTOEXEC.NCF.

Processing the Configuration File

An ESCON configuration file is only processed if you specifically request it be processed by loading ESCONCFG.NLM. The LOAD command for loading the configuration program is:

```
LOAD ESCONCFG <config file name>
```

Typing this command at the NetWare console or including it in AUTOEXEC.NCF will cause ESCONCFG to read the configuration file named on the command line and process it. If no config file name is specified, the default ("SYS:CHANNEL/ESCON.CFG") will be processed.

To insure the Netfinity ESCON Adapter is correctly configured whenever NetWare is restarted, you should include the LOAD ESCONCFG command in the AUTOEXEC.NCF startup control file. The low level device driver for the adapter (PBXAAPI.NLM) must be loaded first and the configuration process must be performed before any connections are opened.

NOTE: *ESCON configuration changes do not take effect until the Server has been hard RESET (or Power Off and Power On). Bringing the NetWare server DOWN and back up without resetting the hardware will cause an ESCON configuration load error when ESCONCFG is executed.*

The following sample shows a properly defined AUTOEXEC.NCF for NetWare for SAA. The LOAD commands load the low level device driver, process an ESCON configuration file name "ESCON.CFG", and then load ODI drivers for two devices; indexed 01 and 02.

```
Set Time Zone = EST5EDT
Set Daylight Savings Time Offset = 1
Set Start Of Daylight Savings Time = (APRIL SUNDAY FIRST 2:00:00 AM)
Set End Of Daylight Savings Time = (OCTOBER SUNDAY LAST 2:00:00 AM)
Set Default Time Server Type = SINGLE
Set Bindery Context = O=BTI
File Server Name NETSHUTTLE
IPX Internal Net 2F7C7B62
Search add sys:system\nwsaa
Search add sys:system\commexec
Search add c:
Set Maximum Packet Receive Buffers=2000
Set Reply to Get Nearest Server=off
Mount allSYS:ETC\INITSYS.NCF
Load PBXAAPI
Load ESCONCFG ESCON.CFG
Load BTIPBXA Slot=2 Unit=01 Frame=3174 PU=2.1 Name=ESCON1
Load BTIPBXA Slot=2 Unit=02 Frame=3174 PU=2.1 Name=ESCON2
Load COMMEEXEC
Load NWSAA
```

Chapter 5. MULTI-PATH CHANNEL+

Included on the Netfinity ESCON Adapter's software CD is optional Multi-Path Channel+ (MPC+) software for Windows NT. This chapter discusses installation and configuration of MPC+ into your Netfinity Windows NT server.

Overview

Multipath Channel + (MPC+) is a high-performance channel protocol used to communicate between systems across Enterprise Systems Connection (ESCON). MPC+ offers a number of advantages over older, more traditional channel protocols including:

- Reduced Mainframe CPU utilization
- Improved ESCON channel utilization
- Improved Fault Tolerance

Additionally, MPC+ can use the group of ESCON subchannels (devices) to move both TCP/IP or APPN traffic between the mainframe and the server. These devices may be defined over a single ESCON channel, or over multiple ESCON channels.

MPC+ software provided with the Netfinity ESCON Adapter can be defined as a link option with Communications Server for Windows NT and/or TCP/IP Direct Connect. TCP/IP Direct Connect provides a Network Driver Interface Specification (NDIS) driver allowing Microsoft's TCP/IP protocol stack to communicate in a point-to-point connection with the mainframe TCP/IP protocol stack (see Chapter 6).

Figure 5-1 shows the relationship between the Netfinity ESCON Adapter, MPC+, TCP/IP Direct Connect, Communications Server for Windows NT, and Microsoft's TCP/IP protocol stack. Notice that both CS/NT and TCP/IP Direct Connect can communicate either directly with the Netfinity ESCON Adapter through MPC+.

Note: Netware for SAA, TCP/IP Passthrough for Netware, and Microsoft's SNA Server do not support MPC+ connections.

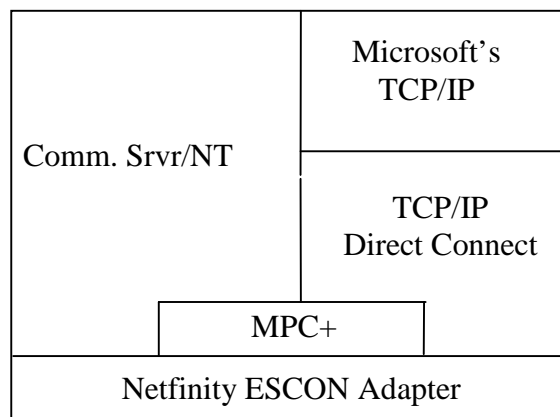


Figure 5-1. MPC+ for Windows NT Software Implementation

MPC+ Installation

The MPC+ software must be installed if you intend to use High Speed Access Services (HSAS), Multi-Path Channel Point-to-Point (MPCPTP) TCP/IP, or MPC+ with Communications Server for Windows NT. For HSAS and MPCPTP, the MPC+ software must be installed before you install TCP/IP Direct Connect (See Chapter 6). MPC+ software is never required and is not supported by TCP/IP Passthrough for Windows NT or Microsoft's SNA Server.

The following step-by-step procedure will install the MPC+ software onto your Netfinity server.

Step

1. From the **Start** menu of your Windows NT Server console, click the **R**un command. The Run dialog box will display (Figure 5-2).

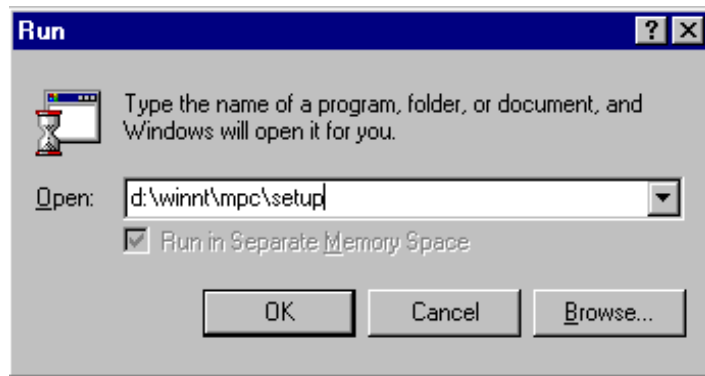


Figure 5-2. Run Dialog Box

2. Type in “d:\winnt\mpc\setup” where **d** is the drive letter assigned to your Netfinity server's CD-ROM drive.
3. Click **OK** to execute the setup program. The Welcome dialog box will display (Figure 5-3).

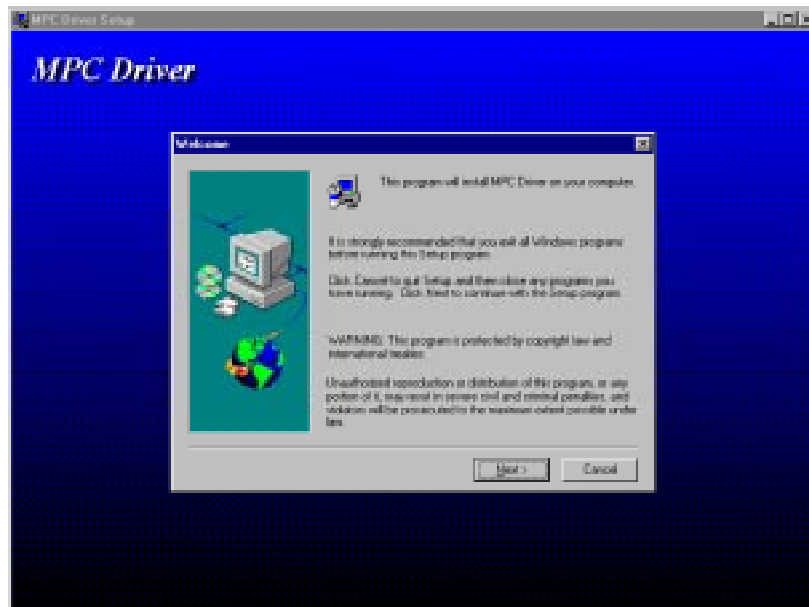


Figure 5-3. MPC Driver Welcome Dialog Box

4. Once you have all programs stopped, click **N**ext to start the installation.

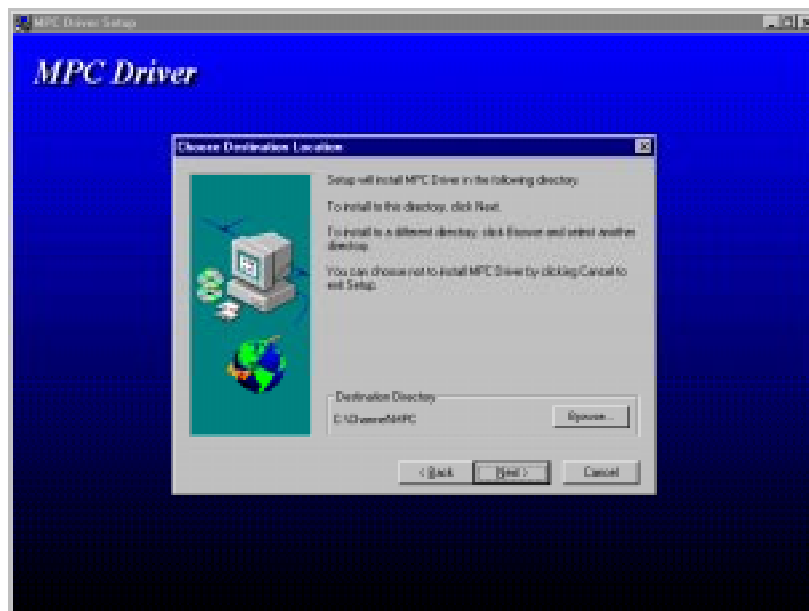


Figure 5-4. Choose Destination Location

- The Choose Destination Location dialog box will display showing the target installation directory (Figure 5-4). Unless you have a specific reason for changing the directory you should allow it to default to “C:\CHANNEL\MPC”. Click **N**ext to continue the install. Progress bars will display while the MPC+ driver is copied to the Netfinity’s hard drive (Figure 5-5).

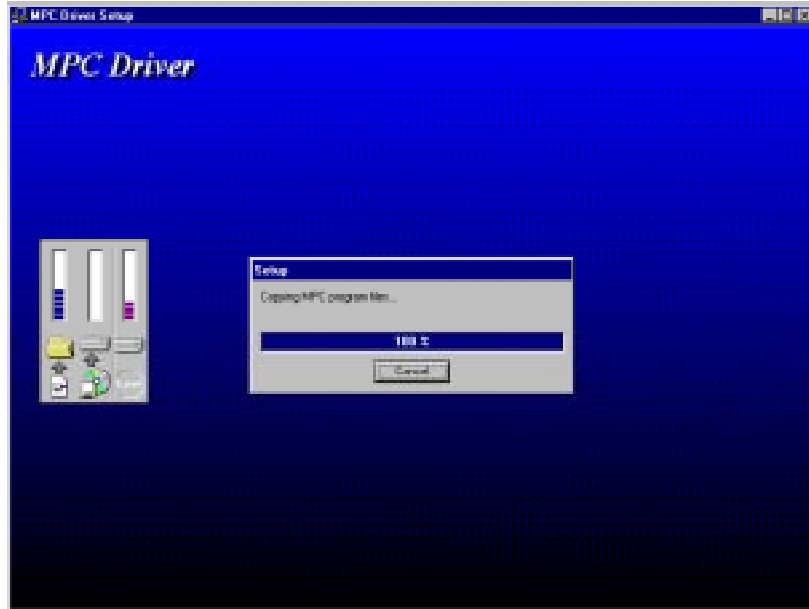


Figure 5-5. Installation Progress

- The Setup Complete dialog box (Figure 5-6) allows you to reboot your server immediately or postpone reboot until later. You must reboot the server before attempting to use the MPC+ driver. Click **F**inish to complete the install.

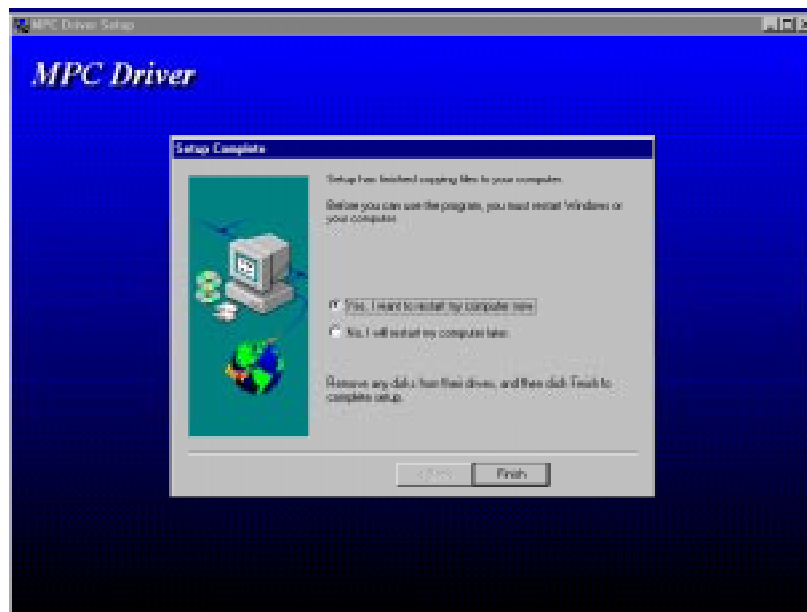


Figure 5-6. Setup Complete

MPC Transmission Groups

MPC+ uses the concept of a transmission group to communicate across one or more ESCON channels. A MPC transmission group is a collection of subchannels (ESCON devices) identified by a single name. Within the group subchannels are defined as either a Mainframe Read connection or a Mainframe Write connection. Each subchannel sends data in only one direction, reducing set up and turnaround times.

During link definition for TCP/IP Direct Connect (see page 58) or CS/NT (see page 78) you will be given the option to configure MPC. When you select the option to configure MPC the MPC Configuration dialog box is displayed (Figure 5-7). The following step-by-step procedure will define a new MPC transmission group.

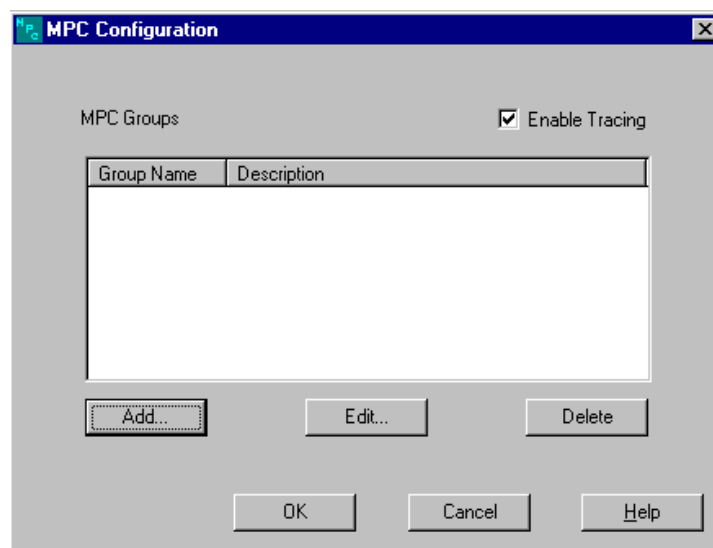


Figure 5-7. MPC Configuration

Step

1. From the MPC Configuration screen (Figure 5-7), click the **Add...** button.
2. The MPC Group Add/Edit screen (Figure 5-8) is used to define a new MPC transmission group. Enter a Group Name and an informational description.

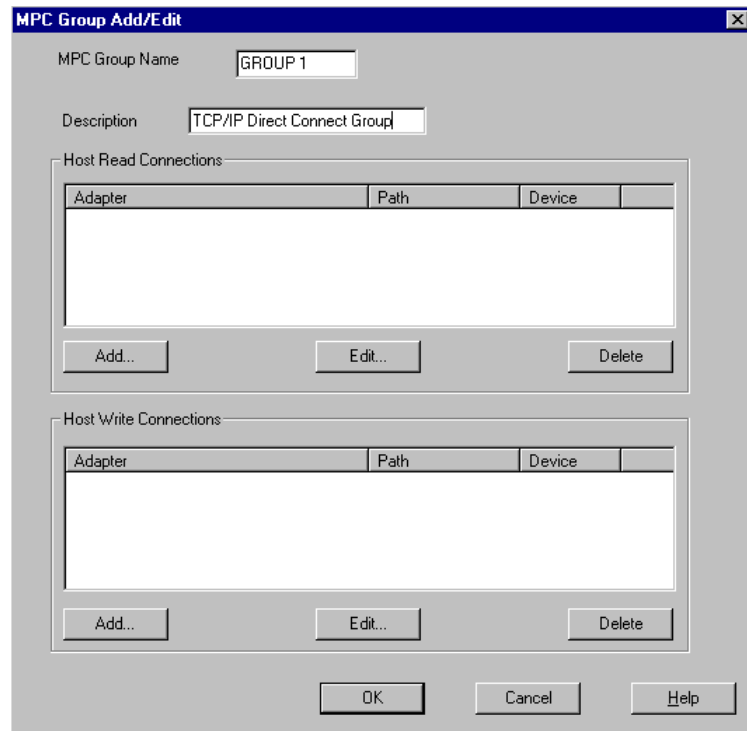


Figure 5-8. MPC Group Add/Edit Screen

- Each MPC group requires at least one subchannel address assigned for Host Read Connections and one subchannel address assigned for Host Write Connections.

To add a subchannel to either the Host Read Connections list or the Host Write Connections list, click the **Add...** button under that list. The Add Connection screen displays (Figure 5-9).

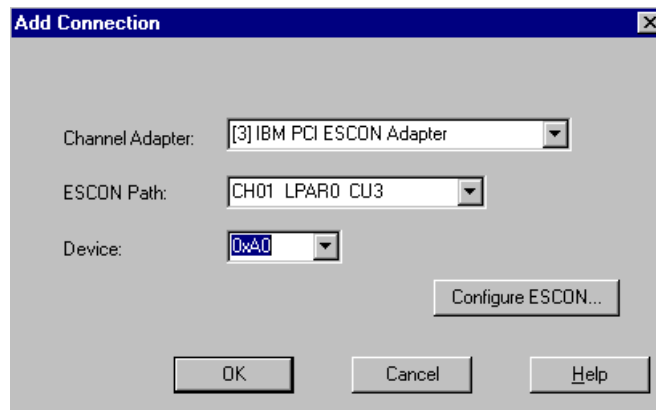


Figure 5-9. Add Connection to MPC Group

- Use your mouse to select a **Channel Adapter**, **ESCON Path**, and **Device** from the list of available adapters and devices already defined in the system. If you have not yet defined your ESCON configuration, click on **Configure ESCON...** Refer to Chapter 4 for information on defining the ESCON configuration.

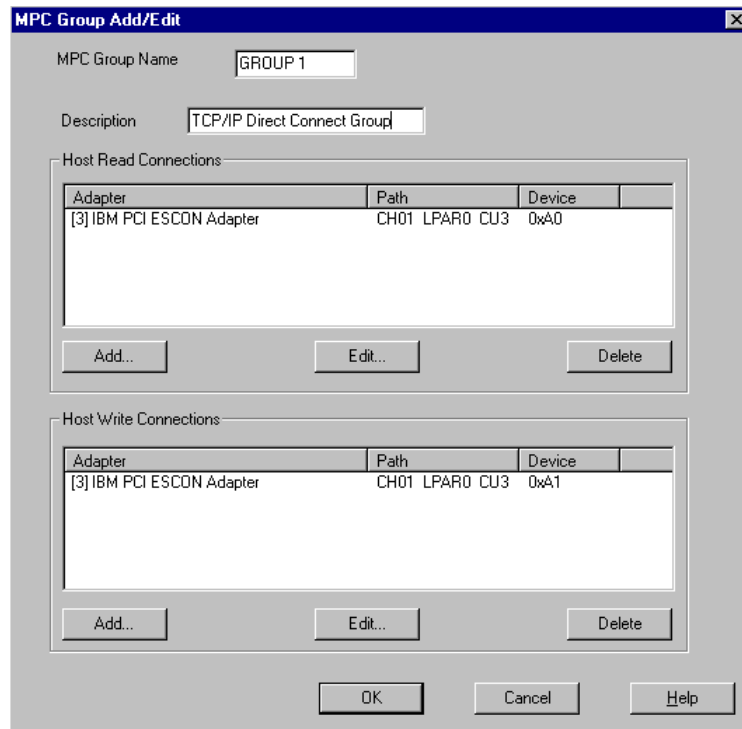


Figure 5-10. Completed MPC Group Definition

5. Once both Read and Write connections have been defined (Figure 5-10), click **OK** to define the group and return to the MPC Configuration screen (Figure 5-11) which now shows the new MPC Group.

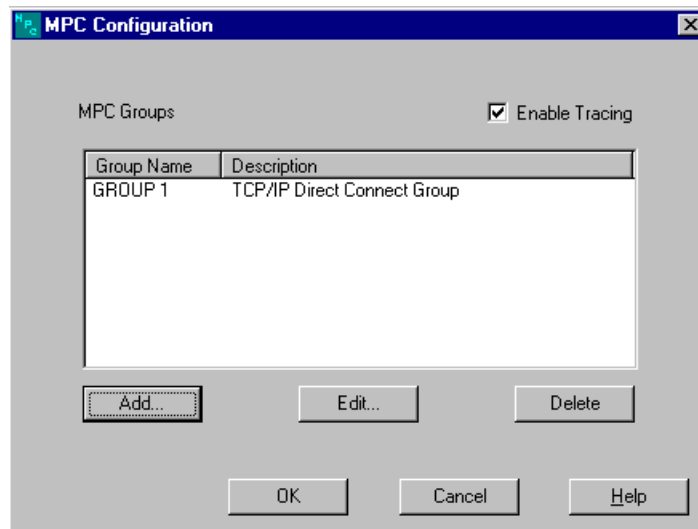


Figure 5-11. MPC Configuration with New Group

Click **OK** to return to the link configuration screen you started from.

Chapter 6. TCP/IP DIRECT CONNECT

Note: TCP/IP Direct Connect was previously known as Virtual Point-to-Point Adapter (VPPA).

TCP/IP Direct Connect software included on the Netfinity ESCON Adapter's CD-ROM is used to provide Point-to-Point TCP/IP communications between the server and the mainframe. TCP/IP Direct Connect is required if you are implementing the System/390 SAP R/3 solution using the Netfinity ESCON Adapter (Chapter 13). TCP/IP Direct Connect is not required and does not need to be installed for TCP/IP Passthrough for Windows NT (see Chapter 9), Communications Server for Windows NT (see Chapter 7), or Microsoft's SNA Server (see Chapter 8).

TCP/IP Direct Connect provides an interface compliant with the Network Driver Interface Specification (NDIS). This allows Microsoft's TCP/IP stack to communicate with the Netfinity ESCON Adapter in the same fashion it would use to communicate with any other network interface card (NIC). TCP/IP applications running on the Netfinity server can communicate across the ESCON adapter with peer applications running on the IBM mainframe (Figure 6-1).



Figure 6-1. TCP/IP Direct Connect

Further, when the Netfinity server's TCP/IP stack is properly configured for IP forwarding, any client in a TCP/IP network can gain immediate access to TCP/IP applications and/or services running on the mainframe (Figure 6-2).

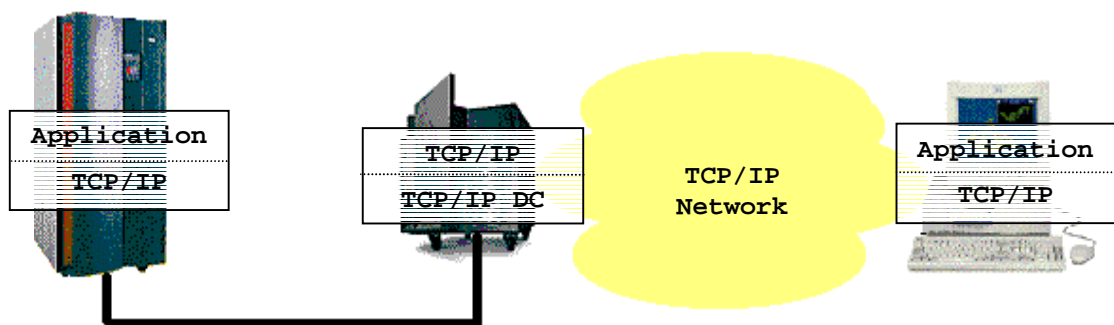


Figure 6-2. Distributed TCP/IP Applications

TCP/IP Direct Connect supports three link types across the ESCON channel: Channel-to-Channel (CTC), High-Speed Access Services (HSAS), or Multi-Path Channel Point-to-Point (MPCPTP).

CTC uses two ESCON devices (one for read, one for write) to communicate with legacy mainframe TCP/IP stacks including MVS TCP/IP, VM TCP/IP, Interlink's TCPAccess, and Connectivity Systems' TCP/IP for VSE. These links support full TCP/IP communications between OS/390 and Windows NT.

High-Speed Access Services is a MPC+ link specifically designed to work with the OpenEdition TCP/IP stack provided with OS/390 version 2 release 4 and above. HSAS provides support for applications using Universal Datagram Protocol (UDP). The System/390 SAP R/3 implementation uses HSAS TCP/IP to retrieve data from DB/2 running under OS/390.

Finally, MPCPTP links provide full TCP/IP communications over MPC to OS/390 version 2 release 5 and above. Applications such as Telnet, TN3270, FTP, and Web Servers would use a MPCPTP link to communicate with OS/390 TCP/IP over MPC+.

Installation

TCP/IP Direct Connect is installed as a Windows NT network adapter through the Network ICON in the Windows NT Control panel.

The following step-by-step procedure will install TCP/IP Direct Connect. The PCI ESCON Adapter driver must be installed before TCP/IP Direct Connect (see Page 7). TCP/IP Direct Connect may be installed multiple times if you need multiple link types.

Step

1. From the Windows NT Control Panel invoke Network configuration (Figure 6-3).

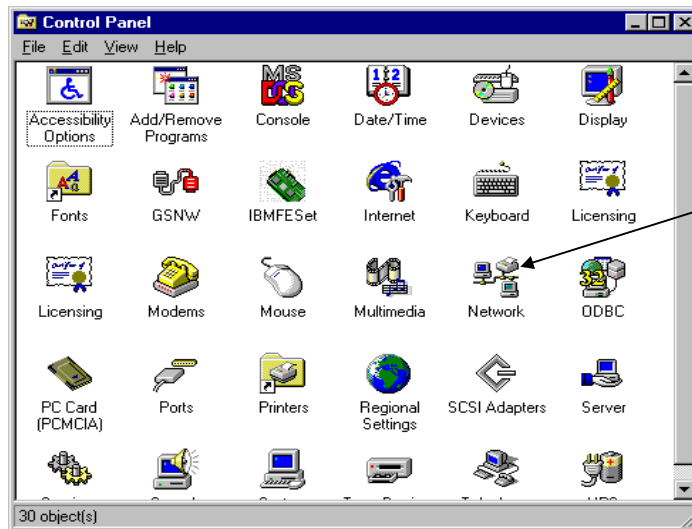


Figure 6-3. Invoking Network Configuration

2. Click on the Adapters tab (Figure 6-4). Make sure the IBM PCI ESCON Adapter is listed. If not, you must install the adapter before installing TCP/IP Direct Connect (Refer to Page 7).

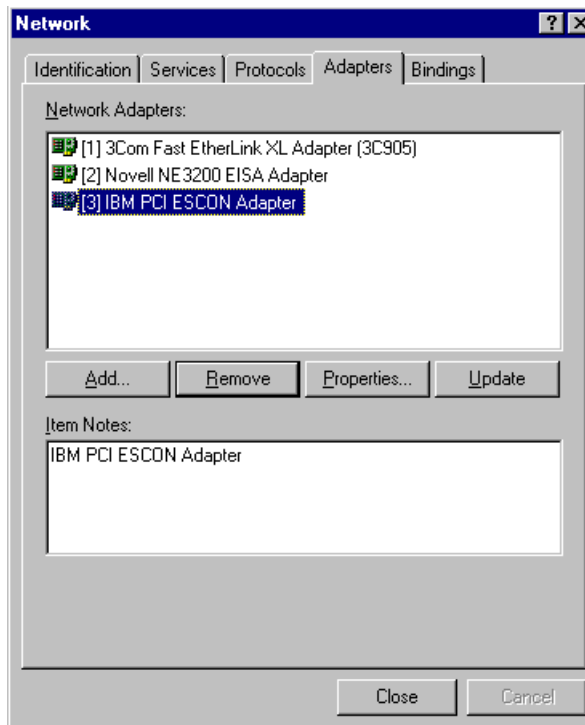


Figure 6-4. Adapter List with ESCON Adapter

3. Click the **A**dd button to add a new adapter. The Select Network Adapter dialog box will display a list of adapters included with Windows NT (Figure 6-5).

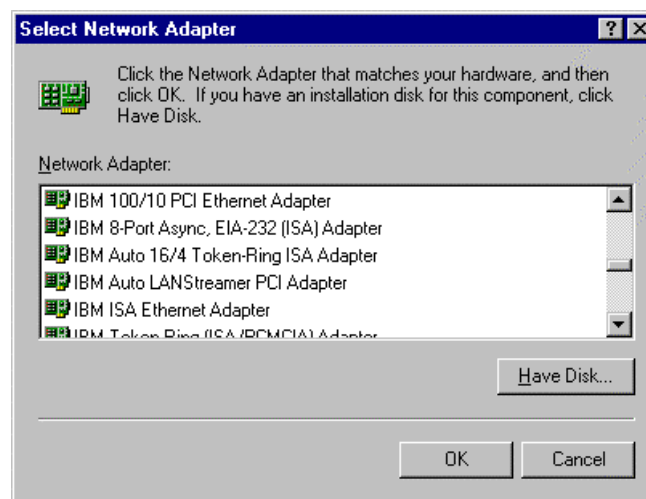


Figure 6-5. Select Network Adapter

4. Click the **H**ave Disk button. The Insert Disk dialog box will display (Figure 6-6).

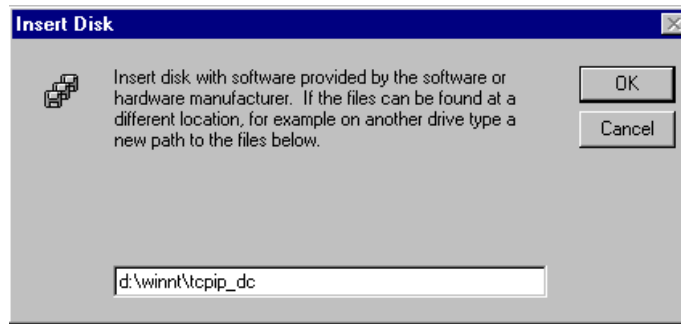


Figure 6-6. Insert Disk

5. Enter “d:\winnt\tcpip_dc” where **d** is the drive letter assigned to your Netfinity’s CD-ROM drive. Click **OK**.
6. The Select OEM Option dialog (Figure 6-7) will display the Virtual Point to Point Adapter. Click **OK** to install the driver.

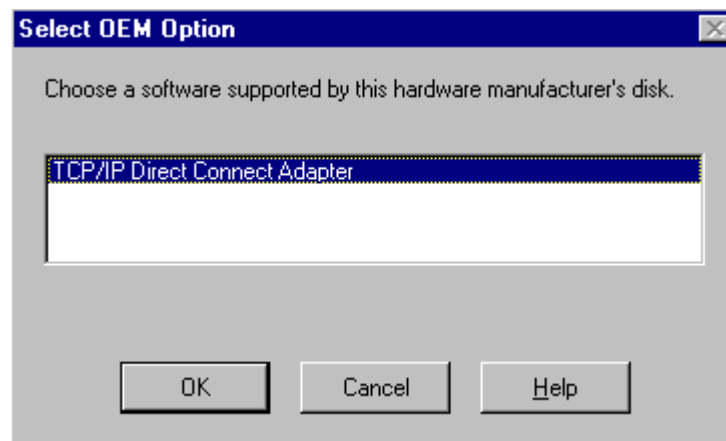


Figure 6-7. Select OEM Option

7. The TCP/IP Direct Connect Properties screen for Channel-to-Channel (CTC) link type (Figure 6-8) will display. If you are defining a MPC+ link skip forward to step 8 of this procedure.

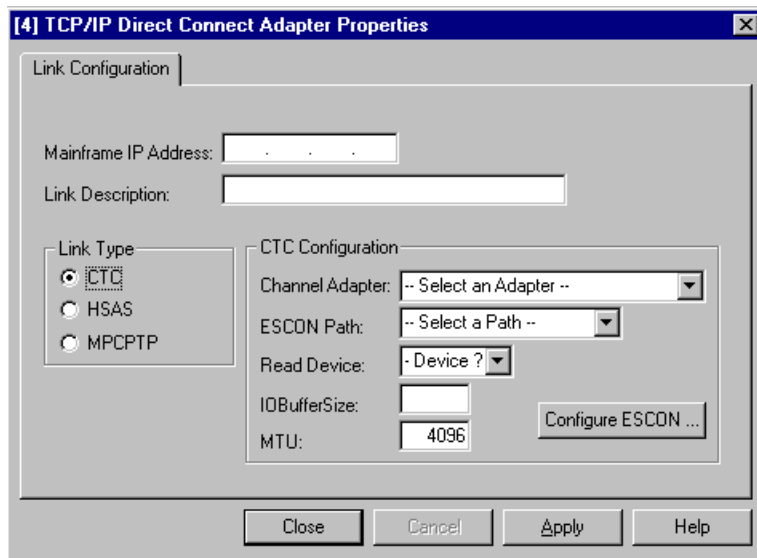


Figure 6-8. TCP/IP Direct Connect Adapter Properties

For CTC Links complete the fields as follows:

Mainframe IP Address – The IP address of the mainframe this connection is to communicate with. This must match the HOME IP address assigned in the TCP/IP Profile.

Link Description – A description of the link being defined.

Channel Adapter – Use your mouse to select one of the IBM PCI ESCON Adapter this connection is to be defined on.

ESCON Path – Use your mouse to select a path from those defined for this ESCON adapter. If no paths are available, you will have to define the ESCON configuration. Click on **Configure ESCON...** Refer to Chapter 4.

Read Device – Select the device from the list of available devices on the selected Path. The device must be the first of two consecutive devices that will be used by this connection. If no devices are available, click on **Configure ESCON...**

IOBufferSize – The IO Buffer Size is defined in the Mainframe's TCP/IP configuration. The value entered in this field must be between 8192 and 65535 and must match the value defined on the mainframe. In the mainframe TCP/IP Profile this value is set with either the LARGEENVELOPEPOOLSIZE or IOBUFFERSIZE parameter depending on the version of TCP/IP in use.

MTU – Maximum Transmission Unit must match what is defined on the mainframe for this connection or packet loss will occur. The recommended MTU for CTC connections is 4096.

After defining the fields click **C**lose to save your values and return to the Network Adapters screen (Figure 6-10).

Skip forward to step 9.

8. Both HSAS and MPCPTP are MPC+ links. HSAS is used for UPD applications such as SAP R/3. MPCPTP is used full TCP/IP communications with OS/390. Click the appropriate radio button based on which service this link is to provide. The TCP/IP Direct Connect Adapter Properties screen will display MPC+ configuration fields (Figure 6-9). (Note: TCP/IP Direct Connect is configured the same for both HSAS and MPCPTP. The example shown here creates a HSAS link).

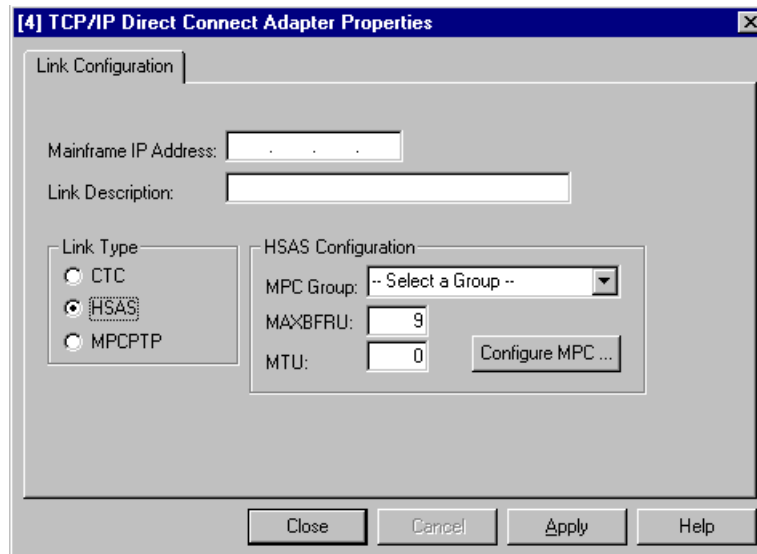


Figure 6-9. HSAS Configuration

Complete the following fields:

Mainframe IP Address – The IP address of the Mainframe. This address must match the source IP address specified on the `oeifconfig` statement for HSAS (see page 166) or the HOME IP address defined in the TCP/IP Profile for MPCPTP (see page 168).

Link Description – An informational Link description

MPC Group – Identifies which MPC transmission group this link is to use. Use you mouse to select a group from the list of available groups. If no groups are available this pull-down list will be empty. To define or modify a group, click the **Configure MPC...** button. See Chapter 5 for instructions on configuring a MPC transmission group.

MAXBFRU – The maximum number of 4096 byte buffers to be used. For HSAS MAXBFRU must be set to 9. For MPCPTP the maximum value is 17 and must match the MAXBFRU specified on the VTAM TRLE macro for the MPC group.

MTU – Enter the Maximum Transmission Unit as it appears on your `oeifconfig` statement for HSAS. For MPCPTP enter the MTU defined by the equation $MTU = (MAXBFRU - 1) * 4096$. If MAXBFRU = 9 then $MTU = (9-1) * 4096 = 32768$. If MAXBFRU = 16 then $MTU = (16-1) * 4096 = 61440$.

Click **C**lose to save the configuration and return to the Network Adapters list (Figure 6-10).

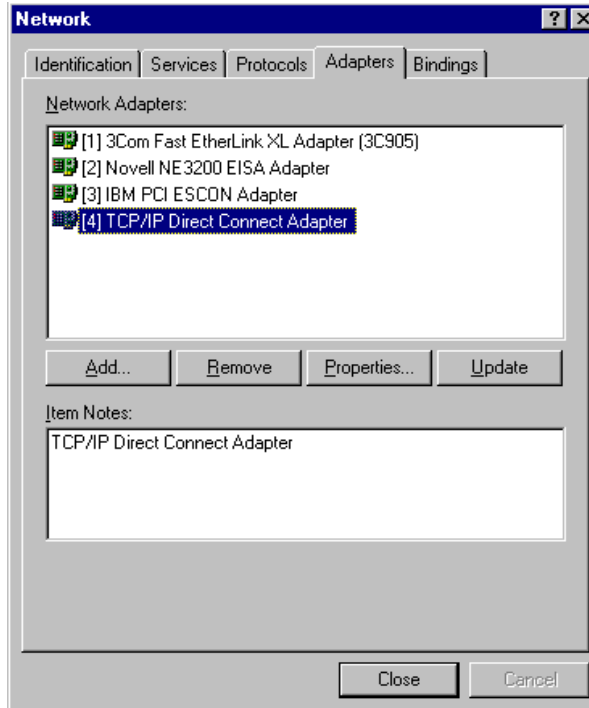


Figure 6-10. Network Adapter List with TCP/IP Direct Connect

9. Click **C**lose to end network configuration. Windows NT will perform an automatic bind process. TCP/IP Direct Connect is bound to Microsoft's TCP/IP stack on the Netfinity server. When Windows NT attempts to perform this bind, the standard Microsoft TCP/IP Properties dialog box will display (Figure 6-11).

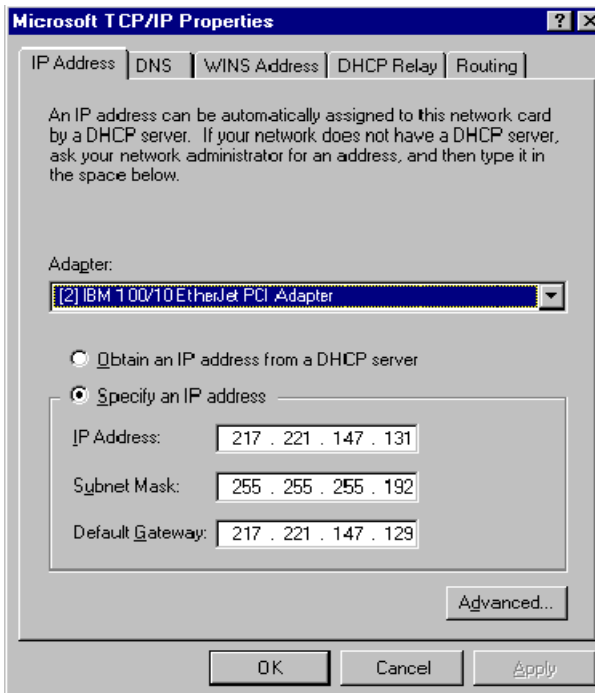


Figure 6-11. TCP/IP Properties

10. Use your mouse to select the TCP/IP Direct Connect Adapter from the list of Adapters bound to TCP/IP (Figure 6-12).

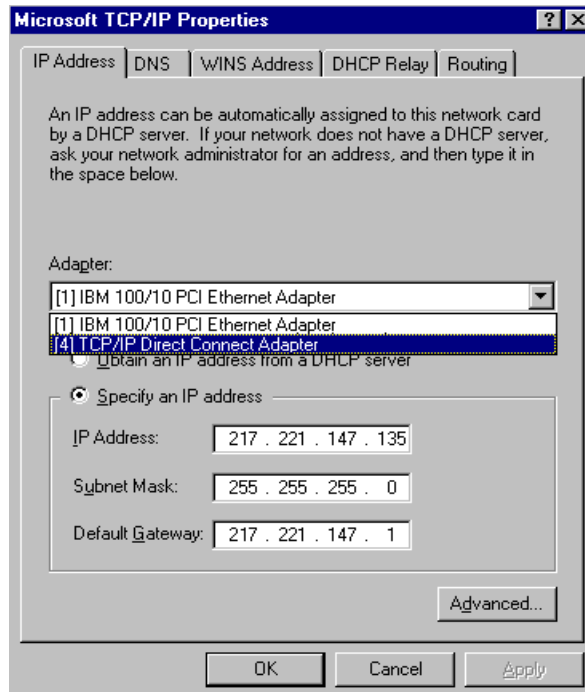


Figure 6-12. Select TCP/IP Direct Connect

11. Enter an IP Address and Subnet Mask; defining the address that the mainframe will use to communicate with the Netfinity server Figure 6-13). Note that the mainframe IP address and this address must be in the same network (subnet). There is generally no need to enter a Default Gateway since TCP/IP Direct Connect is a point-to-point connection. However, in some environments it may be necessary to enter the mainframe IP address as the default gateway.

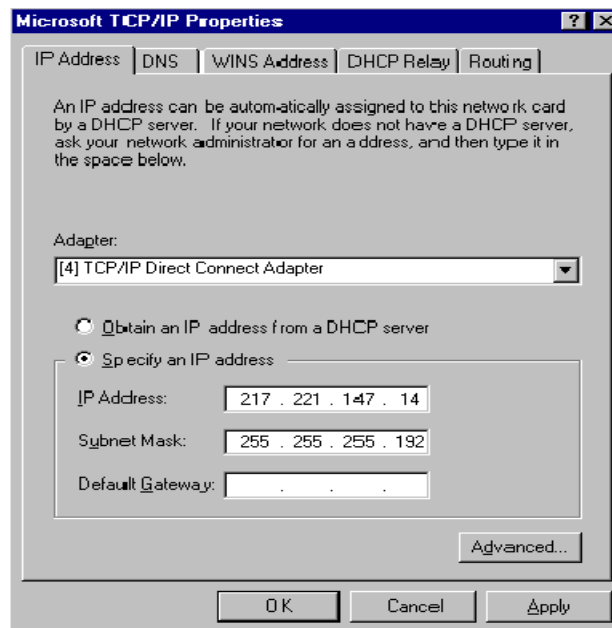


Figure 6-13. Assigning an IP Address to the ESCON Adapter

Finally, if you intend to have Windows NT perform IP forwarding from a network attached to the Netfinity server to the mainframe (see Figure 6-2), the IP address of the mainframe and TCP/IP Direct Connect must be in a *different* network (subnet) from the network adapter(s) in the server. Windows NT only performs routing between IP subnets. Forwarding IP traffic between two adapters on the same subnet is a bridging function not performed by Windows NT TCP/IP.

12. Click **OK**. Windows NT will complete the binding process and prompt you to reboot the server. You must reboot for network changes to take affect.

Installation of TCP/IP Direct Connect is complete.

Chapter 7. COMMUNICATIONS SERVER FOR WINDOWS NT

This chapter discusses installation and configuration of Data Link Control for Communications Server for Windows NT.

In addition to Data Link Control your server will require the PCI ESCON Adapter driver. Installation of this driver is discussed in Chapter 2. If you have not yet installed the adapter driver please go back and do it now.

If you intend to use a MPC transmission group, then you must first install the MPC+ driver as described in Chapter 2.

Once you have completed driver installation you may proceed with installation of Data Link Control.

Installing Data Link Control

Before the Netfinity ESCON Adapter can be configured in Communications Server for Windows NT, Data Link Control must be installed. The following procedure provides step-by-step instructions for completing that installation.

Step

1. DLC drivers are provided on the CD that accompanies each adapter. The drivers are in the sub-directory "WINNT\CSNT". To begin installation execute the Setup program (Figure 7-1).



Figure 7-1. Invoking DLC Driver Install

2. After Setup prepares, the Welcome screen (Figure 7-2) will be displayed. Click on **N**ext to proceed with the installation.

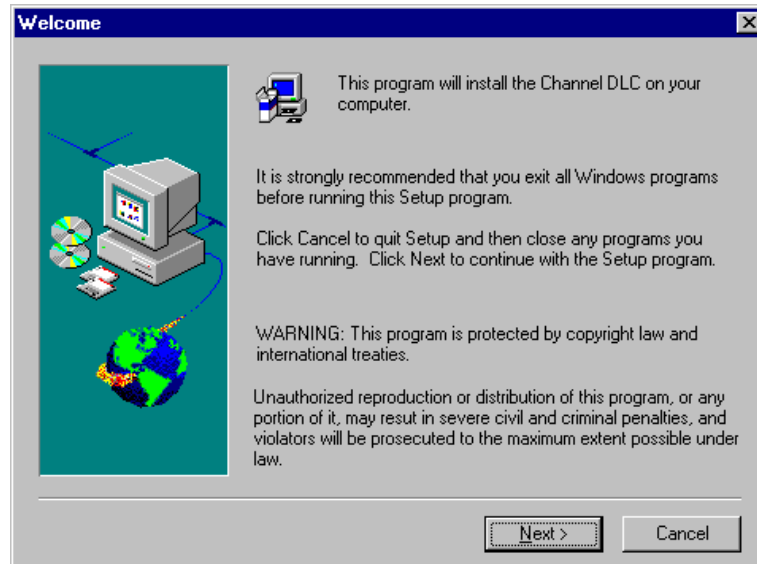


Figure 7-2. Welcome Screen

3. You will be prompted whether you wish to install Configuration Files or Driver and Configuration Files (Figure 7-3). The purpose of this prompt is to allow you to set up an administrator's system that can run the configuration utility but does not have an adapter installed. Driver files are only needed on servers where an adapter is installed. Click **N**ext to continue.

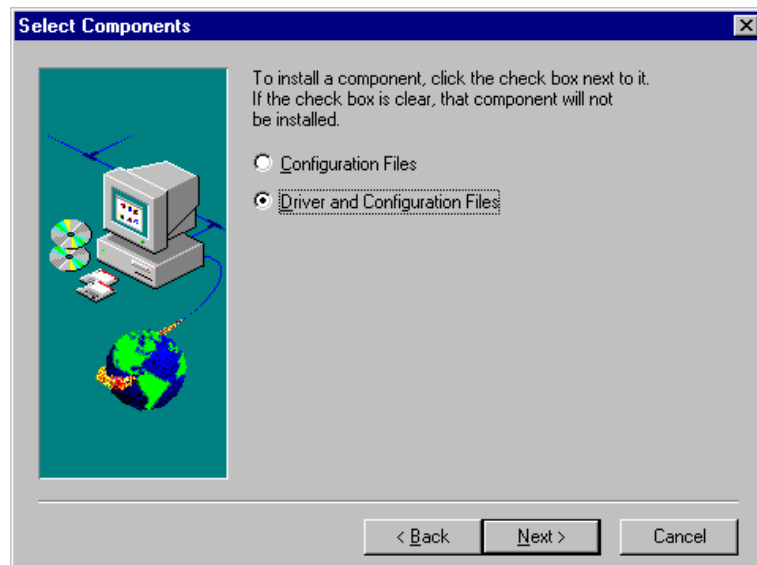


Figure 7-3. Select Components

4. The next screen to display allows you to choose a directory where Data Link Control will be installed (Figure 7-4). The default directory is "C:\Channel\CSNT". You may use the **B**rowse button to select a different directory. Once the directory is defined to your satisfaction, click on **N**ext to continue the installation.

