Bridge Management Software—Windows

FEDERAL COMMUNICATIONS COMMISSION
AND
INDUSTRY CANADA
RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

TRADEMARKS USED IN THIS MANUAL

IBM®, AT®, NetView®, and OS/2® are registered trademarks of International Business Machines Corporation.

Microsoft®, MS-DOS®, and Windows® are registered trademarks of Microsoft Corporation.

Any other trademarks mentioned in this manual are acknowledged to be the property of the trademark owners.

NORMAS OFICIALES MEXICANAS (NOM)
ELECTRICAL SAFETY STATEMENT

INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.

2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.

3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.

4. Todas las instrucciones de operación y uso deben ser seguidas.

5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc..

6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.

7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.

8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.

9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.

10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.

11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.

13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.

14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.

15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.

16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.

17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.

18. Servicio por personal calificado deberá ser provisto cuando:

    A: El cable de poder o el contacto ha sido dañado; u

    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o

    C: El aparato ha sido expuesto a la lluvia; o

    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o

    E: El aparato ha sido tirado o su cubierta ha sido dañada.

Contents

Contents (continued)

1. Introduction

The Bridge Management Software—Windows program allows you to control local and remote bridges from a central location using a PC with Windows on any token-ring segment of your network.

1.1 Features and Benefits

With Bridge Management Software—Windows, you can:

- Fully control each bridge unit across your network—whether point-to-point, frame relay, or local—including sending commands and changing configuration parameters.

- Use the automatic NetScan function to quickly display information about the bridges, such as status, number, type, and MAC address.

- Set up MAC addresses and protocol filters to decrease frame traffic and increase security.

- Use source-routing or transparent bridging protocol with the SRT option on local bridges.

- Upgrade operating code if necessary by downloading through the network.

1.2 Token-Ring Bridges

Our token ring bridges allow you to greatly increase the reach of your network, without sacrificing manageability. They are designed to be fully compatible with the IBM token-ring network, server functions, LAN Manager program, and NetView®.

These bridges connect two or more geographically separated LANs. Using point-to-point configuration with a standard data telecommunications link, they allow you to build a worldwide token ring enterprise network. You can upgrade all remote bridges to support frame relay WAN communication.

Table 1-1. Remote Bridges.

Remote Bridges	Description
LB7620C	A remote bridge on a PC card that installs into a standard 16-bit expansion slot. Self-contained, draws power from the PC bus. Software or hardware configurable for either 4- or 16-Mbps operation.
LB7620A	A stand-alone bridge supporting 4- or 16-Mbps operation. Can be used in point-to-point or frame-relay configurations.
LB7600A	A high-end remote bridge supporting 4- or 16-Mbps operation. Advanced features include SDLC outstanding frame threshold limit and SNMP support, dual EEPROM configuration/operating code banks, dual WAN port, and Frame-Relay switching capabilities.
LB7610A	A slim-chassis rackmount remote bridge ideally suited to regional-center applications.
LB7630A	An integrated bridge and intelligent Multistation Access Unit (MAU). Has seven lobe ports for attaching token-ring devices and a MAU port for attaching external MAU to extend number of lobe ports.

2. Installation

This chapter describes installing Bridge Management Software—Windows. It includes:

- Meeting the requirements for installation

- Installation procedure

- Using a secondary adapter

2.1 Requirements for Installation

Make sure you have the following before installing Bridge Management Software—Windows:

- An IBM® AT® or compatible clone (16 MHz 80386SX or faster recommended) with:

- Microsoft® Windows® 3.1 installed

- IBM PC-DOS or Microsoft MS-DOS 3.3 or higher

- Minimum 4 MB of RAM

- A floppy disk drive, 3 1/2" or 5 1/4"

- A hard drive with at least 2 Mb of free space

- CGA, VGA or better color monitor

- A mouse compatible with Windows

  If you have a small network, you can use the PC for other functions in addition to bridge management. If you have a large network, however, you should dedicate your PC to the running of Bridge Management Software.

- An installed token-ring adapter card if the PC is communicating with the bridges over the LAN. The card must operate at the appropriate network speed (4 Mbps or 16 Mbps) and support IEEE 802.2 Logical Link Control.

- An available COM port and a DB25 cable, if the PC is communicating with each bridge individually over an RS-232 serial connection.

- One or more token-ring bridges.

2.2 Installation Procedure

To install Bridge Management Software—Windows, do the following:

1. Modify the PC's CONFIG.SYS file to load the network drivers: an interrupt arbitrator and a Logical Link Control interface. (Bridge Management Software does not use NetBIOS.)

   Using Notepad or another ASCII text editor, add the following device specifications:

Enter: For:

DEVICE=pathnameDXMA0MOD.SYS   Interrupt arbitrator
DEVICE=pathnameDXMC0MOD.SYS   LLC driver
DEVICE=pathnameDXMT0MOD.SYS   NetBIOS driver   (optional)

2. Place the Bridge Management Software—Windows program diskette in the PC's floppy drive.

3. From the Program Manager File menu, choose Run. In the Run dialog box, type *drive letter:\pathname***SETUP** and click OK.

4. Follow the instructions on the screen to install Bridge Management Software—Windows.

2.3 Using a Secondary Adapter

If you want Bridge Management Software to use an appropriately configured secondary adapter, modify the Windows WIN.INI file, as follows:

1. Near the end of the [Bridge Management Software] section, locate the line:

   Adapter=0

2. Change the 0 to 1 for a secondary adapter. If there is no such line in the [Bridge Management Software] section, type in the whole line:

   Adapter=1

For more information, refer to your adapter card's documentation.

3. Operation

This chapter describes operating Bridge Management Software—Windows. It includes:

- Starting Bridge Management Software—Windows

- Using Bridge Management Software—Windows information windows.

- Using Bridge Management Software—Windows command menus.

3.1 Starting Bridge Management Software—Windows

To start the Bridge Management Software program, do the following:

1. Make sure the PC and the bridges on the network are installed and powered on.

2. Double-click on the Bridge Manager icon on the screen. A screen displays program version information. Click on OK.

```
┌─────────────────────────────────────────────────────┐
│ ▬              Bridge Manager                        │
├─────────────────────────────────────────────────────┤
│  ┌──────────┐              Bridge Manager Program    │
│  │ ┆OK┆     │                   Copyright © 1992     │
│  └──────────┘                  All rights reserved   │
│                                      Version 1.14    │
│                                                      │
│                                                      │
│                                                      │
└─────────────────────────────────────────────────────┘
```
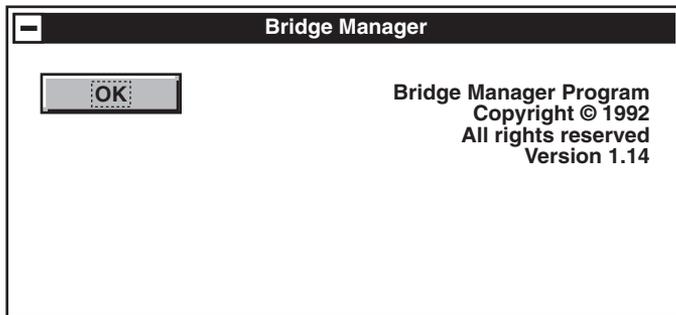
Figure 3-1. Program Version Information Screen.

3. The screen displays the Communication Type dialog box. Select Token Ring or RS-232 serial port and click on OK.
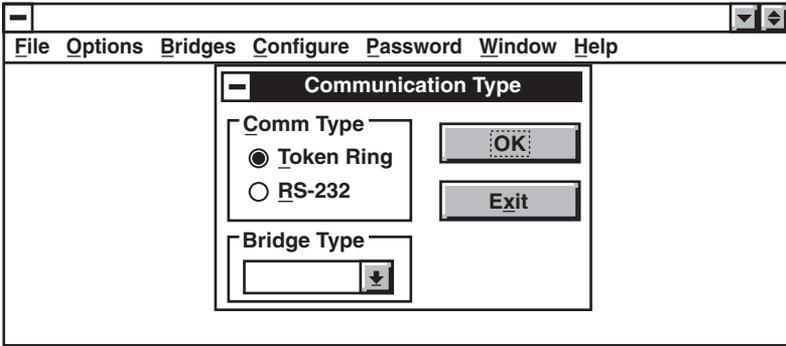
Figure 3-2. Communication Type Dialog Box.

3.1.1 TOKEN RING SERIAL CONNECTION

If you select Token Ring, the program prompts you for a NetScan password.
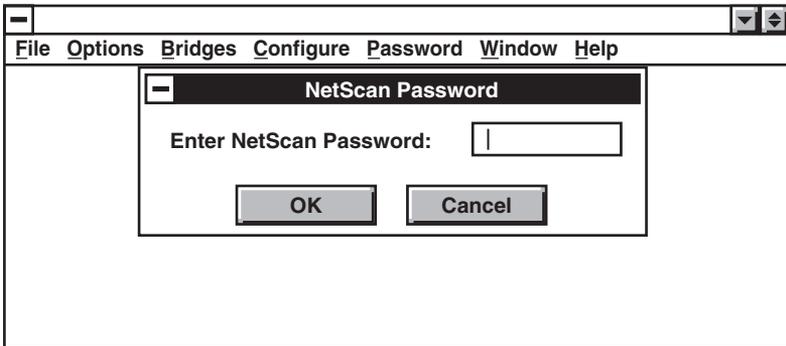
Figure 3-3. Enter NetScan Password Prompt.

1. Enter the NetScan password, or if you are starting Bridge Management Software for the first time, press Enter.

2. The screen displays the Bridge Management Software information windows in either cascaded or tiled format. To configure screen display format, use the Window pull-down menu described in **Section 3.3**.
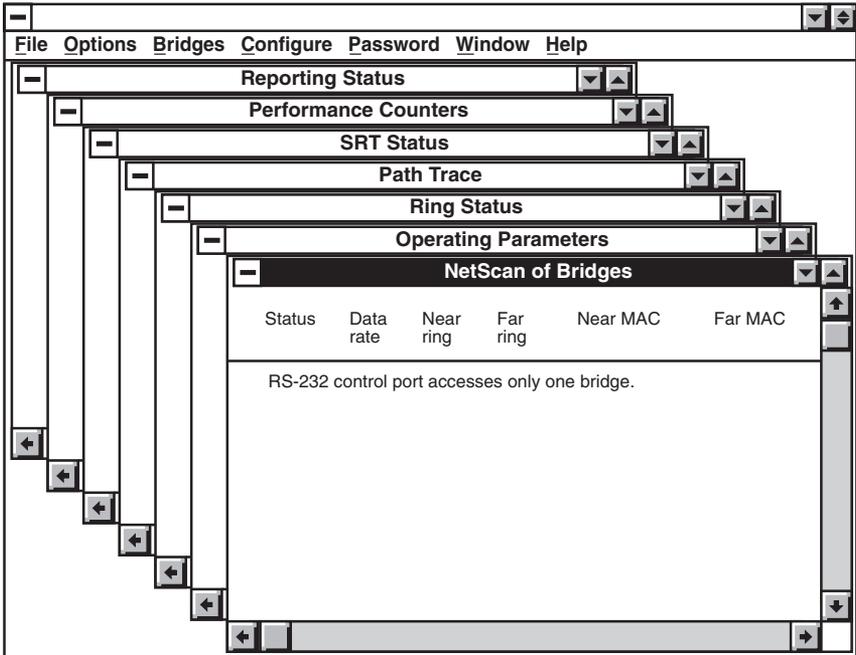
Figure 3-4. Bridge Management Software Information Windows in Cascaded Format.
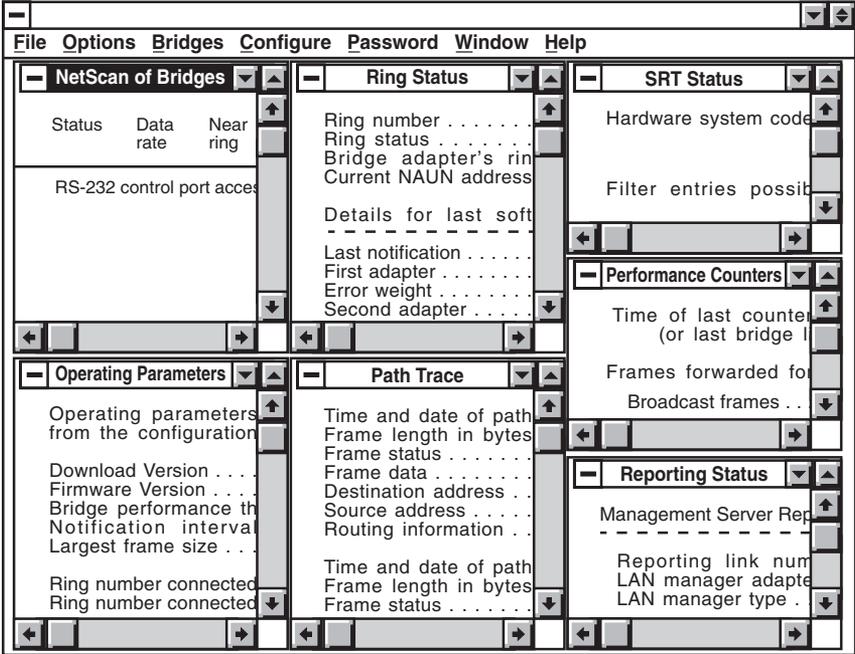
Figure 3-5. Bridge Management Software Information Windows in Tiled Format.

3.1.2 RS-232 SERIAL PORT CONNECTION

If you select RS-232, the PC must be connected to the bridge's serial control port with an appropriate cable.

1. From the Communication Type screen, select RS-232 and a bridge type and click on OK.
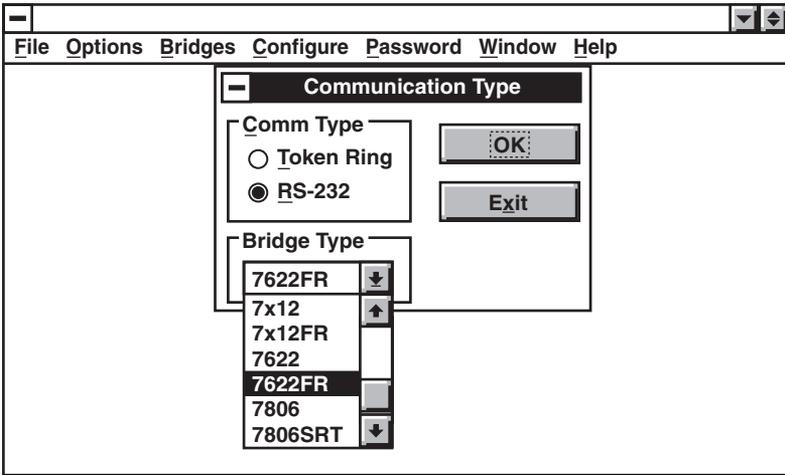
Figure 3-6. Communication Type Screen.

NOTE
"7622" refers to the LB7600A.

"7x12" refers to LB7610A, LB7620A, LB7620C, and LB7630A.

2. The screen prompts you for a bridge link password.
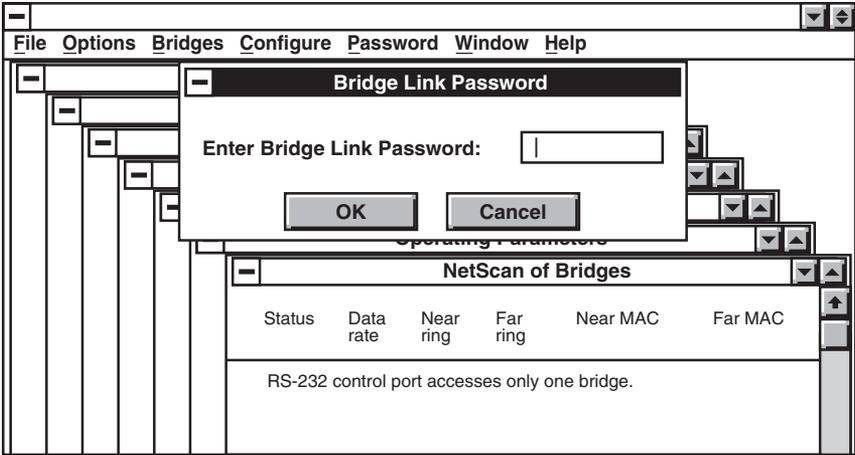
Figure 3-7. Bridge Link Password Prompt.

3. Enter the Bridge Link password, or type BRIDGE if you are using Bridge Management Software for the first time. Click OK.

4. The screen displays the Bridge Management Software information windows.

3.2 Using Information Windows

The Bridge Management Software program includes seven information windows, described in **Table 3-1**.

Table 3-1. Information Windows.

Bridge Management Software Window	Description
NetScan of Bridges	Provides a quick survey of the entire network so you can identify trouble spots. Allows you to select a bridge for configuration.
Operating Parameters	Shows the current value of configuration parameters.
Ring Status	Shows any network problems on either token ring.
Path Trace	Display information about path trace activity.
SRT Status	Displays status of each transparent filter table in bridge.
Performance Counters	A three-page screen displaying information about flow of traffic, WAN Line Use test feature, and frame-relay Permanent Virtual Circuit.
Reporting Status	Displays information about status of reporting links between bridge and IBM LAN Manager program.

To move through an information window, use the mouse or the Page Up and Page Down keys. For further information on using Bridge Management Software, use the Help pull-down menu, described in **Section 3.3.7**.

3.2.1 NETSCAN OF BRIDGES WINDOW

The automatic NetScan function allows you to control bridges without being physically present at a bridge site. After a bridge is installed, powered on, and successfully initialized, it establishes itself automatically as a ring station on each connected ring. It then waits for a "Hello, I'm here" broadcast message from Bridge Management Software. When it receives the message, it sends the Bridge Management Software its address. Once the Bridge Management Software knows a bridge's address, you have full control of the bridge across the network.

