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Using 3174 in TCP/IP Networks

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First Edition (June 1994)

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Abstract

The 3174 Establishment Controller is a very important component in multi-protocol networks involving subarea SNA, Advanced Peer-to-Peer Networking (APPN), Peer Communication, Token-Ring and Ethernet LANs, X.25, Integrated Services Digital Network (ISDN), asynchronous communication, frame relay, and Transmission Control Protocol/Internet Protocol (TCP/IP).

This document focuses on the roles of the 3174 in TCP/IP networks. It includes functions introduced by the 3174 TCP/IP TELNET RPQ 8Q0935, enhancements such as TN3270, TCP/IP host printer, and SNMP MIB-II support offered by 3174 TCP/IP Enhancements RPQ 8Q1041 and the recently available IP Forwarding RPQ 8Q1289.

This document is intended to help customers and systems engineers understand the functionality provided and how to customize the 3174 for participation in a TCP/IP network. It is organized to help the reader understand the basics of the TCP/IP Architecture in general and the 3174 implementation specifically. The scenarios include sample configuration files and panels for the 3174 and other TCP/IP hosts in the network. The reader is assumed to have a basic knowledge of TCP/IP as implemented by the other products used in the scenarios.

(373 pages)

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Special Notices

This publication is intended to help IBM and customer system engineers, system planners, system programmers and network administrators implement the TCP/IP TELNET Support and Peer Support provided by the 3174 Network Controller Configuration Support-C Licensed Internal Code. The information in this publication is not intended as the specification of any programming interfaces that are provided by 3174 Network Controller Configuration Support-C Licensed Internal Code. See the PUBLICATIONS section of the IBM Product Announcement (193-121) for the IBM 3174 Establishment Controller Networking Enhancements for more information about what publications are considered to be product documentation.

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Preface

The 3174 Establishment Controller is a very important component in multi-protocol networks involving subarea SNA, Advanced Peer-to-Peer Networking (APPN), Peer Communication, Token-Ring and Ethernet LANs, X.25, Integrated Services Digital Network (ISDN), asynchronous communication, frame relay, and Transmission Control Protocol/Internet Protocol (TCP/IP).

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How This Document is Organized

The document is organized as follows:

- Chapter 1, "An Introduction to 3174 TCP/IP Support" on page 1
  - This chapter gives a functional overview of 3174 TCP/IP support. It also contains a description of the TCP/IP architecture.
- Chapter 2, "3174 TCP/IP Telnet Support" on page 9
  - This chapter provides information on how to implement the 3174 to support TCP/IP.
- Chapter 3, "Adding 3174 to TCP/IP Network" on page 19
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- Chapter 4, "Scenario 1: TCP/IP Using 3174 Peer Communication Only" on page 67
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- Chapter 5, "Scenario 2: Concurrent Access to SNA and TCP/IP Hosts" on page 119
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- Chapter 6, "Scenario 3: APPN and TCP/IP via 3174 to AS/400 and VTAM" on page 159

- This chapter (Scenario 3) shows the capability of a PS/2 EN utilizing an 3174 NN to communicate to an AS/400 NN and Subarea Node simultaneously. An 3270 CUT terminal using the 3174 Gateway to establish TCP/IP session with the TCP/IP on the AS/400 and establish a session with the SNA host.

- Chapter 7, "Scenario 4: TCP/IP via 3174 and RS/6000 Router to VAX" on page 209
  - This chapter (Scenario 4) shows the capability of a PS/2 and 3270 3270 CUT terminal using the 3174 Gateway to establish a TCP/IP session to the VAX host which is connected via Ethernet on the RS/6000 router. Simultaneously the PS/2 and the 3270 CUT terminal using the 3174 Gateway to establish a TCP/IP session to an AS/400 host.
- Chapter 8, "3174 Ethernet Considerations" on page 227
  - This chapter discusses, in general, the 3174 Ethernet support. This include the microcode, adapter and customization.
- Chapter 9, "3174 TCP/IP Enhancements RPQ 8Q1041" on page 263
  - This chapter discusses the enhancements made to the 3174 TCP/IP support in the 3174 TCP/IP Enhancements RPQ 8Q1041.
- Chapter 10, "3174 Configuration Support C, Release 5" on page 351
  - This chapter discusses the ability to for the 3174 to communicate using TCP/IP protocol over a frame relay link, provided in Configuration Support-C Release 5
- Appendix A, "Address Bit Order for Ethernet Addresses" on page 359
  - This Appendix discusses addressing issues when using 3174 Ethernet support.
- Appendix B, "SNMP Variables" on page 363
  - This Appendix contains a table of the SNMP variables supported by the 3174.

Related Publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this document.

- *3174 Establishment Controller Functional Description*, GA23-0218
- *3174 Establishment Controller Configuration Support-C Release 3 Planning Guide*, GA27-3918
- *3174 Establishment Controller Configuration Support-C Release 3 Utilities Guide*, GA27-3920
- *3174 Establishment Controller Status Codes*, GA27-3832
- *3174 Establishment Controller Supplemental Customer Information for Configuration Support-C Release 4 Ethernet Adapter*, GA27-3994
- *3174 Establishment Controller Customer Problem Determination*, GA23-0217
- *3174 Establishment Controller Terminal User's Reference for Expanded Functions*, GA23-0332
- *Communications Manager/2 Configuration Guide*, SC31-6171

- *IBM Transmission Control Protocol/Internet Protocol Version 2.0 for OS/2: User's Guide*, SC31-6076
- *NTS/2 LAN Adapter and Protocol Support Configuration Guide*, S96F8489
- *IBM Transmission Control Protocol/Internet Protocol Version 2.1.1 for DOS: Installation and Administration*, SC31-7047
- *IBM Transmission Control Protocol/Internet Protocol Version 2.1.1 for DOS: User's Guide*, SC31-7045
- *AIX Version 3 RISC System/6000, Communication Concepts and Procedure*, GC23-2203
- *AIX System Management System/6000, Communication Concepts and Procedure*, GC23-2487
- *Sun Microsystems System and Network Administration*, 800-3805-10
- *HP-UX System Administration Manual, Release 9.0*, 800-3805-10

International Technical Support Organization Publications

- *3174 Establishment Controller, Installation Guide*, GG24-3061
- *3174 Establishment Controller APPN Implementation Guide*, GG24-3702
- *IBM Personal Communication/3270 Version 3.0 Implementation Guide*, GG24-3949
- *IBM TCP/IP V2.1 for VM Installation and Interoperability*, GG24-3624
- *TCP/IP Tutorial and Technical Overview*, GG24-3531

A complete list of International Technical Support Organization publications, with a brief description of each, may be found in:

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Chapter 1. An Introduction to 3174 TCP/IP Support

Transmission Control Protocol/Internet Protocol (TCP/IP) is a set of standards that have been widely accepted by the computer industry, both users and manufacturers, for communication between multivendor systems.

The 3174, traditionally a cluster controller for 3270 host devices, was enhanced with the TCP/IP Telnet client capability to allow 3270 displays operating in CUT mode, and ASCII displays attached to the Asynchronous Emulation Adapter (AEA), to access TCP/IP Telnet servers in TCP/IP networks. This capability was offered, in March 1992, as a no-charge 3174 TCP/IP Telnet RPQ 8Q0935, based on Configuration Support-C Release 2 LIC.

In May 1993, Configuration Support-C Release 3 was announced. Its base microcode includes the base functions of previous releases of 3174 Licensed Internal Code. In addition, the functions provided by the 3174 TCP/IP Telnet RPQ 8Q0935 are now integrated in the base functions of Configuration Support-C Release 3. This integrated capability is referred to as the *3174 TCP/IP Telnet Support* in this document. Configuration Support-C Release 3 became available in June 1993.

In May 1993, Configuration Support-C Release 4 was also announced. Included in this announcement was the 3174 TCP/IP Enhancements RPQ 8Q1041, which provides TN3270 support, TCP/IP-dependent host printer support, and SNMP MIB-II support. This RPQ, available as of April 1994, combines the token-ring support of Configuration Support-C Release 3 with the Ethernet support of Configuration Support-C Release 4.

Currently the 3174 performs the function of a bridge for TCP/IP hosts that are coax-attached using the 3174 Peer Communications support. In this case there is no routing of IP traffic being done by the 3174. RPQ 8Q1289, scheduled for July 1994, expands the 3174 services of programmable workstation running TCP/IP by providing IP forwarding, via static routing.

This document focuses on the TCP/IP functions provided by the Configuration Support-C Release 3 and Configuration Support-C Release 4 base microcode and the RPQ 8Q1041. A brief discussion on TCP/IP support in Configuration Support-C Release 5 has been included to assist in doing some preliminary planning.

This chapter provides an overview of TCP/IP, and briefly describes the TCP/IP protocols supported by the 3174. This chapter uses material from the following document:

- *TCP/IP Tutorial and Technical Overview*, GG24-3531

1.1 3174 Functional Overview

The following table is an overview of the functionality available in the different 3174 Configuration Support C microcode releases and RPQs.

Table 1. Function Availability Matrix

Function	T/R	APPN	Peer	ISDN	Enet	Frame Relay	Telnet	TN3270 LPD MIB-2	Date
C2	Y	Y	Y	Y	N	N	N	N	**now**
RPQ 8Q0935	Y	Y	Y	Y	N	N	Y	N	**now**
C3	Y	Y	Y	Y	N	N	Y	N	**now**
C4	N	Y	Y	Y	Y	N	Y	N	**12/93**
RPQ 8Q1041	Y	Y	Y	Y	Y	N	Y	Y	**04/94**
C5	Y	Y	Y	Y	Y	Y	Y	N	**06/94**
RPQ 8Q1289	Y	Y	Y	Y	Y	Y	Y	Y	**07/94**

Note: With Configuration Support-C Release 2 the End-User Productivity Enhancements became available, which are described in *IBM 3174 Establishment Controller Installation Guide, GG24-3061-04.*

1.2 TCP/IP Overview

TCP/IP includes a set of network standards specifying the details for computer communication, as well as a set of conventions for interconnecting networks and routing traffic. Its primary use is for interconnection of networks providing universal communication services. The collection of these networks interconnected through TCP/IP is known as an *internet*.

Each network uses a gateway, a bridge or a router to connect into an internet. All nodes on all networks within an internet communicate with each other as if all other nodes were in the same network. TCP/IP connectivity includes routing capabilities for both local area and wide area networks.

When TCP/IP is used on a token-ring network, all the normal token-ring network management functions are available because token-ring network management is independent of the higher-level protocol. This applies as well to environments using an SNA network as the transport mechanism for TCP/IP.

In today's multivendor and multiprotocol world, SNA networks and TCP/IP networks need to run side by side to allow users to access, from a single display station, any application in the network.

Together with the 3174 TCP/IP Telnet Support, the 3174 is now able to support TCP/IP environments via the token-ring network.

1.3 TCP/IP Architecture

This section briefly describes the TCP/IP architectural layers supported by the 3174 TCP/IP Telnet Support.

The internet protocols are modeled into four functional layers:

- Application

  This is a user process cooperating with another process on the same or different host.

- Transport

  This layer provides the end-to-end data transfer.

- Internetwork

  This layer provides the "virtual network" image of internet and shields the higher levels from the network architecture below it. It is probably the most important protocol.

- Network Interface

  This layer is the interface to the actual network hardware.

1.3.1 Transmission Control Protocol (TCP)

Most of the user application protocols, such as Telnet and FTP, use TCP as the underlying protocol. TCP is a connection-oriented, end-to-end reliable protocol providing logical connections between pairs of processes.

For applications making use of this protocol, TCP provides the following:

- Stream data transfer

From the application's viewpoint, TCP transfers a contiguous stream of bytes through the internet. First it groups the data into TCP segments, before passing the segments to IP for transmission to its destination.

- Reliability

  TCP assigns a sequence number to each transmitted byte and expects a positive acknowledgment (ACK) from the receiving TCP. If the ACK is not received within a timeout interval, the data is retransmitted.

- Flow control

  The receiving TCP, when sending an ACK back to the sender, indicates to the sender the number of bytes it can receive beyond the last received TCP segment, without causing overruns or overflows.

- Multiplexing

  With this technique datagrams are directed through the use of ports.

- Logical connections

  The reliability and flow control mechanism described above requires that TCPs initialize and maintain certain status information for each "data stream." The combination of this status, including sockets, sequence numbers and window sizes, is called a logical connection (or virtual circuit). Each connection is uniquely identified by the pair of sockets used by the sending and receiving process.

- Full-duplex

  TCP provides for concurrent data streams in both directions.

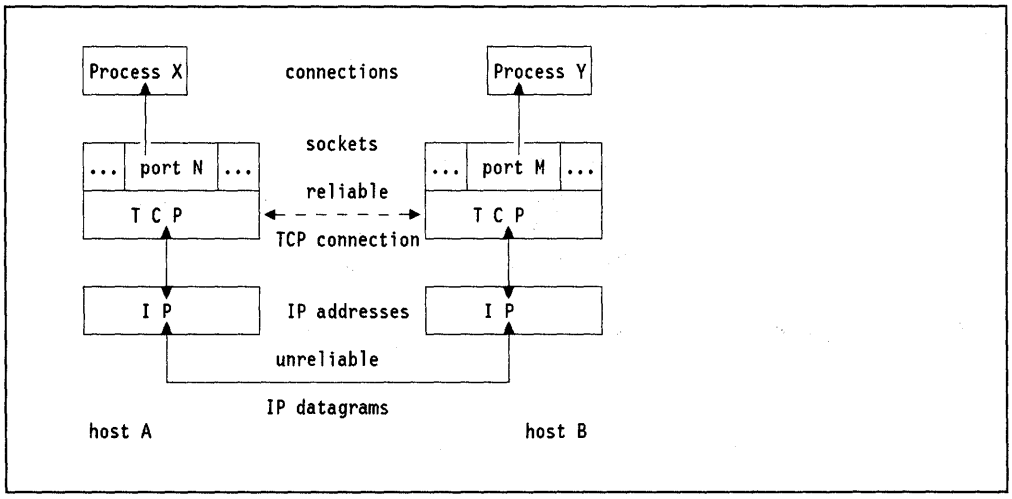


Figure 1. TCP Logical Connections

Establishing a TCP Connection

Before any data can be transferred, a connection has to be established between the two processes. One of the processes issues a "passive OPEN" call, the other an "active OPEN" call. The passive OPEN call remains dormant until another process tries to connect to it by an active OPEN.

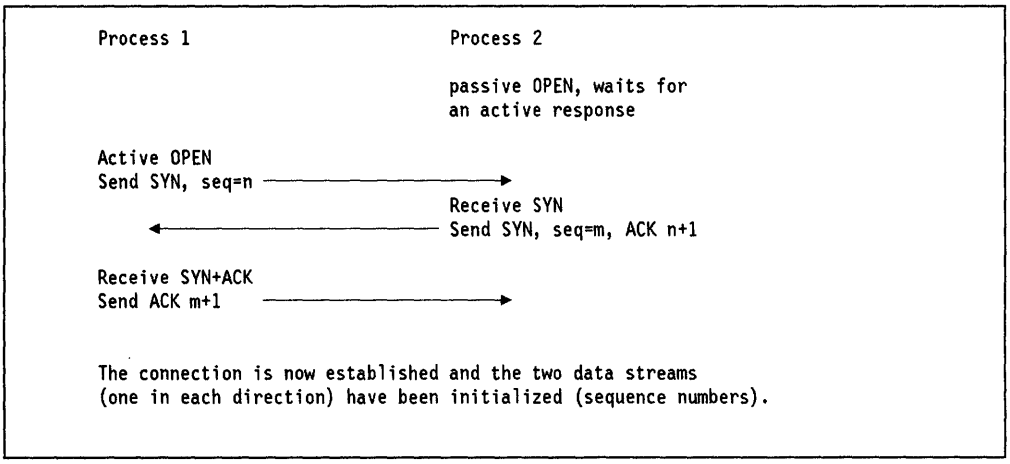


Figure 2. TCP Connection Establishment

This whole process is known as a three-way handshake. Note that the exchanged TCP segments include the initial sequence numbers from both sides to be used on subsequent data transfers.

Closing the connection is done implicitly by sending a TCP segment with the FIN bit set (no more TCP data). As the connection is full-duplex (two independent data streams, one in each direction), the FIN segment only closes the data transfer in one direction. The other process will now send the remaining data it still has to transmit and also ends with the TCP segment where the FIN bit is set. The connection is deleted once the data stream is closed in both directions.

1.3.2 Telnet

The Telnet protocol provides a standardized interface, which allows a program on one host (the Telnet client) to access the resources of another host (the Telnet server). One example of this would be an ASCII device on an ASCII host accessing an S/390 application with TCP/IP installed. Another example would be a 3270 CUT display attached to a 3174 with Configuration Support-C Release 3 installed and customized for TCP/IP Telnet support, accessing a RISC System/6000* (or other TCP/IP Telnet server).

1.3.3 Internet Protocol (IP)

The Internet Protocol is the layer that hides the underlying physical network by creating a virtual network view. This is a connectionless protocol and hence offers no reliability, flow control or error recovery.

IP uses addresses to identify the source and target hosts on the internet. The internet (IP) address is 32 bits long and consists of two parts:

IP address = <network address> <host address>

The network part of the IP address identifies the network within the internet; the host part of the IP address identifies the individual host or gateway within that network. The division between the network and host parts of the IP address is determined by the first one to four bits of the IP address (see 3.1, "IP Addresses" on page 19).

The 32-bit IP address is usually represented in dotted decimal form w.x.y.z (for example, 9.67.38.87) for easy reference.

1.3.4 Internet Control Messaging Protocol (ICMP)

ICMP is a standard protocol. The IP is used for datagram services in an interconnected set of networks (internets). The network connection devices are IP gateways that exchange routing information between themselves using special TCP/IP protocols. ICMP functions are characterized as:

- ICMP uses IP as if it were a higher-level protocol. It is also an integral part of IP and is implemented in every IP module.
- ICMP is used to report errors found during datagram processing, and is used by:
  - The gateway
  - The destination host

1.3.5 User Datagram Protocol (UDP)

UDP is an application interface to IP. It serves as a "multiplexer/demultiplexer" for sending and receiving IP datagrams, using ports to direct the datagrams.

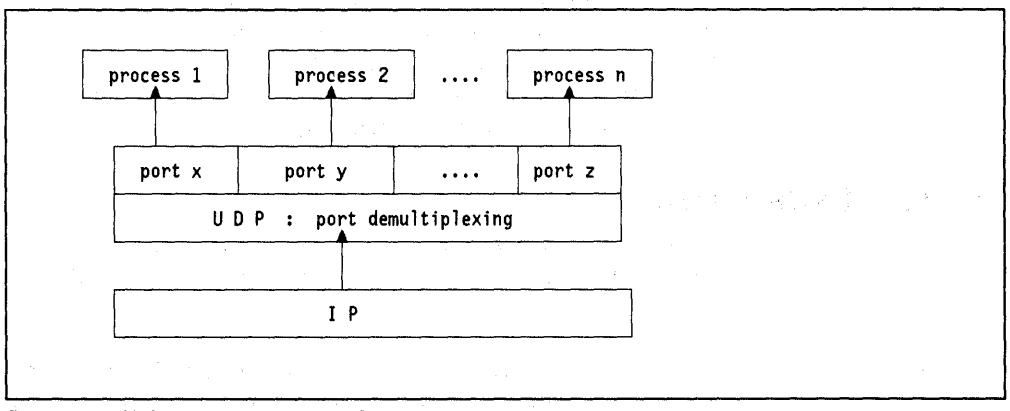


Figure 3. Using Ports to Direct Datagrams

Standard applications using UDP are:

- Trivial File Transfer Protocol
- Host Name Server and Domain Name Server
- Remote Procedure Call, used by Network File System (NFS)
- Network Computing System
- Simple Network Management Protocol (SNMP)

1.3.6 Address Resolution Protocol (ARP)

The ARP is responsible for converting the higher-level protocol addresses (IP addresses) to physical network addresses. On a single physical network, individual hosts are known on the network by their physical hardware address. Higher-level protocols address a destination host in the form of a symbolic address (IP address in the internet environment). When such a protocol wants to send a datagram to destination IP address w.x.y.z, the device driver does not understand this address.

Hence, ARP is used to translate this high-level address to the physical address of the destination host. ARP uses a lookup table to perform this translation. When an address is not found, a broadcast, known as an "ARP request," is sent out onto the network. If one of the machines on the network recognizes this

address, an "ARP reply" is sent back to the requesting host with the physical hardware address of the host and source route information. This is then stored for future use.

1.3.7 Simple Network Management Protocol (SNMP)

SNMP is used to communicate management information between the network management stations and the agents in the network elements.

1.3.8 Domain Name System

The Domain Name System, through the use of a server application, provides the translation between high-level machine names and the IP addresses. The client function (called the resolver) is transparent to the user and is called by most of the other applications to resolve the symbolic high-level names into real IP addresses.

1.3.9 Packet Internet Groper (PING)

PING is an application that sends out an ICMP datagram to a specified destination and waits for its return. The server counterpart merely echoes the frame it receives back to the originator. PING, therefore, can be used to determine if the destination host can be reached, that is, to check the connectivity path between two machines.

1.3.10 TCP/IP Gateways

Gateways interconnect multiple networks to form an internet. In the IBM* environment we use the following definitions for bridges, routers and gateways:

- Bridge

  A bridge interconnects LAN segments at the data link layer and forwards frames between them. It performs the function of a MAC relay and is independent of any higher layer protocols.

- Router

  A router interconnects networks at the network layer and route packets between them. Because it needs to understand the network addressing schemes used, a router is protocol-dependent. Routers are able to optimize packet sizes and transmission paths.

- Gateway

  A gateway interconnects networks at higher layers than bridges or routers, ranging from the network layer to the application layer. It usually supports address mapping from one network to another.

In the TCP/IP environment, the terms "gateway" and "internet gateway" are used to qualify what is defined above as being a router.

1.4 TCP/IP Protocols Supported

The 3174 supports the following protocols:

- Tel. (client only)
- TCP - Transmission Control Protocol
- IP - Internet Protocol

- ICMP - Internet Control Messaging Protocol
- UDP - User Datagram Protocol
- ARP - Address Resolution Protocol
- SNMP - Simple Network Management Protocol (MIB-I agent only)
- DNS - Domain Name System (resolver client only)
- PING - Packet Internet Groper

Figure 4 shows the protocols, within the detailed TCP/IP architectural model, supported by the 3174 TCP/IP Telnet Support.

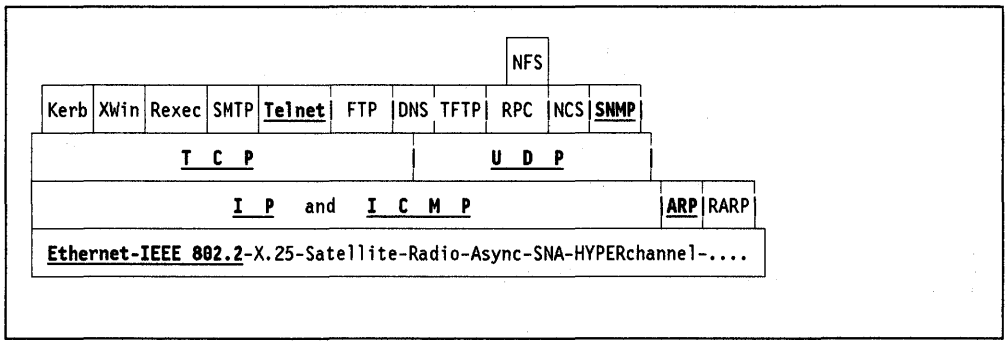


Figure 4. Protocols Supported by the 3174 TCP/IP Telnet Support

The SNMP agent responds to requests for MIB variable information from an SNMP manager elsewhere in the network.

Using the 3174 TCP/IP Telnet Support, any dependent terminal that is attached to a 3174 can operate in Telnet mode. ASCII displays are supported via the AEA. Coax-attached 3270 displays operating in CUT or DFT-E mode are supported as VT100, VT220, IBM 3101 or DG 210 devices. These displays are supported as 24 x 80 full-screen devices. When accessing TCP/IP on an IBM host (for example, TCP/IP for MVS or VM), only line-by-line mode is supported. TN3270 operation, in which the IBM host sends a full-screen 3270 data stream to the display, is not supported by Configuration Support-C Release 3. TN3270 will be supported by the 3174 TCP/IP Enhancements RPQ 8Q1041 (see Chapter 9, "3174 TCP/IP Enhancements RPQ 8Q1041" on page 263).

Chapter 2. 3174 TCP/IP Telnet Support

Existing IBM program products, TCP/IP for DOS and TCP/IP for OS/2*, provide TCP/IP support for intelligent workstations. These workstations may be attached using a Token-Ring, IBM PC Network, Ethernet, 3174 Peer (LAN over COAX), or Asynchronous Serial Line Internet Protocol (SLIP). 3174 TCP/IP Telnet support, provides TCP/IP host access to CUT and ASCII terminals directly attached.

This chapter describes the 3174 TCP/IP Telnet Support, including the 3174 models supported, the customization required, and operational aspects of this capability. This chapter uses material from the following document:

- *3174 TCP/IP Telnet RPQ Diskettes Installation Instruction* (provided with the RPQ 8Q0935 package).

The 3174 TCP/IP Enhancements RPQ 8Q1041 and Configuration Support-C Release 5 enhancements are described, in later chapters.

2.1 Support before 3174 TCP/IP Telnet RPQ 8Q0935

With the addition of the Peer Communication LIC feature or the Peer Communication RPQ 8Q0718 in a 3174 that is attached to a Token-Ring, the intelligent workstations can be coax-attached to the 3174 and participate in TCP/IP networking. For this configuration, the workstations require the appropriate LAN-Over-Coax device drivers provided by the following:

- For DOS, Workstation Peer Communication Support Program
- For OS/2, Extended Services, OS/2 LAN Server or NTS/2

Note:

The DOS Workstation Peer Communications Support Program has been replaced with the NDIS compliant driver, IBMXLN.DOS.

The 3174, in this instance, provides nothing more than an internal ring and an internal bridge to allow the coax-attached workstations access to the Token-Ring; it has no TCP/IP capability and dependent (CUT, DFT-E or ASCII) terminals attached to the 3174 cannot participate in TCP/IP networking.

The TCP/IP hosts to be accessed by the intelligent workstations may be attached directly to the same Token-Ring, or they may be accessible through the Token-Ring via bridges or routers.

2.2 Support with 3174 TCP/IP Telnet RPQ 8Q0935

With the announcement of the 3174 TCP/IP Telnet RPQ 8Q0935 and Configuration Support-C Release 2 in March 1992, a new capability was added to a Token-Ring attached 3174: the 3174 could now be customized to provide TCP/IP Telnet client services to allow dependent (CUT, DFT-E or ASCII) terminals attached to the 3174 to communicate with TCP/IP Telnet servers.

With the 3174 TCP/IP Telnet RPQ 8Q0935, a dependent (CUT, DFT-E and ASCII) terminal attached to the 3174 can establish a TCP/IP Telnet connection with a TCP/IP host/server anywhere in the existing LAN/WAN network. The TCP/IP

hosts to be accessed by the dependent terminals may be attached directly to the same Token-Ring, or they may be accessible through the Token-Ring via bridges or routers.

Each terminal user can have up to five logical terminals (LTs) if Multiple Logical Terminal (MLT) is customized. These five LTs can be used to access 3270, ASCII or TCP/IP host sessions; that is, all five LTs may be used to access five 3270 host sessions, or five ASCII host sessions, or five TCP/IP host sessions, or some combination of 3270, ASCII and TCP/IP host sessions. The desired host connection can be selected by means of the Connection Menu, or established by default. Any LT can be used to access the TCP/IP "pipe," very much the same way that a dial-out AEA port is accessed. For each TCP/IP LT, a simple set of commands allows the user to request and operate a session with any TCP/IP host in the network.

As seen above, the 3174 TCP/IP Telnet RPQ 8Q0935 works in conjunction with MLT and AEA functions. You can also use the 3174 TCP/IP Telnet RPQ 8Q0935 concurrently with all other functions that a given 3174 is capable of, such as Peer Communication and APPN*.

2.3 Support with Configuration Support-C Release 3

In May 1993, Configuration Support-C Release 3 was announced. Its base microcode includes the base functions of previous releases of 3174 Licensed Internal Code. In addition, the functions provided by the 3174 TCP/IP Telnet RPQ 8Q0935 are now integrated in the base functions of Configuration Support-C Release 3. This integrated capability is referred to as the *3174 TCP/IP Telnet Support* in this document.

In other words, the TCP/IP capabilities provided by the 3174 TCP/IP Telnet RPQ 8Q0935 are now provided by Configuration Support-C Release 3 base microcode.

2.4 Support with 3174 TCP/IP Enhancements RPQ 8Q1041

In May 1993, Configuration Support-C Release 4 was also announced. Included in this announcement was the 3174 TCP/IP Enhancements RPQ 8Q1041, which will provide TN3270 support, TCP/IP dependent host printer support, and SNMP MIB-II support. This RPQ, was made available April 1994, and is based on Configuration Support-C Release 4. With RPQ 8Q1041, therefore, the TCP/IP capabilities of the 3174 are extended even further.

2.5 Support with Configuration Support-C Release 5

Configuration Support-C Release 5 and frame relay support expands the 3174 connectivity for 3174 TCP/IP support. Prior to Configuration Support-C Release 5 all TCP/IP access to and from the 3174 assumed LAN (token-ring or Ethernet). With Configuration Support-C Release 5, you are able to telnet to TCP/IP host in the network via frame wide area network links. As of the publication date of this document, 3174 TCP/IP Enhancements RPQ 8Q1041 was not available for Configuration Support-C Release 5.

2.6 Support with 3174 IP Forwarding RPQ 8Q1289

3174 IP Forwarding RPQ 8Q1289 enables intelligent workstation that are not directly attached to the 3174 using Peer Communications, access to TCP/IP hosts via the 3174 the frame relay link(s). The 3174 actually, provides static IP routing for LAN (token-ring or Ethernet) attached intelligent workstation running as TCP/IP hosts.

2.7 TELNET Emulation and NLS Support

The 3174 TCP/IP Telnet Support allows CUT terminals to have up to five TELNET sessions. The supported emulators for National Language Support (NLS) are:

- VT100
- VT220 7-bit

Note: IBM3101, DG210 and VT220 8-bit emulation are not supported for NLS

In our scenario, we have tested NLS for the German and Canadian/Bilingual languages. In TELNET session with the RISC System/6000, we use the SMIT (Systems Management Interface Tool) facility.

German NLS experience:

- VT100 emulation:
  - All PF keys useable.
  - Use Alt instead of Esc key.
- VT220 7-bit emulation:
  - SMIT panel displays OK.
  - All PF keys usable.

Canadian/Bilingual NLS experience:

- VT100 emulation:
  - All PF keys, except the PF8, PF9 and PF10 keys, are usable.
  - PF8, PF9 and PF10 keys only capable in conjunction with Esc key.
  - Use Alt instead of Esc key.
- VT220 7-bit emulation:
  - SMIT panel displays OK.
  - All PF keys usable.

Note: If you are using a PS/2* with a 3270 CUT mode emulation program, you have to respond to 3174 customization Question 168 with 1. This function allows you to define the Home key as hot key.

Using this emulation will require you to define some additional keys. For more information about the different keyboard maps, see *Terminal User's Reference for Expanded Functions*, GA23-0332.

2.8 3174 Models Supported

The 3174 TCP/IP Telnet Support allows display devices that are attached to a 3174 to communicate with any TCP/IP host that is accessible via the LAN (token-ring or Ethernet). The TCP/IP host may be attached directly to the LAN (token-ring or Ethernet), or it may be bridged or routed to the LAN (token-ring or Ethernet) from elsewhere in the network.

The 3174 can be attached to a LAN (token-ring or Ethernet), either as a gateway, DSPU or stand-alone. Stand-alone requires no SNA host, and was first available in Configuration Support-C Release 4. For Configuration Support-C Release 3 and earlier versions the only way to customize the token-ring adapter was as a gateway or DSPU. Once you have the LAN (token-ring or Ethernet) attachment, the 3174 TCP/IP Telnet Support can be used on most models of the 3174.

2.8.1 Gateway 3174 Configuration

In a gateway configuration, the 3174 is attached to the SNA 3270 host either by a channel or a teleprocessing attachment. The 3174 gateway allows other devices on the LAN (token-ring or Ethernet) to access the 3270 host. The 3174 TCP/IP Telnet Support supports this configuration, allowing terminals that are attached to the 3174 gateway to access TCP/IP hosts via the LAN (token-ring or Ethernet).

The following 3174 models, customized as gateways, can be used with the 3174 TCP/IP Telnet Support; each of these 3174s requires a LAN adapter (IBM Token-Ring Adapter feature #3026, #3030 or #3044 or IBM Ethernet Adapter feature #3045):

- Models 01L, 01R, 02R
- Models 11L, 11R, 12L, 12R, 14R
- Models 21L, 21R, 22L, 22R, 24R
- Models 51R, 61R, 62R, 64R

One and only one LAN adapter can be customized and operational.

Figure 5 on page 13 shows a gateway configuration. In this configuration, the RISC System/6000 is using the 3174 gateway to access the 3270 host. The RISC System/6000, in turn, is being accessed as a TCP/IP host by the 3174 terminals. The token ring, in this case, can be replaced by an Ethernet LAN.

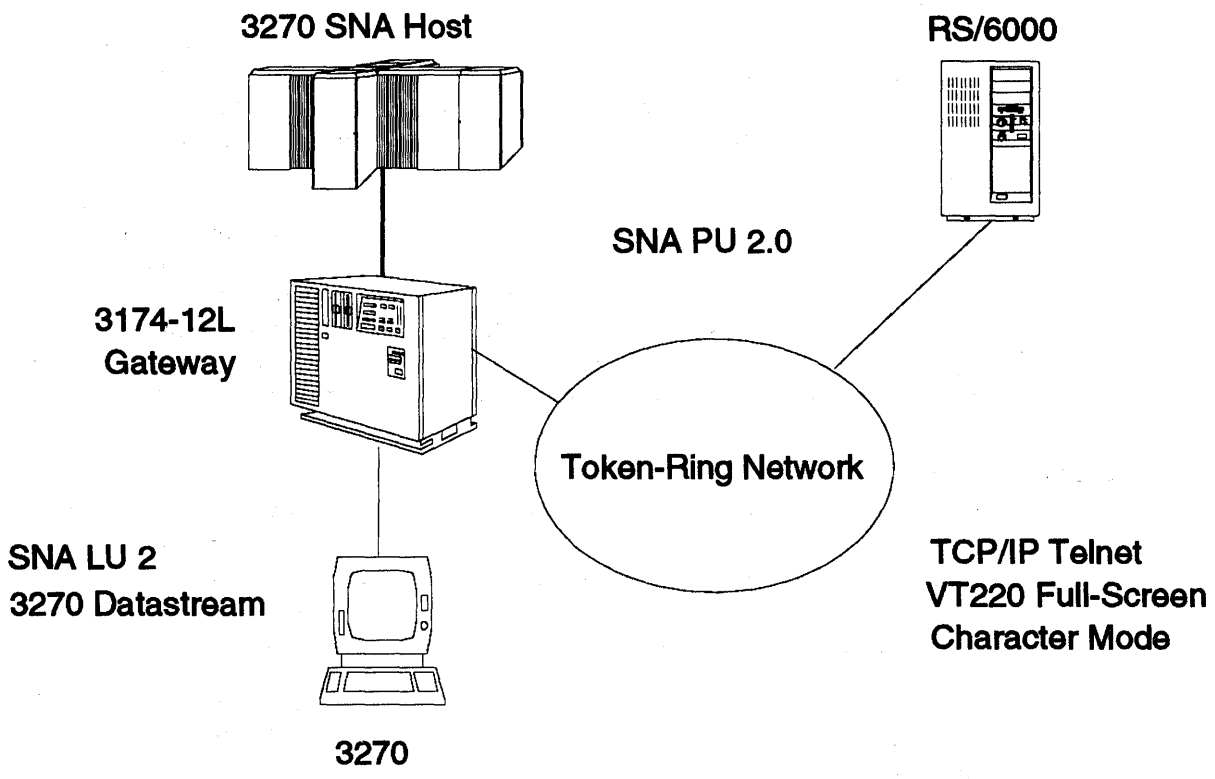


Figure 5. 3174 Gateway Configurations with 3174 TCP/IP Telnet Support

The 3174 provides the TCP/IP connection as an additional path for the user on a logical terminal (LT) basis. Each display may have up to five LTs which can be shared between the 3270 and the RISC System/6000 hosts.

2.8.2 DSPU 3174 Configuration

In a DSPU configuration, the 3174 uses the LAN (token-ring or Ethernet) to access SNA 3270 hosts. The 3174 TCP/IP Telnet Support allows dependent terminals that are attached to the 3174 DSPU to access TCP/IP hosts via the LAN (token-ring or Ethernet). Again, each display's LTs may be shared between the 3270 and the TCP/IP (RISC System/6000) hosts.

The following 3174 models are supported:

Each of these 3174s has an IBM Token-Ring Adapter as a standard feature:

- Models 3R, 13R, 23R, 53R and 63R

Each of these 3174s has an IBM Ethernet Adapter as a standard feature:

- Models 14R, 24R and 64R

The 3174 TCP/IP Telnet Support may also be used on a 3174 with a LAN (token-ring or Ethernet) adapter that is customized as a Model x3R or x4R, using the Alternate IML capability.

Figure 6 on page 14 shows a DSPU configuration. The 3174 DSPU must be customized for at least one SNA host attachment.

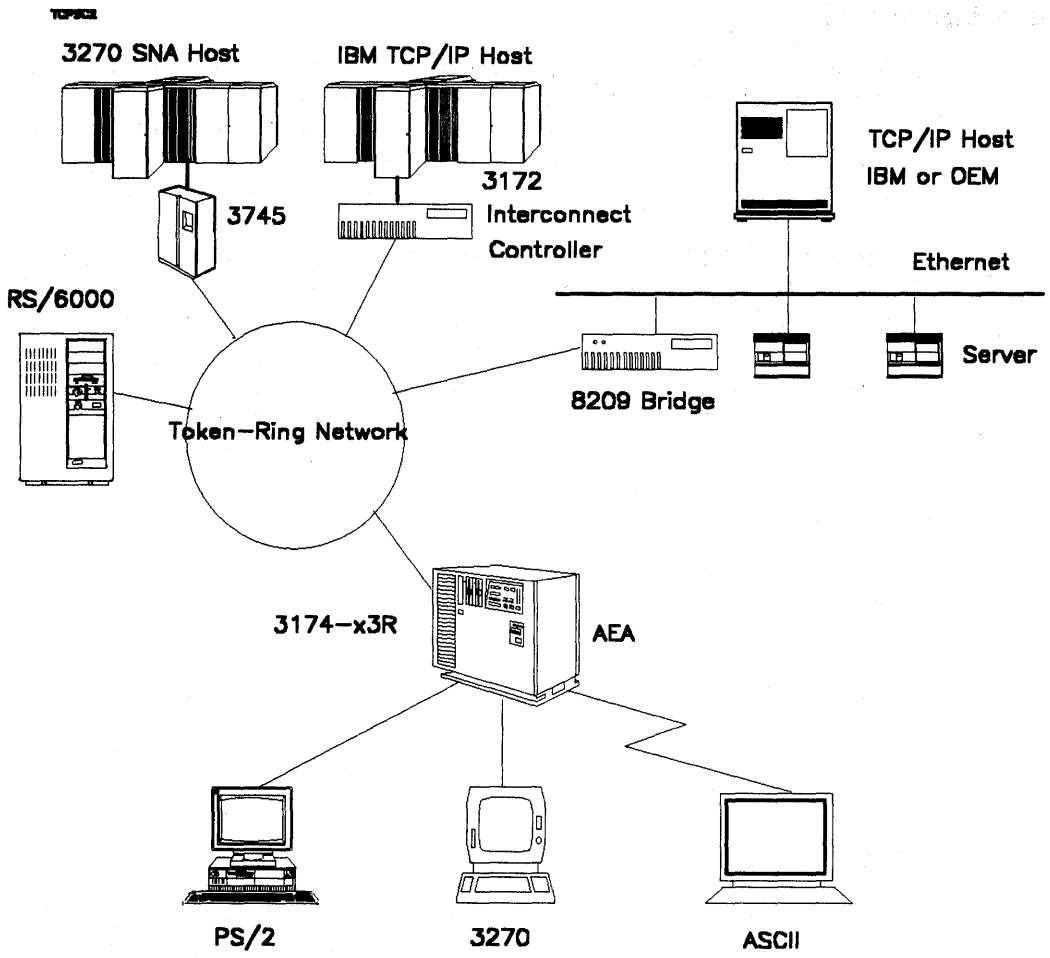


Figure 6. 3174 DSPU Configuration with 3174 TCP/IP Telnet Support

2.9 Devices Supported

The 3174 TCP/IP Telnet Support allows all displays that attach to the 3174, except DFTs, to operate in Telnet mode. The supported displays include the following:

- 3270 displays that are attached to the 3174 coax ports

  These 3270 displays must be operating in CUT mode (CUT displays, or the CUT side of a DFT-E display). They are supported as DEC VT100, DEC VT200, IBM 3101, or DG Dasher 210 devices, using the ASCII emulation microcode for the 3174 (an AEA adapter is not required). NLS support for these devices is the same as that provided by the AEA.

  The 3174 TCP/IP Telnet Support supports these devices in 24x80 mode only; the 132-column support for DEC VT220 provided in Configuration Support-C Release 2 is not available for the TCP/IP sessions.

- ASCII displays that are attached to the 3174 AEA ports

  The 3174 TCP/IP Telnet Support negotiates support for the specific terminal type when setting up the Telnet connection. If the specific terminal support is not available, simple line mode is used (ANSITERM).

2.10 Hosts Supported

The 3174 TCP/IP Telnet Support connects the supported devices to any host or device attached to the network that can communicate with TCP/IP and Telnet protocols, including IBM and non-IBM hosts. The TCP/IP hosts may be attached directly to the LAN (token-ring or Ethernet), or they may be bridged or routed to the LAN (token-ring or Ethernet) from elsewhere in the network.

Access to IBM TCP/IP hosts (TCP/IP for VM or MVS), however, is limited to line mode only, when using base Configuration Support-C Release 3 or 4. This is because the 3174 TCP/IP Telnet Support currently available in the base Configuration Support-C Release 3 or 4 does not support TN3270 protocols. Support for TN3270 is available in 3174 TCP/IP Enhancements RPQ 8Q1041 (see Chapter 9, "3174 TCP/IP Enhancements RPQ 8Q1041" on page 263).

2.11 Storage Requirements

Table 2 shows the additional storage your 3174 must have for the 3174 TCP/IP Telnet Support. These additional requirements must be added to the amounts that are needed by your 3174 without TCP/IP.

Table 2. 3174 TCP/IP Telnet RPQ Storage Requirements

	With AEA Customized	**Without AEA Customized**
Basic TCP/IP Telnet	231KB	362KB
Per session	7KB	
TCP/IP data buffers	See 2.11.2, "TCP/IP Data Buffers."	
Split Screen	If you expect to use split screen functions while accessing TELNET sessions, add 2 KB for each non-EAB Telnet LT and 4 KB for each EAB Telnet LT to your base MLT calculation.	
SNMP	50	

2.11.1 Sessions

When you customize for the 3174 TCP/IP Telnet Support, you must select the maximum number of concurrent Telnet connections you want to allow. This is given by your response to question 058 on the TCP/IP Options Menu. The 3174 creates a pool of session resources, available to terminal users on a first-come, first-served basis. They are not assigned to any particular 3174 terminal port or LT. Each session requires the amount of storage shown in the table.

2.11.2 TCP/IP Data Buffers

When you customize for the 3174 TCP/IP Telnet Support, storage is automatically reserved for 40 data buffers. Using customization question 060 on the TCP/IP Options Menu, you can include an additional amount of storage for data buffers. This additional amount should be included in your storage calculations.

A 3174 TCP/IP data buffer has roughly 100 bytes available for data. To determine how much storage your 3174 will need for these buffers, you should consider the types of host applications that your users will be accessing. For example, applications that send only one line at a time to the user's screen will use only one buffer at a time for a message. However, applications that send a

full screen of information with screen formatting controls included may send much larger messages, requiring many 3174 buffers at a time. Your decision will also be affected by the number of concurrent sessions you select in question 058.

When the 3174 runs out of buffers:

- The 3174 discards data from the TCP/IP network, causing retransmissions and adversely affecting response times.
- Requests to establish host connections will be rejected, and the users must retry to establish the connection.

2.12 Microcode Packaging

- RPQ 8Q0935 packaging

  The information in this section is included for completeness.

  The 3174 TCP/IP Telnet RPQ 8Q0935 is a Control/Utility/Extension disk RPQ. This means that you receive a complete set of 3174 diskettes with each order of the RPQ. It is based on Configuration Support-C Release 2 LIC and provides all Configuration Support-C Release 2 functions. Just as with other Configuration Support-C releases, any DSL or feature microcode must be merged onto the Control Extension diskette before the feature can be used.

  Notes:

  1. The 3174 TCP/IP Telnet RPQ 8Q0935 may not be compatible with other Configuration Support-C Release 2 RPQs. You should check with your IBM marketing representative if you have questions about RPQ compatibility.
  2. The 3174 TCP/IP Telnet RPQ 8Q0935 should not be used in configurations that has the TCP/IP capability disabled (via customization).

- Configuration Support-C Release 3 packaging

  The 3174 TCP/IP Telnet Support functions are integrated in Configuration Support-C Release 3, which is shipped as follows:

  - One Utility diskette
  - Two Control diskettes
  - One Control Extension diskette

- Configuration Support-C Release 4 packaging

  The 3174 TCP/IP Telnet Support functions are enhanced for Ethernet connectivity in Configuration Support-C Release 4, which is shipped as follows:

  - One Utility diskette
  - Two Control diskettes
  - One Control Extension diskette

- 3174 TCP/IP Enhancements RPQ 8Q1041 packaging

  The 3174 TCP/IP functions are enhanced in 3174 TCP/IP Enhancements RPQ 8Q1041, with TN3270, LPD and SNMP MIB-II, which is shipped as follows:

  - One Utility diskette

- Two Control diskettes
- One Control Extension diskette (pre-merged)

Notes:

1. Depending on IBM business and technical judgements, the 3174 TCP/IP Enhancements RPQ 8Q1041 may be integrated into the Configuration Support-C base microcode in the future.

- Configuration Support-C Release 5 packaging

  Configuration Support-C Release 5 adds the additional connectivity option of frame relay to 3174 TCP/IP, which is shipped as follows:

  - One Utility diskette
  - Two Control diskettes
  - One Control Extension diskette(pre-merged)
  - One optional frame relay DSL

- 3174 IP Forwarding RPQ 8Q1289 packaging

  3174 IP Forwarding RPQ 8Q1289 provides static IP routing for LAN (token-ring or Ethernet) attached intelligent workstations via 3174 frame relay link(s), which is shipped as follows:

  - One mergeable RPQ diskette

Chapter 3. Adding 3174 to TCP/IP Network

Before you can customize your 3174 for the 3174 TCP/IP Telnet Support, you must assign an IP address and a TCP/IP host name to the 3174. If you are adding the 3174 to an existing TCP/IP network, you should get the name and address from the administrator of the network. A brief overview of IP addresses and network names is provided here; if you are unfamiliar with these TCP/IP concepts, see the *TCP/IP Tutorial and Technical Overview*.

3.1 IP Addresses

Each computer that attaches to the TCP/IP network is called a host, even though it may not provide functions you would normally attribute to a host. The 3174, for example, is a terminal server, but it is still called a TCP/IP "host."

Each host has a unique 32-bit IP address. These addresses are usually written as a series of four decimal numbers from 0 to 255, separated by periods, for ease of reference by humans (this is also known as dotted decimal notation). For example, a host address referred to as 9.67.7.218 is converted as follows:

```
Address in decimal:              9      67       7      218
Address in binary:       00001001 01000011 00000111 11011010
```

The address always has two logical parts: the network address or identifier (ID) and the host ID. The bits at the beginning of the address determine how the address is split into its parts, as shown in Figure 7.

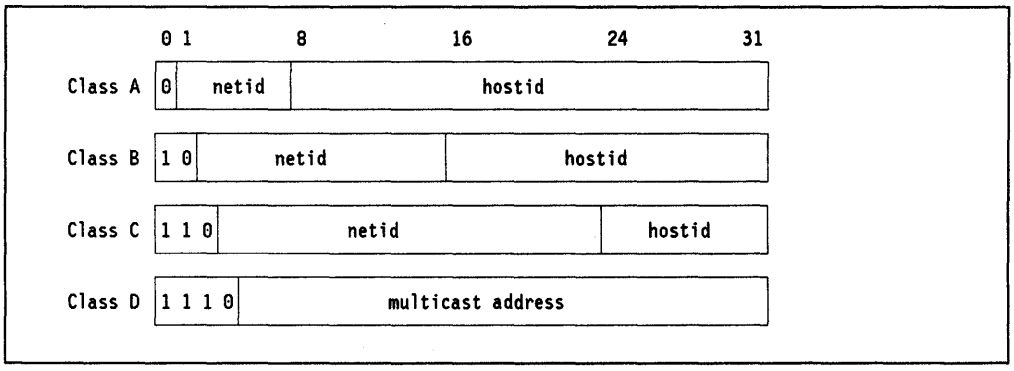


Figure 7. Classes of IP Addresses

In other words, an IP address can easily be classified by the first number in the dotted decimal notation as follows:

- Class A: first number between 1 and 127 (first byte 00000001 min. 01111111 max.)
- Class B: first number between 128 and 191 (first byte 10000000 min. 10111111 max.)
- Class C: first number between 192 and 223 (first byte 11000000 min. 11011111 max.)
- Class D: first number between 224 and 239 (first byte 11100000 min. 11101111 max.).

(An address of all 0s or all 1s has special meaning.)

We can see that 9.67.7.218 is a Class A address, with 9 (the first byte) as the network ID and 67.7.218 (the next three bytes) as the host ID.

You will, therefore, need an IP address for the 3174 being customized (see your system/network administrator).

3.2 Subnet Masks

A single TCP/IP network, however, can be further divided into multiple smaller networks, known as subnetworks or subnets. You may wish to divide a single large TPC/IP network at your organization into several subnets, for example, by department.

To identify these subnets, we use some of the host ID bits to form the subnet ID. A subnet mask determines which bits of the host ID will be used. The subnet mask contains a 1 for each bit of the IP address that is used for the network or subnet ID. For example, using a subnet mask of 255.255.255.0 and applying it to the address 9.67.7.218 yields the following:

```
Address in decimal:              9      67       7      218
Address in binary:          00001001 01000011 00000111 11011010
Subnet mask in binary:      11111111 11111111 11111111 00000000
Subnet mask in decimal:          255      255      255        0
Address interpretation:  |Network ID|    Subnet ID    | Host ID|
```

What this means is that:

- The first eight bits are used as the network ID (because it is a Class A address)
- The next 16 bits are used as the subnet ID (because of the 1 bits in the subnet mask)
- The last eight bits are used as the host ID (because of the 0 bits in the subnet mask).

If a different subnet mask is used, the bits are interpreted differently. For example, using a subnet mask of 255.255.240.0 and applying it to the address 9.67.7.218 yields the following:

```
Address in decimal:              9      67       7      218
Address in binary:          00001001 01000011 00000111 11011010
Subnet mask in binary:      11111111 11111111 11110000 00000000
Subnet mask in decimal:          255      255      240        0
Address interpretation:  |Network ID|  Subnet ID |   Host ID   |
```

Now, what this means is that:

- The first eight bits are used as the network ID (as before).
- The next 12 bits are used as the subnet ID.
- The last 12 bits are used as the host ID.

Using subnet mask 255.255.255.0 on IP address 9.67.7.218 shows that the host is identified as being in network ID 9, subnet ID 17152, host ID 218. Using subnet mask 255.255.240.0 on the same IP address shows that the host is identified as being in network ID 9, subnet ID 1072, host ID 2010.

If your TCP/IP network is split into subnets, you will, therefore, have to know the subnet mask to use when you customize the 3174.

3.3 Customizing IP Addresses

Whenever you are asked to provide an IP address on the 3174 customization panels, you must give the full address, with leading zeros. The panels provide the "dots." For example, 9.67.7.218 is entered as:

009.067.007.218

When you enter a network or subnet address, you must provide all four parts of the address. For example, network 9 is entered as:

009.000.000.000

Subnet 9.67 is entered as:

009.067.000.000

3.4 Names

Since most people can remember names better than numeric addresses, TCP/IP allows you to assign names to each host. These names can be grouped into domains, so that they do not have to be unique across the entire network. For example, OURNET.OURDEPT.HOST1 is a different host from YOURNET.YOURDEPT.HOST1. When you customize the 3174 for the 3174 TCP/IP Telnet Support, you must give both a host name and a domain name. When appended, these give the fully-qualified name of your host in the network.

3.5 Name Servers

Unfortunately, most communication protocols including TCP/IP, do not work with character-string names very well and must instead use numeric addresses. To convert names to addresses, your network may have Domain Name Servers. These servers maintain tables of name-to-address correlations. A TCP/IP host can send a server a name, and the server returns the IP address assigned to that name. This means the hosts do not need to maintain extensive tables for name-to-address resolution, and only the server's table is updated when hosts are added to or deleted from the network.

3.6 3174 Nicknames

The 3174 TCP/IP Telnet Support allows you to define a set of nicknames for your users. You provide an IP address to associate with each nickname.

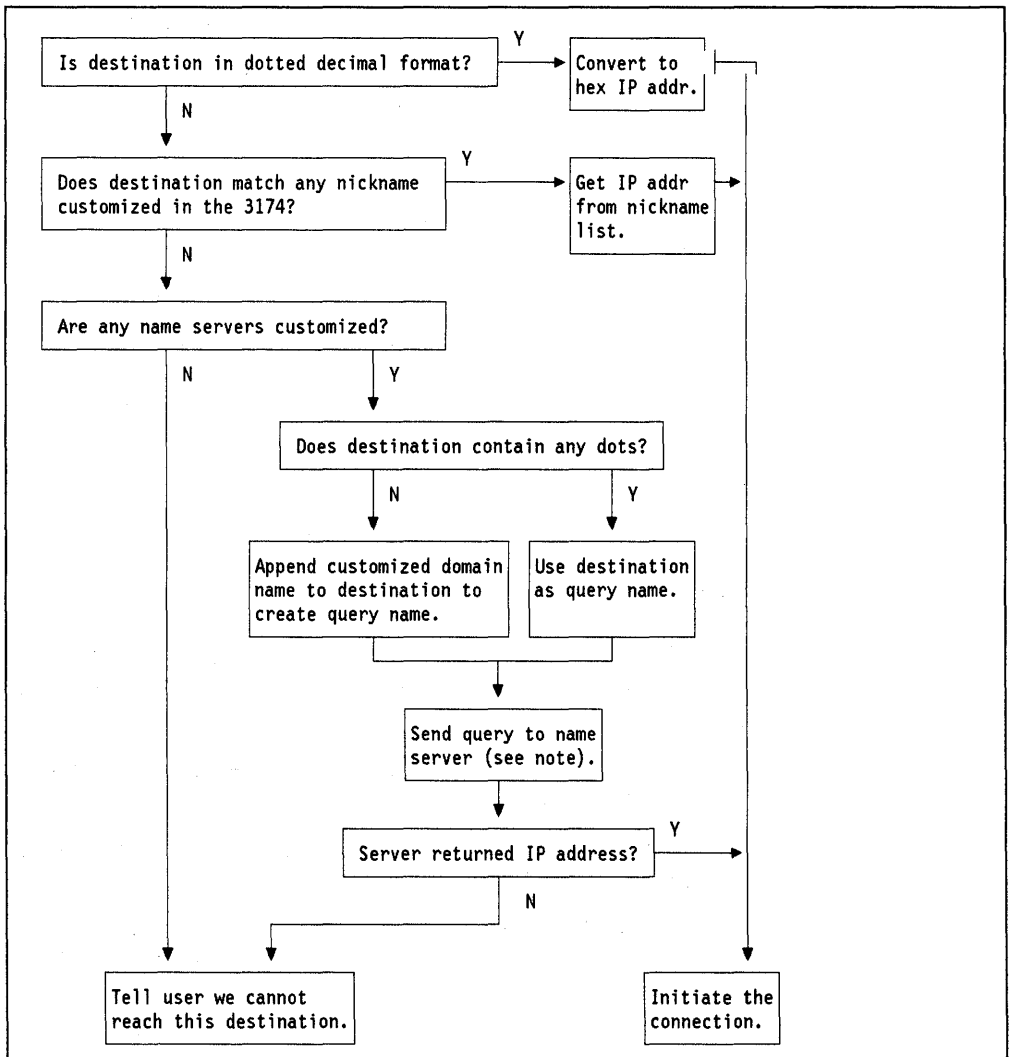
If your network does not have name servers, these nicknames can make life a little easier for your users, as they will not have to remember numeric IP addresses.

3.7 How the 3174 TCP/IP Telnet Support Looks at Names

A person sitting at a terminal attached to the 3174 may select the desired remote TCP/IP host by giving one of the following destinations:

- The host's IP address, in dotted decimal form
- A nickname
- An unqualified host name, different from any nicknames, if the remote host is in the same domain as the 3174
- A fully-qualified host name

The 3174 TCP/IP Telnet Support uses the destination as follows:



Note: The 3174 TCP/IP Telnet Support sends the query to the first server in the list and waits approximately two seconds for a response, before sending the query to the next server, if there is more than one.
If no server responds, the 3174 repeats the process with a four-second timeout, then six seconds, then eight seconds.

Figure 8. TCP/IP Resolving Name/Destination

3.8 Routes

If your users want to access remote hosts that are on other networks or subnets, at least one TCP/IP router must be on the same subnet as your 3174. You will need to know the router's IP address when you customize for the 3174 TCP/IP Telnet Support, and this will be your default router. If there are other routers in your network, you can define these to the 3174, by giving their IP addresses and the destinations that they service.

The routes that you configure tell the 3174 the best way to get the TCP/IP traffic to the desired destinations. As an example, in Figure 9, the 3174's IP address is 9.67.5.80, and the subnet mask being used is 255.255.255.000. That means the network is 9, and 67.5 identifies the subnet. Router 2 connects the 3174's network to Network 10, Router 1 connects the 3174's subnet to subnet 67.4, and Router 3 provides access to all other external networks.

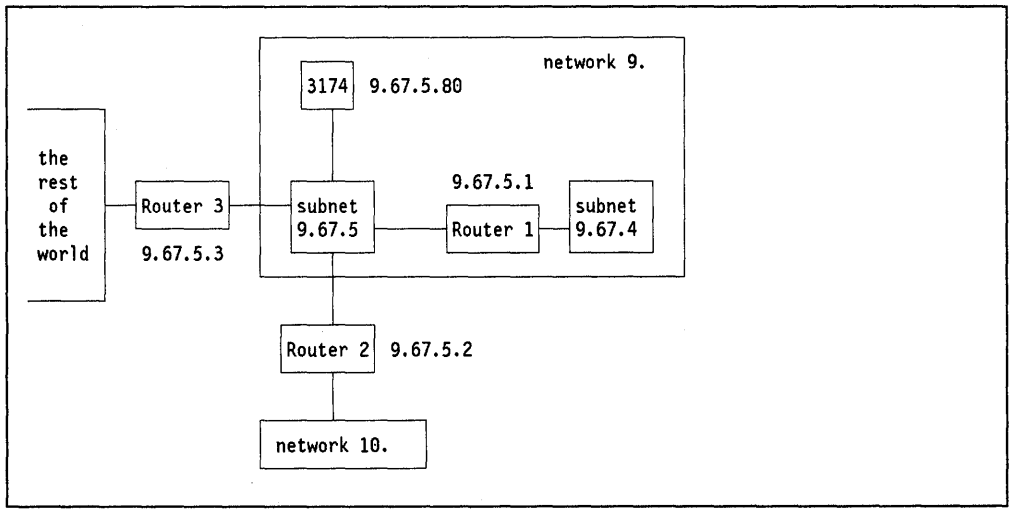


Figure 9. TCP/IP Router Example

In the 3174 customization, you would have three route entries for this configuration, telling the 3174 where to route traffic for destinations that are not part of the 3174's subnet:

1. For destinations on subnet 9.67.4 use Router 1, whose address on the local subnet is 9.67.5.1.
2. For destinations on network 10., use Router 2, whose address on the local subnet is 9.67.5.2.
3. For any other destinations that are not on the local subnet, use the default Router 3, with address on the local subnet of 9.67.5.3.

```
                ____ TCP/IP Routing Information ____

Destination IP Address      Type          Router IP Address
                          (N,S,H,D)

009 . 067 . 004 . 000        S        009 . 067 . 005 . 001

010 . 000 . 000 . 000        N        009 . 067 . 005 . 002

XXX . XXX . XXX . XXX        D        009 . 067 . 005 . 003

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX


PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 10. TCP/IP Router Example Customization

3.9 Customizing 3174 TCP/IP Telnet Support

In many respects, the 3174 TCP/IP Telnet Support can be thought of as providing ASCII host access across a TCP/IP network. Because of this similarity, customizing for the 3174 TCP/IP Telnet Support uses many of the concepts that were introduced with the AEA. If you are familiar with customizing for AEA, adding the 3174 TCP/IP Telnet Support will be very simple.

If you are not familiar with the AEA, and you are not installing an AEA in your 3174, the following explanations include suggested responses for many of the customization questions. These suggestions will result in a very simple configuration where all coax ports are set up the same. After you have done this once, you will be able to see how to change it if you want a different setup for some ports. Your coax-attached terminals will use the ASCII emulation function when connected to a TCP/IP host; therefore, the customization questions that affect ASCII emulation operation are the ones that you will have to answer.

For more information on AEA customization, refer to the *3174 Installation Guide*, GG24-3061.

3.9.1 Example Scenario

In the example shown in Figure 11 on page 25, one important point must be emphasized regarding the 3174-11L channel-attached to MVS18. The 3174 does supports TCP/IP access via the LAN (token-ring or Ethernet) on which it is resides (Configuration Support-C Release 5 adds frame relay as an additional transport). This means that the channel can be used for SNA traffic, but in order to access MVS18 as a TCP/IP host, the traffic must flow over the token ring. The 3172 will serve as a router to MVS18, making it possible for the 3174 to have a Telnet to MVS18.

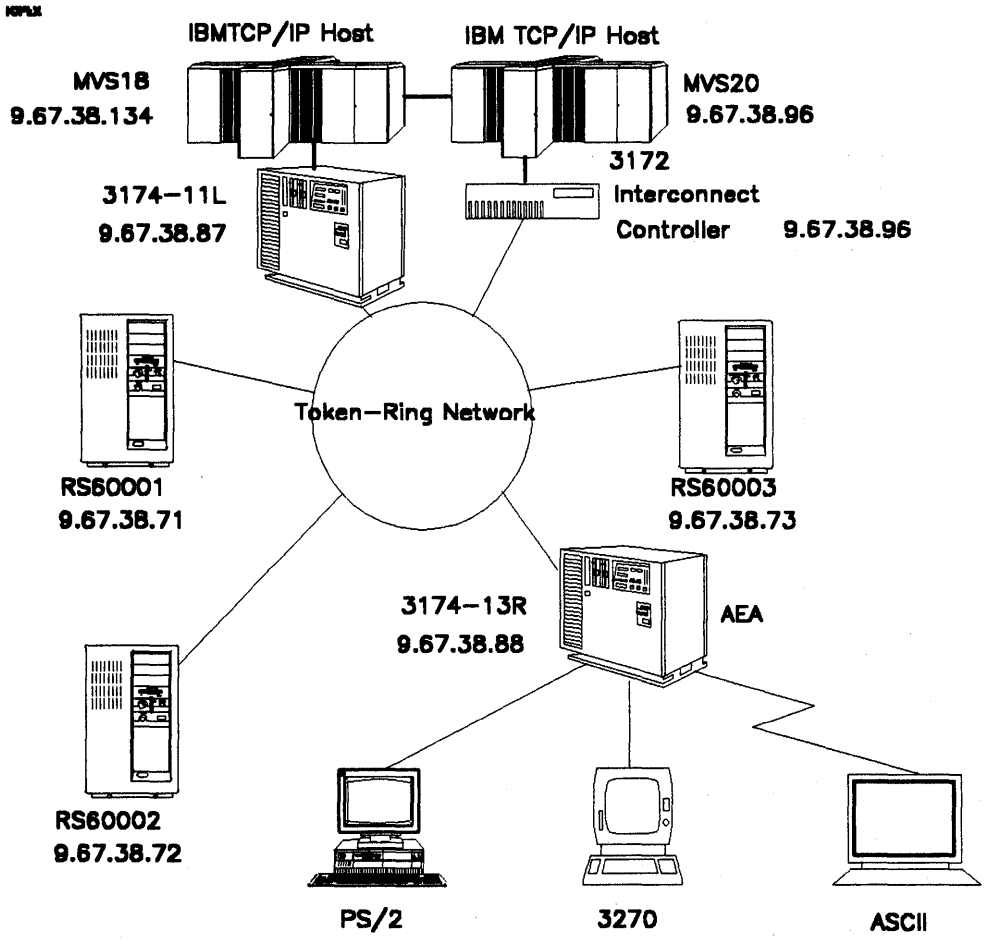


Figure 11. TCP/IP Example Scenario

We will use this example as the basis for the 3174 customization that follows.

3.9.2 Panel Flow

Figure 12 shows the panel flow sequence when customizing the 3174 TCP/IP Telnet Support.

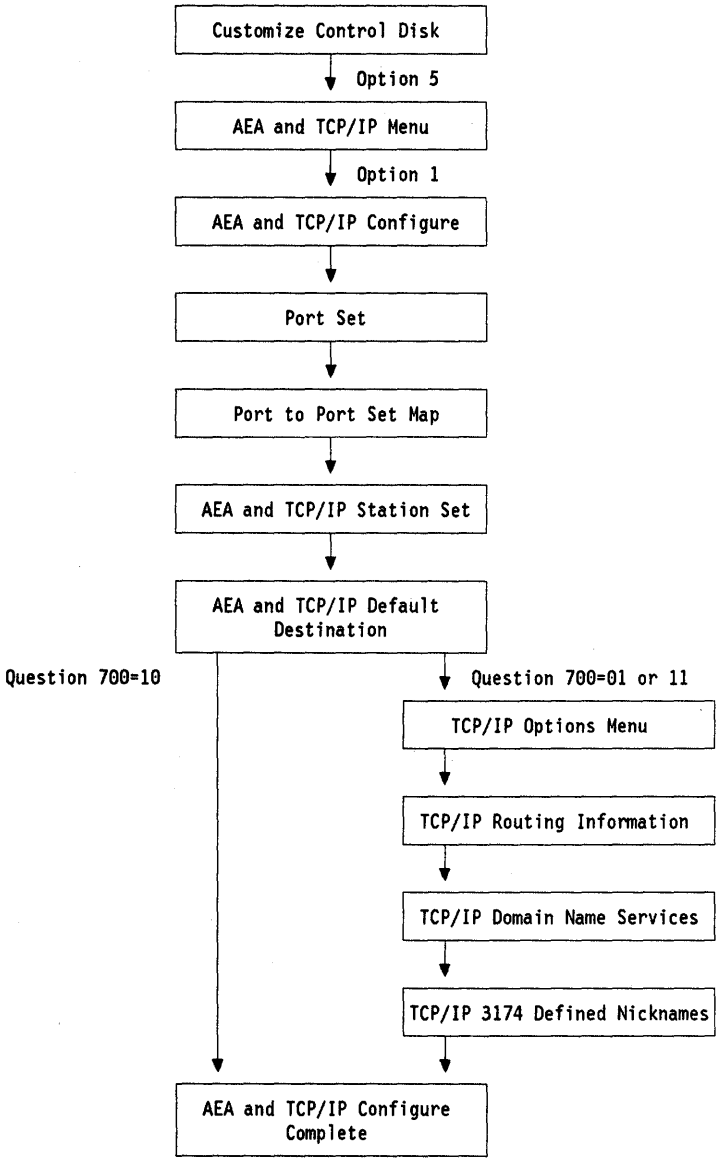


Figure 12. TCP/IP Customization Panel Flow

3.9.3 Configure AEA and TCP/IP

After you have IMLed your 3174 from a Utility diskette, select **Customize the Control Disk** from the Master Menu. The Customize Control Disk Menu panel is displayed (see Figure 13 on page 27).

```
                  _______ Customize Control Disk Menu _______

Select Option; press ENTER

Option     Description

   1       Configure
   2       Define Devices
   3       Merge RPQs
   4       Modify Keyboards
   5       Define AEA and TCP/IP
   6       Define APPN Node
   7       Define COS
   8       Define 3174-PEER




    Select ===> 5

PF: 3=Quit    4=Default    7=Back    8=Fwd    9=Check    12=File
```

Figure 13. Define AEA and TCP/IP Option

Select Option **5** to configure the 3174 TCP/IP Telnet Support. The AEA and TCP/IP Menu panel is displayed (see Figure 14).

```
                  __________ AEA and TCP/IP Menu __________

Select Option; press ENTER

Option     Description

   1       Configure AEA and TCP/IP
   2       Define UDT
   3       Define UDX









    Select ===> 1

PF: 3=Quit    4=Default    7=Back    8=Fwd    9=Check    12=Done
```

Figure 14. Configure AEA and TCP/IP Option

Select Option **1** to configure the 3174 TCP/IP Telnet Support. The AEA and TCP/IP Configure panel is displayed (see Figure 15 on page 28).

3.9.4 Enabling AEA and TCP/IP

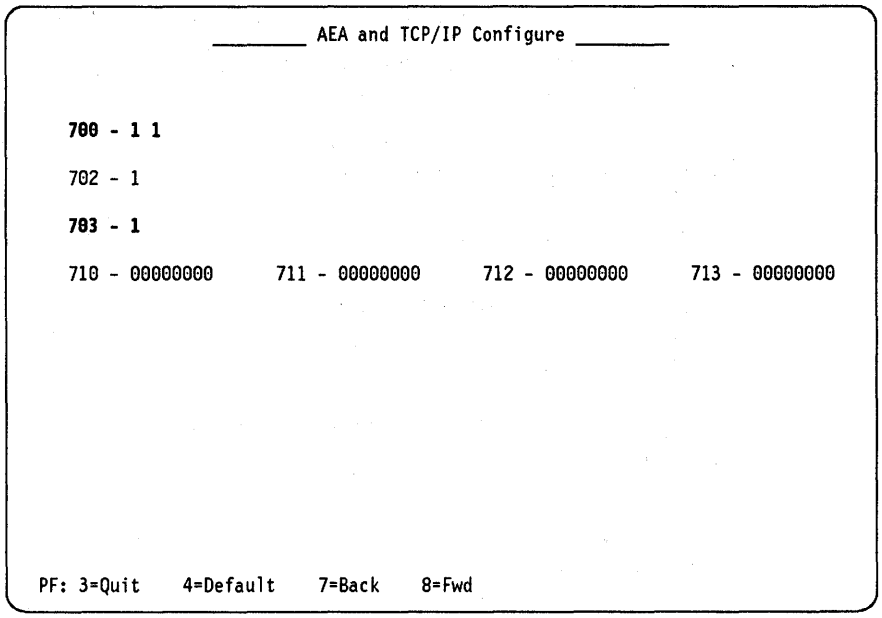


Figure 15. AEA and TCP/IP Configure Panel

For a detailed description of each customizing question, see the *3174 Installation Guide*, GG24-3061. This section will highlight information relevant to customizing the 3174 TCP/IP Telnet Support.

Question 700: Configure the AEA and TCP/IP Feature

Question 700 has been changed from a one-digit response that allows the AEA feature to be customized, to a two-digit response that allows the AEA feature and the 3174 TCP/IP Telnet Support to be customized. The two digits are used as follows:

- **Digit 1 - AEA Feature**
  - 0=Turns off the AEA feature (default response).
  - **1**=Turns on the AEA feature.
- **Digit 2 - TCP/IP Feature**
  - 0=Turns off the TCP/IP feature (default response).
  - **1**=Turns on the TCP/IP feature without SNMP.
  - 2=Turns on the TCP/IP feature with SNMP.

For our example, we have customized for both AEA and TCP/IP capabilities.

Question 702: Control Key Assignment

This question allows you to specify the control key when using ASCII emulation.

- 0=Use the Alt key.
- 1=Use the Ctrl key (default response).

If you select 0, the same end-user keyboard interface is provided as in 3174 Configuration Support-B Release 1.

Notes:

1. Option 0 is valid only for USA English.
2. If option 0 is selected, DEC VT220 and DG D210 emulation are not permitted.
3. When option 0 is selected, KDU mappings are ignored during ASCII emulation; the keyboard reverts to its normal layout.
4. The microcode upgrade process defaults this question to a 1 during upgrade from Configuration Support-B Release 2.

If you have never used the AEA feature before, use the default value.

Question 703: Request MLT for AEA

This question allows you to specify if you are using MLT on ASCII terminals. It is not affected by the 3174 TCP/IP Telnet Support.

- 0=No AEA MLT support (default response).
- **1**=Request AEA MLT support.

Questions 710 through 713: Miscellaneous ASCII Feature Options

Each of these four questions has an eight-digit response. Each digit determines whether certain modes of operation are enabled or not enabled. The only one that you need to consider for the 3174 TCP/IP Telnet Support is question 710 digit 1: Reverse Video Blanks-to-Hyphens Option. For 3270 displays without EABs, specifying this digit as 1 causes reverse video blanks to be displayed as hyphens.

3.9.5 Defining Port Set

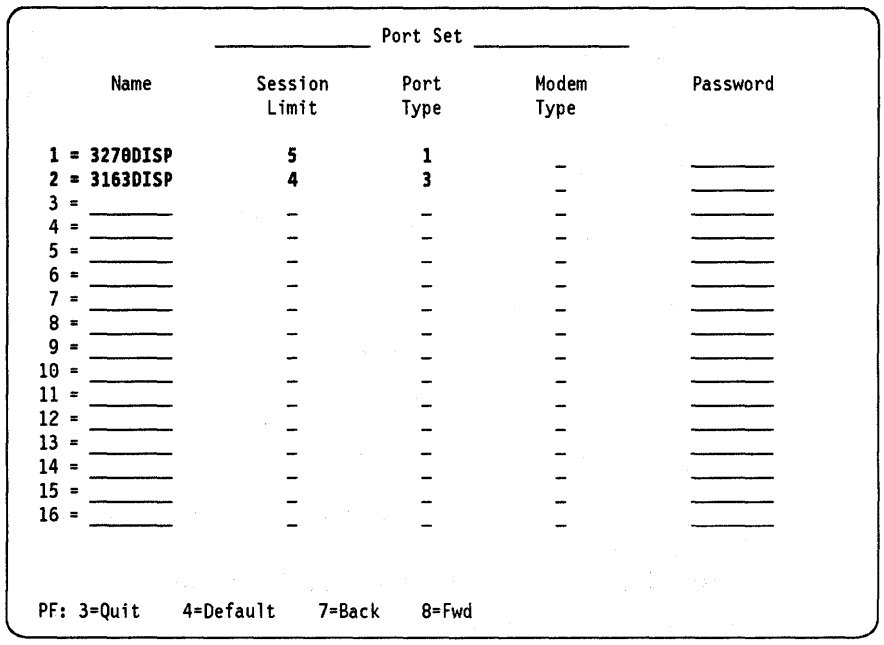


Figure 16. Port Set Panel

If you have already customized for the AEA, you may not need to change this panel. If you want to allow 3270 displays to access TCP/IP destinations and the displays have not been included in a port set, then add them to this panel.

If you do not have an AEA, you should use this panel to define port set 1 for your 3270 displays to allow them to access TCP/IP destinations:

- Enter the name **3270DISP** in the Name field.
- Select a session limit that matches the number of LTs you want the 3270 displays to have (the default is **1**). This number may be larger than the number of addresses assigned by questions 117 and 118.
- Enter a 1 in the Port Type field for our 3270 displays, where:
  - 1=3270 devices
  - 2=Switched (for ASCII devices connected via modems and switched lines)
  - 3=Direct (for ASCII devices connected via null modems)
  - 4=Non-Switched (for ASCII devices connected via modems and non-switched lines).
- Leave the Modem Type and Password fields blank.

For our example, we have customized a port set for coax attached 3270 displays and another port set for 3163 displays that are attached to the AEA via null modems.

3.9.6 Mapping Port to Port Set

```
                    Port to Port Set Map
                                                          Page 01 of 03
Type the port set number to group the 3174 ports

 3270 Ports       0  1  2  3  4  5  6  7
26-00 to 26-07    1  1  1  1  1  1  1
26-08 to 26-15
26-16 to 26-23
26-24 to 26-31

Port Sets
1 = 3270DISP      2 = 3163DISP      3 =               4 =
5 =               6 =               7 =               8 =
9 =              10 =              11 =              12 =
13 =             14 =              15 =              16 =

PF: 3=Quit   4=Default   7=Back   8=Fwd   10=PageBack   11=PageFwd
```

Figure 17. Port to Port Set Map Panel (1 of 3)

If you have already customized for the AEA, you may not need to change this panel. If you have added a port set for 3270 displays in the Port Set panel, you will need to assign the 3270 ports to that new port set using this panel.

If you do not have an AEA, you should use this panel to assign coax ports to the port set, named 3270DISP, that you have defined in the Port Set panel:

- Enter the port set number for each port that you wish to use the 3174 TCP/IP Telnet Support. We have entered **1**. This assigns that port to the 3270 display port set.

There are three pages for mapping ports to the port sets you have defined. The first page shows ports in hardware group 26, the first 32 coax ports. The second page shows ports in hardware group 27, the next 32 coax ports (provided by the 3270 Port Expansion Feature). The third page shows ports in hardware groups 21, 22 and 23, ASCII ports (provided by the AEA).

For our example, we have:

- Mapped the first seven coax ports to the port set number **1** (1=3270DISP) in Figure 17 on page 30.
- No ports are mapped for the 3270 Port Expansion Feature in Figure 18.
- Mapped the first seven ASCII ports to the port set number **2** (2=3163DISP) in Figure 19 on page 32.

```
                    Port to Port Set Map
                                                          Page 02 of 03
Type the port set number to group the 3174 ports

  3270 Ports        0  1  2  3  4  5  6  7
 27-00 to 27-07     _  _  _  _  _  _  _  _
 27-08 to 27-15     _  _  _  _  _  _  _  _
 27-16 to 27-23     _  _  _  _  _  _  _  _
 27-24 to 27-31     _  _  _  _  _  _  _  _




  Port Sets
  1 = 3270DISP        2 = 3163DISP        3 =                 4 =
  5 =                 6 =                 7 =                 8 =
  9 =                10 =                11 =                12 =
 13 =                14 =                15 =                16 =


All responses are correct
PF: 3=Quit    4=Default    7=Back    8=Fwd    10=PageBack    11=PageFwd
```

Figure 18. Port to Port Set Map Panel (2 of 3)

```
                    Port to Port Set Map
                                                              Page 03 of 03
Type the port set number to group the 3174 ports

 AEA Ports          0  1  2  3  4  5  6  7
 21-00 to 21-07     2_ 2_ 2_ 2_ 2_ 2_ 2_ __
 22-00 to 22-07     __ __ __ __ __ __ __ __
 23-00 to 23-07     __ __ __ __ __ __ __ __



 Port Sets
 1 = 3270DISP        2 = 3163DISP        3 =                 4 =
 5 =                 6 =                 7 =                 8 =
 9 =                10 =                11 =                12 =
13 =                14 =                15 =                16 =


All responses are correct
PF: 3=Quit    4=Default    7=Back    8=Fwd    10=PageBack   11=PageFwd
```

Figure 19. Port to Port Set Map Panel (3 of 3)

3.9.7 Defining 3270 Host and Display Station Sets

```
                    AEA and TCP/IP Station Set

1  721 - 3270 HOST_____________   722 - 3H  723 - _______  725 - 1
   731 - 1   732 - 1   733 - 0   734 - _   735 - 0  736 - 1  737 - _
   741 - 000 742 - 015 743 - 1   744 - 0   745 - 0  746 - 0 0
   751 - _   752 - ____________________________________________
    761 - 1   762 - 1   763 - 1   764 - 1  765 - 0
    771 - 1   772 - 1   773 - 1   774 - 1   775 - 1  776 - 1
   781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
   790 - 000 . 000 . 000 . 000

2  721 - 3270 DISPLAY__________   722 - 3D  723 - 3270DISP  725 - 1
   731 - 1   732 - 1   733 - 0   734 - _   735 - 0  736 - 1  737 - _
   741 - 000 742 - 015 743 - 1   744 - 0   745 - 0  746 - 0 0
   751 - _   752 - ____________________________________________
    761 - 1   762 - 1   763 - 1   764 - 1  765 - 0
    771 - 1   772 - 1   773 - 1   774 - 1   775 - 1  776 - 1
   781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
   790 - 000 . 000 . 000 . 000



PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 20. AEA and TCP/IP Station Set Panel (1 of 4)

If you have already customized for AEA, you will have defined station sets for the 3270 host and the 3270 displays that are attached to your 3174. You will still need to define station sets for TCP/IP access, so do not skip this panel. You may, however, proceed to 3.9.8, "Defining TCP/IP Station Sets" on page 33.

If you do not have an AEA, you should define two station sets, one for the 3270 host and one for the 3270 displays we have added. You will also need to define

station sets for TCP/IP access (see 3.9.8, "Defining TCP/IP Station Sets" on page 33). We will start by defining station set 1 for the 3270 host:

Q721 Enter a station set name for the 3270 host to be accessed. Whatever name you enter here will be displayed on the Connection Menu as a possible destination for the LT. If your 3270 host has a common name that the terminal users will recognize, enter that name.

In our example, we have used the name 3270 HOST.

Q722 Enter 3H as the station type for the 3270 host.

Leave all other questions at their default values.

Next, we will define station set 2 for the 3270 displays:

Q721 Enter a station set name for the 3270 displays we have added in the Port Set panel.

Q722 Enter 3D as the station type for the 3270 displays.

Q723 Enter 3270DISP as the port set name (the name we defined on the Port Set panel) to which the 3270 displays will be mapped.

Q725 Leave the response at its default value of 1.

This allows the terminal users to use the Connection Menu to select alternative host connections for an LT. After you are more familiar with Connection Menu operation, you may wish to change this to 0.

Response 0 means that the terminal users in this station set will not be allowed to select host connections from the Connection Menu; they are restricted to access only the connection defined in their Default Destination.

Leave all other responses at their default values.

3.9.8 Defining TCP/IP Station Sets

A station set for TCP/IP access defines a set of ASCII emulation characteristics and an optional host IP address. The 3174 TCP/IP Telnet Support supports the following ASCII terminal emulation:

- DEC VT100
- IBM 3101
- DG D210 (USA English only)
- DEC VT220, 7-bit control
- DEC VT220, 8-bit control

Each TCP/IP station set you define will be displayed on the host Connection Menu for the terminal user to select as a connection.

For each station set definition, you may specify an IP host address, or use the default response (all zeros), in question 790. Your response is used as follows:

- If you specify an address, the 3174 *does not* automatically connect to that address when the station set is selected from the Connection Menu. The address is used if the user issues a PING or an OPEN command without specifying a destination.

- If you do not specify an address (default all zeros), then the user will need to specify the destination when issuing the PING or the OPEN command.

So, if your users at the 3270 coax terminals will use the 3174 TCP/IP Telnet Support to access only one TCP/IP host and that host supports DEC VT100 devices, then you only need to define one TCP/IP station set (the DEC VT100 station set). You will specify that host's IP address in question 790 so that the users do not have to remember it. To access that host, the user selects the DEC VT100 station set from the Connection Menu, which puts the display into local mode, and then issues the OPEN command without specifying a destination.

If your users will access more than one hosts, you probably should define five TCP/IP station sets, one for each type of ASCII Emulation supported. This allows the users to select the required station set from the Connection Menu. Again, if you specify an address in question 790, it will be used when the user issues a PING or OPEN command without a destination. If you do not specify an address in question 790 (default all zeros), then the user will need to specify the destination when issuing the PING or OPEN command.

For our example, we have defined five station sets (station set numbers 3 through 7 in the following panels) for TCP/IP access. Station set number 3 also has a "default destination" customized in question 790. Station set number 8 defines 3163 displays that are attached to the 3174 AEA; they can also select the TCP/IP connections from their Connection Menu.

```
                  _______ AEA and TCP/IP Station Set _______

3  721 - TELNET VT100 _______      722 - TH  723 - _______  725 - 1
    731 - 1   732 - 1   733 - 0   734 - _   735 - 0  736 - 1  737 - _
    741 - 000 742 - 015 743 - 1   744 - 0   745 - 0  746 - 0 0
    751 - 1   752 - ____________________________________________
     761 - 1  762 - 1   763 - 0   764 - 1  765 - 0
     771 - 1  772 - 1   773 - 1   774 - 1   775 - 1  776 - 1
    781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
    790 - 009 . 067 . 038 . 071

4  721 - TELNET IBM3101           722 - TH  723 - _______  725 - 1
    731 - 1   732 - 1   733 - 0   734 - _   735 - 0  736 - 1  737 - _
    741 - 000 742 - 015 743 - 1   744 - 0   745 - 0  746 - 0 0
    751 - 2   752 - ____________________________________________
     761 - 1  762 - 1   763 - 1   764 - 1  765 - 0
     771 - 1  772 - 1   773 - 1   774 - 1   775 - 1  776 - 1
    781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
    790 - 000 . 000 . 000 . 000


All responses are correct
PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 21. AEA and TCP/IP Station Set Panel (2 of 4)

To define each station set for TCP/IP access, respond to the following questions:

Q721 Enter a station set name that you wish displayed on the Connection Menu.

Q722 Enter **TH** as the station type for the TCP/IP host.

Q751 Specify the data stream supported by the TCP/IP host:

- 1=DEC VT100
- 2=IBM 3101
- 3=DG D210 (USA English only)
- 4=DEC VT220, 7-bit control
- 5=DEC VT220, 8-bit control

Your response to this question only affects the operation of 3270 displays. It determines the type of ASCII emulation that the 3174 provides for the 3270 display when the user selects this station set as the destination. When the user at an ASCII terminal selects a TCP/IP destination, the value of this field is ignored.

Q761 Respond only for VT100 or VT220 data stream, that is, if question 751=1, 4 or 5. The valid responses are:

- 0=Auto XON/XOFF disabled.,
- 1=Auto XON/XOFF enabled (default response).

Q762 Respond only for VT100 or VT220 data stream, that is, if question 751=1, 4 or 5. The valid responses are:

- 0=Wraparound option disabled.
- 1=Wraparound option enabled (default response).

Q763 Respond only for VT100 or VT220 data stream, that is, if question 751=1, 4 or 5. The valid responses are:

- 0=New line option disabled.
- 1=New line option enabled (default response).

Your response to this question depends on the host applications you will be using. If not answered correctly, characters may be placed in the wrong positions on the screen. When set to 1, the 3174 treats a line feed character from the host as a new line (line feed followed by carriage return).

Note: For connections to RS/6000* hosts, question 763 should be 0.

Q764 Respond only for VT100 or VT220 data stream, that is, if question 751=1, 4 or 5. The valid responses are:

- 0=Margin bell disabled.
- 1=Margin bell enabled (default response).

Q765 Respond only for VT100 or VT220 data stream, that is, if question 751=1, 4 or 5. The valid responses are:

- 0=DEC host ASCII character set is NRC (default response).
- 1=DEC host ASCII character set is MCS.

Q771 Respond only for IBM 3101 data stream, that is, if question 751=2. The valid responses are:

- 0=Automatic line feed disabled.
- 1=Automatic line feed enabled (default response).

  The receipt of a carriage return from the host will cause a carriage return and a line feed at the terminal.

Q772 Respond only for IBM 3101 data stream, that is, if question 751=2. The valid responses are:

- 0=Enter causes a carriage return only.
- 1=Enter causes a carriage return and a line feed (default response).

Q773 Respond only for IBM 3101 data stream, that is, if question 751=2. The valid responses are:

- 0=Automatic new line at column 80 disabled.
- 1=Cursor automatically moves to the first position of the next line after reaching column 80 (default response).

Q774 Respond only for IBM 3101 data stream, that is, if question 751=2. The valid responses are:

- 0=Scrolling disabled.
- 1=Scrolling enabled (default response).

Q775 Respond only for IBM 3101 data stream, that is, if question 751=2. The valid responses for the line turnaround character to be used are:

- 0=Use EOT (end of transmission).
- 1=Use CR (carriage return) (default response).
- 2=Use XOFF (transmit off).
- 3=Use ETX (end of text).

Q790 Enter the host IP address that is the default destination for the 3174.

You may leave the response at its default value (all zeros). The user will need to specify the destination when issuing the PING or the OPEN command.

If you do specify an address, the 3174 attempts to connect to that address as the default destination or when this station set is selected from the Connection Menu.

You can leave all other responses at their default values.

```
                    _______ AEA and TCP/IP Station Set _______

 5  721 - TELNET D210                722 - TH  723 - _______  725 - 1
    731 - 1    732 - 1    733 - 0   734 - _   735 - 0  736 - 1  737 - _
    741 - 000  742 - 015  743 - 1  744 - 0  745 - 0  746 - 0 0
    751 - 3    752 - ____________________________________________
     761 - 1   762 - 1    763 - 1   764 - 1  765 - 0
     771 - 1   772 - 1    773 - 1   774 - 1   775 - 1  776 - 1
    781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
    790 - 000 . 000 . 000 . 000

 6  721 - TELNET VT220 7 BIT         722 - TH  723 - _______  725 - 1
    731 - 1    732 - 1    733 - 0   734 - _   735 - 0  736 - 1  737 - _
    741 - 000  742 - 015  743 - 1  744 - 0  745 - 0  746 - 0 0
    751 - 4    752 - ____________________________________________
     761 - 1   762 - 1    763 - 0   764 - 1  765 - 0
     771 - 1   772 - 1    773 - 1   774 - 1   775 - 1  776 - 1
    781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
    790 - 000 . 000 . 000 . 000


All responses are correct
PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 22. AEA and TCP/IP Station Set Panel (3 of 4)

```
                    _______ AEA and TCP/IP Station Set _______

 7  721 - TELNET VT220 8 BIT___      722 - TH  723 - _______  725 - 1
    731 - 1    732 - 1    733 - 0   734 - _   735 - 0  736 - 1  737 - _
    741 - 000  742 - 015  743 - 1  744 - 0  745 - 0  746 - 0 0
    751 - 5    752 - ____________________________________________
     761 - 1   762 - 1    763 - 0   764 - 1  765 - 0
     771 - 1   772 - 1    773 - 1   774 - 1   775 - 1  776 - 1
    781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
    790 - 000 . 000 . 000 . 000

 8  721 - 3163 DISPLAY__________    722 - I3  723 - 3163DISP  725 - 1
    731 - 1    732 - 1    733 - 6   734 - _   735 - 1  736 - 1  737 - _
    741 - 000  742 - 015  743 - 0  744 - 0  745 - 2  746 - 0 0
    751 - _    752 - ____________________________________________
     761 - 1   762 - 1    763 - 1   764 - 1  765 - 0
     771 - 1   772 - 1    773 - 1   774 - 1   775 - 1  776 - 1
    781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
    790 - 000 . 000 . 000 . 000


All responses are correct
PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 23. AEA and TCP/IP Station Set Panel (4 of 4)

3.9.9 Defining Default Destinations

AEA and TCP/IP Default Destination

Station Set	Station Set Name	Session Limit	Session LT1	LT2	LT3	LT4	LT5
1	3270 HOST	0	_	_	_	_	_
2	3270 DISPLAY	5	_	_	_	_	_
3	TELNET VT100	0	_	_	_	_	_
4	TELNET IBM3101	0	_	_	_	_	_
5	TELNET D210	0	_	_	_	_	_
6	TELNET VT220 7 BIT	0	_	_	_	_	_
7	TELNET VT220 8 BIT	0	_	_	_	_	_
8	3163 DISPLAY	4	_	_	_	_	_
9		0	_	_	_	_	_
10		0	_	_	_	_	_
11		0	_	_	_	_	_
12		0	_	_	_	_	_
13		0	_	_	_	_	_
14		0	_	_	_	_	_
15		0	_	_	_	_	_

PF: 3=Quit 4=Default 7=Back 8=Fwd 10=Page Back 11=Page Fwd

Figure 24. AEA and TCP/IP Default Destination Panel

This panel determines what the terminal user will see on each LT when it is first accessed. You specify default destinations only for station sets that represent devices; you do not specify default destinations for host station sets. If you have already customized for the AEA, you should make changes here only if you want a TCP/IP session to be the default destination. If you are not not using the AEA, what you enter here will affect your end users as follows:

- If you select the 3270 host station set as the default destination, the LT is initially assigned to the 3270 host. You should do this if you do not want things to look different to your users after you have installed the 3174 TCP/IP Telnet Support.
- If you select a TCP/IP host station set as the default destination, the LT is initially assigned to TCP/IP and the user will see the following prompt at the top of the screen:

  3174 TELNET>
- If you select the Connection Menu as the default destination (leave the fields in the Session LTx columns blank), the Connection Menu will be displayed as the first screen and the user can choose the desired connection.

For each LT, enter either the 3270 host station set number, one of the TCP/IP station set numbers, or leave blank to request the Connection Menu as the default destination.

Note: You cannot change the information in the Station Set Name or Session Limit columns. The Station Set Name is your response to question 721 and the Session Limit is your response to the Session Limit for that station set in the Port Set panel.

For our example, we have specified the Connection Menu as the default destination for all the attached displays (both 3270 and ASCII).

3.9.10 Defining TCP/IP Options

```
                ____ TCP/IP Options Menu ____

3174 IP Address              052 - 009 . 067 . 038 . 088
Subnet Mask                  054 - 255 . 255 . 255 . 192

Maximum TELNET Connections   058 - 020    (001 - 250)
TCP/IP Buffer Space          060 - 0256 K (K = 1024 bytes)

Routing Field Support        062 - Y      (Y,N)
All Routes Broadcast         064 - Y      (Y,N)









PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 25. TCP/IP Options Menu

Question 052: 3174 IP Address

Enter the IP address assigned to your 3174. Each of the four fields of your response should contain a decimal number between 000 and 255. For example, the IP address of our 3174-13R is 9.67.38.88; it is entered as:

009.067.038.088

Question 054: Subnet Mask

Enter the subnet mask for your network. Each of the four fields of your response should contain a decimal number between 000 and 255. For example, the subnet mask of our network at ITSO Raleigh is 255.255.255.192; it is entered as:

255.255.255.192

The mask contains a 1 for each bit of the address that is part of the network or subnet identifier.