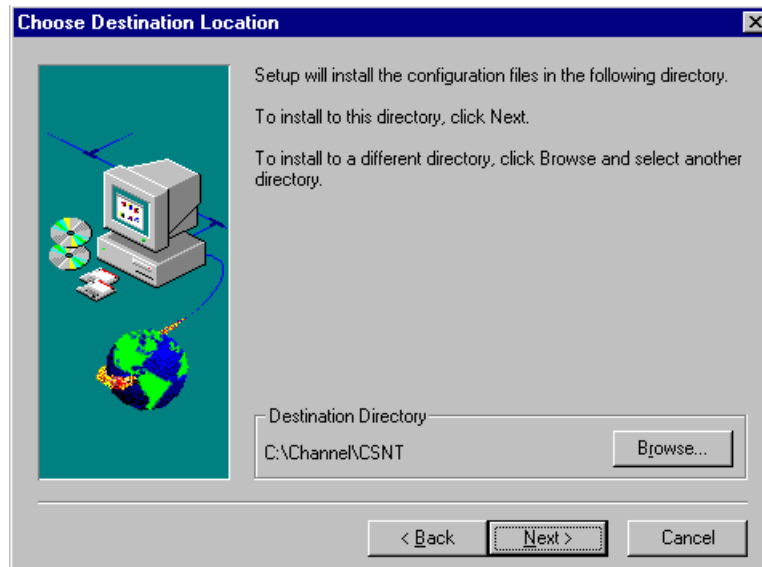


Figure 7-4. Choose Destination Location Screen

5. Progress bars will display during installation (Figure 7-5).

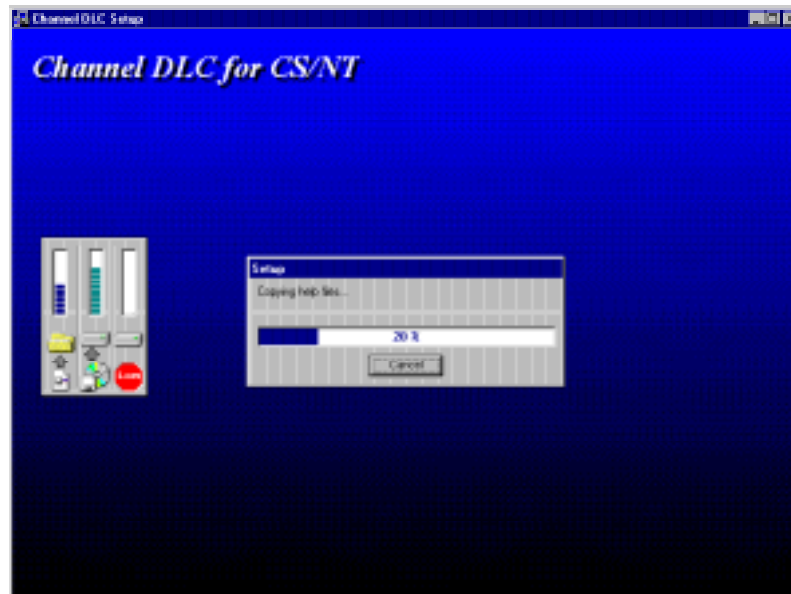


Figure 7-5. Installation Progress

6. Once installation is complete, a Setup Complete screen (Figure 7-6) will display informing you that the system must re-boot for the Channel DLC to take effect and prompting you if you want the re-boot to occur now or not. Select Yes or No and Click on **Finish**.

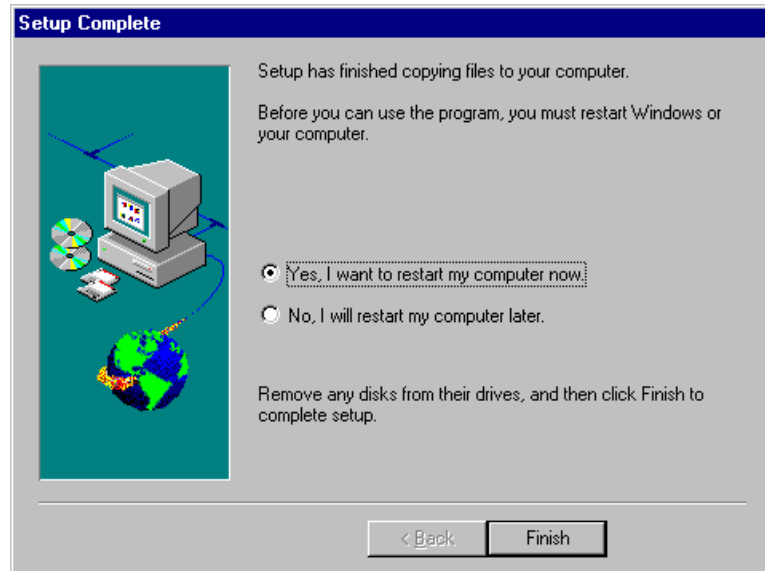


Figure 7-6. Setup Complete

Communications Server Configuration

Before Communications Server can use a new host adapter there are two definitions that must be completed. First, Data Link Control must be defined in the “*Devices*” section of the Definition Hierarchy (Figure 7-7). “*Defining Data Link Control*” takes you through a Step-by-Step procedure for completing this definition.

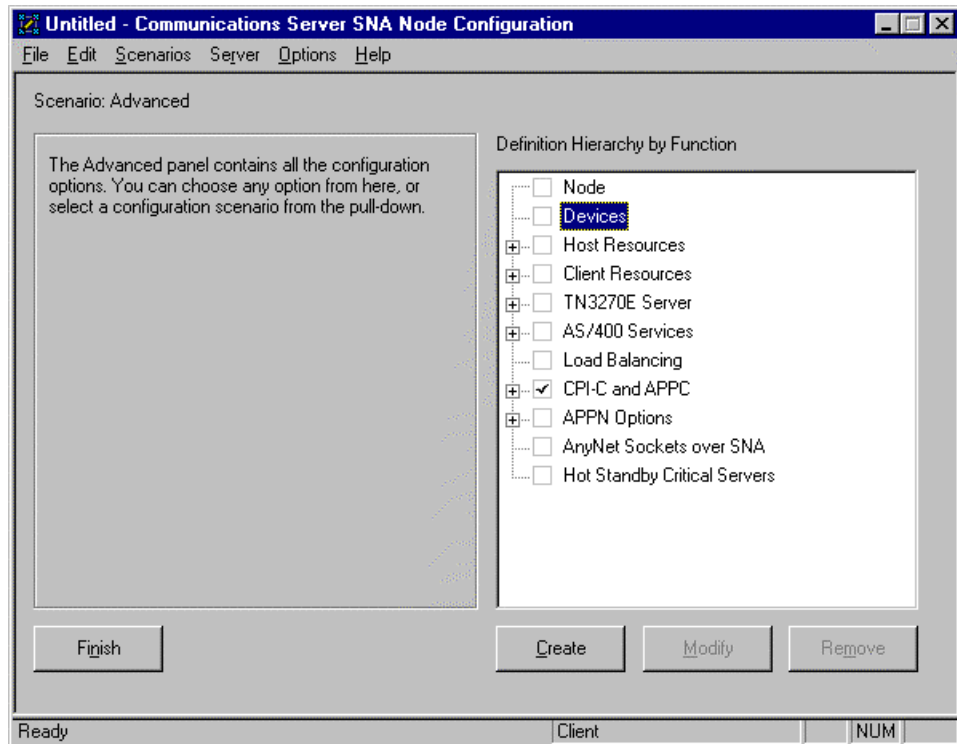


Figure 7-7. Devices Section of the Definition Hierarchy

Second, one or more Host Connections (PUs) must be defined in the Host Resources section of the Definition Hierarchy (Figure 7-8) and associated with the adapter. “*Defining a Host Connection*” provides a Step-by-Step procedure for defining a Channel Host Connection.

This manual does not completely describe configuration of Communications Server for Windows NT. Please refer to the **eNetwork Communications Server for Windows NT** documentation for complete description of setting up a Communications Server.

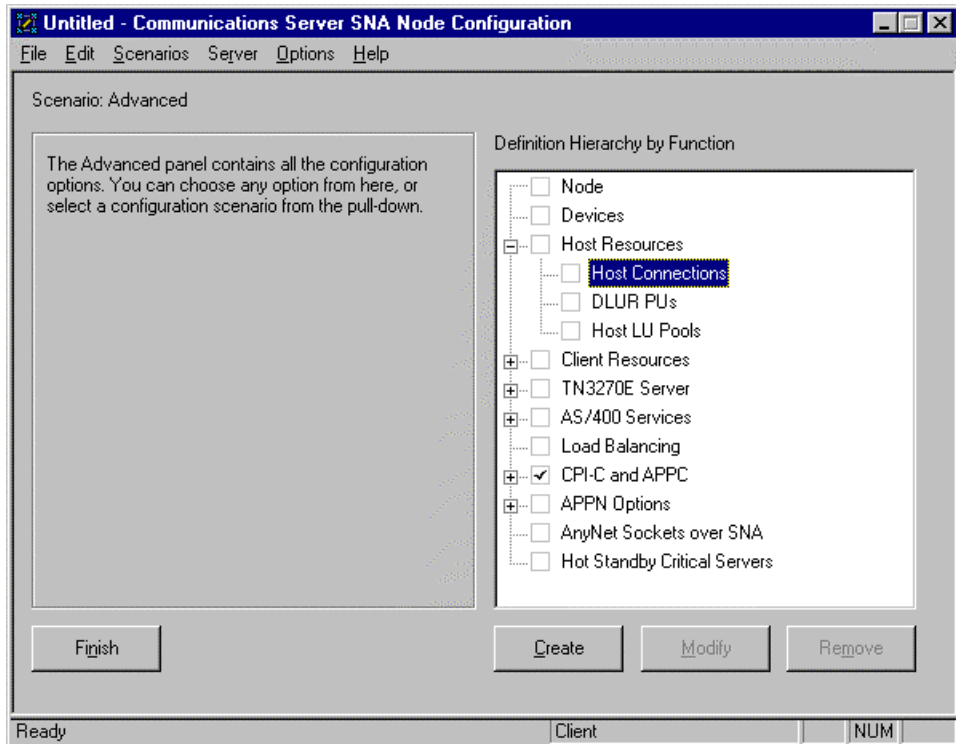


Figure 7-8. Host Connections in Host Resources of Definition Hierarchy

Defining Data Link Control

Each data link control type (adapter type) to be used by Communications Server must be defined as a device. It may only be defined once. The following procedure covers definition of data link control for Netfinity ESCON adapters.

STEP

1. When you start the SNA Node Configuration utility an automated procedure will prompt you whether to create a new configuration or use an existing one (Figure 7-9).

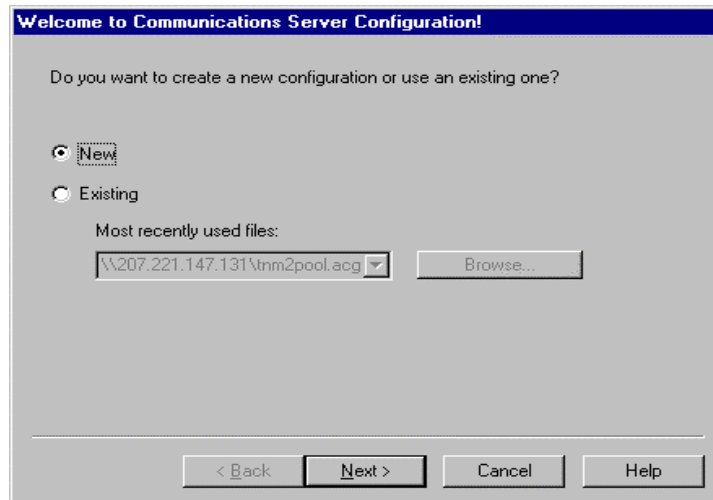


Figure 7-9. Automated Configuration Wizard

For Existing Configurations

If you are adding ESCON data link control to an existing system click the “Existing” radio button, specify a configuration file name, and then click next.

You will be prompted for a configuration scenario (Figure 7-10). Select the scenario that best matches your configuration and click “Finish”.

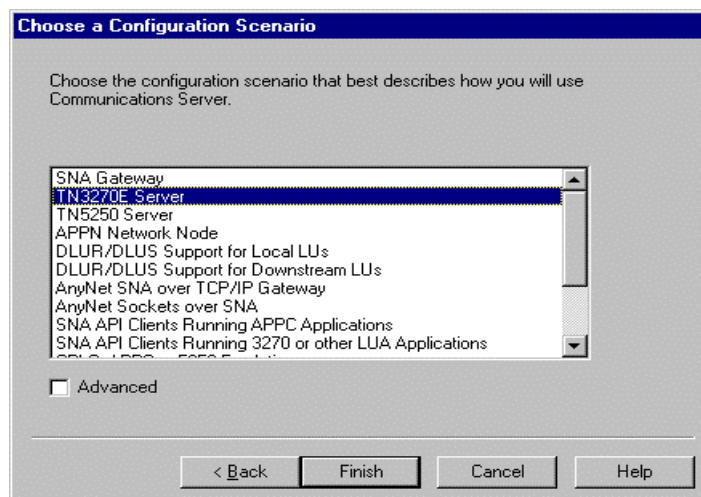


Figure 7-10. Prompt for Configuration Scenario

The configuration scenario will be displayed. Figure 7-11 shows an example of the TN3270 Server scenario.

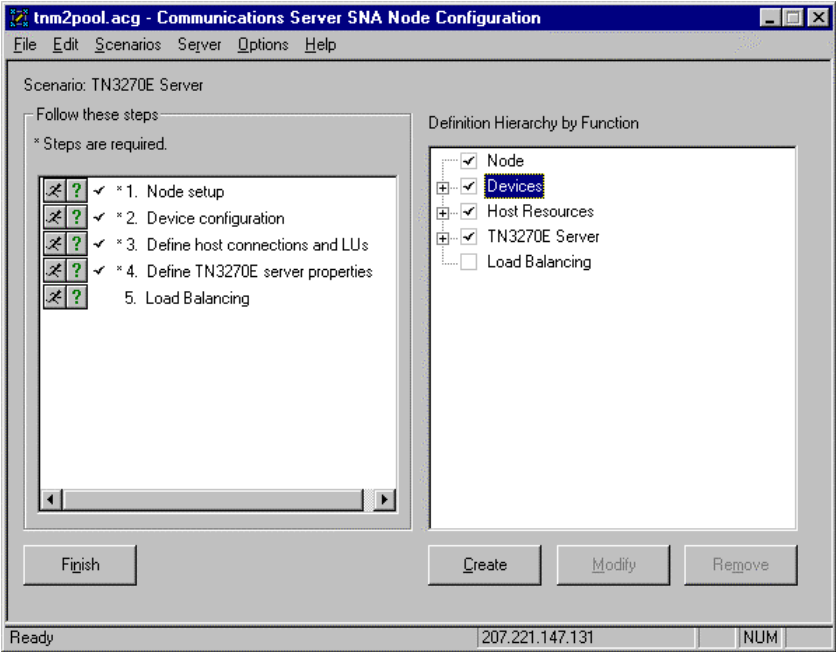


Figure 7-11. TN3270 Server Scenario

For New Configurations

New configurations using channel data link control cannot be defined by the automated procedure. If you are creating a new configuration click the “Cancel” button on the “Welcome to Communications Server Configuration!” dialog (Figure 7-9) to stop automated configuration. The Advanced scenario will display (Figure 7-12).

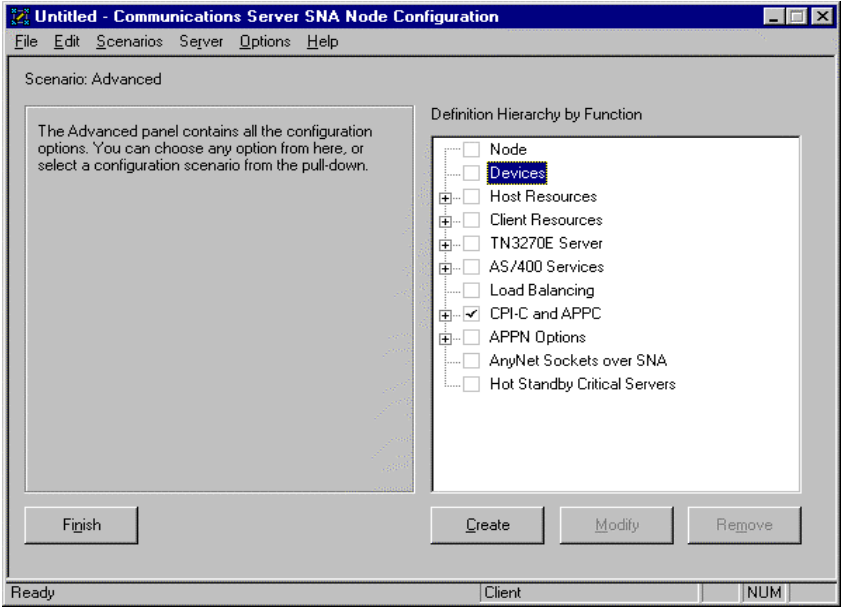


Figure 7-12. Advanced Configuration Scenario

For a new configuration you must define the node before adding a device. Please refer to the “Quick Beginnings” manual that came with Communications Server for detailed information on configuring the node.

2. Once you have a configuration scenario displayed (Figure 7-11 or Figure 7-12) and the node defined you are ready to add the channel adapter data link control to the configuration. Double-click “Devices” in the Definition Hierarchy to invoke device definition. You will be prompted for device type. For standard (non-MPC) connections select “Channel Adapter DLC” (Figure 7-13). For MPC connections select “MPC Channel Adapter”. Click OK.

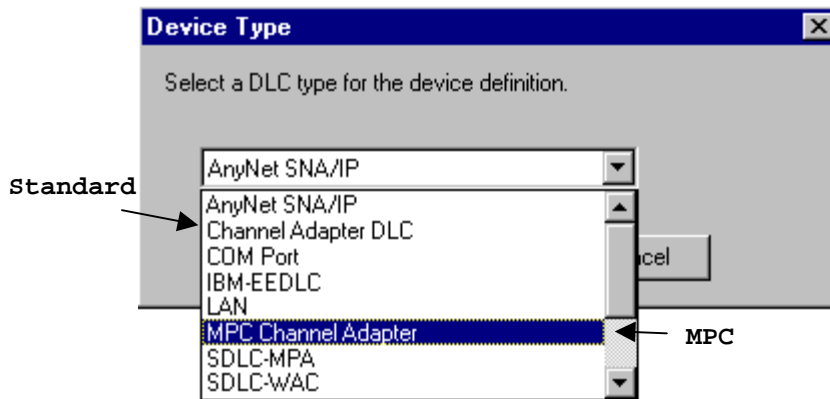


Figure 7-13. Selecting a Channel DLC

The basic information screen will display (Figure 7-14).

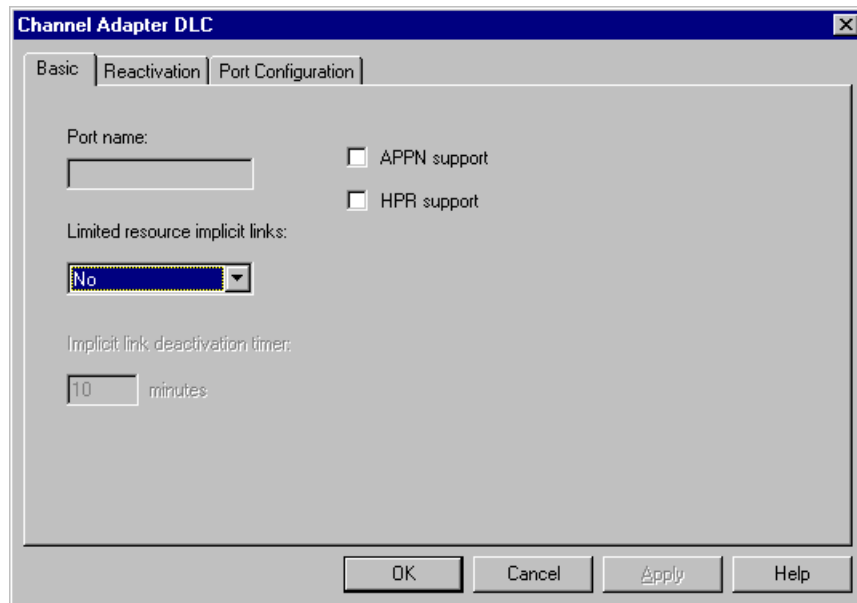


Figure 7-14. Basic Device Configuration Screen

For MPC Channel Adapters there are no active fields on this screen. For standard connections there are three fields that can be set on this screen:

Limited resource implicit links - This field should be set to **No** for channel connections.

APPN support - This check box indicates whether the connection (channel adapter) is to support CP-CP communications between nodes. Set based on your requirements. Note that if **Adjacent CP type** (see page 76) is set to **Host-XID0** or **Host-DEP. LU Only** then APPN support is not used.

HPR support - This check box indicates whether the connection is to support High Performance Routing (HPR). APPN support must also be selected if you intend to use HPR.

3. Click the **Port Configuration** tab to cause the configuration utility to select the channel port (Figure 7-15).

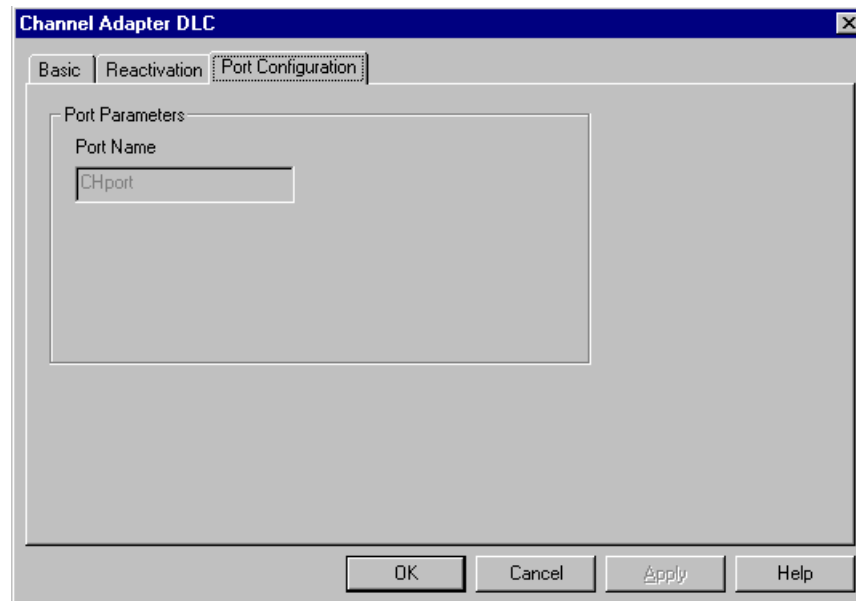


Figure 7-15. Port Configuration

Click **OK**.

4. The main configuration screen will be displayed again. Data Link Control should now appear in the Device Hierarchy on the right side of the screen (Figure 7-16).

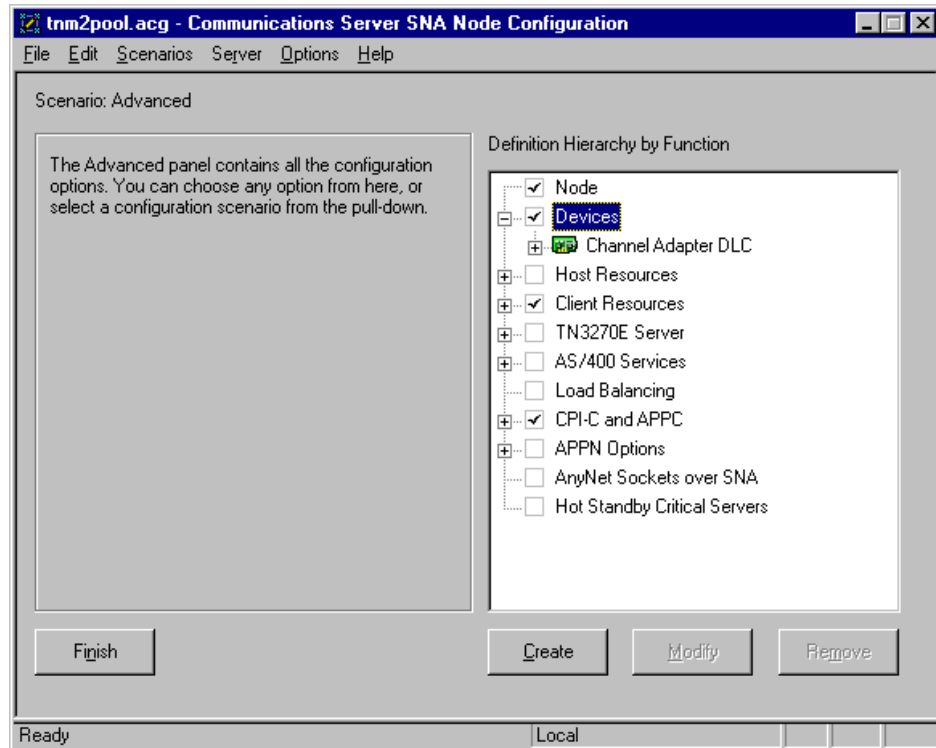


Figure 7-16. Channel Adapter listed under Devices

Data link control is now defined to Communications Server for Windows NT. The following section describes how to define Host Connections (PUs) which use the adapter to communicate with the host.

Defining a Host Connection

This section discusses how to define (connect) a Host Link to a previously defined channel adapter. A Host Link can logically be thought of as the Physical Unit (PU). A maximum of 32 Host Links can be defined to a single adapter.

The following procedure defines a Host Link and connects it to the adapter.

STEP

1. Once Device configuration has been completed (see previous section) double click “Host Connections” in the Host Resources section of the hierarchy (Figure 7-17).

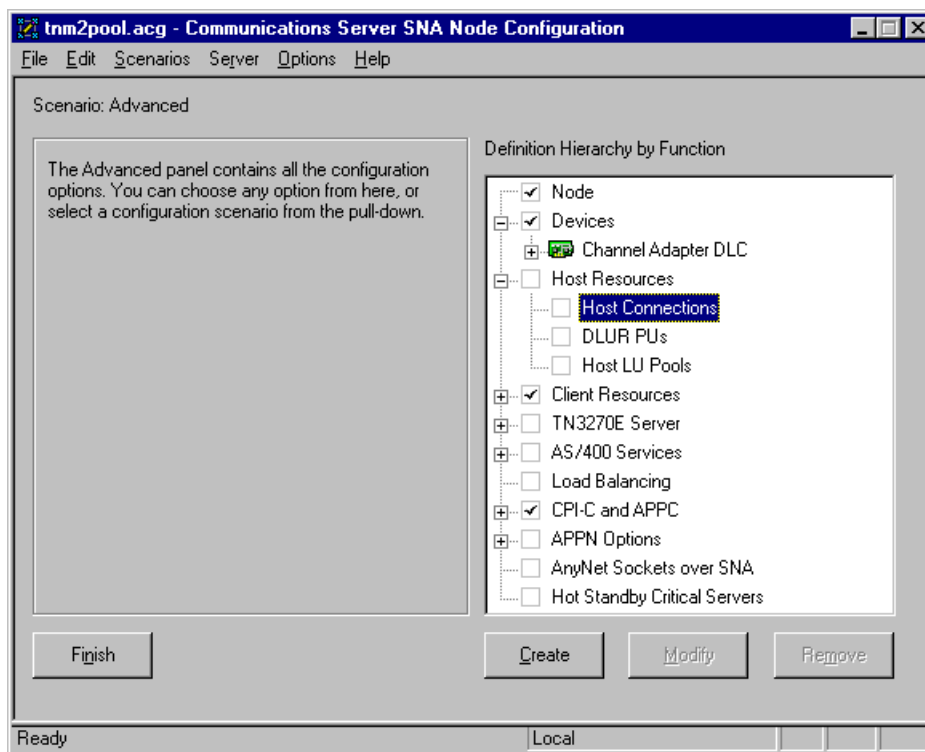


Figure 7-17. Host Connections

If the channel data link control is the only device type defined, configuration will proceed to the Basic screen for the channel adapter (Figure 7-19). If more than one device type has been defined, a Link Type dialog box will display. Select the Channel type and click OK (Figure 7-18).

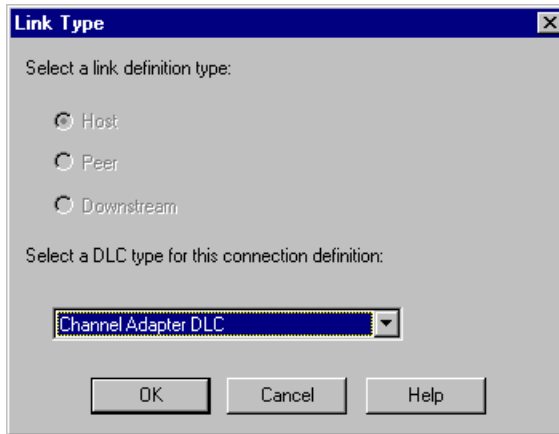


Figure 7-18. Link Type Selection

2. There is nothing that needs to be completed on the Basic host connections screen (Figure 7-19). Both the Channel Adapter and MPC DLCs provide a single port, so port name will be automatically defined. The Local Node ID for the port will display. It will default to the Node Id defined for this Communications Server (defined when configuring the Node). There is no need to change it. Click on the Advanced tab to continue.

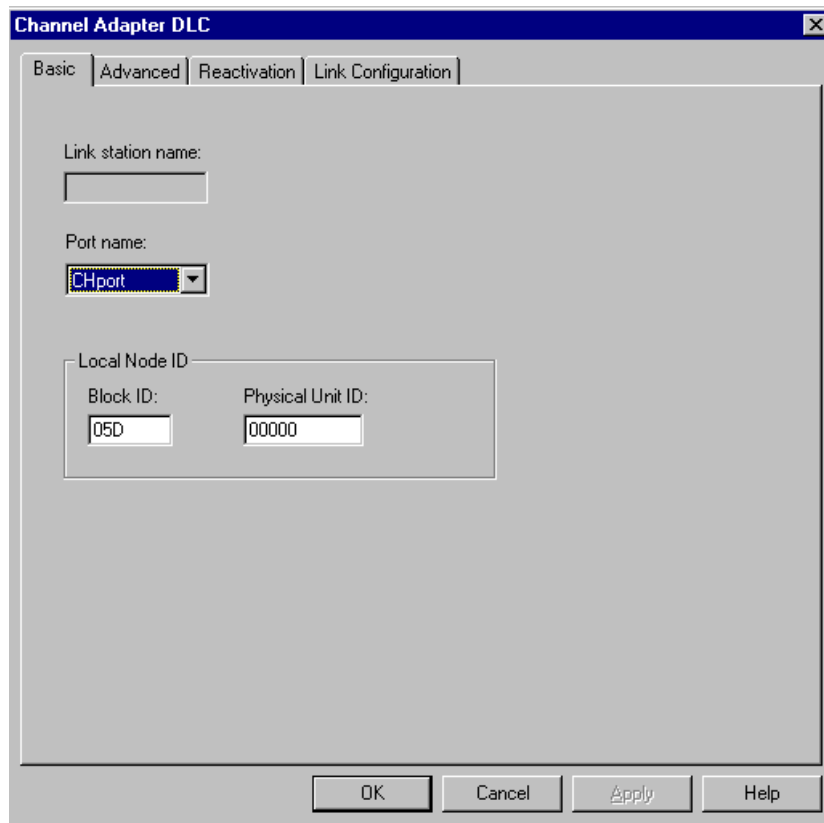


Figure 7-19. Basic Connection Configuration

The Advanced configuration screen will display (Figure 7-20).

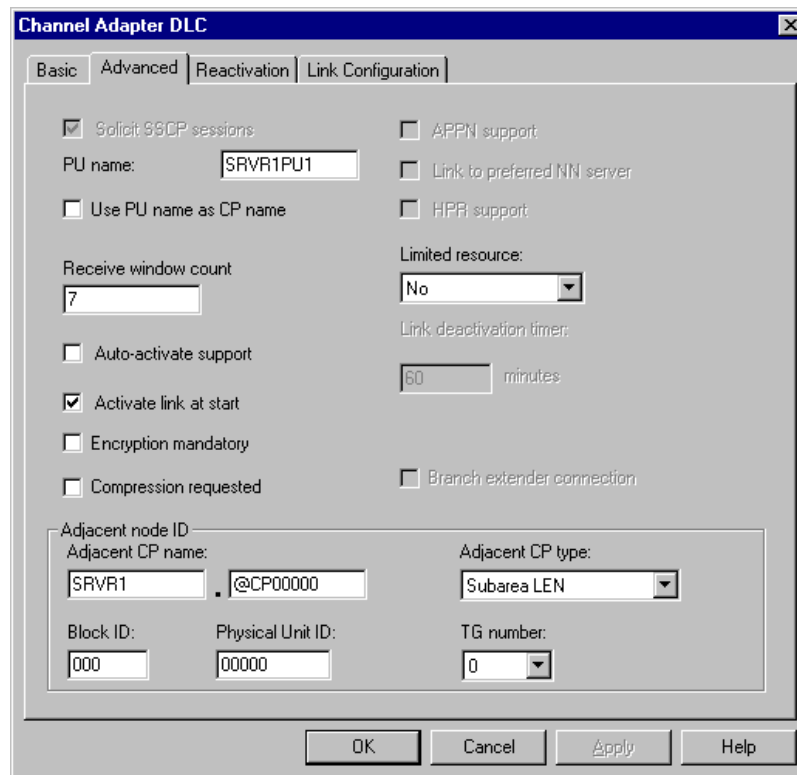


Figure 7-20. Advanced Host Connection Screen

You may define a **PU Name** to this connection. If you do not enter a PU name it will default to the Link name as entered on the Link Configuration screen (Figure 7-21) for non-MPC links. It will default to the MPC Connection Name (Figure 7-22) for MPC links.

The **Receive window count** indicates the number of I-frames that this link can receive before acknowledge must be sent. Any number from 1 to 127 is acceptable. 7 is the default.

The Advanced configuration screen allows you to specify automatic PU activation as follows:

- **Auto-activate Support** - Activates the link automatically on demand. That is, when a workstation attempts to attach the link will be activated. This option is normally used for remote connections. It should not be selected for a channel attachment.
- **Auto-reactivate Support** - Activates the link automatically whenever the adjacent node (the host) attempts to activate the Node. This should be checked to enable automatic restarts from the host.
- **Activate link at start** - Activates the link whenever the Node is started. If this option is not selected, manual activation from the SNA Node Operations screen will be required.

The **Limited resource** field indicates when the link should be de-activated. Since channel connections are not a limited resource, this field should be set to **No**.

The **Adjacent CP type** field is used by the adapter to determine whether to communicate with the host using PU 2.0 or PU 2.1. Setting Adjacent CP type to **Host - XID0** will cause the adapter to communicate with the host as a Physical Unit type 2.0 (PU 2.0). Setting Adjacent CP type to any other value will cause the adapter to communicate with the host as a Physical Unit type 2.1 (PU 2.1).

The default is **Subarea LEN** (PU 2.1).

3. For standard connections click on the **Link Configuration** tab (Figure 7-21).

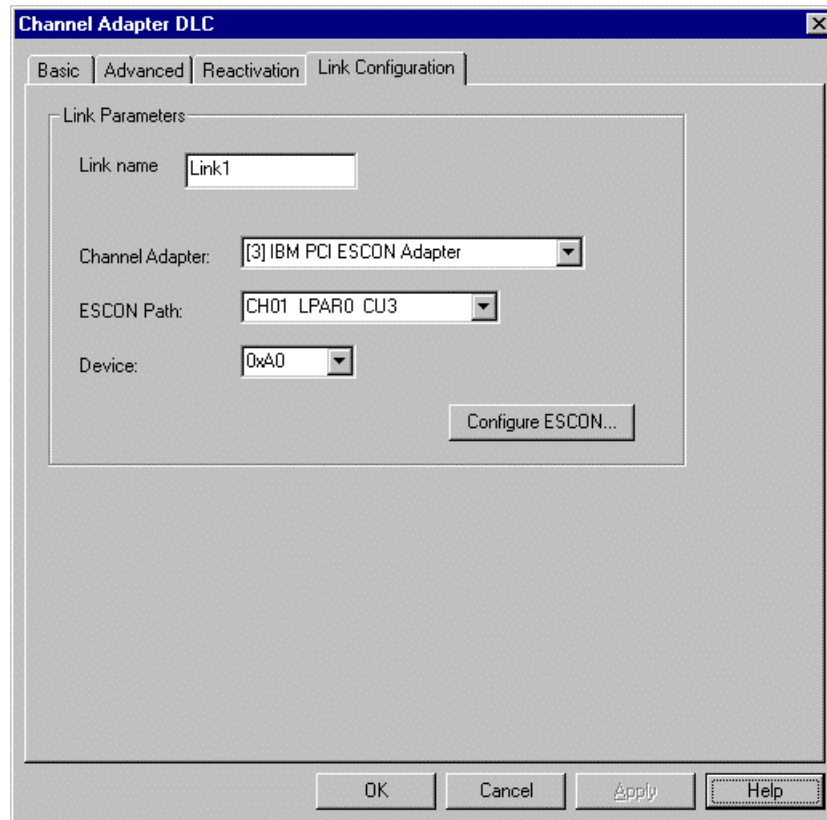


Figure 7-21. Link Configuration

You may enter a link name or allow the system to assign one. Use your mouse to select an ESCON adapter, Path, and Device from the list of available adapters, paths, and devices. If there are none available, click on the **Configure ESCON...** button to update the ESCON configuration. Refer to Chapter 4.

Remember that more than one host connection can be defined to an adapter. The PU address (Device address) must be unique to this definition.

Once you have entered the correct address, click **OK** to complete the Host Connection definition.

For MPC connections, click on the **MPC Connection** tab (Figure 7-22).

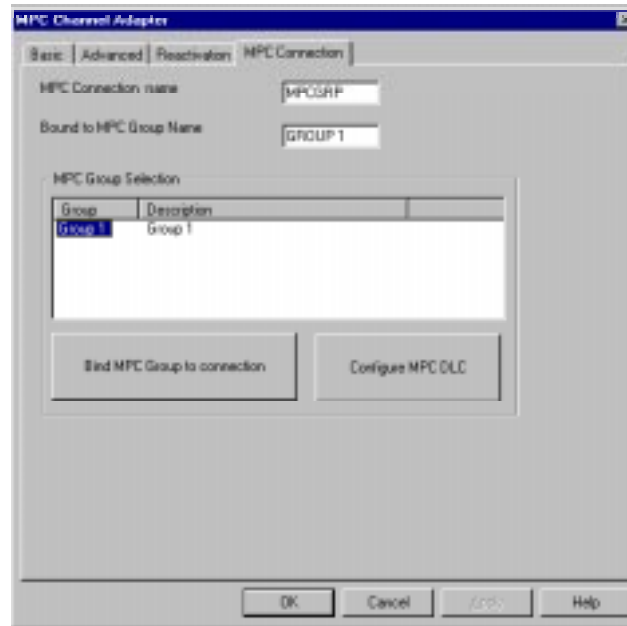


Figure 7-22. MPC Channel Adapter Connection Definition

Enter a MPC Connection name which must be 1-8 characters with no spaces. Point to a group in the MPC Group Selection and double-click on it to bind the MPC Group for this connection. If there are no groups displayed for selection you will have to click **Configure MPC DLC** to define one. See Chapter 5 for specific instructions on defining a MPC transmission group.

Click **OK** to complete the Host Connection definition.

4. When you define a new connection, you will be automatically prompted whether or not you want APPC traffic automatically routed across the connection or not (Figure 7-23). Answer “Yes” if you want Communications Server to create a wildcard (*) partner LU definition which will forward all LAN APPC sessions over this connection.

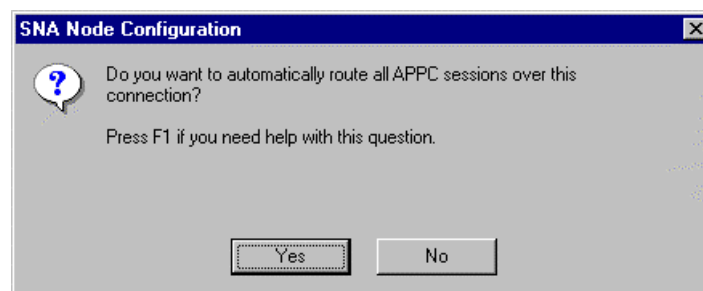


Figure 7-23. APPC Prompt

5. You will now be prompted to create new LUs for this connection (Figure 7-24). Click **Yes** to create a range of LUs for your new host link.

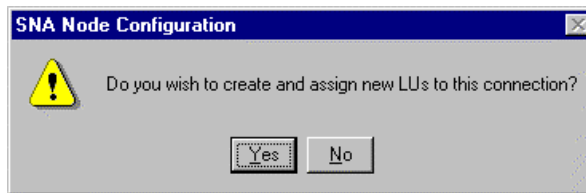


Figure 7-24. Automatic LU Generation for New Connection

6. The Communications Server for Windows NT LU Definition screen is displayed (Figure 7-25). Complete the screen as directed by Communications Server documentation and click OK at the bottom of the screen to create the LUs.

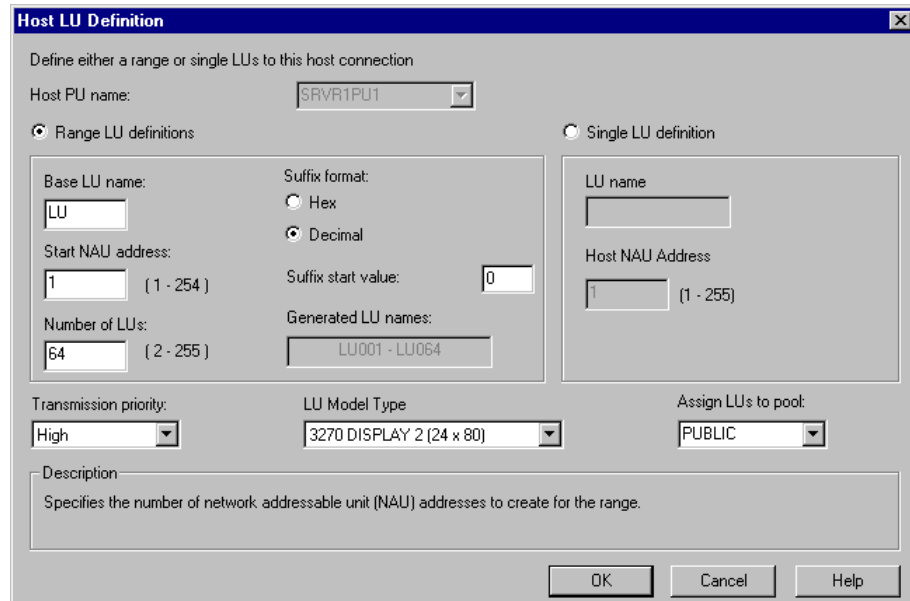


Figure 7-25. LU Definition

7. Verify that the connection now appears in the Host Connections hierarchy (Figure 7-26). Click the Define host connection and LUs again if you wish to define a second Host Link.

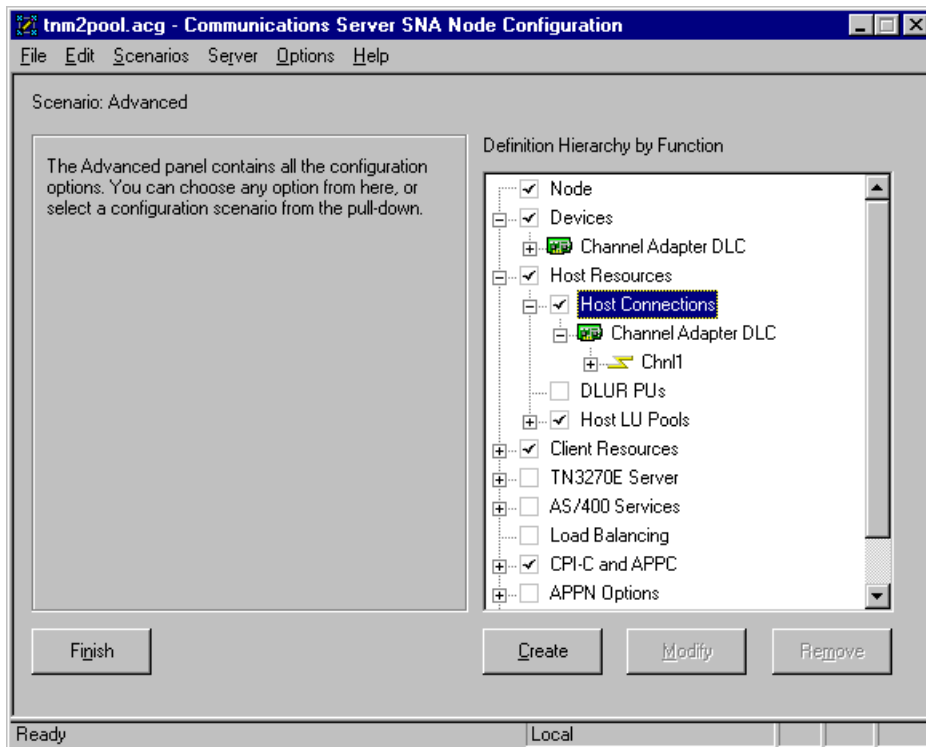


Figure 7-26. Host Links Defined

Once you have defined one or more Host Links to the adapter, your Communications Server is ready to begin communicating with the Host. Make sure you save the configuration before exiting SNA Node Configuration.

Chapter 8. SNA SERVER FOR WINDOWS NT

You must define a Link Service for each channel path (defined in your ESCON configuration) you intend to use with SNA Server. Connections (PUs) are then defined to use the Link Service. The following two sections cover step-by-step how to set up a Link Service and Connection (PU) to use a Netfinity ESCON Adapter.

In addition to the Link Service your server will require the PCI ESCON Adapter driver. Installation of this driver is discussed in Chapter 2. If you have not yet installed the adapter driver please go back and do it now. Once you have completed the installation of the driver proceed with defining a Link Service.

Defining a Link Service

The following section, “*Installation from CD*”, provides a step-by-step procedure for installing Link Services from the CD-ROM that accompanied your adapter. The Link Service software only needs to be installed once.

The section “*Configuring a Link Service*” provides instructions for adding a Link Service to your SNA Server configuration. You will need to configure a Link Service for each ESCON channel path you want to use with SNA Server.

Installation from CD

The following procedure installs the Channel Link Service from CD.

STEP

1. Begin by pressing the **START** button on the Windows NT Server console. Select **Run**. Assuming your CD-ROM is the **d** drive, type **d:\winnt\snavr\setup** and press **OK**. (Figure 8-1).

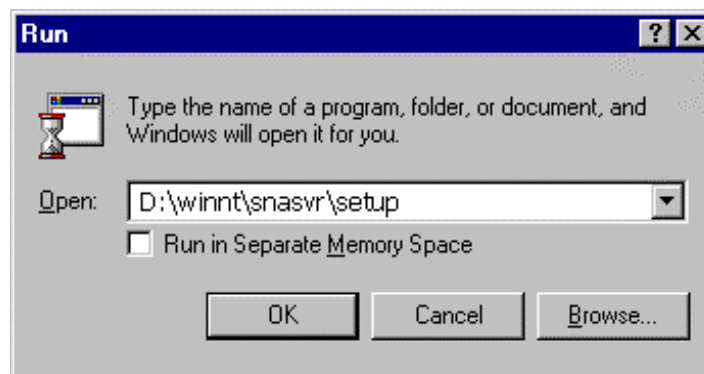


Figure 8-1. Starting Setup to Install a Data Link Service

The InstallShield progress bar will briefly display while setup prepares the InstallShield Wizard (Figure 8-2).

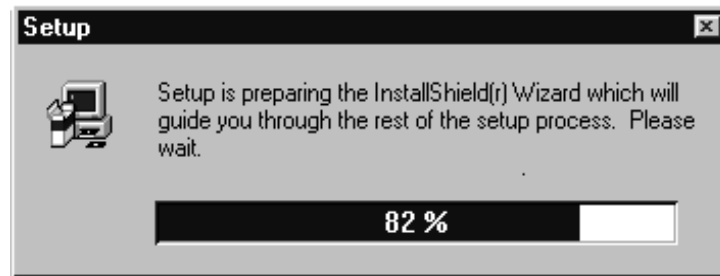


Figure 8-2. Preparing InstallShield Wizard

2. A Welcome dialog box appears (See Figure 8-3). Click **N**ext to proceed to the next dialog screen.

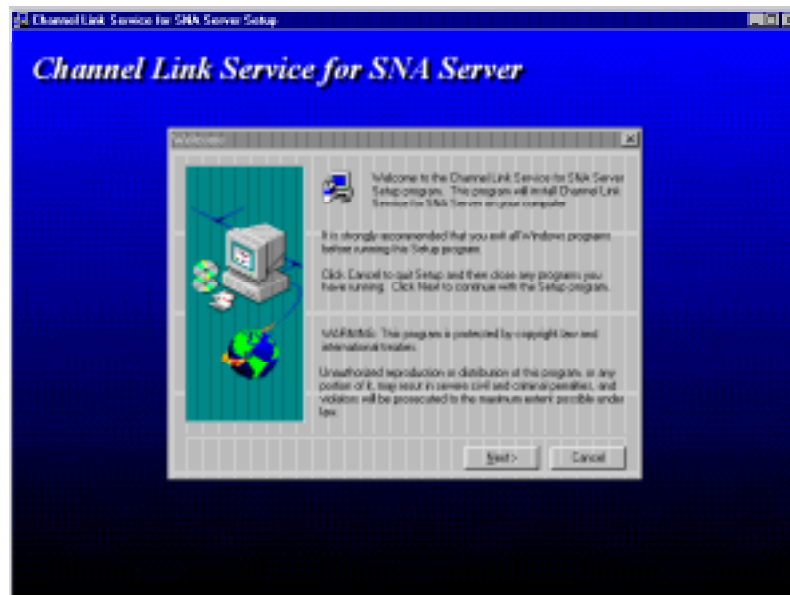


Figure 8-3. Welcome Dialog Box

- 3. Progress bars will display to show installation progress (Figure 8-4).



Figure 8-4. Installation Progress Bars

- 4. When the Setup Complete screen (Figure 8-5) appears, click Finish to end the installation.