You can use two Bridge Management Software packages at once to communicate with a bridge, but only one at a time to send commands, change configuration parameters, or download operating code.

You control access to a bridge with passwords.

You cannot use NetScan when your Bridge Management Software PC is connected to a bridge's serial control port.

Use the NetScan of Bridges window to quickly survey your entire network. The window displays the operating status of up to 200 bridges so that you can identify trouble spots if necessary.

Status	Data rate	Near ring	Far ring	Near MAC	Far MAC	Bridge type
NetScan of Bridges						
< >		Unlinked				
_ _ _ _ _ _ _ _ _ _ 0 hops _ _ _ _ _ _ _ _ _ _						
	4–4	204-B-BB1		000104021637	000104021636	7606
_ _ _ _ _ _ _ _ _ _ 1 hops _ _ _ _ _ _ _ _ _ _						
	4–4	BB1-D-404		000104021600	000104021601	1212
	4–16	BB1-A-104		000104021664	000104021665	2212
	4–E	BB1-C-304		00010402152E	00010402152F	7609
	4–16	BB1-7-604		000104021667	000104021666	SRT
_ _ _ _ _ _ _ _ _ _ 2 hops _ _ _ _ _ _ _ _ _ _						

Figure 3-8. NetScan of Bridges Window.

You can also use the NetScan of Bridges window to configure a bridge:

1. Click on the line with the <> character (often the Unlinked line).

2. When that line is highlighted, click on the line of the bridge you want to configure. The <> character should then appear next to it.

If the PC is connected to a bridge through the control port, no information is displayed.

NetScan of Bridges						
File	Options	Bridges	Configure	Password	Window	Help
Status	Data rate	Near ring	Far ring	Near MAC	Far MAC	Bridge type
RS-232 control port accesses only one bridge.						
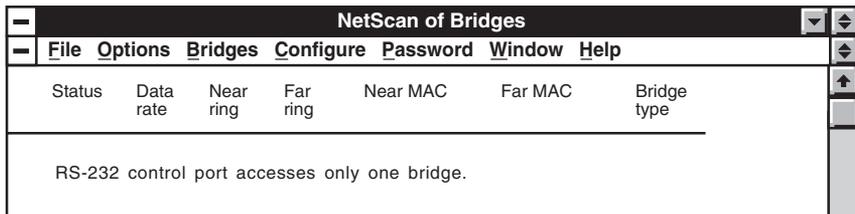
Figure 3-9. Configuring a Bridge Using the NetScan of Bridges Window.

The NetScan of Bridges window displays the following information:

Status. Bridge operating status:

startup	Bridge is in Startup Mode
closed	Far ring is non-operational
???	Status of the bridge is unknown
soft errs	Excessive soft errors on the network
beaconing	Far ring is in a beaconing condition
disable	Frame forwarding option has been turned off

Data Rate. Data rates of the two rings to which a bridge is attached. For example:

4-16	Near ring is 4 Mbps and far ring is 16 Mbps
4-FR or 16-FR	4 and 16 indicate the speed of the ring, FR is the WAN interface.

4-4   Unknown status. Communication with Bridge
             Management Software may have been lost.

Near Ring/Far Ring. Bridge units are designated in this window as
follows: 001-8-002

   In this example, token ring 001 (the ring closest to the Bridge Management
Software) is connected to token ring 002 by bridge 8. All numbers are
hexadecimal. The range of token-ring numbers is 001 to FFF. The range of
bridge numbers is 0 to F.

Near MAC. MAC address assigned to the bridge on the ring closest to the
Bridge Management Software.

Far MAC. MAC address assigned to the bridge on the ring farthest from the
Bridge Management Software.

Bridge Type. Type of bridge:

Remote bridge pairs are represented by a four-number code. The first two
numbers indicate the bridge nearest to the Bridge Management Software.
The second two numbers indicate the bridge farthest from the Bridge
Management Software.

   12   LB7610A, LB7620A, LB7620C, LB7630A
   22   LB7600A
   FR   Frame-relay WAN link to one or more remote bridges of any type
          (LB7600A, LB7610A, LB7620A, LB7620C, or LB7630A)

WAN Status. Displays the status of each WAN port on the LB7600A:

   O   Open. Bridge acknowledging.
   C   Closed. Bridge not acknowledging or not acknowledging correctly.

3.2.2 OPERATING PARAMETERS WINDOW

Use the Operating Parameters window to display the current configuration parameters of your bridge.

```
┌─────────────────────────────────────────────────────────────────┐
│ ▬              Operating Parameters                        ▼ ▲   │
├─────────────────────────────────────────────────────────────────┤
│                                                                   │
│   Operating parameters currently in effect.  These may differ     │
│   from the configuration if there has not been a reset.           │
│                                                                   │
│   Download Version . . . . . . :                                  │
│   Firmware Version . . . . . . . :        Frame forwarding active . . . . :    NO │
│   Bridge performance threshold . . . . . . . . . . . . . . . . . . . . . . . . :        00.0 │
│   Notification interval . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . :           0 │
│   Largest frame size . . . . . . :      516 Bridge number . . . . . . . . . . . . :           0 │
│                                                                   │
│   Ring number connected to token-ring port A . . . . . . . . . . . . . . . . . . . . :        000 │
│   Ring number connected to token-ring port B . . . . . . . . . . . . . . . . . . . . :        000 │
│                                                                   │
│                                       Ring 000                Ring 000            │
│   MAC ring address . . . . . . . . . . . . . :  000000000000        000000000000        │
│                                                                   │
│   Hop count limit . . . . . . . . . . . . . . . . . . . . :        0                  0           │
│   Single route broadcast . . . . . . . . . . . . . . : SR-M-NO            SR-M-NO         │
│                                                                   │
│   Enabled Functional Addresses                                    │
│       Ring parameter server . . . . . . . . . . :     NO                 NO           │
│       Ring error monitor . . . . . . . . . . . . . . :     NO                 NO           │
│       Configuration report server . . . . . . . :     NO                 NO           │
│       LAN bridge server . . . . . . . . . . . . . . :     NO                 NO           │
│                                                                   │
└─────────────────────────────────────────────────────────────────┘
```

Figure 3-10. Operating Parameters Window.

Use the options shown in **Table 3-2** in the Single route broadcast field.

Table 3-2. "Single Route Broadcast" Field Options.

Entry	Meaning
SR-M-Yes	Source-routing bridge. SR Broadcast Mode set to manual. Single Route Broadcast set to Yes.
SR-M-No	Source-routing bridge. SR Broadcast Mode set to manual. Single Route Broadcast set to No.
SR-A-Yes	Source-routing bridge. SR Broadcast Mode set to Auto. Single Route Broadcast set to Yes. Enables Spanning Tree.
SR-A-No	Source-routing bridge. SR Broadcast Mode set to Auto. Single Route Broadcast set to No.
SRT-Yes	SRT bridge. SR Broadcast Mode always auto. Single Route Broadcast set to Yes. Enables SRT functionality. See **Chapter 7**.
SRT-No	SRT bridge. SR Broadcast Mode always auto. Single Route Broadcast set to No.

3.2.3 RING STATUS WINDOW

Use the Ring Status window to display ring status information and determine network problems. It includes two screens, one for each token ring.
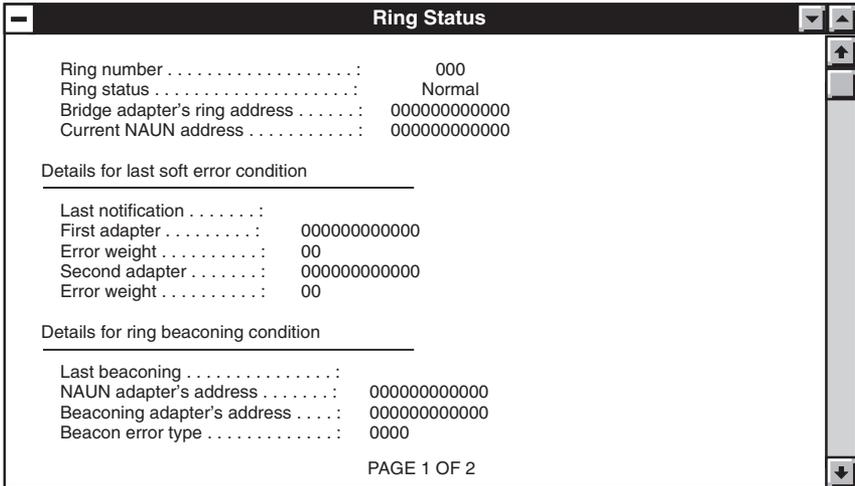
```
┌─────────────────────────────────────────────────────────────────┐
│ ▬                        Ring Status                       ▼ ▲   │
├─────────────────────────────────────────────────────────────────┤
│                                                              ↑   │
│    Ring number . . . . . . . . . . . . . . . . . . :    000      │
│    Ring status . . . . . . . . . . . . . . . . . . . :   Normal  │
│    Bridge adapter's ring address . . . . . . :  000000000000     │
│    Current NAUN address . . . . . . . . . . . :  000000000000    │
│                                                                  │
│   Details for last soft error condition                          │
│   ─────────────────────────────────────                          │
│                                                                  │
│    Last notification . . . . . . . :                             │
│    First adapter . . . . . . . . . :    000000000000             │
│    Error weight . . . . . . . . . . :    00                      │
│    Second adapter . . . . . . . :       000000000000             │
│    Error weight . . . . . . . . . . :    00                      │
│                                                                  │
│   Details for ring beaconing condition                           │
│   ─────────────────────────────────────                          │
│                                                                  │
│    Last beaconing . . . . . . . . . . . . . . . :                │
│    NAUN adapter's address . . . . . . . :  000000000000          │
│    Beaconing adapter's address . . . . :  000000000000           │
│    Beacon error type . . . . . . . . . . . . . :  0000           │
│                              PAGE 1 OF 2                      ↓   │
└─────────────────────────────────────────────────────────────────┘
```

Figure 3-11. Ring Status Window.

The Ring Status window displays the following information:

Details for last soft error condition. Items relating to soft errors. If there is no data to display, the item is followed by zeroes.

Last notification. Date last soft error notification received from the attached ring. If there is no date, no soft error notifications were received.

First Adapter and Second Adapter. MAC addresses of the first and second adapters reporting the soft error condition.

Error weight. Severity of the soft error (00 hex = lowest and 80 hex = highest)

Details for ring beaconing condition. Date and error information:

Last beaconing. Date of the last beaconing condition on the attached ring. If there is no date, there has been no beaconing condition.

NAUN adapter's address. Adapter address of Nearest Active Upstream Neighbor.

Beaconing adapter's address. Fault domain or offender's MAC address.

Beacon error type. Type of beacon error:

0001	Recovery mode set
0002	Signal loss error
0003	Streaming signal not Claim Token MAC frame
0004	Streaming signal. Claim Token MAC frame or intermediate detection of hard error.

3.2.4 PATH TRACE WINDOW

Use the Path Trace window to see information about path trace activity when a trace has been initiated by the IBM LAN Manager program. The window displays the five most recent frames, with the most recent one listed first.
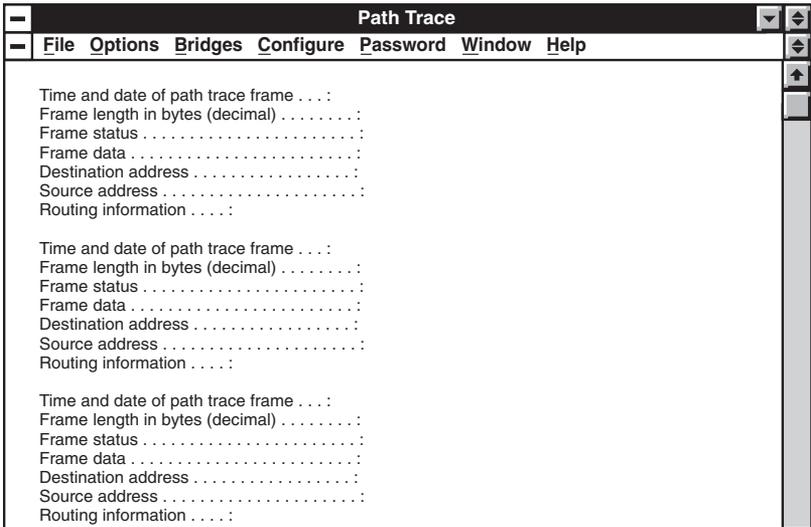
```
┌─┬──────────────────────────────── Path Trace ────────────────────┬─┬─┐
│─│  File  Options  Bridges  Configure  Password  Window  Help      │ │▲│
├─┴─────────────────────────────────────────────────────────────────┤ │▲│
│                                                                     │ │ │
│     Time and date of path trace frame . . . :                       │ │ │
│     Frame length in bytes (decimal) . . . . . . . . :               │ │ │
│     Frame status . . . . . . . . . . . . . . . . . . . . . . :      │ │ │
│     Frame data . . . . . . . . . . . . . . . . . . . . . . . :      │ │ │
│     Destination address . . . . . . . . . . . . . . . . :           │ │ │
│     Source address . . . . . . . . . . . . . . . . . . . . :        │ │ │
│     Routing information . . . . :                                    │ │ │
│                                                                     │ │ │
│     Time and date of path trace frame . . . :                       │ │ │
│     Frame length in bytes (decimal) . . . . . . . . :               │ │ │
│     Frame status . . . . . . . . . . . . . . . . . . . . . . :      │ │ │
│     Frame data . . . . . . . . . . . . . . . . . . . . . . . :      │ │ │
│     Destination address . . . . . . . . . . . . . . . . :           │ │ │
│     Source address . . . . . . . . . . . . . . . . . . . . :        │ │ │
│     Routing information . . . . :                                    │ │ │
│                                                                     │ │ │
│     Time and date of path trace frame . . . :                       │ │ │
│     Frame length in bytes (decimal) . . . . . . . . :               │ │ │
│     Frame status . . . . . . . . . . . . . . . . . . . . . . :      │ │ │
│     Frame data . . . . . . . . . . . . . . . . . . . . . . . :      │ │ │
│     Destination address . . . . . . . . . . . . . . . . :           │ │ │
│     Source address . . . . . . . . . . . . . . . . . . . . :        │ │ │
│     Routing information . . . . :                                    │ │ │
└─────────────────────────────────────────────────────────────────────┘
```

Figure 3-12. Path Trace Window.

3.2.5 PERFORMANCE COUNTERS WINDOW

The Performance Counters window consists of three screens:

- Frames forwarded screen

- WAN line counters and use screen

- Frame relay PVC statistics screen

To reset all counters to zero, select Clear Counters from the Bridges pull-down menu.

Frames Forwarded Screen

Use this screen to evaluate the flow of bridge traffic by counting how many frames were and were not forwarded. The counts displayed are cumulative, and update automatically every 10 seconds.
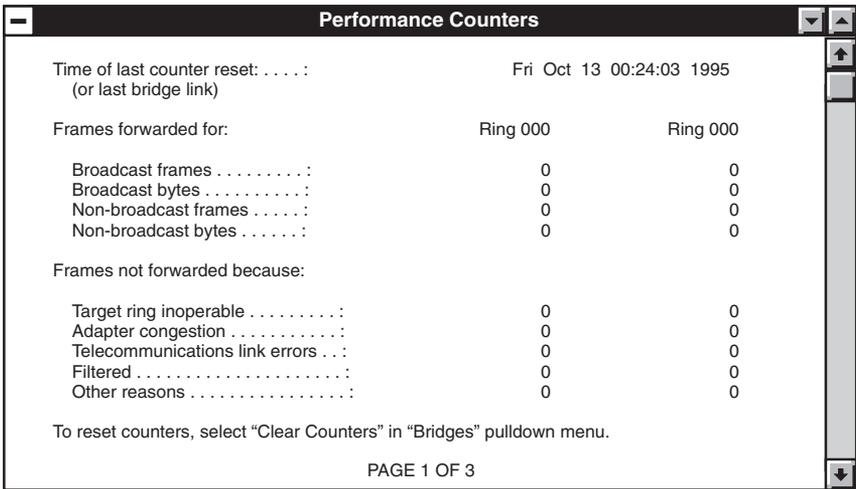

Figure 3-13. Performance Counters Screen.

WAN Line Counters and Utilization Screen

Use this screen to monitor WAN line use. For more information, see
Appendix C.

```
┌─────────────────────────────────────────────────────────────────┬───┬───┐
│ ▬                    Performance Counters                        │ ▼ │ ▲ │
├─────────────────────────────────────────────────────────────────┴───┼───┤
│                                                                      │ ♦ │
│   WAN line counters:                                                 │   │
│                                                                      │   │
│      BaudRate (bps X 1000) . . . . . . . . . . . :        2.4     2.4│   │
│      Transmitted Bytes . . . . . . . . . . . . . . . . :    0       0│   │
│      Time Interval (sec) . . . . . . . . . . . . . . . :    0       0│   │
│      Accumulated Transmitted Bytes . . . . . :           0       0   │   │
│      Elapsed Time (sec) . . . . . . . . . . . . . . :     0       0   │   │
│      Transmitted Packets . . . . . . . . . . . . . . :    0       0   │   │
│      Accumulated Transmitted Packets . . . :            0       0   │   │
│      Receiver errors . . . . . . . . . . . . . . . . . . :    0       0│   │
│      Accumulated Receiver errors . . . . . . . :         0       0   │   │
│                                                                      │   │
│   WAN line utilization:                                              │   │
│                                                                      │   │
│      Average utilization . . . . . . . . . . . . . . . :   0.00    0.00│   │
│      Current utilization . . . . . . . . . . . . . . . . :  0.00    0.00│   │
│      Average frame error rate . . . . . . . . . . . :     0.00    0.00│   │
│      Current frame error rate . . . . . . . . . . . . :   0.00    0.00│   │
│                                                                      │   │
│   To reset counters, select "Clear Counters" in "Bridges" pulldown menu.│  │
│                          PAGE 2 OF 3                                  │ ↓ │
└─────────────────────────────────────────────────────────────────────┴───┘
```

Figure 3-14. WAN Line Counters and Utilization Screen.