Question 058: Maximum Telnet Connections

Enter the maximum number of concurrent connections you wish to have available for terminal users. This pool of connections is available on a first-come-first-served basis. Each connection requires an additional 7KB of storage.

Your response should be a decimal number between 001 and 250. For our example, we have specified 20 connections as the maximum.

Question 060: TCP/IP Buffer Space

Enter the amount of additional memory you wish to allocate for TCP/IP data buffers. When you configure for TCP/IP, storage is assigned for 40 data buffers. Each data buffer has approximately 100 bytes available for data. See 2.11, "Storage Requirements" on page 15 for more information.

Your response should be a decimal number between 0000 and 1024, and specifies the number of 1024-byte (1KB) increments.

Question 062: Routing Field Support

Your response should be as follows:

- Y=If you wish the TCP/IP frames to use token-ring network source routing (default response). This allows communication through bridges.
- N=If you want to disable bridge access.

Question 064: All Routes Broadcast

Your response should be as follows:

- Y=All Routes Broadcast (default response).
- N=Single Route Broadcast.

Note: The response to question 064 is meaningful only if question 062=Y.

3.9.11 Defining TCP/IP Routing Information

```
                ____ TCP/IP Routing Information ____

Destination IP Address      Type        Router IP Address
                          (N,S,H,D)

009 . 067 . 038 . 134         H       009 . 067 . 038 . 096
XXX . XXX . XXX . XXX         X       XXX . XXX . XXX . XXX
XXX . XXX . XXX . XXX         X       XXX . XXX . XXX . XXX
XXX . XXX . XXX . XXX         X       XXX . XXX . XXX . XXX
XXX . XXX . XXX . XXX         X       XXX . XXX . XXX . XXX
XXX . XXX . XXX . XXX         X       XXX . XXX . XXX . XXX
XXX . XXX . XXX . XXX         X       XXX . XXX . XXX . XXX


PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 26. TCP/IP Routing Information

This panel contains information about the routers that you want the 3174 to use. You can define four types of routes:

- Type=N means route to a specific network.
- Type=S means route to a specific subnet.
- Type=**H** means route to a specific host IP address.
- Type=D means this is the default router.

For host, subnet and network entries, you must fill in all fields in the row:

- The Destination IP Address is the specific host, subnet or network address.
- The Type is H (host), S (subnet) or N (network).
- The Router IP Address is the network IP address of the router that should receive that destination's traffic. This IP address must have the same network and subnet values as the 3174 you are customizing.

The default router (Type=D) is used for all other destinations that are not on the local network (or subnet). The Destination IP Address field for the default router must be left as:

XXX.XXX.XXX.XXX

Notes:

1. You should have only one default router entry.
2. If you define a route to a subnet, it must be on the same network as the 3174 you are customizing.
3. Do not add a route to the network or the subnet of the 3174 you are customizing.

For our example, we have defined one extra destination host, 9.67.38.134, which is reachable through 9.67.38.96. The 3172 (9.67.38.96) is the router for MVS18 (9.67.38.134) and MVS20 (9.67.38.96), but since MVS20 is in the same subnet as the 3174-13R (9.67.38.88), a routing statement is not required.

3.9.12 Defining Domain Name Services

```
                ____ TCP/IP Domain Name Services ____

3174 Hostname
317413R_____________________________________________

3174 Domain Name
ITSO RALEIGH IBM COM_____________________________________
_________________________________________________________
_________________________________________________________
_____________________________________________________

Domain Nameserver IP Addresses

009 . 067 . 038 . 096

009 . 067 . 038 . 134

XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX


PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 27. TCP/IP Domain Name Services

3174 Hostname

A response is required for this field. Enter the name assigned to your 3174. Observe the following rules when defining the 3174 Hostname:

- The name may be up to 63 characters long.
- Only alphabetic (A through Z), numeric (0 through 9) and the hyphen characters are allowed.
- Use the dollar sign ($) to represent a hyphen.
- No imbedded blanks are allowed.
- Although you enter the name in uppercase characters, the 3174 converts it to lowercase before using it.

3174 Domain Name

Enter the name of the domain that your 3174 is in. This name can be made up of several parts. Observe the following rules when defining the 3174 Domain Name:

- Each part of the name may be up to 63 characters long.
- Only alphabetic (A through Z), numeric (0 through 9) and the hyphen characters are valid.
- Use the dollar sign ($) to represent a hyphen.
- Use blanks to separate the parts of the name.

  For example, you would enter MYDEPT.MY-COMPANY.MYNET as MYDEPT MY$COMPANY MYNET.
- Although you enter the name in uppercase characters, the 3174 converts it to lowercase before using it.

A domain name is required if any Domain Nameserver IP Address is entered.

Domain Nameserver IP Addresses

Enter the IP addresses of the name servers that the 3174 should use to resolve names to IP addresses. Enter the primary name server's address first. These responses are optional.

3.9.13 Defining TCP/IP Nicknames

```
_____ TCP/IP 3174 Defined Nicknames _____

      Nickname                    IP Address

RS60001_____________        009 . 067 . 038 . 071
RS60002_____________        009 . 067 . 038 . 072
RS60003_____________        009 . 067 . 038 . 073
MVS20_______________        009 . 067 . 038 . 096
MVS18_______________        009 . 067 . 038 . 134
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX


PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 28. TCP/IP 3174 Defined Nicknames

Since users remember names better than numeric IP addresses, this panel allows you to define up to 16 host nicknames and their associated IP addresses. Observe the following rules when defining nicknames:

- The nickname can be up to 20 characters long.
- Only alphabetic (A through Z) and numeric (0 through 9) characters are allowed.
- No imbedded blanks are allowed.
- Although you enter these names in uppercase characters, the 3174 converts them to lowercase before using them.

3.9.14 Configure Complete

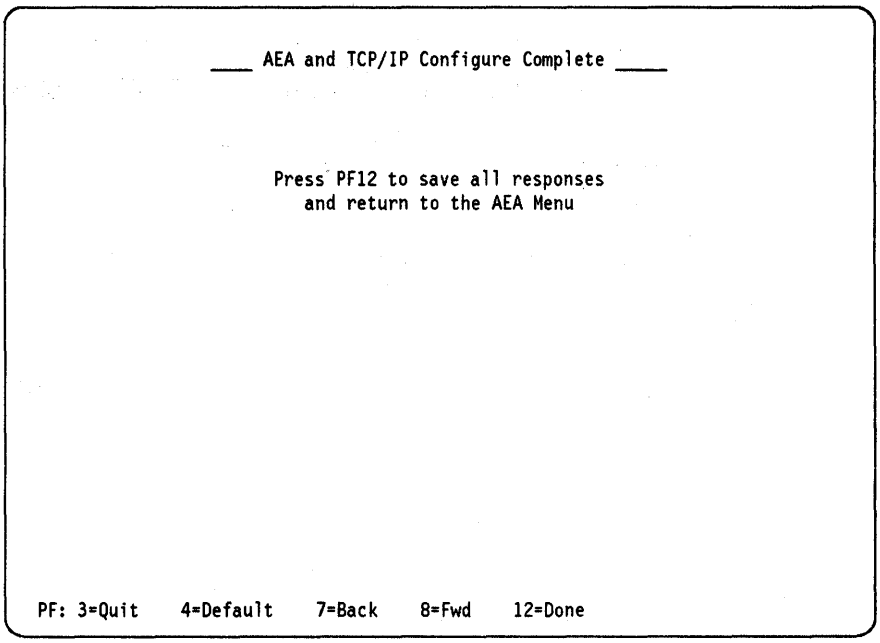


Figure 29. AEA and TCP/IP Configure Complete

You have now completed customizing for the 3174 TCP/IP Telnet Support.

3.9.15 Token-Ring Considerations

You may have noticed that we have not mentioned any token-ring network customization questions. Since your 3174 must be either a x3R model customized for at least one 3270 host attachment, or a model customized as a token-ring gateway, you have already set up the token-ring network interface previously. No changes to your token-ring network customization are required for the 3174 TCP/IP Telnet Support.

3.9.16 Ethernet Considerations

We are not using Ethernet in this example, but if we were the 3174 could be a DSPU, Ethernet Gateway, or a standalone Telnet terminal server. For DSPU, or a Ethernet Gateway, there are no changes to your LAN (token-ring or Ethernet) customization As a standalone Telnet terminal server, the 3270 host is not and has not been defined, thus you must customize for the use of the Ethernet adapter. Refer to Chapter 8, "3174 Ethernet Considerations" on page 227, for information on customizing the the Ethernet adapter.

3.10 How to Use the 3174 TCP/IP Telnet Support

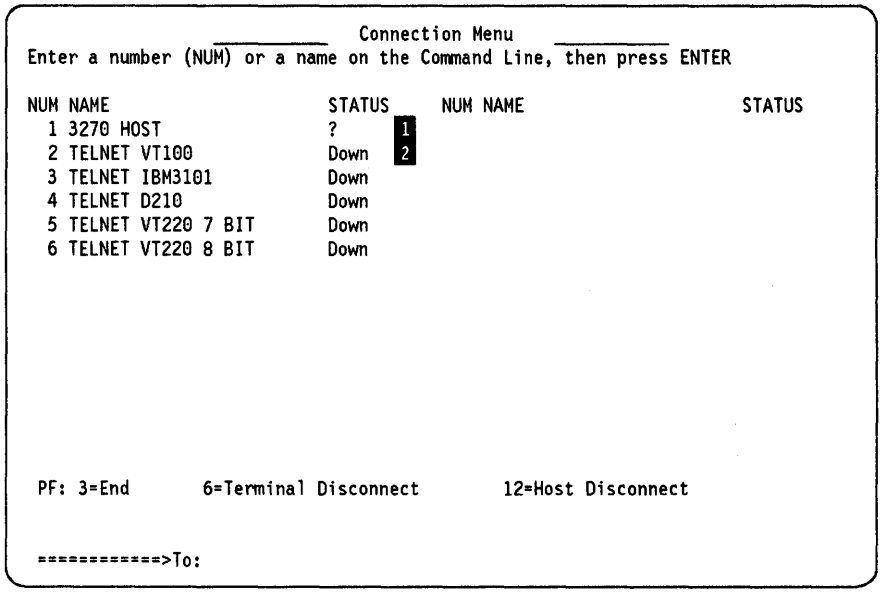


Figure 30. Connection Menu Immediately after 3174 IMLed

Re-IML the 3174 after you have completed your customizing procedures. Since we have specified the Connection Menu as the default destination for all our attached terminals, this screen appears immediately after the re-IML. Note the status displayed:

1. The 3270 host status is a question (?) mark.
2. The TCP/IP host status is Down.

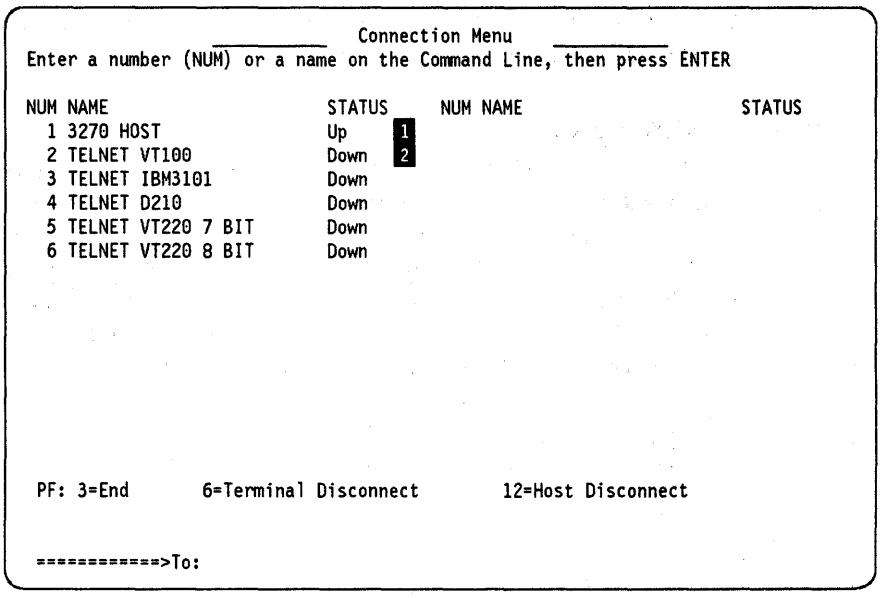


Figure 31. Connection Menu after 3174 Becomes Active

When the 3270 host attachment becomes active, the status changes, without user intervention, to the following:

1 The 3270 host status is now Up and, if selected, the session will be established between the LT and the host.

2 The TCP/IP host status continues to be Down.

```
                    Connection Menu
Enter a number (NUM) or a name on the Command Line, then press ENTER

NUM NAME                    STATUS     NUM NAME                    STATUS
  1 3270 HOST               Up
  2 TELNET VT100            Up
  3 TELNET IBM3101          Up
  4 TELNET D210             Up
  5 TELNET VT220 7 BIT      Up
  6 TELNET VT220 8 BIT      Up




 PF: 3=End       6=Terminal Disconnect        12=Host Disconnect


 ============>To:
```

Figure 32. Connection Menu after 3174 Becomes Active And Enter Pressed

When you press the Enter key, the status shows all hosts active, only if the LAN (token-ring or Ethernet) adapter has successfully opened. You can now select any one of the hosts from the Connection Menu.

3.11 Terminal Operation with the 3174 TCP/IP Telnet Support

When you select a TCP/IP option from the Connection Menu, your LT is placed into the local mode. You know you are in local mode when the following prompt is displayed:

3174 TELNET>

In the local mode, you are interacting with the 3174, just as if it were a "host computer." You ask the 3174 to perform functions on your behalf. The most important function is opening a connection with a remote TCP/IP host.

3.11.1 Opening a Connection

Once in the local mode, there are two ways to open a connection with a TCP/IP host:

- If you have specified an address in question 790 and it is the desired destination, type the following at the Telnet prompt and press Enter:

  3174 TELNET> **open**

- If you have specified an address in question 790 and it is not the desired destination, or if you have not specified an address in question 790, type the following at the Telnet prompt and press Enter:

  3174 TELNET> **open** *destination*
  where *destination*={IPaddress|hostname}

Once your connection is opened, you leave the local mode and enter into session with the remote host.

When you are in session with the host, you can return to the local mode temporarily, without losing your connection to the host, by pressing the escape key.

3.11.2 Escaping to Local Mode

To escape to the local mode while you are in an active Telnet session, use the escape key (the escape key usually involves pressing more than one key and is not the key marked Esc or ESC on your keyboard). To find out what the escape key is, type the following at the Telnet prompt and press Enter:

3174 TELNET> **display**

Figure 46 on page 57 shows an example of the resulting display. Note the line that shows:

escape [^L]

This is the default setting; it means that:

- If you have a Ctrl key on your keyboard and your display is setup offline for native mode (Standard), press and hold the Ctrl key (a ← shows in the OIA) and then press the L key.
- If you do not have a Ctrl key, enter Extension mode (for example, press and hold Alt, and then press Erase EOF), then press and release the C key, which puts you into the Ctrl mode (a ← now shows in the OIA), then press the L key.

  If you find this cumbersome, use the SET command to define your preferred escape key (for example, the $ key) before you open the connection:

  3174 TELNET> **set escape $**

Once you have escaped to the local mode, you can enter local commands (see 3.11.8, "Local Mode Commands" on page 51). If you enter the CLOSE or the QUIT command, the connection will be ended.

After the command is performed, you automatically return to your host session, unless the command was a request to end the connection. You may have to press Enter once to regain the host prompt.

If you did not issue any command when you escaped to the local mode, just press Enter once and you will be returned to your host session.

When you return to your host session, you may need to request the host application to refresh the screen. For example, if you are working with SMIT (System Management Interface Tool) on the RS/6000, press the PF2 key to refresh. Otherwise, the commands and responses that were displayed during local mode remain on the screen until they are replaced by data from the host.

3.11.3 Returning to The Connection Menu

The procedure used to return to the Connection Menu from your Telnet session depends on the type of device you are using.

For 3270 devices:

- If a Telnet session is active, enter into Extension mode and then press the M key.
- If a Telnet session is not active, do either of the following:
  - Enter into Extension mode and then press the M key.
  - Type the following at the Telnet prompt and press Enter:

    3174 TELNET> **quit**

For ASCII devices, escape to the local mode first, and then escape to the Connection Menu; that is, press the escape key twice.

3.11.4 Returning to the Telnet Session

When you have returned to the Connection Menu:

- If you choose the same host connection as the host session you came from, you will be returned to that session.
- If you choose a different destination, the previous session is disconnected and you will be placed into the local mode to allow you to open a new connection.

3.11.5 TELNET Session Resources

When you first request a TCP/IP destination from the Connection Menu, one of the Telnet session resources reserved by question 058 must be available. If it is not, your request is rejected (see Figure 33).

```
                    Connection Menu
Enter a number (NUM) or a name on the Command Line, then press ENTER

NUM NAME                  STATUS     NUM NAME                  STATUS
  1 IBM HOST              ?
  2 TELNET VT100          Busy
  3 TELNET IBM3101        Busy
  4 TELNET D210           Busy
  5 TELNET VT220 7 BIT    Busy
  6 TELNET VT220 8 BIT    Busy









PF: 3=End       6=Terminal Disconnect       12=Host Disconnect
802 03 No 'TELNET VT220 8 BIT      ' ports are available

============>To:
```

Figure 33. TCP/IP Resources Not Available

Once your request is accepted, a session resource is allocated for you until you do either of the following:

- You enter a QUIT command from the local mode.
- You return to the Connection Menu and successfully select a different destination from the menu.

3.11.6 Operation: Telnet to RS/6000 Host

```
                    Connection Menu
Enter a number (NUM) or a name on the Command Line, then press ENTER

NUM NAME                    STATUS     NUM NAME                    STATUS
  1 3270 HOST               Up
  2 TELNET VT100            Up
  3 TELNET IBM3101          Up
  4 TELNET D210             Up
  5 TELNET VT220 7 BIT      Up
  6 TELNET VT220 8 BIT      Up









 PF: 3=End       6=Terminal Disconnect       12=Host Disconnect


 ============>To: 2
```

Figure 34. Selecting Connection to RS/6000 Host

```
3174 TELNET> open 9.67.38.73
```

Figure 35. TELNET Local Mode

```
IBM AIX Version 3 for RISC System/6000
(C) Copyrights by IBM and by others 1982, 1991.
login: root
root's Password:
*******************************************************************************
*                                                                             *
*                                                                             *
*  Welcome to IBM AIX Version 3.2!                                            *
*                                                                             *
*                                                                             *
*  Please see the README file in /usr/lpp/bos for information pertinent to    *
*  this release of the AIX Operating System.                                  *
*                                                                             *
*                                                                             *
*******************************************************************************

Last unsuccessful login: Fri Oct  2 11:07:03 CDT 1992 on hft/0
Last login: Tue Oct  6 12:21:51 CDT 1992 on pts/8 from rs60002
[YOU HAVE NEW MAIL]
swcons: console output redirected to: /log/060ct92
<rs60003># smit
```

Figure 36. RS/6000 after Login

```
                                System Management

Move cursor to desired item and press Enter.

  Installation and Maintenance
  Devices
  Physical & Logical Storage
  Security & Users
  Diskless Workstation Management
  Communications Applications and Services
  Spooler (Print Jobs)
  Problem Determination
  Performance & Resource Scheduling
  System Environments
  Processes & Subsystems
  Applications
  Using SMIT (information only)




F1=Help             F2=Refresh          F3=Cancel           Esc+8=Image
Esc+9=Shell         Esc+0=Exit          Enter=Do
```

Figure 37. RS/6000 after Invoking SMIT

3.11.7 Operation: Telnet to MVS TCP/IP Host

```
3174 TELNET> open mvs20
Finding address of mvs20
Trying...
Connected to 9.67.38.96
Application Id required, no installation default
Enter Application Name:
tso
IKJ56700A ENTER USERID -
IKJ56714A ENTER CURRENT PASSWORD FOR TONYTAN-
 ICH70001I TONYTAN  LAST ACCESS AT 13:51:50 ON TUESDAY, OCTOBER 6, 1992
IKJ56481I THE PROCEDURE NAME $ASNETDA IS A DEFAULT NAME - YOU MAY CHANGE IT
IKJ56455I TONYTAN LOGON IN PROGRESS AT 13:54:24 ON OCTOBER 6, 1992
 SA20 was converted to ESA 4.2 on OCT 9
INVALID TERMINAL ACCESS METHOD, ISPF VERSION 3 REQUIRES ACF/VTAM.
READY
IKJ56470I TONYTAN LOGGED OFF TSO AT 13:55:41 ON OCTOBER 6, 1992
******
 Connection closed by foreign host.

3174 TELNET>
```

Figure 38. Logging On to MVS TSO

3.11.8 Local Mode Commands

The 3174 converts all local mode commands and arguments into lowercase before processing. Any numeric arguments that are required must be given in decimal. IP addresses must be entered in dotted decimal form, with no imbedded spaces, and leading zeros are not necessary.

In the following explanations of the commands, arguments must be given in the order shown. We have adopted the following convention:

- A command is shown in uppercase.
- An argument, option or variable (for example, hostname) is shown in lowercase.

Parentheses () denote optional arguments. If you wish to specify any optional argument, you must specify all the arguments that precede it. Abbreviations for commands and parameters are allowed. If the correct input cannot be determined, you will receive either an "invalid" or an "ambiguous" message.

You can use "?" after any command to get help.

NAMES Command

Purpose: The NAMES command will display any host nicknames that you have customized at your 3174 (see 3.9.13, "Defining TCP/IP Nicknames" on page 43) together with its associated IP address.

Command Format: NAMES

Example Display:

```
3174 TELNET> names
rs60001              9.67.38.71
rs60002              9.67.38.72
rs60003              9.67.38.73
mvs20                9.67.38.96
mvs18                9.67.38.134
```

Figure 39. TCP/IP Using NAMES Command

Figure 39 shows the display for the nicknames defined in 3.9.13, "Defining TCP/IP Nicknames" on page 43.

PING Command

Purpose: The PING command is used to query the availability of a remote host. Once issued, the PING operation will continue until the 3174 has sent a specified number of packets to the remote host (if it is available). You can stop the PING operation at any time by pressing any key.

Command Format: PING *(destination (count (size)))*

Where:

destination Is the remote host being queried. The *destination* can be:

- A nickname
- An unqualified hostname, if the host is part of the same domain as the 3174 you are attached to
- A fully qualified hostname
- An IP address

If no destination is given, the IP address, if customized in question 790 for the selected station set, is used.

count Is the number of packets the 3174 should send. If count=0, the 3174 will send packets until you stop the query. Possible values are 0 through 1000 (default 10).

size Is the number of bytes to send in each query. Possible values are 8 through 64 (default 64).

Example Display:

```
3174 TELNET> ping

 ...sending 00064 characters to 9.67.38.71
Received reply to packet 00000, delay (ms) = 00020
Received reply to packet 00001, delay (ms) = 00020
Received reply to packet 00002, delay (ms) = 00020
Received reply to packet 00003, delay (ms) = 00020
Received reply to packet 00004, delay (ms) = 00020
Received reply to packet 00005, delay (ms) = 00027
Received reply to packet 00006, delay (ms) = 00039
Received reply to packet 00007, delay (ms) = 00020
Received reply to packet 00008, delay (ms) = 00020
Received reply to packet 00009, delay (ms) = 00020

Summary for PING to 9.67.38.71

   Packets sent: 00010 Packets received: 00010
   Round-trip (ms) ( min avg max ) = 00020 00022 00039

3174 TELNET>
```

Figure 40. TCP/IP Using PING Command - to Default Destination

In this display, the PING command was issued, without a destination, from an LT that selected the DEC VT100 station set number 3 (see Figure 21 on page 34). The default destination is, therefore, as customized in question 790.

```
3174 TELNET> ping mvs20 8 2

Finding address of mvs20
 ...sending 00008 characters to 9.67.38.96
Received reply to packet 00000, delay (ms) = 00047
Received reply to packet 00001, delay (ms) = 00021

Summary for PING to 9.67.38.96

   Packets sent: 00002 Packets received: 00002
   Round-trip (ms) ( min avg max ) = 00021 00034 00047

3174 TELNET>
```

Figure 41. TCP/IP Using PING Command - with Parameters

In this display, the PING command is issued, specifying the destination host name as mvs20, data packet size 8 bytes, and two packets to be sent for the PING operation.

```
3174 TELNET> ping ?

Usage:  ping host size count
    host - destination host name or address
    size - size of data packet (8-64)
   count - number of packets (0-1000)
If unspecified, size=64 and count=10.

3174 TELNET>
```

Figure 42. TCP/IP Using PING Command - Help

In this display, the help information is provided to show the format and valid values that can be specified.

You can request help with any command by typing in the command followed by the question mark (or by the word help).

```
3174 TELNET> ping mvs30

Finding address of mvs30 1
Unknown host

3174 TELNET> ping mvs18

Finding address of mvs18 2
 ...sending 00064 characters to 9.67.38.134

Summary for PING to 9.67.38.134

   Packets sent: 00010 Packets received: 00000
   Percent packet loss:   100

3174 TELNET>
```

Figure 43. TCP/IP Using PING Command - Messages

1 Messages displayed for a destination that is not known.

2 Messages displayed for a destination that is not available.

OPEN Command

Purpose: The OPEN command opens a connection to a remote host.

Command Format: OPEN *(destination (remote_port))*

Where:

destination Is a remote host to which you wish to connect. The *destination* can be:

- A nickname
- An unqualified hostname, if the host is part of the same domain as the 3174 you are attached to
- A fully qualified hostname
- An IP address.

If no destination is given, the IP address, if customized in question 790 for the selected station set, is used.

remote_port Is the port number of the Telnet server at the remote host, if you want a port other than the standard Telnet port 23. Possible values are 0 through 65535.

Example Display: See Figure 35 on page 49 and Figure 38 on page 51.

CLOSE Command

Purpose: The CLOSE command will end the connection with the remote host; that is, it is used to disconnect from a remote host. Your LT will remain in Telnet local mode.

Command Format: CLOSE

Example Display:

```
login: root
root's Password:
*******************************************************************************
*                                                                             *
*                                                                             *
*  Welcome to IBM AIX Version 3.1!                                            *
*                                                                             *
*                                                                             *
*  Please see the README file in /usr/lpp/bos for information pertinent to    *
*  this release of the AIX Operating System.                                  *
*                                                                             *
*                                                                             *
*******************************************************************************

1 unsuccessful login attempt since last login
Last unsuccessful login: Fri Oct  9 08:14:26 1992 on pts/1 from 9.67.38.88
Last login: Fri Oct  9 08:13:52 1992 on pts/1 from 9.67.38.88
[YOU HAVE NEW MAIL]
<rs60001>#          1
3174 TELNET> close  2
Connection closed by user request

3174 TELNET>
```

Figure 44. TCP/IP Using CLOSE Command

1 At this point, you are in session with the RS/6000 host.

2 At this point, you have escaped to the local mode and issued the CLOSE command. The resulting message shows the connection was closed at your request and you are returned to the Telnet prompt.

QUIT

Purpose: The QUIT command will end any open connection and return the LT to the Connection Menu.

Command Format: QUIT

Example Display: No example display is provided.

STATUS Command

Purpose: The STATUS command is used to display the status of the current connection, showing the address of the remote host, and the mode of operation.

Command Format: STATUS

Example Display:

```
login: root
root's Password:
*******************************************************************************
*                                                                             *
*                                                                             *
*  Welcome to IBM AIX Version 3.1!                                            *
*                                                                             *
*                                                                             *
*  Please see the README file in /usr/lpp/bos for information pertinent to    *
*  this release of the AIX Operating System.                                  *
*                                                                             *
*                                                                             *
*******************************************************************************

1 unsuccessful login attempt since last login
Last unsuccessful login: Fri Oct  9 08:14:26 1992 on pts/1 from 9.67.38.88
Last login: Fri Oct  9 08:13:52 1992 on pts/1 from 9.67.38.88
[YOU HAVE NEW MAIL]
<rs60001>#              1
3174 TELNET> status     2
Connected to 9.67.38.71
Operating in character-at-a-time mode.
escape     [$]
                        3
<rs60001>#              4
```

Figure 45. TCP/IP Using STATUS Command

1 At this point, you are in session with the RS/6000 host.

2 At this point, you have escaped to the local mode and issued the STATUS command. The resulting three messages show the connection status, the operating mode, and the character that will allow you to escape to the local mode.

3 The display will stay at this point until you press Enter.

4 When you press Enter, you are again in session with the RS/6000.

DISPLAY Command

Purpose: The DISPLAY command, without any argument, will show the current operating parameters and their settings. The settings can be changed by the SET or TOGGLE command.

Command Format: DISPLAY

```
(option (option (option ... )))
```

Where:

option Is one of the options set by the SET or TOGGLE command.

Example Display:

```
3174 TELNET> display
 2          1
won't - map received carriage returns
won't - recognize local control characters
won't - wrap long output lines
will - translate backspace/delete

 3          4
escape     [^L]
terminal   DEC-VT100
erase      [^H]
interrupt  [^Z]
kill       [^U]
quit       [^X]

3174 TELNET>
```

Figure 46. TCP/IP Using DISPLAY Command

This display shows the current parameters and their settings:

1 Shows the parameters that can be changed by the TOGGLE command from "will" to "won't" and vice versa.

2 Shows the current TOGGLE values. For example, if you issue the following command:

TELNET> toggle crmod

The result will show the following change:

will - map received carriage returns

3 Shows the parameters that can be changed by the SET command.

4 Shows the current SET values. For example, if you issue the following command:

TELNET> set escape $

The result will show the following change:

escape [$]

SET Command

Purpose: The SET command allows you to assign a function to a specific keystroke. You can also set a terminal type string to send in response to a terminal type negotiation (for ASCII terminals).

Command Format: SET *option key*

Where:

option Is one of the following:

- **escape** Is the character that will place you in local mode.
- **terminal** Is the string which will be used in terminal type negotiation.

The following need "localchars" to be toggled on:

- **erase** A character that will cause an Erase character.
- **interrupt** A character that will cause a Telnet interrupt.
- **kill** A character that will cause an Erase line.
- **quit** A character that will cause a Break.

key Is one of the following:

- **¬x** A control key (¬e represents Ctrl-e or X'05').
- **x** A non-alphanumeric character.
- **string** The terminal type for host negotiation.

TOGGLE Command

Purpose: The TOGGLE command allows you to switch the setting (from "will" to "won't," or vice versa) of certain local functions.

Command Format: TOGGLE *option (option (option ...))*

Where:

option Is one of the following:

- **crmod** Mapping of received carriage returns.
- **localchars** Recognize local control characters.
- **wrap** Wrap long output lines.
- **bs** Backspace as a delete character function.

SEND Command

Purpose: The SEND command allows you to send special control sequences to the remote host. It also gives you the ability to pass the current escape character to the remote host, since the 3174 will intercept this character if it is typed on the keyboard.

Command Format: SEND *option (option (option ...))*

Where:

option Is one of the following:

ayt	TELNET "Are You There" command.
brk	TELNET "Break" command.
break	TELNET "Break" command.
ec	Erase Character.
el	Erase Line.
escape	The current escape character.
ip	TELNET "Interrupt" command.
interrupt	TELNET "Interrupt" command.
intp	TELNET "Interrupt" command.
intr	TELNET "Interrupt" command.
nop	TELNET "No Operation" command.
synch	TELNET "Synch Operation" command.

HELP Command

Purpose: The 3174 displays help information for the requested commands, for example, if you need an explanation of a command and its options. It is the same as the ? (question mark) command.

Command Format: {HELP|?} *(command (command (command ...)))*

Where:

command Is one of the other local mode commands.

3.11.9 Special Considerations for ASCII Terminals

When you are accessing a Telnet destination from an ASCII terminal, the data received from your terminal is sent to the remote host unchanged.

Terminal Types

If you are using a 3174 User Defined Terminal (UDT), use the SET command to enter the name of your terminal. Do this before you issue an OPEN command. The 3174 will send this character string to the host, in response to a terminal type negotiation request.

If you do not use the SET command, the 3174 uses predefined character strings as answers when the host asks for the terminal type. The character string is determined by the station type of the terminal, as follows:

Station Type	Character String Sent to Host
A2	ADDS-VIEWPOINT-A2
A7	ADDS-VIEWPOINT/78
E1	HAZELTINE-1500
E7	HAZELTINE-ESPRIT
H2	HP-2621
I1	IBM-3101
I2	IBM-3151

I5	IBM-3161
I7	IBM-3162
I4	IBM-3164
L1	LSI-ADM-11
L3	LSI-ADM-3A
L7	LSI-ADM-1178
T1	TELEVIDEO-912
T7	TELEVIDEO-970
V1	DEC-VT100
V6	DEC-VT220
V2	DEC-VT241
V5	DEC-VT52
M1	MINTEL-1B
W1	WYSE-50
X4	TEKTRONIX-4205
S1	ANSI
Others	UNKNOWN

Operation: ASCII Terminal

Some other things to note about using the 3174 TCP/IP Telnet RPQ from an ASCII terminal are:

- To request the Connection Menu, enter the escape key while in local mode.

  If you have an active Telnet session, enter the escape key twice - the first time, to enter local mode, and the second time to access the Connection Menu.

- If your terminal uses MLT to access more than one session, you must invoke the Connection Menu before using the Change Screen sequence.
- You cannot use Copy Session to Session functions while your LT is in Telnet mode.
- An LT in Telnet mode cannot be part of a Split Screen workgroup.

3.11.10 Special Considerations for 3270 Terminals

When you are accessing a Telnet destination from a 3270 terminal, the data received from your terminal is converted into an ASCII data stream that the remote host understands. Your terminal may operate differently from the way it does when you access a 3270 host. For example, there may be a delay after you press a key before the corresponding character appears on your screen. This is because the remote host usually provides the echoing of the keystroke. Also, the functions provided by some keys may be different from those you are used to. For a full description of how to use your 3270 terminal with ASCII hosts, refer to *Terminal User's Reference for Expanded Functions*.

Operation: 3270 Terminal

Some special things to note about using the 3174 TCP/IP Telnet RPQ from a 3270 terminal are:

- You can use Copy Session to Session function only to copy from a Telnet screen to a 3270 screen. You cannot copy to a Telnet screen.
- LTs in Telnet mode may be part of a Split Screen workgroup. However, you cannot do Split Screen setup functions from an LT in TELNET mode. You must access the Connection Menu on the LT before entering Split Screen setup.

3.11.11 Special Considerations for 3270 Emulation

Because most 3270 emulation software, filter the keys labeled **CTRL** and **ALT**, it is sometimes necessary to select a different key as the extension mode key. **Q168**, allows you select an additional extension mode key. Extension mode is required to execute any control mode functions (like escaping to local mode). Even if the emulator support native (standard) scancodes, extension mode is the prerequisite mode to control (Ctrl) mode. Once in extension mode, you press and release the C key to enter control mode. Control mode is is indicated by a left arrow in the OIA.

Question 168: Additional Extension Mode Key

Your response should be as follows:

- 0=No Additional Key Specified.
- 1=Home Key.
- 2=Print ID Key.

3.12 If Things Go Wrong...

The 3174 TCP/IP Telnet Support adds the following online tests:

- Test 2 Option 4 - to display AEA and TCP/IP configuration panels.
- Test 3 Option 3 - to display 3270 device status, including TCP/IP connections and information.

Here are some actions you can take if you have trouble with your session:

1. If you are communicating with a TCP/IP host, escape to the local mode. Use the STATUS command to get the status of the session.
2. If your session appears hung, or you want to interrupt the host, escape to the local mode and use the SEND command to send an interrupt to the host.
3. If you want to end the session, escape to the local mode and use the CLOSE command.
4. To see if a host is active, use the PING command. Since you cannot use the PING command from an active connection, you may need to use another LT, or CLOSE the active connection before issuing the PING command.
5. You can use the 3174 online tests /3 (for 3270 terminals) or /12 (for ASCII terminals) to display the connectivity of the LTs at any port. If an LT has selected a TCP/IP destination from the Connection Menu but has not used the OPEN command to start a session, these online tests will indicate the LT

is in the local mode. If there is an active connection with a remote TCP/IP host, the host IP address is shown (see Figure 47 on page 62).

```
BKBCP235          _____ Connectivity for PN 03, HG 26 _____

 Adapter (HG) status:          Enabled
 Port (PN) status:             Powered on
 Device type:                  Video display (MLT)


 Current connectivity-
                     Host
       LT    Bound   Addr    IDn    HG_PN  Host/Station Name

 ACTIVE 1      Yes    002     1A1    16     3270 host          1
        2      n/a    n/a     n/a           009.067.038.071    2
        3      n/a    n/a     n/a           TELNET Local Mode  3
        4      No     014     1A4           LT not available   4
        5             n/a     1A5           LT not available   5


To go directly to other tests, enter: /Test,Option
Select Test; press ENTER ===>

PF:  3=Quit  12=Test Menu
```

Figure 47. Online Test /3,3,26

1 LT-1 has a session with a 3270 host; the ACTIVE indicates this LT is currently being displayed on the screen.

2 LT-2 has an active connection to the Telnet host shown.

3 LT-3 is in Telnet local mode.

4 LT-4 is displaying the Connection Menu and has a local address customized in the PAST.

5 LT-5 is displaying the Connection Menu but does not have a local address customized in the PAST.

3.13 Telnet Codes

Some messages that you see during Telnet local mode operation contain a return code to help in problem determination.

Code	Meaning
00007	Argument list too long
00013	Permission denied
00014	Bad address
00022	Invalid argument
00031	Too many links
00032	Broken pipe
00033	Argument too large
00034	Result too large
00035	Operation would block
00036	Operation now in progress
00040	Message too long
00042	Protocol not available
00043	Protocol not supported
00044	Socket type not supported
00048	Address already in use
00050	Network is down
00051	Network is unreachable
00054	Connection reset by peer
00055	No buffer space available
00056	Socket is already connected
00057	Socket is not connected
00058	Can't send after socket is shutdown
00060	Connection timed out
00061	Connection refused
00064	Host is down
00065	No route to host

3.14 Data Flows

Figure 48 on page 65 shows an example flow of TCP/IP traffic to initiate a session for an LT. The flow shows these steps:

1. The user has already selected one of the Telnet options from the Connection Menu. He then types in "open MVS1.HOST1".
2. The 3174 TCP/IP Telnet Support uses the Domain Name Service function to determine the IP address associated with that host name. If the current routing table does not contain an entry for this host, a request is sent into the network to the Domain Name Server to resolve the address. For this flow, assume that the 3174 TCP/IP Telnet Support already has an entry for MVS1.HOST.
3. The 3174 TCP/IP Telnet Support determines that the request should be forwarded to the router at 128.10.0.2.
4. It does not know the MAC address of the router, so it uses ARP to find out.
5. The 3174 TCP/IP Telnet Support forwards the request to start a session (the first TCP message sent to do this is a SYN request).
6. The router discovers that the host is on a network that it can address directly and uses ARP to seek out the host's MAC address. It forwards the request.
7. The host processes the request, builds a reply and consults its routing tables which point to the router.
8. On the return journey, neither the host nor the router needs to use ARP, because they have both seen recent ARP activity which identifies the MAC addresses they need. These combinations are kept in a sort of cache and are discarded at regular intervals so that any changes can be reflected. Thus, such discovery activity is not restricted to the login, but could happen at any point during the user's host session.

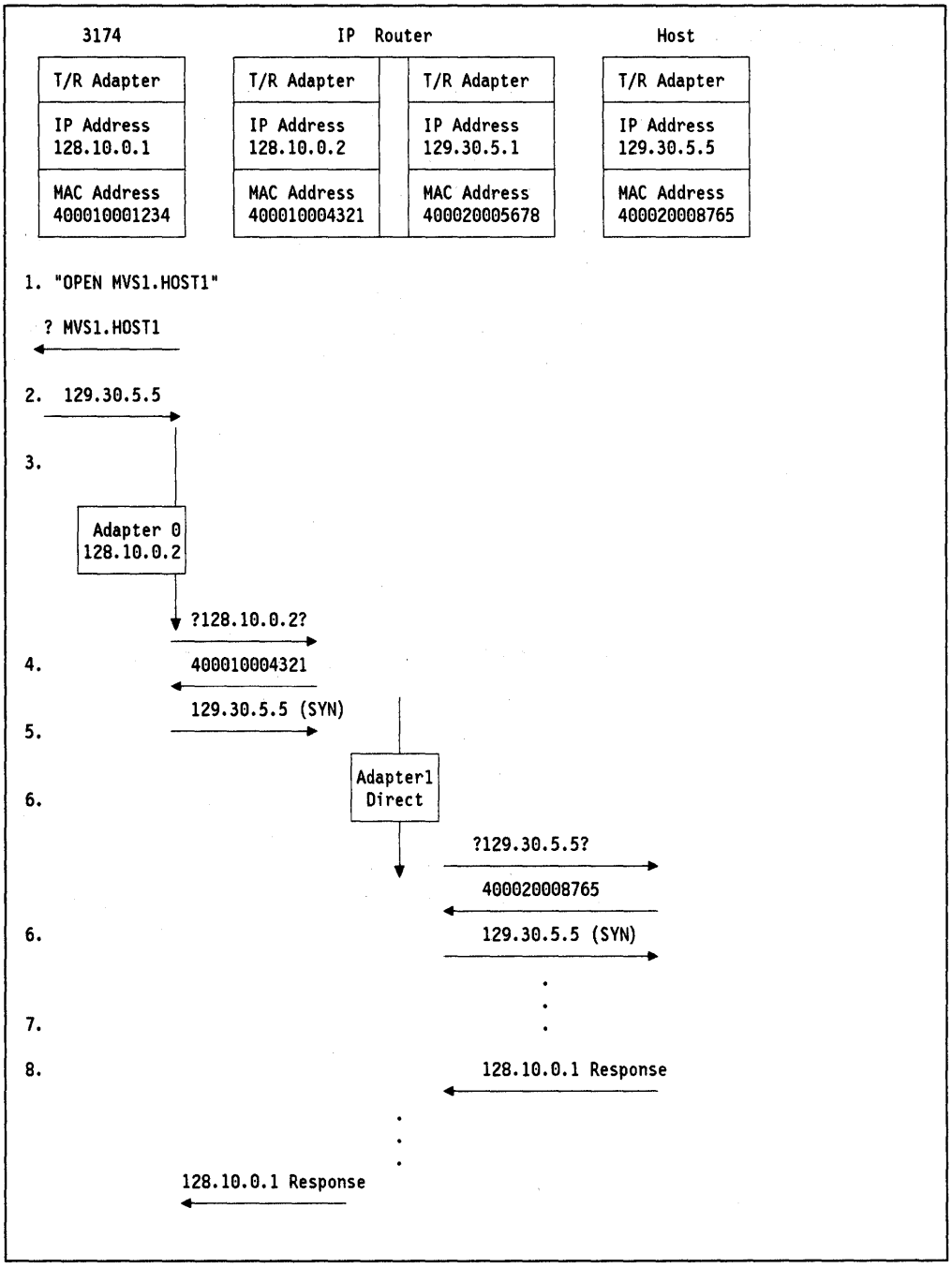


Figure 48. TCP/IP Connection Establishment

Chapter 4. Scenario 1: TCP/IP Using 3174 Peer Communication Only

Scenario 1 is used to illustrate the 3174 support for IBM TCP/IP products, such as TCP/IP for DOS and TCP/IP for OS/2, used in intelligent workstations coax-attached to a 3174 with the Peer Communication LIC feature. For this scenario, is not required to customize the 3174 for 3174 TCP/IP Telnet Support since the 3174 is not being used a Telnet terminal server. The 3174 is providing the bridge from the internal peer segment to the real token-ring network segment. This scenario will show the PS/2 workstations accessing a TCP/IP host and an SNA host through the 3174.

4.1 Scenario 1 Configuration Diagram

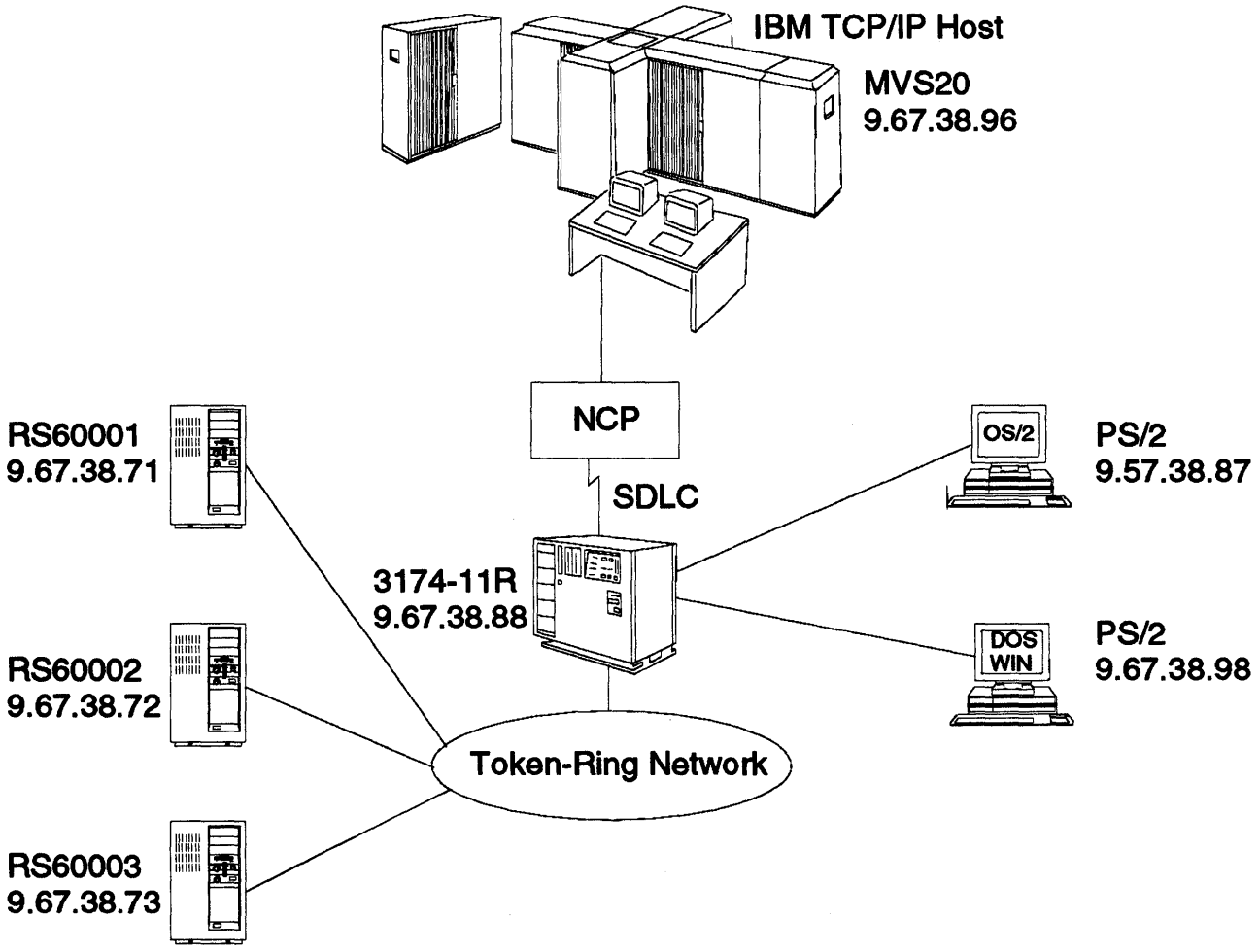


Figure 49. TCP/IP Access through 3174 Peer Communication

4.2 Scenario 1 Configuration Description

Scenario 1 shows an OS/2 and a DOS PS/2 workstation, each coax-attached to the 3174-11R using the Peer Communication LIC feature in Configuration Support-C Release 3 to bridge to the real token-ring network.

The composite network has the following components:

- An S/370 MVS host with ACF/VTAM* V4.1
- A channel-attached 3745 with ACF/NCP V6.2
- A 3174-11R Establishment Controller:
  - As a token-ring gateway to the S/370 host
  - With Peer Communication (LAN-Over-Coax) support enabled.
- A PS/2 OS/2 workstation, coax-attached to the 3174-11R, with:
  - OS/2 V2.0
  - Communications Manager/2 V1.0
  - Token-Ring address (400031742992)
  - Peer attachment (LAPS)
  - TCP/IP V1.2.1 for OS/2.
- A PS/2 DOS workstation, coax-attached to the 3174-11R, with
  - PC DOS V5.02
  - Personal Communications/3270 V3.0
  - Token-Ring address (400031744992)
  - Peer attachment (Peer NDIS Driver in LAN Support Program V1.33)
  - TCP/IP V2.1 for DOS.

4.3 Communications Manager/2 Definitions

On the OS/2 workstation, we start Communications Manager/2.

- Communications Manager Installation/Setup
- Communication Setup
- Open Configuration
- Communication Manager Configuration Definition - 3270TCP
- 3270 Emulation through Token-Ring
- Communication Setup Close

Communications Manager/2 Installation and Setup

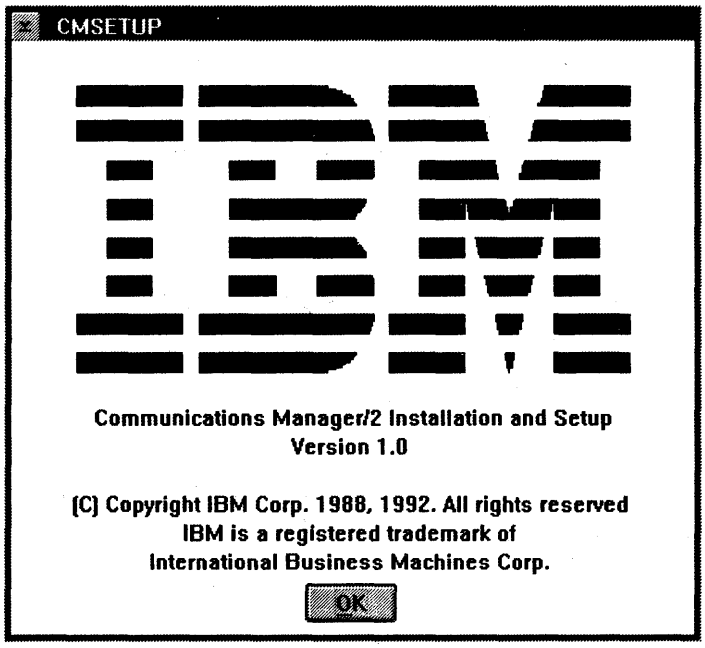


Figure 50. Communications Manager/2 Installation and Setup

To initiate setup, either click OK on the CMSETUP panel if Communications Manager/2 is already installed, or enter **cmsetup** from the command prompt if this is the initial installation.

Refer to the *Communications Manager/2 Installation Guide* for more details.

Note: If you do not have LAPS installed, you will have to do so prior to cmsetup.

Communications Manager Setup

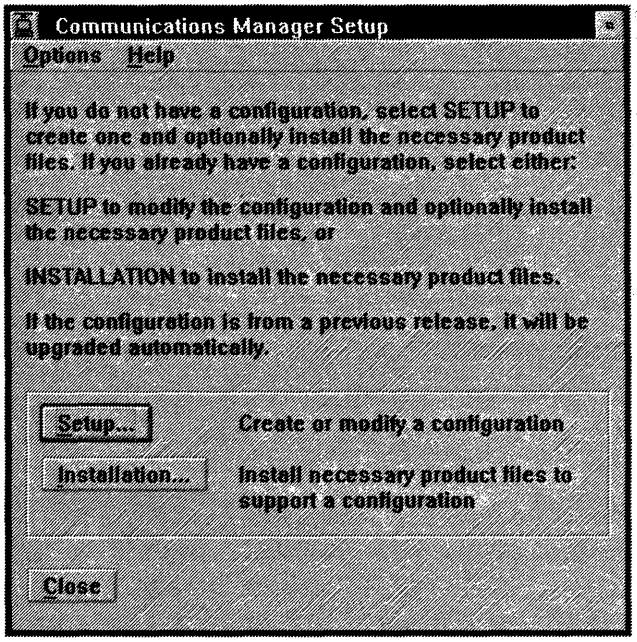


Figure 51. Communications Manager Setup

- Select **Setup** to create or modify a configuration definition and proceed to Figure 52 on page 71.
- Select **Installation** to install necessary product files to support a configuration, if this is your initial installation.
- Select **Close** to end Communications Manager Setup process.

We have selected **Setup** since we are creating a new configuration definition.

Open Configuration

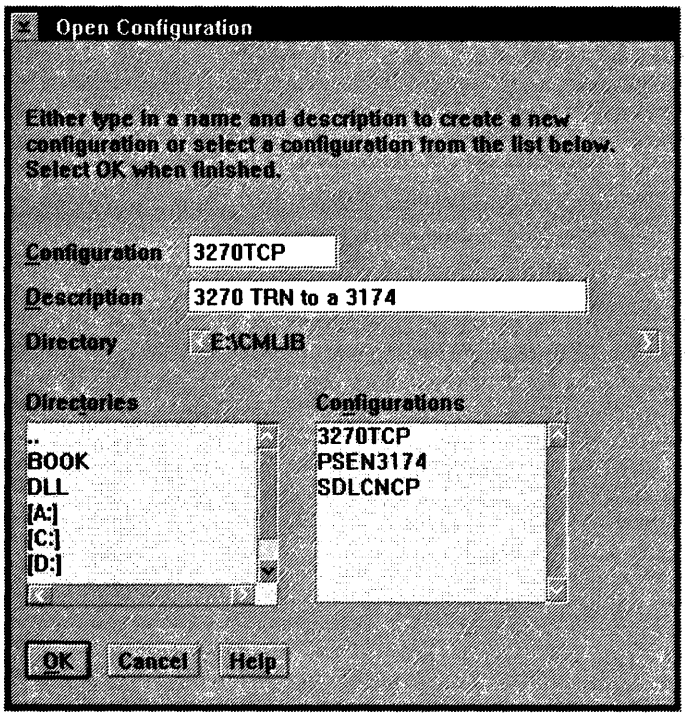


Figure 52. Open Configuration

- Enter a configuration name in the **Configuration** field.
- Enter a description of the configuration in the **Description** for documentation purposes.
- You will be asked, **Will this configuration be used for this workstation**.

  Click on **Yes** and continue to the next step. If a new file is being created, Communications Manager/2 will store all files in the **E:\CMLIB\3270TCP** subdirectory.
- Click on **OK** to get to the next panel, shown in Figure 53 on page 72.

This configuration will be used by the OS/2 workstation to access the 3270 host via the 3174-11R token-ring gateway.

Communications Manager Configuration Definition - 3270TCP

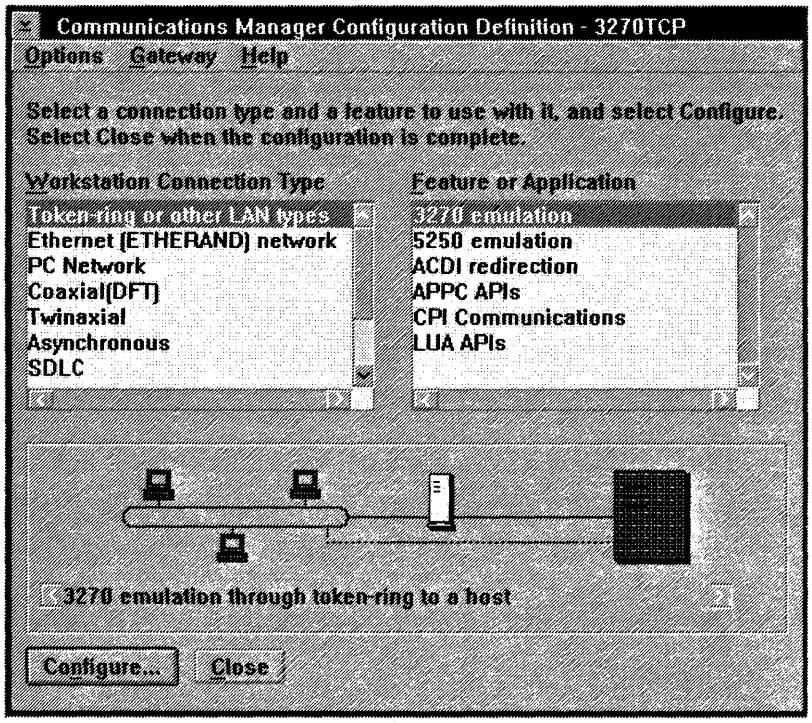


Figure 53. Communications Manager Configuration Definition for 3270 Emulation

- Select **Token-ring or other LAN types**.
- Select **3270 emulation**.
- Click on **Configure** to get to the next the panel, shown in Figure 54 on page 73.

Even though, we are using the physical coax 3278 adapter, we configure for **Token-ring or other LAN types** since the Peer Communication support is transparent to Communications Manager/2. LAPS will provide the API interface to the physical adapter. What we are configuring is the logical connection.

3270 Emulation through Token-Ring

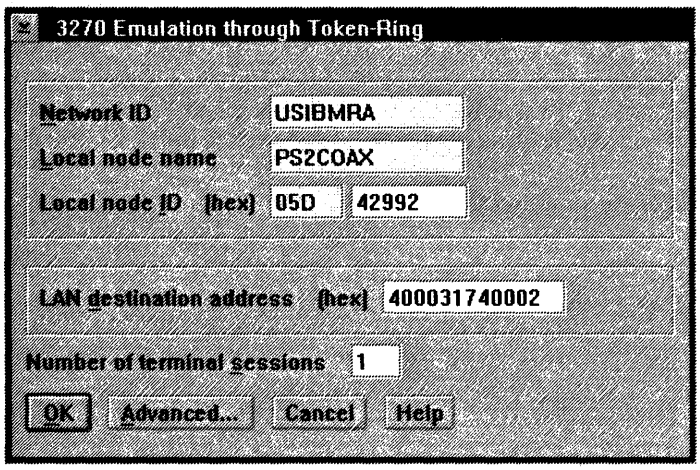


Figure 54. 3270 Emulation through Token-Ring

- Enter the network ID, local node name and local node ID for the OS/2 workstation.
- Enter the token-ring network address of the 3174-11R gateway in the **LAN destination address** field.
- Enter the number of 3270 sessions you want for the OS/2 workstation.
- Click on **OK**.

The Communications Manager Configuration Definition - 3270TCP panel reappears.

Communications Manager Configuration Definition - 3270TCP

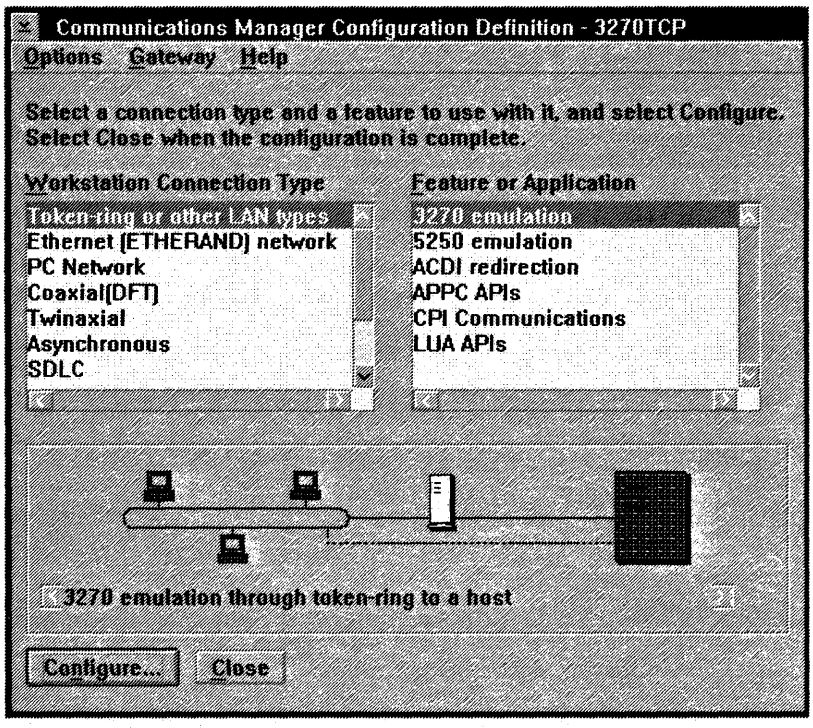


Figure 55. Communications Manager Configuration Definition for 3270 Emulation

You have now completed Communications Manager Configuration Definition.

- Click on **Close**.

If your configuration requires additional installation, refer to the *Communications Manager/2 Configuration Guide*, SC31-6171 for further information.

4.4 TCP/IP V1.2.1 for OS/2 Installation/Configuration

This section provides information on how to install and configure TCP/IP V1.2.1 for OS/2 on your PS/2 workstation which is coax-attached to the 3174. For more information, see *TCP/IP V1.2.1 for OS/2 Installation and Interoperability*, GG24-3531.

Installation and Configuration Automation Tool (ICAT)

The following sections describe the installation and configuration of TCP/IP V1.2.1 for OS/2 at a PS/2 which already has OS/2 V2.0 and Communications Manager/2 installed.

ICAT is a Presentation Manager* application that uses standard input and output conventions.

Installation Using ICAT

To start the installation process with ICAT, insert the TCP/IP V1.2.1 for OS/2 diskette labeled **B-1** into drive A and enter the following command at a command prompt in OS/2 full-screen or Windows mode:

A:\icat

The panel in Figure 56 is displayed.

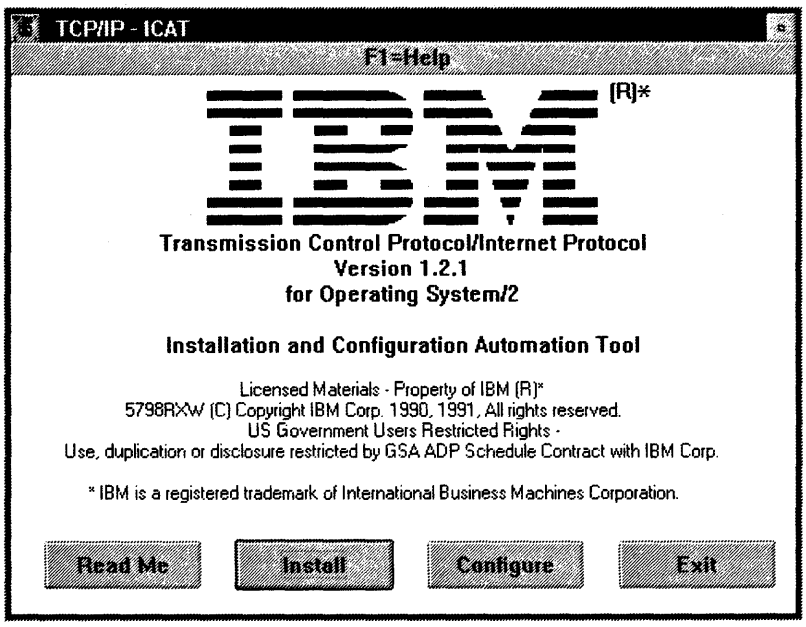


Figure 56. TCP/IP V1.2.1 for OS/2 ICAT Introduction Panel

To install TCP/IP V1.2.1 for OS/2 click on **Install**; the panel in Figure 57 on page 76 is displayed.

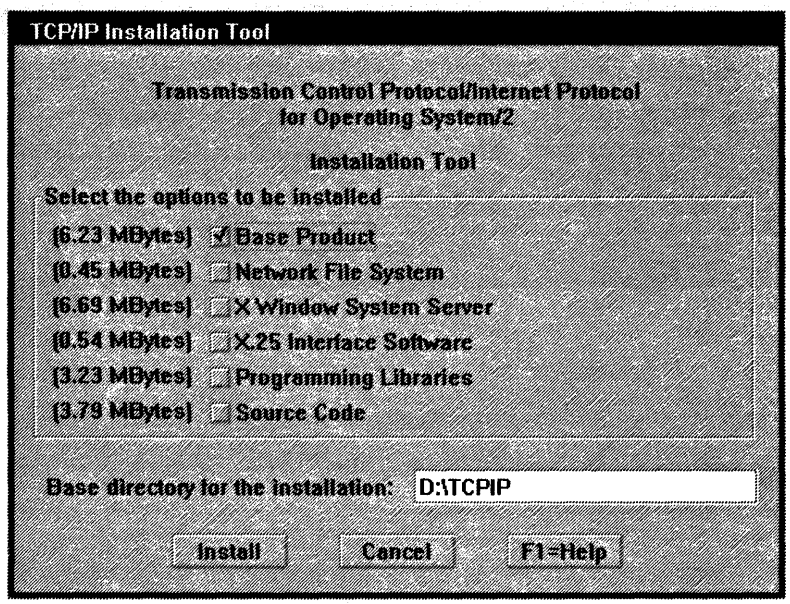


Figure 57. TCP/IP V1.2.1 for OS/2 ICAT Installation Panel

We only choose the **Base Product** to install on this PS/2 host. The base directory to install TCP/IP V1.2.1 for OS/2 is D:\tcpip. Select **Install**; ICAT will start the installation process on your PS/2. You are prompted to insert the appropriate diskette ICAT needs.

When ICAT has finished the installation, you are asked if ICAT can make changes to the CONFIG.SYS file for you. Select **Yes** and ICAT will update the statements in the CONFIG.SYS file.

Then you get a message to run TCPLAPS to complete the installation. Select **OK**. Then, on the ICAT introduction panel select **Exit**. This completes your installation.

Configuration using ICAT

The next step is to configure your system using ICAT. At a minimum, the OS/2 TCP/IP system should be customized to include its IP address in the **Configure Network Interface Parameters** panel.

To start configuring, enter **ICAT** at an OS/2 command prompt. The ICAT introduction panel appears. Select **Configure** to display the **Configuration Menu**.

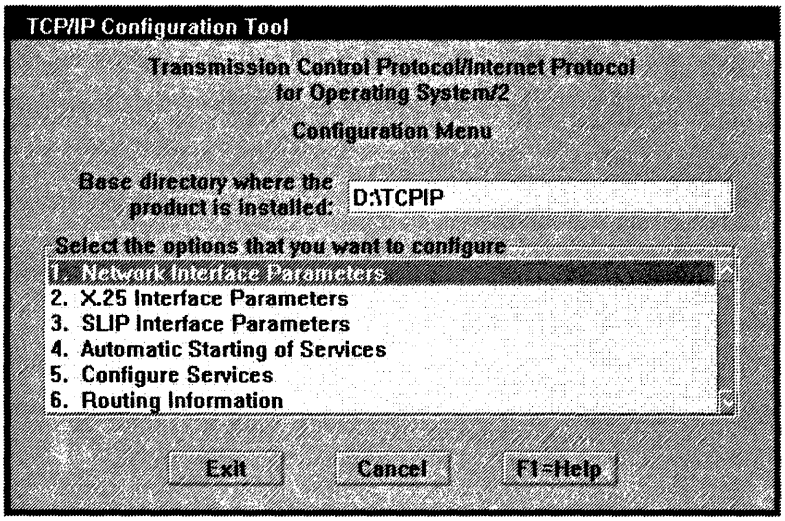


Figure 58. ICAT Configuration Menu

The detailed information about the different options are described in *TCP/IP V1.2.1 for OS/2 Installation and Interoperability*, GG24-3531. Select **Network Interface Parameters**.

Your responses in the **Configure Network Interface Parameters** panel change the IFCONFIG statement in the SETUP.CMD file.

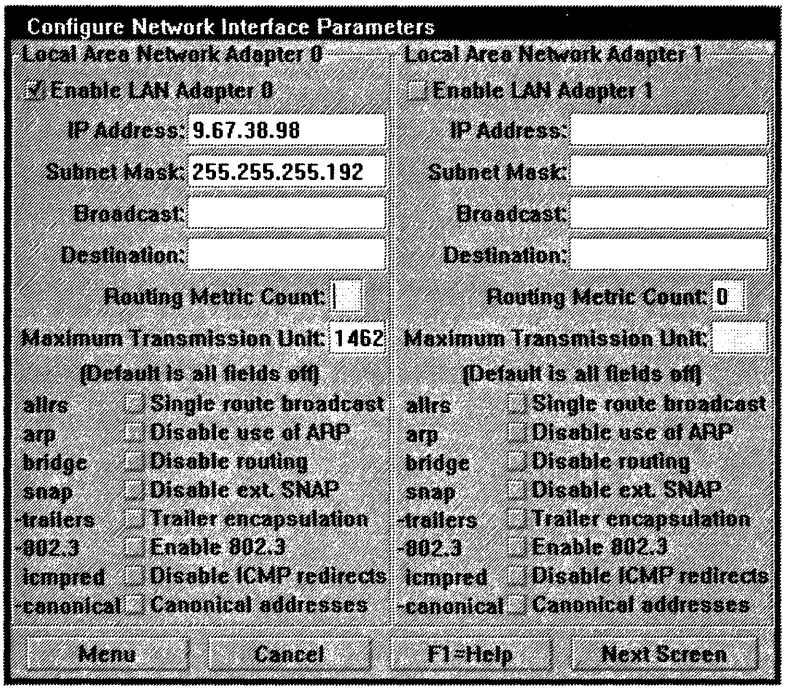


Figure 59. ICAT Configure Network Interface Parameters

When updating the ICAT Network Interface Parameters menu, enter the IP Address, the Subnet Mask (if the IP network is using subnets) and the Routing Metric Count if you use routers in your network. Let the other IFCONFIG values default.

With the responses shown in Figure 59, ICAT creates the following IFCONFIG statements in the SETUP.CMD file:

```
route -fh
arp -f
ifconfig lan0 9.67.38.98 netmask 255.255.255.192 metric 01 mtu 1462
REM ifconfig lan1
REM ifconfig lan2
REM ifconfig lan3
REM ifconfig sl
```

Figure 60. IFCONFIG Statement in SETUP.CMD File

As you can see, ICAT allows the configuration of up to four LAN adapters at a time.

Note: The Maximum Transmission Unit size depends on the type of adapter in your PS/2.

For more information about the IFCONFIG parameters, see *TCP/IP V1.2.1 for OS/2 Installation and Maintenance.*

4.5 Installation: TCP/IP LAN Adapter and Protocol Support (TCPLAPS)

TCPLAPS is a Presentation Manager based utility, which allows you to install and configure your system to run the NDIS version of TCP/IP V1.2.1 for OS/2. It is used to associate the IBM TCP/IP protocol with one or more network adapters. To install TCPLAPS on a workstation, insert the diskette labeled **LAPS** in the diskette drive and enter the following command at an OS/2 prompt:

A:\laps

The panel shown in Figure 61 is displayed.

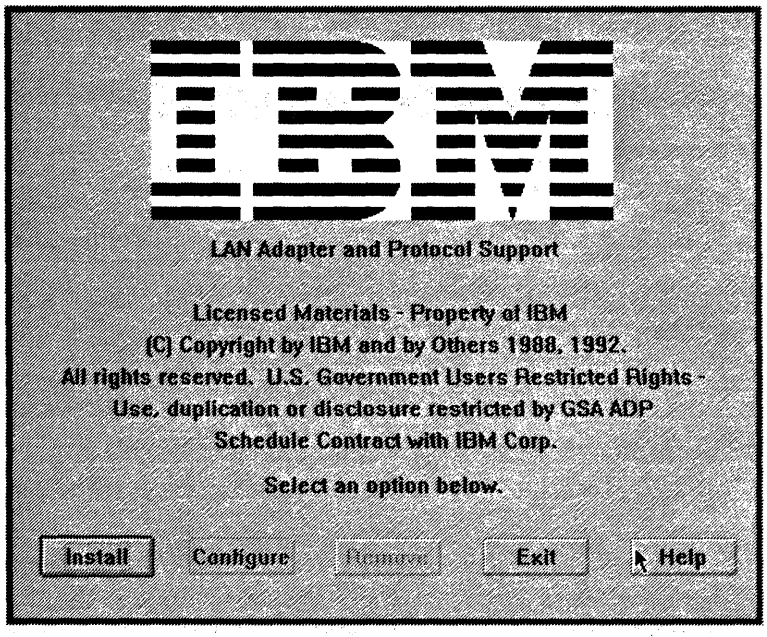


Figure 61. TCPLAPS Introduction Panel

Select **Install** to begin the LAN adapter and protocol support installation process. You are prompted with the panel shown in Figure 62 on page 79.

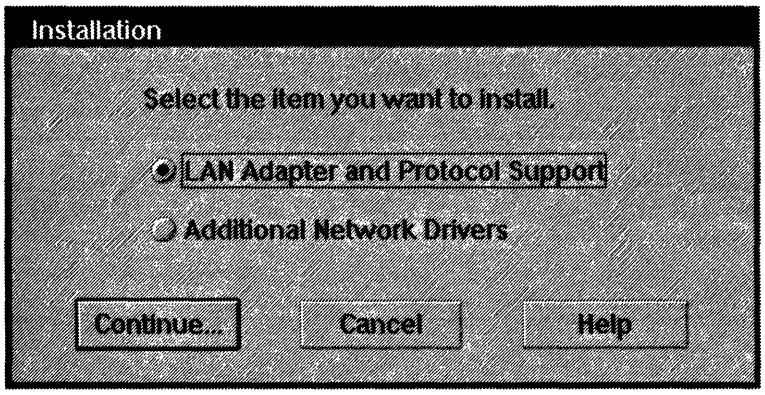


Figure 62. TCPLAPS Installation Panel

Select **LAN Adapter and Protocol Support** and then **Continue**. TCPLAPS checks if a previous version or other version of LAPS is already installed. If it finds one, the panel in Figure 63 is displayed.

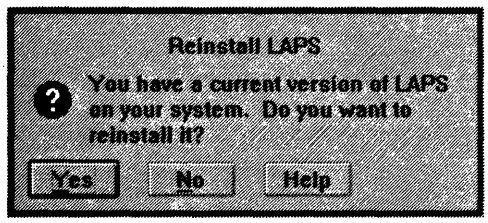


Figure 63. TCPLAPS Reinstall Selection

Select **Yes** to reinstall the LAN adapter and protocol support. TCPLAPS now updates the LAPS drivers. When completed, the TCPLAPS introduction panel is displayed.

If there is no previous version installed, the panel in Figure 64 is displayed.

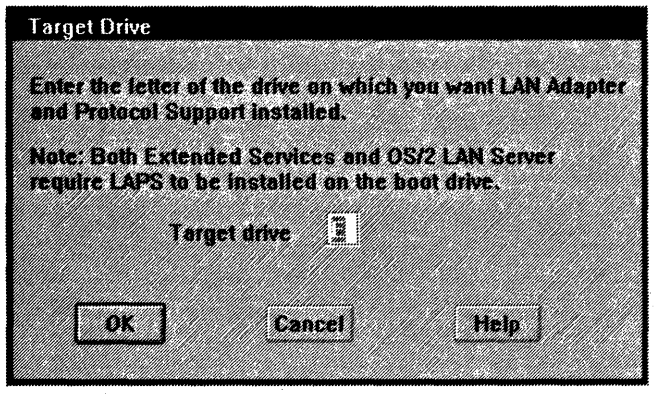


Figure 64. Target Drive

Type in the letter of the drive where LAPS will be installed. TCPLAPS now installs the LAPS drivers. When completed, the TCPLAPS introduction panel, is displayed again. Select **Configure** to start TCPLAPS configuration. The panel in Figure 65 on page 80 is displayed.

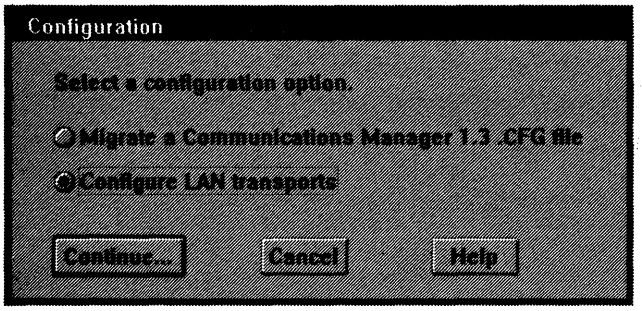


Figure 65. TCPLAPS Configuration Panel

Select **Configure LAN transports** and then **Continue** to get the panel shown in Figure 66.

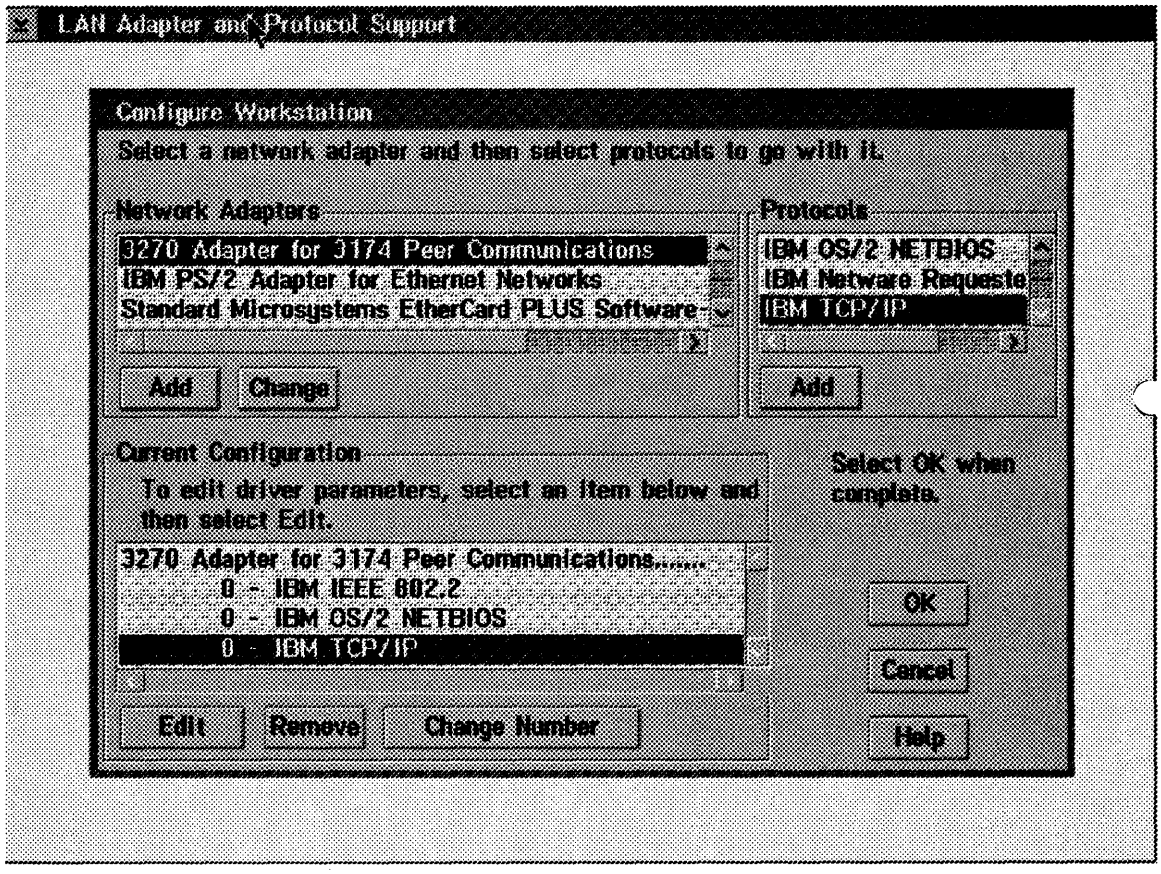


Figure 66. TCPLAPS Configuration Selection

In the **Network Adapters** section of this panel, all supported adapters are listed.

In the **Protocols** section, the available protocols are shown.

In the **Current Configuration** section, the selected adapter and protocols for 3174 Peer Communication are shown.

Now select **OK** to complete the TCP/IP V1.2.1 for OS/2 installation process.

Because ICAT did not complete the installation, TCPLAPS will add additional statements to your CONFIG.SYS file. Figure 67 on page 81 shows the drive in which the updates will be made:

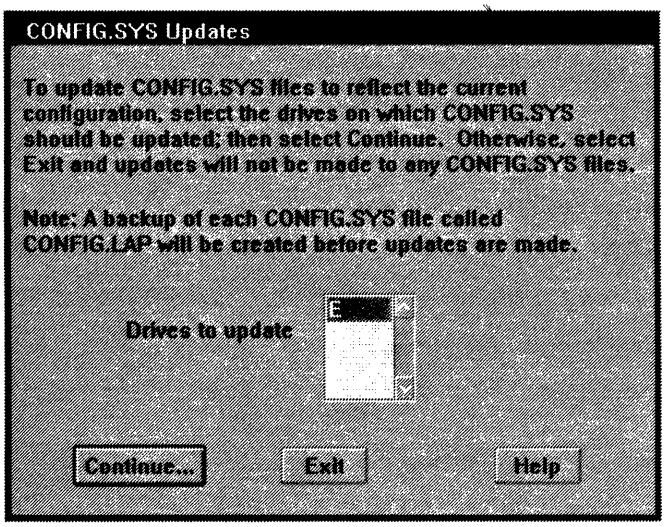


Figure 67. CONFIG.SYS Update

Select **Continue** and TCPLAPS updates the following statements of the CONFIG.SYS file for you.

```
LIBPATH=E:\IBMCOM\DLL;.;E:\OS2\DLL;E:\OS2\MDOS;E:\;E:\OS2\APPS\DLL;E:\CMLIB\DLL;
E:\MUGLIB\DLL;D:\TCPIP\DLL;
SET PATH=E:\OS2;E:\OS2\SYSTEM;E:\OS2\MDOS\WINOS2;E:\OS2\INSTALL;E:\;E:\OS2\MDOS;

SET HELP=E:\OS2\HELP;E:\OS2\HELP\TUTORIAL;E:\CMLIB;D:\TCPIP\HELP;

SET ETC=D:\TCPIP\ETC
SET TMP=D:\TCPIP\TMP

RUN=D:\TCPIP\BIN\CNTRL.EXE
```

Figure 68. Updated CONFIG.SYS

You will now be returned to the TCPLAPS Introduction panel shown in Figure 61 on page 78. Select **Exit** to complete the configuration process.

4.6 Personal Communications/3270 Definitions

On the PS/2 DOS workstation, we do the following:

- Create Configuration File
- Choose Configuration
- Attachment Types
- Advanced Option for 3174 Peer Communication
- Advanced Option for Network Stations
- Screen Sizes
- Keyboard and Code Pages
- PC/3270-Startup Option
- Link Option

4.6.1 Personal Communications/3270 Configuration Program

Personal Communications/3270 (PC/3270) was installed on directory d:/pcom/pcom3f.

To start the configuration process, enter the following command at the DOS command prompt of the subdirectory:

d:\PCOM\PCOM3F > config

The logo panel, shown in Figure 69, is displayed.

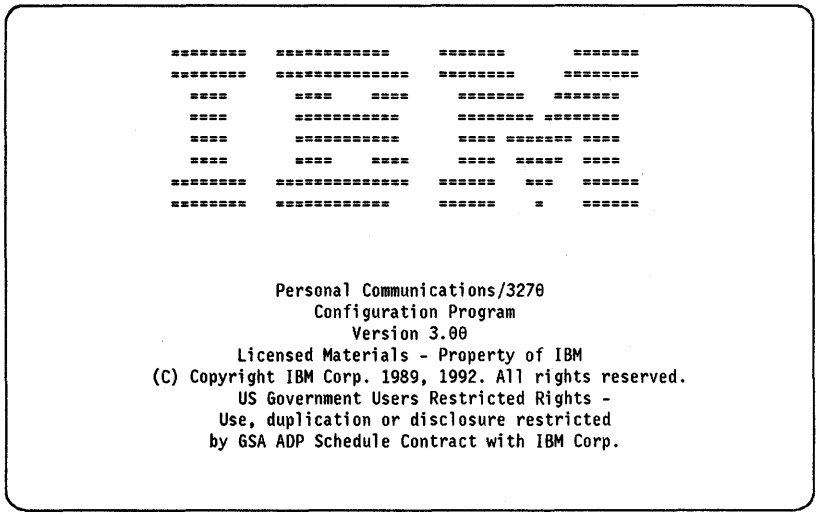


Figure 69. PC/3270 Logo

Create Configuration File

```
                        Create Configuration File                  More:  +
------------------------------------------------------------------------------
Enter the required information and press F8 to continue.

  Name of an existing configuration
   file (optional)  . . . . . .

  Drive and directory in which you will store
   PC/3270 configuration data files    D:\PCOM\PCOM3F

  Name of the new configuration file
   (This is what you will type
     to start PC/3270). . . . . .    PC3270









F1=Help  F3=Exit          F8=Forward
```

Figure 70. PC/3270 Create Configuration File

The Create Configuration File panel allows you to specify your own subdirectory and startup batch file name. Enter your preferred responses, then press **F8** to take you to the Choose Configuration panel.

Choose Configuration

```
                          Choose Configuration                 More: -+
------------------------------------------------------------------------------
Press F10 to change the choice.

  Type of configuration . . . . . .    Network station

  Advanced link options . . . . . .    Yes
    ------------------------------------------------
    ! More than one LAN or communications adapter  !
    ! More than one type of host connection        !
    ! Connection to more than one gateway          !
    ! X.25 connection                              !
    ------------------------------------------------

  Use expanded memory  . . . . . .    No

  Use a Task Swapper . . . . . .    No
    Update CONFIG.SYS  . . . . . .    No









F1=Help  F3=Exit  F7=Backward  F8=Forward  F9=Prev choice  F10=Next choice
```

Figure 71. PC/3270 Choose Configuration

The Choose Configuration panel allows you to specify the type of configuration you require. For more details on configuring, refer to *IBM Personal Communications/3270 Version 3.0 Implementation Guide*, GG24-3949.

Select **Yes** for **Advanced link options** for the simplest of configuration scenarios.

Press **F8** to take you to the Attachment Types panel.

Attachment Types

```
                              Attachment Types                        More: -+
------------------------------------------------------------------------------
Enter the required information.

  Total number of sessions for:

  Distributed Function Terminal (DFT) . . . . . .    0

  LAN via 802.2 protocol  . . . . . . . . . . . .    0

  LAN via NetBIOS . . . . . . . . . . . . . . . .    0

  3174 Peer Communication . . . . . . . . . . . .    1

  Synchronous Data Link Control (SDLC)  . . . . .    0

  Asynchronous Data Link Control (ASYNCH) . . . .    0
    (for attachment to a Series/1 SNA gateway only)

  CCITT X.25 Network (X.25) . . . . . . . . . . .    0



F1=Help  F3=Exit  F7=Backward  F8=Forward
```

Figure 72. PC/3270 Attachment Types

On the Attachment Types panel, select **3174 Peer Communication** by entering the number of sessions required.

Press **F8** to display the Advanced Options for 3174 Peer Communication panel.

Advanced Options for 3174 Peer Communication

```
                Advanced Options for 3174 Peer Communication        More: -+
------------------------------------------------------------------------------
Enter the required information.

  Total number of LAN sessions  . . . . .    1

  Link name  . . . . . . . . . . . . . .    lan1

  Destination address  . . . . . . . . .    400031740002

  Number of sessions for this gateway  . .    1

  Physical Unit ID  . . . . . . . . . . .    00000

  Adapter number  . . . . . . . . . . . .    0

  Remote SAP/Local SAP  . . . . . . . . .    04 / 08

  Block ID  . . . . . . . . . . . . . . .    061

  PIU size  . . . . . . . . . . . . . . .    0265


F1=Help  F3=Exit  F7=Backward  F8=Forward
```

Figure 73. PC/3270 Advanced Options for 3174 Peer Communication

Enter the destination address of the 3174.

Press **F8** to go to the Advanced Options for Network Station panel.

Advanced Options for 3174 Network Stations

```
                    Advanced Options for Network Stations            More: -+
------------------------------------------------------------------------------
Enter the required information.

  File-transfer packet size for non-SNA  . . .    07160

  File-transfer packet size for SNA  . . . . .    02500


                                    LU address/
  Session   Link       Adapter      LT number
  ID        name       number       (optional)

    a       lan1         0            LU




F1=Help  F3=Exit  F7=Backward  F8=Forward
```

Figure 74. PC/3270 Advanced Options for 3174 Network Stations

The Advanced Options for Network Stations panel allows you to specify the file transfer packet size. We decided to take the default values.

Press **F8** to take you to the Screen Sizes panel.

Screen Sizes

```
                                Screen Sizes                         More: -+
------------------------------------------------------------------------------
Press F9 or F10 to change the choices.


  Session  Link             Screen
  ID       name             size

  a        lan1             24 x 80









F1=Help  F3=Exit  F7=Backward  F8=Forward  F9=Prev choice  F10=Next choice
```

Figure 75. PC/3270 Screen Sizes

On the Screen Size display, choose **24 x 80**.

Press **F8** to take you to the Keyboard and Code Pages panel.

Keyboard and Code Pages

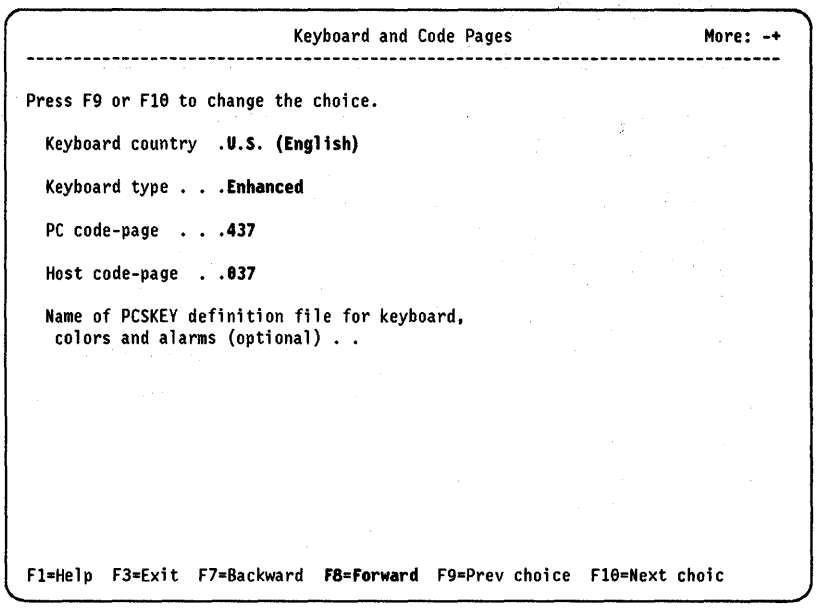


Figure 76. PC/3270 Keyboard and Code Pages

On the Keyboard and Code Pages panel, select the options for your country configuration.

Press **F8** to get the PC/3270-Startup Options panel, shown in Figure 77.

PC/3270 Startup Options

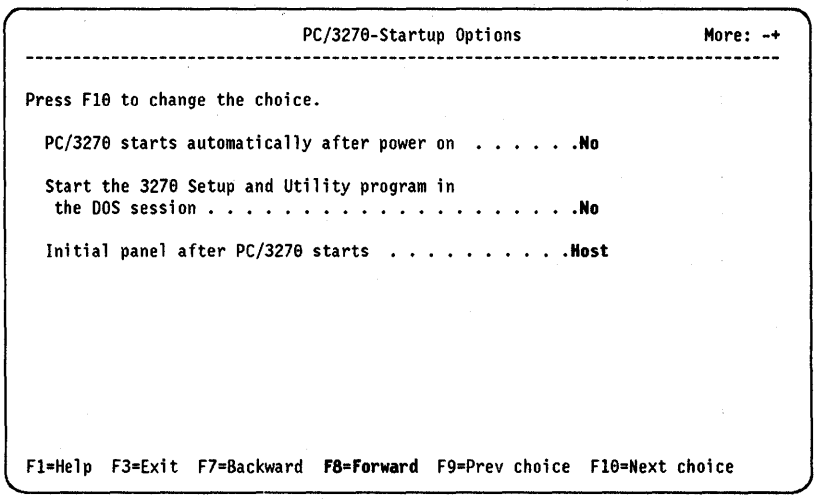


Figure 77. PC/3270 Startup Options

On the PC/3270-Startup Options panel we specify the options shown.

You have now completed the configuration of the link options. You can move on to the Advanced Configuration Options panel by selecting **Yes** in the End of Link Options panel (next panel) if required.

End of Link Option

```
                          End of Link Options                    More: -+
------------------------------------------------------------------------------

Press F10 to change the choice.

  You have completed the configuration for connectivity.

  Do you wish to add or change
   Advanced Configuration Options? . . . . . .No
------------------------------------------------------------------------------
! Advanced Configuration Options are:                                        !
!     Facilities                                                            !
!          EHLLAPI (High-Level-Language Application-Program Interface)      !
!          PCSPCLK interface for GDDM-PCLK                                  !
!          LLAPI (Low-Level Application-Program Interface) for PS/PC etc.   !
!          ECF (Enhanced Connectivity Facilities)                           !
!          Automatic-Logon Facility                                         !
!          Presentation-Space Copy                                          !
!          Record/Play                                                      !
!          SNA Data Compression                                             !
!     Display options (font, appearance, DOS graphics)                      !
!     Print options (local copy, host-directed printing)                    !
------------------------------------------------------------------------------


F1=Help  F3=Exit  F7=Backward  F8=Forward  F9=Prev choice  F10=Next choice
```

Figure 78. PC/3270 End of Link Option

On the End of Link Options panel we have entered **No** for the **Advanced Configuration Options** field.

Press **F8** to take you to the End of Configuration panel.

End of Configuration (Before Save)

```
                          End of Configuration                   More: -
------------------------------------------------------------------------------


You have now completed your selections and are ready to save the configuration.