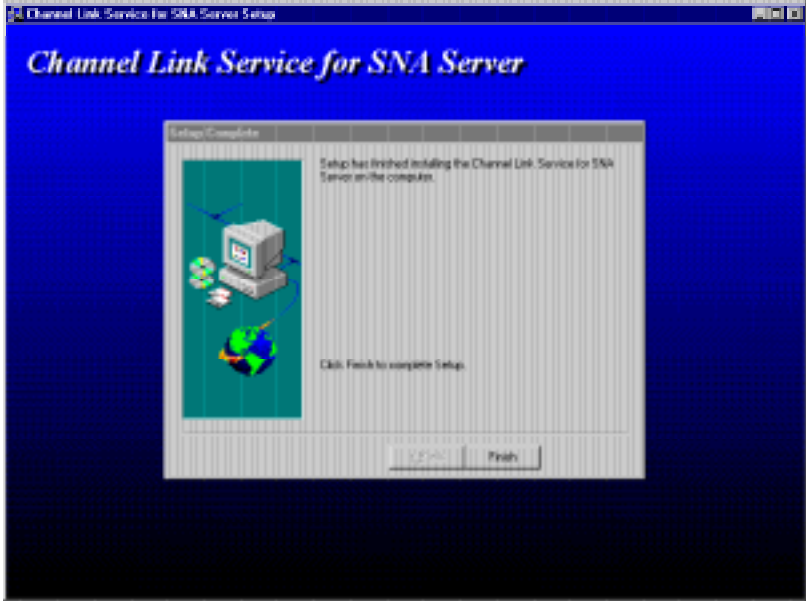


Figure 8-5. Installation Complete

Configuring a Link Service

The following procedure shows how to create a Link Service once the Channel Link Service has been installed on the server. You will need to define a Link Service for each channel path you intend to use with SNA Server. If your adapter is connected to a mainframe using ESCON Multiple Image Facility (EMIF), you will have to define a channel path for each Logical Partition (LPAR) (see Chapter 4). A Link Service must then be defined for each channel path.

1. Invoke the SNA Server Manager from Windows NT (Figure 8-6).

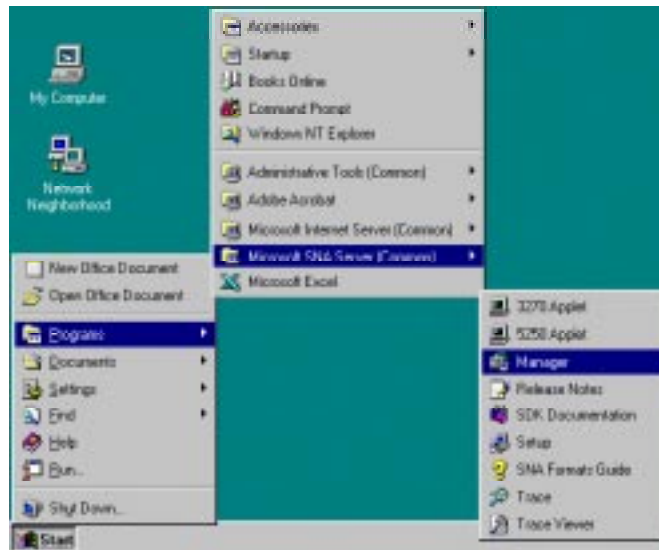


Figure 8-6. Invoking SNA Server Manager

2. From the Insert pull down menu, select Link Service... (See Figure 8-7).

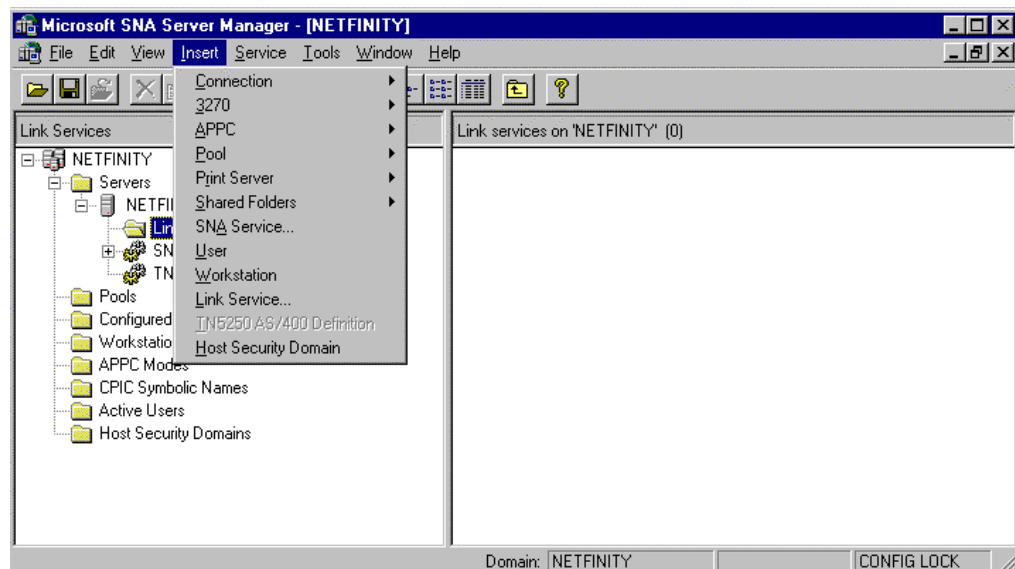


Figure 8-7. Insert Link Service

3. A list of installable link services will appear. Select **Channel Link Service** and click **Add** (Figure 8-8).



Figure 8-8. Select Link Service

4. The Service Properties screen displays (Figure 8-9).

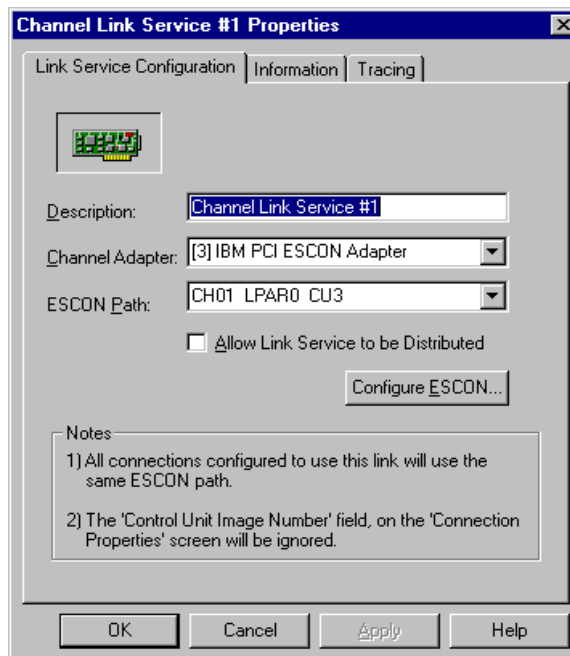


Figure 8-9. Link Service Properties

You may modify the default service description assigned to this link service. Then use your mouse to select an adapter and ESCON Path (channel path). If there is no adapter or path available click **Configure ESCON...** to define the ESCON configuration. Refer to Chapter 4.

Check “Allow Link Service to be Distributed” if you intend to use the Distributed Link Service capability of SNA Server.

Click **OK** to complete the installation.

Defining Connections

Once a Link Service has been configured you can define connections (PUs) to the mainframe using that Link Service. A maximum of 32 connections may be defined to a single ESCON Adapter.

1. Start SNA Server Manager from Windows NT. If you open the **Link Services** folder you will notice the link service created by the previous procedure (Figure 8-10).

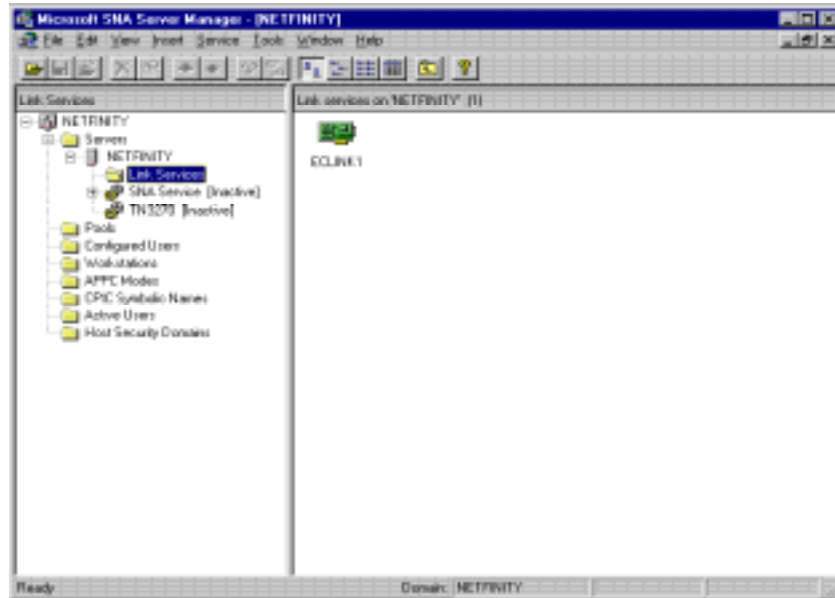


Figure 8-10. ESCON Link Service

2. Using your mouse, menu select **I**nsert, **C**onnection, and **C**hannel as shown in Figure 8-11).

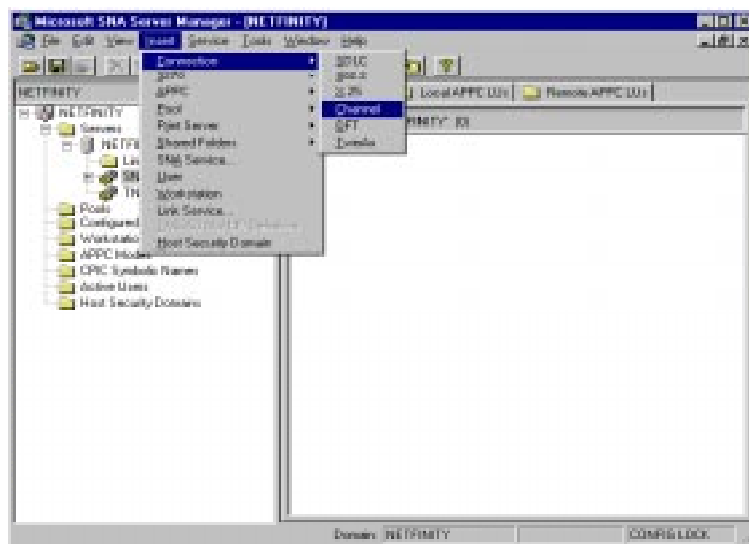


Figure 8-11. Inserting a New ESCON Connection

3. The **Connection Properties** screen (Figure 8-12) will appear. You may change the Connection Name and Comment and set the Activation option. Select a Channel Link Service; connecting this connection to the ESCON adapter. Then click the **Address** tab.

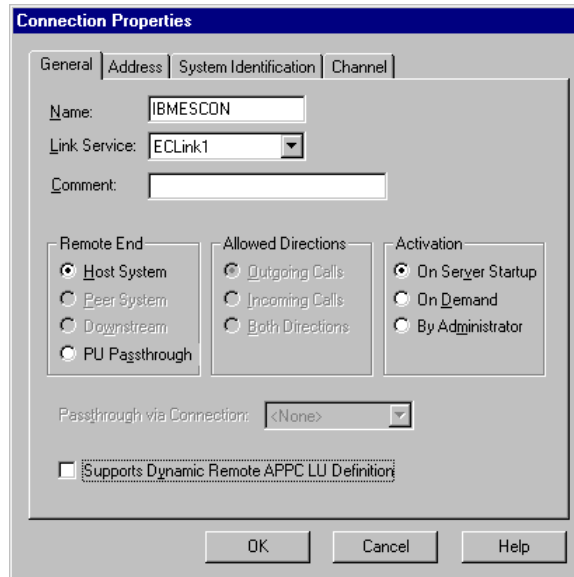


Figure 8-12. Connection Properties

4. The Channel Address dialog box appears (Figure 8-13).

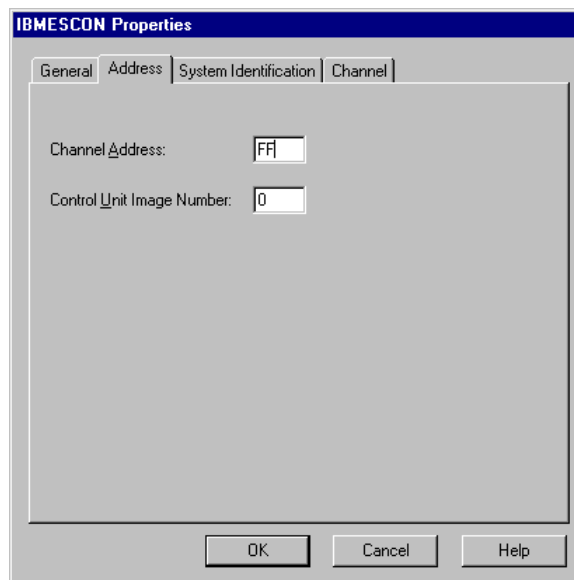


Figure 8-13. Channel Address

Type a two-digit hexadecimal number identifying the device. The range is from 00 through FF; the default is FF. Be careful to use a device defined in the ESCON configuration for the adapter and channel path you have assigned to the Link Service.

Control Unit Image Number is not used.

5. Click on the **System Identification** tab (Figure 8-14).

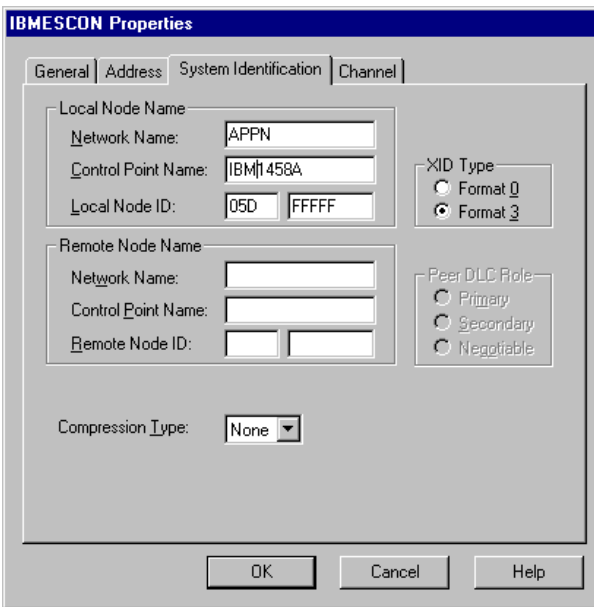


Figure 8-14. System Identification Dialog Box

You may enter a Network Name and Control Point Name.

Select the XID type for SNA Server to send:

Format 0 sends only the Node ID. Use this option only if the host does not support Format 3; most hosts support Format 3.

Format 3 sends up to 100 bytes of identifying information, including the Local Node ID and Control Point Name.

The default is Format 3, requiring XID=YES in the VTAM PU definition.

Type the Local Node ID, an eight-digit hexadecimal number that identifies the local system. Type the first three digits (the block number) in the first box and the last five digits (the node number) in the second box. Notify the host administrator of the Local Node ID used for your system. The numbers should match corresponding parameters in the VTAM PU definition: block number should match IDBLK, and node number should match IDNUM. In most cases the default is fine.

Use the same Local Node ID for all connections and link services on a particular server.

Do not use 000 or FFF for the first three digits of the Local Node ID. These values are reserved.

The default for Local Node ID is 05D-FFFFFF.

6. Click on the **Channel** Tab (Figure 8-15). Set the parameters on the Channel Screen as follows:

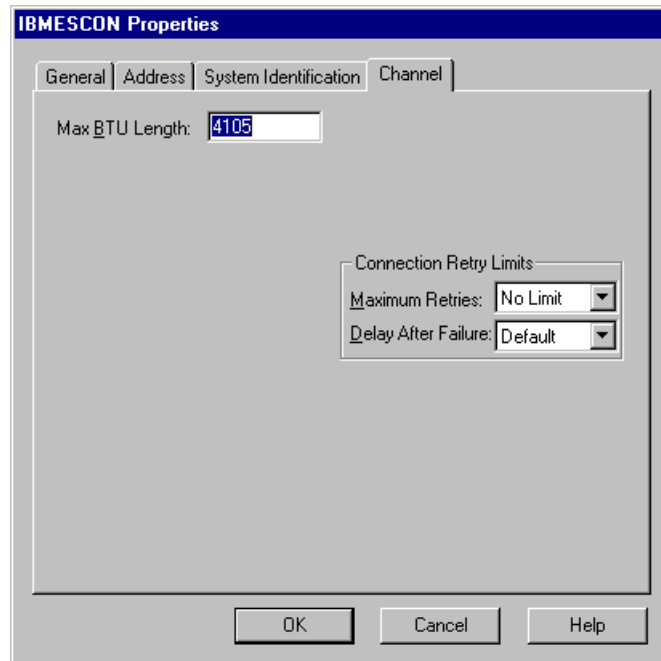


Figure 8-15. Channel Connection Properties

Max BTU Length

Specify the maximum length for the BTU, which is the number of bytes that can be transmitted in a single data-link information frame. A BTU is also called an I-frame.

The range for the Netfinity ESCON adapter is 256 – 8201 for PU type 2.1 connections and 256 – 4105 for PU type 2.0 connections.

Max BTU Length must be less than MAXBFRU (defined for the PU in VTAM) times the VTAM I/O buffer size.

The default is 4105.

Maximum Retries

Select the number of attempts for SNA Server to make when trying to establish the connection. After making this number of attempts, SNA Server makes an entry in the event log and stops trying.

The range is from 1 through No Limit; the default is No Limit.

Delay after failure

Select the length of time for SNA Server to wait between attempts to establish the connection.

The range is from 5 seconds through 255 seconds; the default is 10 seconds.

To accept the settings, choose the OK button.

7. When you return to the SNA Server Manager dialog box, the new Connection will be displayed (See Figure 8-16).

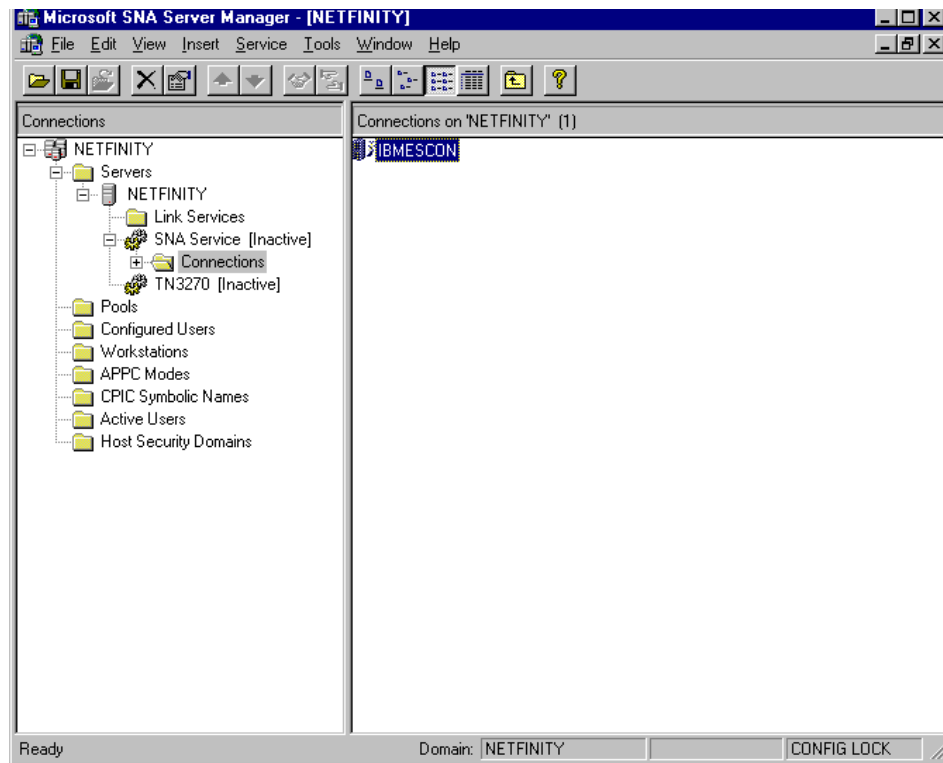


Figure 8-16. Configured Connection

To complete the installation of the adapter you must now define LUs to the Connection(s) and then configure the mainframe to match. Refer to the Microsoft SNA Server Administration Guide for assistance in assigning LUs to the connections you have defined.

Chapter 9. TCP/IP PASSTHROUGH FOR WINDOWS NT

There are two separate software components that must be installed for TCP/IP Passthrough for Windows NT to operate properly:

- PCI ESCON adapter driver
- TCP/IP Passthrough protocol

Installation of the PCI ESCON adapter driver is explained in detail in the section titled “Windows NT Server ” in **Chapter 2** beginning on page 7. The adapter driver must be installed prior to installing the TCP/IP Passthrough Protocol.

Installing TCP/IP Passthrough Protocol

The following procedure describes installation of TCP/IP Passthrough as a protocol in Windows NT.

STEP

1. To begin the installation, click the Network Icon in the Windows NT Control Panel (Figure 9-1).

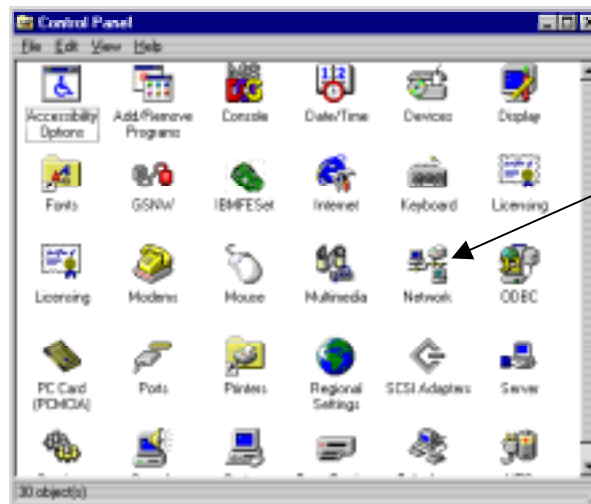


Figure 9-1. Network Icon on Control Panel

2. The Network dialog box will display. Click on the **Protocols** tab (Figure 9-2). Click **Add** to begin the installation of TCP/IP Passthrough.

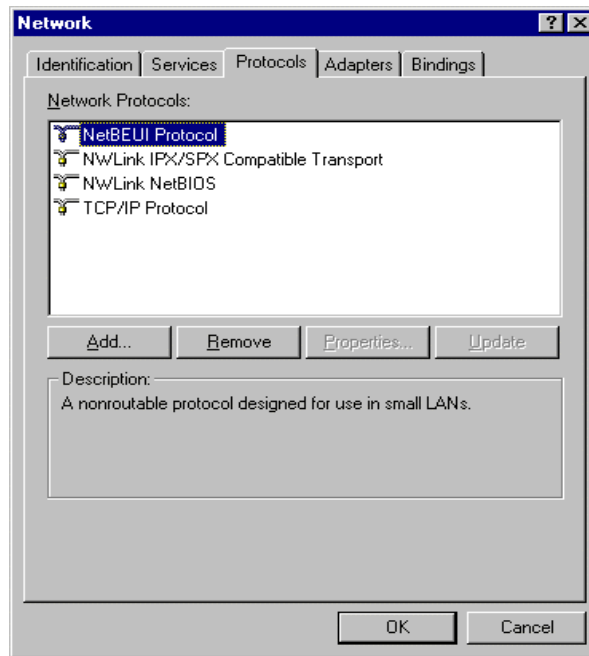


Figure 9-2. Protocol tab on Network Dialog

3. The Select Network Protocol dialog box will display (Figure 9-3). Click on Have Disk... to continue.

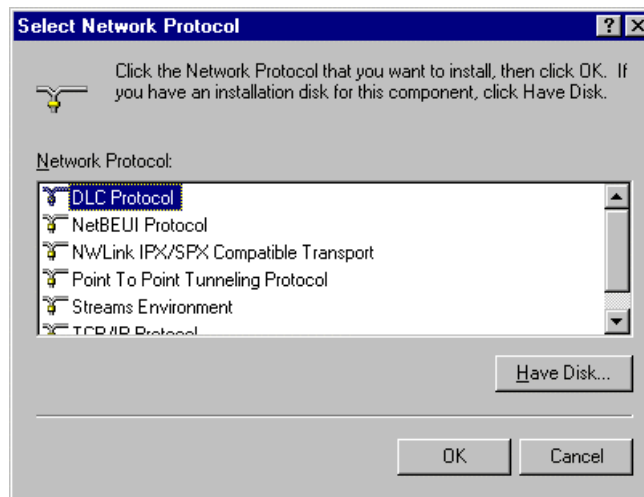


Figure 9-3. Select Network Protocol

4. The Insert Disk dialog will display. Enter the directory for TCP/IP Passthrough for Windows NT ("**d:\winnt\tcpip_pt**" where "d" is the driver letter associated with your CD-ROM) and click OK (Figure 9-4).

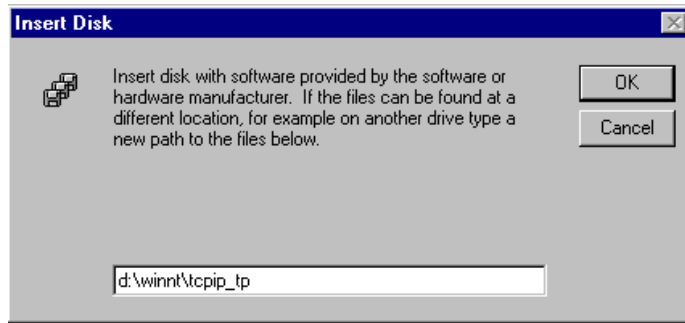


Figure 9-4. Insert Disk

3. The Select OEM Option dialog box will display (Figure 9-5). TCP/IP Passthrough should be selected. Click **OK** to invoke the install.

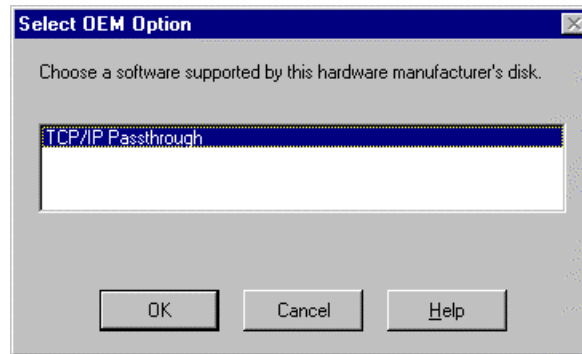


Figure 9-5. Select OEM Option

4. The system will proceed to install the software. During the install a progress bar will be displayed. At the end of the install a Setup Message box will display indicating successful installation (Figure 9-6). Click **OK** to continue.

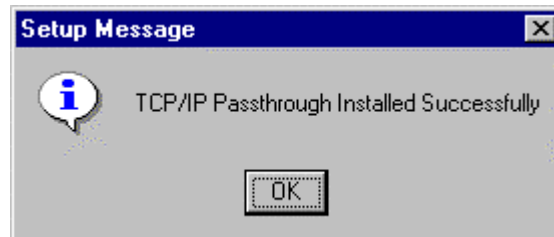


Figure 9-6. Setup Message - Install Successful

5. The Network dialog Protocol page will redisplay (Figure 9-7). You should now see TCP/IP Passthrough on the list of installed protocols.

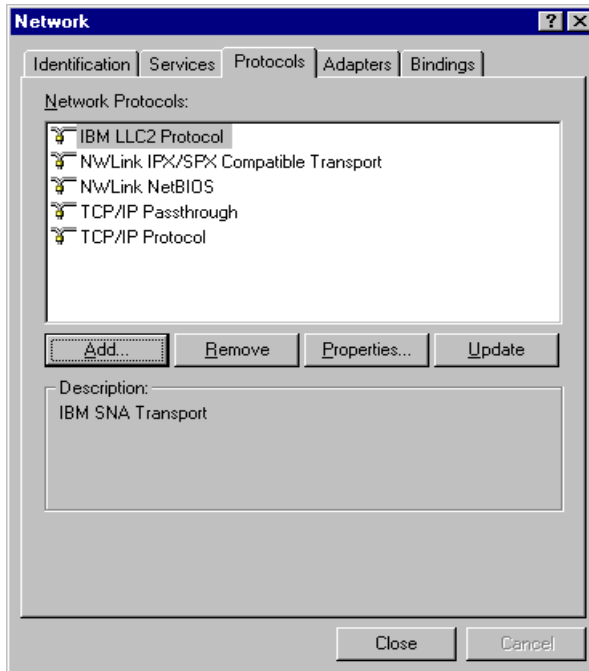


Figure 9-7. Network Protocol list with TCP/IP Passthrough

6. TCP/IP Passthrough requires dedicated LAN adapters. You must disable all other services and protocols bound to LAN adapters that are planned for use with TCP/IP Passthrough. Click on the **Bindings** tab in the Network screen (Figure 9-7). Then select **All Adapters** to display the list of installed adapters in the server. Expand the bindings for any adapter that you plan to use for TCP/IP Passthrough. Highlight and **Disable** all services and protocols bound to the adapter except for TCP/IP Passthrough. Figure 9-8 shows a properly configured LAN adapter.

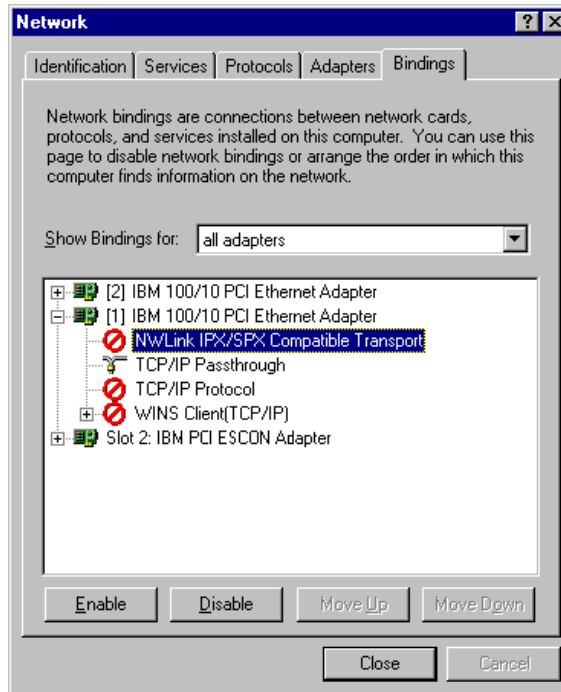


Figure 9-8. Network Bindings for all Adapters

7. Click **C**lose to end the installation. The system will begin updating the network bindings. Since TCP/IP Passthrough has not been configured the update will be paused for you to configure TCP/IP Passthrough. The TCP/IP Passthrough properties screen will display (Figure 9-9).

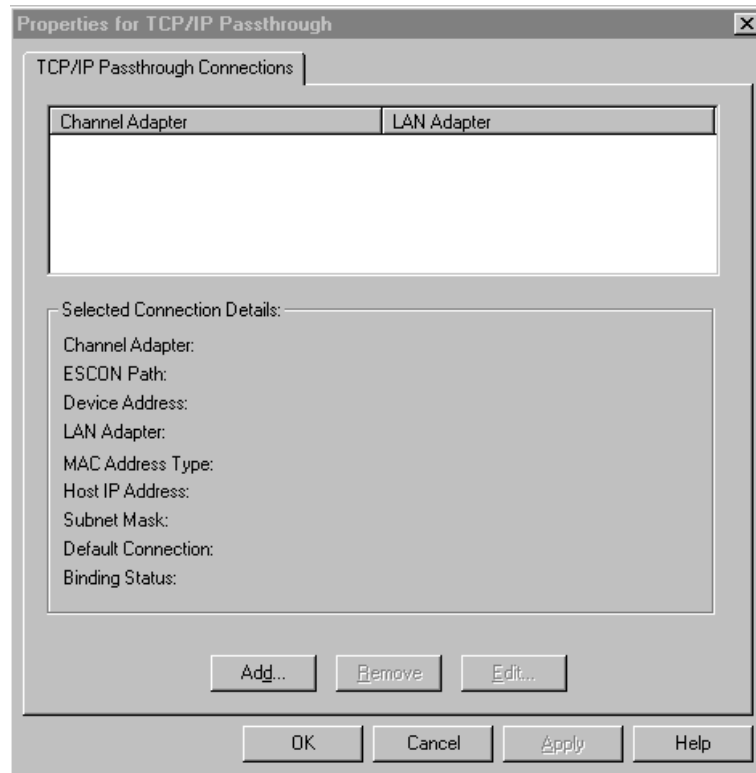


Figure 9-9. TCP/IP Passthrough Configuration

8. Define at least 1 connection as described in “*Configuring TCP/IP Passthrough*”. Click **S**ave to save the configuration. Update of the Network Bindings will complete and you will be returned to the Control Panel.

TCP/IP Passthrough installation is complete.

Configuring TCP/IP Passthrough

TCP/IP Passthrough can be re-configured at any point in time after installation but requires a re-boot of the server to implement the change.

STEP

1. From the Windows NT control panel, click the Network icon (Figure 9-10).



Figure 9-10. Invoking Network Configuration

2. The standard network configuration panel will appear. Click on **Protocols** to display a list of installed protocols (Figure 9-11).

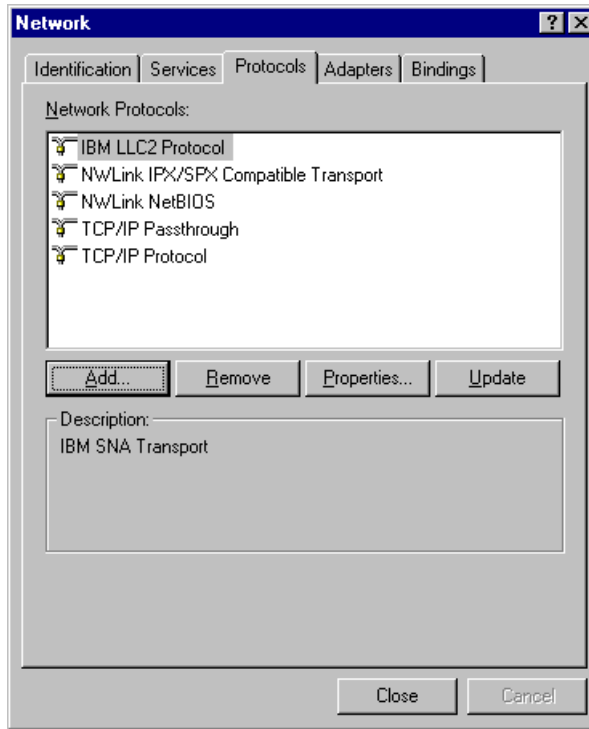


Figure 9-11. Network Protocol Dialog Box

3. Highlight TCP/IP Passthrough and click on Properties to configure TCP/IP Passthrough. The TCP/IP Passthrough Configuration dialog will display (Figure 9-12).

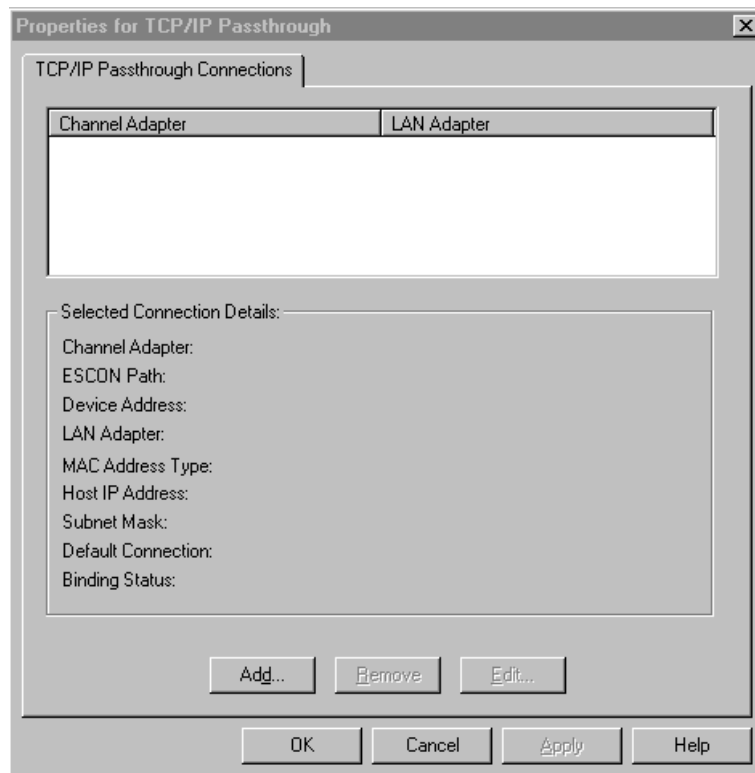


Figure 9-12. TCP/IP Passthrough Configuration

On initial configuration the screen will be empty. Only the **Add...** button will be available to add new connections.

Once connections have been defined, the top of the screen will display a list of defined connections. You may use your mouse pointer to select a connection for viewing. The bottom of the screen will display specific configuration parameters defined for the connection selected (Figure 9-13). The **Remove** and **Edit** buttons will become active on select; allowing you to remove the connection definition or edit configuration information.

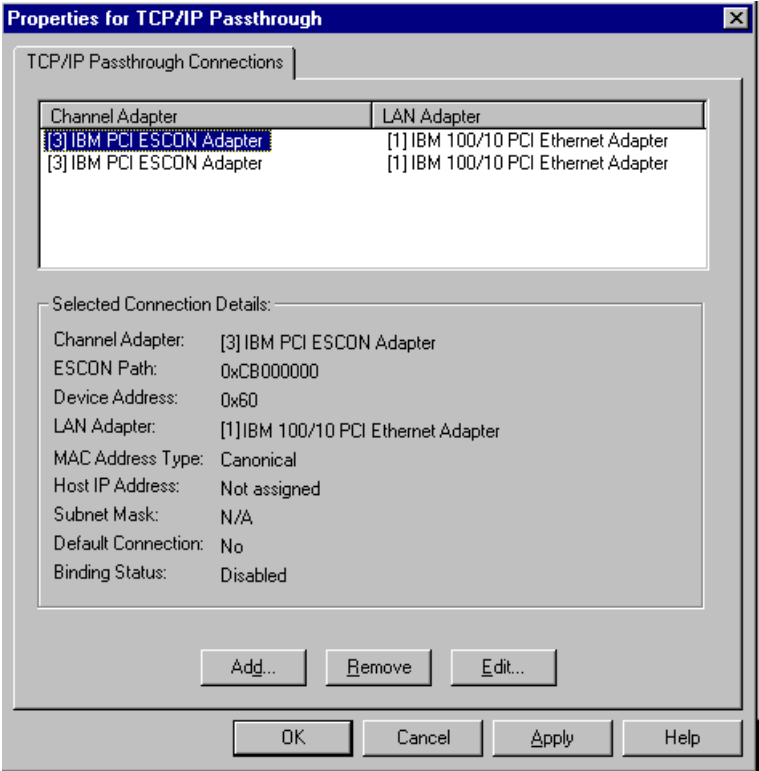


Figure 9-13. Properties Screen with Selected Connection

Adding a Connection

STEP

1. To add a new connection click on the **Add...** button on the TCP/IP Passthrough Properties screen (Figure 9-12). The TCP/IP Passthrough Configuration Screen will display (Figure 9-14).

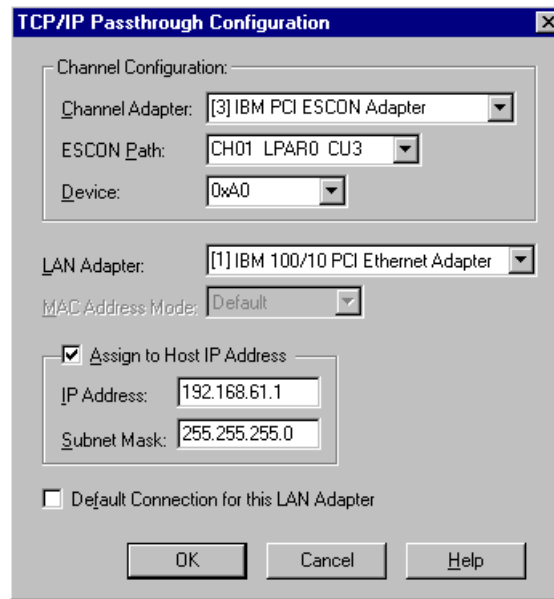


Figure 9-14. New TCP/IP Passthrough Connection Screen

2. Use your mouse to select Channel Adapter, ESCON Path, and Device. If any one of these fields show nothing available, you will need to define the ESCON Configuration for the adapter you intend to use. Refer to Chapter 4. Keep in mind that passthrough connections use two device addresses and the first must be even numbered.
3. Select a LAN Adapter.

When you select a Token Ring or FDDI adapter, **MAC Address Mode** becomes available. Specify Canonical or Noncanonical format. The default option is Noncanonical mode for token-ring adapters, and Canonical mode for FDDI adapters. This field is needed to accommodate the addressing mode options on the host TCP/IP. You must specify what the mainframe is configured for. This field is not available for ethernet adapters.

4. Check the **Assigned to Host IP Address** check box to indicate you want to filter TCP/IP packets sent to the mainframe. If not checked the connection will pass all IP packets that come in on the LAN adapter to the mainframe. If this field is checked only broadcast packets and packets whose destination address match that specified by **IP Address** and **Subnet Mask** will be sent to the host. If **Assigned to Host IP Address** is checked, then **IP Address** and **Subnet Mask** are required fields and must the address specified for this connection on the mainframe.

5. Check **Default Connection for a LAN Adapter** to make this the default connection for the LAN adapter. The default connection receives all IP packets filtered out by other connections on the same LAN adapter using **Assigned to Host IP Address, IP Address, and Subnet Mask**. There can be only one default connection per LAN adapter. Configuring this connection as the default will overwrite a previously configured default connection.

Assigned to Host IP Address and **Default Connection for a LAN Adapter** can be used together to control IP traffic being sent to the host. As an example, consider a LAN adapter with 2 connections defined for it. The first connection assigns a Host IP address of 237.221.147.43 to the connection. The second connection is defined as the Default for the LAN adapter. When configured in this manner, broadcast messages and traffic destined for 237.221.147.43 are sent to connection 1. Connection 2 receives broadcast messages and all IP packets not for 237.221.147.43. Turning off the Default Connection definition on connection 2 would send all IP traffic to connection 2, but connection 1 would still only receive broadcasts and traffic destined for 237.221.147.43. Turning off Assigned to Host IP Address on connection 1 would cause all traffic to go to connection 1.

6. Once you have configured the connection click **OK** to complete the connection definition and return to the TCP/IP Properties screen. Click **Apply** to save the configuration without exiting the Properties screen. Click **OK** to save the configuration and exit the Properties Screen; returning you to the Microsoft Network Configuration screen.
7. Click **Close** to exit Network Configuration. You will be prompted to reboot the server. Changes in TCP/IP Passthrough will not take effect until the next time the server is booted.

Deleting a Connection

STEP

1. To delete a connection from the TCP/IP Passthrough configuration simply highlight the connection you wish to delete (as shown in Figure 9-15) and click **Remove**.

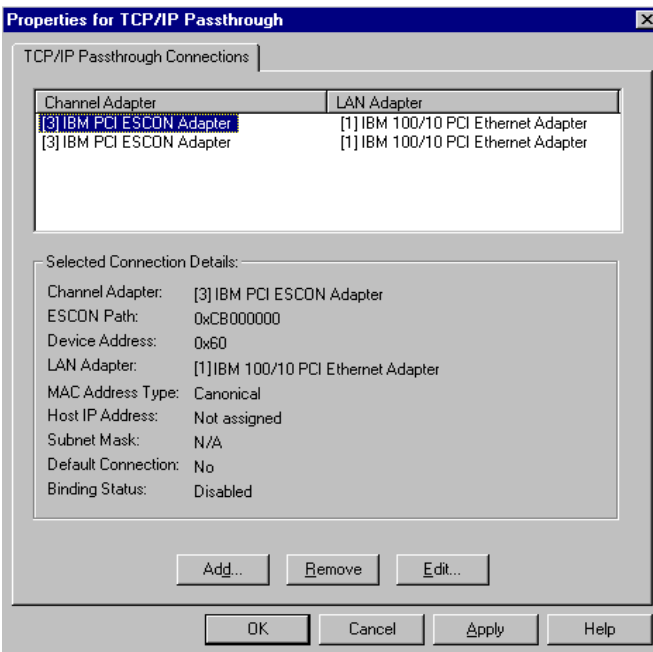


Figure 9-15. Removing a Connection

The connection will immediately be deleted and the screen will be updated showing the change (Figure 9-16).

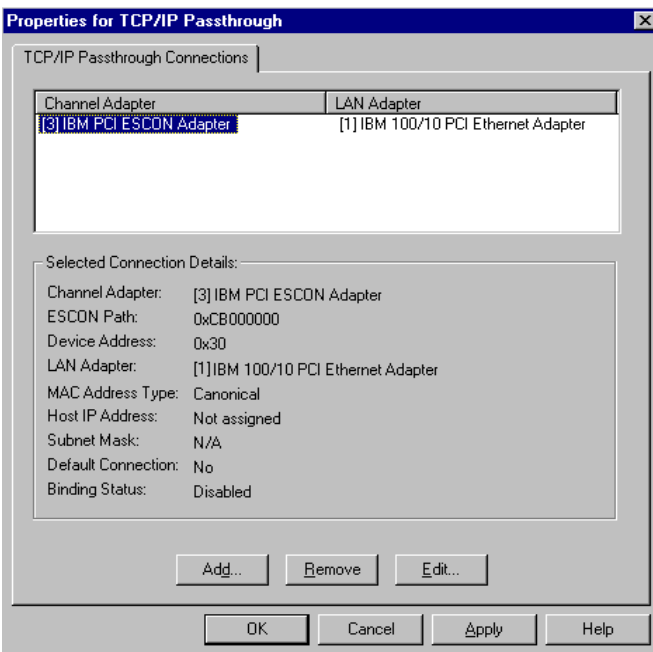


Figure 9-16. Updated Properties Screen After Delete

2. Click **A**pply to save the configuration without exiting the Properties screen.
Click **O**K to save the configuration and exit the Properties Screen; returning you to the Microsoft Network Configuration screen.
3. Click **C**lose to exit Network Configuration.

Deleting the connection from TCP/IP Passthrough does not delete the sub-channel definitions from either the ESCON configuration of the mainframe's Input/Output Configuration (IOCP).

Edit a Connection

STEP

1. To edit an existing TCP/IP Passthrough connection highlight the connection on the TCP/IP Passthrough Properties Screen (Figure 9-17) and click on **E**dit...

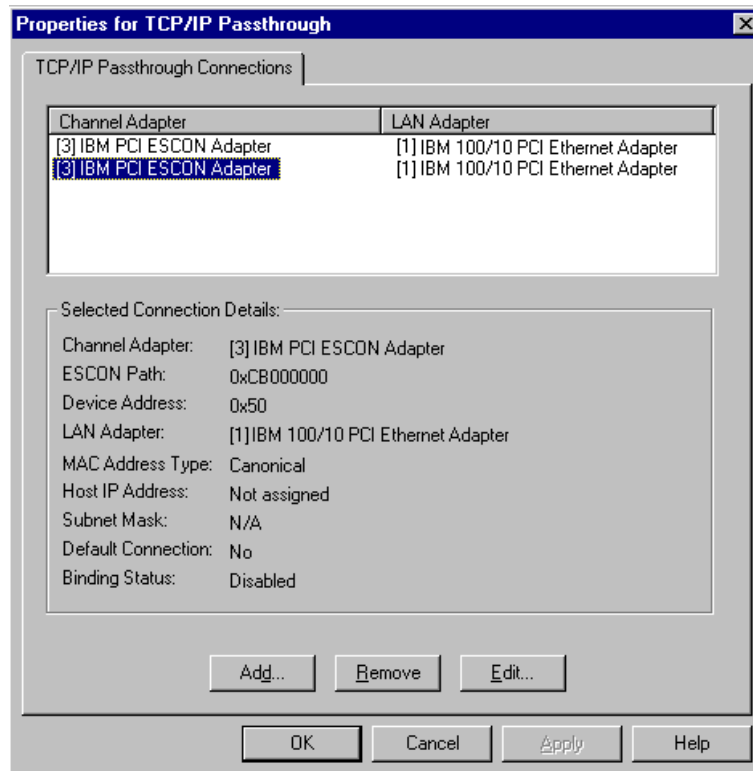


Figure 9-17. Edit a Connection

The TCP/IP Passthru Configuration screen (Figure 9-18) will be displayed for the highlighted connection.

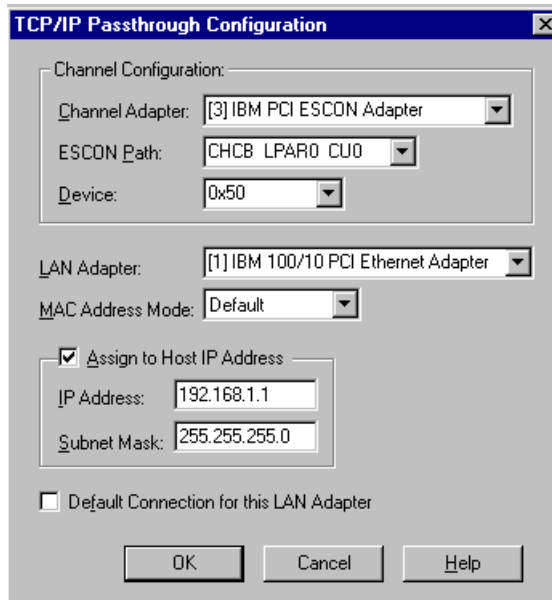


Figure 9-18. Edit a Connection - Configuration Screen

For a complete description of fields on this configuration screen, please refer to the section titled “**Adding a Connection**” on page 99 of this manual.

2. Once you have changed the fields to your satisfaction click **OK** to end the edit. The TCP/IP Passthru Properties screen will be re-displayed (Figure 9-19). Confirm your change on the right side of the display.

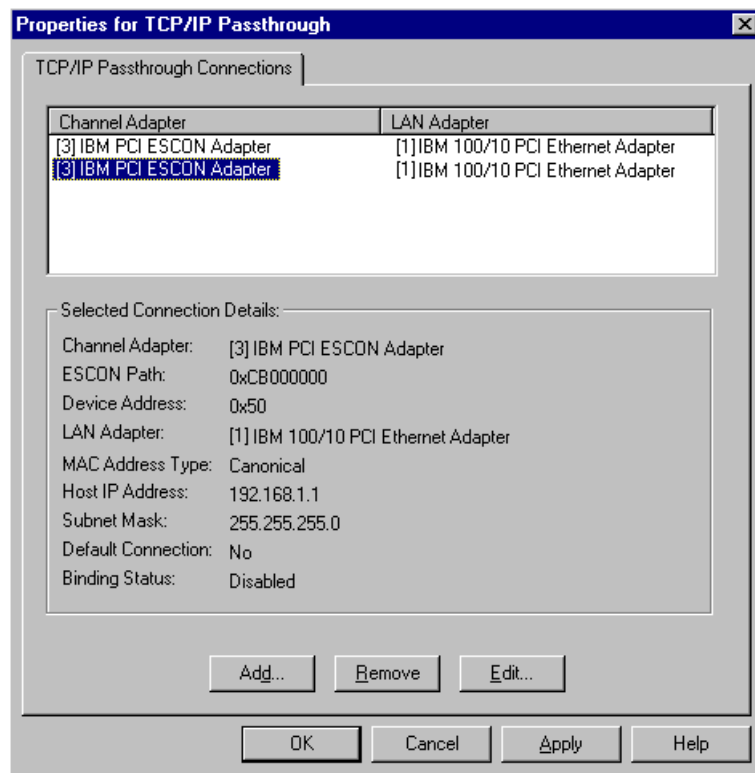


Figure 9-19. Properties Display Confirms Edits

3. Click **Apply** to save the configuration without exiting the Properties screen.
Click **OK** to save the configuration and exit the Properties Screen; returning you to the Microsoft Network Configuration screen.
4. Click **Close** to exit Network Configuration.