Frame Relay PVC Statistics Screen

Use this screen to display the Permanent Virtual Circuit (PVC) table for use with remote bridges communicating on a frame-relay WAN link. By entering segment numbers and Data Link Connection Identifiers (DLCIs) for all your leased PVCs, you allow the Bridge Manager to record statistical information on bridge performance.

	DLCI	Transmit packets	Received packets	Lost•Bad Format packets
PVC 1	0	0	0	0
PVC 2	0	0	0	0
PVC 3	0	0	0	0
PVC 4	0	0	0	0
VR Link 1	0	0	0	0
VR Link 2	0	0	0	0
VR Link 3	0	0	0	0
VR Link 4	0	0	0	0
VR Link 5	0	0	0	0

Performance Counters

Frame Relay PVC Statistics

Bad DLCI Packets: 0

Frame Relay Management Packets Sent: 0
Received: 0

To reset counters, select "Clear Counters" in "Bridges" pulldown menu.
PAGE 3 OF 3

Figure 3-15. Frame Relay PVC Statistics Screen.

3.2.6 REPORTING STATUS WINDOW

Use the Reporting Status window to display information about the status of reporting links between the selected bridge and an IBM LAN Manager program. There can be up to four links, but you can use only one as a controlling link.

```
┌─┬──────────────────────────────────────────────────────────┬───┬─┐
│─│                      Reporting Status                     │ ▼ │▲│
│ │                                                           │   │▼│
├─┼──────────────────────────────────────────────────────────┴───┼─┤
│─│ File  Options  Bridges  Configure  Password  Window  Help     │▲│
│ │                                                               │▼│
└─┴───────────────────────────────────────────────────────────────┴─┘

   Management Server Reporting Links

       Reporting link number . . . . . . . . . . . . . . . . . :            0
       LAN manager adapter address . . . . . . . . . . . :   10005A278D21
       LAN manager type . . . . . . . . . . . . . . . . . . . . :        Controlling
       LAN manager route . . . . :

       Reporting link number . . . . . . . . . . . . . . . . . :
       LAN manager adapter address . . . . . . . . . . . :
       LAN manager type . . . . . . . . . . . . . . . . . . . . :
       LAN manager route . . . . :

       Reporting link number . . . . . . . . . . . . . . . . . :
       LAN manager adapter address . . . . . . . . . . . :
       LAN manager type . . . . . . . . . . . . . . . . . . . . :
       LAN manager route . . . . :

       Reporting link number . . . . . . . . . . . . . . . . . :
       LAN manager adapter address . . . . . . . . . . . :
       LAN manager type . . . . . . . . . . . . . . . . . . . . :
       LAN manager route . . . . :
```

Figure 3-16. Reporting Status Window.

3.3 Using the Pull-Down Menu Bar

The menu bar at the top of the Bridge Management Software screen display
includes seven pull-down menus, each with options. To open a pull-down
menu, use the mouse or press <Alt> and the first letter of the menu name.
(For example, press <Alt/F> to open File.)
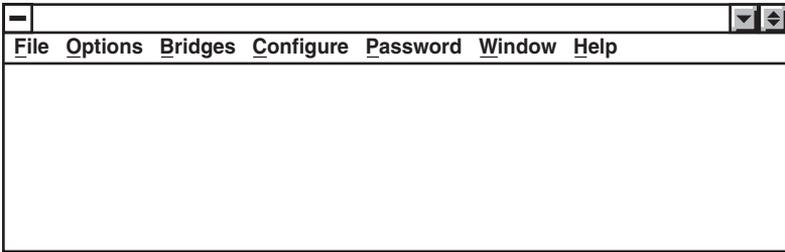
Figure 3-17. Pull-Down Menu Bar.

Use the menus and menu options described in **Table 3-3** to perform various
actions on a bridge.

Table 3-3. Menus and Menu Options.

Menu	Use menu options to:
File	Exit program.
Options	Reset adapter card. Configure PC COM port.
Bridges	Select a bridge. Clear counters. Update parameters. Reset control port. Reset startup mode. Download new code. Restart bridge mode. Perform loopback test. Display LAN table.
Configure	Control ports. Configure bridge, filter, and miscellaneous parameters. See **Chapter 4**.
Password	Change bridge link and NetScan passwords.
Window	Determine how the screen displays windows and icons and other information.
Help	Load Help system with index, list of keys, commands, procedures.

3.3.1 FILE MENU
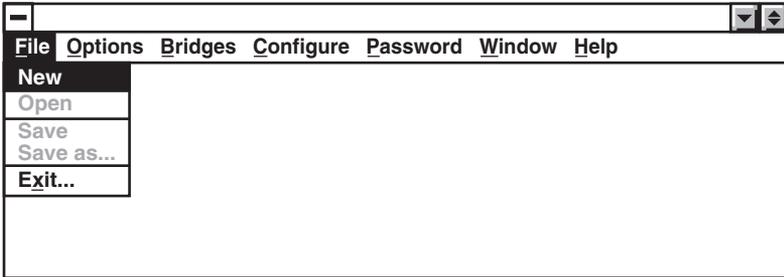
Figure 3-18. File Menu.

Use the File menu to do the following:

Exit. Exit the Bridge Management Software program.

The other File menu options are not yet available.

3.3.2 OPTIONS MENU
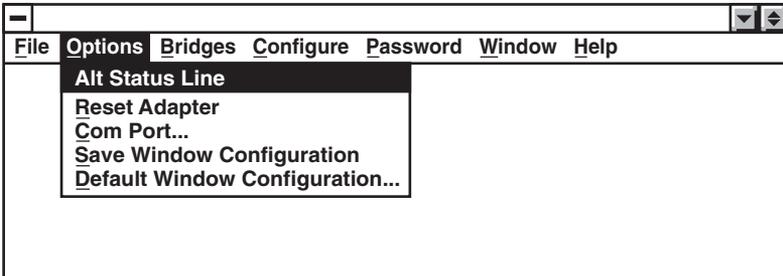
Figure 3-19. Options Menu.

Use the Options menu to do the following:

Alt Status Line. Not yet implemented.

Reset Adapter. Resets the token-ring adapter card in the Bridge Management Software PC. Clears all windows of data, except Performance Counters window. Breaks any existing bridge link.

Com Port. Reconfigures the PC serial port you are using to connect to a bridge's control port.

Save Window Configuration. Saves the way the windows are currently laid out as your User Configuration, which you can select at any time from the Windows menu.

Default Window Configuration. Choose how the Bridge Management Software screen display appears at startup:

Tile. Fits all windows onto screen.
Cascade. Factory default. Opens windows so that each title bar is visible.
Arrange Icons. Minimizes windows
User Configuration. See **Save Window Configuration**.

3.3.3 BRIDGES MENU
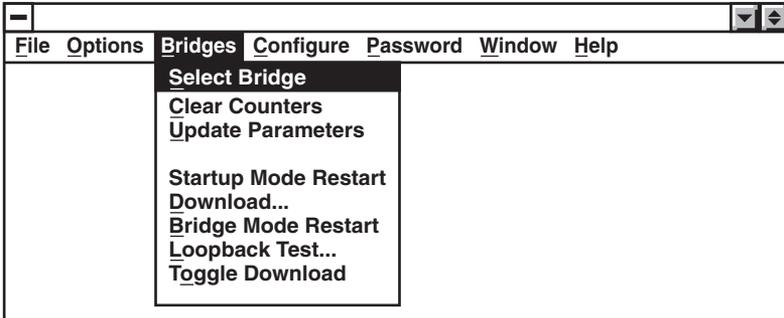
Figure 3-20. Bridges Menu.

Use the Bridges options to do the following:

Select Bridge. To select a bridge using the keyboard, choose this option, then use the arrow keys to highlight the bridge you want to configure. Press Enter.

Clear Counters. Resets the Performance Counters to zero.

Update Parameters. Refreshes the information windows with current information when the PC is connected to a bridge's control port.

Reset Control Port. Resets a bridge's control port to default parameters. Resets the PC's COM1 port.

NOTE

The PC's COM1 port will revert to the configuration you specified during Bridge Management Software installation the next time you start Bridge Management Software. To change this setting, choose "Com Port" in the Options menu.

Startup Mode Restart. Restarts the currently selected bridge and brings it up in startup mode. The bridge communicates with the Bridge Management Software, but frames are not bridged. Startup mode is required for downloading the new operating code to a bridge.

Download. Downloads an operating-code upgrade from a PC drive to the selected bridge. See **Chapter 5** for more information.

Bridge Mode Restart. Restarts the currently selected bridge and brings it up in bridge mode, the normal operating mode the bridge.

Loopback test. Performs a remote loopback test on point-to-point remote bridges. See **Appendix C** for more information.

3.3.4 CONFIGURE MENU

Use the Configure menu options to change various parameters, including control port, bridge parameters, filters, and source routing or transparent protocol. See **Chapter 4** for more information.

3.3.5 PASSWORD MENU
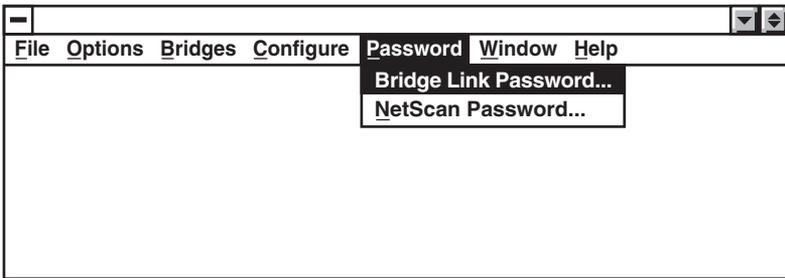
Figure 3-21. Password Menu.

Use the Password options to do the following:

Bridge Link Password. Prompts you for the bridge link password, allowing you to change passwords without restarting the Bridge Management Software. This is useful on networks that have a different password for every bridge.

NetScan Password. Prompts you for the NetScan password, allowing you to change passwords without restarting the Bridge Management Software. This password is not necessary when the Bridge Management Software PC is connected to a bridge unit's serial control port.
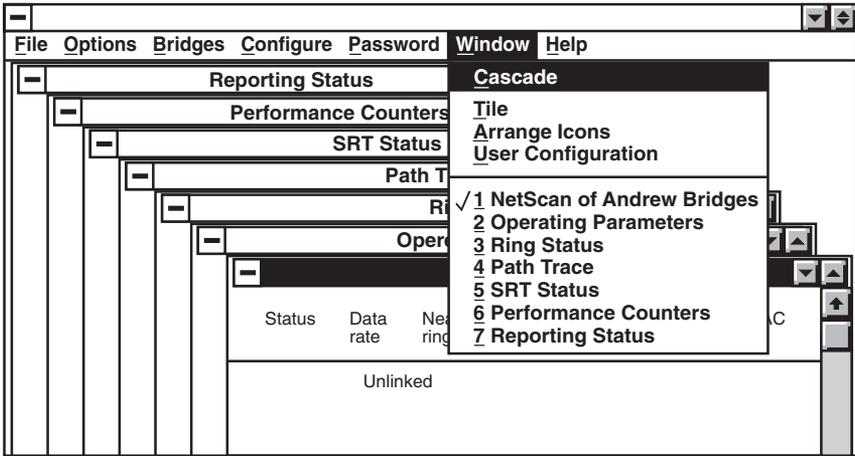
Figure 3-22. Window Menu.

Use the Window options to do the following:

Cascade. Open windows overlap so that each title bar is visible.

Tile. Displays open windows to fit inside the Bridge Management Software screen display.

Arrange Icons. Displays the Bridge Management Software information window icons at the bottom of the screen.

User Configuration. Brings up the user configuration you saved using "Save Window Configuration" in the Options menu.

Information Window List. Choose the desired name to make that window active.

3.3.7 HELP MENU
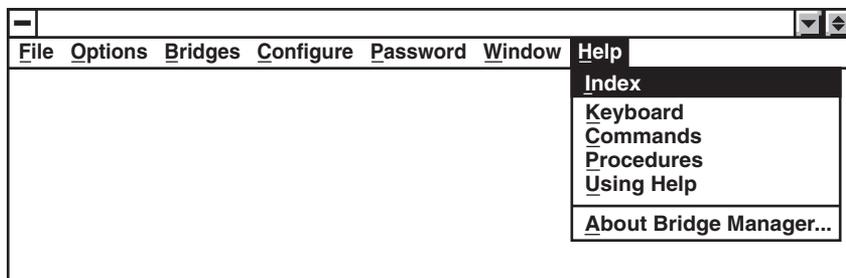
Figure 3-23. Help Menu.

Use the Help options to do the following:

Index. Displays Bridge Management Software Help index.

Keyboard. Displays information on Bridge Management Software keyboard functions.

Commands. Displays information on Bridge Management Software commands.

Procedures. Displays information on Bridge Management Software procedures.

About the Bridge Management Software. Displays version information for the Bridge Management Software.

Using Help. Loads the Microsoft Windows Help system.

4. Configuration

This chapter describes using Bridge Management Software—Windows to configure a bridge or bridges on your LAN. If you are using a bridge connected through its serial control port, you must configure it directly through its port.

4.1 Starting Configuration

To start the configuration process, do the following:

1. Start Bridge Management Software.

2. Select the bridge you want to configure from the NetScan of Bridges window. Pull down the Passwords menu and select Bridge Link Password. Enter the password. (The default is BRIDGE.)

   Click on the line with the <> character (usually the unlinked line) and while the line is highlighted, click on the name of the bridge you are selecting. It may take a moment for Bridge Management Software to establish the link.

3. Select the Configure pull-down menu from the menu bar and select the option or options you want to use.
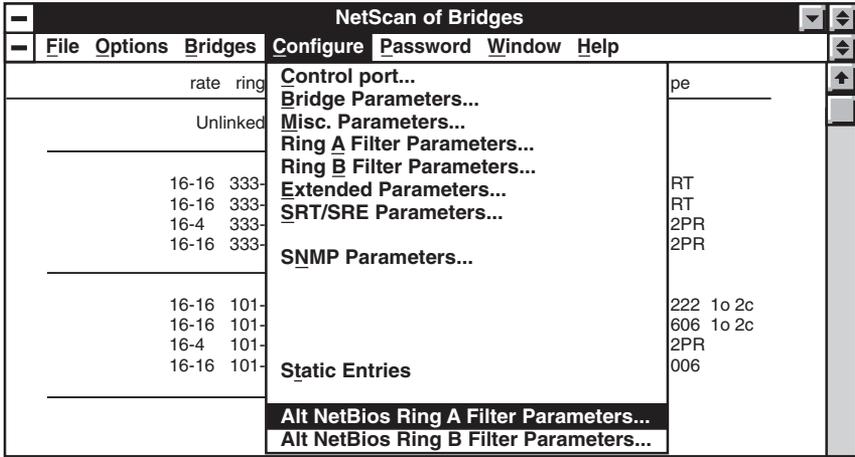
Figure 4-1. Configure Pull-Down Menu.

4.2 Configuring a Control Port

To configure a control port:

1. Select Control port from the Configure pull-down menu. The screen displays the RS-232 Configuration dialog box:
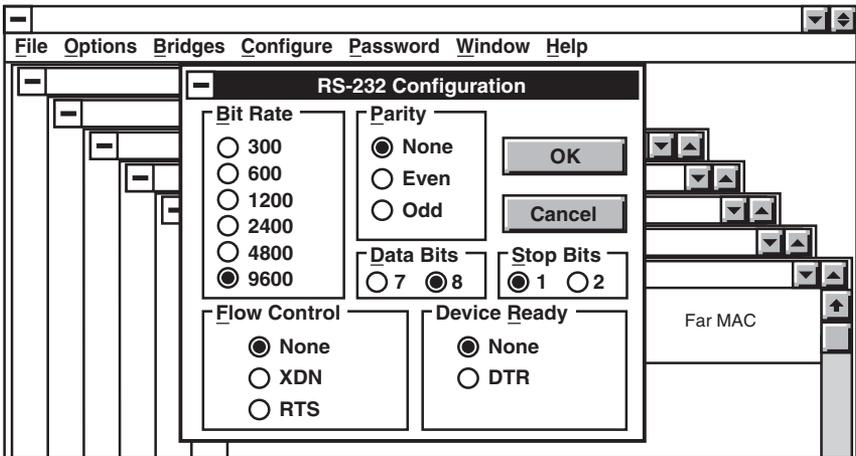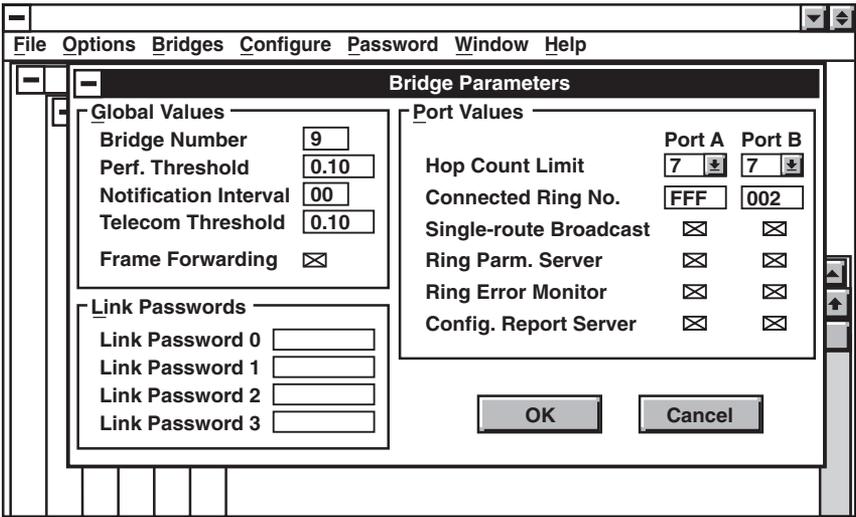

Figure 4-2. RS-232 Configuration.

