PC Network Bridge Program

User's Guide

Communications Family

Second Edition (June 1990)

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System Security Advice

This product is intended for use within a single establishment and within a single, homogeneous user population. For sensitive applications requiring isolation from each other, management may wish to provide isolated cabling or to encrypt the sensitive data before putting it on the network.

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About This Book

The IBM PC Network Bridge Program (*Bridge Program*) enables communication between devices that are connected to different LAN segments. A LAN segment is either a ring of an IBM Token-Ring Network or a bus of a broadband or baseband IBM* PC Network*. The Bridge Program connects broadband and baseband PC Network segments and Token-Ring Network segments operating at either 4 or 16 Mbps. Broadband PC Network segments can use the same or different frequency pairs.

This Bridge Program also supports communication with up to four IBM LAN Manager programs. You can use the IBM LAN Manager through a link with the bridge to change some bridge configuration parameters. The IBM LAN Manager can receive bridge error messages, alerts, and LAN segment status. See "Using the Bridge Program with the IBM LAN Manager" on page 2-2 and the *IBM LAN Manager User's Guide* for more information about bridge management.

Users of This Manual

The users of this manual are the installer of the Bridge Program, the operator of the Bridge Program, and the network planner or administrator.

This manual explains:

- To the Bridge Program installer, how to
  - Prepare the computer
  - Prepare, set, and install the adapters
  - Prepare and install programs and files using the Installation Program
- To the Bridge Program operator, how to
  - Use the Configuration Program
  - Start and stop Bridge Program operation
  - Load the Bridge Program
  - Use the Bridge Program functions
  - Perform problem determination

- To the network planner or administrator
  - Default values, and valid values for the Bridge Program configuration parameters
  - Instructions for completing the Bridge Planning Chart
  - Planning for Bridge Program installation
  - Evaluating bridge traffic flow
  - Performing problem determination.

"What You Need" on page 1-6 lists the computer equipment and supplies you will need to install and operate the Bridge Program in your network.

Prerequisite Knowledge

If you are the **bridge operator**, knowledge of the supported IBM Personal System/2* (PS/2*) computers with Micro Channel* architecture and DOS Version 3.3 or later is required. You will also find it helpful to be familiar with the IBM PC Network, both broadband and baseband, IBM Token-Ring Network, and LAN concepts.

If you are the **network administrator**, the following knowledge is required: knowledge of the supported IBM PS/2 computers, DOS Version 3.3 or later, IBM PC Network, both broadband and baseband, IBM Token-Ring Network (if used in your network), and LAN concepts.

Organization

Chapter 1 is an introduction to the Bridge Program: how you use the bridge in a network, the contents of the Bridge Program package, and the computer hardware, software, and supplies you need to install and operate the Bridge Program.

Chapter 2 provides planning information to the network administrator to configure the bridge correctly for the network. This chapter contains detailed descriptions of installation and configuration parameters, charts showing default values and value ranges, and examples of Configuration Program panels.

This chapter also contains a blank Bridge Planning Chart and instructions for completing the chart. The network planner or administrator uses the chart to locate the bridge physically in the network and to specify the values for the bridge installation and configuration parameters.

Chapter 3 describes the installation of bridge hardware and software. This chapter explains how to use the Installation Program to copy the Bridge Program and related files and build the CONFIG.SYS file onto a working diskette or fixed disk. It also explains how to use the Configuration Program to alter default configuration parameters for the Bridge Program.

Chapter 4 explains how to load the Bridge Program and how to use the panels, functions, and information available to the Bridge Program operator.

Chapter 5 provides guidance for problem determination.

Appendix A describes the messages and status information displayed by the Bridge Program.

Appendix B contains the statements necessary to edit the CONFIG.SYS file for a fixed disk or a working diskette.

Appendix C contains information that the network administrator or planner needs to know to assign values to some of the Bridge Program configuration parameters (such as single-route broadcast) and to evaluate bridge performance. This appendix also contains

instructions for filling out the Bridge Performance Analysis Worksheet and the Bridge Performance Analysis Calculations Worksheet.

Appendix D contains blank Bridge Performance Analysis Worksheets used for obtaining the performance counter values. The network administrator can use the worksheets, the bridge performance counters, and the instructions in Appendix C to evaluate the flow of traffic through the bridge.

Appendix E contains License Information and a Statement of Service, and describes the program specifications and the operating environment for the Bridge Program.

Related Publications

If you are not familiar with the computer in which you will run the Bridge Program, refer to the publications for that computer before proceeding with the Bridge Program installation.

Publications related to the computers, adapters, the IBM Token-Ring Network, the IBM PC Network, and NetView* include:

Computer Publications

- *Quick Reference* manuals for IBM PS/2 computers
- *IBM Personal System/2 Hardware Maintenance and Service*
- *IBM Personal System/2 Hardware Maintenance Reference.*

Disk Operating System (DOS) Manuals

- *DOS User's Guide*
- *DOS Reference*
- *Disk Operating System Technical Reference*

Note: Use DOS 3.3 or later to install and operate the Bridge Program.

PC Network Adapter Publications

- *IBM PC Network Adapters Technical Reference,* S68X-2265
- *IBM PC Network Baseband Adapter/A Installation Instructions* (packaged with the baseband Adapter/A)
- *IBM PC Network Adapter II/A Installation Instructions* (packaged with Adapter II/A and cable)
- *IBM PC Network Adapter II/A - Frequency 2 Installation Instructions* (packaged with Adapter II/A - Frequency 2)
- *IBM PC Network Adapter II/A - Frequency 3 Installation Instructions* (packaged with Adapter II/A - Frequency 3 and cable).

Token-Ring Network Adapter Publications

- *IBM Token-Ring Network Adapter/A Installation and Testing Instructions* (packaged with Adapter/A and diskette)
- *IBM Token-Ring Network Adapter/A Supplement* (Adapter/A Hardware Maintenance Service and Reference sections packaged with a diskette and a wrap plug)
- *IBM Token-Ring Network 16/4 Adapter/A Installation and Testing Instructions* (packaged with Adapter/A and diskette).

Network Publications

PC Network Publications

- *IBM PC Network Broadband Planning Guide*, S68X-2268
- *IBM PC Network Baseband Planning Guide*, S68X-2269
- *IBM PC Network Hardware Maintenance and Service*, S68X-2240
- *IBM PC Network Translator Unit and Cabling Options Technical Reference*, S68X-2228.

Token-Ring Network Publications

- *IBM Token-Ring Network Introduction and Planning Guide*, GA27-3677
- *IBM Token-Ring Network Problem Determination Guide*, SX27-3710
- *IBM Token-Ring Network Installation Guide*, GA27-3678
- *IBM Token-Ring Network Telephone Twisted-Pair Media Guide*, GA27-3714
- *IBM Token-Ring Network Architecture Reference*, SC30-3374.

Local Area Network Publications

- *IBM Local Area Network Administrators Guide*, GA27-3748
- *IBM LAN Manager User's Guide*, Version 1.0
- *IBM LAN Manager User's Guide*, Version 2.0

- *IBM Local Area Network Host Information*, GC30-3479
- *IBM Local Area Network Technical Reference.*

NetView Publications

- *NetView Resource Alerts Reference*, SC31-6024.

How to Obtain IBM Publications

Requests for IBM publications should be made to your IBM representative or to the IBM branch office serving your region. You may also contact the place where you purchased the Bridge Program.

Using This Manual

When you use this manual, read the section you are using completely before trying to perform the task. Make sure you are familiar with the tasks to be performed before you start.

Contents

Figures

Tables

Chapter 1. Introduction

The IBM PC Network Bridge Program (Bridge Program)

The IBM PC Network Bridge Program (Bridge Program) enables communication between devices that are connected to different LAN segments. A LAN segment is either a ring of an IBM Token-Ring Network or a bus of a broadband or baseband IBM* PC Network*. The Bridge Program connects broadband or baseband PC network segments and token-ring network segments operating at 4 or 16 Mbps. Broadband PC Network segments can use the same or different frequency pairs.

Specifically, the Bridge Program connects two LAN segments, such as:

- Two broadband IBM PC Network segments using the same or different frequency pairs
- Adapters using different frequency pairs on the same broadband IBM PC Network segment
- One IBM Token-Ring Network segment operating at either 4 or 16 Mbps and one broadband IBM PC Network segment
- Two IBM Token-Ring Network segments operating at either 4 or 16 Mbps
- Two baseband IBM PC Network segments
- One IBM Token-Ring Network segment and one baseband IBM PC Network segment
- One broadband IBM PC Network segment and one baseband IBM PC Network segment.

  See Figure 1-1 on page 1-2, Figure 1-2 on page 1-2, Figure 1-3 on page 1-3, and Figure 1-4 on page 1-3 for illustrations of these networks.

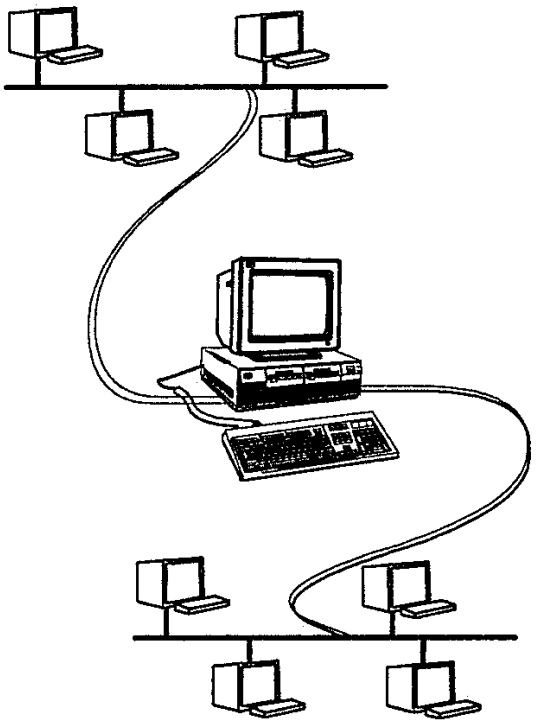


Figure 1-1. Bridge Computer Connecting Baseband and Broadband IBM PC Network Segments

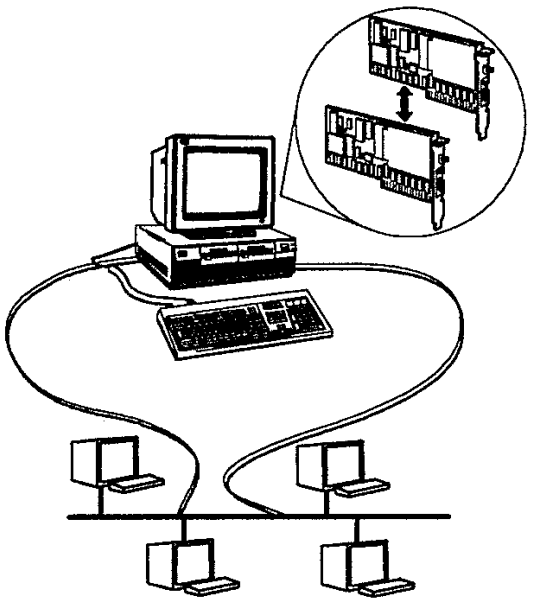


Figure 1-2. Bridge Computer Connecting a Broadband IBM PC Network Segment

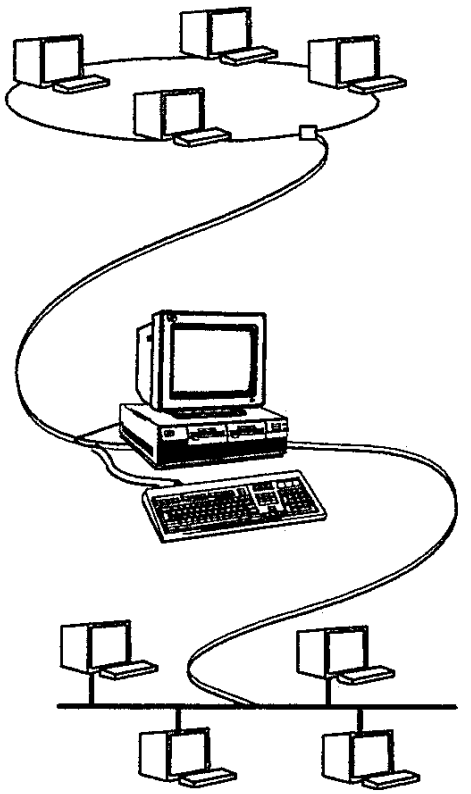


Figure 1-3. Bridge Computer Connecting Token-Ring Network and PC Network Segment

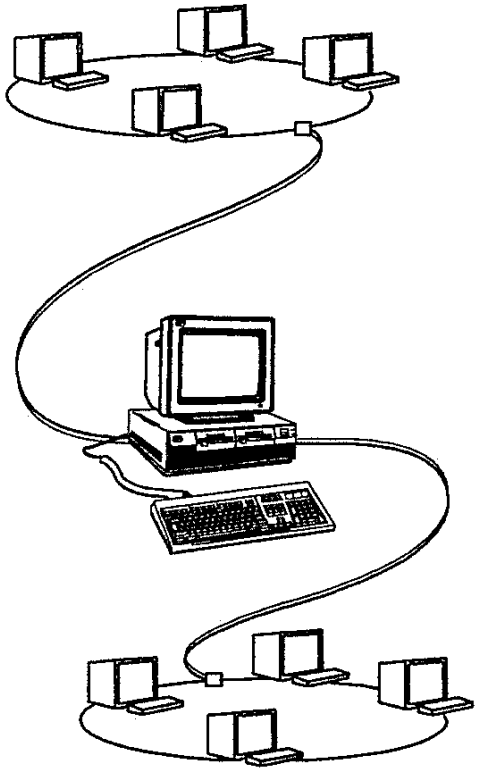


Figure 1-4. Bridge Computer Connecting Two IBM Token-Ring Network Segments

The Bridge Program also supports communication with up to four IBM LAN Manager programs. You can use the IBM LAN Manager through a link with the bridge to change some bridge configuration parameters. The IBM LAN Manager can receive bridge error messages, alerts, and LAN segment status. See "Using the Bridge Program with the IBM LAN Manager" on page 2-2 and the *IBM LAN Manager User's Guide* for more information about bridge management.

The following terms are used throughout this book:

bridge — A functional unit that connects two LANs that use the same logical link control (LLC) procedure but may use different medium access control (MAC) procedures.

A bridge consists of the bridge computer, two adapters and their cables, and the Bridge Program. "What You Need" on page 1-6 lists the hardware and software needed to support the Bridge Program.

Bridge Program — The IBM PC Network Bridge Program.

bridge computer — The dedicated computer in which the Bridge Program is loaded.

LAN segment — Any portion of a LAN (for example, a single ring or bus) that can operate independently but is connected to the establishment network via bridges, controllers, or gateways.

The Bridge Program connects two LAN segments that are either single rings of an IBM Token-Ring Network or buses of a broadband or baseband IBM PC Network.

Notes:

1. All references in this manual to the IBM PC Network refer to the broadband and baseband IBM PC Network.
2. All references in this manual to the IBM LAN Manager program refer to **all versions** of the IBM LAN Manager, unless specific versions are listed.

3. All references in this manual to the IBM Token-Ring Network Adapter/A also refer to the IBM Token-Ring Network 16/4 Adapter/A.
4. All references in this manual to token-ring network segments and PC network segments refer to IBM products.

Packaged with the Bridge Program are two additional programs:

- An Installation Program to allow you to install the Bridge Program on one or more bridge computers
- A Configuration Program to allow you to configure the Bridge Program to the needs of your network.

The computer in which the Bridge Program is loaded is a **dedicated** machine and cannot be used for any other operation while performing as a bridge. For example, you cannot load the IBM LAN Manager while the Bridge Program is running in the same computer.

Using the Bridge Program with the IBM PC Network

If your network includes the IBM PC Network, use the *IBM PC Network Broadband Planning Guide* or the *IBM PC Network Baseband Planning Guide* to help you determine the need for using the Bridge Program, or talk to your professional network designer or installer.

Appendix C will help you to assign values to some of the Bridge Program configuration parameters to configure the bridge to meet the needs of your network.

Note: Workstations on a PC Network segment connected by a bridge will require the IBM Local Area Network Support Program Version 1.0 or higher.

Using the Bridge Program with the IBM Token-Ring Network

If your network includes the IBM Token-Ring Network, use the information provided in the *IBM Token-Ring Network Introduction and Planning Guide* to help you determine the need for using the Bridge Program.

In addition, see the *IBM Local Area Network Administrator's Guide* to understand some of the following network considerations:

- Assigning values to some of the Bridge Program installation and configuration parameters, such as Early Token Release (ETR) and single-route broadcast, to change the characteristics of the bridge to meet the needs of your network
- Assigning IBM LAN Manager roles (such as controlling or observing) in relation to the bridge
- Deciding which bridges communicate with which IBM LAN Manager programs in your network.

  For more information about using the IBM LAN Manager in your network, see the *IBM LAN Manager User's Guide.*

Appendix C helps you assign values to some of the Bridge Program installation and configuration parameters, such as ETR and single-route broadcast, to configure the bridge to meet the needs of your network.

Contents of the Package

The Bridge Program package contains:

- One IBM PC Network Bridge Program Diskette (3.5-inch)
- This *User's Guide.*

If any item is missing or defective, return the package to your IBM representative or authorized dealer.

What You Need

Computer Equipment and Supplies

To install and operate the Bridge Program, you need:

- An IBM Personal System/2* (PS/2*) computer with Micro Channel* architecture and the following
  - At least 512 KB of memory

- A minimum of one 720 KB diskette drive or one 1.44 MB diskette drive with at least 300 KB of free disk space
- Two network adapters that are compatible with your computer (see Table 1-1) and their cables
- A display that is compatible with your computer (one of the following)
  - An IBM monochrome display
  - An 80-column color monitor
- An IBM PC Graphics Printer, or its equivalent, if you want printer output

- At least two blank 3.5-inch diskettes.

Refer to Table 1-1 to determine the type of adapters you will be installing in the bridge computer.

Table 1-1. Network and Adapter Combinations

Type of Network	**Name of Adapter**
Token-Ring Network	Token-Ring Network Adapter/A Token-Ring Network 16/4 Adapter/A
PC Network	PC Network Adapter II/A PC Network Adapter II/A - Frequency 2 PC Network Adapter II/A - Frequency 3 IBM PC Network Baseband Adapter/A

For more information concerning computer equipment and supplies see "Related Publications" on page ix.

Software

In addition to the Bridge Program, you will need:

For all networks

Disk Operating System (DOS)

Use the IBM Personal Computer Disk Operating System (PC DOS), version 3.3 or later to install and operate the Bridge Program. You need to be familiar with DOS commands, such as FORMAT and DISKCOPY, in order to prepare and use Bridge Program files.

Diagnostic Tests

Each IBM Token-Ring Network and IBM PC Network adapter comes with adapter diagnostics to use when you install the adapter and later as a problem determination tool. The adapter diagnostics are run each time you turn power on at the computer.

IBM Token-Ring Network adapters also come with a Ring Diagnostic diskette to use for problem determination of a segment in the IBM Token-Ring Network.

For an IBM PC Network only

Note: Workstations on a PC Network segment connected by a bridge will require the IBM Local Area Network Support Program Version 1.0 or higher.

Documentation

- Related manuals to help you plan, install, configure, and solve problems (see "Related Publications" on page ix)
- A completed Bridge Planning Chart, provided by the network administrator or planner, showing installation and configuration parameters used in installing and configuring the Bridge Program (see Chapter 2).

Summary of Steps

The following table provides a summary of the tasks you must complete to plan, install, configure, load, and operate the Bridge Program. Use it as a guide to help you find the required detailed information for the task you want to perform.

Table 1-2 (Page 1 of 2). Summary of Steps

TASK	PERFORMER	REFERENCE
Plan for bridge installation	Administrator	Chapter 2 and Appendix C
Complete Bridge Planning Chart	Administrator	Chapter 2 and Appendix C
Gather hardware and software	Administrator, operator, or hardware installer	Chapter 1
Configure adapters and install hardware	Administrator, operator, or hardware installer	Chapter 3
Obtain Bridge Planning Chart from administrator	Operator	Chapter 2 and Chapter 3
Prepare backup copy of Bridge Program	Operator	Chapter 3
Install Bridge Program	Operator	Chapter 3
Configure Bridge Program	Operator	Chapter 3
Load Bridge Program	Operator	Chapter 4
Operate Bridge Program	Operator	Chapter 4

Table 1-2 (Page 2 of 2). Summary of Steps		
TASK	**PERFORMER**	**REFERENCE**
Perform problem determination	Operator and administrator	Chapter 5 and Appendix A

Notes:

1. The administrator refers to the network administrator who designs, controls, and manages the LAN.
2. The operator refers to the bridge operator who installs, loads, and operates the Bridge Program.

Chapter 2. Planning the Bridge Configuration

The information in this chapter will help you make the decisions necessary to configure the Bridge Program correctly for your network. If you are using the IBM LAN Manager in your network, see page 2-2 for information concerning the capability of each version of the IBM LAN Manager to change the Bridge Program's configuration parameters.

As the network administrator or planner, you must fill out a copy of the Bridge Planning Chart specifying the values to use for the installation and configuration parameters for this Bridge Program. Refer to "Filling Out the Bridge Planning Chart" on page 2-4 to specify the installation and configuration parameters for the Bridge Program. A blank original of the Bridge Planning Chart is on page 2-31. Complete the Bridge Planning Chart as you read this chapter.

The section beginning on page 2-8 contains detailed descriptions of the installation parameters and charts that show default values and value ranges. The section beginning on page 2-12 contains detailed descriptions of the configuration parameters, charts that show default values and value ranges, and Configuration Program panel examples.

When you have finished filling out the Bridge Planning Chart, give a copy to the person who will install the bridge hardware and prepare the Bridge Program working disk or diskette. File a copy with the other permanent records for your network.

If your network contains a PC network segment, see Appendix C for additional information concerning locally administered addresses and the single-route broadcast parameter.

If your network contains a token-ring network segment, see the *IBM Local Area Network Administrator's Guide* for additional information concerning the configuration parameters. Also, see Appendix C for information concerning single-route broadcast and ETR.

Using the Bridge Program with the IBM LAN Manager

Read the following sections if you are using either the IBM LAN Manager Version 1.0 or Version 2.0 in your network with this version of the Bridge Program. These sections provide information concerning the capability of each version of the IBM LAN Manager to change the Bridge Program's configuration parameters.

Using the Bridge Program with the IBM LAN Manager Version 1.0

If you are using the IBM LAN Manager Version 1.0 in your network, you must be aware of the following:

- The IBM LAN Manager Version 1.0 **can** communicate with the Bridge Program only when it connects two token-ring network segments.

  This version of the IBM LAN Manager **cannot** communicate with the Bridge Program when it connects two PC network segments or a token-ring network segment with a PC network segment.

- This version of the IBM LAN Manager provides Bridge Profile information **only** about bridges that connect two token-ring network segments.

- You can change **only** the manual single-route broadcast parameter of the Bridge Program to on or off.

  If you use Version 1.0 to change the single-route broadcast parameter value of the Bridge Program, the value will be permanently recorded by writing it to the ECCPARMS.BIN file.

- **Do not** change any other bridge configuration parameter using this version of the IBM LAN Manager.

For more information about Version 1.0 of the IBM LAN Manager, see the *IBM LAN Manager User's Guide*, Version 1.0.

Using the Bridge Program with the IBM LAN Manager Version 2.0

If you are using the IBM LAN Manager Version 2.0 in your network, you must be aware of the following:

- The IBM LAN Manager Version 2.0 **can** communicate with the Bridge Program only if the LAN Manager is installed on a token-ring network segment or a PC network broadband segment. Therefore, if you are using the Bridge Program to connect PC network baseband segments, the LAN Manager must be installed on a PC network broadband or token-ring network segment elsewhere in your network.
- Version 2.0 of the IBM LAN Manager provides Bridge Profile information about all IBM bridges in the network.
- You **can** change the following bridge configuration parameters using Version 2.0 of the IBM LAN Manager
  - Bridge number
  - LAN segment number (for primary and alternate adapters)
  - Frame forwarding active
  - Bridge performance threshold
  - Hop count limit
  - Single-route broadcast (selection mode and parameter value)
  - Link passwords.
- Bridge configuration parameter values changed by the IBM LAN Manager will be permanently recorded by writing them to the ECCPARMS.BIN file.

For more information about Version 2.0 of the IBM LAN Manager, see the *IBM LAN Manager User's Guide*, Version 2.0.

The Bridge Planning Chart

Fill out a Bridge Planning Chart for each bridge in your network. The chart will be used for hardware and software installation and for problem determination. Place each completed chart with your network's permanent records.

The last page of this chapter is a blank Bridge Planning Chart. Before you fill out the chart, make the required number of copies of the blank original. Save the original for making future copies.

Note: DO NOT use the Bridge Planning Chart or information about filling out the chart found in the *IBM Token-Ring Network Introduction and Planning Guide*, the *IBM Local Area Network Administrator's Guide*, or in previous versions of the *IBM Token-Ring Network Bridge Program User's Guide*. It may not be correct for this version of the Bridge Program.

Filling Out the Bridge Planning Chart

Complete the Bridge Planning Chart as you read this chapter.

Section 1 of the Bridge Planning Chart shows the physical location of the bridge in your network.

Section 2 contains installation parameter values to use when you install the Bridge Program as explained in Chapter 2.

Section 3 contains parameter values to use when you prepare the configuration file as explained in Chapter 2.

The Chart Heading

In the spaces provided at the top of the chart:

- Write the date
- Select and write a unique bridge identification name or number to identify this bridge in your network.

  This name or number is for your identification purposes only and is not known by the Bridge Program or the network.

How to Load the Bridge Program

Place a check mark in the correct space on the chart to indicate how you will load the Bridge Program into the bridge computer memory: by using a DOS command or automatically.

Load Using a DOS Command

A bridge operator can use a DOS command to load the Bridge Program. Each time the Bridge Program is loaded, the operator types either the Bridge Program load command or the name of a batch file containing the load command. (See "Instructions to Load the Bridge Program Using a DOS Command" on page 4-3 for more information.)

Load Automatically

You can load the Bridge Program automatically:

- With the only operator action being to turn on the power at the bridge computer
- Without further operator action if you use the **Restart on error** bridge function.

Automatic loading requires an AUTOEXEC.BAT file on the working disk or diskette with the Bridge Program files. The AUTOEXEC.BAT file must contain the Bridge Program load command (see "AUTOEXEC.BAT File" on page 3-6, "AUTOEXEC.BAT File" on page 3-9, and "Automatic Loading Instructions" on page 4-5).

Automatic loading is useful if you are using the computer only for the bridge, or in case of a power failure so that the Bridge Program can be restarted without operator action. The **Restart on error** function also requires automatic loading.

Bridge Planning Chart Section 1 — Physical Connections

This section of the chart shows the physical connection of the bridge to each LAN segment that it connects.

At the center of the sketch indicate the location and number of the computer that will be used for the bridge.

Starting with the primary adapter, write on the chart the following information for the LAN segment connections to each adapter:

1. The type of adapter used in the bridge computer.
2. The number of the cable, if applicable.
3. The type of cable connected to each adapter card
   - For the IBM Token-Ring Network—an IBM Token-Ring Network PC Adapter Cable or Type 3 Media Filter (if the IBM Token-Ring Network operates at a data rate of 4 Mbps and uses telephone twisted-pair media as its lobe wiring) or other cable
   - For the broadband IBM PC Network—a Community Antenna Television (CATV) cable (75-ohm coaxial cable)
   - For the IBM PC Network Baseband—telephone twisted-pair cable, type 3 specification.
4. The number of the faceplate to which the cable is attached, if applicable.
5. The type of connecting hardware being used
   - For the IBM Token-Ring Network—an access unit
   - For the IBM PC Network—a splitter or other network hardware.
6. Locate the correct box for the IBM Token-Ring Network or the IBM PC Network (shaded in gray).

7. Fill out the correct box for your network as follows:
   - The location, number, and lobe receptacle of the access unit to which each IBM Token-Ring Network adapter is attached, or
   - The location of the connecting hardware to which each IBM PC Network adapter is attached.
8. Return to step 1 to complete Section 1 for the alternate adapter.

Refer to the *IBM Token-Ring Network Introduction and Planning Guide*, the *IBM PC Network Broadband Planning Guide*, or the *IBM PC Network Baseband Planning Guide* for more information about physically locating and labeling the devices in a network. DO NOT use the Bridge Planning Chart information in the *IBM Token-Ring Network Introduction and Planning Guide*, the *IBM Local Area Network Administrator's Guide*, or in the *IBM Token-Ring Network Bridge Program User's Guide*. It may not be correct for this version of the Bridge Program.

Bridge Planning Chart Section 2 — Bridge Installation Parameters

Follow these steps to complete Section 2 of the Bridge Planning Chart.

1. Write in the type of each adapter in the bridge computer (for example, 16/4 Adapter/A).
2. Write in the data rate of each IBM Token-Ring Network adapter in the bridge computer.

   This field pertains **only** to the IBM Token-Ring Network adapter.
3. Write in the locally administered address for each adapter in the bridge computer.

   To obtain more information about locally administered addresses:
   - For the IBM Token-Ring Network, see page 2-9 and the *IBM Local Area Network Administrator's Guide*
   - For the IBM PC Network, see page 2-9 and Appendix C.
4. Write in the shared random access memory (RAM) address for each adapter in the bridge computer.

See pages 2-9 and 2-10 for more information on shared RAM addresses.

5. Write in if you will be using ETR.

   See page 2-11 and "Early Token Release" on page C-16 for more information on ETR.

   ETR pertains **only** to the IBM Token-Ring Network adapter.

Installation Parameter Defaults and Allowed Ranges

See Table 2-1 for the default values and value ranges for each installation parameter.

Table 2-1. Installation Parameter Value Ranges and Defaults

Parameter Description	**Default Value**	**Allowed Range**
Locally administered address	000000000000	400000000001 - 40007FFFFFFF
†Shared RAM Address	0000	
†ETR	Y	Y,N

†This configuration parameter applies to only the IBM Token-Ring Network. This parameter is ignored by the IBM PC Network.

Continue reading this chapter for information about these installation parameters.

Installation Parameter Descriptions

As the network administrator or planner, you must coordinate the selection of values for all installation parameters in your network.

Locally Administered Address

Explanation: Use this parameter to define the network address for the primary or the alternate adapter. If the value is all zeros, the universally administered address permanently encoded on the adapter becomes the network address.

Refer to the instructions in your computer's *Quick Reference* manual for using the computer's Reference Diskette to determine and set the values for this parameter.

For the IBM Token-Ring Network, see the *IBM Local Area Network Administrator's Guide* for more information about assigning locally administered addresses.

For the IBM PC Network, see "Locally Administered Addresses" on page C-5 for more information about locally administered addresses and how to assign them.

Note: If you use locally administered addresses, they must be unique for each primary and alternate adapter in your network.

Shared RAM Address (Adapter 0 — primary)

Explanation: Use this parameter to define where in the computer memory map to locate the primary adapter RAM.

Note: The shared RAM address value is ignored for all IBM PC Network adapters (specify the default value 0000).

The shared RAM address must be located on a 16 KB boundary and is dependent upon the options installed in your computer. The primary adapter's shared RAM address must not conflict with any of the following addresses:

1. Shared RAM address of the alternate token-ring network adapter
2. Read-only memory (ROM) address of the alternate adapter
3. ROM address of this adapter.

Use the default value of 0000 for the shared RAM address on the primary bridge adapter unless there are other features and options in your computer that require you to change the values.

If you have a specific need to use values other than the defaults, use the configuration information on the computer's Reference Diskette to determine and set the shared RAM address for each adapter.

Shared RAM Address (Adapter 1 — alternate)

Explanation: Use this parameter to define where in the computer memory map to locate the alternate adapter RAM.

Note: The shared RAM address value is ignored for all IBM PC Network adapters (specify the default value 0000).

The shared RAM address must be located on a 16 KB boundary and is dependent upon the options installed in your computer. The alternate adapter's shared RAM address must not conflict with any of the following addresses:

1. Shared RAM address of the primary token-ring network adapter
2. ROM address of the primary adapter
3. ROM address of this adapter.

Use the default value of 0000 for the shared RAM address on the bridge adapter unless you have one IBM PC Network adapter and one IBM Token-Ring Network adapter, or if there are other features and options in your computer that require you to change the values.

If you have one IBM PC Network Adapter and one IBM Token-Ring Network adapter in the bridge computer, change the shared RAM address on the IBM Token-Ring Network adapter (which must be the alternate adapter) from the default to D400.