Press one of the following keys to proceed:

  F6: Save configuration file

  F7: Review and change your selections









F1=Help  F3=Exit  F6=Save  F7=Backward
```

Figure 79. PC/3270 End of Configuration (Before Save)

On this panel, press F6 to save the configuration file. The message **Your configuration file has been saved successfully; press F3 to exit to DOS** is displayed when completed (see next panel).

End of Configuration (After Save)

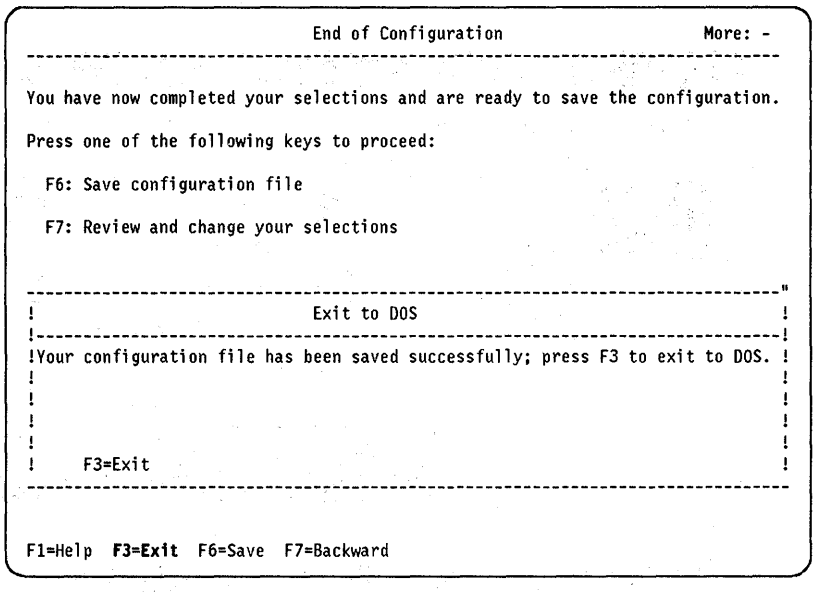


Figure 80. PC/3270 End of Configuration (After Save)

Press F3 to exit to the DOS prompt.

You have now completed configuring PC/3270 for Scenario 1.

In Windows mode, the Customize Communication panel allows you to configure PC/3270. The next few steps show how you can configure PC/3270 in Windows mode.

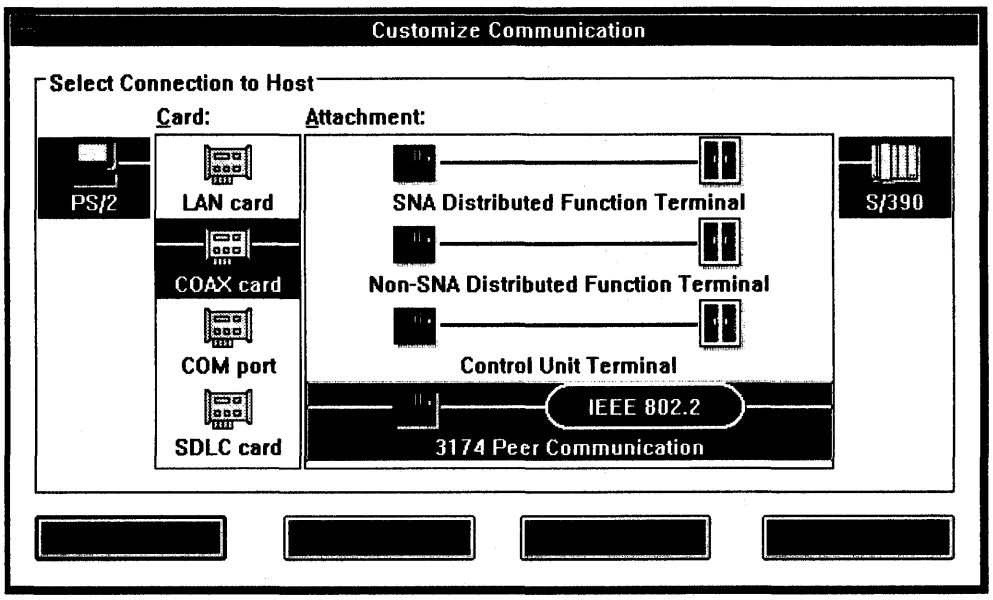


Figure 81. PC/3270 Customize Communication (Windows Mode)

Click on **COAX card** and **3714 Peer Communication**, then click on **Configure**. The Customize Communication - 3270 Host panel appears.

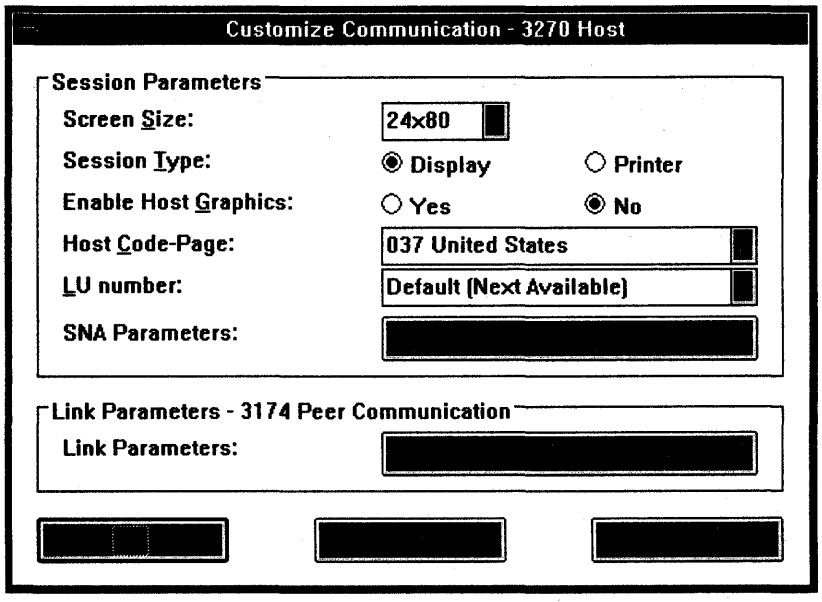


Figure 82. Customize Communication - 3270 Host (Windows Mode)

On this panel, specify the panel size, session type and host code page as shown. (If you click on **Configure SNA...**, you will be able to enable/disable SNA data compression and specify the compression buffer size.) Click on **Configure Link...** and the IEEE 802.2 panel is displayed.

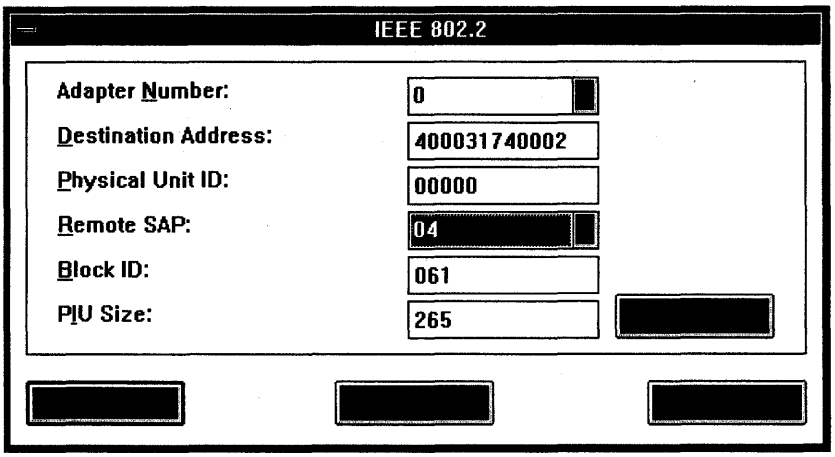


Figure 83. IEEE 802.2 (Windows Mode)

Enter the **Destination Address** and the **Remote SAP** of the 3174-11R gateway. Click on **Advanced...** to get the next panel.

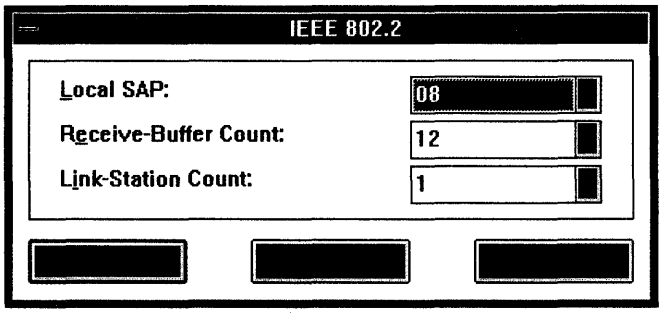


Figure 84. IEEE 802.2 Advanced (Windows Mode)

In this panel, specify the **Local SAP** of the PS/2.

Note: The local SAP should not have the same SAP number as the SAP for TCP/IP. Therefore we specified Local SAP as **08**.

Click on **OK** to take you to the panel shown in Figure 83.

Then, click on **OK** to take you to the panel shown in Figure 82 on page 89.

Then, click on **OK** to take you to the panel shown in Figure 81 on page 89.

Finally, click on **OK** to complete the configuration process. You have now completed configuring PC/3270 in Windows mode for Scenario 1.

4.7 Installation: TCP/IP for DOS

This section provides information on how to install and configure TCP/IP for DOS V2.1 on your PS/2 which is coax-attached to the 3174-11R and using the Peer Communication support in the 3174-11R.

For more information, see *IBM Transmission Control Protocol/Internet Protocol Version 2.1 for DOS: Installation and Administration*, SC31-7047.

Installation

To install TCP/IP for DOS V2.1:

1. Insert the TCP/IP for DOS base product distribution diskette B-1 into drive A.
2. At the DOS prompt, type the following and press Enter:

   A:\>\install

3. When the INSTALL program displays the IBM logo, press Enter and continue with step 4.

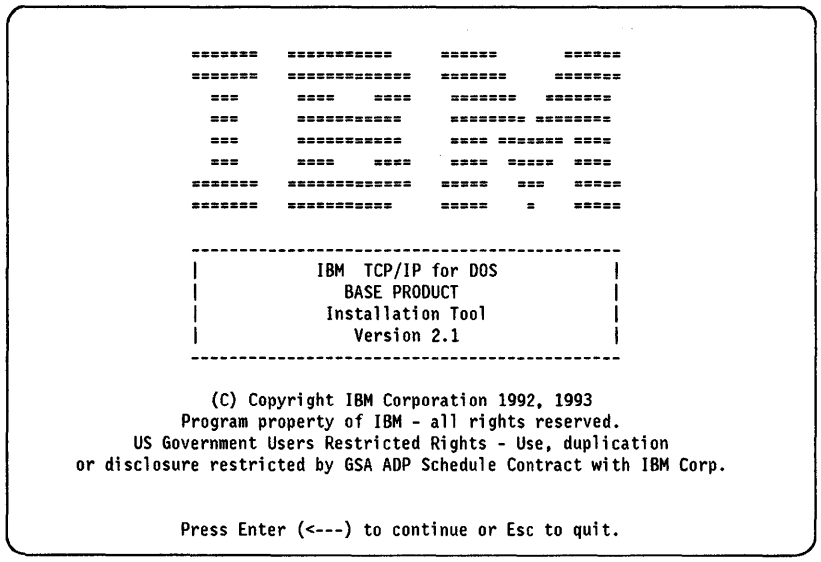
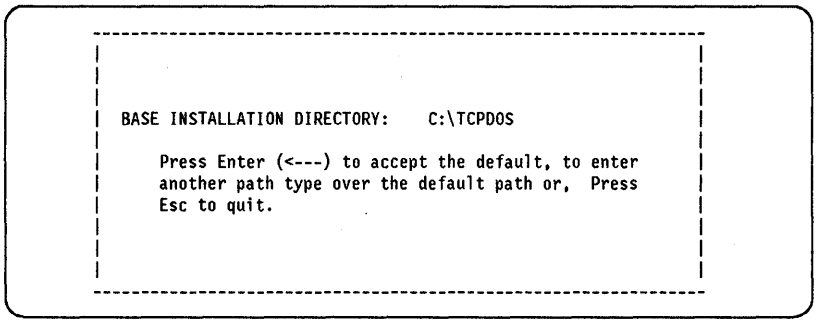


Figure 85. IBM TCP/IP for DOS Installation Tool

4. The INSTALL program displays the default path, and prompts you to specify the hard disk drive and base directory into which to copy the TCP/IP for DOS files.

   If **Use the default** is checked, press Enter.



5. As the INSTALL program prompts you, insert each additional base product distribution diskette in drive A.
6. Update the AUTOEXEC.BAT and CONFIG.SYS files.

   When the INSTALL program prompts you, specify whether you want the INSTALL program to update the AUTOEXEC.BAT and CONFIG.SYS system files on your PC.

   If you allow the INSTALL program to update the files, the INSTALL program renames and saves the original files as AUTOEXEC.BK and CONFIG.BK.

   For more information, see Appendix C, *IBM Transmission Control Protocol/Internet Protocol Version 2.1 for DOS: Installation and Administration*, SC31-7047.

   The following shows the new statements in the CONFIG.SYS file:

```
DEVICE=D:\TCPDOS21\BIN\PROTMAN.DOS /I D:\TCPDOS21\ETC
DEVICE=D:\TCPDOS21\BIN\DOSTCP.SYS
```

   The following shows the new statements in the AUTOEXEC.BAT file:

```
D:\TCPDOS21\BIN\NETBIND
SET ETC=D:\TCPDOS21\ETC
PATH C:\WIN31;C:\DOS52;D:\TCPDOS21\BIN;
```

7. Restart your PC to begin using the updated system files.
8. The files for the TCP/IP for DOS V2.1 base product are now installed.

   If you are installing one or more optional kits, continue with **Installing Optional Kits** as described in Chapter 1, *IBM Transmission Control Protocol/Internet Protocol Version 2.1 for DOS: Installation and Administration*, SC31-7047.

   If you are not installing optional kits, use the CUSTOM program for Configuration.

Configuration

1. Start the CUSTOM program.
2. Change the current directory to the base directory containing TCP/IP for DOS.
3. At the DOS prompt, type the following and press Enter:

   A:\custom

The CUSTOM program displays the main menu.

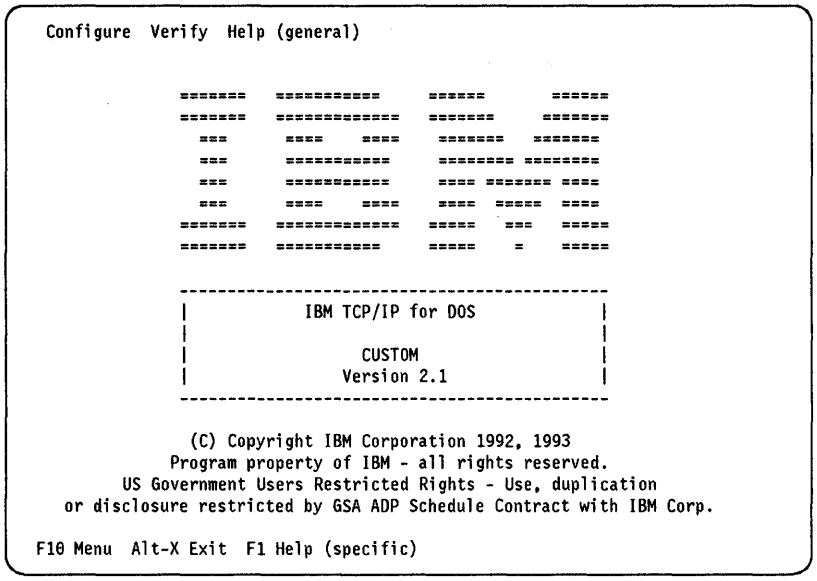


Figure 86. IBM TCP/IP for DOS CUSTOM

Immediately after the main menu, the following panel appears.

Read TCP/IP Configuration

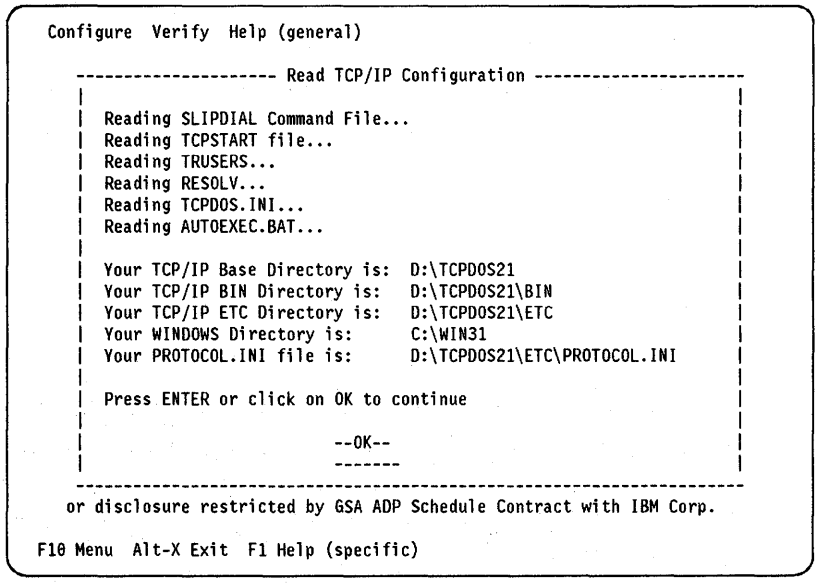


Figure 87. Read TCP/IP Configuration

Press Enter and the main menu will be displayed again.

On the main menu, select **Configure**; the panel shown in Figure 88 on page 94 is displayed.

NDIS Interface and Protocol Manager Configuration

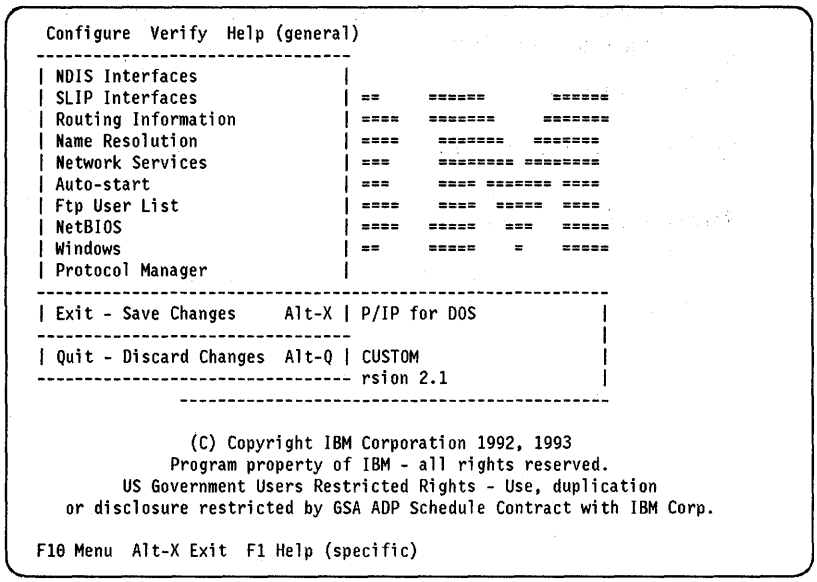


Figure 88. NDIS Interface and Protocol Manager Configuration

Select **NDIS Interfaces** from the menu bar and press Enter; the panel shown in Figure 89 is displayed.

NDIS Interfaces

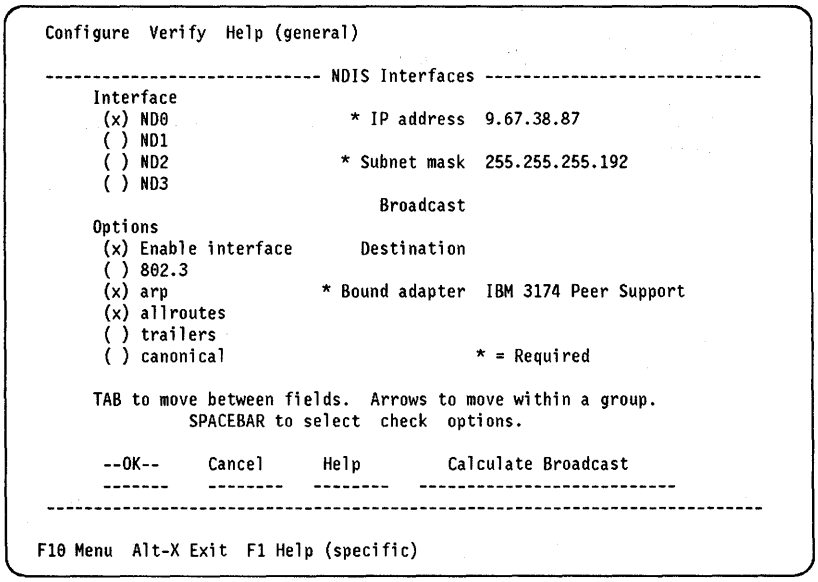


Figure 89. NDIS Interfaces

1. Select **ND0**.
2. Select the **Options** as shown on the panel.
3. Type in the **IP address** of your workstation.
4. Type in the **Subnet mask**.

   On **Bound adapter** field, you should select **IBM 3174 Peer Support**.

Note: If you do not get the IBM 3174 Peer Support on the menu bar you should first do the Protocol Manager Selection as described in *IBM Transmission Control Protocol/Internet Protocol Version 2.1 for DOS: Installation and Administration*, SC31-7047.

5. Select **OK** and press Enter.

The Read TCP/IP Configuration panel appears.

Read TCP/IP Configuration

```
Configure  Verify  Help (general)

   -------------------- Read TCP/IP Configuration ----------------------
   |                                                                     |
   |  Reading SLIPDIAL Command File...                                   |
   |  Reading TCPSTART file...                                           |
   |  Reading TRUSERS...                                                 |
   |  Reading RESOLV...                                                  |
   |  Reading TCPDOS.INI...                                              |
   |  Reading AUTOEXEC.BAT...                                            |
   |                                                                     |
   |  Your TCP/IP Base Directory is:  D:\TCPDOS21                        |
   |  Your TCP/IP BIN Directory is:   D:\TCPDOS21\BIN                    |
   |  Your TCP/IP ETC Directory is:   D:\TCPDOS21\ETC                    |
   |  Your WINDOWS Directory is:      C:\WIN31                           |
   |  Your PROTOCOL.INI file is:      D:\TCPDOS21\ETC\PROTOCOL.INI       |
   |                                                                     |
   |  Press ENTER or click on OK to continue                             |
   |                                                                     |
   |                          --OK--                                     |
   |                          -------                                    |
   ----------------------------------------------------------------------
  or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

F10 Menu  Alt-X Exit  F1 Help (specific)
```

Figure 90. Read TCP/IP Configuration

Press Enter and you get the Write TCP/IP Configuration panel with a warning message.

Write TCP/IP Configuration

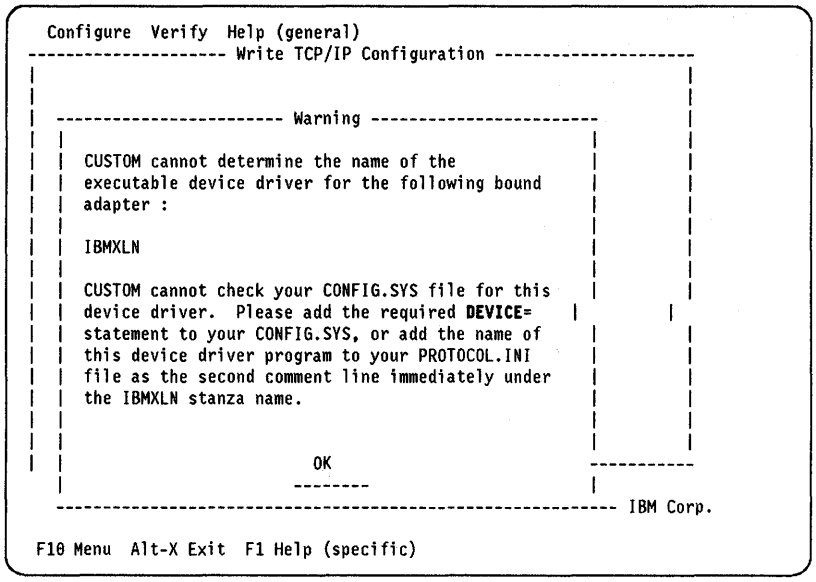


Figure 91. Write TCP/IP Configuration

Press Enter; the Write TCP/IP Configuration is completed and you are returned to the DOS prompt.

4.7.1 System Files

This section describes changes to system CONFIG.SYS, AUTOEXEC.BAT and PROTOCOL.INI files when installing and configuring TCP/IP for DOS V2.1. Some of the changes are required to use the product and others are optional. You can use either of the following methods to make the changes:

- You can choose to let the INSTALL and CUSTOM programs make most of the changes automatically during installation and configuration.
- You can choose to make the changes yourself if they are needed for your configuration.

For more information about changes to the system files, see Appendix C, *IBM Transmission Control Protocol/Internet Protocol Version 2.1 for DOS: Installation and Administration*, SC31-7047.

CONFIG.SYS for TCPDOS

```
DEVICE=C:\DOS52\SETVER.EXE
DEVICE=C:\WIN31\HIMEM.SYS
REM DOS=HIGH
FILES=30
BUFFERS=40
DEVICE=C:\WIN31\SMARTDRV.EXE /DOUBLE_BUFFER
STACKS=9,256
REM DEVICE = C:\DOS52\ANSI.SYS
DEVICE = D:\TCPDOS21\BIN\PROTMAN.DOS /I D:\TCPDOS21\ETC
DEVICE = D:\TCPDOS21\BIN\IBMXLN.DOS
DEVICE = D:\TCPDOS21\BIN\DOSTCP.SYS
DEVICE=\LSP133\DXMA0MOD.SYS 001
DEVICE=\LSP133\DXME0MOD.SYS
```

```
DEVICE=\LSP133\DXMT0MOD.SYS  0=N ES=2 EST=3
DEVICE = C:\DOS52\ANSI.SYS
```

CONFIG.SYS for TCPWIN

```
DEVICE=C:\DOS52\SETVER.EXE
DEVICE=C:\WIN31\HIMEM.SYS
REM DOS=HIGH
FILES=30
BUFFERS=40
DEVICE=C:\WIN31\SMARTDRV.EXE /DOUBLE_BUFFER
STACKS=9,256
DEVICE = D:\TCPWIN21\BIN\PROTMAN.DOS /I D:\TCPWIN21\ETC
DEVICE = D:\TCPWIN21\BIN\IBMXLN.DOS
DEVICE = D:\TCPWIN21\BIN\DOSTCP.SYS
DEVICE=\LSP133\DXMA0MOD.SYS 001
DEVICE=\LSP133\DXME0MOD.SYS
DEVICE=\LSP133\DXMT0MOD.SYS 0=N ES=2 EST=3
DEVICE = C:\DOS52\ANSI.SYS
```

AUTOEXEC.BAT for TCPDOS

```
D:\TCPDOS21\BIN\NETBIND
SET ETC=D:\TCPDOS21\ETC
C:\WIN31\SMARTDRV.EXE /L
@ECHO OFF
PROMPT $P$G
REM OLD PATH STATEMENT
REM PATH C:\WIN31;C:\DOS52;D:\PCS\RUMBAPCS;C:\RUMBAPCS
REM OLD PATH STATEMENT
REM PATH C:\WIN31;C:\DOS52;D:\PCS\RUMBAPCS;C:\RUMBAPCS;D:\TCPDOS21\BI
PATH C:\WIN31;C:\DOS52;D:\TCPDOS21\BIN;
KEY
TEMP=C:\DOS52
C:\WIN31\MOUSE.COM /Y
```

AUTOEXEC.BAT for TCPWIN

```
\LSP133\NETBIND
SET ETC=D:\TCPWIN21\ETC
C:\WIN31\SMARTDRV.EXE /L
@ECHO OFF
PROMPT $P$G
REM OLD PATH STATEMENT
REM PATH C:\WIN31;C:\DOS52;D:\PCS\RUMBAPCS;C:\RUMBAPCS
REM OLD PATH STATEMENT
REM PATH C:\WIN31;C:\DOS52;D:\PCS\RUMBAPCS;C:\RUMBAPCS;D:\TCPDOS21\BI   N
PATH C:\WIN31;C:\DOS52;D:\TCPWIN21\BIN;
DOSKEY
SET TEMP=C:\DOS52
C:\WIN31\MOUSE.COM /Y
```

PROTOCOL.INI for TCPDOS

```
; --------------------  Protocol Manager Definition  -------------------
{PROTMAN_MOD}
    DriverName = PROTMAN$

; ------------------  Protocol Driver Definition ----------------------
; IBM TCP/IP V2.1 for DOS
;
{TCPIP_V21}
    DriverName = DOSNDIS$
```

```
; ---- Bindings Statement ----
    Bindings = IBMXLN,,,

; ------------  IBM LAN Support Program V1.3  ---------------------------
{DXME0_MOD}
    DriverName = DXME0$
    Bindings = IBMXLN

{DXMT0_MOD}
    DriverName = DXMT0$
    Bindings = IBMXLN

; ------------------------  Adaptor Definitions -------------------------

; -------------------  IBM Token Ring Adapter Definition ----------------
{IBMTOK}
; IBM Token Ring
; IBMTOK.DOS
    DriverName = IBMTOK$

; -------------------  IBM Token Ring Adapter Definition (2nd one) ------
{IBMTOK2}
; IBM Token Ring (2nd)
; IBMTOK.DOS
    DriverName = IBMTOK2$

; --------------  IBM PS/2 Adapter/A for Ethernet  Networks -------------
{IBMAC}
; IBM Ethernet
; MACETH.DOS
    DriverName = MACETH$
    IRQ = 10
    RamAddress = 0xC800
;
; Specify IOBase only for IBM PC Family adapters. (Must match adapter jumpers!)
;
    IOBase = 0x200
    ReceiveBuffers = 16
    ReceiveChains = 16
    MaxRequests  = 10
    MaxTransmits = 10
    ReceiveBufSize = 256

; --------------  IBM PS/2 Adapter/A for Ethernet Networks (2nd one) ----
{IBMAC2}
; IBM Ethernet (2nd)
; MACETH2.DOS
    DriverName = MACETH2$
    IRQ = 15
    RamAddress = 0xD800
;
; Specify IOBase only for IBM PC Family adapters. (Must match adapter jumpers!)
;
    IOBase = 0x280
    ReceiveBuffers = 16
    ReceiveChains = 16
    MaxRequests  = 10
    MaxTransmits = 10
    ReceiveBufSize = 1500

; -------------------  3Com Network Adapter Definition  -----------------
{TCMAC2}
; 3COM Etherlink MC
; ELNKMC.DOS
    DriverName = ELNKMC$
    MaxTransmits = 10

{STCMAC2}
; 3COM Ethlink.MC (2nd)
; ELNKMC.DOS
    DriverName = ELNKMC2$
    MaxTransmits = 10
    SlotNumber = 2
```

```
{TCMAC}
; 3COM Etherlink II
; ELNKII.DOS
    DriverName = ELNKII$
    Interrupt = 3
    IOAddress = 0x280
    DMAChannel = 1
    MaxTransmits = 10
    Transceiver  = Onboard

{STCMAC}
; 3COM Ethlink.II (2nd)
; ELNKII.DOS
    DriverName = ELNKII2$
    Interrupt = 3
    IOAddress = 0x280
    DMAChannel = 1
    MaxTransmits = 10
    Transceiver  = Onboard

; --------------  Western Digital Network Adapter Definition  -----------
{WDMAC}
; Western Dig. Ethernet
; MACWD.DOS
    DriverName = MACWD$
    IRQ = 3
    RamAddress = 0xD800
;
; Specify IOBase only for IBM PC Family adapters. (Must match adapter jumpers!)
;
    IOBase = 0x280
    ReceiveBuffers = 16
    ReceiveChains = 16
    MaxRequests  = 10
    MaxTransmits = 10
    ReceiveBufSize = 1500

; -------------- IBM 3174 Peer Support ---------------------------------
{IBMXLN}
     ; IBM 3174 PEER SUPPORT
     ; IBMXLN.DOS
     DriverName = IBMXLN$
     Maxtransmits = 6
     NETADDRESS = 400031744992
     Maxtransmits = 6

;**** END OF FILE ****
```

Note: The IBMXLN must be configured for 3174 Peer Support.

4.8 Using TCP/IP Application for Windows

These applications enable you to perform the primary network user tasks: file transfer, remote printing, mail management, terminal emulation, and verification of remote host connections. This section introduces the TCP/IP TELNET and PING applications for Windows.

For further information of TCP/IP applications, see Chapter 7, *IBM Transmission Control Protocol/Internet Protocol Version 2.1 for DOS: User's Guide*, SC31-7045.

4.8.1 Overview of the TCP/IP for Windows

The TCP/IP applications for the Windows environment are installed as a TCP/IP program group, each with its own icon, as shown in Figure 92 on page 100.

Note: If you are running TCP/IP for Windows, you must run TCPSTART before you load Windows.

IBM TCP/IP for DOS

After loading Windows, you get the Program Manager panel. Click on the icon **IBM TCP/IP for DOS**, and the following panel appears.

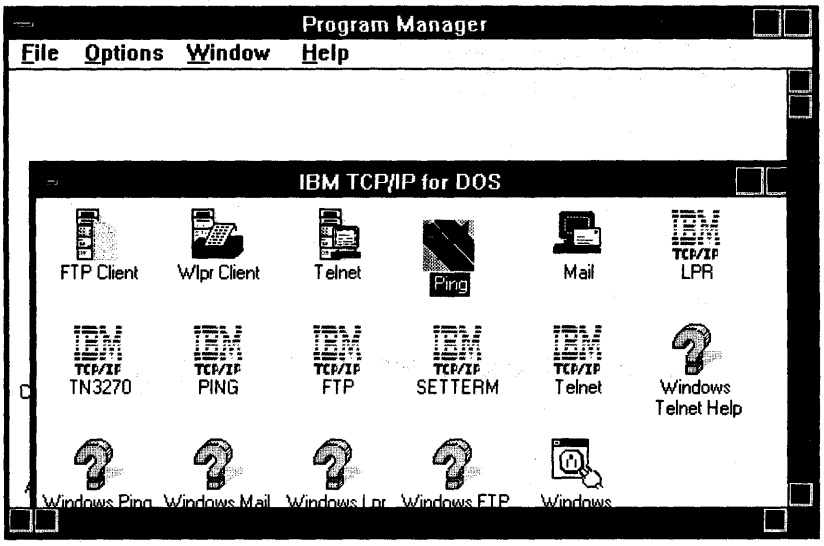


Figure 92. The TCP/IP Program Group

All of the applications have a similar graphical user interface so that once you are familiar with one application, you will understand how to work with the others.

4.8.2 Windows Ping

Ping for Windows enables you to:

- Start and stop a Ping session.
- Display running Ping information.
- Display summary information for Ping sessions.
- Specify the number of times to Ping.
- Define hosts as side-bar push buttons.

Ping

On the IBM TCP/IP for DOS panel, click on the **Ping** icon, and the Ping panel is displayed.

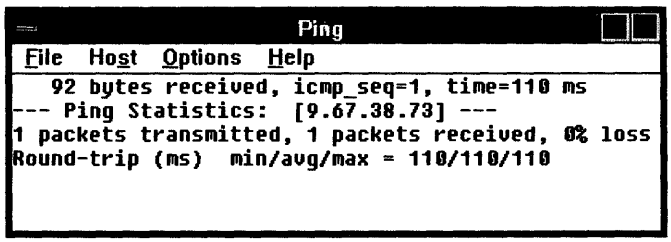


Figure 93. PING

From the option-bar select **Host**, and the following panel appears.

Host

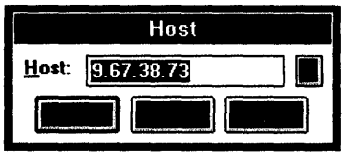


Figure 94. HOST

Here you enter the internet address of the host you want to ping. Press the **OK** push button and the Ping panel reappears.

Ping (OK)

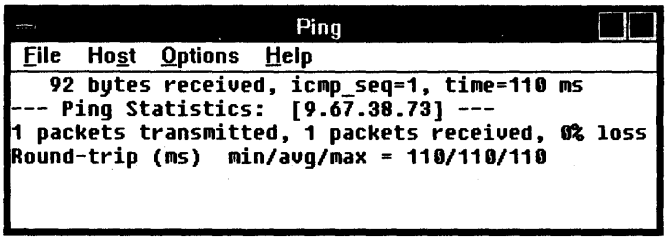


Figure 95. Ping (OK)

If the foreign host is up, you get the information summary of the chosen ping session in this display.

4.8.3 Windows TELNET

TELNET for Windows enables you to:

- Emulate up to eight host sessions.
- Use a configuration file defined by SetTerm.
- Specify emulator preferences.
- Select a font size for a panel session.
- Access online help.

TELNET

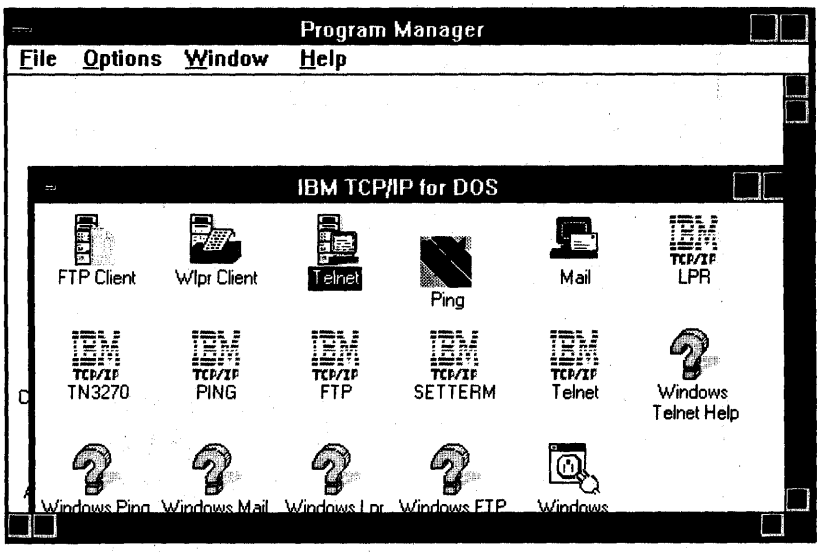


Figure 96. TELNET

On the IBM TCP/IP for DOS panel, click on the **TELNET** icon, and the IBM TCP/IP TELNET panel appears.

TELNET Configure

Select **Configure**; and the actions-bar displayed.

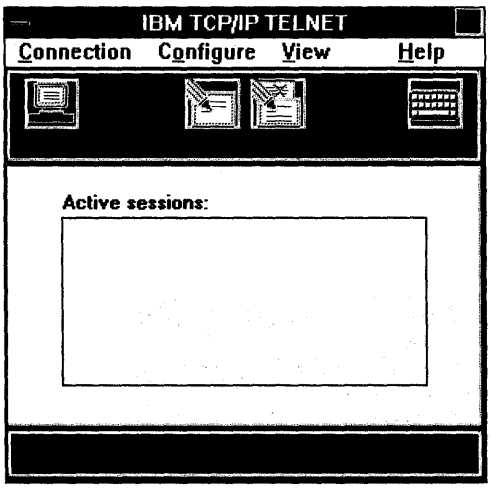


Figure 97. IBM TCP/IP TELNET Configure

Press the **Define** push button and the Define Session panel appears, which allows you to define session parameters.

Define Session

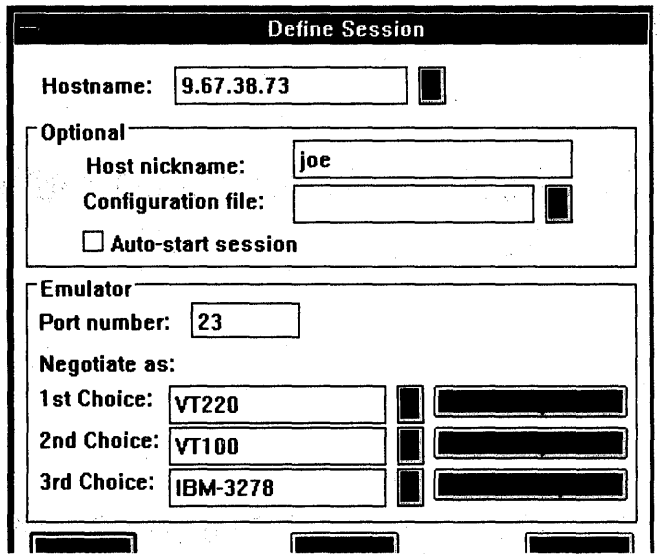


Figure 98. Define Session

In the **Hostname** field, type in your destination host internet address. Using a host nickname is optional. Specify your preferred emulator negotiation choices.

Note: The option emulator negotiation works only for DOS TELNET. Windows TELNET does not use the emulator negotiation order information that SetTerm generates. For detailed information of the Emulator Negotiation Order, see Chapter 8, *IBM Transmission Control Protocol/Internet Protocol Version 2.1 for DOS: User's Guide*, SC31-7045.

Press the **Define** push button, and the IBM TCP/IP TELNET connection is displayed (left side of panel).

TELNET Connection

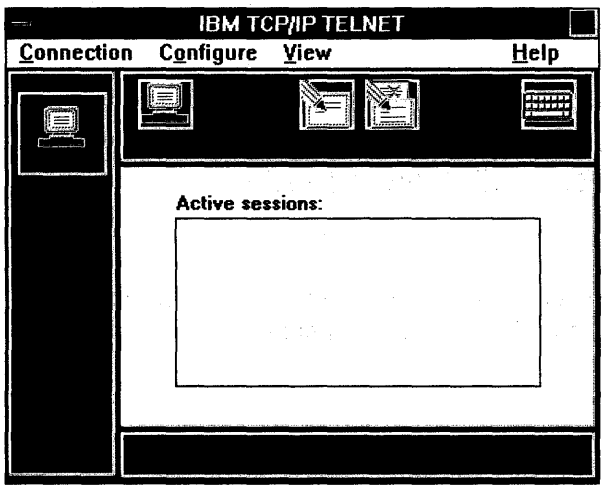


Figure 99. IBM TCP/IP TELNET Connection

Select the **Open** icon and the Open Session panel appears.

Open Session

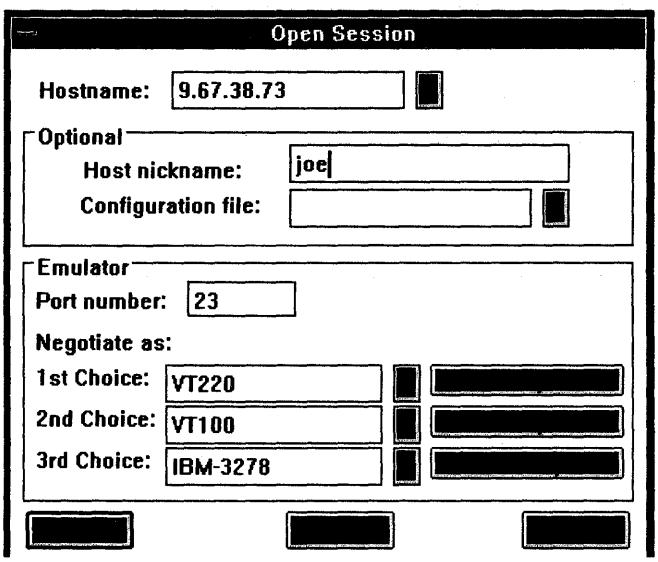


Figure 100. Open Session

Press the **Open** push button to establish a TCP/IP TELNET session with the predefined host. The following panel appears after the session is established.

Session Establishment

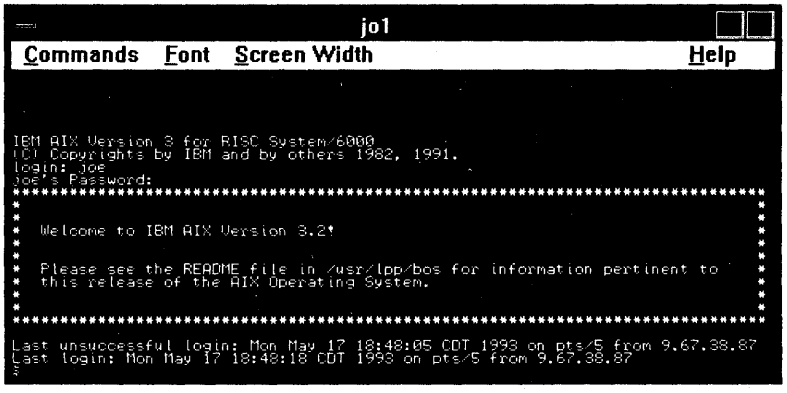


Figure 101. Session Establishment

In our example, we opened a session with the RISC System/6000.

4.9 RISC System/6000 Definitions

On the RISC System/6000, we type in the following at the command prompt:

smit tcpip

The panel shown in Figure 102 is displayed.

4.9.1 SMIT TCP/IP

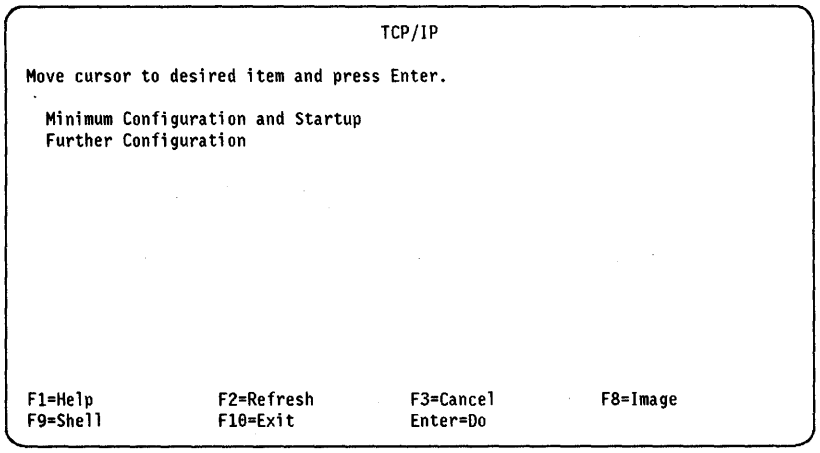


Figure 102. SMIT TCP/IP

Select **Minimum Configuration and Startup**. The panel shown in Figure 103 on page 106 is displayed.

4.9.2 Minimum Configuration and Setup

```
                    Minimum Configuration & Startup

 To Delete existing configuration data, please use Further Configuration menus


Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      -Entry Fields-
* HOSTNAME                                           -rs60001-
* Internet ADDRESS (dotted decimal)                  -9.67.38.71-
  Network MASK (dotted decimal)                      -255.255.255.192-
* Network INTERFACE                                   tr0
  NAMESERVER
          Internet ADDRESS (dotted decimal)          --
          DOMAIN Name                                --
  Default GATEWAY Address                            -9.67.46.193-
  (dotted decimal or symbolic name)
  RING Speed                                         4                    +
  START Now                                          no                   +


F1=Help          F2=Refresh       F3=Cancel        F4=List
F5=Undo          F6=Command       F7=Edit          F8=Image
F9=Shell         F10=Exit         Enter=Do
```

Figure 103. Minimum Configuration and Startup

On the Minimum Configuration and Startup menu, do the following:

- Type in your hostname.
- Specify the IP address of your workstation.
- Specify the network mask.
- Specify the network interface.
- Specify the default gateway address.
- Define the ring speed.

If you have completed your input, press Enter; the Minimum Configuration and Setup is completed.

4.10 3174-11R Customization

In 3174-11R customization, do the following:

- Specify the 3174-11R SDLC address
- Define the upper limit address for DSPUs
- Specify the 3174-11R network ID
- Specify the token-ring address for the 3174-11R
- Specify the token-ring address for each PS/2.

```
                    Model / Attach

098 ______
099 - 3174 11R SDLC  ITSO RALEIGH BY J MINDERLEIN 19 MAY 93
100 - 11R
101 - 2

PF:  3=Quit  4=Default            8=Fwd
```

Figure 104. 3174-11R Customization

4.10.1 SDLC

```
                         SDLC

                                                              SDLC
104 - C1 [1]    105 - C8 [2]    108 - 0000000   110 - 1 0000   116 - 2_ _
121 - 01        123 - 0         125 - 00000000  126 - 00000000 127 - 0 0
132 - 0 0 0 0   136 - 1 0 0 1   137 - 0 0 0 0   138 - 0
141 - A         150 - 1 0 [3]   165 - 1         166 - A       168 - 0
173 - 00000000  175 -           179 - 0 0 0     190 - 00
213 - 1         215 - 00000     220 - 0
310 - 0         313 - 1         317 - 0         318 - 0       340 - 1
365 - 0         370 - 1


PF:  3=Quit  4=Default   7=Back    8=Fwd
```

Figure 105. Customizing the 3174-11R for an SDLC Link

[1] Question 104 specifies the SDLC address of the 3174-11R.

[2] Question 105 defines the upper limit poll address for DSPUs. We will use poll address:

- C3 for the PS/2 DOS coax-attached workstation
- C5 for the PS/2 OS/2 coax-attached workstation

3 Question 150=10 enables the token-ring gateway function for DSPUs.

4.10.2 Common SNA

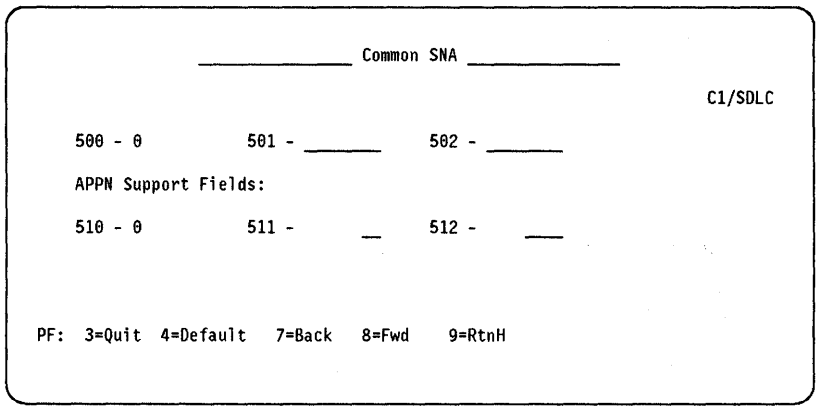


Figure 106. Names to Identify the 3174-11R Network Node

Use default responses on this panel.

4.10.3 Common Network

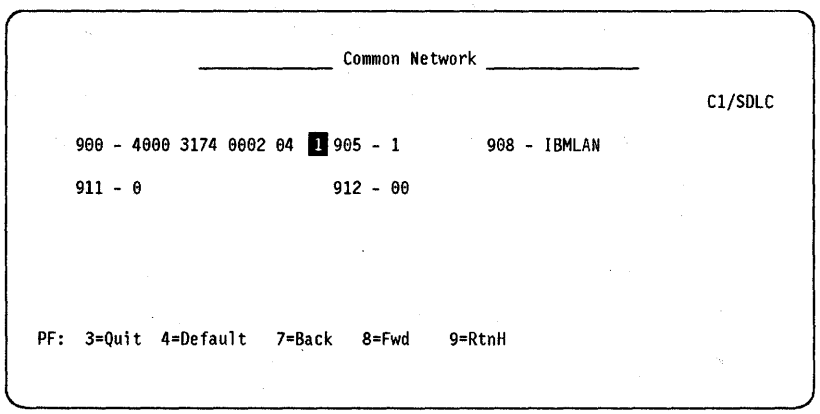


Figure 107. Token-Ring Definition for the 3174-11R

1 Question 900 specifies the token-ring address of the 3174-11R.

4.10.4 Ring Address Assignment

```
                    _____ 940: Ring Address Assignment _____

  S     Ring Address     SAP    T          S     Ring Address     SAP    T
  C1   4000 3174 0002    04
  C2   4000 3174 1992    04     0          C3   4000 3174 4992 1 04     0
  C4   4000 3174 3992    04     0          C5   4000 3174 2992 2 04     0
  C6   4000 3174 5992    04     0          C7   4000 3174 6992   04     0
  C8   4000 3174 0003    04     1



 PF:  3=Quit  4=Default   7=Back   8=Fwd   9=RtnH
```

Figure 108. Ring Address Assignment

1 C3 for the PS/2 DOS coax-attached workstation

2 C5 for the PS/2 OS/2 coax-attached workstation

4.11 3174-Peer Definition

3174 Peer Communication is referred to in the customizing panels as the 3174-Peer Support.

3174-Peer Support provides a logical internal token-ring segment and a bridge to a real external token-ring network segment. Each coax-attached PS/2 workstation appears to be attached to the internal token-ring.

In the customizing panel descriptions, the following terms are used:

- *3174-Peer device* refers to a coax-attached PS/2 workstation.
- *3174-Peer port* refers to the coax port to which a PS/2 workstation is attached.
- *3174-Peer bridge* refers to the internal bridge.
- *3174-Peer segment* refers to the internal token-ring segment .
- *Token-Ring segment* refers to the external token-ring segment.

Each 3174-Peer device can have a token-ring address:

- Specified as a DXML1MOD.SYS parameter in its CONFIG.SYS file or the parameter NETADDRESS in the PROTOCOL.INI file.
- Assigned by the 3174-Peer Support according to its port number, with some portion of the address specified by the user.

The 3174-Peer Definition panels allow you to:

- Enable the internal token-ring segment
- Enable the internal bridge function
- Customize the internal bridge parameters
- Enable LAN Manager support

- Specify the middle six hexadecimal digits of the 3174-assigned token-ring address for the 3174-Peer devices.

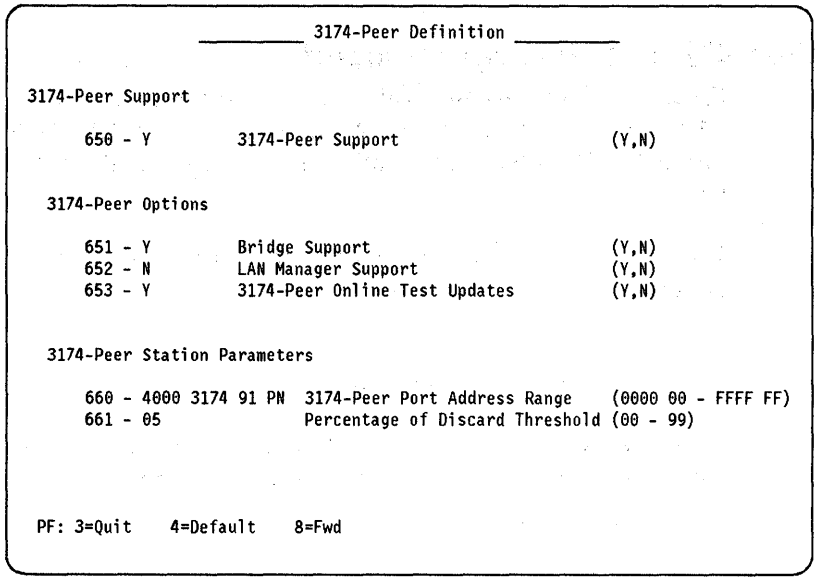


Figure 109. Enabling 3174 Peer Communication Functions

4.11.1 Question 650: 3174-Peer Support

The response indicates whether the internal token-ring segment is to be enabled. Valid responses are:

Y = Yes

N = No (default response)

If the response is Y, then the Peer Communication function will be included and operational when the 3174 is IMLed. A Y response increases the total control storage required on the 3174.

For Scenario 1, the DOS and OS/2 workstations will use 3174-Peer Support to form an internal token-ring segment.

4.11.2 Question 651: Bridge Support

The response indicates whether the internal bridge function is to be enabled. This bridge function requires that the 16/4 Mbps Token-Ring Network Adapter be installed in the 3174. Valid responses are:

Y = Yes

N = No (default response)

You must respond with a Y if you want the 3174-Peer devices to communicate:

- With devices on the external token-ring for server/requester functions, for example, a 3174-Peer device requester accessing an external server or an external requester accessing a 3174-Peer device server.
- As DSPUs to the 3174 gateway (the 3174 you are now customizing).

A Y response increases the total control storage required on the 3174.

For Scenario 1, the DOS and OS/2 workstations on the internal token-ring segment will use the 3174-Peer bridge to bridge to the external token-ring network.

4.11.3 Question 652: LAN Manager Support

Note: The **LAN Manager** referred to here does not mean the IBM LAN Manager V1 and V2, or the Microsoft LAN Manager, or the LAN Network Manager V1.0 products. The first product officially supported is the IBM LAN Network Manager V1.1.

The response indicates whether support for a LAN Network Manager is to be enabled. Valid responses are:

Y = Yes

N = No (default response).

If your response is Y, then LAN Network Manager will support the LAN Reporting Mechanism in the 3174-Peer bridge and provide functions such as:

- LAN Bridge Server
- Ring Parameter Server
- Configuration Report Server (for the 3174-Peer segment only)
- Ring Error Monitor (for the 3174-Peer segment only)

If the LAN Manager support is enabled, the 3174-Peer bridge must also be enabled (Question 651=Y). LAN Network Manager V1.1 is required to manage a 3174-Peer segment.

For Scenario 1, no LAN Manager is used. You should respond with an N.

With the LAN Manager support disabled, you can update 3174-Peer status and bridge profile parameters via online Test 9 (LAN tests).

A Y response increases the total control storage required on the 3174.

4.11.4 Question 653: 3174-Peer Online Test Updates

The response is used in conjunction with Questions 651 and 652 to determine the update options you are allowed to perform via the LAN Test Menu. Valid responses are:

Y = Yes

N = No (default response)

Table 3. 3174-Peer Online Test Updates Allowed

Q651: Bridge Support	Q652: LAN Manager Support	Q653: 3174-Peer Online Test Updates	Updates Allowed Via
N/A	Y	Y	Test 9, option 12 LAN Manager profile
Y	N	Y	Test 9, option 9 3174-Peer status Test 9, option 10 3174-Peer bridge profile
N	N	Y	Test 9, option 9 3174-Peer status

You must enter a password in Question 98 (Online Test Password) if you want to use the 3174-Peer Online Test Updates capability. If a password is not provided in Question 98, this capability is deconfigured when the 3174 is IMLed.

4.11.5 Question 660: 3174-Peer Port Address Range

We have mentioned before that there are two ways to give a 3174-Peer device a token-ring address:

- As a DXML1MOD.SYS parameter in its CONFIG.SYS file
- Assigned by the 3174 Peer Communication function according to its port number, with some portion of the address specified by the user

Question 660 allows you to enter the user-specified portion of the address.

The format of the address is as shown in Figure 110.

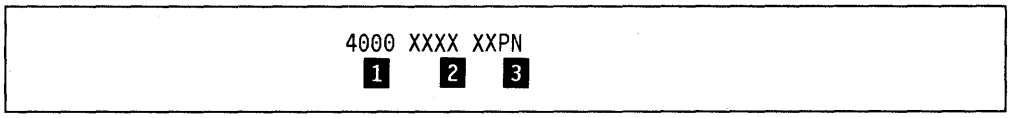


Figure 110. Format of 3174-Peer Device Address

1 4000 is a protected field and cannot be modified.

2 XXXXXX is the user-specified portion of the address. The valid range is from hexadecimal '000000' to 'FFFFFF'.

3 PN is the port number to which the 3174-Peer device is attached. This value ranges from 00 (HG26-00) to 63 (HG27-31).

As shown in Figure 109 on page 110, we have entered 317491 as the user-specified portion of the address. This means that a 3174-Peer device attached to port HG26-23 will have a 3174-assigned address of 400031749123. Another 3174-Peer device attached to port HG27-23 will have a 3174-assigned address of 400031749155.

Note: The *3174 Planning Guide* description for Question 660 gives an impression that the addresses in this example would be 400031749117 (port HG26-23 decimal 23 converted to X'17') and 400031749137 (port HG27-23 decimal 55 converted to X'37'). Using Online Test 9 option 9, the addresses are displayed with the port numbers in decimal.

In addition, if the LAN Manager Support is enabled in Question 652, then the 3174 has an address with a PN of FF on the internal token-ring. In our example, this address is 4000317491FF.

Note that if an address is specified via the DXML1MOD.SYS driver:

- It will override the 3174-assigned address.
- It must be outside the range of addresses available for assignment by the 3174 if you wish to have port-independent addressing. In our example, it should be outside the range 400031749100 to 400031749163.
- It must not be the address of the 3174 when the LAN Manager Support is enabled. In our example, it must not be 4000317491FF.

If 3174-Peer Support and Bridge Support are both enabled, you should check that no other device uses any of the 3174-Peer Support addresses in Questions 106, 107, 900 and 940.

Recommendation: We recommend that you specify 3174-Peer device addresses via the DXML1MOD.SYS driver. This will give you addressing independent of the port numbers and allow 3174-Peer devices to be swapped from one port to another without problems.

4.11.6 Question 661: Percentage of Discard Threshold

As a 3174-Peer device becomes congested, it cannot receive as many frames and starts to discard those it cannot receive. The more frames it discards within a given time interval, the more congested the device becomes.

Question 661 allows you to specify a threshold to use in deciding when a device has become congested. The valid range of response is 00 to 99. The default response is 05; this means that we consider a device to be congested if more than 5% of the frames are discarded in any one-minute interval. If you specify 00, it means that we consider a device to be congested if it discards any frame at all in any one-minute interval.

4.11.7 3174-Peer Bridge Profile

The 3174-Peer Bridge Profile panel allows you to specify parameters to be used by the internal bridge function. These parameters include:

- The internal bridge number
- The internal ring segment number
- The external token-ring network segment number
- The number of hops over which a broadcast frame can cross
- Whether frames will be forwarded by the bridge
- Setting threshold for bridge congestion
- How long to wait before logging a bridge congestion
- How long to wait before sending an alert about a congested bridge

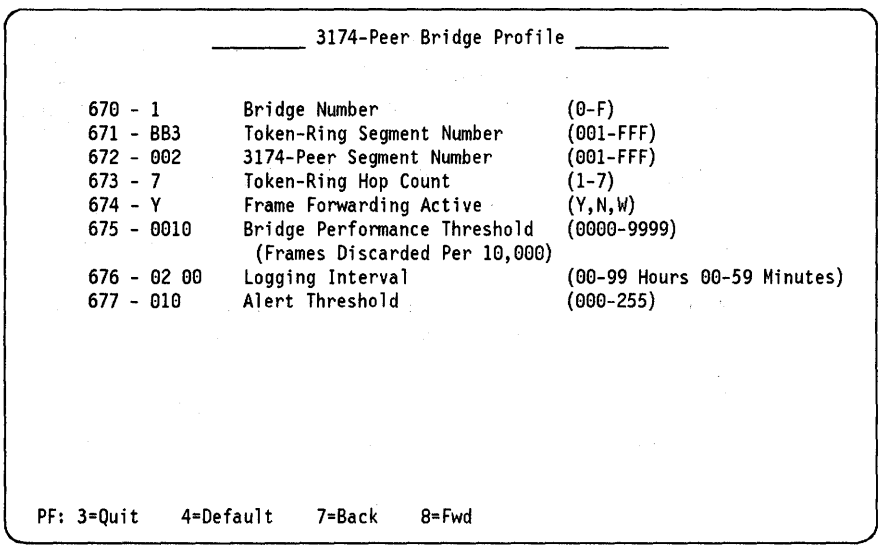


Figure 111. 3174-Peer Bridge Parameters

Question 670: Bridge Number

The response assigns a number to the internal 3174-Peer bridge. The valid range of response is a hexadecimal value from 0 to F, with 1 being the default. The bridge number is required for source routing.

If there is more than one 3174-Peer segment on the same token-ring network, the 3174-Peer bridge number can be the same for all the 3174-Peer bridges.

Question 671: Token-Ring Segment Number

The response assigns a number to the external (real) token-ring network segment. The valid range of response is a hexadecimal value from 001 to FFF, with no default. It is required for source routing.

If the 3174 is attached to an existing token-ring network, you should use the segment number already assigned to the token-ring network for question 671.

If an IBM Token-Ring Network Bridge Program station is active on the token-ring network, you must use the segment number assigned by the Bridge Program for question 671. If the numbers do not match, the 3174-Peer bridge will not be able to communicate on the token-ring network.

If there is more than one 3174-Peer segment on the same token-ring network, the token-ring network segment number must be the same for all the 3174-Peer segments (obviously, since they are attached to the same token-ring network).

The token-ring network segment number, however, cannot be the same as the 3174-Peer segment number.

Question 672: 3174-Peer Segment Number

The response assigns a number to the internal ring segment (the 3174-Peer segment). The valid range of response is a hexadecimal value from 001 to FFF, with no default.

If there is more than one 3174-Peer segment on the same token-ring network, the 3174-Peer segment number must be different for all the 3174-Peer segments.

It must also be different from the token-ring network segment number. If the token-ring network is bridged to other token-ring networks, you must ensure that all 3174-Peer segment numbers are unique throughout the entire network.

Question 673: Token-Ring Hop Count

The response specifies the maximum number of bridges that a broadcast frame can cross. The valid range of response is a from 1 to 7, with 7 as the default.

Note that the 3174-Peer bridge is counted as one hop when frames cross from the 3174-Peer segment to the external token-ring network or vice versa.

Question 674: Frame Forwarding Active

The response indicates whether the 3174-Peer bridge is to forward frames it receives. Valid responses are:

Y=Yes (default response)

N=No

W=Wrap mode

Enter:

- Y if you want the 3174-Peer bridge to forward frames as well as process frames received from the token-ring network, or if a wrap plug is used on the Token-Ring Adapter in the 3174.
- N if you do not want the 3174-Peer bridge to forward frames received from the token-ring network. In fact, it will discard any frames it receives and stop incrementing the discard frame counters.
- W if a token-ring adapter cable is connected to the Token-Ring Adapter in the 3174 but not to the token-ring network (that is, not plugged into, for example, an 8230 Controlled Access Unit) and you want the adapter to open in wrap mode. Wrap mode allows 3174-Peer devices to access the 3174 token-ring gateway function for host communication without requiring the 3174 to be physically connected to a token-ring.

  Note:

  Before Configuration Support-C Release 3, you could put the 3174 into wrap mode by doing one of the following (depending on the microcode level):

  - Install a wrap plug (PN 6165899) instead of the Token-Ring Adapter cable at the 3174 Token-Ring Adapter port; respond to question 674 with a Y.
  - Install a Token-Ring Adapter cable at the 3174 Token-Ring Adapter port and apply patch TR 824501 (3174 Peer Communication Wrap Mode); respond to question 674 with a Y.

    Note: Patch TR 824501 is only valid for the Peer Communications RPQ 8Q0718 (Configuration Support-B Release 4). This patch is not needed for Configuration Support-C Release 1 and later because Online Test /9,10 support for wrap mode was added.
  - Install a Token-Ring Adapter cable at the 3174 Token-Ring Adapter port; use Online Test /9,10 to set the **Frame Forwarding Active** response to W.

With Configuration Support-C Release 3, you could put the 3174 into wrap mode by doing one of the following:

- Install a wrap plug (PN 6165899) instead of the Token-Ring Adapter cable at the 3174 Token-Ring Adapter port; respond to question 674 with a Y.
- Install a Token-Ring Adapter cable at the 3174 Token-Ring Adapter port; respond to question 674 with a W (Wrap).
- Install a Token-Ring Adapter cable at the 3174 Token-Ring Adapter port; use Online Test /9,10 to set the **Frame Forwarding Active** response to W.

Configuration Support-C Release 3 allows you to set the wrap mode through customization instead of using Online Test /9,10. The token-ring adapter is still required.

Question 675: Bridge Performance Threshold

The response specifies the maximum percentage of information frames that may be discarded by the internal bridge within a one-minute interval before a count is incremented. The valid range is from 0000 to 9999; the number is in hundredths of a percent or the number of frames per 10,000. The default is 0010 and means that the discard counter will be incremented by one if 0.1% (10 hundredths of a percent) of the frames received within any one-minute interval are discarded. It is the same as saying the discard counter will be incremented by one if 10 out of every 10,000 frames received within any one-minute interval are discarded.

A separate count is maintained for frames received from the token-ring network and frames received from the 3174-Peer segment.

Question 676: Logging Interval

When the internal bridge performance threshold is exceeded at the end of a one-minute interval, the bridge is congested. To measure how serious the congestion is, you can specify a time interval during which the congestion is monitored.

The monitoring begins at the end of the one-minute interval when the congestion occurred, counting that one-minute interval as the first minute of the monitoring interval. At the end of the monitoring interval, the Log Manager is invoked to record the number of minutes in that interval during which the bridge was congested. The number of minutes and a non-alertable status code are recorded in the event log. This information is time stamped.

Question 676 allows you to set the monitoring interval. The valid range of response is from 00 Hours 00 Minutes to 99 Hours 59 Minutes, with the default being 02 00 (every two hours). If 00 Hours 00 Minutes is specified, then no logging of the bridge congestion is invoked. If you specify any interval other than 0000, then logging begins only after bridge congestion has been detected.

Question 677: Alert Threshold

Within the monitoring interval set by Question 676, you can set another threshold to raise an alert if the congestion is serious. Question 677 allows you to set this alert threshold. The valid range of response is from 000 to 255, with the default being 010 minutes.

Using the default logging interval (0200) and default alert threshold (010) as an example, if bridge congestion is detected then monitoring begins. If bridge congestion total time is less than 10 minutes (the alert threshold), no alert is raised and logging is invoked at the end of two hours.

As soon as bridge congestion total time reaches 10 minutes (the alert threshold), an alert is raised, the Log Manager is immediately invoked to record a status code and the alert threshold in the event log and the logging interval is treated as if it has completed.

4.11.8 LAN Manager Profile

The LAN Manager Profile panel allows you to specify a password for each reporting link. The following rules apply to the reporting link passwords:

- The passwords need not be unique.
- Each password must be six to eight characters in length.
- Each character must be in the range 0-9 and A-Z.
- No blanks preceding or imbedded in the password are allowed
- The default is all blanks (no password specified).

The following questions allow you to specify the passwords:

- Question 690: Reporting Link 0 Password
- Question 691: Reporting Link 1 Password
- Question 692: Reporting Link 2 Password
- Question 693: Reporting Link 3 Password

4.12 Display 3174-Peer Status

```
              ----- Display 3174-Peer Status - HG 26 -----
    Current       Functional     Group          Discarded  Device
Port Address      Address        Address        Frame Ctr  Status
 00
 01
 02
 03
 04
 05  4000 3174 2992 .... .... ....  .... .... ....       0  1 1
 06  4000 3174 4992 .... .... ....  .... .... ....       0  1 1
 06
 07
 08
 09
 10
 11
 12
 13
 14
 15

 To go directly to other tests, enter: /Test,Option
   Select Test; press ENTER ===>
 PF:  3=Quit  5=Refresh  8=Fwd  9=Ctr->0  12=Test Menu
```

Figure 112. Display 3174-Peer Status

1 The **1** means the interface is enabled

For detailed information about Online Test Status Information see Chapter 5 in the *Customer Problem Determination Guide,* , GA23-0217.

Chapter 5. Scenario 2: Concurrent Access to SNA and TCP/IP Hosts

This scenario shows the concurrent ability of the:

- RISC System/6000 workstation to access the 3270 SNA host, using the 3174-12L as the SNA gateway.
- The 3270 terminal to access the 3270 SNA host, using the 3174-12L as a cluster controller.
- The same 3270 terminal to access the RISC System/6000, using the 3174-12L as the TCP/IP TELNET client.

The 3174-12L is attached to the S/390 host via an ESCON channel connection.

5.1 Scenario 2 Configuration Diagram

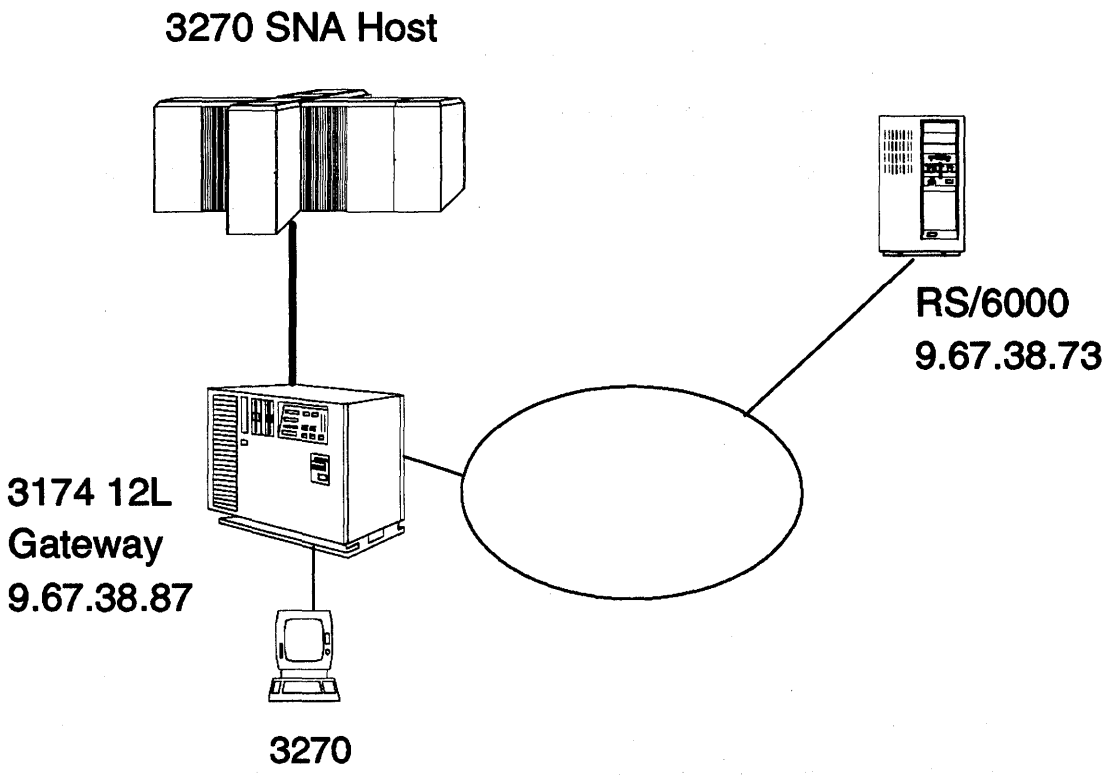


Figure 113. 3174 MLT Access to SNA 3270 and TCP/IP Hosts

5.2 Scenario 2 Configuration Description

The composite network has the following components:

- An S/390 host with VTAM* V4.1
- A 3174-12L Establishment Controller with:
  - An ESCON connection
  - Token-ring address of 400031740004
- A RISC System/6000
  - Token-ring address of 100054AF58CE
- 3270 terminal

5.3 3174-12L Multi-Host Customization

In 3174-12L customization, we do the following:

- Define a multi-host connection.
- Specify the 3174-12L SNA channel addresses.
- Specify the 3174-12L network ID.
- Specify the token-ring address for the 3174-12L.
- Specify the token-ring address for the RISC System/6000.

Model/Attach

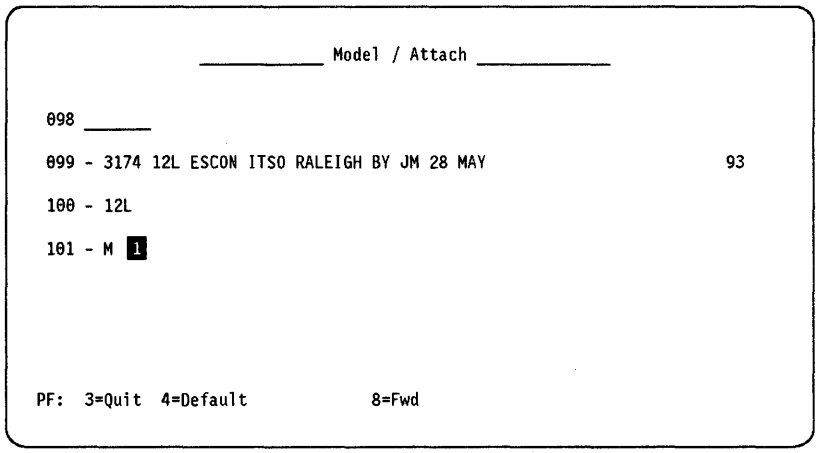


Figure 114. 3174-11L Multi-Host Customization

1 Question 101 response is M for multi-host attachment.

Multi-Host Definition

```
                ____ Multi-Host Definition ____________
                                                    Entry 01 0f 16
Fill in a new host, change a host or select a host for configuring
Host  Adapter    Host      Hardware     Include      Host Descriptor

 ID     Type      Attach      Group        in IML

1A 1              5                              PRIMARY_SNA_CH30___
2A        _        _          __          _      ____________________
3A        _        _          __          _      ____________________
1B 2                                      1      VCU2_1B_CH37_______
__        _        _          __          _      ____________________
__        _        _          __          _      ____________________
__        _        _          __          _      ____________________
__        _        _          __          _      ____________________
__        _        _          __          _      ____________________
__        _        _          __          _      ____________________
__        _        _          __          _      ____________________
__        _        _          __          _      ____________________

       Select ===>

 PF:  3=Quit            7=Back                 11=PageFWd   12=Done
```

Figure 115. Multi-Host Definition

1 On this panel we define host ID 1A as the primary host via channel address 30.

2 We define host ID 1B as the secondary host via channel address 37.

Local (SNA) 1A Host

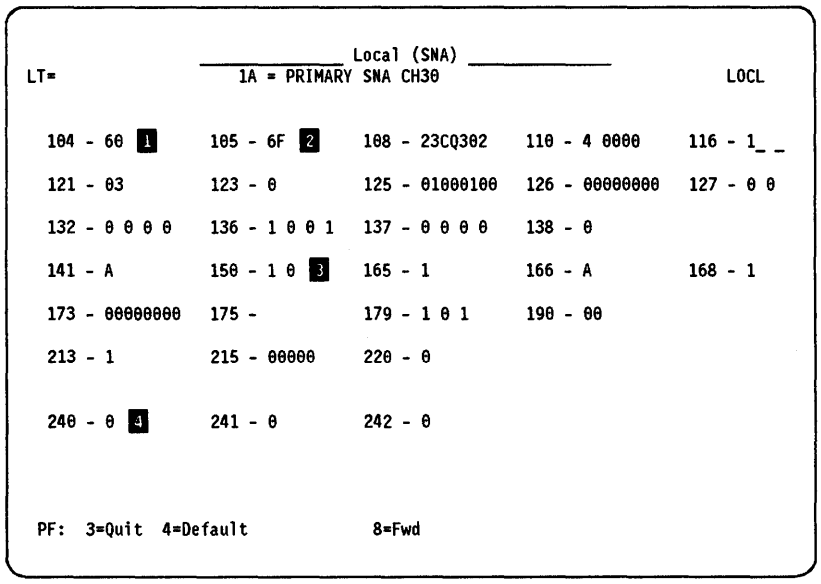


Figure 116. Customizing the 3174-12L for an ESCON Connection

1 Question 104 specifies the controller address of the 3174-12L.

2 Question 105 defines the upper limit address.

3 Question 150=10 enables the token-ring gateway function for DSPUs.

4 Question 240 is the controller logical address.

Common SNA

```
                 ____________ Common SNA ____________
                    1A = PRIMARY SNA CH30
                                                              C60/LOCL

   500 - 0            501 - ______       502 - ______

   APPN Support Fields:

   510 - 0            511 -    _         512 -    ___


PF:  3=Quit  4=Default   7=Back   8=Fwd    9=RtnH
```

Figure 117. Names to Identify the 3174-12L Network Node

Use the defaults on this panel.

Common Network

```
                 ___________ Common Network ___________
                    1A = PRIMARY SNA CH30
                                                              C60/LOCL
                               1   2
   900 - 4000 3174 0004 04     905 - 1        908 - IBMLAN

   911 - 0                     912 - 00


PF:  3=Quit  4=Default   7=Back   8=Fwd    9=RtnH
```

Figure 118. Token-Ring Definition for the 3174-12L

1 Question 900 specifies the token-ring address of the 3174-12L.

2 SAP=04 for the primary host.

Note: In multi-host connections, the primary host has SAP=04. The secondary host must have a different SAP number.

Ring Address Assignment

```
              ______ 940: Ring Address Assignment ______
                   1A = PRIMARY SNA CH30
                                                                  C60/LOCL

  S      Ring Address     SAP    T         S      Ring Address     SAP    T
  60    4000 3174 0004  1 04
  61    1000 5A4F 58CE  2 04     0         62    XXXX XXXX XXXX     04    0
  63    XXXX XXXX XXXX    04     0         64    XXXX XXXX XXXX     04    0
  65    XXXX XXXX XXXX    04     0         66    XXXX XXXX XXXX     04    0
  67    XXXX XXXX XXXX    04     1




PF:  3=Quit  4=Default    7=Back    8=Fwd    9=RtnH
```

Figure 119. Ring Address Assignment

1 The token-ring gateway address is assigned to host address 60.

2 The token-ring address of the RISC System/6000 is assigned to host address 61.

Ring Transmission Definition

```
              ______ 941: Ring Transmission Definitions__
                   1A = PRIMARY SNA CH30
                                                                  C60/LOCL

  S      Ring Address     SAP    F   W     S      Ring Address     SAP    T
  60    4000 3174 0004    04
  61    1000 5A4F 58CE    04     1 1 7 2   62    XXXX XXXX XXXX     04    0
  63                                       64                           0
  65                                       66                           0
  67




PF:  3=Quit  4=Default    7=Back    8=Fwd    9=RtnH
```

Figure 120. Ring Transmission Definition

1 Is the value of transmit I-frames (1=521 bytes).

For detailed information about transmit I-frames, see *AIX Version 3 RISC System/6000, Communication Concepts and Procedures, Volume 2*, GC23-2203.

2 Maximum-Out (transmit window size) - the number of transmits before waiting to receive an acknowledgment.

Port Assignment

```
                    __________ 117: Port Assignment _____________
LT=                        1A = PRIMARY SNA CH30
         Host addresses                              Host addresses            60/LOCL
Port  IS  1   2   3   4   5            Port  IS  1   2   3   4   5
26-00 1  __  __  __  __  __            26-01 1  __  __  __  __  __
26-02 1  __  __  __  __  __            26-03 1  __  __  __  __  __
26-04 1  __  __  __  __  __            26-05 1  __  __  __  __  __
26-06 1  __  __  __  __  __            26-07 1  __  __  __  __  __
26-08 1  __  __  __  __  __            26-09 1  __  __  __  __  __
26-10 0  __  __  __  __  __            26-11 0  __  __  __  __  __
26-12 0  __  __  __  __  __            26-13 0  __  __  __  __  __
26-14 0  __  __  __  __  __            26-15 0  __  __  __  __  __
26-16 0  __  __  __  __  __            26-17 0  __  __  __  __  __
26-18 0  __  __  __  __  __            26-19 0  __  __  __  __  __
26-20 0  __  __  __  __  __            26-21 0  __  __  __  __  __
26-22 0  __  __  __  __  __            26-23 0  __  __  __  __  __
26-24 0  __  __  __  __  __            26-25 0  __  __  __  __  __
26-26 0  __  __  __  __  __            26-27 0  __  __  __  __  __
26-28 0  __  __  __  __  __            26-29 0  __  __  __  __  __
26-30 0  __  __  __  __  __            26-31 0  __  __  __  __  __


 PF:  3=Quit  4=Default   7=Back   8=Fwd   9=RtnH                  11=PageFwd
```

Figure 121. Port Assignment

This is a panel that appears during the Configure procedure if you respond to Question 116 with 1 or 2. For detailed information, see *3174 Establishment Controller Planning Guide, Configuration Support C Release 3*, GA27-3918.

Port Address

```
                    __________ 118: Port Address _____________
LT=010                     1A = PRIMARY SNA CH30
         Host addresses                              Host addresses            60/LOCL
Port  IS  1   2   3   4   5            Port  IS  1   2   3   4   5
26-00 1  02  __  __  __  __            26-01 1  03  __  __  __  __
26-02 1  04  __  __  __  __            26-03 1  05  __  __  __  __
26-04 1  06  __  __  __  __            26-05 1  07  __  __  __  __
26-06 1  08  __  __  __  __            26-07 1  09  __  __  __  __
26-08 1  0A  __  __  __  __            26-09 1  0B  __  __  __  __
26-10 0  __  __  __  __  __            26-11 0  __  __  __  __  __
26-12 0  __  __  __  __  __            26-13 0  __  __  __  __  __
26-14 0  __  __  __  __  __            26-15 0  __  __  __  __  __
26-16 0  __  __  __  __  __            26-17 0  __  __  __  __  __
26-18 0  __  __  __  __  __            26-19 0  __  __  __  __  __
26-20 0  __  __  __  __  __            26-21 0  __  __  __  __  __
26-22 0  __  __  __  __  __            26-23 0  __  __  __  __  __
26-24 0  __  __  __  __  __            26-25 0  __  __  __  __  __
26-26 0  __  __  __  __  __            26-27 0  __  __  __  __  __
26-28 0  __  __  __  __  __            26-29 0  __  __  __  __  __
26-30 0  __  __  __  __  __            26-31 0  __  __  __  __  __


 PF:  3=Quit  4=Default   7=Back   8=Fwd   9=RtnH                  11=PageFwd
```

Figure 122. Port Address

This panel appears on the screen after the 117 panel if you assign your own addresses. The customizer cannot enter information on this panel.

Local (SNA) 1B Host

```
                  ___________ Local (SNA) ____________
                     1B = VCU2 1B CH37                              LOCL

 104 - 80 [1]     105 - 8F [2]                                 116 - 1_ _

                              125 - 00*****0                   127 - 0 0



                  150 - 1 0 [3]  165 - 0

                              179 - 1 0 1     190 - 00

                  215 - 00000  220 - 3        221 - 0


 240 - 7 [4]



PF:  3=Quit  4=Default           8=Fwd
```

Figure 123. Customizing the 3174-12L for an ESCON Connection (1B Host)

[1] Question 104 specifies the controller address of the 3174-12L.

[2] Question 105 defines the upper limit address.

[3] Question 150 = 10 enables the token-ring gateway function for DSPUs.

[4] Question 240 is the controller logical address.

5.3.1 Common Network (1B Host)

```
                  __________ Common Network ___________
                      1B = VCU 1B CH37                             C70/LOCL
                         [1] [2]
  900 - 4000 3174 0004 08     905 - 1        908 - IBMLAN

  911 - 0                     912 - 00




PF:  3=Quit  4=Default  7=Back  8=Fwd   9=RtnH
```

Figure 124. Token-Ring Definition for the 3174-12L

[1] Question 900 specifies the token-ring address of the 3174-12L.

[2] SAP = 08 for the secondary host.

Note: In multi-host connections, the secondary host must have a SAP number different from the primary one. In our case, we have SAP = 08.

5.3.2 Ring Address Assignment (1B Host)

```
                  940: Ring Address Assignment
                  1B = VCU2 1B CH37
                                                              C67/LOCL

 S     Ring Address    SAP   T        S     Ring Address    SAP   T
 80    4000 3174 0008  1 04
 81    1000 5A4F 58CE  2 04  0        82    XXXX XXXX XXXX  04    0
 83    XXXX XXXX XXXX    04  0        84    XXXX XXXX XXXX  04    0
 85    XXXX XXXX XXXX    04  0        86    XXXX XXXX XXXX  04    0
 87    XXXX XXXX XXXX    04  1


PF:  3=Quit  4=Default   7=Back   8=Fwd   9=RtnH
```

Figure 125. Ring Address Assignment (1B Host)

1 The token-ring gateway address is assigned to host address 80.

2 The token-ring address of the RS/6000 is assigned to host address 81.

5.3.3 Ring Transmission Definition (1B Host)

```
                  941: Ring Transmission Definitions
                  1B = VCU2 1B CH37
                                                              C70/LOCL

 S     Ring Address    SAP   F  W     S     Ring Address    SAP   T
 80    4000 3174 0004  08
 81    1000 5A4F 58CE  04    1 1 2 2  82    XXXX XXXX XXXX  04    0
 83                                   84                          0
 85                                   86                          0
 87


PF:  3=Quit  4=Default   7=Back   8=Fwd   9=RtnH
```

Figure 126. Ring Transmission Definition (1B Host)

1 Is the value of transmit I-frames (1=521 bytes).

2 Maximum-Out (transmit window size) - the number of transmits before waiting to receive an acknowledgment.

Port Assignment (1B Host)

```
                    __________ 117: Port Assignment __________
LT=                          1B = VCU2 1B CH37                116=1           70/LOCL
        Host addresses                          Host addresses
Port  IS  1   2   3   4   5                  Port  IS  1   2   3   4   5
26-00 1  __  __  __  __  __                  26-01 1  __  __  __  __  __
26-02 1  __  __  __  __  __                  26-03 1  __  __  __  __  __
26-04 1  __  __  __  __  __                  26-05 1  __  __  __  __  __
26-06 1  __  __  __  __  __                  26-07 1  __  __  __  __  __
26-08 1  __  __  __  __  __                  26-09 1  __  __  __  __  __
26-10 0  __  __  __  __  __                  26-11 0  __  __  __  __  __
26-12 0  __  __  __  __  __                  26-13 0  __  __  __  __  __
26-14 0  __  __  __  __  __                  26-15 0  __  __  __  __  __
26-16 0  __  __  __  __  __                  26-17 0  __  __  __  __  __
26-18 0  __  __  __  __  __                  26-19 0  __  __  __  __  __
26-20 0  __  __  __  __  __                  26-21 0  __  __  __  __  __
26-22 0  __  __  __  __  __                  26-23 0  __  __  __  __  __
26-24 0  __  __  __  __  __                  26-25 0  __  __  __  __  __
26-26 0  __  __  __  __  __                  26-27 0  __  __  __  __  __
26-28 0  __  __  __  __  __                  26-29 0  __  __  __  __  __
26-30 0  __  __  __  __  __                  26-31 0  __  __  __  __  __


 PF:  3=Quit  4=Default   7=Back   8=Fwd   9=RtnH                 11=PageFwd
```

Figure 127. Port Assignment (1B Host)

This is a panel that appears during the Configure procedure if you respond to Question 116 with 1 or 2. For detailed information, see *3174 Establishment Controller Planning Guide, Configuration Support C Release 3*, GA27-3918.

Port Address

```
                    __________ 118: Port Address __________
LT=010                       1B = VCU2 1B CH37                116=1           70/LOCL
        Host addresses                          Host addresses                60/LOCL
Port  IS  1   2   3   4   5                  Port  IS  1   2   3   4   5
26-00 1  02  __  __  __  __                  26-01 1  03  __  __  __  __
26-02 1  04  __  __  __  __                  26-03 1  05  __  __  __  __
26-04 1  06  __  __  __  __                  26-05 1  07  __  __  __  __
26-06 1  08  __  __  __  __                  26-07 1  09  __  __  __  __
26-08 1  0A  __  __  __  __                  26-09 1  0B  __  __  __  __
26-10 0  __  __  __  __  __                  26-11 0  __  __  __  __  __
26-12 0  __  __  __  __  __                  26-13 0  __  __  __  __  __
26-14 0  __  __  __  __  __                  26-15 0  __  __  __  __  __
26-16 0  __  __  __  __  __                  26-17 0  __  __  __  __  __
26-18 0  __  __  __  __  __                  26-19 0  __  __  __  __  __
26-20 0  __  __  __  __  __                  26-21 0  __  __  __  __  __
26-22 0  __  __  __  __  __                  26-23 0  __  __  __  __  __
26-24 0  __  __  __  __  __                  26-25 0  __  __  __  __  __
26-26 0  __  __  __  __  __                  26-27 0  __  __  __  __  __
26-28 0  __  __  __  __  __                  26-29 0  __  __  __  __  __
26-30 0  __  __  __  __  __                  26-31 0  __  __  __  __  __


 PF:  3=Quit  4=Default   7=Back   8=Fwd   9=RtnH                 11=PageFwd
```

Figure 128. Port Address (1B Host)

This panel appears on the screen after the 117 panel if you assign your own addresses. The customizer cannot enter information on this panel.

5.3.4 Configure Complete

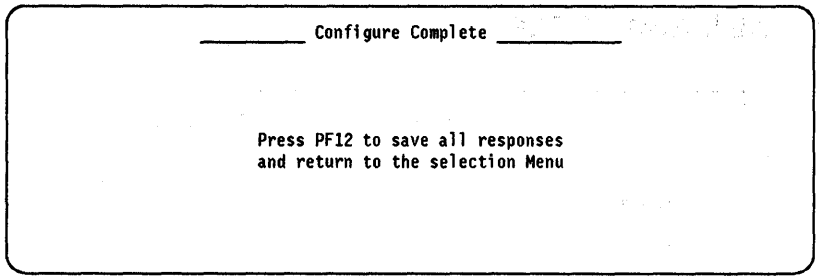


Figure 129. Configure Complete

5.4 3174 TCP/IP Customizing

5.4.1 Enabling AEA And TCP/IP

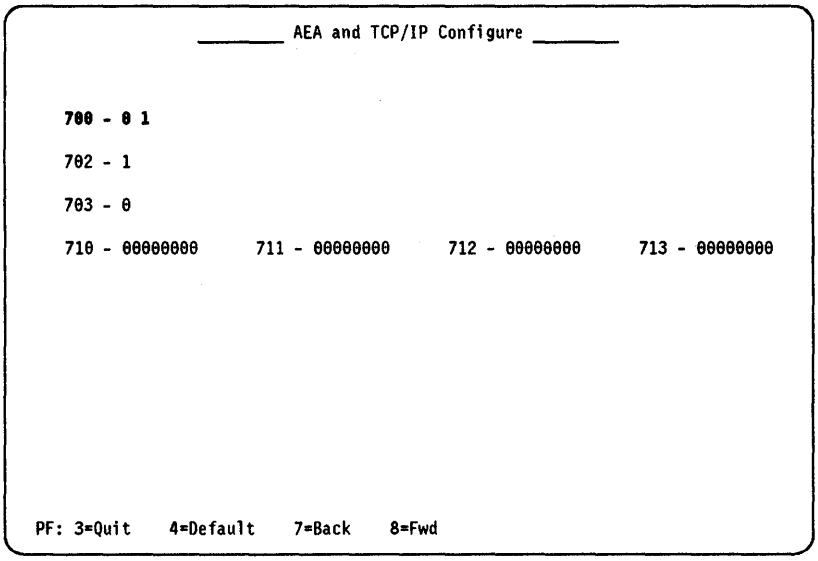


Figure 130. AEA and TCP/IP Configure Panel

For a detailed description of each customizing Question, see 3.9, "Customizing 3174 TCP/IP Telnet Support" on page 24 or *3174 Establishment Controller Planning Guide, Configuration Support C Release 3*, GA27-3918.

Question 700: Configure AEA and TCP/IP Feature

We only have 3270 terminals attached, thus we only to set digit 2 of Q170, to 1. For Scenario 2, we have customized only the TCP/IP capabilities.

Questions 702, 703 and 710 are not affected by the 3174 TCP/IP Telnet Support.

5.4.2 Defining Port Set

```
                    ____________ Port Set ____________

          Name          Session     Port       Modem          Password
                         Limit      Type       Type

     1 = 3270DISP          4          1          _           _______
     2 = _______           _          _          _           _______
     3 = _______           _          _          _           _______
     4 = _______           _          _          _           _______
     5 = _______           _          _          _           _______
     6 = _______           _          _          _           _______
     7 = _______           _          _          _           _______
     8 = _______           _          _          _           _______
     9 = _______           _          _          _           _______
    10 = _______           _          _          _           _______
    11 = _______           _          _          _           _______
    12 = _______           _          _          _           _______
    13 = _______           _          _          _           _______
    14 = _______           _          _          _           _______
    15 = _______           _          _          _           _______
    16 = _______           _          _          _           _______


    PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 131. Port Set Panel

Use this panel to define a port set for the 3270 displays to allow them to access TCP/IP destinations:

- Enter **3270DISP** in the Name field.
- Select a session limit that matches the number of LTs you want the 3270 displays to have (the default is 1 and we have chosen 4).
- Enter a 1 in the Port Type field for our 3270 displays.