Re-boot the NT server for your changes to take effect.

Chapter 10. COMMUNICATIONS SERVER FOR UNIXWARE 7

This chapter discusses how to configure Communications Server for UnixWare 7 (CS/UnixWare) to use the Netfinity ESCON Adapter as a high-speed data link to one or more System 390s.

It is assumed that CS/UnixWare has already been installed on the Netfinity server and that the user is familiar with the eNetwork Communications Server graphical configuration utility (xsnaadmin). Topics discussed in this chapter are specific to the Netfinity ESCON Adapter. For information on installation and configuration of CS/UnixWare please refer to the Communications Server for UnixWare 7 publications.

For the most part, CS/UnixWare configuration tasks are the same when using a Netfinity ESCON Adapter as they are for other type data links. Once you have defined at least one Port and Link Station on the ESCON Adapter, any CS/UnixWare Service except for 5250 (specific to the AS/400) can be configured to use the ESCON Adapter.

Node Configuration

If your mainframe is configured to support XID exchange, it is best to configure your ESCON-attached Physical Units (PUs) as Type 2.1. PU 2.1 supports dependent LU types 1, 2, 3, and 6.2 as well as independent LU type 6.2 and provides better error recovery than PU type 2.0.

In order to complete the XID exchange PU 2.1 nodes must be uniquely identified to their adjacent nodes; ensuring a certain level of security on an SNA network

Figure 10-1 shows the basic node parameters for a CS/UnixWare node. In order to configure PU type 2.1 connections the first part of the Control point name must match the name assigned to VTAM with the NETID start option. In this example, NETID would be coded "NETID=APPN". The second part of the name ("SCOUNIX1") must be unique in the network.

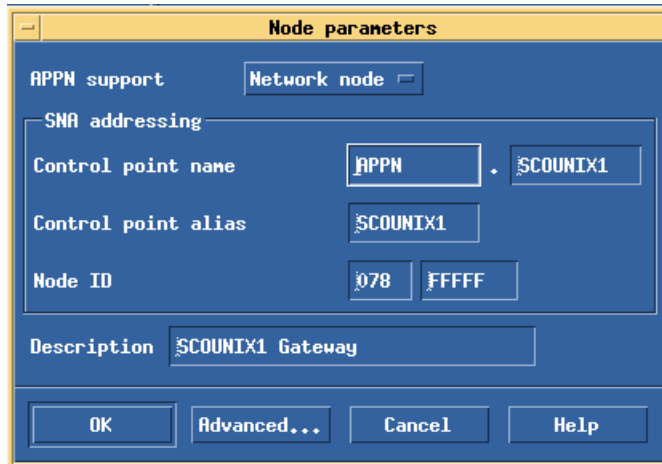


Figure 10-1. Node Parameters

Adding a Port

Configuring a Netfinity ESCON Adapter in Communications Server for UnixWare 7 begins by adding a Port to the Node configuration. Use your mouse to select **Connectivity** and then **New port...** from the **Services** pull-down on the CS/UnixWare node configuration panel (Figure 10-2).

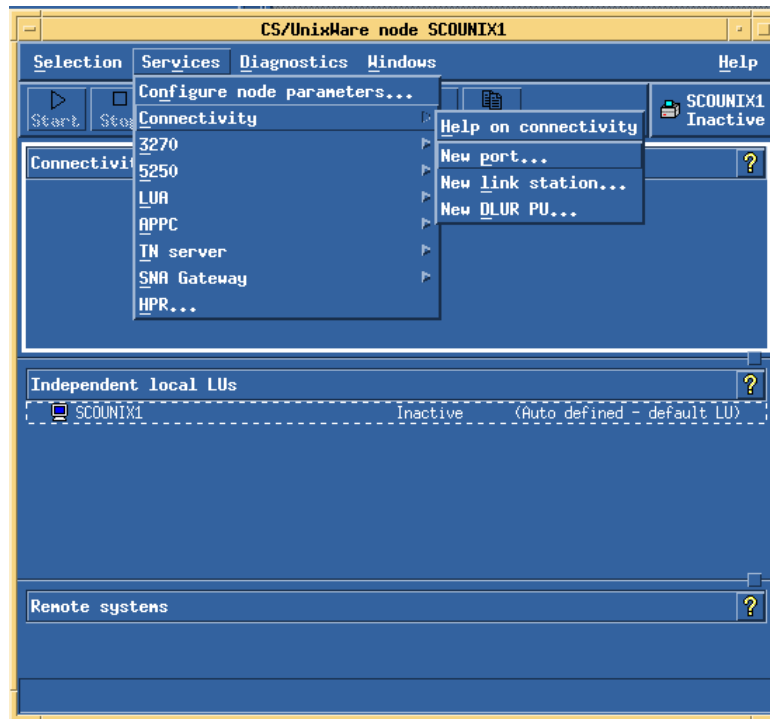


Figure 10-2. CS/UnixWare Node Configuration

You will be prompted for a Port type. Use your mouse to select **Channel Card** (Figure 10-3).



Figure 10-3. Adding ESCON Channel Port

The ESCON Channel port definition panel is displayed (Figure 10-4). A default port name and number will be assigned. It is recommended you replace the default port name with the port name you assigned in **chldlpi**.

You must enter a valid Port number of a port configured in the ESCON configuration using **chldlpi**.

Since ESCON Adapters are dedicated connections, it is recommended you leave the **Initially active** check box selected so that the port is made active whenever the node becomes active.

Click **OK** to create the Port.

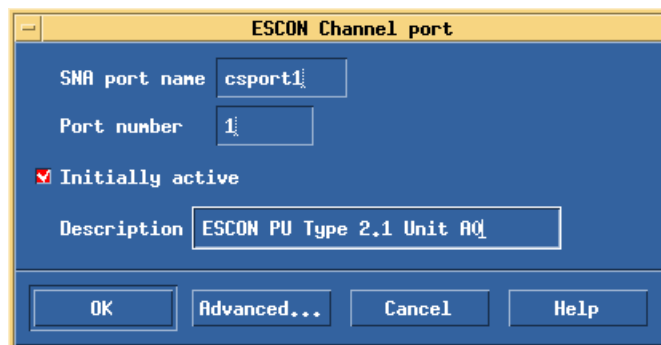


Figure 10-4. ESCON Port Definition

The new port should now appear in Connectivity and Dependent LUs list in the CS/UnixWare node panel (Figure 10-5).

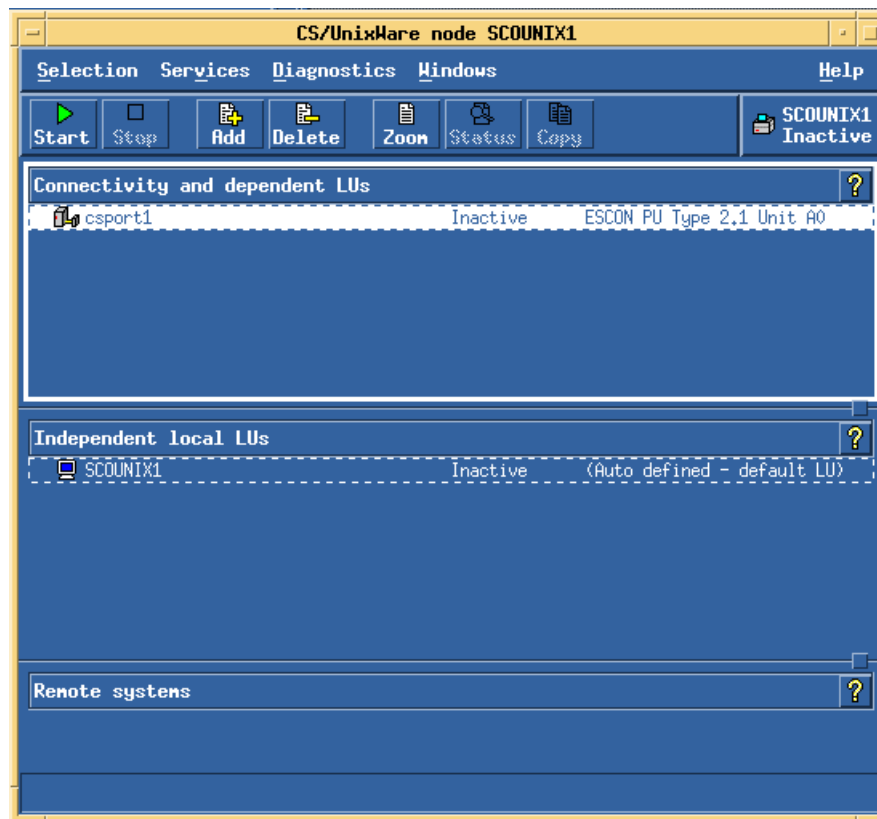


Figure 10-5. Newly Created Port

Link Station Definition

Once an ESCON Port has been created, you must define a Link Station for the port. Unlike other port types (Ethernet, Token Ring, etc.), ESCON ports only allow one Link Station to be defined per port. Remember that the ESCON port configured by **chldlpi** defines the device (unit) address, which for locally attached devices uniquely identifies the Physical Unit (PU).

To define a Link Station use your mouse to select **C**onnectivity and then **N**ew **l**ink **s**tation... from the **S**ervices pull-down in the CS/UnixWare node configuration panel (Figure 10-6).

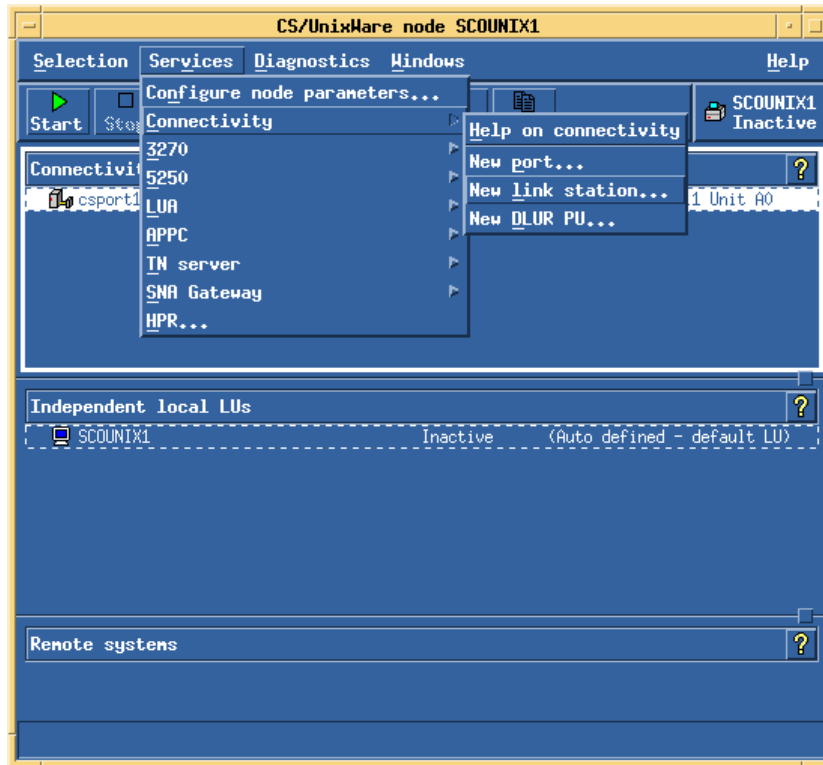


Figure 10-6. Adding a New Link Station

You will be prompted for a port to associate the Link Station with. Use your mouse to select the correct ESCON port (Figure 10-7). Remember only one Link Station may be defined for each ESCON port.

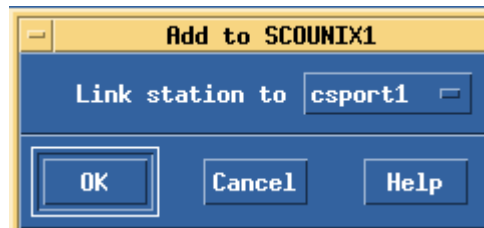


Figure 10-7. Add a Link Station to an ESCON Port

Click **OK**. The Channel link station panel will be displayed (Figure 10-8).

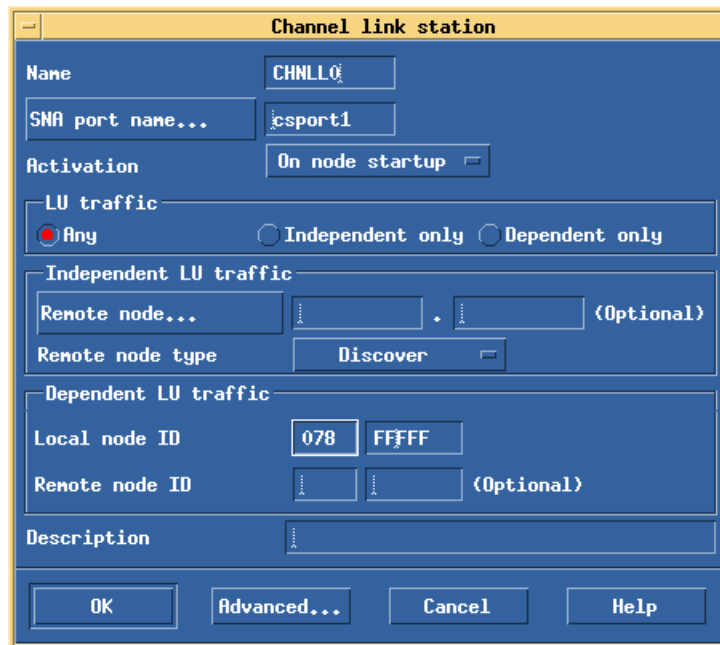


Figure 10-8. Channel Link Station Panel

A default link station name will be assigned by the configuration program ('CHNLL0'). You may replace the name with your own if you prefer. The port name will default to the port selected in Figure 10-7. If this is not the port you intended, click on **SNA port name...** for a list of all ESCON ports.

The activation setting defaults to **By Administrator**, meaning the Link Station will have to be manually brought online. Normally you should change this to **On node startup** for dedicated links like the ESCON adapter. You should not set the activation option to **On Demand** for dedicated links.

The LU traffic radio buttons in the middle of the panel control which fields are displayed in the bottom half of the panel. The default, **Any**, displays all fields as shown. The other two radio buttons (**Independent only** and **Dependent only**) will result in the panel re-displaying with only those fields appropriate to the LU type being displayed. You must set LU traffic to **Dependent only** for PU type 2.0 link stations.

Notice that both **Remote node...** and **Remote node ID** are optional fields. You are not required to enter them. However, if you chose to enter these fields they **must** match the values entered at the mainframe. If they do not, connection will fail.

You may select **Remote node type** (Network Node, End Node, or LEN) to match how your mainframe is configured or you may allow it to default to Discovery mode in which case the node type will be determined at activation.

The **Local node ID** is a numeric node identifier consisting of a 3-digit network identifier and a 5-digit node identifier. Format 0 XID exchange uses this ID to identify the sender to the receiver. When exchanging XID 0s, this ID should be unique in the network. However ESCON data links do not exchange XID 0s.

Further, XID3 includes the Control Point (CP) Name specified in the Node properties panel. Only older systems use Local node ID when CP Name is present. Most do not use Local node ID, so you generally do not need to code a unique Local node ID.

The **Description** is optional.

The **Advanced...** button on the Channel link station panel displays an advanced link station configuration options. Generally you may allow these options to default.

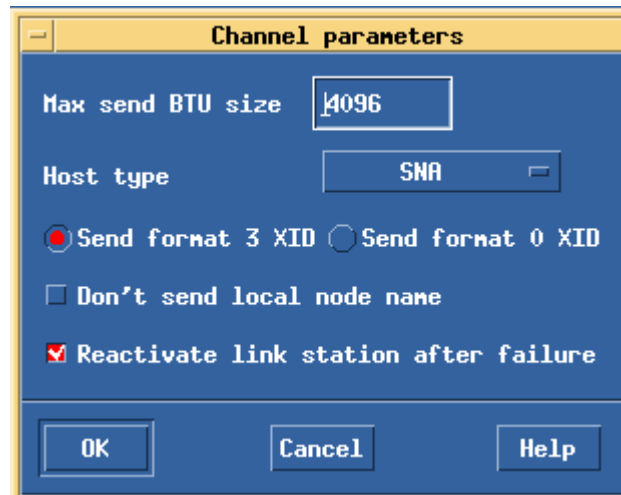


Figure 10-9. Advanced Channel Parameters

Which fields actually display on the Advanced panel is dependent on how the node and link station are configured. Clicking **Help** on the Channel parameters panel (Figure 10-9) will provide information on setting each field.

Figure 10-9 shows the advanced options that appear when LU traffic has been set to **Dependent only**. If your port has been defined by **chldlpi** (see Section "UnixWare", Chapter 4) as PU type 2.0 you must select **Send format 0 XID**. Format 3 XID exchange is not valid for PU type 2.0. If you do not override the default (**Send format 3 XID**), CS/UnixWare will attempt to send format 3 XIDs and the link station will not activate. When you click **OK** on the Channel Link Station panel, the link station will be defined (Figure 10-10).

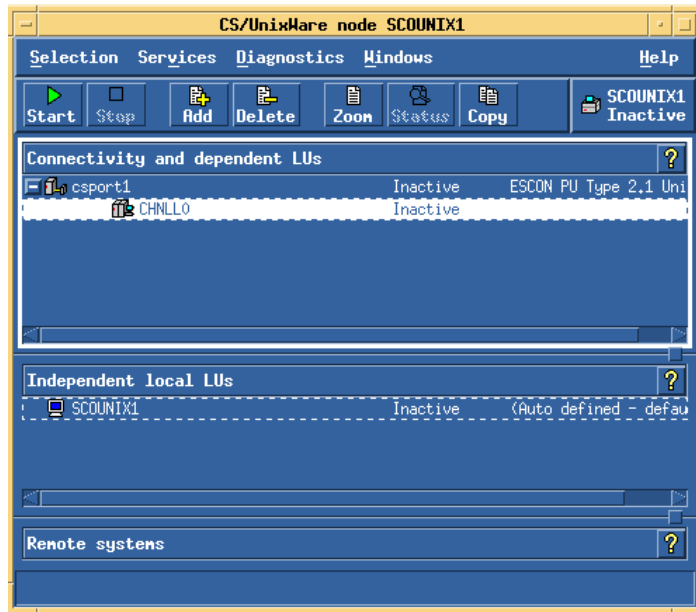


Figure 10-10. Link Station Defined

Once the Link Station has been defined to the Port, you can configure any one of the following services using the ESCON link station:

- 3270
- LUA
- APPC
- TN Server
- SNA Gateway

Chapter 11. NETWARE FOR SAA

This chapter covers configuration of NetWare for SAA version 4.0 or intraNetWare for SAA version 3.0 to make use of a Netfinity ESCON Adapter. It is assumed that the user is familiar with NetWare for SAA Management utilities provided with NetWare for SAA and has a general understanding of how to configure NetWare for SAA. Topics covered in this chapter are specific to use of an ESCON adapter. Please see appropriate Novell documentation for further details of NetWare for SAA management.

NetWare for SAA is a full APPN network node. NetWare for SAA supports a variety of configuration scenarios including:

- 3270/LUA Emulation
- 5250 Emulation
- TN3270(E) Emulation
- TN5250 Emulation
- APPN/APPC
- Downstream Links

The Netfinity ESCON Adapter may be configured for use in any of these scenarios except for 5250 Emulation and TN5250 Emulation which are specific to AS/400 environments.

The Netfinity ESCON Adapter is recognized by NetWare for SAA as a *custom data link adapter*. As such the following NetWare for SAA server configuration tasks may need to be completed based on the scenario being defined:

- Configure Data Link Adapter (Always required)
- Configure Host Links (Required for 3270/LUA Emulation, TN3270(E) Emulation, and Downstream Links)
- Configure Custom Peer Links (Required for APPN/APPC)

Completion of each of these tasks will be discussed in this chapter. Configuration of NetWare for SAA version 4.0 and intraNetWare for SAA version 3.0 is mostly the same. Therefore, most of the configuration screens included below are from version 4.0. Version 3.0 screens are also included where necessary for clarity.

It is assumed that the adapter has already been defined to the NetWare operating system via the “LOAD BTIPBSA SOT=n UNIT=xx NAME=nnnn PU=2.1” statement in the NetWare AUTOEXEC.NCF. This statement “registers” the adapter with NetWare as an ODI device during server boot up. The “NAME” that is assigned to the adapter in the “LOAD” statement provides a logical connection for NetWare applications such as NetWare for SAA to communicate with the adapter. The syntax of the “Load BTIxxx” statement is described in Chapter 3 of this manual in the section titled “*Loading the Drivers*” on page 28.

It is important to note that each NetWare for SAA connection (i.e., each individual VTAM PU) requires a unique “LOAD BTIxxx” statement in the AUTOEXEC.NCF, and also a unique Custom Data Link Adapter definition with a corresponding PU Profile definition. As an example, a NetWare for SAA server configured for three VTAM PU’s will require three “LOAD BTIxxx” statements in the NetWare AUTOEXEC.NCF, three NetWare for SAA Data Link Adapter definitions and three NetWare for SAA PU Profiles.

Configure Data Link Adapters

The Configure Data Link Adapter task is used to define the ESCON adapter to NetWare for SAA and link it to a specific LOAD command (and therefore sub-channel address) defined in AUTOEXEC.NCF.

For new configurations you will first need to complete the “Configure the Node” task (refer to appropriate Novell documentation). The following process will then successfully define a Netfinity ESCON Adapter to NetWare for SAA. For simplicity, a 3270/LUA scenario is being used for demonstration.

STEP

1. From the main configuration screen, double click **Data Link Adapters** under Definition Hierarchy by Function. (Figure 11-1).

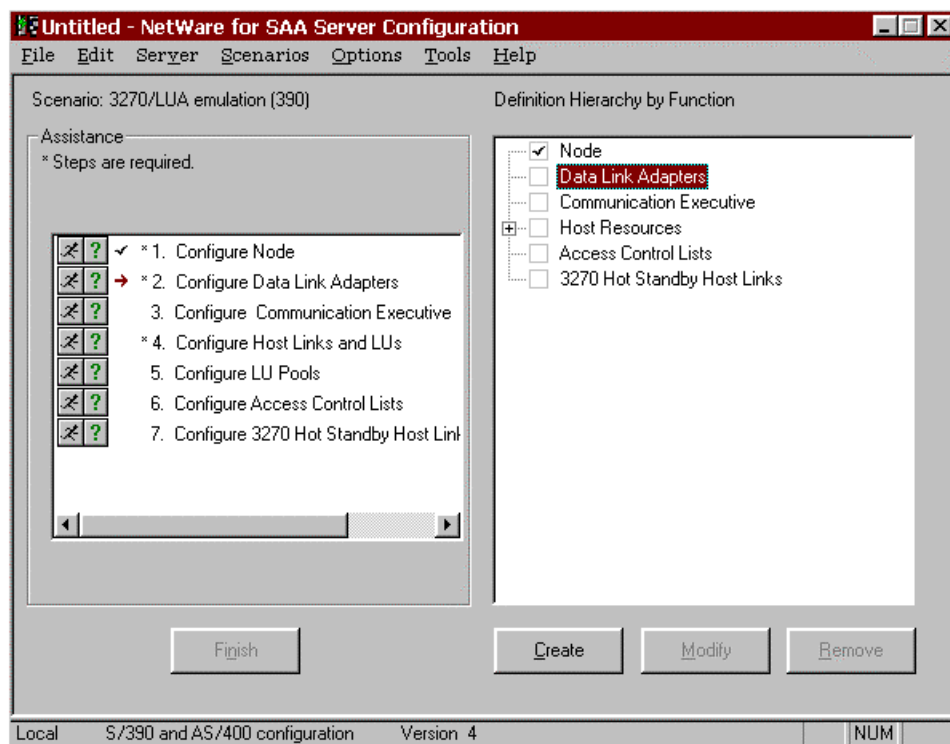


Figure 11-1. Version 4 Main Configuration Screen

The **Adapter DLC Type** pop-up (Figure 11-2) will appear. Highlight **Custom** and click **OK**.

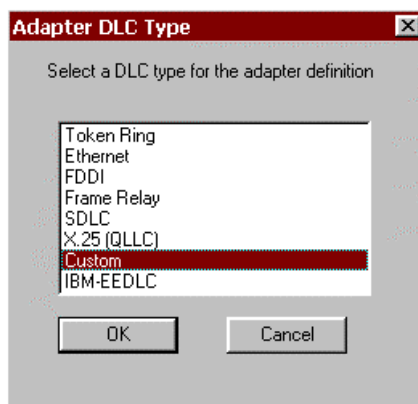


Figure 11-2. Specify Adapter Type

For intraNetWare for SAA version 3.0, select **Configure Data Link Adapters** under Configuration options. Then scroll down and select **Custom** under Adapters (Figure 11-3). Click **New...**

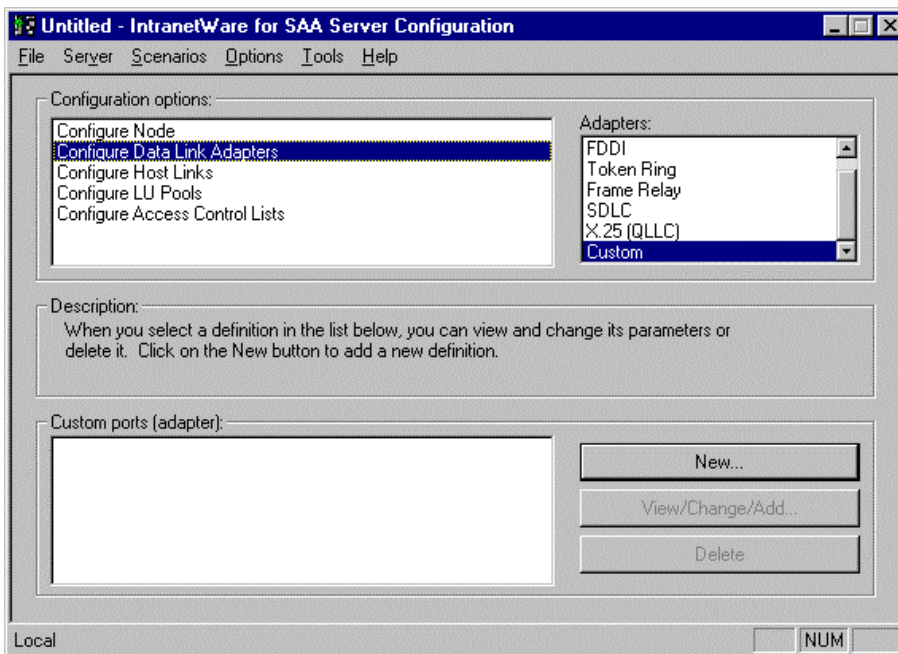


Figure 11-3. Version 3 Main Configuration Screen

3. The **Configure a Custom Adapter** dialog will appear (Figure 11-4). Note that the **Reactivation** tab is new in version 4.

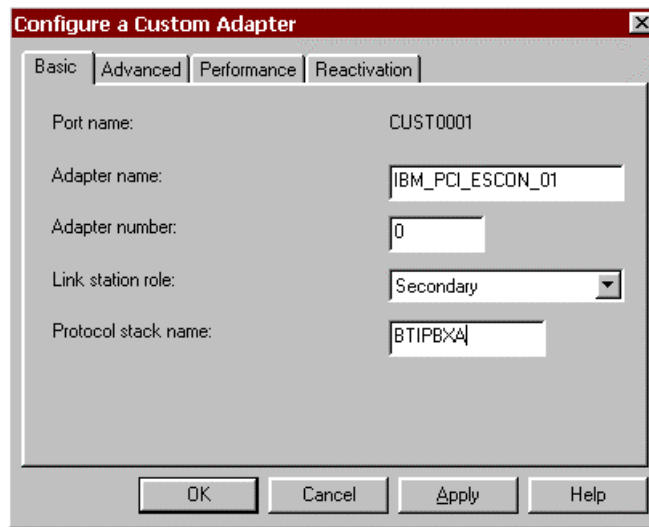


Figure 11-4. Configure a Custom Adapter

The following fields are displayed and must be configured on the **Basic** tab:

- **Adapter name:** Enter the name you wish to assign to this Custom Data Link Adapter. This can be any combination of alpha-numeric and special characters, up to a maximum of 17 characters. Spaces are not allowed. This name must match the *name* which is specified on the “LOAD BTIPBXA SLOT=*n* UNIT=*xx* NAME=*name*” parameter in the AUTOEXEC.NCF of the NWSAA Server (see sections “**Loading the Drivers**” and “Updating AUTOEXEC.NCF” beginning on page 28).
- **Adapter number:** This field defines the unique number that a local Transaction Program (TP) must present for NetWare for SAA to identify the adapter and create the connection between the local TP and the partner LU in the remote node.

Enter any decimal number from 0 to 255. The logical adapter number must be unique within a link type.

Note: *Because all Netfinity ESCON Adapters use the same link type (CUSTOM), you must assign a unique logical adapter number to each adapter you define.*

- **Link station role:** The link station role this adapter is to assume when communicating to the host. This parameter must be set to **Secondary** for ESCON adapters.
- **Protocol Stack Name:** Specify the name of the adapter driver, enter *btipbxa* for the ESCON adapter.

3. Once all fields are defined, continue by clicking the **Advanced** tab (Figure 11-5).

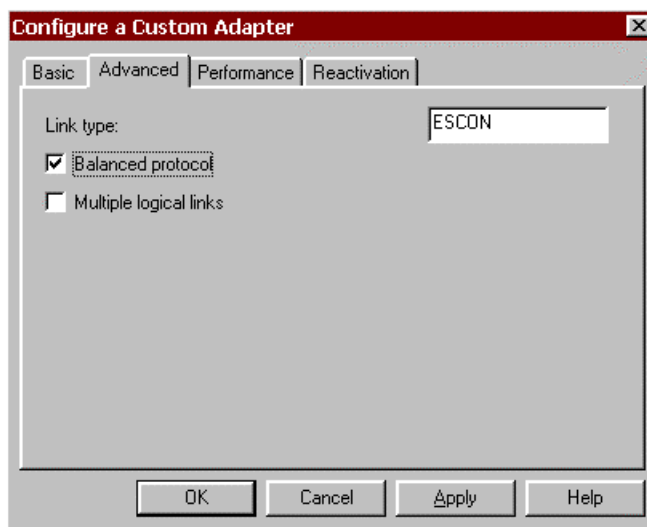


Figure 11-5. Completed Configure a Custom Adapter Advanced Screen

Complete the fields as follows:

- **Link Type:** A text string defining type to the custom data link. Enter "ESCON".
 - **Balanced protocol:** This parameter **must** be enabled for the ESCON adapter. Check this box to enable Balanced Protocol.
 - **Multiple logical links:** This box **must not** be checked for the ESCON adapter.
4. After completing the Advanced screen, click the **Performance** tab (Figure 11-6).

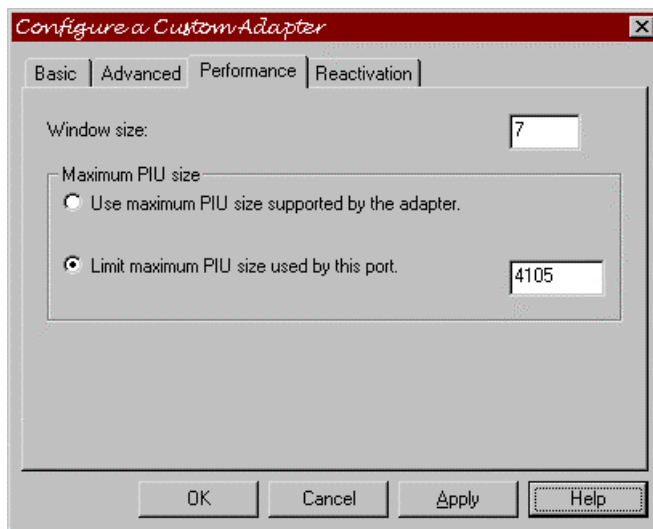


Figure 11-6. Completed Performance Screen

The following fields are available from this screen:

- **Window Size:** Specifies the maximum number of Information (I) frames that may be received from the host at once. The default of 7 provides the best performance for the ESCON adapter.
 - **Use the adapter default for maximum PIU size:** This check box should not be used with the Netfinity ESCON Adapter.
 - **Override adapter default maximum PIU size:** This check box should be clicked to display a box for entering a maximum PIU size. A setting of 4105 is recommended for the Netfinity ESCON Adapter PIU size.
5. For version 4 and above, click the **Reactivation** tab (Figure 11-7). A link may fail to start or fail after a successful start for a variety of reasons. You may set automatic reactivation parameters for the ESCON adapter so that it will automatically attempt to restart following a failure. The following fields are used to control reactivation:

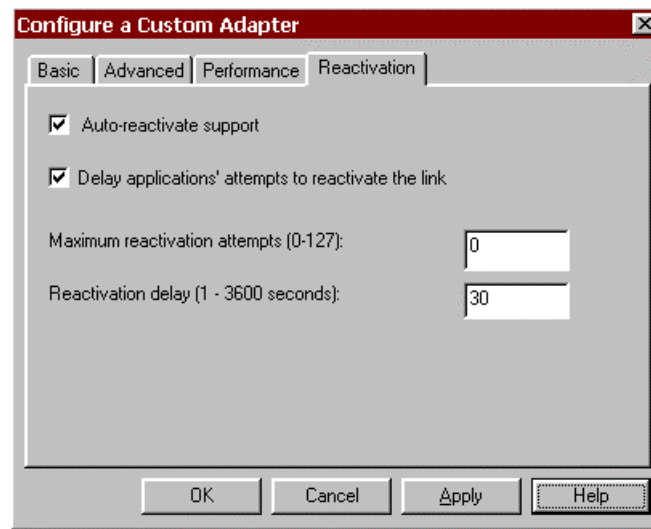


Figure 11-7. Reactivation Dialog

- **Auto-reactivate support:** This check box controls whether or not automatic reactivation is attempted or not. When checked (the default), auto-reactivate will be attempted based on options specified in the remaining fields on this dialog.
- **Delay applications' attempts to reactivate the link:** Specify whether reactivation attempts are to be delayed or not. When checked (the default), reactivation will be delayed based on the Reactivation delay entered.
- **Maximum reactivation attempts:** This field specifies the maximum number of reactivation attempts to be processed. The range is 0-127. Entering 0 causes an unlimited number of attempts.

- **Reactivation Delay:** Specifies the number of seconds to wait (delay) between attempts to reactivate the link. The range is 1 – 3600. The default is 30 seconds.

6. Click **OK** to save the newly defined adapter definition.

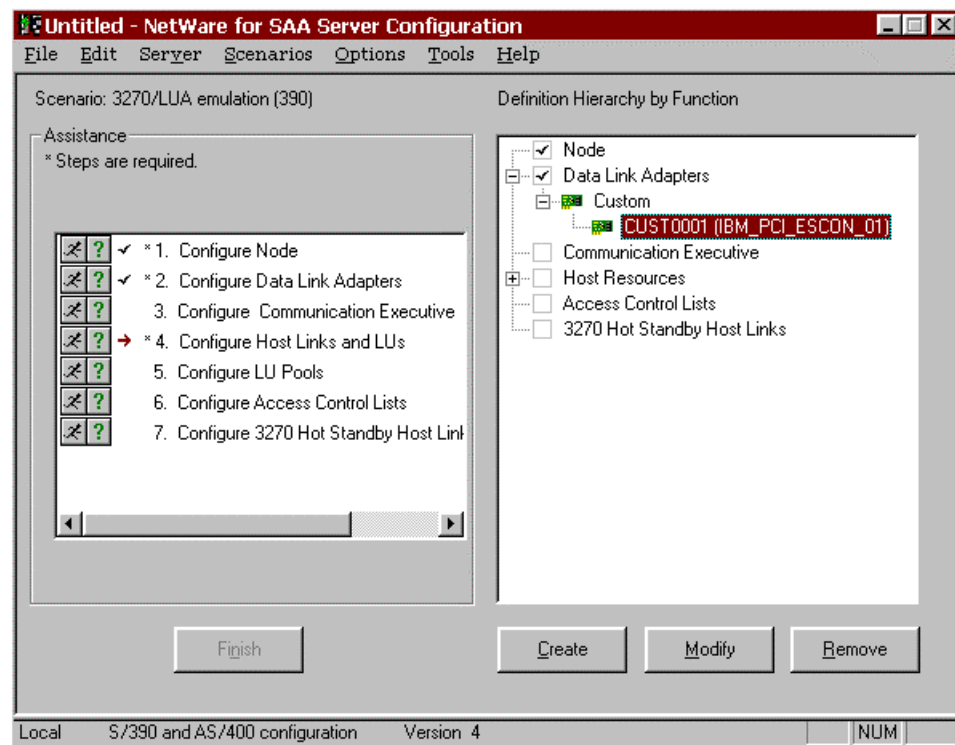


Figure 11-8. Custom Adapter List

The NetWare for SAA Server Configuration main screen will re-display (Figure 11-8). The adapter you have defined will now appear under Custom Data Link Adapters.

Figure 11-9 shows the adapter listed in version 3 Server Configuration.

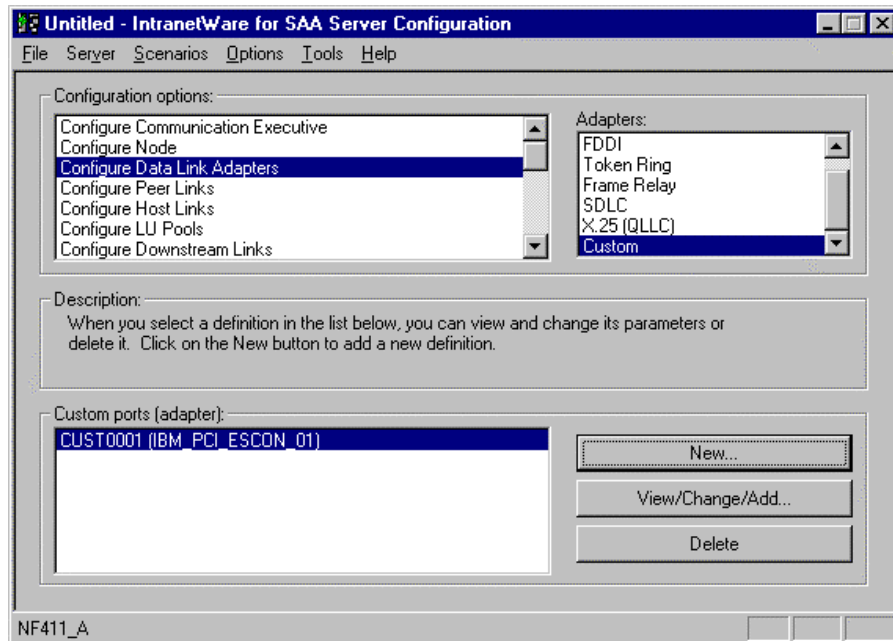


Figure 11-9. Version 3 Custom Adapters

Keep in mind that you will need to define a Custom Data Link Adapter for **each** Physical Unit (PU) you intend to define to NetWare for SAA. The control unit address (sub-channel address) used by the PU is defined on the LOAD statement in AUTOEXEC.NCF. The Custom Data Link Adapter definition points to the LOAD statement via the Adapter Name field, which must match the NAME parameter on the LOAD statement.

Repeat the Configure Data Link Adapters task for each LOAD you have defined.

Configure Host Links

The Configure Host Links task is required for 3270/LUA Emulation, TN3270(E) Emulation, and Downstream Links scenarios in NWSAA Server Configuration.

Once you have completed the Configure Data Link Adapters task, the following procedure will define a Host Link.

STEP

1. Click the “Running Man” next to **Configure Host Links and LUs** (Figure 11-10).

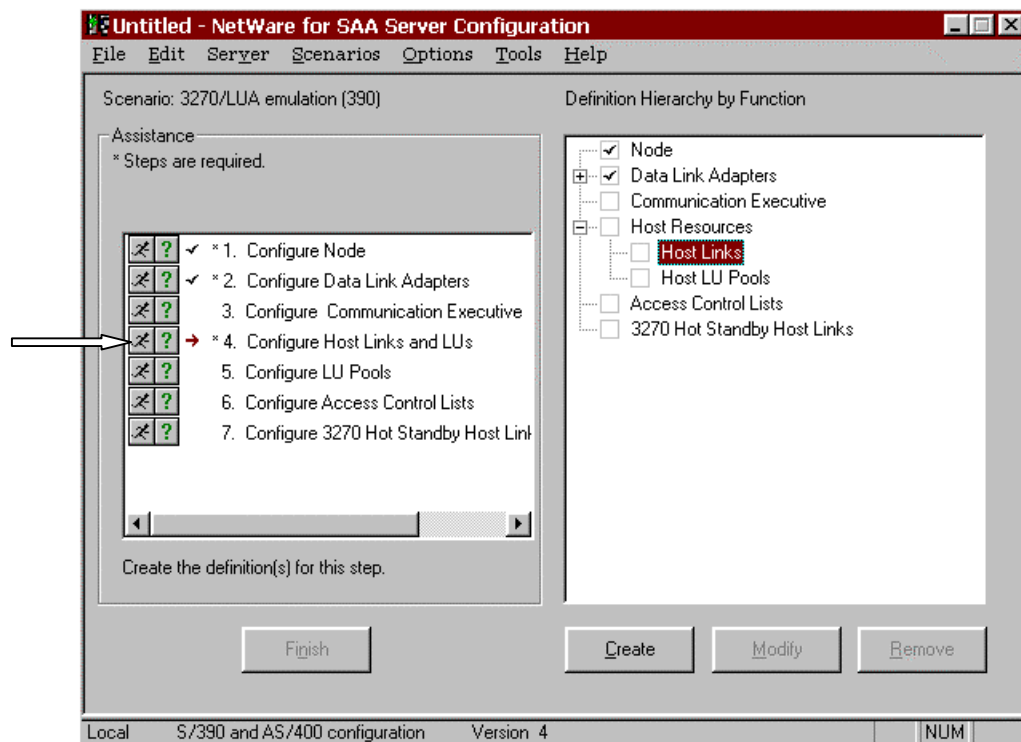


Figure 11-10. Start a Host Link Configuration

In intraNetWare for SAA version 3, highlight **Configure Host Links** in the **Configuration Options** box (Figure 11-11). Click **View/Change/Add...**

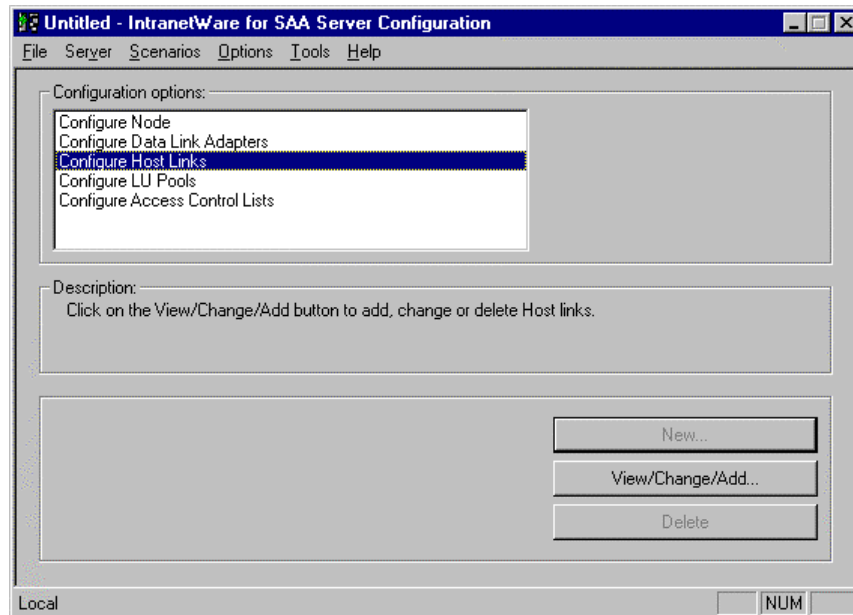


Figure 11-11. Select Configure Host Links

The **Configure Host Links** screen will display (Figure 11-12). Click **Create Host Links...**

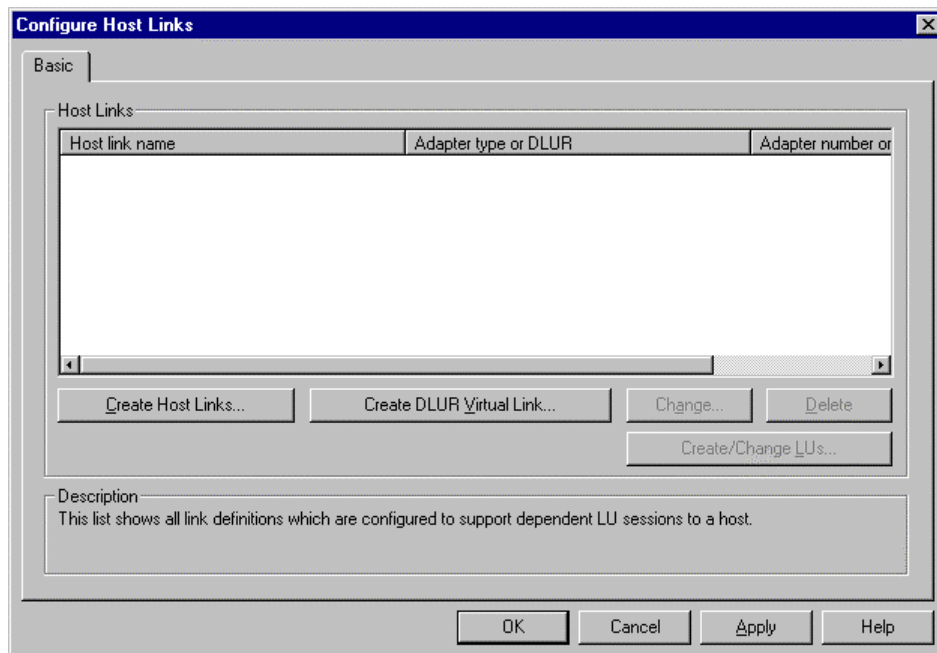


Figure 11-12. Configure Host Links

2. A Link Type dialog will prompt you for the link type. Select **Custom** and then click **OK**.

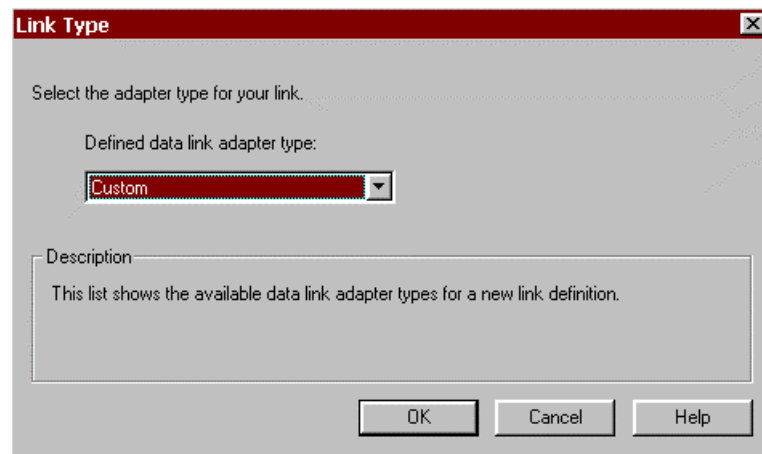


Figure 11-13. Link Type

3. The **Configure a Custom Host Link** screen will display (Figure 11-14). Note that the **Reactivation** tab is new to version 4 of the configuration utility.

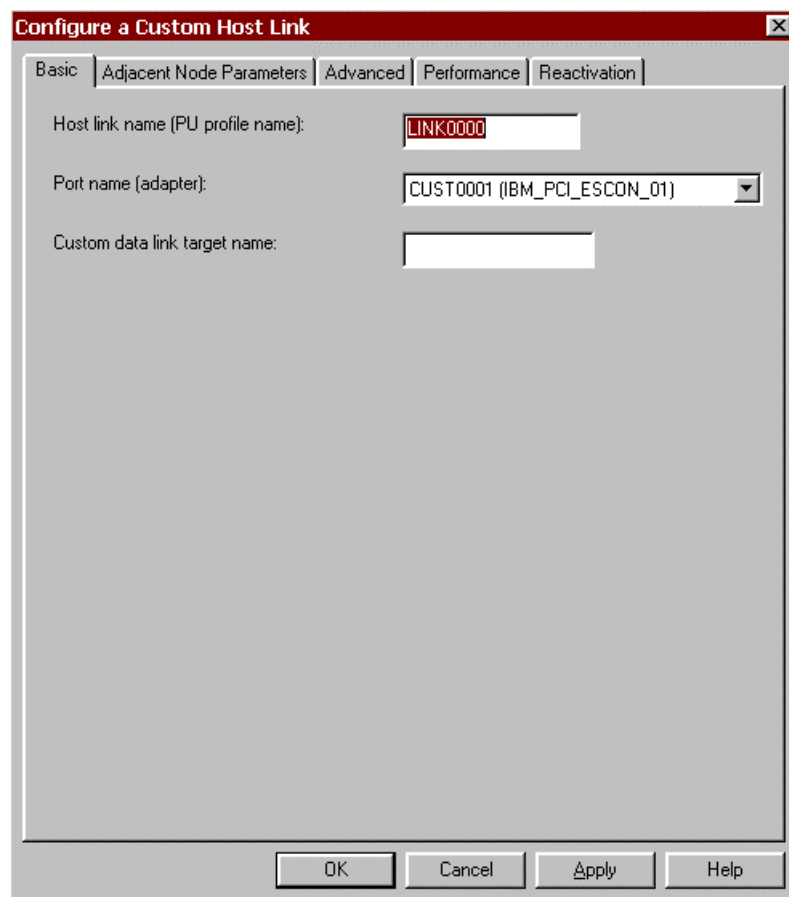


Figure 11-14. Configure a Custom Host Link - Basic

The following fields appear on the **Basic** tab:

- **Host link name(PU profile name):** A default name will be automatically assigned by the system. You may accept the default, or enter your own name up to eight (8) characters in length. Host link name is the PU Profile or Service Name required by an IPX (QEL/MU) client emulator.
- **Port name (adapter):** By default the first custom data link adapter defined will be displayed. Select the adapter you wish to associate with this Host Link (PU) from the pull-down list. Keep in mind that the ESCON adapter associates the PU to the sub-channel address used to communicate with the host.
- **Custom data link target name:** This optional field, which allows you to assign a symbolic address to the adapter, is used in NWSAA informational messages. It can be up to 16 characters long. It is recommended you enter the VTAM PU name in this field.