2. Type in new information where you want to change parameters. Use the mouse or the <Tab> or <Shift/Tab> keys to move between fields.

3. Click on OK to save any changes. Changes do not take effect until you reset the bridge. To reset the bridge, select Bridge Mode Restart from the Bridges pull-down menu.

You can change the following to set up RS-232 configuration:

Table 4-1. Setting Up RS-232 Configuration.

Parameter	Default	Range
Bit Rate	9600	300, 600, 1200, 2400, 4800, 9600
Parity	None	None, Odd, Even
Data Bits	8	7 or 8
Stop Bits	1	1 or 2
Flow Control	None	XON, None, RTS
Device Ready	None	DTR or None

4.3 Configuring the PC's COM Port

You can configure the PC's COM in two ways:

• Select the COM Port option in the Options pull-down menu, or

• Edit the Windows WIN.INI file.

4.3.1 USING THE COM PORT OPTION

To configure the PC's COM port using the COM Port option, do the following:

1. Make sure the PC is connected to the bridge's serial control port with an appropriate cable.

2. Select COM Port from the Options pull-down menu. The screen displays the PC COM port dialog box:
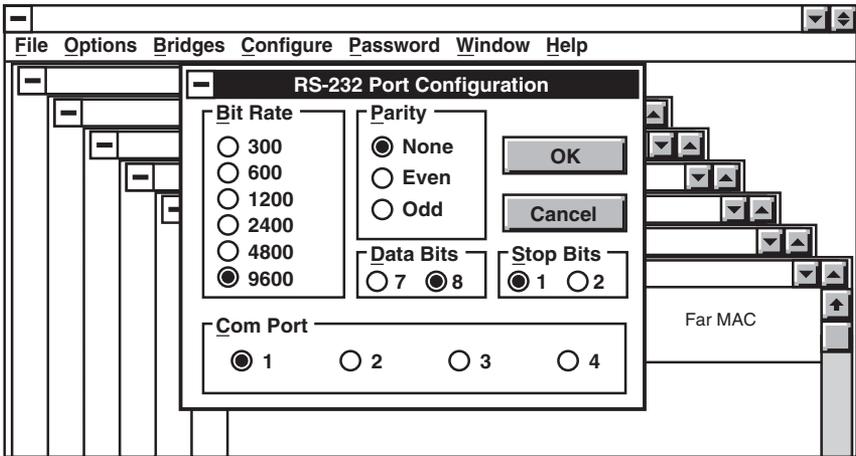
Figure 4-3. Using the COM Port Option.

3. Select the appropriate parameters and click OK.

4.3.2 USING THE WIN.INI FILE

To configure the PC's COM port using the WIN.INI file, do the following:

1. Open WIN.INI with an ASCII text editor, such as Windows Notepad.

2. In the [Bridge Management Software] section of WIN.INI, edit the line:

   CommDCB=COM1:96,N,8,1

   COM1. The PC serial port assigned to the Bridge Management Software. Options are COM1, COM2, COM3 and COM4.

   96. The two-digit abbreviation for 9600 bps. Options are 30 (300 bps), 60 (600 bps), 12 (1200 bps), 24 (2400 bps), 48 (4800 bps) and 96 (9600 bps).

   N. No parity. The only allowable setting.

   8. Indicates 8 data bits. The only allowable setting.

   1. Indicates 1 stop bit. Options are 1 and 2.

3. Save the changes to the WIN.INI file and exit Windows.

4.3.3 CONFIGURING BRIDGE PARAMETERS

To configure bridge parameters:

1. Select Bridge parameters from the Configure pull-down menu. The
   screen displays the Bridge Parameters dialog box:

Figure 4-4. Bridge Parameters.

2. Type in new information where you want to change parameters. Use the
   mouse or the <Tab> or <Shift/Tab> keys to move between fields.

3. Click on OK to save any changes. Changes do not take effect until you
   reset the bridge. To reset the bridge, select Bridge Mode Restart from the
   Bridges pull-down menu.

You can change the following information on the Bridge Parameters dialog box.

Table 4-2. Bridge Parameters Options.		
Parameter	**Default**	**Range**
Bridge Number	9	hex 0-F
Performance Threshold	0.10%	0% to 100%
Notification Interval	0	0 to 99 minutes
Telecom, Threshold	00.10	00.00-99.98
Frame Forwarding	Yes	Yes/No
Link Passwords (0-3)	00000000	6-8 alphanumeric characters
Hop Count Limit	7	1-7
Connected Ring No.	003/002	hex 001-FFF
Single-route Broadcast	Yes	Yes/No
Ring Parameter Server	Yes	Yes/No
Ring Error Monitor	Yes	Yes/No

Config. Report Server	Yes	Yes/No

- *Bridge Number*—Identifies the bridge to the Bridge Management Software. Bridge numbers do not have to be unique throughout the network, but two parallel bridges connecting the same rings must have different bridge numbers. The bridge number is part of a frame's routing information field.

- *Notification Interval*—Specifies how long, in minutes, the bridge will wait before sending each notification of performance counter data to IBM LAN Managers. Specifying 0 minutes stops all notifications.

- *Telecommunication Threshold*—Specifies a frame error rate. When this rate is exceeded, the bridge sends an alert message to the IBM LAN. The range is 00.00% to 99.99%. If you enter 00.00, no alert messages are sent. To determine which LAN Manager has a controlling link over the bridge, select the Reporting Status window.

- *Performance Threshold*—Defines the percentage of lost frames tolerated before the IBM LAN Manager is notified. Default is 0.10%.

  For more information, refer to **Appendix C**.

- *Frame Forwarding*—Enables frame forwarding, the basic operation of a bridge. Set to No to disable frame forwarding. Both ports are affected.

- *Link Password 0/1/2/3*—Allows the bridge to verify that an IBM LAN Manager can establish a reporting link. The passwords configured in the bridge must agree with those configured for the IBM LAN Manager programs.

  Do not change the link passwords if your network does not use IBM LAN Manager or if the IBM LAN Manager in you network has default passwords.

- *Hop Count Limit*—Defines how many hops (bridge links between two token rings) a frame can pass through and still be able to pass through Port A or B on the selected bridge.

  Non-broadcast frames are exempt from this limit, but because they use broadcast frames to determine their routes through the network, they are limited by the hop count limit.

- *Connected Ring Number*—Specifies the number of the ring to which token-

ring Ports A and B are attached. Ring numbers must be unique throughout the entire network.

A ring number can be overridden if it has already been assigned a different number by another Bridge Management Software or IBM LAN Manager. If so, the current ring number is displayed in the NetScan of Bridges window.

If you change ring numbers from the IBM LAN Manager, change both ring numbers to unused values such as EEE and FFF and then change them to the desired values. The bridge then operates with the new ring numbers.

• *Single-route Broadcast*—Select Yes to allow single-route broadcast frames to pass from this token ring to the other. Select No to discard broadcast frames.

This parameter is an important network planning tool. Those bridges which pass single-route broadcast frames should be selected to form a spanning-tree network topology. For more information, see **Chapter 7**.

• *Ring Parameter Server*—Specifies whether or not the Ring Parameter Server function is active on this port. When it is active, the functional address for the Ring Parameter Server is enabled, and frames associated with this server that are received by that port are handled according to the server's requirements.

• *Ring Error Monitor*—Activates the Ring Error Monitor (REM) for this port by enabling the REM functional address. For more information, see **Appendix A**.

• *Configuration Report Server*—Specifies whether or not the Configuration Report Server function is active on this port. For more information, see **Appendix A**.

4.4 Configuring Miscellaneous Parameters

To configure miscellaneous parameters:

1. Select "Misc. Parameters" from the Configure pull-down menu. The screen displays the Miscellaneous Parameters dialog box:
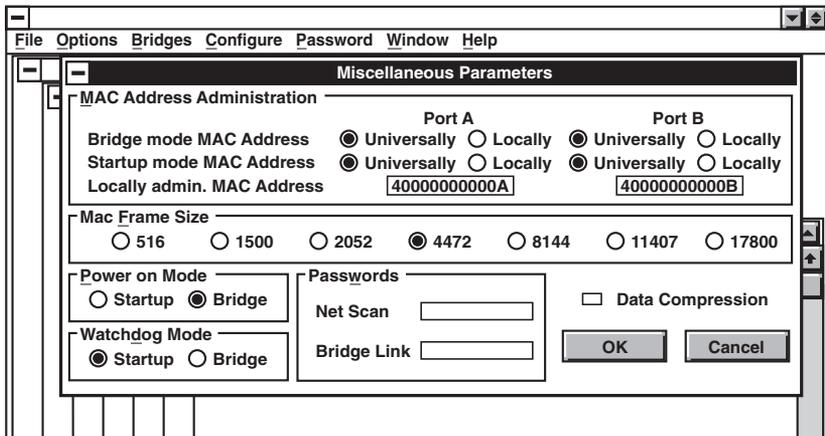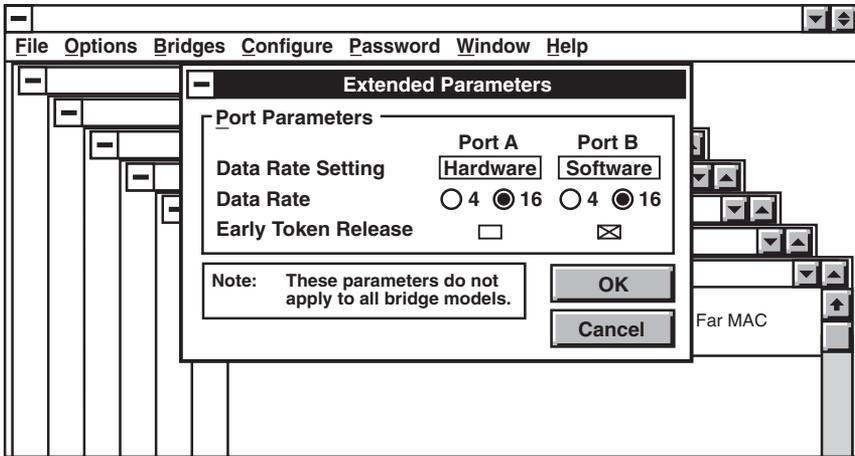

Figure 4-5. Miscellaneous Parameters Dialog Box.

2. Type in new information where you want to change parameters. Use the mouse or the <Tab> or <Shift/Tab> keys to move between fields.

3. Click on OK to save any changes. Changes do not take effect until you

reset the bridge. To reset the bridge, select "Bridge Mode Restart" from the Bridges pull-down menu.

You can change the following miscellaneous parameters:

Table 4-3. Miscellaneous Parameters Options.

Parameter	Default	Range
Bridge Mode MAC Address	universally	universally, locally
Startup Mode MAC Address	universally	universally, locally
Locally Admin MAC Address (Ring A)	40000000000A	See description
Locally Admin MAC Address (Ring B)	40000000000B	See description
Max Frame Size	4472	See description
Power On Mode	startup	startup, bridge
Watchdog Mode	bridge	startup, bridge
NetScan Password	(anything)	8 alphanumeric char
Bridge Link Password	BRIDGE	8 alphanumeric char

Data Compression   Yes   Turn off above 256 Kbps

- *Bridge Mode MAC Address. Startup Mode MAC Address.*—Locally Administered MAC Address. Used to override the MAC-level address permanently recorded in each bridge unit. Enter the desired address. Specify a secondary address, beginning with 4, 5, 6 or 7.

- *Maximum Frame Size*—Defines the largest frame size (in bytes) that can be passed by the bridge. Options for most bridges are 516, 1500, 2050 and 4472.

- *Power On Mode*—Specifies mode in which the bridge comes up after you power it on.

- *Watchdog Mode*—Specifies mode in which the bridge unit comes up after a watchdog time-out.

- *NetScan Password*—Allows you to access the information in the NetScan of Bridges information window. You cannot control or configure a bridge without the password.

  You do not have to give all bridges the same NetScan password, but you should. When you enter a password at the beginning of a session, only those bridges with the same password appear in the NetScan of Bridges window.

- *Bridge Link Password*—Allows you to change bridge configurations, download new operating code and gather detailed statistics on bridge performance. You do not have to give all bridges the same bridge link password, but you should. The default password for the bridge link level is BRIDGE.

- *Software data compression*—Used with remote bridges to increase throughput over the remote link by compressing the data. Data compression should be turned off above 256 Kbps.

• *Hardware data compression*—Used with the LB7600A bridge.

4.5 Configuring Ring A or B Filter Parameters

Configuring Ring A or B filter parameters allows you to set up MAC address and protocol NetBIOS filtering of source-routed frames. See **Chapter 6** for more information.

4.6 Configuring Extended Parameters

Extended parameters apply only to bridge models supporting 16-Mbps operation. To configure extended parameters:

1. Select "Extended Parameters" from the Configure pull-down menu. The screen displays the Extended Parameters dialog box:
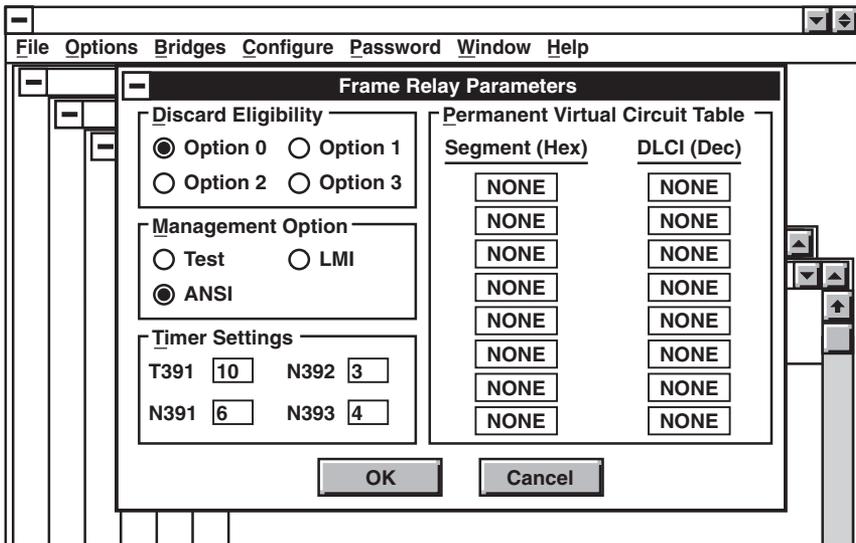

Figure 4-6. Extended Parameters Dialog Box.

2. Type in new information where you want to change parameters. Use the mouse or the <Tab> or <Shift/Tab> keys to move between fields.

3. Click on OK to save any changes.

You can change the following extended parameters:

Table 4-4. Extended Parameters.

Extended Parameters	Default Port A	Default Port B	Range
Data Rate Jumper Setting	Software*	Software*	Software*, Hardware
Data Rate	4 Mbps	4 Mbps	4 Mbps, 16 Mbps
Early Token Release	No	No	Yes, No

*Applies to all bridges except LB7630A.

• *Data Rate Setting*—Indicates whether LAN speed is selected by hardware on a physical bridge unit. On the LB7620A and LB7600A bridges, use the back-panel DIP switch. On the LB7630A bridge, you must select LAN speed using hardware.

• *Data Rate*—Indicates the LAN speed of a given token-ring port. Data rates you have set with hardware can be 4 or 16 Mbps. If you have set the data rates with software, you can use this parameter to change a token-ring port's data rate.

Hardware LAN-speed selections override software selections. See your bridge user's guide for more information.

• *Early Token Release*—Allows more than one token at a time to be released onto the network. Applies to 16-Mbps rings only.

4.7 Configuring Frame-Relay Parameters

Frame-relay parameters allow remote bridges to communicate without a separate physical link between each one. Frame relay bridges are connected with Permanent Virtual Circuits (PVCs). Data frames are routed through the network with a Data Link Connection Identifier (DLCI). A DLCI is an attached label identifying a logical connection between the bridge and the network access node.

The default frame-relay parameters are recommended by the ANSI T1.617 Annex D management specification. If they are not appropriate for your application, you must reconfigure them before the bridge is connected to the frame relay network. You can obtain most of the information you need from your frame-relay carrier.

If you are using IBM LAN Manager, you must assign a unique MAC address to each frame relay bridge in the network. The MAC address must be in the range 4000 0000 0000 to 4000 7999 9999.

To configure frame-relay parameters:

1. Select "Frame Relay Parameters" from the Configure pull-down menu. The screen displays the Frame Relay dialog box:

Figure 4-7. Frame Relay Parameters Dialog Box.

2. Type in new information where you want to change parameters. Use the mouse or the <Tab> or <Shift/Tab> keys to move between fields.

3. Click on OK to save any changes. Changes do not take effect until you reset the bridge. To reset the bridge, select "Bridge Mode Restart" from the Bridges pull-down menu.

You can change the following frame-relay parameters:

Table 4-5. Frame Relay Parameters Options.