If you need to use values other than the defaults, use the configuration information on the computer's Reference Diskette to determine and set the shared RAM address for each adapter.

Early Token Release

Explanation: Use this option to increase the utilization of the network by reducing the average time required for a network adapter to gain access to a free token. It is automatically enabled when the 16/4 adapter's data rate is set to 16 Mbps. (ETR is ignored if the token-ring network segment operates at a data rate of 4 Mbps and for the IBM PC Network.) Valid values are:

N	Do not use ETR
Y	Use ETR.

The default value for both the primary and alternate adapters is **Y (Yes)**.

See "Early Token Release" on page C-16 for additional information about ETR and how it affects the performance of the network.

Bridge Planning Chart Section 3 — Bridge Configuration Parameters

This section of the chart corresponds with the panels of the Configuration Program.

In the correct space on the chart write the value for each changed parameter. Write a dash in the space if the default value is to be used.

More information about these configuration parameters is provided in "Configuration Program Panels and Parameter Descriptions" on page 2-15. For additional information, see "Single-Route Broadcast Information" on page C-6 and the *IBM Local Area Network Administrator's Guide* to help you select valid values for the other parameters for the IBM Token-Ring Network. For the IBM PC Network, see Appendix C to help you select valid values for the single-route broadcast parameter.

When you have finished filling out the Bridge Planning Chart, give a copy to the person who will be installing the bridge hardware and preparing the Bridge Program working disk or diskette. File a copy with the other permanent records for your network.

Configuration Parameter Defaults and Allowed Ranges

See Table 2-2 for a list of the Bridge Program's configuration parameters, the default values, and the allowed ranges for these parameters.

Table 2-2 (Page 1 of 2). Configuration Parameter Value Ranges and Defaults

Parameter Description	Default Value	Allowed Range
Bridge number	1	0-9, A-F
LAN segment number - adapter 0 (primary)	001	001-FFF
LAN segment number - adapter 1 (alternate)	002	001-FFF
Frame forwarding active	Y	Y,N
Bridge performance threshold	10	0-9999

Table 2-2 (Page 2 of 2). Configuration Parameter Value Ranges and Defaults

Parameter Description	Default Value	Allowed Range
Restart on error	Y	Y,N
Drive for memory dump on error	0	0,A,B,C,D
Drive for error log	0	0,A,B,C,D
Hop count limit	7	1-7
Single-route broadcast (selection mode)	M (Manual)	M (Manual) A (Automatic)
Single-route broadcast active (manual mode)	Y	Y,N
Automatic single-route broadcast: Bridge label Path cost	 8000 0000 See Table 2-3 on page 2-26	 0000-FFFF 0000-FFFF
Parameter server	Y	Y,N
Error monitor	Y	Y,N
† Configuration report server	Y	Y,N
Link password 0	00000000	
Link password 1	00000000	
Link password 2	00000000	
Link password 3	00000000	

†This configuration parameter applies to only the IBM Token-Ring Network. This parameter is ignored by the IBM PC Network.

Using The Parameter Defaults

Select one of the following ways to use the parameter default values in the configuration file for the Bridge Program:

1. Copy the configuration file (ECCPARMS.BIN) from the Bridge Program diskette onto your working diskette or fixed disk just as it is provided; do not alter it. All values in the provided file are the default values.
2. Do not have a copy of the configuration file (ECCPARMS.BIN) on your working diskette or fixed disk; erase it from or do not copy it to the working diskette or fixed disk.

   When the Bridge Program does not find the ECCPARMS.BIN file on the working diskette or fixed disk, it will use the parameter default values.

   Note: You do not need to have a copy of the Configuration Program (ECCCNFG.EXE) on your working diskette or fixed disk to use the parameter default values.

If you decide to use the default values, you do not need to alter the configuration file. Be sure to do the following:

- Indicate on the Bridge Planning Chart that the defaults are to be used by placing a check mark beside "Use defaults."

  The check mark indicates to the person installing the Bridge Program whether it is necessary to use the Configuration Program to alter any of the bridge configuration parameters.
- Write a dash in each space on the Bridge Planning Chart next to each parameter for which the default will be used.

The rest of Chapter 2 contains samples of Configuration Program panels and descriptions of the configuration parameters to help you decide whether to change any parameters from the defaults.

Configuration Program Panels and Parameter Descriptions

```
ECCPCG10                IBM PC NETWORK BRIDGE PROGRAM              Page 1 of 4
                           Configuration Program                    08:47:17
------------------------------------------------------------------------------
Type the desired values in each of the fields below.
Press F6 (Save) to save the configuration parameters to the file ECCPARMS.BIN.
Press F3 (Exit) to exit to DOS.

Bridge number..................................... [1]    (0-9, A-F)

LAN segment number connected to primary adapter.. [001]  (001-FFF Hexadecimal)
LAN segment number connected to alternate adapter [002]  (001-FFF Hexadecimal)

Frame forwarding active........................... [Y]    (Y=Yes, N=No)

Bridge performance threshold...................... [10 ] (0-9999 Decimal)

Restart on error.................................. [Y]    (Y=Yes, N=No)
Drive for memory dump on error.................... [0]    (0=Default, A,B,C,)
Drive for error log............................... [0]    (0=Default, A,B,C,D)

<--Any message occurring while this panel is active will be displayed here-->
F1=Help      F3=Exit
F6=Save                                                          PgDn ↓
```

Figure 2-1. The Configuration Program with Default Parameters (Page 1 of 4)

Bridge Number

Explanation: This parameter uniquely identifies a bridge to the Bridge Program when frames are forwarded through the bridge. The network administrator or planner assigns a bridge number to each bridge in the network. Multiple bridges spanning the same two LAN segments (that is, parallel bridges) **must** have different bridge numbers.

Note: You can use the default bridge number if none of the bridges connected to a LAN segment are parallel bridges.

LAN Segment Number (Primary Adapter)

Explanation: This parameter specifies the 3-digit number used to identify the LAN segment to which the primary adapter (adapter 0) is attached. The network administrator or planner assigns this value. The value for the LAN segment to which the primary adapter is attached must be different from the value for the LAN segment to which the alternate adapter is attached.

Notes:

1. All bridges connected to a specific LAN segment must refer to that LAN segment by the **same** number.
2. All bridges connecting the same two LAN segments must have **different** bridge numbers.

LAN Segment Number (Alternate Adapter)

Explanation: This parameter specifies the 3-digit number used to identify the LAN segment to which the alternate adapter (adapter 1) is attached. The network administrator or planner assigns this value. The value of the LAN segment number to which the alternate adapter is attached must be different from the value of the LAN segment number to which the primary adapter is attached.

Notes:

1. All bridges connected to a specific LAN segment must refer to that LAN segment by the **same** number.
2. All bridges connecting the same two LAN segments must have **different** bridge numbers.

Frame Forwarding Active

Explanation: This parameter specifies whether the bridge will begin transmitting frames from one LAN segment to the other when the Bridge Program is initialized.

Warning: If you have the IBM LAN Manager 1.0 in your network, you **must** set **Frame Forwarding Active** to **Y (Yes)** because this version does not have a function to start or stop frame forwarding. Therefore, if you set **Frame Forwarding Active** to **N (No)**, the Bridge Program will not be able to forward frames to other workstations, which could isolate LAN segments from the network.

Set this parameter value to **N (No)** for the following reasons:

- You want to use the IBM LAN Manager Version 2.0 to activate frame forwarding for a bridge through its link with the Bridge Program.
- You want to isolate a LAN segment or segments from the rest of the network for a particular reason or time period, and activate frame forwarding only at certain times or for certain tasks. A network administrator can use this function to control each bridge individually from a central location.

Bridge Performance Threshold

Explanation: This parameter defines the tolerance for lost frames. It expresses the number of frames per 10 000 that can be lost before notification. This notification takes the form of an entry on the Performance Statistics panel (see "The Performance Statistics Panel" on page 4-29) and a report to any network manager programs that have requested such reports.

Adjust the bridge performance threshold value over time to provide a better correlation between the occurrence of the threshold being exceeded and an awareness of a problem in response time, data exchange, or application program operation. The default is 10 frames per 10 000.

For the IBM Token-Ring Network, refer to the *IBM Local Area Network Administrator's Guide* for information on determining the value for this parameter. For the IBM PC Network, refer to "Bridge Performance Analysis" on page C-18 for information on determining the value for this parameter.

Restart on Error

Explanation: Use this parameter to restart the bridge computer automatically, reload DOS, and reload the Bridge Program if an adapter check or a critical resource depletion occurs. Valid values are:

N	No automatic restart
Y	Reload DOS and execute the AUTOEXEC.BAT file.

To use this option, verify the following:

1. The AUTOEXEC.BAT file on the Bridge Program Working Diskette or fixed disk directory in the default drive contains all of the commands necessary to load and start the Bridge Program.

   a. If the AUTOEXEC.BAT file is on a diskette, the default drive must contain the diskette and be ready (door closed, if it has a door) whenever the Bridge Program is running. The diskette must be prepared as a system diskette (formatted with the /S option).
   b. If the AUTOEXEC.BAT file is on a fixed disk, diskette drives **A** and **B**, if present, must be empty (doors open, if they have doors).

2. In order for the **Restart on error** option to function without operator action, the AUTOEXEC.BAT file must not contain any commands requiring manual responses, such as time and date requests.

Drive for Memory Dump on Error

Explanation: Use this parameter to write an image of the Bridge Program memory and buffers on the diskette or fixed disk in the specified drive if a critical resource depletion occurs.

The drive must be one that is installed and operating in the computer, and there must be enough space (210 KB) available on a disk or diskette in that drive. The dump will not be written if there is not enough space. If there is a file with the same name (ECCDUMP.DAT) already existing on that disk or diskette, it will be overwritten.

If the bridge computer has two diskette drives, use the second diskette drive for the memory dump. Valid values are:

0	Use default drive
A-D	The drive to which the dump is to be written.

Note: If the **Restart on error** option is also selected, the drive specified for the dump must be the same as or a later sequential alphabetic character than the system drive for the restart.

Drive for Error Log

Explanation: Use this parameter to specify the drive on which to log errors in the file ECCLOG.DAT (the drive must be installed and operating in the computer). Entering the drive as "0" will log the errors on the default drive. Valid values are:

0	Use default drive
A-D	The drive to which the error log is to be written.

The errors logged are those that cause the Bridge Program to stop for some reason. The file entries can provide problem determination information, particularly in cases where the bridge is unattended for long periods of time and uses **Restart on error** to reload the Bridge Program after an error causes it to stop running.

The ECCLOG.DAT file is not erased from a disk or diskette when the Bridge Program is restarted. Entries are added to the file until the file is full. The Shutdown panel displays a message when the ECCLOG.DAT file fills up. You must then erase the file or supply a new diskette for the file before you restart the Bridge Program. (If you need to save the information in the ECCLOG.DAT file for problem determination, copy the file to another diskette before you erase the file or print the file.)

You can view the ECCLOG.DAT file using a text editor such as DOS EDLIN or IBM Personal Editor. (You cannot use the editor on the bridge computer while the Bridge Program is running, however.)

```
07-13-89 16:25:32
Network adapter 0 was removed by network manager.          ECCBR228I
07-17-89 14:51:36
Abnormal system termination (110 ).                        ECCBR990E
07-17-89 14:51:42
Memory dump was taken.                                     ECCBR992I
07-18-89 11:22:12
Network adapter 0 command failed (03, 07, 0059).           ECCBR217E
07-21-89 11:37:05
Network adapter 0 command failed (03, 07, 0059).           ECCBR217E
07-21-89 10:43:48
Network adapter 0 command failed (03, 07, 0011).           ECCBR217E
08-18-89 14:37:09
Error log is full, data might be lost.                     ECCBR084W
08-19-89 09:25:18
Network adapter 0 command failed (03, 07, 0011).           ECCBR217E
08-24-89 12:33:21
```

Figure 2-2. Error Log Example

```
ECCPCG20                IBM PC NETWORK BRIDGE PROGRAM          Page 2 of 4
                           Configuration Program                01:16:35
------------------------------------------------------------------------------
Type the desired values in each of the fields below. -
Press F6 (Save) to save the configuration parameters to the file ECCPARMS.BIN.
Press F3 (Exit) to exit to DOS.

                                      LAN SEGMENT 001   LAN SEGMENT 002

   Hop count limit.................. [7]               [7]    (1-7)

   ENABLED FUNCTIONAL ADDRESSES

      Parameter server.............. [Y]               [Y]    (Y=Yes, N=No)
      Error monitor................. [Y]               [Y]    (Y=Yes, N=No)
      Configuration report server... [Y]               [Y]    (Y=Yes, N=No)


<--Any message occurring while this panel is active will be displayed here-->
F1=Help      F3=Exit                                                PgUp ↑
F6=Save                                                             PgDn ↓
```

Figure 2-3. The Configuration Program with Default Parameters (Page 2 of 4)

Refer to the *IBM Local Area Network Administrator's Guide* and Appendix C for more information about selecting values for the parameters shown on this panel.

Hop Count Limit

Explanation: This parameter specifies the number of consecutive bridges through which a broadcast frame can travel, including the current bridge. Hop count does not apply to non-broadcast frames or to single-route broadcast frames.

If the number of bridges the frame has passed through is equal to or greater than this hop count limit value, the frame will not be transmitted further.

Note: In Versions 1.0 and 1.1 of the IBM Token-Ring Network Bridge Program, hop count applied to all types of broadcast frames. In Versions 2.0 and 2.1 of the IBM Token-Ring Network Bridge Program and the IBM PC Network Bridge Program, hop count does not apply to single-route broadcast frames.

Parameter Server

Explanation: This parameter specifies for each LAN segment whether the Parameter Server functional address is enabled; that is, whether the Bridge Program will copy and process frames destined for this function.

The Parameter Server provides the LAN segment number to an adapter when the adapter is attaching to the LAN segment, and sends a notification to one or more network manager programs when a new adapter has attached to the LAN segment.

Error Monitor

Explanation: This parameter specifies for each LAN segment whether the Error Monitor functional address is enabled; that is, whether the Bridge Program will copy and process frames destined for this function.

For the IBM Token-Ring Network, the Error Monitor:

- Compiles error statistics reported by adapters on either token-ring network segment
- Analyzes the statistics to determine a probable cause of errors degrading network operation
- Sends reports to indicate critical problems to the network manager programs that have requested reports
- Updates the LAN Segment Status area of the Bridge Program panels to **Soft Error** when necessary.

For the IBM PC Network, the Error Monitor updates the LAN Segment Status area of the Bridge Panels to **Cont. Carrier** or **No Carrier** when necessary.

For the IBM Token-Ring Network, if the Error Monitor parameter value is **N (No)**, the Bridge Program will not display error information for that token-ring network segment. The error information on the Network Status Details panel will be zeros, and the LAN segment status **Soft Error** will not be displayed on the Bridge Program panels when soft errors occur.

For the IBM PC Network, if the Error Monitor parameter value is **N (No)**, the Bridge Program will be unable to report new stations to the IBM LAN Manager. The Bridge Program will also lose the ability for

the IBM LAN Manager to request a list of the active stations on the IBM PC Network segments connected by that bridge.

Configuration Report Server

Explanation: This parameter specifies for each token-ring network segment whether the Configuration Report Server functional address is enabled; that is, whether the Bridge Program will copy and process frames destined for this function.

The Configuration Report Server sends notifications about the current active configuration of each token-ring network segment to the IBM LAN Manager programs that request reports. It reports changes in nearest active upstream neighbor (NAUN) addresses and active monitor on the token-ring network segment.

Note: The Configuration Report Server is for **only** the IBM Token-Ring Network and should be set to **N (No)** for the IBM PC Network.

```
ECCPCG30                IBM PC NETWORK BRIDGE PROGRAM          Page 3 of 4
                           Configuration Program                01:16:35
------------------------------------------------------------------------------
Type the desired values in each of the fields below.
Press F6 (Save) to save the configuration parameters to the file ECCPARMS.BIN.
Press F3 (Exit) to exit to DOS.

Single-route broadcast selection mode...  [M]  (M=Manual, A=Automatic)

 ┌──────────────────────────────────────────────────────────────────────────┐
 │                                LAN SEGMENT 001    LAN SEGMENT 002       │
 │                                                                          │
 │ Single-route broadcast.....[Y]                   [Y]  (Y=Yes, N=No)      │
 │                                                                          │
 │                                                                          │
 └──────────────────────────────────────────────────────────────────────────┘

<--Any message occurring while this panel is active will be displayed here-->
F1=Help      F3=Exit                                                  PgUp ↑
F6=Save                                                               PgDn ↓
```

Figure 2-4. The Configuration Program with Default Parameters (Page 3 of 4)

Single-Route Broadcast

Explanation: Use this parameter to specify if single-route broadcast frames are to be passed from one LAN segment to the other through the bridge computer.

You can choose to set the single-route broadcast parameter manually or automatically for the bridges in your network.

Manual Mode

If you choose the **M (Manual)** mode, you must set the single-route broadcast parameter for each bridge in your network.

If you set this parameter value to **Y (Yes)**, the LAN segment adapter receives all single-route broadcast frames and passes them to the other LAN segment.

If you set this parameter value to **N (No)**, all single-route broadcast frames received from the LAN segment are discarded.

See Figure 2-4 on page 2-23 for an example of the panel that will be displayed if you choose the **M (Manual)** mode.

For more information about setting the single-route broadcast parameter value, see "Single Route Broadcast — Manual Mode" on page C-7. For the IBM Token-Ring Network, also see the section "Bridges" in the *IBM Local Area Network Administrator's Guide*. For the IBM PC Network, also see "Single-Route Broadcast Information" on page C-6 for more information about setting the single-route broadcast parameter.

```
ECCPCG30                IBM PC NETWORK BRIDGE PROGRAM              Page 3 of 4
                           Configuration Program                    01:16:35
------------------------------------------------------------------------------
Type the desired values in each of the fields below.
Press F6 (Save) to save the configuration parameters to the file ECCPARMS.BIN.
Press F3 (Exit) to exit to DOS.

Single-route broadcast selection mode...  [A]  (M=Manual, A=Automatic)

      ┌──────────────────────────────────────────────────────────────┐
      │                                                              │
      │  Bridge label.............. [8000] (0000 - FFFF Hexadecimal) │
      │  Path cost increment...... [0000] (0000 - FFFF Hexadecimal) │
      │                                                              │
      │                                                              │
      └──────────────────────────────────────────────────────────────┘


<--Any message occurring while this panel is active will be displayed here-->
F1=Help      F3=Exit                                              PgUp ↑
F6=Save                                                           PgDn ↓
```

Figure 2-5. The Configuration Program with Default Parameters (Page 3 of 4)

Automatic Mode

If you choose the **A (Automatic)** mode, the Bridge Program will communicate with other Bridge Programs to determine how to set the single-route broadcast parameter value to **(Y) Yes** or **(N) No** to make up for changes in the network configuration. If you choose the **(A) Automatic** mode, **all** bridges in the network also should be set to **(A) Automatic**.

You can specify the path cost and bridge label, which are used by automatic single-route broadcast to determine the parameter settings.

The **bridge label** is a 2-byte hexadecimal number that you can assign to each bridge. The bridge label combined with the adapter address of the adapter connecting the bridge to the LAN segment with the lowest LAN segment number is the **bridge ID**.

The automatic single-route broadcast function uses the bridge ID to decide which one of two or more parallel bridges will forward single-route broadcast frames. For more information about setting this parameter, see "Single-Route Broadcast — Automatic Mode" on page C-11.

Path cost indicates the relative length of the path between this bridge and a centrally located (root) bridge in the network. A bridge's path cost equals the sum of the increments of the bridges between it and the root bridge, plus its own increment.

The automatic single-route broadcast function uses path cost to decide which parallel path between two LAN segments to use as the single-route broadcast path.

You should use the default value of 0 for the path cost increment for the bridge. Table 2-3 shows the default values for the path cost increment parameter. The default depends on the types, data rates, and combination of the adapters used in the bridge computer.

Table 2-3. Path Cost Increment Default Values

	PC Network Adapters/A	**Token-Ring Network Adapter/A at 4 Mbps**
PC Network Adapters/A	16	20
Token-Ring Network Adapter/A at 4 Mbps	20	16
Token-Ring Network 16/4 Adapter/A at 4 Mbps	68	40
Token-Ring Network 16/4 Adapter/A at 16 Mbps	65	34

	Token-Ring Network 16/4 Adapter/A at 4 Mbps	**Token-Ring Network 16/4 Adapter/A at 16 Mbps**
PC Network Adapters/A	68	65
Token-Ring Network Adapter/A at 4 Mbps	40	34
Token-Ring Network 16/4 Adapter/A at 4 Mbps	64	40
Token-Ring Network 16/4 Adapter/A at 16 Mbps	40	16

If you have a specific need to use a value other than the default, see "Single-Route Broadcast — Automatic Mode" on page C-11.

Warning: If your network contains bridges using Versions 1.0 and 1.1 of the IBM Token-Ring Network Bridge Program or non-IBM bridge programs, the Bridge Program will not recognize their existence. This can cause the following problems:

- Some LAN segments can become isolated from the network.
- Some LAN segments can receive duplicate single-route broadcast frames.

The Bridge Program **will** recognize bridges using the IBM Token-Ring Network Bridge Program, Version 2.0 or 2.1.

For more information about setting the single-route broadcast parameter value, see "Single-Route Broadcast — Automatic Mode" on page C-11. For the IBM Token-Ring Network, also see the section "Bridges" in the *IBM Local Area Network Administrator's Guide*. For the IBM PC Network, also see"Single-Route Broadcast Information" on page C-6 for more information about setting this parameter.

See Figure 2-5 on page 2-25 for an example of the panel that will be displayed if you choose the **A (Automatic)** mode.

Note: In this version of the *IBM PC Network Bridge Program User's Guide*, limited broadcast will be referred to as single-route broadcast.

```
ECCPCG40                IBM PC NETWORK BRIDGE PROGRAM              Page 4 of 4
                           Configuration Program                    01:16:35
------------------------------------------------------------------------------
Type the desired values in each of the fields below.
Press F6 (Save) to save the configuration parameters to the file ECCPARMS.BIN.
Press F3 (Exit) to exit to DOS.
Press F5 (Clear Fields) to clear all the fields if any errors have been made.

Passwords must be 6-8 alphanumeric characters.
New password must be typed twice to confirm.

                              OLD              NEW              NEW

   Link password 0..... [        ]      [        ]      [        ]

   Link password 1..... [        ]      [        ]      [        ]

   Link password 2..... [        ]      [        ]      [        ]

   Link password 3..... [        ]      [        ]      [        ]


<--Any message occurring while this panel is active will be displayed here-->
F1=Help      F3=Exit                              F5=Clear Fields
F6=Save                                                        PgUp ↑
```

Figure 2-6. The Configuration Program with Default Parameters (Page 4 of 4)

Link Passwords

Explanation: The Bridge Program uses these passwords to determine that an IBM LAN Manager program is authorized to establish a reporting link with the Bridge Program. The IBM LAN Manager program requests and receives network management reports and notifications from the Bridge Program over the link. The controlling IBM LAN Manager program (the program that established link 0) can change some Bridge Program configuration parameters in the bridge computer memory. Bridge configuration parameter values changed by the IBM LAN Manager are permanently recorded by writing them to the ECCPARMS.BIN file.

The IBM LAN Manager program must give a valid password when it is establishing a link or the link request will be rejected. Note that if the link password is not changed from the default, which is 00000000, the IBM LAN Manager link must still specify that the password is "00000000."

Up to four IBM LAN Manager programs can establish a reporting link with the Bridge Program at the same time. Each IBM LAN Manager program must use its own link password.

The completed Bridge Planning Chart should show any link passwords used instead of the defaults. Give a copy of the passwords to the person who will configure the IBM LAN Manager programs that will communicate with your bridge. Keep the Bridge Planning Chart in a safe place for future reference.

Notes:

1. If there are no IBM LAN Manager programs in the network, use the link password defaults.
2. The password must consist of 6-8 alphanumeric characters, or the symbols @, #, $, and %.
3. The passwords do not have to be unique.
4. The Configuration Program panels do *not* display the passwords before, during, or after you type them.
5. The default for the old password is eight zeros. You must type in the eight zeros for the old password if you have never changed the password and are typing in a new password.
6. If the old password is not available, you must erase the ECCPARMS.BIN configuration file and use the Configuration Program to build the file again from the beginning in order to change the password. When there is no existing configuration file, the old passwords are the defaults (00000000).
7. Press **F5 = Clear Fields** to clear the link password fields if you make an error while typing the entries.

Other Record-Keeping

In addition to completing the Bridge Planning Chart, you should add certain information to your other network records.

For token-ring network information, refer to the *IBM Token-Ring Network Introduction and Planning Guide* for information on locating, completing, and updating the following planning charts:

- On the *Cabling Chart* for the access unit you are using, indicate which lobe receptacles have bridges attached to them.
- *Locator Charts*. Indicate in the "Device Identification" column that the device is used as a bridge.

  In the "LAN Segment Number" column, indicate the number of the adapter's own LAN segment as well as the number of the LAN segment that the other half of the bridge serves.
- *Ring Sequence Chart*. Fill out one chart for each ring that has bridges attached to it. Indicate the bridge number next to the access unit to which it is attached.

For IBM PC Network information, refer to the *IBM PC Network Broadband Planning Guide* or the *IBM PC Network Baseband Planning Guide* and your professional network designer and installer. Update your network documentation as required.

These documents will assist you in installing your network and performing problem determination procedures.

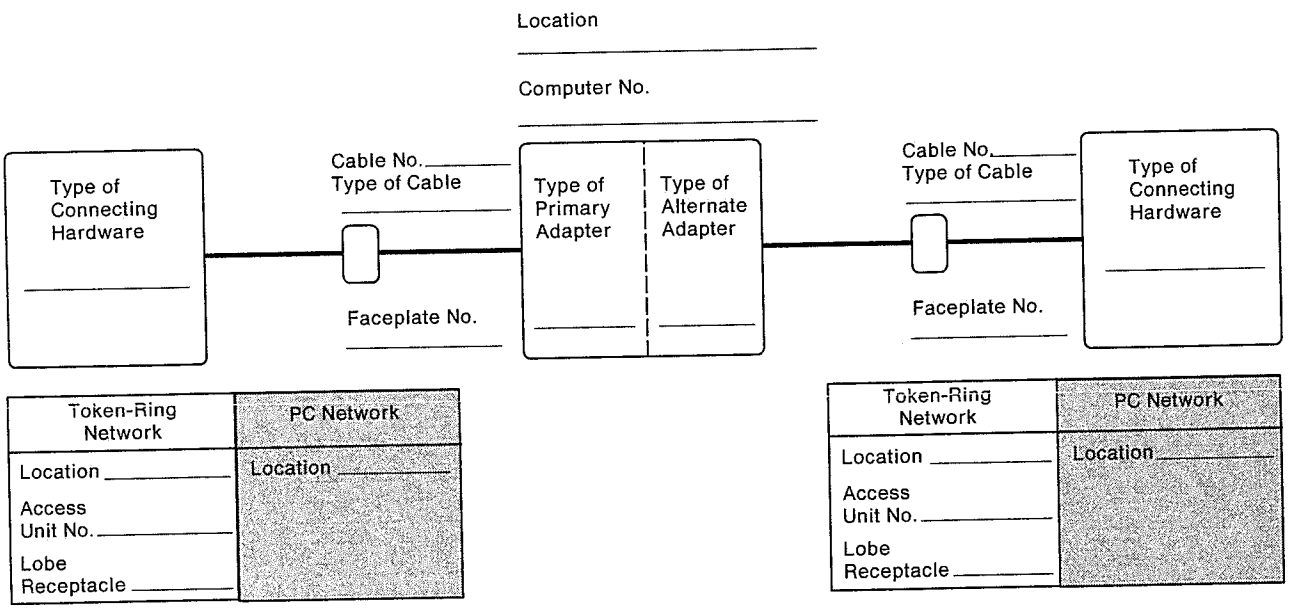
Bridge Planning Chart

Date _____

Bridge Name or Number _____

Check one: Load using a DOS command ____ Load automatically ____

Section 1 — Physical Connections



Section 2 — Bridge Installation Parameters

	Primary Adapter	Alternate Adapter
Adapter name		
Adapter data rate (token-ring network adapter only)		
Locally administered address (Defaults = 000000000000)		
Shared RAM address (Defaults = 0000) (token-ring network adapter only)		
Early Token Release (Defaults = N) (token-ring network adapter only)		

Continued on other side

Section 3 — Bridge Configuration Parameters

Check one: Alter configuration ____ Use defaults ____

Bridge number (Default = 1)	
LAN segment number connected to primary adapter (Default = 001)	
LAN segment number connected to alternate adapter (Default = 002)	
Frame forwarding active (Default = Y)	
Bridge performance threshold (Default = 10)	
Restart on error (Default = Y)	
Drive for memory dump on error (Default = 0)	
Drive for error log (Default = 0)	

	Primary Adapter	Alternate Adapter
Hop count limit (Defaults = 7)		
Parameter server (Defaults = Y)		
Error monitor (Defaults = Y)		
Configuration report server (Defaults = Y)		

Single-route broadcast selection mode (Default = M)	

For manual selection mode only:	Primary Adapter	Alternate Adapter
Single-route broadcast (Defaults = Y)		

For automatic selection mode only:	
Bridge label (Default=8000)	
Path cost (Default=0000)	

	Old	New
Link password 0 (Default = 00000000)		
Link password 1 (Default = 00000000)		
Link password 2 (Default = 00000000)		
Link password 3 (Default = 00000000)		

Write a dash **(—)** when using default.

Hardware Installation

1 Before you can successfully load and operate the Bridge Program, you must:

a. Install two network adapters suitable for the bridge computer and the networks you are connecting.

Refer to Table 3-1 on page 3-3 to configure the adapters according to your network configuration.

1) Check the box corresponding to the adapter combination you are installing in your bridge computer.
2) Choose one adapter to be the primary adapter and configure it according to the table.
3) Configure the other adapter as the alternate adapter according to the table.

Notes:

a) If you are using an IBM PC Network adapter and an IBM Token-Ring Network adapter in the bridge computer, configure the IBM PC Network adapter as the primary adapter.

b) The type of adapters installed in the bridge computer affects the largest frame size that the Bridge Program can support. For more information about the largest frame size, see page 4-22.

b. Follow the installation instructions in the publications packaged with the adapters and connect the cables to the correct hardware.

c. Verify the correct operation of the adapters in the bridge computer by running the adapter diagnostics. (See "Diagnostic Tests" on page 1-8.)

d. Connect each adapter cable to one of the following:

- Hardware (such as a splitter) for one or both PC network segments, or
- A faceplate or an access unit for one or both segments of the token-ring network.

Table 3-1. Network Adapter Settings		
Check Adapter Combination	**Primary** Network Adapter Settings	**Alternate** Network Adapter Settings
	PC Network and PC Network	
	Adapter: ***0*** Interrupt request: ***2*** Memory mapping: ***Standard*** ROM: ***Enabled***	Adapter: ***1*** Interrupt request: ***3*** Memory mapping: ***Alternate*** ROM: ***Disabled***
	PC Network and Token-Ring Network	
	Adapter: ***0*** Interrupt request: ***2*** Memory mapping: ***Standard*** ROM: ***Enabled***	Adapter: ***1*** Interrupt level: ***3*** ROM address: ***DC000***
	Token-Ring Network and Token-Ring Network	
	Adapter: ***0*** Interrupt level: ***2*** ROM address: ***CC000***	Adapter: ***1*** Interrupt level: ***3*** ROM address: ***DC000***

Note: If you are installing an IBM Token-Ring Network 16/4 Adapter/A in the bridge computer, you must set the RAM size to 16 KB. See the *Guide to Operations* packaged with the adapter for more information about setting RAM size.

If you are installing an IBM Token-Ring Network Adapter/A in the bridge computer, you must set the RAM size to 16 KB. See the *Installation and Testing Instructions* packaged with the adapter for more information about setting RAM size.

2 Check communication on the network.

You should check the ability of each adapter to communicate on its LAN segment by trying to send a message between two adapters on the network using an application program.

- For the IBM PC Network, use the Advanced Diagnostic diskette that comes with the *IBM PC Network Hardware Maintenance and Service* manual.
- For the IBM Token-Ring Network, use the "Ring Test" option of the Ring Diagnostic as described in the *IBM Token-Ring Network Problem Determination Guide.*

  Instructions for "Checking of the Ring" are also included in the *IBM Token-Ring Network Installation Guide.*

Software Installation

Bridge Program Installer

You can install and configure the Bridge Program in either of two ways:

1. On each dedicated bridge computer in your network or
2. On a working diskette on one computer for all of the bridge computers in your network.

