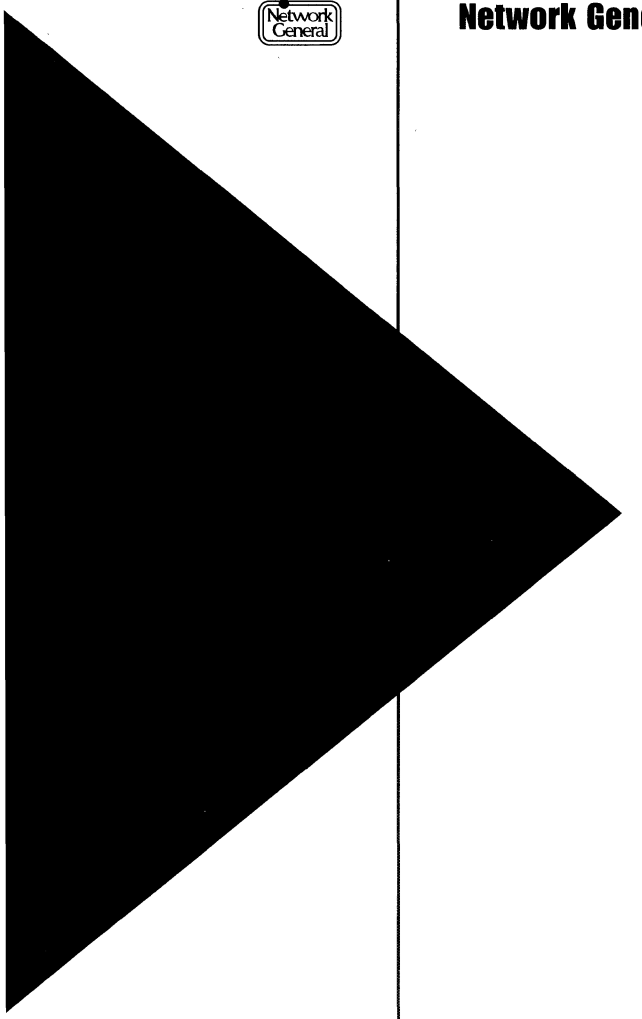
SNIFFER NETWORK ANALYZER® TOKEN-RING MONITOR OPERATIONS

Network General Corporation

SNIFFER NETWORK ANALYZER®
TOKEN-RING MONITOR OPERATIONS



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SNIFFER NETWORK ANALYZER®

TOKEN-RING MONITOR OPERATIONS

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Document prepared by Sacha Parisot with contributions from Terri Fitzmaurice.
April 1992

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List of References

TMS380 Adapter Chipset User's Guide. Texas Instruments Incorporated, 1986.

Token-Ring Network, Architecture Reference. IBM Corporation, second edition, 1987.

PREFACE

Preface

About This Manual

This manual describes the functions and operations of the Token-Ring Monitor, a software component of the Sniffer™ Network Analyzer. It also gives recommendations on how to use the monitor effectively to detect network problems.

The Sniffer Network Analyzer observes the local or wide-area network to which it is attached, and displays the monitored activity.

Organization of This Manual

Figure i describes the organization of this manual.

Chapter/Appendix	Contents
Chapter 1, "Product Overview"	Provides an overview of the monitor and describes its capabilities.
Chapter 2, "Getting Started"	Describes the preparation required before you start a monitoring session. It also discusses the menu structure.
Chapter 3, "Displaying Statistics"	Describes how to display various types of statistics gathered in the current monitoring session.
Chapter 4, "Managing the Station Data Files"	Describes how to specify information about stations on the network, which affects the way the monitor observes the network and generates alarms.
Chapter 5, "Working with Alarms"	Describes different types of alarms.
Chapter 6, "Creating Reports"	Describes the report scripts and gives procedures for generating, printing, and saving reports.
Chapter 7, "Establishing a Baseline for Your Network"	Provides recommendations on how to use the monitor features to become familiar with normal network traffic patterns.
Chapter 8, "The Monitor Data Files"	Describes the files that you might need to modify or view when using the monitor.
Chapter 9, "The Monitor Menu Items"	Explains in detail all the menu items and the terms used in the monitor's screen displays.

Figure i. Scope of each chapter or appendix in this manual.

Chapter/Appendix	Contents
Appendix A, "Error and Warning Messages"	Lists all warning and error messages and describes recommended actions.
Appendix B, "Report Fields"	Lists and describes the report fields that you can insert in a report script.
Appendix C, "Ethertype Values in SNAP SAPs"	Lists the hexidecimal values of various Ethertypes.s

Figure i. Scope of each chapter or appendix in this manual.

Audience of This Manual

The Token-Ring Monitor Operations manual has been prepared with the following assumptions:

- You are a Token-Ring network manager or troubleshooter who understands how a Token-Ring network operates.
- You are familiar with DOS.
- You have properly started the Sniffer Network Analyzer.