Parameter	Default	Range
Discard Eligibility	0	0, 1, 2
Management Option	ANSI	ANSI, LMI, TEST
Timer settings		
T391	10	5-30 seconds
N391	6	1-255 polling cycles
N392	3	1-10 errors
N393	4	1-10 seconds
PVC Table	Empty	4 segments, 4 DLCIs

• *Discard Eligibility*—The DE bit used by the bridge to identify which frames should be discarded if there is congestion on the network.

0 sets the DE bit to 0. Frames originating from the bridge are least likely to be discarded in the event of congestion.

1 sets the DE bit to 1 in all frames bound to a given destination if a frame is received from that destination with the Backward Explicit Congestion Notification (BECN) bit set to 1. The BECN is set to 1 by the frame-relay network to notify the bridge of possible congestion on the network.

2 instructs the bridge that is the source of frames with the Forward Explicit Congestion Notification (FECN) bit set to 1 to discard frames to the same destination for 1/2 second. The FECN is set to 1 by the frame-relay network to notify the bridge that a specific frame has already encountered congestion on the network.

- *Management Option*—Specifies the type of management used on the frame-relay network.

  ANSI. ANSI T1.617 Annex D management specification. Default.

  LMI. Local Management Interface, the predecessor to the ANSI T1.617 Annex D standard.

  TEST. Identical to the ANSI option except that bridges do not shut down the link if the management frames it sends out are not acknowledged. This option is useful for testing bridge units with modem eliminators in isolation from the frame relay network.

- *T391—Link Integrity Verification Timer*—Indicates how frequently, in seconds, the bridge should initiate a Status Inquiry message. Range is 5 to 30. Default is 10.

- *N391—Full Status Polling Cycles*—Indicates how frequently the bridge requests a Full Status Report, in polling cycles. A polling cycle is defined as a Status Inquiry and Status message exchange. Range is 1 to 255. Default is 6.

- *N392—Error Threshold*—Indicates the number of either Local In-Channel Signaling Link Reliability Errors and/or Local In-Channel Signaling Protocol Errors that can occur during the time period specified by N393 before a bridge or channel is declared inactive. Range is 1-10. Default is 3.

- *N393—Monitored Events Count*—With N392, specifies size of sliding window used to decide if a channel or bridge is active. A monitored event is defined as the transmission of a Status Inquiry message. Range is 1 to 10. Default is 4.

4.8 Configuring SNMP Parameters

You can set up some bridges so that they are managed by Simple Network Management Protocol (SNMP). Configure these parameters from the SNMP manager. You must assign an Internet Protocol (IP) address with Bridge Management Software before the SNMP Manager can access the bridge.

To configure SNMP parameters:

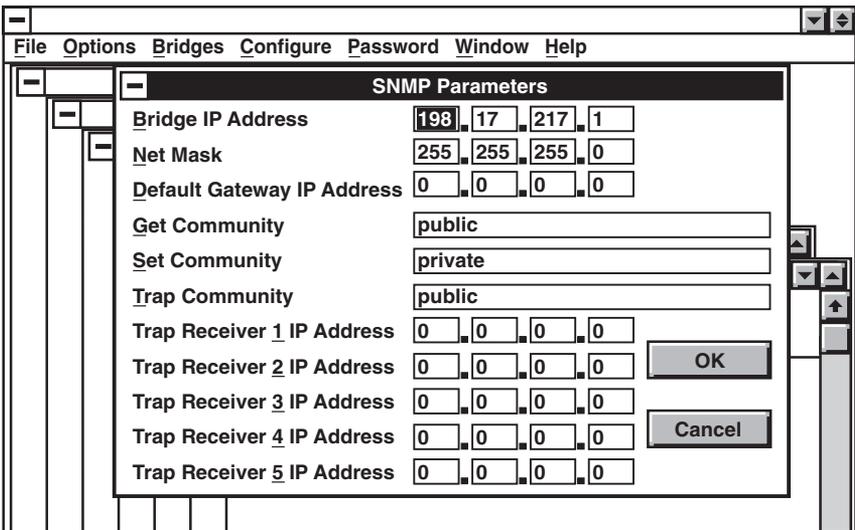1. Select "SNMP Parameters" from the Configure pull-down menu. The screen displays the SNMP Parameters dialog box:

Figure 4-8. SNMP Parameters Dialog Box.

2. Type in new information where you want to change parameters. Use the mouse or the <Tab> or <Shift/Tab> keys to move between fields.

3. Click on OK to save any changes. Changes do not take effect until you reset the bridge. To reset the bridge, select "Bridge Mode Restart" from the Bridges pull-down menu.

You can change the following SNMP parameters:

Table 4-6. SNMP Parameter Options.

Parameter	Default	Range
Bridge IP Address	IEEE assigned	Any 32-bit IP address
Net Mask	255.255.255.00	Any 32-bit IP address
Default Gateway IP Address	00.00.00.00	Any 32-bit IP address
Get Community	Public	Anything
Set Community	Private	Anything
Trap Community	Public	Anything
Trap Receiver (1-5) IP Address	00.00.00.00	Any 32-bit IP address

- *Bridge IP Address*—Displays the bridge's IP address. Default IP addresses are universally assigned by the IEEE, but can be locally administered.

- *Net Mask*—Displays 32-bit mask indicating where to divide an IP address into the network portion and the host portion. Set all bits in the network portion to 1 and all bits in the host portion to 0.

  For example, a subnet that has a 24-bit network portion and an 8-bit host portion would have a mask of 255.255.255.00. A subnet that has a 25-bit network portion and a 7-bit host portion would have a mask of 255.255.255.128.

- *Default Gateway IP Address*—IP address of default gateway. Required only if the bridge communicates with SNMP managers outside its IP subnet.

- *Get Community*—Who can GET MIB variables from the bridge. Optional.

- *Set Community*—Who can SET MIB variables in the bridge. Optional.

- *Trap Community*—Appears in the community field of all traps sent out from this bridge. Optional.

- *Trap Receiver 1-5 IP Addresses*—Configure up to five trap receiver stations. The bridge sends out no trap if none are configured.

4.9 Configuring WAN Manager Parameters

To configure WAN manager parameters for the LB7600A point-to-point bridges:

1. Select "WAN Manager Parameters" from the Configure pull-down menu. The screen displays the WAN Manager Parameters dialog box:

Figure 4-9. WAN Manager Parameters Dialog Box.

2. Type in new information where you want to change parameters. Use the mouse or the <Tab> or <Shift/Tab> keys to move between fields.

3. Click on OK to save any changes. Changes do not take effect until you reset the bridge. To reset the bridge, select "Bridge Mode Restart" from the Bridges pull-down menu.

You can change the following WAN manager parameters:

Table 4-7. WAN Manager Parameters Options.

Parameter	Default	Range
WAN Management Mode	Disable	Disable Dial Backup Load Sharing Bandwidth on Demand
WAN Mgmt. Times/ WAN Hello Frame Transmit Interval	10	10-100 seconds
WAN Port Remote Response Timeout Primary Port Secondary Port	30 30	30-300 seconds 30-300 seconds
Secondary Port Parameters: Conn Est Timeout Conn Relay Delay Max Dialup Retries	10 10 10	90-600 seconds 20-100 seconds 0-100 seconds
Load Sharing Parameters (Rec. Packet Timeout)	10	1-30 seconds

Table 4-7 (continued). WAN Manager Parameters Options.

Parameter	Default	Range
Load Sharing Transmit Method	Balanced	WAN Port 1 first WAN Port 2 first Balanced
Bandwidth On Demand Param.		
Load Interval	10	10-100 seconds
Dialup Threshold	30	1-99%
Hangup Threshold	5	1-99%

- *WAN Management Mode*—Use with LB7600A point-to-point bridges. Specify mode of operation:

  Disable. Disables second WAN port. Data is transferred through port 1 only. Allows compatibility with earlier versions of the LB7600A, LB7610A, LB7620A, LB7620C, and LB7630A bridges. Default.

  Dial Backup. Secondary port is activated only if primary port   fails. If the primary port recovers, the secondary port is   deactivated.

  Load Sharing. Both WAN ports are operating and WAN traffic is load-shared dynamically across the WAN circuits.

  Bandwidth on Demand. The secondary port is activated if   traffic volume on the primary port reaches the Dial-Up Load Threshold, or if the primary port fails. It is deactivated if traffic volume falls below the Hangup Load Threshold.

- *WAN Management Times/WAN Hello Frame Transmit Interval*—Determines how often the bridge sends frames across the WAN link to verify that the link is operating. Measured in tenths of seconds.

- *WAN Port Remote Response Timeout (Primary and Secondary Ports)*—Specifies how long bridge waits for a response to a WAN "Hello" Frame sent to a remote bridge before determining that the link is down. Enter separate values for primary and secondary ports. Measured in tenths of seconds.

• *Secondary Port Parameters*—Includes the following:

Connection Establishment Timeout. Specifies length of time   bridge waits to establish a remote link before aborting if the remote bridge does not respond. Measured in tenths of seconds.

Connection Retry Delay. Specifies length of time bridge waits before making another attempt to link to a remote bridge after Connection Establishment Timeout.

Maximum Dialup Retries. Number of times secondary WAN port attempts to establish a connection if the primary port fails. Used in Dial Backup mode.

• *Load Sharing Parameters*—Determine how workload is handled between the two ports. Active only when the WAN Management Mode is set to Load Sharing or Bandwidth on Demand. There is only one parameter.

Receive Packet Timeout. Maximum amount of time out-of-sequence packets are held by the receiving bridge before they   are determined as lost and forwarded to the LAN. Measured in tenths of seconds.

• *Load Sharing Transmit Method*—How the workload is distributed between the two WAN lines:

WAN Port 1 First. All traffic goes across port 1 until its bandwidth is saturated and overflow traffic goes across port 2.

WAN Port 2 First. All traffic goes across port 2 until its bandwidth is saturated and overflow traffic goes across port 1.

Balanced. The ports share the workload evenly. Frames are transmitted alternately on both ports.

• *Bandwidth-On-Demand Parameters*—Determine when load-sharing function is used when the WAN Management Mode is set to Bandwidth on Demand.

Load Measurement Time Interval. How often data traffic to   port 1 is sampled to determine if Dialup Load or Hangup Load thresholds have been exceeded.

Dial-Up Load Threshold. Traffic volume percentage above which secondary port is activated.

Hang-Up Load Threshold. Traffic volume percentage below which secondary port is activated.

4.10 Configuring Frame-Relay WAN-Port Management Parameters

To configure frame-relay WAN-port parameters for the LB7600A bridge:

1. Select "Frame Relay WAN port parameters" from the Configure pull-down menu. The screen displays the Frame Relay WAN Port Management Parameters dialog box:
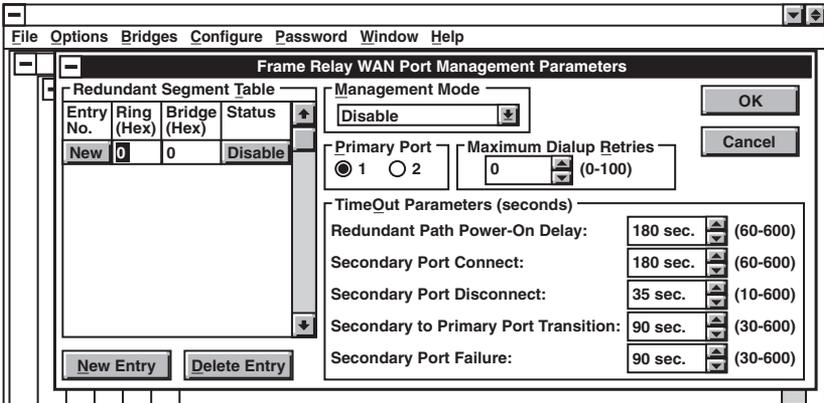

Figure 4-10. Frame Relay WAN Port Management Parameters Dialog Box.

2. Type in new information where you want to change parameters. Use the mouse or the <Tab> or <Shift/Tab> keys to move between fields.

3. Click on OK to save any changes. Changes do not take effect until you reset the bridge. To reset the bridge, select "Bridge Mode Restart" from the Bridges pull-down menu.

You can change the following frame-relay WAN parameters:

Table 4-8. Frame Relay WAN Parameters Options.

Parameter	Default	Range
Management Mode	Disable	Disable, Enable Emergency Backup
Primary Port	1	1 or 2
Max. Dialup Retries	0	0 to 100
Redundant Path Power-On Delay	180	60 to 600 seconds
Secondary Port Connect	180	60 to 600 seconds
Secondary Port Disconnect	35	10 to 600 seconds
Secondary to Primary Port Transition	90	30 to 600 seconds
Secondary Port Failure	90	30 to 600 seconds

- *Management Mode*—Determines the type of secondary port support desired. Specify one of the following:

  Disable. The second WAN port is disabled, so data is transferred through port 1 only. Ensures backward compatibility with earlier versions of the bridges. Default.

  Enable. Bridge sends WAN traffic over both ports.

  Emergency Backup. Bridge activates secondary port if there is a communication loss with one of the remote rings listed in the Redundant Segment Table.

- *Primary Port*—Specifies primary WAN port. The unselected port becomes the secondary port, activated or deactivated as needed.

- *Maximum Dialup Retries*—Maximum number of dialup attempts bridge makes on secondary port when primary port fails. If you enter 0, the bridge makes an infinite number of attempts.

- *Redundant Path Power-On Delay*—Time bridge waits for primary port to connect when you power on. If the primary port does not connect in this time, the bridge attempts to establish a link through the secondary port.

- *Secondary Port Connection*—Time bridge waits for secondary port to connect.

- *Secondary Port Disconnect*—Time bridge waits between attempts for secondary port to connect if it does not connect during the time you specified in Secondary Port Connection.

- *Secondary to Primary Port Transition*—Time bridge waits before disconnecting secondary port if primary port connects.

- *Secondary Port Failure*—Time bridge waits to disconnect from WAN after secondary port disconnects.

- *Redundant Segment Table*—For dial backup. Identifies all redundantly accessible segments (ring number and bridge number) with a check mark in the Status column if the bridge tries to connect through the secondary port. If the bridge loses its connection to this segment on the primary port, it raises DTR or secondary port.

4.11 Configuring Frame-Relay Filtering

To configure frame-relay filtering parameters:

1. Select "Frame Relay Filtering" from the Configure pull-down menu. The screen displays the Frame Relay Filter Parameters dialog box:
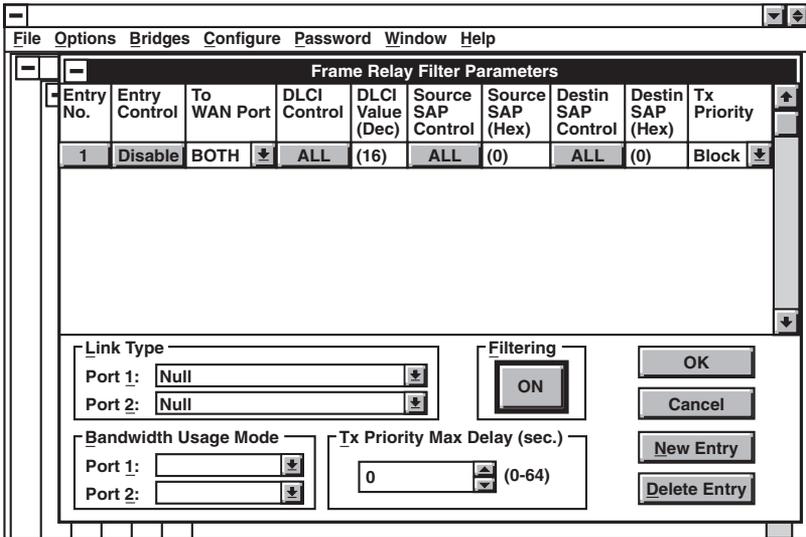

Figure 4-11. Frame Relay Filter Parameters Dialog Box.

2. Type in new information where you want to change parameters. Use the mouse or the <Tab> or <Shift/Tab> keys to move between fields.

3. Click on OK to save any changes. Changes do not take effect until you reset the bridge. To reset the bridge, select "Bridge Mode Restart" from the Bridges pull-down menu.

You can change the following frame-relay filtering parameters:

Table 4-9. Frame Relay Filtering Parameters Options.

Parameter	Default	Range
Entry No.	1	Up to 32
Entry Control	Disable	Enable/Disable
TX WAN Port	Both	WAN Port 1 WAN Port 1 Both WAN Ports
DLCI Control	All	One/All
DLCI Value (Dec.)	16	16-991 (Decimal)
Source SAP Control	All	OneAll
Source SAP (Hex.)	0	0-FF (Hexadecimal) (Must be even number, not 98H, F4H, or AAH.)
Destin. SAP Control	All	One/All
Destin. SAP (Hex.)	0	0-FF (Hexadecimal) (Must be even number, not 98H, F4H, or AAH.)
Tx Priority		+3, +2, +1, Norm -1, -2, -3, Block

Table 4-9 (continued). Frame Relay Filtering Parameters Options.

Parameter	Default	Range
Link Type Port 1/2	Null	Null VR Node over Public FR Link VR Node over Dedicated Link FR Node over Dedicated Link
Filtering	Off	On/Off
Bandwidth Usage Mode Port 1/2	Exclusive	Exclusive/Shared
Tx Priority Max Delay	0	0-64 seconds

• *Entry No.*—You can make up to 32 entries.

• *Entry Control*—Determines whether entry is enabled or disabled.

• *Tx WAN Port*—Determines whether transmission is for WAN Port 1, WAN Port 2, or both WAN Ports.

• *DLCI Control*—Determines whether entry is used for a particular DLCI or for all DLCIs per port or for both ports as determined by the Tx WAN Port field.

• *DLCI Value (Dec.)*—Decimal value of the DLCI to which filtering parameters are being applied when the DLCI Control field is set to One.