For our example, we have customized a port set for coax-attached 3270 displays.

5.4.3 Mapping Port To Port Set

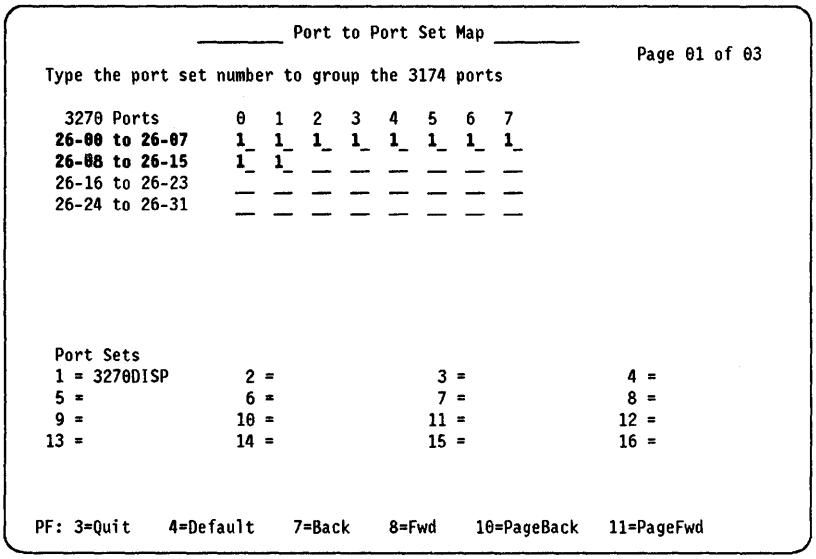


Figure 132. Port to Port Set Map Panel (1 of 3)

Use this panel to assign coax ports to the port set, named 3270DISP, that you defined in the Port Set panel:

- Enter the port set number for each port that will use the 3174 TCP/IP Telnet Support function. This assigns that port to the 3270 display port set.

There are three pages for mapping ports to the port sets you have defined. The first page shows ports in hardware group 26, the first 32 coax ports. The second page shows ports in hardware group 27, the next 32 coax ports provided by the 3270 Port Expansion feature. The third page shows ports in hardware groups 21, 22 and 23, ASCII ports provided by the AEA.

For our example, we have mapped the first nine coax ports to port set 1 (3270DISP).

5.4.4 Defining 3270 Host and Display Station Sets

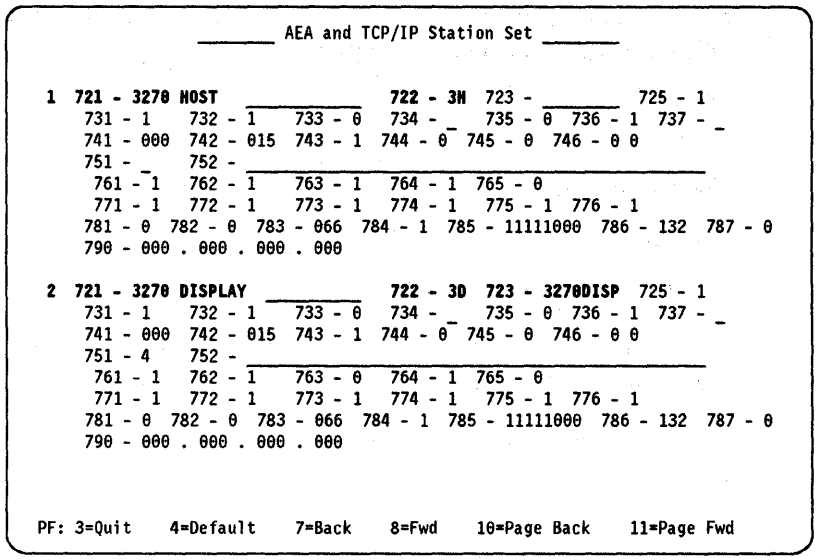


Figure 133. AEA and TCP/IP Station Set Panel (1 of 3)

We have defined two station sets, one for the 3270 host and one for the 3270 displays.

First, we will define station set 1 for the 3270 host:

Q721 Enter a station set name for the 3270 host to be accessed.

Q722 Enter 3H as the station type for the 3270 host.

Leave all other responses at their default values.

Next, we will define station set 2 for the 3270 displays:

Q721 Enter a station set name for the 3270 displays we added in the Port Set panel.

Q722 Enter 3D as the station type for the 3270 displays.

Q723 Enter 3270DISP as the port set name (the name we have defined).

Leave all other responses at their default values.

5.4.5 Defining TCP/IP Station Sets

A station set for TCP/IP access defines a set of ASCII emulation characteristics and an optional host IP address. The 3174 TCP/IP Telnet Support supports the following ASCII terminal emulation:

- DEC VT100
- IBM 3101
- DG D210 (USA English only)
- DEC VT220, 7-bit control
- DEC VT220, 8-bit control

Each TCP/IP station set you define will be displayed on the host Connection Menu for the terminal user to select as a connection.

For each station set definition, you may specify an IP host address, or use the default response (all zeros), in Question 790. Your response is used as follows:

- If you specify an address, the 3174 *does not* automatically connect to that address when the station set is selected from the Connection Menu. The address is used if the user issues a PING or an OPEN command without specifying a destination.
- If you do not specify an address (default all zeros), then the user will need to specify the destination when issuing the PING or the OPEN command.

So, if your users at the 3270 coax terminals will use the 3174 TCP/IP Telnet Support to access only one TCP/IP host and that host supports DEC VT100 devices, then you only need to define one TCP/IP station set (the DEC VT100 station set). You will specify that host's IP address in Question 790 so that the users do not have to remember it. To access that host, the user selects the DEC VT100 station set from the Connection Menu, which puts the display into local mode, and then issues the OPEN command without specifying a destination.

If your users will access more than one host, you probably should define five TCP/IP station sets, one for each type of ASCII emulation supported. This allows the users to select the required station set from the Connection Menu. Again, if you specify an address in Question 790, it will be used when the user issues a PING or OPEN command without a destination. If you do not specify an address in Question 790 (default all zeros), then the user will need to specify the destination when issuing the PING or OPEN command.

For our example, we have defined only one station set for TCP/IP access.

```
                    _______ AEA and TCP/IP Station Set _______

 3  721 - TELNET VT100 _______      722 - TH  723 - _______  725 - 1
     731 - 1    732 - 1    733 - 0    734 - _    735 - 0  736 - 1  737 - _
     741 - 000  742 - 015  743 - 1    744 - 0  745 - 0  746 - 0 0
     751 - 1    752 - ____________________________________________
      761 - 1   762 - 1    763 - 0    764 - 1  765 - 0
      771 - 1   772 - 1    773 - 1    774 - 1    775 - 1  776 - 1
     781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
     790 - 009 . 067 . 038 . 071

 4  721 - TELNET IBM3101            722 - TH  723 - _______  725 - 1
     731 - 1    732 - 1    733 - 0    734 - _    735 - 0  736 - 1  737 - _
     741 - 000  742 - 015  743 - 1    744 - 0  745 - 0  746 - 0 0
     751 - 2    752 - ____________________________________________
      761 - 1   762 - 1    763 - 1    764 - 1  765 - 0
      771 - 1   772 - 1    773 - 1    774 - 1    775 - 1  776 - 1
     781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
     790 - 000 . 000 . 000 . 000


All responses are correct
PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 134. AEA and TCP/IP Station Set Panel (2 of 3)

To define each station set for TCP/IP access, respond to the following Questions:

Q721 Enter a station set name that you wish displayed on the Connection Menu.

Q722 Enter TH as the station type for the TCP/IP host.

Q751 Specify the data stream supported by the TCP/IP host:

- 1=DEC VT100
- 2=IBM 3101
- 3=DG D210 (USA English only)
- 4=DEC VT220, 7-bit control
- 5=DEC VT220, 8-bit control

Your response to this Question only affects the operation of 3270 displays. It determines the type of ASCII emulation that the 3174 provides for the 3270 display when the user selects this station set as the destination. When the user at an ASCII terminal selects a TCP/IP destination, the value of this field is ignored.

Q790 Enter the default host IP address.

You may leave the response at its default value (all zeros). The user will need to specify the destination when issuing the PING or the OPEN command.

If you do specify an address, the 3174 *does not* automatically connect to that address when this station set is selected from the Connection Menu. In this case, if the user issues a PING or an OPEN command:

- Without specifying an address, the address in Question 790 is used.
- Specifying an address, the address specified is used.

You can leave all other responses at their default values.

```
                    _______ AEA and TCP/IP Station Set _______

5  721 - TELNET VT220 7 BIT          722 - TH  723 - _______  725 - 1
   731 - 1    732 - 1    733 - 0    734 - _    735 - 0  736 - 1  737 - _
   741 - 000  742 - 015  743 - 1    744 - 0  745 - 0  746 - 0 0
   751 - 4    752 - ____________________________________________
    761 - 1   762 - 1    763 - 0    764 - 1  765 - 0
    771 - 1   772 - 1    773 - 1    774 - 1   775 - 1  776 - 1
   781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
   790 - 009 . 067 . 038 . 073

6  721 - TELNET VT220 8 BIT          722 - TH  723 - _______  725 - 1
   731 - 1    732 - 1    733 - 0    734 - _    735 - 0  736 - 1  737 - _
   741 - 000  742 - 015  743 - 1    744 - 0  745 - 0  746 - 0 0
   751 - 5    752 - ____________________________________________
    761 - 1   762 - 1    763 - 0    764 - 1  765 - 0
    771 - 1   772 - 1    773 - 1    774 - 1   775 - 1  776 - 1
   781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
   790 - 000 . 000 . 000 . 000


All responses are correct
PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 135. AEA and TCP/IP Station Set Panel (3 of 3)

5.4.6 Defining Default Destinations

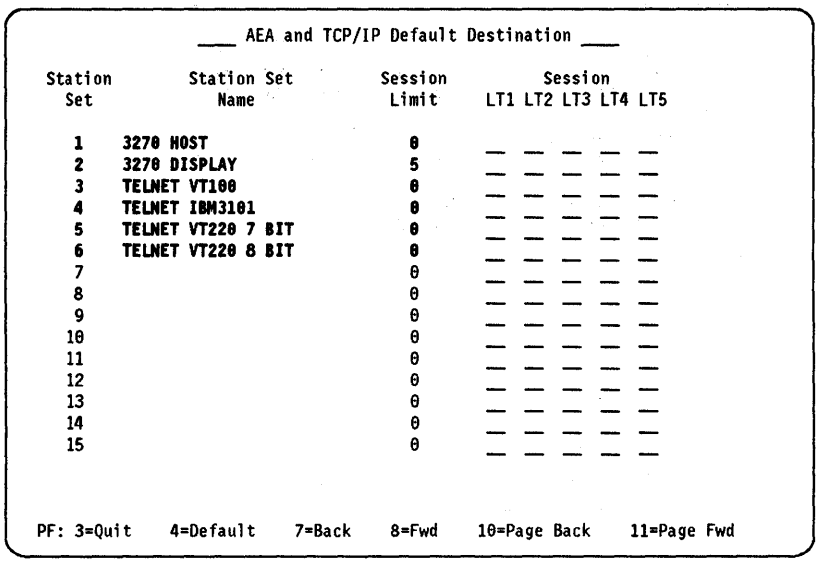


Figure 136. AEA and TCP/IP Default Destination Panel

This panel determines what the terminal user will see on each LT when it is first accessed.

For Scenario 2, we select the Connection Menu as the default destination (leave the fields in the Session LTx columns blank). The Connection Menu will be displayed as the first screen and the user can choose the desired connection.

For more information about defining default destinations, refer to *IBM 3174 Establishment Controller Installation Guide*, GG24-3061.

5.4.7 Defining TCP/IP Options

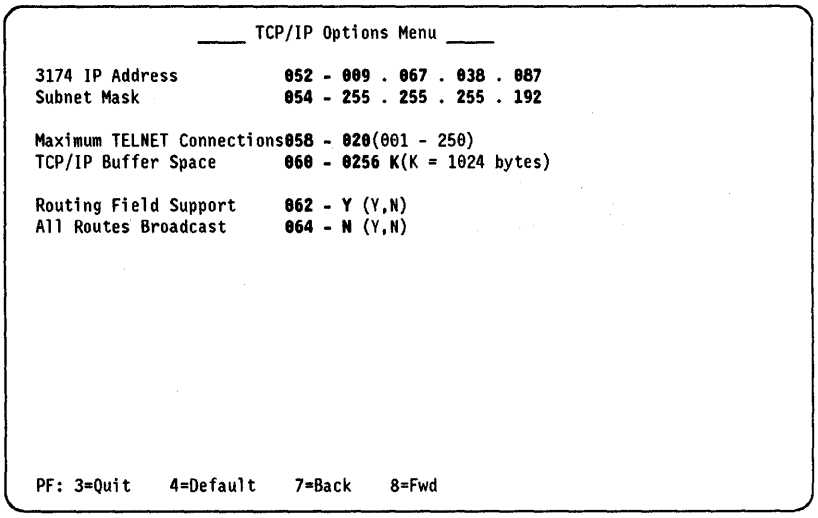


Figure 137. TCP/IP Options Menu

Question 052: 3174 IP Address

Enter the IP address assigned to your 3174. For our example, the IP address of the 3174-12L is 9.67.38.87; it is entered as:

009.067.038.087

Question 054: Subnet Mask

Enter the subnet mask for your network. For example, the subnet mask of our network at ITSO Raleigh is 255.255.255.192; it is entered as:

255.255.255.192

The mask contains a 1 for each bit of the address that is part of the network or subnet identifier.

Question 058: Maximum TELNET Connections

Enter the maximum number of connections you wish to have available for terminal users. For our example, we have specified 20 connections as the maximum.

Question 060: TCP/IP Buffer Space

Enter the amount of additional memory you wish to allocate for TCP/IP data buffers.

Question 062: Routing Field Support

Your response should be as follows:

- Enter Y if you wish the TCP/IP frames to use Token-Ring source routing. This allows communication through bridges.
- Enter N if you want to disable bridge access.

Question 064: All Routes Broadcast

Your response should be as follows:

- Enter Y for All Routes Broadcast.
- Enter N for Single Route Broadcast.

Note: The response to Question 064 is meaningful only if Question 062=Y.

5.4.8 Defining TCP/IP Routing Information

Since the 3174 is in the same subnet as RS/6000 TCP/IP hosts, there is no routing information customized.

5.4.9 Defining Domain Name Services

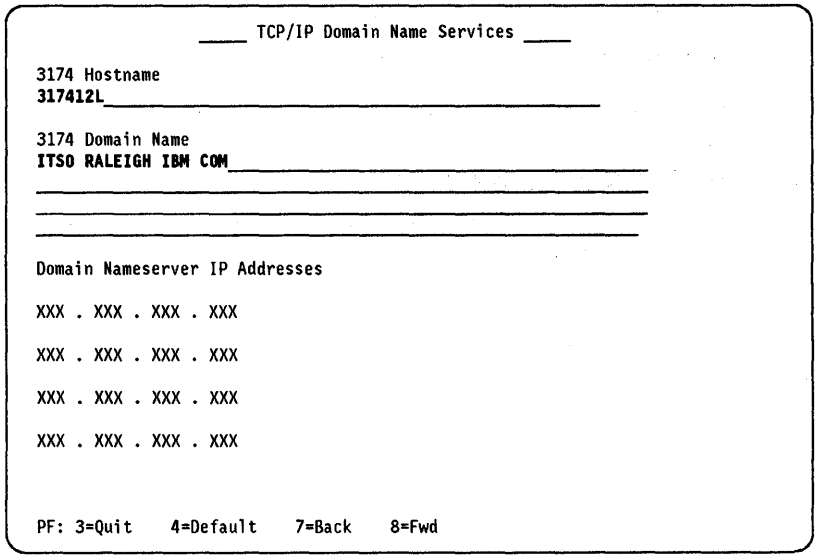


Figure 138. TCP/IP Domain Name Services

3174 Hostname
A response is required for this field. Enter the name assigned to your 3174.

3174 Domain Name
Enter the name of the domain that your 3174 is in.

Domain Nameserver IP Addresses
In our example we have no Domain Nameserver so the responses are left as default XXXs.

5.4.10 Defining TCP/IP Nicknames

```
____ TCP/IP 3174 Defined Nicknames ____

      Nickname                  IP Address

RS60003_____________        009 . 067 . 038 . 073
RS60002_____________        009 . 067 . 038 . 072
RS60001_____________        009 . 067 . 038 . 071
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX
____________________        XXX . XXX . XXX . XXX

PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 139. TCP/IP 3174 Defined Nicknames

Since users remember names better than numeric IP addresses, this panel allows you to define up to 16 host nicknames and their associated IP addresses. Note that RS60003 is the name of the RISC System/6000 host in this scenario.

5.4.11 Configure Complete

```
___ AEA and TCP/IP Configure Complete ____

          Press PF12 to save all responses
            and return to the AEA Menu

PF: 3=Quit    4=Default    7=Back    8=Fwd    12=Done
```

Figure 140. AEA And TCP/IP Configure Complete

You have now completed customizing for the 3174 TCP/IP Telnet Support.

5.5 Operation: TELNET to RISC System/6000

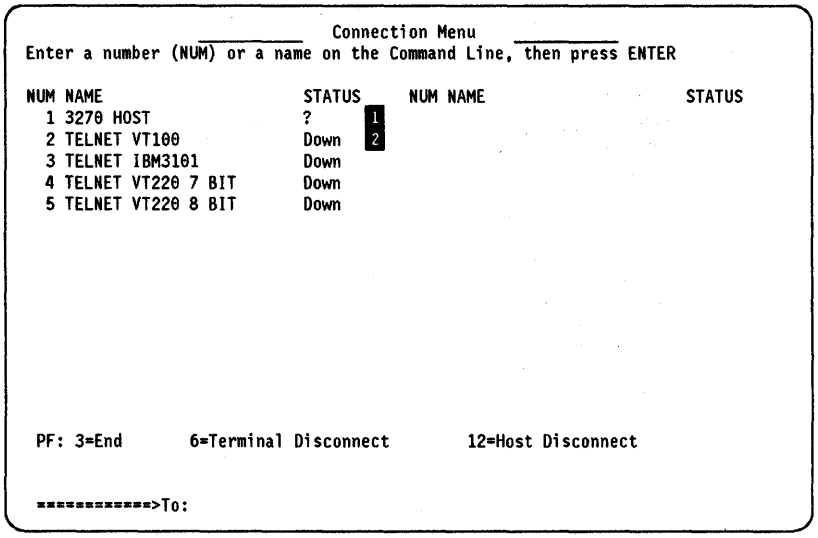


Figure 141. Connection Menu Immediately after 3174 IMLed

Re-IML the 3174 after you have completed your customizing procedures. Since we have specified the Connection Menu as the default destination for all our attached terminals, this screen appears immediately after the re-IML. Note the status displayed:

1. The 3270 host status is a Question (?) mark.
2. The TCP/IP host status is Down.

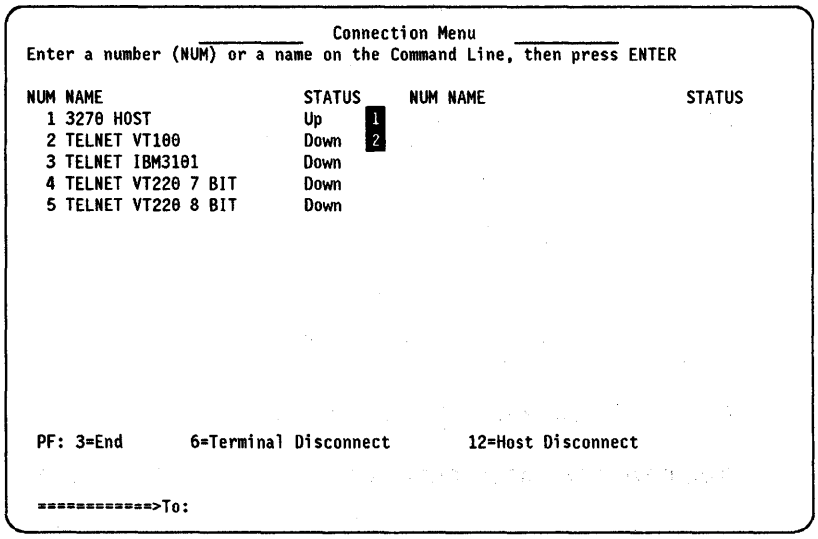


Figure 142. Connection Menu after 3174 Becomes Active

When the 3270 host attachment becomes active, the status changes, without user intervention, to the following:

1. The 3270 host status is now Up and, if selected, the session will be established between the LT and the host.

2 The TCP/IP host status continues to be Down.

```
                    Connection Menu
Enter a number (NUM) or a name on the Command Line, then press ENTER

NUM NAME                    STATUS     NUM NAME                    STATUS
  1 3270 HOST               Up
  2 TELNET VT100            Up
  3 TELNET IBM3101          Up
  4 TELNET VT220 7 BIT      Up
  5 TELNET VT220 8 BIT      Up




 PF: 3=End       6=Terminal Disconnect        12=Host Disconnect

 ============>To:
```

Figure 143. Connection Menu after 3174 Becomes Active and Enter Pressed

When you press the Enter key, the status shows all hosts active, once the LAN adapter is opened. You can now select any one of the hosts from the Connection Menu.

If you specified an address in the TCP/IP station set, type in the number to access the desired host session.

```
                    Connection Menu
Enter a number (NUM) or a name on the Command Line, then press ENTER

NUM NAME                    STATUS     NUM NAME                    STATUS
  1 3270 HOST               Up
  2 TELNET VT100            Up
  3 TELNET IBM3101          Up
  4 TELNET VT220 7 BIT      Up
  5 TELNET VT220 8 BIT      Up




 PF: 3=End       6=Terminal Disconnect        12=Host Disconnect

 ============>To: 4
```

Figure 144. Selecting Connection to RS/6000 Host

In our example, we selected NUM field **4** to get a connection to the host with IP address 9.67.38.73.

If you have not specified an address in the TCP/IP station set, select the emulation that you want to have on the RISC System/6000; you will get the 3174 TELNET prompt.

```
3174 TELNET>  open 9.67.38.73
```

Figure 145. TELNET Local Mode

At the TELNET prompt, type in the command and destination IP address or hostname.

```
IBM AIX Version 3 for RISC System/6000
(C) Copyrights by IBM and by others 1982, 1991.
login: root
root's Password:
*******************************************************************************
*                                                                             *
*                                                                             *
*  Welcome to IBM AIX Version 3.2!                                            *
*                                                                             *
*                                                                             *
*  Please see the README file in /usr/lpp/bos for information pertinent to    *
*  this release of the AIX Operating System.                                  *
*                                                                             *
*                                                                             *
*******************************************************************************

Last unsuccessful login: Thu May 27 11:07:03 CDT 1993 on hft/0
Last login: Tri May 28 12:21:51 CDT 1998 on pts/8 from rs60002
[YOU HAVE NEW MAIL]
swcons: console output redirected to: /log/28May93
<rs60003># smit
```

Figure 146. RS/6000 after Login

```
                                System Management

Move cursor to desired item and press Enter.

  Installation and Maintenance
  Devices
  Physical & Logical Storage
  Security & Users
  Diskless Workstation Management
  Communications Applications and Services
  Spooler (Print Jobs)
  Problem Determination
  Performance & Resource Scheduling
  System Environments
  Processes & Subsystems
  Applications
  Using SMIT (information only)



F1=Help             F2=Refresh          F3=Cancel           Esc+8=Image
Esc+9=Shell         Esc+0=Exit          Enter=Do
```

Figure 147. RS/6000 after Invoking SMIT

5.6 RISC System/6000 Definitions

On the RISC System/6000, we do the following:

- Login as the *root* user.
- At the command prompt, type in:

  smit sna

You will get the following screen:

5.6.1 SNA Services

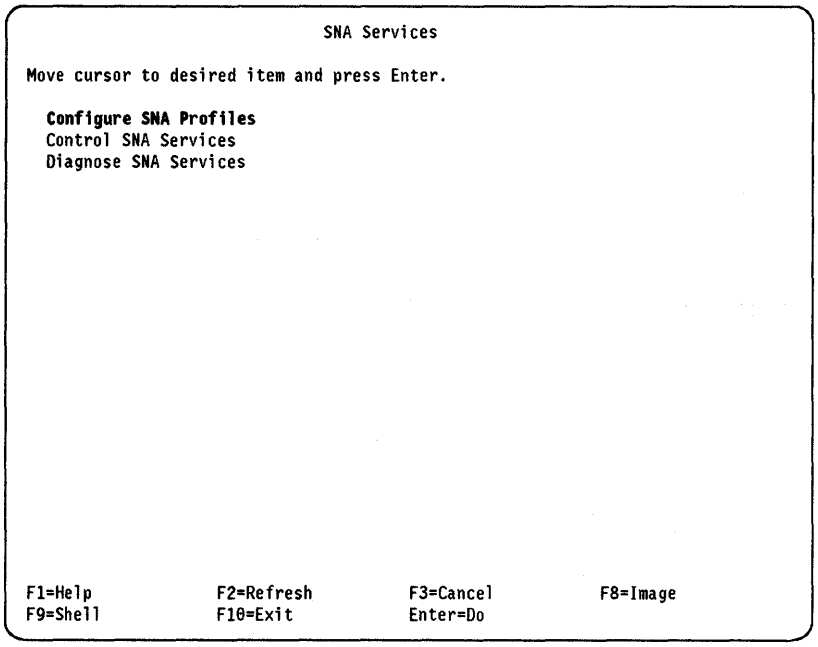


Figure 148. SNA Services

Select **Configure SNA Profiles** and press Enter.

5.6.2 Configure SNA Profiles

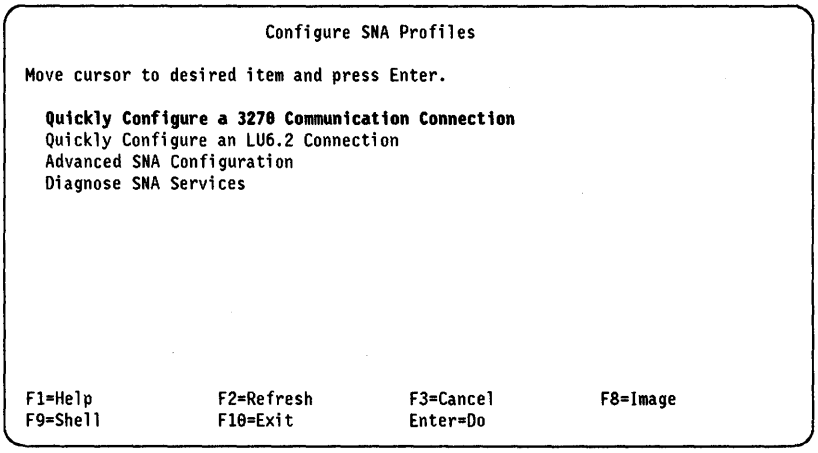


Figure 149. Configure SNA Profiles

Select **Quickly Configure a 3270 Communication Connection** and press Enter.

5.6.3 Quick Configuration

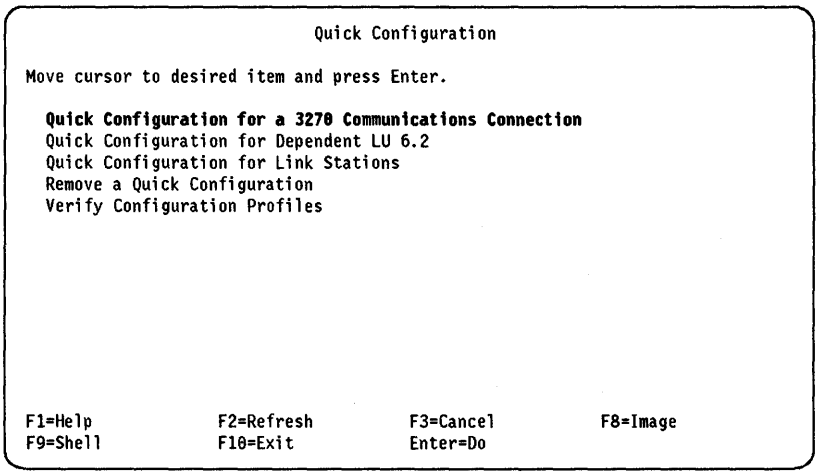


Figure 150. Quick Configuration

Select **Quick Configuration for a 3270 Communication Connection** and press Enter

5.6.4 Quick Configuration for a 3270 Communication Connection: Information

```
     Quick Configuration for a 3270 Communications Connection: Information

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        Entry Fields
* Quick configuration name                            TCPIP3174
  Link Station                                        token_ring_call
  Link address                                        400031740004

* System services control point (SSCP) ID (1-65535)   *
  XID node ID                                         *

  Provide LU addresses (values of 2 to 254) or
  address ranges for any of the following LU types:
     LU 1                                             8
     LU 2                                             2-4
     LU 3                                             9



F1=Help          F2=Refresh       F3=Cancel        F4=List
F5=Undo          F6=Command       F7=Edit          F8=Image
F9=Shell         F10=Exit         Enter=Do
```

Figure 151. Quick Configuration for a 3270 Communication: Information

On this screen, type in the configuration data and press Enter. The next screen shows you the status of the created profiles.

5.6.5 Command Status

```
                                COMMAND STATUS

Command: OK          stdout: yes          stderr: no

Before command completion, additional instructions may appear below.

The Link Station Profile 'TCPIP317' has been created successfully.
The Connection Profile 'TCPIP317402' has been created successfully.
The Local LU Profile 'TCPIP317402' has been created successfully.
The Connection Profile 'TCPIP317403' has been created successfully.
The Local LU Profile 'TCPIP317403' has been created successfully.
The Connection Profile 'TCPIP317404' has been created successfully.
The Local LU Profile 'TCPIP317404' has been created successfully.
The Connection Profile 'TCPIP317408' has been created successfully.
The Local LU Profile 'TCPIP317408' has been created successfully.
The Connection Profile 'TCPIP317409' has been created successfully.
The Local LU Profile 'TCPIP317409' has been created successfully.




F1=Help          F2=Refresh       F3=Cancel        F6=Command
F8=Image         F9=Shell         F10=Exit
```

Figure 152. Command Status

At this time you have created the attachment profile successfully. You are now able to start the SNA Services.

Note: The SNA Services must be started from the *root* user.

5.6.6 Advanced SNA Configuration

Select **Advanced SNA Configuration** from the Configure SNA Profiles panel shown in Figure 149 on page 147.

For more information about Advanced SNA Configuration, see Chapter 13 Volume 2, *AIX Version 3.2 for RISC System/6000, Communication Concepts and Procedures*, GC23-2402.

```
                        Advanced SNA Configuration

Move cursor to desired item and press Enter.

  Physical Units
  Logical Units
  Nodes
  Security
  Verify SNA Configuration Profiles
  Export SNA Configuration Profiles
  Import SNA Configuration Profiles

F1=Help          F2=Refresh       F3=Cancel        F8=Image
F9=Shell         F10=Exit         Enter=Do
```

Figure 153. Advanced SNA Configuration

Select **Physical Units** and press Enter. The next screen shows the the list of physical units.

5.6.7 Physical Units

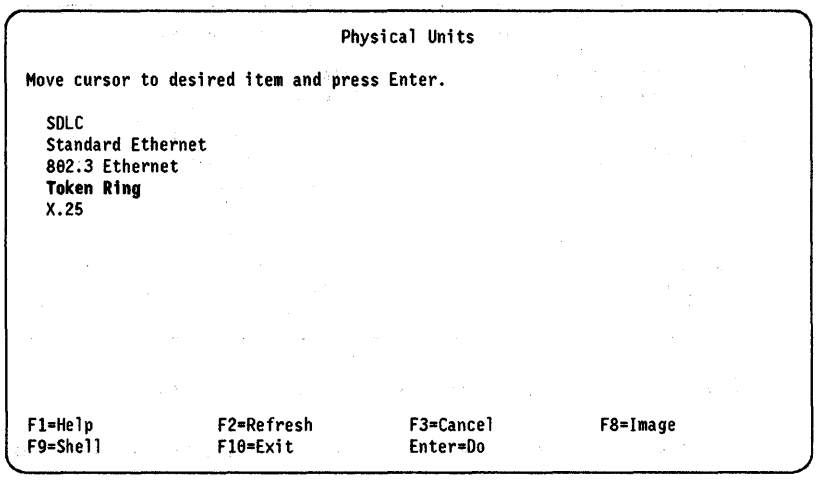


Figure 154. Physical Units

Select **Token Ring** and press Enter.

5.6.8 Token-Ring

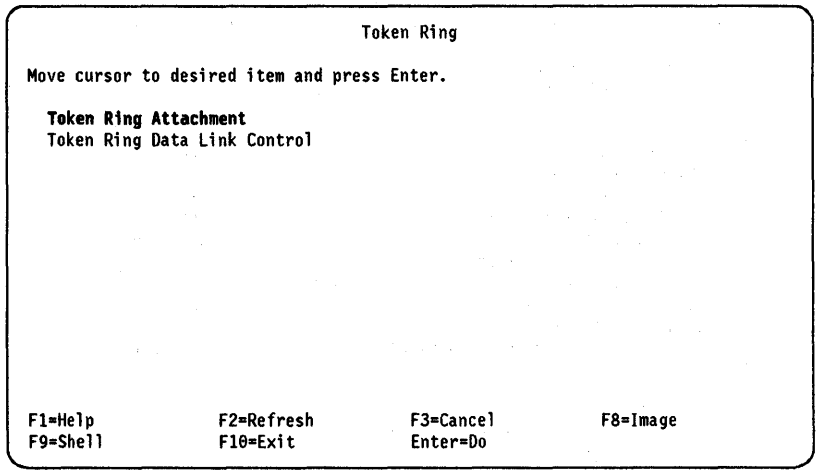


Figure 155. Token Ring

Select **Token Ring Attachment** and press Enter.

5.6.9 SNA Token Ring Attachment Profile Name

```
                SNA Token Ring Attachment Profile Name

Type or select a value for the entry field.
Press Enter AFTER making all desired changes.

                                                        Entry Fields
* PROFILE name                                      tcp3174          +



F1=Help          F2=Refresh       F3=Cancel        F4=List
F5=Undo          F6=Command       F7=Edit          F8=Image
F9=Shell         F10=Exit         Enter=Do
```

Figure 156. SNA Token Ring Attachment Profile Name

On this screen you type in the profile name, or you select the profile name from a list (F4).

If you have entered the profile name of your token-ring attachment, the SNA Token Ring Attachment Profile screen will be displayed next.

5.6.10 Change/Show SNA Token Ring Attachment Profile

```
            Change / Show SNA Token Ring Attachment Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

 TOP                                                  Entry Fields
  CURRENT profile name                              tcp3174
  NEW PROFILE name
  CONTROL POINT profile name                        RS03TOK0              +
  LOGICAL LINK profile name                         RS03TOK0              +
  PHYSICAL LINK profile name                        RS03TOK0              +
  STOP ATTACHMENT on inactivity?                    no                    +
     If yes, inactivity TIMEOUT (0-10 minutes)      0
  RESTART on deactivation?                          no                    +
  LU address REGISTRATION?                          no                    +
     If yes, LU address REGISTRATION PROFILE name   LDEFAULT               +
  CALL type                                         call                  +
     If listen,
        AUTO-LISTEN?                                no                    +
        MINIMUM SAP address (hex 04-ec)             04                     X
        MAXIMUM SAP address (hex 04-ec)             EC                     X
     If call, ACCESS ROUTING                        link_address          +
        If link-name, REMOTE LINK name
        If link-address,
           Remote LINK address                      400031748004           X
           Remote SAP address (hex 04-ec)           04               X
 BOTTOM

F1=Help          F2=Refresh       F3=Cancel        F4=List
F5=Undo          F6=Command       F7=Edit          F8=Image
F9=Shell         F10=Exit         Enter=Do
```

Figure 157. Change/Show SNA Token Ring Attachment Profile

On this screen you can change some of the parameters.

The Remote Link address is the token-ring address of the 3174-12L, which is the gateway for the RISC System/6000 to the SNA host.

5.6.11 Manage SNA Services

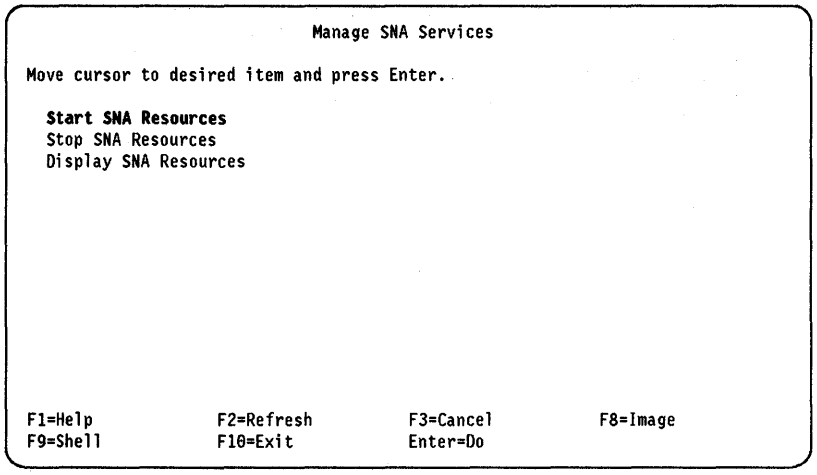


Figure 158. Manage SNA Services

Select **Start SNA Resources** and press Enter.

5.6.12 Start SNA Resources

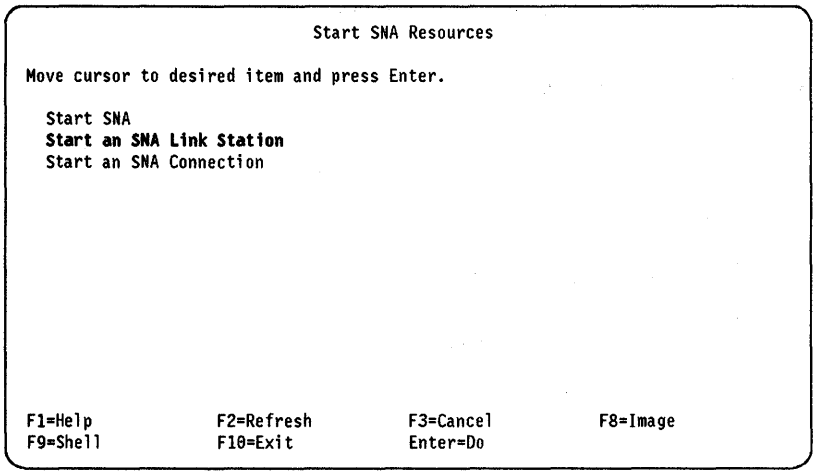


Figure 159. Start SNA Resources

Select **Start SNA Link Station** and press Enter.

5.6.13 Start an SNA Link Station

```
                        Start an SNA Link Station

Type or select a value for the entry field.
Press Enter AFTER making all desired changes.

                                                        Entry Fields
* Link Station Profile name                             TCPIP314        +

F1=Help          F2=Refresh       F3=Cancel        F4=List
F5=Undo          F6=Command       F7=Edit          F8=Image
F9=Shell         F10=Exit         Enter=Do
```

Figure 160. Start SNA Link Station

Use the Link Station Profile name, defined in the **Quick configuration name** field shown in Figure 151 on page 148.

5.6.14 Display SNA Resources

```
                        Display SNA Resources

Move cursor to desired item and press Enter.

  Display the Status of SNA
  Display SNA Global Information
  Display Session Information
  Display Active Link Information
  Display APPN Topology Database
  Display APPN Directory Database
  Display SNA Gateway Information

F1=Help          F2=Refresh       F3=Cancel        F8=Image
F9=Shell         F10=Exit         Enter=Do
```

Figure 161. Display SNA Resources

Select **Display Active Link Information** to check if the link station is active.

5.6.15 Command Status

```
                              COMMAND STATUS

Command: OK          stdout: yes          stderr: no

Before command completion, additional instructions may appear below.

    Link          Adjacent      Node    Device
   station        CP name       type     name      State
-------------- ---------------- ----- --------- ----------
@x25s0                                  x25s0     Starting
@tok0                                   tok0      Starting
R1N2A1N        USIBMRA.RALYAS4A  NN    tok0      Active
RA62266        USIBMRA.RAP       EN    tok0      Active
TCPIP317                                tok0      Active









F1=Help            F2=Refresh          F3=Cancel          F6=Command
F8=Image           F9=Shell            F10=Exit
```

Figure 162. COMMAND STATUS

The SNA link station is already started and active. Now you are able to start AIX* 3270 Host Communication Program/6000 (HCON).

Note: The HCON program can be started by any user.

5.6.16 AIX 3270 Host Communication Program/6000 (HCON)

Do the following:

- Login with your user ID.
- At the command prompt, type in:

  smit hcon

You will get the following screen:

```
                AIX 3270 Host Connection Program/6000 (HCON)

Move cursor to desired item and press Enter.

  HCON Administrator Functions
  HCON User Functions
  HCON Control

F1=Help          F2=Refresh       F3=Cancel        F8=Image
F9=Shell         F10=Exit         Enter=Do
```

Figure 163. AIX 3270 Host Communication Program/6000 (HCON)

Select **HCON User Functions** to get the next screen.

Note: The 3174 must be customized for multiple logical terminal (MLT) support if HCON on the RISC System/6000 is to support multiple sessions.

5.6.17 HCON User Functions

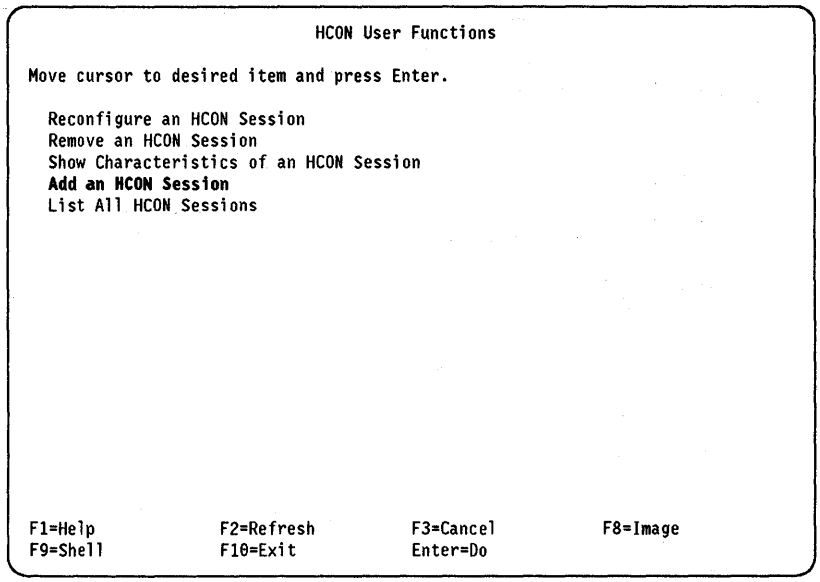


Figure 164. HCON User Functions

Select **Add an HCON Session** and press Enter.

5.6.18 Add an HCON Session

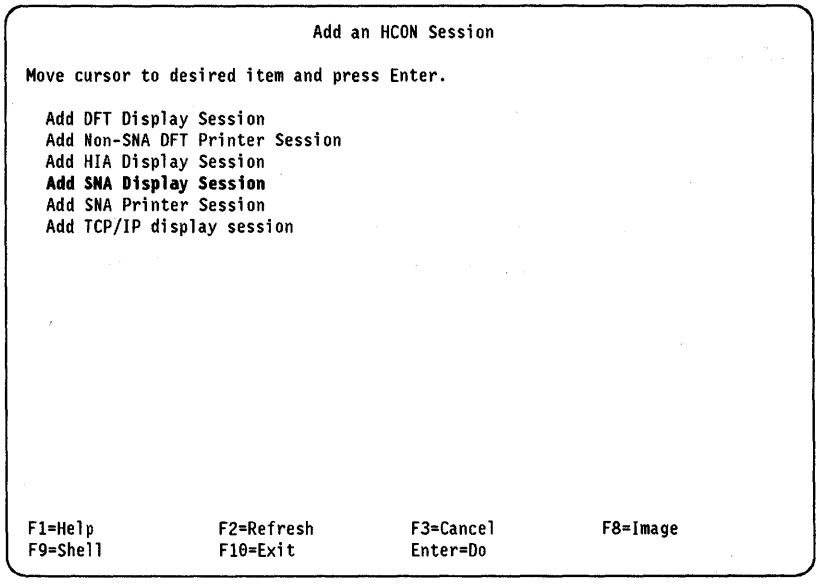


Figure 165. Add an HCON Session

Select **Add SNA Display Session** and press Enter.

5.6.19 Add SNA Display Session

```
                        Add SNA Display Session

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

 TOP                                                  Entry Fields
   HCON user name                                     joe
   SESSION name                                       a               +
   Session USE                                        Gateway 3174
 * SNA logical connection prefix or profile          TCPIP317402     +
   LANGUAGE                                           English (U.S.A.)      +
 * KEYBOARD table                                     /usr/lib/hcon/e789_ktb>
 * COLOR table                                        /usr/lib/hcon/e789_ctb>
 * File used by SAVES key                             /e789_saves
 * File used by REPLS key                             /e789_repls
 * Local printer used by PRINT key                    lp0
   Host TYPE                                          TSO             +
   Host LOGIN ID
   Autolog NODE ID
   Autolog TRACE                                      no              +
 MORE...6

F1=Help          F2=Refresh       F3=Cancel        F4=List
F5=Undo          F6=Command       F7=Edit          F8=Image
F9=Shell         F10=Exit         Enter=Do
```

Figure 166. Add SNA Display Session

Type or select values in the entry fields.

After adding the SNA display session, you will get the following screen. If there are no errors, the screen will show an **OK** in the first status line.

5.6.20 Command Status

```
                              COMMAND STATUS

Command: OK          stdout: yes          stderr: no

Before command completion, additional instructions may appear below.

0789-540  Session a for user joe is added successfully to the HCON
        system.









F1=Help          F2=Refresh       F3=Cancel        F6=Command
F8=Image         F9=Shell         F10=Exit
```

Figure 167. COMMAND STATUS

The HCON user functions are now completed. Press Enter as required to get back to a command prompt.

From the command prompt, you are now able to start the HCON session.

5.6.21 HCON Session

At the command prompt, type in:

e789 a

You will get the 3270 host screen.

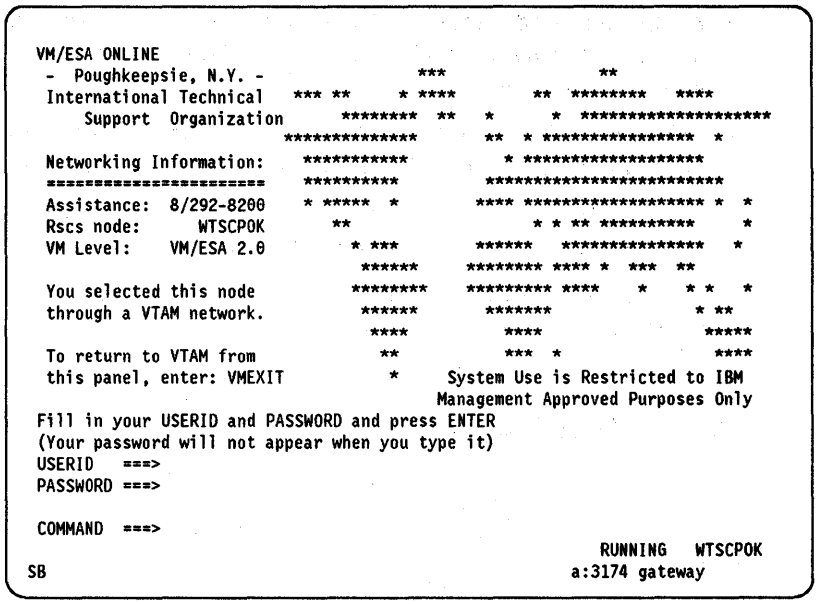


Figure 168. Host

Chapter 6. Scenario 3: APPN and TCP/IP via 3174 to AS/400 and VTAM

This scenario shows the ability of the 3174 to act as an SNA token-ring gateway, an APPN network node and a TCP/IP TELNET client simultaneously:

- A PS/2 end node uses the 3174 as an APPN network node server to access an AS/400* network node via the 3174 Peer Communication capability and an external token-ring.
- The same PS/2 uses the 3174 as a token-ring gateway to access an S/370 host via the 3174 Peer Communication capability and the external token-ring.
- A 3270 CUT terminal uses the 3174 as a TCP/IP TELNET client to establish a TCP/IP connection with the AS/400 TCP/IP host capability.
- The same 3270 CUT terminal uses the 3174 as a traditional cluster controller to establish a session with an S/370 host application.

6.1 Scenario 3 Configuration Diagram

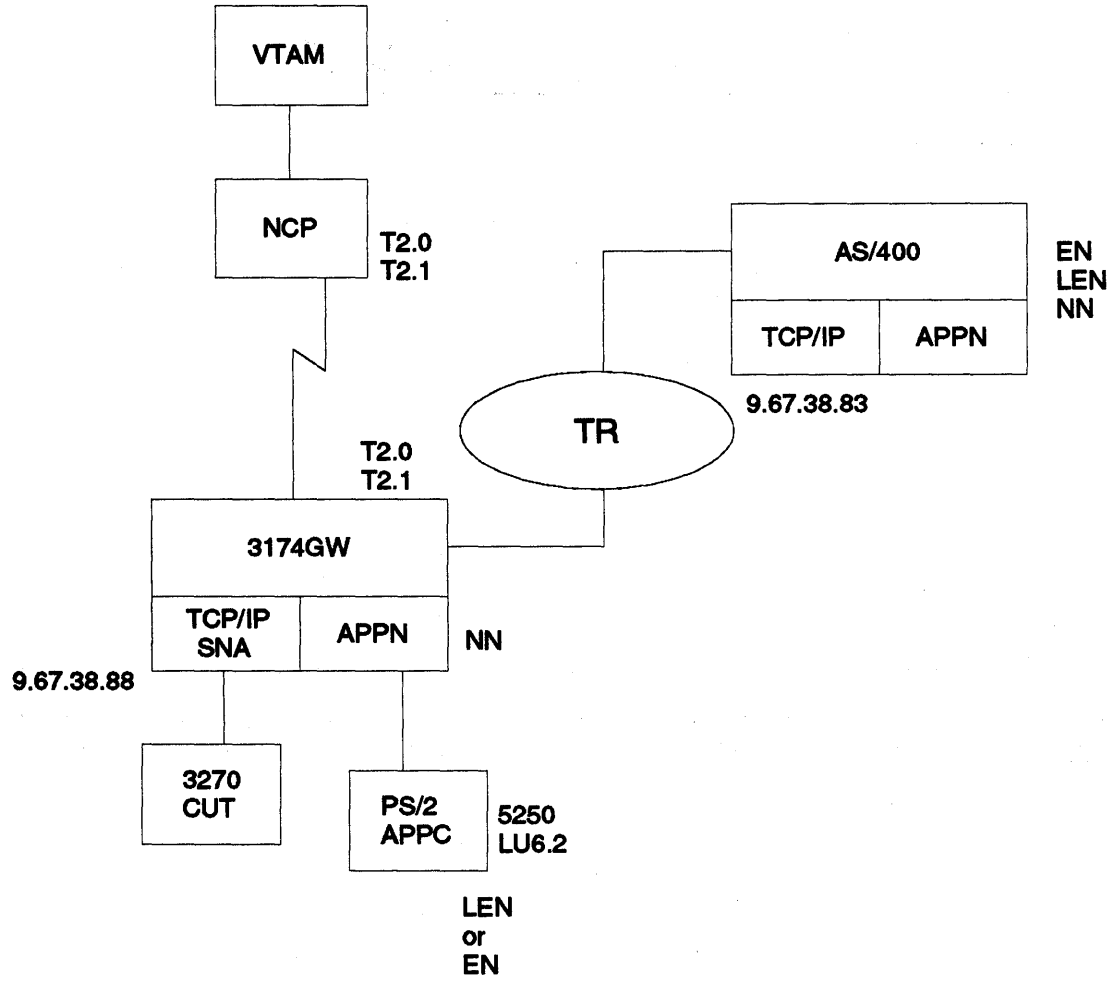


Figure 169. 3174 in an APPN, TCP/IP and SNA Environment

6.2 Scenario 3 Configuration Description

Scenario 3 shows a PS/2 APPN end node (PS2COAX) coax-attached to a 3174-11R, which is SDLC-attached to an S/370 host and token-ring attached to an AS/400. It also shows a 3270 CUT terminal (CUTCOAX) attached to the same 3174-11R.

The composite network has the following components:

- An S/370 host with VTAM V4.R1
- A 3745 with NCP V6.2, channel-attached to the S/370 host
- An AS/400 attached to the 3174-11R via a token-ring network
- A 3174-11R (CP31742), SDLC-attached to the 3745, as:
  - An APPN network node (NN) server for the PS/2 workstation
  - A token-ring gateway for the PS/2 workstation
  - A TCP/IP TELNET client for the 3270 CUT terminal
  - A cluster controller for the 3270 CUT terminal
  - With Peer Communication (LAN-Over-Coax) enabled.
- A PS/2 APPN end node (EN) (PS2COAX) with:
  - Communications Manager/2
  - 5250 emulation to access the AS/400 host
  - 3270 emulation to access the S/370 host
  - Token-ring address of 400031742992.
- A 3270 CUT terminal (CUTCOAX):
  - With access to the AS/400 host as a VT100 terminal
  - With access to the S/370 host as a 3270 terminal

Note: This chapter does not describe the Communications Manager/2 configuration required to enable the PS/2 workstation to access the S/370 host using 3270 emulation.

6.3 3174-11R APPN, Peer Communication and TCP/IP Customization

The following Control Disk Menu shows the customization options required to be selected for Scenario 3.

6.3.1 Customize Control Disk Menu

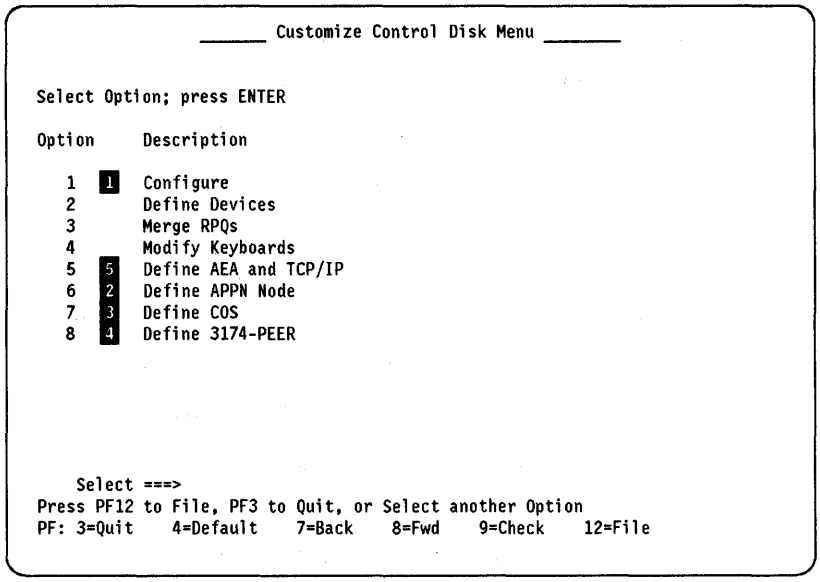


Figure 170. Customize Control Disk Menu

1 Option 1 is used to customize the 3174 for SNA functions.

2 Option 6 is used to customize the APPN functions.

3 Option 7 is used to define COS tables and mode/COS correlations.

4 Option 8 is used to define the Peer Communication function. In subsequent panels, the Peer Communication function is referred to as 3174-Peer support.

5 Option 5 is used to define TCP/IP functions.

6.4 3174 as an APPN Network Node

Using SDLC, token-ring network, or S/370 SNA channel, the 3174 NN supports LEN end node (LEN EN), APPN end node (EN) and APPN network node (NN) communication, including subarea VTAM and APPN VTAM communication, to the 3174 NN.

Using peer communication, intelligent workstations can attach to the 3174 Terminal Adapter (HG 26 and HG 27) ports as LEN ENs, ENs, or NNs. In addition, the 3174 NN provides network node services to LEN ENs and ENs.

The 3174 NN calculates the best route to a destination for resources it owns, using its knowledge of the network's topology and the desired COS. When a link fails and another path is available, the 3174 NN can re-establish a session using dynamic routing. Because routes are not predefined and ENs can register their

resources with the 3174 NN, network system definition is minimal. Nodes can be added or deleted without recustomizing.

Because a 3174 NN allows LU 6.2 traffic to flow on a single link, multiple subchannel addresses or multidrop links are not needed for T2.1 traffic.

6.5 3174 APPN and Peer Communication Customization

This chapter provides guidance on customizing the 3174 for APPN and Peer Communication functions. For a detailed description of each customizing question, refer to *3174 Establishment Controller Planning Guide Configuration Support-C Release 3*, GA27-3918.

The following chapters in the planning guide are important:

- Chapter 11: Planning for Common SNA
- Chapter 12: Planning for APPN
- Chapter 13: Planning for 3174 Peer Communication
- Appendix A: Configuration Worksheets

Figure 171 on page 163 shows the flow sequence of panels when customizing the 3174 for APPN and Peer Communications.

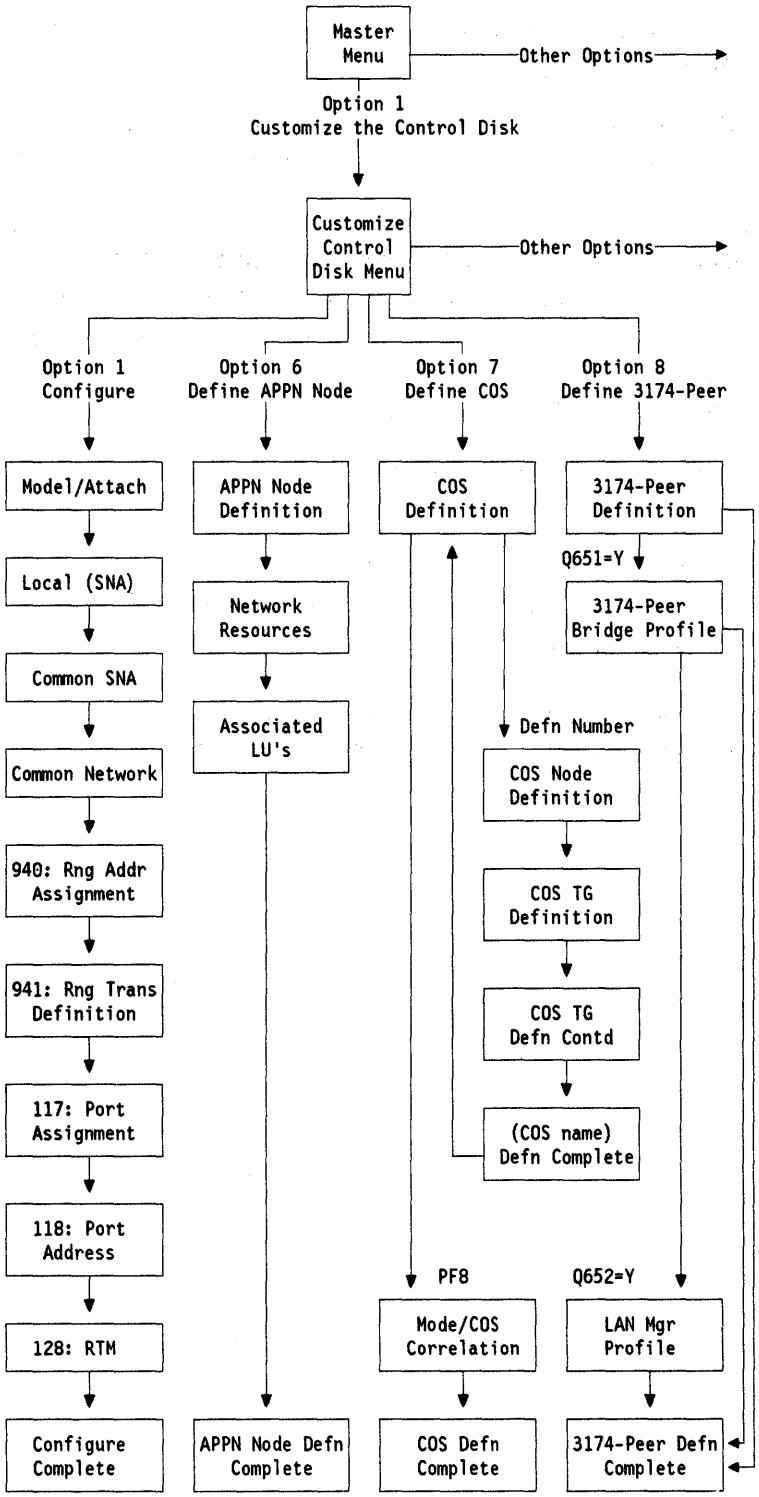


Figure 171. 3174 Customization Panel Flow Sequence

6.5.1 SDLC

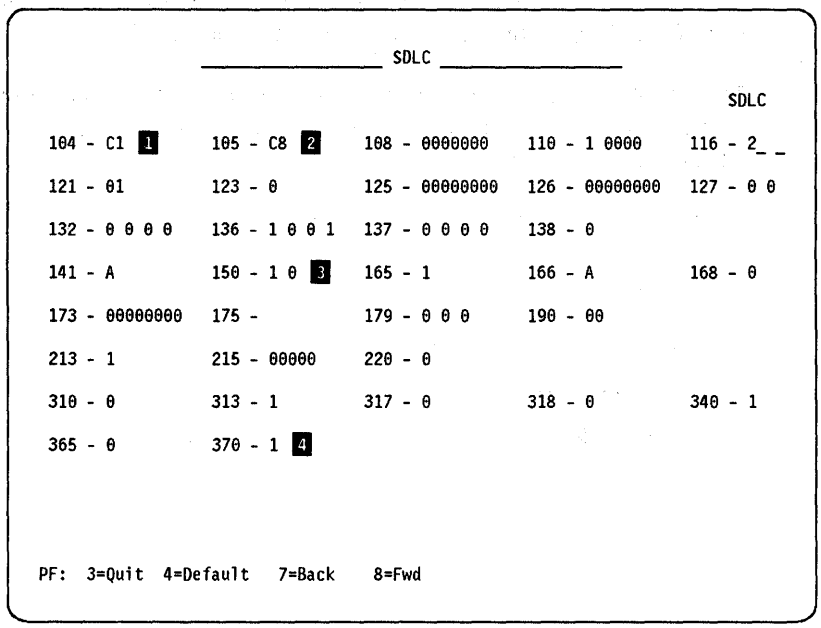


Figure 172. Customizing the 3174-11R for an SDLC Link

1 Question 104 specifies the SDLC address of the 3174-11R which, in the VTAM definitions, is the PU that has XID=YES to allow T2.0/2.1 shared link support.

2 Question 105 defines the upper limit poll address for DSPUs.

3 Question 150=10 enables the token-ring gateway function for DSPUs.

4 When APPN is selected and the connection is to NCP (which is the case here), the response should be a 1. This will allow inbound RU sizes up to 512 bytes to flow, as BINDs may be longer than 256 bytes and NCP does not support BIND reassembly.

6.5.2 Common SNA

The Common SNA panel is an important panel for APPN customization. The Common SNA panel allows you to:

- Give a name for the network in which the 3174 you are customizing resides.
- Give a name to the control point for the 3174.
- Give a name to the connection network.
- Enable the 3174 APPN functions.

Other responses on this panel are:

- Question 500: CSCM Unique
- Question 502: Logical Unit Name

These questions are for Central Site Change Management (CSCM) functions. The LU named in Question 502 can be a dependent or an independent LU but is not relevant to APPN functions.

The LU for CSCM is a dependent LU if APPN is not enabled (Question 510=0). It is also a dependent LU if APPN is enabled (Question 510=1) but the LUNAME (Question 502) and CPNAME (Question 511) are not the same. In both cases, the host CSCM LU definition should specify LOCADDR=1.

The LU for CSCM is an independent LU only if APPN is enabled and the LUNAME is the same as the CPNAME. In this case, the host CSCM LU definition should specify LOCADDR=0.

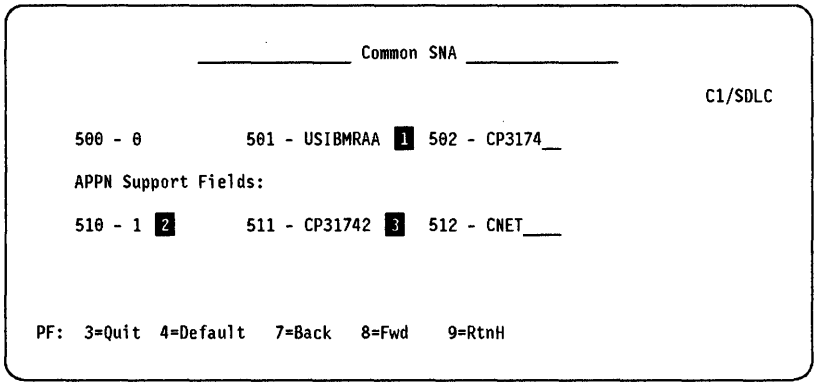


Figure 173. Names to Identify the 3174-11R Network Node

1 The 3174-11R is customized as being in network ID USIBMRAA.

2 Question 510=1 enables the APPN functions.

3 Question 511 specifies the control point name used for the 3174-11R.

Question 501: Network ID

The response is the name used to identify the network that the 3174 you are customizing is attached to. A network ID is required if you are using either of the following:

- CSCM (Question 500=1 or 2)
- APPN (Question 510=1).

The following rules apply to the network ID when APPN is enabled:

- It must not be the same as:
  - The control point name given in Question 511
  - The virtual node name given in Question 512
  - Any CPNAME on the Network Resources panel
  - Any CPNAME, LUNAME or SERVING NN name on the Associated LUs panel.
- It may be up to eight alphanumeric characters long. The first character must be alphabetic with no blanks or spaces allowed between characters.

Question 510: APPN Network Controller

The response indicates whether APPN functions in the 3174 are enabled. Valid responses are:

0 = APPN not enabled (default response)

1 = APPN enabled.

If you enabled the 3174 APPN functions (Question 510=1), then:

- The link type for a channel-attached 3174 must be able to carry both T2.0 and T2.1 traffic (Question 242=1)
- The network ID (Question 501), the control point name (Question 511) and the virtual node name (Question 512) must be unique.

If you enabled the 3174 APPN functions and perform no further APPN customization, you will get a minimum APPN configuration using the IBM-supplied class of service definitions.

Question 511: APPN Control Point Name (CPNAME)

The response is used as the control point name and identifies the 3174 network node to the network.

The following rules apply to the control point name:

- It is required when APPN is enabled.
- It must not be the same as:
  - The network ID given in Question 501
  - The virtual node name given in Question 512
  - Any other resource names in the network.
- It may be up to eight alphanumeric characters long. The first character must be alphabetic with no blanks or spaces allowed between characters.

Question 512: APPN Virtual Node Name (VNODE)

A connection network is used to minimize definitions for nodes connected to a shared-access transport facility such as a token-ring network. Physically, the connection network is the token-ring network to which the 3174 network node is attached.

Question 512 allows you to give a name to a connection network so that all nodes using the same connection network can point to the same name.

The connection network name is also referred to as:

- The virtual node name in the 3174
- The connection network control point name (CNNCPNAME) in the AS/400
- The connection network name in NS/2

  It is used fully qualified by the network ID.

The following rules apply to the connection network (or virtual node) name:

- It is required when Question 510=1 (APPN enabled) even if a connection network is not used.
- It must not be the same as:

  - The network ID given in Question 501
  - The control point name given in Question 511
  - Any CPNAME on the Network Resources panel
  - Any CPNAME, LUNAME or SERVING NN name on the Associated LUs panel
  - Any other resource names in the network
- It may be up to eight alphanumeric characters long. The first character must be alphabetic with no blanks or spaces allowed between characters.

6.5.3 Common Network

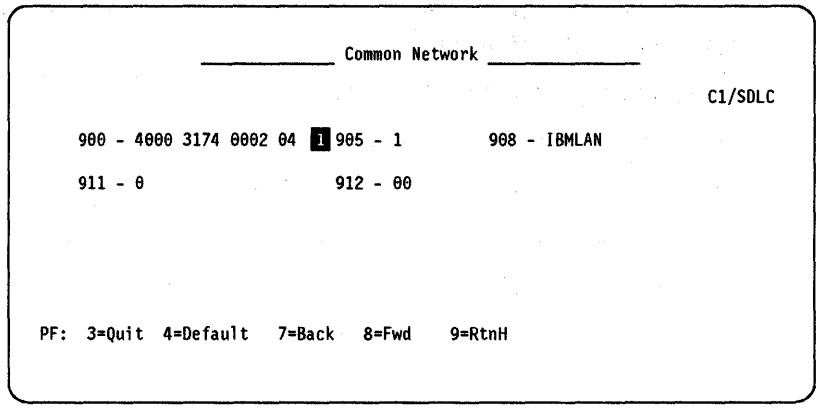


Figure 174. Token-Ring Definition for the 3174-11R

1 Question 900 specifies the token-ring address of the 3174-11R.

6.5.4 Ring Address Assignment

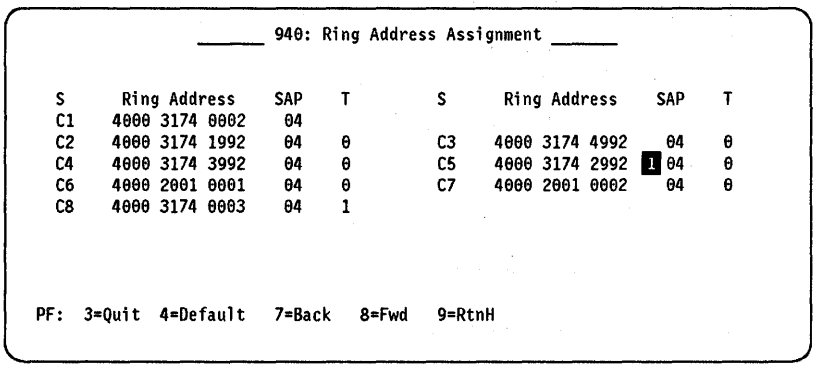


Figure 175. Ring Address Assignment

1 In our example, the PS2COAX EN is assigned to ring address 400031742992.

6.5.5 APPN Node Definition

The APPN Node Definition panel allows you to specify the capabilities of the 3174 network node:

- Question 610: APPN Sessions
- Question 611: APPN Nodes/Links
- Question 612: APPN Wildcard Option

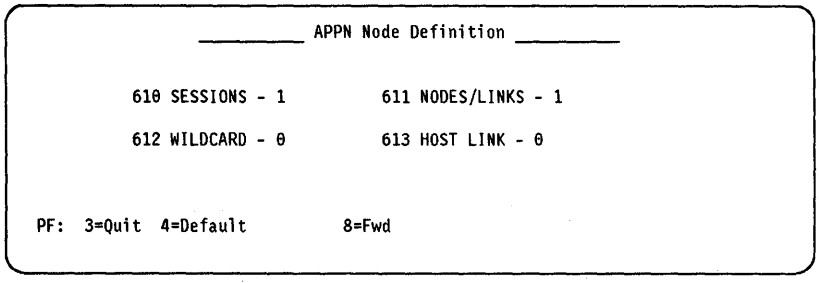


Figure 176. APPN Node Definition

Question 610: APPN Sessions

The response indicates the number of LU 6.2 intermediate sessions that may be activated through the 3174. Valid responses are:

1 = up to 225 sessions (default response)

2 = up to 500 sessions

3 = up to 750 sessions

4 = up to 1000 sessions

Your response is used to:

- Allocate control storage when the 3174 network node is initially loaded. Since APPN sessions are dynamically set up, dependent upon resources (buffers, control blocks, links) available at session initiation, this value may not always be achieved.
- Determine the total amount of storage required for the 3174.

  The number of APPN sessions customized affects the amount of control storage required.

Question 611: APPN Nodes/Links

The response indicates the number of T2.1 links to adjacent nodes that are supported by the 3174 network node. Valid responses are:

1 = up to 20 nodes/links (default response)

2 = up to 75 nodes/links

3 = up to 150 nodes/links

4 = up to 225 nodes/links.

Your response is used to:

- Allocate control storage when the 3174 network node is initially loaded. Since T2.1 links are dynamically activated as required, dependent upon

resources (control blocks and ports) available at link establishment, this value may not always be achieved.

- Determine the total amount of storage required for the 3174.

  The number of nodes/links customized affects the amount of control storage required.

Question 612: APPN Wildcard Option

The response indicates whether the 3174 network node you are customizing holds the wildcard connection to the host for the APPN network. Valid responses are:

0 = No (default response)

1 = Yes

The wildcard option allows LUs to be dynamically located in a subarea network. The wildcard option permits sessions to be established from LUs in the APPN network to LUs in or through a subarea network.

For detailed information about the 3174 APPN wildcard, see *IBM 3174 APPN Implementation Guide*, GG24-3702.

Question 613: APPN Wildcard Host Link

The response indicates which host link to this 3174 NN will be used for wildcard routing. Valid responses are:

1A = Host link 1A is used for wildcard routing (default response).

1B = Host link 1B is used for wildcard routing.

1C = Host link 1C is used for wildcard routing.

1D = Host link 1D is used for wildcard routing.

1E = Host link 1E is used for wildcard routing.

1F = Host link 1F is used for wildcard routing.

1G = Host link 1G is used for wildcard routing.

1H = Host link 1H is used for wildcard routing.

6.6 Network Resources Definition

The Network Resources and Associated LUs panels allow you to define nodes in the APPN network to the 3174 network node you are customizing. You may use these panels to define:

- LEN nodes for which the 3174 is acting as a server
- LUs that are located in the LEN nodes served by the 3174
- Network nodes that are adjacent to the 3174
- Nodes that share a link for both T2.0 and T2.1 traffic, such as a 3174-13R that is used for both 3270 DSPU and APPN functions
- Addresses of nodes to which the 3174 NN will initiate a connection when it is IMLed
- Resources that are to be preloaded in the 3174 directory cache to reduce the number of broadcasts in the network

6.6.1 Network Resources

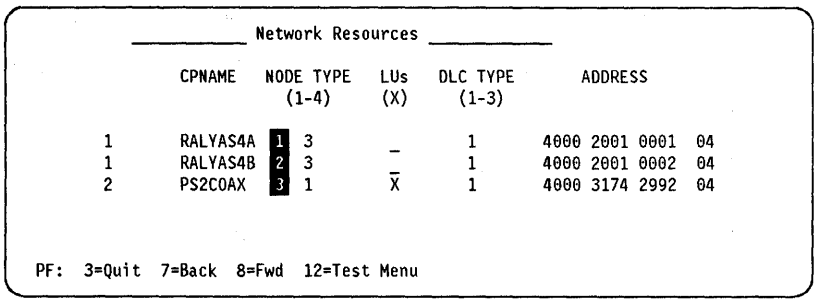


Figure 177. Network Resources

1 RALYAS4A (AS/400) is defined as an adjacent network node with NODE TYPE of 3 (network node) and a DLC TYPE of 1 (token-ring attached).

2 RALYAS4B (AS/400) is defined as an adjacent network node with NODE TYPE of 3 (network node) and a DLC TYPE of 1 (token-ring attached).

3 PS2COAX is defined as NODE TYPE of 1 (LEN EN). An X in the LUs field indicates that its local LU is defined in the Associated LUs panel, as shown in Figure 178 on page 172. It also has a DLC TYPE of 1 (token-ring attached).

Note:

Valid NODE TYPEs are:

1 = LEN end node (LEN EN)

2 = APPN end node (EN)

3 = APPN network node (NN)

4 = LEN end node (LEN SSCP)

Valid DLC TYPEs are:

1 = Token-ring attached

2 = SDLC attached

3 = S/370 channel-attached

6.6.2 Associated LUs

The Associated LUs panel is displayed if an X has been entered in the LUs field for a node on the Network Resources panel.

```
            ____________ Associated LUs ____________

     CPNAME       LUNAME     LUNAME     LUNAME     LUNAME      SERVING NN

   1 PS2COAX      PS2COAX [1]_______  _______    _______      CP31742_




  PF:  3=Quit  7=Back  12=Test Menu
```

Figure 178. Associated LUs

[1] PS2COAX LU is defined with the 3174-11R as the network node server.

6.7 COS Definitions

Modifying or deleting an IBM-supplied COS table, or creating new COS tables, should only be undertaken with careful planning for unique environments.

```
                   ____________ COS Definition ____________

   Enter the number of the COS Definition and the number of the
   definition to be used as a model.

   COS Definition Number - _ [1]      Model Definition Number - _ [2]
   (1-14)                             (0-14)

                  ----------Definition Numbers----------

               [3]  0. Clear Definition
               [4]  1. #BATCH__         8. _______
                    2. #BATCHSC         9. _______
                    3. #INTER__        10. _______
                    4. #INTERSC        11. _______
                    5. #CONNECT        12. _______
                    6. _______         13. _______
                    7. _______         14. _______

  When using models 1-5, IBM-supplied defaults will always be invoked.


  PF: 3=Quit                    8=Fwd
```

Figure 179. COS Definition

[1] The COS Definition Number is the COS table number you want to add or modify:

- If you enter a number from 1 to 5, you can modify one of the five IBM-supplied tables.
- If you enter a number from 6 to 14 and there is no name associated with that number, you can add a new COS table.
- If you enter a number from 6 to 14 and it is associated with a name, you can modify an existing user-defined COS table of that name.

2 You may choose to add a new COS table. To reduce the effort involved in creating a new table, the Model Definition Number allows you to select a table to be used as a model.

To add a new table using a model:

- Enter a COS Definition Number that is not associated with a name. This will be the COS Definition Number of the new table.
- Enter the Model Definition Number to be used as the model.

  If you enter 0 (Clear Definition) or leave it blank, then you will not be using a model; the definition screens that follow contain blank fields and you will have to enter all values required.

Notes:

1. If a COS Definition Number 1 to 5 is modeled on itself (that is, the COS Definition Number is the same as the Model Definition Number), a warning message that the existing values will be overwritten is displayed. This warning is provided to indicate that the IBM-supplied values will be presented and will replace all the values you have customized, if you continue by pressing Enter. If this is not desired, press PF3 to quit.
2. If a COS Definition Number 6 to 14 is modeled on itself, no warning message is displayed because the values you have customized will be presented.
3. If a COS Definition Number 1 to 14 is modeled on another COS Definition Number, a warning message that the existing values will be overwritten is displayed. This warning is provided to indicate that the values contained in the COS Definition Number table will be overwritten by values in the Model Definition Number table, if you continue by pressing Enter. If this is not desired, press PF3 to quit.
4. SNASVCMG and CPSVCMG are IBM reserved names and cannot be used as a COS table name or mode name.
5. If you modify an IBM-supplied COS table, you have actually modified *a copy* of the IBM-supplied table. This modified copy is then filed and used for routing calculations.

   When you select the same IBM-supplied table again, it will display the table with your customized values. To restore the IBM-supplied values, model the IBM-supplied table you have modified on itself.

3 Clear Definition presents you with definition screens that contain blank fields.

4 #BATCH is one of the five IBM-supplied COS tables. The IBM-supplied COS table names are the only names allowed to begin with a # character. You will not be able to enter this character in the COS name field; when you press the # key, nothing happens.

6.7.1 Mode/COS Correlation

The Mode/COS Correlation panel allows you to correlate a mode name with a particular COS table name. You can specify up to 14 mode/COS name correlations.

The first five mode names are automatically filled in and cannot be modified. The first four mode names are correlated to COS tables of the same name by

default. The fifth mode name **blank** is correlated to #CONNECT. You may specify a maximum of nine other mode names.

The mode name points to a set of parameters for LU-LU sessions. Each mode name also points to the COS table to be used. The mode name must be unique.

If a mode name is specified, the COS table name must also be specified. Similarly, if a COS table name is specified, a mode name must also be specified. You may have different mode names pointing to the same COS table, as shown in Figure 180. But the same mode name may not be used to point to the different COS tables.

```
                    Mode/COS Correlation

      Mode Name    #  COS Name          Mode Name    #  COS Name

      #BATCH__     _  #BATCH__          _______      _  _______
      #BATCHSC     _  #BATCHSC          _______      _  _______
      #INTER__     _  #INTER__          _______      _  _______
      #INTERSC     _  #INTERSC          _______      _  _______
      blank        _  #CONNECT          _______      _  _______
 5    QPCSUPP_     _  #CONNECT          _______      _  _______
      _______      _  _______          _______      _  _______

Define Mode/COS pairs.  To specify IBM-supplied COS names, place 1-5 in
the #-column.  1=#BATCH  2=#BATCHSC  3=#INTER  4=#INTERSC 5=#CONNECT


PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 180. Correlating Mode Names with COS Table Names

5 5250 emulation in OS/2 and AS/400 uses a mode named QPCSUPP by default. QPCSUPP is also mapped to the COS table #CONNECT in the AS/400 by default. Therefore, we have correlated QPCSUPP with the COS table named #CONNECT in the 3174, as shown in Figure 180. If this is not done, you will get an error message indicating session negotiation failure.

6.8 3174-Peer Definitions

The 3174 Peer Communication, referred to in the customizing panels as 3174-Peer Support, is separate and distinct from the APPN function. The 3174-Peer Support can be used as a means to allow coax-attached LEN nodes to connect to a token-ring APPN network.

The 3174-Peer Support provides a logical internal token-ring segment and a bridge to a real external token-ring segment. Each coax-attached PS/2 workstation appears to be attached to the internal token-ring.

In the customizing panel descriptions, the following terms are used:

- *3174-Peer device* refers to a coax-attached PS/2 workstation.
- *3174-Peer port* refers to the coax port to which a PS/2 workstation is attached.
- *3174-Peer bridge* refers to the internal bridge.
- *3174-Peer segment* refers to the internal token-ring segment.
- *Token-Ring segment* refers to the external token-ring segment.

Each 3174-Peer device can have a token-ring address:

- Specified as a DXML1MOD.SYS parameter in the CONFIG.SYS file or as the NETADDRESS parameter in the PROTOCOL.INI.
- Assigned by 3174-Peer Support according to its port number, with some portion of the address specified by the user

6.8.1 3174-Peer Definition Panel

The 3174-Peer Definition panels allow you to:

- Enable the internal token-ring segment.
- Enable the internal bridge function.
- Customize the internal bridge parameters.
- Enable LAN Manager support.
- Specify the middle six hexadecimal digits of the 3174-assigned token-ring address for the 3174-Peer devices.

```
                    _________ 3174-Peer Definition _________

3174-Peer Support

     650 - Y [1]     3174-Peer Support                    (Y,N)


  3174-Peer Options

     651 - Y [2]     Bridge Support                       (Y,N)
     652 - N         LAN Manager Support                  (Y,N)
     653 - Y         3174-Peer Online Test Updates        (Y,N)


  3174-Peer Station Parameters

     660 - 4000 3174 91 PN  3174-Peer Port Address Range    (0000 00 - FFFF FF)
     661 - 05               Percentage of Discard Threshold (00 - 99)



 PF: 3=Quit    4=Default    8=Fwd
```

Figure 181. Enabling 3174 Peer Communication Functions

[1] Question 650=1 enables the 3174 Peer Support.

[2] Question 651=1 enables the Bridge Support.