Navigational Aids Used in This Manual

To help you find procedures easily, there is a separate list of procedures in this manual in addition to the Table of Contents and List of Figures. Also, there are "Recommendation" entries in the Index to point you to suggestions for getting the most from your Token-Ring Monitor. On several occasions, this manual refers to publications from other vendors; the List of References provides the titles of these publications.

This manual uses icons in the margin to help you locate information as explained below:

IMPORTANT INFORMATION. Next to this icon is information that is especially important; you should be certain to read it carefully before you proceed. This icon also indicates useful and valuable ways of using the product.

CAUTION. Next to this icon is information that you must know to avoid damage to data files, program files, or hardware devices. This icon also indicates information that you must know to avoid possible injury to yourself or others.

PROCEDURE. Next to this icon is a series of steps for accomplishing a particular task.

Conventions Used in This Manual

Special Notations

The following describes the conventions used in this manual:

Bold	Menu options and menu names are in bold type. For example: Move to **Display** and press Enter. Move to the **Report\Print** menu.
UPPERCASE	The filenames and command names you type at a DOS prompt are in uppercase. For example: Modify the AUTOEXEC.BAT file if necessary. To duplicate the file, use the COPY command.
Bold italics	Variables, for which you insert values, are in bold italics. For example: Type the number of minutes and seconds in the ***mm:ss*** format.
`Screen font`	Screen messages are printed in monospaced font. For example: If a monitoring session is in progress, the following message appears: `You must stop monitoring before you can use this feature.`

Terminology

Hexadecimal numbers mentioned in the manual are followed by "(hex)"; numbers without any notations are decimal. For example, "The maximum number of stations is 75. The default memory address is D8000 (hex)."

The term "application" refers to a software component (that is, the monitoring or analysis program) running on the Sniffer Network Analyzer.

This manual sometimes uses abbreviated names for the various components of the Sniffer Network Analyzer. The term "monitor" stands for the Token-Ring monitoring application, and the term "analyzer" stands for the Token-Ring analysis application.

Screen Displays

The screen displays in this manual may not exactly match what you see on your screen. There may be certain minor differences that do not affect the functions of the displays.

Other Sources of Information

Network General Corporation (NGC) provides other sources of information that can help you get familiar with the Sniffer Network Analyzer.

On-Line Help

After highlighting an item in the analyzer or monitor menu, a phrase or sentence in a panel near the bottom of the screen explains the meaning of the highlighted item.

If you want to obtain general information on a particular feature of the Sniffer Network Analyzer, press F1 at any time. A window containing a list of topics opens. If you are displaying a monitor statistics screen, pressing F1 gives you information on the current screen.

Tutorial

NGC distributes a booklet with accompanying diskette entitled *Real Networks. Real Problems.* It presents case studies based on data captured with a Sniffer Network Analyzer from four different networks. The case studies allow you to see how investigation of a network problem proceeds.

You can obtain the tutorial free of charge from any of the company's sales representatives or directly from NGC.

Technical Support

If you have problems with the Sniffer Network Analyzer, refer to the Troubleshooting section of the *Sniffer Network Analyzer: Analyzer Operations Manual* for the procedure to contact NGC's technical support.

Training

NGC offers a comprehensive set of training courses focused on hands-on network analysis and troubleshooting using the Sniffer Network Analyzer. For more information contact your sales representative.

Manuals for the Sniffer Network Analyzer

Figure ii lists the manuals that accompany the Sniffer Network Analyzer. These manuals describe normal operation. The actual manuals in your shipment depend on the system configuration.

If the product shipment includes release notes or README files on disks, the information in the notes or files supersedes the information in this manual.

For Information On...	Read...
Installing and configuring the Sniffer Network Analyzer.	*Sniffer Network Analyzer: Installation Guide.*
Operating the analysis functions on an Ethernet or Token-Ring network.	*Sniffer Network Analyzer: Analyzer Operations.*
Operating the monitor functions on an Ethernet network. Using the monitor features effectively to detect network abnormalities.	*Sniffer Network Analyzer: Ethernet Monitor Operations.*
Operating the monitor functions on a Token-Ring network. Using the monitor features effectively to detect network abnormalities.	*Sniffer Network Analyzer: Token-Ring Monitor Operations* (this manual).
Various network and protocol types.	*Sniffer Network Analyzer: Network and Protocol Reference.*
Operating the Sniffer Network Analyzer from a remote PC via modem.	*Sniffer Network Analyzer: TeleSniffer Installation and Operations.*

Figure ii. Manuals for the Sniffer Network Analyzer.

CHAPTER ONE: PRODUCT OVERVIEW 1

Product Overview

Overview

The Token-Ring Monitor is a network monitoring program. This chapter describes the monitor's features, typical application, and requirements.

What the Monitor Can Do

The monitor provides an accurate picture of network activity at any moment or a historical record of network activity over a period of time. This information helps you find traffic overloads, plan for network expansion, detect intruders, establish performance baselines, and distribute traffic more efficiently among servers and subnets.

The monitor's report capabilities let you communicate this information to others, complete with graphs and tables. The alarm capabilities alert you to problems with the network or with individual stations before users call you to complain.