   If you choose the second option, you will need one diskette formatted with the /S option for each bridge computer.

   The computer you use to create these installation and configuration diskettes must have at least two diskette drives or one fixed disk and one diskette drive.

You can install the Bridge Program by using the Installation Program packaged with the Bridge Program or by copying the files you need (using the DOS COPY command) and editing the CONFIG.SYS file. The Installation Program simplifies the job of copying files onto the working disk or diskette and editing the CONFIG.SYS file and AUTOEXEC.BAT file.

If you are an experienced DOS user, you may want to customize the CONFIG.SYS file without using the Installation Program. Appendix B contains the statements you need to include in the CONFIG.SYS file for either the fixed disk or the working diskette. See "Instructions to Load the Bridge Program Using a Batch File" on page 4-4 for more information about creating or modifying the AUTOEXEC.BAT file.

Preparing a Backup Copy of the Bridge Program

Before you use the Bridge Program, follow these steps to prepare a copy of the Bridge Program's modules and files.

1. Use the DOS DISKCOPY command to make a copy of the Bridge Program's modules and files. See your DOS reference manuals for more information on DOS commands.

2. Using a felt-tip pen, label the diskette **Bridge Program Backup Copy**.

3. After you have prepared this copy, store the original Bridge Program diskette in a safe place for its protection.

Installing and Configuring the Bridge Program on a Fixed Disk

Use the procedure in this section to install the Bridge Program on a fixed disk. The fixed disk can be on the bridge computer or another computer from which you can create working diskettes for all bridge computers in your network.

CONFIG.SYS File

The Installation Program creates a new CONFIG.SYS file in the root directory of the fixed disk with the commands to load the required adapter support when the computer is started. If you already have a CONFIG.SYS file on the fixed disk, it will be saved under the name CONFIG.SAV. If you want to use DOS commands to create or edit the CONFIG.SYS file, see Appendix B.

AUTOEXEC.BAT File

The Installation Program creates a new AUTOEXEC.BAT file in the root directory so that the Bridge Program will be loaded automatically. If you already have an AUTOEXEC.BAT file in your root directory, it will be saved under the name AUTOEXEC.SAV. The new AUTOEXEC.BAT file contains the command **ECCMAIN**.

Note: For more information on DOS commands and fixed disk directories, see your DOS manuals.

Installation and Configuration Steps

1 Make sure you use DOS 3.3 or later to prepare the fixed disk as described in the *DOS Reference* manual. To check the version that is currently loaded, use the DOS VER command.

Warning: Do not format a disk that already has been prepared and contains files. Existing files will be erased if you do this.

Note: If you are using a new computer as the bridge computer, be sure to prepare the fixed disk before installing the Bridge Program. See the *DOS Reference* manual for more information.

2 Insert the **Bridge Program Backup Copy** of the Bridge Program into drive A.

If you are installing the Bridge Program on the bridge computer, go to step 3.

If you want to create working diskettes for the other bridge computers in your network from one fixed disk, go to step 5.

3 At the DOS prompt type:

A:INSTALL C

and press the **Enter** key.

4 Go to Step 6.

5 At the DOS prompt type:

A:INSTALLH

and press the **Enter** key.

6 Follow the instructions and answer the questions on the program panels.

When you have followed the instructions and answered the questions on the program panels, then you have completed installing the Bridge Program onto a fixed disk.

Continue with step 7 to configure the Bridge Program.

7 Configure the Bridge Program.

If you use the defaults as the configuration parameter values, the Installation Program will immediately return to DOS. You do not need to use the Configuration Program if you use the configuration parameter default values.

If you want to alter any of the bridge configuration parameter values, the Installation Program will prompt you to use the Configuration Program.

Refer to the Bridge Planning Chart you obtained from the network administrator to fill in these values. If you have any questions, see Chapter 2 or talk to your network administrator.

After you save the configuration parameter values, the Configuration Program will return to DOS.

The Bridge Program is now installed and configured on the fixed disk.

You have created your **working disk**. You will not need the original or the **Bridge Program Backup Copy** for everyday operation. You will need these diskettes only if your working disk is damaged.

Go to Chapter 4 to load and use the Bridge Program.

Installing and Configuring the Bridge Program on a Working Diskette

The following procedure allows you to install the Bridge Program on a working diskette. This working diskette will be referred to as the **Bridge Program Working Diskette**.

CONFIG.SYS File

The Installation Program creates a new CONFIG.SYS file on the Bridge Program Working Diskette with the commands to load the required adapter support when the computer is started. If you already have a CONFIG.SYS file on the Bridge Program Working Diskette, it will be saved under the name CONFIG.SAV. If you want to use DOS commands to create or edit the CONFIG.SYS file, see Appendix B.

AUTOEXEC.BAT File

The Installation Program creates a new AUTOEXEC.BAT file on the Bridge Program Working Diskette so that the Bridge Program will be loaded automatically. If you already have an AUTOEXEC.BAT file on your Bridge Program Working Diskette, it will be saved under the name AUTOEXEC.SAV. The new AUTOEXEC.BAT file contains the command **ECCMAIN**.

Note: For more information on DOS commands, see your DOS manuals.

Installation and Configuration Steps

1. Prepare a blank diskette using the FORMAT command as described in the *DOS Reference* manual.

   Prepare the diskette as a system diskette (using the /S option on the FORMAT command) if it will contain DOS and the Bridge Program files. Make sure you use DOS 3.3 or later when preparing the system diskette.

   Using a felt-tip pen, label the diskette Bridge Program Working Diskette.

2 Insert the diskette labeled **Bridge Program Backup Copy** into drive A and the diskette labeled **Bridge Program Working Diskette** into drive B.

3 To install the Bridge Program on the Bridge Program Working Diskette, at the DOS prompt type:

A:INSTALL B

and press the **Enter** key.

4 Follow the instructions and answer the questions on the program panels.

When you have followed the instructions and answered the questions on the program panels, you have completed installing the Bridge Program onto a working diskette.

Continue with step 5 to configure the Bridge Program.

5 Configure the Bridge Program.

If you use the defaults as the configuration parameter values, the Installation Program will immediately return to DOS. You do not need to use the Configuration Program if you use the configuration parameter default values.

If you want to alter any of the bridge configuration parameter values, the Installation Program will prompt you to use the Configuration Program.

Use the Bridge Planning Chart you obtained from the network administrator to fill in these values. If you have any questions, see Chapter 2 or talk to your network administrator.

After you save the configuration parameter values, the Configuration Program will return to DOS.

The Bridge Program is now installed and configured on the working diskette.

You have created your Bridge Program Working Diskette. You will not need the original or the Bridge Program Backup Copy for everyday operation. You will need these diskettes only if you want to

change your configuration later or if your working diskette is damaged.

Go to Chapter 4 to load and use the Bridge Program.

Using the Configuration Program

The following steps explain how to use the Configuration Program (ECCCNFG.EXE) to alter configuration parameter or default values in the configuration file (ECCPARMS.BIN).

You can use the Configuration Program with the configuration file on a computer other than the one to be used for the Bridge Program. The Configuration Program requires DOS 3.3 or later; it does not require the network adapters to be installed in the computer and does not require attachment to the network. However, the configuration file (ECCPARMS.BIN) containing any changed parameter values must be in the current drive and directory of the working diskette or fixed disk with the Bridge Program files when the Bridge Program is loaded.

Steps to Use the Configuration Program

To use the Configuration Program:

1. Make sure that the ECCCNFG.EXE and the ECCPARMS.BIN files are on the Bridge Working Diskette or in the current directory of the fixed disk drive.

   To load and start the Configuration Program, at the DOS prompt type:

   CONFIG

   and press the **Enter** key.

   The IBM Logo panel for the Configuration Program will be displayed. Press the **Enter** key to display the first panel of the Configuration Program as shown in Figure 3-1 on page 3-12.

```
ECCPCG10                IBM PC NETWORK BRIDGE PROGRAM              Page 1 of 4
                          Configuration Program                    08:47:17
------------------------------------------------------------------------------
Type the desired values in each of the fields below.
Press F6 (Save) to save the configuration parameters to the file ECCPARMS.BIN.
Press F3 (Exit) to exit to DOS.


Bridge number.....................................  [1]    (0-9, A-F)

LAN segment number connected to primary adapter..  [001]  (001-FFF Hexadecimal)
LAN segment number connected to alternate adapter  [002]  (001-FFF Hexadecimal)

Frame forwarding active...........................  [Y]    (Y=Yes, N=No)

Bridge performance threshold......................  [10 ] (0-9999 Decimal)

Restart on error..................................  [Y]    (Y=Yes, N=No)
Drive for memory dump on error....................  [0]    (0=Default, A,B,C,)
Drive for error log...............................  [0]    (0=Default, A,B,C,D)

<--Any message occurring while this panel is active will be displayed here-->
F1=Help       F3=Exit
F6=Save                                                        PgDn ↓
```

Figure 3-1. The Configuration Program with Default Parameters (Page 1 of 4)

2 Enter any parameter values specified on the Bridge Planning Chart that are not the defaults. Update the Bridge Planning Chart each time you change the bridge configuration.

Use the **PgUp** and **PgDn** keys to scroll between the panels of the Configuration Program. The four panels are shown in Figure 2-1 on page 2-15, Figure 2-3 on page 2-21, Figure 2-4 on page 2-23, Figure 2-5 on page 2-25, and Figure 2-6 on page 2-28.

The Configuration Program will check to see whether you typed a valid value. An invalid value will result in a message or a beep, depending on the nature of the error.

The information on the Help panel for the first Configuration Program panel explains how to use the function and cursor keys to erase and correct values typed incorrectly. Press **F1 (Help)** to display the Help panel. Appendix A explains the messages displayed on the panels.

3 When you have finished altering parameters on all four Configuration Program panels, press **F6 (Save)** to write the new con-

figuration parameters into the configuration file (ECCPARMS.BIN) on the working diskette or fixed disk in the default drive.

Press **F3 (Exit)** to exit from the Configuration Program and return to DOS.

Configuration is complete.

If you came to this procedure from the installation instructions in Chapter 3, return to those instructions to continue file preparation.

If you are using this procedure to modify or recreate an existing configuration file, return to the activity that brought you to this procedure.

Chapter 4. Loading and Operating the Bridge Program

The sections in this chapter describe how to:

- Load the Bridge Program using a DOS command or a batch file
- Load the Bridge Program automatically when the computer power is turned on or when **Restart on error** is used
- Use the functions of the Bridge Program.

Before You Load the Bridge Program

Before you can successfully load and operate the Bridge Program, you must have already:

- Installed two network adapters in the bridge computer and connected each adapter cable to
  - A faceplate or an access unit if you are connecting to a token-ring network segment
  - The necessary hardware (such as a splitter) if you are connecting to a PC network segment.

    (See step 1a on page 3-2 for instructions on how to configure the adapters.)
- Used the Installation Program to copy all of the necessary files onto the working diskette or fixed disk (as described in Chapter 3).
- Used the Configuration Program to specify the values of any configuration parameters for which you are not using the supplied defaults in the ECCPARMS.BIN configuration file (see Chapter 2).

  Note: You cannot use the Bridge Program to change bridge configuration parameters. You must use the Configuration Program to change the configuration parameters.

Bridge Program Loading Instructions

After you have completed the preparations listed in the previous section, you can load and use the Bridge Program.

If you want to load the Bridge Program using a DOS command, go to "Instructions to Load the Bridge Program Using a DOS Command" on page 4-3.

If you want to use automatic loading, go to "Automatic Loading Instructions" on page 4-5.

Instructions to Load the Bridge Program Using a DOS Command

To load the Bridge Program after you have DOS operating in your computer:

1 If you have just run the Ring Diagnostic or a program other than the Bridge Program in the bridge computer, reload DOS in the bridge computer by turning the computer power off for at least 15 seconds and then back on.

2 Use DOS commands to verify that the date and time stored in the computer are correct if your bridge computer has a clock/calendar with battery backup feature. When DOS is started, the computer takes the date and time displayed from that standard feature. If the date and time are not correct or if your computer does not have the feature, use DOS commands to set the date and time before proceeding. The Bridge Program will stamp the entries in the Error Log file (ECCLOG.DAT) with the date and time as logging occurs.

3 Before you load the Bridge Program, make sure that either:

- Your Bridge Program Working Diskette is in the bridge computer's default drive (including the ECCPARMS.BIN configuration file if you have changed any parameter values), or
- The Bridge Program has been installed on the bridge computer's fixed disk (including the ECCPARMS.BIN configuration file if you have changed any parameter values), and the directory containing the Bridge Program files is set as the default directory.

4 Load the Bridge Program by typing:

BRIDGE

at the DOS prompt and pressing the **Enter** key.

The Bridge Program should now begin loading and initializing.

5 Go to "Bridge Initialization" on page 4-6 to continue.

Instructions to Load the Bridge Program Using a Batch File

To load the Bridge Program using a batch file:

1 Use a text editor to create a batch file on the working disk or diskette. The name of the file ends with the extension **BAT**.

For more information about creating an AUTOEXEC.BAT file, see your DOS manuals.

2 Type the command **ECCMAIN** in the file.

3 To load the Bridge Program, type the name of the batch file at the DOS prompt and press the **Enter** key.

4 The Bridge Program should now begin loading and initializing.

Go to "Bridge Initialization" on page 4-6 to continue.

Automatic Loading Instructions

Be sure your computer is ready for use as a bridge as explained in Chapter 3. The AUTOEXEC.BAT file containing the Bridge Program load command must be on the working disk or diskette.

Note: To find out if your computer will automatically power back on after a loss of electrical service voltage, refer to the documentation for your computer. Even a brief loss of electrical power, for example, might require some computers to be switched off and back on to start again.

To load the Bridge Program automatically:

1. Turn the computer power on. **(If the bridge computer power is already on, turn the power off for at least 15 seconds and then back on.)**

   The Bridge Program will automatically load after DOS is loaded in the computer.

2. The Bridge Program should now begin initializing.

   Go to "Bridge Initialization" on page 4-6 to continue.

Bridge Initialization

As you are loading the Bridge Program, a Copyright panel appears on the monitor screen.

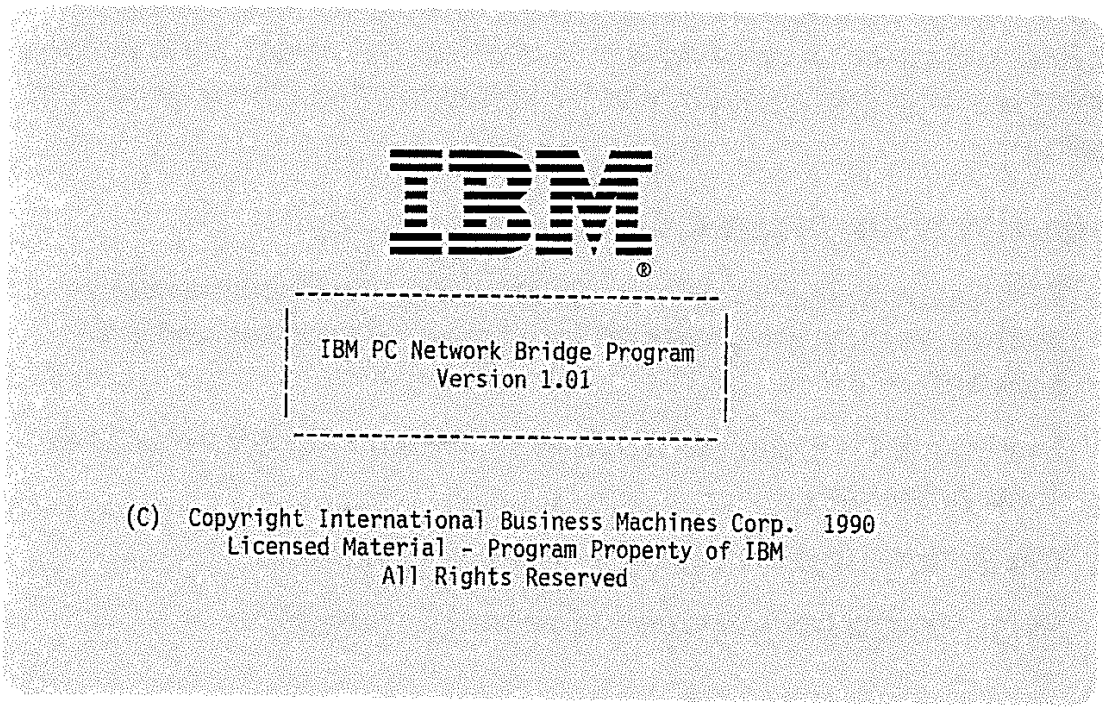


Figure 4-1. The Copyright Panel

After a few seconds the Initialization panel replaces the Copyright panel.

The Initialization Panel

```
ECCPIT10              IBM PC NETWORK BRIDGE PROGRAM
                           Initialization                        11:43:25
-------------------------------------------------------------------------
Bridge initialization is in progress, please wait.                ECCBR001I
Using parameters in ECCPARMS.BIN file.                            ECCBR025I
Bridge Program level is 1.0.                                      ECCBR026I
Network adapter 0 is open, address is 10005A000567.               ECCBR028I
Network adapter 1 is open, address is 10005A0005DE.               ECCBR028I
Bridge test has been started, please wait.                        ECCBR170I
Bridge test completed successfully.                               ECCBR174I
Bridge  1 initialization is complete.                             ECCBR029I
Press any key to view function menu.                              ECCBR045I









LAN Segment 001 Status = Normal          LAN Segment 002 Status = Normal
```

Figure 4-2. The Initialization Panel

This panel displays messages indicating the progress of the loading and initialization. Appendix A describes all of these messages.

Note: The initialization procedure can take up to 3 minutes to complete. When both network adapters have opened, the LAN Segment Status area at the bottom of the panel dynamically displays the current LAN segment status.

When the "Bridge initialization complete" and "Press any key to view function menu" messages are displayed, the Bridge Program is operating and communication can occur across the bridge.

Warning: Once the Bridge Program is operating, do not stop it by turning off the computer power or by pressing the **Ctrl-Alt-Del** key sequence. Unpredictable results will occur on the network if that is done. Use the **Shutdown** function on the Main Menu panel to end Bridge Program operation in an orderly way.

By pressing any key, you can display the Main Menu panel, which allows you to select a supporting function. See "The Main Menu Panel" on page 4-19. The Initialization panel will not be displayed again after the first time the Main Menu panel is displayed. However, the Configuration Data panel, available from the Main Menu panel, also displays the configuration parameter values and the Bridge Program level as displayed on the Initialization panel.

If you do not want to use the functions available from the Main Menu panel, you can leave the Initialization panel displayed until you need to perform a function, such as Shutdown.

If the initialization does not progress as it should, a message will indicate the problem. Find the message in Appendix A and follow the actions recommended in the message description.

Retry Initialization

Retry initialization applies to **only** the IBM Token-Ring Network.

If the Bridge Program detects a beaconing condition on one or both of the rings due to a problem on the network, the Bridge Program will try to open the adapters until both adapters have been opened successfully, or until the bridge operator intervenes by pressing the **F3 (Exit)** key. A beaconing condition indicates that the ring is inoperative.

For example, a beaconing condition is caused by a broken cable somewhere in the network. The Bridge Program will retry initialization until the cable is fixed and is able to open its adapter successfully.

Note: In case an adapter in the bridge computer has been set to the wrong data rate, the Bridge Program will not be able to initialize until you change the data rate of the adapter to match the data rate of the ring.

While attempting to initialize, the Bridge Program performs the following actions:

1. When the Bridge Program first tries to open the adapter and determines that the ring is beaconing, a message is displayed notifying the bridge operator that the ring has beaconed during initialization and that it will continue trying to open the adapter.

2. The Bridge Program continues trying to open the adapter once per minute until both adapters open successfully in the bridge computer. The bridge operator can stop this process by pressing the **F3 (Exit)** key. After pressing the **F3 (Exit)** key, it can take up to 1 minute for the Bridge Program to return to the DOS prompt.

3. The Bridge Program sends an alert to the IBM LAN Manager Version 2.0 as notification of the beaconing condition on the ring. The IBM LAN Manager will forward the alert to NetView* if a link with NetView has been established.

4. If the Bridge Program does not receive an acknowledgment from the IBM LAN Manager Version 2.0 within 1 minute, the Bridge Program continues sending an alert every minute until it has sent four alerts.

   If the Bridge Program does receive an acknowledgment from the IBM LAN Manager Version 2.0, the Bridge Program will not send out any more alerts.

5. After the fourth alert is sent without receiving an acknowledgment, the Bridge Program waits 10 minutes and repeats the procedure again (steps 3—5) if the beaconing condition has not been corrected.

The IBM LAN Manager Version 2.0 logs each alert in its alert log, and passes the alert to NetView if a link with NetView has been established. Each alert contains the fault domain for problem determination. See the *IBM LAN Manager User's Guide* Version 2.0 or the *NetView Resource Alerts Reference* for more information about these alerts.

Operating the Bridge Program

The remainder of Chapter 4 describes the format of the Bridge Program panels and the use of the Bridge Program functions.

Panel Areas

All panels displayed by the Bridge Program following the Copyright panel use specific areas of the screen for similar information.

Presented below is a diagram of a panel showing the placement of the panel elements.

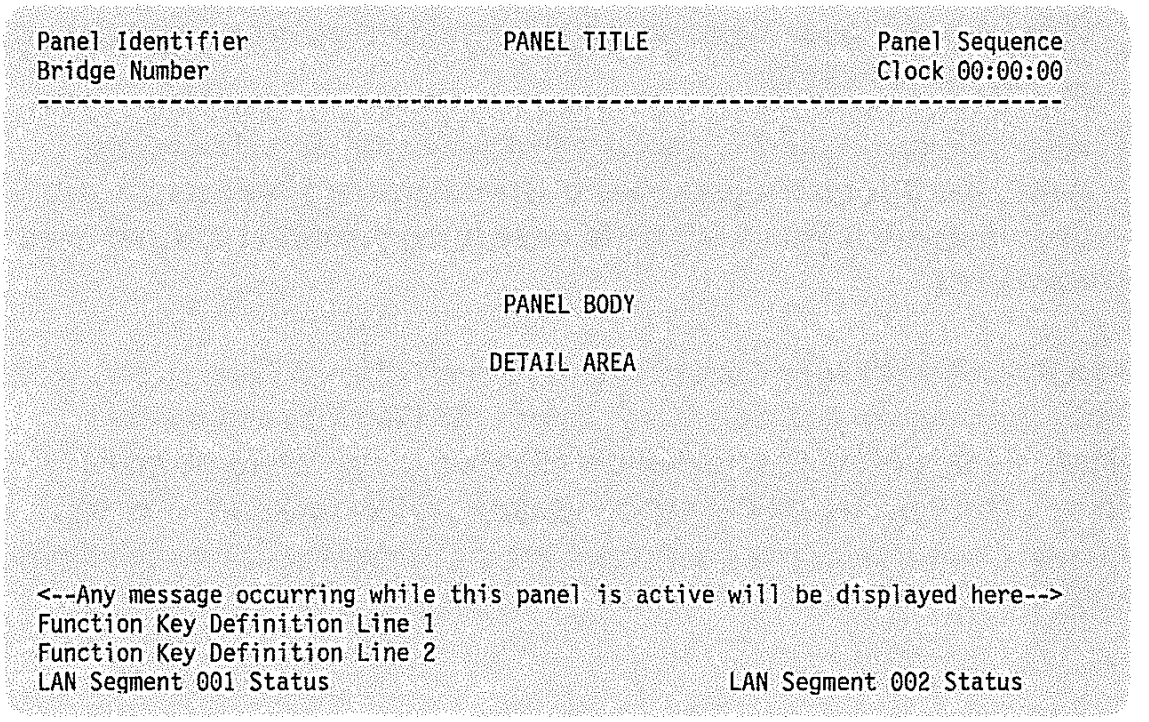


Figure 4-3. Placement of Panel Elements

Panel Identifier and Bridge Number

An identification number appears in the upper left of the panel for each panel displayed by the Bridge Program. All panels except the Initialization panel display the bridge number just below the panel identification number.

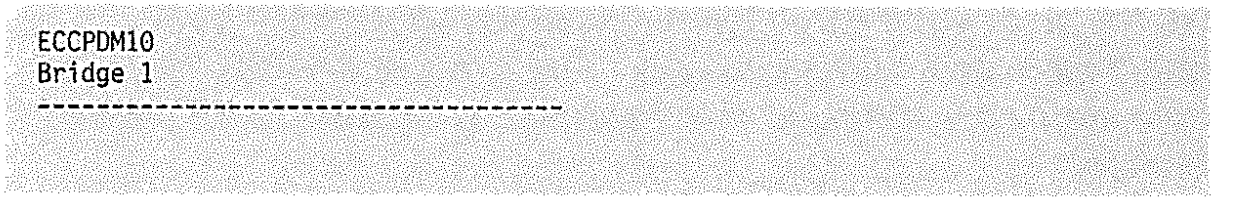


Figure 4-4. The Panel Identifier and Bridge Number

Panel Sequence and Clock

Some panels are part of a series. On those panels, the sequential number and the total number of panels in the series appear in the upper-right area of the panel.

A dynamically updated 24-hour clock also appears in the upper-right area of the panel. After the Initialization panel replaces the Copyright panel, the clock appears on the Initialization panel when both adapters have opened successfully. The clock represents the time maintained by the computer clock feature. It appears on all panels thereafter.

Note: During peak traffic periods, such as when large files are crossing the bridge or many users are sending data over the same bridge at the same time, the clock may lose time. You can correct the clock by doing the following:

1. Stop Bridge Program operation.
2. At the DOS prompt, type the DOS command **TIME**.

   You will then see what the current time is and you will be asked to enter the new time.
3. Type in the correct time as hours (hh), minutes (mm), and seconds (ss) (hh:mm:ss).

   If you need more information about using DOS commands, see your DOS manuals.
4. Load the Bridge Program again.

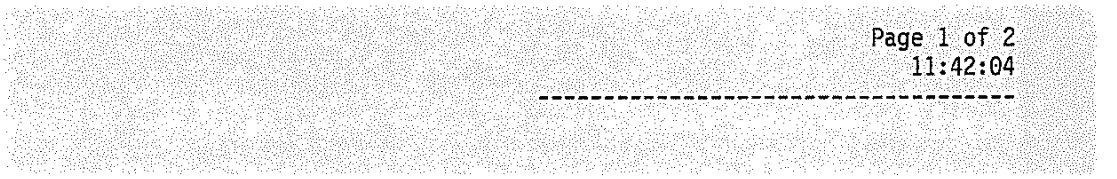


Figure 4-5. A Panel with Two Pages

Lower Panel Areas

At the bottom of each panel are three areas:

- The LAN Segment Status area
- The function key displays
- The message area.

LAN Segment Status Area

After the adapters have been opened and the Bridge Program has gained access to each LAN segment, the status of each LAN segment appears on the bottom line of the panel. The status of the LAN segment to which adapter 0 (the primary adapter) is connected appears on the left in the LAN Segment Status area. The status of the LAN segment to which adapter 1 (the alternate adapter) is connected appears on the right in the LAN Segment Status area. See Appendix A for a description, and suggested actions where applicable, for the five IBM Token-Ring Network and four IBM PC Network status conditions that you may see here.

The five IBM Token-Ring Network status conditions are:

- **Normal**
- **Soft Error**
- **Beaconing**
- **Adapter Closed**
- **Wire Fault**.

The four IBM PC Network status conditions are:

- **Normal**
- **Continuous Carrier**
- **No Carrier**
- **Adapter Closed**.

Help panels, displayed by pressing **F1 (Help)**, provide descriptions of these conditions.

Function Key Displays

The area just above the LAN Segment Status line indicates the function keys that are active for the panel.

Message Area

For all panels except the Initialization and Shutdown panels, the line above the function key indicators displays any messages that occur while the panel is being displayed. When there is no message to display, the area is blank. If a message is displayed in this area and another message occurs, the first message is erased and replaced. A message displayed in this area is also erased when any key except the **Shift-PrtSc** sequence is pressed.

The Initialization and Shutdown panels use the entire screen area for messages. See Appendix A for a description, and suggested actions where applicable, for any messages that may appear in the message area.

```
<--Any message occurring while this panel is active will be displayed here-->
F1=Help      F3=Exit

<---Adapter "0" LAN Segment Status--->|<---Adapter "1" LAN Segment Status--->
```

Figure 4-6. The Message, Functions, and LAN Segment Status Areas

The Detail Area

For all panels except the Initialization and Shutdown panels, the remaining lines in the middle of the panel display descriptive information and operator entries when applicable.

```
Please select one of the following functions:

  ID   FUNCTION                    DESCRIPTION
  --   --------                    -----------

  1    CONFIGURATION DATA          Display configuration file content
  2    NETWORK STATUS              Display network status details
  3    PATH TRACE                  Display path trace log information
  4    PERFORMANCE STATISTICS      Display threshold exceeded information
  5    PERFORMANCE COUNTERS        Display frames forwarded counters
  6    COMMUNICATION STATUS        Display bridge communication status


  S    SHUTDOWN                    End Bridge Program and return to DOS

Type the ID of the function and press Enter
Selection ===> [ ]
```

Figure 4-7. The Detail Area

Key Use

Use the keys described here when operating the Bridge Program. No other keys are active. If you press any other key, a beep will sound.

Key	Function
PgDn	Press **PgDn** to display the next panel (page) if the current panel is one of a series. If there are no more panels, a beep sounds and an error message is displayed.
PgUp	Press **PgUp** to display the previous panel (page) if the current panel is one of a series. If there are no previous panels, a beep sounds and an error message is displayed.
F1	If **F1 = Help** is displayed on the current panel, press **F1** to display help information related to the current panel. If **F1 = Help** is not displayed on the current panel, a beep sounds and no action results when the key is pressed.
F3	If **F3 = Exit** is displayed on the current panel, press **F3** to return to the panel that was displayed when the current panel or sequence of panels was selected. If **F3 = Exit** is not displayed on the current panel, a beep sounds and no action results when the key is pressed.
F5	If **F5 = Refresh** is displayed on the current panel, press **F5** to update the panel with the most current information available. The third panel of the Configuration Program allows **F5 = Redisplay** to be pressed to clear the link password fields if an error is made in typing the entries. If **F5 = Refresh** or **F5 = Redisplay** is not displayed on the current panel, a beep sounds and no action results when the key is pressed.
F7	If **F7 = Bridge Test** is displayed on the current panel, press **F7** to start the Bridge Test. See "The Bridge Test" on page 4-20. If **F7 = Bridge Test** is not displayed on the current panel, a beep sounds and no action results when the key is pressed.

F9 If **F9 = Reset** is displayed on the current panel, press **F9** to reset the bridge performance counters to zero, clear the Path Trace Log, or clear the Network Status Details panels. See "The Performance Counters Panel" on page 4-30, "The Path Trace Panel" on page 4-28, and "The Network Status Details Panels" on page 4-25. If **F9 = Reset** is not displayed on the current panel, a beep sounds and no action results when the key is pressed.

 Press the **Enter** key after typing in a character to select a function on the Main Menu panel.

Shift-PrtSc Press the **Shift-PrtSc** key sequence to invoke the Print Screen function available with DOS. The information displayed is sent to your printer. If there is no printer attached to the computer or the printer is not ready, no action results when the key sequence is pressed.

Ctrl-NumLock **Do not use the Ctrl-NumLock key sequence**. It will place the computer in a *Pause* state and cause unpredictable results. No further bridge processing will occur. Pressing any key will stop the pause, and the bridge will resume normal processing.

Ctrl-Alt-Del **Do not use the Ctrl-Alt-Del key sequence while the Bridge Program is operating unless all other options have been exhausted.** This key sequence will start the computer again. This will cause the Bridge Program to stop processing immediately and will bring about unpredictable results.