6.8.2 3174-Peer Bridge Profile

The 3174-Peer Bridge Profile panel allows you to specify parameters to be used by the internal bridge function. These parameters include:

- The internal bridge number
- The internal token-ring segment number
- The external token-ring segment number
- The number of hops over which a broadcast frame can cross
- Whether frames will be forwarded by the bridge
- Setting threshold for bridge congestion
- How long to wait before logging a congested bridge
- How long to wait before sending an alert about a congested bridge

```
                    3174-Peer Bridge Profile

     670 - 1        Bridge Number                 (0-F)
     671 - BB3      Token-Ring Segment Number     (001-FFF)
     672 - 741      3174-Peer Segment Number      (001-FFF)
     673 - 7        Token-Ring Hop Count          (1-7)
     674 - Y        Frame Forwarding Active       (Y,N)
     675 - 0010     Bridge Performance Threshold  (0000-9999)
                     (Frames Discarded Per 10,000)
     676 - 02 00    Logging Interval              (00-99 Hours 00-59 Minutes)
     677 - 010      Alert Threshold               (000-255)




PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 182. Parameters for the Internal Bridge Function

6.9 AS/400 Definitions

On the AS/400, we do the following:

- Specify the AS/400 network ID and control point name.
- Define the AS/400 node type.
- Define the local LU name.
- Define the connection from the AS/400 to the 3174-11R (Controller Description).

Note:

Defining the controller description is not necessary if you specify **Autocreate Controller :*Yes** on the AS/400 Line Description. We have done it here just to show the the matching of parameters and terminology between the AS/400 and the 3174.

6.9.1 Network Attributes

```
                        Display Network Attributes
                                                          System:   RALYAS4A
Current system name . . . . . . . . . . . . . . :   RALYAS4A
  Pending system name . . . . . . . . . . . . . :
Local network ID . . . . . . . . . . . . . . . :   USIBMRAA
Local control point name . . . . . . . . . . . :   RALYAS4A
Default local location . . . . . . . . . . . . :   RALYAS4A
Default mode . . . . . . . . . . . . . . . . . :   BLANK
APPN node type . . . . . . . . . . . . . . . . :   *NETNODE
Maximum number of intermediate sessions  . . . :   200
Route addition resistance  . . . . . . . . . . :   128
Server network ID/control point name . . . . . :
```

Figure 183. Network Attributes of the AS/400

6.9.2 Configuration Status

```
                        Work with Configuration Status                RALYAS4A

Opt  Description      Status               ------------Job----------
__   CP31742         VARIED ON
__     PS2COAX       VARIED ON
__
__
__
__
__
__
__
```

Figure 184. Configuration Status

6.9.3 Controller Description Screens (C31742)

```
                    Display Controller Description              RALYASYA
                                                          06/15/93  15:46:20
Controller description . . . . . :   C3174C2
Option . . . . . :   *BASIC
Category of controller . . . . . :   *HOST

Link type  . . . . . :   *LAN
Online at IPL  . . . . . :   *YES
Active switched line . . . . . :   *L31TR
Character code . . . . . :   *EBCDIC
Maximum frame size . . . . . :   521
Remote network identifier  . . . . :   USIBMRA
Remote control point . . . . . :   CP31742
Local exchange identifier. . . . . :   *LIND
Initial connection . . . . . :   *DIAL
Dial initiation. . . . . :   *LINKTYPE
Switched disconnect. . . . . :   *NO
LAN remote adapter address . . . . :   400031740002


Press Enter to continue
```

Figure 185. Controller Description (C31742) 1 of 4

```
                    Display Controller Description              RALYASYA
                                                          06/15/93  15:46:20
Controller description . . . . . :   C3174C2
Option . . . . . :   *SWLINST
Category of controller . . . . . :   *HOST



------------------- Switched  Lines --------------------

L31TR



Press Enter to continue
```

Figure 186. Controller Description (CP31742) 2 of 4

```
                    Display Controller Description              RALYASYA
                                                          06/15/93  15:46:20
Controller description . . . . . :   C3174C2
Option . . . . . :   *SWLINST
Category of controller . . . . . :   *HOST



------------------- Attached  Devices ------------------

PS2COAX



Press Enter to continue
```

Figure 187. Controller Description (CP31742) 3 of 4

```
                    Display Controller Description                  RALYASYA
                                                           06/15/93  15:46:20
Controller description . . . . . . :   CP31742
Option . . . . . . . . . . . . . . :   *APPN
Category of controller . . . . . . :   *HOST


APPN-capable . . . . . . . . . . . :   *YES
APPN CP session support  . . . . . :   *YES
APPN node type . . . . . . . . . . :   *NETNODE
APPN transmission group number . . :   1
APPN minimum switch status . . . . :   *VRYONPND
Autodelete device  . . . . . . . . :   1440
User-defined 1 . . . . . . . . . . :   *LIND
User-defined 2 . . . . . . . . . . :   *LIND
User-defined 3 . . . . . . . . . . :   *LIND


Press Enter to continue
```

Figure 188. Controller Description (CP31742) 4 of 4

6.9.4 Device Description Screens (PS2COAX)

```
                          Display Device Description              RALYASYA
                                                          06/15/93  15:46:20
 Device description . . . . . :   PS2COAX
 Option . . . . . :   *BASIC
 Category of device . . . . . :   *APPC

 Automatically created  . . . . . :   NO
 Remote location  . . . . . :   PS2COAX
 Online at IPL  . . . . . :   *NO
 Local location . . . . . :   RALYAS4A
 Remote network identifier  . . . . :   *NETATR
 Attached controller  . . . . . :   CP31742
 Message queue  . . . . . :   QSYSOPR
   Library  . . . . . :     *LIBL
 Local location address . . . . . :   00
 APPN-capable . . . . . :   *YES
 Single session:
   Single session capable . . . . . :   *NO
Text . . . . . :   AUTOMATICALLY CREATED BY QLUS
```

Figure 189. Device Description (PS2COAX) 1 of 2

```
                          Display Device Description              RALYASYA
                                                          06/15/93  15:46:20
 Device description . . . . . :   PS2COAX
 Option . . . . . :   *MODE
 Category of device . . . . . :   *APPC



 ---------------------------- Mode ----------------------

 *NETATR
```

Figure 190. Device Description (PS2COAX) 2 of 2

6.10 Communications Manager/2 Definitions for 5250 Emulation

On the PS/2, we run Communications Manager/2 and do the following:

- Communications Manager Installation/Setup
- Communication Setup
- Open Configuration
- Communication Manager Configuration Definition - 5250
- 5250 Emulation through Token-Ring
- Communication Setup Close

6.10.1 Communications Manager/2 Installation and Setup

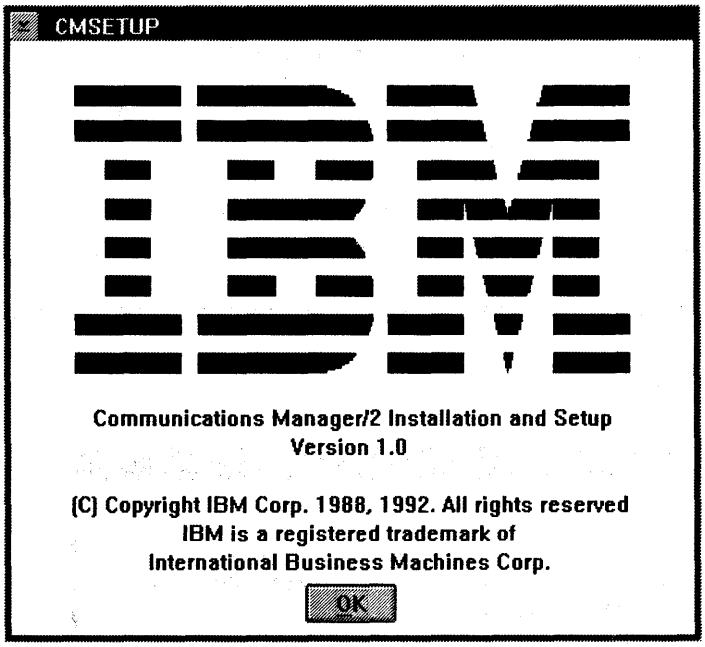


Figure 191. Communications Manager/2 Installation and Setup

To initiate setup you will have to either click on the CMSETUP Icon if Communications Manager/2 is already installed, or enter *cmsetup* from the command prompt if this is the initial installation (see *Communications Manager/2 Installation Guide* for details).

6.10.2 Communications Manager Setup

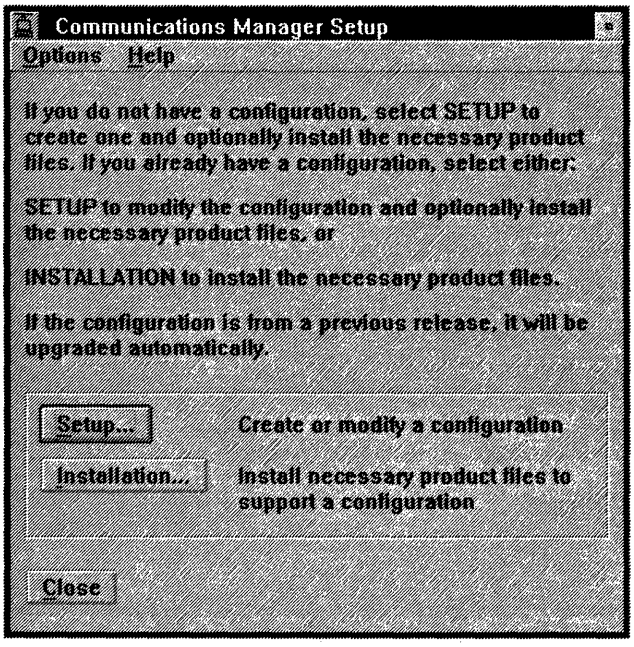


Figure 192. Communications Manager Setup

Select **Setup...** to create or modify a configuration definition.

6.10.3 Open Configuration

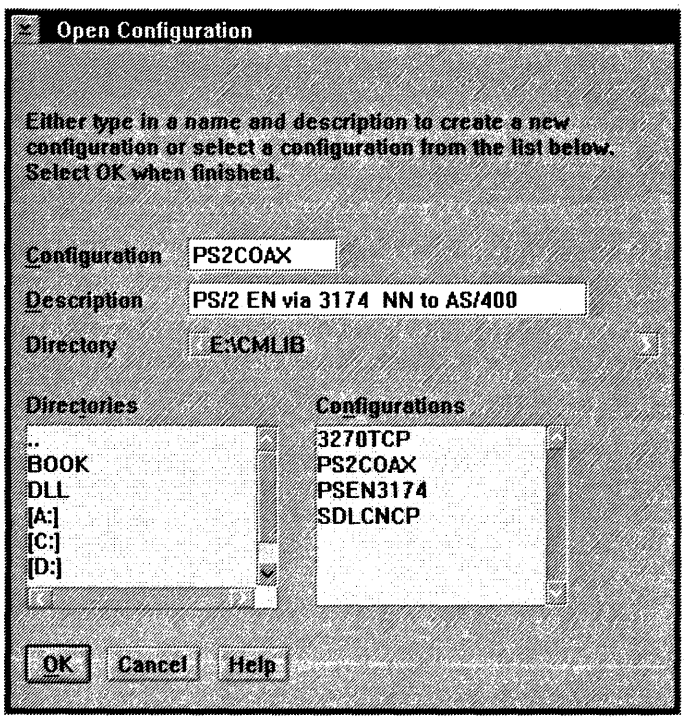


Figure 193. Open Configuration

1. Enter a configuration name.

2. Enter a description of the configuration for documentation purposes.

   Then you will be asked, **Will this configuration be used for this workstation**; press the **Yes** key and continue with the next step.

3. Press the **OK** key to get the panel shown in Figure 194

6.10.4 Communications Manager Configuration Definition-PSEN3174

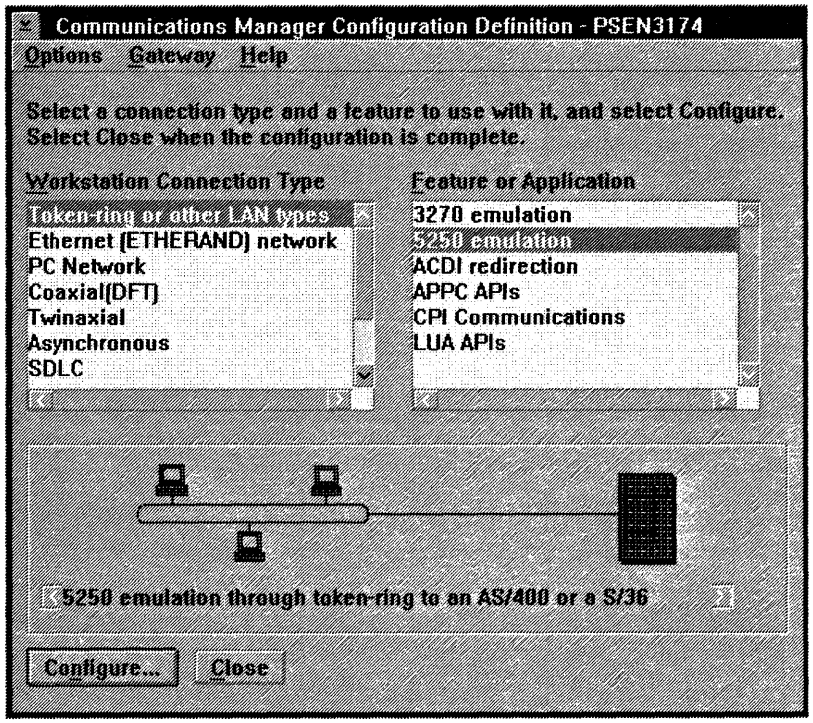


Figure 194. Communications Manager/2 Configuration Definition for 5250 Emulation

Here we define the logical connection from Communications Manager/2 to the AS/400.

- Select **Token-ring or other LAN types**.
- Select **5250 emulation**.
- Press the **Configure** push button to get the **Communications Manager Profile List Sheet** shown in Figure 195 on page 185.

6.10.5 Communications Manager Profile List Sheet

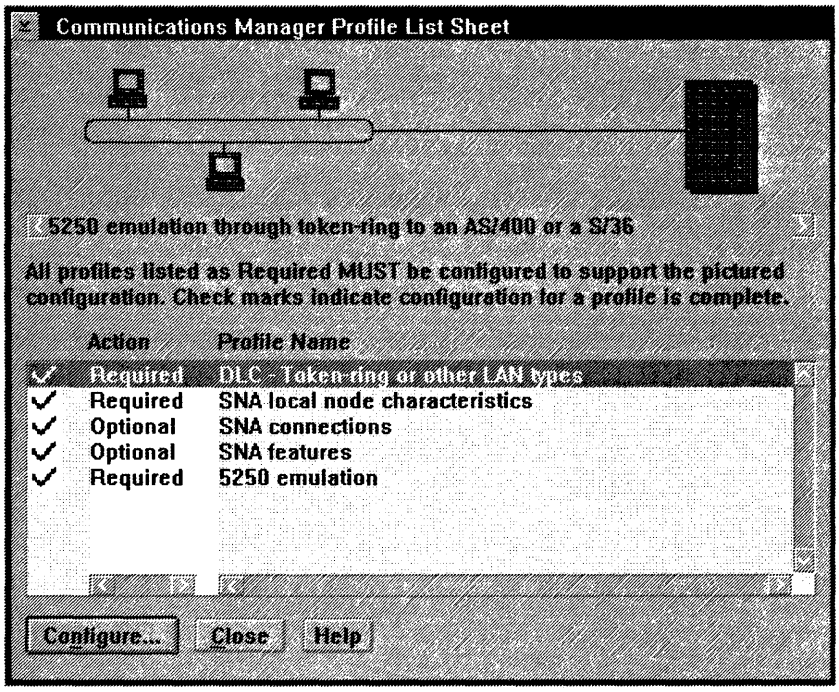


Figure 195. Communications Manager Profile List Sheet

In the **Action** and **Profile Name** fields, you select your needed profiles for configuration.

6.10.6 Token-Ring or Other LAN Types DLC Adapter Parameters

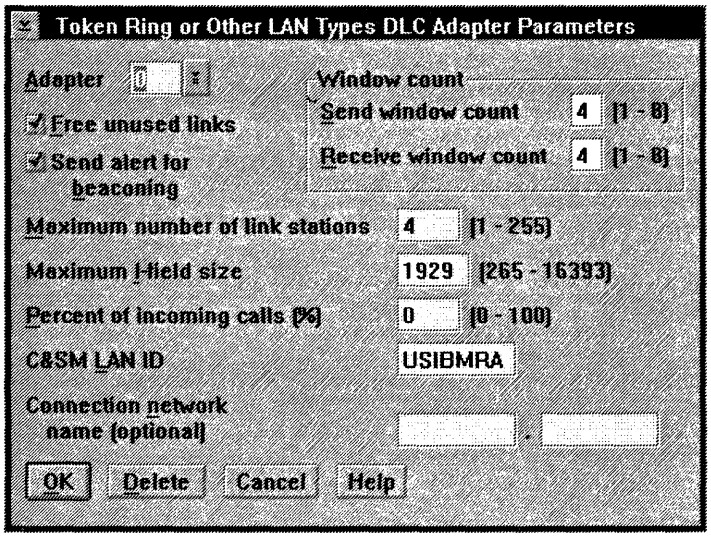


Figure 196. Token-Ring or Other LAN Types DLC Adapter Parameters

Here you select the adapter, window counts, I-field size and other SNA DLC information.

Note: Using this DLC requires that you have an appropriately installed and configured LAPS.

6.10.7 Local Node Characteristics

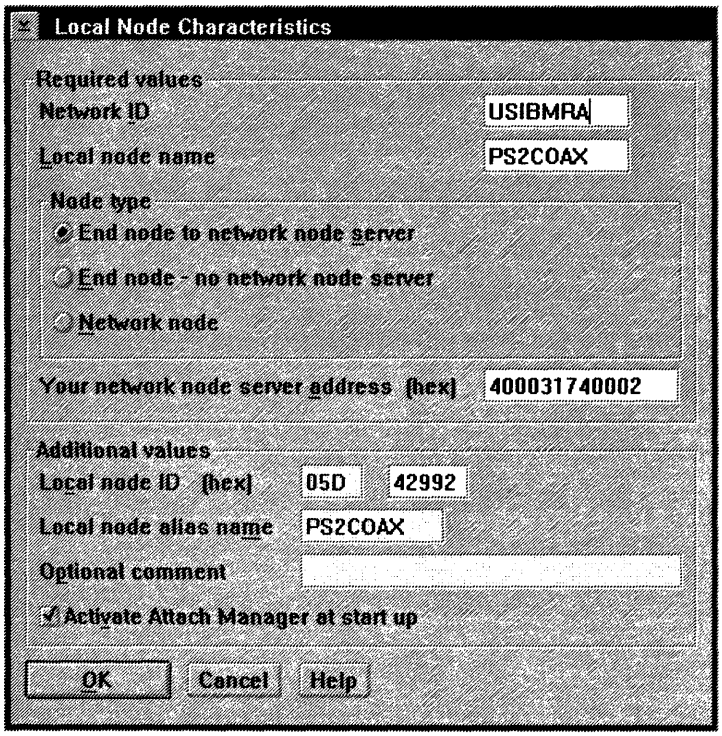


Figure 197. Local Node Characteristics

This panel is displayed if you select **SNA local node characteristics** shown in Figure 195 on page 185. This profile provides the base SNA information such as network ID, local node name, type of node (EN or NN) and your node ID.

6.10.8 SNA Features List

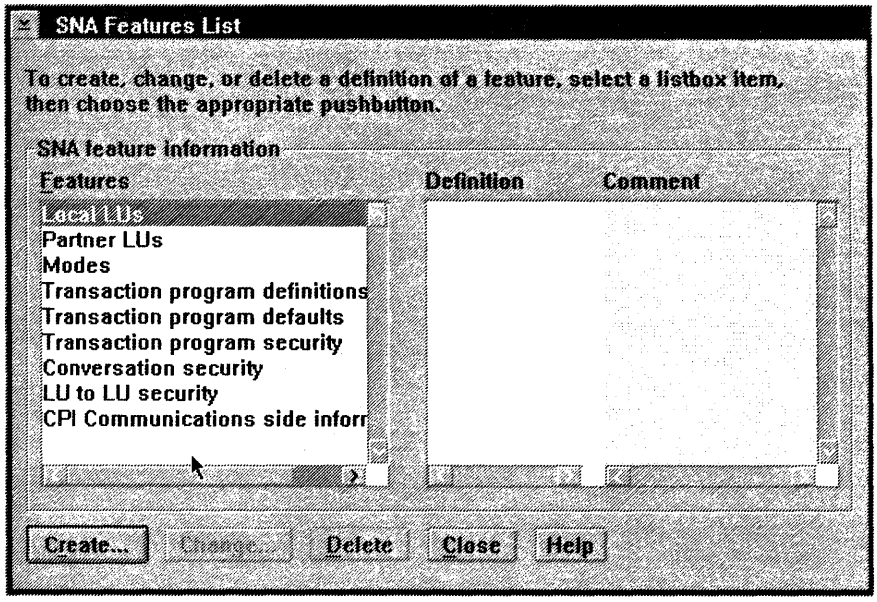


Figure 198. SNA Features List

On the SNA Features List panel, you get a list of the available features. All of the LU6.2 information is provided from this window.

If you select **5250 emulation** in Figure 195 on page 185, you get the screen shown in Figure 199.

6.10.9 5250 Emulation

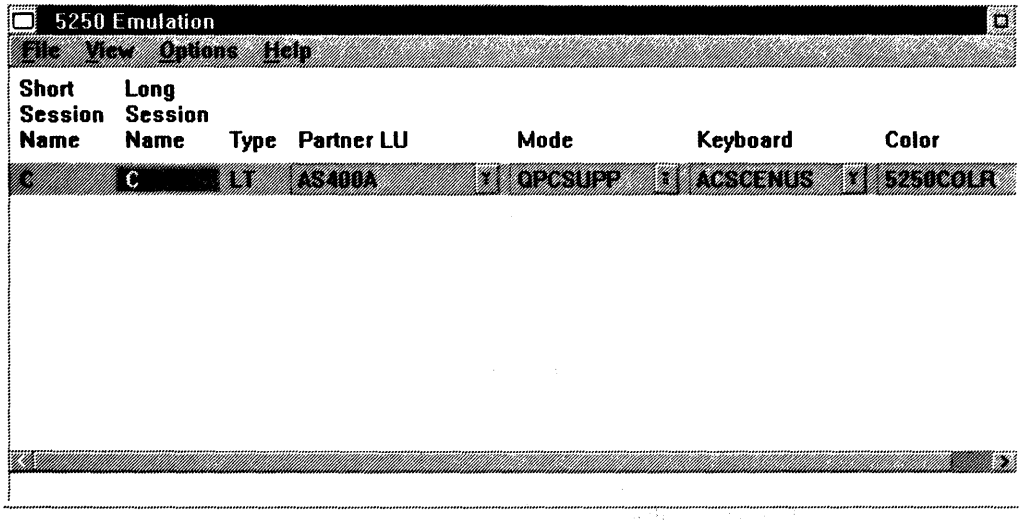


Figure 199. 5250 Emulation

Here you can select, create or modify keyboard and color profiles This screen allows you to complete the customization of 5250 emulation.

If your configuration requires additional installation, see *Communications Manager/2 Configuration Guide*, SC31-6171, for further information.

6.11 LAN Adapter and Protocol Support

In LAN Adapter and Protocol Support, we do the following:

- Configure LAN transports
- Configure workstation
- Define network adapter address.

6.11.1 LAN Adapter and Protocol Support

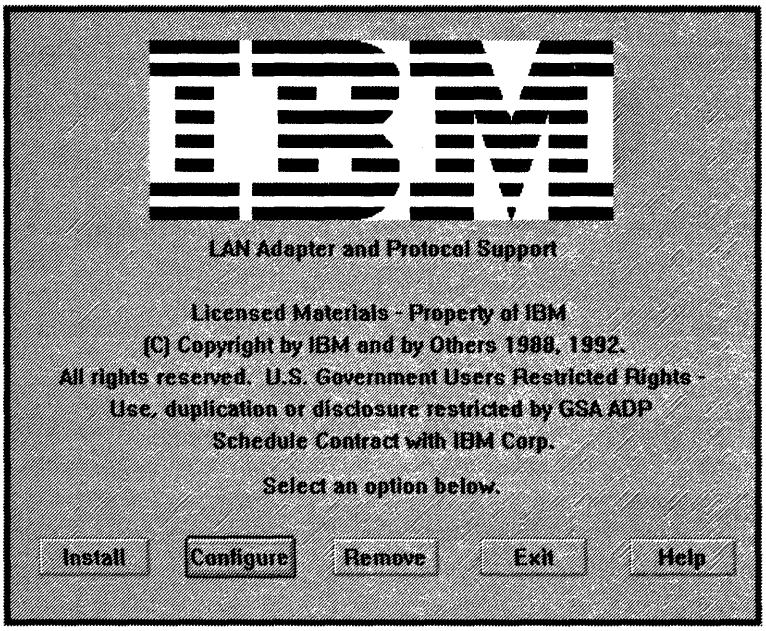


Figure 200. LAN Adapter and Protocol Support

Select **Configure** to proceed to Figure 201.

6.11.2 Configure LAN Transports

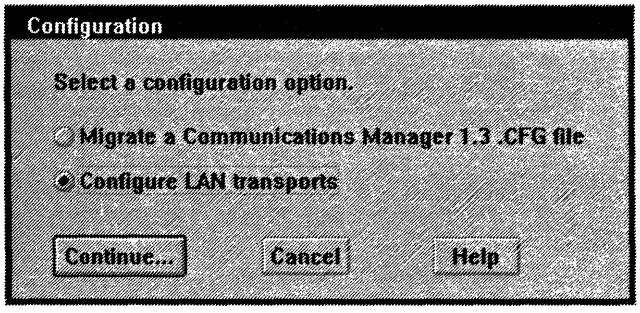


Figure 201. Configure LAN Transports

Select **Continue** to proceed to Figure 202 on page 189.

6.11.3 Configure Workstation

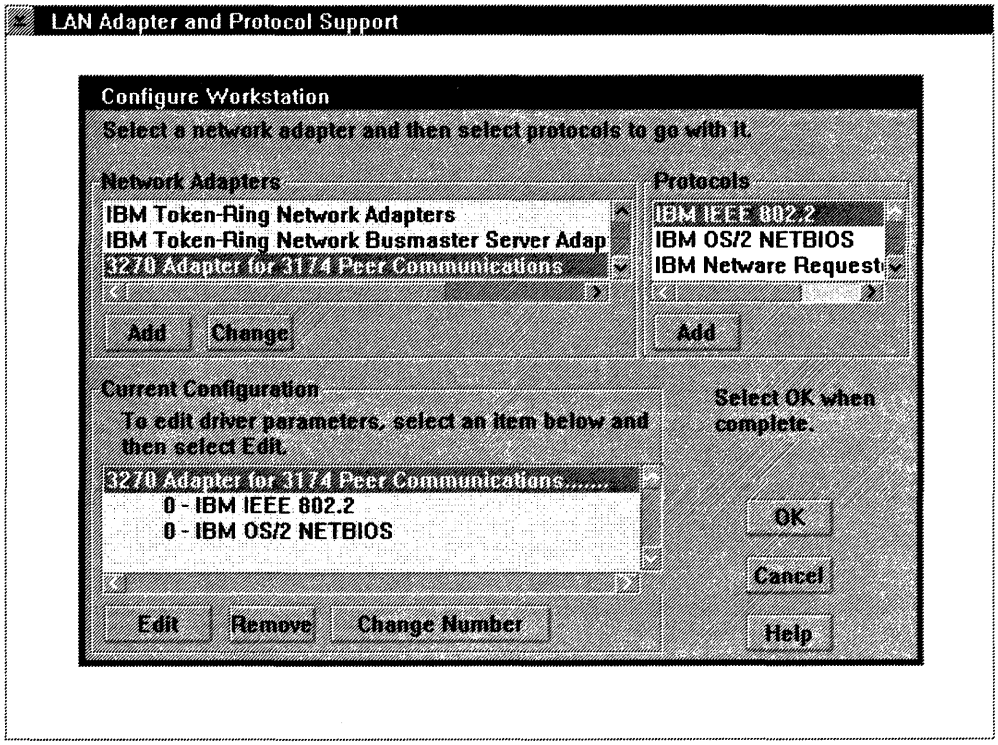


Figure 202. Configure Workstation

1. Select **3270 Adapter for 3174 Peer Communications**.
2. Press the **OK** key to get to the panel shown in Figure 203

6.11.4 Parameters for 3270 Adapter for 3174 Peer Communications

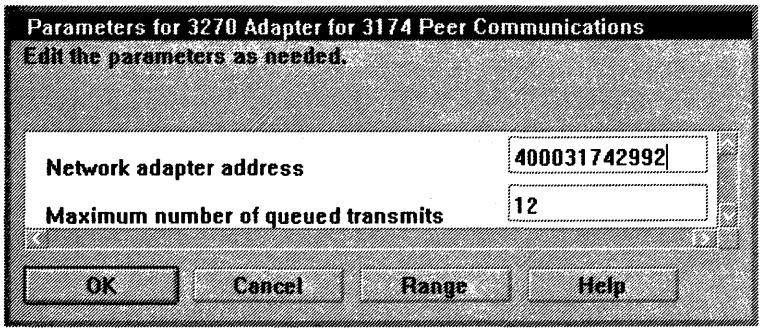


Figure 203. Network Adapter Address

1. Enter the PS/2 network adapter address.
2. Press the **OK** key to get the panel shown in Figure 204 on page 190; note that your CONFIG.SYS file is updated at the same time.

6.11.5 LAN Adapter and Protocol Support

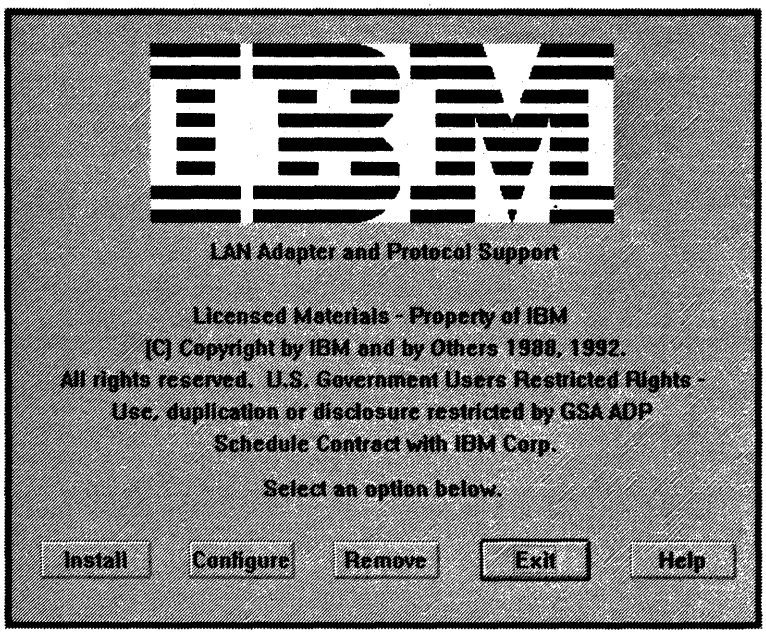


Figure 204. LAN Adapter and Protocol Support

Select **Exit** to end the LAN Adapter and Protocol Support process.

6.11.6 3174-11R Online Display

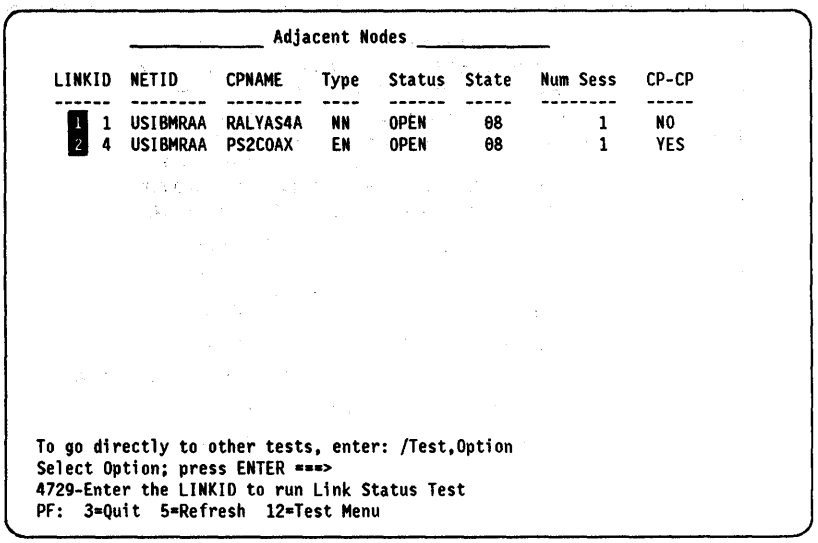


Figure 205. Display of Nodes Adjacent to the 3174-11R.

1 There is one session from the 3174-11R to the network node (RALYAS4A), but no CP-CP session exist

2 Shows one session from the 3174-11R (CP3174) to the end node PS2COAX and that CP-CP sessions exist between CP3174 and PS2COAX

6.12 VTAM Definition List

This VTAM definition list shows you the PU/LU specifications for the PU addresses C1 to C8 which are customized on our 3174.

```
NCPOPT   OPTIONS NEWDEFN=(YES,ECHO,NOSUPP),USERGEN=(FNMNDFGN)
*********************************************************************
*        PCCU MACRO - VTAM THAT WILL ACTIVATE THIS NCP               *
*********************************************************************
VTAMV321 PCCU CUADDR=930,          SA20 WTCOS MVS/XA.          *AK*  *
              AUTODMP=NO,          ONLY ONE AUTODMP-HOST IF TWINTAIL  *
              AUTOIPL=NO,          ONLY ONE AUTOIPL-HOST IF TWINTAIL  *
              AUTOSYN=YES,         USE THE ALREADY LOADED NCP IF OK   *
              BACKUP=YES,          RESOURCE TAKEOVER PERMITTED        *
              CHANCON=COND,        CONDITIONAL CONTACT REQ. TO NCP SENT*
              DUMPDS=NCPDUMP,      DUMP DATASET                       *
              MDUMPDS=NCPDMOSS,    MOSS DUMP DATASET                  *
              CDUMPDS=NCPDCSP,     SCANNER DUMP DATASET               *
              MAXDATA=5000,                                           *
              OWNER=M25,                                              *
              VFYLM=YES,           VERIFY LMOD WHEN LOADING           *
              SUBAREA=25           WTCXA MVS/XA VTAM V3R1.1
*********************************************************************
*        PCCU MACRO - VTAM 03 WILL ACTIVATE THIS NCP                 *
*********************************************************************
VTAM03   PCCU AUTODMP=NO,          ONLY ONE AUTODMP-HOST IF TWINTAIL  *
              AUTOIPL=NO,          ONLY ONE AUTOIPL-HOST IF TWINTAIL  *
              AUTOSYN=YES,         USE THE ALREADY LOADED NCP IF OK   *
              BACKUP=YES,          RESOURCE TAKEOVER PERMITTED        *
              CHANCON=COND,        CONDITIONAL CONTACT REQ. TO NCP SENT*
              DUMPDS=NCPDUMP,      DUMP DATASET                       *
              MDUMPDS=NCPDMOSS,    MOSS DUMP DATASET                  *
              CDUMPDS=NCPDCSP,     SCANNER DUMP DATASET               *
              MAXDATA=5000,                                           *
              OWNER=M25,                                              *
              VFYLM=YES,           VERIFY LMOD WHEN LOADING           *
              SUBAREA=03           WTCXA MVS/XA VTAM V3R1.1
*********************************************************************
*        BUILD MACRO - NCP/CONTROLER INFORMATION                     *
*********************************************************************
         BUILD BFRS=(240),           NCP BUFFER SIZE                  *
               ADDSESS=300,       ALLOCATED SESSION CONTROL BLOCKS T2.1 *
               AUXADDR=300,       EXTRA ADDR. FOR ILU ACT AS PLU   T2.1 *
               MEMSIZE=4M,          4M TO USE                          *
               BRANCH=8000,         BRANCH TRACE ENTRIES               *
               CATRACE=(YES,100),             CHANNEL ADAPTER TRACE    *
               CWALL=26,            MIN. BUFFERS BEFORE SLOWDOWN       *
               DSABLTO=6.5,                                            *
               ENABLTO=6.5,         IBM 386X REQUIRE 6.5 AS MINIMUM    *
               ERLIMIT=16,                                             *
               LTRACE=4,            SIT FOR 4 LINES                    *
               LOADLIB=NCPLOAD,     NCP LOAD MODULE LIBRARY            *
               MAXSSCP=8,           8 SSCP'S CAN ACTIVATE THIS NCP     *
               MAXSESS=5000,        MAX NUMBER OF SESSIONS FOR ILU     *
               MLTGORDR=MLTGPRI,    USE MLTGS IN ORDER OF PRIORITY     *
               MODEL=3745-61A,      3745 COMMUNICATION CONTROLLER      *
               NAMTAB=50,           MAX NUMBER SSCP,NETWORKS,CP T2.1   *
               NETID=USIBMRA,       REQUIRED                           *
               NPA=(YES,DR),                                           *
```

```
               NEWNAME=RA6NCSF,    NAME OF THIS LOAD MODULE     *AK*   *
               NUMHSAS=6,          6 HOSTS MAY COMMUNICATE CONCURRENTLY*
               PUNAME=RA6NCSF,     NAME OF THIS PU              *AK*   *
               SUBAREA=06,         SUBAREA ADDRESS = 06                *
               TRACE=(YES,64),     64 ADDRESS-TRACE ENTRIES            *
               TYPGEN=NCP,         NCP ONLY                            *
               TYPSYS=MVS,         MVS OPERATING SYSTEM                *
               USGTIER=5,          NCP USAGE TIER                      *
               VERSION=V6R2F       NDF VERSION INDICATOR
*************************************************************************
*        PATH SPECIFICATIONS                                            *
*************************************************************************
RA6NCP NCPPATH    NETID=USIBMRA
         PATH DESTSA=3,                                                 *
               ER0=(9,6),                                               *
               ER1=(9,6),                                               *
               ER2=(9,6),                                               *
               ER3=(9,6),                                               *
               ER4=(9,6),                                               *
               ER5=(9,6),                                               *
               VR0=2,                                                   *
               VRPWS00=(1,30),VRPWS01=(1,30),VRPWS02=(1,30),            *
               VR1=0,                                                   *
               VRPWS10=(1,30),VRPWS11=(1,30),VRPWS12=(1,30),            *
               VR2=1,                                                   *
               VRPWS20=(1,30),VRPWS21=(1,30),VRPWS22=(1,30)
*************************************************************************
*        LINE MACRO SPECIFICATION                                       *
*************************************************************************
L06143   LINE ADDRESS=(143,FULL),   FULL DUPLEX                         *
               ANS=CONTINUE,       DON'T BREAK CROSS DOMAIN SESSIONS    *
               GP3174=AE,                                               *
               CLOCKNG=EXT,        DTE CABLE 7837395 ATTACHED           *
               ISTATUS=ACTIVE,                                          *
               DUPLEX=(FULL),      REQUEST TO SEND ALWAYS UP            *
               ETRATIO=30,         DEFAULT                              *
               MAXPU=20,           ALLOW NO MORE THAN 9 PUS ON LINE     *
               SERVLIM=10,                                              *
               SPEED=9600,         NPA AND SCANNER USE       ####       *
               SRT=(,64)
*              STATOPT=('3174 GW LINE')
*************************************************************************
*        SERVICE MACRO SPECIFICATION FOR SDLC (LINE 143)                *
*************************************************************************
         SERVICE ORDER=(P06143A,P06143B,P06143C,P06143D,P06143E,        *
               P06143F,P06143G,P06143H,P06143I,P06143J,P06143K,P06143L,*
               P06143M,P06143N,P06143O,P06143P,P06143Q,P06143R,P06143S,*
               P06143T),MAXLIST=20
*************************************************************************
*       PU/LU SPECIFICATIONS                                            *
*************************************************************************
P06143A  PU ADDR=C1,                 CLUSTER ADDRESS = 01               *
               MAXDATA=265,          MAXIMUM AMOUNT OF DATA             *
               MAXOUT=7,             MAX SDLC FRAMES BEFORE RESPONSE    *
               PACING=0,             PACING SET BY BIND IMAGE           *
               PASSLIM=8,                                               *
               PUDR=YES,                                                *
               PUTYPE=2,                                                *
               RETRIES=(,4,5),       7 RETRY PER SECOND FOR 5 TIMES     *
```

```
                DISCNT=(NO),          (V) VTAM                          *
                ISTATUS=ACTIVE,       (V) VTAM                          *
                SSCPFM=USSSCS,        (V) VTAM                          *
                USSTAB=US327X,        (V) VTAM                          *
                VPACING=0             (V) VTAM
*               STATOPT=('3174',NOACTY)
T06143A1 LU LOCADDR=2,                FIRST LU MUST BE LOCADDR=2        *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE        (V) VTAM
T06143A2 LU LOCADDR=3,                                                  *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE        (V) VTAM
T06143A3 LU LOCADDR=4,                                                  *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE        (V) VTAM
T06143A4 LU LOCADDR=5,                                                  *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE        (V) VTAM
P06143B  PU ADDR=C2,                  CLUSTER ADDRESS = 02              *
                MAXDATA=265,          MAXIMUM AMOUNT OF DATA            *
                MAXOUT=7,             MAX SDLC FRAMES BEFORE RESPONSE   *
                PACING=0,             PACING SET BY BIND IMAGE          *
                PASSLIM=8,                                              *
                PUDR=YES,                                               *
                PUTYPE=2,                                               *
                RETRIES=(,4,5),       7 RETRY PER SECOND FOR 5 TIMES    *
                DISCNT=(NO),          (V) VTAM                          *
                ISTATUS=ACTIVE,       (V) VTAM                          *
                SSCPFM=USSSCS,        (V) VTAM                          *
                USSTAB=US327X,        (V) VTAM                          *
                VPACING=0             (V) VTAM
*               STATOPT=('3174',NOACTY)
T06143B1 LU LOCADDR=2,                FIRST LU MUST BE LOCADDR=2        *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE        (V) VTAM
T06143B2 LU LOCADDR=3,                                                  *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE        (V) VTAM
T06143B3 LU LOCADDR=4,                                                  *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE        (V) VTAM
T06143B4 LU LOCADDR=5,                                                  *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE        (V) VTAM
P06143C  PU ADDR=C3,                  CLUSTER ADDRESS = 03              *
                MAXDATA=265,          MAXIMUM AMOUNT OF DATA            *
                MAXOUT=7,             MAX SDLC FRAMES BEFORE RESPONSE   *
                PACING=0,             PACING SET BY BIND IMAGE          *
                PASSLIM=8,                                              *
                PUDR=YES,                                               *
                PUTYPE=2,                                               *
                RETRIES=(,4,5),       7 RETRY PER SECOND FOR 5 TIMES    *
                DISCNT=(NO),          (V) VTAM                          *
                ISTATUS=ACTIVE,       (V) VTAM                          *
                SSCPFM=USSSCS,        (V) VTAM                          *
                USSTAB=US327X,        (V) VTAM                          *
                VPACING=0             (V) VTAM
*               STATOPT=('3174',NOACTY)
T06143C1 LU LOCADDR=2,                FIRST LU MUST BE LOCADDR=2        *
```

```
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE      (V) VTAM
T06143C2 LU LOCADDR=3,                                                  *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE      (V) VTAM
T06143C3 LU LOCADDR=4,                                                  *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE      (V) VTAM
T06143C4 LU LOCADDR=5,                                                  *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE      (V) VTAM
P06143D  PU ADDR=C4,                CLUSTER ADDRESS = 04                *
                MAXDATA=265,        MAXIMUM AMOUNT OF DATA              *
                MAXOUT=7,           MAX SDLC FRAMES BEFORE RESPONSE     *
                PACING=0,           PACING SET BY BIND IMAGE            *
                PASSLIM=8,                                              *
                PUDR=YES,                                               *
                PUTYPE=2,                                               *
                RETRIES=(,4,5),     7 RETRY PER SECOND FOR 5 TIMES      *
                DISCNT=(NO),        (V) VTAM                            *
                ISTATUS=ACTIVE,     (V) VTAM                            *
                SSCPFM=USSSCS,      (V) VTAM                            *
                USSTAB=US327X,      (V) VTAM                            *
                VPACING=0           (V) VTAM
*               STATOPT=('3174',NOACTY)
T06143D1 LU LOCADDR=2,              FIRST LU MUST BE LOCADDR=2          *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE      (V) VTAM
T06143D2 LU LOCADDR=3,                                                  *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE      (V) VTAM
T06143D3 LU LOCADDR=4,                                                  *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE      (V) VTAM
T06143D4 LU LOCADDR=5,                                                  *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE      (V) VTAM
P06143E  PU ADDR=C5,                CLUSTER ADDRESS = 05                *
                MAXDATA=265,        MAXIMUM AMOUNT OF DATA              *
                MAXOUT=7,           MAX SDLC FRAMES BEFORE RESPONSE     *
                PACING=0,           PACING SET BY BIND IMAGE            *
                PASSLIM=8,                                              *
                PUDR=YES,                                               *
                PUTYPE=2,                                               *
                RETRIES=(,4,5),     7 RETRY PER SECOND FOR 5 TIMES      *
                DISCNT=(NO),        (V) VTAM                            *
                ISTATUS=ACTIVE,     (V) VTAM                            *
                SSCPFM=USSSCS,      (V) VTAM                            *
                USSTAB=US327X,      (V) VTAM                            *
                VPACING=0           (V) VTAM
*               STATOPT=('3174',NOACTY)
T06143E1 LU LOCADDR=2,              FIRST LU MUST BE LOCADDR=2          *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE      (V) VTAM
T06143E2 LU LOCADDR=3,                                                  *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE      (V) VTAM
T06143E3 LU LOCADDR=4,                                                  *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
```

```
                ISTATUS=ACTIVE      (V) VTAM
T06143E4 LU LOCADDR=5,                                                  *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE      (V) VTAM
P06143F  PU ADDR=C6,                CLUSTER ADDRESS = 06                *
                MAXDATA=265,        MAXIMUM AMOUNT OF DATA              *
                MAXOUT=7,           MAX SDLC FRAMES BEFORE RESPONSE     *
                PACING=0,           PACING SET BY BIND IMAGE            *
                PASSLIM=8,                                              *
                PUDR=YES,                                               *
                PUTYPE=2,                                               *
                RETRIES=(,4,5),     7 RETRY PER SECOND FOR 5 TIMES      *
                DISCNT=(NO),        (V) VTAM                            *
                ISTATUS=ACTIVE,     (V) VTAM                            *
                SSCPFM=USSSCS,      (V) VTAM                            *
                USSTAB=US327X,      (V) VTAM                            *
                VPACING=0           (V) VTAM
*               STATOPT=('3174',NOACTY)
T06143F1 LU LOCADDR=2,              FIRST LU MUST BE LOCADDR=2          *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE      (V) VTAM
T06143F2 LU LOCADDR=3,                                                  *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE      (V) VTAM
T06143F3 LU LOCADDR=4,                                                  *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE      (V) VTAM
T06143F4 LU LOCADDR=5,                                                  *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE      (V) VTAM
P06143G  PU ADDR=C7,                CLUSTER ADDRESS = 07                *
                MAXDATA=265,        MAXIMUM AMOUNT OF DATA              *
                MAXOUT=7,           MAX SDLC FRAMES BEFORE RESPONSE     *
                PACING=0,           PACING SET BY BIND IMAGE            *
                PASSLIM=8,                                              *
                PUDR=YES,                                               *
                PUTYPE=2,                                               *
                RETRIES=(,4,5),     7 RETRY PER SECOND FOR 5 TIMES      *
                DISCNT=(NO),        (V) VTAM                            *
                ISTATUS=ACTIVE,     (V) VTAM                            *
                SSCPFM=USSSCS,      (V) VTAM                            *
                USSTAB=US327X,      (V) VTAM                            *
                VPACING=0           (V) VTAM
*               STATOPT=('3174',NOACTY)
T06143G1 LU LOCADDR=2,              FIRST LU MUST BE LOCADDR=2          *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE      (V) VTAM
T06143G2 LU LOCADDR=3,                                                  *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE      (V) VTAM
T06143G3 LU LOCADDR=4,                                                  *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE      (V) VTAM
T06143G4 LU LOCADDR=5,                                                  *
                MODETAB=MODEVR,DLOGMOD=VR03270,                         *
                ISTATUS=ACTIVE      (V) VTAM
P06143H  PU ADDR=C8,                CLUSTER ADDRESS = 08                *
                MAXDATA=265,        MAXIMUM AMOUNT OF DATA              *
                MAXOUT=7,           MAX SDLC FRAMES BEFORE RESPONSE     *
```

```
                PACING=0,           PACING SET BY BIND IMAGE          *
                PASSLIM=8,                                            *
                PUDR=YES,                                             *
                PUTYPE=2,                                             *
                RETRIES=(,4,5),     7 RETRY PER SECOND FOR 5 TIMES    *
                DISCNT=(NO),        (V) VTAM                          *
                ISTATUS=ACTIVE,     (V) VTAM                          *
                SSCPFM=USSSCS,      (V) VTAM                          *
                USSTAB=US327X,      (V) VTAM                          *
                VPACING=0           (V) VTAM
*               STATOPT=('3174',NOACTY)
T06143H1 LU LOCADDR=2,              FIRST LU MUST BE LOCADDR=2        *
                MODETAB=MODEVR,DLOGMOD=VR03270,                       *
                ISTATUS=ACTIVE      (V) VTAM
T06143H2 LU LOCADDR=3,                                                *
                MODETAB=MODEVR,DLOGMOD=VR03270,                       *
                ISTATUS=ACTIVE      (V) VTAM
T06143H3 LU LOCADDR=4,                                                *
                MODETAB=MODEVR,DLOGMOD=VR03270,                       *
                ISTATUS=ACTIVE      (V) VTAM
T06143H4 LU LOCADDR=5,                                                *
                MODETAB=MODEVR,DLOGMOD=VR03270,                       *
                ISTATUS=ACTIVE      (V) VTAM
        GENEND INIT=ECLINIT,                                          *
                TMRTICK=ECLTICK,                                      *
                UGLOBAL=ECLUGBL
```

6.13 3174 TCP/IP Definitions

6.13.1 AEA And TCP/IP Configure

```
              _______ AEA and TCP/IP Configure _______

    700 - 0 1 [1]

    702 - 1   [2]

    703 - 0

    710 - 00000000     711 - 00000000     712 - 00000000     713 - 00000000




  PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 206. AEA and TCP/IP Configure Panel

1 Question 700 allows enabling of the AEA and TCP/IP capability. For our example, we have customized for TCP/IP capability.

2 Question 702 allows you to specify the control key when using ASCII emulation:

- 0=Use the Alt key
- 1=Use the Ctrl key (default response)

If you have never used the AEA feature before, use the default value.

6.13.2 Defining Port Set

```
                  __________ Port Set __________
         Name          Session    Port      Modem          Password
                        Limit     Type      Type

   1 = 3270DISP [1]      5         1 [2]      _            _______
   2 = _______           _         _          _            _______
   3 = _______           _         _          _            _______
   4 = _______           _         _          _            _______
   5 = _______           _         _          _            _______
   6 = _______           _         _          _            _______
   7 = _______           _         _          _            _______
   8 = _______           _         _          _            _______
   9 = _______           _         _          _            _______
  10 = _______           _         _          _            _______
  11 = _______           _         _          _            _______
  12 = _______           _         _          _            _______
  13 = _______           _         _          _            _______
  14 = _______           _         _          _            _______
  15 = _______           _         _          _            _______
  16 = _______           _         _          _            _______


  PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 207. Port Set Panel

1 Enter **3270DISP** in the Name field.

2 Enter a 1 in the Port Type field for 3270 displays. This allows your 3270 display defined to port set 1 to access the TCP/IP destination.

6.13.3 Mapping Port To Port Set

```
                 ________ Port to Port Set Map ________
                                                          Page 01 of 03
  Type the port set number to group the 3174 ports

   3270 Ports        0   1   2   3   4   5   6   7
   26-00 to 26-07    1_  1_  1_  1_  1_  1_  1_  1_  [1]
   26-08 to 26-15    _   _   _   _   _   _   _   _
   26-16 to 26-23    _   _   _   _   _   _   _   _
   26-24 to 26-31    _   _   _   _   _   _   _   _



   Port Sets
   1 = 3270DISP       2 =                3 =                4 =
   5 =                6 =                7 =                8 =
   9 =               10 =               11 =               12 =
  13 =               14 =               15 =               16 =


 PF: 3=Quit    4=Default    7=Back    8=Fwd    10=PageBack   11=PageFwd
```

Figure 208. Port To Port Set Map Panel

1 You should use this panel to assign coax ports to the port set, named 3270DISP, that you have defined in the Port Set panel. Enter the port set number for each port that you wish to use the 3174 TCP/IP TELNET function.

6.13.4 Defining 3270 Host and Display Station Sets

```
                 _______ AEA and TCP/IP Station Set _______

 [1]1  721 - 3270 HOST_____________  722 - 3H[3] 723 - _______ 725 - 1
       731 - 1    732 - 1    733 - 0    734 - _   735 - 0  736 - 1  737 - _
       741 - 000  742 - 015  743 - 1  744 - 0  745 - 0  746 - 0 0
       751 - _    752 - ________________________________________
        761 - 1    762 - 1    763 - 1    764 - 1  765 - 0
        771 - 1    772 - 1    773 - 1    774 - 1   775 - 1  776 - 1
       781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
       790 - 000 . 000 . 000 . 000

 [2]2  721 - 3270 DISPLAY__________  722 - 3D[4] 723 - 3270DISP 725 - 1
       731 - 1    732 - 1    733 - 0    734 - _   735 - 0  736 - 1  737 - _
       741 - 000  742 - 015  743 - 1  744 - 0  745 - 0  746 - 0 0
       751 - _    752 - ________________________________________
        761 - 1    762 - 1    763 - 1    764 - 1  765 - 0
        771 - 1    772 - 1    773 - 1    774 - 1   775 - 1  776 - 1
       781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
       790 - 000 . 000 . 000 . 000


 PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 209. AEA and TCP/IP Station Set Panel (1 of 2)

1 Is the station set name for the 3270 host.

2 Is the station set name for the 3270 displays.

Whatever name you enter here will be displayed on the Connection Menu as a possible destination for the LT.

3 Enter 3H as the station type for the 3270 host.

4 Enter 3D as the station type for 3270 displays.

You will also need to define station sets for TCP/IP access (see 6.13.5, "Defining TCP/IP Station Sets").

For detailed information about defining TCP/IP station sets, see 3.9, "Customizing 3174 TCP/IP Telnet Support" on page 24.

6.13.5 Defining TCP/IP Station Sets

```
                    _______ AEA and TCP/IP Station Set _______

1 3  721 - TELNET VT100  ______  2 722 - TH  723 - ______      725 - 1
     731 - 1    732 - 1    733 - 0   734 - _    735 - 0  736 - 1  737 - _
     741 - 000  742 - 015  743 - 1  744 - 0  745 - 0  746 - 0 0
3    751 - 1    752 - _____________________________________
      761 - 1   762 - 1    763 - 0   764 - 1  765 - 0
      771 - 1   772 - 1    773 - 1   774 - 1   775 - 1  776 - 1
     781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
     790 - 000 . 000 . 000 . 000

1 4  721 - TELNET VT220 8 BIT___ 2 722 - TH  723 - ______      725 - 1
     731 - 1    732 - 1    733 - 0   734 - _    735 - 0  736 - 1  737 -
     741 - 000  742 - 015  743 - 1  744 - 0  745 - 0  746 - 0 0
3    751 - 4    752 - _____________________________________
      761 - 1   762 - 1    763 - 1   764 - 1  765 - 0
      771 - 1   772 - 1    773 - 1   774 - 1   775 - 1  776 - 1
     781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
     790 - 000 . 000 . 000 . 000


All responses are correct
PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 210. AEA and TCP/IP Station Set Panel (2 of 2)

To define each station set for TCP/IP access, respond to the following questions:

1 Enter the station set name that you wish displayed on the connection menu.

2 Enter TH as the station type of the TCP/IP host.

3 Enter the type of ASCII emulation (1=VT100, 4=VT220 7-bit).

6.13.6 Defining Default Destinations

```
                ___ AEA and TCP/IP Default Destination ___

 Station        Station Set         Session          Session
   Set              Name             Limit      LT1 LT2 LT3 LT4 LT5

    1     3270 HOST                    0        ___ ___ ___ ___ ___
    2     3270 DISPLAY                 5        ___ ___ ___ ___ ___
    3     TELNET VT100                 0        ___ ___ ___ ___ ___
    4     TELNET VT220 7 BIT           0        ___ ___ ___ ___ ___
    5                                  0        ___ ___ ___ ___ ___
    6                                  0        ___ ___ ___ ___ ___
    7                                  0        ___ ___ ___ ___ ___
    8                                  0        ___ ___ ___ ___ ___
    9                                  0        ___ ___ ___ ___ ___
   10                                  0        ___ ___ ___ ___ ___
   11                                  0        ___ ___ ___ ___ ___
   12                                  0        ___ ___ ___ ___ ___
   13                                  0        ___ ___ ___ ___ ___
   14                                  0        ___ ___ ___ ___ ___
   15                                  0        ___ ___ ___ ___ ___


PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 211. AEA and TCP/IP Default Destination Panel

This panel determines what the terminal user will see on each LT when it is first accessed.

6.13.7 Defining TCP/IP Options

```
                ____ TCP/IP Options Menu ____

3174 IP Address                052 - 009 . 067 . 038 . 088  1
Subnet Mask                    054 - 255 . 255 . 255 . 192  2

Maximum TELNET Connections     058 - 020    (001 - 250)
TCP/IP Buffer Space            060 - 0256 K (K = 1024 bytes)

Routing Field Support          062 - Y      (Y,N)
All Routes Broadcast           064 - Y      (Y,N)







PF: 3=Quit    4=Default    7=Back    8=Fwd
```

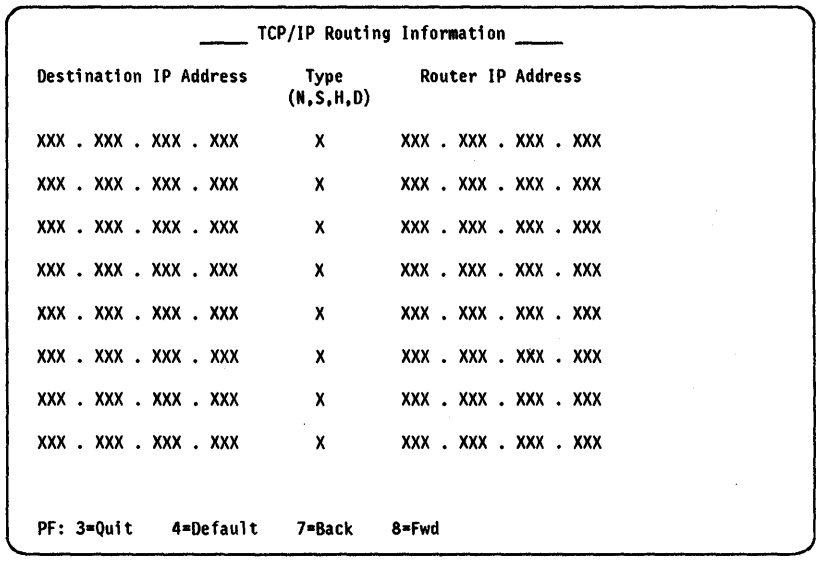
Figure 212. TCP/IP Options Menu

1 Is the IP address assigned to your 3174.

For example, the IP address of our 3174-11R is 9.67.38.88.

2 Is the subnet mask of the network.

6.13.8 Defining TCP/IP Routing Information



```
                ____ TCP/IP Routing Information ____

Destination IP Address      Type          Router IP Address
                            (N,S,H,D)

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX


PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 213. TCP/IP Routing Information

Since all AS/400 and the 3174-11R are in the same subnet, there is no need for routing table entries.

6.13.9 Defining Domain Name Services

```
                ____ TCP/IP Domain Name Services ____

3174 Hostname
317411R 1 _____________________________________________

3174 Domain Name
ITSO RALEIGH IBM COM 2 _____________________________________ ___
_____________________________________________________________
_____________________________________________________________
_____________________________________________________________

Domain Nameserver IP Addresses

XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX


PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 214. TCP/IP Domain Name Services

1 Is the name assigned to our 3174.

2 Is the domain which our 3174 resides.

6.13.10 Defining TCP/IP Nicknames

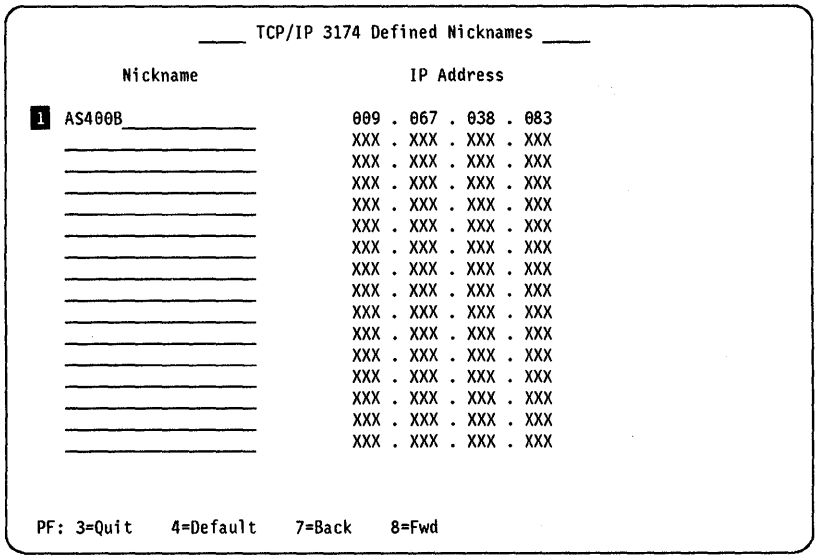


Figure 215. TCP/IP 3174 Defined Nicknames

Since users remember names better than numeric IP addresses, this panel allows you to define up to 16 host nicknames and their associated IP addresses.

1 Is the nickname of the AS/400 TCP/IP host.

6.13.11 Configure Complete

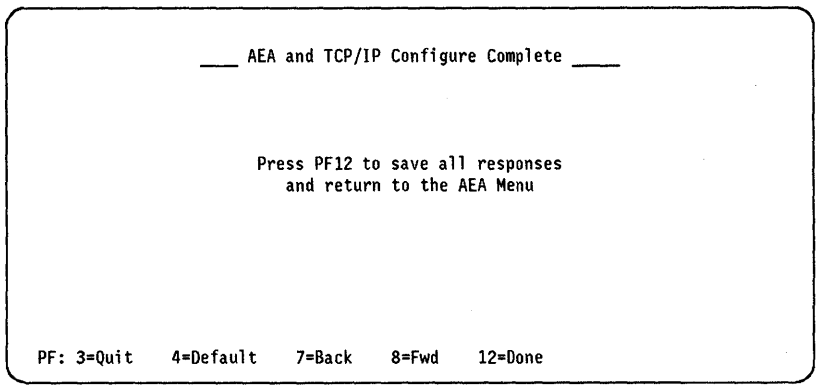


Figure 216. AEA and TCP/IP Configure Complete

You have now completed customizing for the 3174 TCP/IP Telnet Support.

6.13.12 TELNET to AS/400

If you specified an address at the TCP/IP Station Set, type in the number of the host to which you want to have a session.

```
                    Connection Menu
Enter a number (NUM) or a name on the Command Line, then press ENTER

NUM NAME                    STATUS     NUM NAME                    STATUS
  1 3270 HOST               Up
  2 TELNET VT100 [1]        Up
  3 TELNET VT220 7 BIT      Up




 PF: 3=End       6=Terminal Disconnect       12=Host Disconnect

 ============>To: 2
```

Figure 217. Selecting Emulation for AS/400

If you have not specified an address at the TCP/IP Station Set, select the emulation in the NUM Field of the Connection Menu and you get the 3174 TELNET prompt.

1 VT100 is the selected emulation in our example.

6.13.13 TELNET Prompt

```
3174 TELNET> open 9.67.38.83
```

Figure 218. Command and Destination

At the TELNET prompt, type in the command and destination.

In our example, we entered the OPEN command and the IP address of the AS/400 (9.67.38.83).

The following AS/400 sign-on screen appears on the 3270 CUT terminal.

6.13.14 AS/400 Sign-On Screen

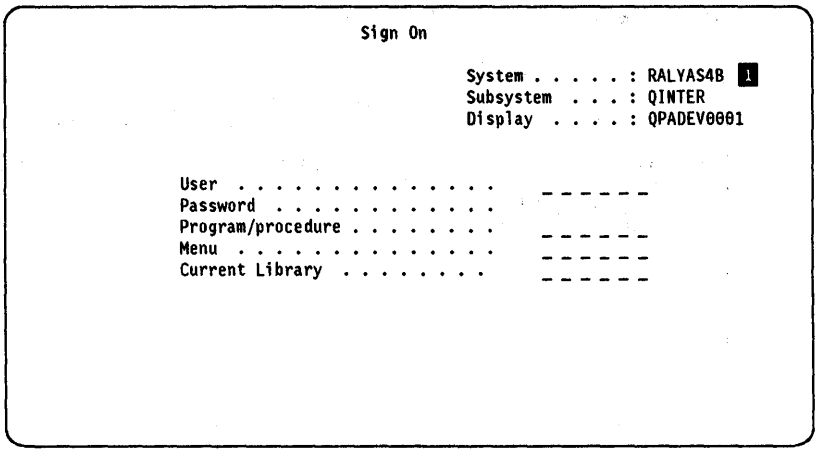


Figure 219. AS400 Sign On Screen

1 Is the network name (or network ID) of the AS/400.

After signing on to the AS/400, you get the AS/400 Main Menu.

6.13.15 AS/400 Main Menu

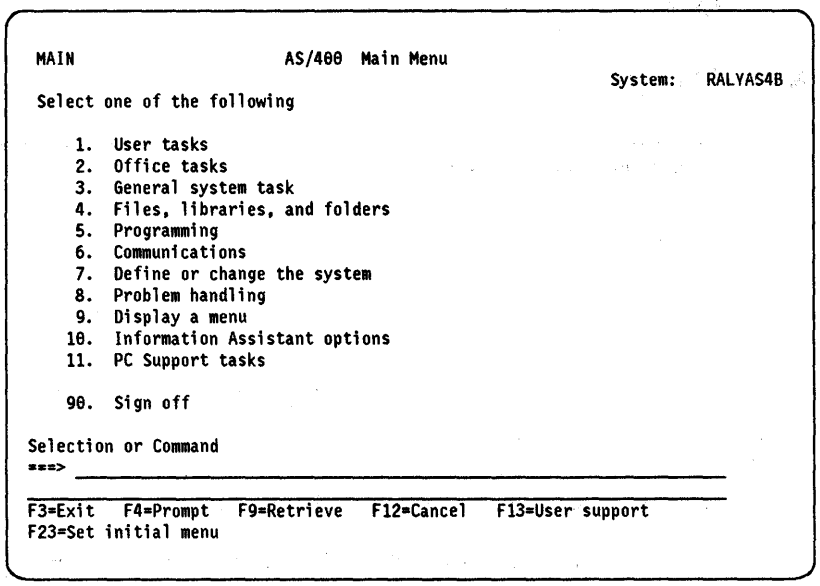


Figure 220. AS/400 Main Menu

6.14 Display 3174-Peer Status

```
              ----- Display 3174-Peer Status - HG 26 -----
    Current       Functional     Group          Discarded  Device
Port Address      Address        Address        Frame Ctr  Status
 00
 01
 02
 03
 04
 05  4000 3174 2992 .... .... ....  .... .... ....      0    1 1
 06
 07
 08
 09
 10
 11
 12
 13
 14
 15

 To go directly to other tests, enter: /Test,Option
   Select Test; press ENTER ===>
 PF:  3=Quit  5=Refresh  8=Fwd  9=Ctr->0  12=Test Menu
```

Figure 221. Display 3174-Peer Status

1 The **1** means that the interface is enabled.

For detailed information about online test status information, see *Customer Problem Determination Guide*, GA23-0217.

Chapter 7. Scenario 4: TCP/IP via 3174 and RS/6000 Router to VAX

This scenario shows the ability of a 3270 CUT terminal, using the 3174 TCP/IP Telnet Support, to establish TCP/IP sessions with a DEC VAX host which is connected via Ethernet to a RISC System/6000 router. Simultaneously, the PS/2 is using the 3174 Peer bridging function to access other TCP/IP host on the LANs. The emphasis in this scenario is the routing from token-ring network subnet to Ethernet subnet.

7.1 Scenario 4 Configuration

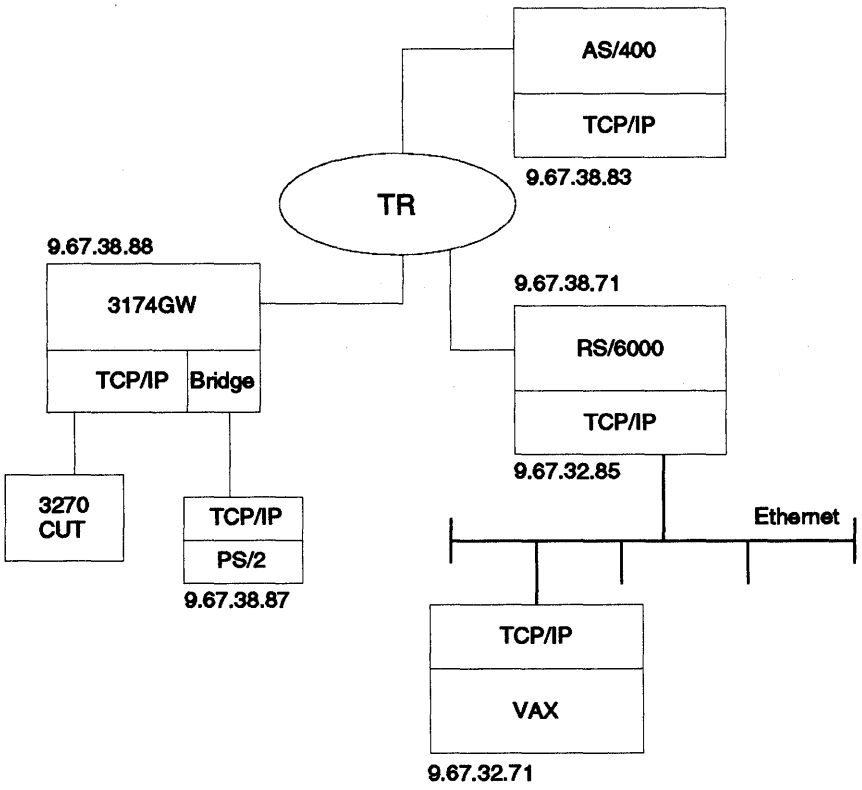


Figure 222. TCP/IP to DEC VAX and AS/400 Hosts

7.2 Scenario 4 Description

Scenario 4 shows a PS/2 workstation and a 3270 CUT Terminal coax-attached to the 3174-11R using the 3174 Peer Communication and 3174 TCP/IP Telnet Support, and the RISC System/6000 router to access a DEC VAX host via Ethernet.

The composite network has the following components:

- A 3174-11R with:
  - 3174 TCP/IP Telnet Support enabled
  - Peer Communication
- A PS/2 Communications Manager/2 (PS2COAX) with:
  - 3270 emulation
  - Token-ring address (400031742992)
- A 3270 CUT terminal (CUTCOAX)
- The AS/400 host
- The RISC System/6000 attached to a token-ring on one side and an Ethernet LAN on the other side, acting as a router
- A DEC VAX host attached to the same Ethernet LAN as the RISC System/6000

7.3 3174-11R TCP/IP and Peer Support Customization

The following Control Disk Menu shows the options that must be customized for Scenario 4.

7.3.1 Customize Control Disk Menu

```
                _____ Customize Control Disk Menu _____

Select Option; press ENTER

Option     Description

   1       Configure
   2       Define Devices
   3       Merge RPQs
   4       Modify Keyboards
   5  1    Define AEA and TCP/IP
   6       Define APPN Node
   7       Define COS
   8  2    Define 3174-PEER


    Select ===>
Press PF12 to File, PF3 to Quit, or Select another Option
PF: 3=Quit    4=Default    7=Back    8=Fwd    9=Check    12=File
```

Figure 223. Customize Control Disk Menu

1 Option 5 is used to customize the TCP/IP functions.

2 Option 8 is used to define the Peer Communication functions.

7.4 3174-Peer Definition

The 3174-Peer support provides a logical internal token-ring segment and a bridge to a real external token-ring segment. Each coax-attached PS/2 workstation appears to be attached to the internal token-ring.

7.4.1 3174-Peer Definition Panel

The 3174-Peer Definition panels allow you to:

- Enable the internal token-ring segment.
- Enable the internal bridge function.
- Customize the internal bridge parameters.
- Enable LAN Manager support.
- Specify the middle six hexadecimal digits of the 3174-assigned token-ring address for the 3174-Peer devices.

```
                    3174-Peer Definition

3174-Peer Support

     650 - Y [1]    3174-Peer Support                    (Y,N)

  3174-Peer Options

     651 - Y [2]    Bridge Support                       (Y,N)
     652 - N        LAN Manager Support                  (Y,N)
     653 - Y        3174-Peer Online Test Updates        (Y,N)

  3174-Peer Station Parameters

     660 - 4000 3174 91 PN  3174-Peer Port Address Range    (0000 00 - FFFF FF)
     661 - 05               Percentage of Discard Threshold (00 - 99)



PF: 3=Quit    4=Default    8=Fwd
```

Figure 224. Enabling 3174 Peer Communication Functions

For Peer Communication to an external token-ring, the following responses are required:

[1] 3174-Peer support is enabled.

[2] Bridge support is enabled.

7.5 3174 TCP/IP Definitions

7.5.1 AEA and TCP/IP Configure

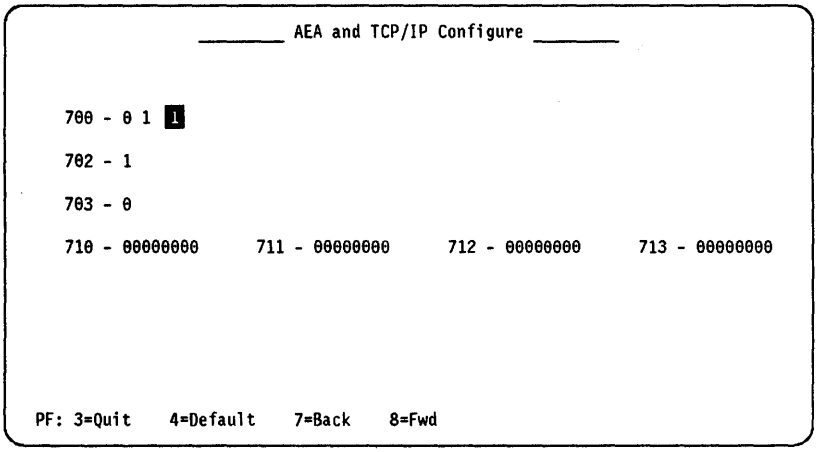


Figure 225. AEA and TCP/IP Configure Panel

1 We enable the TCP/IP capability only (second digit response). The first digit refers to the AEA.

7.5.2 Defining Port Set

```
                      ____________ Port Set ____________

         Name          Session     Port        Modem        Password
                        Limit      Type        Type

  1 = 3270DISP [1]        5          1 [2]       _          ________
  2 = ________            _          _           _          ________
  3 = ________            _          _           _          ________
  4 = ________            _          _           _          ________
  5 = ________            _          _           _          ________
  6 = ________            _          _           _          ________
  7 = ________            _          _           _          ________
  8 = ________            _          _           _          ________
  9 = ________            _          _           _          ________
 10 = ________            _          _           _          ________
 11 = ________            _          _           _          ________
 12 = ________            _          _           _          ________
 13 = ________            _          _           _          ________
 14 = ________            _          _           _          ________
 15 = ________            _          _           _          ________
 16 = ________            _          _           _          ________


 PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 226. Port Set Panel

1 Enter **3270DISP** in the Name field.

2 Enter a 5 in the Session Limit field and a 1 in the Port Type field for this port set. It defines terminals belonging to this port set as 3270 displays, each with five sessions (MLT).

7.5.3 Mapping Port to Port Set

```
                    Port to Port Set Map
                                                          Page 01 of 03
Type the port set number to group the 3174 ports

  3270 Ports       0  1  2  3  4  5  6  7
 26-00 to 26-07    1_ 1_ 1_ 1_ 1_ 1_ 1_ 1_ 1
 26-08 to 26-15    __ __ __ __ __ __ __ __
 26-16 to 26-23    __ __ __ __ __ __ __ __
 26-24 to 26-31    __ __ __ __ __ __ __ __


 Port Sets
 1 = 3270DISP        2 =              3 =              4 =
 5 =                 6 =              7 =              8 =
 9 =                10 =             11 =             12 =
13 =                14 =             15 =             16 =


PF: 3=Quit    4=Default    7=Back    8=Fwd    10=PageBack    11=PageFwd
```

Figure 227. Port to Port Set Map Panel

1 You should use this panel to assign coax ports to the port set, named 3270DISP, that you have defined in the Port Set panel.

Enter the port set number for each port to be assigned to this port set.

7.5.4 Defining 3270 Host and Display Station Sets

```
                    AEA and TCP/IP Station Set

1 1  721 - 3270 HOST_____________  722 - 3H3 723 - _______ 725 - 1
     731 - 1    732 - 1    733 - 0   734 - _   735 - 0  736 - 1  737 - _
     741 - 000  742 - 015  743 - 1  744 - 0  745 - 0  746 - 0 0
     751 - _    752 - ____________________________________________
      761 - 1   762 - 1    763 - 1   764 - 1  765 - 0
      771 - 1   772 - 1    773 - 1   774 - 1   775 - 1  776 - 1
     781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
     790 - 000 . 000 . 000 . 000

2 2  721 - 3270 DISPLAY__________  722 - 3D4 723 - 3270DISP 725 - 1
     731 - 1    732 - 1    733 - 0   734 - _   735 - 0  736 - 1  737 - _
     741 - 000  742 - 015  743 - 1  744 - 0  745 - 0  746 - 0 0
     751 - _    752 - ____________________________________________
      761 - 1   762 - 1    763 - 1   764 - 1  765 - 0
      771 - 1   772 - 1    773 - 1   774 - 1   775 - 1  776 - 1
     781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
     790 - 000 . 000 . 000 . 000


PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 228. AEA and TCP/IP Station Set Panel

1 Is the station set name for the 3270 host.

2 Is the station set name for the 3270 displays.

Whatever name you enter here will be displayed on the Connection Menu as a possible destination for the LT.

3 Enter 3H as the station type for 3270 host.

4 Enter 3D as the station type for 3270 displays.

You will also need to define station sets for TCP/IP access (see 7.5.5, "Defining TCP/IP Station Sets").

For detailed information about defining TCP/IP station sets, see 3.9, "Customizing 3174 TCP/IP Telnet Support" on page 24.

7.5.5 Defining TCP/IP Station Sets

```
                    _______ AEA and TCP/IP Station Set _______

1 3  721 - TELNET VT100 _____ 2 722 - TH  723 - _____      725 - 1
     731 - 1    732 - 1    733 - 0   734 - _   735 - 0  736 - 1  737 - _
     741 - 000  742 - 015  743 - 1  744 - 0  745 - 0  746 - 0 0
3    751 - 1    752 - _____________________________________
      761 - 1   762 - 1    763 - 0   764 - 1  765 - 0
      771 - 1   772 - 1    773 - 1   774 - 1   775 - 1  776 - 1
     781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
     790 - 000 . 000 . 000 . 000

1 4  721 - TELNET VT220 7 BIT___ 2 722 - TH  723 - _____      725 - 1
     731 - 1    732 - 1    733 - 0   734 - _   735 - 0  736 - 1  737 -
     741 - 000  742 - 015  743 - 1  744 - 0  745 - 0  746 - 0 0
3    751 - 2    752 - _____________________________________
      761 - 1   762 - 1    763 - 1   764 - 1  765 - 0
      771 - 1   772 - 1    773 - 1   774 - 1   775 - 1  776 - 1
     781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
     790 - 000 . 000 . 000 . 000


All responses are correct
PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 229. AEA and TCP/IP Station Set Panel

To define each station set for TCP/IP access, respond to the following questions:

1 Enter the station set name that you wish displayed on the Connection Menu.

2 Enter TH as the station type of the TCP/IP host.

3 Enter 1 (VT100) and 4 (VT220 7-bit) as the ASCII emulation for the station set.

7.5.6 Defining Default Destinations

```
                ___ AEA and TCP/IP Default Destination ___

Station        Station Set          Session        Session
  Set            Name               Limit     LT1 LT2 LT3 LT4 LT5

   1    3270 HOST                     0
   2    3270 DISPLAY                  5
   3    TELNET VT100                  0
   4    TELNET VT220 7 BIT            0
   5                                  0
   6                                  0
   7                                  0
   8                                  0
   9                                  0
  10                                  0
  11                                  0
  12                                  0
  13                                  0
  14                                  0
  15                                  0

PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 230. AEA and TCP/IP Default Destination Panel

This panel determines what the terminal user will see on each LT when it is first accessed. Because the Session LTx fields are blank, the Connection Menu is the default.

7.5.7 Defining TCP/IP Options

```
                    ____ TCP/IP Options Menu ____

3174 IP Address                 052 - 009 . 067 . 038 . 088 1
Subnet Mask                     054 - 255 . 255 . 255 . 192

Maximum TELNET Connections      058 - 020    (001 - 250)
TCP/IP Buffer Space             060 - 0256 K (K = 1024 bytes)

Routing Field Support           062 - Y      (Y,N)
All Routes Broadcast            064 - Y      (Y,N)

PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 231. TCP/IP Options Menu

1 The IP address of our 3174-11R is 9.67.38.88.

7.5.8 Defining TCP/IP Routing Information

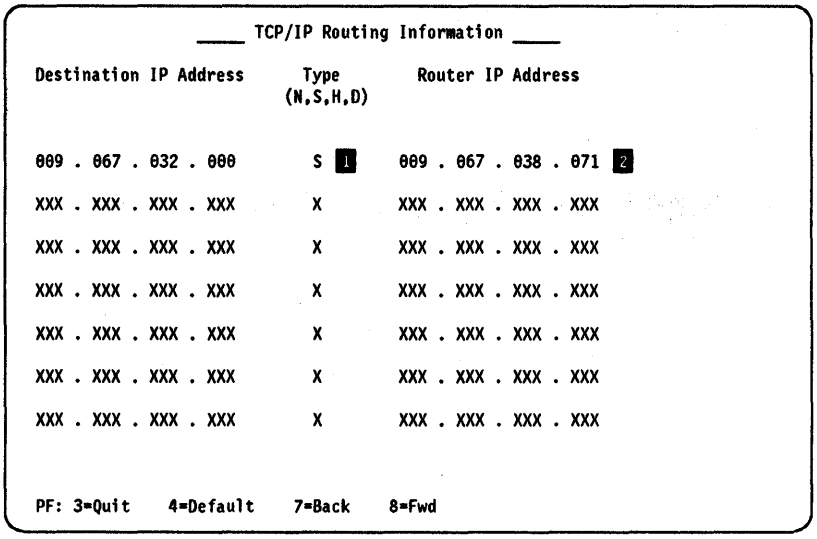


Figure 232. TCP/IP Routing Information

1 Type=S means route to a specific subnet.

2 The Router IP Address is the IP address of the router that should receive that destination's traffic. In our example, it is the RISC System/6000 with IP address 9.67.38.85.

7.5.9 Defining Domain Name Services

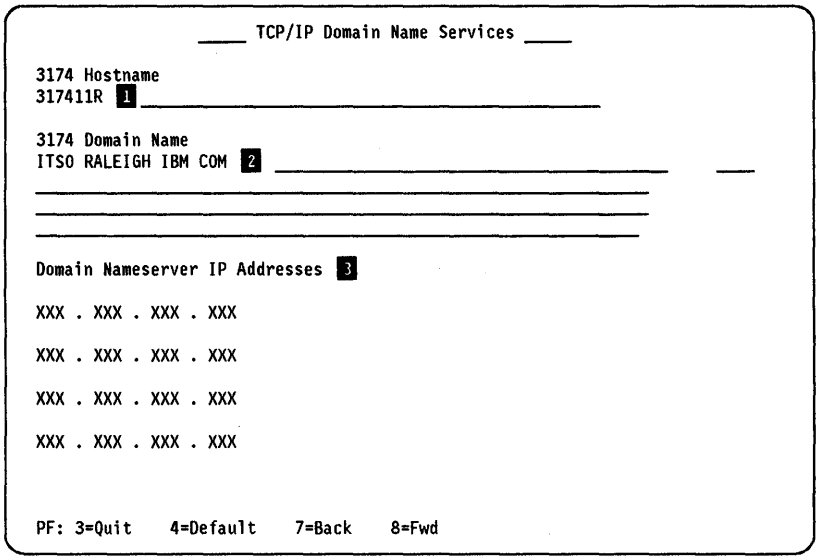


Figure 233. TCP/IP Domain Name Services

1 Is the name assigned to our 3174.

2 Is the domain which our 3174 resides.

3 In our example, we have not define a nameserver.

7.5.10 Defining TCP/IP Nicknames

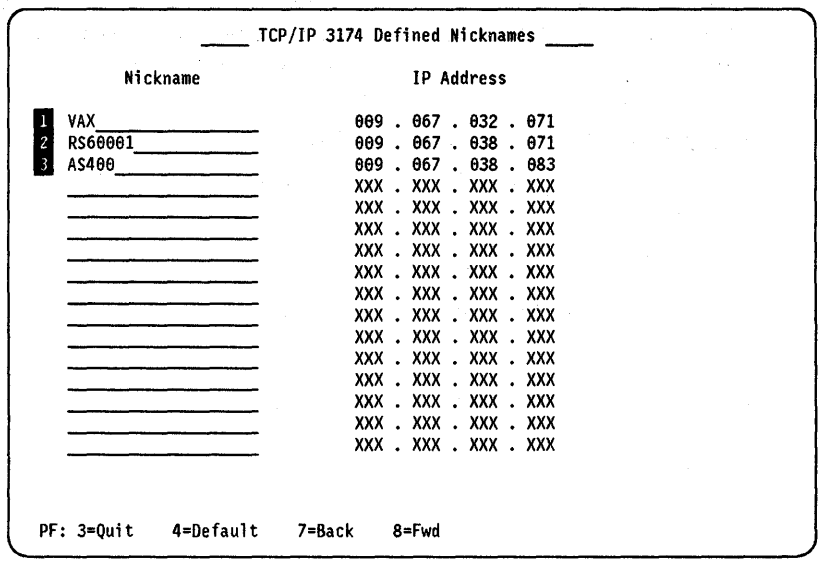


Figure 234. TCP/IP 3174 Defined Nicknames

Since users remember names better than numeric IP addresses, this panel allows you to define up to 16 host nicknames and their associated IP addresses.

1 Is the nickname of the DEC VAX.

2 Is the nickname of the RISC System/6000.

3 Is the nickname of the AS/400.

7.6 RS/6000 Definitions

Since the DEC VAX is in a different network than the 3174, we are you the RS/6000 as the static router between the two networks. This section discusses the definition that are in place at the RS/6000 to do static routing.

7.6.1 Router Definition on RISC System/6000

On the RISC System/6000, which is the router to the DEC VAX, we do the following:

- Login as the *root* user.
- At command prompt, type in the following and press Enter:

  smit tcp/ip

  You will get the screen shown in Figure 235.

SMIT TCP/IP

```
                                    TCP/IP

Move cursor to desired item and press Enter.

  Minimum Configuration & Startup
  Further Configuration



F1=Help             F2=Refresh          F3=Cancel           F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 235. SMIT TCP/IP

Select**Further Configuration** and press Enter.

Further Configuration

```
                              Further Configuration

Move cursor to desired item and press Enter.

  Hostname
  Static Routes
  Network Interfaces
  Name Resolution
  Client Network Services
  Server Network Services
  Remote Printer Subsystem
  Select BSD style rc Configuration



F1=Help             F2=Refresh          F3=Cancel           F8=Image
F9=Shell            F10=Exit            Enter=Do
```

Figure 236. Further Configuration

Select**Static routes** and press Enter.

Static Routes

```
                              Static Routes

Move cursor to desired item and press Enter.

  List All Routes
  Add a Static Route
  Remove a Static Route
  Flush Routing Table









F1=Help          F2=Refresh       F3=Cancel        F8=Image
F9=Shell         F10=Exit         Enter=Do
```

Figure 237. Static Routes

Select**Add a Static Route** and press Enter.

Add Static Route

```
                           Add Static Route

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                    Entry Fields
* DESTINATION Address                              9.67.32.64
  (dotted decimal or symbolic name)
* Default GATEWAY Address                          9.67.32.85
  (dotted decimal or symbolic name)









F1=Help          F2=Refresh       F3=Cancel        F4=List
F5=Undo          F6=Command       F7=Edit          F8=Image
F9=Shell         F10=Exit         Enter=Do
```

Figure 238. Add Static Route

Type the destination and gateway addresses in the Entry Fields.

In our example, we use address 9.67.32.64 as the destination address. Our default gateway address is 9.67.32.85.

7.6.2 Command Status

```
                              COMMAND STATUS

Command: OK            stdout: yes           stderr: no

Before command completion, additional instructions may appear below.

 TOP
Routing tables
Destination      Gateway           Flags  Refcnt Use       Interface
Netmasks:
(root node)
(0)0
(0)0 ff00 0
(0)0 ffff ffc0 0
(root node)

Route Tree for Protocol Family 2:
(root node)
default          9.67.32.85        UG         0   711333  en0
2.2.4.0          9.67.38.91        UGH        0        0  tr0
2.2.4.1          9.67.38.91        UGH        0        0  tr0
2.2.4.2          9.67.38.91        UGH        0        0  tr0
9.67.32.64       9.67.32.85 1      U          4    21172  en0
9.67.32.192      9.67.38.67        UGH        0        0  tr0
9.67.32.242      9.67.38.67        UGH        0      279  tr0
9.67.38.64       9.67.38.71        U         28   168032  tr0
9.67.46.4        9.67.38.91        UGH        0      282  tr0
9.67.46.5        9.67.38.91        UGH        0        0  tr0
9.67.46.128      9.67.46.138       U          1     2189  tr1
9.67.46.192      9.67.46.195       U          1    30065  tr2
127              127.0.0.1         U          6     5050  lo0
191.10.10.64     191.10.10.81      U          1      277  xt0
(root node)

Route Tree for Protocol Family 6:
(root node)
(root node)

 BOTTOM

F1=Help          F2=Refresh        F3=Cancel         F6=Command
F8=Image         F9=Shell          F10=Exit
```

Figure 239. Command Status

1 Is the IP address of our router.

7.6.3 Router Definition on DEC VAX

On the DEC VAX host, we do the following:

- Login as a privileged user.
- At the command prompt, type in the following and press Enter:

  multinet set/route/add=(dest=9.67.38.88,gate=9.67.32.85
  1 2

  1 Is the IP address of our 3174-11R.

  2 Is the IP address of our RISC System/6000 router.

  On the DEC VAX we are using the MultiNet** V3.1 software.

  For detailed information about the VAX MultiNet configuration, see:

  - *MultiNet Users' Guide, VMS V5.0 , MultiNet V3.1*
  - *MultiNet System Administrators' Guide, VMS V5.0, MultiNet V3.1*

7.7 TELNET to VAX Host

If you specified an address at the TCP/IP station set, type in the number of the host to which you want to have a session.

```
                    Connection Menu
Enter a number (NUM) or a name on the Command Line, then press ENTER

NUM NAME                    STATUS     NUM NAME                    STATUS
  1 3270 HOST               Up
  2 TELNET VT100            Up
  3 TELNET VT220 7 BIT  1   Up




 PF: 3=End       6=Terminal Disconnect        12=Host Disconnect

 ============>To: 3
```

Figure 240. Selecting Connection to VAX Host

If you have not specified an address at the TCP/IP station set, select the emulation in the NUM Field of the Connection Menu and you get the 3174 TELNET prompt.

1 VT220 7-BIT is the emulation selected.

TELNET Prompt

```
3174 TELNET>  open vax
Finding address of vax
Trying ....
Connected to 9.67.32.71


******** ITSC  Open Network Management Lab ********



Username: System
Password:
```

Figure 241. TELNET Connection to VAX host

At the TELNET prompt, type in the command and destination.

In our example we entered the OPEN command and the nickname of the VAX host.

VAX Host Login

```
3174 TELNET>  open vax
Finding address of vax
Trying ....
Connected to 9.67.32.71


******** ITSC  Open Network Management Lab ********

Username: System
Password:
        Welcome to VAX/VMS version A5.5 on node ITSCV1
     Last interactive login on Thursday, 10-Jun-1993 11:39
     Last non-interactive login on Tuesday, 25-May-1993 08:50


          You have 2 new Mail messages


         International Technical Support Laboratory
                        Raleigh
                         ITCSV1









$
```

Figure 242. TELNET Cession to VAX host

The TELNET session to the VAX host is established.

Chapter 8. 3174 Ethernet Considerations

This chapter provides the following general information about 3174 Establishment Controller Ethernet attachment:

- 3174 Configuration Support C, Release 4
- 3174 Ethernet adapter
- 3174 Ethernet customization

The new 3174 communications adapter that attaches the 3174 to CSMA/CD (Ethernet) LANs, in conjunction with Configuration Support-C Release 4, provides the following:

- Support for IEEE 802.3 frame formats and Ethernet V2 (DIX) frame formats
- Attachment via one of 3 types of connectors:
  1. 10base-2 BNC connector
  2. 10base-5 15-pin D-SUB connector
  3. 10base-T RJ-45 connector
- 802.2 LLC for both 802.3 and V2 frames

Note:

Ethernet support is also available in 3174 TCP/IP Enhancements RPQ 8Q1041 and Configuration Support-C Release 5. Any claims made in this section apply to all 3174 Ethernet Support.

8.1 3174 Configuration Support C, Release 4

LIC C4 allows the 3174 to participate in Ethernet configurations that are analogous to those token-ring configurations that the 3174 supports. That is, with the new x4R models, Ethernet may provide the upstream host attachment of the 3174, analogous to the x3R models. The 3174 may be an Ethernet gateway, connecting DSPUs on the Ethernet to an SDLC or channel-attached SNA host.

In both of these configurations, the following functions are available:

- TCP/IP TELNET client support (for locally attached ASCII or CUT displays only)
- APPN
- Peer Communications (for coax-to-coax communication on the same 3174)

Note: Coax-to-Ethernet bridging is not supported.

With Configuration Support-C Release 4, locally attached ASCII or CUT displays can also access a TCP/IP host through the Ethernet network without the 3174 configured as a gateway, or without SNA or APPN function being present.

APPN and TCP/IP can be used concurrently with either a LAN-attached DSPU controller or gateway. However, a LAN-attached DSPU controller and a gateway cannot be configured within the same 3174.

C4 supports the Ethernet adapter **in place of** a token-ring adapter. Just as with the token-ring network support, only one LAN adapter may be used.

8.1.1 Configurations

Ethernet attachment is possible with configurations supported by the following model designations: 11L, 11R, 12L, 12R, 14R, 21L, 21R, 22L, 22R, 24R, 61R, 62R, and 64R. The Ethernet Adapter is a base hardware feature with Models 14R, 24R, and 64R. The new models are essentially x3Rs with the token-ring card replaced by the Ethernet card.

8.1.2 Alternate Configurations

The following alternative configurations are possible with the new Ethernet adapter card and the C4 diskettes. The conversion of an x4R to a non-Ethernet model is not supported with the C4 diskettes.

Table 4. Alternative Configurations

Primary Configuration	Additional Adapter	Alternate Configuration
11L	Ethernet	14R
11R	Ethernet	14R
12R	Ethernet	14R
13R	Ethernet	14R
23R	Ethernet	24R
61R	Ethernet	64R
62R	Ethernet	64R

Note: Alternate configurations allow you to change the use of a given 3174 model; 11L can be used as a remote TP model by adding a type 1 card (PCA) and customizing as an 11R.

8.1.3 Storage Requirements

Ethernet applications should not require any more 3174 storage than the corresponding token-ring configuration. That is, an Ethernet gateway will have the same configuration as an equivalent token-ring gateway.

The size of LAN support code, which is included in the NCU or gateway numbers must be included separately and this amount is **150KB.**

TCP/IP storage calculation is done with the following scheme:

Table 5 (Page 1 of 2). 3174 CS-C4 TCP/IP TELNET Storage Requirements

	With AEA Customized	Without AEA Customized
Basic TCP/IP TELNET	231KB	362KB
Per session	7KB	
TCP/IP data buffers	See 2.11.2, "TCP/IP Data Buffers" on page 15.	
Split Screen	If you expect to use split screen functions while accessing TELNET sessions, add 2KB for each non-EAB TELNET LT and 4KB for each EAB TELNET LT to your base MLT calculation.	
SNMP	50	

Table 5 (Page 2 of 2). 3174 CS-C4 TCP/IP TELNET Storage Requirements		
	With AEA Customized	**Without AEA Customized**
No NCU, GW or APPN installed	**150**	

8.1.4 Configuration Examples

An Ethernet adapter allows a 3174 to attach to an Ethernet for the following configurations:

- NCU/DSPU

  Just like a 3174 token-ring model, a 3174 Ethernet model can communicate with up to 8 SNA hosts via the Ethernet, operating as a PU 2.0 in the network. This is called a Network Control Unit (NCU) or Downstream Physical Unit (DSPU). The terminals attached to the 3174 can access the 3270 applications provided by the hosts:

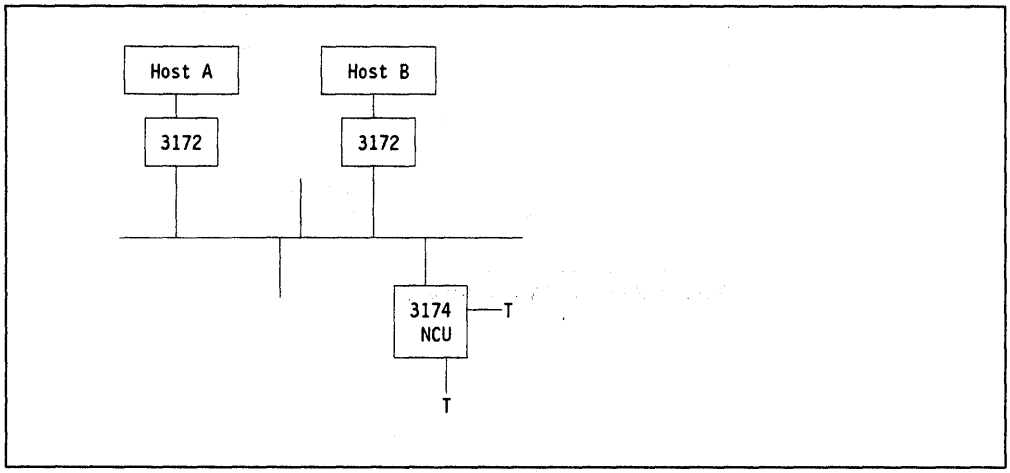


Figure 243. NCU Configuration

- Gateway

  A 3174 SDLC or SNA channel model, with the new Ethernet adapter can operate as a gateway and connect 250 Ethernet DSPUs to the SNA host. 250 is the architectural limitation of the adapter and the 3174 microcode; however, a realistic limit for the LAN may be much lower.

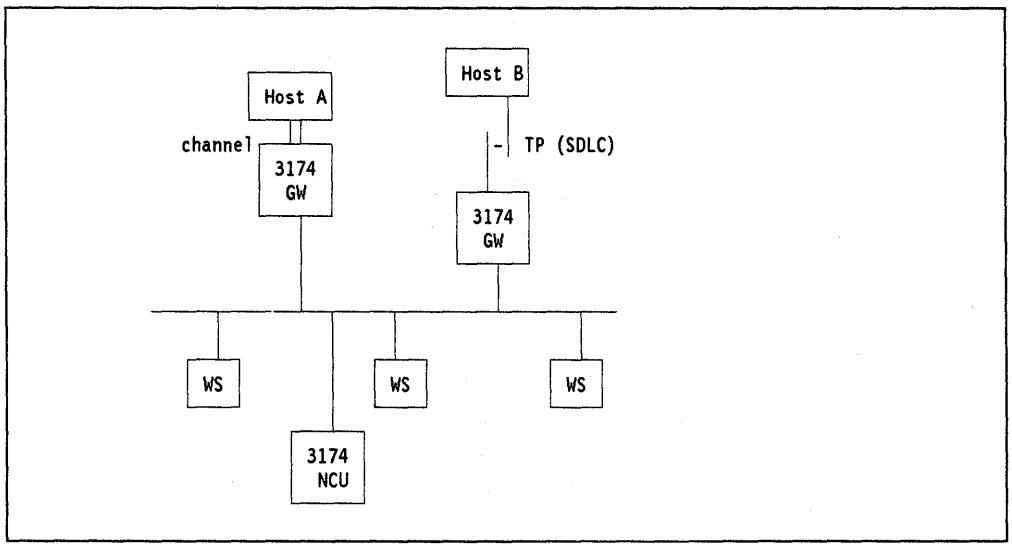


Figure 244. Gateway Configuration

- **APPN**

  Network node (NN) functions that are available in the C3 release over token-ring are now available over Ethernet. The only exception is that coax devices using peer communications cannot participate.