• *Source SAP Control*—Determines whether one or all source SAPs are considered.

• *Source SAP (Hex.)*—Hexadecimal value of source SAP passed to filtering process when Source SAP Control is set to One. If SAP Control is set to All, this value is enclosed in parentheses.

• *Destin. SAP Control*—Determines whether all or one destination SAPs are considered.

- *Destin. SAP (Hex.)*—Hexadecimal value of destination SAP passed to filtering process when Destination SAP Control is set to One. If Destination SAP Control is set to All, this value is enclosed in parentheses.

- *Tx Priority*—Determines priority level of filtering transmission. Used in conjunction with Bandwidth Usage Mode and Tx Priority Max Delay.

- *Link Type Port 1 / 2*—Determines type of link used for ports 1 and 2:

  Null.
  VR Node over Public FR Link.
  VR Node over Dedicated Link.
  FR Node over Dedicated Link.

- *Bandwidth Usage Mode*—Determines whether available bandwidth for each port transmits high-priority frames exclusively or shared with frames of various priorities. If you specify shared usage mode, the number of frames transmitted varies with the priority level, as shown in the following table. (These values are approximate and will vary according to your application.)

Table 4-10. Bandwidth Usage Mode.

Priority	Number of Frames Relative to Normal
+3	2.5
+2	2.0
+1	1.5
Normal	1
-1	0.75
-2	0.5
-3	0.25

- *Filtering*—Turns the filtering option on or off.

- *Tx Priority Max Delay*—Specifies maximum WAN transmit buffer size. WAN transmit buffer size is based on baud rate and number and size of frames in the queue.

  If you enter a high value in this field, it is possible that high-priority frames will consume the entire bandwidth and cause low-priority frames to be discarded. These are reported to the Bridge Management Software and appear in the Other Reasons field on the Frames Forwarded screen of the Performance Counters information window.

4.12 Configuring Static Entries

Static addresses are written to a bridge's flash EEPROM and are retained even if you turn off the bridge. See **Chapter 6** for information on storing addresses in transparent filter tables and changing static addresses.

4.13 Configuring Alternate NetBIOS Ring A or B Filter Parameters

This option allows you to set up a filtering table with up to 50 NetBIOS names and command numbers. For further information, see **Chapter 6**.

5. Upgrading Bridge Operating Code

This chapter describes how to upgrade the bridge's operating code. You can upgrade by downloading new operating code through the network, or through the bridge's control port.

All new Bridge Management Software releases are backward-compatible, so a more recent release of the program can communicate with older download versions. If newer features are not supported by a bridge, they do not appear when you select that bridge.

To upgrade the bridge, do the following:

1. Place the code distribution diskette in the diskette drive of the Bridge Management Software PC. You can copy the contents of the diskette to the hard drive, or you can download from the diskette drive.

2. Start the Bridge Management Software. Select the bridge to which you want to download, if necessary. When downloading code to more than one bridge across the network, download to bridges farthest away from the Bridge Management Software PC first, and work back.

3. Make sure the bridge is in startup mode using the "Startup Mode Restart" option. Once the bridge has been restarted, select it again.

4. Select "Download" from the Bridges menu. Enter the drive letter and path where the new code is located. The download takes approximately four minutes.

5. When the download is complete, the Bridge Management Software prompts you to restart the bridge. Use either the "Bridge Mode Restart" or "Startup Mode Restart" option.

6. Logical Filtering

This chapter describes configuring logical filtering. By filtering a frame, you block its passage by a bridge. You can use it to decrease broadcast frame traffic and to increase security on the LAN. Logical filtering applies to source-routed frames only, not to transparent frames.

You can configure two types of logical filtering with Bridge Management Software:

- • MAC address filtering

- • Protocol filtering (NetBIOS, as used by the IBM LAN Program, IBM OS/2 LAN server, and Microsoft LAN)

If you enable both types of filtering, the MAC address filtering is applied to a frame first, then Protocol filtering.

To configure logical filtering, you should be familiar with MAC layer addresses and NetBIOS protocols.

6.1 Starting Logical Filtering

To start logical filtering, do the following:

1. Make sure you have the correct version of Bridge Management Software.

Table 6-1. Bridge Management Software Versions.

Bridge	Bridge Management Software Version
LB7600A	1.02 or higher
LB7610A, LB7620A, LB7620C, LB7630A	1.15 or higher

2. Select Ring A filter parameters or Ring B filter parameters from the Configure pull-down menu. The screen displays the Filter Parameters dialog box.
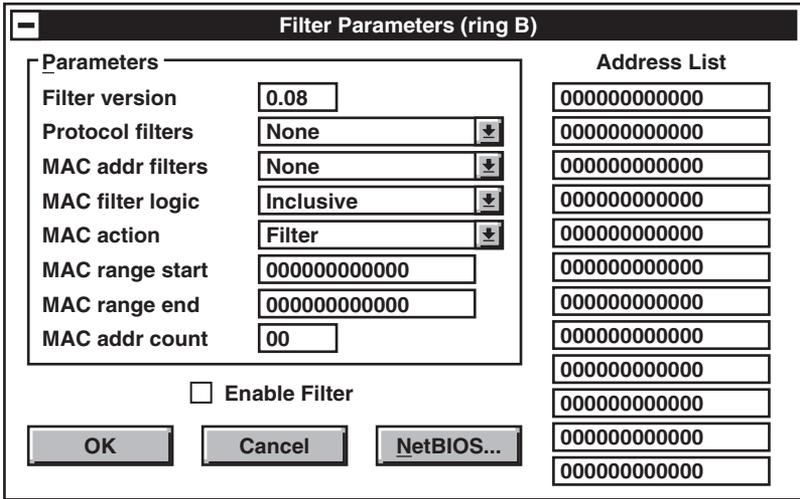
Filter Parameters (ring B)		Address List
Parameters		
Filter version	0.08	000000000000
Protocol filters	None	000000000000
MAC addr filters	None	000000000000
MAC filter logic	Inclusive	000000000000
MAC action	Filter	000000000000
MAC range start	000000000000	000000000000
MAC range end	000000000000	000000000000
MAC addr count	00	000000000000
		000000000000
☐ **Enable Filter**		000000000000
OK **Cancel** **NetBIOS...**		000000000000
		000000000000

Figure 6-1. Filter Parameters Dialog Box.

3. Type in new information where you want to change parameters. Use the mouse or the <Tab> or <Shift/Tab> keys to move between fields.

4. Click on OK to save any changes. Changes do not take effect until you reset the bridge. To reset the bridge, select Bridge Mode Restart from the Bridges pull-down menu.

You can change the following parameters on the Filter Parameters dialog box:

Table 6-2. Filter Parameters Dialog Box Options.

Parameter	Default	Range
Filter Version	N/A	N/A
Enable Filter	No	Yes, No
Protocol Filters	None	None, Forward, Filter
MAC Address Filters	None	None List: Src and Dest List: Src or Dest List: Source List: Destination Range: Src or Dest Range: Source Range: Destination
MAC Filter Logic	Inclusive	Inclusive, Exclusive
MAC Action	Filter	Filter, Forward
MAC Address Count	00	00 to 12
MAC Address Range	None	Any MAC range
MAC Address List	Empty	Up to 12 MAC addresses
NetBIOS Network Names	Empty	Up to 12 names
NetBIOS Command Tables	None specified	Up to 12 sets: command number and addresses

6.2 MAC Address Filtering

MAC address filtering is based on three variables:

- MAC address the filter looks for

- Logic used by the filter (inclusive or exclusive)

- Action performed when a MAC address match occurs (filter or forward)

Configure MAC address filtering by changing the following parameters on the logical filtering table:

- *Filter enable*—MAC and Protocol filtering for the chosen ring. The default is No, or filtering disabled.

- *MAC address filters*—Addresses the MAC Address filter looks for and tries to match up with your entries in the MAC address table:

  None. No MAC address filtering.

  List: Src and Dest. Looks for frames with matching source and destination addresses.

  List: Src or Dest. Looks for frames with either a matching source or destination address.

  List: Source. Looks for frames with a matching source address only.

  List: Destination. Looks for frames with a matching destination address only.

  Range: Src or Dest. Looks for frames with a source or destination address within the MAC address range.

  Range: Source. Looks for frames with a source address within the MAC address range.

  Range: Destination. Looks for frames with a destination address within the MAC address range.

- *MAC filter logic*—Select one of the following:

  Inclusive. Performs MAC filter action on all matching frames. Passes non-matching frames to the protocol filtering function.

  Exclusive. Performs MAC filter action on non-matching frames. Passes all matching frames to the protocol filtering function.

- *MAC filter action*—Select one of the following:

  Filter. Frame will not be bridged.

  Forward. Frame will be bridged. If a frame is filtered or forwarded by the MAC action, it will not reach the protocol filtering function.

- *MAC address count*—Specifies the number of addresses in the MAC Address List used for filtering. If you specify 12 for this option, all addresses in the list are used. If you specify 03, only the first three addresses are used, even if you have entered 12.

- *MAC address range*—Specifies the range of MAC addresses looked for by the MAC filter. The first MAC address specified is the lower boundary; the second address is the upper boundary. You cannot use wildcard characters.

- *MAC address list*—Enter up to 12 MAC addresses. Each 6-byte MAC address is specified by a string of 12 hex (0-F) characters, one character for each nibble (a nibble is four binary bits).

  You can use question marks as wildcard characters to help specify MAC addresses. For example, if you specify the MAC address as 4000000010??, the filter matches it with any of the 256 MAC addresses from 400000001000 to 4000000010FF.

Example of MAC Address Filtering

Communications Server A is set up on Ring 2 to allow dial-up access to the LAN. Server A's MAC address is 400000000100. For security reasons, the dial-up users of the LAN cannot be allowed to access Ring 3 (Accounting), so the MAC filter for Port A of Bridge 6 is configured to filter all frames with the source MAC address 400000000100. The NetBIOS filter is not used.
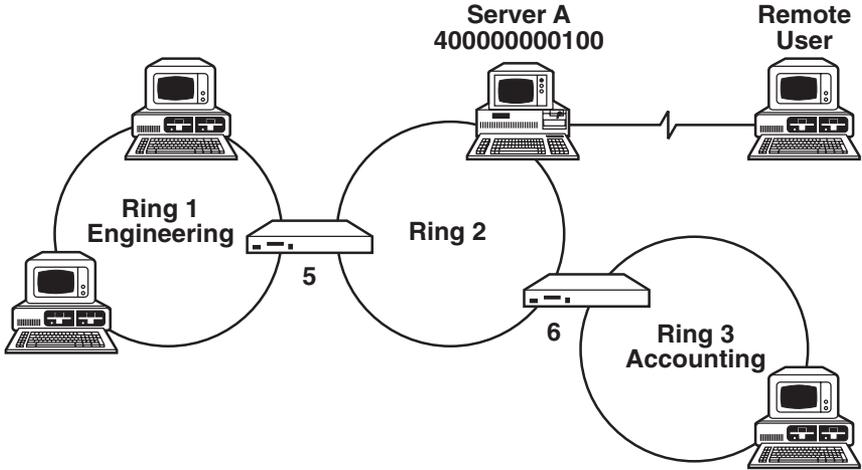
Figure 6-2. Example of MAC Address Filtering.

For this example, the Filter Parameters (Ring A) dialog box for Bridge 6 displays the following parameters:
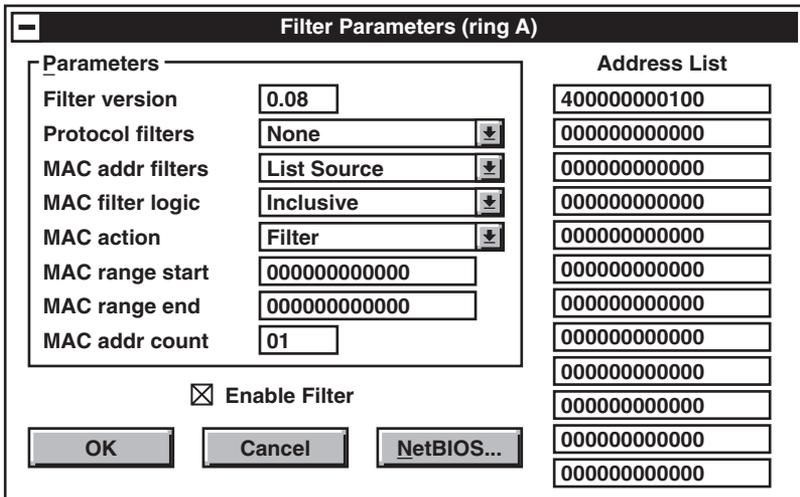

Figure 6-3. Filter Parameters (Ring A) Dialog Box.

6.3 Protocol (NetBIOS) Filtering

A frame reaches the Protocol filter if the MAC address filter is not enabled. The Protocol filter supports Service Access Point (SAP) protocol (hex F0) and examines Unnumbered Information (UI) frames.

   To configure Protocol filtering, open "Ring A Filter Parameters" or "Ring B Filter Parameters" from the Configure pull-down menu. Change the following parameters on the Filter Parameters dialog box:

- *Filter enable*—Enables MAC and Protocol filtering for the chosen ring. The default is No, or filtering disabled.

- *Protocol filters*—Select one of the following:

   None. No Protocol (NetBIOS) filtering will be done.

   Filter. A UI frame with the NetBIOS SAP (F0) will be filtered when it matches the previously defined Protocol filtering parameters.

   Forward. A UI frame with the NetBIOS SAP (hex F0) will be forwarded when it matches the previously defined Protocol filtering parameters.

   Click on NetBIOS to go to the NetBIOS Command Filtering dialog box:

Figure 6-4. NetBIOS Command Filtering Dialog Box.

Enter the following information to set up a filtering table:

• *Network Names*—Specify up to 12 NetBIOS names, up to 15 ASCII characters long. Enter capital letters only. Use a question mark (?) for any individual ASCII character, or an asterisk (*) for any remaining characters. For example:

Ring_002_Server
Ring_???_Server
Ring_002_*
*

Use the number next to each field in the NetBIOS Command Table for network name. (For example, if the network CHERYL-M is Entry 4, use 04 in the command table for the network name CHERYL-M. Or, if * is entered in field number 3 of the Network Name List, enter 03 in the Source Name field of a protocol filter.)

Specify up to 12 filters, each consisting of a NetBIOS command number, a source name, and a destination name. For any NetBIOS command line in your table to be active, neither its Source Name nor Destination Name can contain 00.

The NetBIOS table lists the allowable frame types and functions. To see the table, select "Index" from the Help pull-down menu and do a search for NetBIOS Commands.

Table 6-2. NetBIOS Table Options.

UI Frame Name	Hex. No.	Function
Add Group Name Query	00	Check for a duplicate group name
Add Name Query	01	Check for a duplicate query
Add Name Response	0D	Negative response (add name is duplicate)
Datagram	08	Transmits a datagram to a name
Datagram Broadcast	09	Transmits a datagram to all names on the network
Name in Conflict	02	Indicates duplicate names detected
Name Query	0A	Request to locate a name on the network
Name Recognized	0E	Name is recognized (Name Query response)
Status Query	03	Request status of a remote node
Status Response	0F	Carries status information on a remote node (Status Query response)
Terminate Trace (remote)	07	Terminates traces at remote nodes
Terminate Trace (all)	13	Terminates traces at local and remote nodes
(All NetBIOS UI frames)	FF	Includes all frames above

6.3.1 ALTERNATE NETBIOS FILTERING

Alternate NetBIOS filtering allows you to enter up to 50 names and commands in the filtering table for ring A or B. To use alternate NetBIOS filtering, do the following:

1. Open "Alt NetBIOS Ring A Filter Parameters" or "Alt NetBIOS Ring B Filter Parameters" from the Configure pull-down menu. The screen displays the Alternate NetBIOS Command Filtering dialog box:

Figure 6-5. Alternate NetBIOS Command Filtering (Ring A) Screen.

2. Type in the new information where you want to change parameters. Use the mouse or <Tab> or <Shift/Tab> keys to move between fields. You can enter up to 50 names and commands in the filter table.

   You cannot use wildcards in the name list, but you can use them in the command portion of the filtering parameter. To enter a wildcard, press *. A** appears in the field and the cursor advances to the next field.

3. Click on OK to save any changes. Changes do not take effect until you reset the bridge. To reset the bridge, select "Bridge Mode Restart" from the Bridge pull-down menu.

6.3.2 EXAMPLE OF PROTOCOL (NETBIOS) FILTERING

Protocol filtering allows you more subtle control of network traffic than MAC address filtering. In a NetBIOS-based network operating system, you establish communication using source routing as follows:
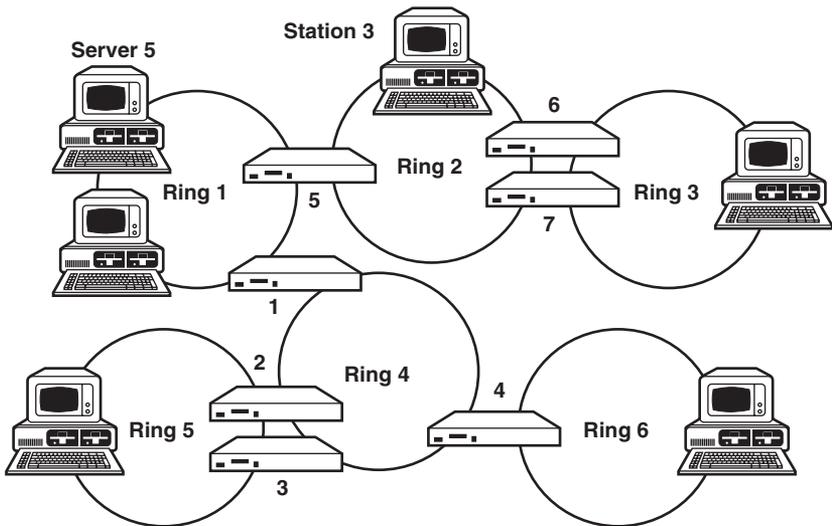

Figure 6-6. Example of Protocol (NetBIOS) Filtering.