4. Click the **Adjacent Node Parameter** tab (Figure 11-15) to continue.

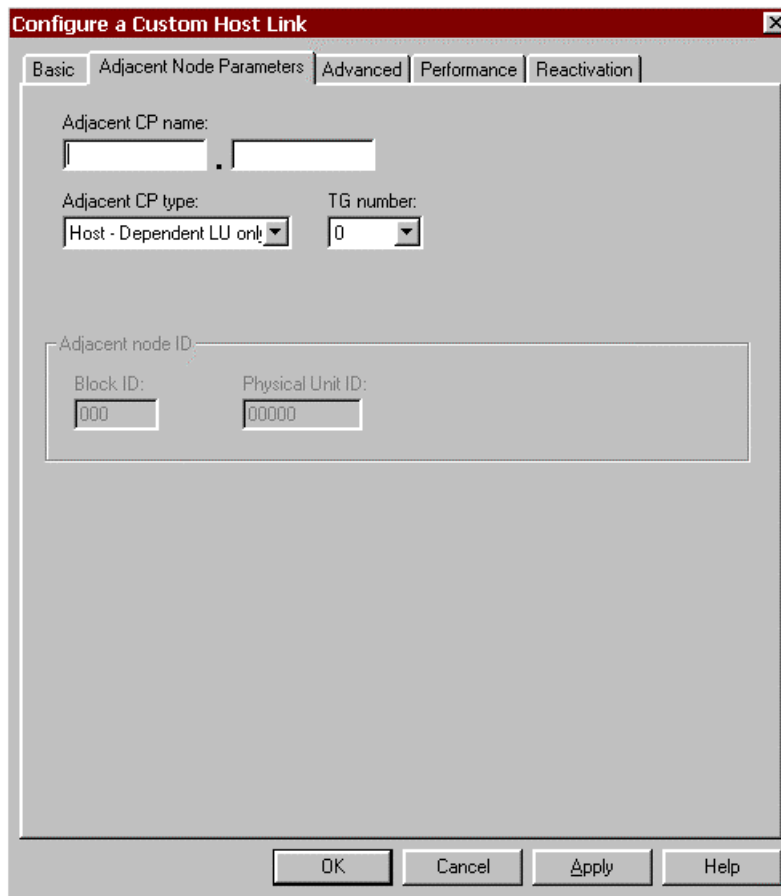


Figure 11-15. Configure a Custom Host Link - Adjacent Node Parameters

The following fields appear on the **Adjacent Node Parameters** tab:

- **Adjacent CP name:** Identifies the Control Point (CP) name of the host. If this field is entered the name must match that defined on the host or a connection will not be established. Leave the field blank to avoid checking.
- **Adjacent CP type:** Identifies the CP type of the host. If you plan to only support LU0 - LU3 traffic across this adapter, use of the default of **Host – Dependent LU only (Host - XID3** in version 3). The default requires XID=YES to be coded in the VTAM PU definition. If your host does not support XID3, then use **Host - XID0** for LU0 – LU3 traffic. If you plan APPN traffic then use either **End Node** or **Network Node**.
- **TG number:** A Transmission Group is a group of links between nodes that appears as a logical link. TG number identifies the transmission group this link belongs to. Any number from 0 to 20 may be entered. However, if a non-zero is entered it **must** match the number assigned on the adjacent node. Entering 0 will cause the TG number to be negotiated when the link is activated. Normally you should leave TG number at 0.
- **Adjacent Node ID:** If Adjacent CP type is set to Back-Level LEN, these fields become available. Some Back-Level LEN nodes do not send CP Node

ID. These fields allow you to specify the ID of the remote node. Normally these fields are not required.

5. Click the **Advanced** tab (Figure 11-16):

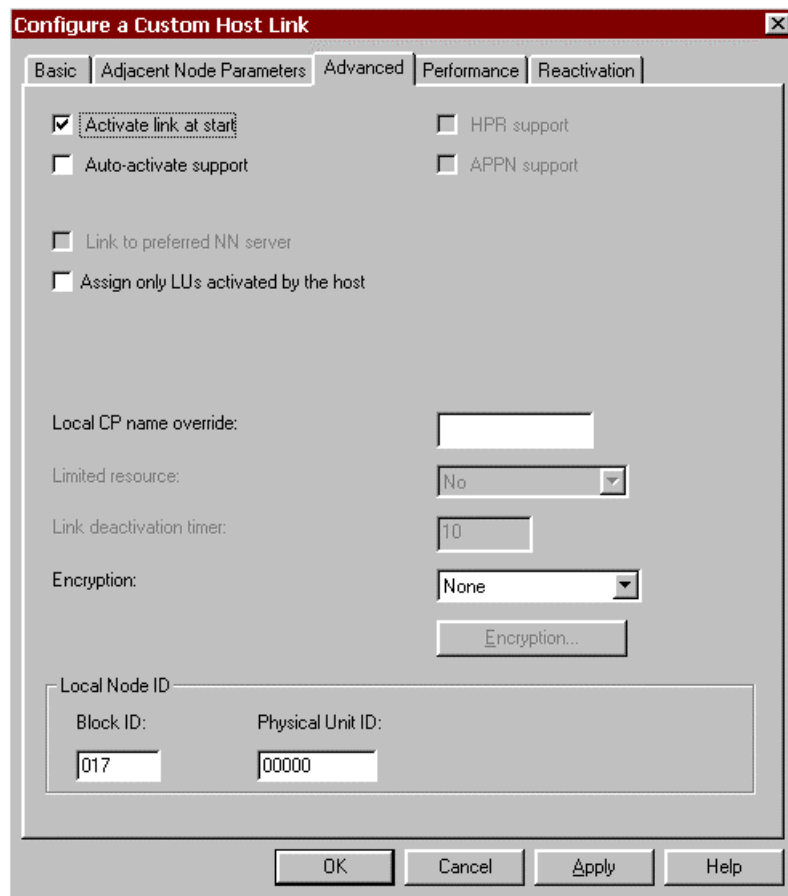


Figure 11-16. Configure a Custom Host Link - Advanced

The fields on the **Advanced** tab are:

- **Activate link at start:** This check box tells NetWare for SAA whether or not to automatically activate this communications link at startup. For a dedicated link, such as ESCON, this check box should **always** be checked.
- **HPR support:** This check box specifies if the link is to support High Performance Routing or not. It is only available for CP types of End Node, Network Node, or Learn.
- **APPN support:** This check box specifies if the link supports APPN or not. It is only available and is automatically checked for CP types of End Node, Network Node, and Learn.
- **Auto-Activate Support:** This check box specifies if the link should be automatically activated when needed by a session. For a dedicate link such as ESCON, which is auto-activated at startup, there is normally no need to

specify Auto-Activate Support. Note that this support cannot be selected with APPN support.

- **Auto-reactivate support:** (version 3 only) This check box specifies whether or not the link can be automatically re-activated if it becomes inactive. Re-activation will only be attempted once. If the re-activate fails, the link will remain inactive.
- **Link to preferred NN server:** This check box is only applicable if the CP type is set to End Node. It is used to identify this link as the link to the preferred Network Node server. It is normally cleared.
- **Assign only LUs activated by the host:** This check box tells NetWare for SAA to only assign LUs which are active at the host. Selecting this option prevents workstations from being assigned to an inactive LU. This box should be checked for ESCON connections.
- **Local CP name override:** This field is always enabled for CP types of Host - XID0 and Host - XID3, but is **not required**. If specified this name flows on the XID and allows connection with non-APPN hosts.
- **Limited resource:** This check box is enabled if Auto-activate support is selected. There is no need to select Auto-activate support for the ESCON adapter so this field is not enabled.
- **Link deactivation timer:** If Auto-activate support is checked and the Limited resource is defined to be **Inactivity**, then this field specifies a time (in minutes) after which the link will be de-activated if inactive. Since the ESCON adapter is a dedicated resource, you should not select Auto-activate support and this field will be disabled.
- **Local Node ID: Block ID and Physical Unit ID** provide the local node id that flows in the XID3. The Block ID identifies the product type in an SNA network and is a 3-digit hexadecimal number. Physical Unit ID is a 5 digit hexadecimal number that may be used to identify the PU. You should allow Block ID to default to 017. You may allow Physical Unit ID to default to 00000 or enter a unique 5-digit hexadecimal number.

6. Click the **Performance** tab (Figure 11-17).

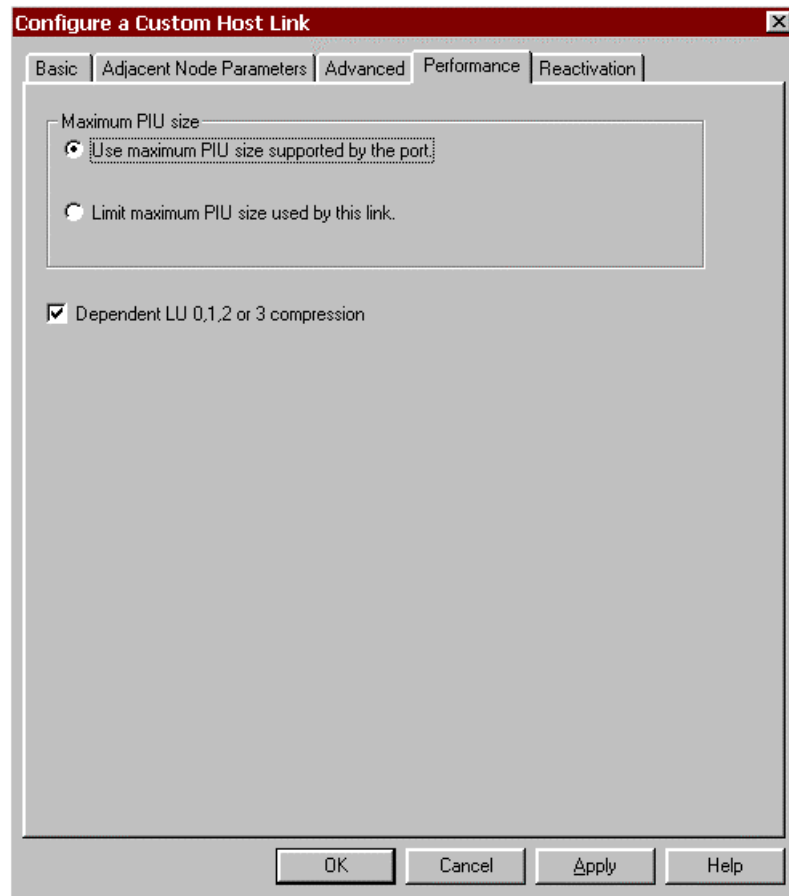


Figure 11-17. Configure a Custom Host Link - Performance

The fields on the **Performance** tab are:

- ***Use maximum PIU size supported by the port:*** Select this check box to allow this link to use the maximum PIU size specified for the adapter.
- ***Limit maximum PIU size used by this link:*** Selecting this button will display a box in which you may enter a maximum PIU size to be used with this PU. This value cannot exceed the maximum PIU size entered for the adapter (port).
- ***Dependent LU 0,1, 2, or 3 compression:*** Checking this box enables data compression for these LU types.

If you are using NetWare for SAA version 4, click the **Reactivation** tab (Figure 11-18).

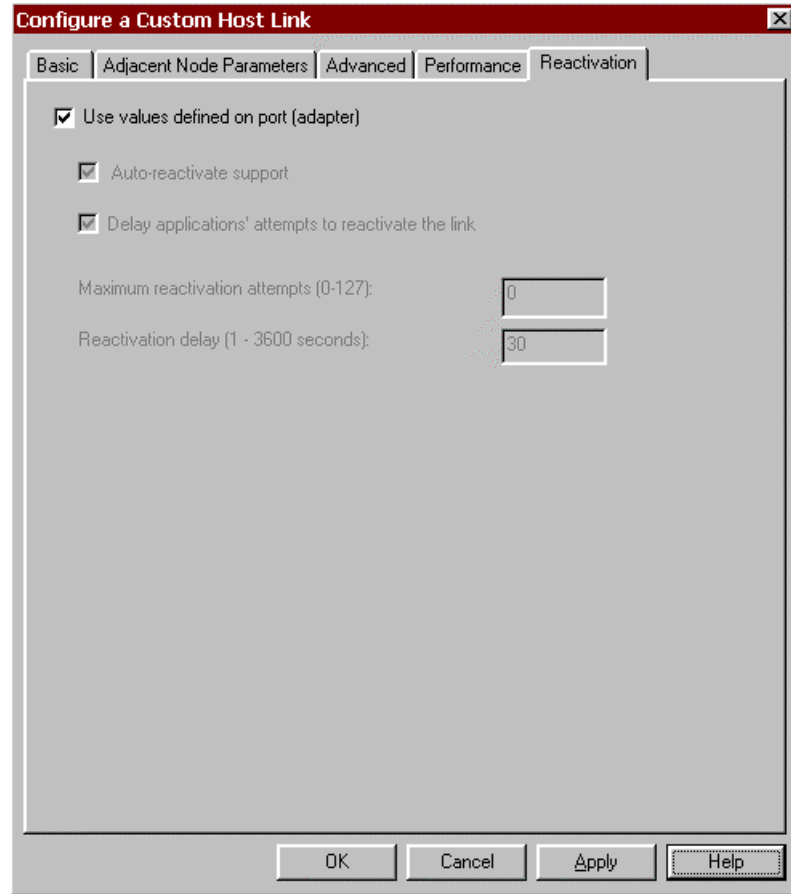


Figure 11-18. Reactivation Parameters

A link may fail to start or fail after a successful start for a variety of reasons. You may set automatic reactivation parameters for the ESCON adapter so that it will automatically attempt to restart following a failure. The following fields are used to control reactivation:

- ***Use values defined on port (adapter)***: When selected this check box turns off all other reactivation settings on this dialog box and uses those set for the adapter. De-select this check box to set parameters specific to the link.
- ***Auto-reactivate support***: This check box controls whether or not automatic reactivation is attempted or not. When checked (the default), auto-reactivate will be attempted based on options specified in the remaining fields on this dialog.
- ***Delay applications' attempts to reactivate the link***: Specify whether reactivation attempts are to be delayed or not. When checked (the default), reactivation will be delayed based on the Reactivation delay entered.

- **Maximum reactivation attempts:** This field specifies the maximum number of reactivation attempts to processed. The range is 0-127. Entering 0 causes an unlimited number of attempts.
 - **Reactivation Delay:** Specifies the number of seconds to wait (delay) between attempts to reactivate the link. The range is 1 – 3600. The default is 30 seconds.
7. Click **OK** to complete the Host Link definition. You will be prompted as to whether or not you wish to assign LUs to this link (Figure 11-19).

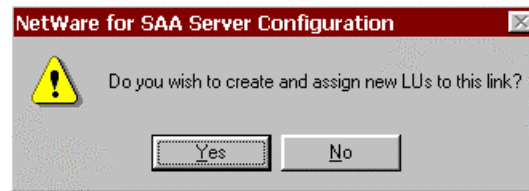


Figure 11-19. LU Prompt

8. Click **Yes** to define LUs. The **Create a range or single LUs for host link** screen will be displayed, allowing you to define LUs. There is nothing unique to the Netfinity ESCON Adapter when defining LUs. Please refer to either the online help or Novell's documentation for information on using this screen. The following example shows how to set up 32 public LUs named LU001-LU032 (Figure 11-20).

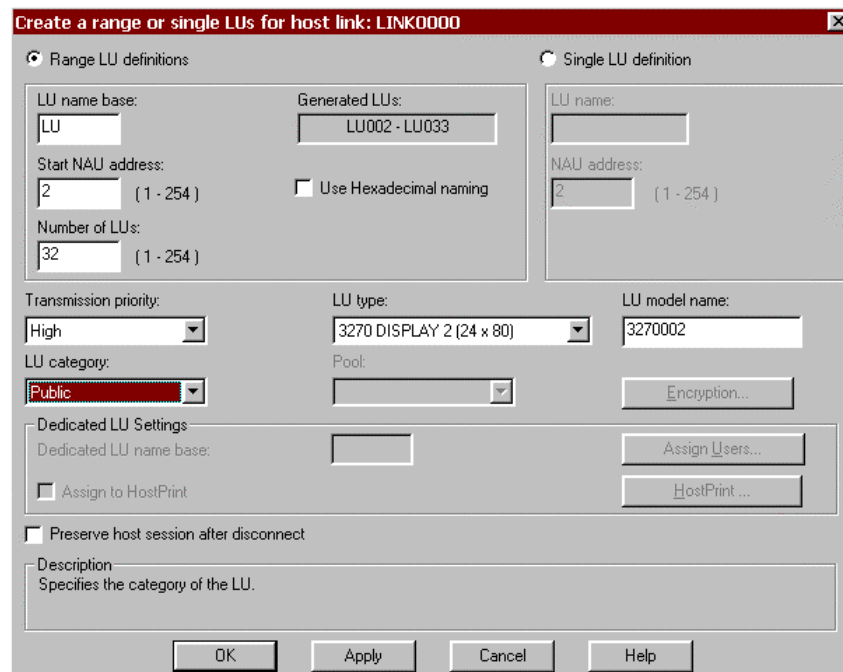


Figure 11-20. Create a range or single LUs for host link

9. Click **OK** to create the LUs. The **Assigned LUs** screen will display (Figure 11-21).

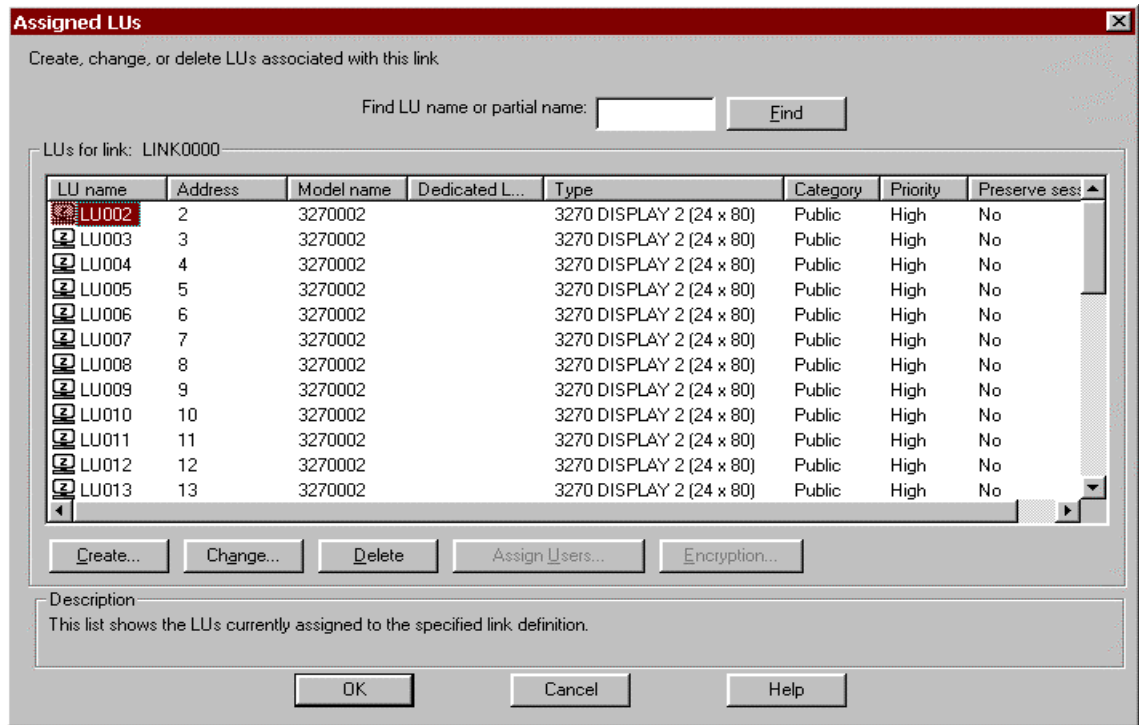


Figure 11-21. Assigned LUs

- Click **OK** to accept the LU definitions and complete the Host Link definition. The *Configure Host Links* screen will re-appear (Figure 11-22). The Host Link you have just defined will be displayed.

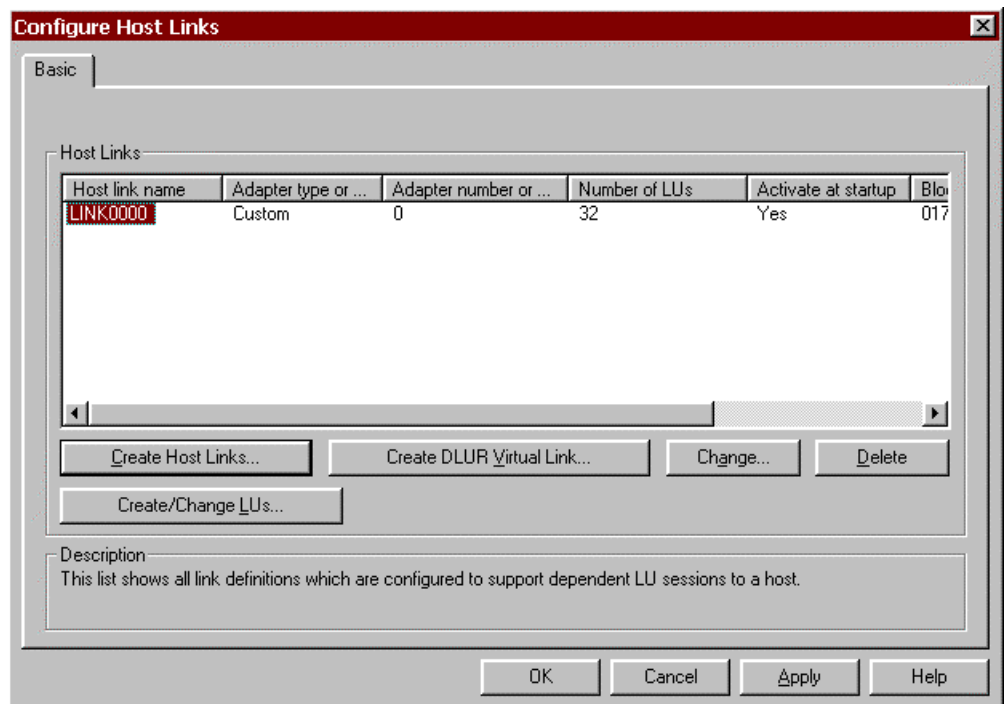


Figure 11-22. Configure Host Links with Newly Created Link0000

- You may create additional links if you need to. Click **OK** to end Configuring Host Links.

Configure Peer Links

When you elect to configure an APPN/APPC scenario within NWSAA Server Configuration, you will be required to configure peer links. Before you can configure a peer link you must first configure the node and the data link adapter. Refer to Novell documentation if you need assistance configuring the node. Refer to the section "**Configure Data Link Adapters**" on page 114 for assistance defining an ESCON adapter as a Custom Data Link Adapter in NetWare for SAA.

The following procedure will configure a peer link.

STEP

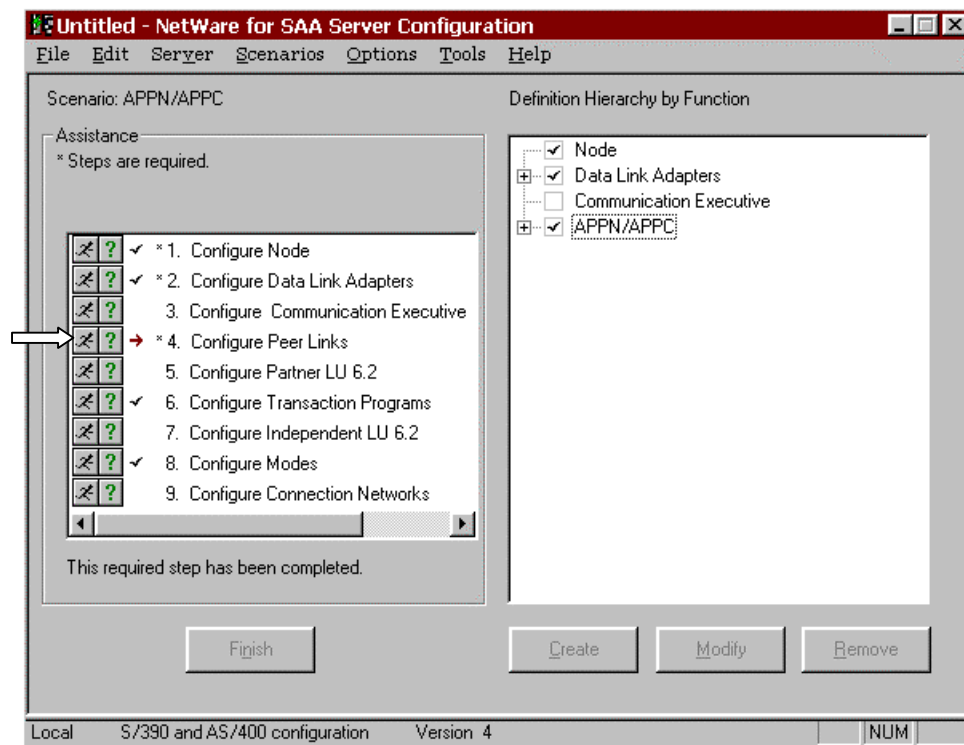


Figure 11-23. Configuring Peer Links

1. Click the "Running Man" next to **Configure Peer Links** (Figure 11-23). A Link Type dialog will display (Figure 11-24). Select **Custom** and click **OK**.

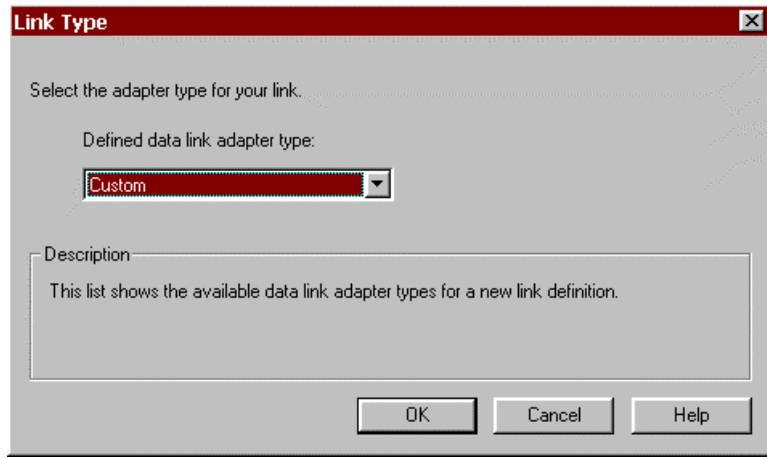


Figure 11-24. Specify Link Type for Peer Link

In IntraNetWare for SAA version 3, highlight **Configure Peer Links** in the **Configuration options:** box of the **APPN/APPCC...** scenario. Scroll to the bottom of the **Adapters:** box and highlight **Custom** (Figure 11-25).

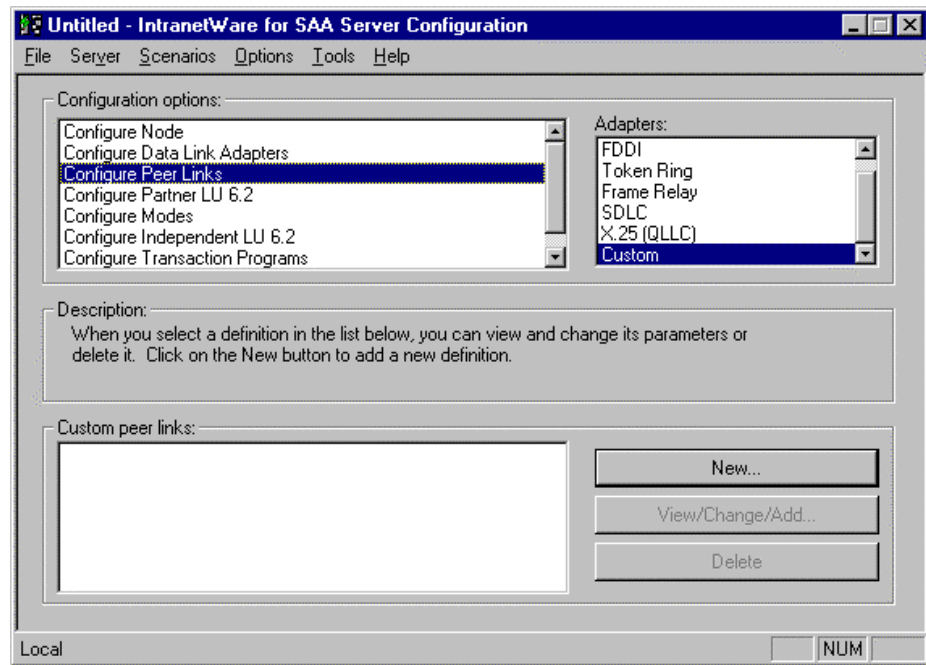


Figure 11-25. Start a Configure Peer Links Task

Click **New...**

2. The **Basic** tab of the *Configure a Custom Peer Link* screen (Figure 11-26) will display. Note that the **Reactivation** is new beginning in version 4 of the configuration utility.

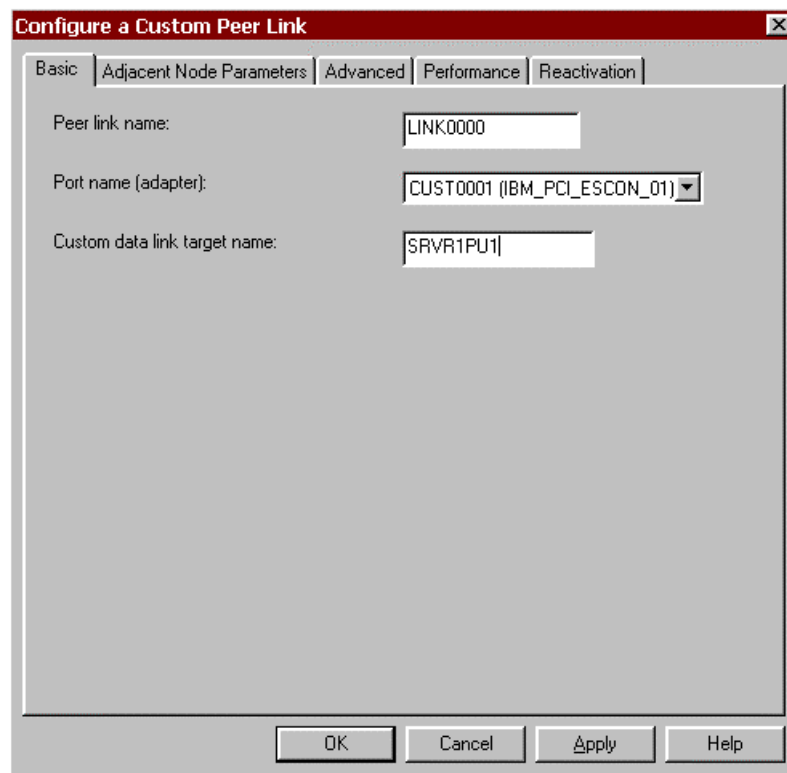


Figure 11-26. Configure a Custom Peer Link - Basic

The following fields appear on the **Basic** tab:

- **Host link name (PU profile name):** A default name will be automatically assigned by the system. You may accept the default, or enter your own name up to eight (8) characters in length.
- **Port name (adapter):** By default the first custom data link adapter defined will be displayed. Select the adapter you wish to associate with this Host Link (PU) from the pull-down list. Keep in mind that the ESCON adapter associates the PU to the sub-channel address used to communicate with the host.
- **Custom data link target name:** This optional field, which allows you to assign a symbolic address to the adapter, is used in NWSAA informational messages. It can be up to 16 characters long. It is recommended you enter the VTAM PU name in this field.

3. Click the **Adjacent Node Parameters** tab (Figure 11-27) to continue.

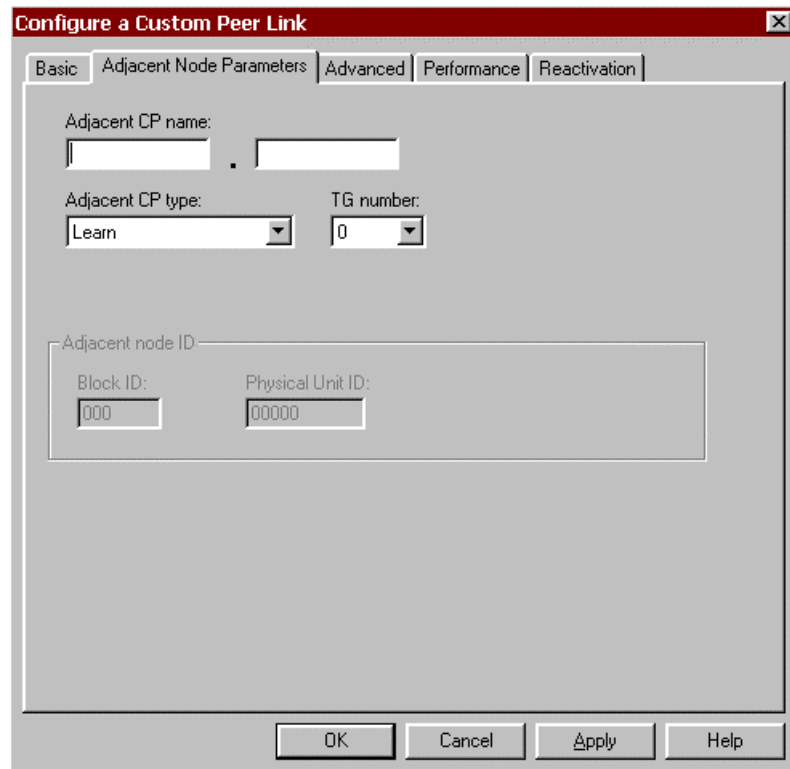


Figure 11-27. Configure a Custom Peer Link - Adjacent Node Parameters

The following fields appear on the **Adjacent Node Parameters** tab:

- **Adjacent CP name:** Identifies the Control Point (CP) name of the host. If this field is entered the name must match that defined on the host or a connection will not be established. Leave the field blank to avoid checking.
- **Adjacent CP type:** Identifies the CP type of the host. Select either End Node, Network Node, or Learn.
- **TG number:** A Transmission Group is a group of links between nodes that appears as a logical link. TG number identifies the transmission group this link belongs to. Any number from 0 to 20 may be entered. However, if a non-zero is entered it **must** match the number assigned on the adjacent node. Entering 0 will cause the TG number to be negotiated when the link is activated. Normally you should leave TG number at 0.
- **Adjacent Node ID:** If Adjacent CP type is set to Back-Level LEN, these fields become available. Some Back-Level LEN nodes do not send CP Node ID. These fields allow you to specify the ID of the remote node. Normally these fields are not required.

4. Click the **Advanced** tab (Figure 11-28):

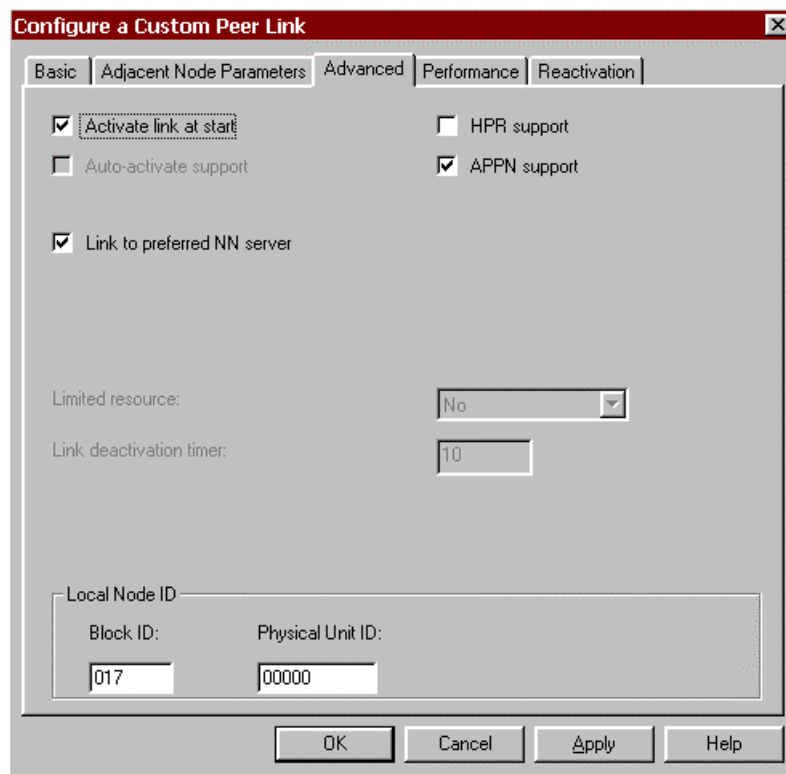


Figure 11-28. Configure a Custom Peer Link

The fields on the **Advanced** tab are:

- **Activate link at start:** This check box tells NetWare for SAA whether or not to automatically activate this communications link at startup. For a dedicated link, such as the ESCON adapter, this check box should **always** be checked.
- **HPR support:** This check box specifies if the link is to support High Performance Routing or not.
- **APPN support:** This check box specifies if the link supports APPN or not. It is automatically checked for peer links.
- **Auto-Activate Support:** This check box specifies if the link should be automatically activated when needed by a session. It cannot be selected with APPN support.
- **Auto-reactivate support:** (version 3 only) This check box specifies whether or not the link can be automatically re-activated if it becomes inactive. Re-activation will only be attempted once. If the re-activate fails, the link will remain inactive.
- **Link to preferred NN server:** This check box is only applicable if the CP type is set to End Node. It is used to identify this link as the link to the preferred Network Node server. It is normally set for peer link configurations.
- **Limited resource:** This check box is enabled if Auto-activate support is selected. There is no need to select Auto-activate support for an ESCON connection so this field is not enabled.

- **Link deactivation timer:** If Auto-activate support is checked and the Limited resource is defined to be **Inactivity**, then this field specifies a time (in minutes) after which the link will be de-activated if inactive. Since ESCON connections are a dedicated resource, you should not select Auto-activate support and this field will be disabled.
- **Local Node ID: Block ID and Physical Unit ID** provide the local node id that flows in the XID3. The Block ID identifies the product type in an SNA network and is a 3-digit hexadecimal number. Physical Unit ID is a 5 digit hexadecimal number that may be used to identify the PU. You should allow Block ID to default to 017. You may allow Physical Unit ID to default to 00000 or enter a unique 5-digit hexadecimal number.

5. Click the **Performance** tab (Figure 11-29).

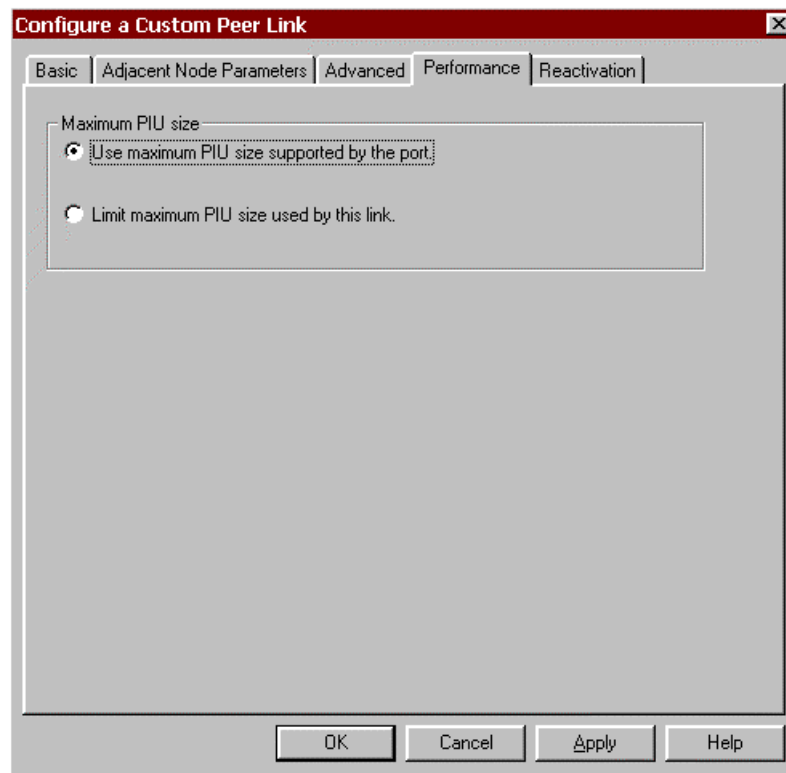


Figure 11-29. Configure a Custom Peer Link - Performance

The fields on the **Performance** tab are:

- **Use maximum PIU size supported by the port:** Check this box to all this link to use the maximum PIU size specified for the adapter (port).
- **Limit maximum PIU size used by this link:** Selecting this button will display a box in which you may enter a maximum PIU size to be used with this PU. This value may not exceed the value specified for maximum PIU size for the adapter (port).

6. If you are using NetWare for SAA version 4, click the **Reactivation** tab (Figure 11-30).

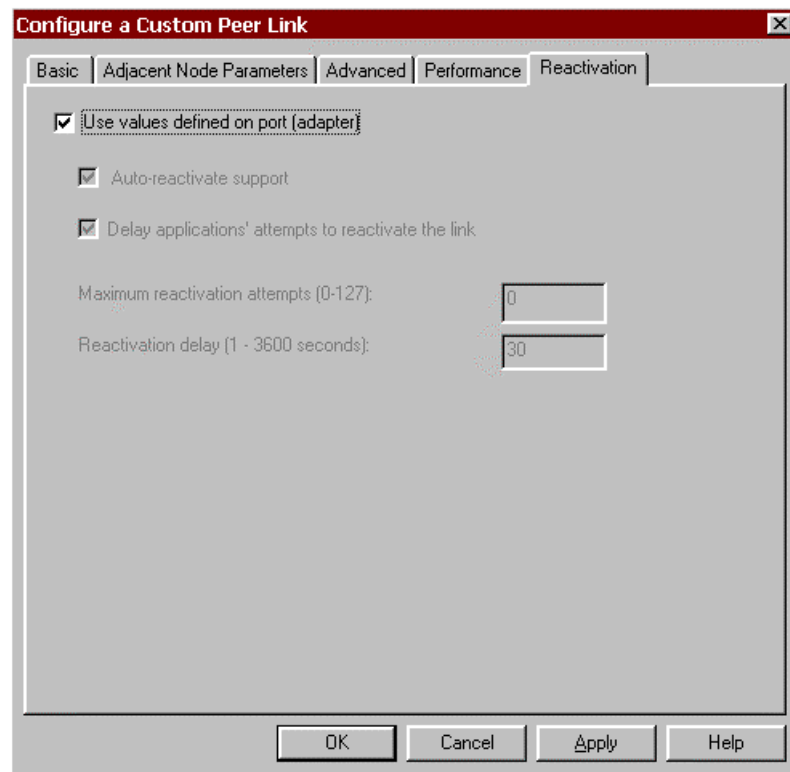


Figure 11-30. Peer Link Reactivation Parameters

A link may fail to start or fail after a successful start for a variety of reasons. You may set automatic reactivation parameters for the ESCON adapter so that it will automatically attempt to restart following a failure. The following fields are used to control reactivation:

- ***Use values defined on port (adapter)***: When selected this check box turns off all other reactivation settings on this dialog box and uses those set for the adapter. De-select this check box to set parameters specific to the link.
- ***Auto-reactivate support***: This check box controls whether or not automatic reactivation is attempted or not. When checked (the default), auto-reactivate will be attempted based on options specified in the remaining fields on this dialog.
- ***Delay applications' attempts to reactivate the link***: Specify whether reactivation attempts are to be delayed or not. When checked (the default), reactivation will be delayed based on the Reactivation delay entered.
- ***Maximum reactivation attempts***: This field specifies the maximum number of reactivation attempts to processed. The range is 0-127. Entering 0 causes an unlimited number of attempts.

- **Reactivation Delay:** Specifies the number of seconds to wait (delay) between attempts to reactivate the link. The range is 1 – 3600. The default is 30 seconds.
7. To complete the peer link configuration, click **OK**. The NWSAA Server Configuration main screen will re-appear (Figure 11-32). The newly defined link will appear in Custom Peer Links under the APPN/APPCC Hierarchy.

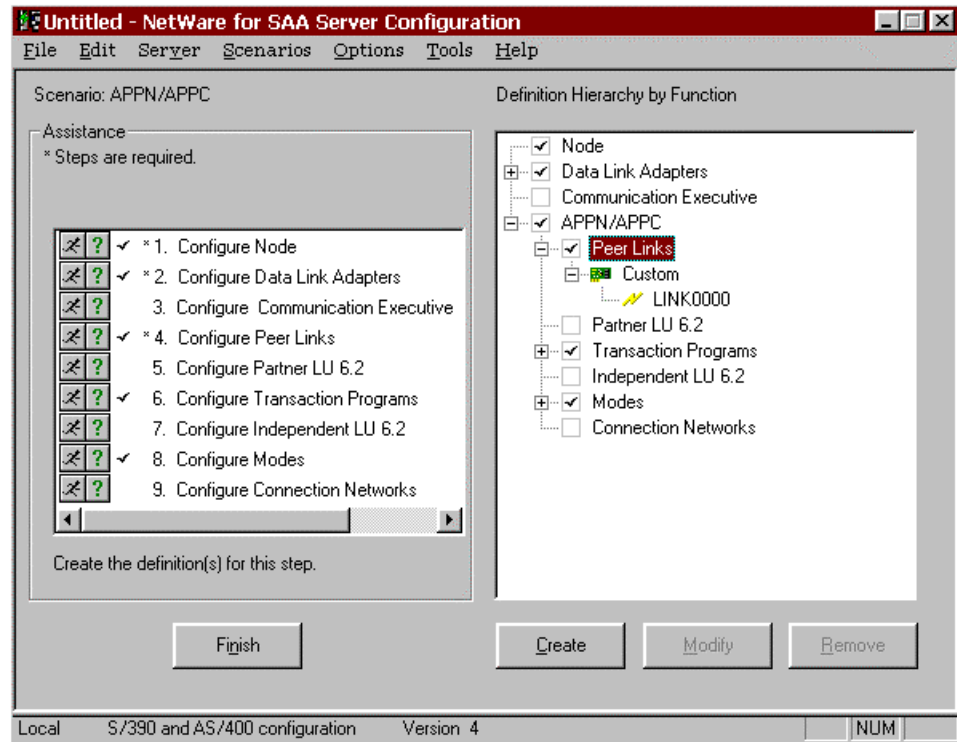


Figure 11-31. Custom Link

In intraNetWare for SAA version 3, the link will appear in the **Custom Peer Links:** box (Figure 11-32).

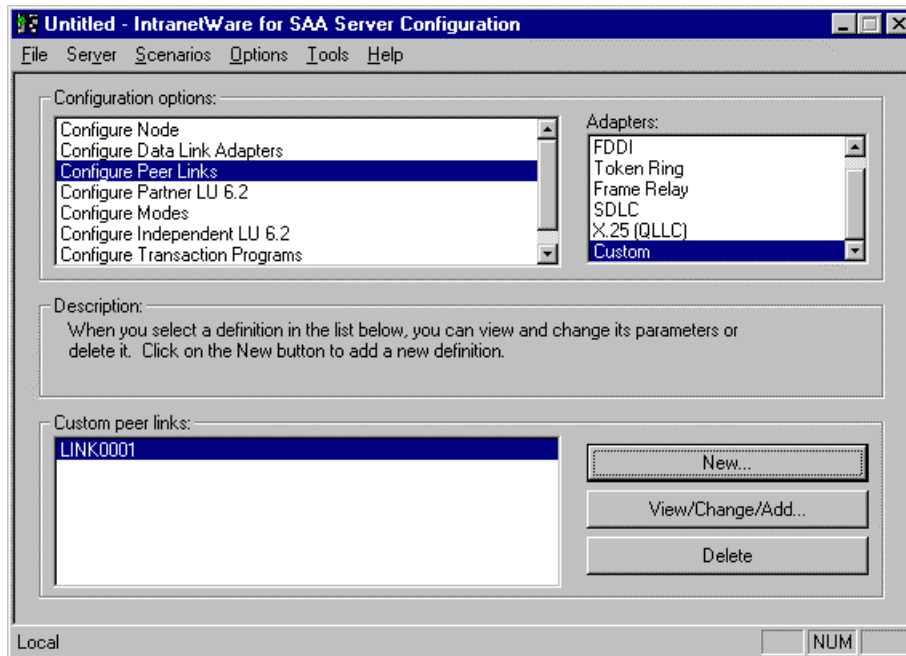


Figure 11-32. Main Display - Newly Created Custom peer link

This ends the Configure Peer Links task.

Chapter 12. TCP/IP PASSTHROUGH FOR NETWARE

Installation

Note: TCP/IP Passthrough is not supported under NetWare 5.

Two software components must be installed in order to use TCP/IP Passthrough:

- Channel Drivers for NetWare
- TCP/IP Passthrough for NetWare

Installation of the Channel Drivers is covered in Chapter 2 beginning on page 11. The channel drivers must be installed before you install TCP/IP Passthrough.

The TCP/IP Passthrough program is installed using Novell's installation utility, INSTALL.