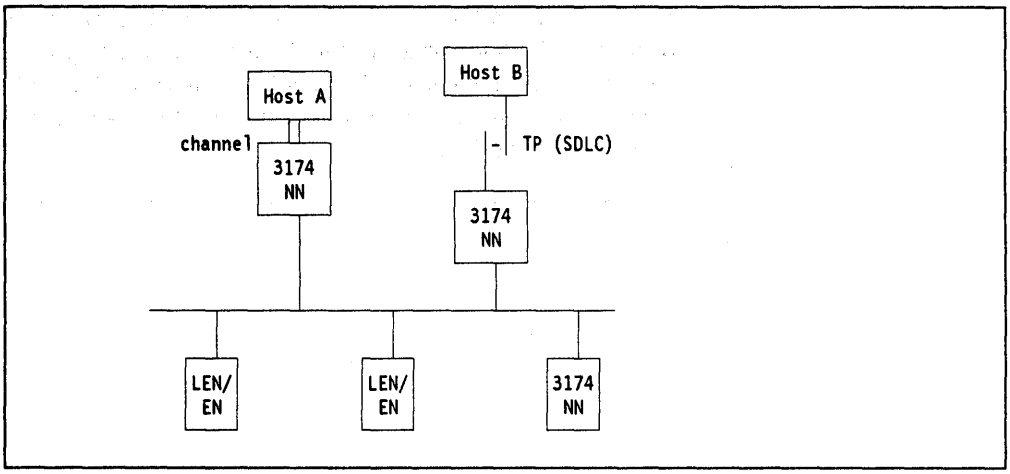


Figure 245. APPN Configuration

- Stand-alone (TCP/IP)

  When on Ethernet adapter is in the 3174, the local terminals (CUT and ASCII) can reach TELNET servers via the Ethernet. So in the next picture, all of the "T's" can use the TCP/IP TELNET support to log on to the TCP/IP host. Notice that the 3174 attached to host C is not a gateway in this example. This is what is called the stand-alone option and the LAN is available strictly for TCP/IP communications. Prior to Configuration Support-C Release 4, the LAN adapter had to be customized for DSPU (NCU) or gateway support.

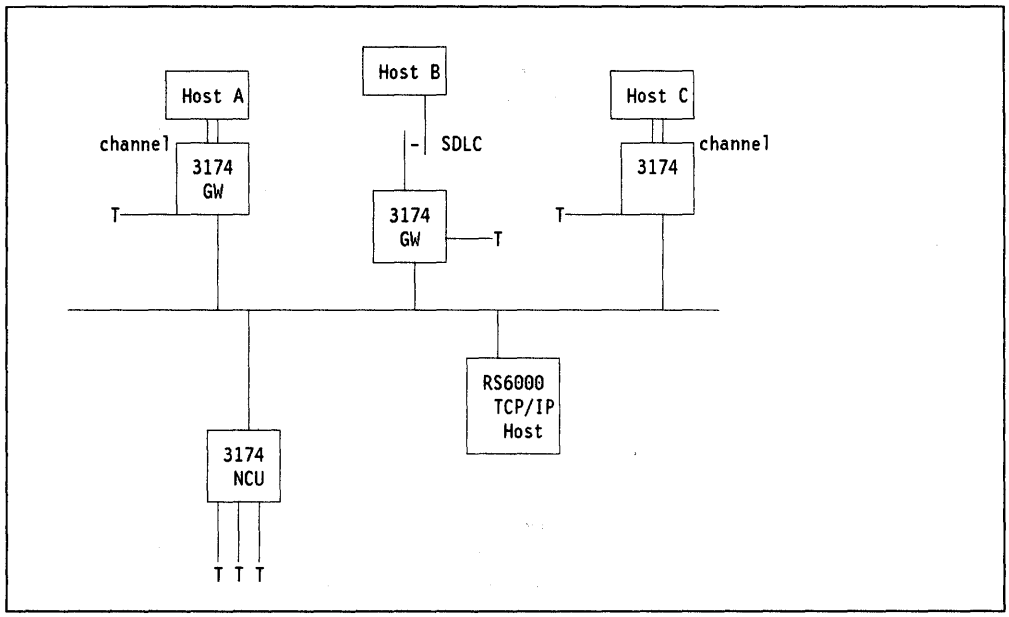


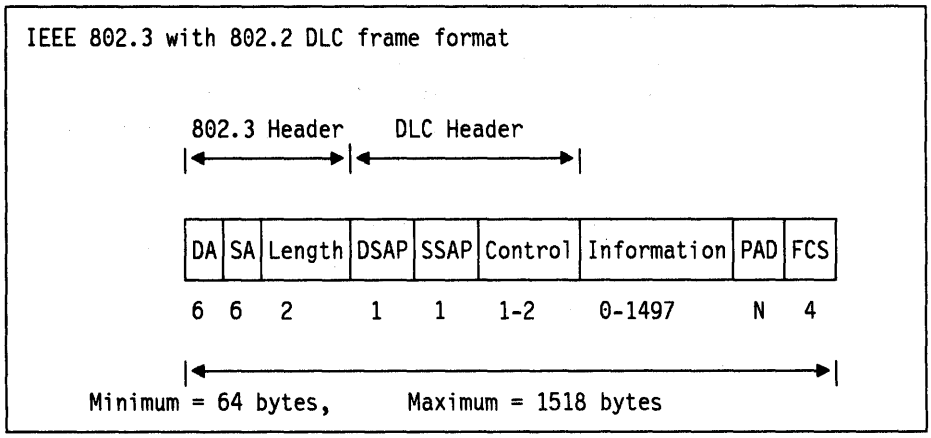
Figure 246. TCP/IP Configuration

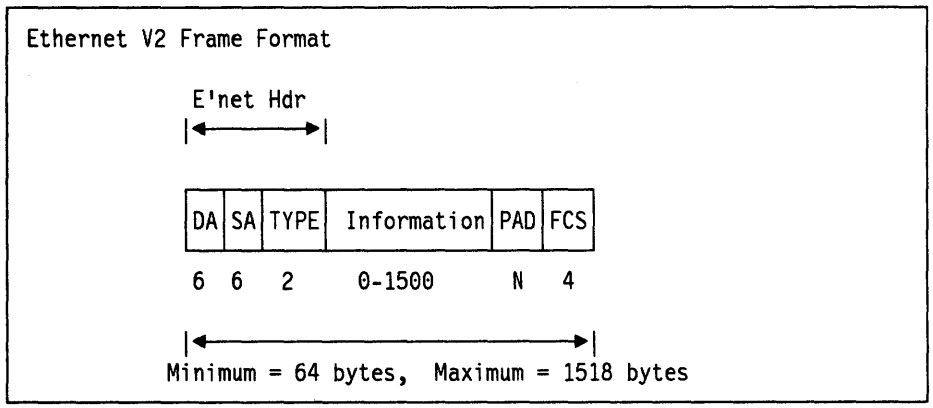
All of the above configurations (NCU, Gateway, APPN and TCP/IP) can be used concurrently, except that gateway and NCU cannot coexist in a 3174.

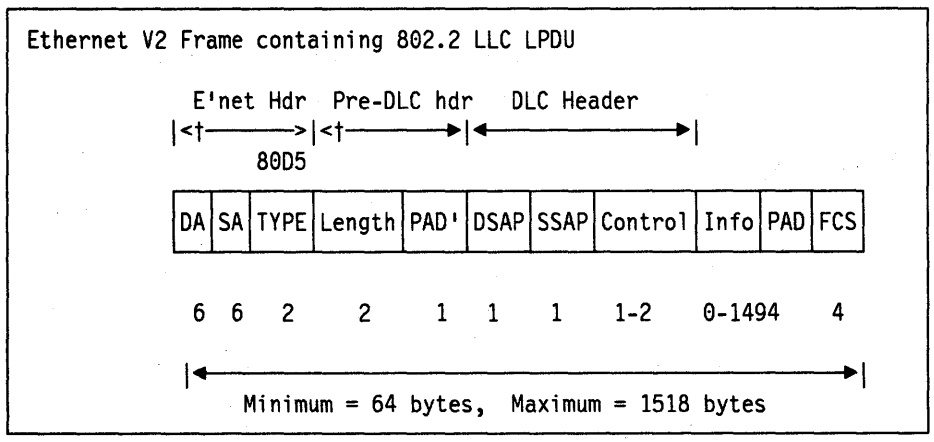
8.1.5 MAC Layer

To support as many Ethernet environments as possible, The 3174 Ethernet adapter supports both 802.3 and DIX V2 frame formats. A 3174 customization question determines whether the 3174 provides 802.3, V2 or both. If both, the 3174 "discovers" which frame format to use for a given connection rather than requiring each connection to have a customized frame format. The discovery process is shown in 8.1.7, "Frame Format Discovery Process" on page 236.

Figure 247 on page 233 shows the frame formats. See also *ISO/IEC 8802-3 ANSI/IEEE Standard 802.3* and *Ethernet: A Local Area Network Data Link Layer and Physical Layer Specification Version 2.0.*







SFD - Start Frame Delimiter
DA - Destination Address
SA - Source Address
DSAP - Destination Service Access Point
PAD - Pad to minimum frame length
PAD' - Pad of unknown use
FCS - Frame Check Sequence

Figure 247. Frame Format

Bit Order of Ethernet Addresses

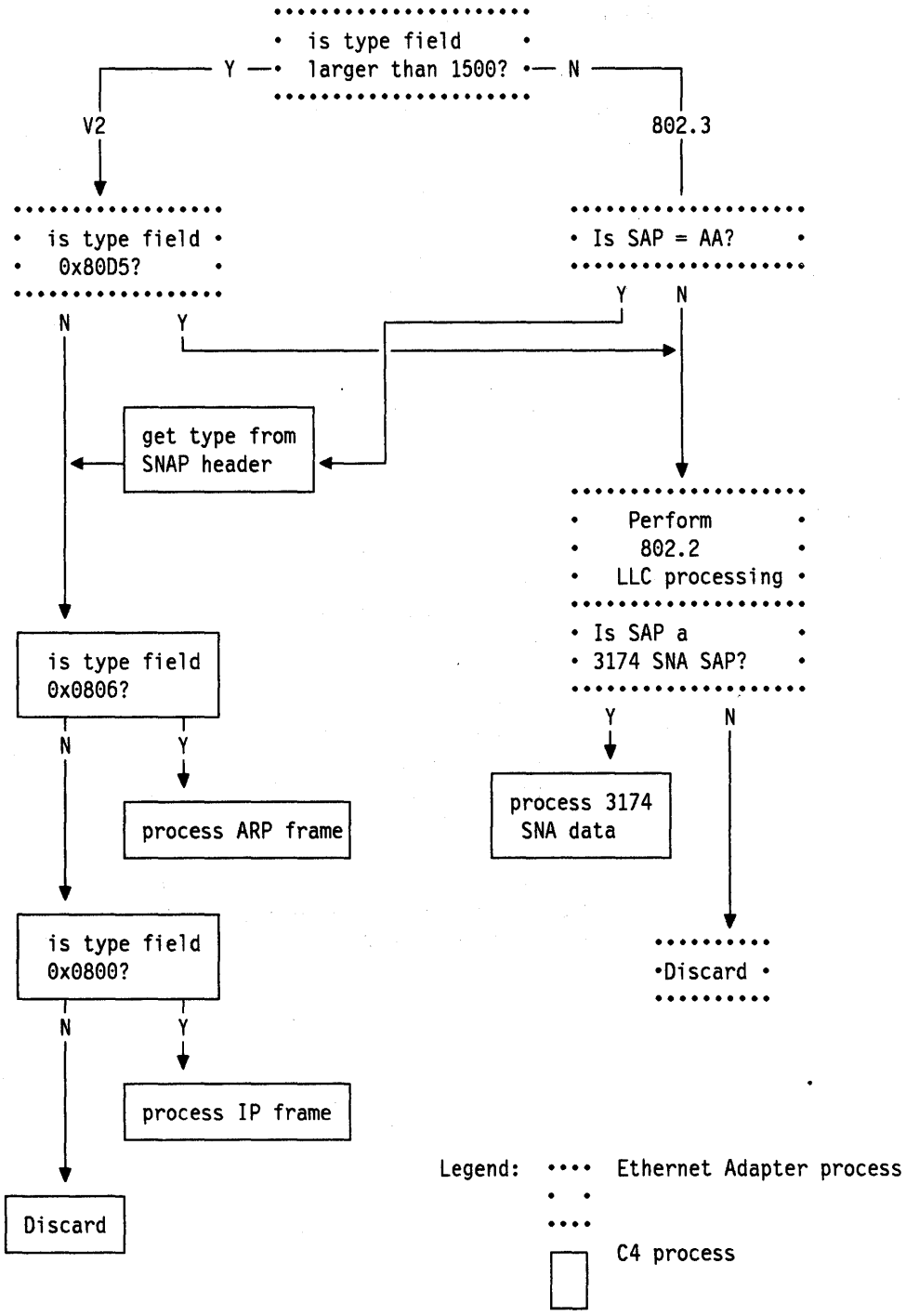
Even though the architectural definition of Ethernet and token-ring hardware addresses appear the same, there is a subtle difference: Ethernet defines the Individual/Group address bit as the least significant bit of the byte, while token-ring defines it as the most significant bit. The order of bit transmission is also different: Ethernet transmits the Least Significant Bit first, while token-ring transmits the Most Significant Bit first. The addresses are stored in 3174 memory in the usual IBM manner, most significant bit on the left, and are also described that way in text: 400031740000 would be a locally administered, individual address. Therefore, the bits of each byte of the address are reversed before transmitting on the Ethernet. This does not present a problem for TCP/IP connections, since ARP handles the address resolution For SNA over Ethernet, it is dependent upon how a particular connecting product is configured or implements addressing that determines how the addresses are customized at the 3174.

8.1.6 LLC Layer

With 802.3 frames, C4 and the Ethernet adapter always use 802.2 Logical Link Control. The 802.2 LLC function is provided by microcode on the Ethernet adapter. C4 uses SAP AA for TCP/IP traffic, and SNA SAPs (multiples of 04) for NCU and gateway connections.

With V2 frames, SNA connections are provided by using the Ethernet type field 80D5, and using "LLC over Ethernet". As above, SNA SAPs (multiples of 04) provide the NCU and gateway connections. The LLC function is provided by microcode on Ethernet adapter. For TCP/IP, no LLC function is used; rather, TCP/IP traffic is identified by the Ethernet type fields 0800 (IP) and 0806 (ARP).

Here is a high-level view of 3174 processing of a frame from the Ethernet, showing the difference between SNA and TCP/IP. The diagram shows that TCP/IP is not supported using 802.2 LLC-over-Ethernet on V2.


is type field larger than 1500?
Y
N
V2
802.3
is type field 0x80D5?
Is SAP = AA?
N
Y
Y
N
get type from SNAP header
Perform 802.2 LLC processing
Is SAP a 3174 SNA SAP?
Y
N
process 3174 SNA data
is type field 0x0806?
N
Y
process ARP frame
Discard
is type field 0x0800?
N
Y
process IP frame
Discard
Legend:
Ethernet Adapter process
C4 process

8.1.7 Frame Format Discovery Process

The next sections describe how the 3174 determines the frame format (802.3 vs V2) to use, when the 3174 is customized to allow both frame formats.

TCP/IP

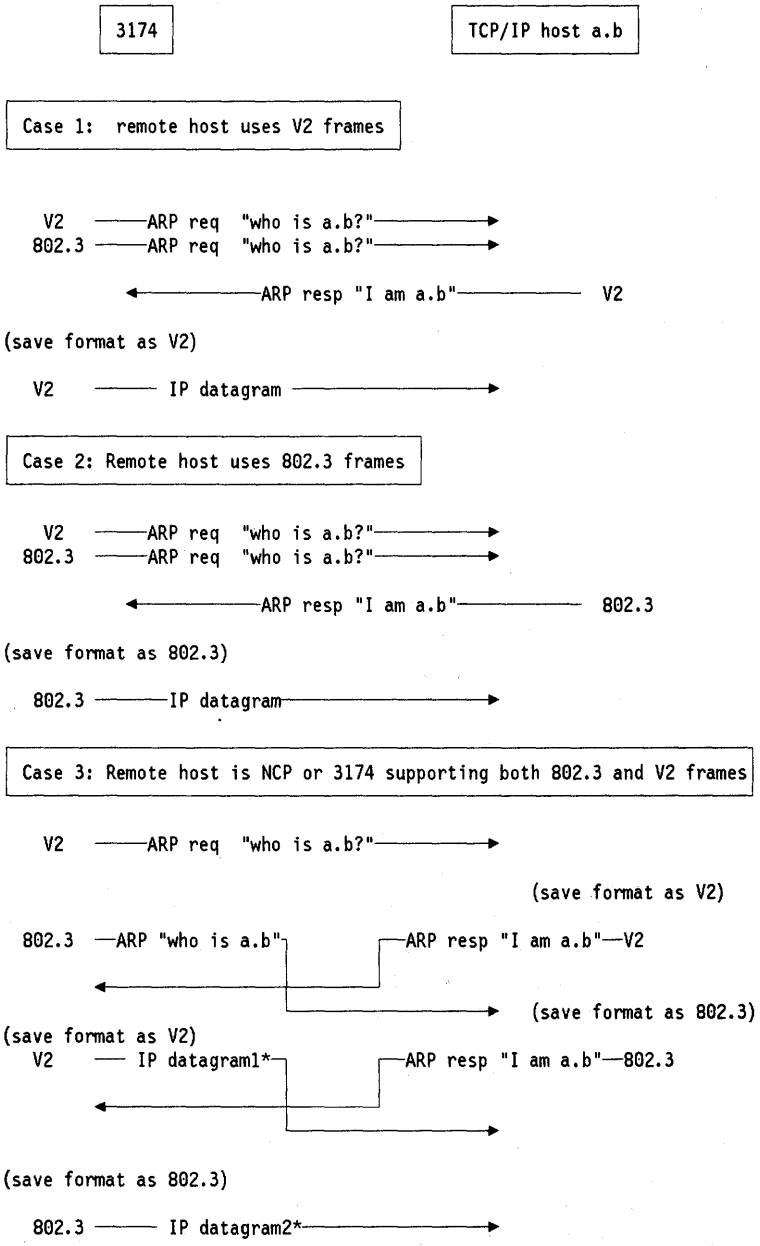
For TCP/IP, the Address Resolution Protocol (ARP) is used to find the Ethernet address associated with an IP address. During ARP processing, the 3174 will also determine the frame format to use when sending datagrams to a particular IP address. The frame format associated with an IP address is only used for transmission; the 3174 accepts all received datagrams regardless of frame format.

The 3174 maintains an ARP table with entries for each remote host that it is talking to. Each entry contains the IP address of the host, the associated Ethernet physical address, the frame format to use, and some flags that show the state of the entry. When an entry is marked as complete, the physical address and frame format have been determined by ARP processing. This is done as follows:

1. If the 3174 wishes to send a datagram to IP address A.B, and no ARP table entry exists, the 3174 sends an ARP request to locate A.B. A table entry is created, but is not "complete". Since we are only discussing the "dynamic" case, the 3174 sends the ARP request in each format, sending the V2 format first. When a valid ARP response comes back, the 3174 marks the entry as complete, if it is not already complete, and assigns the frame format of the response to that entry, replacing the previous frame format. Any pending datagram is sent with that frame format. Therefore, if the remote host supports both frame formats, and answers both of the ARPs, the format of the second response would replace that of the first in the ARP entry.
2. When a remote TCP/IP host (X.Y) sends an ARP request containing the 3174's IP address, the 3174 creates an ARP table entry, if it does not already exist, and marks it complete. It also assigns the frame format of the request to the ARP entry and responds with that format. Therefore, if the requestor supports both frame formats, and sends ARPs in both formats, the 3174 would answer both requests; the format of the second request would be stored in the ARP entry.

Since TCP/IP operates in a "connectionless" environment, frames may be lost during ARP. If ARP processing does not complete, the datagram that caused the search is discarded. If this happens, the higher layers of the TCP/IP stack are responsible for recovering appropriately. For example, the 3174 PING function would not retry a frame if no response is received; rather, it would report the loss to the user. If a request to start a TELNET session is lost, the TCP layer times out and notifies the user, who can then attempt the session again.

The following figures show the possible flows for this discovery procedure.



* Since the 3174 does not care what format an incoming datagram has, it does not matter that the first datagram from the left side is V2 format, while later datagrams are 802.3

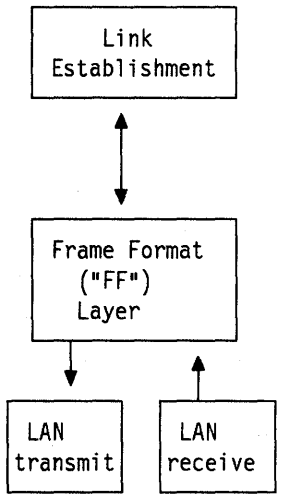
Figure 248. Frame Format Discovery for TCP/IP

SNA Connections

For its SNA connections, the 3174 also goes through a discovery process, using LLC TEST and XID commands and responses. There is a key difference, however, between the LLC process and the TCP/IP ARP process: for the SNA connections, the 3174 must tell the adapter which format is to be used for a given end-to-end connection. There are 2 phases of the 3174 SNA LLC sessions:

1. Link Establishment -- this phase uses type 1 (connectionless) TEST and XID frames to determine the remote station's availability and readiness to communicate. This phase is managed by code in the 3174 which builds TEST and XID frames, and analyzes responses. (The only exception is when the adapter receives a TEST command; it automatically responds, without notifying the 3174.) Timeouts and retries are handled by the 3174 link establishment code.
2. Connected -- this phase uses type 2 (connection-oriented) frames to communicate with the remote station. This phase is managed by the LLC function in the adapter; it maintains sequence counts, responds to incoming frames and handles all retries and timeouts. Only data is passed to/from the 3174. When this phase is entered, the 3174 must tell the adapter which frame format to use for the connection; therefore, during the link establishment phase, the 3174 code will make the determination.

To dynamically discover the correct frame format, an FF (frame format) layer is added to the 3174 token-ring processing; this layer is inserted between the link establishment code and the transmit and receive interfaces to the adapter.



The FF layer works with 2 state variables: FFSENT and FFRCVD. A pair of these variables exists for each link station, and they have these possible values:

- 0 -- neither 802.3 nor V2
- 1 -- 802.3
- 2 -- V2
- 3 -- both 802.3 and V2

For example, if FFSENT is 1, then a frame has been sent in 802.3 format. And if FFRCVD is 3, then frames have been received from the remote station in both V2 and 802.3 formats. The FF layer can set these variables, but never clear them.

The link establishment layer clears the variables before starting link establishment, and between TEST and XID subphases.[1] It then uses the final values of these variables to determine what frame format to direct the adapter to use for the session. If FFRCVD is 2, use V2, otherwise use 802.3.

The FF layer has no knowledge of the type of frame (XID or TEST, command or response) it is handling. Its only job is to determine the frame format to use. For received data, the FF layer simply sets the FFRCVD variable according to the received frame. For transmitting data, Table 6 shows how the FF layer uses these variables. The underlying theme of this algorithm is that once the 3174 has received a frame in 802.3 format, it will transmit all future frames in that format.

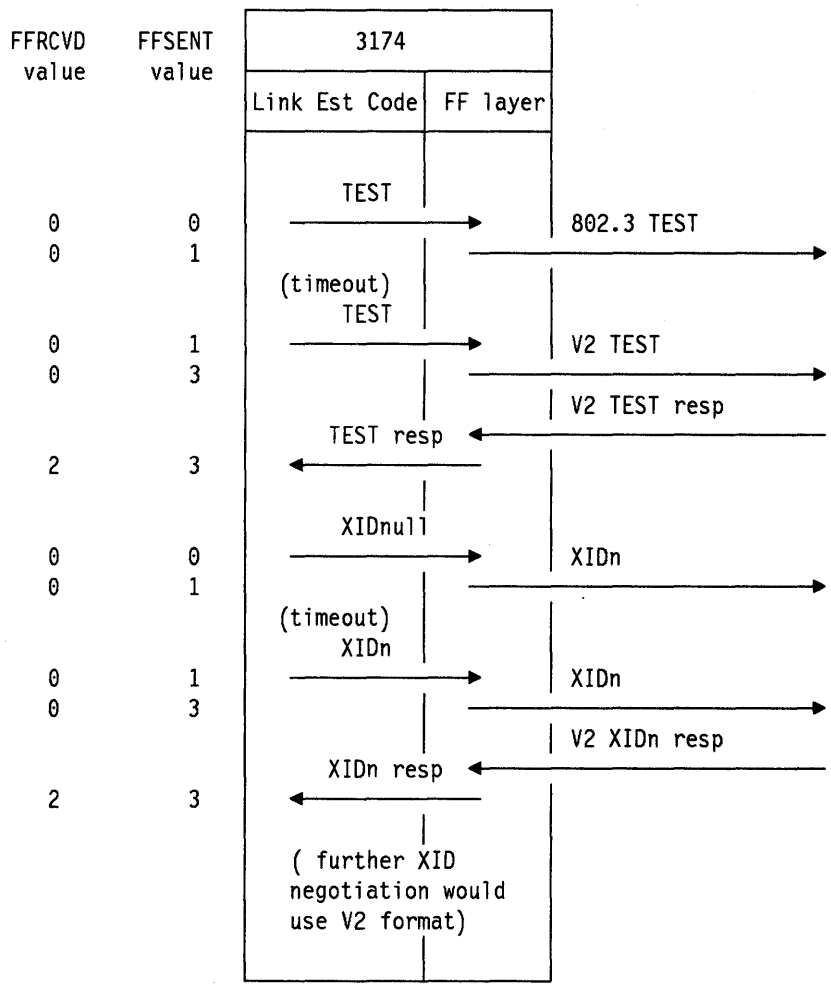
Table 6. Transmission Table for SNA Frame Format Discovery

if FFRCVD=	... and FFSENT=	then send the frame with format=	and set FFSENT to
0	0	802.3	1
0	1	V2	3
0	2	n/a	
0	3	802.3	1
1	0	802.3	1
1	1	802.3	1
1	2	n/a	
1	3	802.3	1
2	0	V2	2
2	1	V2	3
2	2	V2	2
2	3	V2	3
3	0	802.3	1
3	1	802.3	1
3	2	802.3	3
3	3	802.3	3

[1] The TEST subphase does not necessarily give a true reading of the remote station's capabilities, since a TEST frame is sent to a remote SAP of 0, and not to a specific SAP. Also, the remote adapter may respond to a TEST frame of either frame format, while the higher layer SNA processing in the remote machine is not able to handle one or the other. Therefore, we use the FF layer processing to ensure that we try both formats during TEST subphase, but we cannot use the results of that phase to determine the real capabilities of the remote station.

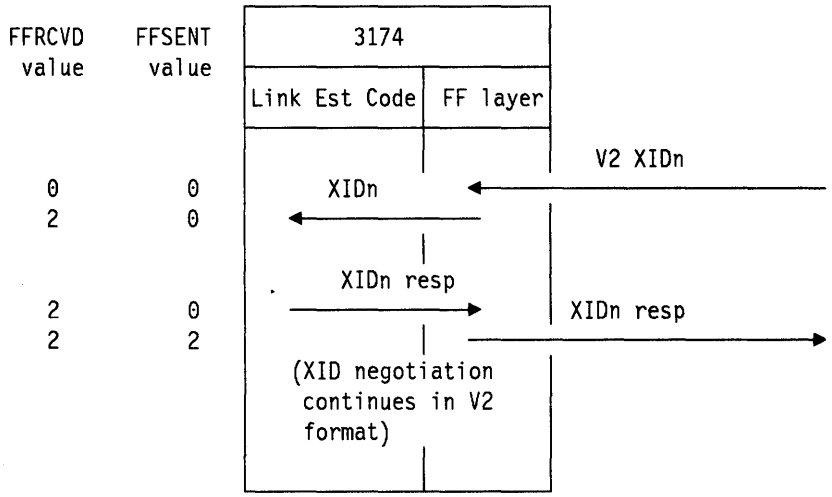
The following flows show how this processing works with the 3174 link establishment code:

In this example, the remote device supports only V2 frames:



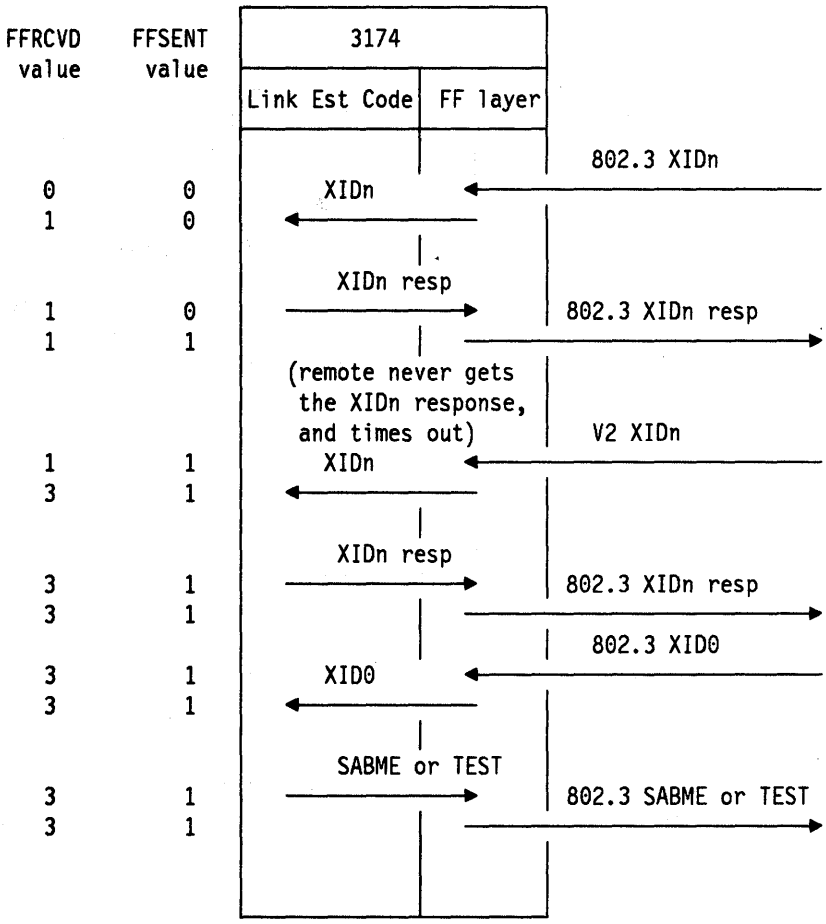
When XID negotiation is complete, FFRCVD = 2, so the 3174 opens the station to the adapter with frame format = V2.

In this example, the remote device supports only V2 frames, and is the initiator of the session:



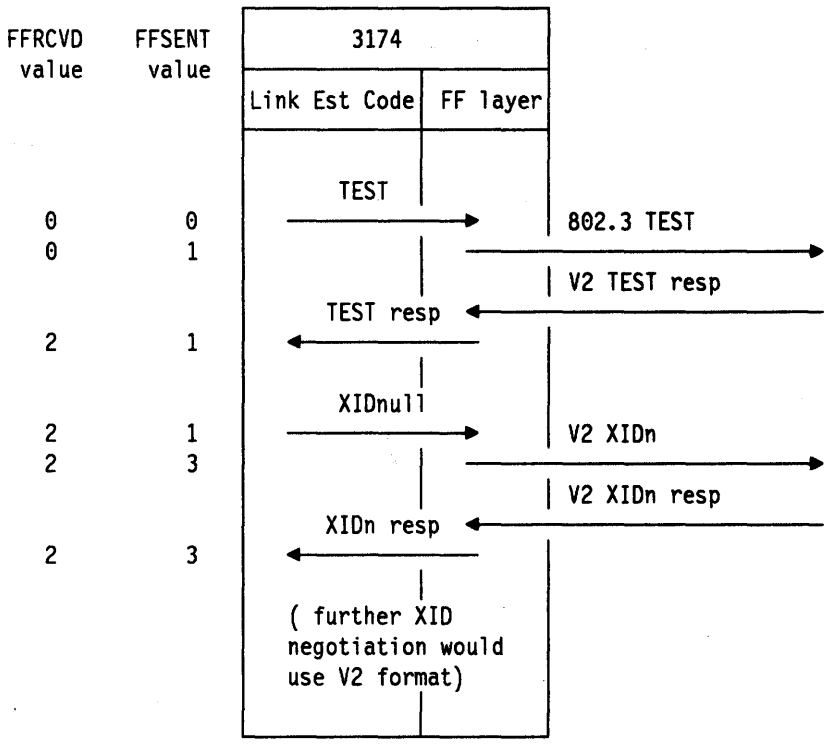
When XID negotiation is complete, FFRCVD = 2, so the 3174 opens the station to the adapter with frame format = V2.

In this example, the remote device supports both types of frames, and is the initiator of the session. The first XID response from the local 3174 is lost in transmission and never received at the remote end:



When XID negotiation is complete, FFRCVD = 3, so the 3174 opens the station to the adapter with frame format = 802.3.

In this example, the remote device is an AS400 that supports only V2 frames (that is, it will transmit only V2, but will accept both as input):



When XID negotiation is complete, FFRCVD = 2, so the 3174 opens the station to the adapter with frame format = V2.

8.2 3174 Ethernet Adapter

The purpose of this adapter is to provide the 3174 with a high performance CSMA/CD and Ethernet Version 2.0 (DIX) communication facility via 16-bit MMIO transfers. This adapter performs the functions necessary to support one, and only one, CSMA/CD LAN when installed in the 3174.

Functional and operational highlights of the adapter are as follows:

- Interfaces the CSMA/CD logic to the 5005-Bus (MMIO) using 8 or 16-bit transfers.
- Provides physical access to a CSMA/CD and Ethernet Version 2.0 (DIX) LAN via one of the following physical media:
  - 10Base-2
  - 10Base-5
  - 10Base-T
- Supports universal addressing.
- Supports CDID (Card Detect and Identify facility).
- Provides the LLC (Logical Link Control) functions.

8.2.1 Capacity

This adapter provides physical and logical attachment to a single 10Mbps CSMA/CD or Ethernet Version2.0 (DIX) LAN. LAN physical attachment is made via an RJ-45 connector (10base-T), coaxial connector (10base-2), or through an AUI and MAU attached to a 15-pin D-shell (10base-5). The MAU and AUI are not provided with the adapter.

8.2.2 Configurations

This adapter comes standard with no features which can be changed physically. There are no program pins or switches on the card that can be changed to alter any function of the adapter.

Cables for attaching the LAN to the adapter are not supplied with this adapter.

One BNC-T connector is supplied with the adapter. The T connector is supplied by IBM, and is included in the build group in USA.

Wrap plugs are supplied with the adapter, one for each physical interface. The wrap plugs are supplied by IBM, and are included in the build group in the USA.

8.2.3 CSMA/CD LAN Physical Interfaces

The CSMA/CD adapter provides three physical interfaces to the LAN. Only one of these physical interfaces may be used at a time.

The supported physical interfaces are:

- 10Base-2 which uses a BNC connector
- 10Base-5 which uses a 15-pin D-SUB connector
- 10Base-T which uses an RJ-45 connector

10Base-2 Connector

The adapter has a BNC male connector that provides attachment to the coaxial cable. The BNC connectors shall be of the 50 ohm constant impedance type.

10Base-5 Connector

Attachment between the adapter and Medium Attachment Unit (MAU) is done via an Attachment Unit Interface (AUI). The adapter has a female 15-pole connector.

For detailed information see *IEEE 802.3 CSMA/CD Specification*.

The pin assignments for the adapter are as follows:

Table 7. 10base-5 AUI Connector Pin Assignment

CONTACT	CIRCUIT	USE
3	DO-A	Data Out circuit A
10	DO-B	Data Out circuit B
11	DO-S	Data Out circuit Shield
5	DI-A	Data IN circuit A
12	DI-B	Data IN circuit B
4	DO-S	Data In circuit Shield
7		Reserved
15		Reserved
8		Reserved
2	CI-A	Control In circuit A
9	CI-B	Control In circuit B
1	CI-S	Control In circuit Shield
6	VC	Voltage Common
13	VP	Voltage Plus
14	VS	Voltage Shield
Shell	PG	Protective Ground (Conductive Shell)

10Base-T Connector

Attachment between the adapter and the Telephone Twisted Pair (TTP) cable is made via an RJ-45 connector. The adapter has a female connector.

The pin assignments for the adapter are as follows:

Table 8. 10base-T RJ-45 Connector Pin Assignment

CONTACT	CIRCUIT	USE
1	TD+	Transmit Data Positive for HI Signal
2	TD-	Transmit Data Negative for HI Signal
3	RD+	Receive Data Positive for HI Signal
4		Not Used for 10Base-T
5		Not Used for 10Base-T
6	RD-	Receive Data Negative for HI Signal
7		Reserved
8		Reserved

8.2.4 Hardware Group and Type Number

The hardware group (HG) number for the Ethernet adapter is 41. The type number for the Ethernet adapter is 9344. For more information about hardware group numbers and type numbers, refer to your base model maintenance information manual.

8.2.5 Field Replaceable Unit Identification (FRU ID)

The FRU ID numbers are used to build the hardware configuration table that is written on the disk used to IML the controller. The hardware configuration table is shown on the following screen. The hardware configuration table can be displayed using Online Test 2 or the offline test monitor.

```
                ____ Hardware Configuration Table _______

HG TYPE LC DESCRIPTION      SC      HG TYPE LC DESCRITION          SC

01 9154 21 File Adpt                41 9344 12 Ethernet Adapter
01 0114 01 Diskette 1 - 2.4MB       51 9263 15 Tpl Concur. Com-EIA
02 0114 02 Diskette 2 - 2.4MB       87 9501 18 Processor
03 9132 03 Fixed Disk 1 - 20MB      87 9053 19 Storage-2MB
08 9501 18 Timer Disk 1 - 20MB      87 9053 20 Storage-2MB
09 9011 05 Ops Panel                87 9053 17 Storage-2MB
09 9520 05 Ops Panel Assembly
16 9210 11 Channel Adpt
16 9230 10 Channel Drvvr/Rcvr
26 9154 21 Terminal Adpt
26 9174 13 Terminal Adpt, 00-07
26 9174 16 Terminal Adpt, 08-15
26 9174 22 Terminal Adpt, 16-23
26 9172 23 Terminal Adpt, 24-31



Select test; press ENTER ===> _

PF: 3=Quit  12=Test menu
```

Figure 249. Hardware Configuration Table

```
HG   = Hardware Group
TYPE = FRU Type number
LC   = FRU Location
SC   = Status code indicating an error on normal IML
```

Note: In the 3174, only those FRUs that are physically installed appear in this table.

For more information about FRU ID numbers, Online Test 2, and the offline test monitor, refer to the base model maintenance information manual.

8.2.6 Status Codes

For information about:

- Status codes that deal solely with Ethernet attachment, refer to *Supplemental Customer Information of Configuration Support C Release 4 - Ethernet Attachment, GA27-3994.*
- Status codes that apply to token-ring and Ethernet attachments, refer to *3174 Status Codes, GA27-3832.*
- Event log, refer to the base model maintenance information manual.

8.3 3174 Ethernet Customization

Since Configuration Support-C Release 4 function is essentially the same as token-ring, most of the existing customization panels that are available in Configuration Support-C Release 3, apply to Configuration Support-C Release 4, with a few changes. For 3174 TCP/IP Telnet Support there is no need for an SNA host over the primary link. 3174 TCP/IP Telnet Support under Configuration Support-C Release 4, does not require that customize the 3174 as an APPN node, gateway or DSPU. To do this, the LAN specific type question have been isolated to two new panels -- one for token-ring and one for Ethernet. The token-ring panel has been disabled in base Configuration Support-C Release 4 microcode. This isolates the common LAN information from the panels that pertain to specific functions that use the LAN.

The following pages show you the difference between Configuration Support-C Release 3 and Configuration Support-C Release 4 customization panels.

If you are planning microcode customization for the first time, read Part 1 and Chapter 5 of the *3174 Establishment Controller Planning Guide*. If you are experienced at planning microcode customization, you may want to skim those chapters.

8.4 Configuration Questions

As you follow the procedure in the *3174 Planning Guide* to answer the configuration questions and fill out the worksheets, use the information in this chapter for Ethernet-specific information. This information has been taken from the *3174 Ethernet Supplement*. For worksheets and configuration questions not included in this section, refer to the worksheets and configuration questions in the *3174 Planning Guide*.

8.4.1 Model/Attach Panel

Here is the C3 format of this panel:

```
                    ___________ Model / Attach ____________

 098 ______

 099 -

 100 - XXX

 101 - X




PF:  3=Quit  4=Default           8=Fwd
```

Figure 250. Model / Attach

Here is the C4 format of this panel:

```
                    ____________ Model / Attach ____________

Online Test Password     098 -

Product Assistance Data
099 - 3174 ETHERNET ADAPTER

3174 Model               100 - XXX

Host Attachment          101 - X    1-BSC             5-SNA Channel
                                    2-SDLC            6-SDLC, X.21 Switched
                                    3-X.25            7-Token-Ring
                                    4-Non-SNA Channel 8-Ethernet
                                                      M-Multi-host

LAN adapter type         102 - X    0-none
                                    1-Token Ring
                                    2-Ethernet

NSO selection            103 - 0000000000000000

PF:  3=Quit  4=Default           8=Fwd
```

Figure 251. Model / Attach

Here are the changes to the Model/Attach panel:

Question 100: 3174 Model

Response:

Enter the actual model number or the alternate configuration model number of the controller you plan to customize. See "Alternate Configurations", for the alternative configurations that can be used.

Question 101: Host Attachment

Response:

1 = BSC
2 = SDLC
3 = X.25
4 = Non-SNA (Channel)
5 = SNA (Channel)
6 = SDLC (X.21 Switched)
7 = Token-Ring Network
8 = Ethernet
M = Multi-Host Support

This question allows a response of 8 to signify Ethernet host attachment.

Question 102: LAN Adapter Type

This is a new question.

Response:

0 = None
1 = Token-Ring
2 = Ethernet

This question determines the type of LAN, if any, to which the 3174 attaches.

Default is 0.

Question 103: Non-Standard Operation Selection

Response:

16-character hexadecimal string using hexadecimal digits 0-9 and A-F.

Default is 0000000000000000 which means feature is enabled. Each of the hexadecimal digits represents four NSO bits, and these bits control the NSO feature. If an NSO bit is 1, the NSO feature is enabled. If 0, it is disabled.

Note: Most installations require that the NSO bits be set to the default. Your customer support center will advise you if any of the NSO bits are applicable for your installation.

Note: New checks for these questions are:

1. For x3R, 7 and M are the only valid responses for Q101, and 1 (token-ring) is the only valid response for Q102.
2. For x4R, 8 and M are the only valid responses for Q101, and 2 (Ethernet) is the only valid response for Q102.

8.4.2 Ethernet Description Panel

This new panel is displayed if Q102 indicates that there is an Ethernet adapter in the box.

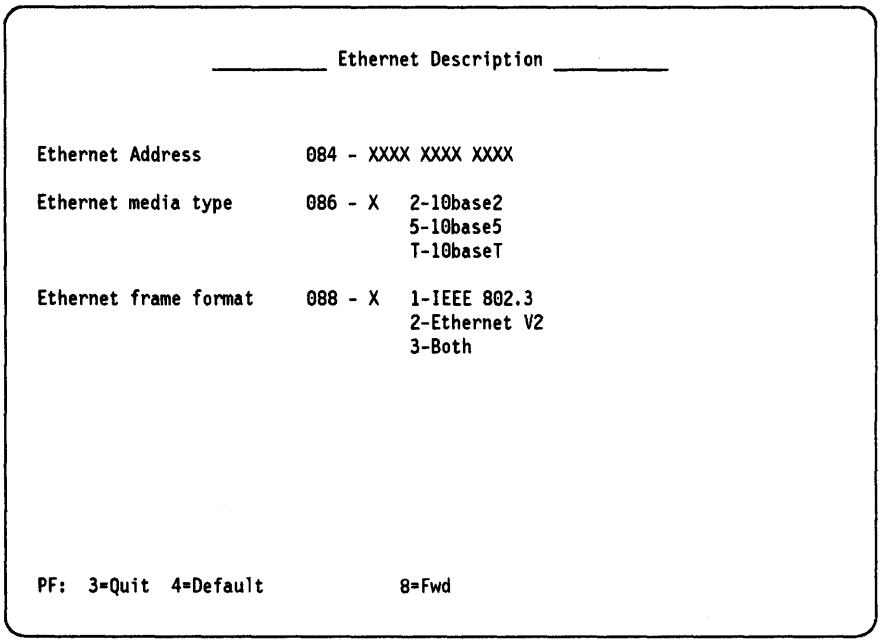


Figure 252. Ethernet Description Panel

The new questions are:

Question 84: Ethernet Address

Response:
12-character hexadecimal address.

The address can be a locally administered address, a universal address, or all zeros.

A locally administered address is in the following format:

```
4000 XYYY YYYY
```

where XYYY and YYYY are the user-assigned portion of the locally administered address. The X should not be greater than hexadecimal 7.

A universal address is in the following format:

```
WWWW WWZZ ZZZZ
```

where WWWW WW = the ID of the adapter manufacturer (IBM's ID = 0800 5A).
ZZ ZZZZ = the unique address portion of this adapter's universal address.

Warning: When the product permits you to enter either type of address, the suggested choice is a locally administered address. If the universal address is used and the Ethernet adapter is replaced, the 3174 and the gateway will have to be recustomized with the new address.

An address of all zeros allows the registered universal address built into the adapter to be used.

Note: LAN address must be customized using a canonical form of hexadecimal representation. For information about bit order in addresses and a guideline for address conversion, see Appendix A, "Address Bit Order for Ethernet Addresses" on page 359.

Question 86: Ethernet Media Type

Response:
2 = 10base2
5 = 10base5
T = 10base-T

There is no default.

This shows the type of Ethernet media that the 3174 is attached to.

Question 88: Ethernet Frame Format

Response:
1 = IEEE 802.3
2 = Ethernet V2
3 = Both

The default is (3) both 802.3 and V2.

This question determines the frame format(s) that you want the 3174 to recognize.

8.4.3 Local Area Network Panel

This new panel is displayed if Q101 indicates that there is an Ethernet connection to the host.

```
                    Local Area Network

106 - YYYY YYYY YYYY 04   107 - XXXX XXXX XXXX 04   108 - 0000000

110 - 0 0000              116 - 0_ __

121 - 01      123 - 0     125 - 00000000            126 - 00000000   127 - 0 0

132 - 0 0 0 0             136 - 0 0 0 0             137 - 0 0 0 0    138 - 0

141 - A                   165 - 0                   166 - A          168 - 0

173 - 00000000            175 - 000000              179 - 0 0 0

213 - 1                   215 - 00000               220 - 0

382 - 0521                383 - 2

385 - IBMLAN              386 - 1


PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 253. Local Area Network Panel

Here are the changes to the LAN panel, which now appears if you specify an Ethernet host attachment.

New Title

"Token-Ring Network" becomes "Local Area Network"

Question 106: Address and SAP

Response:
12-character hexadecimal address and a 2-character hexadecimal service access point.

The address portion of this question is protected and filled in from the answer to Q84. Only the SAP can be changed.

Question 382: Transmit I-Frame Size

Response:
Four numeric characters.

The default is 0521.

For the Ethernet adapter, the valid response ranges from 265 to 1493 bytes.

Note: The response to this question depends on your gateway and LAN configuration.

8.4.4 Common Network Panel (Gateway 900)

Here is the C3 format of the common network panel:

```
                    Common Network

900 - XXXX XXXX XXXX 04    905 - 1            908 - IBMLAN

911 - 0                    912 - 00

920 - XXXXXXX



PF: 3=Quit    4=Default    7=Back    8=Fwd    9=RtnH
```

Figure 254. Common Network

Here is the C4 format of this panel:

```
                    Common Network

900 - YYYY YYYY YYYY 04    905 - 0            908 - IBMLAN

                           912 - 00

920 - XXXXXXX



PF: 3=Quit    4=Default    7=Back    8=Fwd    9=RtnH
```

Figure 255. Common Network

These are the changes to the common network panel:

Question 900: Address and SAP

The address portion of this question is protected and filled in from the answer to Q84, depending on the LAN type. Only the SAP can be changed.

The default value for the SAP is 04.

Question 905:

This question has no meaning for Ethernet, and the response should be ignored if Q102=2.

Question 908: Link Subsystem Name for LAN

The default response is IBMLAN, which is automatically filled in during customization.

Question 911: Ring Speed of the Gateway

This has been deleted and replaced by Q083 on the Token-Ring Description panel.

8.4.5 Gateway 940 Panel

The Gateway 940 panel has one change to support Ethernet adapters: The "T" column, which assigns a device type to each gateway DSPU, currently allows responses of 0 (workstation), 1 (3174) or 2 (8KB RU device). These responses are used to fill in an appropriate default frame size on the 941 panel. Since Ethernet has a max I-field size of 1493, the type 2 class of device is not applicable. So a response of 2 is not allowed for Ethernet.

8.4.6 Gateway 941 Panel

The 941 panel has only one change. The Transmit I-frame size column gives the maximum I-frame size to use when transmitting to the station. (Actually, this should really be "I-field" of the I-frames.) Responses of 3 (2KB), 4 (4KB) and 5 (8KB) are not applicable for Ethernet adapters, because with Ethernet, we can only send up to 1493 bytes of data. Therefore, response 3 for an Ethernet configuration will mean 1493 bytes, and responses larger than 3 are not allowed.

8.4.7 TCP/IP Options Menu

This menu appears in the AEA and TCP/IP utility. The last 2 questions on this panel are Routing Field Support and All Routes Broadcast; these 2 are not applicable for an Ethernet configuration, and the responses should be ignored.

8.4.8 End-User Productivity Panel

The option on this panel titled "Token-Ring T1 Timer" is changed to "LAN T1 Timer".

8.5 Online Test ("/TEST")

This section discusses online tests that involve Ethernet attachment.

Here are the options from the online test main panel:

```
                ___ 3174 Test Menu (XTEST) ___
                                                (Page 1 of 2)
    Test      Description

      0       Terminal check
      1       Display event logs and response time log
      2       Display configuration panels
      3       3270 device status information
      4       Reset logs and cable errors
      5       Display vital data
      6       Display Control Areas
      7       Color convergence
      8       Extended functions and program symbols
      9       LAN tests
     10       Port wrap tests
     11       Trace control
     12       Asynchronous emulation adapter tests
      A,n     Alert to host ID n (n=1A-1H,2A-2D,3A-3D)
      D,n,m   Dump device on port n, HG m (n=0-31, m=26-27)
     13       Enterprise Systems Connection (ESCON) Adapter tests
     14       3174 Operator Functions
     15       Display 3270 Host Status Summary
     16       Integrated Services Digital Network (ISDN) tests
     17       Advanced Peer-to-Peer Networking (APPN) tests


Select Test; press ENTER ===> _

PF: 3=Quit  8=Fwd
```

Figure 256. 3174 Test Menu

Configuration Support-C Release 4 causes changes to the following tests:

- /1 -- Logs display
- /2 -- Display customization
- /9 -- LAN tests
- /15 - Host status summary
- /17 - APPN tests

8.5.1 /1 -- Logs Display

The new hardware group number for Ethernet adapters is displayed here for log entries pertaining to the adapter. There are no code hits however, as the actual HG numbers are transparent to the LOG display code.

8.5.2 /2 -- Display Customization

The changes to the customization panels and sequences are reflected in this test.

8.5.3 /9 -- LAN Tests

Here is the current menu for /9, LAN tests:

```
                  _________ LAN Test Menu _________

     Option    Description

       1       Monitor token-ring status
       2       Display token-ring adapter status summary
       3       Reset token-ring adapter status counters
       4       Display link status summary for all links
       5,*     Display link status summary
       6       Reset link status counters for all links
       7,*     Reset link status counters
       8       Display Gateway host status summary for all links
       8,h     Display host status summary for all host id h
       9,u     3174-Peer status (u=update)
      10,u     3174-Peer bridge profile (u=update)
      11       3174-Peer bridge status
      12,u     LAN Manager Profile (u=update)
      13       Re-open token-ring adapter
    * = N or h or h,n where n=link address  h=host ID

To go directly to other tests, enter: /Test,Option
Select option; press ENTER ===> _

PF:  3=Quit
```

Figure 257. LAN Test Menu

For C4, the panel is changed to "LAN" instead of "token-ring":

```
                  _________ LAN Test Menu _________

     Option    Description

       1       Monitor LAN status
       2       Display LAN adapter status summary
       3       Reset LAN adapter status counters
       4       Display link status summary for all links
       5,*     Display link status summary
       6       Reset link status counters for all links
       7,*     Reset link status counters
       8       Display Gateway host status summary for all links
       8,h     Display host status summary for all host id h
       9,u     3174-Peer status (u=update)
      10,u     3174-Peer bridge profile (u=update)
      11       3174-Peer bridge status
      12,u     LAN Manager Profile (u=update)
      13       Re-open LAN adapter
    * = N or h or h,n where n=link address  h=host ID

To go directly to other tests, enter: /Test,Option
Select option; press ENTER ===> _

PF:  3=Quit
```

Figure 258. LAN Test Menu

For an Ethernet configuration, selections 10, 11 and 12 are not valid, since the bridge part of peer communications is not supported for Ethernet.

/9, Option 1 -- Monitor LAN Status

This test puts the user in a monitor mode, where hardware interface information is displayed/updated until the user stops the operation. For token-ring, Signal Loss, Hard Error and Wire Fault are displayed. For Ethernet, these indicators are not appropriate; the following statuses are substituted[2]:

- No Carrier
- Collisions Detected

The C4 version of this panel is shown below.

In the panel, the first line will say which adapter type is installed. The message lines starting with "nnnn" are displayed for a 10base-2 or 10base-5 interface, while the "mmmm" lines are shown for a 10base-T interface. SSC numbers to replace xxxx, nnnn and mmmm are to be determined.

```
                ____ Monitor LAN Status ____

4739-Local LAN Adapter is Ethernet

4697-Local LAN adapter closed

4741-Media Error - Transceiver not working?
                   Cable fault?
                   Cable disconnected?
                   Hub not connected?
4742-AUI 12-Volt Overcurrent Error - replace AUI cable

4740-Adapter Check - service Ethernet adapter


4694-The test has been active for 00000 minutes.

4695-The test will terminate in n minutes.
     Press PF9 to continue for another 10 minutes.

To go directly to other tests, enter: /Test,Option
Select option; press ENTER ===> _

PF: 3=Quit  9=Cont  12=Test menu
```

Figure 259. Monitor LAN Status

[2] Based on *IBM 3174 Ethernet Adapter RAS Characteristics*, by D.L.Hough, October 8, 1992

/9, Option 2 -- Display LAN Adapter Status Summary

This option displays error counters that are maintained by the LAN adapter. The following counters are defined for Ethernet:

```
                ____ Ethernet Adapter Status Summary ____

Address - 400000000001 (Open  )   Links:   Customized - XXX    Active - XXX

                                    Counters        Overflow
Alignment errors                    XXXXXXXX           0
FCS errors                          XXXXXXXX           0
Single Collision Frames             XXXXXXXX           0
Multiple Collision Frames           XXXXXXXX           0
SQE Test Errors                     XXXXXXXX           0
Late Collisions                     XXXXXXXX           0
Internal MAC Transmit Errors        XXXXXXXX           0
Carrier Sense Errors                XXXXXXXX           0
Excessive Deferrals                 XXXXXXXX           0
Frames Too Long                     XXXXXXXX           0
Frames Too Short                    XXXXXXXX           0
Internal MAC Receive Errors         XXXXXXXX           0



To go directly to other tests, enter: /Test,Option
Select option; press ENTER ===> _

PF:  3=Quit       12=Test menu
```

Figure 260. Ethernet Adapter Status Summary

/9, Option 3 -- Reset LAN Adapter Status Counters

This test will reset all the counters displayed using option 2.

/9, Options 4, 5, 6, and 7

These options allow the display and reset of link station information for LLC connections, including the LAN address of the remote device, and LLC states. Since these tests pertain to LLC level information, they will look the same for C4 as they do for token-ring, with one exception. The frame format being used for the station is added for Ethernet connections. The format of the new information is shown in the following panel.

```
                              Link Status Test

 Link Address           XXXXXXXXXXXXX
 Primary/Secondary          XX/XX
 Trans I-Frames           XXXXXX  - 0
 Rec I-Frames             XXXXXX  - 0
 Transmit Errors          XXXXXX  - 0
 Received Errors          XXXXXX  - 0
 T1 Expired               XXXXXX  - 0
 Com/Res Ind, Format      WW XX  802.3









To go directly to other tests, enter: /Test,Option
Select ===>
 Informational message line
PF: 3=Quit                          12=Test menu
```

Figure 261. Link Status Test

/9, Option 8

Modify the panel to use "LAN" instead of "Token-Ring."

/9, Option 13 -- Re-open LAN adapter

(This support was added for token-ring under DCR 287.54.) We will continue to support this function for Ethernet adapters. It allows a user (under password protection) to restart the LAN interface, often after some terminating error occurs. For most errors, the 3174 retries automatically, so this function is only used for catastrophic errors.

8.5.4 /15 - Host Status Summary

The only change here is that the new Ethernet attachment type is displayed as appropriate. Here is a sample panel:

```
                    _______ 3270 Host Status Summary ________

                                                Connection
  ID   Host Descriptor       HG   Attach     Status

  1A   3270 type IBM host    41   Ethernet 505-10 Down
  1B   3270 type IBM Host    41   Ethernet 505-10 Down
  1C   3270 type IBM host    41   Ethernet 500-01 Up
  1D   3270 type IBM host    41   Ethernet 500-01 Up
  1E   3270 type IBM host    41   Ethernet 500-01 Up
  1F   3270 type IBM host    41   Ethernet 500-01 Up
  1G   3270 type IBM host    41   Ethernet 500-01 Up
  1H   3270 type IBM host    41   Ethernet 505-01 Down
  2A   3270 type IBM host    51   X.25     504-03 Down
  2B   3270 type IBM host    51   X.25     504-03 Down
  2D   3270 type IBM host    51   X.25     500-01 Up
  3A   3270 type IBM host    52   X.25     500-01 Up
  3B   3270 type IBM host    52   X.25     500-01 Up
  3C   3270 type IBM host    52   X.25     500-01 Up

 To go directly to other tests, enter: /Test,Option
 Select test; press ENTER ===> _

 PF: 3=Quit  5=Refresh  8=Fwd  12=Test menu
```

Figure 262. 3270 Host Status Summary

8.5.5 /17 - APPN Tests

Only one panel in the APPN tests requires a change for C4. Option 3 from the APPN test menu requests Link Status. The panel is shown below. The Adapter type is "ENET" for an Ethernet adapter, the local and remote address information is displayed just like token-ring, and the hardware group (HG) is 41.

```
                   _______________ Link Status _______________

                                                  Route Addition
   NETID      CPNAME    Type   Status   State     Resistance
  --------   --------   ----   ------   -----   --------------
  nnnnnnnn   nnnnnnnn    nn    nnnnnn    nn          nnnn


  RCV     SND     Combined      Number                      Session Resource
  Slam    Slam     PU 2.0      APPN Sess    Congestion         Depletion
  ----    ----    --------     ---------    ----------      ----------------
YES|NO|NA YES|NO|NA YES|NO        nnn          YES|NO            YES|NO


  Adapter     Local                                              Product
   Type      Address      TG  HG       Remote Address          Information
  -------  ------------   --  --   --------------------     ----------------
   nnnn    aaaaaaaaaaaa   nn  nn   aaaaaaaaaaaaaaaaaaaa     nnnnnnnnnnnnnnnn


 To go directly to other tests, enter: /Test,Option
 Select test; Press ENTER ===>

 PF: 3=Quit  5=Refresh  12=Test menu
```

Figure 263. Link Status

Chapter 9. 3174 TCP/IP Enhancements RPQ 8Q1041

With the availability of the 3174 TCP/IP Enhancements RPQ 8Q1041 in April 1994 new TCP/IP capabilities were added to the 3174.

The RPQ is based on Configuration Support-C Release 4, with token-ring and Ethernet adapter support enabled.

The RPQ 8Q1041 contains the following TCP/IP enhancements:

- TCP/IP TN3270

  TN3270 support makes it possible for client terminals to use the TCP/IP protocol to access 3270 applications in full-screen mode. While products such as the RS/6000 do a good job of supporting ASCII terminals in full-screen mode over TCP/IP TELNET, using an ASCII terminal data stream, VM and MVS typically do not. Normal VM/MVS support for ASCII terminal communications is via line-by-line mode.

  TN3270 makes it possible to use full-screen 3270 data stream communication between VM/MVS and a client terminal, instead of the line-by-line ASCII terminal data stream. This makes it feasible for client terminals to access mainframe 3270 applications via TCP/IP, as well as traditional SNA. Customers who prefer to avoid routing SNA over a TCP/IP network can now use the 3174's TN3270 support to build a pure TCP/IP network with IBM host access.

- LPD (Line Printer Daemon)

  TCP/IP dependent host printer support allows TCP/IP hosts to send ASCII print output to the 3174 for printing on the attached printers. Thus, printers can be either coax-attached or AEA-attached.

  Multiple 3174 attached printers provide print distribution for multiple TCP/IP hosts. A pool of printers can be defined as an LPD *queue*. The access to a queue can be open or restricted to a single host.

  The addition of TCP/IP host printing services through the 3174 allows offloading of the TCP/IP printing from the existing TCP/IP printing facilities. Multiple 3174 attached TCP/IP hosts will further offload TCP/IP host printing facilities.

  LPD provides only realtime printing. Spooling of the print jobs is not available. If the attached host does not support sending the control file before the data, MLT storage space is used to hold the data until the control file arrives.

- SNMP MIB-II

  SNMP MIB-II support enhances the level of network management support offered by the 3174. SNMP now allows access to the network management parameters defined in RFC 1213 - Managing Information Base (MIB) for Network Management of TCP/IP-based Internets.

9.1 Configurations

You can use the TCP/IP Enhancements RPQ on all models of the 3174 that connect to a token-ring or an Ethernet, and has sufficient memory.

In Figure 264, all CUT-mode terminals can access both TCP/IP hosts and the traditional IBM 3270 host. Using the 3174 Multiple Logical Terminal (MLT) support, the users can **hot-key** among all these sessions. The printer that is attached to the 3174 can receive print jobs from both of the TCP/IP hosts. In this example, the channel-attached 3174 is also performing the 3174's SNA gateway function, enabling the LAN-attached 3174 to access the traditional 3270 host.

TCP/IP support in the 3174 can be used concurrently with all other 3174 functions, including APPN. For example, the two 3174s in Figure 264 might be acting as APPN network nodes at the same time that they are participating in TCP/IP.

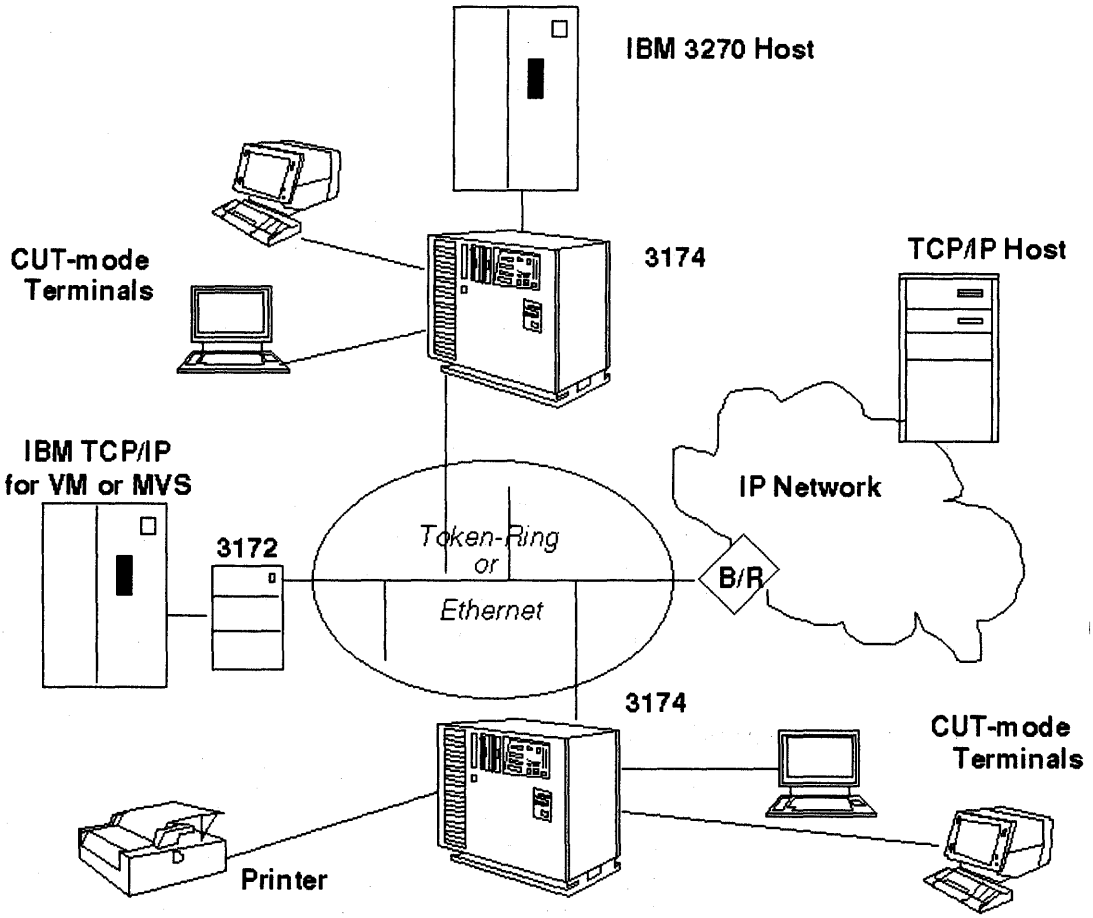


Figure 264. 3174 TCP/IP in a LAN

9.2 Devices

The TCP/IP Enhancements RPQ allows all displays that attach to the controller, except DFTs, to operate in ASCII TELNET or TN3270 mode[3] :

- Coax displays operating in CUT mode (CUTs, or the CUT side of a DFT-E)

  ASCII TELNET These are supported as DEC VT100, DEC VT200, IBM 3101 or Dasher D210 devices, using the ASCII emulation function of the 3174. (An AEA adapter is not required.)

  The TCP/IP Enhancements RPQ supports these devices in 24X80 mode only; the 132-characters-per-line support for DEC VT220 made available in Configuration Support-C Release 2, is not available for the TCP/IP sessions.

  TN3270 Full 3270 function is provided for these devices, including color support, models 2, 3, 4 and 5 screen sizes and Write Structured Fields. Local functions, such as copy session-to-session and split screen, are fully enabled while in a TN3270 session.

- ASCII displays that are attached via an AEA

  ASCII TELNET The ASCII data stream is passed to the terminal with no manipulation by the 3174

  TN3270 The 3174 performs 3270 emulation.

All printers that are directly attached to the 3174, either coax-attached or AEA-attached, can be used as LPD printers. HAP printers (printers attached to a port on a display) cannot be used for LPD. A printer that is being used for LPD cannot be used for 3270 host print sessions, nor can it be used for local copy printing.

9.3 Hosts

The 3174 connects the above devices to any host or device attached to the network, that can communicate over TCP/IP networks using ASCII TELNET, TN3270 or LPD protocols. This includes IBM and non-IBM hosts. In particular, TN3270 support allows full-function display access to TCP/IP in mainframe IBM hosts (TCP/IP for VM or MVS) and to CICS/6000* workstations.

9.4 3174 Microcode and Packaging

The TCP/IP Enhancements RPQ is a Control/Utility/Extension disk RPQ. This means you receive a complete set of 3174 diskettes with each order of the RPQ. It is based on Configuration Support-C Release 4 (CS-C4) Licensed Internal Code, with token-ring support enabled. The TCP/IP Enhancements RPQ provides all CS-C4 functions. DSL device, AEA, Peer Communications and APPN feature microcode has already been merged onto the Extension disk for you.

The TCP/IP Enhancements RPQ may not be compatible with other CS-C4 RPQs. Please contact your IBM marketing representative if you have questions about RPQ compatibility.

---

[3] 9.6, "Protocols" on page 269 describes the difference between these 2 modes.

The RPQ diskettes should not be used in configurations without TCP/IP.

9.5 Storage Requirements

Table 9 shows the additional storage your 3174 must have for the TCP/IP Enhancements RPQ. These amounts should be added to the amounts that are needed by your 3174 without TCP/IP.

Table 9. TCP/IP Enhancements RPQ Storage Requirements

	With AEA customized	Without AEA customized
Basic TCP/IP TELNET	231KB	362KB
SNMP	50KB	
Per session (printer or display)	7KB	
TCP/IP data buffers	Q060 amount -- see following text	
LPD	You may wish to allocate additional MLT space for temporary storage of LPD data files.	
Split Screen and/or TN3270	For each LT that is involved in split screen operations while accessing TELNET sessions, or is accessing a TN3270 destination, add 2KB to your base MLT calculation if the associated device does not have an EAB and add 4KB if the device does have an EAB.	

9.5.1 Sessions

When you customize for the TCP/IP Enhancements RPQ, you must select the number of concurrent TELNET sessions you want to allow, and the number of printer sessions. These are given by your responses to Questions 58 and 59 on the TCP/IP Options Menu. Each session requires the amount of storage shown in the table. For display sessions, the 3174 creates a pool of session resources, available to terminal users on a first-come, first-served basis. They are not assigned to any particular 3174 terminal port or LT. For printers, sessions are allocated as TCP connection requests are received from the remote host, and freed when the connection is ended.

9.5.2 Data Buffers

When you customize for the TCP/IP Enhancements RPQ, storage is reserved for 40 TCP/IP data buffers. Using customization Question 60 on the TCP/IP Options Menu, you can include an additional amount of storage for TCP/IP data buffers. This additional amount should be included in your storage calculations.

A 3174 TCP/IP data buffer has roughly 100 bytes available for data. To determine how much storage your controller will need for these buffers, you should consider the types of host applications that your users will be accessing. For example, host applications that send only a line at a time to the user's screen will use only 1 buffer at a time for a message. However, applications that send a full screen of information with screen formatting control included may send much larger messages, requiring many 3174 buffers at a time. Your decision will also be affected by the number of concurrent sessions you select.

When you run out of buffers:

- The 3174 discards data from the TCP/IP network, causing retransmissions and affecting response times.

- Requests to establish host connections will be rejected, and the users must retry.

9.6 Protocols

The 3174 supports the TCP/IP family of protocols over a LAN (token-ring or Ethernet). The next figure shows the protocol stack in the 3174, including the new TN3270 and LPD applications provided by the TCP/IP Enhancements RPQ. The rest of this chapter describes how the 3174 supports SNMP, TN3270, ASCII TELNET and LPD with the TCP/IP Enhancements RPQ.

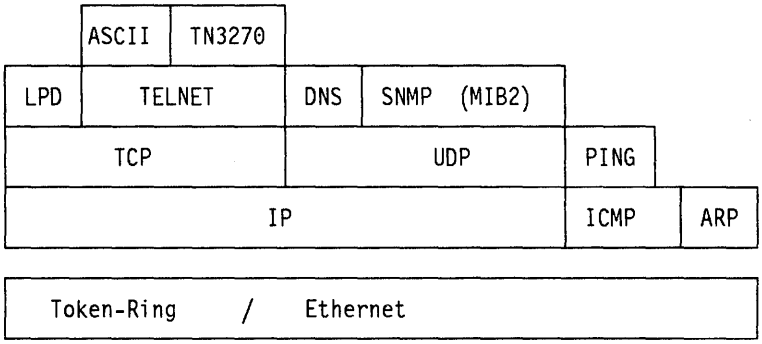


Figure 265. TCP/IP Protocols Provided by the 3174

9.7 TN3270

The 3174 TCP/IP TELNET function was originally shipped in August, 1992 as an RPQ on the C2 base, and has been incorporated into the base code for C3. This initial support provides connectivity to TCP/IP TELNET servers and hosts that communicate with an ASCII data stream. For the 3270 CUT terminals that are attached to the 3174, the controller's ASCII emulation function is used to convert between the ASCII data stream and the 3270 device control stream. For ASCII terminals, the controller's ASCII pass-through function is used, allowing the device and the server to exchange ASCII data with no manipulation by the 3174. For many TCP/IP hosts and servers, this ASCII support is required and sufficient.

IBM's TCP/IP function in VM and MVS does not support ASCII devices in full-screen mode; they can be used only in a line-by-line mode, which isn't exactly state-of-the-art! TCP/IP in VM and MVS use the TN3270 protocol to support terminals in full-screen mode. TN3270 is a TELNET session where a 3270 data stream is exchanged instead of an ASCII terminal data stream. This support in the mainframe allows client terminals to use TCP/IP to access existing 3270 applications in the mainframe.

The initial TCP/IP support in the 3174 is for token-ring access only. Because of this, the requirement to do TN3270 was not very strong; 3270 terminal users had an existing path to get to the 3270 mainframe applications, using the SNA support in the 3174. With the addition of Ethernet connectivity, however, there may be no 3270 **path** to the host, and TCP/IP may be the only way. Therefore, it is more important to have TN3270 in the 3174.

Also, a performance improvement is achieved with TN3270, since 3270 protocol is a block-mode exchange, rather than the typical character-mode used with ASCII data streams. Echoing of keystrokes is done by the 3174; when an Enter or function key is pressed, changes to the screen are sent to the host in blocks.

CICS/6000 is now available, allowing CICS applications to execute in an RS/6000. These applications typically support a 3270 data stream; they can be accessed via an ASCII data stream through TCP/IP TELNET, but this involves a conversion in the workstation from 3270 to the ASCII data stream. That is, they do the reverse of the 3174's ASCII emulation function. So with the existing 3174 TELNET support, a 3270 terminal's data stream is converted in the 3174 to ASCII, and then back to the 3270 in the RS/6000. By adding TN3270 in the 3174, we will eliminate the two conversions, and allow direct transfer of a 3270 data stream to a CICS/6000 platform.

9.7.1 Function

From the perspective of the TELNET protocols, TN3270 support is most easily understood as another TELNET terminal type. In a typical TELNET session establishment sequence, the host or server initiates terminal type negotiation (see RFC 930), by asking the client for its terminal type. If the server does not support that type of terminal, the server asks again. The client can answer with another type, if it can provide more than one type, or it can answer with the same type. Once a client responds twice with the same type, that means it can't do any others.

The 3174 will handle this by adding a new host data stream type in the station sets for TCP/IP hosts. When a host with the new **3270** type is selected as the destination from a 3270 terminal, the 3174 will send the 3270 device type during terminal-type negotiation.

The 3174 doesn't know the exact device type that is attached to a coax port. However, the 3174 does learn certain attributes of the device, that can be mapped into the device types that TCP/IP for VM and MVS understands.

The 3174 maps color devices to **3279** and monochrome to **3278** The screen size determines the model attribute (2, 3, 4 or 5). And the presence of an EAB is represented by **E** at the end of the device name. So, the 3174 will return one of the following types for coax terminals:

- IBM-3278-2
- IBM-3278-3
- IBM-3278-4
- IBM-3278-5
- IBM-3278-2-E
- IBM-3278-3-E
- IBM-3278-4-E
- IBM-3278-5-E
- IBM-3279-2
- IBM-3279-3
- IBM-3279-2-E
- IBM-3279-3-E

For ASCII terminals, the station set type determines the model size that is emulated, and also whether color is supported. The TN3270 types that are returned for ASCII terminals are:

- IBM-3278-4
  - DEC VT100
- IBM-3278-5
  - IBM 3151 Model 31,41,51,61
  - IBM 3162
  - IBM-3279-2
    - FTTERM
    - IBM 3164
    - Tektronix 4205
  - IBM-3278-2
    - All others

If the host rejects the 3270 device type by asking for the terminal type a second time, the TCP session ends.

While in an active TN3270 session, the user cannot enter the 3174's local mode. The main uses of local mode during an active session are for manipulating ASCII terminal characteristics, so it is not needed during 3270 mode. Between sessions, the 3174's local mode is the existing line-by-line interface: 3270 terminals will emulate VT100; ASCII terminals are in ASCII pass-through mode.

Since CICS/6000 TN3270 must be reached via a TCP port other than the **well-known** TELNET port, a customization option has been added to the station set definition. This new field allows the customer to specify which TCP port to use when doing an automatic host connection. (Automatic host connection is attempted if the IP address field in the station set is non-zero.) When not using automatic connections, the 3174 already allows the terminal user to select a TCP port number.

While in a TN3270 session, all the keyboard functions used during other 3270 sessions will work. That is, the restrictions that currently apply to TELNET sessions are removed:

- Copy session-to-session can be done with the TN3270 session as either the source or destination session
- Split screen functions can be done, even on ASCII TN3270 sessions

9.7.2 ASCII TELNET vs TN3270

With the RPQ 8Q1041, the 3174 now provides two ways to access TCP/IP TELNET servers: ASCII TELNET and TN3270. When ASCII TELNET is used, an ASCII terminal data stream is carried on the TCP session; the server exchanges ASCII data with the 3174, usually a character at a time. When the 3174 device is a coax terminal, the 3174 performs ASCII emulation, and converts the ASCII terminal data stream so that it can be displayed on a 3270 coax device. When the 3174 device is an ASCII terminal, the 3174 merely passes the data stream on to the terminal, as it is already in ASCII characters.

When TN3270 is used, an EBCDIC 3270 data stream is carried in the TCP session; the server and the 3174 exchange messages, or blocks of data, rather than characters. When the 3174 device is a coax-attached terminal, the 3174 processes the data stream for display on the device. When the 3174 device is an ASCII terminal, the 3174 performs 3270 emulation, and converts the 3270 terminal data stream to the appropriate ASCII terminal data stream.

Figure 266 illustrates the difference between these two types of connections.

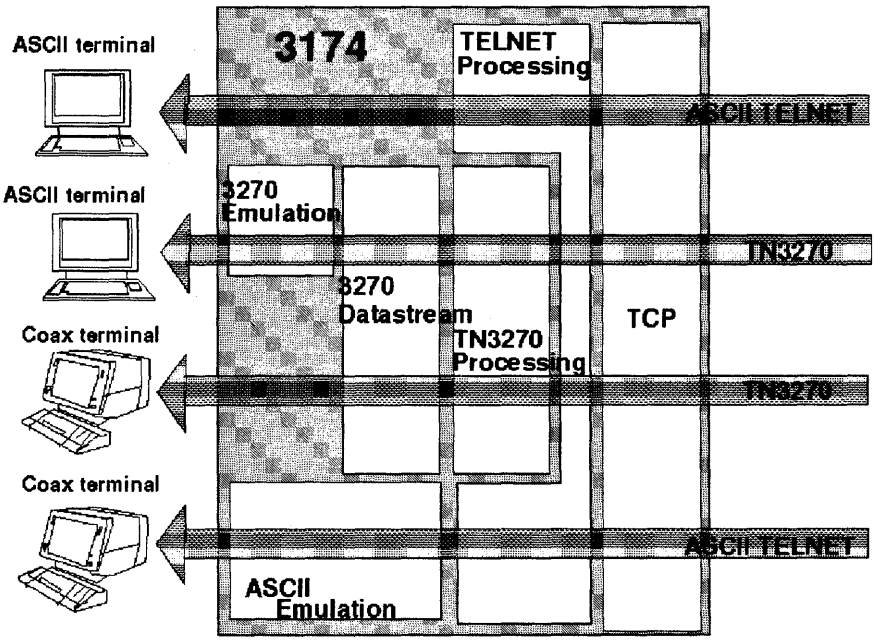


Figure 266. 3174 Processing for ASCII TELNET and TN3270

9.8 Line Printer Daemon (LPD)

The TCP/IP Enhancements RPQ expands the TCP/IP functions of the 3174 by allowing TCP/IP hosts to send print output to 3174 printers. With an LPD (Line Printer Daemon) server, the 3174 can accept print jobs for either coax or ASCII printers that are attached to the 3174. This function is **not** provided for printers that are attached to displays (HAPs).

The 3174 is not a spooling device; jobs are printed as they are received.

The 3174 assumes that the print data is ASCII. When the output printer is a 3270 printer, the ASCII emulation function of the 3174 is used; when the output printer is an ASCII printer (AEA-attached), the data is passed without conversion to the ASCII device. Figure 267 illustrates this processing.

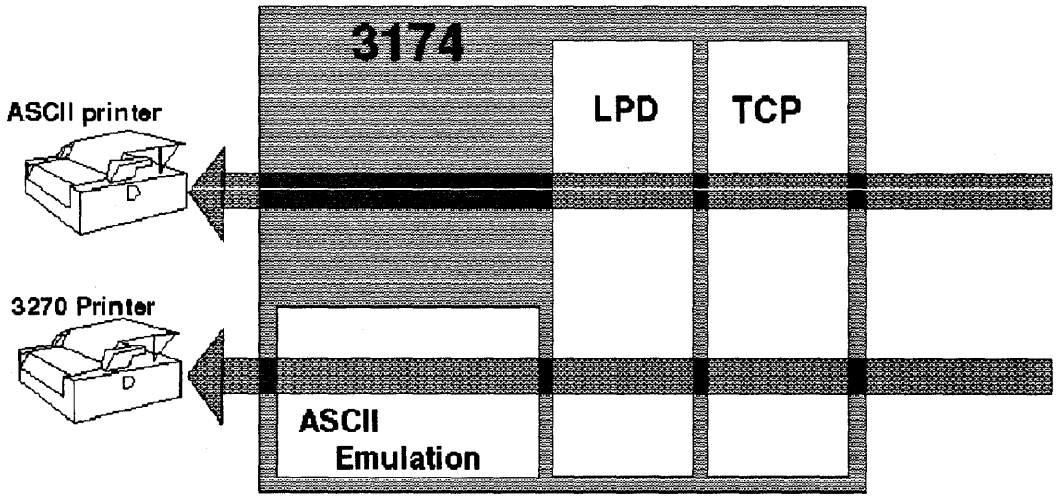


Figure 267. 3174 LPD Support

When providing ASCII emulation for 3270 printers, the 3174 supports a basic set of ASCII control codes shown in Table 10. No other ASCII control codes or escape sequences are recognized by the 3174.

Table 10. ASCII Control Codes for 3270 Printers

Character	Hex Code	Action Taken
BEL	X'07'	Sound audible alarm
CR	X'0D'	Carriage return
FF	X'0C'	Form feed
HT	X'09'	Tab --skip to next multiple of 8
LF	X'0A'	New line
US	X'1F'	Carriage return, line feed
VT	X'0B'	New line
XON	X'11'	Resume sending
XOFF	X'13'	Stop sending

9.8.1 Printer Pooling

You can configure the 3174 with any or all of these variations:

1. A set of similar[4] printers can be grouped into a pool, and any remote TCP/IP host can send jobs to that printer pool.
2. A set of similar printers can be grouped into a pool, and only one specific TCP/IP host can send jobs to that printer pool.
3. A set of similar printers can be grouped into a pool, and any TCP/IP host in a specified subnet can send jobs to that printer pool.
4. An individual printer can receive jobs from any remote TCP/IP host.
5. An individual printer can receive jobs from only one specific remote TCP/IP host.
6. An individual printer can receive jobs from any TCP/IP host in a specified subnet.

To provide these variations, the print queue name used by LPD to select a printer is mapped to the 3174 station set name. If the station set is assigned to a port set with more than one printer, an incoming job is sent to any available printer in that group. If the printer station set has an IP address specified that has **0** in the host portion of the address, jobs from any host on that subnet are accepted. If the printer station set has any other kind of IP address specified, only jobs from that IP address are accepted for that queue.

[4] **Similar** printers are those with the same connect type: AEA vs coax, direct vs. switched.

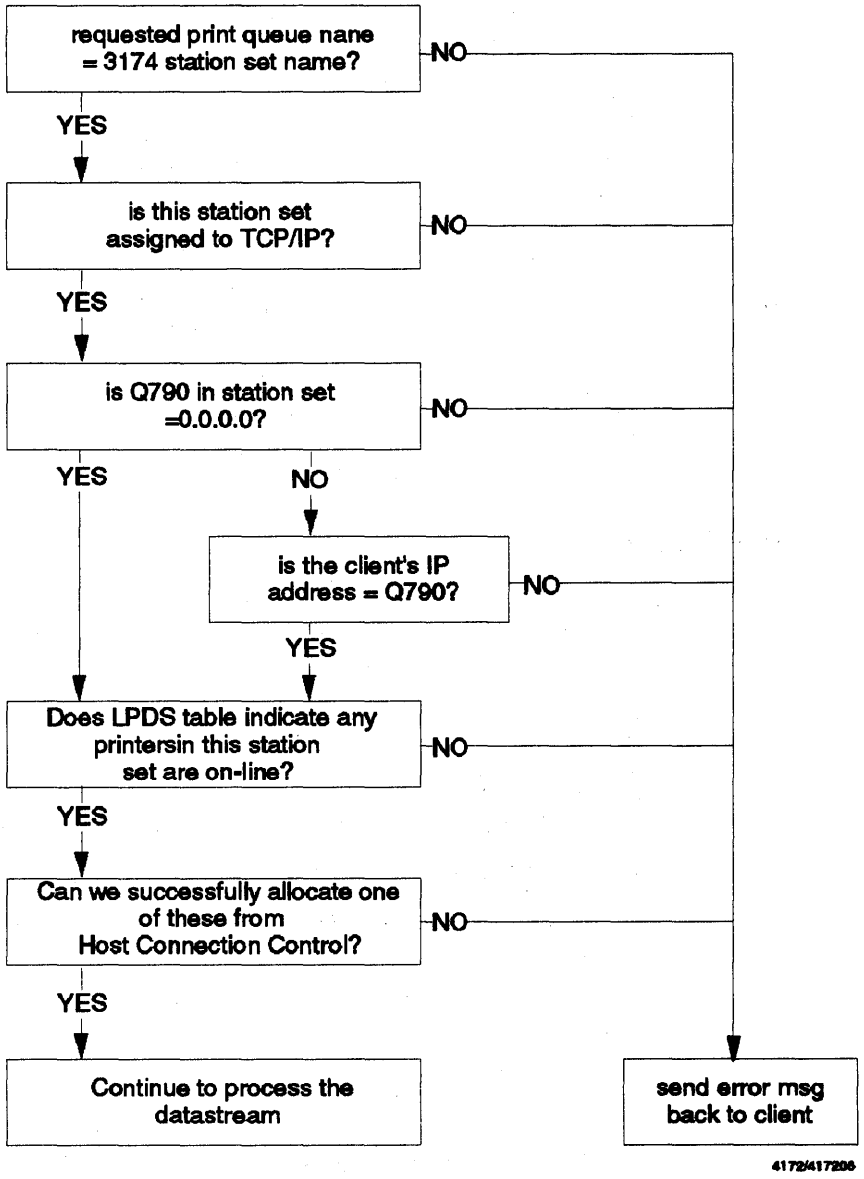


Figure 268. Printer Queue Validation Flow

9.8.2 LPD Data Stream

LPD function is defined in RFC 1179. The 3174 implements this RFC, but supports only a subset of the functions.

To use LPD, a TCP/IP client establishes a TCP connection with the 3174's LPD server. It then sends LPD commands as shown in Table 11 on page 277. A typical flow has two commands: receive control file, and receive data file. A control file contains another set of commands, shown in Table 12 on page 278. These commands determine how the data file is to be interpreted and printed.

Since the 3174 is not providing a spooling function, jobs are printed as they are received from the client. The 3174 listens on TCP port 515 for connection requests. Each connection can send data for only one print queue, but can send more than one pair of control and data files for that queue. The 3174 can accept either the control file or the data file first, but processing differs according to the command sequence that the host sends:

Case 1, Receive Data File, Receive Control File: When the data file comes first, the 3174 must buffer the entire file before printing. This is because the control file must be processed to determine how to print the data. The 3174 buffers the file in storage that is allocated from the MLT pool (Question 116).

Note:

If there is not enough MLT storage available to buffer the entire print job, the print request will be rejected.

Case 2, Receive Control File First, Receive Data File: This is the preferred sequence, because no extra buffer space is required to hold any files. The data file is printed as it is received.

Case 3, Receive Control File, Receive Data File: Same as case 2.

Case 4, Receive Control File First, Receive Data File with Unspecified Length: Same as case 2.

Table 11. LPD Commands

Command.	Explanation	3174 Support	Note
01	Print any waiting jobs	No	3174 prints jobs as they arrive. We never have any waiting jobs.
02	Receive a printer job	Yes	
02 01	subcommand, abort job	Yes	
02 02	subcommand, receive control file	Yes	
02 03	subcommand, receive data file	Yes	
02 04	subcommand, receive control file first	Yes	
02 05	subcommand, receive data file with unspecified length	Yes	Supported only with the Control File First subcommand.
03	Send Queue State (short)	No	3174 prints jobs as they arrive, and does not really ever have a queue of jobs.
04	Send Queue State (long)	No	3174 prints jobs as they arrive, and does not really ever have a queue of jobs.
05	Remove Jobs	No	3174 prints jobs as they arrive, and does not really ever have a queue of jobs.

Table 12. LPD Control File Commands

Command	Explanation	3174 Support	Note
C	Class for banner page	Yes	
H	Host name	Ignore	
I	Indent printing	Reject	
J	Job name for banner page	Yes	
L	Print banner page	Yes	
M	Mail when printed	Ignore	3174 has no way to send mail
N	Name of source file	Ignore	Only used for queries or when 'p' support is used
P	User Identification	Ignore	
S	Symbolic link data	Ignore	N/A (Unix)
T	Title for print	Ignore	Only used when 'p' support is used
U	Unlink data file	Ignore	
W	Width of output	Ignore	
1	troff R font	Ignore	No special fonts are supported
2	troff I font	Ignore	No special fonts are supported
3	troff B font	Ignore	No special fonts are supported
4	troff S font	Ignore	No special fonts are supported
c	plot CIF file	Reject	Plotting is not supported
d	print DVI file	Reject	TeX output not supported
f	print formatted file	Yes	Discard all control characters other than HT, CR, FF, LF and BS. Convert LF to CRLF. (see note below) The 3174 support of the **f** command is similar to OS/2: LF is converted to CRLF, since most clients do the reverse conversion in order to emulate Unix file structure.
g	plot file	Reject	plotting is not supported
l	print file leaving control characters	Yes	Transparent data
n	print ditroff output file	reject	ditroff not supported
o	print postscript output file	reject	postscript not supported
p	print file with 'pr' format	ignore	
r	print file with FORTRAN carriage control	reject	
t	print troff output file	reject	
v	print raster file	reject	(SUN)

9.8.3 Banner Page

If the control file contains an **L** command to request a banner page, the 3174 sends this data to the printer, followed by a formfeed (FF)[5]:

```
(blank line)
(blank line)
*******************************************************************************
*******************************************************************************
*******************************************************************************
***      Output from IBM 3174, printer_station_set_name                     ***
***                                                                         ***
***                                                                         ***
***                                                                         ***
***      first_50_bytes_of_the_job_name_xxxxxxxxxxxxxxxxxx                  ***
***      first_50_bytes_of_the_job_name_xxxxxxxxxxxxxxxxxx                  ***
***      first_50_bytes_of_the_job_name_xxxxxxxxxxxxxxxxxx                  ***
***                                                                         ***
***                                                                         ***
***                                                                         ***
***                                                                         ***
***                                                                         ***
***                                                                         ***
***                                                                         ***
***      31_byte_class_xxxxxxxxxxxxxxxxx                                    ***
***      31_byte_class_xxxxxxxxxxxxxxxxx                                    ***
***      31_byte_class_xxxxxxxxxxxxxxxxx                                    ***
***                                                                         ***
***                                                                         ***
***                                                                         ***
*******************************************************************************
*******************************************************************************
*******************************************************************************
```

first_50_bytes_of_the_jobname is gotten from a **J** command in the control file. **31_byte_class** is gotten from a **C** command in the control file. If no **C** command is used, the 3174's TCP/IP host name is inserted here.

9.8.4 Internal Queuing

If the 3174 receives more print requests for a given queue than there are printers in that queue, the extra requests are queued internally until a printer becomes available. The host may break the TCP connection during this time, if it wants to.

If the 3174 receives more LPD connections than there are TCP/IP printer sessions allowed. The extra connections are queued internally until a session becomes available. The host may break the TCP connection during this time, if it wants to.

---

5 The 3174 assumes any previous print activity left the printer at the top of form

9.8.5 Translation Support

When printing to a 3270 printer, ASCII emulation requires translation of the characters from ASCII to internal code points. The type of translation is specified by Question 784 for each printer station set, and should match the character set of the sending host:

- IBM Code Page 850
- ISO 8859
- DEC NRC
- DEC MCS

Note: The printer queue name that you use at the sending host must be the same as the 3174 station set name. This name is case sensitive; since the 3174 station set name is always uppercase, you must use uppercase at the host when defining and selecting the queue.

9.9 MIB-II

The original 3174 TCP/IP SNMP support provided only MIB-I variables. The MIB-II support in the TCP/IP enhancements RPQ Q81041 expands the 3174's SNMP agent function to include MIB-II variables. The 3174 now supports the standard MIB defined by RFC 1231, the token-ring MIB from RFC 1231 and the Ethernet MIB from RFC 1398.

The 3174 agent responds to request for MIB variable information from SNMP clients elsewhere in the network. NetView/6000, for example, can operate as the SNMP client. The 3174 supports GET and GET_NEXT requests for the variables listed in Appendix B, "SNMP Variables" on page 363. The 3174 does not honor SET requests, nor does the 3174 generate TRAPs. The 3174 uses the community name *public*.

SNMP support requires additional storage. You may customize the 3174 to run with or without SNMP, as shown in Figure 269 on page 291.

There are some variables that the 3174 cannot support; we return NOSUCHNAME indications to the remote SNMP client when these variables are requested. For example, some Ethernet counters are not available from our adapter.

The rest of this section describes the new MIB-II variables.Appendix B, "SNMP Variables" on page 363 shows all the variables supported by the 3174 in ASN.1 numeric order.

- The System group (MIB-II 1)
  - sysContact (system 4) - DisplayString

    The textual identification of the contact person for this managed node, together with information on how to contact this person. For 3174, this is the response to Q99.
  - sysName (system 5) - DisplayString

    An administratively assigned name for this managed node. By convention, this is the node's fully-qualified domain name. For 3174, this is created from the information on the Domain Name Service customization panel.

- sysLocation (system 6) - DisplayString

  The physical location of this node (for example, telephone closet, third floor). For the 3174, this is the information entered via /5,2 (Update VPD).

- sysServices (system 7) - Integer

  A value which indicates the set of services that this entity primarily offers. For the 3174, it is **8**

- The Interfaces group (MIB-II 2)
  - ifSpecific (ifEntry 22) - ObjectID

    A reference to MIB definitions specific to the particular media being used to realize the interface. This is 1.3.6.1.2.1.10.9 when our interface is token-ring, and 1.3.6.1.2.1.10.7 when our interface is Ethernet.

  Traffic counters in the interfaces group reflect only IP/ICMP traffic. They do not include traffic that is generated by other 3174 applications (SNA, APPN) that are also using the interface.

- The Address Translation group (MIB-II 3)

  This group has been **deprecated** from MIB-I to MIB-II. This means that, although it is still included in MIB-II, it very likely will be removed in future MIB lists (for example, MIB-III). Address Translation tables are being distributed to the various network protocol groups.

- The IP group (MIB-II 4)
  - ipAdEntReasmMaxSize (ipAddrEntry 5) - Integer

    The size of the largest IP datagram which this entity can reassemble from incoming IP fragmented datagrams received on this interface.

    65535 for the 3174.

  - ipRouteMask (ipRouteEntry 11) - IP Address

    The mask to be logically ANDed with the destination address before being compared to the value in the ipRouteDest field.

    3174 provides this as follows:

    - Default route, mask - 0.0.0.0
    - Route entry from host route table, mask = 255.255.255.255
    - Route entry from network route table, if destination network is different from 3174's network: mask corresponds to type of network (255.0.0.0, 255.255.0.0, 255.255.255.0)
    - Route entry from network route table, if destination network is the same as 3174's, mask = 3174's subnet mask

  - ipRouteMetric5 (ipRouteEntry 12) - Integer

    An alternate routing metric for this route. For 3174, this is **-1**

  - ipRouteInfo (ipRouteEntry 13) - ObjectID

    A reference to MIB definitions specific to the particular routing protocol which is responsible for this route, as determined by the value specified in the route's ipRouteProto value. For 3174, this is 0.0.

  - ipNetToMediaTable (ip 22) - Aggregate

The IP Address Translation table used for mapping from IP addresses to physical addresses.

- ipNetToMediaEntry (ipNetToMediaTable 1) - Table

  Each entry contains one IP Address to PhysAddress equivalence.

  - ipNetToMediaIfIndex (ipNetToMediaEntry 1) - Integer

    The interface number on which this entry's equivalence is effective.

  - ipNetToMediaPhysAddress (ipNetToMediaEntry 2) - PhysAddress

    The media-dependent **physical** address.

  - ipNetToMediaNetAddress (ipNetToMediaEntry 3) - IP Address

    The IP address corresponding to the media-dependent **physical** address.

  - ipNetToMediaType (ipNetToMediaEntry 4) - Integer

    The type of mapping. For 3174, this is **3** which is dynamic, since all the 3174's ARP entries are dynamic.

— ipRoutingDiscards (ip 23) - Counter

The number of routing entries which were chosen to be discarded even though they are valid.

- The ICMP group (MIB-II 5)

  This group has no changes for MIB-II.

- The TCP group (MIB-II 6)

  — tcpInErrs (tcp 14) - Counter

  The total number of segments received in error (for example, bad TCP checksums).

  — tcpOutRsts (tcp 15) - Counter

  The number of TCP segments sent containing the RST flag.

- The UDP group (MIB-II 7)

  — udpTable (udp 5) - Aggregate

  A table containing UDP listener information.

  - udpEntry (udpTable 1) - Table

    Information about a particular current UDP listener.

    - udpLocalAddress (udpEntry 1) - IP Address

      The local IP Address for this UDP listener.

    - udpLocalPort (udpEntry 2) - Integer

      The local port number for this UDP listener.

- The EGP group (MIB-II 8)

  This group is not implemented by the 3174.

- The CMOT group (MIB-II 9)

  This group is not implemented by the 3174.

- The Transmission group (MIB-II 10)

When attached to Ethernet (either 802.3 or V2), this group contains the **dot3** variables that are defined in RFC 1398. When attached to a token-ring, this group contains the **dot5** variables that are defined in RFC 1231.

dot3 (transmission 7)

- dot3StatsTable (dot3 2) - Aggregate

  Statistics for a collection of Ethernet-like interfaces attached to a particular system.

- dot3StatsEntry (dot3StatsTable 1) - Table

  Statistics for a particular interface to an Ethernet-like medium.

  - dot3StatsIndex (dot3StatsEntry 1) - Integer

    An index value that uniquely identifies an interface to an Ethernet-like medium. The interface identified by a particular value of this index is the same interface as identified by the same value of ifIndex. Right now, this is always 1 for the 3174, as we have only one interface to the TCP/IP network.

  - dot3StatsAlignmentErrors (dot3StatsEntry 2) - Counter

    A count of frames received on a particular interface that are not an integral number of octets in length and do not pass the FCS check.

    This count is provided by the 3174 Ethernet adapter.

  - dot3StatsFCSErrors (dot3StatsEntry 3) - Counter

    A count of frames received on a particular interface that are an integral number of octets in length but do not pass the FCS check.

    This count is provided by the 3174 Ethernet adapter.

  - dot3StatsSingleCollisionFrames (dot3StatsEntry 4) - Counter

    A count of successfully transmitted frames on a particular interface for which transmission is inhibited by exactly one collision.

    This count is provided by the 3174 Ethernet adapter.

  - dot3StatsMultipleCollisionFrames (dot3StatsEntry 5) - Counter

    A count of successfully transmitted frames on a particular interface for which transmission is inhibited by more than one collision.

    This count is provided by the 3174 Ethernet adapter.

  - dot3StatsSQETestErrors (dot3StatsEntry 6) - Counter

    A count of times that the SQE TEST ERROR message is generated by the PLS sublayer for a particular interface.

  - dot3StatsDeferredTransmissions (dot3StatsEntry 7) - Counter

    A count of frames for which the first transmission attempt on a particular interface is delayed because the medium is busy. The count represented by an instance of this object does not include frames involved in collisions.

    This count is not provided by the 3174 Ethernet adapter; therefore, the 3174 does not support this variable.

  - dot3StatsLateCollisions (dot3StatsEntry 8) - Counter

The number of times that a collision is detected on a particular interface later than 512 bit-times into the transmission of a packet.

This count is provided by the 3174 Ethernet adapter.

- dot3StatsExcessiveCollisions (dot3StatsEntry 9) - Counter

  A count of frames for which transmission on a particular interface fails due to excessive collisions.

  This count is provided by the 3174 Ethernet adapter.

- dot3StatsInternalMacTransmitErrors (dot3StatsEntry 10) - Counter

  A count of frames for which transmission on a particular interface fails due to an internal MAC sublayer transmit error.

  This count is provided by the 3174 Ethernet adapter.

- dot3StatsCarrierSenseErrors (dot3StatsEntry 11) - Counter

  The number of times that the carrier sense condition was lost or never asserted when attempting to transmit a frame on a particular interface.

- dot3StatsFrameTooLongs (dot3StatsEntry 13) - Counter

  A count of frames received on a particular interface that exceed the maximum permitted frame size.

  This count is provided by the 3174 Ethernet adapter.

- dot3StatsInternalMacReceiveErrors (dot3StatsEntry 16) - Counter

  A count of frames for which reception on a particular interface fails due to an internal MAC sublayer receive error.

  This count is provided by the 3174 Ethernet adapter.

– dot3CollTable (dot3 5) - Aggregate

  A collection of collision histograms for a particular set of interfaces.

  This is not supported by the 3174; it is an optional variable, and the information it provides is not available from our adapter.

dot5 (transmission 9)

– dot5Table (dot5 1) - Sequence of Dot5Entry

  This table contains token-ring interface parameters and state variables, with one entry per 802.5 interface. There is only one entry for the 3174, as we have only one 802.5 interface.

– dot5Entry (dot5Table 1) - Table

  A list of token-ring status and parameter values for an 802.5 interface.

  - dot5IfIndex (dot5Entry 1) - Integer

    The value of this object identifies the 802.5 interface for which this entry contains management information. For the 3174 today, this is always 1.

  - dot5Commands (dot5Entry 2) - Integer

    This object is used with SNMP Set commands to initiate a change to the interface state (for example, open onto the ring). Currently 3174 does not support SETs at all, so the command values are not important. When read, this object always has a value of no-op(1).

- dot5RingStatus (dot5Entry 3) - Integer

  The current interface status which can be used to diagnose fluctuating problems that can occur on token-rings, after a station has successfully been added to the ring.

  Before an open is completed, this object has the value for the **no status** condition. The dot5RingState and dot5RingOpenStatus objects provide for debugging problems when the station cannot even enter the ring.

  The object's value is a sum of values, one for each currently applicable condition. The following values are defined for various conditions:

```
      0 = No Problems detected
     32 = Ring Recovery
     64 = Single Station
    256 = Remove Received
    512 = Reserved
   1024 = Auto-Removal Error
   2048 = Lobe Wire Fault
   4096 = Transmit Beacon
   8192 = Soft Error
  16384 = Hard Error
  32768 = Signal Loss
 131072 = No status, open not completed.
```

- dot5RingState (dot5Entry 4) - Integer

  opened(1),
  closed(2),
  opening(3),
  closing(4),
  openFailure (5),
  ringFailure (6)

  The current interface state with respect to entering or leaving the ring.

- dot5RingOpenStatus (dot5Entry 5) - Integer

  noOpen(1), -- no open attempted
  badParam(2),
  lobeFailed(3),
  signalLoss(4),
  insertionTimeout(5),
  ringFailed(6),
  beaconing(7),
  duplicateMAC(8),
  requestFailed(9),
  removeReceived(10),
  open(11) -- last open successful

  This object indicates the success, or the reason for failure, of the station's most recent attempt to enter the ring.

- dot5RingSpeed (dot5Entry 6) - Integer

  unknown(1),
  oneMegabit(2),
  fourMegabit(3),

sixteenMegabit(4)

The ring's bandwidth.

- dot5UpStream (dot5Entry 7) - MacAddress

  The MAC address of the upstream neighbor station in the ring.

  If the adapter is not OPEN, the 3174 returns an address of all 0s, since the true information is not available.

- dot5ActMonParticipate (dot5Entry 8) - Integer (true (1), false (2))

  If this object has a value of true (1) then this interface participates in the active monitor selection process. If the value is false (2) then it does not.

  3174 value is always 2.

- dot5Functional (dot5Entry 9) - MacAddress

  The bit mask of all token-ring functional addresses for which this interface will accept frames.

  If the adapter is not OPEN, the 3174 returns an address of all 0s, since the true information is not available.

— dot5StatsTable (dot5 2) - SEQUENCE OF Dot5StatsEntry

A table containing token-ring statistics, with one entry per 802.5 interface.

— dot5StatsEntry (dot5StatsTable 1) - Table.

An entry contains the 802.5 statistics for a particular interface.

- dot5StatsIfIndex (dot5StatsEntry 1) - Integer

  The value of this object identifies the 802.5 interface for which this entry contains management information. For now, this is always 1 for the 3174.

- dot5StatsLineErrors (dot5StatsEntry 2) - Counter

  This counter is incremented when a frame or token is copied or repeated by a station, the E bit is zero in the frame or token, and one of the following conditions exists: 1) there is a non-data bit (J or K bit) between the SD and the ED of the frame or token, or 2) there is an FCS error in the frame.

  This count is provided by the 3174 token-ring adapter.

- dot5StatsBurstErrors (dot5StatsEntry 3)

  This counter is incremented when a station detects the absence of transitions for five half-bit timers (burst-five error).

  This count is provided by the 3174 token-ring adapter.

- dot5StatsACErrors (dot5StatsEntry 4) - Counter

  This counter is incremented when a station receives an AMP or SMP frame in where A is equal to C is equal to 0, and then receives another SMP frame where A is equal to C is equal to 0 without first receiving an AMP frame. It denotes a station that cannot set the AC bits properly.

- dot5StatsAbortTransErrors (dot5StatsEntry 5) - Counter

This counter is incremented when a station transmits an abort delimiter while transmitting.

This count is provided by the 3174 token-ring adapter.

- dot5StatsInternalErrors (dot5StatsEntry 6) - Counter

  This counter is incremented when a station recognizes an internal error.

  This count is provided by the 3174 token-ring adapter.

- dot5StatsLostFrameErrors (dot5StatsEntry 7) - Counter

  This counter is incremented when a station is transmitting and its TRR timer expires. This condition denotes a condition where a transmitting station in strip mode does not receive the trailer of the frame before the TRR timer goes off.

  This count is provided by the 3174 token-ring adapter.

- dot5StatsReceiveCongestions (dot5StatsEntry 8) - Counter

  This counter is incremented when a station recognizes a frame addressed to its specific address, but has no available buffer space indicating that the station is congested.

  This count is provided by the 3174 token-ring adapter.

- dot5StatsFrameCopiedErrors (dot5StatsEntry 9) - Counter

  This counter is incremented when a station recognizes a frame addressed to its specific address and detects that the FS field A bits are set to 1 indicating a possible line hit or duplicate address.

  This count is provided by the 3174 token-ring adapter.

- dot5StatsTokenErrors (dot5StatsEntry 10) - Counter

  This counter is incremented when a station acting as the active monitor recognizes an error condition that needs a token transmitted.

  This count is provided by the 3174 token-ring adapter.

- dot5StatsSoftErrors (dot5StatsEntry 11) - Counter

  The number of Soft Errors the interface has detected. It directly corresponds to the number of Report Error MAC frames that this interface has transmitted. Soft Errors are those which are recoverable by the MAC layer protocols.

- dot5StatsHardErrors (dot5StatsEntry 12) - Counter

  The number of times this interface has detected an immediately recoverable fatal error. It denotes the number of times this interface is either transmitting or receiving beacon MAC frames.

- dot5StatsSignalLoss (dot5StatsEntry 13) - Counter

  The number of times this interface has detected the loss of signal condition from the ring.

- dot5StatsTransmitBeacons (dot5StatsEntry 14) - Counter

  The number of times this interface has transmitted a beacon frame.

- dot5StatsRecoverys (dot5StatsEntry 15) - Counter

The number of Claim Token MAC frames received or transmitted after the interface has received a Ring Purge MAC frame. This counter signifies the number of times the ring has been purged and then recovered back into a normal operating state.

- dot5StatsLobeWires (dot5StatsEntry 16) - Counter

  The number of times the interface has detected an open or short circuit in the lobe data path. The adapter will be closed and dot5RingState will signify this condition.

- dot5StatsRemoves (dot5StatsEntry 17) - Counter

  The number of times the interface has received a Remove Ring Station MAC frame request. When this frame is received the interface will enter the close state and dot5RingState will signify this condition.

- dot5StatsSingles (dot5StatsEntry 18) - Counter

  The number of times the interface has sensed that it is the only station on the ring. This will happen if the interface is the first one up on a ring, or if there is a hardware problem.

- dot5StatsFreqErrors (dot5StatsEntry 19) - Counter

  The number of times the interface has detected that the frequency of the incoming signal differs from the expected frequency by more than that specified by the IEEE 802.5 standard.

  This count is provided by the 3174 token-ring adapter.

– dot5TimerTable (dot5 5)

  Not supported by the 3174; this is an optional variable, and most of the values in it are not accessible to the 3174 as they are implemented on the token-ring card.

• The SNMP group (MIB-II 11)

  This group is all new to MIB-II.

  – snmpInPkts (snmp 1) - Counter

    The total number of SNMP messages delivered to an SNMP entity from the transport service.

  – snmpOutPkts (snmp 2) - Counter

    The total number of SNMP messages which were passed from the SNMP protocol entity to the transport service.

  – snmpInBadVersions (snmp 3) - Counter

    The total number of SNMP messages which were delivered to the SNMP protocol entity and were for an unsupported SNMP version.

  – snmpInBadCommunityNames (snmp 4) - Counter

    The total number of SNMP messages delivered to the SNMP protocol entity which used an unknown SNMP community name.

  – snmpInBadCommunityUses (snmp 5) - Counter

    The total number of SNMP messages delivered to the SNMP protocol entity which represented an SNMP operation which was not allowed by the SNMP community named in the message.

For 3174, this is the number of SET commands received for valid variables, since the 3174 does not support SETs.

- snmpInASNParseErrs (snmp 6) - Counter

  The total number of ASN.1 or BER errors encountered by the SNMP protocol entity when decoding received SNMP messages.

- (snmp 7) is not used.

- snmpInTooBigs (snmp 8) - Counter

  The total number of SNMP PDUs which were delivered to the SNMP protocol entity and for which the value of the error-status field is **tooBig**

- snmpInNoSuchNames (snmp 9) - Counter

  The total number of SNMP PDUs which were delivered to the SNMP protocol entity and for which the value of the error-status field is **noSuchName**

- snmpInBadValues (snmp 10) - Counter

  The total number of SNMP PDUs which were delivered to the SNMP protocol entity and for which the value of the error-status field is **badValue**

- snmpInReadOnlys (snmp 11) - Counter

  The total number of SNMP PDUs which were delivered to the SNMP protocol entity and for which the value of the error-status field is **readOnly**

- snmpInGenErrs (snmp 12) - Counter

  The total number of SNMP PDUs which were delivered to the SNMP protocol entity and for which the value of the error-status field is **genErr**

- snmpInTotalReqVars (snmp 13) - Counter

  The total number of MIB objects which have been retrieved successfully by the SNMP protocol entity as a result of receiving valid SNMP Get-Request and Get-Next PDUs.

- snmpInTotalSetVars (snmp 14) - Counter

  The total number of MIB objects which have been altered successfully by the SNMP protocol entity as a result of receiving valid SNMP Set-Request PDUs.

- snmpInGetRequests (snmp 15) - Counter

  The total number of SNMP Get-Request PDUs which have been accepted and processed by the SNMP protocol entity.

- snmpInGetNexts (snmp 16) - Counter

  The total number of SNMP Get-Next PDUs which have been accepted and processed by the SNMP protocol entity.

- snmpInSetRequests (snmp 17) - Counter

  The total number of SNMP Set-Request PDUs which have been accepted and processed by the SNMP protocol entity.

- snmpInGetResponses (snmp 18) - Counter

  The total number of SNMP Get-Response PDUs which have been accepted and processed by the SNMP protocol entity.

- snmpInTraps (snmp 19) - Counter

  The total number of SNMP Trap PDUs which have been accepted and processed by the SNMP protocol entity.

- snmpOutTooBigs (snmp 20) - Counter

  The total number of SNMP PDUs which were generated by the SNMP protocol entity and for which the value of the error-status field is **tooBig**

- snmpOutNoSuchNames (snmp 21) - Counter

  The total number of SNMP PDUs which were generated by the SNMP protocol entity and for which the value of the error-status field is **noSuchName**

- snmpOutBadValues (snmp 22) - Counter

  The total number of SNMP PDUs which were generated by the SNMP protocol entity and for which the value of the error-status field is **badValue**

- (snmp 23) is not used.

- snmpOutGenErrs (snmp 24) - Counter

  The total number of SNMP PDUs which were generated by the SNMP protocol entity and for which the value of the error-status field is **genErr**

- snmpOutGetRequests (snmp 25) - Counter

  The total number of SNMP Get-Request PDUs which have been generated by the SNMP protocol entity.

- snmpOutGetNexts (snmp 26) - Counter

  The total number of SNMP Get-Next PDUs which have been generated by the SNMP protocol entity.

- snmpOutSetRequests (snmp 27) - Counter

  The total number of SNMP Set-Request PDUs which have been generated by the SNMP protocol entity.

- snmpOutGetResponses (snmp 28) - Counter

  The total number of SNMP Get-Response PDUs which have been generated by the SNMP protocol entity.

- snmpOutTraps (snmp 29) - Counter

  The total number of SNMP Trap PDUs which have been generated by the SNMP protocol entity.

- snmpEnableAuthenTraps (snmp 30) - Integer

  Indicates whether the SNMP agent process is permitted to generate authentication-failure traps. For 3174, this is **2** (disabled).

9.10 TCP/IP Enhancements Customization

This section describes the changes to the different customization panels that are needed to support the TCP/IP enhancements.

9.10.1 AEA and TCP/IP Configure

```
                    AEA and TCP/IP Configure

   700 - 0 2

   702 - 1

   703 - 0

   710 - 00000000      711 - 00000000      712 - 00000000      713 - 00000000



PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 269. AEA and TCP/IP Configure Panel

Q700 The second field is used to select the level of TCP/IP function:

- 0 = no TCP/IP
- 1 = TCP/IP
- **2** = TCP/IP with SNMP

On this panel you are now able to define TCP/IP with SNMP.

9.10.2 Defining TN3270 Station Set

A new value of 6 is now allowed for Question 751, to indicate that the TN3270 data stream is used. 6 is only valid when the station set is for a TCP/IP host. It means Question 722 is set to TH.

The following screen will show you the TCP/IP Station Set panel.

```
                  _______ AEA and TCP/IP Station Set _______


721 - TN3270 _______     722 - TH  723 - TN3270__  725 - 1
    731 - 1   732 - 1    733 - 0   734 - _   735 - 0  736 - 1  737 - _
    741 - 000 742 - 015  743 - 1   744 - 0  745 - 0  746 - 0 0
    751 - 6   752 - ________________________________________________
     761 - 1  762 - 1    763 - 0   764 - 1  765 - 0
     771 - 1  772 - 1    773 - 1   774 - 1   775 - 1  776 - 1
    781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
    790 - 000 . 000 . 000 . 000  791 - 00000

   721 -                              722 -          723 - _______  725 - 1
    731 - 1   732 - 1    733 - 0   734 - _   735 - 0  736 - 1  737 - _
    741 - 000 742 - 015  743 - 1   744 - 0  745 - 0  746 - 0 0
    751 - 2          752 - ________________________________________________
     761 - 1  762 - 1    763 - 1   764 - 1  765 - 0
     771 - 1  772 - 1    773 - 1   774 - 1   775 - 1  776 - 1
    781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
    790 - 000 . 000 . 000 . 000  791 - 00000


All responses are correct
PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 270. AEA and TCP/IP Station Set Panel

To define the station set for TN3270 access, respond to the following questions:

Q721 Enter a station set name that you wish displayed on the Connection Menu.

Q722 Enter **TH** as the station type for the TCP/IP host.

Q751 Specify the data stream supported by the TCP/IP host:

- 1=DEC VT100
- 2=IBM 3101
- 3=DG D210 (USA English only)
- 4=DEC VT220, 7-bit control
- 5=DEC VT220, 8-bit control
- **6**=TN3270

9.10.3 Defining Printer Station Set

Question 784 is now valid for a 3270 printer station set, when the station set is used for TCP/IP printing. The responses are used differently for 3270 printers than they are for ASCII printers.

The following screen will show you the Printer Station Set panel.

```
                  _______ AEA and TCP/IP Station Set _______


     721 - PRINTER ______ 722 - 3P  723 - COAX      725 - 1
      731 - 1    732 - 1    733 - 0   734 - _   735 - 0  736 - 1  737 - _
      741 - 000  742 - 015  743 - 1  744 - 0  745 - 0  746 - 0 0
      751 - ?    752 - ____________________________________________
       761 - 1   762 - 1    763 - 0   764 - 1  765 - 0
       771 - 1   772 - 1    773 - 1   774 - 1   775 - 1  776 - 1
      781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
      790 - 000 . 000 . 000 . 000  791 - 00000

     721 -                              722 -          723 - _______  725 - 1
      731 - 1    732 - 1    733 - 0   734 - _   735 - 0  736 - 1  737 - _
      741 - 000  742 - 015  743 - 1  744 - 0  745 - 0  746 - 0 0
      751 -            752 - ____________________________________________
       761 - 1   762 - 1    763 - 1   764 - 1  765 - 0
       771 - 1   772 - 1    773 - 1   774 - 1   775 - 1  776 - 1
      781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
      790 - 000 . 000 . 000 . 000  791 - 00000

  All responses are correct
  PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 271. AEA and TCP/IP Station Set Panel

To define the station set for LPD support, respond to the following questions:

Q721 Enter a station set name that you wish displayed on the Connection Menu. We have selected **PRINTER**.

Q722 Enter **3P** as the station type for the TCP/IP host.

Q784 Specify the translation tables to be used for printing:

- 1=US ASCII
- 4=PC code page 850
- 2=ISO-8859/1.2
- 3=DEC MCS
- 4=User-Defined Translate table 1
- 5=User-Defined Translate table 2
- 6=User-Defined Translate table 3

Q790 This question is now valid for a printer station set.

Q791 This is a new question, which allows a TCP port number from 0001 to 56535.

9.10.4 Defining Default Destinations

```
               ____ AEA and TCP/IP Default Destination ____

 Station       Station Set         Session        Session
   Set            Name              Limit    LT1 LT2 LT3 LT4 LT5

    1    TN3270                       0      ___ ___ ___ ___ ___
    2    PRINTER                      5      TP_ ___ ___ ___ ___
    3                                 0      ___ ___ ___ ___ ___
    4                                 0      ___ ___ ___ ___ ___
    5                                 0      ___ ___ ___ ___ ___
    6                                 0      ___ ___ ___ ___ ___
    7                                 0      ___ ___ ___ ___ ___
    8                                 0      ___ ___ ___ ___ ___
    9                                 0      ___ ___ ___ ___ ___
   10                                 0      ___ ___ ___ ___ ___
   11                                 0      ___ ___ ___ ___ ___
   12                                 0      ___ ___ ___ ___ ___


PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 272. AEA and TCP/IP Default Destination Panel

Allow **TP** as the default destination for a printer station set. This denotes that the station set is to be used for TCP/IP printing

9.10.5 Defining TCP/IP Options

Question 059 is new, and has been added to the TCP/IP Options Menu to set the **Maximum Printer Connections** This question represents the number of concurrent printer sessions that you want to allow.

```
                   _____ TCP/IP Options Menu _____

3174 IP Address             052 - 009 . 067 . 038 . 087
Subnet Mask                 054 - 255 . 255 . 255 . 192
.* Broadcast Address          056 - 000 . 000 . 000 . 000

Maximum TELNET Connections  058 - 020    (001 - 250)
Maximum Printer Connections 059 - 005    (001 - 099)
TCP/IP Buffer Space         060 - 0256 K(K = 1024 bytes)

Routing Field Support       062 - Y      (Y,N)
All Routes Broadcast        064 - N      (Y,N)


PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 273. TCP/IP Options Menu

Q059 Enter the maximum number of concurrent printer sessions.

Note: Each session requires 7KB of memory in the storage calculations. The allowed range is from 1 to 99.

9.11 Scenario 1 - 3174 Line Printer Daemon (LPD)

This configuration shows the capability of different TCP/IP hosts connected via Ethernet or token-ring to the 3174 Line Printer Daemon (LPD). It uses the 3174 RPQ 8Q1041 TCP/IP Enhancements.

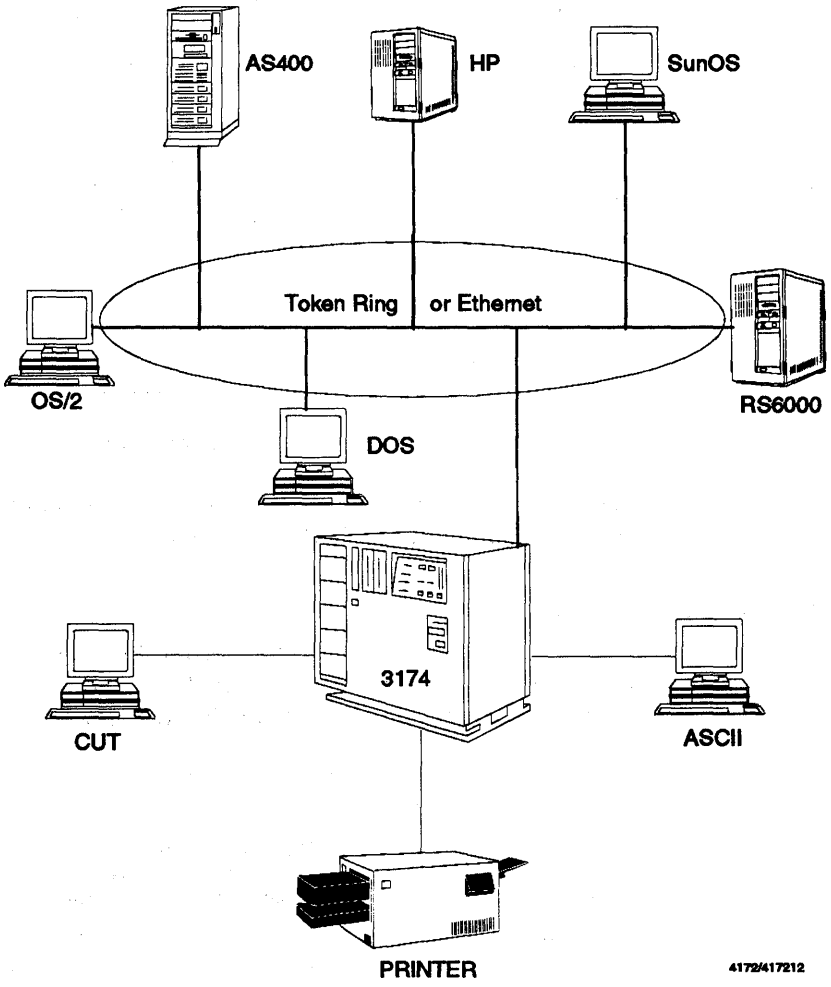


Figure 274. 3174 LPD Support

9.11.1 Scenario Description

The composite network has the following components:

- 3174-11L with an Ethernet adapter, address 9.67.32.91
- RS/6000 with AIX 3.2.3 and address 9.67.32.85
- PS/2 with OS/2 2.0 and address 9.67.32.94
- PS/2 with DOS 5.2 and address 9.67.32.93
- AS/400 with address 9.67.32.95

9.11.2 3174 Line Printer Daemon Customization

For Line Printer Deamon customization questions were added or enhanced on the following customization panels.

- AEA And TCP/IP Station Set
  - Q790 is not new, but is used by LPD.
  - Q791 is for TN3270.
- AEA and TCP/IP Default Destination
  - New response of **TP**, for TCP/IP printer
- TCP/IP Options Menu
  - Q059 is new for LPD support.

9.11.3 Defining 3270 Printer Station Set

The following screen will show you the 3270 Printer Station Set panel.

```
                _______ AEA and TCP/IP Station Set _______


 721 - 3174PRTQ _____              722 - 3P  723 - COAXPRT   725 - 1
731 - 1    732 - 1    733 - 0   734 - _   735 - 0  736 - 1  737 - _
741 - 000  742 - 015  743 - 1   744 - 0  745 - 0  746 - 0 0
 751 - 1    752 - ____________________________________________
761 - 1    762 - 1    763 - 0   764 - 1  765 - 0
771 - 1    772 - 1    773 - 1   774 - 1   775 - 1  776 - 1
781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
790 - 000 . 000 . 000 . 000           791 - 00000

721 -                              722 -     723 - _______  725 - 1
731 - 1    732 - 1    733 - 0   734 - _   735 - 0  736 - 1  737 - _
741 - 000  742 - 015  743 - 1   744 - 0  745 - 0  746 - 0 0
751 -            752 - ____________________________________________
761 - 1    762 - 1    763 - 1   764 - 1  765 - 0
771 - 1    772 - 1    773 - 1   774 - 1   775 - 1  776 - 1
781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
790 - 000 . 000 . 000 . 000           791 - 00000


All responses are correct
PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 275. AEA and TCP/IP Station Set Panel

The following questions show the responses to the LPD support that we used in our scenario:

Q721 The station set name we wish displayed on the Connection Menu.

Q722 **3P** is the station type for the TCP/IP host.

Q784 We specify **code page 850** for the printer (1=code page 850).

9.11.4 Defining Default Destinations

```
                ____ AEA and TCP/IP Default Destination ____

  Station        Station Set           Session          Session
    Set             Name                Limit      LT1 LT2 LT3 LT4 LT5

     1    3270 HOST                       0        _   _   _   _   _
     2    3270 DISPLAY                    5        _   _   _   _   _
     3    TELNET VT100                    0        _   _   _   _   _
     4    IBM3101                         0        _   _   _   _   _
     5    TELNET VT220 7 BIT              0        _   _   _   _   _
     6    TELNET VT220 8 BIT              0        _   _   _   _   _
     7    3174PRTQ                        1        TP  _   _   _   _
     8                                    0        _   _   _   _   _
     9                                    0        _   _   _   _   _
    10                                    0        _   _   _   _   _
    11                                    0        _   _   _   _   _
    12                                    0        _   _   _   _   _
    13                                    0        _   _   _   _   _
    14                                    0        _   _   _   _   _
    15                                    0        _   _   _   _   _


 PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 276. AEA and TCP/IP Default Destination Panel

TP is the default destination for a printer station set. This denotes that the station set is to be used for TCP/IP printing.

9.11.5 Defining TCP/IP Options

```
                  _____ TCP/IP Options Menu _____

 3174 IP Address               052 - 009 . 067 . 032 . 091
 Subnet Mask                   054 - 255 . 255 . 255 . 000

 Maximum TELNET Connections    058 - 020 (001 - 250)
 Maximum Printer Connections   059 - 005(001 - 099)
 TCP/IP Buffer Space           060 - 0256 KB (KB = 1024 bytes)

 Routing Field Support         062 - Y (Y,N)
 All Routes Broadcast          064 - N (Y,N)



 PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 277. TCP/IP Options Menu

Q059 The maximum number of concurrent printer sessions is defined as **005**.

9.11.6 3174 Line Printer Daemon Configuration for OS/2

This section describes how to configure the 3174 Line Printer Deamon on the OS/2 workstation.

After invoking the TCP/IP configuration, you get the TCP/IP Configuration panel.

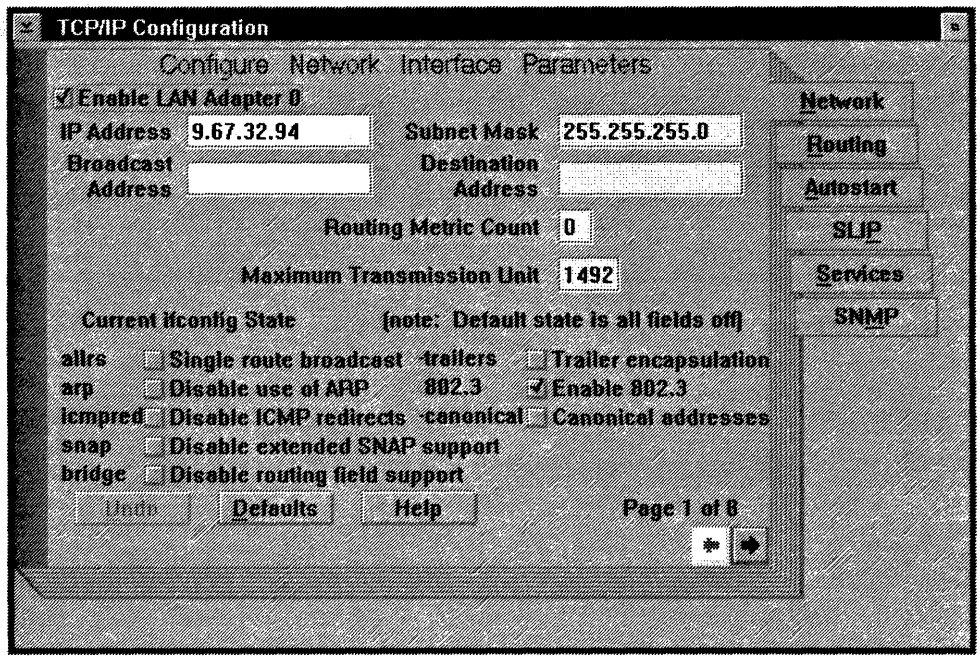


Figure 278. TCP/IP Configuration

Select the **Services** tab, and you get the panel as shown below.

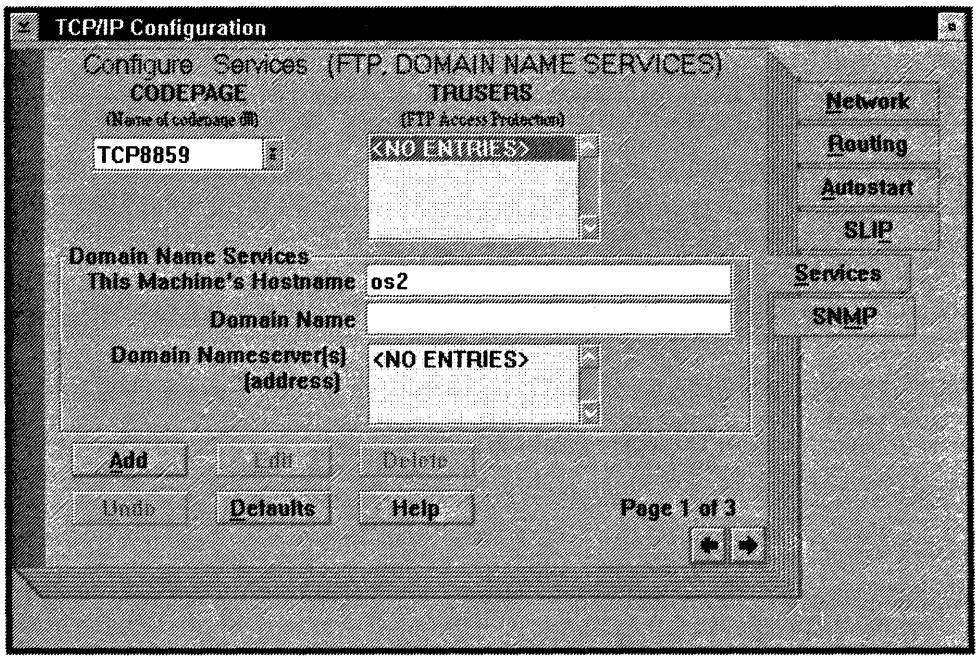


Figure 279. TCP/IP Configuration Configure Services Page 1 of 3

On the TCP/IP Configuration Configure Services Page 1 of 3 window you define the CODEPAGE and the Hostname for the OS/2 machine.

Select Configure Services Page 2 of 3.

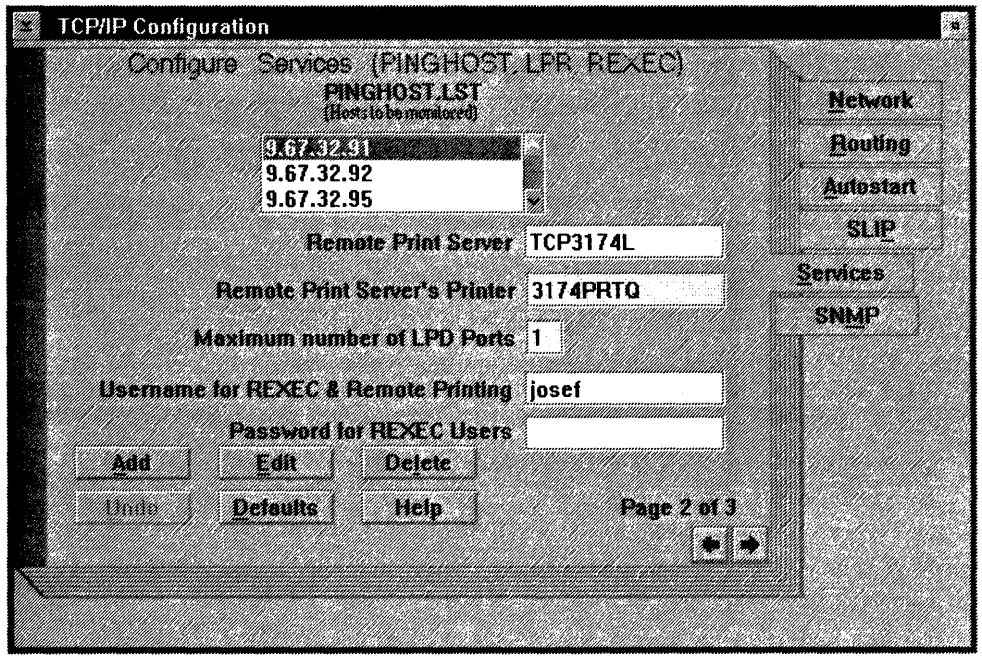


Figure 280. TCP/IP Configuration Configure Services Page 2 of 3

Enter the **Remote Print Server** Here you enter either the 3174 IP address or the 3174 Hostname which is defined in the TCP/IP Domain Name Service panel of the 3174 LPD customization.

Enter the **Remote Print Server's Printer** The definition of the Remote Print Server's Printer was done on the TCP/IP Station Set panel of the 3174 LPD customization panel.

This window also allows you to define the Maximum number of LPD Ports and the Username for Remote Printing.

Go to the next page of the TCP/IP Configuration panel.

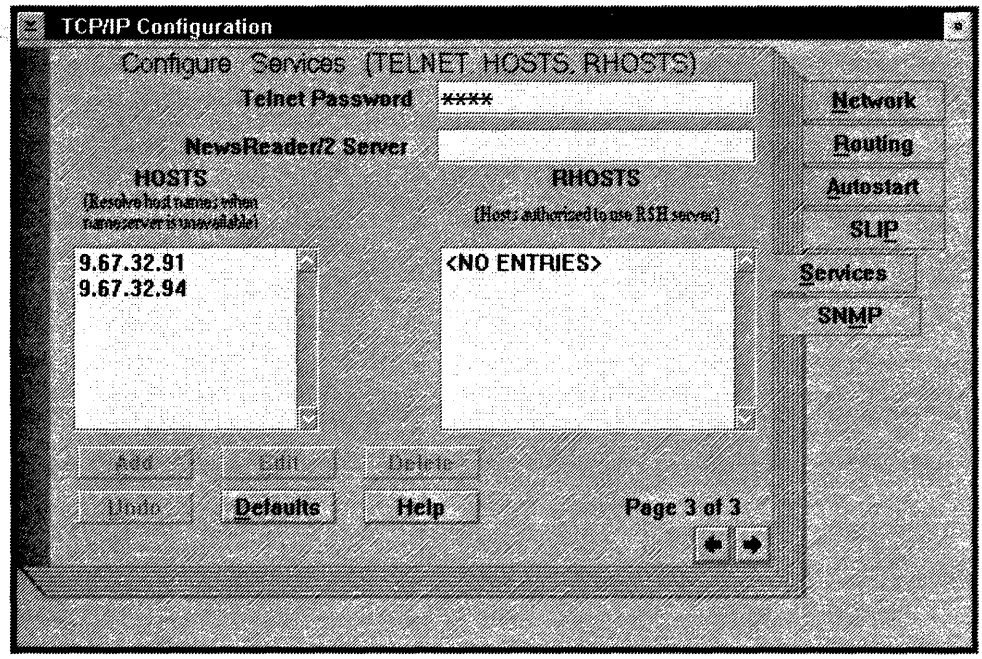


Figure 281. TCP/IP Configuration Configure Services Page 3 of 3

On Page 3 of 3 you enter the IP address of the 3174 LPD and the IP address of local OS/2 TCP/IP station.

Press Enter and the Closing TCP/IP Configuration panel is displayed.

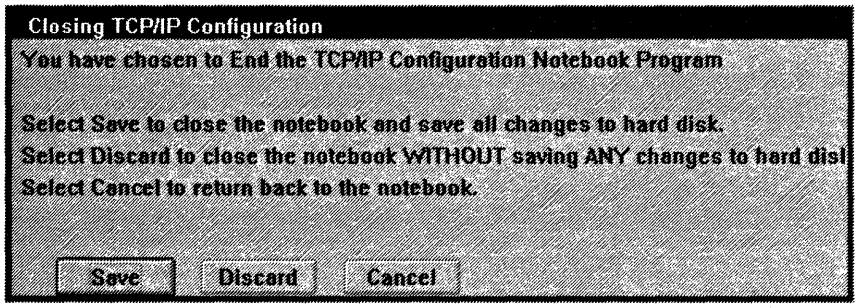


Figure 282. Closing TCP/IP Configuration

Select **SAVE** to close the TCP/IP Configuration Notebook Program. The 3174 Line Printer Daemon configuration on the OS/2 system.

Note: Notice the following changes to the different system files on OS/2 station.

These are the the Remote Print Server entries in the **CONFIG.SYS** file:

```
SET LPR_SERVER=TCP3174L
SET LPR_PRINTER=3174PRTQ
```

These are the Remote Print Server entries in the **\etc\hosts** file:

```
9.67.32.91      TCP3174L
9.67.32.94      os2
```

9.11.7 Printing with the 3174 Line Printer Daemon from TCP/IP for OS/2

At an OS/2 prompt enter the following command:

```
:E:\>lpr -p COAXPRT -s 3174PRTQ print.test
```

The lpr command enables you to transfer the contents of the file (print.test) from your workstation to the 3174 Line Printer Daemon that provides print services.

For a detailed description of the lpr command refer to *IBM Transmission Control Protocol/Internet Protocol Version 2.0 for OS/2: Command Reference, SX75-0070-02.*

9.11.8 3174 Line Printer Daemon Configuration for DOS

This section describes how to configure the 3174 Line Printer Deamon on the DOS workstation. To invoke the configuration for printer services on DOS, do the following:

At the DOS prompt, type the following and press Enter:

C:\>**custom**

The CUSTOM program displays the main menu and with the Enter key you step to the Configuration panel.

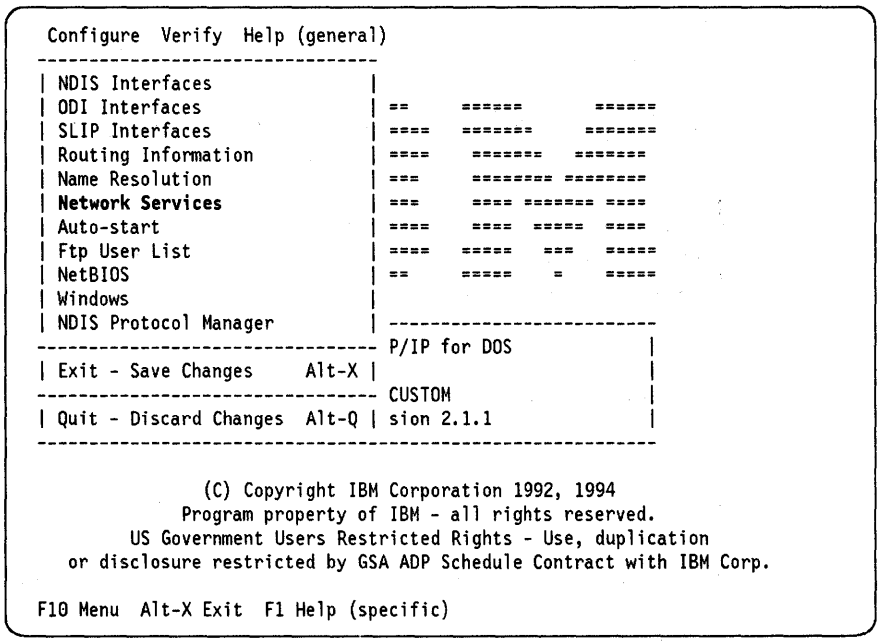


Figure 283. Network Services

Select **Network Services** from the action bar and press Enter the panel shown in Figure 283 is displayed. This panel allows you to describe the Printer Services.

```
Configure  Verify  Help (general)

   ------------------------ Network Services -------------------------

         --- Printer Services ---      --- Time Services ---

         Printer server                 Time zone label
         TCP3174L
         Printer                        Daylight savings label
         3174PRTQ
         User name                      Time zone offset
         pcdos
                                        Time servers
                                      1
                                      2
                                      3
                                      4

                        TAB to move between fields.

                      OK          Cancel          Help
                    --------      --------      --------
    ------------------------------------------------------------------

F10 Menu  Alt-X Exit  F1 Help (specific)
```

Figure 284. Printer Services

Type in the field **Printer Server**, under Printer Services, the name of the 3174 print server. server. In our case, we typed **TCP3174L**. In the **Printer** field, type in the name of the 3174 device. This is the device name we defined on question 721 of the 3174 TCP/IP Station Set Customization panel. We entered **3174PRTQ**. In the **User name** field we enter **pcdos**; this is the hostname of the DOS machine.

If **OK** is highlighted on the Configuration panel, press Enter and the LPD configuration for DOS is finished.

Note: Notice the following changes to the different system files on DOS.

These are the the Remote Print Server entries in the **config.sys** file:

```
SET LPR_SERVER=TCP3174L
SET LPR_PRINTER=3174PRTQ
```

These are the Remote Print Server entries in the **\etc\hosts** file:

```
#
# hosts
#
# This file contains the hostnames and their address for hosts in the network
# This file is used to resolve a hostname into an Internet address
#
#
# Internet Address    Hostname    Alias         # Comments
# 192.1.1.1           mentor_n1   mether        # Address of mentor in Network1
# 129.5.5.3           mentor_n2   m802_3 wise   # Address of mentor in Network2
# 9.5.2.201           mentor_n3   mtok          # Address of mentor in Network3
# 9.5.2.205           babbage                   # Address of mentor in Network3
  9.67.32.91          TCP3174L                  # Address of LPD Server
  9.67.32.93          pcdos                     # Address of this User
```

These are the additional entries for Remote Printer Service in the **tcpdos.ini** file:

```
(lpr)
    lpr.printer=3174PRTQ
    lpr.server=TCP3174L
    lpr.user=pcdos
```

9.11.9 Printing with the 3174 Line Printer Daemon from TCP/IP for DOS

At a DOS prompt enter the following command:
:E:\>**lpr -p COAXPRT -s 3174PRTQ print.test**

The lpr command sends the text file (print.test) to the remote printer.

For more information about the lpr command refer to *TCP/IP Version 2.1.1 for DOS: User's Guide, SC31-7045-01*.

9.11.10 3174 Line Printer Daemon Configuration for AS/400

This section describes how to configure the 3174 Line Printer Deamon on the AS/400.

On the AS/400 we do the following:

- Configure communication and remote hardware
  - Work with TCP/IP links
  - Work with TCP/IP host table entries
- TCP/IP administration
  - Start TCP/IP subsystem
  - Send TCP/IP spooled file

After signing on to the AS/400 the Main Menu is displayed.

```
MAIN                              AS/400 Main Menu
                                                          System:   RALYAS4B
Select one of the following:

     1. User tasks
     2. Office tasks
     3. General system tasks
     4. Files, libraries, and folders
     5. Programming
     6. Communications
     7. Define or change the system
     8. Problem handling
     9. Display a menu
    10. Information Assistant options
    11. PC Support tasks

    90. Sign off

Selection or command
===> 6

F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel   F13=Information Assistant
F23=Set initial menu
(C) COPYRIGHT IBM CORP. 1980, 1993.
```

Figure 285. AS/400 Main Menu

On the Main Menu type **6** to select the Communications panel

```
CMN                              Communications
                                                          System:   RALYAS4B
Select one of the following:

     1. Communication status
     2. Messages
     3. Access a remote system
     4. Configure communications and remote hardware
     5. Network management
     6. Network configuration
     7. Verify communications
     8. Send or receive files
     9. Jobs

    70. Related commands



Selection or command
===> 6

F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel   F13=Information Assistant
F16=AS/400 Main menu
 C  COPYRIGHT IBM CORP. 1980, 1993.
```

Figure 286. Communications

On the Communications panel type **6** to reach the Network Configuration panel.

```
NETCFG                       Network Configuration
                                                          System:   RALYAS4B
Select one of the following:

     1. Work with system directory
     2. Configure distribution services
     3. Work with network job entries
     4. Configure VM/MVS bridge
     5. Work with remote document libraries

    10. Configure communications and remote hardware

    70. Related commands




Selection or command
===> 10

F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel   F13=Information Assistant
F16=AS/400 Main menu
 C  COPYRIGHT IBM CORP. 1980, 1993.
```

Figure 287. Network Configuration

On the Network Configuration panel type **10**, to get the Configure communications and remote hardware panel.

```
CFGCMN          Configure Communications and Remote Hardware
                                                        System:   RALYAS4B
Select one of the following:

     1. Work with lines
     2. Work with communications controllers
     3. Work with work station controllers
     4. Work with communications devices
     5. Work with printers
     6. Work with display stations
     7. Work with modes
     8. Work with classes-of-service
     9. Work with configuration lists
    10. Work with network interfaces
    11. Work with connection lists

    20. Configure TCP/IP
                                                                  More...
Selection or command
===> 20

F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel   F13=Information Assistant
F16=AS/400 main menu
 C  COPYRIGHT IBM CORP. 1980, 1993.
```

Figure 288. Configure Communications and Remote Hardware

On this panel type **20** to configure the TCP/IP on AS/400.

```
                          Configure TCP/IP
                                                        System:   RALYAS4B
Select one of the following:

     1. Work with TCP/IP host table entries
     2. Work with TCP/IP links
     3. Work with TCP/IP route entries
     4. Change local domain name
     5. Work with names for SMTP
     6. Work with TCP/IP remote system information

    10. Change remote name server
    11. Change TCP/IP attributes
    12. Work with TCP/IP port entries
    13. Change SMTP attributes
    14. Change TCP/IP tuning values

    25. Convert host table

Selection or command
===> 2

F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel
 C  COPYRIGHT IBM CORP. 1987, 1993.
```

Figure 289. Configure TCP/IP

Type **2** to work with TCP/IP links.

```
                          Work with TCP/IP Links
                                                              System:   RALYAS4B
Type options, press Enter.
 1=Add2=Change   4=Remove        5=Display         9=Start   10=End

          Line          Internet            Link
Opt     Description     Address             Type

        L71ETH          9.67.32.95          *ELAN

                                                                      Bottom
F3=Exit   F5=Refresh   F12=Cancel   F15=Print list   F17=Top   F18=Bottom
```

Figure 290. Work with TCP/IP Links

On this panel you type in the desired line description and its associated Internet Address. In our configuration we use **L71ETH** for the Line Description. The Internet Address of the AS/400 is **9.67.32.95**. The Link Type that we used is ***ELAN** for the Ethernet adapter.

Press Enter to get the display of the TCP/IP link description.

```
                                                              System:   RALYAS4B
Line description . . . . . :   L71ETH
Internet address . . . . . :   9.67.32.95
Link type  . . . . . . . . :   *ELAN
Auto start link  . . . . . :   *YES

Press Enter to continue.

F3=Exit   F12=Cancel
```

Figure 291. Display TCP/IP Link

On this panel your TCP/IP link descriptions are displayed.

Press Enter and the TCP/IP Configuration panel appears again.

```
                              Configure TCP/IP
                                                          System:   RALYAS4B
Select one of the following:

     1. Work with TCP/IP host table entries
     2. Work with TCP/IP links
     3. Work with TCP/IP route entries
     4. Change local domain name
     5. Work with names for SMTP
     6. Work with TCP/IP remote system information

    10. Change remote name server
    11. Change TCP/IP attributes
    12. Work with TCP/IP port entries
    13. Change SMTP attributes
  * 14. Change TCP/IP tuning values

    25. Convert host table

Selection or command
===> 1

F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel
 C  COPYRIGHT IBM CORP. 1987, 1993.
```

Figure 292. Configure TCP/IP

Select **1** on this panel to make the TCP/IP host table entries.

```
                    Work with TCP/IP Host Table Entries
                                                          System:   RALYAS4B
Type options, press Enter.
  1=Add   2=Change   4=Remove   5=Display

       Internet           Host
Opt    Address            Name

       9.24.104.1         ROUTER
       9.24.104.56        RALYAS4A
       9.24.104.57        RALYAS4B
       9.24.104.58        3174TCP1
       9.24.104.59        3174TCP2
       9.24.97.23         RS60003
       9.24.97.25         RS60005
       9.67.192.234       DAVESRTP
       9.67.32.85         RS6K
       9.67.38.71         RS60001
       9.67.32.91         TCP3174L
       9.67.32.95         AS400B

F3=Exit   F5=Refresh   F12=Cancel   F15=Print list   F17=Position to
```

Figure 293. Work with TCP/IP Host Table Entries

After adding the internet address and the hostname of the appropriate hosts, press **PF3** to return to the Communications panel.

```
CMN                              Communications
                                                          System:   RALYAS4B
Select one of the following:

     1. Communication status
     2. Messages
     3. Access a remote system
     4. Configure communications and remote hardware
     5. Network management
     6. Network configuration
     7. Verify communications
     8. Send or receive files
     9. Jobs

    70. Related commands



Selection or command
===> 5

F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel   F13=Information Assistant
F16=AS/400 Main menu
 C  COPYRIGHT IBM CORP. 1980, 1993.
```

Figure 294. Communications

On the Communications panel type **5** to reach the Network Management panel.

```
NETWORK                       Network Management
                                                          System:   RALYAS4B
Select one of the following:

     1. Display network attributes
     2. Change network attributes
     3. Display sphere of control  SOC  status
     4. Work with sphere of control  SOC
     5. Network problem handling
     6. Display APPN information
     7. Work with distribution queues
     8. Display distribution services
     9. Display distribution services log
     10. TCP/IP administration

    70. Related commands

                                                                      Bottom
Selection or command
===> 10

F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel   F13=Information Assistant
F16=AS/400 Main menu
 C  COPYRIGHT IBM CORP. 1980, 1993.
```

Figure 295. Network Management

On the Network Management panel type **10**, and the TCP/IP Administration panel appears.

```
TCPADM                    TCP/IP Administration
                                                        System:   RALYAS4B
Select one of the following:

     1. Configure TCP/IP
     2. Start TCP/IP subsystem
     3. End TCP/IP subsystem
     4. Start TCP/IP FTP session
     5. Verify TCP/IP connection
     6. Work with names for SMTP
     7. Start TCP/IP TELNET session
     8. Work with TCP/IP network status
     9. Send TCP/IP spooled file




Selection or command
===> 2

F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel
 C  COPYRIGHT IBM CORP. 1987, 1993.
```

Figure 296. TCP/IP Administration

Type **2** to activate the TCP/IP subsystem on the AS/400.

```
TCPADM                    TCP/IP Administration
                                                        System:   RALYAS4B
Select one of the following:

     1. Configure TCP/IP
     2. Start TCP/IP subsystem
     3. End TCP/IP subsystem
     4. Start TCP/IP FTP session
     5. Verify TCP/IP connection
     6. Work with names for SMTP
     7. Start TCP/IP TELNET session
     8. Work with TCP/IP network status
     9. Send TCP/IP spooled file




Selection or command
===> 2

F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel
Subsystem name QTCP active.
 C  COPYRIGHT IBM CORP. 1987, 1993.
```

Figure 297. TCP/IP Administration

If the TCP/IP subsystem is active, the following message is displayed on the lower screen line: **Subsystem name QTCP active**

Now the AS/400 is configured and prepared for printing a job with the 3174 Line Printer Daemon (LPD).

9.11.11 Printing with the 3174 Line Printer Daemon on AS/400

To start an LPD print job from the AS/400, the TCP/IP Administration panel should be displayed.

```
TCPADM                      TCP/IP Administration
                                                        System:   RALYAS4B
Select one of the following:

     1. Configure TCP/IP
     2. Start TCP/IP subsystem
     3. End TCP/IP subsystem
     4. Start TCP/IP FTP session
     5. Verify TCP/IP connection
     6. Work with names for SMTP
     7. Start TCP/IP TELNET session
     8. Work with TCP/IP network status
     9. Send TCP/IP spooled file




Selection or command
===> 9

F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel
 C  COPYRIGHT IBM CORP. 1987, 1993.
```

Figure 298. TCP/IP Administration

Type **9** on this panel, and you get the Send TCP/IP Spooled File panel.

```
                  Send TCP/IP Spooled File  SNDTCPSPLF

Type choices, press Enter.

Remote system  . . . . . . . . . > TCP3174L


Printer queue  . . . . . . . . . > 3174PRTQ


Spooled file . . . . . . . . . .   QPDSPJOB      Name
Job name . . . . . . . . . . . .   QDFTJOBD      Name, *
  User . . . . . . . . . . . . .     QSECOFR     Name
  Number . . . . . . . . . . . .     010602      000000-999999
Spooled file number  . . . . . .   1             1-9999, *ONLY, *LAST
Destination type . . . . . . . .   *OTHER        *AS400, *PSF2, *OTHER
Transform SCS to ASCII . . . . .   *YES          *YES, *NO
Manufacturer type and model  . .   *IBM42011
                                                                    Bottom
F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
F13=How to use this display        F24=More keys
```

Figure 299. Send TCP/IP Spooled File SNDTCPSPLF

On this panel you type in the desired data. Remote system is the host name of the 3174 which is customized for LPD. In our example this is **TCP3174L**. The Printer queue name is **3174PRTQ**, the same name as used in the 3174 LPD customization.

The entries in the other fields are AS/400 specific. For more details see *AS/400 Transmission Control Protocol/Internet Protocol Guide Version 2, SC41-9875-02.*

Press Enter to start the print job.

```
TCPADM                    TCP/IP Administration
                                                        System:   RALYAS4B
Select one of the following:

     1. Configure TCP/IP
     2. Start TCP/IP subsystem
     3. End TCP/IP subsystem
     4. Start TCP/IP FTP session
     5. Verify TCP/IP connection
     6. Work with names for SMTP
     7. Start TCP/IP TELNET session
     8. Work with TCP/IP network status
     9. Send TCP/IP spooled file




Selection or command
===>

F3=Exit   F4=Prompt   F9=Retrieve   F12=Cancel
Spooled file QPDSPJOB sent.
```

Figure 300. TCP/IP Administration

After the job is started and the LPD printer is printing, the following is displayed on the lower screen line:
Spooled file QPDSPJOB sent.

9.11.12 3174 Line Printer Daemon Configuration for RS/6000

This section describes how to configure the 3174 Line Printer Deamon on the RS/6000.

The following steps are required to configure the printer system on the RS/6000.

- Manage Local Printer Subsystem
  - Add a Local Printer Queue
  - Add a Local Queue Device
  - Start a Queue
- Manage Remote Printer Subsystem
  - Add a Remote Printer Queue
  - Add a Remote Queue Device
- Server Services
  - Start LPD Remote Printer Subsystem
  - Start a Print Job

After you login to your RS/6000 workstation you get the Login screen.

```
IBM AIX Version 3 for RISC System/6000
 C  Copyrights by IBM and by others 1982, 1991.
login: root
root's Password:
*******************************************************************************
*                                                                             *
*                                                                             *
*  This is RISC System/6000 RS60001, in the lab at ITSO Raleigh               *
*                                                                             *
*                                                                             *
*  This system is at AIX level 3.2.5. If you have any questions about it      *
*  call Rob Macgregor on 1-2325                                               *
*******************************************************************************

Last unsuccessful login: Mon Apr 25 13:58:18 1994 on pts/2 from TCP3174L
Last login: Tue Apr 26 09:54:49 1994 on pts/2 from 9.24.104.73
¼YOU HAVE NEW MAIL'
swcons: console output redirected to: /log/26Apr94
¼root:rs60001' / > smit
```

Figure 301. RISC System/6000

On this screen you invoke the System Management panel by entering `smit` on the command line.

SMIT is a menu-driven, command-building facility. SMIT menus, submenus, and dialog screens present complex system management tasks in an organized manner and prompt you for parameters when necessary. As you make menu selections, SMIT builds or runs the appropriate command.

The SMIT text interface uses cursor keys to navigate through the panels.

```
                                System Management

Move cursor to desired item and press Enter.

  Software Installation & Maintenance
  Devices
  Physical & Logical Storage
  Security & Users
  Diskless Workstation Management & Installation
  Communications Applications and Services
  Spooler  Print Jobs
  Problem Determination
  Performance & Resource Scheduling
  System Environments
  Processes & Subsystems
  Applications
  Using SMIT  information only


F1=Help             F2=Refresh          F3=Cancel           Esc+8=Image
Esc+9=Shell         Esc+0=Exit          Enter=Do
```

Figure 302. System Management (SMIT Text Interface)

Select **Spooler Print Jobs** with the cursor to get the Spooler Print Jobs panel.

9.11.13 Manage Local Printer Subsystem

```
                          Spooler  Print Jobs

Move cursor to desired item and press Enter.

  Start a Print Job
  Cancel a Print Job
  Show the Status of Print Jobs
  Prioritize a Print Job
  Schedule Jobs
  Manage Local Printer Subsystem
  Manage Remote Printer Subsystem



F1=Help           F2=Refresh        F3=Cancel         Esc+8=Image
Esc+9=Shell       Esc+0=Exit        Enter=Do
```

Figure 303. Spooler Print Jobs

Here, select **Manage Local Printer Subsystem**, and the following panel is shown.

```
                    Manage Local Printer Subsystem

Move cursor to desired item and press Enter.

  Virtual Printers
  Local Printer Queues
  Local Printer Queue Devices



F1=Help           F2=Refresh        F3=Cancel         Esc+8=Image
Esc+9=Shell       Esc+0=Exit        Enter=Do
```

Figure 304. Manage Local Printer Subsystem

Here select **Local Printer Queues** and the following panel appears, which allows you to add the local printer queue.

```
                          Add a Local Queue

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                  (Entry Fields)
*  NAME of queue to add                          3174PRTQ
   ACTIVATE the queue?                           yes                    +
   Will this become the DEFAULT queue?           no                     +
   Queuing DISCIPLINE                            first come first serve +
   ACCOUNTING FILE pathname                      ()
*  NAME of device to add                         COAXPRT
   BACKEND OUTPUT FILE pathname                  ()
   ACCESS MODE of backend output file            write only             +
*  BACKEND PROGRAM pathname                      (/usr/lpd/piobe)
   Number of FORM FEEDS prior to printing        (0)                      #
   Print HEADER pages?                           never                  +
   Print TRAILER pages?                          never                  +
   ALIGN pages between files within jobs?        yes                    +

F1=Help           F2=Refresh        F3=Cancel         F4=List
Esc+5=Reset       Esc+6=Command     Esc+7=Edit        Esc+8=Image
Esc+9=Shell       Esc+0=Exit        Enter=Do
```

Figure 305. Add a Local Queue

The **NAME of queue to add** is the predefined printer name of the 3174 Line Printer Daemon customization.

The **NAME of device to add** is the predefined printer device name as specified during the 3174 Line Printer Daemon customization.

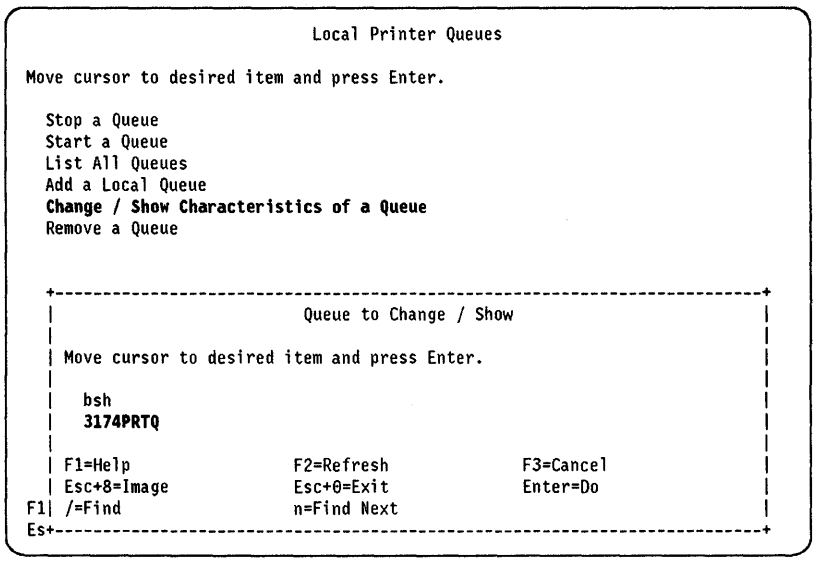


Figure 306. Queue to Change / Show

Select **Change / Show Characteristics of a Queue** to display or to change the characteristics of the local printer queue.

Select **3174PRTQ** and press Enter.

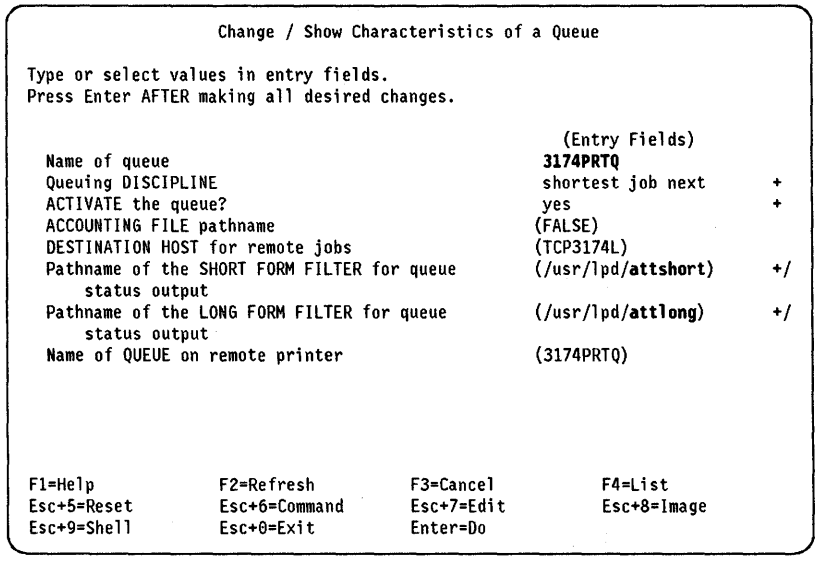


Figure 307. Change / Show Characteristics of a Queue

The **Name of queue** is the predefined printer name of the 3174 Line Printer Daemon customization. The **Name of Queue on remote printer** is identical to this customized printer name. The **DESTINATION HOST for remote jobs** is the name of the 3174, which has been customized for 3174 Line Printer Daemon.

Note: When creating a queue on the RS/6000, you should use **attshort** for the SHORT FORM FILTER, and **attlong** for the LONG FORM FILTER. The other filters have commands in their respective control file defaults that the 3174 will reject and will cause the job to be aborted.

Press Enter, and the local printer queue is defined. The Local Printer Queues panel appears again.

```
                          Local Printer Queues

Move cursor to desired item and press Enter.

  Stop a Queue
  Start a Queue
  List All Queues
  Add a Local Queue
  Change / Show Characteristics of a Queue
  Remove a Queue
```

Figure 308. Local Printer Queues

To make sure the local printer queue is active, select **Start a Queue**. The following panels allow you to select the predefined local printer queue.

```
                            Start a Queue

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        (Entry Fields)
* QUEUE name


  +-------------------------------------------------------------------------+
  |                              QUEUE name                                 |
  |                                                                         |
  | Move cursor to desired item and press Enter.                            |
  |                                                                         |
  |   bsh:bshdev                                                            |
  |   3174PRTQ:COAXPRT                                                      |
  |   bsh                                                                   |
  |   3174PRTQ                                                              |
  |                                                                         |
  | F1=Help                F2=Refresh             F3=Cancel                 |
F1| Esc+8=Image            Esc+0=Exit             Enter=Do                  |
Es| /=Find                 n=Find Next                                      |
Es+-------------------------------------------------------------------------+
```

Figure 309. QUEUE Name

Select **3174PRTQ:COAXPRT** and press Enter.

```
                            Start a Queue

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        (Entry Fields)
* QUEUE name                                            3174PRTQ:COAXPRT

F1=Help             F2=Refresh          F3=Cancel          F4=List
Esc+5=Reset         Esc+6=Command       Esc+7=Edit         Esc+8=Image
Esc+9=Shell         Esc+0=Exit          Enter=Do
```

Figure 310. Start a Queue

Press Enter on this screen, and the Command Status is displayed on the next panel.

```
                              COMMAND STATUS

Command: OK            stdout: no            stderr: no

Before command completion, additional instructions may appear below.



F1=Help          F2=Refresh         F3=Cancel          Esc+6=Command
Esc+8=Image      Esc+9=Shell        Esc+0=Exit
```

Figure 311. Command Status Panel

Now the local printer queue is active.

9.11.14 Manage Remote Printer Subsystem

To manage the remote printer subsystem select **Manage Remote Printer Subsystem** on the Spooler Print Jobs panel.

```
                            Spooler  Print Jobs

Move cursor to desired item and press Enter.

  Start a Print Job
  Cancel a Print Job
  Show the Status of Print Jobs
  Prioritize a Print Job
  Schedule Jobs
  Manage Local Printer Subsystem
  Manage Remote Printer Subsystem



F1=Help          F2=Refresh         F3=Cancel          Esc+8=Image
Esc+9=Shell      Esc+0=Exit         Enter=Do
```

Figure 312. Spooler Print Jobs

```
                      Manage Remote Printer Subsystem

Move cursor to desired item and press Enter.

  Client Services
  Server Services



F1=Help          F2=Refresh         F3=Cancel          Esc+8=Image
Esc+9=Shell      Esc+0=Exit         Enter=Do
```

Figure 313. Manage Remote Printer Subsystem

Here, select **Client Services**, and the following screen will be shown.

```
                              Client Services

Move cursor to desired item and press Enter.

  Remote Printer Queues
  Remote Printer Queue Devices



F1=Help          F2=Refresh       F3=Cancel        Esc+8=Image
Esc+9=Shell      Esc+0=Exit       Enter=Do
```

Figure 314. Client Services

Select **Remote Printer Queues**, and you get the following screen which allows you to display the characteristics of the 3174PRTQ remote printer queue.

```
                          Remote Printer Queues

Move cursor to desired item and press Enter.

  List All Queues
  Add a Remote Queue
  Change / Show Characteristics of a Queue
  Remove a Queue

  +-------------------------------------------------------------------------+
  |                          Queue to Change / Show                         |
  |                                                                         |
  | Move cursor to desired item and press Enter.                            |
  |                                                                         |
  |   bsh                                                                   |
  |   3174PRTQ                                                              |
  |                                                                         |
  | F1=Help              F2=Refresh            F3=Cancel                    |
  | Esc+8=Image          Esc+0=Exit            Enter=Do                     |
F1| /=Find               n=Find Next                                        |
  +-------------------------------------------------------------------------+
```

Figure 315. Queue to Change / Show

Select **3174PRTQ** and press Enter.

```
                    Change / Show Characteristics of a Queue

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      (Entry Fields)
  Name of queue                                       3174PRTQ
  Queuing DISCIPLINE                                  shortest job next      +
  ACTIVATE the queue?                                 yes                    +
  ACCOUNTING FILE pathname                            (FALSE)
  DESTINATION HOST for remote jobs                    (TCP3174L)
  Pathname of the SHORT FORM FILTER for queue         (/usr/lpd/attshort)    +/
      status output
  Pathname of the LONG FORM FILTER for queue          (/usr/lpd/attlong)     +/
      status output
  Name of QUEUE on remote printer                     (3174PRTQ)



F1=Help           F2=Refresh        F3=Cancel         F4=List
Esc+5=Reset       Esc+6=Command     Esc+7=Edit        Esc+8=Image
Esc+9=Shell       Esc+0=Exit        Enter=Do
```

Figure 316. Change / Show Characteristics of a Queue

The **Name of queue** is the predefined printer name of the 3174 Line Printer Daemon customization. The **Name of Queue on remote printer** is identical to this customized printer name. Press Enter, and the Manage Remote Printer Subsystem panel is displayed.

9.11.15 Server Services

```
                        Manage Remote Printer Subsystem

Move cursor to desired item and press Enter.

  Client Services
  Server Services


F1=Help           F2=Refresh        F3=Cancel         Esc+8=Image
Esc+9=Shell       Esc+0=Exit        Enter=Do
```

Figure 317. Manage Remote Printer Subsystem

Select **Server Services**, and the Server Services panel is displayed.

```
                                Server Services

Move cursor to desired item and press Enter.

  Host Access for Printing
  lpd Remote Printer Subsystem
  Manage Local Printer Subsystem


F1=Help           F2=Refresh        F3=Cancel         Esc+8=Image
Esc+9=Shell       Esc+0=Exit        Enter=Do
```

Figure 318. Server Services

Select **lpd Remote Printer Subsystem**, and the following panel appears.

```
                        lpd Remote Printer Subsystem

Move cursor to desired item and press Enter.

  Start Using the lpd Subsystem
  Change / Show Restart Characteristics of the lpd Subsystem
  Stop Using the lpd Subsystem


F1=Help          F2=Refresh        F3=Cancel         Esc+8=Image
Esc+9=Shell      Esc+0=Exit        Enter=Do
```

Figure 319. lpd Remote Printer Subsystem

Select **Start Using the lpd Subsystem**.

```
                      Start Using the lpd Subsystem

Move cursor to desired item and press Enter.

  Start NOW
  Start at Next System RESTART
  Start BOTH Now and at System Restart


F1=Help          F2=Refresh        F3=Cancel         Esc+8=Image
Esc+9=Shell      Esc+0=Exit        Enter=Do
```

Figure 320. Start Using the lpd Subsystem

Press Enter, and the lpd Remote Printer Subsystem is started.

The RS/600 remote printer system is configured now for printing a print job on the 3174 Line Printer Daemon (LPD).

9.11.16 Printing with the 3174 Line Printer Daemon from RS/6000

To start an LPD print job from the RS/6000, invoke from the System Management panel the function Spooler Print Jobs, and you will get the following panel.

```
                          Spooler  Print Jobs

Move cursor to desired item and press Enter.

  Start a Print Job
  Cancel a Print Job
  Show the Status of Print Jobs
  Prioritize a Print Job
  Schedule Jobs
  Manage Local Printer Subsystem
  Manage Remote Printer Subsystem



F1=Help          F2=Refresh        F3=Cancel         Esc+8=Image
Esc+9=Shell      Esc+0=Exit        Enter=Do
```

Figure 321. Spooler Print Jobs

Select **Start a Print Job** and press Enter.

On the following panel you see all print job definitions.

```
                              Start a Print Job

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

* FILE to print                                      print.test
  PRINT QUEUE:(Queue Device)                        3174PRTQ:COAXPRT  +
  NUMBER of copies                                 (1)                 #
  Make a COPY of the file on the local host?         no                +
       Applicable to local print jobs only.
  ERASE the file from the system after printing?     no                +
  Send notification of job status?                   no                +
* BURST Status                                       no burst pages    +
  USER NAME for 'Delivery to' output label          ()
  CONSOLE acknowledgement message for               ()
      remote print
  FILE acknowledgement message for                  ()
      remote print
  ERASE the file from the system after printing?     no                +
  Send notification of job status?                   no                +
* BURST Status                                       no burst pages    +
  USER NAME for 'Delivery to' output label          ()
  CONSOLE acknowledgement message for               ()
      remote print
  FILE acknowledgement message for                  ()
      remote print
  Priority LEVEL.                                   (15)                #
      Enter a number between 0 and 20.  A user with
      administrative privileges for the qpri
      command may enter a number between 0 and 30.
       Larger numbers indicate higher priorities.

F1=Help           F2=Refresh        F3=Cancel         F4=List
Esc+5=Reset       Esc+6=Command     Esc+7=Edit        Esc+8=Image
Esc+9=Shell       Esc+0=Exit        Enter=Do
```

Figure 322. Start a Print Job

Press Enter, and start the print job.

```
                                COMMAND STATUS

Command: OK          stdout: no          stderr: no

Before command completion, additional instructions may appear below.



F1=Help           F2=Refresh        F3=Cancel         Esc+6=Command
Esc+8=Image       Esc+9=Shell       Esc+0=Exit
```

Figure 323. Command Status Panel

After the print job is successfully started, **OK** is displayed on the Command line.

9.11.17 3174 Line Printer Daemon Configuration for HP-UX Workstation

This section describes how to configure the 3174 Line Printer Deamon on the HP-UX workstation.

The following steps are required to configure the remote printer on the HP-UX system:

- Add remote printer/plotter.
- Enable printer/plotter.
- Start up print spooler.

Note: These are the 3174 hostname entries in the /etc/hosts file.

```
9.67.212.250    MNFLAB  # Proteon Router to site 9.67.194.31
9.67.212.210    RTB17AS4 AS4TR  # HP 9000 Series 800 mdl G40
9.24.104.74     mvs18
9.24.104.58     317412L
```

After you login to the HP workstation, the following screen is shown.

```
 c Copyright 1985, 1986, 1988 Massachusetts Institute of Technology
 c Copyright 1986 Digital Equipment Corp.
 c Copyright 1990 Motorola, Inc.
 c Copyright 1990-1992 Cornell University
 c Copyright 1988 Carnegie Mellon

                        RESTRICTED RIGHTS LEGEND
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                        Palo Alto, CA 94304 U.S.A.

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forth in FAR 52.227-19 c  1,2 .



WARNING:  YOU ARE SUPERUSER

# sam
```

Figure 324. Login at HP Host

After login as superuser **root** you are able to call the System Management panel by entering **sam** on the command line.

SAM is a menu-driven, command-building facility. It is comparable to the RS/6000 SMIT facility. SAM menus, submenus, and dialog screens present complex system management tasks in an organized manner and prompt you for parameters when necessary. As you make menu selections, SAM builds or runs the appropriate command.

The following screen shows you the System Administrations Manager (SAM) panel.

System Administrations Manager (SAM)

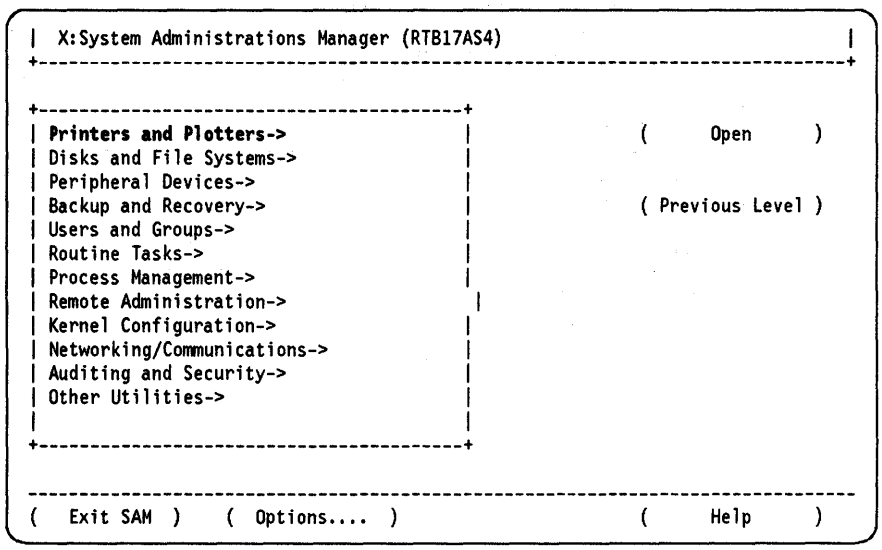


Figure 325. System Administrations Manager (SAM) Panel

Select **Printers and Plotters**, press Enter, and the Printer/Plotter menu bar will be displayed.

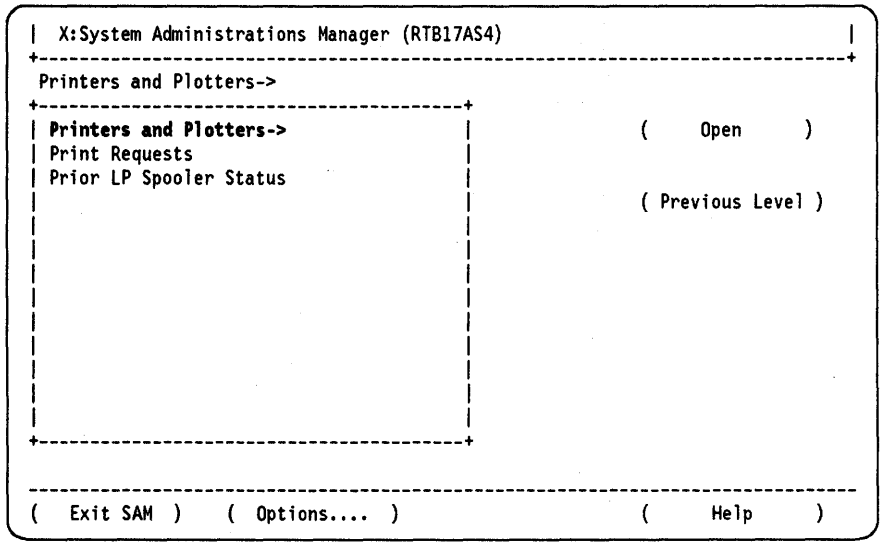


Figure 326. Printer/Plotter Menu Bar

On this panel, the line **Printers and Plotters** is highlighted. Press Enter and you get the following panel.

Printer/Plotter Manager

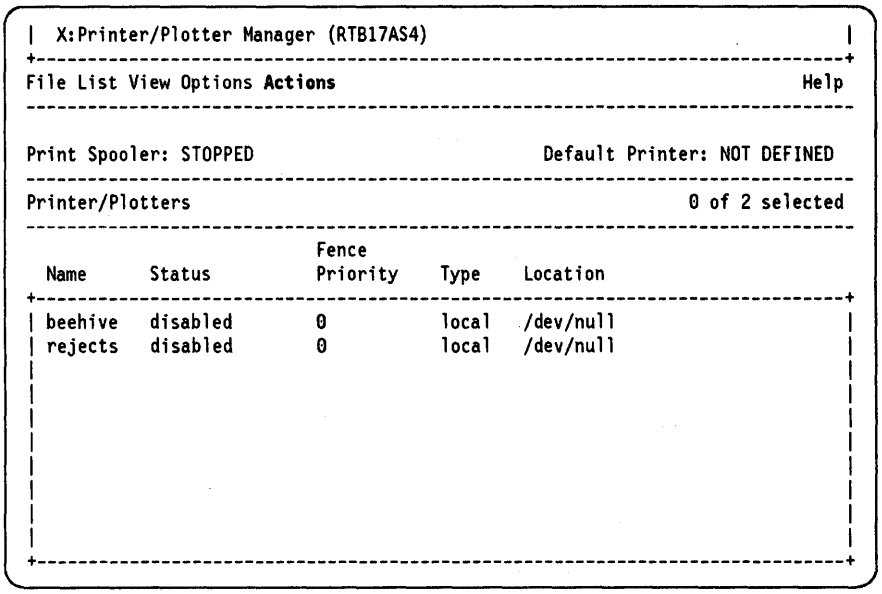


Figure 327. Printer/Plotter Manager

Select **Actions** with the Tab key on the upper menu bar, press Enter, and the following panel is shown.

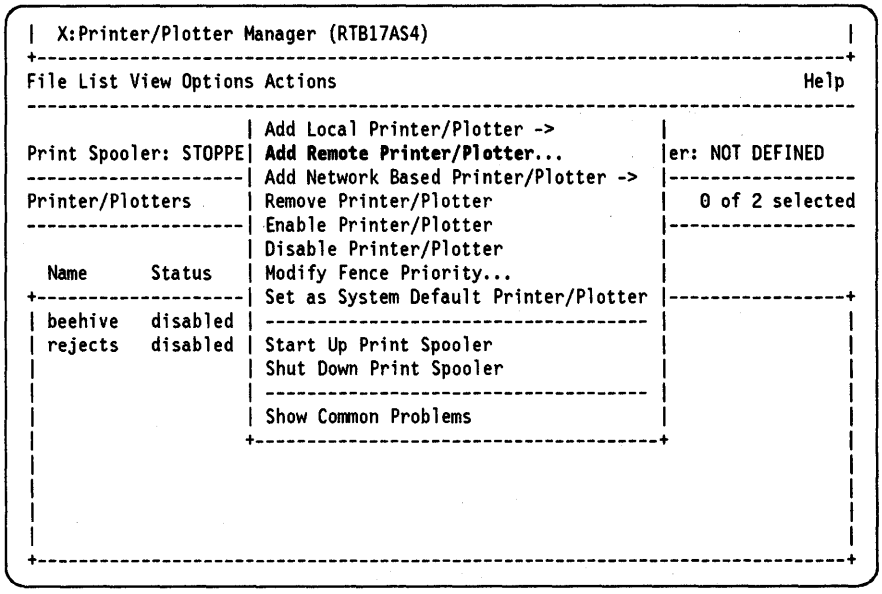


Figure 328. Add Remote Printer/Plotter

Here, use the Arrow key to select **Add Remote Printer/Plotter** and press Enter. On the following panel you are able to specify the remote printer.

Add Remote Printer

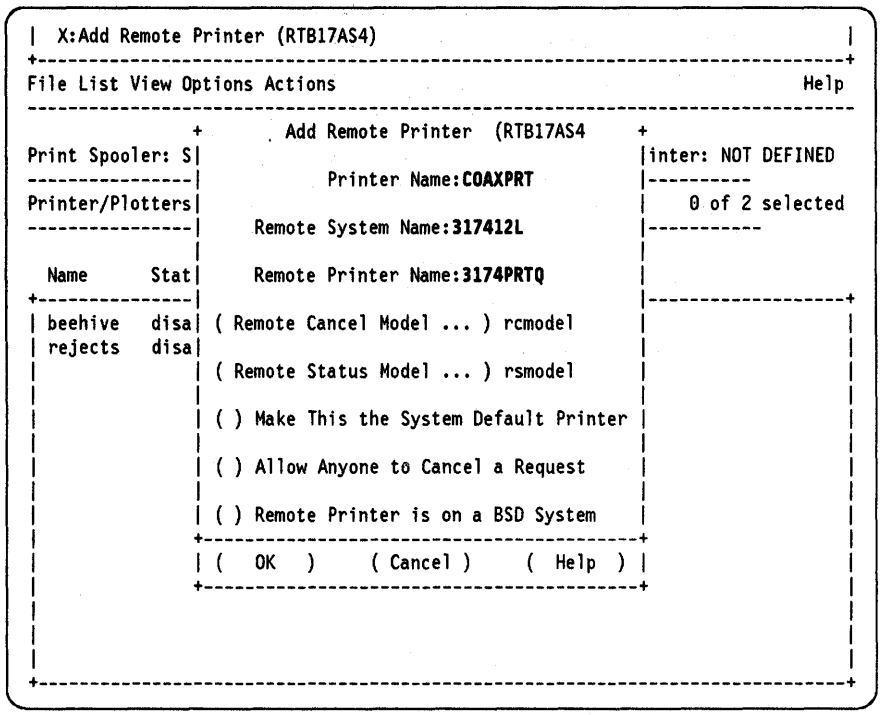


Figure 329. Add Remote Printer/Plotter

Enter on the **Printer Name** field the predefined printer device name of the 3174 LPD customization. In our case, we used **COAXPRT**. Type in the field **Remote System Name** the hostname of the 3174, which is used instead of the 3174 IP address. In our example, the 3174 hostname is **317412L**. In the **Remote Printer Name** field, we typed in **3174PRTQ**; this is the printer name, as predefined in the 3174 LPD customization.

With the Tab key select **OK** and press Enter; the remote printer is added now. The Printer/Plotter panel with the action menu bar is displayed again.

The next action, which is required, is enabling the newly defined remote printer.

Enable Printer

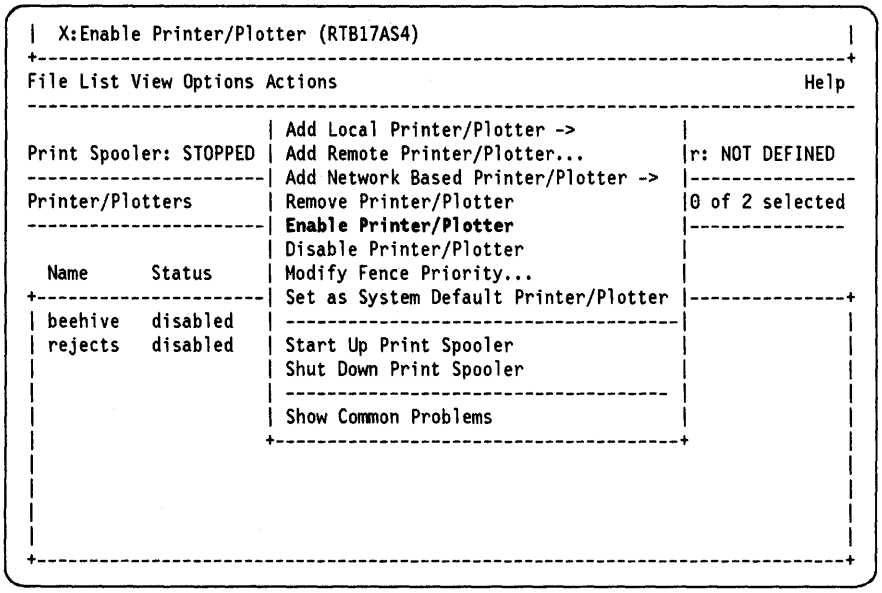


Figure 330. Enable Printer/Plotter

On the Printer/Plotter panel do the following. Select with the Arrow key **Enable Printer/Plotter** and press Enter. Press PF8, and the next panel shows you the status of the remote printer.

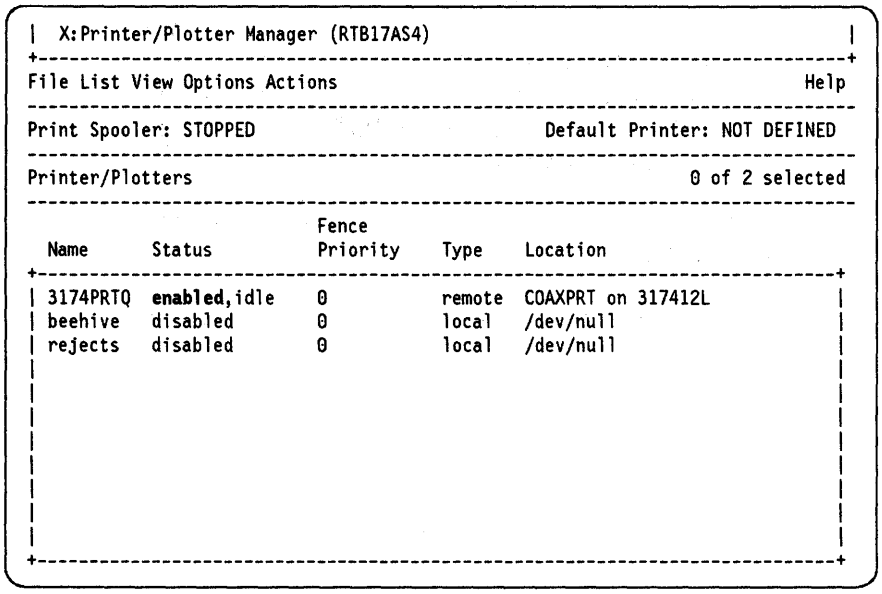


Figure 331. Printer/Plotter Status

Here, in the status field, you see 3174PRTQ (remote printer name), is enabled. Press PF8, and you get again the Printer/Plotter panel with the action menu bar.

Start Up Print Spooler

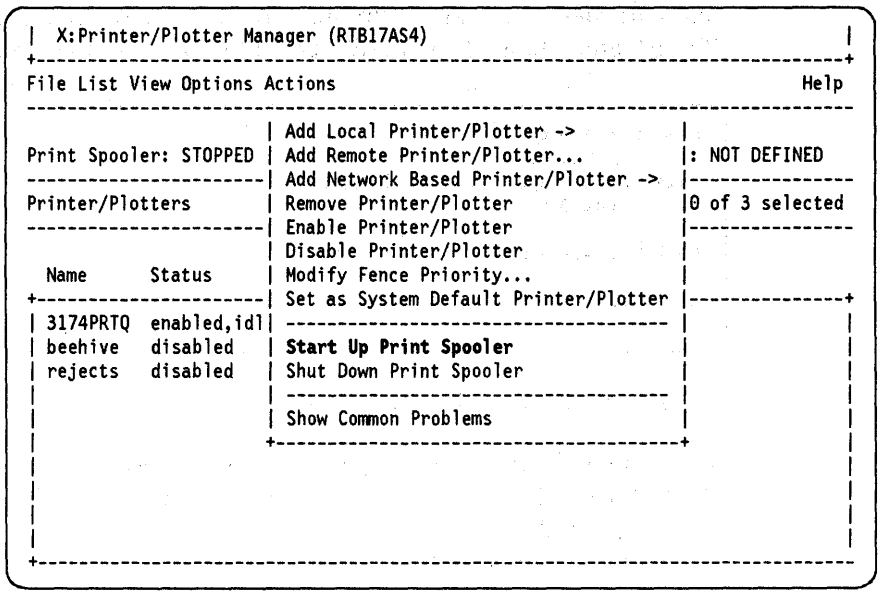


Figure 332. Start Up Print Spooler

With the Arrow key, select **Start Up Print Spooler** on the menu bar, and press Enter. Press PF8, and the following panel appears.

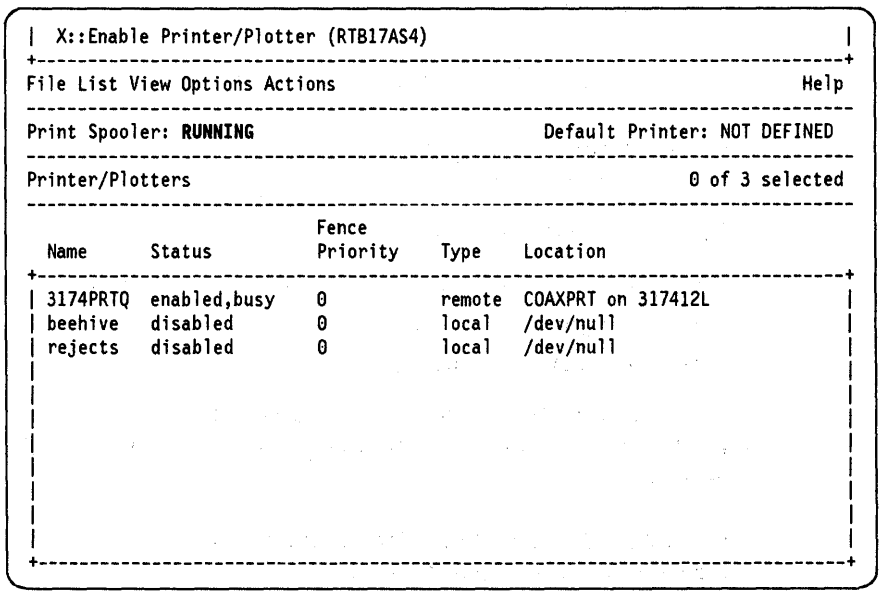


Figure 333. Print Spooler Running

The print spooler is running now. At this point the remote printer on the HP workstation is defined, enabled and ready to do a print job.

If you want to leave SAM, press PF key **Exit SAM** which is not shown on the panel.

Printing with the 3174 Line Printer Daemon on HP-UX System

In our scenario we start the LPD print job on the HP-UX system from our 3174 coax-attached terminal. From the 3174 Connection Menu we select the desired TELNET emulation. The TELNET Local Mode screen will appear.