Help Panels

You can access help panels by pressing the **F1 (Help)** key from any panel that indicates help is available. The Help panel information describes the terms and values shown on the panel displayed when help was requested. Figure 4-8 shows an example of a Help panel.

```
ECCHDM10              IBM PC NETWORK BRIDGE PROGRAM            Page 3 of 7
Bridge 1                     HELP:  MAIN MENU                    11:43:55
------------------------------------------------------------------------
The LAN segment status area is located on the bottom line of each panel.
The value on the left side is the status for the LAN segment connected to
the primary adapter; the value on the right is for the alternate adapter.
Each LAN segment attached to the bridge can be in one of the following states:

   Normal          - The LAN segment is operating normally.
   Soft Error      - Intermittent errors are occurring and being corrected
                     on the Token-Ring Network.
   Beaconing       - The Token-Ring Network is inoperative.
   Wire Fault      - There is a problem with the lobe between the Token-Ring
                     Network adapter and the access unit to which it is
                     connected.
   No Carrier      - The PC Network is experiencing a no-carrier condition.
   Cont. Carrier   - The PC Network is inoperative because of a continuous-
                     carrier condition.
   Adapter Closed - The adapter is no longer attached to the network.

   The next two panels give the recommended action for each state.
<--Any message occurring while this panel is active will be displayed here-->
               F2=Quit                                              PgUp ↑
                                                                    PgDn ↓
LAN Segment 001 Status = Normal         LAN Segment 002 Status = Normal
```

Figure 4-8. A Help Panel

Specific Help panels are available from each of the Function panels and from the Main Menu panel. The Help panels explain the information displayed on those panels and indicate how to use a panel or function.

The Main Menu Panel

You can display this panel by pressing any key at the Initialization panel, or by pressing the **F3 (Exit)** key at any of the function panels.

```
ECCPDM10                  IBM PC NETWORK BRIDGE PROGRAM
Bridge 1                          Main Menu                          11:44:30
--------------------------------------------------------------------------------

Please select one of the following functions:

   ID   FUNCTION                       DESCRIPTION
   --   --------                       -----------

   1    CONFIGURATION DATA             Display configuration file content
   2    NETWORK STATUS                 Display network status details
   3    PATH TRACE                     Display path trace log information
   4    PERFORMANCE STATISTICS         Display threshold exceeded information
   5    PERFORMANCE COUNTERS           Display frames forwarded counters
   6    COMMUNICATION STATUS           Display bridge communication status


   S    SHUTDOWN                       End Bridge Program and return to DOS

  Type the ID of the function and press Enter
  Selection ===> [ ]
<--Any message occurring while this panel is active will be displayed here-->
F1=Help
            F7=Bridge Test
LAN Segment 001 Status = Normal        LAN Segment 002 Status = Normal
```

Figure 4-9. The Main Menu Panel

To use one of the functions, type in the applicable number from 1 through 6 or **S** for Shutdown and press the **Enter** key. If you perform any of the following actions, an error message will be displayed or a beep will sound:

- Press an invalid function key or a cursor movement key
- Press **Enter** without having typed in a number from 1 through 6 or **S** for Shutdown
- Press **Enter** after having typed in an alphabetic or numeric value other than 1 through 6 or **S** for Shutdown.

You can press the **F1 (Help)** key to display Help information describing the available functions.

The Bridge Test

The bridge test function is available from several of the function panels and from the Main Menu.

By pressing **F7 (Bridge Test)** you initiate a test to verify that the Bridge Program can communicate from one LAN segment to the other by using both adapters. The test consists of transmitting frames from each adapter through the bridge to the other adapter in the bridge computer. In this way, the test verifies a path from each LAN segment through the bridge to the opposite LAN segment.

The Bridge Test initiates automatically during the Bridge Program's initialization process. It is also available from the following panels:

- Main Menu
- Configuration Data
- Network Status Details
- Path Trace
- Performance Statistics
- Performance Counters
- Communication Status.

A message appears to indicate successful completion of the Bridge Test. If an error should occur, messages will indicate the detected failure. Refer to Appendix A for cause and action information.

The Function Panels

The function panels provide detailed information to a network administrator, planner, or person performing network problem determination.

Type a selection number on the Main Menu and press the **Enter** key to display a function panel. Each of the fields or terms used on the function panels is explained on associated Help panels available by pressing the **F1 (Help)** key while viewing the panel.

Some fields are displayed only for use by service suppliers in the event of a problem that you are unable to resolve (beacon error type, for example). If the explanations of the fields and the actions in message explanations in Appendix A do not indicate that you need the information for network management or problem resolution, just record the information and have it ready to provide to the service supplier.

The Configuration Data Panels

Type **1** and press the **Enter** key on the Main Menu to display the Configuration Data panels.

These panels display the configuration parameters currently being used by the Bridge Program. You can use these parameters to verify that the configuration file has been correctly prepared or to isolate network problems.

The largest frame size is displayed on one of the Configuration Data panels. The type of adapters installed in the bridge computer affects the largest frame size that the Bridge Program can support. For application programs sending frames across a bridge, adjust the application to send a maximum frame size less than or equal to the largest frame size that the bridge can process. See Table 4-1 on page 4-23 for the largest frame size in bytes depending on the type of adapters in the bridge computer.

Table 4-1. Largest Frame Sizes in Bytes

Alternate Adapter	Primary Adapter	
	PC Network/A adapters	**Token-Ring Network Adapter/A at 4 Mbps**
PC Network/A adapters	2052	2052
Token-Ring Network Adapter/A at 4 Mbps	2052	2052
Token-Ring Network 16/4 Adapter/A at 4 Mbps	2052	2052
Token-Ring Network 16/4 Adapter/A at 16 Mbps	2052	2052

Alternate Adapter	Primary Adapter	
	Token-Ring Network 16/4 Adapter/A at 4 Mbps	**Token-Ring Network 16/4 Adapter/A at 16 Mbps**
PC Network/A adapters	2052	2052
Token-Ring Network Adapter/A at 4 Mbps	2052	2052
Token-Ring Network 16/4 Adapter/A at 4 Mbps	4472	4472
Token-Ring Network 16/4 Adapter/A at 16 Mbps	4472	8144

You **cannot** alter the parameters from this panel. You can alter the configurable parameters in these two ways:

- Using the Configuration Program to change the configuration file as described in Chapter 2, and then restarting the Bridge Program.
- Using the IBM LAN Manager Version 2.0 through a controlling link with the bridge to change the configuration parameters.

The **F5 (Refresh)** function updates the Configuration Data panels to show the Bridge Program's configuration parameters that have been changed by the IBM LAN Manager Version 2.0.

The bridge may automatically change the following parameters during initialization due to an error condition:

- Frame forwarding active
- Parameter server
- Configuration report server
- Automatic single-route broadcast.

When you press **F5 (Refresh)**, if the Bridge Program changed configuration parameter values due to an error condition, the fields are marked by an asterisk (*).

To display the second and third Configuration Data panels, press the **PgDn** key. You can return to the first or second Configuration Data panel by pressing the **PgUp** key. You can return to the Main Menu panel by pressing the **F3 (Exit)** key.

The Network Status Details Panels

Type **2** and press the **Enter** key at the Main Menu to display the first of these two panels.

The information available on these panels is useful for network problem determination. Separate panels display information about each LAN segment; use the **PgDn** and **PgUp** keys to view the LAN segment status for each part of the network.

The following panel displays information about the most recent no-carrier and continuous-carrier conditions for a PC network segment connected to the bridge.

```
ECCPNS10                IBM PC NETWORK BRIDGE PROGRAM          Page 1 of 2
Bridge 1                    NETWORK STATUS DETAILS               11:45:58
------------------------------------------------------------------------------

   LAN segment number.............................: 001
   Bridge adapter's address.......................: 10005A0005DE
   Network type...................................: PC Network

   DETAILS FOR LAST NO-CARRIER CONDITION
      Date of last notification...................: 00-00-00
      Time of last notification...................: 00:00:00

   DETAILS FOR LAST CONTINUOUS-CARRIER CONDITION
      Date of last notification...................: 12-23-89
      Time of last notification...................: 12:33:58
      Adapter address.............................: 400000010000
      Universal address...........................: 10005A0005D4

<--Any message occurring while this panel is active will be displayed here-->
F1=Help      F2=Quit                                  F5=Refresh
             F7=Bridge Test            F9=Reset                        PgDn ↓
LAN Segment 001 Status = Normal         LAN Segment 002 Status = Normal
```

Figure 4-10. The Network Status Details Panel (Page 1)

The following panel displays information about the most recent soft error and beaconing conditions for a token-ring network segment connected to the bridge.

```
ECCPRS10                  IBM PC NETWORK BRIDGE PROGRAM              Page 2 of 2
Bridge 1                     NETWORK STATUS DETAILS                    11:47:21
------------------------------------------------------------------------------
   LAN segment number.............................: 002
   Bridge adapter's address.......................: 10005A000567
   Network type...................................: Token-Ring
   Current NAUN address...........................: 10005A001BEF
   FAULT DOMAIN DETAILS FOR LAST SOFT ERROR CONDITION
      Date of last notification...................: 12-23-89
      Time of last notification...................: 12:28:48
      First adapter's address.....................: 40005A0004D4
      Error Count.................................: 0F
      Second adapter's address....................: 40005A0002AB
      Error Count.................................: 0F

   FAULT DOMAIN DETAILS FOR LAST BEACONING CONDITION
      Date beacon occurred........................: 00-00-00
      Time beacon occurred........................: 00:00:00
      NAUN adapter's address......................: 000000000000
      Beaconing adapter's address.................: 000000000000
      Error type..................................: 0000
<--Any message occurring while this panel is active will be displayed here-->
F1=Help      F2=Quit                                  F5=Refresh
             F7=Bridge Test          F9=Reset                        PgUp ↑
LAN Segment 001 Status = Normal       LAN Segment 002 Status = Normal
```

Figure 4-11. The Network Status Details Panel (Page 2)

The Network Status Details panels shown here illustrate what the first panel would look like if the primary adapter were connected to a PC network segment, and what the second panel would look like if the alternate adapter were connected to a token-ring network segment.

The first panel displayed is for the LAN segment connected to the primary adapter; the second panel is for the LAN segment connected to the alternate adapter. Please note that the correct panel will appear corresponding to whether it is for the token-ring network or the PC network.

If the bridge connects two token-ring network segments, then the first Network Status Details panel will appear for the segment attached to the primary adapter. Press the **PgDn** key and the second Network Status Details panel will appear for the other segment that is attached to the alternate adapter. Both panels will be similar to the panel shown in Figure 4-11.

If the bridge connects two PC network segments, then the first Network Status Details panel will appear for the segment attached to the primary adapter. Press the **PgDn** key and the second Network

Details Status panel will appear for the other segment that is attached to the alternate adapter. Both panels will be similar to Figure 4-10 on page 4-25.

Information Pertaining to Both Panels

If no errors have been detected since the Bridge Program has been running, the fields will contain all zeros.

The bridge adapter address currently being used for each LAN segment is also displayed.

If you suspect that an error has occurred while these panels have been displayed, press the **F5 (Refresh)** key to update the panels with the most recent information.

For detailed help concerning specific fields or conditions for the IBM Token-Ring Network, refer to:

- The *IBM Token-Ring Network Problem Determination Guide*
- The *IBM Token-Ring Network Architecture Reference*.

For detailed help concerning specific fields or conditions for the IBM PC Network, refer to the *IBM PC Network Hardware Maintenance and Service* manual.

The Path Trace Panel

Type **3** and press the **Enter** key at the Main Menu to display the Path Trace panel. This panel displays information about path trace log entries.

The log entries are the result of up to the 15 most recent frames that have passed through the bridge and requested that system path trace information be compiled. If no system path trace frames have been received since the Bridge Program was loaded, the path trace log is empty. The **Routing information** field will be blank and all other fields will contain zeros.

When multiple entries are in the log, use the **PgDn** and **PgUp** keys to scroll through all of the path trace entries in the log. The upper-right section of the panel displays the number of panels required to display all of the entries. The most recent log entries are displayed. If you suspect that another entry has been logged while you are viewing this panel, press **F5 (Refresh)** to update the panel with the most recent log information.

To clear the path trace log, press **F9 (Reset)**.

The Path Trace Help panels explain the information displayed on the Path Trace panel.

The Performance Statistics Panel

Type **4** and press the **Enter** key at the Main Menu to display the Performance Statistics panel.

The information available on this panel is useful for evaluating the flow of bridge traffic over a 24-hour period.

This panel gives information about frames not forwarded from one bridge adapter to the other by the Bridge Program. It displays the number of times within a 5-minute period that the bridge performance threshold is exceeded. These statistics are displayed for each LAN segment for a 24-hour period. The performance statistics span two panels; use the **PgUp** and **PgDn** keys to change the display to the previous or next panel.

To obtain more information about bridge traffic, use:

- The Performance Counters panel (described on page 4-30)
- The Performance Analysis Worksheets (see Appendix D)
- Appendix C
- The *IBM Local Area Network Administrator's Guide.*

The Performance Counters Panel

Type **5** and press the **Enter** key at the Main Menu to display the Performance Counters panel. This panel provides a cumulative count of:

- Broadcast frames and bytes forwarded
- Non-broadcast frames and bytes forwarded
- Frames not forwarded because target LAN segment inoperative
- Frames not forwarded because of adapter congestion
- Frames not routed across this bridge
- Frames not forwarded for other reasons.

The display of information on this panel is not updated automatically as the activity and error counters change. To display the latest data, press **F5 (Refresh)**.

To set the counters to zero, press **F9 (Reset)**.

The Help panels explain the information displayed on the Performance Counters panel.

To obtain more information about bridge traffic, use:

- The Performance Counters panel (described on this page)
- The Performance Analysis Worksheets (see Appendix D)
- Appendix C
- The *IBM Local Area Network Administrator's Guide*.

Note: The "Frames not routed across this bridge" counter (H) is not sent to the IBM LAN Manager. If a bridge in your network has experienced adapter congestion (counter F is not zero), you should use the Worksheet Method at the bridge station to evaluate more exactly the traffic for that bridge. See Appendix C for an explanation of how to use the Worksheet Method. Although the calculations done without using counter H yield an acceptable approximation, the use of counter H refines the adapter congestion calculations for a more precise result.

The Communication Status Panel

Type **6** and press the **Enter** key at the Main Menu to display the Communication Status panels. Each panel describes the status of one of the four reporting links between the bridge and the IBM LAN Manager. Use the **PgUp** and **PgDn** keys to view the panel for each link.

The information displayed on these panels is not refreshed automatically as it changes. To display the latest data, press **F5 (Refresh)**.

If there are no links established to the IBM LAN Manager, the **Network manager type** will be **None**.

The first 2 characters (hexadecimal) of the **Network manager route** field are 2 bytes of routing control information. Each following 4 characters (2 bytes; 16 bits) consist of a LAN segment number (12 bits) and a bridge number (4 bits) for each bridge that was crossed to establish the link between this bridge and the IBM LAN Manager.

You enable the **Parameter server**, **Error monitor**, and the **Configuration report server** functional addresses by using the Configuration Program to set their parameters to **Y (Yes)** in the Bridge Program ECCPARMS.BIN configuration file. The **LAN reporting mechanism** and the **Bridge server** are always enabled for the Bridge Program.

The IBM LAN Manager that establishes the link with the bridge requests the reports from the servers and the **Error monitor**.

See the *IBM LAN Manager User's Guide* for more information about requesting reports, and the *IBM Local Area Network Administrator's Guide* for information about the use of the report information in problem determination for your network.

The Shutdown Verification Window

Type **S** and press the **Enter** key at the Main Menu to display the Shutdown Verification window. If there are one or more links to the IBM LAN Manager, a message is displayed. You should contact your network administrator to determine if the links need to be disconnected before continuing with shutdown of the Bridge Program.

If there are no links active, or after IBM LAN Manager links are disconnected and you continue with shutdown, the **Shutdown Panel** will be displayed.

If you want to return to the Main Menu without shutting down the Bridge Program, type **N (No)** and press the **Enter** key.

If you want to proceed with shutdown to end the operation of the Bridge Program, type **Y (Yes)** and press the **Enter** key.

The Shutdown Panel

This panel is displayed as a result of one of the following:

- You typed **Y (Yes)** on the Shutdown Verification window.
- An error condition was detected that made the Bridge Program unable to continue operation.

Note: If the shutdown is due to an error and your system is prepared for automatic loading, the computer will automatically reload DOS and the Bridge Program.

This panel is similar to the Initialization panel. The messages displayed indicate either an orderly shutdown or a shutdown caused by an error condition. The first message displayed on this panel indicates the reason for the shutdown. The Error Log (ECCLOG.DAT) file logs the error messages.

After the shutdown is complete, the bottom of the panel is erased and the DOS prompt is displayed.

Chapter 5. Bridge Program Problem Determination

Initialization

The Bridge Program looks for errors during the initialization procedure. Messages indicate any errors that are detected. Appendix A provides cause and action information for those messages to help locate and correct the cause of the detected error.

Operation

If the Bridge Program does not detect any error conditions during initialization and becomes operational, follow these suggestions to resolve communication problems involving the bridge:

1. For any messages displayed on the Bridge Program panels, refer to their cause and action descriptions in Appendix A.
2. If you want to determine if communication is possible through your bridge, use a network application program to see if data can be transmitted from a device on one LAN segment to a device on the other LAN segment.
3. If a device or devices on a LAN segment cannot communicate with a device or devices on the other LAN segment:
   a. Verify that each adapter used in the bridge computer is actually connected to the correct LAN segment as planned.

      Notes:

      1) The IBM LAN Manager Version 1.0 will provide information about **only** the token-ring network connections to the bridge, not the PC network connections to the bridge.

         - If you have the IBM Token-Ring Network Manager or IBM LAN Manager Versions 1.0 or 2.0 installed on the same token-ring network segment as the bridge's adapter, you can refer to the program's ring configuration "map" to locate the bridge's adapter and the adapter of the device initiating the communication.

If both the bridge adapter and the communicating device are not in the network configuration list and are therefore not on the same LAN segment, you must correct that situation to proceed.

Next, verify that the bridge's other adapter is on the same LAN segment as the device to which the communication is directed, using the same method as above.

If there are multiple bridges in the path, you must verify that each two sequential bridges in the path are connected to the same LAN segment.

- If you do not have a facility such as the IBM Token-Ring Network Manager or IBM LAN Manager installed on your network, you must determine the network configurations in another way. Contact your network administrator or planner, and refer to the network planning and organization documentation for your network.

2) For PC network problems, talk to your professional network designer or installer.

b. Verify the correct Bridge Program configuration settings.

1) The single-route broadcast parameter is set as required (according to the overall design of your network).
2) The hop count limit parameter is set as required (according to the overall design of your network).
3) All bridges attached to each LAN segment refer to that LAN segment by the same LAN segment number.

You can use the Bridge Test to determine if the Bridge Program can communicate from one LAN segment to the other by using both adapters. See "The Bridge Test" on page 4-20 for more about the test.

If a bridge providing single-route broadcast paths becomes inoperative, the single-route broadcast bridge parameter settings throughout the network must be reevaluated and reset as necessary to maintain the single-route broadcast paths. If you chose single-route broadcast manual mode in the bridge configurations in your network, you must manually reevaluate the paths and change bridge single-route broad-

cast parameters. Automatic single-route broadcast will make the necessary adjustments automatically.

For the IBM Token-Ring Network, see the *IBM Local Area Network Administrator's Guide*, the *IBM Token-Ring Network Introduction and Planning Guide*, and Appendix C for more help. For the IBM PC Network, see Appendix C or talk to your professional network designer or installer.

Special Consideration for Using the Bridge Program

Read this section only if you are using the Bridge Program to connect **a PC network segment and a Token-Ring network segment**. There is a special consideration you must be aware of to prevent problems from occurring when using the Bridge Program in the network.

PC Network Memory Location 3

Choose memory location 1 or 2 when using the Reference Diskette to set the configuration for one of the following:

- IBM PC Network Adapter II/A
- IBM PC Network Adapter II/A - Frequency 2
- IBM PC Network Adapter II/A - Frequency 3
- IBM PC Network Baseband Adapter/A.

Warning: DO NOT USE memory location 3 due to possible shared RAM address conflicts. See the "Host Interface" chapter in the respective adapter's technical reference manual for more information about memory locations.

Appendix A. Status and Messages

LAN Segment Status Conditions

Any one of seven conditions can be displayed in each of the LAN Segment Status areas.

If your computer has a color monitor, the LAN Segment Status conditions appear as follows:

- Normal condition is **white**
- Soft Error condition is **yellow**
- Beaconing, Adapter Closed, Wire Fault, Continuous-Carrier, and No-Carrier conditions are **red**.

If your computer has a monochrome monitor, all the LAN segment status conditions except **Normal** are highlighted.

Normal

Cause: The LAN segment is operating normally.

Action: No action is necessary.

Soft Error

Cause: Intermittent errors are occurring and being corrected on the token-ring network segment.

Action: No action is necessary, but if this persists, refer to the *IBM Token-Ring Network Problem Determination Guide* or contact the person responsible for your network problem determination.

Note: A soft-error message will be displayed for **only** the IBM Token-Ring Network.

Beaconing

Cause: The token-ring network segment is inoperative.

Action: If this condition persists longer than 1 minute, problem determination is necessary. Refer to the *IBM Token-Ring Network Problem Determination Guide* or contact the person responsible for your network problem determination.

Note: A beaconing message will be displayed for **only** the IBM Token-Ring Network.

Adapter Closed

Cause: The bridge adapter on the indicated LAN segment is no longer active on the network.

Action: If a message is displayed with this status, follow the recommended action for the message. This condition does not usually indicate a problem with the LAN segment; no action to correct LAN segment problems is needed.

Wire Fault

Cause: There is a problem with the lobe (cable) between the adapter and the access unit to which it is connected.

Action: Verify correct operation of the adapter and the adapter cable. For the IBM Token-Ring Network Adapter/A and IBM Token-Ring Network 16/4 Adapter/A, use the system tests on the Reference Diskette for the bridge computer. If the adapter or cable is not defective, contact the person responsible for your network problem determination.

Note: A wire fault message will be displayed for **only** the IBM Token-Ring Network.

No Carrier

Cause: There is a hardware problem with the PC network, such as:

- A broken cable
- The translator is not functioning
- The pair of frequencies that the adapter is using does not match the pair of frequencies that the translator is using
- The adapter is failing.

Action: Contact the network administrator and report the no-carrier status of the PC network segment.

To correct the no-carrier PC network status, the network administrator does one of the following:

- Isolates and replaces any failing components (translator, cable, or adapter)
- Verifies that all other nodes are functioning correctly
- Installs the correct adapter for the network.

The network administrator should refer to the *IBM PC Network Hardware Maintenance and Service* for additional information to correct this situation.

Note: A no-carrier message will be displayed for **only** the IBM PC Network.

Continuous Carrier

Cause: The network is not operating. A faulty adapter is causing a carrier to be continuously transmitted on the network, thus preventing any other nodes from transmitting their carriers.

Action: Contact the network administrator and report the continuous-carrier status of the PC network segment.

The network administrator determines which node is transmitting the continuous carrier by examining each node's error codes and takes the defective node off the network until the problem is fixed.

The network administrator should refer to the *IBM PC Network Hardware Maintenance and Service* manual for additional information to correct this situation.

Notes:

1. A continuous-carrier message will be displayed for **only** the IBM PC Network.
2. The message will appear on the screen as "Cont. Carrier."

The Messages

Message Content

The messages listed here can be displayed by:

- The Bridge Program on the Initialization panel, the Shutdown panel, or the message line (area) of the function panels
- The Configuration Program on the message line (area) of each panel.
- The Installation Program on the message line (area) of each panel.

The message consists of a message ID (identifier) and related text.

The messages listed here are in sequence by the numerical portion of the message ID (the 6th through 8th characters of the message ID). Explanations of the cause and the action to take are also included. The last character of the message ID indicates the classification of the message. The classifications are:

I	An information message, no action required
W	A warning message, action may be required
E	An error message, some action is required

If your computer has a color monitor, the messages appear as follows:

- Information messages are **cyan (turquoise)** when displayed on the panel or **white** when displayed on the message line
- Warning messages are **yellow**
- Error messages are **red**.

Additionally, instructions for operation, such as function key use, are displayed in **cyan (turquoise)**.

If your computer has a monochrome monitor, the messages appear as follows:

- Warning messages are **highlighted**
- Error messages are **highlighted**
- Information messages are not highlighted

- All messages are **highlighted** when displayed on the message line. You may need to adjust the contrast and intensity on your display so that both highlighted and non-highlighted messages are visible.

The remainder of this chapter contains Bridge Program messages in numerical order. The message number and text of the message are enclosed in boxes. Some reasons that cause the Bridge Program to display each message and the actions to be taken follow each message.

ECCBR001I Bridge initialization is in progress, please wait.

Cause: This message is displayed while the Bridge Program is performing its initialization process.

Action: None. Wait for subsequent messages. The initialization process can take up to 3 minutes.

ECCBR021E Network adapter interrupt levels are incorrect.

Cause: This message is displayed when the Bridge Program detects that a bridge adapter interrupt level is set to something other than 2 or 3, or when both bridge adapter interrupt levels are set to the same value. The "Bridge initialization failed" message follows this message.

Action: Verify the interrupt level settings. Check:

- The configuration information displayed using the Reference Diskette for the bridge computer for the IBM Token-Ring Network Adapter/A and the IBM Token-Ring Network 16/4 Adapter/A.

  Make sure the primary adapter is set to interrupt level 2 and the alternate adapter is set to interrupt level 3. Correct the settings if necessary, start the computer again, and reload the Bridge Program.

- The configuration information displayed using the Reference Diskette for the IBM PC Network Adapter II/A, Adapter II/A - Fre-

quency 2, Adapter II/A - Frequency 3, and the IBM PC Network Baseband Adapter/A.

Make sure the primary adapter is set to interrupt level 2 and the alternate adapter is set to interrupt level 3. Correct the settings if necessary, start the computer again, and reload the Bridge Program.

Note: If you are using a token-ring network adapter and a PC network adapter in the bridge computer, the PC network adapter **must** be the primary adapter and set to interrupt level 2.

ECCBR023E Adapter interface is not loaded.

Cause: This message is displayed when the Bridge Program detects that adapter support code has not been loaded into bridge computer memory.

Action:

1. Verify that the CONFIG.SYS file is correct as described on page 3-6, page 3-9, or in Appendix B.
2. Verify that the ECCxxMOD.SYS files are on the Bridge Program working copy and that the correct working copy is in the default drive or default directory.

ECCBR024W ECCPARMS.BIN file was not found, default values were used.

Cause: This message is displayed when the Bridge Program detects that there is no configuration file on the working diskette or fixed disk directory from which the Bridge Program is being loaded. The Bridge Program will continue to initialize using default values identical to those provided in the original ECCPARMS.BIN file.

Action: If you want to use the default values for the bridge configuration parameters, no action is required.

If you have changed the default values by altering the configuration file (ECCPARMS.BIN), make sure that the altered file is on the working diskette or fixed disk in the default drive. Then reload the Bridge Program.

ECCBR025I Using parameters in ECCPARMS.BIN file.

Cause: This message is displayed when the Bridge Program detects that there is a configuration file on the working diskette or fixed disk directory with the Bridge Program files.

Action: None.

ECCBR026I Bridge Program level is X.X.

Cause: This message is displayed when the Bridge Program starts the initializing and opening of the adapters.

This message is also displayed when the Bridge Program stops running.

Action: None normally. If this message is displayed as a result of an abnormal termination of the Bridge Program, refer to the error message that describes the termination. Also, record the program level for presentation to your service supplier.

ECCBR028I Network adapter X is open, address is YYYYYYYYYYYY.

Cause: This message is displayed after the Bridge Program has opened each adapter during initialization. It is displayed once for each adapter and contains the following additional data:

- X = Adapter number (0=primary or 1=alternate)
- Y = Adapter address (6 bytes, 12 hex characters).

Action: None.

ECCBR029I Bridge X initialization is complete.

Cause: This message is displayed when the initialization process is completed without errors. In the message, X is the bridge number as defined in the configuration file or as the default value.

Action: None.

ECCBR030E Invalid ECCPARMS.BIN file.

Cause: This message is displayed when the Bridge Program detects that a cyclic redundancy check (CRC) of the configuration file has failed. This can be caused when:

- The file has been altered in some way other than by using the Configuration Program or the IBM LAN Manager Version 2.0 (for example, editing the file with a text editor).
- An ECCPARMS.BIN file from a previous Bridge Program version has been used.

The "Bridge initialization failed" message follows this message.

Action: Use the Configuration Program to verify and correct the parameter values in the configuration file. When you have made all of the necessary corrections, press **F6 (Save)**; a new ECCPARMS.BIN file will be created. Reload the Bridge Program with the new ECCPARMS.BIN file on the working diskette or fixed disk in the default drive.

ECCBR031W Invalid ECCPARMS.BIN; default values were used.

Cause: This message is displayed when the Configuration Program detects that a CRC of the existing configuration file has failed. This can be caused when:

- The file has been altered in some way other than by using the Configuration Program or the IBM LAN Manager Version 2.0 (for example, editing the file with a text editor).

- An ECCPARMS.BIN file from a previous Bridge Program version has been used.

The Configuration Program will display the parameter defaults on the panel; it will not try to display the values in the existing file.

Action: Change values for any parameters not using the defaults as required for the network. Press **F6 (Save)** to write the changed configuration in a new ECCPARMS.BIN file on the diskette or fixed disk in the default drive. The old invalid configuration file will be erased.

ECCBR033W LAN segment number conflict on LAN segment XXX; actual value is YYY.

Cause: This message is displayed when the Bridge Program detects that the configured LAN segment number does not match the LAN segment number sent by another bridge on the same LAN segment. It contains the following additional data:

- XXX = LAN segment number obtained from the configuration file
- YYY = LAN segment number obtained from another bridge on this LAN segment.

The Bridge Program will cease to function as a bridge or as a parameter server.

Action:

1. Determine the correct LAN segment number.
2. Use the Configuration Data panel to verify the LAN segment number value in the configuration file (ECCPARMS.BIN) for each bridge on the LAN segment.
3. Use the Configuration Program or IBM LAN Manager Version 2.0 to correct any discrepancies.
4. Reload the Bridge Program for the bridges that required corrections; use the corrected configuration files.

ECCBR035W Unable to start parameter server on LAN segment XXX.

Cause: This message is displayed when the Bridge Program is unable to start the parameter server due to a LAN segment parameter conflict or a network problem during the parameter server initialization process.

This message also can be displayed when the Bridge Program is initializing during peak traffic periods, such as when large files are crossing the bridge or many users are sending data over the same bridge at the same time.

In the message, XXX is the LAN segment number.

Action:

1. Shut down the Bridge Program and then reload it.

   If the message does not reappear, the Bridge Program is operating correctly and no further action is required.

   If you receive this message again, continue with step 2.

2. Use the Configuration Data panel to verify that the configuration parameters are correct (particularly the LAN segment numbers and bridge number) for all bridges on the LAN segment.

3. Use the Configuration Program to make any necessary corrections.

4. Reload the Bridge Program for the bridges requiring corrections using the corrected configuration files.

If the message appears and the parameters are correct, use the Ring Diagnostic to verify that each token-ring network segment is operating correctly. See the *IBM Token-Ring Network Problem Determination Guide* for instructions on using the Ring Diagnostic. If this does not correct the problem, contact your service supplier.

ECCBR036W Unable to start automatic single-route broadcast.

Cause: This message is displayed when the Bridge Program is unable to start automatic single-route broadcast processing due to a network problem during the parameter server initialization process.

This message also can be displayed when the Bridge Program is initializing during peak traffic periods, such as when large files are crossing the bridge or many users are sending data over the same bridge at the same time.

Action:

1. Shut down the Bridge Program and then reload it.

   If the message does not reappear, the Bridge Program is operating correctly and no further action is required.

   If you receive this message again, continue with step 2.

2. Use the Configuration Data panel to verify that the configuration parameters are correct (particularly the LAN segment numbers and bridge number) for all bridges on the LAN segment.

3. Use the Configuration Program to make any necessary corrections.

4. Reload the Bridge Program for the bridges requiring corrections using the corrected configuration files.

If the message appears and the parameters are correct, use the Ring Diagnostic to verify that each token-ring network segment is operating correctly. See the *IBM Token-Ring Network Problem Determination Guide* for instructions on using the Ring Diagnostic. If this does not correct the problem, contact your service supplier.

ECCBR037E Frame forwarding is not active.

Cause: This message appears when the frame forwarding function is not active due to a parameter conflict, failure of the bridge test, or the frame forwarding configuration parameter being set to **N (No)**.

Action: If frame forwarding is inactive due to a parameter conflict, correct the bridge configuration parameters. Reload the Bridge

Program for the bridges that required corrections; use the corrected configuration files. Check specifically the LAN segment and bridge numbers for all bridges on the LAN segment.

If frame forwarding is inactive as a result of the failure of the Bridge Test, take the action indicated by the message regarding the failure of the Bridge Test.