It is assumed your Netfinity server has the CDROM driver (CDROM.NLM) loaded. Using RCONSOLE, or the keyboard and monitor attached to the server, access the server console.

STEP

1. Mount the CD that came with your Netfinity ESCON Adapter in the CD-ROM drive and enter the following mount command at the NetWare system console prompt:

CD MOUNT IBMESCON

2. Then invoke the INSTALL utility by entering the following LOAD command:

LOAD INSTALL

INSTALL will display a menu of Installation Options (Figure 12-1).

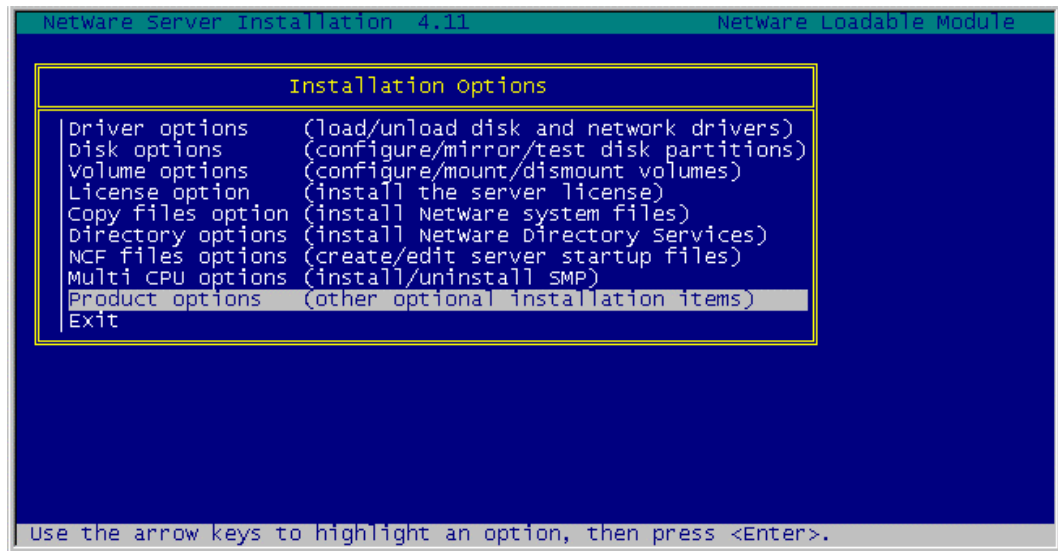


Figure 12-1. INSTALL Utility Main Menu

3. Choose the menu selection “**Product options**” and press **ENTER**. The Other Installation Actions menu will display (Figure 12-2).

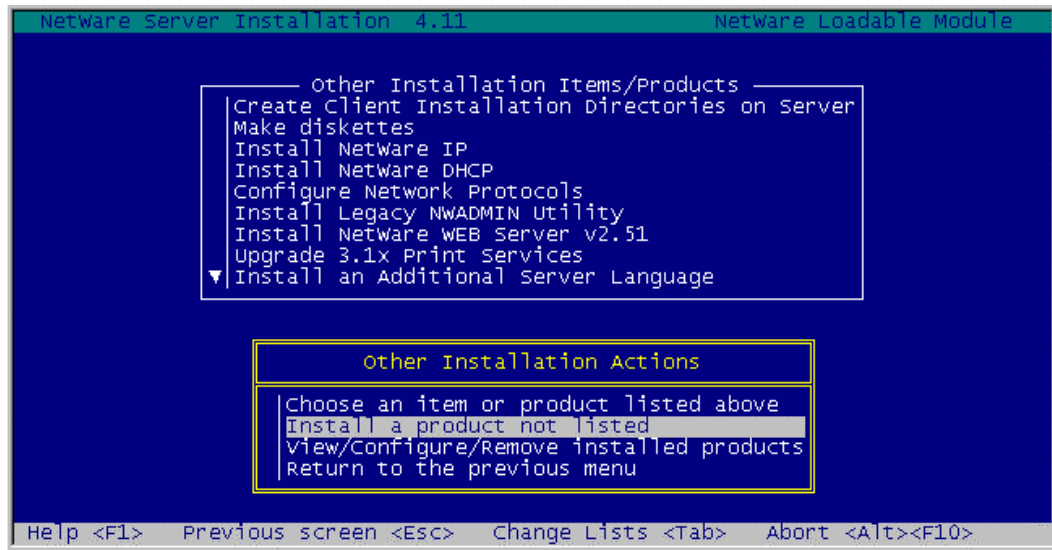


Figure 12-2. Other Installation Actions Menu

4. Select **“Install a product not listed”**. The Install Product screen (Figure 12-3) will be displayed.

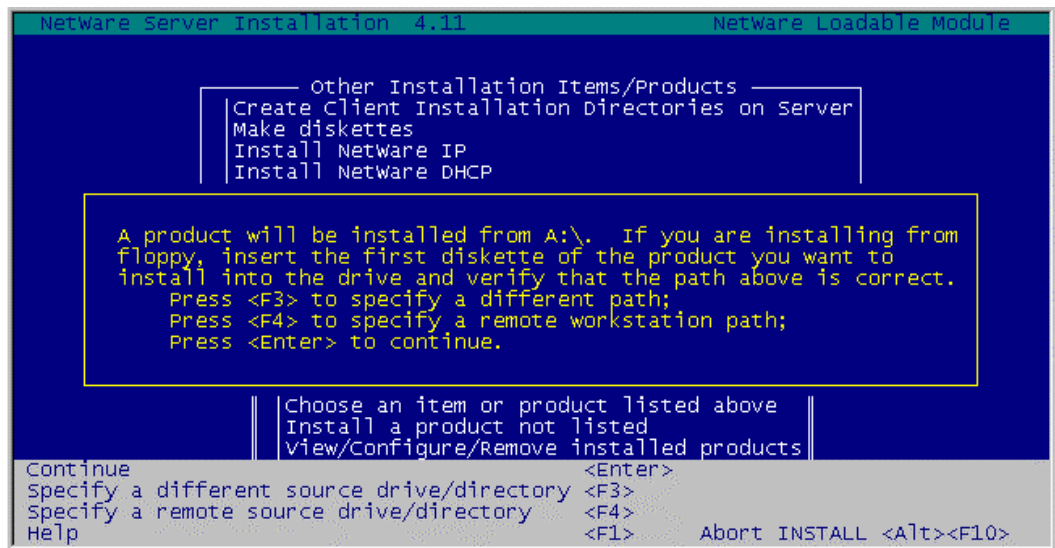


Figure 12-3. Install Product Screen

Press the **<F3>** key in order to install from the CD-ROM volume. A pop-up window prompting for a different path will display. Enter the path for the TCP/IP Passthrough install directory (“IBMESCON:\NETWARE\TCPIP”) as shown in Figure 12-4.

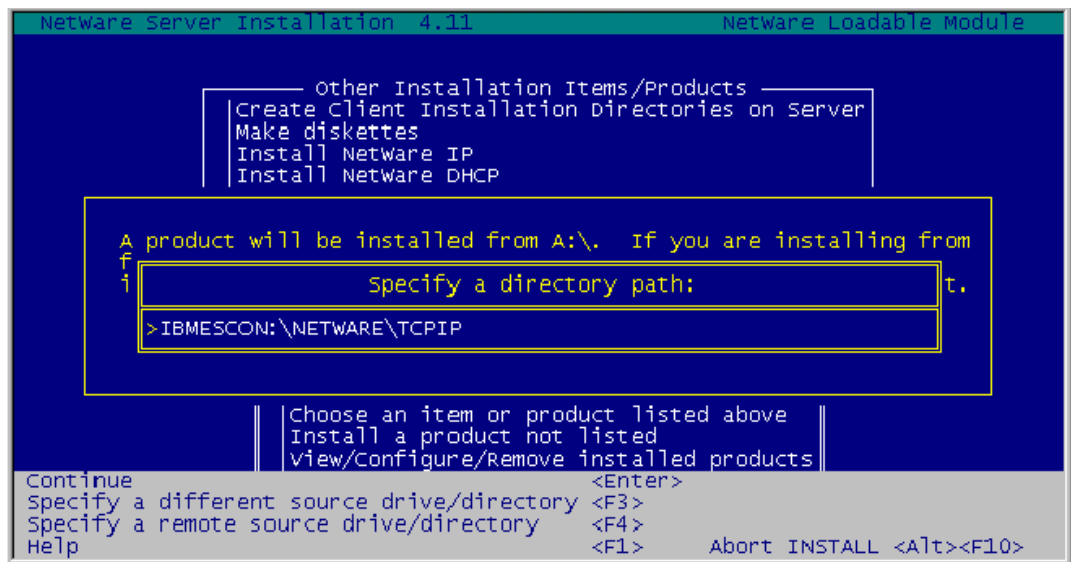


Figure 12-4. Pointing to the CD Install Directory

5. Press **<Enter>** to continue. An Installation Confirmation screen will display with the **“Install on this Server”** action highlighted (Figure 12-5). Press **<Enter>** to install the product.

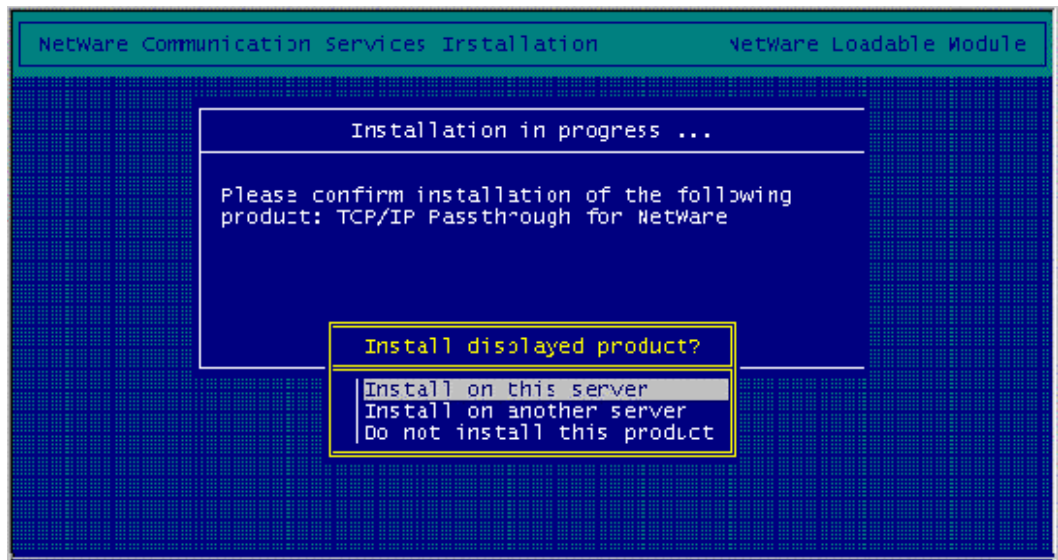


Figure 12-5. Installation Confirmation Screen

An installation complete message will display at the end of the install (Figure 12-6).

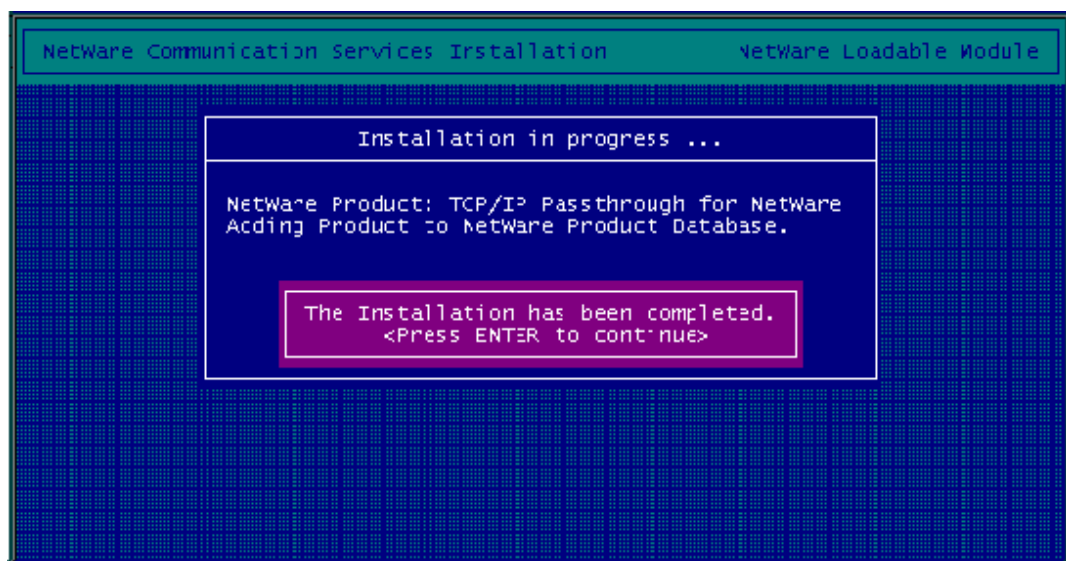


Figure 12-6. Installation Complete

6. Press <Enter> to display a list of the installed products on the server; now including TCP/IP Passthrough (Figure 12-7).

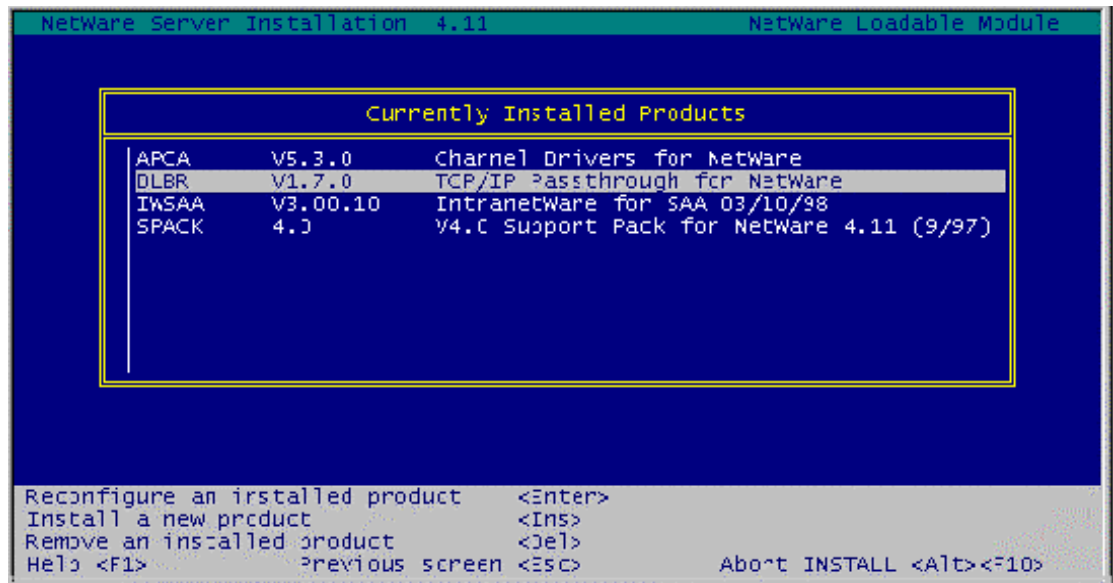


Figure 12-7. Installed Product List

7. The installation of TCP/IP Passthrough is complete. Press <ESC> three times to exit the INSTALL utility.
8. The following command will dismount the CD volume from the NetWare server:

CD DISMOUNT IBMESCON /PURGE

Configuration Overview

Configuring TCP/IP Passthrough involves the following steps:

1. Configuring the ESCON Adapter.
2. Configuring the LAN Adapter.
3. Loading the TCP/IP Passthrough NLM.
4. Binding TCP/IP Passthrough to the ESCON adapter and LAN adapter.

The following sections discuss each of these steps in detail and provide configuration examples for Ethernet, Token Ring, and FDDI LAN connections.

Configuring the ESCON Adapter

For each TCP/IP Passthrough connection, it is necessary to define the first subchannel address of each subchannel address pair to the ESCON adapter. For each connection the first subchannel address must always be even. Definition is accomplished as follows:

```
LOAD BTIPBXA SLOT=<n> FRAME=8232 UNIT=<xx> NAME=<name>
```

where '*<n>*' is the hardware slot number of the ESCON adapter. '*<xx>*' is the first path index of a pair of devices (range x'02'-x'40') and must be even. '*name*' is a unique name given to the adapter for the TCP/IP connection to be supported by this statement.

Ethernet LAN Adapter

The Ethernet LAN **frame type** normally used in a TCP/IP network is Ethernet_II. Consequently, if you do not already have this frame type included in the AUTOEXEC.NCF file for your Ethernet adapter, you must add it as follows:

```
LOAD <landriver> SLOT=<n> FRAME=ETHERNET_II  
NAME=<adapter>
```

where '*<landriver>*' is the name of the Ethernet LAN driver you are using, '*<n>*' is the hardware slot number of the Ethernet board in the NetWare Server, and '*<adapter>*' is a unique name given to the Ethernet board for this frame type.

Token Ring LAN Adapter

The LAN frame type normally used in a TCP/IP Token Ring network is Token Ring SNAP. Consequently, if you do not already have this frame type included in the AUTOEXEC.NCF file for your Token Ring adapter, you must add it as follows:

```
LOAD <landriver> SLOT=<n> FRAME=TOKEN-RING_SNAP  
NAME=<adapter>
```

where '*<landriver>*' is the name of the Token-Ring LAN driver you are using, '*<n>*' is the hardware slot number of the Token Ring board in the NetWare Server, and '*<adapter>*' is a unique name given to the Token Ring board for this frame type.

FDDI LAN Adapter

The FDDI LAN frame type normally used in a TCP/IP network is FDDI_SNAP. Consequently, if you do not already have this frame type included in the AUTOEXEC.NCF file for FDDI adapter, you must add it as follows:

```
LOAD <landriver> SLOT=<n> FRAME=FDDI_SNAP NAME=<adapter>
```

where '*<landriver>*' is the name of the FDDI LAN driver you are using, '*<n>*' is the hardware slot number of the FDDI board in the NetWare Server, and '*<adapter>*' is a unique name given to the FDDI adapter for this frame type.

Loading TCP/IP Passthrough NLM

The TCP/IP Passthrough for NetWare software should be loaded as follows:

```
LOAD BTIDLBR
```

BTIDLBR only needs to be loaded once regardless of the number of TCP/IP connections to be supported. You must load BTIDLBR after you have loaded the respective ESCON adapter driver (LOAD BTIPBXA).

Binding TCP/IP Passthrough

In order for TCP/IP Passthrough to work, it is necessary to associate it with the LAN adapter and mainframe subchannel address pair. This is accomplished with the following BIND statement:

CHL BIND DATALINK <adapter> TO <name>

where '*<adapter>*' refers to the name given the LAN adapter in the "LOAD <landriver> . . ." statement , and '*<name>*' refers to the **NAME=<name>**, given in the "LOAD BTI . . ." statement for this TCP/IP connection.

Note: *Each TCP/IP host connection requires a unique MAC address as its HOME HARDWARE ADDRESS. Due to this requirement, there can be only one CHL BIND DATALINK statement per LAN adapter in the NetWare Server.*

Sample AUTOEXEC.NCF for Ethernet TCP/IP Passthrough

The following is an example of two TCP/IP Passthrough connections to two mainframe TCP/IPs. Note that this example indicates the use of two different Ethernet boards, named SLOT6II and SLOT7II, to support these two TCP/IP connections.

```
;      Define two NICs for the TCP/IP frame type.

LOAD IBMPCO SLOT=6 FRAME=ETHERNET_II NAME=SLOT6II
LOAD IBMPCO SLOT=7 FRAME=ETHERNET_II NAME=SLOT7II

;      Define two address pairs for the two TCP/IP connections.

LOAD BTIPBXA SLOT=4 UNIT=02 FRAME=8232 NAME=ESCON_TCP9F0
LOAD BTIPBXA SLOT=4 UNIT=04 FRAME=8232 NAME=ESCON_TCP920

;      Load the DataLinkBridge (TCP/IP) Support modules

LOAD BTIDLBR

;      Bind TCP/IP Passthrough to the Ethernet and ESCON Adapters.

CHL BIND DATALINK SLOT6II TO ESCON_TCP9F0
CHL BIND DATALINK SLOT7II to ESCON_TCP920
```

Sample AUTOEXEC.NCF for Token Ring TCP/IP Passthrough

The following is an example of two TCP/IP Passthrough connections to two mainframe TCP/IPs. Note that this example indicates the use of two different Token Ring boards, named SLOT6TR and SLOT7TR, to support these two TCP/IP connections.

```
;      Define two NICs for the TCP/IP frame type.

LOAD IBMMPCO SLOT=6 FRAME=TOKEN-RING_SNAP NAME=SLOT6TR
LOAD IBMMPCO SLOT=7 FRAME=TOKEN-RING_SNAP NAME=SLOT7TR

;      Define two address pairs for the two TCP/IP connections.

LOAD BTIPBXA SLOT=4 UNIT=02 FRAME=8232 NAME=ESCON_TCP9F0
LOAD BTIPBXA SLOT=4 UNIT=04 FRAME=8232 NAME=ESCON_TCP920

;      Load the DataLinkBridge (TCP/IP) Support modules

LOAD BTIDLBR

;Bind TCP/IP Passthrough to the Token-Ring and ESCON Adapters.

CHL BIND DATALINK SLOT6TR TO ESCON_TCP9F0
CHL BIND DATALINK SLOT7TR to ESCON_TCP920
```

Sample AUTOEXEC.NCF for FDDI TCP/IP Passthrough

The following is an example of two TCP/IP Passthrough connections to two mainframe TCP/IPs. Note that this example indicates the use of two different FDDI adapters, named SLOT6FDDI and SLOT3FDDI, to support these two TCP/IP connections.

```
;      Define two NICs for the TCP/IP frame type.
LOAD IBMFDDIO SLOT=6 FRAME=FDDI_SNAP NAME=SLOT6FDDI
LOAD IBMFDDIO SLOT=3 FRAME=FDDI_SNAP NAME=SLOT3FDDI

;      Define two address pairs for the two TCP/IP connections.
LOAD BTIPBXA SLOT=4 UNIT=02 FRAME=8232 NAME=ESCON_TCP9F0
LOAD BTIPBXA SLOT=4 UNIT=04 FRAME=8232 NAME=ESCON_TCP920

;      Load the DataLinkBridge (TCP/IP) Support modules
LOAD BTIDLBR

;      Bind TCP/IP Passthrough to the FDDI and ESCON Adapters.
CHL BIND DATALINK SLOT6FDDI TO ESCON_TCP9F0
CHL BIND DATALINK SLOT3FDDI TO ESCON_TCP920
```

Chapter 13. IMPLEMENTING SAP R/3

Overview

SAP's R/3 system is a set of core business applications including accounting and controlling, production and material management, quality management, plant maintenance, sales and distribution, human resources management, and project management. The R/3 applications are offered on a number of different operating platforms including Microsoft's Windows NT.

IBM and SAP have worked together to provide a three-tiered computing model in which the System/390 mainframes running OS/390 and DB/2 become the data base server for R/3 applications running on AIX or Windows NT servers (See Figure 13-1).

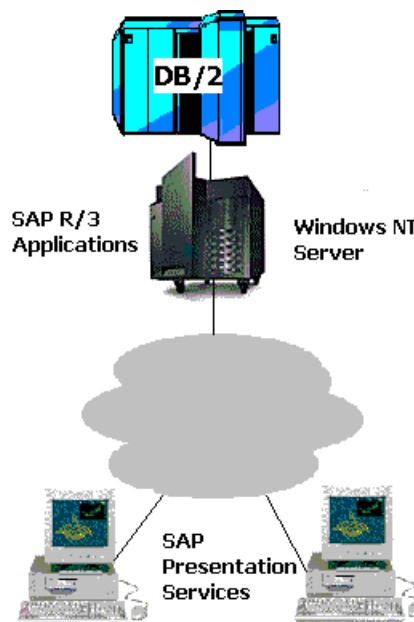


Figure 13-1. System/390 SAP R/3

The Netfinity ESCON Adapter may be configured to provide a very high-speed communications link between a Netfinity Windows NT R/3 application server and the mainframe DB/2 database. This chapter specifically discusses how to configure your Netfinity ESCON Adapter to support SAP R/3 in Windows NT.

The R/3 applications support two types of connections over the Netfinity ESCON Adapter; a High-Performance Data Transport (HPDT) UDP connection or a TCP/IP connection over Multi-Path Channel (MPC+).

Mainframes running OS/390 version 2 release 6 or higher can use either of these connections. Mainframes running OS/390 version 2 release 4 or OS/390 version 2 release 5 must use a HPDT UDP connection.

The following two sections discuss how to configure your environment based on connection type (HPDT UDP or TCP/IP). Please refer to the section appropriate to your installation.

HPDT UDP

Note: TCP/IP Direct Connect was formerly known as Virtual Point-to-Point Adapter (VPPA).

HPDT is a Multi-Path Channel link which runs on top of High-Speed Access Services (HSAS). MPC+ and TCP/IP Direct Connect provide the necessary HSAS link in Windows NT.

When using HPDT UDP for SAP R/3, a second, Serial Channel-to-Channel (SCTC) link must also be configured to support FTP (TCP/IP). This SCTC link may be defined over the ESCON adapter using TCP/IP Direct Connect. The following step-by-step procedure will install the necessary adapter software to provide both a HPDT UDP link and a SCTC link for use with a System/390 SAP R/3 implementation.

Step

1. Once you have installed the Netfinity ESCON Adapter into an option slot in your Netfinity server (see Chapter 2), begin by installing the PCI ESCON Adapter driver into Windows NT. Instructions for installing this driver may be found in Chapter 3 under the heading “Windows NT Server” beginning on page 7.
2. Install the MPC+ software. Instructions for installing MPC+ may be found in Chapter 5 under the heading “MPC+ Installation” beginning on page 46.
3. Install TCP/IP Direct Connect for use with HSAS. Instructions for installing TCP/IP Direct Connect are found in Chapter 6 under the heading “Installation” beginning on page 54. Be sure to set the link type to “HSAS”. As part of this installation you will need to create a MPC+ transmission group. Keep specific note of the sub-channel addresses you assign to the MPC Group (transmission group) and to the IP addresses assigned to the mainframe’s and NT server’s TCP/IP stacks.
4. Install TCP/IP Direct Connect a second time. This time set link type to “CTC”. Again keep track of sub-channels and IP addresses assigned.
5. Add the sub-channel’s device definitions to the mainframe’s IOCP using the HCD utility (see Chapter 15). You should be adding a minimum of 4 subchannels; two for the MPC+ (HSAS) connection and two for the CTC connection.
6. Define the TCP/IP stack to the system parmlib as described in Chapter 15 in the section titled “Define the Stack in the OpenEdition Parmlib Member” beginning on page 165.

7. Define a VTAM Transport resource list entry (TRLE) for the MPC group as described in Chapter 15 in the section titled “Define the MPC Transmission Group to VTAM” beginning on page 162.
8. Activate the MPC Group by issuing a VARY command on the OS/390 console:

```
V NET,ACT, ID=MPCGroup
```

Where MPCGroup is the name assigned to the group in VTAM

9. Issue an oeifconfig command to assign the IP addresses to the MPC group. Be sure the IP addresses match those assigned in the TCP/IP Direct Connect Adapter Properties screen and the Microsoft TCP/IP Properties screen. (see page 166)

```
oeifconfig trl_name source_IP_address destination_IP_address mtu maxmtu netmask
subnet_mask nochecksum
```

10. Modify the TCP/IP Profile for the TCP/IP Direct Connect link type CTC connection (see page 163).

MPCPTP TCP/IP

Starting with OS/390 Version 2 Release 6, TCP/IP can provide a high-speed, high-bandwidth communications connection between a SAP R/3 application server and the OS/390 database server. This connection uses HPDT MPC (MPC+) channel protocol.

The Netfinity ESCON Adapter supports SAP R/3 using TCP/IP using TCP/IP Direct Connect and MPC+ software running on the Windows NT server.

The following step-by-step procedure installs the necessary software to provide a TCP/IP connection for SAP R/3:

Step

1. Once you have installed the Netfinity ESCON Adapter into an option slot in your Netfinity server (see Chapter 2), begin by installing the PCI ESCON Adapter driver into Windows NT. Instructions for installing this driver may be found in Chapter 3 under the heading “Windows NT Server” beginning on page 7.
2. Install the MPC+ software. Instructions for installing MPC+ may be found in Chapter 5 under the heading “MPC+ Installation” beginning on page 46.
3. Install TCP/IP Direct Connect for use with MPC Point-to-Point (MPCPTP). Instructions for installing TCP/IP Direct Connect are found in Chapter 6 under the heading “Installation” beginning on page 54. Be sure to set the link type to “MPCPTP”. As part of this installation you will need to create a MPC+ transmission group. Keep specific note of the sub-channel addresses you assign

to the MPC Group (transmission group) and to the IP addresses assigned to the mainframe's and NT server's TCP/IP stacks.

4. Add the sub-channel's device definitions to the mainframe's IOCP using the HCD utility (see Chapter 15). At least 2 "SCTC" devices must be defined to support the MPC transmission group.
5. Define a VTAM Transport resource list entry (TRLE) for the MPC group as described in Chapter 15 in the section titled "Define the MPC Transmission Group to VTAM" beginning on page 162.
6. Activate the MPC Group by issuing a VARY command on the OS/390 console.
7. Update the HOST TCP/IP Profile in order to define the MPCPTP device and link. Refer to Chapter 15 beginning on page 168. Also, refer to OS/390 eNetwork Communications Server IP Configuration manual for specifics on configuring HOST TCP/IP services.
8. Re-start TCP/IP on the host. To activate the MPCPTP device defined above begin by checking to see if it is active:

```
d net, id=TRL_Name
```

will display the status, where TRL_Name is the name assigned to the MPC Group.

```
v net,act,id=TRL_Name
```

will activate the group.

Chapter 14. ADDING AN ADDITIONAL ADAPTER

During installation of the first Netfinity ESCON Adapter into a Windows NT or NetWare server it was necessary to install an adapter driver and/or application specific software such as Data Link Control or TCP/IP Passthrough.

When adding a second Netfinity ESCON Adapter to an existing server it is not always necessary for you to re-install software already present in your system. The following sections discuss what needs to be done for each environment.

Windows NT

When adding an additional Netfinity ESCON Adapter to an existing server you will need to install the IBM PCI ESCON adapter driver for the new adapter. The procedure for installing the driver is discussed in detail in Chapter 3 beginning on page 7.

MPC+

The MPC+ software only needs to be installed once in your server. Once the IBM PCI ESCON adapter driver is installed for the second adapter, both adapters will be available in the **Add Connection** panel (Figure 5-9) when defining a MPC transmission group.

TCP/IP Direct Connect

TCP/IP Direct Connect Adapter must be installed into the Network Adapters list for each Point-to-Point TCP/IP connection you wish to define. Multiple copies of the TCP/IP Direct Connect Adapter may be installed for use with a single Netfinity ESCON Adapter. Refer to page 54 for instructions on installing a TCP/IP Direct Connect Adapter.

Communications Server for Windows NT

If your existing Netfinity ESCON Adapter was previously configured to work with Communications Server for Windows NT (CS/NT), it is not necessary to re-install Data Link Control. Proceed with CS/NT configuration as described beginning on page 67 of this manual.

If your existing Netfinity ESCON Adapter was not previously configured for CS/NT, you will need to install Data Link Control from CD as described at the beginning of Chapter 7.

SNA Server for Windows NT

If your existing Netfinity ESCON Adapter was previously configured for SNA Server, you will not need to re-install the Data Link Service. Follow the procedure “Configuring a Link Service” on page 84 to configure the new adapter.

If your existing Netfinity ESCON Adapter was not configured for SNA Server, you will need to install the Link Service from CD as described at the beginning of Chapter 8.

TCP/IP Passthrough

If your existing Netfinity ESCON Adapter was configured for TCP/IP Passthrough, there is no need to re-install TCP/IP Passthrough. Simply configure the new adapter as described in the section “Configuring TCP/IP Passthrough” on page 96.

If your existing Netfinity ESCON Adapter was not configured for TCP/IP Passthrough you will need to install the TCP/IP Passthrough software. Installation is described beginning on page 91.

UnixWare 7

If you are installing an additional Netfinity ESCON Adapter into an existing UnixWare 7 server you do not need to install channel driver software if it is already installed. Configuration of the new adapter is accomplished by adding additional control ESCON definition statements using **chldlpi**. For a complete description of how to define an ESCON configuration refer to Chapter 4.

Communications Server for UnixWare 7

To define the new ESCON Adapter to CS/UnixWare, you must complete the configuration process defined in Chapter 10.

NetWare

If you are installing an additional Netfinity ESCON Adapter into an existing NetWare server you will only need to install software that has not previously been installed. Configuration of the new adapter is accomplished by adding additional control statements to AUTOEXEC.NCF.

Defining the ESCON configuration to the adapter is accomplished exactly the same for the second adapter as it was for the first. Refer to the section “NetWare ESCON Configuration” beginning on page 41.

NetWare for SAA

If an existing Netfinity ESCON Adapter is configured for use with NetWare for SAA it is not necessary to re-install the NetWare drivers to support NetWare for SAA.

Configuration of the new adapter is accomplished with the following steps:

1. Addition of one or more LOAD BTIPBXA commands in AUTOEXEC.NCF.
2. Configuration of the Data Link Adapter.
3. Configuration of Host Links or Custom Peer Links.

Coding of the LOAD commands is described in the section “Loading the Drivers” on page 28. Configuration of the Data Link Adapter, Host Links, and Customer Peer Links is described in Chapter 11.

If no existing Netfinity ESCON Adapter has been configured for NetWare for SAA it is necessary to install NetWare drivers that will support NetWare for SAA. Follow the driver installation procedure beginning on page 18. Once the drivers are installed, proceed with ESCON configuration as described in Chapter 4 and NetWare for SAA configuration as described in Chapter 11.

TCP/IP Passthrough

If an existing Netfinity ESCON Adapter has been configured for TCP/IP Passthrough it is not necessary to re-install TCP/IP Passthrough into your NetWare server. The new adapter can be configured for use with TCP/IP Passthrough by adding additional commands to AUTOEXEC.NCF. Please refer to the section titled “Configuration Overview” beginning on page 146 for instructions on configuring TCP/IP Passthrough.

If no existing Netfinity ESCON Adapter has been configured for TCP/IP Passthrough for NetWare it will be necessary to install the software from CD. Please refer to Chapter 12 for a complete discussion of both installation and configuration of TCP/IP Passthrough for NetWare.

Chapter 15. MAINFRAME CONFIGURATION

This chapter is organized in sections based on the type of channel connection being defined:

- MPC+
- TCP/IP Direct Connect
- SNA Gateway
- TCP/IP Passthrough

Please refer to the section or sections appropriate to your server's configuration.

MPC+

As explained in Chapter 5, MPC+ uses transmission groups for communications over the ESCON channel. A MPC transmission group is made up of a minimum of 2 sub-channels (devices); one for mainframe read activity and one for mainframe write activity.

Configuring the mainframe with a new MPC transmission group involves two simple tasks on the mainframe:

1. Define the devices to the I/O configuration.
2. Define the MPC transmission group to VTAM.

Make sure you know which devices are defined in the adapter's configuration as type "MPC" (refer to the Chapter 3).

Define the Devices to the Mainframe I/O Configuration

At least two sub-channels (devices) must be defined for each MPC transmission group; one for read activity and one for write activity. Devices defined for a MPC transmission group must be defined as Serial Channel-to-Channel ("SCTC") devices in the mainframe IOCP. It is recommended that for serviceability these devices be adjacent and the first one be even numbered.

OS/390 Version 2 Release 4 and above uses the HCD Configuration Utility, a menu-based interactive program to complete this task. Refer to the *OS/390 HCD User's Guide* for instructions on using HCD.

In HCD define devices with Device Type "SCTC".

OS/390 Parmlib Update

Turn off the missing interrupt handling processes for the device addresses being used by MPC+ by adding the devices to the SYS1.PARMLIB(IECIOSxx) member as follows:

```
MIH TIME=00:00,DEV=(xxx-yyy)
```

where xxx-yyy identifies the range of addresses you want to disable for MIH processes.

Define the MPC Transmission Group to VTAM

A MPC transmission group is defined to VTAM with a VTAM Transport Resource List Major Node (TRL). Following is an example for a VTAM TRL major node defining a MPC Group:

```
MPCTRL VBUILD TYPE=TRL  
MPC410 TRLE LNCTL=MPC,READ=(410),WRITE=(411),MAXBFRU=9
```

The MAXBFRU **must be** set to 9 to support HSAS (see Chapter 5). Each buffer is 4096 bytes. VTAM reserves the MAXBFRU buffers for each read sub-channel in the group.

The TRLE name (MPC410) will be used to identify the MPC transmission group by APPN and TCP/IP.

Note that if the TRLE MPCLEVEL=NOHPDT operand is coded the connection cannot support HSAS.

Information about defining the TRLE can be found in *OS/390 eNetwork Communications Server: SNA Resource Definition Reference*. For more information on VTAM commands, refer to *OS/390 eNetwork Communications Server: SNA Operation*.

Once defined, the following VTAM operator command will vary the TRL active:

```
V NET,ACT,ID=MPC410
```

TCP/IP Direct Connect

Note: TCP/IP Direct Connect was previously known as Virtual Point-to-Point Adapter (VPPA).

Mainframe configuration TCP/IP Direct Connect is dependent on link type (CTC, HSAS, or MPCPTP). Please refer to the appropriate sub-section below.

CTC

TCP/IP Direct Connect over Channel-to-Channel (CTC) uses two adjacent sub-channel addresses. The first of these addresses must be even numbered (for example: A0, C0, 40, etc.).

The two sub-channel addresses must both be defined to the mainframe as Channel-to-Channel (SCTC) devices.

OS/390 Version 2 Release 4 and above uses the HCD Configuration Utility, a menu-based interactive program to complete this task. Refer to the *OS/390 HCD User's Guide* for instructions on using HCD.

Turn off the missing interrupt handling processes for the device addresses being used by adding the devices to the SYS1.PARMLIB(IECIOSxx) member as follows:

```
MIH TIME=00:00,DEV=(xxx-yyy)
```

where xxx-yyy identifies the range of addresses you want to disable for MIH processes.

Make sure the Subchannel Address field on the TCP/IP Direct Connect Adapter Properties screen (see Figure 6-8) matches the first of the two device addresses defined in HCD.

TCP/IP Direct Connect requires the IBM TCP/IP protocol stack running on your System/390. Your TCP/IP Profile will need to be modified to support the new link. The following is an example of the TCP/IP Profile required to define a TCP/IP Direct Connect link:

Note: See Hint's and Tips on the ESCON Support Web page (see Page 3) for helpful info on "Fine Tuning TCPIP Direct Connect for Optimal Performance".

```

; CTC connection
DEVICE DEVCTC1 CTC a00 IOBUFFERSIZE 32768
LINK LINKCTC1 CTC 0 DEVCTC1
;
HOME
  192.168.1.33 LINKCTC1
GATEWAY
;
; Direct Routes - Routes that are directly connected to my interfaces.
;
; Network  First Hop  Link Name Packet Size  Subnet Mask  Subnet Value
192.168.1    =    LINKCTC1  4096          0.0.0.224   0.0.0.32
START DEVCTC1

```

Depending on the HOST TCP/IP version, either IOBUFFERSIZE or LARGEENVELOPEPOOLSIZE must match the IOBufferSize specified in the TCP/IP Direct Connect link configuration screen (see page 57). Also note that the packet size on the Gateway statement must be less than this IOBUFFERSIZE value in order to allow for header information. Also packet size must match the MTU value entered for this TCP/IP Direct Connect Adapter. MTU defaults to 4096.

The following is an example TCP/IP Profile when Host routing is turned on.

```

;TCPIP Profile with a CTC connection using OROUTED and 64K buffers
;
DEVICE DEVCTC1 CTC A00 IOBUFFERSIZE 65535
LINK LINKCTC1 CTC 0 DEVCTC1
;
HOME
  192.168.1.33 LINKCTC1
;
BSDROUTINGPARMS TRUE
LINKCTC1 4096 0 255.255.255.224 192.168.1.34
ENDBSDROUTINGPARMS
;
START DEVCTC1

```

IOBUFFERSIZE (LARGEENVELOPEPOOLSIZE) must match the IOBufferSize configured in TCP/IP Direct Connect (see page 57). Packet Size (4096 above) must match the MTU size.

If Windows NT is not running RIP you will need to disable RIP across the CTC link. Otherwise the mainframe will time out the interface after 300 seconds. The following statement in the TCP/IP Gateways Data Set will disable RIP on the channel link.

```

;TCPIP Gateways data set
;
OPTIONS INTERFACE LINKCTC1 192.168.1.33 PASSIVE

```

High Speed Access Services

For High-Speed Access Services you must have at least one MPC transmission group defined in the IOCP and VTAM (see the section titled “MPC+” earlier in this chapter). Once the MPC transmission group is defined, complete the following mainframe configuration tasks to use HSAS:

1. Define the Stack in the OpenEdition Parmlib Member
2. Configure and activate the HSAS network interface.

For further information on High Speed Access Services please refer to *OS/390 eNetwork Communications Server: High Speed Access Services User's Guide*.

Define the Stack in the OpenEdition Parmlib Member

You must define the OpenEdition Common INET physical file system to include the HSAS communications stack (OESTACK). Unlike other TCP/IP stacks which require a separate MVS address space, the HSAS stack resides within the OpenEdition kernel. HSAS is defined through the BPXPRMxx member in SYS1.PARMLIB.

The following is a sample of BPXPRMxx:

```
FILESYSTYPE      ENTRYPOINT(BPXTCINT)
                  TYPE(CINET)

SUBFILESYSTYPE   NAME(TCPIP)
                  ENTRYPOINT(BPXPFINI)
                  DEFAULT

SUBFILESYSTYPE   NAME(OESTACK)
                  ENTRYPOINT(BPXUIINT)
                  TYPE(CINET)

NETWORK          DOMAINNAME(AF_INET)
                  DOMAINNUMBER(2)
                  MAXSOCKETS(25000)
                  TYPE(CINET)
                  INADDRANYPORT(20000)
                  INADDRANYCOUNG(4000)
```

Where:

FILESYSTYPE

defines the common INET physical file system (PFS), which is required to allow multiple AF_INET transport drivers to provide IP network access transparently from a socket application perspective.

SUBFILESYSTYPE NAME(TCPIP) statement

defines the full-function TCP/IP stack. It's parameter, **DEFAULT**, makes TCP/IP the default stack, since it is the only full-function stack. The **NAME**

parameter can be variable for TCP/IP. Refer to *OS/390 OpenEdition Planning* for more information.

SUBFILESYSTYPE NAME (OESTACK) statement

defines the HSAS stack. You must code this statement exactly as shown (including the identifier OESTACK) and you may code only one such statement.

NETWORK statement

correlates the common INET PFS with all its sub-transport drivers through the TYPE parameter. The INADDRANYPORT and INADDRANYCOUNT parameters reserve ports explicitly for common INET use. Refer to *OS/390 OpenEdition Planning* for more information about INADDRANYPORT and INADDRANYCOUNT.

Configure and Activate the HSAS Network Interface

The *oeifconfig* command assigns IP Addresses to the VTAM TRLE. The format of the command is:

```
oeifconfig trl_name source_IP_address destination_IP_address mtu maxmtu netmask  
subnet_mask nochecksum
```

Where:

trl_name

defines the name of the TRLE entry for the MPC Group.

source_IP_address

defines the OS/390 home IP address of this interface. This address must be unique for the entire OS/390 image, which includes the full-function TCP/IP stack. This address must match the IP address specified for mainframe IP address in the TCP/IP Direct Connect Adapter Properties screen (see Figure 6-9).

destination_IP_address

defines the IP address of the Netfinity Windows NT server. This address must match the address configured in the Microsoft TCP/IP Properties screen for this TCP/IP Direct Connect Adapter (see Figure 6-11).

maxmtu

defines the maximum transmission unit size for this interface. All hosts connected to the ESCON link must agree on a common maximum transmission unit size. The range of this values is from 512 to 32768. The default is 32768 bytes.

subnet_mask

defines the subnet mask associated with the interface. The value can be expressed in either dotted decimal format (for example, 255.255.255.0), or in hexadecimal format (for example, 0xfffff00). If netmask is not specified, the subnet mask is based on the local address portion of the destination address.

The following command activates a HSAS link using MPC Group MP1 between a mainframe with address 237.221.147.35 and a NT server with address 237.221.147.36 with a subnet mask of 255.255.255.192:

```
oeifconfig MP1 237.221.147.35 237.221.147.36 mtu 32768 netmask 255.255.255.192  
nochecksum
```

For more information on using oifconfig to configure and control a HSAS connection, please refer to *OS/390 eNetwork Communications Server: High Speed Access Services User's Guide*.

MPCPTP

For MPCPTP you must have at least one MPC transmission group defined in the IOCP and VTAM (see the section titled “MPC+” earlier in this chapter). Once the MPC transmission group is defined, you must configure OpenEdition to support the Telnet server and/or FTP server. Please refer to *OS/390 eNetwork Communications Server: IP Configuration* manual for information specific to configuring OpenEdition services.

The following bolded lines provide a sample of the control statements that must be added to the OpenEdition TCP/IP Profile in order to define a new MPC link.

```
; ===== MPC Profile Entries =====  
  
DEVICE MPC410      MPCPTP  
LINK   LINKPTP    MPCPTP      MPC410  
  
HOME  
198.178.232.3    LINKPTP  
  
GATEWAY  
198.178.232      =          LINKPTP    4096    0  
START MPC410
```

In this example, **MPC410** is the name of the VTAM TRLE statement defining the MPC transmission group (see page 162). The same name must be entered on both the DEVICE and LINK statements.

198.178.232.3 is the IP address assigned to this link. In other words it is the IP address client workstations would use to access the mainframe over this link. It must match the Mainframe IP Address coded in the TCP/IP Direct Connect Adapter Properties (see Figure 6-9 on page 58).

The GATEWAY statement beginning “**198.178.232**” defines a static IP route over the MPC link for the entire Class C network and assigns a maximum packet size of 4096. The maximum packet size (4096) must match the MTU size (default 4096) defined in the TCP/IP Direct Connect Adapter Properties (see Figure 6-8).

Note: See Hint's and Tips on the ESCON Support Web page (see Page 3) for helpful info on "Fine Tuning TCPIP Direct Connect for Optimal Performance".

The following is an example TCP/IP Profile when Host routing is turned on.

```
;TCPIP Profile with a CTC connection using OROUTED  
;  
DEVICE MPC410 MPCPTP  
LINK LINKPTP MPCPTP MPC410  
;  
HOME  
192.168.1.33 LINKPTP  
;  
BSDROUTINGPARMS TRUE  
LINKPTP 4096 0 255.255.255.224 192.168.1.34  
ENDBSDROUTINGPARMS  
;  
START MPC410
```

The packet size specified on the BSDROUTINGPARMS (4096) must match the MTU size entered in TCP/IP Direct Connect (see page 58).

If Windows NT is not running RIP you will need to disable RIP across the MPCPTP link. Otherwise the mainframe will time out the link after 300 seconds. The following statement, added to the TCP/IP Gateways Dataset will disable RIP on the link.

```
;TCPIP Gateways data set  
;  
OPTIONS INTERFACE LINKPTP 192.168.1.33 PASSIVE
```

SNA Gateway Definition

This section describes how to configure your mainframe for Communications Server for Windows NT, Communications Server for UnixWare 7, Novell's NetWare for SAA, and Microsoft's SNA Server.

Note: *If you are planning to use an MPC+ link for Communications Server for Windows NT you do not need to define 3174 devices in the IOCP. Refer to the section "MPC+" earlier in this chapter for information on defining an MPC transmission group to the mainframe. Then follow instructions beginning on page 176 for VTAM System Definition of the APPN Physical Units (PUs).*

Each ESCON adapter attached to a mainframe channel must be described to the mainframe hardware. Depending on the host CPU type, this is performed with either an IOCP generation or the method of defining the CPU's UCWs (Unit Control Words) supported by your CPU type.

For proper operation observe the following IOCP or UCW parameter requirements:

- Each adapter can support a maximum of thirty two (32) channel addresses (PUs). Each PU requires a separate I/O Device Address.
- For IOCP CNTLUNIT and IODEVICE definitions, specify UNIT=3174.

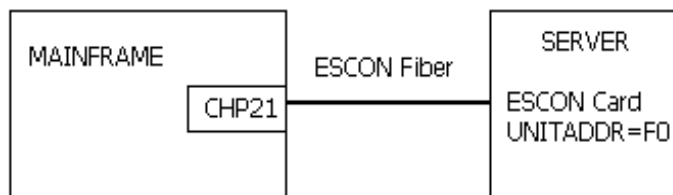
For further information on IOCP or UCW generation methods and parameters, refer to your mainframe CPU documentation.

IOCP Definition Examples

The following are non-MPC examples for creating the Mainframe IOCP Generation for ESCON Adapter cards connecting to IBM ESCON Channels.