In this example, the stations on Ring 2 frequently access Server 5. Station 3 needs to know the MAC address of Server 5, so it sends out a single-route broadcast frame addresses to the NetBIOS functional MAC address. It uses a Name Query frame specifying the NetBIOS network name of the file server, in this case SERVER5. The frame also includes the MAC address of workstation 3 and its NetBIOS name, WORK3.

Server 5 receives the Name Query frame with its own name specified and responds with a Name Recognized frame. This is sent as an all-routes broadcast frame to the MAC address of Station 3.

To reduce the number of unnecessary broadcast frames, configure Port A of Bridge 1 to filter:

- Name Query frames (hex code 01) from WORK3 to SERVER5

- Name Recognized frames (hex code 0E) from SERVER5 to WORK3

For this example, the Filter Parameters (ring A) dialog box displays the following parameters:
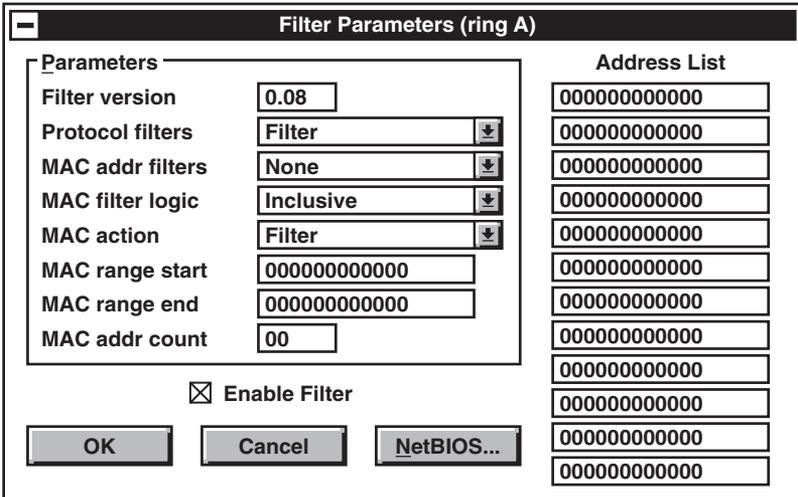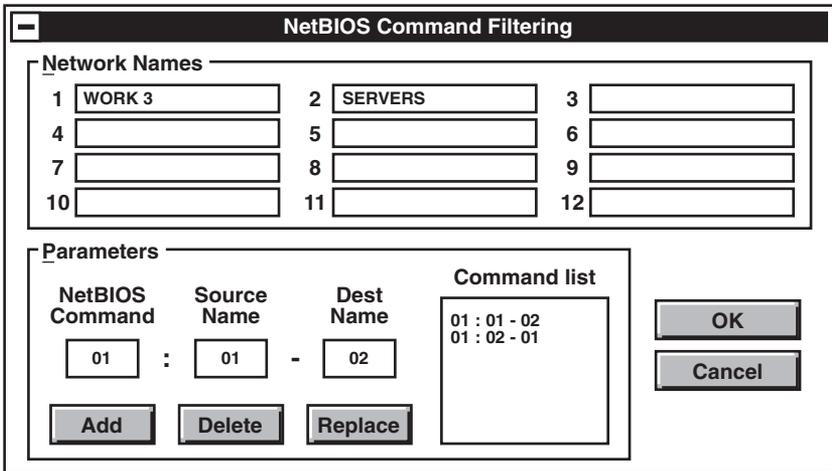
Filter Parameters (ring A)		
Parameters		**Address List**
Filter version	0.08	000000000000
Protocol filters	Filter ⬇	000000000000
MAC addr filters	None ⬇	000000000000
MAC filter logic	Inclusive ⬇	000000000000
MAC action	Filter ⬇	000000000000
MAC range start	000000000000	000000000000
MAC range end	000000000000	000000000000
MAC addr count	00	000000000000
		000000000000
☒ **Enable Filter**		000000000000
OK　**Cancel**　**NetBIOS...**		000000000000
		000000000000

Figure 6-7. Filter Parameters (Ring A) Dialog Box.

The NetBIOS Command Filtering dialog box displays the following parameters:

NetBIOS Command Filtering

Network Names

1	WORK 3	2	SERVERS	3	
4		5		6	
7		8		9	
10		11		12	

Parameters

NetBIOS Command | Source Name | Dest Name | Command list

| 01 | : | 01 | - | 02 |

01 : 01 - 02
01 : 02 - 01

Add   Delete   Replace

OK

Cancel

Figure 6-8. NetBIOS Command Filtering Dialog Box.

You can also configure Port A of Bridges 6 and 7 in the same way to further reduce traffic.

6.3.3 FLOWCHARTS

The following eight flowcharts show the flow of logic in all eight combinations of MAC address and Protocol filtering configurations.
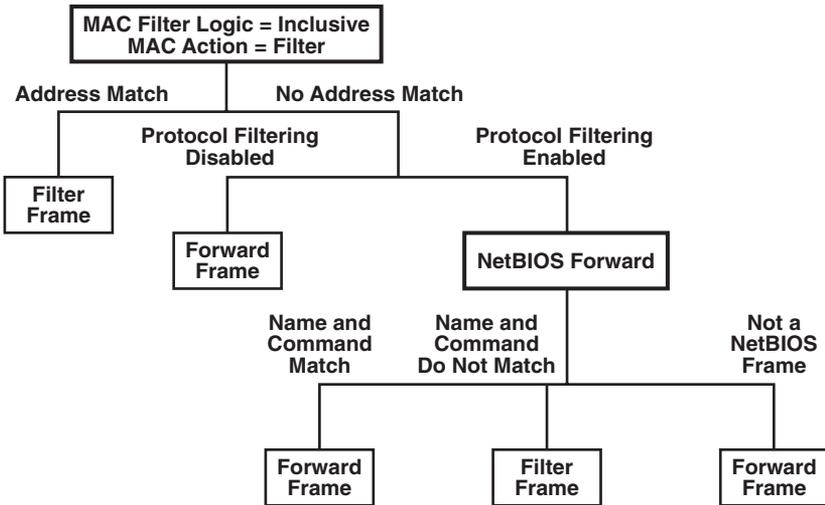

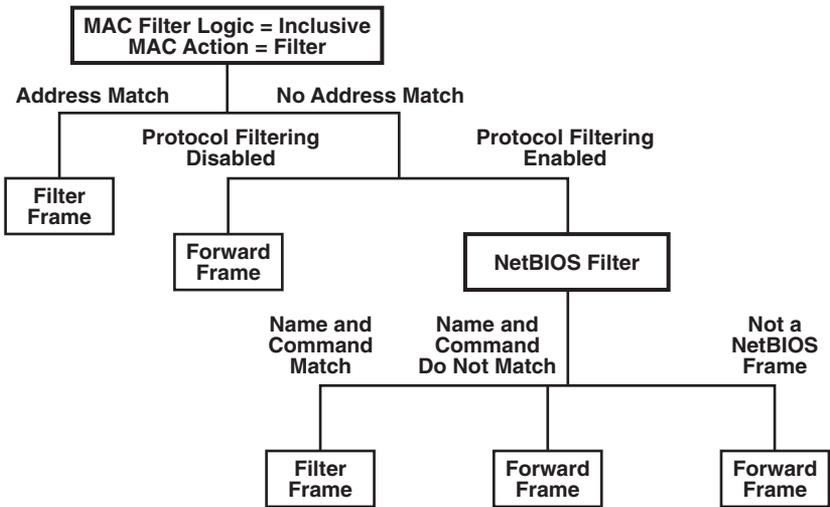**Figure 6-9. MAC filter: inclusive, filter. NetBIOS filter: forward.**

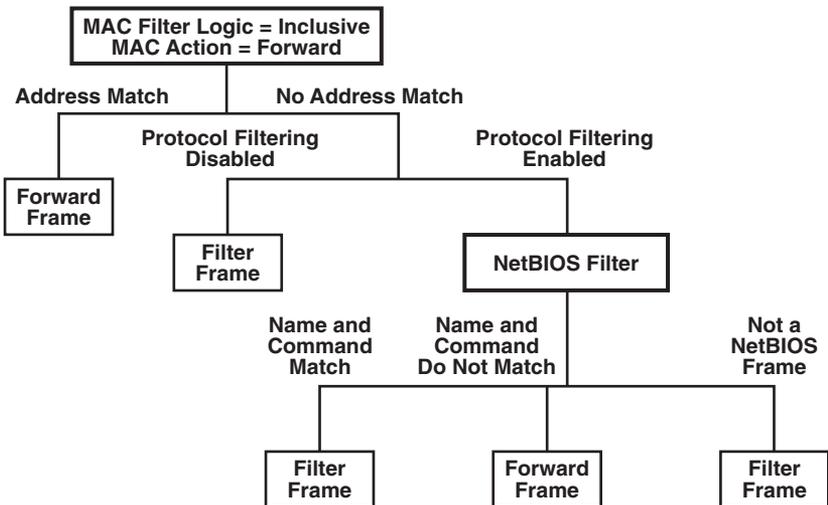**Figure 6-10. MAC filter: inclusive, filter. NetBIOS filter: filter.**

Figure 6-11. MAC filter: inclusive, forward. NetBIOS filter: filter.
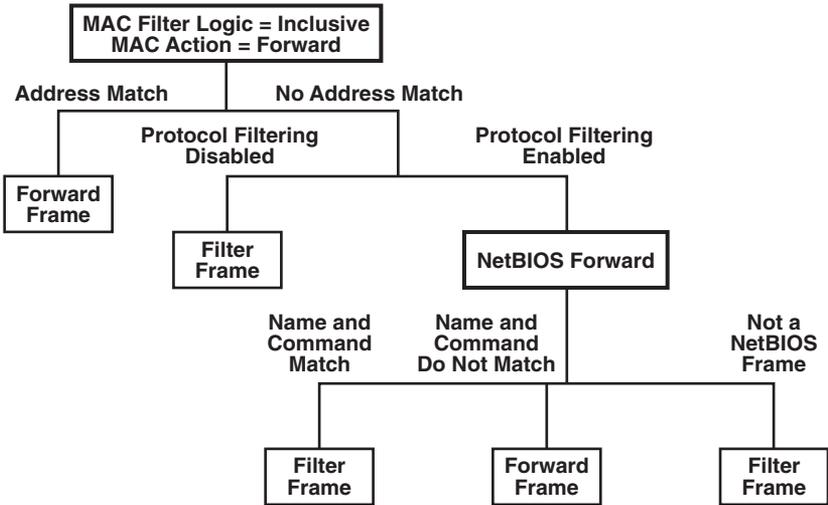
Figure 6-12. MAC filter: inclusive, forward. NetBIOS filter: forward.
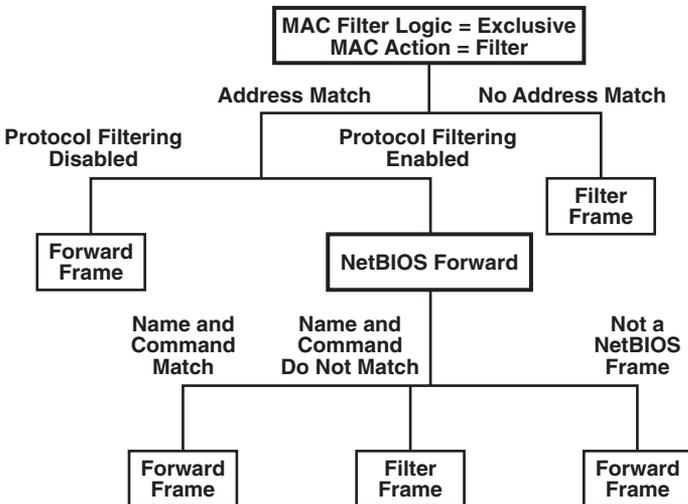

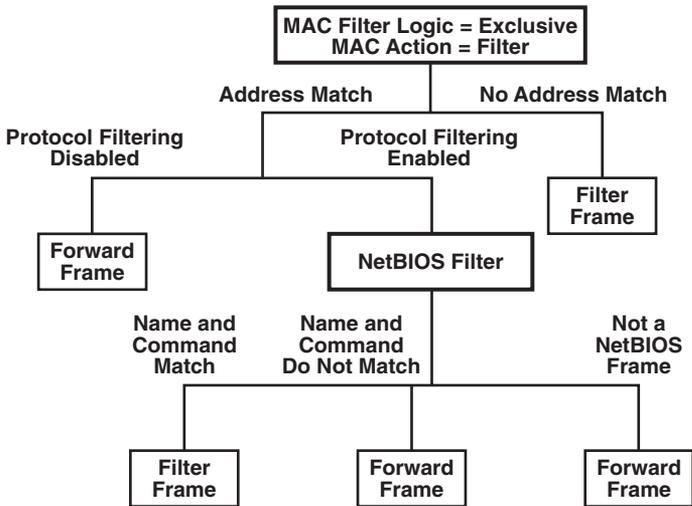**Figure 6-13. MAC filter: exclusive, filter. NetBIOS filter: forward.**

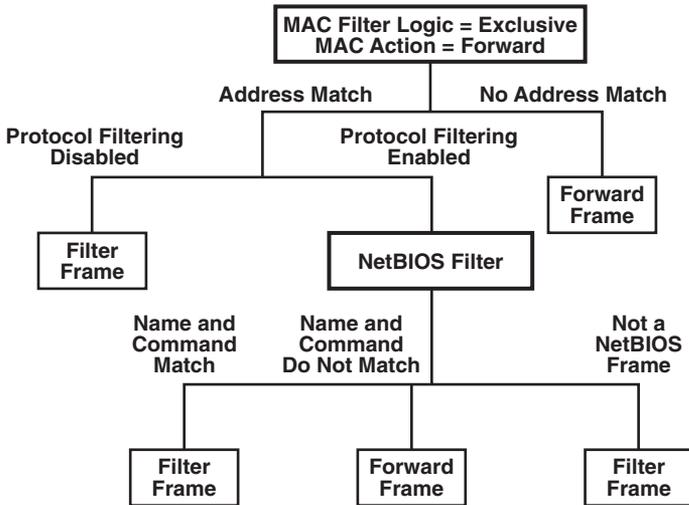**Figure 6-14. MAC filter: exclusive, filter. NetBIOS filter: filter.**

Figure 6-15. MAC filter: exclusive, forward. NetBIOS filter: filter.

```
                    ┌─────────────────────────────┐
                    │ MAC Filter Logic = Exclusive│
                    │    MAC Action = Forward      │
                    └─────────────────────────────┘
         Address Match              No Address Match

   Protocol Filtering      Protocol Filtering
       Disabled                 Enabled
                                                  ┌──────────┐
                                                  │ Forward  │
                                                  │  Frame   │
                                                  └──────────┘
   ┌──────────┐              ┌──────────────────┐
   │  Filter  │              │ NetBIOS Forward  │
   │  Frame   │              └──────────────────┘
   └──────────┘

   Name and        Name and              Not a
   Command         Command              NetBIOS
    Match         Do Not Match           Frame

   ┌──────────┐   ┌──────────┐      ┌──────────┐
   │ Forward  │   │  Filter  │      │  Filter  │
   │  Frame   │   │  Frame   │      │  Frame   │
   └──────────┘   └──────────┘      └──────────┘
```
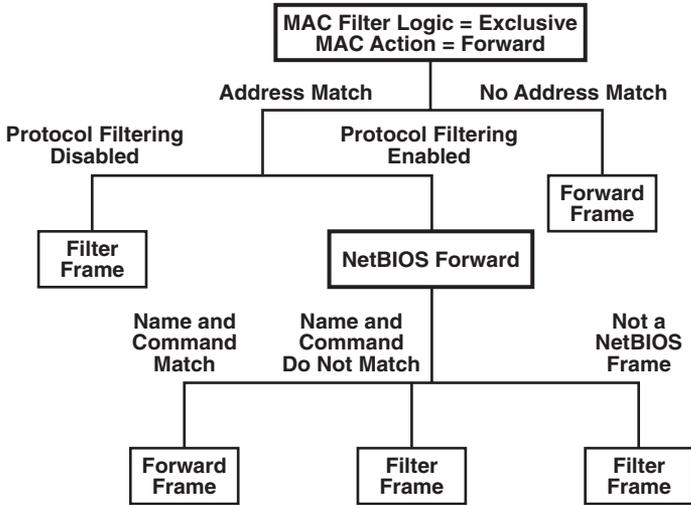
Figure 6-16. MAC filter: exclusive, forward. NetBIOS filter: forward.

Appendix A: LAN Manager Interface

This appendix describes the IBM LAN Management Server functions emulated by the bridges. These software functions communicate with IBM LAN Managers.

A.1 Ring Parameter Server (RPS)

The Ring Parameter Server provides the ring number to an adapter when it is inserting onto the ring. It sends a notification to any linked IBM LAN Manager which has requested reports when a new adapter has attached to the ring.

The functional address for the RPS is C00000000002.

A.2 Ring Error Monitor (REM)

The Ring Error Monitor compiles error statistics reported by adapters on either ring, analyzes those statistics to determine a probable cause of errors that are degrading ring performance, updates the Ring Status window in the Bridge Management Software display and sends reports indicating critical problems to IBM LAN Managers.

If the functional address of REM for a given ring is not enabled in a bridge, then the Bridge Management Software program does not display soft error information for that ring.