If the configuration parameter was intentionally set to **N (No)**, no action is necessary. Use the IBM LAN Manager Version 2.0 that is linked to the bridge as the controlling LAN Manager to start frame forwarding when desired.

Note: The IBM LAN Manager Version 1.0 does not contain a function to start bridge frame forwarding. Frame forwarding must always be set to **Y (Yes)** in the Bridge Program configuration file if there are links with the IBM LAN Manager Version 1.0. The IBM LAN Manager Version 2.0 does contain the function to start frame forwarding. See page 2-16 for more information about setting this parameter.

ECCBR038E Both adapters are using the same locally administered address.

Cause: This message is displayed during the initialization process when the Bridge Program discovers that both adapters in the bridge computer are using the same locally administered address.

Action: Edit the CONFIG.SYS file and make sure that each statement contains a different locally administered address for each adapter.

Make sure the CONFIG.SYS file has been modified according to the manual instructions in Appendix B.

ECCBR040I Bridge initialization has failed.

Cause: This message is displayed when the Bridge Program detects that the initialization has failed. After this message is displayed the program stops running and control is returned to DOS.

Action: Refer to the explanation of the previously displayed error message on this panel that describes the reason for the termination.

ECCBR045I **Press any key to view function menu.**

Cause: This message is displayed on the message line after the "Bridge initialization complete" message.

Action: If you want to use one of the available bridge functions, press any key to display the Main Menu. The Initialization panel is not displayed again after the Main Menu panel is first requested.

If you do not want to use one of the functions, the Bridge Program is running and no further action is required.

ECCBR047W **There are reporting links with one or more network manager programs.**

Cause: This message is displayed when you type **S** and press the **Enter** key on the Main Menu to shut down the Bridge Program and reporting links exist with one or more network manager programs.

Action: Contact the network administrator to verify that the shutdown of the Bridge Program is necessary. The links may need to be ended by the network manager programs before you continue with the Bridge Program shutdown.

If the administrator indicates that shutdown is necessary, continue with shutdown by typing **Y (Yes)** on the Shutdown Verification window and pressing the **Enter** key. If the Bridge Program should not be stopped at this time, type **N (No)** on the Shutdown Verification window and press **Enter** to cancel the shutdown request and continue bridge operation.

ECCBR049I **Shutdown is in progress as requested by operator.**

Cause: This message is displayed when you stop the Bridge Program by selecting "Shutdown" on the Main Menu panel, typing **Y (Yes)** and then pressing the **Enter** key on the Shutdown Verification Window. The Bridge Program is continuing with shutdown and will display further messages as they occur.

Action: No further operator action is required.

ECCBR050I	**Shutdown is complete, bridge processing is terminated.**

Cause: This message is displayed after the adapters have been closed and the Bridge Program is not running. Control is passed to DOS.

Action: The Bridge Program must be reloaded in order to be started again.

ECCBR051I	**LAN segment XXX is beaconing (XXXXXXXXXXXX, XXXXXXXXXXXX, XXXX).**

Cause: This message will be displayed during the initialization process when the Bridge Program determines that one or both of the token-ring network segments connected to the bridge are beaconing. When the Bridge Program detects a beaconing condition on one or both of the token-ring network segments connected to the bridge, the Bridge Program will try to open the adapters until both adapters have been opened successfully, or until the bridge operator intervenes by pressing the **F3 (Exit)** key.

For more detailed information about what actions the Bridge Program performs while trying to initialize when one or both of the token-ring network segments are beaconing, see page 4-8.

XXX = LAN segment number

XXXXXXXXXXXX = Beaconing adapter address

XXXXXXXXXXXX = NAUN adapter address

XXXX = Beacon type

Note: This message is displayed for **only** the IBM Token-Ring Network.

Action:

1. Write down the adapter addresses and the error type. You will need this information to resolve the beaconing condition yourself or to give to the service supplier if you cannot resolve the beaconing condition on the token-ring network segment.
2. Use the adapter addresses and the procedures in the *IBM Token-Ring Network Problem Determination Guide* to resolve the beaconing condition.

ECCBR055I	**Bridge will retry adapter open command until it is successful.**

Cause: This message will be displayed after message ECCBR051I during the initialization process when the Bridge Program determines that one or both of the LAN segments connected to the bridge are beaconing. When the Bridge Program detects a beaconing condition on either LAN segment connected to the bridge, the Bridge Program will try to open the adapters until they have both been opened successfully, or until the bridge operator intervenes by pressing the **F3 (Exit)** key. For more detailed information about what actions the Bridge Program performs while trying to initialize when one or both of the LAN segments is beaconing, see page 4-8.

Note: This message is displayed for **only** the IBM Token-Ring Network.

Action: None.

ECCBR056I Press F3 (Exit) if you want to exit to DOS.

Cause: This message will be displayed after message ECCBR055I during the initialization process when the Bridge Program determines that one or both token-ring network segments connected to the bridge are beaconing. When the Bridge Program detects a beaconing condition on either token-ring network segment connected to the bridge, the Bridge Program will try to open the adapters until they have both been opened successfully, or until the bridge operator intervenes by pressing the **F3 (Exit)** key. For more detailed information about what actions the Bridge Program performs while trying to initialize when one or both of the token-ring network segments is beaconing, see page 4-8.

Action:

- If you want to interrupt the initialization retry process and exit to DOS, press the **F3 (Exit)** key.
- If you want the Bridge Program to try to open the adapters until they have both been opened successfully, no action is required.

ECCBR062I Panel data has been updated.

Cause: This message is displayed in the message area on a panel when you press **F5 (Refresh)**. Updated information is displayed on the panel. The message is also displayed when you press **F9 (Reset)**:

- On the Performance Counters panel:
  The counter values are set to zero, and the panel is updated to show all counter values as zero.
- On the Path Trace panel:
  The path trace log is cleared.
- On the Network Status Details panel:
  The panel values are cleared and not updated with the most recent information.

Action: None.

ECCBR065E Unable to display panel XXXXXXXX from file ECCCHELP.SCN.

Cause: This message is displayed in the message area when a Help panel cannot be found in the ECCHELP.SCN file. The variable data (XXXXXXXX) contains the panel identification number of the Help panel that could not be displayed.

Action: Replace the ECCHELP.SCN file on your working diskette or fixed disk by copying the file from the original Bridge Program diskette. Then, start the Bridge Program again.

If the problem occurs again, record the panel identification number and then refer to the "Statement of Service" on page E-10.

ECCBR081E File XXXXXXXX.XXX was not found.

Cause: This message is displayed when a file cannot be found on the working diskette or fixed disk directory in the default drive. It contains the following additional data:

XXXXXXXX.XXX = File name and extension

Action: Verify that the working diskette or fixed disk directory containing the Bridge Program files is in the default drive, and that the specified file is located on that diskette or fixed disk. If the file is not found, copy the file from the original Bridge Program diskette to the working diskette or fixed disk in the default drive. Then, reload the Bridge Program.

ECCBR082E Drive is not ready.

Cause: This message is displayed when a file access is attempted and the disk drive is not ready (the door is open, for example).

Action: Make the drive ready and refer to any other messages displayed.

ECCBR083E I/O Error on file XXXXXXXX.XXX (RC).

Cause: This message is displayed when a file-related operation, other than "file not found" and "drive not ready," is not successful. It contains the following additional data:

- X = File name and extension (12 characters)
- RC = Failure reason code (1 byte, 2 hex characters)

Action:

1. Verify that the disk or diskette drive is operating correctly by running the disk drive tests described in your computer's *Guide to Operations* or *Quick Reference* manual.
   - If the tests indicate a problem with the drive, contact your computer service supplier to correct the problem. After the problem has been corrected, continue with step 2.
   - If the tests do not indicate a problem, replace the named file on your working diskette or fixed disk by copying the file from the original Bridge Program diskette.
2. Start the Bridge Program again.

If the error reoccurs, record the failure reason code and contact your service supplier.

ECCBR084W Error log is full, data may be lost.

Cause: This message is displayed on the Shutdown panel when the error log has been filled to capacity. Error messages associated with termination are also recorded as entries in the error log. The last error log entry contains the reason for the termination of the Bridge Program.

Action: If the Bridge Program stops operating due to a problem (and not to an orderly shutdown requested by the operator), use the actions described for the messages in the Error Log or on the Shutdown panel or both to correct the problem.

Copy the ECCLOG.DAT file to another disk directory or diskette if you want to save it, then erase the ECCLOG.DAT file. Reload the Bridge

Program. A new log file is created the next time the Bridge Program needs to log a message.

ECCBR085W Receive congestion, error analysis data was lost.

Cause: This message is displayed when error analysis messages (error monitor, soft error reports, and network configuration changes) are being received at a rate too fast to be processed by the Bridge Program. This could be caused by heavy traffic through the bridge or by using the Ctrl-NumLock key sequence.

Action:

- If this condition was caused by the Ctrl-NumLock key sequence, press any key to remove the pause condition.
- If this condition was caused by error analysis messages, contact your network administrator for assistance. One or both of the token-ring network segments may be experiencing high rates of soft errors or temporary beaconing conditions, generating a large number of error analysis messages to the bridge.

  Note: Data traffic crossing the bridge between the LAN segments is not experiencing any deterioration or lost data.

ECCBR153E Invalid selection, please try again.

Cause: This message is displayed when:

- A value other than 1 through 6 or **S** for Shutdown has been selected on the Main Menu panel of the Bridge Program
- An incorrect number has been selected on one of the Installation Program panels.

Action:

- If you receive this message on the Main Menu of the Bridge Program, type a value from 1 to 6 or **S** for Shutdown and press the **Enter** key.
- If you receive this message on one of the Installation panels, type one of the available option numbers and press the **Enter** key.

ECCBR160E **Top of data is displayed, press PgDn to continue.**

Cause: This message is displayed when the **PgUp** key has been pressed and there is no previous panel to be displayed.

Action: Press the correct key for the action you want to take.

ECCBR161E **Bottom of data is displayed, press PgUp to continue.**

Cause: This message is displayed when the **PgDn** key has been pressed and there is no additional panel to be displayed.

Action: Press the correct key for the action you want to take.

ECCBR164E **Passwords must be 6-8 characters.**

Cause: This message is displayed by the Configuration Program when you type a new link password of less than 6 characters.

Action: Choose and type a password of 6-8 characters.

ECCBR165W **Do you want to quit without saving your changes? (Y/N)**

Cause: This message appears on a Configuration Program panel or on an Installation Program panel when you press **F3 (Exit)** after changing configuration or installation parameters, but do not press **F6 (Save)** first.

Action: If you want to save your changes, type **N (No)** and press **F6 (Save)**. If you do not want to save your changes, type **Y (Yes)**. The Configuration Program or the Installation Program will end and control will be passed to DOS.

ECCBR166E Field contains an invalid value.

Cause: This message is displayed when the Configuration Program or the Installation Program detects that the parameter value you specified is invalid.

Action: Specify a value that falls within the specified range.

ECCBR167E Duplicate values are not allowed.

Cause: This message is displayed by:

- The Configuration Program when you specify a parameter value for one adapter's LAN segment number that is the same parameter value specified for the bridge adapter connected to the other LAN segment. Values for these parameters must be different for each LAN segment.
- The Installation Program when you specify a parameter value for one adapter's shared RAM address or locally administered address that is the same parameter value specified for the bridge adapter connected to the other LAN segment.

Action:

- Verify the values specified for each bridge adapter's LAN segment number on the Configuration Program panels (see Chapter 2).
- Verify the values specified for each bridge adapter's shared RAM address and locally administered address in the CONFIG.SYS file (see Chapter 2 or Appendix B).

Change the values as necessary, so that the values for the primary adapter are different from the values for the alternate adapter.

ECCBR168E Incorrect value given for old password.

Cause: This message appears when the Configuration Program detects one of the following errors:

- The password you typed in the old password field does not match the password used previously (as it exists in the configuration file).
- You typed a new password in the new password fields without typing a password in the old password field.

Action: Do one of the following steps:

- Obtain the old password and type it in the old password field.

  If the correct old password is not available, you must erase the ECCPARMS.BIN configuration file and use the Configuration Program to rebuild the file in order to change the password. When there is no existing configuration file, the old passwords are the defaults (00000000).
- Type 8 zeros in the field for the old password if you are changing the password for the first time, and then type in the new password.

ECCBR169E New password values do not match.

Cause: This message is displayed when the Configuration Program detects that the first and second entries of a new link password do not match.

Action: Specify the correct (same) new password in both fields on the panel.

ECCBR170I **Bridge test has been started, please wait.**

Cause: This message is displayed when the bridge test is running, either during the Bridge Program initialization or after **F7 (Bridge Test)** is pressed.

Action: Observe the messages that follow to determine the result of the test.

ECCBR171W **Unable to perform bridge test, frame forwarding is not active.**

Cause: This message is displayed when the bridge test tries to run, either during the initialization process or after **F7 (Bridge Test)** is pressed, and the frame forwarding function is not active.

Action: If the frame forwarding configuration parameter was intentionally set to **N (No)** during configuration, no action is necessary.

If the frame forwarding configuration parameter was incorrectly set to **N (No)** during configuration, use the Configuration Program to change the parameter to **Y (Yes)**. Start the Bridge Program again using the changed ECCPARMS.BIN configuration file.

ECCBR172W **Unable to perform bridge test, LAN segment is inoperative.**

Cause: This message is displayed when the bridge test detects that one or both of the adapters indicate a LAN segment status of other than **Normal** or **Soft Error**.

Action: Follow the indicated actions in "LAN Segment Status Conditions" on page A-1 and the procedures in the *IBM Token-Ring Network Problem Determination Guide* to correct the IBM Token-Ring Network problems or in the *IBM PC Network Hardware Maintenance and Service* to correct the IBM PC Network problems.

If the message was displayed after you pressed **F7 (Bridge Test)**, you can try the bridge test again or continue with other bridge functions.

If the message was displayed during Bridge Program initialization, start the bridge computer again and reload the Bridge Program.

ECCBR173W Bridge test failed, both adapters are on the same LAN segment.

Cause: This message is displayed when the bridge test detects that the alternate bridge adapter is connected to the same LAN segment as the primary adapter.

Action: Refer to section 2 of your Bridge Planning Chart to verify that both adapters are connected to the correct LAN segments. If you have both adapters connected as shown in the chart, contact your network planner or administrator to find out the reason for both adapters being on the same LAN segment.

ECCBR174I Bridge test completed successfully.

Cause: This message is displayed when the bridge test completes all operations with no failures.

Action: None.

ECCBR175W Bridge test is already in progress, please wait.

Cause: This message is displayed when you press **F7 (Bridge Test)** while the bridge test is already in progress.

Action: Wait for another message to be displayed.

ECCBR176W Bridge test failed, unable to pass data.

Cause: This message is displayed when the bridge test fails before completion of all functions.

Action:

1. Press **F7 (Bridge Test)** to run the test again.

   If the bridge test does not fail again, the Bridge Program is operating and no further action is required.

   An unusual occurrence may have caused the initial failure, such as trying to do the bridge test during a peak traffic period. A peak traffic period may be when large files are crossing the bridge or many users are sending data over the same bridge at the same time.

   If the bridge test fails again, turn the computer power off for at least 15 seconds and then back on to start the computer again. Then, load the Bridge Program again if it is not automatically loaded by an AUTOEXEC.BAT file.

   If the bridge test fails again, continue with step 2 for the IBM Token-Ring Network or with step 4 for the IBM PC Network.

2. For the IBM Token-Ring Network, use the Ring Diagnostic to verify that each token-ring network is operating correctly. See the *IBM Token-Ring Network Problem Determination Guide* for instructions on using the Ring Diagnostic.

   If you have no token-ring network problems or when you have corrected any problems, start the computer again (turn the computer power off for at least 15 seconds and then back on). Then reload the Bridge Program if it is not automatically loaded by an AUTOEXEC.BAT file.

   If the bridge test fails again, continue with step 3.

3. Run the diagnostic tests for both adapters in the bridge computer using the computer's Reference Diskette.

   Continue with step 5 when you have determined that there are no adapter problems or you have corrected any adapter or cable problems.

4. For the IBM PC Network, run the Advanced Diagnostics (packaged with the *IBM PC Network Hardware Maintenance and Service* manual) to verify that the PC network segment is working correctly.

   Start the bridge computer again (turn the computer power off for at least 15 seconds and then back on).

If the bridge test fails again, continue with step 5.

5. Start the bridge computer again. If the bridge test fails again, continue with step 6.

6. Recopy the Bridge Program files from either your Bridge Program Backup Copy or from the original Bridge Program diskette to create a new working diskette or fixed disk directory, as described in Chapter 3.

   Start the bridge computer again and reload the Bridge Program from the new working diskette or fixed disk directory.

7. If the bridge test fails again, refer to the "Statement of Service" on page E-10.

ECCBR178E Bridge test failed, network routing conflict.

Cause: This message can occur during initialization or after you press **F7 (Bridge Test)** to select the bridge test. The message can occur for one of the following reasons:

- There is another bridge in the network that is configured with the same routing information (LAN segment numbers and bridge numbers) as this bridge.
- There is a parallel bridge in the network that is configured with a conflicting LAN segment number value.

If this message occurs during initialization, it will be followed by the "Bridge initialization failed" message.

Action: Talk with the network planner or network administrator to determine which bridge is incorrectly configured. Use the Configuration Program (see Chapter 2) to correct the error in the ECCPARMS.BIN configuration file. Reload the Bridge Program using the corrected configuration file.

ECCBR186I **Configuration parameters have been saved in the file ECCPARMS.BIN.**

Cause: This message is displayed when **F6 (Save)** is pressed on a Configuration Program panel. All parameters that have been changed on any of the four Configuration Program panels are written into the ECCPARMS.BIN file on the diskette or fixed disk in the default drive.

Action: None. You can press **F3 (Exit)** to return control to DOS.

ECCBR188E **Disk is full; unable to save parameters.**

Cause: This message is displayed when you press **F6 (Save)** on a Configuration Program panel and there is not enough space on the diskette or fixed disk in the default drive to save the changed data in the ECCPARMS.BIN file.

Action: Press **F3 (Exit)** to end the Configuration Program. Make additional space on the diskette or fixed disk. Start the Configuration Program again, change the parameter values again and press **F6 (Save)** to write the changes on the diskette or fixed disk.

ECCBR189W **Performance counters have overflowed; press reset to clear them.**

Cause: One or more of the Bridge Program performance counters has reached the maximum value that can be recorded by the counter. The counter rolls over to zeros and resumes counting.

Action: Repeat the measurement using a shorter measurement period. On the Bridge Program Main Menu panel, select the Performance Counters panel by typing **5** and pressing **Enter**. On the Performance Counters panel, press **F9 (Reset)** to clear the counters.

ECCBR212E Network adapter X hardware failed (YYYY).

Cause: This message is displayed and logged when the Bridge Program detects a hardware failure in one of the bridge adapters. It contains the following additional information:

- X = Adapter number (0= primary or 1=alternate)
- YYYY = The reason code.

Action: Run the diagnostic tests to verify the operation of the indicated adapter and adapter cable.

IBM Token-Ring Network Adapters

Use the system tests on the bridge computer's Reference Diskette. See the *IBM Token-Ring Network Adapter/A Installation and Testing Instructions* packaged with the adapter and the *Quick Reference* manual for the computer.

IBM PC Network Adapters

Refer to the *IBM PC Network Hardware Maintenance and Service* and run the Advanced Diagnostics.

If the diagnostics indicate that the adapter is operating correctly, start the bridge computer again (turn the computer power off for at least 15 seconds and then back on) and reload the Bridge Program.

If this message is displayed again, record the reason code and contact your service supplier.

ECCBR213E Network adapter X microcode failed (YYYY).

Cause: This message is displayed and logged whenever the Bridge Program detects an error during its communication with one of the bridge adapters. It contains the following additional data:

- X = Adapter number (0=primary or 1=alternate)
- YYYY = The reason code.

Action: Do the following steps:

1. Verify that both adapters do not have the ROM address set the same and that the shared RAM address for the indicated adapter does not conflict with other features installed in your computer.

   Use the Reference Diskette and the *Quick Reference* manual for the bridge computer to check the values.

2. Start the computer again (turn the computer power off for at least 15 seconds and then back on).

3. Reload the Bridge Program if it is not automatically loaded by an AUTOEXEC.BAT file.

4. If the same error occurs, recopy the Bridge Program files from your Bridge Program Backup Copy or from the original Bridge Program diskette to a new working or fixed disk directory, as described in Chapter 3.

   Start the computer again and reload the Bridge Program using the new working diskette or fixed disk.

5. If the problem still occurs, record the reason code and contact your service supplier.

ECCBR215E Network adapter X or its lobe failed.

Cause: This message is displayed and logged when one of the bridge adapters detects that there is a problem with the adapter or the cable that connects the adapter to the network. It contains the following additional data:

X = Adapter number (0 = primary or 1 = alternate).

The LAN Segment Status is **Wire Fault** and Bridge Program operation is ended.

Action: Refer to the procedures in the *IBM Token-Ring Network Problem Determination Guide* to locate and correct a "Wire Fault" problem. Then start the bridge computer again and reload the Bridge Program.

Note: This message is displayed for **only** the IBM Token-Ring Network.

ECCBR216I Network adapter X is closed.

Cause: This message is displayed when the Bridge Program closes a bridge adapter as a result of Bridge Program termination or as a result of the other bridge adapter being closed due to an error condition. It contains the following additional data:

X = Adapter number (0 = primary or 1 = alternate).

The LAN segment status is **Adapter Closed** and Bridge Program operation is ended.

Action: Take the action indicated for the messages displayed preceding this message. The preceding messages show the reason for Bridge Program termination or an adapter being closed.

ECCBR217E Network adapter X command failed (YY, ZZ, EEEE).

Cause: This message is displayed and logged whenever an adapter command fails. It contains the following additional data:

- X = Adapter number (0 = primary or 1 = alternate)
- YY = Command (1 byte, 2 hex characters)
- ZZ = Return code (1 byte, 2 hex characters)
- EEEE = (2 bytes, 4 hex characters)
  Bring-up error code if YY is 20
  Open error code or zeros if YY is 03
  Otherwise zeros.

If the problem occurs during initialization, this message will be followed by the "Bridge initialization failed" message.

Use the following tables to help you determine why the network adapter command failed.

1. Determine which adapter is failing (primary or alternate).
2. Determine what type of adapter it is (token-ring network or PC network).
   - If it is a token-ring network adapter, see Table A-1 on page A-32 for a list of the error codes ("YY ZZ" values) and their possible causes. Actions for the IBM Token-Ring Network follow the table.
   - If it is a PC network adapter, see Table A-2 on page A-34 for a list of the error codes ("YY ZZ" values) and their possible causes. Actions for the IBM PC Network follow Table A-2.

For the **IBM Token-Ring Network**, some possible "YY ZZ" values are caused by:

Table A-1 (Page 1 of 2). IBM Token-Ring Network Adapter Failure Codes and Causes

YY	ZZ	Possible Causes
20	07	1. The selected shared RAM address conflicts with other features installed in your computer. 2. The indicated adapter is defective.
20	1D	1. The indicated adapter is not installed. 2. The adapter settings are set the same on both bridge adapters (see Table 3-1 on page 3-3). 3. The adapter settings on the indicated adapter are not set correctly (see Table 3-1 on page 3-3). 4. The selected shared RAM address conflicts with other features installed in your computer. 5. The adapter support code is not installed.

Table A-1 (Page 2 of 2). IBM Token-Ring Network Adapter Failure Codes and Causes		
YY	**ZZ**	**Possible Causes**
03	07	1. There is a token-ring network segment problem such as a duplicate address or the token-ring network segment is beaconing. 2. If the error code is other than zeros, the adapter or the token-ring network segment has a problem, such as a duplicate address, or the token-ring network segment is beaconing. The "open error" code (EEEE) should be reported to the person responsible for ring problem determination or to your network administrator. **Note:** The following error code is the most common code: • EEEE=0038 Duplicate address • EEEE=0027 LAN segment beaconing
0C	05	If the error code is zeros, the indicated adapter has the 8 KB/16 KB RAM switch set incorrectly (it must be set to 16 KB).

Action: Do the following steps:

1. Correct any problem described above.

   Start the computer again (turn the computer power off for at least 15 seconds and then back on). Reload the Bridge Program if it is not automatically loaded by an AUTOEXEC.BAT file. Continue with step 4.

   If the problem is not described above, there may be either a problem with the token-ring network segment or a problem with the indicated bridge adapter. Continue with step 2.

2. For the IBM Token-Ring Network, run the Ring Diagnostic as described in the *IBM Token-Ring Network Problem Determination Guide* using the adapter indicated in this message.

   If no token-ring network segment problems are indicated, continue with step 3.

If there are token-ring network segment problems, correct them. Then start the bridge computer again (turn the computer power off for at least 15 seconds and back on) and reload the Bridge Program.

If the problem occurs again, continue with step 3.

3. Run the diagnostic tests on the adapter indicated in this message.

   Use the system tests on the bridge computer's Reference Diskette. See the *IBM Token-Ring Network Adapter/A Installation and Testing Instructions* packaged with the adapter and the *Quick Reference* manual for the computer.

   If the diagnostic tests indicate that the adapter is operating correctly, start the bridge computer again (or turn the computer power off for at least 15 seconds and then back on). Reload the Bridge Program, if it is not automatically loaded by an AUTOEXEC.BAT file.

4. If the same error occurs, recopy the Bridge Program files from your Bridge Program Backup Copy or from the original Bridge Program diskette to a new working or fixed disk directory, as described in Chapter 3. (If you copy the files from the original diskette, you must either create the configuration file again or copy the ECCPARMS.BIN file from the Backup Copy.)

   Start the computer again (turn the computer power off for at least 15 seconds and then back on) and reload the Bridge Program using the new working diskette or fixed disk.

5. If the problem still occurs, record the additional data from the message and contact your service supplier.

Actions for the IBM Token-Ring Network are now complete.

For the **IBM PC Network**, some possible "YY ZZ" values are caused by:

Table A-2 (Page 1 of 2). PC Network Adapter Failure Codes and Causes

YY	ZZ	Possible Causes
20	07	The indicated adapter is defective.

Table A-2 (Page 2 of 2). PC Network Adapter Failure Codes and Causes

YY	ZZ	Possible Causes
20	1D	1. The indicated adapter is not installed. 2. The adapter settings are set the same on both bridge adapters (see Table 3-1 on page 3-3). 3. The adapter settings on the indicated adapter are not set correctly (see Table 3-1 on page 3-3). 4. The adapter support code is not installed .
03	07	1. There is a problem on the PC network, such as a duplicate address or there is a continuous-carrier or a no-carrier condition. 2. If the error code is other than zeros, the adapter or the PC network segment has a problem, such as a duplicate address or the PC network segment has a continuous-carrier or a no-carrier condition. The open error code (EEEE) should be reported to the person responsible for ring problem determination or to your network administrator. **Note:** The following error code is the most common code: • EEEE=0022 Error on frame transmission caused by no-carrier condition

Action: Do the following steps:

1. Correct any problem described above.

   Start the computer again (turn the computer power off for at least 15 seconds and then back on). Reload the Bridge Program if it is not automatically loaded by an AUTOEXEC.BAT file. Continue with step 4.

   If the problem is not described above, there may be either a problem with the PC network segment or a problem with the indicated bridge adapter. Continue with step 2.

2. If the error code appears on the panel a few seconds after you turn on the power at the bridge computer, do one of the following steps:
   - Follow the instructions on the panel to have the network or system serviced.
   - Run the Advanced Diagnostics (packaged with the *IBM PC Network Hardware Maintenance and Service* manual).
   - Follow the instructions provided in the *IBM PC Network Hardware Maintenance and Service* to correct any problems with the IBM PC Network.
3. Start the bridge computer again (turn the computer power off for at least 15 seconds and back on) and reload the Bridge Program.
4. If the problem occurs again, record the additional data from the message and contact your service supplier.

Actions for the IBM PC Network are now complete.

ECCBR222I Network adapter X was removed.

Cause: This message is displayed and logged when the indicated bridge adapter has been removed from the LAN segment by the Bridge Program.

X = Adapter number (0=primary or 1=alternate).

The LAN Segment Status is changed to **Adapter Closed**.

Action: Do the following steps:

1. Use the procedure in the *IBM Token-Ring Network Problem Determination Guide* to find and correct an "Auto-Removal" problem.

   Start the bridge computer again (turn the computer power off for at least 15 seconds and then back on). Reload the Bridge Program if it is not automatically loaded by an AUTOEXEC.BAT file.

   If the problem occurs again, continue with step 2.
2. Run the diagnostic tests on the adapter indicated in this message.

   Use the system tests on the bridge computer's Reference Diskette. See the *IBM Token-Ring Network Adapter/A Installation*

and Testing Instructions packaged with the adapter and the *Quick Reference* manual for the computer.

If the diagnostic tests indicate that the adapter is operating correctly, start the bridge computer again (turn the computer power off for at least 15 seconds and then back on). Reload the Bridge Program if it is not automatically loaded by an AUTOEXEC.BAT file.

3. If none of the above steps solves your problem, contact your service supplier.

ECCBR228I Network adapter X was removed by a network manager program.

Cause: This message is displayed and logged when a network manager program (the IBM LAN Manager, for example) has sent a command to force the specified bridge adapter to detach itself from the network.

X = Adapter number (0=primary or 1=alternate).

The LAN segment status display is changed to **Adapter Closed** The Bridge Program then stops running and control is returned to DOS.

Action: Contact your network administrator to find out why the adapter was removed by the network manager program. When any network problems have been resolved, start the computer again (turn the computer power off for at least 15 seconds and back on) and reload the Bridge Program.

ECCBR301E There is not a primary adapter installed.

Cause: This message is displayed when you have chosen the option to have the Bridge Program installed directly on the bridge computer, and the Installation Program is unable to locate an adapter in the bridge computer configured as the primary adapter.

Action: Configure one of the adapters in the bridge computer as the primary adapter.

See Table 3-1 on page 3-3 and the installation instructions packaged with the adapter for information about setting and installing the adapters.

Note: If you are using a token-ring network adapter and a PC network adapter in the bridge computer, configure the PC network adapter as the primary adapter.

ECCBR302E There is not an alternate adapter installed.

Cause: This message is displayed when you have chosen the option to have the Bridge Program installed directly on the bridge computer, and the Installation Program is unable to locate an adapter in the bridge computer configured as the alternate adapter.

Action: Configure one of the adapters in the bridge computer as the alternate adapter.

See Table 3-1 on page 3-3 and the installation instructions packaged with the adapter for information about setting and installing the adapters.

Note: If you are using a token-ring network adapter and a PC network adapter in the bridge computer, configure the PC network adapter as the primary adapter.

ECCBR305E Adapters must be set: PC Network - Primary; Token-Ring Network - Alternate.

Cause: This message is displayed when you have chosen the option to have the Bridge Program installed directly on the bridge computer, and the Installation Program determines that that the PC network adapter has been set as the alternate adapter and the token-ring network adapter has been set as the primary adapter.

Action:

1. Determine that you have installed a PC network adapter and a token-ring network adapter in the bridge computer.
2. Use the reference diskette to determine if the PC network adapter has been set as the primary adapter and the token-ring network adapter has been set as the alternate adapter.

3. If they have been configured incorrectly, change the configuration to set them correctly.
4. If they have been configured correctly, record the message number and contact your service supplier

ECCBR306E	**Both adapters are set as primary; set one as the alternate adapter.**

Cause: This message is displayed when you have chosen the option to have the Bridge Program installed directly on the bridge computer, and the Installation Program ascertains both adapters are configured as the primary adapter. Only one adapter can be configured as primary. The other adapter must be configured as alternate.

Action: Check the adapter that should be configured as the alternate adapter and configure it as the alternate adapter. If it already is configured as the alternate adapter, record the message number and contact your service supplier.

Note: If you are using a token-ring network adapter and a PC network adapter in the bridge computer, configure the PC network adapter as the primary adapter.

ECCBR307E	**Both adapters are set as alternate; set one as the primary adapter.**

Cause: This message is displayed when you have chosen the option to have the Bridge Program installed directly on the bridge computer, and the Installation Program ascertains both adapters are configured as the alternate adapter. Only one adapter can be configured as alternate. The other adapter must be configured as primary.

Action: Check the adapter that should be configured as the primary adapter and configure it as the primary adapter. If it already is configured as the primary adapter, record the message number and contact your service supplier.

Note: If you are using a token-ring network adapter and a PC network adapter in the bridge computer, configure the PC network adapter as the primary adapter.