Example A: CONNECTION DIRECT TO ESCON CHANNEL (ONE VTAM PU)

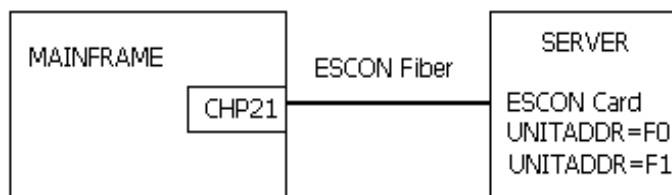
The following example shows a configuration of one subchannel address (i.e., one VTAM PU) generated on the adapter connected to a mainframe using CHPID 21:



```
*** CHPID STATEMENTS ***
    CHPID PATH=( ( 21 ) ),TYPE=CNC
*** CNTLUNIT STATEMENTS ***
    CNTLUNIT CUNUMBR=002,PATH(21),LINK=( ** ),UNIT=3174,UNITADD=( ( F0,1 ) )
*** IODEVICE STATEMENTS ***
    IODEVICE ADDRESS=( 2F0,1 ),CUNUMBR=( 002 ),UNIT=3174
```

Example B: Connection direct to ESCON Channel (Multiple VTAM PUs)

The following example shows a configuration of two subchannel addresses (i.e. two VTAM PUs) generated on the adapter connected to a mainframe using CHPID 21:



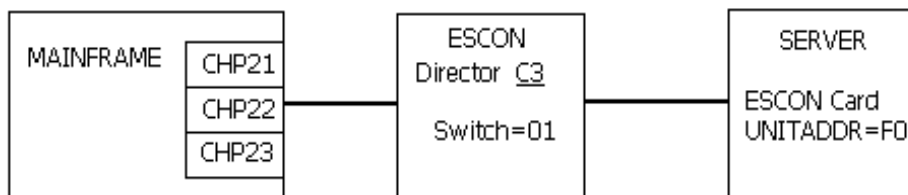
```
*** CHPID STATEMENTS ***
    CHPID PATH=(( 21 ) , TYPE=CNC

*** CNTLUNIT STATEMENTS ***
    CNTLUNIT CUNUMBR=002 , PATH( 21 ) , LINK=( ** ) , UNIT=3174 , UNITADD=( ( F0 , 2 ) )

*** IODEVICE STATEMENTS ***
    IODEVICE ADDRESS=( 2F0 , 2 ) , CUNUMBR=( 002 ) , UNIT=3174
```

Example C: CONNECTION TO ESCON DIRECTOR IN BASIC MODE (ONE VTAM PU)

The following example shows a configuration of one subchannel address (i.e. one VTAM PU) generated on the adapter connected to a mainframe using CHPID 22:



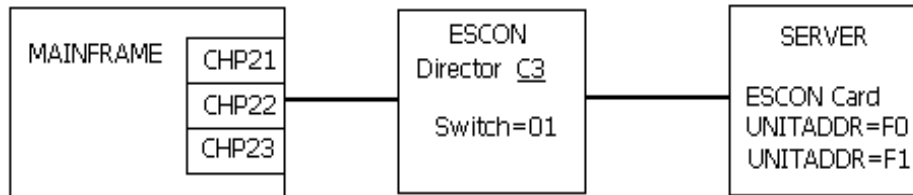
```
*** CHPID STATEMENTS ***
    CHPID PATH=(( 22 ) , TYPE=CNC , SWITCH=01

*** CNTLUNIT STATEMENTS ***
    CNTLUNIT CUNUMBR=002 , PATH( 22 ) , UNITADD=( ( F0 , 1 ) ) , UNIT=3174 LINK=( C3 )

*** IODEVICE STATEMENTS ***
    IODEVICE ADDRESS=( F0 , 1 ) , CUNUMBR=( 002 ) , UNIT=3174
```

Example D: CONNECTION TO ESCON DIRECTOR IN BASIC MODE (MULTIPLE VTAM PUs)

The following example shows a configuration of two subchannel addresses (i.e. two VTAM PUs) generated on the adapter connected to a mainframe using CHPID 22:



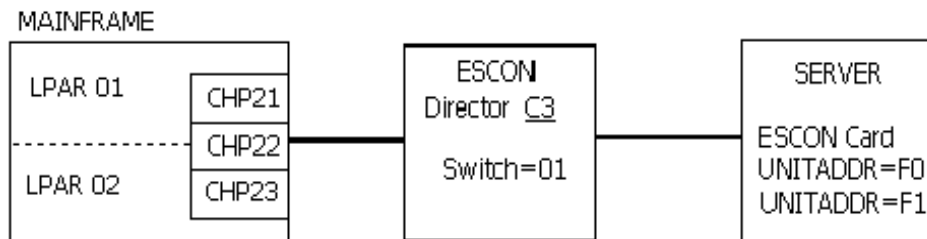
```
*** CHPID STATEMENTS ***
    CHPID PATH=((22)),TYPE=CNC,SWITCH=01

*** CNTLUNIT STATEMENTS ***
CNTLUNIT CUNUMBR=002,PATH(22),UNITADD=((F0,2)),UNIT=3174 LINK=(C3)

*** IODEVICE STATEMENTS ***
IODEVICE ADDRESS=(F0,2),CUNUMBR=(002),UNIT=3174
```

Example E: CONNECTION TO ESCON DIRECTOR IN SHARED (EMIF) MODE (MULTIPLE VTAM PUs)

The following example shows a configuration of two subchannel addresses (i.e. two VTAM PUs) generated on the adapter connected to a mainframe using CHPID 22. CHPID 22 is shared among multiple LPARS on the mainframe:



```
*** CHPID STATEMENTS ***
    CHPID PATH=((22)),TYPE=CNC,SWITCH=01,SHARED

*** CNTLUNIT STATEMENTS ***
CNTLUNIT CUNUMBR=002,PATH(22),UNITADD=((F0,2)),UNIT=3174 LINK=(C3)

*** IODEVICE STATEMENTS ***
IODEVICE ADDRESS=(F0,2),CUNUMBR=(002),UNIT=3174
```

VM System Generation

VM/SP

For proper operation of the Netfinity ESCON Adapter on a VM/SP system, observe the following DMKRIO system generation requirements:

- There must be one RCTLUNIT macro, each with one RDEVICE defined, for each device address to be supported.
- Specify CUTYPE=3725 in each RCTLUNIT macro.
- Specify DEVTYPE=3725, MODEL=2, ADAPTER=TYPE5, and CPTYPE=NCP in each RDEVICE macro.

VM/SP Definition Example

```
DMKRIO

* ONE RDEVICE/CUADDR PER PU:

ESC1      RDEVICE ADDR=5F0,DEVTYPE=3725,MODEL=2,          +
           ADAPTER=TYPE5,CPTYPE=NCP
ESC2      RDEVICE ADDR=5F1,DEVTYPE=3725,MODEL=2,          +
           ADAPTER=TYPE5,CPTYPE=NCP

* ONE RCTLUNIT PER PU:

RCTLUNIT ADDRESS=5F0,CUTYPE=3725
RCTLUNIT ADDRESS=5F1,CUTYPE=3725
```

VM/ESA, VM/XA

For proper operation on a VM/ESA or VM/XA system, observe the following HCPRIO system generation requirements:

- There must be one RDEVICE defined for each device address to be supported. VM/XA and VM/ESA do not use the RCTLUNIT macro.
- Specify DEVTYPE=3705, MODEL=L1, and ADAPTER=TYPE4 in each RDEVICE macro.

VM/ESA, VM/XA Definition Example

```
HCPRIO

* ONE RDEVICE/CUADDR PER PU:

ESC1      RDEVICE ADDR=5F0,DEVTYPE=3705,MODEL=L1,          +
          ADAPTER=TYPE4
ESC2      RDEVICE ADDR=5F1,DEVTYPE=3705,MODEL=L1,          +
          ADAPTER=TYPE4
```

MVS System Generation

For proper operation of the Netfinity ESCON Adapter on an MVS system, observe the following MVS system generation requirements:

- There must be one CNTLUNIT and one IODEVICE definition for each device address to be supported.
- In each CNTLUNIT definition, specify SHARED=N.
- In each CNTLUNIT and IODEVICE definition, specify UNIT=3791L.

MVS Definition Example

```
IODEVICE CUNUMBR=5F0,UNIT=3791L,ADDRESS=(5F0,1)
IODEVICE CUNUMBR=5F1,UNIT=3791L,ADDRESS=(5F1,1)
```


DOS/VSE, VSE/ESA System Generation

For proper operation of the Netfinity ESCON Adapter on a DOS/VSE or VSE/ESA system, define the adapters in the IPL file:

- There must be one ADD statement for each device address to be supported.
- Specify device type 3791L on the ADD statement(s).

DOS/VSE, VSE/ESA Definition Example

```
* ONE ADD STATEMENT FOR EACH PU / DEVICE ADDRESS  
ADD 5F0,3791L  
ADD 5F1,3791L
```

VTAM System Generation

Installation of an ESCON adapter for SNA communications requires changes or additions to your current VTAM definitions.

For proper operation with VTAM, observe the following definition requirements:

- There must be one PU defined for each host connection (PU) defined in the gateway (CS/NT, CS/UnixWare, SNA Server, or NetWare for SAA).
- The channel DLC uses a maximum frame size of 4105. For better performance it is recommended the MAXBFRU value in the PU definition be set so that when multiplied by VTAM's I/O Buffer size (IOBUF) the result is greater than 4109 (4105 plus 4 bytes of channel link header). Further explanation may be found in the IBM VTAM Network Implementation Guide, SC31-6434.

Either the IBM supplied standard VTAM LOGMODE tables, or those currently in use in your installation may be used for VTAM terminals. The LOGMODE specified in the VTAM generation should match the Model Type specified in the gateway.

For further information on VTAM generation, refer to the appropriate VTAM documentation for your installation.

Following are VTAM sample definitions for a typical installation. Modify these samples as necessary for your own installation.

VTAM PU 2.0 Definition Example

This example defines a LOCAL SNA Major Node (non-MPC) for PU type 2.0. This example is applicable to SNA Server, CS/NT, or NetWare for SAA.

```

                                LCL5F0  VBUILD TYPE=LOCAL

PL5F0  PU  CUADDR=5F0,          * ONE CUADDR PER GATEWAY PU      +
          DISCNT=NO,           +
          DLOGMOD=D4A32782,    * DEFAULT MOD 2 LOGON TABLE ENTRY  +
          ISTATUS=ACTIVE,      +
          MAXBFRU=5,           * MUST SUPPORT FRAME SIZE OF 4105  +
          MODETAB=ISTINCLM,    * DEFAULT LOGMODE TABLE          +
          PUTYPE=2,            +
          USSTAB=AUSSTAB,      +
          VPACING=5           +
          * LU DEFS TO MATCH GATEWAY CONFIG:
            LL5F0002 LU      LOCADDR=002
            LL5F0003 LU      LOCADDR=003
            LL5F0004 LU      LOCADDR=004
            LL5F0005 LU      LOCADDR=005
            LL5F0006 LU      LOCADDR=006
            LL5F0007 LU      LOCADDR=007
            LL5F0008 LU      LOCADDR=008
                                ...etc...

PL5F1  PU  CUADDR=5F1,          * ONE CUADDR PER GATEWAY PU      +
                                ...etc...
```

VTAM PU 2.1 Definition Example

This example defines a LOCAL SNA Major Node (non-MPC) for PU type 2.1 (notice XID=YES on the PU definition). This example is applicable to SNA Server, CS/NT, or NetWare for SAA.

```

                                LCL5F0  VBUILD TYPE=LOCAL

PL5F0  PU    CUADDR=5F0,      * ONE CUADDR PER GATEWAY PU      +
          DISCNT=NO,          +
          DLOGMOD=D4A32782,   * DEFAULT TABLE ENTRY          +
          ISTATUS=ACTIVE,     +
          MAXBFRU=5,          * MUST SUPPORT FRAME SIZE OF 4105 +
          MODETAB=ISTINCLM,   * DEFAULT MODE TABLE           +
          PUTYPE=2,           +
          SSCPFM=USSSCS,      +
          USSTAB=AUSSTAB,     +
          VPACING=5,          +
          XID=YES              * NOTE: XID=YES FOR PU TYPE 2.1

* LU DEFS TO MATCH COMM. SERVER CONFIG:
          LL5F0002 LU    LOCADDR=002
          LL5F0003 LU    LOCADDR=003
          LL5F0004 LU    LOCADDR=004
          LL5F0005 LU    LOCADDR=005
          LL5F0006 LU    LOCADDR=006
          LL5F0007 LU    LOCADDR=007
          LL5F0008 LU    LOCADDR=008
                                ...etc...

PL5F1  PU    CUADDR=5F1,      * ONE CUADDR PER GATEWAY PU      +
          ...etc...

```

VTAM LOCAL SNA Major Node implementing APPN

This example defines a Local APPN Major Node (non-MPC). The node could be either a Network Node (NN) or an End Node (EN). This example is applicable to either CS/NT or NetWare for SAA which are both APPN nodes.

```

AP900  VBUILD TYPE=LOCAL
*
APU900  PU    CUADDR=0900,      +
          ISTATUS=ACTIVE,      +
          XID=YES,              +
          CONNTYPE=APPN,       +
          CPCP=YES,            +
          MAXBFRU=32,          +
          DELAY=0
*
ALU900  LU    LOCADDR=0

```

VTAM LOCAL SNA Major Node implementing MPC and APPN including RTP

This example defines a Local SNA Major Node which references a VTAM Transport Resource List (TRL) and implements APPN including support for Rapid Transport Protocol (RTP). This example is only applicable to Communications Server for Windows NT which supports a MPC transport.

```
AT950  VBUILD TYPE=LOCAL
*
*  OPTIONS - Local SNA APPN LINK via ESCON MPC (High Performance)
*           (requires HPR be enabled in the VTAM startup parms )
*           (i.e. - HPR=(RTP,NONE))
*
TPU950  PU      TRLE=TRL950,                                +
           ISTATUS=ACTIVE,                                  +
           XID=YES,                                         +
           CONNTYPE=APPN,                                    +
           CPCP=YES,                                         +
           CAPACITY=128M,                                     +
           HPR=YES,                                          +
           DELAY=0
*
TLU950  LU      LOCADDR=0
```

You will notice that CAPACITY=128M has been specified. Testing has shown significant performance improvements sending data out from the mainframe when the link capacity is specified as 128M (Mbits) in the PU definition for 17.5 Mbyte ESCON connections. Setting CAPACITY too high can have significant impact on mainframe CPU utilization. Also note that setting CAPACITY to a value higher than the capacity of the link will significantly impact the performance of the connection. You may need to adjust this value based on the characteristics of your mainframe.

MPC requires High-Performance Routing (HPR). VTAM uses a startup option to specify support for HPR. HPR=(RTP,NONE) in the VTAM startup parameters allows RTP when HPR=YES is coded on the PU definition. If HPR is not coded on the PU definition then no routing (NONE) will be allowed.

A sample TRL definition completing this example is:

```
MPC950  VBUILD TYPE=TRL
*
*  OPTIONS - Transport Resource List Major Node for ESCON
*           (Reference SNA Local Major Node AT950)
*
TRL950  TRLE    LNCTL=MPC,MAXBFRU=9,READ=950,WRITE=951
```

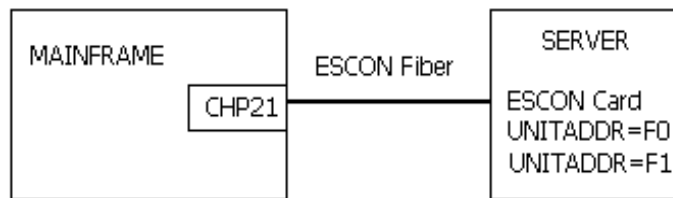
TCP/IP Passthrough

IOCP Definition Examples

The following are examples of the Mainframe IOCP Generation for a Netfinity ESCON Adapter supporting TCP/IP Passthrough.

Example A: CONNECTION DIRECT TO ESCON CHANNEL

The following example shows a configuration of two subchannel addresses (i.e. one TCP/IP Passthrough connection) generated on the ESCON adapter in the server connected to a mainframe using CHPID 21:



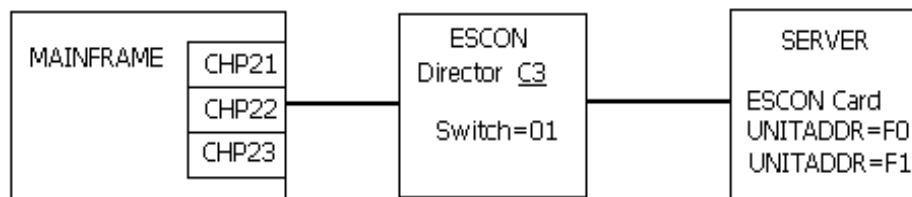
```
*** CHPID STATEMENTS ***
    CHPID PATH=(( 21 ) ) ,TYPE=CNC

*** CNTLUNIT STATEMENTS ***
    CNTLUNIT CUNUMBR=002 ,PATH=( 21 ) ,LINK=( ** ) ,UNIT=SCTC ,UNITADD=(( F0 , 2 ) )

*** IODEVICE STATEMENTS ***
    IODEVICE ADDRESS=( 2F0 , 2 ) ,CUNUMBR=( 002 ) ,UNIT=SCTC
```

Example B: CONNECTION TO ESCON DIRECTOR IN BASIC MODE

The following example shows a configuration of two subchannel addresses (i.e. one TCP/IP Passthrough connection) generated on the ESCON adapter in the server connected to a mainframe using CHPID 22:



```

*** CHPID STATEMENTS ***
CHPID PATH=((22)),TYPE=CNC,SWITCH=01

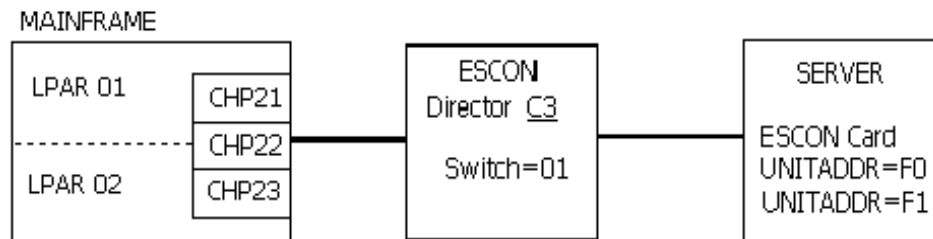
*** CNTLUNIT STATEMENTS ***
CNTLUNIT CUNUMBR=002,PATH=(22),UNITADD=((F0,2)),UNIT=SCTC,LINK=(C3)

*** IODEVICE STATEMENTS ***
IODEVICE ADDRESS=(F0,2),CUNUMBR=(002),UNIT=SCTC

```

Example C: CONNECTION TO ESCON DIRECTOR IN SHARED (EMIF) MODE

The following example shows a configuration of two subchannel addresses (i.e, one TCP/IP Passthrough connection) generated on the ESCON adapter in the server connected to a mainframe using CHPID 22. CHPID 22 is shared among multiple LPARS on the mainframe:



```

*** CHPID STATEMENTS ***
CHPID PATH=((22)),TYPE=CNC,SWITCH=01,SHARED

*** CNTLUNIT STATEMENTS ***
CNTLUNIT CUNUMBR=002,PATH=(22),UNITADD=((F0,2)),UNIT=SCTC,LINK=(C3)

*** IODEVICE STATEMENTS ***
IODEVICE ADDRESS=(F0,2),CUNUMBR=(002),UNIT=SCTC

```

Mainframe Operating System Generation Examples

VM/SP

DMKRIO	TITLE	'DMKRIO EXAMPLE FOR VM/SP'
	RDEVICE	ADDRESS=(9F0,02),DEVTYPE=3088
RCTLUNIT	ADDRESS=9F0,CUTYPE=3088	
RCHANNEL	ADDRESS=9,CHTYPE=BLKMPXR	

VM/XA

HCPRIO	TITLE	'HCPRIO EXAMPLE FOR VM/XA'
	RDEVICE	ADDRESS=9F0,DEVTYPE=3088,CLASS=TERM
RCTLUNIT	ADDRESS=9F0,CUTYPE=3088	
RCHANNEL	ADDRESS=9,CHTYPE=BLKMPXR	

VM/ESA

VM/ESA does not require an I/O gen. The addresses are dynamically defined to the system.

MVS

MVS Version 5 and OS/390 uses the HCD Configuration Utility, a menu-based interactive program. HCD builds both the IOCP statements and the internal MVS device control blocks. For older MVS systems, the following IODEVICE statement is recommended:

IODEVICE	CUNUMBER=016,UNIT=3088,ADDRESS=(9F0,2)
----------	--

Mainframe TCP/IP Profile Examples

IBM's TCP/IP For MVS or VM – Single Link

The following example shows the statements that would be added to the standard IBM TCP/IP configuration dataset PROFILE.TCPIP, when the TCP Passthrough link is the only connection. In this example, two devices have been defined in the IOCP configuration as channel-to-channel adapters, with addresses 9F0 and 9F1. The network is a “Class C” IP network, on Ethernet wiring, having a network IP address of 192.168.4.xxx, with 254 possible nodes. There is a router on the network with the IP address of 192.168.4.254, which knows how to reach other networks outside of 192.168.4.xxx.

```
.  
.
DEVICE      CHAN9F0          LCS          9F0
LINK        CHANLINK        ETHERNET     0          CHAN9F0
.  
HOME
192.168.4.1 CHANLINK
.  
GATEWAY
192.168.4 =      CHANLINK 1500      0
DEFAULTNET      192.168.4.254    =      CHANLINK      DEFAULTSIZE
.  
START  CHAN9F0
```

IBM's TCP/IP for MVS or VM – Multiple Links

The following example shows the statements (**in boldface**) that would be **added** to the standard IBM TCP/IP configuration dataset PROFILE.TCPIP, when the TCP Passthrough link is being installed as an additional connection. In this example, it is assumed that there are 2 existing Token-Ring links, and TCP Passthrough is being added as a new Ethernet link. The new Ethernet link defines a “Class C” network having the address 198.162.4.xxx. Note that Token-Ring link TRLINK1 will still be the master link to the outside world, via its gateway router at 10.200.5.1.

DEVICE	TRDEV8A0	LCS	8A0			
LINK	TRLINK1	IBMTR	0	TRDEV8A0		
DEVICE	TRDEV8C0	LCS	8C0			
LINK	TRLINK2	IBMTR	0	TRDEV8C0		
DEVICE	CHAN9F0	LCS	9F0			
LINK	CHANLINK	ETHERNET	0	CHAN9F0		
HOME						
	10.200.5.2	TRLINK1				
	131.144.29.1	TRLINK2				
	192.168.4.1	CHANLINK				
GATEWAY						
;	Network	First-hop	Driver	Packetsize	Subnetmask	Subnetvalue
	10	=	TRLINK1	4000	0.255.255.0	0.200.5.0
	131.144	=	TRLINK2	4000	0.0.255.0	0.0.29.0
	192.168.4	=	CHANLINK	1500	0	
DEFAULTNET	10.200.5.1		TRLINK1	DEFAULTSIZE	0	
START	TRDEV8A0					
START	TRDEV8C0					
START	CHAN9F0					

Interlink's TCP-Access for MVS – Single Link

The following example shows the statements that would be added to the standard TCP Access configuration member ACPCFG0x, when the TCP Passthrough link is the only connection. In this example, It is assumed that two devices have been defined in the IOCP configuration as channel-to-channel adapters, with addresses 9F0 and 9F1. The network is a “Class C” IP network, on Ethernet wiring, having a network IP address of 192.168.4.xxx, with 254 possible nodes. There is a router on the network with the IP address of 192.168.4.254, which knows how to reach other networks outside of 192.168.4.xxx.

```
***   ICS.PARM(ACPCFG00)
      .
***   LAN CONTROLLER DEFINITIONS SECTION
NETWORK HOST(192.168.4.2)
      SUBNET(255.255.255.0)
      NAME('TCP PASSTROUGH')
      MSSDEF(1500)
      MTU(1500)
      LNID(TCPPLINK)
LNILCS CUTYPE(8232)
      NAME(TCPPDEV)
      DEVADDR(9F0)
LNILINK NAME(TCPPLINK)
      DEVNAME(TCPPDEV)
      ETHERNET
      ADAPTER(0)

***   ROUTING STATEMENTS
ROUTE(0.0.0.0)  DEST(192.168.4.254)  NET('TCP PASSTROUGH')
ROUTE(0.0.0.0)  DEST(192.168.4.254)
```

Interlink's TCP-Access for MVS – Multiple Links

The following example shows the statements (**in boldface**) that would be **added** to the standard TCP Access configuration member ACPCFG0x, when the TCP Passthrough link is being installed as an additional connection. In this example, it is assumed that there is 1 existing FDDI link, and TCP Passthrough is being added as a new Ethernet link. The new Ethernet link defines a “Class C” network having the address 198.162.4.xxx. Note that FDDILINK will still be the master link to the outside world, via its gateway router at 10.200.5.1.

```
*** ICS.PARM(ACPCFG00)
NETWORK HOST(10.200.5.2)
    SUBNET(255.255.255.0)
    NAME('FDDI BACKBONE')
    MSSDEF(32768)
    MTU(32768)
    LNID(FDDILINK)
LNILCS CUTYPE(8232)
    NAME(FDDIDEV)
    DEVADDR(8A0)
LNILINK NAME(FDDILINK)
    DEVNAME(FDDIDEV)
    FDDI
NETWORK HOST(192.168.4.2)
    SUBNET(255.255.255.0)
    NAME('TCP PASSTHROUGH')
    MSSDEF(1500)
    MTU(1500)
    LNID(TCPPLINK)
LNILCS CUTYPE(8232)
    NAME(TCPPDEV)
    DEVADDR(9F0)
LNILINK NAME(TCPPLINK)
    DEVNAME(TCPPDEV)
    ETHERNET
    ADAPTER(0)
*** ROUTING STATEMENTS
ROUTE(0.0.0.0) DEST(10.200.5.1) NET('FDDI BACKBONE')
ROUTE(0.0.0.0) DEST(192.168.4.254) NET('TCP PASSTHROUGH')
ROUTE(0.0.0.0) DEST(10.200.5.1)
```

Chapter 16. TROUBLESHOOTING

If your Netfinity ESCON Adapter fails to initiate successfully this chapter will provide you with some general troubleshooting guidelines to help you identify and fix your problem.

If after you have been through this troubleshooting chapter you are still unable to make your adapter work properly you should contact your primary service provider for assistance. Please refer to the section titled “Help and Service Information” on page 217 for information on obtaining help.

Hardware

The Netfinity ESCON adapter includes two Light Emitting Diodes (LEDs) on the back edge of the adapter. These LEDs are located just below the ESCON connector and can be used to help isolate whether a problem is hardware or software related.

Each LED will illuminate in one of three colors. The Top LED illuminates Red, Yellow, or Green. The bottom LED illuminates Red, Orange, or Green. When the server’s power is turned on both LEDs should always be illuminated. Table 16-1 summarizes the use of each LED.

Color \ LED	Top LED	Bottom LED
OFF	Power Off	Power Off
Yellow	POST in Progress	Not Applicable
Orange	Not Applicable	Emulation Loaded, Channel Offline
Red	POST Failed	Emulation Not Loaded
Green	POST Ran Successfully	Channel Online

Table 16-1. Status LED Summary

As soon as the system is powered on, under normal operation the ESCON adapter executes it’s own Power On Self Test (POST) and then loads the emulation firmware. Follow the steps below to determine if the adapter has powered on successfully and is operational.

STEP

1. With your server powered on, check to make sure both LEDs are lit. If the top LED is Green and the bottom LED is Orange then the adapter has successfully completed POST and loaded firmware. This is the normal condition prior to starting the software. The adapter is operational. The bottom LED will remain Orange until the server is varied online at the mainframe console.

Proceed to the troubleshooting section on ESCON configuration and then the section(s) appropriate to the software you are using.

2. If either LED is off, power down your server, remove the adapter, and re-install it. Make sure the adapter is properly seated in the slot. Power the server back on. If the LED(s) remain unlit, contact your service provider.
3. When your server is first powered on both LEDs will briefly turn Red. When the adapter starts running Power On Self Test (POST) the top LED will illuminate Yellow. Once POST completes, the top LED will illuminate Green if POST was successful or Red if POST failed.

Watch the top LED as your system powers up. Verify the top LED goes from Red to Yellow to Green. If the top LED remains Red or turns Yellow and then Red again the adapter is not working properly. Power down your server and re-install the adapter. Power the server back on. If the condition repeats itself contact your service provider.

If the top LED is Yellow and the bottom LED is Red wait for 5 minutes to see if the status changes.

4. When the top LED turns Green, POST has completed. The adapter's Intel 960 processor will then load the device emulation (either 3172 or 3274). The bottom LED indicates the status of the emulation.

When the adapter is first powered on the bottom LED should be Red. This is a normal indication that the emulation has not loaded. The LED will remain Red while POST runs. Once the top LED turns green, indicating POST has been successful, the bottom LED should quickly turn Orange.

If the top LED is Green and the bottom LED is Red wait for one minute. If the bottom LED remains Red, the emulation has not successfully loaded. Perform a hardware reset (or Power Off / Power On) of your server. If the problem persists contact your service provider.

5. If you have checked your software configuration and are still not able to vary the system online, check your ESCON cable. Make sure both ends are properly seated. Unplug both ends. Plug them back in. Be sure you hear them click when you insert them into the connector.

ESCON Configuration

When the adapter loads the emulation it also loads the ESCON configuration (Chapter 4). This configuration must match the configuration defined on your mainframe(s).

Windows NT

In Windows NT use the Network ICON on the Control Panel to display the server's network adapters (Figure 16-1).

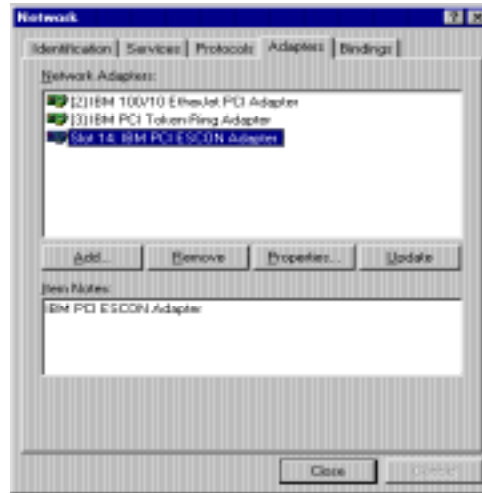


Figure 16-1. Network Adapters

Highlight the ESCON adapter and click Properties to display the ESCON configuration for this adapter (Figure 16-2).

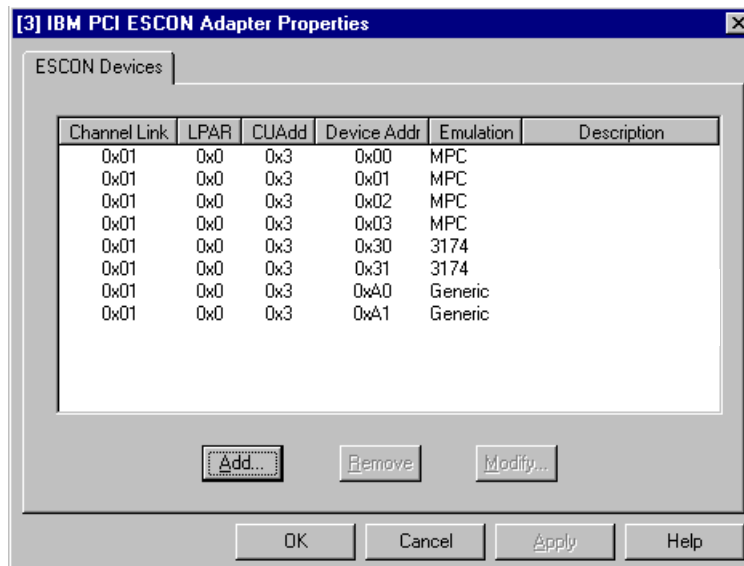
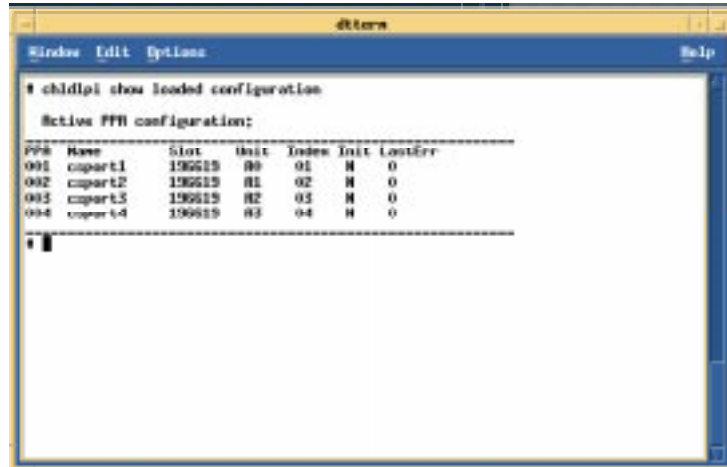


Figure 16-2. ESCON Configuration

Verify that the configuration defined here matches that of the mainframe and that the configuration is enabled. Correct any discrepancies you find and reset the server.

UnixWare 7

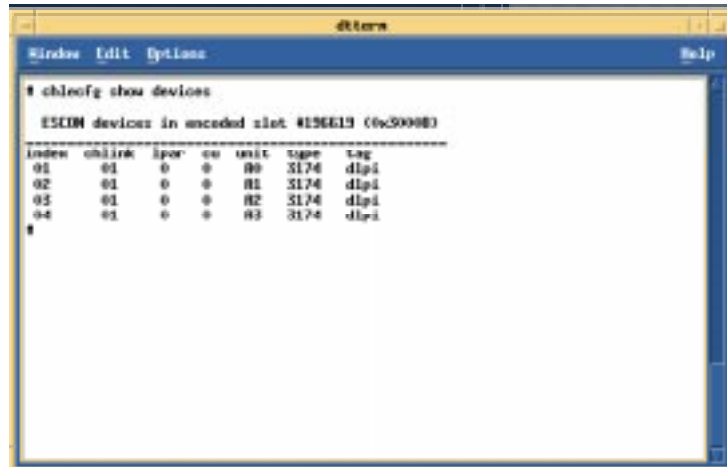
In UnixWare 7 you should have defined the ESCON configuration using the **chldlpi** utility (see Chapter 4). Verify your configuration using the **show loaded configuration** sub-command (Figure 16-3).



```
chldlpi show loaded configuration
Active FFB configuration:
-----
FFB Name      Slot  Unit  Index  Init  LastErr
001 cpart1     196619 00    01    N    0
002 cpart2     196619 01    02    N    0
003 cpart3     196619 02    03    N    0
004 cpart4     196619 03    04    N    0
#
```

Figure 16-3. Displaying ESCON Configuration

To confirm these devices are actually loaded into the adapter's firmware enter the **chlecfg show devices** command (Figure 16-4):



```
chlecfg show devices
ESCON devices in succeeded slot #196619 (0x50000)
-----
Index  chlrk  lpar  cu  unit  type  tag
01     01    0    0   00    3174  dlpi
02     01    0    0   01    3174  dlpi
03     01    0    0   02    3174  dlpi
04     01    0    0   03    3174  dlpi
#
```

Figure 16-4. Display Devices in Firmware

If the devices displayed using **chlecfg** do not match those listed by **chldlpi** then you must reboot the adapter using the **chlnit** command (Figure 16-5).

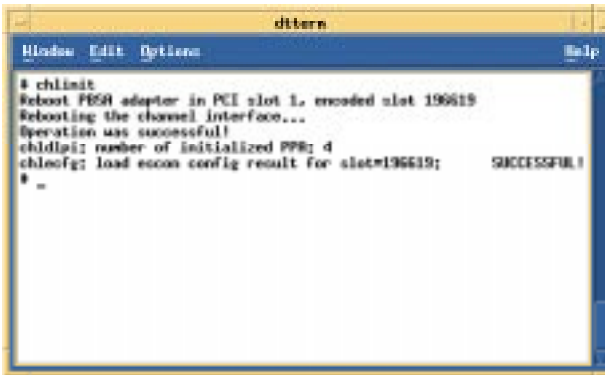


Figure 16-5. Reboot the ESCON Adapter

NetWare

In NetWare verify that the following LOAD statements are properly located in your AUTOEXEC.NCF file:

```
Load PBXAAPI
Load ESCONCFG filename.CFG
Load BTIPBXA Slot=x Unit= ....
```

The low level API driver (PBXAAPI) must be loaded before the configuration program (ESCONCFG). The configuration program must be loaded before the ODI drivers (BTIPBXA).

Edit the file name by “filename.CFG”. Verify the ESCON configuration matches that defined on the mainframe (see section “Creating a Configuration File” on page 41 for explanation of the fields). Correct any discrepancies and reset the server.

MPC+

Setting up MPC+ involves several key items:

Windows NT

- Defining an appropriate ESCON Configuration
- Defining a MPC transmission group
- Configuring the application using MPC+

Mainframe

- Defining devices in the IOCP
- Defining the MPC transmission group (TRL Major Node) to VTAM
- Configuring an application to use the MPC transmission group

Once these activities have been properly completed you should be able to bring the Netfinity server on line using a V Net command for the MPC transmission group.

Figure 16-6 shows a properly configured MPC transmission group.

Verify the devices defined in the MPC Group definition point to devices defined as “MPC” in the ESCON Adapter Configuration.

Verify the devices defined in the ESCON Configuration are properly defined in the IOCDs as “SCTC” devices.

Verify the devices are defined in the VTAM TRLE defining the MPC transmission group. Make sure the same device addresses are defined as read/write in both the TRLE and the MPC Group definition on the server.

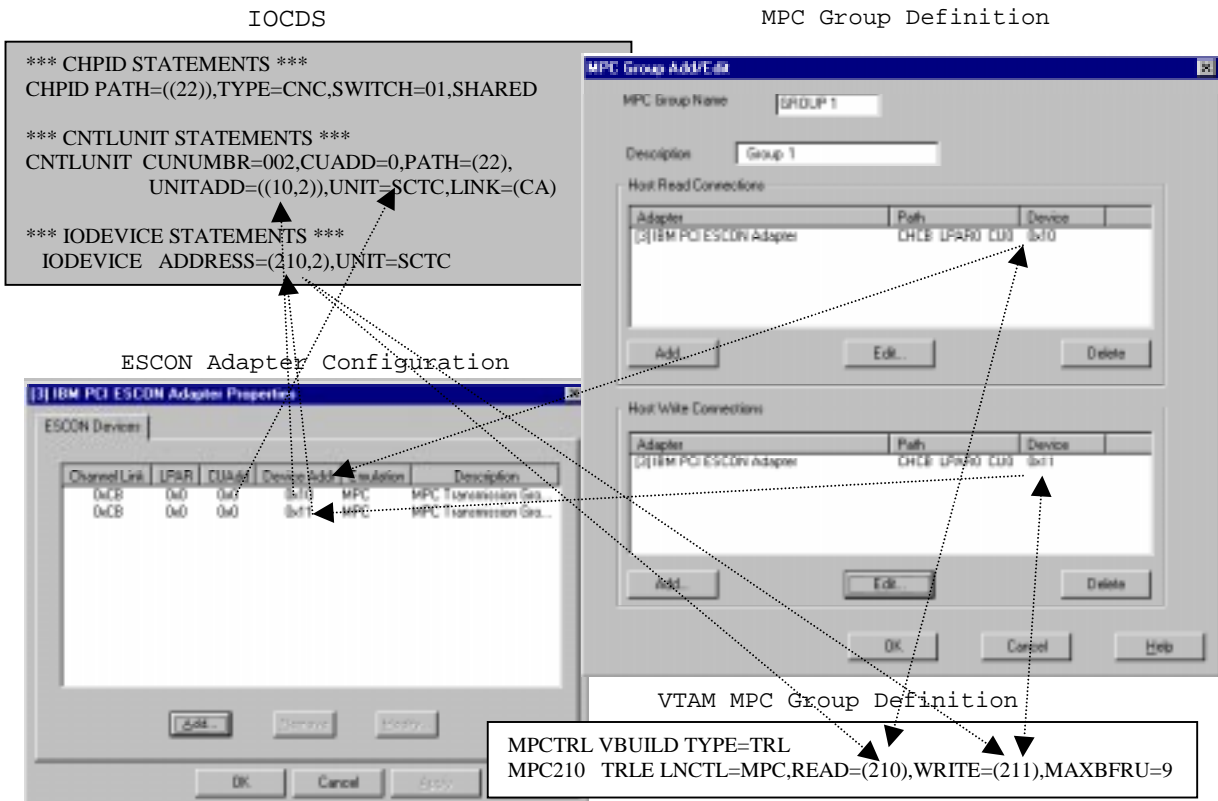
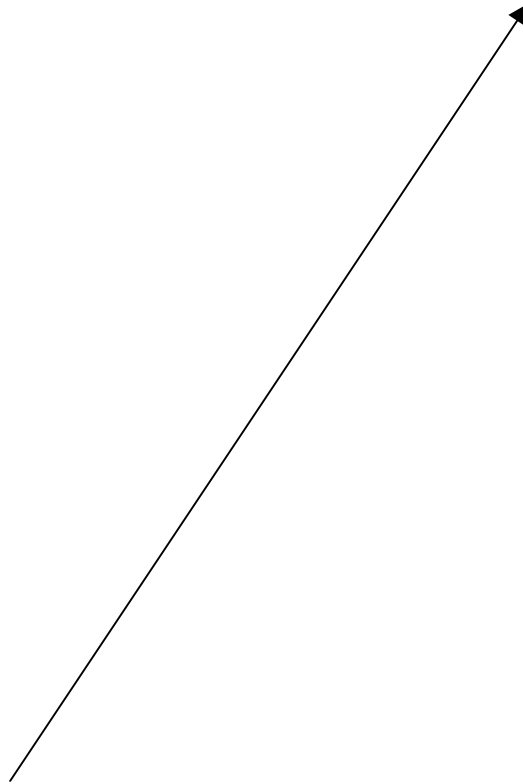


Figure 16-6. MPC Transmission Group Definitions

TCP/IP Direct Connect



Note: TCP/IP Direct Connect was previously known as Virtual Point-to-Point Adapter (VPPA).

CTC

Figure 16-7 shows proper configuration parameters for a Point-to-Point TCP/IP connection using Link Control Station (LCS). Check the following:

1. Verify the devices defined in the IOCDS are defined as “SCTC” devices. CTC requires two adjacent addresses with the first one the even numbered address.
2. Make sure the devices match those defined in the ESCON Configuration. The device type should be “MPC” (note: Although this is not a Multi-Path Channel link, TCP/IP Direct Connect always uses MPC emulation on the ESCON adapter).
3. Verify the even numbered device address has been properly defined in the TCP/IP Profile.
4. Make sure the HOME IP address defined in the TCP/IP Profile matches the IP address defined for “Mainframe IP Address” in the TCP/IP Direct Connect Adapter Properties.
5. Make sure the IP address and subnet mask assigned to the TCP/IP Direct Connect Adapter in Microsoft TCP/IP Properties matches the IP address and subnet mask defined in the TCP/IP Profile for first hop. Make sure the HOME IP address and the TCP/IP Direct Connect IP address are in the same subnet. Otherwise TCP/IP will look for a gateway address.

6. Verify the even numbered channel address defined in the TCP/IP Direct Connect Adapter Properties panel.

7. IOBufferSize defined in TCP/IP Direct Connect Adapter Properties must match the IOBufferSize defined on the Device statement in your TCP/IP Profile. The MTU size defined in TCP/IP Direct Connect must match the packet size define in the GATEWAY statement of the TCP/IP Profile.

TCP/IP Profile

```

: CTC connection
DEVICE DEVCTC1 CTC A40 IOBUFFERSIZE 65535
LINK LINKCTC1 CTC 0 LINKCTC1
;
HOME
206.221.147.67 LINKCTC1
GATEWAY
;
Direct Routes - Routes that are directly connected to my interfaces.
Network First Hop Link Name Packet Size Subnet Mask Subnet Value
206.221.147.66 = LINKCTC1 4096 255.255.255.192 0.0.0.64

```

[3] IBM PCI ESCON Adapter Properties

LPAR	CUAdd	Device Addr	Emulation	Description
0x0	0x0	0x40	MPC	
0x0	0x0	0x41	MPC	

IOCDs

```

*** CHPID STATEMENTS ***
CHPID PATH=((22)),TYPE=CNC,SWITCH=01,SHARED
*** CNTLUNIT STATEMENTS ***
CNTLUNIT CUNUMBR=(CA,CUADD=0,PATH=(22),
UNITADD=((40,2)),UNIT=SCTC,LINK=(CA)
*** IODEVICE STATEMENTS ***
IODEVICE ADDRESS=(A40,2),UNIT=SCTC

```

[4] TCP/IP Direct Connect Adapter Properties

Link Configuration

Mainframe IP Address: 206.221.147.67

Link Description: CTC Link

Link Type: CTC

CTC Configuration:

Channel Adapter: [3] IBM PCI ESCON Adapter

ESCON Path: CHCB LPAR0 CUG

Read Device: 0x40

IO Buffer Size: 65535

MTU: 4096

Microsoft TCP/IP Properties

IP Address: 206.221.147.66

Subnet Mask: 255.255.255.192

Figure 16-7. TCP/IP Direct Connect CTC Configuration

HSAS

High-Speed Access Services is a MPC+ link. As such you must have defined a MPC transmission group. Please refer to Chapter 5 for instruction if you have not defined a MPC transmission group. Then, if you are unable to verify the group active, refer to the section titled “MPC+” earlier in this chapter for information on trouble shooting a MPC+ connection. If you are able to vary the MPC transmission group active but you are still having trouble with a HSAS link check the following (refer to Figure 16-8).

1. Check the OpenEdition Parmlib member to make sure the HSAS stack has been included in the TCP/IP definition.
2. Verify the IP address and subnet mask defined to TCP/IP Direct Connect are the same as those specified for the destination IP address and subnet mask in the oeficonfig. Keep in mind that the IP addresses of the mainframe and TCP/IP Direct Connect must be in the same subnet.

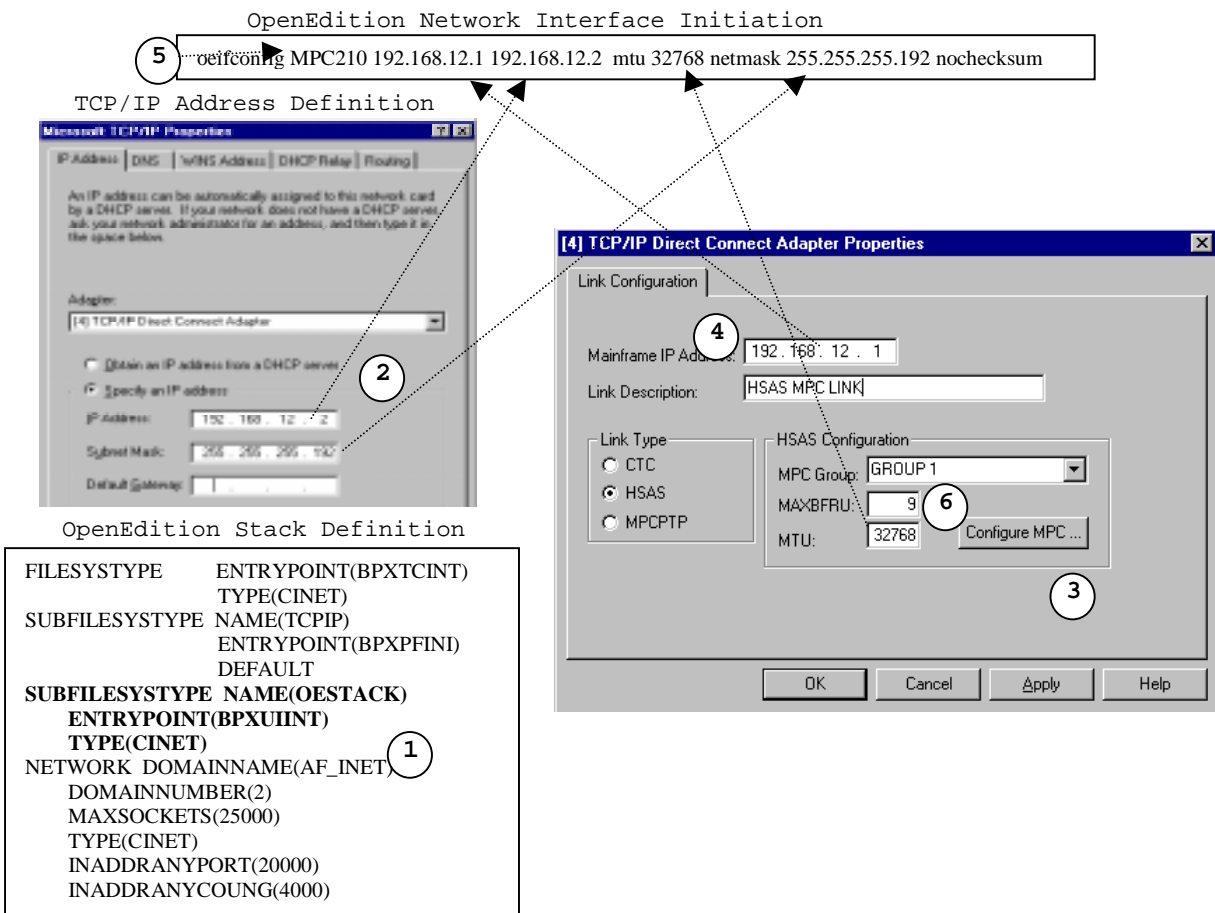


Figure 16-8. HSAS Configuration

3. Verify the MAXBFRU number and MTU size defined in the TCP/IP Direct Connect Adapter Properties match the oeifconfig statement. MAXBFRU must be 9 for HSAS.
4. Verify the Mainframe IP Address in TCP/IP Direct Connect Adapter Properties is the same as the one specified in the source IP field on the oeifconfig.
5. Verify the oeifconfig statement for the MPC group name. The name must match the one included on the VTAM VTRLE.
6. Verify the MPC Group defined in TCP/IP Direct Connect Adapter Properties is the correct group for this connection.

MPCPTP

MPCPTP links are MPC+ connections. You must have installed the MPC+ software before you will be allowed to configure a MPCPTP link to TCP/IP Direct Connect. Additionally, you must define at least one MPC transmission group that can be used by TCP/IP Direct Connect for this link (note: the MPC transmission group may be shared with HSAS and/or CS/NT). Please refer to Chapter 5 for assistance installing MPC+ software or configuring a MPC transmission group.

If you have defined a MPC transmission group but cannot vary it active, then please refer to the section titled “MPC+” earlier in this chapter for information on troubleshooting MPC transmission groups.