The functional address for the REM is C00000000008.

A.3 Configuration Report Server (CRS)

The Configuration Report Server sends notifications about the current active configuration of each ring to LAN Managers requesting them. It also reports changes in the nearest active upstream neighbor (NAUN) and active monitor on the ring. An IBM LAN Manager uses it to query, configure or remove ring stations.

The functional address for the CRS is C00000000010.

A.4 LAN Bridge Server (LBS)

The LAN Bridge Server collects statistical information about frames forwarded between two or more rings through a bridge, and sends this information to IBM LAN Managers which request reports. It also accepts and executes commands from a controlling LAN Manager to change the internal configuration of the bridge or to set the values of operational parameters. The LBS carries out the path trace function.

The LBS is always enabled and cannot be changed using the Bridge Management Software.

The functional address for the LBS is C00000000100.

Appendix B: Messages

This appendix explains messages which can appear in pop-up windows on the screen while the Bridge Management Software is operating.

B.1 General Messages

These messages appear under ordinary operating circumstances:

Creating link, please wait.

Download complete. Activate with Restart command from Bridges menu.

Bridge linked. Press any key.

Please wait.

B.2 Operator Errors

These errors can occur while you are operating Bridge Management Software and require that you perform an action.

- *Bridge unit not in startup mode*—A download has been attempted but the selected bridge is not in startup mode, as required. Select "Startup Mode Restart" from the Bridges pull-down menu and retry the download.

- *Invalid data*—Can occur during configuration when invalid data has been entered in one of the parameter fields of a configuration menu. The cursor is located in the field with the invalid data. Make sure you are entering correct data in the right form, and try again.

- *Invalid password*—You entered an incorrect bridge link password. Re-enter the correct password and try again. This message appears only if the Bridge Management Software is communicating through the bridge's control port.

- *No token ring link – must select bridge*—You have tried to perform a command or monitoring function without first selecting a specific bridge. Select the desired bridge and try again.

- *That bridge is already linked*—You have tried to select a bridge which already has a bridge link connection with another Bridge Management Software.

B.3 Transmission Errors

These messages are usually caused by transmission errors. If you receive one of these errors, retry the action just performed. If the error keeps occurring, make sure the bridge you are trying to communicate with is powered on, and that all cable connectors are tight. Occasionally these messages are caused by network noise or beaconing.

- *Command error*—The bridge unit has not properly echoed the command just sent by the Bridge Management Software.

- *Download error*—The bridge unit has reported an error in the code download.

- *Download time-out*—The bridge unit has not responded at the completion of a code download.

- *Invalid window data received from bridge*—Window data received from the bridge unit was garbled.

- *Response error*—An unexpected response has been received by the Bridge Management Software.

- *Response time-out*—An expected response was not received by the Bridge Management Software.

- *Restart command error*—The Bridge Management Software has sent a restart command to a bridge, and no confirmation of the command has been received.

- *Transmission error*—The Bridge Management Software cannot contact the bridge unit.

- *Unrecognized configurator data from bridge unit*—Configuration data received from the bridge unit was garbled.

- *Update parameter error*—An unexpected parameter update has been received by the Bridge Management Software.

B.4 Other Errors

- *Bridge unit configurator store error*—Retry the action just performed. If the error keeps happening, call for technical support.

- *Bridge unit process error*—This can occur during a code download to a bridge. Retry the download.

- *File too big*—The file being downloaded is larger than the memory capacity of the bridge. Call for technical support.

- *Memory allocation error*—There isn't enough memory in the Bridge Management Software's PC. Make sure this PC has at least 640K of RAM installed. If it has that much memory, there may be too many terminate-and-stay-resident programs installed in RAM. Remove them from memory and retry the action.

- *Make window error*—There may be a memory allocation error (see "Memory allocation error," above), or Bridge Management Software couldn't find one of the text files it uses to construct the screen windows. Copy the files from the Bridge Management Software distribution diskette to the appropriate hard-drive directory to make sure all required files are there, and retry the action.

- *Token ring error, adapter closed*—An unexpected break in all LAN communication by the Bridge Management Software has occurred. The Bridge Management Software PC is no longer inserted on the token ring. Check the cable connections and select "Reset Adapter" from the Options pull-down menu.

- *Token ring link broken*—An unexpected break in the LAN link between a selected bridge and the Bridge Management Software has occurred.

- *Unable to open file "xxxxxxxx.xxx"*—Can occur when a file needed by the Bridge Management Software is not in its hard-disk directory. Copy the files on the distribution diskette to the appropriate hard-drive directory, and retry the action.

Appendix C: WAN Diagnostics

This appendix describes testing and monitoring the status of a wide-area-network (WAN) link between two remote bridges.

C.1 Testing the WAN Link

Use the Remote Loopback Test to locate the source of problems you may be having on your network. The test allows you to send special frames across the WAN link, segment by segment, causing the bridge on the other side to loop them back. The Bridge Management Software program counts the number of frames sent and the number received for each segment of the test. If too many frames are lost during a certain loopback segment, you know you have a problem in that area.

Setting up for the loopback test

To perform the remote loopback test, you should have the following:

1. The Bridge Management Software program running on a PC connected to the serial control port of one of the remote bridges. It can be a remote link using RS-232 modems. Refer to your bridge manual for information on using the serial control port.

2. The two remote bridges in the bridge system in startup mode. Refer to your bridge manual for information about modes.

   Figure C-1 illustrates setting up your equipment to perform a remote loopback test:
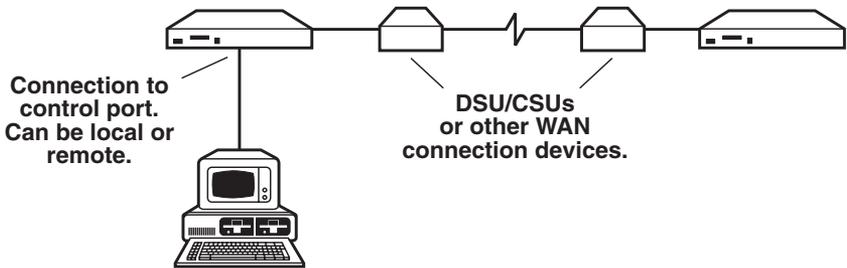
Figure C-1. Setting Up for the Loopback Test.

Before you start the test

Unless you are sure that a certain segment of the WAN link is the problem area, you should start testing with the nearest part of the WAN link. Test the link step by step until you locate the problem area. **Figure C-2** illustrates a combination of both DSU/CSU and loopbacks. The 5th Path is the only loop the bridge affects. Paths 1 through 4 are internal to the DSU/CSU.

Ideally, you should have a means to detect data on all segments between the bridges, such as a protocol analyzer. If you do not have a protocol analyzer, you can narrow down the problem by systematically putting each piece of equipment into loopback mode, as described in the next section.

Figure C-2 illustrates systematic testing of DSU/CSU and loopbacks:
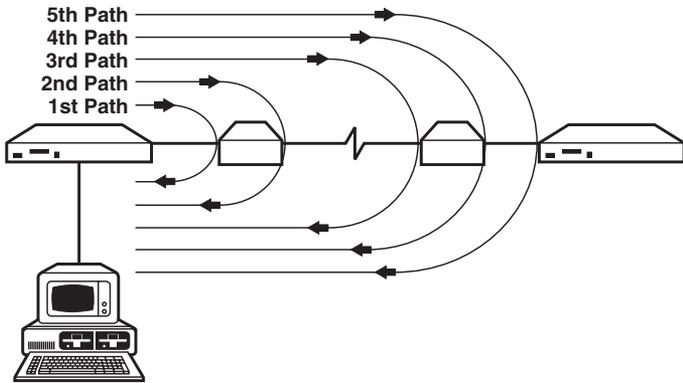
Figure C-2. Systematic Loopback Tests.

Performing the loopback test

To perform the loopback test, do the following:

1. Make sure all devices such as DSU/CSUs are installed properly, that all cables between all devices are firmly secured and that the bridge is in startup mode.

2. From the Bridge Management Software program, select "Loopback Test" from the Bridges pull-down menu.

3. Specify the path and filename of the DOS file you want to send. It can be any size. The test will not change the file in any way. It sends a frame of up to 256 bytes over the WAN. If your file is larger, the test sends the part of the file that fits in one frame.

4. Specify the number of frames you want to send, from 0 to 9999. If you specify 0, frames are sent continuously.

5. Choose OK to start the test. The Bridge Management Software program counts the number of frames sent and the number received. If too many frames are lost, stop the test and go on to the next step.

   The definition of unacceptable loss varies, depending on the speed of, or the amount of traffic on, a WAN link. For example, a few lost frames on a slow link (such as 9.6 Kbps) or on a link without much traffic can cause more disruption than on a faster, busier link.

6. Loop back the device closest to the Bridge Management Software PC. If both local and WAN ports of the device can be looped back, loop back the port nearest the Bridge Management Software PC.

7. Perform another loopback test (Steps 2 through 5). If there are no lost frames during this test, the problem area lies beyond the looped port of the WAN device. Go to Step 8.

   If there was an unacceptable number of lost frames during this test, at least part of the problem is within the area just tested. Find the problem and fix it before going on to Step 8.

8. Continue the testing. Loop back the next portion of the WAN link, and perform another loopback test. Keep doing these steps until the problem area or areas have been found.

More information about the loopback test

There are two other information fields on the Loopback Test screen you can use:

- *Bridge Action, Far End*—The far end of the WAN link is the side opposite to the bridge that is directly connected to the Bridge Management Software PC.

  If the bridge on the far end receives a loopback frame when it is in startup mode, it immediately sends the frame back through its WAN port instead of processing it normally. If the bridge is in bridge mode, it ignores the loopback frame.

If the bridge receives a loopback frame with a bad Cyclic Redundancy Check (CRC), it does not loop back the frame. A bad CRC indicates that the frame has been damaged somewhere on the WAN link. Because the bridge does not loop back a frame with a bad CRC, you can isolate the direction in which an error occurred with a protocol analyzer.

• *Bridge Action, Near End*—When the near-end bridge receives a loopback frame and determines that the frame was generated by itself, it counts and discards the frame. If the frame has a bad CRC, the bridge half does not count it.

C.2 Monitoring the WAN Link

You can use the Bridge Management Software to monitor a single WAN connection between a selected pair of remote bridges. Do this by using the Performance Counters window to view WAN line counters and use.

To monitor a WAN link, do the following:

1. Select the desired remote bridge from the "Select Bridge" option in the Bridges pull-down menu.

2. Click the Performance Counters window and press <PgDn> to go to the second page.

3. Select "Update Parameters" from the Bridges pull-down menu. Enter the bridge link password if you are prompted to do so. The parameters update and continue to update every 10 seconds.

4. The screen displays the WAN-line counters and WAN-line use for each bridge (each end of the WAN link):
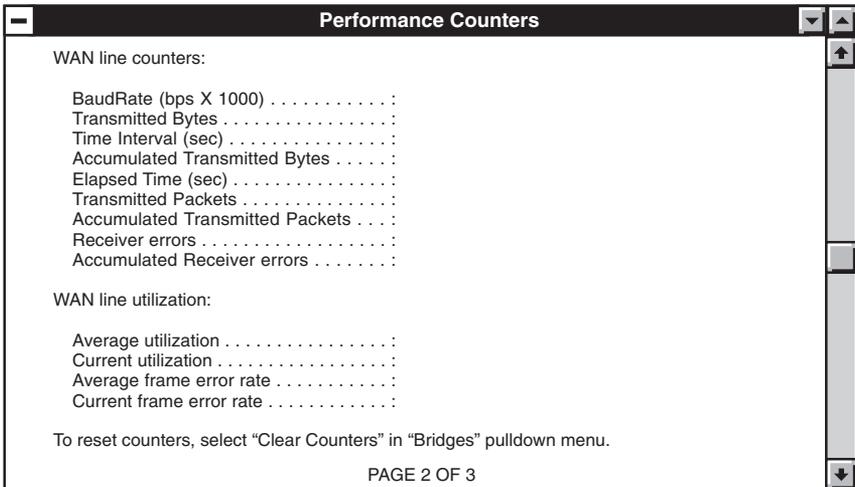
```
┌────────────────────────────────────────────────────────────────────┐
│ ▬            Performance Counters                          ▼ ▲ │
├────────────────────────────────────────────────────────────────────┤
│                                                                  ▲ │
│   WAN line counters:                                               │
│                                                                    │
│       BaudRate (bps X 1000) . . . . . . . . . . . :                │
│       Transmitted Bytes . . . . . . . . . . . . . . . :            │
│       Time Interval (sec) . . . . . . . . . . . . . . :            │
│       Accumulated Transmitted Bytes . . . . . :                    │
│       Elapsed Time (sec) . . . . . . . . . . . . . . :             │
│       Transmitted Packets . . . . . . . . . . . . . :              │
│       Accumulated Transmitted Packets . . . . :                    │
│       Receiver errors . . . . . . . . . . . . . . . . . :          │
│       Accumulated Receiver errors . . . . . . . :          ▐       │
│                                                                    │
│   WAN line utilization:                                            │
│                                                                    │
│       Average utilization . . . . . . . . . . . . . . :            │
│       Current utilization . . . . . . . . . . . . . . . :          │
│       Average frame error rate . . . . . . . . . . :               │
│       Current frame error rate . . . . . . . . . . . :             │
│                                                                    │
│   To reset counters, select "Clear Counters" in "Bridges" pulldown menu. │
│                        PAGE 2 OF 3                                ▼ │
└────────────────────────────────────────────────────────────────────┘
```

Figure C-3. Performance Counters Screen.

WAN Line Counters

The WAN line counters include the following:

- *Baud rate*—Indicates the line speed of the WAN link. The line speed is sampled every 10 seconds, and the speed is classified into one of the following rates:

  9.6 Kbps
  19.2 Kbps
  38.4 Kbps
  56 Kbps
  64 Kbps
  128 Kbps to 1.536 Mbps in 64 Kbps intervals
  1.544 Mbps
  2.048 Mbps

  The speed of the remote link cannot be lower than 9.6 Kbps or higher than 2.048 Mbps. If the actual rate of the line falls between any of the rates listed above, it is displayed as one or the other of the two rates. A frame-relay link does not report this information.

- *Transmitted bytes*—The number of bytes transmitted over the WAN link in the previous 10-second period.

- *Time interval for sampling*—The time interval (10 seconds) between each sampling of the WAN link. The time interval is not configurable.

- *Accumulated transmitted bytes*—The total number of bytes transmitted across the WAN link since the last time the counters were reset to zero.

- *Elapsed time*—The elapsed time since the last counter reset, in seconds.

- *Transmitted packets*—The number of packets transmitted across the WAN link in the last 10 seconds. "Packet" refers to the data unit transmitted over the WAN link. "Frame" refers to the LAN data unit.

- *Accumulated transmitted packets*—The total amount of packets transmitted across the WAN link since the last counter reset.

- *Receiver errors*—The number of corrupted WAN packets received in the last 10 seconds.

- *Accumulated receiver errors*—The total number of corrupted WAN packets received since the last counter reset.

WAN Line Utilization

WAN line utilization includes the following:

- *Average utilization*—The average percentage of the available bandwidth of the WAN link being used. It is a running average, calculated since the last counter reset.

- *Current utilization*—The percentage of the available bandwidth being used during the last 10 seconds. This number is the most useful data supplied for performing utilization trend analysis.

- *Average frame error rate*—A running average of the rate of frame errors on the WAN link. The formula is:

  Frames in Error / Total Frames x 100

- *Current frame error rate*—The frame error rate during the last 10 seconds.

C.3 Alerting the LAN Manager

You can configure the bridge to send an alert message to the IBM LAN Manager and to NetView when a frame error rate is exceeded.

To specify this error rate:

1. Open "Bridge Parameters" from the Configure pull-down menu to display the Bridge Parameters dialog box:
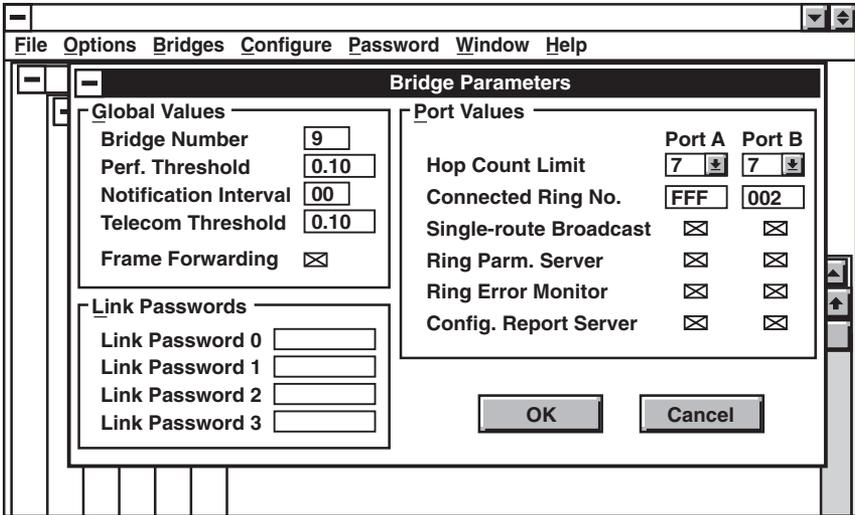

Figure C-4. Bridge Parameters Dialog Box.

2. Enter an error rate in the Telecommunications threshold parameter field. The range is 00.00% to 99.99%. If you enter 00.00, no alerts are sent.

BLACK BOX®

NETWORK SERVICES

1000 Park Drive   •   Lawrence, PA 15055-1018   •   724-746-5500   •   Fax 724-746-0746