ECCBR313E RAM size of primary adapter must be set to 16 KB.

Cause: The RAM size of the IBM Token-Ring Network Adapter/A that is the primary adapter is configured to a setting other than 16 KB, such as 8, 32, or 64 KB.

Action: Reconfigure the primary adapter's RAM size to 16 KB.

ECCBR314E RAM size of alternate adapter must be set to 16 KB.

Cause: The RAM size of the IBM Token-Ring Network 16/4 Adapter/A that is the alternate adapter is configured to a setting other than 16 KB, such as 8, 32, or 64 KB.

Action: Reconfigure the adapter's RAM size to 16 KB.

ECCBR315I Installation in progress, please wait.

Cause: This message is displayed while the Installation Program (packaged with the Bridge Program) is copying its files onto the working diskette or working disk and creating the CONFIG.SYS and AUTOEXEC.BAT files.

Action: None. Wait for subsequent messages. The installation process can take up to 3 minutes.

ECCBR316I Installation complete; exit and run Config. Pgm. to change defaults.

Cause: This message is displayed when the Installation Program has successfully copied its files onto the working diskette or working disk and created the CONFIG.SYS and AUTOEXEC.BAT files.

Action:

1. Exit the Installation Program by pressing the **F3 (Exit)** key.

2. Answer the question on the Installation Program panel asking if you want to use the Bridge Program's configuration parameter defaults or alter them.

   The Installation Program will prompt you to use the Configuration Program to specify the configuration parameter values you want to change.

ECCA0501E Interrupt vector X'5C' is in use.

Cause: This message is displayed when the ECCA0MOD device driver was not the first device driver loaded by the CONFIG.SYS file.

Action: Edit the CONFIG.SYS file and make sure that the ECCA0MOD device driver is loaded before any other bridge device driver.

Make sure the CONFIG.SYS file has been created correctly by the Installation Program (see Chapter 3) or modified according to the manual instructions in Appendix B.

ECCA0502E DOS Version 3.3 or later is required.

Cause: This message is displayed when the device driver determines that the installed DOS version is earlier than 3.3.

Action: Install the correct DOS version and then reload the device drivers and the Bridge Program.

ECCXX503E Interrupt Arbitrator (ECCA0MOD.SYS) device driver is required.

Cause: This message is displayed when one of the device drivers, other than ECCA0MOD, determines that ECCA0MOD is not loaded.

In the message identifier ECCXX503E,

- XX = G0 or
- XX = C0.

Action: Edit the CONFIG.SYS file to make sure that the ECCA0MOD device driver is loaded before the other device drivers.

Make sure the CONFIG.SYS file has been created correctly by the Installation Program (see Chapter 3) or modified according to the manual instructions in Appendix B.

ECCXX504E Program is already loaded.

Cause: This message is displayed when DOS tries to load the same device driver twice.

In the message identifier ECCXX504E,

- XX = G0 or
- XX = C0.

Action: Correct the CONFIG.SYS file so that the name of the device driver does not appear twice.

Make sure the CONFIG.SYS file has been created correctly by the Installation Program (see Chapter 3) or modified according to the manual instructions in Appendix B.

ECCC0512E Token-Ring Network adapter is not installed.

Cause: This message is displayed when ECCC0MOD device driver is loaded and there is no Token-Ring adapter installed.

Action: If you are not using a token-ring network adapter in the bridge computer, correct the CONFIG.SYS file so that the name of the ECCC0MOD device driver is not listed.

Make sure the CONFIG.SYS file has been created correctly by the Installation Program (see Chapter 3) or modified according to the manual instructions in Appendix B.

If you should be using a token-ring network adapter in the bridge computer, verify that the token-ring network adapter has been installed correctly.

ECCG0521E Network error.

Cause: This message is displayed when the ECCG0MOD device driver is loaded and it detects an error on the IBM PC Network. It will be followed by one of the following:

Please record this number YYYY-YY.
Have system serviced.

Please record this number YYYY-YY.
Have network serviced.

Please record this number YYYY-YY.
Adapter not found, have system serviced.

Action:

1. If you receive the "Adapter not found" message,
   a. Ensure that the configuration matches the adapters installed in your computer.
   b. If they do not match, either install an adapter or remove the device driver from the CONFIG.SYS file.
   c. If the configuration in the CONFIG.SYS file matches the adapters installed, record the error number and have the computer serviced.
2. If you receive one of the other messages, record the error number and have either the computer or the network adapter serviced.

ECCBR990E Abnormal system termination (EEEE).

Cause: This message is displayed and logged when the Bridge Program detects an internal failure that prevents further processing. It contains the following additional information:

EEEE = Error code indicating the type of failure (2 bytes, 4 hex characters).

Action: Record the error code, protect the dump file (ECCDUMP.DAT) by copying it to another diskette, and reload the Bridge Program. If this message occurs again, copy the files from your Bridge Program backup copy or the original Bridge Program diskette onto a new working diskette or fixed disk directory. (If you copy the files from the original diskette, you must either create the configuration file again or copy the ECCPARMS.BIN file from the backup copy.) Then start the Bridge Program again using the new working copy.

If the problem still occurs:

1. Write-protect the diskette containing the copy of the ECCDUMP.DAT file.
2. Record the error code.
3. Refer to the "Statement of Service" on page E-10.

ECCBR992I Memory dump was taken.

Cause: This message is displayed and logged when the Bridge Program has successfully written an image of the bridge code and buffers to the ECCDUMP.DAT file on the diskette or fixed disk in the default drive after a system failure.

If the diskette containing the dump file is in the drive when another dump occurs, the ECCDUMP.DAT file will be overwritten.

Action:

1. If the ECCDUMP.DAT file was written on the working disk or diskette, copy the file to another diskette.
2. Write-protect the diskette containing the copy of the ECCDUMP.DAT file.
3. Record the error code.
4. Refer to the "Statement of Service" on page E-10.

ECCBR994W Memory dump was attempted but failed to complete.

Cause: This message is displayed and logged when the Bridge Program was not successful in writing an image of the bridge code and buffers to the ECCDUMP.DAT file on the diskette or fixed disk in the default drive after a system failure.

Action: The dump information has not been saved.

The failure may have been because:

- There was no diskette in the drive specified for the dump
- There was insufficient space on the diskette or fixed disk in the drive specified for the dump.

You must correct that condition in order to obtain any further dump files.

The Bridge Program must be reloaded to continue operation.

Appendix B. Using DOS Commands to Create the CONFIG.SYS File

CONFIG.SYS File for Fixed Disk

If you are using DOS commands to create or modify the CONFIG.SYS file so that the Bridge Program can be installed on the fixed disk, the contents of the file depend upon the combination of IBM PC Network or IBM Token-Ring Network segments you are connecting with the Bridge Program. Depending upon this combination of networks, the CONFIG.SYS file must contain the following statements in the order provided:

1. If the bridge connects two IBM Token-Ring Network segments:

   device=c:*dirname*\ecca0mod.sys
   device=c:*dirname*\eccc0mod.sys *addr0, sram0, tok0, addr, sram1, tok1*

2. If the bridge connects one IBM Token-Ring Network segment and one IBM PC Network segment:

   device=c:*dirname*\ecca0mod.sys
   device=c:*dirname*\eccc0mod.sys *addr0, sram0, tok0*
   device=c:*dirname*\eccg0mod.sys *addr0*

3. If the bridge connects:

   - Two broadband IBM PC Network segments using the same or different frequency pairs
   - Two broadband IBM PC Network segments using different frequency pairs on the same broadband IBM PC Network segment
   - Two baseband IBM PC Network segments
   - One IBM Token-Ring Network segment and one baseband IBM PC Network segment
   - One broadband IBM PC Network segment and one baseband IBM PC Network segment:

   device=c:*dirname*\ecca0mod.sys
   device=c:*dirname*\eccg0mod.sys *addr0,,addr1*

where:

dirname	=	the name of the directory containing the ECCx0MOD.SYS modules
addr0	=	the locally administered adapter address for bridge adapter 0
sram0	=	the first 4 digits of a 5-digit hexadecimal shared RAM address for adapter 0
tok0	=	the ETR parameter setting for bridge adapter 0 (0 = use ETR or 1 = do not use ETR)
addr1	=	the locally administered adapter address for bridge adapter 1
sram1	=	the first 4 digits of a 5-digit hexadecimal shared RAM address for adapter 1
tok1	=	the ETR parameter setting for bridge adapter 1 (0 = use ETR or 1 = do not use ETR)

You can specify only those parameters for which you are not using the default values. If you want to specify a parameter value following an unspecified parameter, insert only a comma (no blank) for the unspecified value. Commas are not required for unspecified parameters following the last specified value.

The following example illustrates the statements in a CONFIG.SYS file for a bridge connecting an IBM PC Network segment and an IBM Token-Ring Network segment, with the following specifications:

- A locally administered address for the IBM Token-Ring Network and IBM PC Network adapters in the bridge computer
- A shared RAM address for the IBM Token-Ring Network adapter
- ETR for the IBM Token-Ring Network adapter.

device=c:*dirname*\ecca0mod.sys
device=c:*dirname*\eccc0mod.sys *400000000000,D800,0*
device=c:*dirname*\eccg0mod.sys *400000000001*

CONFIG.SYS File for Working Diskette

If you will be using DOS commands to create or modify the CONFIG.SYS file so that the Bridge Program can be installed on working diskette, the contents of the file depend upon the combination of IBM PC Network or IBM Token-Ring Network segments you are connecting with the Bridge Program. Depending upon this combination of networks, the CONFIG.SYS file must contain the following statements in the order provided:

1. If the bridge connects two IBM Token-Ring Network segments:

   device = ecca0mod.sys
   device = eccc0mod.sys *addr0, sram0, tok0, addr1, sram1, tok1*

2. If the bridge connects one IBM Token-Ring Network segment and one IBM PC Network segment:

   device = ecca0mod.sys
   device = eccc0mod.sys *addr0, sram0, tok0*
   device = eccg0mod.sys *addr0*

3. If the bridge connects:

   - Two broadband IBM PC Network segments using the same or different frequency pairs
   - Two broadband IBM PC Network segments using different frequency pairs on the same broadband IBM PC Network segment
   - Two baseband IBM PC Network segments
   - One IBM Token-Ring Network segment and one baseband IBM PC Network segment
   - One broadband IBM PC Network segment and one baseband IBM PC Network segment:

   device = ecca0mod.sys
   device = eccg0mod.sys *addr0,,addr1*

where:

addr0	=	the locally administered adapter address for bridge adapter 0
sram0	=	the first 4 digits of a 5-digit hexadecimal shared RAM address for adapter 0
tok0	=	the ETR parameter setting for bridge adapter 0 (0 = use ETR or 1 = do not use ETR)
addr1	=	the locally administered adapter address for bridge adapter 1
sram1	=	the first 4 digits of a 5-digit hexadecimal shared RAM address for adapter 1
tok1	=	the ETR parameter setting for bridge adapter 1 (0 = use ETR or 1 = do not use ETR)

You can specify only those parameters for which you are not using the default values. If you want to specify a parameter value following an unspecified parameter, insert only a comma (no blank) for the unspecified value. Commas are not required for unspecified parameters following the last specified value.

The following example illustrates the statements in a CONFIG.SYS file for a bridge connecting an IBM PC Network segment and an IBM Token-Ring Network segment, with the following specifications:

- A locally administered address for the IBM Token-Ring Network and IBM PC Network adapters in the bridge computer
- A shared RAM address for the IBM Token-Ring Network adapter
- ETR for the IBM Token-Ring Network adapter.

device=ecca0mod.sys
device=eccc0mod.sys *400000000000,D800,0*
device=eccg0mod.sys *400000000001*

Appendix C. Bridge Planning and Administration Information

The network planner or administrator should use this appendix to perform the following tasks:

- Assess the need for using the Bridge Program in your network
- Assign values to some of the Bridge Program installation and configuration parameters
- Evaluate bridge performance.

For more detailed information on planning and administering local area networks, see the following manuals:

- The *IBM PC Network Broadband Planning Guide*
- The *IBM PC Network Baseband Planning Guide*
- The *Introduction to Local Area Networks*
- The *IBM Local Area Network Administrator's Guide*
- The *IBM Token-Ring Network Introduction and Planning Guide*
- The *IBM Token-Ring Network Installation Guide.*

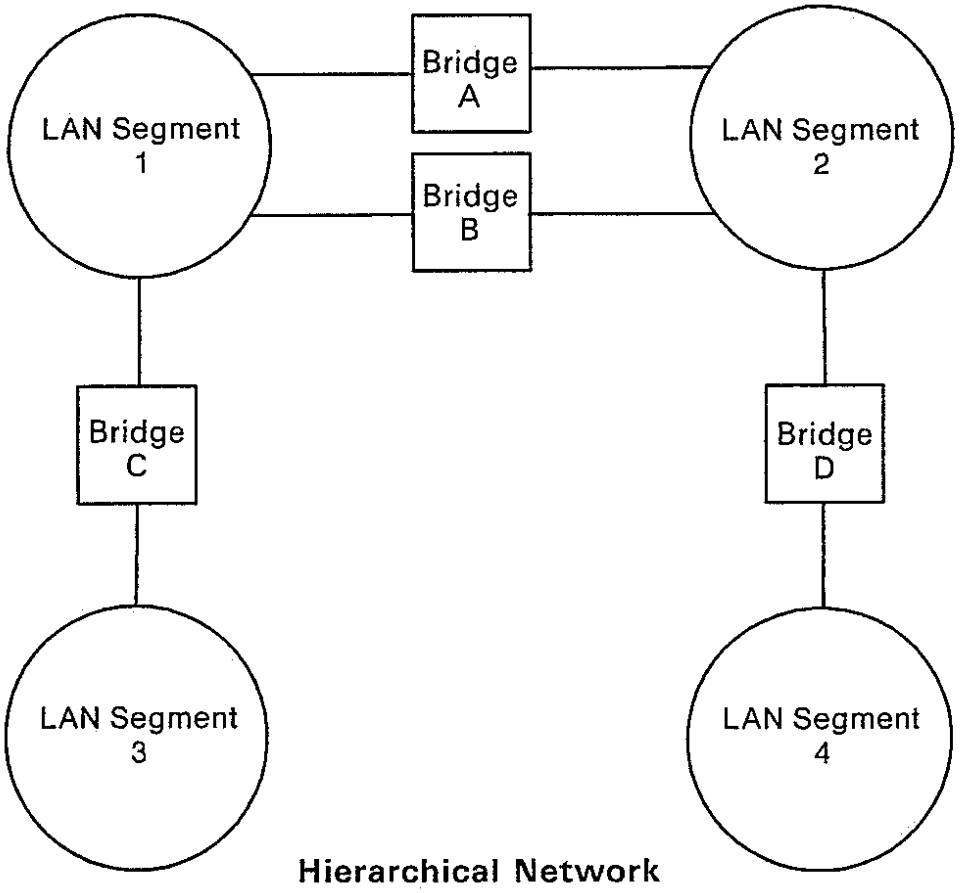
Planning for a Multi-Segment Network

When planning a multi-segment network, you must consider the overall performance of the network and the configuration demands placed upon it by the application programs that you will be using.

You should plan all individual LAN segments so that they provide adequate performance for their users. This may involve organizing the topology (configuration) of the network by location (geographically), or by the function or relationship shared by the users (affinity groups).

Multi-segment networks whose LAN segments are connected by bridges are either hierarchical or mesh configurations. A hierarchical network provides only one path through intermediate LAN segments between a source LAN segment and a destination LAN segment. For example, in Figure C-1 on page C-3 illustrating a hierarchical network, a frame whose source is on LAN segment 3 *must* pass through bridge C, LAN segment 1, and either bridge A or B to reach its destination on LAN segment 2. No other path is possible. For this routing, LAN segment 1 will always be the only possible intermediate LAN segment.

Mesh networks, on the other hand, provide multiple paths through intermediate LAN segments between source LAN segments and destination LAN segments. For example, in Figure C-1 on page C-3 illustrating a mesh network, a frame whose source is on LAN segment 3 and whose destination is on LAN segment 2 has two possible paths. The frame can pass from LAN segment 3, through bridge C, LAN segment 1, and either bridge A or B to LAN segment 2. Unlike the hierarchical example, however, the frame can also pass from LAN segment 3 through bridge E, LAN segment 4, and bridge D to its destination on LAN segment 2. In this case, either LAN segment 1 or LAN segment 4 are both possible intermediate LAN segments.



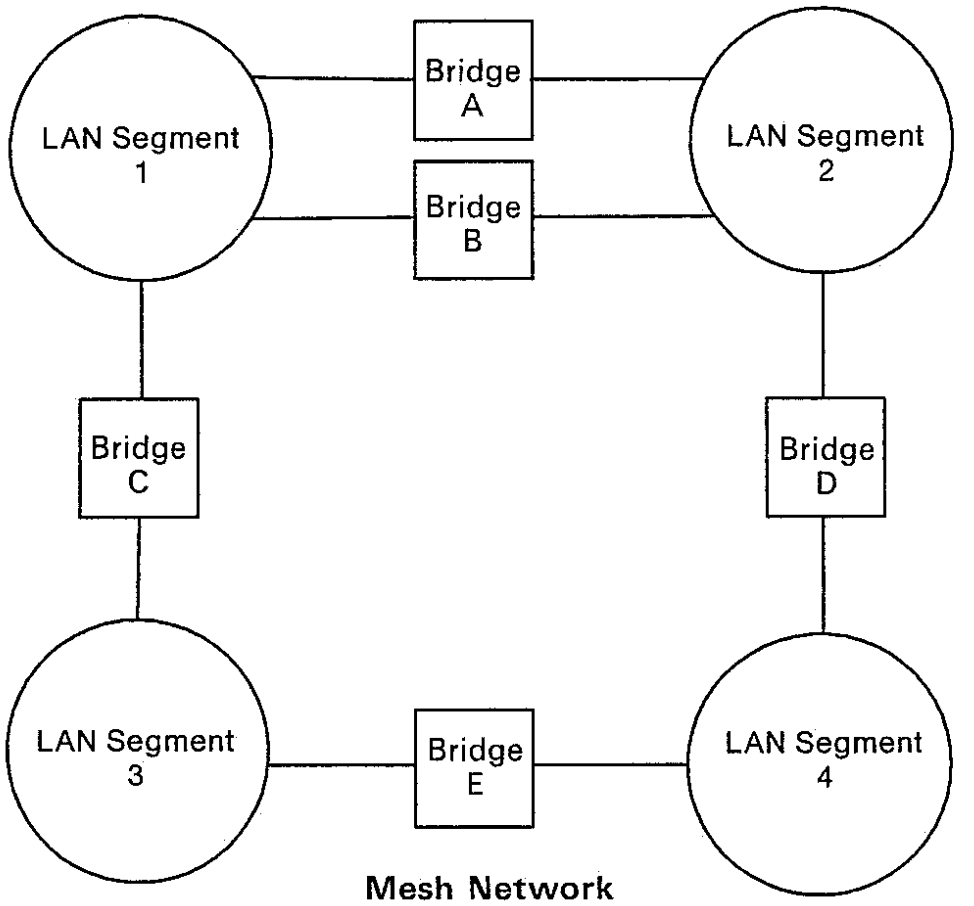


Figure C-1. Hierarchical and Mesh Network Configurations

When used in a multi-segment network, backbone LAN segments improve performance and provide flexibility.

The backbone LAN segment can:

- Provide the shortest average path between any two attaching devices on the network
- Provide the most direct access to shared devices (such as print and file servers or host computers) that are placed on the backbone LAN segment
- Allow placement of host systems on the backbone LAN segment, giving the system administrator the freedom to place new applications on whichever host is most suitable, unless otherwise constrained.

In the following figure, LAN Segment A represents a backbone LAN segment.

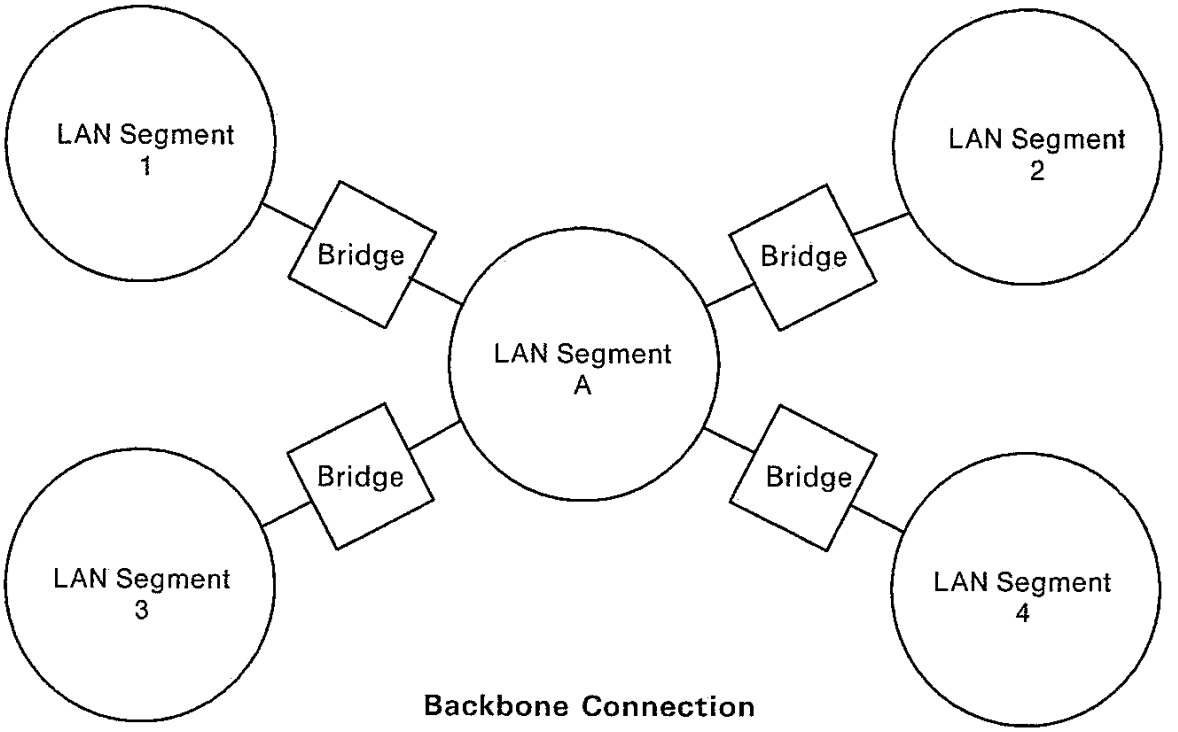


Figure C-2. A Backbone Connection

Bridge Program Configuration Considerations

The following sections deal with understanding the following three parameters, so that you can set them correctly for your network:

1. Locally administered addresses for the primary and alternate adapters in the bridge computer
2. Single-route broadcast
3. Early Token Release.

You must set the ETR and single-route broadcast parameters correctly to maintain the correct performance level of the network.

Locally Administered Addresses

Each adapter installed in a device on the network is recognized by one or more addresses in communications on the network.

Network adapters used in the bridge computer have a 12-digit hexadecimal universally administered address that is permanently encoded in the adapter's microcode as it is manufactured. You may choose to override the universally administered address on the adapter by assigning a locally administered address to that adapter.

You can choose to use locally administered addresses to do the following actions:

- More easily identify the bridge adapters by assigning values that have significance in your establishment (such as location)
- Replace adapters without having to modify the bridge configuration.
- Satisfy some product requirements for addresses with decimal digits only.

The adapter's locally administered address must consist of 12 hexadecimal digits that range from 4000 0000 0000 through 4000 7FFF FFFF.

For typical network installations, it is recommended that the address be restricted to decimal values. The locally administered address would then range from 4000 0000 0000 to 4000 7999 9999.

The use of a locally administered address to override the universally administered adapter address is indicated to an adapter by specifying the locally administered address as a parameter in the Configuration File before loading the Bridge Program. (See Chapter 2 for more information about the Configuration Program.)

Be sure to record the adapter's locally administered addresses on the "IBM Token-Ring Network Bridge Program Planning Chart" on page 2-31 and any other documentation associated with your network.

Warning: Each adapter address must be unique on the network. An error will result when two or more adapters with the same address try to use the network.

Single-Route Broadcast Information

Some programs and interfaces send a special type of broadcast message called single-route broadcast. The message is transmitted once and received by some or all users on the network. The programs that use single-route broadcast messages generally require that only one copy of a message arrive on each LAN segment of the network. On a multi-segment network connected by bridges, the configuration could allow several paths to the same LAN segment, thus allowing receipt of duplicate messages.

Note: The NETBIOS interface uses single-route broadcast messages to set up sessions. Any programs in your network that use the NETBIOS interface require a single path between any two LAN segments to prevent duplicate messages.

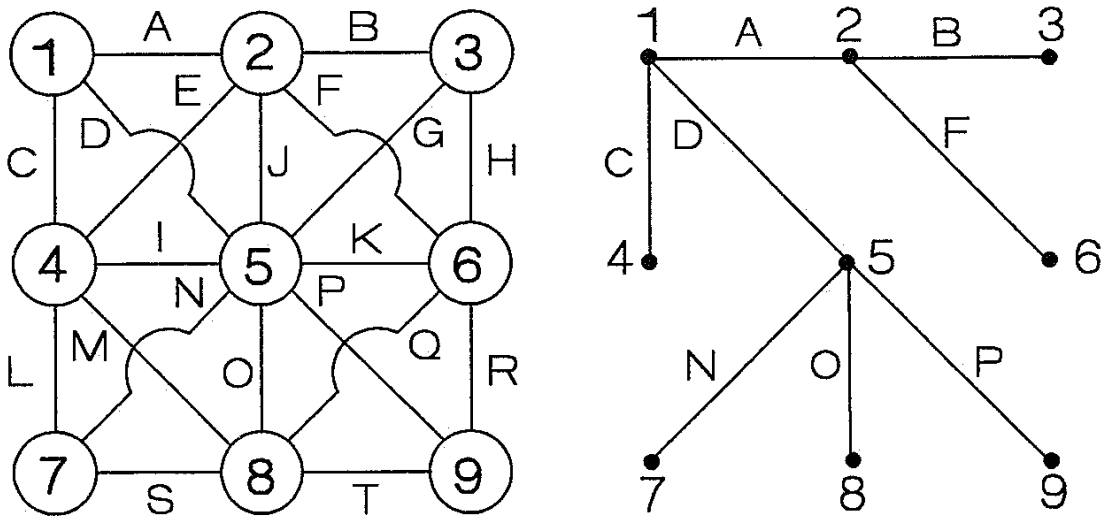
If you elect to use a network with certain configurations, such as parallel bridges, you will need a method of designating a single path between any two LAN segments. The Bridge Program provides the single-route broadcast function, which allows a single-route broadcast message to cross a bridge only if single-route broadcast is active on that bridge. The Bridge Program provides the function to do the following actions:

- Let you manually enable or disable single-route broadcast in each direction for a bridge in your network
- Let the Bridge Program automatically set single-route broadcast for a bridge in your network.

Single Route Broadcast — Manual Mode

You must determine which bridges in the network should have the single-route broadcast function active, and in which direction. Single-route broadcast is set active or inactive for each bridge adapter. "Active" for an adapter means that the Bridge Program will forward single-route broadcast messages through the bridge from that adapter to the other adapter. Although only one direction through the bridge could have single-route broadcast active, both directions are usually named the same (both single-route broadcast or neither single-route broadcast).

To determine manually which bridges need single-route broadcast active, you can draw a diagram like the one in Figure C-3. The illustration on the left side of the figure shows a nine-segment, mesh network. The diagram on the right is the planner's determination of which bridges should have single-route broadcast active.



Letters = Bridges
Numbers = LAN Segments

Figure C-3. Single-Route Broadcast Bridges

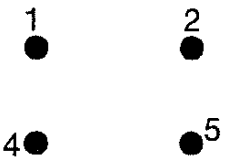
To prepare a similar diagram, follow the steps below:

1. Starting with any LAN segment, make a dot that represents that LAN segment and label it with the LAN segment number.

   The diagram in Figure C-3 on page C-7 began with LAN segment 1.

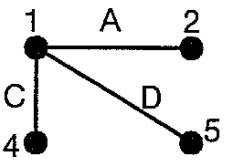
2. Make a dot for each LAN segment to which the first LAN segment is connected by a bridge. Label each new dot with its LAN segment number.

   In Figure C-3 on page C-7, LAN segment 1 connects to LAN segments 2, 4, and 5.



3. Draw a line from the dot for LAN segment 1 to each new dot; each line indicates a bridge. Label each line with the bridge identifier.

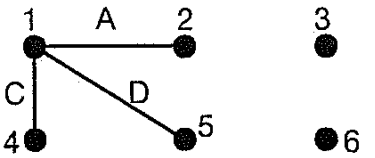
   In Figure C-3 on page C-7, bridges A, C, and D connect LAN segment 1 to LAN segments 2, 4, and 5 respectively.



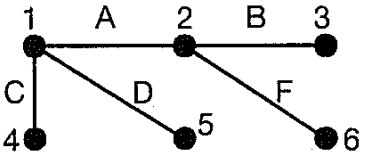
4. Taking each new dot in turn, make a dot for each LAN segment connected to it in the network that is not already shown in the diagram. Label each dot with the LAN segment number. Connect the dots with lines representing bridges; label the lines with bridge identifiers.

   In the example:

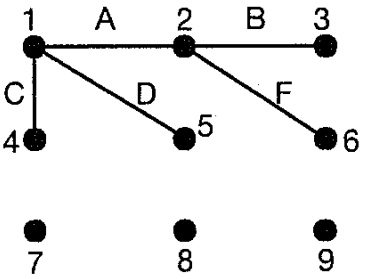
a. In Figure C-3 on page C-7, LAN segment 2 connects to LAN segments 3, 4, 5, and 6. Add dots for LAN segments 3 and 6; LAN segments 4 and 5 already appear on the diagram.



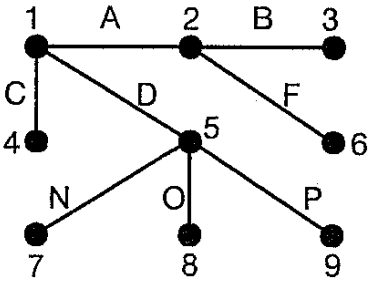
b. In Figure C-3 on page C-7, bridges B and F connect LAN segment 2 to LAN segments 3 and 6 respectively. Draw and label the lines for bridges B and F.



c. In Figure C-3 on page C-7, LAN segment 5 connects to LAN segment 1, 2, 3, 4, 6, 7, 8, and 9. Add and label dots for LAN segments 7, 8 and 9; the other LAN segments already appear in the diagram.



d. In Figure C-3 on page C-7, bridges N, O, and P connect LAN segment 5 to LAN segments 7, 8, and 9 respectively. Draw and label the lines for bridges N, O, and P.



e. In Figure C-3 on page C-7, LAN segment 4 connects to LAN segments 2, 5, 7, and 8. No new dots or lines are needed; all of these LAN segments already appear in the diagram.

   This completes the example; all of the LAN segments now appear on the diagram.

Each of the bridges shown in the completed example should have the single-route broadcast function active. The number of bridges with the single-route broadcast function active will always be equal to one less than the total number of LAN segments in the network.

While this procedure automatically takes care of parallel bridges, you should make sure that in all cases of parallel bridges, only one of the parallel bridges between two LAN segments has single-route broadcast active.

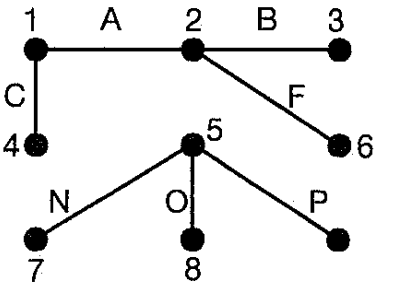
This procedure must be repeated each time:

- A bridge is added to or removed from the network for any reason, including bridge failures
- The single-route broadcast parameter setting is changed for any bridge in the network.

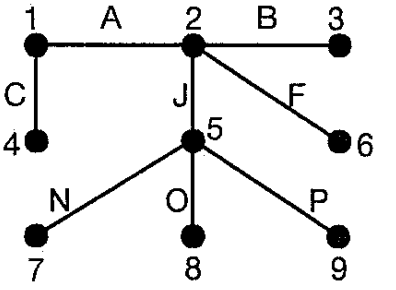
If one bridge's single-route broadcast parameter is changed, the procedure should be repeated to redraw the diagram for the entire network and determine which other bridges also need the single-route broadcast parameter changed. Otherwise, single-route broadcast communication between portions of the network will be either disconnected where it is needed or connected where it should not be.