If the MPC transmission group varies active, but you are still unable to use the MPCPTP connection here are some things to consider (refer to Figure 16-9):

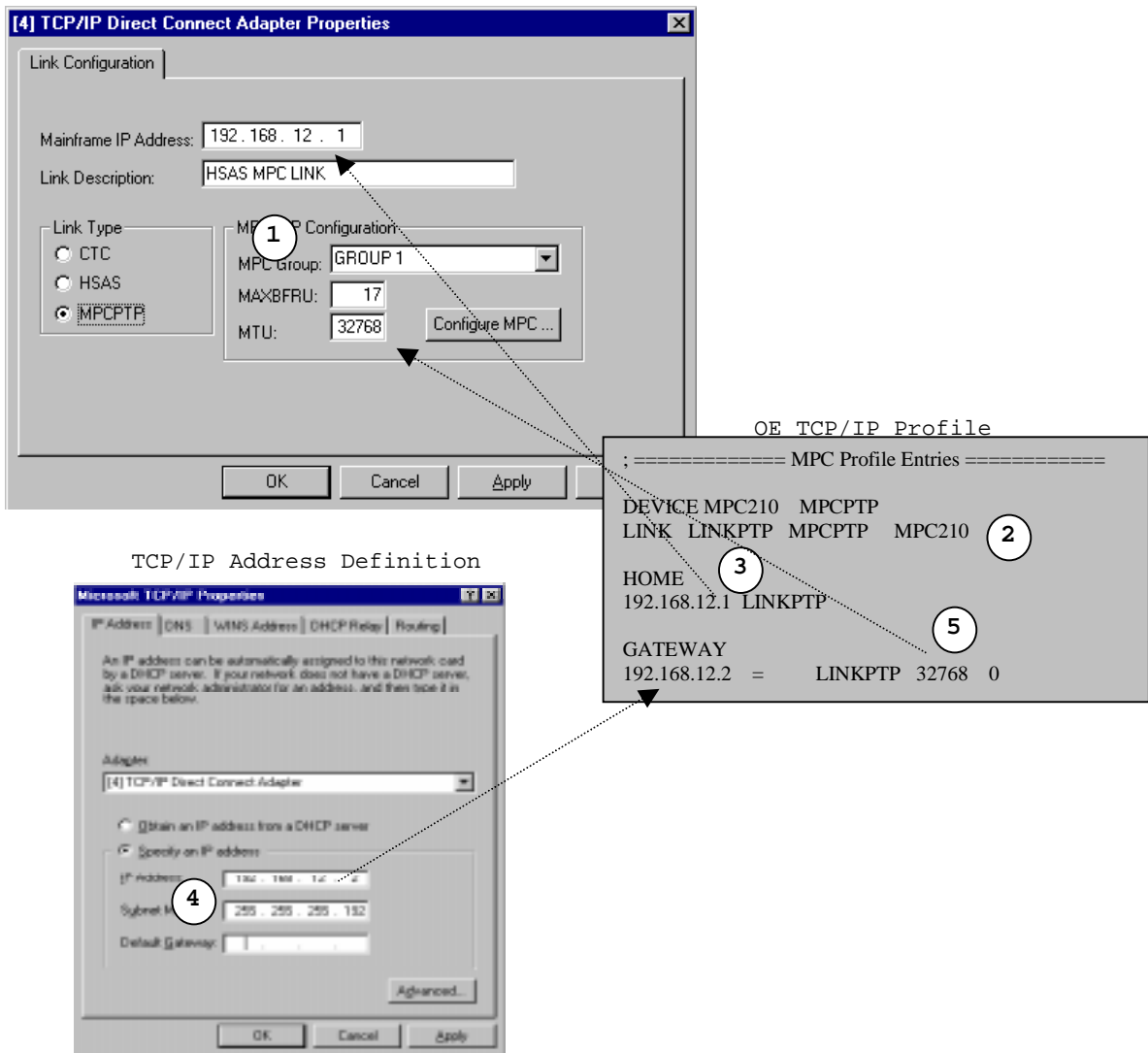


Figure 16-9. MPCPTP Configuration

1. Verify the correct MPC Group has been named in TCP/IP Direct Connect Adapter Properties.
2. Make sure the correct MPC group has been named in the LINK statement in the TCP/IP Profile. It should match the VTAM TRLE.
3. Make sure the HOME IP address in the TCP/IP Profile is identical to the address entered in TCP/IP Direct Connect Adapter Properties.
4. Make sure the IP Address entered for TCP/IP Direct Connect in Microsoft TCP/IP Properties matches the IP address specified in the GATEWAY statement in the TCP/IP profile.

Remember that the Mainframe's IP address and the TCP Direct Connect IP address **MUST BE** in the same subnet. If these two addresses are in different subnets, Microsoft's TCP/IP stack on the Netfinity server will attempt to forward mainframe traffic to a gateway.

5. The MTU size defined in the TCP/IP Direct Connect Adapter Properties is determined by the MAXBFRU size specified in the MPC Transmission Group (see page 162). $MTU = (MAXBFRU - 1) * 4096$. The packet size specified in the TCP/IP profile must match the MTU size.

Communications Server for Windows NT

If the channel fails to vary online there are several things you need to check.

1. Communications Server opens a configuration file during startup. Make sure that the configuration file being used is the correct one.
2. Verify that the ESCON adapter is in the list of devices in the configuration (Figure 16-10).

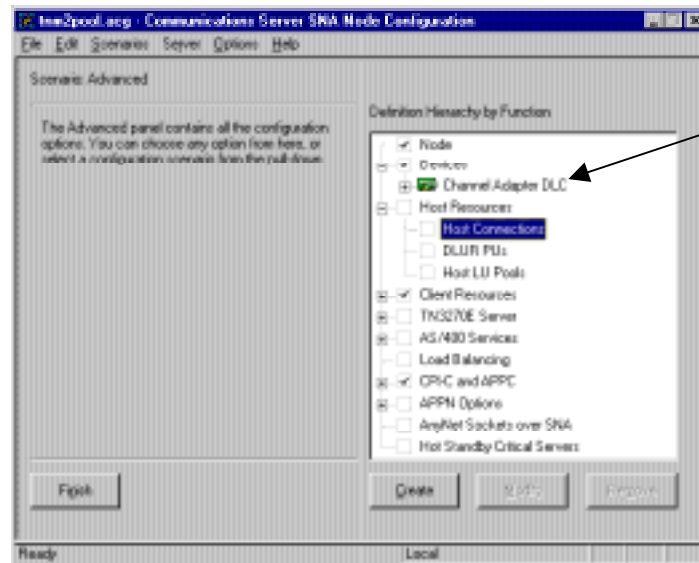


Figure 16-10. ESCON Adapter DLC

If the Channel Adapter DLC is not present, refer to page (68) of this manual for detailed instructions for defining the adapter to Communications Server.

3. Verify that a host connection has been defined for the adapter (Figure 16-11).

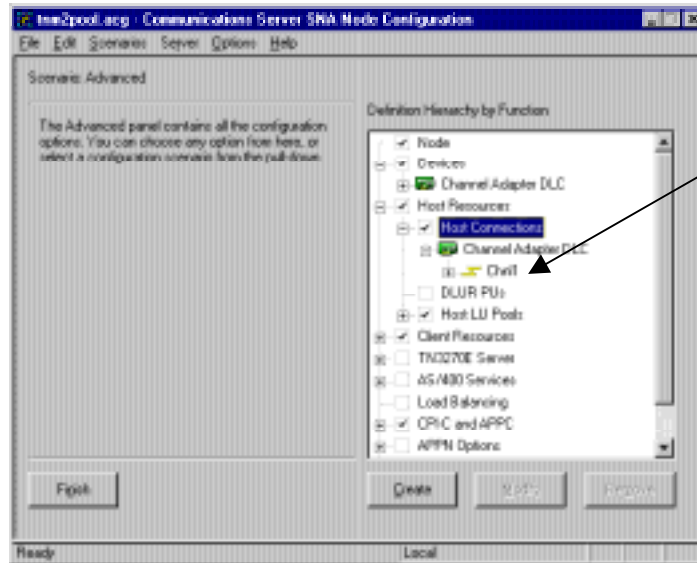


Figure 16-11. Host Connection

4. Verify that the PU Address matches the address defined in the ESCON configuration and the mainframe IOCP (Figure 16-12).

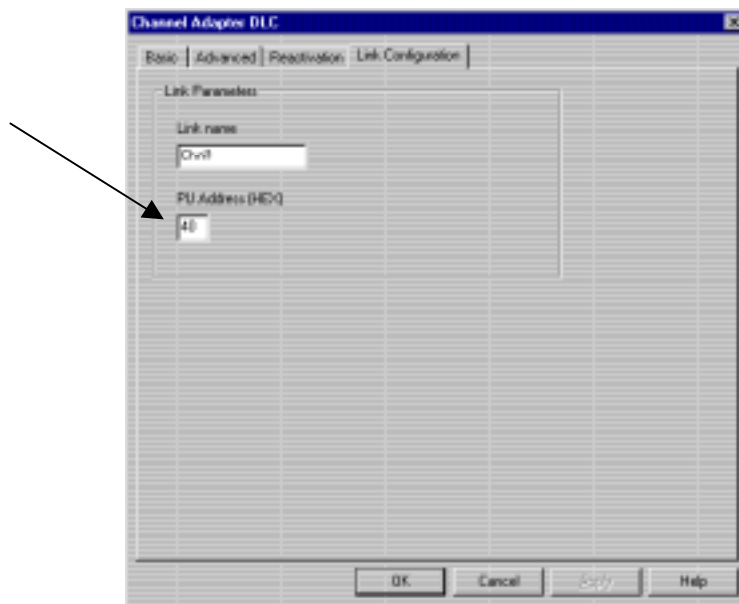


Figure 16-12. Check PU Address

5. Verify when the link is set to activate (Figure 16-13). If Activate link at start is not checked, you will have to manually start this link.

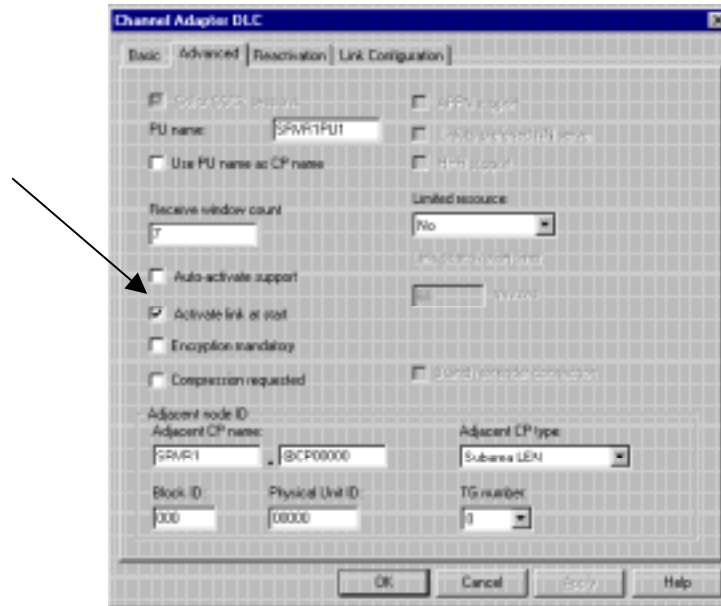
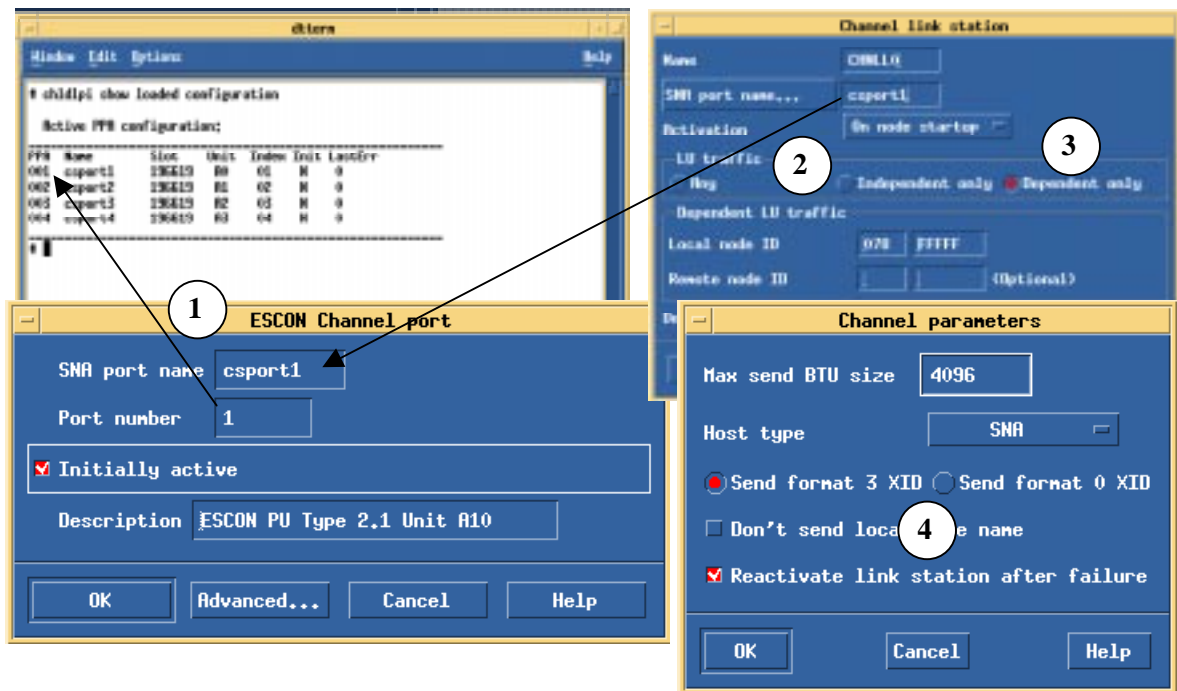


Figure 16-13. Activate Link at Start

Communications Server for UnixWare 7

If the channel fails to vary online there are several things you need to check.



1. Begin by verifying the ESCON configuration as described earlier in this chapter. Make sure the port number used in the ESCON Channel port definition matches a port defined in the ESCON Configuration.
2. Verify that you have selected the correct SNA port name in the Channel link station definition.
3. Verify the **Activation** option is properly set (normally On node startup should be used for channel connections) and that the **LU traffic** type is correct. LU traffic must be set to **Dependent only** for PU type 2.0 mainframes.
4. Make sure the XID option is properly set for your mainframe. PU type 2.0 mainframes should be set to XID 0.

SNA Server for Windows NT

If the channel fails to vary online there are several things you need to check in SNA Server.

1. In SNA Server Manager verify that a link service has been defined for the channel (Figure 16-14).

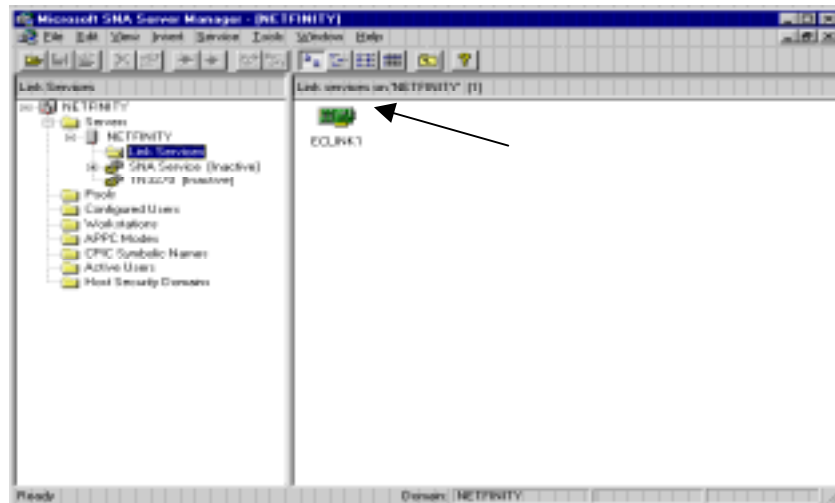


Figure 16-14. ESCON Link Service

2. Verify that a connection is defined to the link service (Figure 16-15).

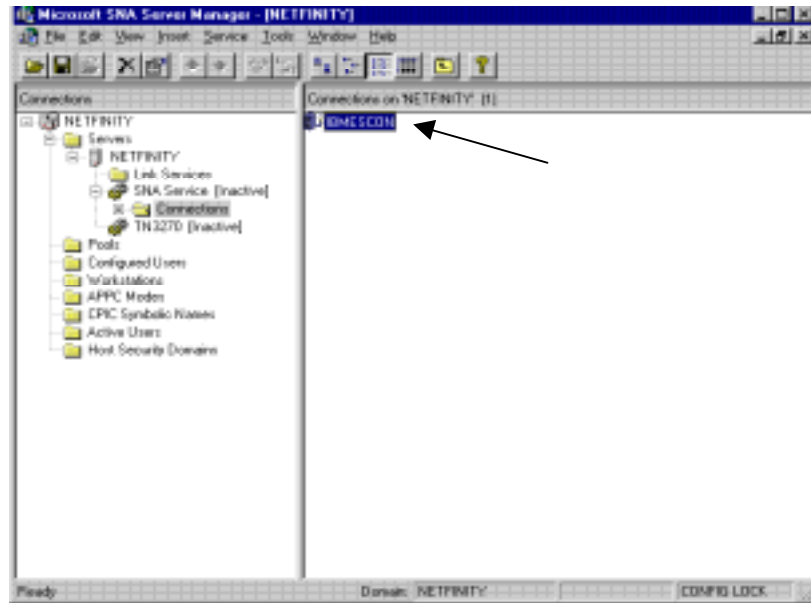


Figure 16-15. ESCON Connection (PU)

3. On the connection properties verify the Channel Address (PU Address) matches that defined in the ESCON configuration and mainframe IOCP (Figure 16-16).

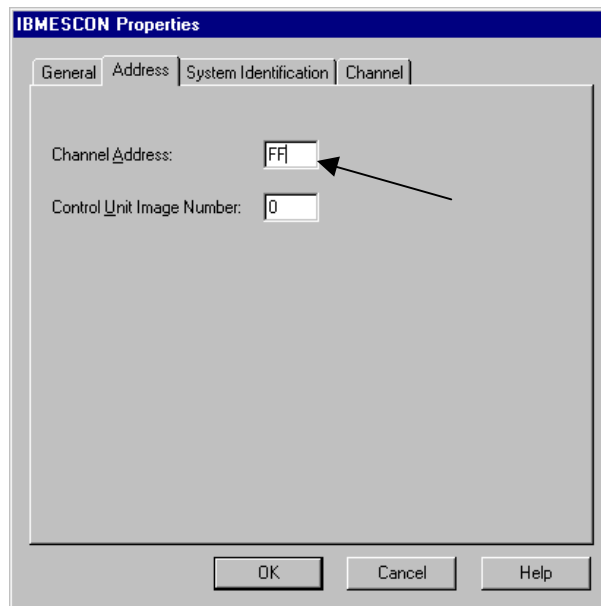


Figure 16-16. Channel (PU) Address]

4. Verify the activation setting for the connection (Figure 16-17). ESCON connections should be set to activate on server startup. They should never be set to activate on demand.

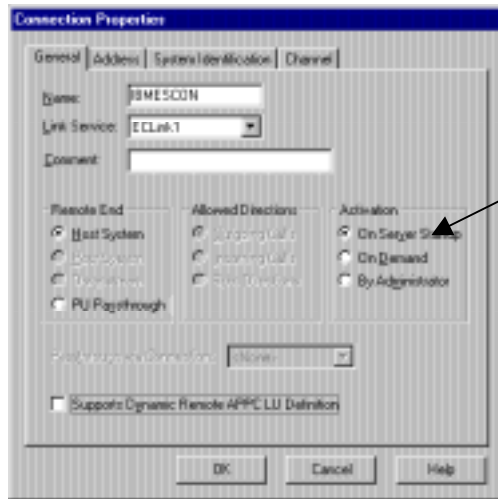


Figure 16-17. Activate at Startup

TCP/IP Passthrough for Windows NT

If the channel fails to vary online there are several things you need to check in TCP/IP Passthrough.

1. From the Network ICON in the Windows NT Control Panel, verify that TCP/IP Passthrough is installed as a protocol (Figure 16-18).

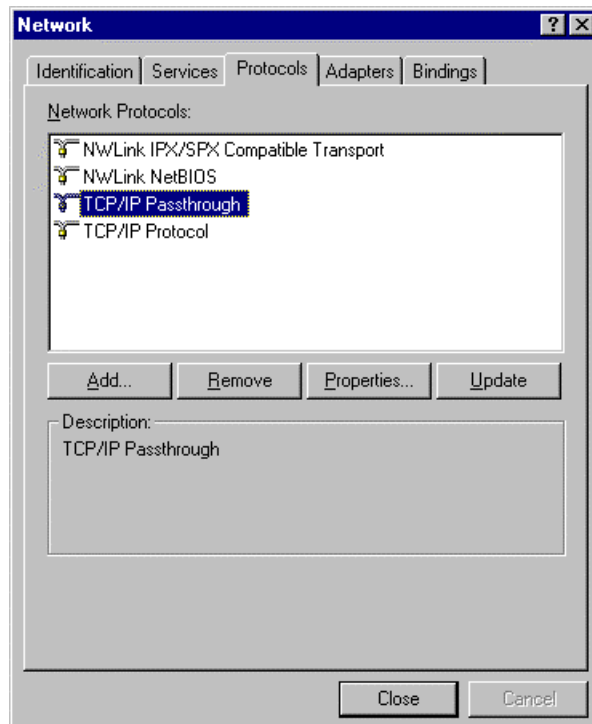


Figure 16-18. TCP/IP Passthrough Protocol

2. Click on **Properties**. Verify the subchannel addresses match the ESCON and mainframe configurations (Figure 16-19). Remember that each TCP/IP connection requires two subchannel addresses. If your TCP/IP Passthrough configuration has subchannel 50 defined, your ESCON and mainframe configurations must have both subchannel 50 and 51 defined.

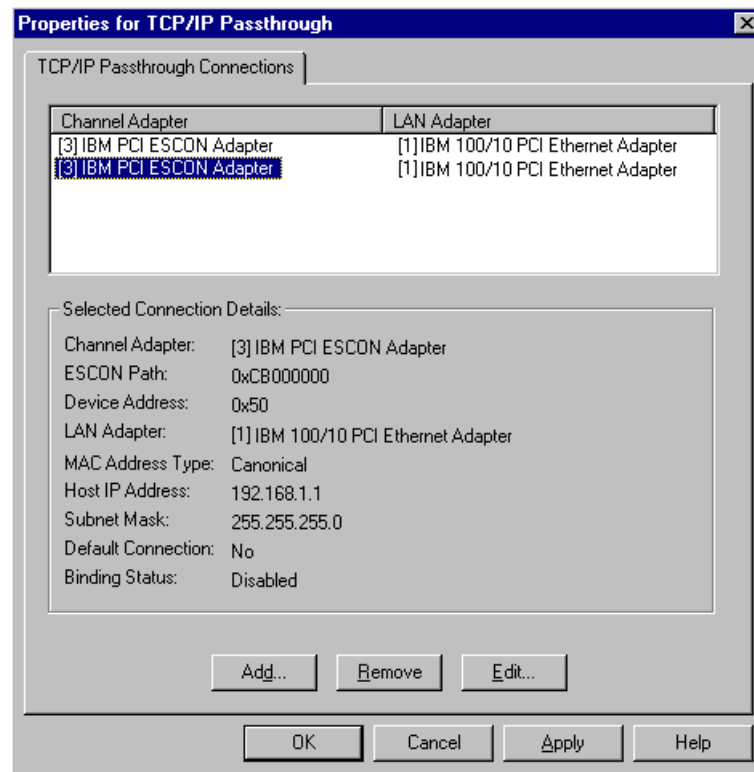


Figure 16-19. TCP/IP Subchannel Configuration

If you find any discrepancies correct them and reset the server.

NetWare for SAA

If the channel fails to vary online there are several things you need to check in NetWare for SAA.

1. Begin by verifying that the adapter is defined in the configuration. In the NetWare for SAA Configuration program, click “**Configure Data Link Adapters**” and then “**Custom**”. A custom adapter should be defined (Figure 16-20) for each host link (PU) that you have defined.

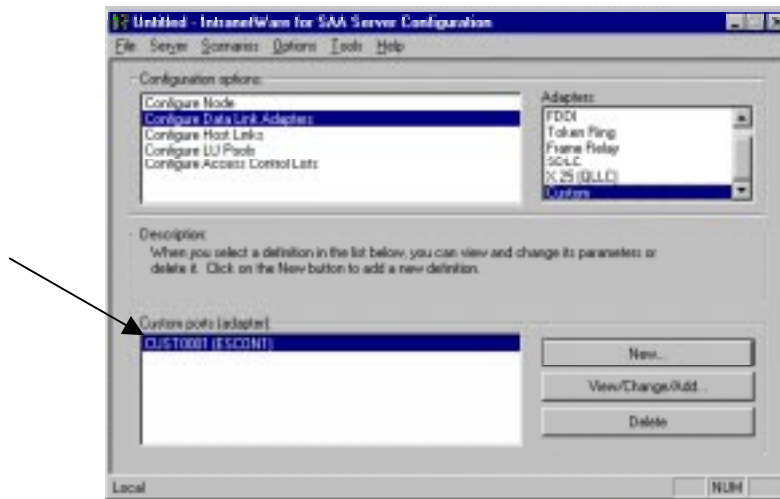


Figure 16-20. ESCON Adapter in SAA

If no Custom adapters are listed, follow the procedure on page 114 to install the adapter.

2. Double click the custom adapter (or click View/Change/Add). The adapter’s properties screen will display (Figure 16-21). Make note of the Adapter name.

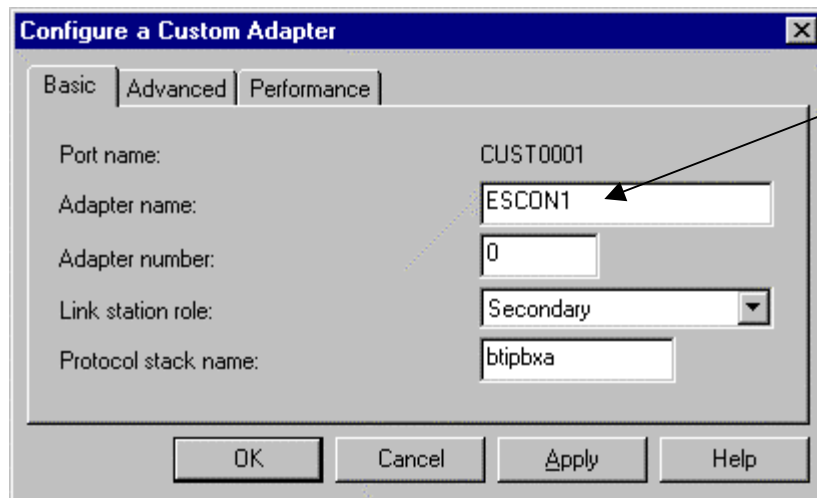


Figure 16-21. Adapter Properties

3. Click **Cancel** to return to the main configuration menu. Double click “**Configure Host Links**” (Figure 16-22).

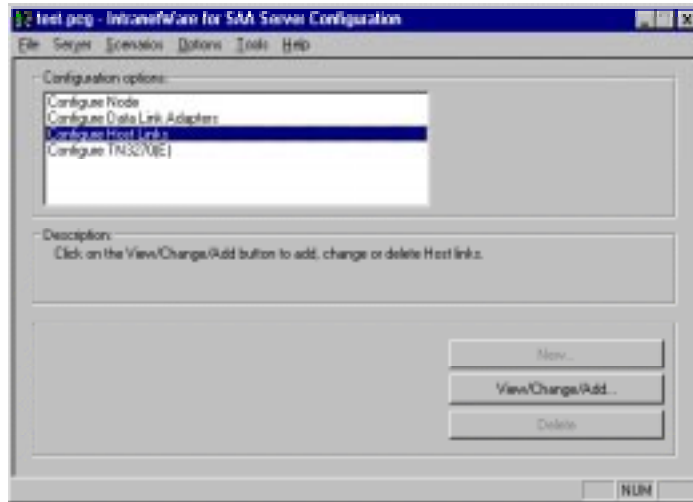


Figure 16-22. To Verify Host Links

The Configure Host Links panel will display (Figure 16-23) and should contain one or more link definitions (PUs).

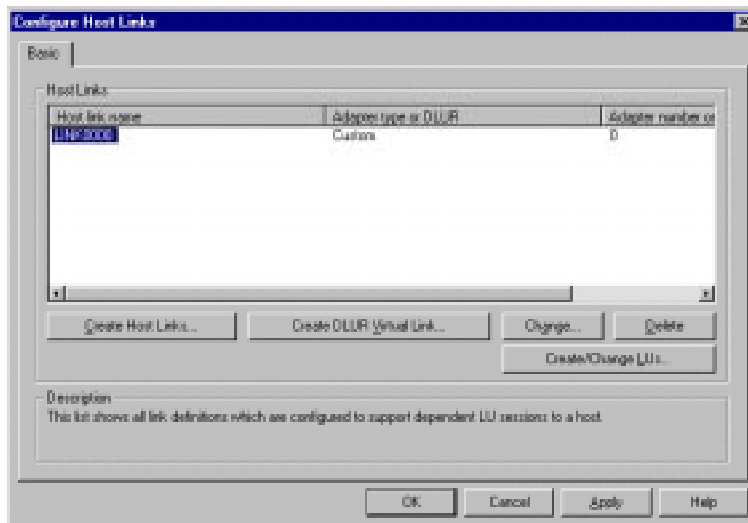


Figure 16-23. Configure Host Links with 1 link (PU)

If no links are configured follow the procedure on page 121 to define at least one link (PU).

4. Double click the link (LINK0000 above) to display the link’s properties (Figure 16-24).

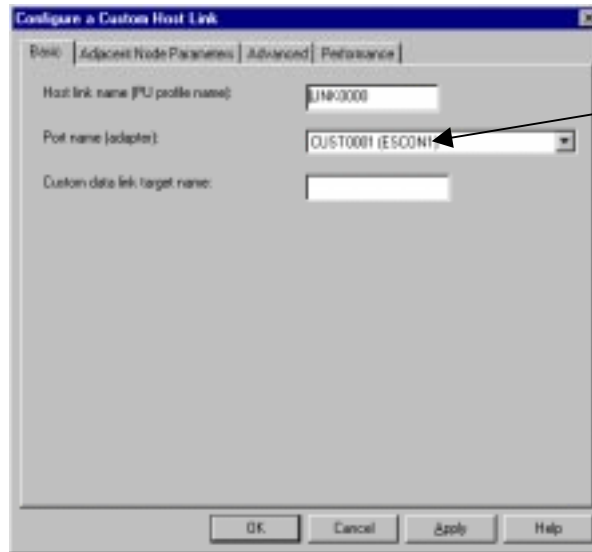


Figure 16-24. Link Configuration

The Port name (adapter) field shows both the port name (CUST0001) and the adapter name (ESCON1).

5. On the Advanced page (Figure 16-25) verify that the adapter is configure to activate at system startup.

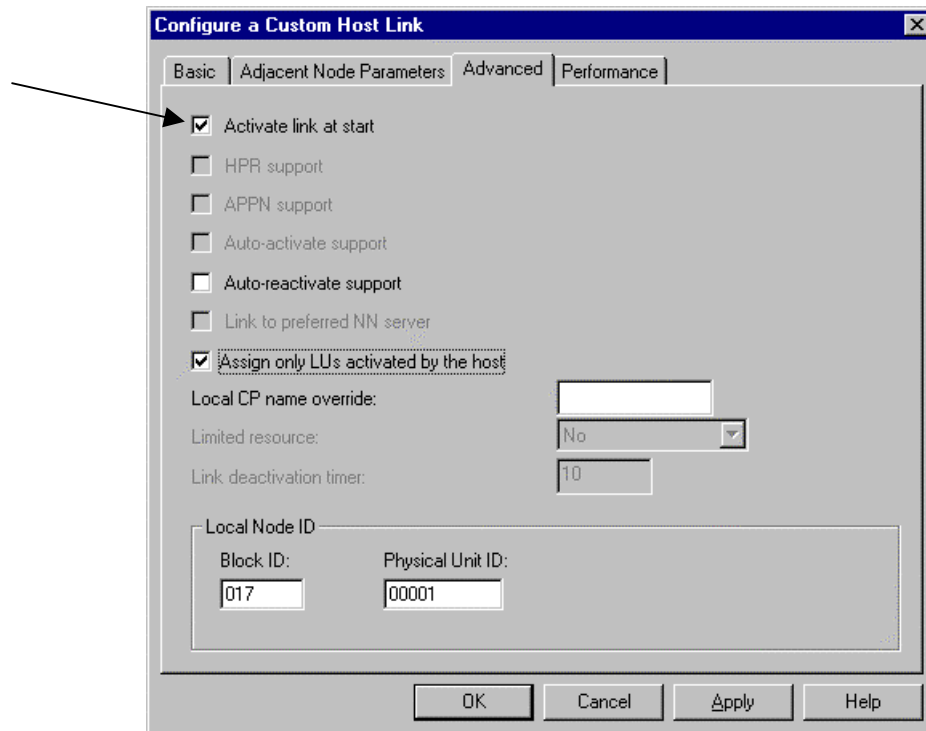


Figure 16-25. Activate Link at Startup

6. Verify the adapter name (ESCON1) is used on a LOAD command in AUTOEXEC.NCF. The adapter name is the connection between the LOAD statement, the Custom Adapter definition, and the Host Link definition.

```

.
.
.
Load PBXAAPI
Load ESCONCFG ESCN1.CFG
Load BTIPBXA Slot=2 Unit=01 Frame=3174 PU=2.1 Name=ESCON1
.
.
Load COMMEEXEC

```

7. Verify that the Unit= parameter is a valid device address and matches an address defined in the ESCON configuration and mainframe IOCP.

TCP/IP Passthrough for NetWare

If TCP/IP Passthrough fails to activate, there are several activities you may try in order to correct the problem.

1. Verify the Passthrough application is installed on your server. Load Novell's INSTALL program and display the Currently Installed Products. TCP/IP Passthrough should be listed (Figure 16-26).

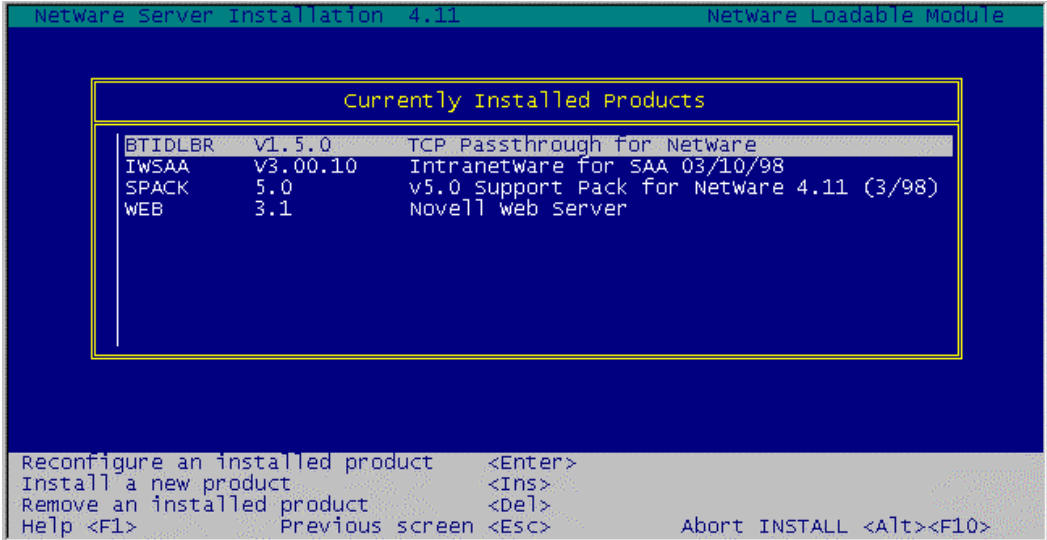


Figure 16-26. Passthrough on Installed Products List

If it is not listed, follow the procedure on page 141 to install TCP/IP Passthrough.

2. Edit AUTOEXEC.NCF. Verify that BTIAAPI is the first module loaded for TCP/IP Passthrough. (Figure 16-27).

```

;      Define two NICs for the TCP/IP frame type.

LOAD IBMMPCO SLOT=6 FRAME=TOKEN-RING_SNAP NAME=SLOT6TR
LOAD IBMFDDIO SLOT=3 FRAME=FDDI_SNAP NAME=SLOT3FDDI

;      Load the ESCON Configuration File

LOAD BTIAAPI
LOAD ESCONCFG ESCN1.CFG

;      Define two address pairs for the two TCP/IP connections.

LOAD BTIPBXA SLOT=4 UNIT=02 FRAME=8232 NAME=ESCON_TCP9F0
LOAD BTIPBXA SLOT=4 UNIT=04 FRAME=8232 NAME=ESCON_TCP920

;      Load the DataLinkBridge (TCP/IP) Support modules

LOAD BTIDLBR

;      Bind TCP/IP Passthrough to the FDDI and ESCON Adapters.

CHL BIND DATALINK SLOT6TR      TO ESCON_TCP9F0
CHL BIND DATALINK SLOT3FDDI TO ESCON_TCP920

```

Figure 16-27. AUTOEXEC.NCF for TCP/IP Passthrough

3. Verify that ESCONCFG is loaded after BTIAAPI but before any LOADs for BTIPBXA.
4. Verify that there is one LOAD statement for each LAN adapter supporting TCP/IP Passthrough.
5. Verify that there is one LOAD BTIPBXA statement for each passthrough connection being defined.
6. For each LOAD BTIPBXA statement verify that the address specified in the Unit= parameter matches a device pair configured in the ESCON configuration and mainframe IOCP. Remember that TCP/IP Passthrough uses two addresses, one for input and one for output. The Path Index number specified in the Unit statement must be an even number in range x'02'-x'40'.

If the LOAD statement specifies Unit=02 then the ESCON configuration must configure Index02 and Index03.
7. Verify that BTIDLBR is loaded following all BTIPBXA load commands.
8. Verify that the CHL BIND commands properly define a connection between the LAN adapter and the ESCON adapter.

Collecting Mainframe TCP/IP Traces

Tracing Devices in TCP/IP for VM and MVS

Sometimes it is necessary to trace the activity of the links in TCP/IP For VM and MVS. TCP/IP provides a comprehensive trace facility based on “process” names, which are typically function-oriented instead of being specific. Each trace process has a unique name, such as TCPUP, TCPDOWN, ARP, CETI, PING, UDP, TELNET, etc. The process name to trace a TCP Passthrough link is **PCCA**. The **PCCA** trace is an “all-link” trace of I/O activity on all links of a particular type. Unfortunately, it cannot trace a specific link so if you have multiple links, all the links are traced.

Activating the PCCA Trace

Edit the TCP/IP profile dataset (in MVS TCP/IP, this is the PROFILE.TCPIP dataset; in VM TCP/IP, this is the PROFILE TCPIP A1 CMS file). Insert a TRACE PCCA statement and a MORETRACE statement at the end of the dataset. For example:

```
; THE LINK DEVICES ARE USUALLY STARTED AT THE END OF THE DATASET
;
; add the TRACE statements just before the START commands
;
TRACE PCCA
MORETRACE
; if this is VM TCP/IP, the trace output appears on the CMS
;   console, and can be captured in a CP spool file.
;
; if this is MVS TCP/IP, add the FILE statement too:
FILE IBMTCP.TRACE.OUTPUT
;
START CHAN9A0
START ETH1
START TRING2C0
```

Stopping the PCCA Trace

The trace can be stopped without shutting down TCP/IP by using the OBEYFILE command and sending a NOTRACE command to the server. The trace is also stopped if the TCP/IP server is shutdown in an orderly way. The TRACE and MORETRACE statements can be then removed from the dataset, or, they can be turned into comments by placing a semicolon and space in front of the commands, such as:

```
; TRACE PCCA
; MORETRACE
```

Tracing Devices in a VM/ESA System

To trace all the I/O activity for a TCP/IP controller in a VM environment, use the TRSOURCE command. The TRSOURCE command must be executed in a privileged virtual machine such as OPERATOR or MAINT. In the following example, devices 5A0 and 5A1 are traced, dumping 256 bytes of data for each I/O event. For this example, the trace event is named "esctrace".

```
LINK MAINT 193 333 RR
ACCESS 333 B/A
TRSOURCE ID esctrace TYPE IO DEVICE 5A0-5A1 IODATA 256
TRSOURCE ENABLE ID esctrace
```

Once these commands are entered, VM is tracing devices 5A0 and 5A1, so you should recreate the situation or problem with those devices. Once that is done, type:

```
TRSAVE ID CHLTRACE
CP QUERY TRFILES (you should see a trace file, e.g. number
2349)
TRSOURCE DROP ID esctrace
TRACERED 2349 CMS esctrace output a ( ALL
```

The trace is stopped. Use TRACERED, a CMS program, to read the trace data file named ESCTRACE OUTPUT A1.

Tracing Devices in MVS Using GTF

Sometimes it is necessary to trace all I/O activity of a TCP/IP link to determine what data, if any, is moving to and from the TCP/IP controller. To trace all the I/O activity for a TCP/IP controller in an MVS environment, use the GTF PROC, which is a standard PROC in SYS1.PROCLIB used for starting the Generalized Trace Facility.

Creating the GTF Trace JCL Procedure

Following is an example of a GTF PROC:

```
//GTF      PROC MEMBER=GTFPARM
//*       LIB:  SYS1.PROC(GTF)
//*       GDE:  CBIPO MVS INSTALLTION
//*       DOC:  THIS PROCEDURE EXECUTES THE PTF PROGRAM
//*
//IEFPROC  EXEC PGM=AHLGTF, PARM='MODE=EXT,DEBUG=NO,TIME=YES', X
//        REGION=2280K,DPRTY=(15,15)
//IEFRDER  DD  DSNAME=SYS1.TRACE,DISP=SHR
//SYSLIB   DD  DSNAME=SYS1.PARMLIB(&MEMBER),DISP=SHR
```


Creating the GTF Trace Parameters Member

Notice the member GTFPARM in SYS1.PARMLIB. You should code default GTF parameters in that member, so that the right trace information is captured. Suggested default parameters are:

```
TRACE=IOP,SSCHP,HSCH,CSCH,CCW
```

Initializing and Starting the GTF Trace Procedure

To trace a problem prepare a job to run the GTF PROC. When the job executes, it will require responses at the operator's console. For example:

```
MSG:
*nn AHL125A Respecify options or reply U
RESPONSE:
nn TRACE=IOP,SSCHP,CCWP,HSCH,CSCH
MSG:
*nn AHL125A SPECIFY TRACE EVENT KEYWORDS
- IO=, SSCH=, IO=SSCH=
RESPONSE:
nn IO=SSCH=A20,CCW=DATA=256
```

In this example, mainframe device address A20 is being traced.

To trace multiple addresses, reply instead:

```
nn IO=SSCH=(A20,A21),CCW=DATA=256
MSG:
*nn AHL102 CONTINUE TRACE DEFINITION
OR REPLY END
RESPONSE:
nn END
```

You will receive another message from GTF:

```
MSG:
*nn AHL125A Respecify options or reply U
```

and you should reply

```
RESPONSE:
nn U
```

At this point, the GTF will be running.

You should now reproduce your problem and then stop GTF with the P command at the operators console.

Formatting the GTF Trace Output

Once the problem is “captured” in the trace, you will need to format the GTF trace data so that it can read. The following PROC is used to print the GTF trace:

```
//GTFPRT JOB (A), 'USER NAME',MSGLEVEL=(1,1),CLASS=X,MSGCLASS=X
//IPCS EXEC PGM=IKJEFT01,DYNAMNBR=20,REGION=1500K
//SYSTSPRT DD SYSOUT=*
//TRACE DD DSN=SYS1.TRACE,DISP=SHR
//IPCSDDIR DD DSN=IPOIPCS.DATA.SET.DIRECTRY,DISP=SHR
//SYSTSIN DD *
IPCS NOPARM
SETDEF DSN('SYS1.TRACE') LIST NOCONFIRM DDNAME(TRACE)
GTFTRACE CCW,IO,SSCH
/*
```

Replacing a Failed Adapter

Replacing a failed Netfinity ESCON Adapter is easy and straightforward. The following steps must be completed.

1. Power down the server.
2. Remove the cover.
3. Disconnect the ESCON cable from the Netfinity ESCON Adapter.
4. Remove the Netfinity ESCON Adapter from system by removing the screw holding down the connector plate and pulling evenly up on the adapter.
5. Follow the instructions in Chapter 2 for installing a new adapter. Be sure to install the replacement adapter into the same slot as the adapter being replaced.
6. Replace the system cover.
7. Re-attach the ESCON cable to the new adapter.
8. Power on the system.
9. Verify the adapter is working by varying the server online.

Note: *As long the new adapter is installed in the same slot as the adapter being removed, there will be no need to re-install or re-configure either the adapter driver or applications using the adapter. However, if the adapter is installed in a new slot then the software will need to be re-configured. Please refer to “[Chapter 14. Adding an Additional Adapter](#)” for a discussion on configuring existing software for a new adapter.*

HELP AND SERVICE INFORMATION

If you have questions about your new Options by IBM product, or require technical assistance, visit the IBM Personal Computing Web site at <http://www.pc.ibm.com> for information about IBM, Options by IBM, or IBM Service and Support. Additionally, you can receive information from the IBM Automated Fax system at 1-800-426-3395 (in Canada, 1-800-465-3299), or from the Personal Systems Group Bulletin Board System (PSG BBS) at 1-919-517-0001. You can also get help and information through the IBM PC HelpCenter, 24 hours a day, seven days a week. Response time may vary depending on the number and nature of the calls received.

Marketing, installation, and configuration support through the HelpCenter will be withdrawn or made available for a fee, at IBM's discretion, 90 days after the option has been withdrawn from marketing. Additional support offerings, including step-by-step installation assistance, are available for a nominal fee.

During the warranty period, assistance for replacement or exchange of defective components is available. In addition, if your IBM option is installed in an IBM computer, you might be entitled to service at your location. Your technical support representative can help you determine the best alternative.

Step 1: Problem Solving

You may be able to solve the problem yourself. Before calling the HelpCenter, please prepare for the call by following these steps:

1. If you are having installation or configuration problems, refer to the detailed installation and configuration sections found in this manual for the software you are configuring, and review any README.TXT files found on the installation CD.
2. Visit the Service and support section of the Personal Computing Web site specific to the model of option you have purchased. Updated installation instructions, hints, and tips, or updated system-specific notes are often published in this section. You might find that later device drivers are available that will improve the performance and compatibility for your new option.

If you are installing this option in an IBM computer, also visit the applicable Web page for that computer model. These pages might also contain useful hints and tips related to installation of this option and might refer to BIOS or device-driver updates required for your computer model. If you are installing the option in a non-IBM computer, refer to the manufacturer's Web site.

3. Uninstall, and then reinstall the option. During the uninstall process, be sure to remove any files that were installed during the previous installation. Many IBM options include uninstall programs.

4. Check your ESCON cabling. Make sure both the server and mainframe are properly connected.
5. Review Chapter 16. Troubleshooting. Go through the steps in the Hardware section as well as Software sections appropriate to your server.

Step 2: Preparing for the Call

To assist the technical support representative, have available as much of the following information as possible:

1. Option name
2. Option number
3. Proof of purchase
4. Computer manufacturer, model, serial number (if IBM), and manual
5. Exact wording of the error message (if any)
6. Description of the problem
7. Hardware and software configuration information for your system

If possible, be at your computer. Your technical support representative might want to walk you through the problem during the call.

Step 3: Placing the Call to IBM

If you call 90 days or more after the date of withdrawal or after your warranty has expired, you might be charged a fee.

For the support telephone number and support hours by country, refer to the following table or the enclosed technical support insert. If the number is not provided, contact your IBM reseller or IBM marketing representative.

<i>Support 24 hours a day, 7 days a week</i>	
Canada	1-800-565-3344
U.S.A. / Puerto Rico	1-800-772-2227

Additional Technical Support Resources

Online technical support is available during the life of your product. Online assistance can be obtained through the IBM Automated Fax System, the Personal Computing Web page, and the PSG Electronic Bulletin Board System.

<i>Online Technical Support</i>	
IBM Personal Computing Web Page	www.pc.ibm.com
IBM PSG BBS	1-919-517-0001
IBM Automated Fax System	1-800-426-3395 1-800-465-3299 (in Canada)

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International Business Machines Corporation

Armonk, New York, 10504

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Machine: Netfinity ESCON Adapter

Warranty Period*: 3 Years

**Contact your place of purchase for warranty service information.*

Production Status

Each Machine is manufactured from new parts, or new and used parts. In some cases, the Machine may not be new and may have been previously installed. Regardless of the Machine's production status, IBM's warranty terms apply.

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IBM warrants that each Machine 1) is free from defects in materials and workmanship and 2) conforms to IBM's Official Published Specifications. The warranty period for a Machine is a specified, fixed period commencing on its Date of Installation. The date on your receipt is the Date of Installation, unless IBM or your reseller informs you otherwise.

During the warranty period IBM or your reseller, if authorized by IBM, will provide warranty service under the type of service designated for the Machine and will manage and install engineering changes that apply to the Machine.

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If a Machine does not function as warranted during the warranty period, IBM or your reseller will repair it or replace it with one that is at least functionally equivalent, without charge. The replacement may not be new, but will be in good working order. If IBM or your reseller is unable to repair or replace the Machine, you may return it to your place of purchase and your money will be refunded.

If you transfer a Machine to another user, warranty service is available to that user for the remainder of the warranty period. You should give your proof of purchase and this Statement to that user. However, for Machines which have a life-time warranty, this warranty is not transferable.

Warranty Service

To obtain warranty service for the Machine, you should contact your reseller or call IBM. In the United States, call IBM at **1-800-772-2227**. In Canada, call IBM at **1-800-565-3344**. You may be required to present proof of purchase.

IBM or your reseller will provide certain types of repair and exchange service, either at your location or at IBM's or your reseller's service center, to restore a Machine to good working order.

When a type of service involves the exchange of a Machine or part, the item IBM or your reseller replaces becomes its property and the replacement becomes yours. You represent that all removed items are genuine and unaltered. The replacement may not be new, but will be in good working order and at least functionally equivalent to the item replaced. The replacement assumes the warranty service status of the replaced item. Before IBM or your reseller exchanges a Machine or part, you agree to remove all features, parts, options, alterations, and attachments not under warranty service.

You also agree to ensure that the Machine is free of any legal obligations or restrictions that prevent its exchange.

You agree to:

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2. where applicable, before service is provided –
 - a. follow the problem determination, problem analysis, and service request procedures that IBM or your reseller provide.
 - b. secure all programs, data and funds contained in a Machine, and
 - c. inform IBM of your reseller of changes in a Machine's location.

IBM is responsible for loss of, or damage to, your Machine while it is 1) in IBM's possession or 2) in transit in those cases where IBM is responsible for transportation charges.

Extent of Warranty

IBM does not warrant uninterrupted or error-free operation of a Machine.

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