```
3174 TELNET> open hp
Finding address ...
Attempting connection to 9.67.212.210
Connected to 9.67.212.210

HP-UX RTB17AS4 A.09.04 E 9000/867  ttyp1

login: hpuser
```

Figure 334. TELNET with HP Workstation

At the TELNET prompt type **open hp** as the desired destination name of the HP-UX host. After the connection to the HP host is established, you are able to login. Type in the user ID and the corresponding password. The HP-UX login screen will be displayed.

```
                        Hewlett-Packard Company
                        3000 Hanover Street
                        Palo Alto, CA 94304 U.S.A.

Rights for non-DOD U.S. Government Departments and Agencies are as set
forth in FAR 52.227-19 c  1,2 .




# lp -d317412L /etc/hosts.
```

Figure 335. Login at HP Host

After the successful login, the command prompt is displayed on the lower line. Here you type in:

 # lp -d3174PRTQ /etc/hosts

The lp command enables you to transfer the contents of the file (/etc/hosts) from the HP-UX workstation to the 3174 Line Printer Daemon that provides print services.

For detailed information of the lp command refer to *HP-UX System Administration Manual, Release 9.0.*

9.11.18 3174 Line Printer Daemon Configuration for SunOS Workstation

The following section describes the configuration and setup considerations that are necessary to print with the 3174 Line Printer Deamon on the SunOS host.

In our scenario we defined the remote printer on the SunOS host with a TELNET session from the 3174.

First do a verification of TCP/IP connectivity between 3174 coax-attached terminal and the SunOS system.

Verification

Verification of TCP/IP connectivity to the Sun workstation, which is connected to Ethernet can be done with a ping.

Invoke the TELNET Local Mode screen by selecting a TELNET emulation.

```
3174 TELNET> ping sun

Finding address ...
00064 characters to 9.67.212.9
Received reply to packet 00000, delay  ms  = 00185
Received reply to packet 00001, delay  ms  = 00209
Received reply to packet 00002, delay  ms  = 00173
Received reply to packet 00003, delay  ms  = 00184
Received reply to packet 00004, delay  ms  = 00169
Received reply to packet 00005, delay  ms  = 00209
Received reply to packet 00006, delay  ms  = 00200
Received reply to packet 00007, delay  ms  = 00190
Received reply to packet 00008, delay  ms  = 00222
Received reply to packet 00009, delay  ms  = 00225

Summary for PING to 9.67.212.9

   Packets sent: 00010 Packets received: 00010
   Round-trip  ms    min avg max   = 00169 00196 00225

3174 TELNET>
```

Figure 336. Ping Command to SunOS Host

TELNET Session to SunOS Host

```
3174 TELNET> open sun
```

Figure 337. TELNET with SunOS Host

At the TELNET prompt, type **open sun**. **Sun** is the destination name of the Sun host; you get the following panel. We entered **Sun** as the alias for the Sun's IP address in the 3174 customization.

```
3174 TELNET> open sun
Finding address ...
Attempting connection to 9.67.212.9
Connected to 9.67.212.9


SunOS UNIX  SPSUN009

login: root
Password:
Last login: Wed May 11 13:52:03 on console
SunOS Release 4.1.3  GENERIC  #3: Mon Jul 27 16:43:54 PDT 1992
You have new mail.
Type dec-vt100 unknown
SPSUN009#
After the connection to the SunOS host is build up, you can login to
to the foreign host, and you get the SunOS login screen with
the hostid as the command prompt.
```

Figure 338. Login to SunOS Host

After the successful login, the command prompt is displayed on the lower line.

Now you are able to define the remote printer daemon on the SunOS station.

LPD Definition on SunOS

/etc/printcap: Printcap is a simplified version of a database for describing printers. The spooling system accesses the printcap file every time it is used, allowing dynamic addition and deletion of printers.

Each entry in the data base describes one printer. The first entry for each printer gives the names which are known for the printer. The second name given is the most common abbreviation for the printer, and the last name given should be a long name fully identifying the printer.

For detailed description how to set up the database refer to *sun microsystems System and Network Administration, Part Number:800-3805-10.*

The following line shows our entry in the /etc/printcap:

```
#
# Printer Caption Entry for remote 3174 ITSO B657
lp|3174PRTQ:\
      :lp=:rm=3174PRTQ:rp=COAXPRT:sd=/var/spool/lpd:
```

/etc/hosts: The following entry has to be made in the /etc/hosts file before printing. In the /etc/hosts file is the name of the 3174 Line Printer Daemon.

```
SPSUN009# vi /etc/hosts
/etc/hosts 14 lines, 322 characters
#
# Sun Host Database
#
# If the NIS is running, this file is only consulted when booting
#
127.0.0.1       localhost
#
9.67.212.9          SPSUN009 loghost
45.119.151.153      8260DMM_A
45.119.151.154      8260DMM_B
45.119.151.155      8260_HMP
```

```
45.119.151.158      8260DMM_D
45.119.151.157      8260DMM_C
9.24.104.58         3174PRTQ
```

User Commands on SunOS

LPR Command: The **lpr** command creates a printer job in a spooling area for subsequent printing as facilities become available. Each printer job consists of a control file and one or more data files. The data files are copies of each filename you specify. The spool area is managed by the line printer daemon, lpd. Jobs that specify a printer on a remote machine are forwarded by lpd.

```
SPSUN009# lpr -P3174PRTQ etc/hosts
```

This command send the print job to our 3174 Line Printer Daemon, named 3174PRTQ. In our example we try to print the /etc/hosts file.

LPQ Command: The **lpq** command displays the contents of a printer queue. It reports the status of the specified jobs, or all jobs owned by the user specified by username.

```
SPSUN009# lpq -P3174PRTQ etc/hosts
```

LPSTAT Command: The **lpstat** prints information about the current status of the printer spooling system.

```
SPSUN009# lpstat
```

Line Printer Administration

The **lpc** program lets you control the operations of those printers which are described in the ***/etc/printcap*** database. Lpc can be used to start or stop a printer daemon, enable or disable the print queue for a printer, rearrange the order of jobs in a printer queue, or display the status of a printer, the printer daemon, and its spooling queue.

The following panels shows the LPC **status** command.

```
Last login: Thu May 12 18:15:58 from 3174PRTQ
SunOS Release 4.1.3  GENERIC  #3: Mon Jul 27 16:43:54 PDT 1992
You have new mail.
SPSUN009# lpc
lpc> status
lp:
        queuing is enabled
        printing is enabled
        1 entry in spool area
        waiting for queue to be enabled on 3174PRTQ
lpc>
```

Figure 339. lpc Program

This example shows the status of an attempt to start a spooling daemon for our 3174PRTQ printer.

9.12 Scenario 2 - TN3270 to MVS Host

The purpose of this connectivity scenario is to describe how terminal attached to a 3174 Ethernet Controller

LAN-attached workstation can use the TCP/IP protocol to communicate with MVS host applications through an IBM 3172 Interconnect Controller as shown in Figure 340.

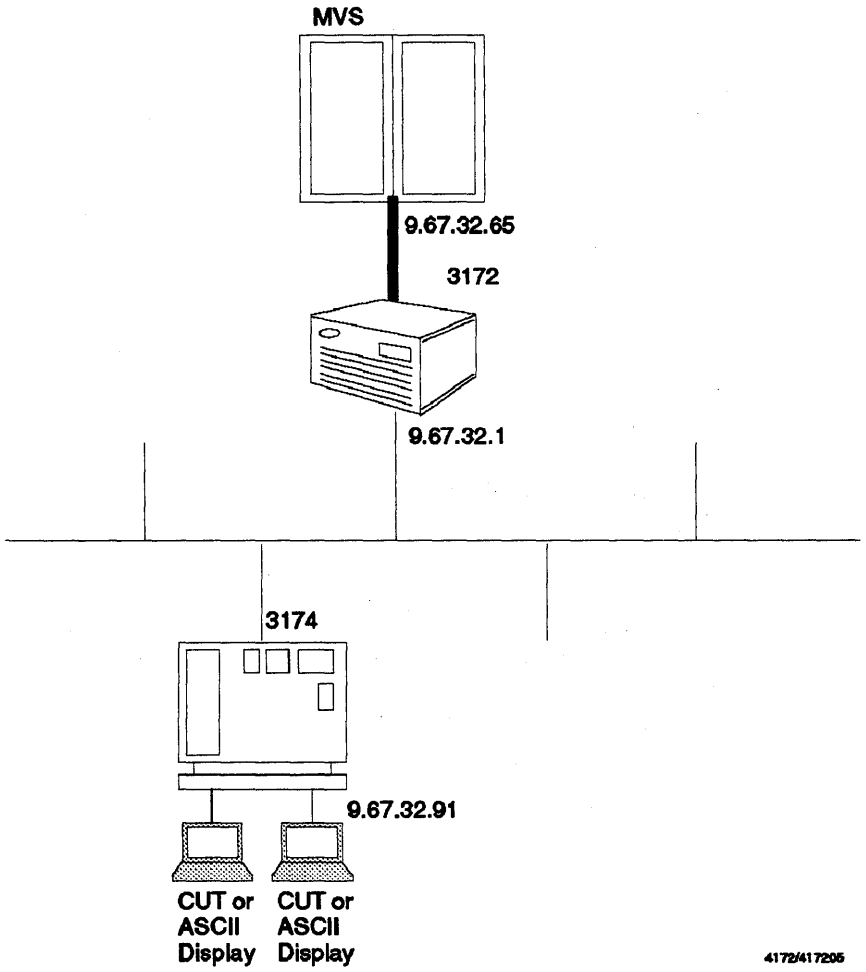


Figure 340. TN3270 to MVS Host

9.12.1 Scenario Description

This section describes the distinctive steps to establish a TN3270 TELNET session to the MVS host.

The composite network has the following components:

- MVS host with the destination address 9.67.32.65
- 3172-1 with IP-address 9.67.32.1
- 3174-14R with the Ethernet adapter address 9.67.32.91

9.12.2 TN3270 Customization

This section describes the entries to the customization that are needed to support the TN3270. If you are not familiar with customizing the 3174 for TCP/IP operation refer to *3174 Planning Guide*.

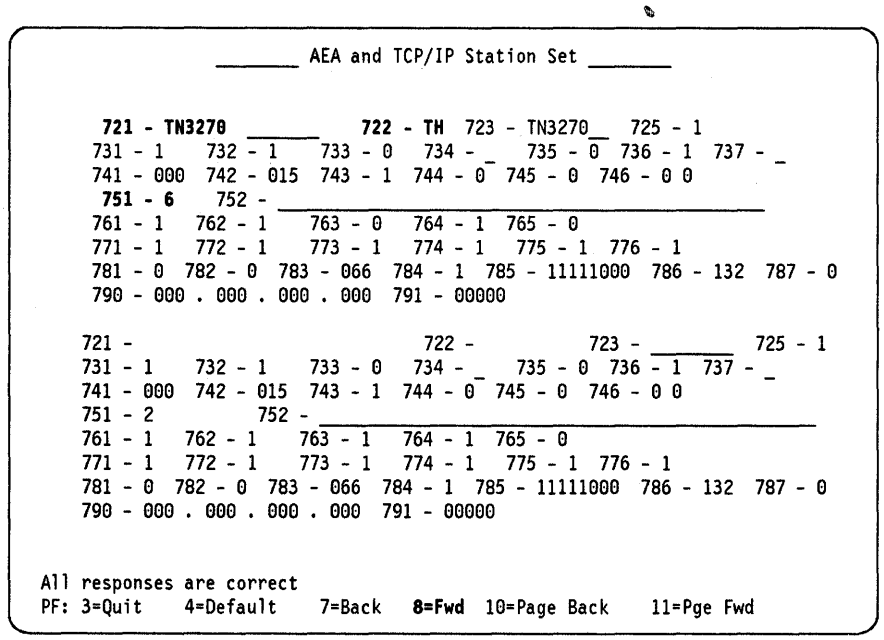


Figure 341. AEA and TCP/IP Station Set Panel

To define the station set for TN3270 access, respond to the following questions:

Q721 Enter **TN3270**; this is the station set name that you wish displayed on the Connection Menu.

Q722 Enter **TH** as the station type for the TCP/IP host.

Q751 Specify **6** for the data stream supported by the TCP/IP host.

Press Enter and PF**8** to continue with the customization.

9.12.3 Defining Default Destinations

```
                  ___ AEA and TCP/IP Default Destination ___

 Station        Station Set          Session          Session
   Set             Name               Limit     LT1 LT2 LT3 LT4 LT5

    1    3270 HOST                      0       ___ ___ ___ ___ ___
    2    TELNET VT100                   0       ___ ___ ___ ___ ___
    3    TELNET IBM3101                 0       ___ ___ ___ ___ ___
    4    TELNET VT220 7 BIT             0       ___ ___ ___ ___ ___
    5    TELNET VT220 8 BIT             0       ___ ___ ___ ___ ___
    1    TN3270                         0       ___ ___ ___ ___
    7                                   0       ___ ___ ___ ___ ___
    8                                   0       ___ ___ ___ ___ ___


PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 342. AEA and TCP/IP Default Destination Panel

This panel determines what the terminal user will see on each LT when it is first accessed. Press PF**8** and the next panel appears.

9.12.4 Defining TCP/IP Options

```
                    ____ TCP/IP Options Menu ____

 3174 IP Address                  052 - 009 . 067 . 032 . 091
 Subnet Mask                      054 - 255 . 255 . 255 . 192

 Maximum TELNET Connections       058 - 020        (001 - 250)
 Maximum Printer Connections      059 - 005        (001 - 099)
 TCP/IP Buffer Space              060 - 0256 K     (K = 1024 bytes)

 Routing Field Support            062 - Y          (Y,N)
 All Routes Broadcast             064 - Y          (Y,N)




PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 343. TCP/IP Options Menu

On this panel you define a 3174 IP address and the corresponding subnet mask. After defining press Enter followed bbyyF**8** and the following panel is displayed.

9.12.5 Defining TCP/IP Routing Information

```
                ____ TCP/IP Routing Information ____

Destination IP Address      Type          Router IP Address
                            (N,S,H,D)

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX


PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 344. TCP/IP Routing Information

In our scenario we do not use router. Therefore, just press PF**8** to continue with the next panel.

9.12.6 Defining Domain Name Services

```
                ____ TCP/IP Domain Name Services ____

3174 Hostname
3174TCP1 1 _____________________________________________

3174 Domain Name
ITS0 RALEIGH IBM COM 2 _____________________________________
_____________________________________________________________
_____________________________________________________________
_____________________________________________________________

Domain Nameserver IP Addresses 3

XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX


PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 345. TCP/IP Domain Name Services

1 Is the name assigned to your 3174.

2 Is the domain in which your 3174 is in.

3 In our example, we have not defined a nameserver.

Press Enter and PF8, and the following panel will allow you to create a host nickname. In our scenario we do not define a host nickname; therefore, walk-through the following panel by pressing Enter and PF8 to finish TN3270 customization.

After you have completed the 3174 TCP/IP customization for TN3270 you have to reIML the 3174.

9.12.7 Connection Menu

The following panel shows you the Connection Menu after the 3174 becomes active. This menu represents the different TELNET emulations which are customized on the 3174.

```
                    Connection Menu
Enter a number (NUM) or a name on the Command Line, then press ENTER

NUM NAME                    STATUS     NUM NAME                    STATUS
  1 3270 HOST               ?
  2 TELNET VT100            Down
  3 TELNET IBM3101          Down
  4 TELNET VT220 7 BIT      Down
  5 TELNET VT220 8 BIT      Down
  6 TN3270                  Down


 PF: 3=End       6=Terminal Disconnect        12=Host Disconnect


 ============>To:
```

Figure 346. Connection Menu Immediately after 3174 IMLed

When the 3270 host attachment becomes active, the status changes without user intervention. When you press the Enter key, the status shows all TCP/IP hosts active.

```
                    Connection Menu
Enter a number (NUM) or a name on the Command Line, then press ENTER

NUM NAME                    STATUS     NUM NAME                    STATUS
  1 3270 HOST               Up
  2 TELNET VT100            UP
  3 TELNET IBM3101          Up
  4 TELNET VT220 7 BIT      Up
  5 TELNET VT220 8 BIT      Up
  6 TN3270                  Up


 PF: 3=End       6=Terminal Disconnect        12=Host Disconnect


 ============>To: 6
```

Figure 347. Connection Menu after 3174 Becomes Active and Enter Pressed

Select **TN2370** by typing **6** on the command line and then press Enter.

```
3174 TELNET> open 9.67.32.65
Attempting connection to 9.67.32.65
Connected to 9.67.32.65
```

Figure 348. TELNET Local Mode

At the TELNET prompt type **open** and **9.67.32.65** as the desired destination of the MVS host. If the connection is opened, you leave the local mode and enter into session with the MVS host.

In our scenario the TN3270 default application in MVS TCP/IP is NetView Access Services.

```
                  Hot Line: 17-6666
                                                    Date . .: 04/29/94
                                                    Time . .: 09:31:24
                                                    Terminal: RAKAE001
        N E T V I E W
        *******    *******    *******   *********   *******    *******
      **     **  **     **  **     **  **          **     **  **     **
     **     **  **         **         **          **         **
     *********  **         **         *********   *******    *******
    **     **  **         **         **                **         **
   **     **  **     **  **     **  **          **     **  **     **
  **     **    ******     ******    *********   *******    *******
                                                      S E R V I C E S
    NetView Access Services, Release 3.1 - Program Number 5665-365
        C  Copyright IBM Corp. 1987, 1991.  All rights reserved

             Enter Logon information:
               User . . . . . . fran        User ID/LOGOFF
               Password . . . .             New Password . .

               Application  . .
               Group  . . . . .
               Location . . . .
PF 1=Help 2=Language
```

Figure 349. NETVIEW ACCESS

The TN3270 session with the MVS host is established. The NETVIEW ACCESS main menu is displayed. At the Logon information field **User**, type in your user ID and the desired **Password** to get access to the Application Selection panel.

```
                    Application Selection       Help: 17-6666  Term: RAKAE001
                                                Date: 04/29/94 Time: 09:43:21
                                                Broadcast:
Select application or enter command. Return to this panel using Escape key PA2
Issue commands in applications using Command key PF01 and Prefix #

  ID  Name     Status M  B Jump Key Application Description
   1  NETV20   07:44         PA2    NPDA/NLDM NetView SA20 - RAKAN
   2  TSO20    07:44         PA2    TSO on SA20 - RAKAT
   3  NRFAS4A                PA2    NRF application on as/400
   4  NRFTEST                PA2
   5  CICS1                  PA2    CICS V2.1 on SA20 - RAKAC001
   6  HONE                   PA2
   7  NETOPS03               PA2    AUTO OPS NetView SA03 - RA3AO
   8  NETOPS18 07:44         PA2    AUTO OPS NetView SA18 - RAIAO
   9  NETOPS20 07:44         PA2    AUTO OPS NetView SA20 - RAKAO
  10  NETOPS25               PA2    AUTO OPS NetView SA25 - RAIAO


To terminate all sessions use the LOGOFF command.


COMMAND ==> 2_____________  _______  _______  ______
PF 1=Help   2=Language   3=Disconnect   4=Redefine Keys   7=Backward   8=Forward
```

Figure 350. Application Selection

On the Application Selection panel you select the application which you want work with. In our example we decided to work with TSO.

Type in **2** on the command line and press Enter; the TSO logon process is started.

```
ICH70001I FRAN     LAST ACCESS AT 09:45:43 ON FRIDAY, APRIL 29, 1994
IKJ56455I FRAN LOGON IN PROGRESS AT 09:45:56 ON APRIL 29, 1994
IKJ56951I NO BROADCAST MESSAGES
***
```

Figure 351. TSO Logon

After a successful TSO logon process, the ISPF/PDF PRIMARY OPTION MENU will appear.

```
                        ISPF/PDF PRIMARY OPTION MENU
OPTION  ===>
                                                                USERID     FRAN
   0  ISPF PARMS    Specify terminal and user parameters       TIME       09:46
   1  BROWSE        Display source data or output listings     ISPF       V3R5
   2  EDIT          Create or change source data
   3  UTILITIES     Perform utility functions
   6  COMMAND       Enter TSO Command, CLIST, or REXX exec
   8  SDSF          System Display and Search Facility
   T  TUTORIAL      Display information about ISPF/PDF
   D  DITTO         MVS DITTO
   J  XMIT          Transmit / Receive
   U  USER Util     NCP GEN, ACFTAP, Language foreground and batch
   R  RACF          Resource Access Control Facility
   H  HCD           Hardware Configuration Definition
   S  SMP/E         SMP/E
   X  EXIT          Terminate ISPF using log and list defaults

Enter END command to terminate ISPF.


 F1=HELP      F2=SPLIT     F3=END       F4=RETURN    F5=RFIND     F6=RCHANGE
 F7=UP        F8=DOWN      F9=SWAP      F10=LEFT     F11=RIGHT    F12=RETRIEVE
```

Figure 352. ISPF/PDF Primary Option Menu

```
                        ISPF/PDF PRIMARY OPTION MENU
OPTION  ===> 6
                                                                USERID     FRAN
   0  ISPF PARMS    Specify terminal and user parameters       TIME       09:50
   1  BROWSE        Display source data or output listings     ISPF       V3R5
   2  EDIT          Create or change source data
   3  UTILITIES     Perform utility functions
   6  COMMAND       Enter TSO Command, CLIST, or REXX exec
   8  SDSF          System Display and Search Facility
   T  TUTORIAL      Display information about ISPF/PDF
   D  DITTO         MVS DITTO
   J  XMIT          Transmit / Receive
   U  USER Util     NCP GEN, ACFTAP, Language foreground and batch
   R  RACF          Resource Access Control Facility
   H  HCD           Hardware Configuration Definition
   S  SMP/E         SMP/E
   X  EXIT          Terminate ISPF using log and list defaults

Enter END command to terminate ISPF.


 F1=HELP      F2=SPLIT     F3=END       F4=RETURN    F5=RFIND     F6=RCHANGE
 F7=UP        F8=DOWN      F9=SWAP      F10=LEFT     F11=RIGHT    F12=RETRIEVE
```

Figure 353. ISPF/PDF Primary Option Menu

To work with the TSO COMMAND PROCESSOR, type in **6** on the OPTION line and press Enter; the following panel appears.

```
------------------------  TSO COMMAND PROCESSOR  ----------------------------
ENTER TSO COMMAND, CLIST, OR REXX EXEC BELOW:

===>



 F1=HELP      F2=SPLIT     F3=END       F4=RETURN    F5=RFIND     F6=RCHANGE
 F7=UP        F8=DOWN      F9=SWAP      F10=LEFT     F11=RIGHT    F12=RETRIEVE
```

Figure 354. TSO Command Processor

```
------------------------  TSO COMMAND PROCESSOR  ----------------------------
ENTER TSO COMMAND, CLIST, OR REXX EXEC BELOW:

===> netstat devlinks



 F1=HELP      F2=SPLIT     F3=END       F4=RETURN    F5=RFIND     F6=RCHANGE
 F7=UP        F8=DOWN      F9=SWAP      F10=LEFT     F11=RIGHT    F12=RETRIEVE
```

Figure 355. TSO Command Processor

On this panel you are able to work with TSO commands. In our scenario we want to show what kind of information is available with the command **netstat devlinks**

On the arrow line type in **netstat devlinks** and press Enter. In our case, the result of this command is shown on the following panel.

```
------------------------  TSO COMMAND PROCESSOR  ----------------------------
ENTER TSO COMMAND, CLIST, OR REXX EXEC BELOW:

===> netstat devlinks




TCPNET267I MVS TCP/IP Netstat V2R2.1
TCPNET245I
TCPNET246I Device CH2EN2           Type: LCS         Status: Ready
TCPNET252I Queue size: 0           Address: 0EC0
TCPNET120I    Link EN2             Type: ETHER|802.3 Net number: 1
TCPNET245I
TCPNET246I Device CH2TR2           Type: LCS         Status: Inactive
TCPNET252I Queue size: 0           Address: 0EC2
TCPNET120I    Link TR2             Type: IBMTR       Net number: 1
TCPNET245I
TCPNET246I Device CTCD2025         Type: CTC         Status: Inactive
TCPNET252I Queue size: 0           Address: 0C04
TCPNET120I    Link CTCL2025        Type: CTC         Net number: 1
```

Figure 356. netstat devlinks

On this panel the TCPNET status information is displayed.

9.13 Scenario 3 - TN3270 to CICS/6000

The purpose of this connectivity scenario is to describe how a 3174 coax-attached or ASCII terminal can communicate over an Ethernet-LAN to CICS/6000 as shown in Figure 357.

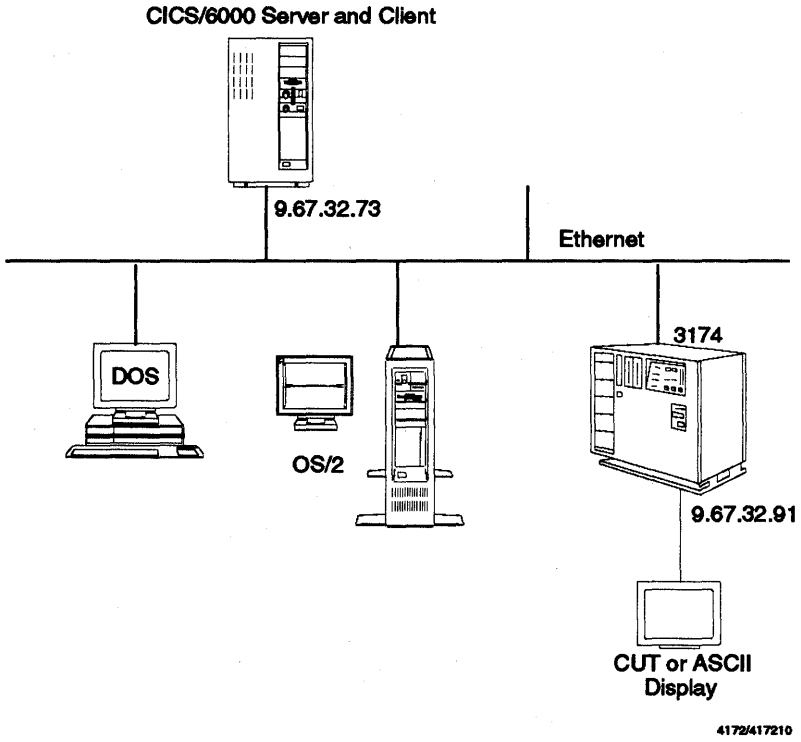


Figure 357. TN3270 to RS/6000 Host

9.13.1 Scenario Description

The test configuration consists of the following components:

- RS/6000 with AIX 3.2.3 and IP-address 9.67.32.73
- 3174-14R with an Ethernet adapter address 9.67.32.91
- PS/2s running DOS and OS/2 are not being used in this scenario.

9.13.2 TN3270 Customization

This section describes the entries to the customization that are needed to support the TN3270. If you are not familiar with customizing the 3174 for TCP/IP operation refer to *3174 Planning Guide*.

```
             _______ AEA and TCP/IP Station Set _______

  721 - TN3270 ______        722 - TH  723 - TN3270__  725 - 1
  731 - 1    732 - 1    733 - 0   734 - _   735 - 0  736 - 1  737 - _
  741 - 000  742 - 015  743 - 1  744 - 0  745 - 0  746 - 0 0
  751 - 6    752 - _______________________________________________
  761 - 1   762 - 1    763 - 0   764 - 1  765 - 0
  771 - 1   772 - 1    773 - 1   774 - 1   775 - 1  776 - 1
  781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
  790 - 000 . 000 . 000 . 000  791 - 00000

  721 -                          722 -          723 - _______   725 - 1
  731 - 1    732 - 1    733 - 0   734 - _   735 - 0  736 - 1  737 - _
  741 - 000  742 - 015  743 - 1  744 - 0  745 - 0  746 - 0 0
  751 - 2          752 - ________________________________________________
  761 - 1   762 - 1    763 - 1   764 - 1  765 - 0
  771 - 1   772 - 1    773 - 1   774 - 1   775 - 1  776 - 1
  781 - 0  782 - 0  783 - 066  784 - 1  785 - 11111000  786 - 132  787 - 0
  790 - 000 . 000 . 000 . 000  791 - 00000

All responses are correct
PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 358. AEA and TCP/IP Station Set Panel

To define the station set for TN3270 access, respond to the following questions:

Q721 Enter **TN3270**, as this is the station set name that you wish displayed on the Connection Menu.

Q722 Enter **TH** as the station type for the TCP/IP host.

Q751 Specify **6** for the data stream supported by the TCP/IP host.

Press Enter and the PF**8** key to continue with the customization.

9.13.3 Defining Default Destinations

```
               ___ AEA and TCP/IP Default Destination ___

 Station         Station Set          Session          Session
   Set              Name               Limit     LT1 LT2 LT3 LT4 LT5

    1     3270 HOST                      0        _   _   _   _   _
    2     TELNET VT100                   0        _   _   _   _   _
    3     TELNET IBM3101                 0        _   _   _   _   _
    4     TELNET VT220 7 BIT             0        _   _   _   _   _
    5     TELNET VT220 8 BIT             0        _   _   _   _   _
    1     TN3270                        0        _   _   _   _   _
    7                                    0        _   _   _   _   _
    8                                    0        _   _   _   _   _

PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 359. AEA and TCP/IP Default Destination Panel

This panel determines what the terminal user will see on each LT when it is first accessed. Press the PF**8** key, and the next panel appears.

9.13.4 Defining TCP/IP Options

```
                ____ TCP/IP Options Menu ____

3174 IP Address                 052 - 009 . 067 . 032 . 091
Subnet Mask                     054 - 255 . 255 . 255 . 192

Maximum TELNET Connections      058 - 020        (001 - 250)
Maximum Printer Connections     059 - 005        (001 - 099)
TCP/IP Buffer Space             060 - 0256 K     (K = 1024 bytes)

Routing Field Support           062 - Y          (Y,N)
All Routes Broadcast            064 - Y          (Y,N)




PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 360. TCP/IP Options Menu

On this panel you define 3174 IP address and the corresponding Subnet Mask. After defining, press Enter and the PF8 key, the following panel is displayed.

9.13.5 Defining TCP/IP Routing Information

```
                ____ TCP/IP Routing Information ____

Destination IP Address      Type          Router IP Address
                          (N,S,H,D)

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX

XXX . XXX . XXX . XXX        X        XXX . XXX . XXX . XXX


PF: 3=Quit    4=Default    7=Back    8=Fwd
```

Figure 361. TCP/IP Routing Information

In our scenario we do not use routers. Therefore, just press PF8 to continue to the next panel.

9.13.6 Defining Domain Name Services

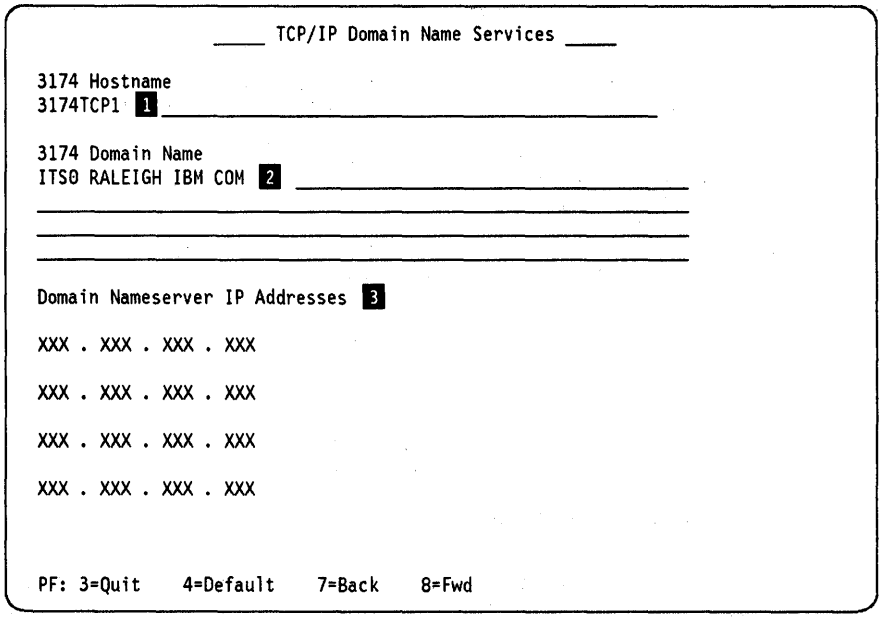


Figure 362. TCP/IP Domain Name Services

1 Is the name assigned to your 3174.

2 Is the domain in which your 3174 is in.

3 In our example, we have not defined a nameserver.

Press Enter and PF8, and the following panel appears.

9.13.7 Defining TCP/IP Nicknames

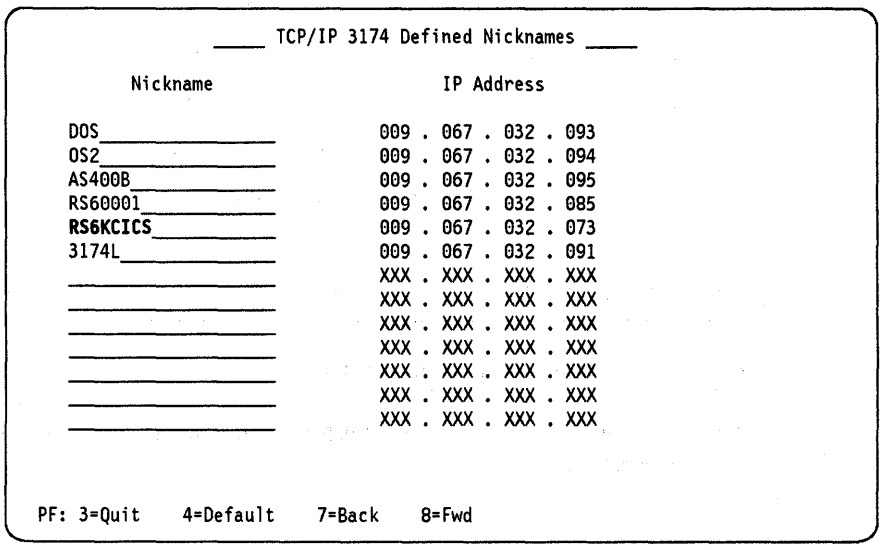


Figure 363. TCP/IP 3174 Defined Nicknames

Since users remember names better than numeric IP addresses, this panel allows you to define up to 16 host nicknames and their associated IP addresses. In our scenario we defined **RS6KCICS** as the nickname. After defining the nickname, press Enter and PF8.

After you have completed the 3174 TCP/IP customization for TN3270, yo have to relML the 3174.

9.13.8 CICS/6000 Overview

CICS/6000 is the latest member of the CICS product family. It extends the distributed processing capabilities of CICS to the AIX environment. Like existing CICS products that run on the MVS, VSE, OS/2, and OS/400 platforms, CICS/6000 requires prerequisite products in order for it to function. In the case of CICS/6000 the prerequisite products are Distributed Computing Environment (DCE) and Encina. The name Encina is derived from Enterprise Computing in a New Age.

DCE is prerequisite to both CICS/6000 and Encina, because it provides a common infrastucture for distributed processing. CICS/6000 is the transaction monitor that enables transaction processing, resource management, and communication with other CICS family members.

For detailed information about the CICS/6000 environment refer to *AIX CICS/6000 Installation and Configuration: A Guide to Implementation, GG24-4091-00.*

9.13.9 CICS/6000 Environment

Before you are able to communicate with TN3270 from a 3174 CUT or ASCII terminal to CICS/6000 be sure that the following steps have been taken on the CICS/6000 system:

- Install the CICS/6000 products.
- Configure a region.
- Create users.
- Customize the environment.
- Define a separate CICS/6000 client machine.
- Enable access from remote machines through a TCP/IP LAN.

For a detailed description about this procedures refer to Chapter 4 of *AIX CICS/6000 Installation and Configuration: A Guide to Implementation, GG24-4091-00.*

9.13.10 CICS/6000 TELNET Server

CICS/6000 supplies a component called cicsteld (CICS telnet daemon). This component provides the telnet server services to telnet clients and communicates with CICS/6000 regions.

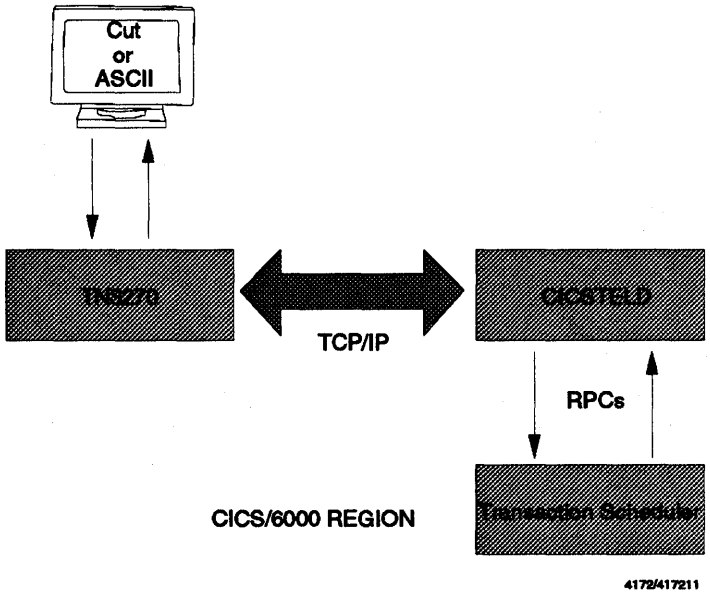


Figure 364. cicsteld Protocol

In our the scenario the telnet client is a 3270 coax-attached terminal.

9.13.11 TCP/IP Port Number

When the telnet client wants to attach to a telnet server, it must supply the hostname of the machine on which that server resides. It must also supply a port number, which distinguishes one TCP/IP service from another; see Figure 365 on page 346.

The TCP/IP protocol architects a set of **well-known** port numbers that are reserved for specific applications and services. When using a telnet client to contact a standard telnet server, you only need to supply the hostname of the server, as the telnet service port number is defined as **well-known** (port23).

The majority of telnet clients provide a mechanism to specify an alternative port number when connecting to a remote telnet server. This mechanism allows alternative servers to coexist on the same TCP/IP host without interfering with each other. This mechanism is used by cicsteld.

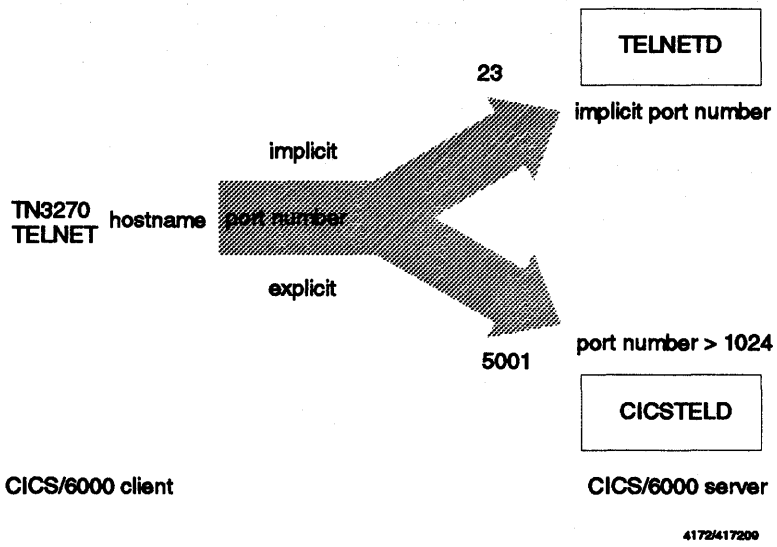


Figure 365. TCP/IP Port Number

You must select a port number for cicsteld registration, in our example we use 5001, that incoming telnet client requests will use to reach the cicsteld server.

After the configuration of cicsteld is finished, we are able to access the CICS/6000 region from the 3174 connection menu, using the TN3270 command. For detailed information refer to Chapter 6 of *AIX CICS/6000 Installation and Configuration: A Guide to Implementation, GG24-4091-00*.

9.13.12 Connection Menu

The following panel shows you the Connection Menu after the 3174 becomes active. This menu represents the different TELNET emulations which are customized on the 3174.

```
                    Connection Menu
Enter a number (NUM) or a name on the Command Line, then press ENTER

NUM NAME                    STATUS     NUM NAME                    STATUS
  1 TN3270                  Up
  2 TELNET VT100            UP
  3 TELNET IBM3101          Up
  4 TELNET VT220 7 BIT      Up
  5 TELNET VT220 8 BIT      Up
  6 TN3270                  Up


 PF: 3=End       6=Terminal Disconnect        12=Host Disconnect


 ============>To: 6
```

Figure 366. Connection Menu after 3174 Becomes Active and Enter pressed

Select TN2370 by typing **6** on the command line and press Enter.

```
3174 TELNET> open rs6kcics 5001
Attempting connection to 9.67.32.73
Connected to 9.67.32.73
```

Figure 367. TELNET Local Mode

At the TELNET prompt type **open rs6kcics 5001** and press Enter. Instead of the IP-destination address, we use the RS/6000 nickname, which was customized.

While attempting to establish a connection to a CICS/6000 region, the following messages will appear, one after another, on the upper line of your screen.

```
ERZ1824T/0031: Checking supplied user identify 'telduser'.


 PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 368. Checking User

```
ERZ1814I/0011: Searching for available regions.


 PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 369. Searching Available Regions

```
                          Available CICS Regions
 Move cursor to desired item and press <ENTER>


    REGION       Description
    itso         Region Definition



         PF3=Exit
```

Figure 370. Available CICS Regions

On this screen, the available CICS regions are displayed. Move the cursor to the desired region and press Enter. In our example, we have defined only the region **itso**

```
ERZ1815I/0013: Connect to region 'itso'.



 PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 371. Connect to Region

After the successful connection to the selected region, you are able to run different commands to start CICS-supplied transactions.

For detailed information about these commands refer to *AIX CICS/6000 Customization and Operation, Release 1, SC33-0931-01*.

CESN Command

This is a CICS-supplied transaction that enables users to sign on to the CICS system.

Run the following command:

CESN

the CICS Signon Screen is displayed.

9.13.13 CICS Signon Screen

```
                CESN - CICS SIGNON - ENTER USERID AND PASSWORD
                       USERID:
                       PASSWORD:



 PF: 3=Quit    4=Default    7=Back    8=Fwd    10=Page Back    11=Page Fwd
```

Figure 372. CESN - CICS Signon Screen

On this screen, Enter your CICS user ID and password to sign on to a CICS/6000 session.

CEMT Command

This is a CICS-supplied transaction that invokes all the master terminal functions. These functions include inquiring and changing the value of parameters used by CICS, altering the status of system resources, and terminating tasks.

Run the following command:

```
CEMT INQUIRE TASK
```

The following panel appears.

```
INQUIRE TASK
STATUS:  RESULTS - OVERTYPE TO MODIFY

  Tas(       14) Tcl(001) Tra(CEMT) Fac(RT00) Run Inf Ter
        User(telduser)









                                                          APPLID=itso
RESPONSE:  NORMAL
PF 1 HELP       3 END                    7 SBH 8 SFH 9 MSG 10 SB 11 SF
```

Figure 373. Inquire Task

9.13.14 Working with Your CICS/6000 Region

Now that your CICS/6000 region is running, you may want to customize your environment to better support the existing terminals in your system configuration.

The following customization steps should be done on your CICS/6000 system:

- Specify a 3270 configuration.
- Modify a 3270 configuration.
- Access CICS/6000 from a remote machine.
- Use the screen design aid tool.

For a detailed description about these topics go to Chapter 7 of *AIX CICS/6000 Installation and Configuration: A Guide to Implementation, GG24-4091-00.*

Chapter 10. 3174 Configuration Support C, Release 5

The new functions added in Release C5 fall into four categories:

- Enhancements to APPN
- Addition of the Frame Relay Communication Feature
- The inclusion of several RPQs as base function
- Miscellaneous enhancements

This chapter describes mainly the 3174 TCP/IP traffic function over the Frame Relay Communications feature.

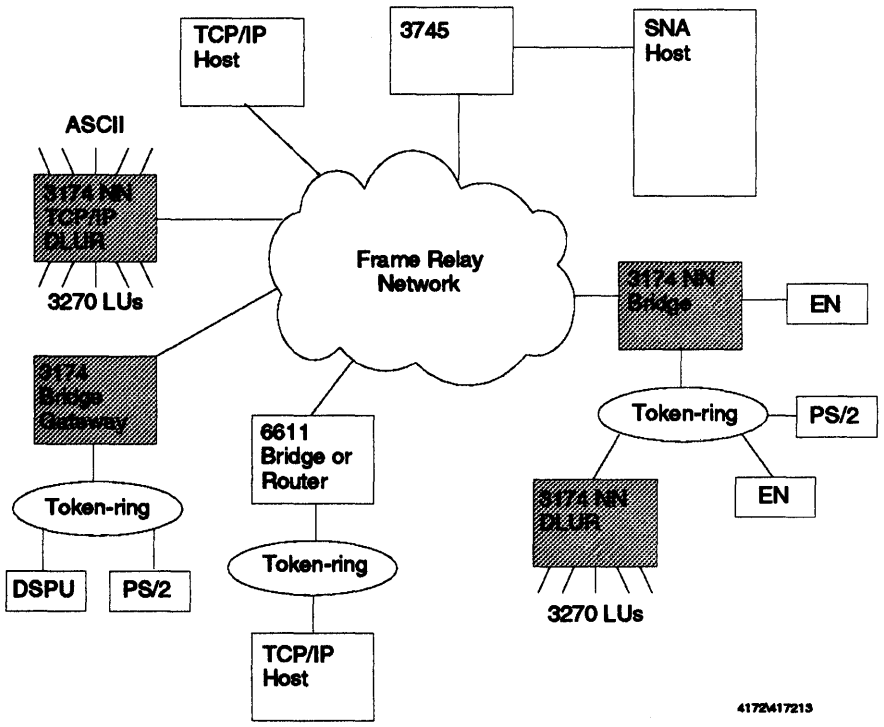


Figure 374. 3174 Frame Relay Communications Feature

With the addition of the Frame Relay interface, the 3174 expands the networking opportunities for interconnecting multiple protocols at speeds up to 256 Kbps. 3174 protocols, such as SNA PU2.0, APPN, LAN Gateway, and TCP/IP, are supported by the Frame Relay Communications feature.

A major application of 3174 Frame Relay support is the interconnection of token-ring LANs across a WAN that requires higher speed access. With source-route remote bridge support, the 3174 can communicate over private or public Frame Relay networks, bridging a token-ring workstation attached to the 3174 across a Frame Relay network to another token-ring workstation.

Note:

Frame relay remote bridge is not available in Configuration Support-C Release 5. The frame relay remote bridge function is planned for late 1994.

You can create hybrid networks where private and public networks are used (as available) with a single network interface. This will allow you to efficiently and economically expand your business network across town, or across country, while using higher communication speeds.

10.1 Multiprotocol Frame Relay

The 3174 Frame Relay Communications feature, along with other IBM products, such as the 6611, 3745, 3172, RouteXpander/2, and AS/400, support RFC 1490 (updated 1294 RFC), a multiprotocol interconnect standard for Frame Relay. This standard establishes a format for transport across a Frame Relay network, so that any other device that meets this standard can read all traffic sent into the network.

10.2 DLCI

The 3174 can support up to 250 Data Link Connection Identifiers (DLCIs) with a single access to a private or public Frame Relay network. Multiple DLCIs are allowed for each protocol type supported, as well as multiple protocols via one DLCI. The Local Management Interface (LMI), which provides status inquiries between the 3174 and the Frame Relay network, is supported for LMI Rev1, Annex D, and CCITT formats.

10.3 IP Support

The IP support of Frame Relay allows coax and ASCII terminal users to log on to TCP/IP hosts as TELNET clients over a WAN. The TELNET sessions can co-exist with existing 3270 or ASCII host sessions using the Multiple Logical Terminal function. Other basic protocols such as ICMP, UDP and SNMP, are also supported. For IP traffic, the 3174 uses InARP (Inverse ARP) when each DLCI becomes active to determine the remote device's IP address. The 3174 requires its remote partners to reply to InARP requests if they want to talk with the 3174 over Frame Relay.

10.4 Interoperability

TCP/IP on the 3174 can use a Frame Relay network to a TCP/IP host or IP router, such as a 6611 or a 3745 using the Frame Relay Handler support in NCP.

10.5 Migration - Coexistence

All functions in the previous C releases can coexist with the C5 functions. You can upgrade an existing 3174 to C5 and not lose any current function given you have installed the memory required to handle all the desired function.

Although C4 allowed Ethernet configurations, but not token-ring configurations, C5 allows either one to be configured.

10.6 Frame Relay Customization

There are 3 new panels to support Frame Relay. The first panel is for information related to the 1A host connection via a Frame Relay network as shown 10.6.2, "Frame Relay Host Panel Layout for the 1A Host" on page 354. The second is for information related to the single link host connections via a Frame Relay network as shown in 10.6.3, "Frame Relay Host Panel Layout for the 1B - 1H Hosts" on page 354. The host panels can only be displayed when the host attachment for the 1A host ID is Frame Relay. The last new panel describes the characteristics of the actual DLCI connections to the Frame Relay network. See 10.6.4, "Frame Relay Description Panel Layout" on page 355, for an example of this panel. The information on this panel is only required once per physical connection to a Frame Relay network. Therefore the single link path of panels need not present this panel.

The Model/Attach panel is the only existing panel that has been modified. It allows the selection of the option **9=Frame Relay** for Question 101 (Host Attachment). 10.6.1, "Model/Attach Panel," shows how the panel looks.

10.6.1 Model/Attach Panel

```
                    Model / Attach

Online Test Password    098 -

Product Assistance Data
099 - 3174 ETHERNET ADAPTER

3174 Model              100 - XXX

Host Attachment         101 - X    1-BSC              6-SDLC, X.21 Switched
                                   2-SDLC             7-Token-Ring
                                   3-X.25             8-Ethernet
                                   4-Non-SNA Channel  9-Frame Relay
                                   5-SNA Channel      M-Multi-host

LAN adapter type        102 - X    0-none
                                   1-Token Ring
                                   2-Ethernet


PF:  3=Quit  4=Default             8=Fwd
```

Figure 375. Model / Attach

Here is the change to the Model/Attach panel:

Question 101: Host Attachment

Response:

1 = BSC	6 = SDLC (X.21 Switched)
2 = SDLC	7 = Token-Ring
3 = X.25	8 = Ethernet
4 = Non-SNA (Channel)	**9 = Frame Relay**
5 = SNA (Channel)	M = Multi-Host Support

This question allows a response of 9 to signify Frame Relay network.

10.6.2 Frame Relay Host Panel Layout for the 1A Host

This is what the panel looks like that describes the connection parameters to a host through a Frame Relay link. In a TCP/IP environment the primary host will more than likely be a VM or MVS host, with the 3174 being a TN3270 terminal server.

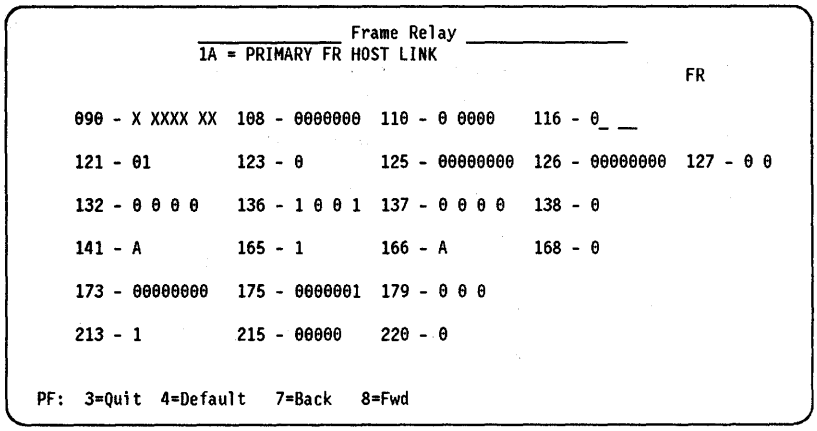


Figure 376. Frame Relay Connection Parameter

10.6.3 Frame Relay Host Panel Layout for the 1B - 1H Hosts

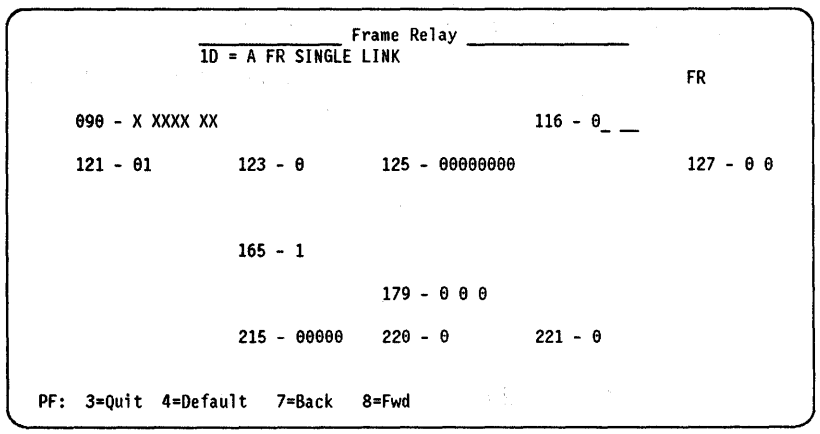


Figure 377. Frame Relay Connection Parameter

Question 090: DLCI Number / SAP

This is the DLCI number and SAP for this host.

Response:

```
90 - x xxxx xx
          └── SAP   any non-zero hex multiple of 4
       └───── DLCI  0016 - 0991 decimal/10 - 3DF hex
    └──────── DLCI  Input format D=Decimal, H=Hex
```

Default:

x' s

10.6.4 Frame Relay Description Panel Layout

This is what the panel looks like that describes the connection parameters to a Frame Relay network.

```
              ______________ Frame Relay ________________
              1A = PRIMARY FR HOST LINK
                                                          00/FR

 300 - _      Enable Frame Relay (0-No, 1-Yes)
 313 - 0      NRZI (0-NRZ, 1-NRZI)

 552 - 050    Maximum Number of DLCIs (001-254)                - 0 0

 554 - ____   Committed Information Rate (002048-256000)

 558 - 0      Congestion control (0-No Support/1-Support)
 560 - 0      DE Bit Support (0-No Support/1-Support)
 562 - 3      LMI Type (2-LMI Rev-1, 3-Annex-D, 5-CCITT)
 563 - 10     LMI Transmit Polling Interval (1-30)
 563 - 10     LMI Receive  Polling Interval (5-30)
 566 - 0000   Additional Receive Buffer Space (0000-1024)




PF:  3=Quit  4=Default   7=Back   8=Fwd   9=RtnH
```

Figure 378. Frame Relay Description

Question 300: Enable Frame Relay (over communication adapter)

This is a flag to indicate if Frame Relay should be enabled over the communication adapter.

Response:

```
_ = do not enable
0 = do not enable
1 = enable
```

Default:

```
underscore
```

Question 552: Maximum Number of DLCIs

This is the maximum number of DLCIs that will be allowed for particular physical connection to an FR network.

Response:

```
1-254 (decimal) for programmable communication adapter
```

Default:

```
050
```

Question 554: Committed Information Rate

This is the maximum bits per second that an FR service provider agrees to carry for a DCLI. This number is determined at the time of subscription to the network.

Response:

```
2048-256000 decimal.
```

Question 558: Frame Relay Congestion Control

This is a 1 digit field to indicate if you want the 3174 to employ congestion control procedures when there is congestion in the network.

Response:

```
0 = Continue to transmit frames even if network is congested
1 = Discard frames queued for transmission if the network is congested
```

Default:

```
0
```

Question 560: Discard Eligibility (DE) Bit Support

The DE bit is used to indicate if frames are eligible to be discarded when the network becomes congested.

Response:

```
0 = DE bit is never turned on in frames transmitted by the 3174.
1 = DE bit is on in data frames transmitted by the 3174.
```

Default:

```
0 = DE off
```

Question 562: Local Management Interface (LMI) Type

This is the type of LMI that is active in the Frame Relay network. It should be determined when you subscribe to a Frame Relay service.

Response:

```
2 = LMI Rev 1 (DLCI 1023)
3 = Annex D (DLCI 0)
5 = CCITT (DLCI 0)
```

Default:

```
3 = Annex D
```

Question 563: LMI Transmit Polling Interval

This is the interval (in seconds) between LMI STATUS ENQUIRY message transmission. This is also known as the T391 timer value parameter, and should be set according to the recommendations of the Frame Relay service provider.

Response:

```
1 - 29 seconds (decimal)
This should be determined when you subscribe to Frame Relay service
provider.
```

Default:

```
10
```

Question 564: LMI Receive Polling Interval

The number of seconds between STATUS ENQUIRY messages expected from the network. If no STATUS ENQUIRY messages are received in the number of seconds specified, then an error is logged. This is also known as the T392 parameter.

Response:

5 - 30 seconds (decimal)
This should be determined when you subscribe to Frame Relay service provider.

Default:

15

Question 566: Additional Receive Buffer Space

The number of additional bytes of storage allocated for receiving frames.

Response:

0 - 1024 KB of storage (decimal)

Default:

00

Note:

Increase the amount of buffer space when:

- You have a large amount of Frame Relay frame fragmentation.
- You see an excessive number of Generic Alerts being issued for buffer pool empty conditions.

10.6.5 Customization Error Messages

Table 13. Customization Error Messages

SSC	Description	Action
7670	Maximum Number of DLCIs must be greater than or equal to the total number of DLCIs defined on the 3174.	Correct total or individual counts and retry.
7666	Q554 must be non-zero when Q300 is 1.	Correct Q554 or Q300 and retry.
7667	Q564 must be greater than Q563.	Correct Q564 and/or Q563 and retry.
7668	Q300 must be 1 when host attach is Frame Relay	Correct Q300 or Host Attach (Q101) and retry.
7669	DLCI number/SAP combination must be unique across all hosts.	Correct duplicate addresses in Q090 and retry.

Appendix A. Address Bit Order for Ethernet Addresses

This appendix provides information about Ethernet addresses and address bit conversions. An Ethernet address is characterized by a value of 0 for the universal/local bit. Figure B-1 shows the structure of an Ethernet address.

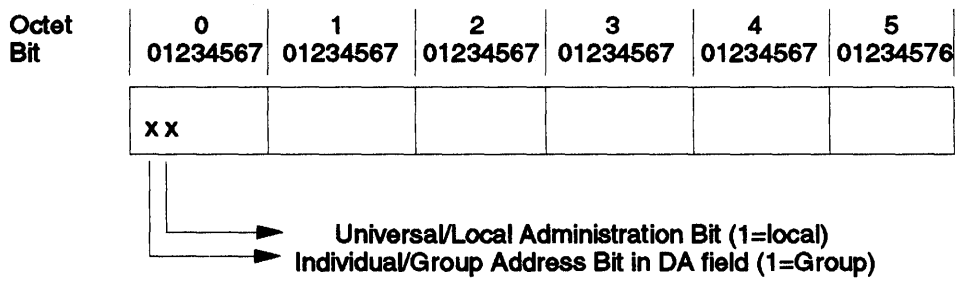


Figure 379. B-1. Ethernet Address

Hexadecimal Representation of Addresses

For any universally administered LAN address, there are two possible hexadecimal representations: non-canonical, in which octet contains the most significant bit first, or canonical, in which each byte contains the least significant bit first. If the representation type being used is not specified, the address can easily misinterpreted.

Figure B-2 shows an example of an address, displayed in bit form as it would be transmitted, with the leftmost bit (individual/group bit) transmitted first.

0001 0000	0000 0000	0101 1010	0000 1111	0111 0100	1010 1000
Octet 0	Octet 1	Octet 2	Octet 3	Octet 4	Octet 5

Figure 380. B-2. Example of Address with the Leftmost Bit Transmitted First

Using this example, the non-canonical hexadecimal representation (most significant bit first) is:

```
10 00 5A 0F 74 A8
```

Using the same example, the canonical hexadecimal representation (least significant bit first) is:

```
08 00 5A F0 2E 15
```

Note: These two examples are different representations of the same address. The major difference is the order of the bits within bytes. The byte order does not vary.

Non-canonical hexadecimal representation is the form that must be used when you specify LAN address during the customization of the 3174.

Canonical hexadecimal representation is the form typically used for Ethernet and is usually written with a hyphen (-) separating each byte. Ethernet addresses using the canonical representation need to be converted to a non-canonical form

before customizing . the 3174. For more information about converting addresses from a canonical to a non-canonical form of hexadecimal representation, see "Address Conversion" on page 360.

Address Conversion

Because the 3174 requires LAN addresses to be customized in a non-canonical form, addresses written in canonical form must be converted to non-canonical form before customization.

Use the following procedure, the Address Conversation Worksheet, and Table 1 to convert an address. For an example of how to convert an address, see "Example of Converting an Address" on page B-3.

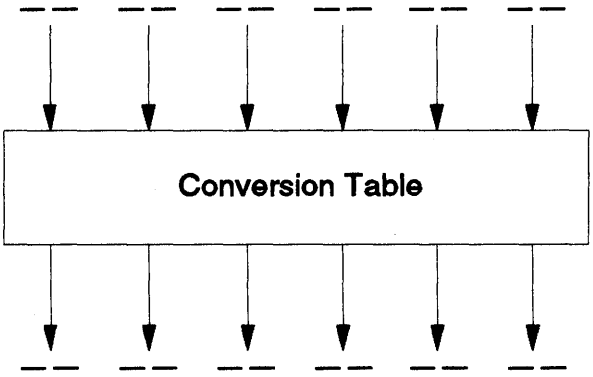
1. Write the 12-digit address on the Address Conversion Worksheet.
2. Separate the 12-digit into pairs. Use the first digit of each pair as the row coordinate and the second digit as the column coordinate.
3. Locate a bit order inverted pair in Table 1 for each pair you wrote on the worksheet.
4. Combine the six pairs from the table into the converted 12-digit address.

Table 14. Address Conversion Table

2nd Char. (Col.)→ 1st Char. ↓(Row)	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	00	80	40	C0	20	A0	60	E0	10	90	05	D0	30	B0	70	F0
1	08	88	48	C8	28	A8	68	E8	18	98	58	D8	38	B8	78	F8
2	04	84	44	C4	24	A4	64	E4	14	94	54	D4	34	B4	74	F4
3	0C	8C	4C	CC	2C	AC	6C	EC	1C	9C	5C	DC	3C	BC	7C	FC
4	02	82	42	C2	22	A2	62	E2	12	92	52	D2	32	B2	72	F2
5	0A	8A	4A	CA	2A	AA	6A	EA	1A	9A	5A	DA	3A	BA	7A	FA
6	06	86	46	C6	26	A6	66	E6	16	96	56	D6	36	B6	76	F6
7	0E	8E	4E	CE	2E	AE	6E	EE	1E	9E	5E	DE	3E	BE	7E	FE
8	01	81	41	C1	21	A1	61	E1	11	91	51	D1	31	B1	71	F1
9	09	89	49	C9	29	A9	69	E9	19	99	59	D9	39	B9	79	F9
A	05	85	45	C5	25	A5	65	E5	15	95	55	D5	35	B5	75	F5
B	0D	8D	4D	CD	2D	AD	6D	ED	1D	9D	5D	DD	3D	BD	7D	FD
C	03	83	43	C3	23	A3	63	E3	13	93	53	D3	33	B3	73	F3
D	0B	8B	4B	CB	2B	AB	6B	EB	1B	9B	5B	DB	3B	BB	7B	FB
E	07	87	47	C7	27	A7	67	E7	17	97	57	D7	37	B7	77	F7
F	0F	8F	4F	CF	2F	AF	6F	EF	1F	9F	5F	DF	3F	BF	7F	FF

Address Conversion Worksheet

The following sheet can be used for converting addresses.



Example of converting an Address

Figure B-3 shows how a bit-inverted Ethernet address of 10-00-5A-4D-BC-96 is converted into a non-canonical hexadecimal representation.

The same process is used to convert a non-canonical address to a canonical address hexadecimal representation.

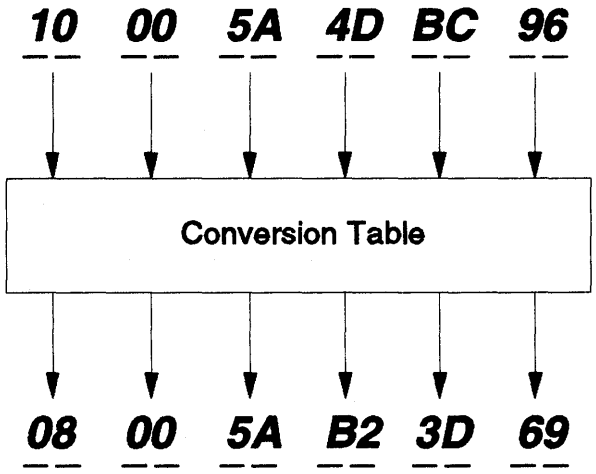


Figure 381. B-3. An Example of How an Ethernet Address is Converted

Appendix B. SNMP Variables

The 3174 supports the MIB-II variables shown in the following table. In the notes, "Qxxx" refers to customization question xxx.

Variable Name	ASN1 Notation	Notes about the 3174's version of the variable
system	1.3.6.1.2.1.1	Only accepted on a GET_NEXT request.
sysDescr.0	1.3.6.1.2.1.1.1.0	"3174-mmm, ID ccccccc, LIC nnnnn-ddddd" **mmm** 3174 model -- for example, 13R **ccccccc** the controller ID from Q108 **nnnnn** The microcode configuration, level and suffix -- for example C0300 **ddddd** The maintenance level -- for example 92340
sysObjectID.0	1.3.6.1.2.1.1.2.0	The 3174's ID is 1.3.6.1.4.1.2.6.13
sysUpTime.0	1.3.6.1.2.1.1.3.0	
sysContact.0	1.3.6.1.2.1.1.4.0	Response to Q099.
sysName.0	1.3.6.1.2.1.1.5.0	3174's host name, appended to the domain name, from Domain Name Services panel.
sysLocation.0	1.3.6.1.2.1.1.6.0	Data entered via online test, (/5,2)
sysServices.0	1.3.6.1.2.1.1.7.0	8
interfaces	1.3.6.1.2.1.2	Only accepted on a GET_NEXT request.
ifNumber.0	1.3.6.1.2.1.2.1.0	This is 1 for the 3174, as TCP/IP is supported on only one interface.
ifTable	1.3.6.1.2.1.2.2	Only accepted on a GET_NEXT request.
ifEntry	1.3.6.1.2.1.2.2.1	Only accepted on a GET_NEXT request.
ifIndex.1	1.3.6.1.2.1.2.2.1.1.1	This is 1.
ifDescr.1	1.3.6.1.2.1.2.2.1.2.1	"IBM 3174 Token-Ring Network Adapter" or "IBM 3174 Ethernet LAN Adapter"
ifType.1	1.3.6.1.2.1.2.2.1.3.1	• 9 - for Token/Ring, • 6 - Ethernet V2 • 7 - 802.3 or both 802.3 and V2
ifMtu.1	1.3.6.1.2.1.2.2.1.4.1	1492
ifSpeed.1	1.3.6.1.2.1.2.2.1.5.1	4M or 16M, for T/R 10M for Ethernet

Variable Name	ASN1 Notation	Notes about the 3174's version of the variable
ifPhysAddress.1	1.3.6.1.2.1.2.2.1.6.1	This is the reply to Q080 (token-ring) or Q084 (Ethernet)
ifAdminStatus.1	1.3.6.1.2.1.2.2.1.7.1	
ifOperStatus.1	1.3.6.1.2.1.2.2.1.8.1	
ifLastChange.1	1.3.6.1.2.1.2.2.1.9.1	
ifInOctets.1	1.3.6.1.2.1.2.2.1.10.1	
ifInUcastPkts.1	1.3.6.1.2.1.2.2.1.11.1	
ifInNUcastPkts.1	1.3.6.1.2.1.2.2.1.12.1	
ifInDiscards.1	1.3.6.1.2.1.2.2.1.13.1	
ifInErrors.1	1.3.6.1.2.1.2.2.1.14.1	
ifInUnknownProtos.1	1.3.6.1.2.1.2.2.1.15.1	
ifOutOctets.1	1.3.6.1.2.1.2.2.1.16.1	
ifOutUcastPkts.1	1.3.6.1.2.1.2.2.1.17.1	
ifOutNUcastPkts.1	1.3.6.1.2.1.2.2.1.18.1	
ifOutDiscards.1	1.3.6.1.2.1.2.2.1.19.1	
ifOutErrors.1	1.3.6.1.2.1.2.2.1.20.1	
ifOutQLen.1	1.3.6.1.2.1.2.2.1.21.1	
ifSpecific.1	1.3.6.1.2.1.2.2.1.22.1	1.3.6.1.2.1.10.9 for Token-Ring 1.3.6.1.2.1.10.7 for Ethernet
at	1.3.6.1.2.1.3	Only accepted on a GET_NEXT request.
atTable	1.3.6.1.2.1.3.1	Only accepted on a GET_NEXT request.
atEntry	1.3.6.1.2.1.3.1.1	Only accepted on a GET_NEXT request.
atIfIndex.1.1.IPaddr	1.3.6.1.2.1.3.1.1.1.1.1.n.n.n.n	"n.n.n.n" = IP address
atPhysAddress.1.1.IPaddr	1.3.6.1.2.1.3.1.1.2.1.1.n.n.n.n	
atNetAddress.1.1.IPaddr	1.3.6.1.2.1.3.1.1.3.1.1.n.n.n.n	
ip	1.3.6.1.2.1.4	Only accepted on a GET_NEXT request.
ipForwarding.0	1.3.6.1.2.1.4.1.0	3174 does not operate as a Gateway, so this variable is 2.
ipDefaultTTL.0	1.3.6.1.2.1.4.2.0	30
ipInReceives.0	1.3.6.1.2.1.4.3.0	
ipInHdrErrors.0	1.3.6.1.2.1.4.4.0	
ipInAddrErrors.0	1.3.6.1.2.1.4.5.0	
ipForwDatagrams.0	1.3.6.1.2.1.4.6.0	Since the 3174 does not operate as a gateway, this is 0.
ipInUnknownProtos.0	1.3.6.1.2.1.4.7.0	
ipInDiscards.0	1.3.6.1.2.1.4.8.0	
ipInDelivers.0	1.3.6.1.2.1.4.9.0	
ipOutRequests.0	1.3.6.1.2.1.4.10.0	

Variable Name	ASN1 Notation	Notes about the 3174's version of the variable
ipOutDiscards.0	1.3.6.1.2.1.4.11.0	
ipOutNoRoutes.0	1.3.6.1.2.1.4.12.0	
ipReasmTimeout.0	1.3.6.1.2.1.4.13.0	
ipReasmReqds.0	1.3.6.1.2.1.4.14.0	
ipReasmOKs.0	1.3.6.1.2.1.4.15.0	
ipReasmFails.0	1.3.6.1.2.1.4.16.0	
ipFragOKs.0	1.3.6.1.2.1.4.17.0	
ipFragFails.0	1.3.6.1.2.1.4.18.0	
ipFragCreates.0	1.3.6.1.2.1.4.19.0	
ipAddrTable	1.3.6.1.2.1.4.20	Only accepted on a GET_NEXT request.
ipAddrEntry	1.3.6.1.2.1.4.20.1	Only accepted on a GET_NEXT request.
ipAdEntAddr.IPaddr	1.3.6.1.2.1.4.20.1.1.n.n.n.n	
ipAdEntIfIndex.IPaddr	1.3.6.1.2.1.4.20.1.2.n.n.n.n	
ipAdEntNetMask.IPaddr	1.3.6.1.2.1.4.20.1.3.n.n.n.n	
ipAdEntBcastAddr.IPaddr	1.3.6.1.2.1.4.20.1.4.n.n.n.n	1
ipAdEntReasmMaxSize.IPaddr	1.3.6.1.2.1.4.20.1.5.n.n.n.n	65535
ipRoutingTable	1.3.6.1.2.1.4.21	Only accepted on a GET_NEXT request.
ipRouteEntry	1.3.6.1.2.1.4.21.1	Only accepted on a GET_NEXT request.
ipRouteDest.IPaddr	1.3.6.1.2.1.4.21.1.1.n.n.n.n	
ipRouteIfIndex.IPaddr	1.3.6.1.2.1.4.21.1.2.n.n.n.n	
ipRouteMetric1.IPaddr	1.3.6.1.2.1.4.21.1.3.n.n.n.n	-1
ipRouteMetric2.IPaddr	1.3.6.1.2.1.4.21.1.4.n.n.n.n	-1
ipRouteMetric3.IPaddr	1.3.6.1.2.1.4.21.1.5.n.n.n.n	-1
ipRouteMetric4.IPaddr	1.3.6.1.2.1.4.21.1.6.n.n.n.n	-1
ipRouteNextHop.IPaddr	1.3.6.1.2.1.4.21.1.7.n.n.n.n	
ipRouteType.IPaddr	1.3.6.1.2.1.4.21.1.8.n.n.n.n	1
ipRouteProto.IPaddr	1.3.6.1.2.1.4.21.1.9.n.n.n.n	**2** customized routes **4** routes determined from ICMP redirects
ipRouteAge.IPaddr	1.3.6.1.2.1.4.21.1.10.n.n.n.n	0 (The 3174 does not track the age of Route table entries.)

Variable Name	ASN1 Notation	Notes about the 3174's version of the variable
ipRouteMask.IPaddr	1.3.6.1.2.1.4.21.1.11.n.n.n.n	**0.0.0.0** Host routes **Customized Subnet Mask** Destinations on the 3174's network **255.0.0.0** Destinations on class A networks **255.255.0.0** Destinations on class B networks **255.255.255.0** Destinations on class C networks
ipRouteMetric5.IPaddr	1.3.6.1.2.1.4.21.1.12.n.n.n.n	-1
ipRouteInfo.IPaddr	1.3.6.1.2.1.4.21.1.13.n.n.n.n	0.0
ipNetToMediaTable	1.3.6.1.2.1.4.22	Only accepted on a GET_NEXT request.
ipNetToMediaEntry	1.3.6.1.2.1.4.22.1	Only accepted on a GET_NEXT request.
ipNetToMediaIfIndex.1.1.IPaddr	1.3.6.1.2.1.4.22.1.1.1.1.n.n.n.n	"n.n.n.n" = IP address
ipNetToMediaPhysAddress. 1.1.IPaddr	1.3.6.1.2.1.4.22.1.2.1.1.n.n.n.n	
ipNetToMediaNetAddress. 1.1.IPaddr	1.3.6.1.2.1.4.22.1.3.1.1.n.n.n.n	
ipNetToMediaType.1.1.IPaddr	1.3.6.1.2.1.4.22.1.4.1.1.n.n.n.n	
ipRoutingDiscards.0	1.3.6.1.2.1.4.23.0	
icmp	1.3.6.1.2.1.5	Only accepted on a GET_NEXT request.
icmpInMsgs.0	1.3.6.1.2.1.5.1.0	
icmpInErrors.0	1.3.6.1.2.1.5.2.0	
icmpInDestUnreachs.0	1.3.6.1.2.1.5.3.0	
icmpInTimeExcds.0	1.3.6.1.2.1.5.4.0	
icmpInParmProbs.0	1.3.6.1.2.1.5.5.0	
icmpInSrcQuenchs.0	1.3.6.1.2.1.5.6.0	
icmpInRedirects.0	1.3.6.1.2.1.5.7.0	
icmpInEchos.0	1.3.6.1.2.1.5.8.0	
icmpInEchoReps.0	1.3.6.1.2.1.5.9.0	
icmpInTimestamps.0	1.3.6.1.2.1.5.10.0	
icmpInTimestampReps.0	1.3.6.1.2.1.5.11.0	
icmpInAddrMasks.0	1.3.6.1.2.1.5.12.0	
icmpInAddrMaskReps.0	1.3.6.1.2.1.5.13.0	
icmpOutMsgs.0	1.3.6.1.2.1.5.14.0	
icmpOutErrors.0	1.3.6.1.2.1.5.15.0	
icmpOutDestUnreachs.0	1.3.6.1.2.1.5.16.0	
icmpOutTimeExcds.0	1.3.6.1.2.1.5.17.0	
icmpOutParmProbs.0	1.3.6.1.2.1.5.18.0	

Variable Name	ASN1 Notation	Notes about the 3174's version of the variable
icmpOutSrcQuenchs.0	1.3.6.1.2.1.5.19.0	
icmpOutRedirects.0	1.3.6.1.2.1.5.20.0	
icmpOutEchos.0	1.3.6.1.2.1.5.21.0	
icmpOutEchoReps.0	1.3.6.1.2.1.5.22.0	
icmpOutTimestamps.0	1.3.6.1.2.1.5.23.0	
icmpOutTimestampReps.0	1.3.6.1.2.1.5.24.0	
icmpOutAddrMasks.0	1.3.6.1.2.1.5.25.0	
icmpOutAddrMaskReps.0	1.3.6.1.2.1.5.26.0	
tcp	1.3.6.1.2.1.6	Only accepted on a GET_NEXT request.
tcpRtoAlgorithm.0	1.3.6.1.2.1.6.1.0	4 (Van Jacobson's algorithm)
tcpRtoMin.0	1.3.6.1.2.1.6.2.0	2000
tcpRtoMax.0	1.3.6.1.2.1.6.3.0	128000
tcpMaxConn.0	1.3.6.1.2.1.6.4.0	Sum of responses to Q058 and Q059
tcpActiveOpens.0	1.3.6.1.2.1.6.5.0	
tcpPassiveOpens.0	1.3.6.1.2.1.6.6.0	
tcpAttemptFails.0	1.3.6.1.2.1.6.7.0	
tcpEstabResets.0	1.3.6.1.2.1.6.8.0	
tcpCurrEstab.0	1.3.6.1.2.1.6.9.0	
tcpInSegs.0	1.3.6.1.2.1.6.10.0	
tcpOutSegs.0	1.3.6.1.2.1.6.11.0	
tcpRetransSegs.0	1.3.6.1.2.1.6.12.0	
tcpConnTable	1.3.6.1.2.1.6.13	Only accepted on a GET_NEXT request.
tcpConnEntry	1.3.6.1.2.1.6.13.1	Only accepted on a GET_NEXT request.
tcpConnState.connid	1.3.6.1.2.1.6.13.1.1.connid	"connid" = local_IPaddr. local_port. remote_IPaddr. remote_port
tcpConnLocalAddress.connid	1.3.6.1.2.1.6.13.1.2.connid	
tcpConnLocalPort.connid	1.3.6.1.2.1.6.13.1.3.connid	
tcpConnRemAddress.connid	1.3.6.1.2.1.6.13.1.4.connid	
tcpConnRemPort.connid	1.3.6.1.2.1.6.13.1.5.connid	
tcpInErrs.0	1.3.6.1.2.1.6.14.0	
tcpOutRsts.0	1.3.6.1.2.1.6.15.0	
udp	1.3.6.1.2.1.7	Only accepted on a GET_NEXT request.
udpInDatagrams.0	1.3.6.1.2.1.7.1.0	
udpNoPorts.0	1.3.6.1.2.1.7.2.0	
udpInErrors.0	1.3.6.1.2.1.7.3.0	

Variable Name	ASN1 Notation	Notes about the 3174's version of the variable
udpOutDatagrams.0	1.3.6.1.2.1.7.4.0	
udpTable	1.3.6.1.2.1.7.5	Only accepted on a GET_NEXT request.
udpEntry	1.3.6.1.2.1.7.5.1	Only accepted on a GET_NEXT request.
udpLocalAddress.connid	1.3.6.1.2.1.7.5.1.1.connid	"connid" = local_IPaddr. local_port.
udpLocalPort.connid	1.3.6.1.2.1.7.5.1.2.connid	"connid" = local_IPaddr. local_port.
transmission	1.3.6.1.2.1.10	Only accepted on a GET_NEXT request
dot3	1.3.6.1.2.1.10.7	Only accepted on a GET_NEXT request
dot3StatsTable	1.3.6.1.2.1.10.7.2	Only accepted on a GET_NEXT request
dot3StatsEntry	1.3.6.1.2.1.10.7.2.1	Only accepted on a GET_NEXT request
dot3StatsIndex	1.3.6.1.2.1.10.7.2.1.1.ifindex	"ifindex" = the index of the interface. This is 1.
dot3StatsAlignmentErrors	1.3.6.1.2.1.10.7.2.1.2.ifindex	
dot3StatsFCSErrors	1.3.6.1.2.1.10.7.2.1.3.ifindex	
dot3StatsSingleCollisionFrames	1.3.6.1.2.1.10.7.2.1.4.ifindex	
dot3StatsMultipleCollisionFrames	1.3.6.1.2.1.10.7.2.1.5.ifindex	
dot3StatsSQETestErrors	1.3.6.1.2.1.10.7.2.1.6.ifindex	
dot3StatsDeferredTransmissions	1.3.6.1.2.1.10.7.2.1.7.ifindex	Not supported
dot3StatsLateCollisions	1.3.6.1.2.1.10.7.2.1.8.ifindex	
dot3StatsExcessiveCollisions	1.3.6.1.2.1.10.7.2.1.9.ifindex	
dot3StatsInternalMacTransmit-Errors	1.3.6.1.2.1.10.7.2.1.10.ifindex	
dot3StatsCarrierSenseErrors	1.3.6.1.2.1.10.7.2.1.11.ifindex	
dot3StatsFrameTooLongs	1.3.6.1.2.1.10.7.2.1.13.ifindex	
dot3StatsInternalMacReceive-Errors	1.3.6.1.2.1.10.7.2.1.16.ifindex	
dot5	1.3.6.1.2.1.10.9	Only accepted on a GET_NEXT request
dot5Table	1.3.6.1.2.1.10.9.1	Only accepted on a GET_NEXT request
dot5Entry	1.3.6.1.2.1.10.9.1.1	Only accepted on a GET_NEXT request
dot5IfIndex	1.3.6.1.2.1.10.9.1.1.1.ifindex	"ifindex" = the index of the interface. This is 1.
dot5Commands	1.3.6.1.2.1.10.9.1.1.2.ifindex	1 (no-op)
dot5RingStatus	1.3.6.1.2.1.10.9.1.1.3.ifindex	

Variable Name	ASN1 Notation	Notes about the 3174's version of the variable
dot5RingState	1.3.6.1.2.1.10.9.1.1.4.ifindex	
dot5OpenStatus	1.3.6.1.2.1.10.9.1.1.5.ifindex	
dot5RingSpeed	1.3.6.1.2.1.10.9.1.1.6.ifindex	3 if customized for 4M, or 4 if customized for 16M
dot5Upstream	1.3.6.1.2.1.10.9.1.1.7.ifindex	
dot5ActMonParticipate	1.3.6.1.2.1.10.9.1.1.8.ifindex	2 (false)
dot5Functional	1.3.6.1.2.1.10.9.1.1.9.ifindex	
dot5StatsTable	1.3.6.1.2.1.10.9.2	
dot5StatsEntry	1.3.6.1.2.1.10.9.2.1	
dot5StatsIfIndex	1.3.6.1.2.1.10.9.2.1.1.ifindex	"ifindex" = the index of the interface. This is 1.
dot5StatsLineErrors	1.3.6.1.2.1.10.9.2.1.2.ifindex	
dot5StatsBurstErrors	1.3.6.1.2.1.10.9.2.1.3.ifindex	
dot5StatsACErrors	1.3.6.1.2.1.10.9.2.1.4.ifindex	
dot5StatsAbortTransErrors	1.3.6.1.2.1.10.9.2.1.5.ifindex	
dot5StatsInternalErrors	1.3.6.1.2.1.10.9.2.1.6.ifindex	
dot5StatsLostFrameErrors	1.3.6.1.2.1.10.9.2.1.7.ifindex	
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Abbreviations

ABBREVIATION	MEANING
ACF/VTAM	Advanced Communications Function/Virtual Telecommunications Access Method
AEA	Asynchronous Emulation Adapter
APAR	Authorized Program Analysis Report
APPN	Advanced Peer-to-Peer Networking
ARP	Address Resolution Protocol
ASCII	American National Standard Code for Information Interchange
BRI	Basic Rate Interface
CCA	Concurrent Communication Adapter
CECP	Country Extended Code Page
CICS	Customer Information Control System
CID	Connection Identifier
CMEP	Change Management Entry Point
CMFP	Change Management Focal Point
COPT	Connection Options
COS	Class Of Service
CP	Control Point
CSCF	Central Site Control Facility
CSCM	Central Site Change Management
CSCU	Central Site Control Unit
CSU	Customer Setup
CUG	Closed User Group
CUT	Control Unit Terminal
DATE	Dedicated Access to X.25 Transport Extension
DDDLU	Dynamic Definition of Dependent LU
DFT	Distributed Function Terminal
DNS	Domain Name System
DPC	Dual Purpose Connector
DRD	Distributed Resource Directory
DSL	Downstream Load
DSPU	Downstream Physical Unit
EAB	Extended Attribute Buffer
EN	End Node (APPN)
ES	Extended Services
ESCON	Enterprise Systems Connection
ET	Exchange Termination
FTA	Fiber Optic Terminal Adapter
FTTERM	File Transfer and Terminal Emulation program
GIX	Generalized Interactive Executive
GW	Gateway
HNAD	Host Network (DTE) Address
ICA	Integrated Communication Adapter
ICMP	Internet Control Message Protocol
IDLC	ISDN Data Link Control
IML	Initial Microprogram Load
IOF	Interactive Operator Facility
IOPT	Incoming Call Options
IP	Internet Protocol
IPDS	Intelligent Printer Data Stream
ISDN	Integrated Services Digital Network
JCL	Job Control Language
KDU	Keyboard Definition Utility
LAP	Link Access Protocol
LEN	Low Entry Networking
LFS	Local Format Storage
LFU	Limited Function Utility
LIC	Licensed Internal Code
LT	Line Termination
MLT	Multiple Logical Terminal
MVS	Multiple Virtual Storage
MVS/ESA	Multiple Virtual Storage/Enterprise System Architecture
MVS/XA	Multiple Virtual Storage/Extended Architecture
NAM	Network Asset Management
NCP	Network Control Program
NDIS	Network Device Interface Specification
NIA	Network Interface Adapter
NLDM	Network Logical Data Manager
NMVT	Network Management Vector Transport
NN	Network Node (APPN)
NPDA	Network Problem Determination Application
NPKT	Negotiated Packet Size
NPSI	NCP Packet Switching Interface
NSCU	Network Site Control Unit
NTRI	NCP Token-Ring Interconnection
NT1	Network Termination 1
NT2	Network Termination 2
NVDM	NetView Distribution Manager
OEM	Other Equipment Manufacturer
OOPT	Outgoing Call Options
OSI	Open Systems Interconnection
PABX	Private Automated Branch Exchange
PAM	Printer Authorization Matrix
PIM	Plug In Module
PING	Packet Internet Groper
PRI	Primary Rate Interface
PS	Programmed Symbols
PSDN	Packet Switched Data Network
PSH	Physical Services Header
PUID	Physical Unit ID
PVC	Permanent Virtual Circuit
QLLC	Qualified Logical Link Control
RARP	Reverse Address Resolution Protocol
RPOA	Recognized Private Operating Authority
RPQ	Request for Price Quotation
RR	Resource Repository
RTM	Response Time Monitor
SAP	Service Access Point

SDDLU	Selection of Definitions for Dependent LU
SDLC	Synchronous Data Link Control
SHM	Short Hold Mode
SID	Short Identifier
SLMH	Single Link Multi-Host
SNA	Systems Network Architecture
SNAIDS	Systems Network Architecture/Distribution Services
SNAIFS	Systems Network Architecture/File Services
SNAIMS	Systems Network Architecture/Management Services
SNMP	Simple Network Management Protocol
SOEMI	Serial Original Equipment Manufacturer Interface
SVC	Switched Virtual Circuit
TA	Terminal Adapter
TCF	Transmission Control File
TCLS	Throughput Class Negotiation
TCP	Transmission Control Program
TCP/IP	Transmission Control Protocol/Internet Protocol
TEI	Terminal Endpoint Identifier
TE1	Terminal Equipment with ISDN Interface
TE2	Terminal Equipment with non-ISDN Interface
TG	Transmission Group
TMA	Terminal Multiplexer Adapter
TTP	Telephone Twisted-Pair
T2.0	Type 2.0
T2.1	Type 2.1
UDP	User Datagram Protocol
UDT	User-Defined Terminal Table
UDX	User-Defined Translate Table
VPD	Vital Product Data
VTAM	Virtual Telecommunications Access Method
WCC	Write Control Character

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Numerics

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