In the completed example shown on page D-9:

If the single-route broadcast parameter is changed to inactive for bridge D or bridge D is not operating in the network, the diagram changes to the one shown at the right. Bridge D is not shown.



Bridge J must have its single-route broadcast parameter changed to active to maintain single-route broadcast communication over all nine LAN segments. Bridge J is added to the diagram.



You must be sure to keep a single path between any two LAN segments in the network when adding bridges, removing bridges, or changing bridge single-route broadcast parameter settings.

Single-Route Broadcast — Automatic Mode

You can configure the Bridge Program to perform the following actions automatically and dynamically:

- Communicate with the other bridges in a network to determine which bridges should have single-route broadcast active and which should not.
- Set the single-route broadcast configuration parameters for each bridge so that there is always a single path between any two LAN segments in the network.

Each bridge has a **bridge ID** that is recognized by the Bridge Program's automatic single-route broadcast function. The bridge ID consists of:

- A 2-byte bridge label, for which you can assign a value or use the default value during the Bridge Program configuration

  See page 2-25 in the "Automatic Mode" section of the single-route broadcast parameter description for more information about bridge IDs and bridge labels.

- The adapter address of the bridge adapter connected to the LAN segment with the lowest LAN segment number.

  The adapter addresses can be universally or locally administered addresses.

Path Cost

Each bridge also maintains a value called **path cost**, which indicates the relative length of the path between a bridge and a centrally located bridge (the *root bridge*). The path cost for the root bridge is zero. During Bridge Program configuration, you can assign a value or use the default value for a bridge's path cost increment. Each bridge's path cost is equal to the sum of the path cost increments of the bridges between it and the root bridge, plus its own path cost increment. See page 2-26 for additional information about path cost, including a table with path cost increment default values used by the Bridge Program.

Bridge Roles

In a network using automatic single-route broadcast, each bridge assumes one of three roles:

- The root bridge
  - There is at any one time only one root bridge in the network.
  - The root bridge is the active bridge with the lowest bridge ID in the network.
  - The responsibility of the root bridge is to send a "hello" message (containing its bridge ID, a path cost of zero, and timing information) every 2 seconds on both LAN segments to which it is connected.
  - The root bridge has single-route broadcast set to active in both directions.
- A designated bridge
  - A designated bridge has single-route broadcast active in both directions.
  - A designated bridge is either not parallel to any other bridge, or is the only bridge of two or more parallel bridges that has single-route broadcast active.

- The responsibility of a designated bridge is to recognize and receive "hello" messages from the root bridge, update the path cost and timing information in each message, and forward the "hello" messages to its other LAN segment.

- A standby bridge
  - A standby bridge has single-route broadcast set to inactive in both directions; it cannot forward single-route broadcast frames.
  - The responsibility of a stand-by bridge is to monitor, but not update and forward, the "hello" messages. As bridges enter and leave the network, a standby bridge may need to assume the role of designated or root bridge and begin forwarding single-route broadcast frames. The "hello" message will indicate when this is necessary.
  - A standby bridge is directly parallel to a designated or root bridge, or is at the end of a path that is parallel to a designated bridge.

In each bridge in the network, the Bridge Program uses path cost, bridge ID, and timing information to:

- Determine which role a newly active bridge should assume
- Determine whether a bridge is a parallel bridge or in a parallel path
- Determine which one of two or more parallel bridges should have single-route broadcast active
- Detect when the root bridge or a designated bridge has left the network
- Reassign the bridge roles as necessary when bridges enter and leave the network.

To use automatic single-route broadcast in your network, you will need to consider the following:

- Automatic mode, manual mode and non-automatic bridges

  If you use Bridge Programs in your network that do not provide the automatic single-route broadcast function, it is recommended that all bridges in the network be set to manual single-route broadcast.

The non-automatic bridges will not be able to send or receive "hello" messages. The automatic bridges will not recognize the non-automatic bridges in the network. There is the probability of creating multiple paths between LAN segments if an automatic bridge changes its single-route broadcast parameter settings.

A similar result can occur if some bridges are set to automatic and some are set to manual in the same network. If all of the Bridge Programs in your network provide automatic single-route broadcast, then all bridges should be set the same way — either all automatic or all manual.

- The IBM LAN Manager

  The IBM LAN Manager Version 2.0 can change the bridge parameter settings for automatic or manual single-route broadcast and for single-route broadcast on or off.

  The IBM LAN Manager Version 1.0 can change only the manual single-route broadcast parameter values to on or off. The single-route broadcast selection mode must be set to manual before the IBM LAN Manager Version 1.0 can change the on/off setting.

  If you are using automatic single-route broadcast in your network, using the IBM LAN Manager to change single-route broadcast settings may disrupt the automatic single-route broadcast process. You may need to reevaluate and change single-route broadcast parameter settings manually throughout the network.

- Path cost and bridge ID

  The Bridge Program tries to assign as designated bridges those on the shortest path between LAN segments (lowest path cost), and those with the lowest bridge ID (for parallel bridges). The root bridge will always be the active bridge with the lowest bridge ID.

  By assigning bridge labels and path cost increments with the selection rules in mind, you, as network administrator, can determine which bridges will be selected as root and designated bridges.

  - The root bridge should be in a central location in your network in order to provide the shortest paths to all connecting LAN segments.

- Automatic single-route broadcast uses the bridge ID to decide which parallel bridge should be the root bridge or a designated bridge (should have single-route broadcast active).

  To make sure that one particular parallel bridge is always selected as the root bridge or a designated bridge, assign a lower 2-byte bridge label to that bridge than you assign to the other bridges parallel to it.

  To make sure that a certain parallel bridge is selected as the root bridge or a designated bridge ONLY if all of the other parallel bridges are not active, assign the highest bridge label to that bridge.

  If you use the default value (X'8000') for the bridge label on more than one bridge (the bridge IDs are the same), automatic single-route broadcast uses the adapter address in the bridge ID to select the designated bridge from two or more parallel bridges.

- Automatic single-route broadcast uses the path cost to choose the shortest parallel path between two LAN segments. You can influence the choice by the values you assign to the path cost increment for each bridge in the path.

  For example, you may have two parallel paths to a LAN segment in your network and want single-route broadcast frames to travel the longer path instead of the shorter one. Assigning a very large path cost increment to one or more bridges in the shorter path will cause its last bridge to become a stand-by bridge. The last bridge in the longer path will become a designated bridge. The stand-by bridge in the shorter path would become a designated bridge only if one or more bridges in the longer path leave the network.

- The time required for a single-route broadcast frame to travel from one end of a path to the other is affected by Bridge Program processing time, adapter type, LAN segment data rate, and type (processing power) of bridge computer. You need to consider all of these factors in assigning bridge labels and path cost increments.

  For example, a reason for choosing a longer path over a shorter one for the single-route broadcast path may be that the longer path uses more powerful (faster) bridge computers

or contains LAN segments with faster data rates than the shorter path.

See "Bridge Performance Analysis" on page C-18 for bridge performance considerations.

Early Token Release

ETR is an adapter configuration option used only in 16 Mbps token-ring network segments. It provides more efficient LAN segment utilization by allowing network adapters more frequent access to a free token.

On a 4 Mbps LAN segment, token access operates as follows:

- An adapter with data to send on the network (the sender)
  - Receives the first available token
  - Adds the data and routing information to make a frame
  - Sends the frame out on the network
- The frame travels to its destination. The receiving adapter
  - Copies the frame from the network
  - Updates the frame to acknowledge receipt
  - Sends the frame back out on the network
- The sender
  - Receives the acknowledged frame
  - Removes the frame from the network
  - Releases a new free token on the network.

On a 4 Mbps LAN segment, there can be only one token or one frame on the network at a time. The sender cannot release the new token until the acknowledged frame is received.

On a 16 Mbps LAN segment, there can be one or more frames and a free token on the network at a time. The use of ETR allows the sender to release a new token without waiting for the acknowledged frame to return.

In deciding whether to set ETR on or off for the bridge adapters, consider the following:

- Each token contains a priority indicator. If a program requires more frequent access to tokens than other programs on the network, the program can indicate the required priority to its network adapter. The adapter then uses tokens that have a priority indicator equal to or lower than the program's required priority. The adapter follows a procedure for setting the priority indicator in the new tokens it releases, so that adapters with lower priorities are not prevented from getting tokens.
- If ETR is used on all of the adapters on a LAN segment, the priority process no longer functions as it does normally (it is essentially disabled).
- If ETR is used on some but not all of the adapters on a LAN segment, priority functioning is unpredictable.
- On a LAN segment connected to a bridge, if there are programs that MUST use a higher priority to acquire tokens more frequently than other programs, then ETR must be set OFF for all adapters on the LAN segment (including the bridge adapters).
- If priority token access is not required by the programs on the LAN segment, then ETR can be set ON for any adapters on the LAN segment.
- Though some programs written to run on the IBM Token-Ring Network do set a higher than normal priority (the Bridge Program does), most of these programs should function normally with ETR active.
- You will need to determine whether there are any programs that require priority token access on the LAN segments connected to the bridge adapters, and set ETR accordingly.

Bridge Performance Analysis

The Bridge Program contains functions to help you evaluate and manage traffic through the bridge. The functions are:

- **Performance Counters**
  - The Bridge Program performance counters
    - Accumulate numbers of frames and bytes forwarded and frames not forwarded from each LAN segment to the other through the bridge
    - Can be displayed at the bridge station
  - All of the counters except the "Frames not routed across this bridge" counter
    - Can be displayed at an IBM LAN Manager station
    - Can be recorded by the IBM LAN Manager, Version 2.0 in a counter file on disk.
- **Performance Statistics**
  - The Bridge Program
    - Allows the user to specify the **Bridge performance threshold** configuration parameter value, that is, the maximum number of frames per 10 000 arriving at the bridge that are not forwarded, before a "threshold exceeded" statistic is generated.
    - Displays the number of times that the threshold is exceeded within each 5 minutes of a 24-hour period
    - Sends a performance notification to network manager programs each time the **Bridge performance threshold** is exceeded.

The following sections describe the Bridge Program performance functions, and explain how to use the performance information to evaluate and manage the traffic through a bridge.

Bridge Program Performance Counters

The Bridge Program maintains several counters for each LAN segment connected to a bridge. In this manual, each counter is identified by a letter for purposes of reference in the performance evaluation process.

The counters record the following information:

- **(A)** Broadcast frames forwarded

  Counter A contains the number of broadcast and single-route broadcast frames successfully forwarded from one LAN segment to the other by the bridge.

- **(B)** Broadcast bytes forwarded

  Counter B contains the number of broadcast and single-route broadcast bytes successfully forwarded from one LAN segment to the other by the bridge.

  Not all of the bytes in each frame are counted. The bytes counted for each frame are those between and included in the Access Control Field and the Information Field (see the frame format in Figure C-4 on page C-21).

- **(C)** Non-broadcast frames forwarded

  Counter C contains the number of non-broadcast frames successfully forwarded from one LAN segment to the other by the bridge.

- **(D)** Non-broadcast bytes forwarded

  Counter D contains the number of non-broadcast bytes successfully forwarded from one LAN segment to the other by the bridge.

  Not all of the bytes in each frame are counted.

  - For bridges connecting two rings, the bytes counted for each frame are those between and included in the Access Control Field and the Frame Check Sequence (see the frame format in Figure C-4 on page C-21).
  - For bridges connecting two buses or one bus and one ring, the bytes counted for each frame are those between and included in the Access Control Field and Information Field (see the frame format in Figure C-4 on page C-21).

- **(E)** Frames not forwarded; target LAN segment inoperative

  - For a target ring

    Counter E contains the number of frames discarded by the bridge because the frames arrived during a period when the target ring was beaconing. The count also includes frames waiting at the bridge to be forwarded when the ring began beaconing; these frames are also discarded.

- For a target bus

  Counter E contains the number of frames discarded by the bridge because the frames arrived during a period when the target bus was in a continuous-carrier condition or a no-carrier condition. The count also includes frames that the bridge discarded after experiencing 16 consecutive collisions in trying to forward the frames to the target bus.

- **(F)** Frames not forwarded; adapter congestion

  Counter F contains the number of frames lost because

  - Frames are coming to the bridge from the source LAN segment faster than the Bridge Program can process them.
  - The destination LAN segment is too busy to accept frames as fast as the Bridge Program is processing and trying to forward them.

  For the IBM Token-Ring Network, counter F contains the number of frames intended to cross this bridge but not forwarded due to adapter congestion.

  For the IBM PC Network, counter F contains the total number of frames arriving at a bridge adapter that is experiencing adapter congestion. (Frames received by but not routed across this bridge are counted in counter H when there is no bridge adapter congestion.)

- **(G)** Frames not forwarded for other reasons

  Counter G contains the number of frames not forwarded due to an IBM adapter failure or to the presence of a non-IBM adapter on the network causing invalid frame lengths or invalid Routing Information (RI) fields. The specific occurrences counted are:

  - Frame length is less than the minimum allowed
    - Minimum broadcast frame = 20 bytes
    - Minimum non-broadcast frame = 22 bytes
  - Frame length exceeds the maximum allowed.
    - IBM Token-Ring Network maximum lengths of the frame information field (some adapter types allow lower maximum lengths than these absolute values)
      - 16 Mbps Token-Ring Network segment = 8144 bytes
      - 4 Mbps Token-Ring Network segment = 4472 bytes.
    - IBM PC Network maximum length of the frame information field

- 2 Mbps PC Network segment = 2052 bytes.

See Table C-1 on page C-22 for the largest frame size in bytes depending on the type of adapters in the bridge computer.

– RI field is invalid
  — Source LAN segment number is in the RI field, but is not last (broadcast frames only)
  — Duplicate LAN segment numbers in the RI field (non-broadcast frames only)
  — Source LAN segment number is not in the RI field (broadcast frames only)
  — Destination LAN segment number is not in the RI field (non-broadcast frames only).

- **(H)** Frames not routed across this bridge

  Counter H contains the number of frames received by an IBM PC Network bridge adapter that are not intended to be forwarded across this bridge (the IBM PC Network bridge adapter is not experiencing congestion).

  Any frames arriving at an IBM PC Network bridge adapter that is experiencing congestion are counted in Counter F.

SD	AC	FC	Dest. Addr.	Source Addr.	Rout.	Info. Field	FCS	ED	FS
1 Byte	1 Byte	1 Byte	6 Bytes	6 Bytes	0-18 Bytes		4 Bytes	1 Byte	1 Byte

Where:
SD = Start delimiter
AC = Access control field
FC = Frame control field
FCS = Frame check sequence
ED = End delimiter
FS = Frame status field

Figure C-4. Frame Format

Largest Frame Size

The type of adapter installed in the bridge computer affects the largest frame size that the Bridge Program can support. For application programs sending frames across a bridge, adjust the application to send a maximum frame size less than or equal to the largest frame size that the bridge can process. See Table C-1 for the largest frame size in bytes depending on the type of adapters in the bridge computer.

Table C-1. Largest Frame Sizes in Bytes

Alternate Adapter	Primary Adapter	
	PC Network/A adapters	**Token-Ring Network Adapter/A at 4 Mbps**
PC Network/A adapters	2052	2052
Token-Ring Network Adapter/A at 4 Mbps	2052	2052
Token-Ring Network 16/4 Adapter/A at 4 Mbps	2052	2052
Token-Ring Network 16/4 Adapter/A at 16 Mbps	2052	2052

Alternate Adapter	Primary Adapter	
	Token-Ring Network 16/4 Adapter/A at 4 Mbps	**Token-Ring Network 16/4 Adapter/A at 16 Mbps**
PC Network/A adapters	2052	2052
Token-Ring Network Adapter/A at 4 Mbps	2052	2052
Token-Ring Network 16/4 Adapter/A at 4 Mbps	4472	4472
Token-Ring Network 16/4 Adapter/A at 16 Mbps	4472	8144

The Bridge Program contains three copies of the performance counters:

- The Bridge Program user interface uses one copy. The user can display the Bridge Program Performance Counters panel to obtain the current values of the counters. From the Performance Counters panel the counters can be cleared to zeroes and then

displayed again after a period of time to gather information about bridge traffic during a specific time period. See "Bridge Traffic Evaluation" on page C-27 for more details.

If these counters reach the maximum values that they can contain, the counters roll over to zeroes and counting continues. When any of the counters roll over, the Bridge Program displays a message indicating that the counters have overflowed and need to be reset.

- The Bridge Program Performance Statistics function uses the second copy of the counters to determine when the **Bridge performance threshold** has been exceeded. See "The Performance Statistics Panel" on page 4-29 and "Bridge Program Performance Statistics" on page C-25 for more information.

  If the counts reach the maximum values that these counters can contain, they are not incremented again until they are reset to zeroes when the next 1-minute measurement interval begins.

- The Bridge Program uses the third copy of the counters to respond to network manager program requests to receive the current counter values from the Bridge Program. A network manager program (such as the IBM LAN Manager) can establish a communication link with the Bridge Program, and request to receive the counter values over the link from the Bridge Program. The IBM LAN Manager provides functions to

  - Request and display the current counter values (IBM LAN Manager Version 1.0 and Version 2.0)
  - Record the counter values in a disk file each time a specified time interval elapses (IBM LAN Manager Version 2.0).

  Note: The "Frames not routed across this bridge" counter does not appear on the IBM LAN Manager Bridge Performance Counters panel or in the counter file.

  If the counts reach the maximum values that these counters can contain, the counters roll over to zeroes and counting continues. These counters are reset to zeroes when the Bridge Program is started again, but cannot be reset by the user. This allows more than one network manager program to obtain the same counter information from a bridge.

Table C-2 shows the counter lengths in bytes, and their maximum values.

Table C-2. Bridge Program Performance Counters

Counter	Length in Bytes	Maximum Value
(A) Broadcast frames forwarded	4	4 294 967 295
(B) Broadcast bytes forwarded	6	281 474 976 710 655
(C) Non-broadcast frames forwarded	4	4 294 967 295
(D) Non-broadcast bytes forwarded	6	281 474 976 710 655
(E) Frames not forwarded; target LAN segment inoperative	4	4 294 967 295
(F) Frames not forwarded; adapter congestion	4	4 294 967 295
(G) Frames not forwarded; other reasons	4	4 294 967 295
(H) Frames not routed across this bridge	4	4 294 967 295

Bridge Program Performance Statistics

The Bridge Program Performance Statistics provide an indication that frames are not being forwarded through the bridge. The bridge is operating under a condition that may be detrimental to end-user performance. (Each time one or more frames are not forwarded due to such a condition, a Bridge Program Performance Counter is incremented; the Performance Statistics indicate only that the condition occurred.) Such conditions include:

- The occurrence of a high rate of invalid frames from a defective network station
- A momentary bridge overload due to fluctuations in the traffic through the bridge or on the destination (target) LAN segment.

The Bridge Performance Threshold

The **Bridge performance threshold** is a parameter in the Bridge Program configuration file. The threshold specifies the maximum number of frames per 10 000 frames arriving at the bridge that are not forwarded to the other LAN segment before a performance statistic is generated and recorded. The Configuration Program packaged with the Bridge Program allows you to set the threshold value that is acceptable for the applications and users that send and receive data through the bridge.

Workloads on the network and the requirements of end users and application programs vary widely. Some end users and application programs may be able to detect that 1 out of 1000 frames was not forwarded through the bridge; others, because of different workloads and performance requirements, will be satisfied if no more than 1 out of 100 frames is not forwarded.

Over time you should adjust the **Bridge performance threshold** value for each bridge in your network to provide better correlation between the occurrence of the threshold being exceeded and the end-user being able to perceive a problem in response time, data exchange, or application program operation.

The Performance Statistics

Once each minute the Bridge Program uses the performance counter values to determine whether the **Bridge performance threshold** has been exceeded. A high value in one or more of the three "Frames not forwarded" performance counters E, F, and G can cause the threshold to be exceeded.

If the threshold is exceeded, the following two events occur:

1. The count of the number of times the threshold has been exceeded is incremented in a 5-minute interval in the Bridge Program Performance Statistics.

   The user can display the Bridge Program Performance Statistics panel to see the number of times the threshold was exceeded during any 5-minute interval of a 24-hour period.

2. A performance notification is sent to any network manager programs that have established links with the Bridge Program. The performance notification contains the bridge and LAN segment numbers, the number of frames not forwarded per 10 000 frames arriving at the bridge, and the values of the performance counters (except the "Frames not routed across this bridge" counter).

Procedures for accessing the performance notifications in the IBM LAN Manager Event Log are described in the *IBM LAN Manager User's Guide* (packaged with the IBM LAN Manager program).

Bridge Traffic Evaluation

You can use the Bridge Program performance information to obtain the following information:

- A characterization of the traffic flowing through a bridge
- An evaluation of bridge traffic on a LAN segment to which two or more bridges are connected.

The **first step** in evaluating bridge traffic is to determine the length of time for which you want the Bridge Program to count frames and bytes before you begin the analysis. This length of time is called the *measurement period*.

The length of the measurement period can be from a few minutes to several hours, and will vary with the purpose of the evaluation.

Use a short measurement period (a few minutes) to:

- Isolate a specific problem
- Observe traffic at a particular time of day
- Observe traffic generated as particular devices or programs use the network.

Use a longer measurement period (an hour or more) to obtain information about average bridge traffic during a busy period of the day.

The **second step** is to obtain the bridge performance counter values accumulated during the measurement period. You can obtain the counters:

- At a bridge station, from the Bridge Program directly
- At a station running a network manager program that can request the values from a Bridge Program.

  Further discussions in this section describe the use of the IBM LAN Manager.

You can use the performance counter values in a series of calculations to provide additional information about the bridge traffic flow, including:

- User traffic through the bridge in frames per second and bytes per second
- Percentage of frames not forwarded due to causes indicated by counters E and G
- The number of frames not processed by the Bridge Program due to bridge adapter congestion (counter F).

The following sections discuss two methods of obtaining the counter values and performing the calculations:

- The Worksheet Method
  - Display the counters at the bridge station.
  - Manually record the counter values on a worksheet.
  - Use the recorded values to do the calculations shown on another worksheet.

  See "The Worksheet Method" on page C-29 below for using the worksheets at the bridge station.

  A similar method is described in the *IBM LAN Manager User's Guide* Version 2.0 for displaying and recording the counters at the LAN Manager station.

- The Counter File Method
  - Use the function provided by the IBM LAN Manager Version 2.0 to record the counter values in a disk file each time the specified performance notification interval elapses.
  - Use a program that you write to read the file, do the analysis calculations, and present the results.

  The Counter File Method is discussed in "The Counter File Method" on page C-33 and in the *IBM LAN Manager User's Guide* Version 2.0.

Note: The "Frames not routed across this bridge" counter (H) is not sent to the IBM LAN Manager. If a bridge in your network has experienced adapter congestion (counter F is not zero), you should use the Worksheet Method at the bridge station to evaluate more exactly the traffic for that bridge. Although the calculations done without using counter H may yield an acceptable approximation, the use of counter

H refines the adapter congestion calculations for a more precise result.

The Worksheet Method

Two worksheets help you to record by hand the counter values for one measurement period, and to perform the calculations:

- The Bridge Performance Analysis Worksheet (see page D-6).
- The Bridge Performance Analysis Calculations Worksheet (see page D-5).

The following sections describe the use of the worksheets and the meaning of the resulting information.

The Bridge Performance Analysis Worksheet

Use the Bridge Performance Analysis Worksheet at the bridge station to record the values of the performance counters displayed on the Bridge Program Performance Counters panel.

To use the Bridge Performance Analysis Worksheet:

1 Make at least one copy of the blank original worksheet. Save the original to copy again later.

2 At the bridge station, select "Configuration Data" from the Main Menu.

3 On a copy of the worksheet:

- Fill in the current date.
- Fill in the bridge name or number.

  You can use the bridge number, or some other identifier that will uniquely identify this bridge.
- Record the Bridge Program Level shown on the Configuration Data panel.
- Fill in the LAN segment types.

4 Determine the length of time for the measurement period.

5 Return to the Bridge Program Main Menu and select "Performance Counters."

6 When the Performance Counters panel is displayed, press **F9 (Reset)** to clear the performance counters to zeros. (Pressing **F9** will not affect the performance counters accessible from the IBM LAN Manager or those used for the Performance Statistics.)

On the copy of the worksheet, record the date and time the counters were reset to zeros. The times are displayed and should be recorded on the worksheet in the format hours (hh), minutes (mm), and seconds (ss) (hh:mm:ss). (08:35:20 means 35 minutes and 20 seconds after 8 o'clock.)

7 Wait until the desired measurement period has elapsed.

Other Bridge Program functions can be used during the measurement period.

If the message "ECCBR189W Performance counters have overflowed, press reset to clear them" appears during the measurement period, the measurement will be in error. Return to step 6 and use a shorter measurement period.

8 At the end of the desired measurement period, display the Performance Counters panel again.

If you were using another Bridge Program function, return to the Performance Counters panel from the Main Menu.

If no other Bridge Program function was used and the Performance Counters panel is still displayed, press **F5 (Refresh)** to update the panel information to the current performance counter values and time of day.

9 On the copy of the Bridge Performance Analysis Worksheet, record the date and time of day the counters were refreshed, and the performance counter values.

10 Add the counter values for the two LAN segments to obtain and record the bridge totals.

Use the information recorded on the worksheet in making the calculations on the Bridge Performance Analysis Calculations Worksheet.

The Bridge Performance Analysis Calculations Worksheet

The performance counter values obtained at the Bridge Program station represent numbers of frames and bytes processed by the bridge during the measurement period, which could vary from a few minutes to a few hours.

The Bridge Performance Analysis Calculations Worksheet contains a number of bridge traffic measurement computations, including frames per second and bytes per second through the bridge. Not all of the computations are required for most analysis purposes.

To use the Bridge Performance Analysis Calculations Worksheet:

1 Make at least one copy of the blank original worksheet (both sides). Save the original to copy again later.

2 Obtain the completed Bridge Performance Analysis Worksheet containing the times and performance counter values from the bridge station.

3 Write the date, bridge name or number, Bridge Program level, LAN segment types, and LAN segment numbers on the Calculations Worksheet (copy from the Performance Analysis Worksheet).

4 Calculate and record on the worksheet the value for J, the length of the measurement period in seconds.

The times are recorded in the format hours (hh), minutes (mm), and seconds (ss) (hh:mm:ss). (08:35:20 means 35 minutes and 20 seconds after 8 o'clock.)

a. Convert the first time shown on the Bridge Performance Analysis Worksheet to seconds (the time the counters were reset to zeroes at the bridge station):

   (((HH x 60) + MM) x 60) + SS = J1

b. Convert the second time shown on the Bridge Performance Analysis Worksheet to seconds (the time the counters were refreshed at the bridge station):

   (((HH x 60) + MM) x 60) + SS = J2

c. Subtract the first time in seconds from the second time in seconds to obtain and record the value for J on the Calculations Worksheet:

   (J2 - J1) = J

5 Perform the calculations indicated by the formulas on both sides of the Calculations Worksheet. Record the answers in the spaces provided.

- The letters A through H, followed by a number to indicate a LAN segment value or a bridge total, identify the performance counters on the Bridge Performance Analysis Worksheets and in the formulas. For example:

  A1 = Broadcast frames forwarded from the LAN segment in the left column

  A2 = Broadcast frames forwarded from the LAN segment in the right column

  A3 = Broadcast frames forwarded from either LAN segment to the other for the bridge total. Where the letters A through H appear in the formulas, use the corresponding counter values from the Bridge Performance Analysis Worksheet.

  Note: If you are using counter values obtained at the IBM LAN Manager station, assume a value of zero for counter H.

- The letters K through Q, (excluding O), followed by a number to indicate a LAN segment value or a bridge total, identify calculation answers that are used in later calculations. Where the letters K through Q appear in the for-

mulas to the left of an = sign, use the corresponding value obtained in an earlier calculation and written to the right of an = sign on the Calculations Worksheet.

The Counter File Method

The IBM LAN Manager (Version 2.0, not any earlier versions) provides a function that:

- Automates the recording of bridge performance counter values, except for the "Frames not routed across this bridge" counter (H).
- Can record counter values for each bridge with which the IBM LAN Manager has established a communication link (up to 64 bridges).

When you use the **Configure Bridge** function of the IBM LAN Manager to specify a non-zero performance notification interval for a bridge, the IBM LAN Manager:

- Creates a disk file with the same name as the bridge and a file extension of PRF
- Requests the Bridge Program at the bridge station to begin sending counter values each time the performance notification interval elapses
- Writes a data record in the file each time counter values are received from the Bridge Program.

The Counter File

Each disk file in which the IBM LAN Manager records counter values (one file per bridge) contains one header record and up to 1440 100-byte records of binary data. This allows for one record per minute over 24 hours.

The data records in the counter file can be used in a way similar to reading the counter values from the IBM LAN Manager Performance Counter panel. Each data record contains a reading of the counter values. For each two consecutive data records in the counter file, you subtract the counter values in the first record from the counter values in the second record to obtain the values accumulated during one performance notification interval.

The file format is described in the *IBM LAN Manager User's Guide* Version 2.0.

The Analysis Program

To use a counter file for bridge performance analysis, you will need to write a program to:

- Read the file records.

  The program must open and close the file, convert binary values to decimal where needed, and establish constants and variables needed for input to the calculations and for saving the results.

- Do the analysis calculations.

  The program can do only the calculations described in the Worksheet Method, or you can add other calculations to meet the needs of your establishment.

  The program must make up for the counters rolling over (reaching their maximum value, resetting to zero, and continuing to count) during a performance notification interval.

  Calculations can be done for

  - A single interval
  - Multiple intervals (sequential or non-sequential)
  - Selected time periods.

- Present the results.

  Your program can do one or more of the following actions

  - Save the results in a disk file or data base
  - Print the results in tables and graphs
  - Display the results
  - Present just the results
  - Present both the results and the values used to obtain the results.

  The results you choose to obtain can vary with your reasons for evaluating bridge traffic, such as

  - Isolating a problem
  - Tracking peaks and trends
  - Balancing traffic flow and workload
  - Anticipating future growth and change.

Bridge Performance Considerations

The following considerations may be useful in managing the traffic flowing through a bridge.

Bridge performance is a part of total network performance. The Bridge Program performance counters and statistics are intended to provide part of the information you need to diagnose and correct problems reported by users of the network.

Diagnosis

One difficulty in problem diagnosis is that, from the user's perspective, different problems appear to have the same symptom. For example, slow response time can result from:

- File server overload (too many concurrent users)
- Data-base fragmentation from modifications
- Heavy network traffic
- Heavy bridge traffic.

Diagnosis will depend upon your knowledge of network operation in addition to the available status, error information, and bridge traffic measurements.

LAN Segment Utilization

For an IBM Token-Ring Network, the recommendation in the *IBM Token-Ring Network Introduction and Planning Guide* concerning ring utilization can also help in regulating bridge utilization. If ring utilization is planned to average 30 % of capacity, a bridge could handle the flow even if all of the ring traffic were sent through the bridge. On a 4 Mbps ring only, the IBM Token-Ring Network Trace and Performance Program can be used to measure source and destination ring utilization.

For an IBM PC Network, the Advanced Diagnostics packaged with the *IBM PC Network Hardware Maintenance and Service* manual provide

a function to measure the percent of utilization of a bus. Once started, the Network Utilization function runs continuously until you stop it, and displays:

- Average use
- Present use
- Highest use
- Lowest use.

The percentages are updated on the panel as the utilization of the bus changes.

Frames Not Forwarded

The **Bridge Performance Threshold** configuration parameter of the Bridge Program indicates the maximum acceptable number of frames not forwarded per 10 000 frames received at the bridge. One or more occurrences of the threshold being exceeded can result in a problem detectable by network users. The performance statistics collected by the Bridge Program show the number of times the threshold is exceeded in each 5-minute interval of a 24-hour period.

If the occurrences of the threshold being exceeded are frequent, you might consider:

- Increasing the threshold parameter value in the Bridge Program configuration file, if the occurrences do not seem to be connected with or causing user problems.
- Investigating further if the occurrences correspond to particular periods of the day and to user complaints.

The values of the Bridge Program performance counters E, F, and G (see Table C-2 on page C-24) indicate possible causes of the threshold being exceeded. A high value in:

- Counter E indicates that the target (destination) LAN segment is malfunctioning and is unable to receive frames from the bridge.

  The count also includes

  - Frames discarded by the bridge that were waiting at the bridge when the destination ring began beaconing, if the destination is a token-ring network segment

- Frames that the bridge discarded after experiencing 16 consecutive collisions in attempting to forward the frames to the target bus, if the destination is a PC network segment.

There should be other status and error indications to isolate the LAN segment problem (from the Bridge Program, the IBM Token-Ring Network Trace and Performance Program on 4 Mbps LAN segments, the IBM LAN Manager, or an application program on the malfunctioning LAN segment).

- Counter F has two possible causes
  - The bridge is overloaded. A symptom will be a high percentage of frames not processed in both flow directions through the bridge.

    This condition can be caused by frames arriving at the bridge from the source LAN segment faster than the Bridge Program can process them.

    This condition can also result from using a slower bridge computer between two fast LAN segments (for example a PS/2 Model 50 between two 16 Mbps rings).

  - The destination (target) LAN segment is too busy to accept frames as fast as the bridge is forwarding them.

    This condition could happen when a source user LAN segment is sending frames to a busy backbone LAN segment, or when a fast source LAN segment (a 16 Mbps ring, for example) is sending frames to a slower destination LAN segment (a 2 Mbps bus, for example).

Possible solutions for these conditions include:

- For a bridge connecting two IBM PC Network segments
  1. Reevaluate utilization of LAN segments.
  2. Physically separate one or both LAN segments, and place bridges between suitable LAN segments.

3. Place some stations on a different frequency pair. Place bridges as needed between segments and frequency pairs, but do not create parallel bridges between PC Network segments using the same frequency pair.
4. Install a bridge computer with a faster processor.

   For example, upgrade the bridge computer from a PS/2 Model 50 to a PS/2 Model 80.

- For a bridge connecting an IBM Token-Ring Network segment and an IBM PC Network segment

  1. Reevaluate utilization of LAN segments.
  2. Rearrange applications so that those that send and receive large amounts of data are all connected to the IBM Token-Ring Network segment.
  3. Physically separate one or both LAN segments, and place bridges between selected LAN segments.
  4. Separate one or both LAN segments by frequency pair. Place some stations on a different frequency pair. Place bridges as needed between selected LAN segments and frequency pairs, but do not create parallel bridges between IBM PC Network segments using the same frequency pair.
  5. Install a bridge computer with a faster processor.

     For example, upgrade the bridge computer from a PS/2 Model 50 to a PS/2 Model 80.

- For a bridge connecting two IBM Token-Ring Network segments

  1. Reevaluate source and destination LAN segment utilization.
  2. Rearrange applications to put those that exchange large amounts of data on the same LAN segment.

3. Install a bridge computer with a faster processor.

   For example, upgrade the bridge computer from a PS/2 Model 50 to a PS/2 Model 80.

4. Install a parallel bridge.

The traffic being sent to a large backbone LAN segment can be estimated by summing the frames or bytes forwarded to it by each connecting bridge during the same time period.

On 4 Mbps LAN segments only, the IBM Token-Ring Network Trace and Performance Program can be used to measure source and destination ring utilization.

- Counter G indicates that the bridge is receiving invalid frames from a malfunctioning attaching device (either the frame is too long, the frame is too short, or the routing information is invalid). See the description of Counter G on page C-20.

- Counter H contains the number of frames received by an IBM PC Network bridge adapter that were not routed across this bridge.

  Counter H accumulates frames passed to the Bridge Program only while the IBM PC Network bridge adapter is not experiencing congestion. When an IBM PC Network bridge adapter experiences congestion, the number of frames that arrived at the adapter but could not be passed to the Bridge Program are counted in counter F.

  Counter H is used in analysis calculations that include the total number of frames received at an IBM PC Network bridge adapter.

Appendix D. Bridge Performance Analysis Worksheets

Included in this appendix are blank originals of:

- The Bridge Performance Analysis Worksheet
- The Bridge Performance Analysis Calculations Worksheet.

Use these worksheets to evaluate the flow of traffic crossing a bridge.

Note: Before using each worksheet, make as many copies of the blank original as needed for each performance measurement. Save the originals for making future copies.

A blank original of the Bridge Performance Analysis Worksheet is included in this appendix. This appendix also contains instructions for filling it out.

Use this worksheet with the Bridge Performance Analysis Calculations Worksheet in the *IBM Local Area Network Administrator's Guide* to evaluate the flow of traffic crossing a bridge.

Note: Before using this worksheet, make as many copies of the blank original as needed for each performance measurement. Save the original for making future copies.

The Bridge Performance Analysis Worksheet

Use the Bridge Performance Analysis Worksheet at the bridge station to record the values of the performance counters displayed on the Bridge Program Performance Counters panel.

To use the Bridge Performance Analysis Worksheet:

1 Make at least one copy of the blank original worksheet. Save the original to copy again later.

2 At the bridge station, select "Configuration Data" from the Main Menu.

3 On a copy of the worksheet:

- Fill in the current date.
- Fill in the bridge name or number.

  You can use the bridge number, or some other identifier that will uniquely identify this bridge.
- Record the Bridge Program Level shown on the Configuration Data panel.
- Fill in the LAN segment types.

4 Determine the length of time for the measurement period.

5 Return to the Bridge Program Main Menu and select "Performance Counters."

6 When the Performance Counters panel is displayed, press **F9 (Reset)** to clear the performance counters to zeros. (Pressing **F9** will not affect the performance counters accessible from the IBM LAN Manager or those used for the Performance Statistics.)

On the copy of the worksheet, record the date and time the counters were reset to zeros. The times are displayed and should be recorded on the worksheet in the format HH:MM:SS,

where H = hour, M = minute, and S = second. (08:35:20 means 35 minutes and 20 seconds after 8 o'clock.)

7 Wait until the desired measurement period has elapsed.

Other Bridge Program functions can be used during the measurement period.

If the message "ECCBR189W Performance counters have overflowed, press reset to clear them" appears during the measurement period, the measurement will be in error. Return to step 6 on page D-3 and use a shorter measurement period.

8 At the end of the desired measurement period, display the Performance Counters panel again.

If you were using another Bridge Program function, return to the Performance Counters panel from the Main Menu.

If no other Bridge Program function was used and the Performance Counters panel is still displayed, press **F5 (Refresh)** to update the panel information to the current performance counter values and time of day.

9 On the copy of the Bridge Performance Analysis Worksheet, record the date and time of day the counters were refreshed, and the performance counter values.

10 Add the counter values for the two LAN segments to obtain and record the bridge totals.

Use the information recorded on the worksheet in making the calculations on the Bridge Performance Analysis Calculations Worksheet.

Bridge Performance Analysis Worksheet
For the IBM PC Network Bridge Program

Date _____

Bridge Name or Number _____

Bridge Program Level _____

LAN Segment Types _____ _____

At the bridge computer:

1. **Display the first Configuration Data panel.**
2. **Record the Bridge Program Level and LAN Segment Types on the worksheet.**
3. **Display the Bridge Program Performance Counters panel.**
4. **Press F9 (Reset) to clear the counters.**
5. **Wait ___ minutes.**
6. **Refresh (press F5) to display the counters again.**
7. **In the spaces provided below, write the information from the panel.**
8. **Add the values for each LAN segment to obtain each Bridge Total.**

Counters reset on ___-___-___ at ___:___:___

Counters refreshed on ___-___-___ at ___:___:___

Frames Forwarded Values for:

	LAN Segment _____	+ LAN Segment _____	= Bridge Total
Broadcast frames	(A1) _____	+ (A2) _____	= (A3) _____
Broadcast bytes	(B1) _____	+ (B2) _____	= (B3) _____
Non-broadcast frames	(C1) _____	+ (C2) _____	= (C3) _____
Non-broadcast bytes	(D1) _____	+ (D2) _____	= (D3) _____

Frames Not Forwarded Because:

	LAN Segment _____	+ LAN Segment _____	= Bridge Total
Target LAN segment inoperative	(E1) _____	+ (E2) _____	= (E3) _____
Adapter congestion	(F1) _____	+ (F2) _____	= (F3) _____
Other reasons	(G1) _____	+ (G2) _____	= (G3) _____

Other Frames Processed by the Bridge:

	LAN Segment _____	+ LAN Segment _____	= Bridge Total
Frames not routed across this bridge	(H1) _____	+ (H2) _____	= (H3) _____

Bridge Performance Analysis Calculations Worksheet

Date _____ **Bridge Identification** _____
Bridge Program Level _____ **LAN Segment Types** _____ _____

Measurement wait time in seconds: J = _____

Broadcast Frames Forwarded:

	LAN Segment _____	LAN Segment _____	Bridge Total
Frames per second:	$\frac{A1}{J} = K1$ _____	$\frac{A2}{J} = K2$ _____	$\frac{A3}{J} = K3$ _____
Bytes per second:	$\frac{B1}{J} = L1$ _____	$\frac{B2}{J} = L2$ _____	$\frac{B3}{J} = L3$ _____
Mean frame bytes:	$\frac{B1}{A1} =$ _____	$\frac{B2}{A2} =$ _____	$\frac{B3}{A3} =$ _____

Non-Broadcast Frames Forwarded:

	LAN Segment _____	LAN Segment _____	Bridge Total
Frames per second:	$\frac{C1}{J} = M1$ _____	$\frac{C2}{J} = M2$ _____	$\frac{C3}{J} = M3$ _____
Bytes per second:	$\frac{D1}{J} = N1$ _____	$\frac{D2}{J} = N2$ _____	$\frac{D3}{J} = N3$ _____
Mean frame bytes:	$\frac{D1}{C1} =$ _____	$\frac{D2}{C2} =$ _____	$\frac{D3}{C3} =$ _____

Total Frames Forwarded:

	LAN Segment _____	LAN Segment _____	Bridge Total
Frames per second:	$K1 + M1 =$ _____	$K2 + M2 =$ _____	$K3 + M3 =$ _____
Bytes per second:	$L1 + N1 =$ _____	$L2 + N2 =$ _____	$L3 + N3 =$ _____
Mean frame bytes:	$\frac{B1 + D1}{A1 + C1} =$ _____	$\frac{B2 + D2}{A2 + C2} =$ _____	$\frac{B3 + D3}{A3 + C3} =$ _____

(Continued on other side)

Total Frames Received by the Bridge:

LAN Segment _____	LAN Segment _____	Bridge Total
$(A1 + C1 + E1 + F1 + G1 + H1) =$	$(A2 + C2 + E2 + F2 + G2 + H2) =$	$(A3 + C3 + E3 + F3 + G3 + H3) =$
$Q1$ _____	$Q2$ _____	$Q3$ _____

Total Frames Routed to the Bridge (Other Than During Adapter Congestion):

LAN Segment _____	LAN Segment _____	Bridge Total
$(A1 + C1 + E1 + G1) =$	$(A2 + C2 + E2 + G2) =$	$(A3 + C3 + E3 + G3) =$
$P1$ _____	$P2$ _____	$P3$ _____

Percentages:

LAN Segment _____	LAN Segment _____	Bridge Total

Percent of Frames Not Forwarded; Target LAN Segment Inoperative:

$$\frac{(100 \times E1)}{P1} = \text{_____} \qquad \frac{(100 \times E2)}{P2} = \text{_____} \qquad \frac{(100 \times E3)}{P3} = \text{_____}$$

Percent of Frames Not Forwarded; Other Reasons:

$$\frac{(100 \times G1)}{P1} = \text{_____} \qquad \frac{(100 \times G2)}{P2} = \text{_____} \qquad \frac{(100 \times G3)}{P3} = \text{_____}$$

Percent of Frames Not Forwarded (Other Than During Adapter Congestion):

$$\frac{100 \times (E1 + G1)}{P1} = \text{_____} \qquad \frac{100 \times (E2 + G2)}{P2} = \text{_____} \qquad \frac{100 \times (E3 + G3)}{P3} = \text{_____}$$

Percent of Frames Not Processed During Adapter Congestion:

$$\frac{(100 \times F1)}{P1} = \text{_____} \qquad \frac{(100 \times F2)}{P2} = \text{_____} \qquad \frac{(100 \times F3)}{P3} = \text{_____}$$

Percent of Total Frames That Arrived at the Bridge and Were Not Forwarded:

$$\frac{100 \times (E1 + F1 + G1)}{Q1} = \text{_____} \qquad \frac{100 \times (E2 + F2 + G2)}{Q2} = \text{_____} \qquad \frac{100 \times (E3 + F3 + G3)}{Q3} = \text{_____}$$

Appendix E. License Information

This Appendix contains License Information about the IBM PC Network Bridge Program, Version 1.0. The product identifier for this program is 560111001 and the program part number is 96X5860.

International Business Machines Corporation Armonk, New York 10504

STATEMENT OF LIMITED WARRANTY (MEDIA AND PROGRAM)

International Business Machines Corporation (IBM) grants the following limited warranty for this IBM Licensed Program (Program) if this copy of the Program is delivered by IBM, an IBM Authorized Dealer for this Program, or any other IBM approved supplier for this Program to a user. (Such a user is referred to herein as "original user.") A "user" shall mean a Customer who acquired possession of and is licensed to use this copy of the Program for its own use or for use within its own business enterprise and not for remarketing. Any unused portion of the Warranty Period may be conveyed to another user.

1. MEDIA
   The Warranty Period for the media on which the Program is recorded is for three months from the date of its delivery to the original user as evidenced by a receipt.

   IBM warrants that this media will be free from defects in material and workmanship under normal use during the Warranty Period. If notified during the Warranty Period that the media contains such defects, IBM will replace such media. If IBM is unable to deliver replacement media, you may terminate your license and your money will be refunded upon return of all your copies of the Program.

2. PROGRAM
   The Warranty Period for this Program is for three months from the date of its delivery to the original user as evidenced by a receipt.

   IBM warrants that this Program, if unaltered, will conform to its Program Specifications during the Warranty Period when such Program is properly used on a machine for which it was designed. If notified during the Warranty Period that the Program contains defects such that it does not conform to its Program Specifications, IBM will 1) attempt to make the Program operate as warranted a) if prior to the Service Expiration Date, by providing a correction, or b) if after the Service Expiration Date, by providing any existing corrections, or 2) replace the Program with a functionally equivalent Program, as determined by IBM. In the event that IBM does not provide such a remedy, you may terminate your license and your money will be refunded upon return of all your copies of the Program.

   IBM does not warrant that any other defects in the Program will be corrected or that the operation of the Program will be uninterrupted.

This limited warranty will apply only if the Program is licensed and located in the United States or Puerto Rico.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Some states do not allow the exclusion of implied warranties, so the above exclusion may not apply to you. This limited warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Following the end of the Warranty Period, Program Services may be available until the Service Expiration Date. The License Information contains details on such availability.

If you have a question as to where you may obtain warranty service, see the Statement of Service in the License Information for this Program.

Program Specifications

The IBM PC Network Bridge Program, Version 1.0, when installed with the required hardware and software (see "Specified Operating Environment" on page E-7), enables communication between devices that are connected to different LAN segments. A LAN segment is either a ring of an IBM Token-Ring Network or a bus of a broadband IBM PC Network or IBM PC Network Baseband. The Bridge Program connects broadband and baseband PC Network segments and Token-Ring Network segments operating at either 4 or 16 Mbps. Broadband PC Network segments can use the same or different frequency pairs.

Specifically, the Bridge Program connects two LAN segments, such as:

- Two broadband IBM PC Network segments using the same or different frequency pairs
- Adapters using different frequency pairs on the same broadband IBM PC Network segment
- One IBM Token-Ring Network segment operating at either 4 or 16 Mbps and one broadband IBM PC Network segment
- Two IBM Token-Ring Network segments operating at either 4 or 16 Mbps
- Two baseband IBM PC Network segments
- One IBM Token-Ring Network segment and one baseband IBM PC Network segment
- One broadband IBM PC Network segment and one baseband IBM PC Network segment.

The Bridge Program also supports communication with up to four IBM LAN Manager programs.

Packaged with the Bridge Program are two additional programs:

- An Installation Program to allow you to install the Bridge Program on one or more bridge computers
- A Configuration Program to allow you to configure the Bridge Program to the needs of your network.

The computer in which the Bridge Program is loaded is a dedicated machine and cannot be used for any other operation while performing as a bridge. For example, you do not load the IBM LAN Manager while the Bridge Program is running in the same computer.

The Bridge Program functions are:

- Frame forwarding active. If the Bridge Program is communicating with the IBM LAN Manager and frame forwarding is enabled, the user can choose to have the Bridge Program:
  - Begin to forward data across the bridge as soon as the Bridge Program is initialized
  - Wait to forward data until the IBM LAN Manager program enables Bridge Program frame forwarding.
- Restart on error. This function automatically restarts the bridge computer, reloads DOS, and reloads the Bridge Program if an adapter check or critical resource depletion occurs. The function requires the use of the DOS AUTOEXEC.BAT file on the Bridge Program working copy.
- Memory dump on error. This function causes an image of the Bridge Program memory and buffers to be written on disk or diskette if a critical resource depletion occurs. The service supplier uses the image in resolving the programming problem.
- Error log. Errors that cause the Bridge Program to end operation are recorded in a file on disk or diskette. The file is useful for problem determination particularly when the bridge is unattended for long periods of time and **Restart on error** is used.
- Hop count limit and single-route broadcast. The hop count limit restricts the number of bridges, to no more than seven, through which a broadcast or single-route broadcast frame can travel in a network.

  When the single-route broadcast function is active for a bridge adapter, frames designated as single-route broadcast frames are passed through the bridge as long as the frame has not reached the bridge's hop count limit.

  These two functions help the user ensure that only one copy of a broadcast or single-route broadcast frame reaches any LAN segment in the network.

- Automatic single-route broadcast. The automatic single-route broadcast function enables the Bridge Program to communicate with other Bridge Programs to determine how to set the single-route broadcast parameter value to make up for for changes in the network configuration.
- Retry initialization during beaconing. If the Bridge Program detects a beaconing condition on one or both rings during initialization, the Bridge Program will try to initialize until both adapters are open or until the bridge operator intervenes.
- Adapter configuration options. The locally administered address function allows the user to override the universally administered address that is permanently encoded in the microcode on each network adapter.

  The shared RAM address function allows the user to specify the address in the computer memory map for the RAM shared with each bridge adapter, if the addresses need to be different from the defaults.
- Communication with IBM LAN Manager programs. The Bridge Program can communicate with up to four IBM LAN Manager programs.

  The Bridge Program parameter server, configuration report server, and error monitor functions collect network and adapter status, error reports, and network configuration information. Some of the collected information is displayed on Bridge Program panels; some is sent as reports or notifications to requesting IBM LAN Manager programs.

  The user can specify a link password for each of the four connections to IBM LAN Manager programs. The IBM LAN Manager programs must use the correct passwords to establish the links with the Bridge Program.

  The Bridge Program allows the IBM LAN Manager Version 2.0 to alter the configuration parameter settings for the

  - Bridge Number
  - LAN Segment Number (primary and alternate adapters)
  - Frame Forwarding Active
  - Bridge Performance Threshold
  - Hop Count
  - Single-Route Broadcast
  - Link Passwords.

- Help function. This function enables an operator to request descriptions and explanations of the use and contents of the Bridge Program function panels.
- Configuration data display. This function enables an operator to display the configuration currently being used by the Bridge Program (the configuration cannot be altered by the Bridge Program; the Configuration Program must be used for alterations). The operator can check for changes to Bridge Program configuration parameters that were made by the IBM LAN Manager.
- Network and communication status. Each Bridge Program function panel displays the current LAN segment status for the LAN segments connected to the bridge. The operator can display more detailed status for each LAN segment, including the fault domain for the last occurring beacon on a ring.

  The operator can also display the current status of any bridge links between the LAN segments and the IBM LAN Manager programs.
- Path trace. The Bridge Program logs an entry for each frame crossing the bridge that requests a system path trace. The log holds the 15 most current entries. The operator can display and clear the path trace log.
- Statistics. The Bridge Program collects statistics on the traffic passing through the bridge, including counts of frames forwarded and frames not forwarded for each LAN segment. The operator can display the bridge performance statistics and counters.
- Shutdown. This function provides the operator with the means to end Bridge Program operation in an orderly manner. Before ending, the Bridge Program verifies the shutdown request with the operator and checks for active links with IBM LAN Manager programs.

Specified Operating Environment

The IBM PC Network Bridge Program is designed to operate with the following hardware and software.

Machine Requirements

To install and operate the Bridge Program, you need:

- An IBM Personal System/2* (PS/2*) computer with Micro Channel* architecture and the following
  - At least 512 KB of memory
  - A minimum of one 720 KB diskette drive or one 1.44 MB diskette drive with at least 300 KB of free disk space.
  - Two network adapters that are compatible with your computer (see Table E-1) and the adapter cables required
  - A display that is compatible with your computer (one of the following)
    - An IBM monochrome display
    - An 80-column color monitor
  - An IBM PC Graphics Printer, or its equivalent, if you want printer output
- At least two blank 3.5-inch diskettes.

Refer to the following table to determine the type of adapters you will be installing in the bridge computer.

Table E-1. Network and Adapter Combinations	
Type of Network	**Name of Adapter**
Token-Ring Network	Token-Ring Network Adapter/A Token-Ring Network 16/4 Adapter/A
PC Network	PC Network Adapter II/A PC Network Adapter II/A - Frequency 2 PC Network Adapter II/A - Frequency 3 PC Network Baseband Adapter/A

For more information concerning computer equipment and supplies see "Related Publications" on page ix.

Program Requirements

In addition to the Bridge Program, you will need to use the IBM Personal Computer Disk Operating System (DOS), version 3.3 or later to install and operate the Bridge Program. You need to be familiar with DOS commands, such as FORMAT and DISKCOPY, in order to prepare and use Bridge Program files.

Note: Workstations on a PC Network segment connected by a bridge will require the IBM Local Area Network Support Program, Version 1.0 or higher.

Prerequisite Software Requirements

See Program Requirements above.

Licensed Program Materials Availability

This licensed program is available without source licensed program materials. It is available in object code only.

Statement of Service

IBM will provide service for valid program-related defects in the IBM PC Network Bridge Program, Version 1.0 to program licensees at no additional charge. Program service is available until December 30, 1991. Specify product identifier 560111001 when requesting service.

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- Defect correction information, such as corrected documentation, corrected code, or notice of availability of corrected code
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- A bypass.

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Type/Duration of Program Services

Central Service, including a Support Center, will be available until December 30, 1991. Programs in this announcement are supported by the IBM LAN Service Group. Access to this Support Center will be provided through the IBM Support Center. See the Statement of Service section for details.

When Central Service is specified, one or more service locations will be designated which will accept documentation in a format described by IBM indicating that a problem is caused by a defect in the licensed program.

Additional Information

Any other documentation with respect to this licensed program, including any such documentation referenced herein, is provided for information purposes only and does not extend or modify the material contained in the License Information.

List of Abbreviations

CATV	Community Antenna Television
DOS	Disk Operating System
ETR	Early Token Release
KB	kilobyte
LAN	local area network
LLC	Logical Link Control
MAC	medium access control
MB	megabyte
Mbps	megabits per second
NAUN	nearest active upstream neighbor
PC	personal computer
RAM	random access memory
ROM	read-only memory

Glossary

This glossary defines abbreviations and terms used in this manual in describing the IBM PC Network Bridge Program, the IBM Token-Ring Network, IBM PC Network, and local area networks in general.

It includes information from the *IBM Vocabulary for Data Processing, Telecommunications, and Office Systems*, GC20-1699.

Definitions from draft proposals and working papers under development by the International Standards Organization, Technical Committee 97, Subcommittee 1 are identified by the symbol **(TC97)**.

Definitions from published sections of the *ISO Vocabulary of Data Processing*, developed by the International Standards Organization, Technical Committee 97, Subcommittee 1 and from published sections of the *ISO Vocabulary of Office Machines*, developed by subcommittees of ISO Technical Committee 95, are preceded by the symbol **(ISO)**.

The symbol (T) identifies definitions from draft international standards, draft proposals, and working papers in development by the International Organization for Standardization, Technical Committee 97, Subcommittee 1.

A

active monitor. In the IBM Token-Ring Network, a function in a single adapter that initiates the transmission of tokens and provides token error recovery facilities. Any active adapter on the ring has the ability to provide the active monitor function if the current active monitor fails.

adapter. The circuit card within a communicating device (such as an IBM Personal Computer) and its associated software that enable the device to be attached to a network.

application program. A program written for or by a user that applies to the user's work.

B

baseband. A frequency band that uses the complete bandwidth of a transmission medium. Contrast with *broadband*.

baseband LAN. A local area network in which information is encoded, multiplexed, and transmitted without modulation of carrier. (T)

beaconing. An error-indicating function of adapters that assists in locating the problem causing a hard error on the IBM Token-Ring Network.

bridge. A functional unit that connects two local area networks (LANs) that use the same logical link control (LLC) procedures but may use different medium access control (MAC) procedures. A bridge consists of the bridge computer, two adapters and their cables, and the Bridge Program.

bridge computer. The dedicated computer in which the Bridge Program is loaded.

bridge ID. The bridge label combined with the adapter address of the adapter connecting the bridge to the LAN segment with the lowest LAN segment number; it is used by the Bridge Program automatic single-route broadcast function.

bridge label. A 2-byte hexadecimal number that you can assign to each bridge. See bridge ID.

broadband. A frequency band divisible into several narrower bands so that different kinds of transmissions such as voice, video, and data transmission can occur at the same time. Synonymous with wideband. Contrast with *baseband*.

broadband LAN. A local area network (LAN) in which information is encoded, multiplexed, and transmitted with modulation of carriers.

broadcast frame. A frame that is to be forwarded by all bridges, unless otherwise restricted.

bus. A network configuration where a series of nodes (attaching devices, such as IBM Personal Computers) are connected to a main cable.

bypass. To eliminate a station or an access unit from a ring network by allowing the data to flow in a path around it.

C

carrier. On broadband networks, a continuous frequency signal that can be modulated with an information-carrying signal.

coaxial cable. (coax cable) A cable consisting of one conductor, usually a small copper tube or wire, within an insulation from another conductor of a larger diameter, usually copper tubing or copper braid.

configuration. (1) (TC97) The arrangement of a computer system or network as defined by the nature, number, and the chief characteristics of its functional units. The term may refer to a hardware or a software configuration. (2) The devices and programs that make up a system, subsystem, or network.

configuration file. The collective set of item definitions that describe a configuration.

continuous carrier. On broadband networks, a condition in which a carrier signal is being constantly broadcast on a given frequency. No further information can be modulated on that frequency. Synonymous with hot carrier.

controlling link. The reporting link between a bridge and a network

manager program that is authorized to change bridge configuration parameters and to disable and enable certain bridge functions.

D

designated bridge. A bridge in a network using automatic single-route broadcast that forwards single-route broadcast frames.

diagnostics. Modules or tests used by computer users and service personnel to diagnose hardware problems.

disk image. A representation of a disk or diskette containing files and programs. The image resides in computer storage and is used by the computer as though it were a physical disk or diskette.

Disk Operating System (DOS). A program that controls the operation of an IBM Personal Computer or IBM Personal System/2 computer and the execution of application programs.

dump. (1) Computer printout of storage. (2) To write the contents of all or part of storage to an external medium as a safeguard against errors or in connection with debugging. (3) (ISO) Data that have been dumped.

E

enabled. Active, operational, and can receive frames from the network. (Servers and functional addresses may be enabled by programs running on the Token-Ring Network.)

establishment. A user's premises that does not extend across public rights of way (for example, a single office building, warehouse, or campus).

F

formatted diskette. A diskette on which track and sector control information has been written and which may or may not contain data.

Note: A diskette must be formatted before it can receive data.

frame. The unit of transmission in the Token-Ring Network. It includes delimiters, control characters, information, and checking characters.

H

hard error. An error occurring on the network that makes it inoperative. See beaconing.

"hello" message. A message used by automatic single-route broadcast to detect what bridges enter and leave the network and to reset single-route broadcast parameters accordingly. The root bridge sends a "hello" message on the network every 2 seconds.

help panel. Information displayed by a program or system in response to a help request from a user. An on-line display that tells you how to use a command or another aspect of a product.

hop count. The number of bridges through which a frame has passed on the way to its destination.

Note: Hop count applies to all broadcast frames that are not single-route broadcast frames.

hop count limit. The maximum number of bridges through which a frame may pass on the way to its destination.

K

kilobyte (KB). 1024 bytes.

L

LAN segment. Any portion of a local area network (for example, a single ring or bus) that can operate independently, but is connected to the establishment network via bridges, controllers, or gateways.

LAN segment status. The condition of the LAN segment (ring or bus).

link. The combination of physical media, protocols, and programming that connects devices on a network.

lobe. In the IBM Token-Ring Network, the section of cable (which may consist of several segments) that attaches a device to an access unit.

local area network (LAN). A data network located on the user's premises in which a serial transmission is used for direct data communication among data stations.

M

megabyte (MB). (1) A unit of measure for storage capacity. One megabyte equals 1 048 576 bytes. (2) Loosely, one million bytes.

N

NAUN. Nearest active upstream neighbor. For any station on a ring, the station that is sending frames or tokens directly to it.

network. A configuration of data processing devices and software connected for information interchange.

network manager. A program or group of programs that is used to monitor, manage, and diagnose the problems of a network.

no carrier. On broadband networks, a condition in which a carrier signal is not being broadcast on a given frequency. In the absence of such a carrier, no information can be modulated on that frequency.

node. Each computer in the IBM PC Network is referred to as a node. Each node includes a personal computer, an adapter, and the necessary software.

non-broadcast frame. A frame containing routing information specifying which bridges are to forward

it. A bridge will forward a non-broadcast frame only if that bridge is included in the frame's routing information.

P

page. (1) The portion of a panel that is shown on a display surface at one time. (2) To move back and forth among the pages of a multiple-page panel. See also *scroll*.

panel. (1) A formatted display of information that appears on a terminal screen. See also *help panel*. (2) In computer graphics, a display image that defines the locations and characteristics of display fields on a display surface.

path. (1) The route traversed by the information exchanged between two attaching devices in the network. (2) A command in DOS that searches specified directories for commands or batch files that were not found by a search of the current directory.

path cost. A value, maintained by each bridge, that indicates the relative length of the path between the root bridge and another bridge.

path trace. A function that may be requested of a bridge by a received frame. The request is for a record of the bridges through which the frame has passed.

R

RAM Paging. RAM paging is a technique that allows the computer software to access all the RAM on the adapter, without having to map the entire shared RAM into the computer's memory map. The shared RAM on the adapter is paged into the computer's memory map one area at a time.

RAM size. The amount of RAM that is directly mapped into the computer's memory map.

random access memory (RAM). A computer's storage area into which data may be entered and retrieved in a nonsequential manner.

read-only memory (ROM). A computer's storage area whose contents cannot be modified.

ring (network). A network configuration where a series of attaching devices, such as IBM Personal Computers, are connected by unidirectional transmission links to form a closed path. A ring of an IBM Token-Ring Network is referred to as a LAN segment or as an IBM Token-Ring Network segment.

root bridge. The bridge in a network using automatic single-route broadcast that sends the "hello" message on the network every 2 seconds. Automatic single-route broadcast uses the message to detect when bridges enter and leave the network, and to change single-route broadcast parameters accordingly.

S

scroll. To move all or part of the display image vertically to display data that cannot be observed within a single display image. See also *page*.

server. A device, program, or code module on a network dedicated to a specific function.

shared RAM. Random access storage on the adapter that is shared by the computer in which the adapter is installed.

single-route broadcast. The forwarding of specially designated broadcast frames only by bridges which have single-route broadcast enabled. If the network is configured correctly, a single-route broadcast frame will have exactly one copy delivered to every LAN segment in the network. Also called limited broadcast.

soft error. (1) An intermittent error on a network that requires retransmission. The adapters are able to retransmit the data that had the difficulty and communication continues. (2) An error on a network that affects the network's performance but does not, by itself, affect its overall reliability. If the number of soft errors reaches the ring error limit, reliability is affected.

splitter. A passive, 5-Mhz to 300-Mhz bandpass device. The device is coupled in line to a main trunk or branch for splitting the power and the information signal two or more ways on a coaxial network. Splitters always pass through 60-Hz power to the network, if used.

stand-by bridge. A bridge in a network using automatic single-route broadcast that does not forward single-route broadcast frames. A stand-by bridge is a parallel bridge or is in a parallel path between two LAN segments.

T

threshold. In the Bridge Program, refers to a value set for the number of frames per 10 000 that can be lost before an entry is made in the bridge Performance Statistics, and a notification is sent to any network manager program that has requested such reports.

V

virtual drive. A direct access storage device that does not physically exist. It exists logically in computer memory.

W

working disk(ette). A computer fixed disk or diskette to which files are copied from an original diskette for use in daily operation.

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