The following list summarizes the capabilities of the monitor:

- Monitors up to 1,024 network stations at data rates of up to 2500 frames per second
- Generates visible and audible alarms for the entire network or for individual stations
- Compiles a historical alarm log
- Provides real-time traffic and historical information for individual stations as well as for the entire network
- Sorts statistics to show only those items that interest you
- Creates customized management reports
- Automatically prints selected information at set time intervals

The monitor loses frames from the Token-Ring network when the traffic exceeds approximately 2500 frames per second. However, the monitor does not inform you that it is losing frames.

The Token-Ring Monitor can monitor a network continuously for up to 49 days. After 49 days, the monitor automatically resets.

The monitor rounds up small percentages to 0.01%. Keep this in mind when you interpret percentages in statistical views or reports.

Typical Application

This section describes how the monitor is typically used to gather statistics on the network.

The monitor only monitors frames on the Token-Ring network to which the network interface card is attached. Figure 1–1 shows how the monitor is typically used on a Token-Ring network.

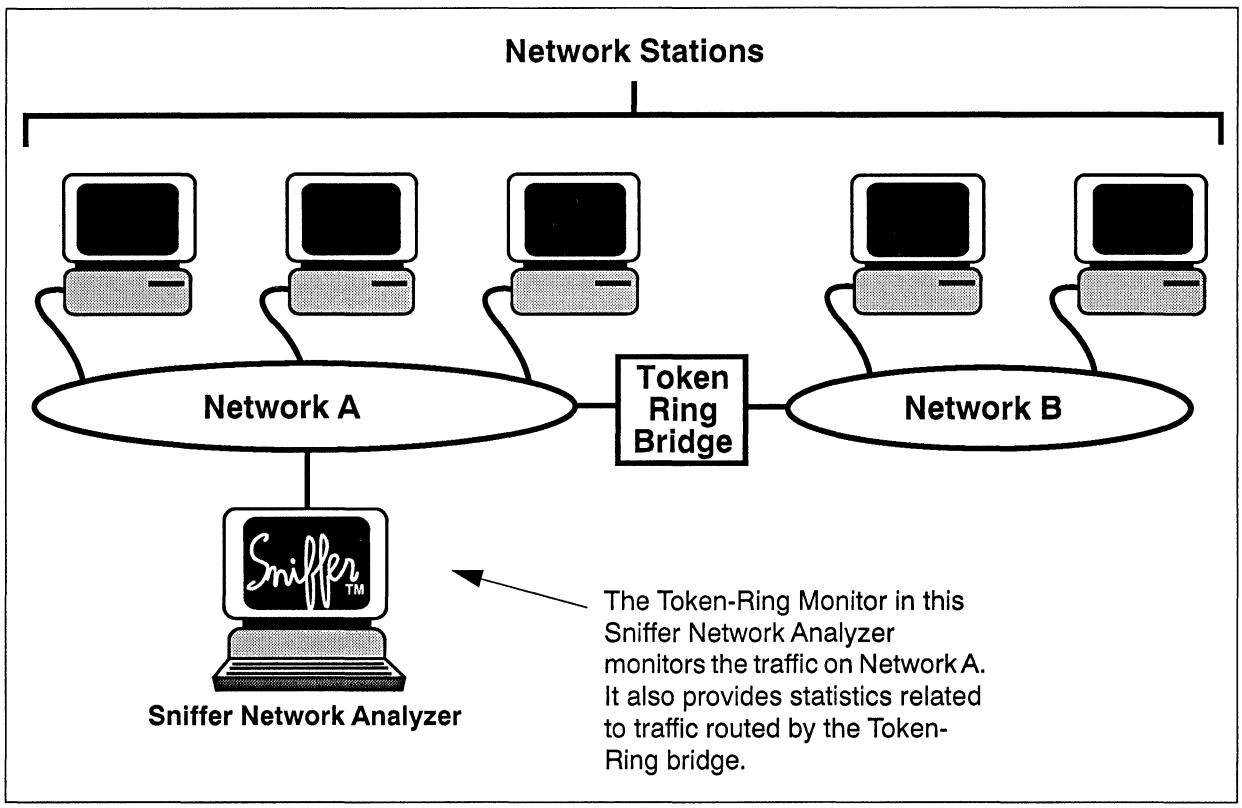


Figure 1–1. A Sniffer Network Analyzer running the Token-Ring Monitor

System Requirements

The monitor can be used only on an IEEE 802.5-compatible network that operates at 4 Mb/s or 16 Mb/s.

If you are running the IBM® LAN Network Manager on the network, it must be configured so that the Token-Ring Monitor can monitor the network. If the LAN Network Manager is not configured properly, it will remove the monitor from the network. For further information on configuration, refer to IBM's documentation on the LAN Network Manager. (The LAN Network Manager described here is a program from IBM that manages a local area network; it is not the LAN Manager developed by Microsoft®, which is a network operating system.)

CHAPTER TWO: GETTING STARTED 2

Getting Started

Overview

You can modify the option settings presented in the monitor's Main Menu to specify how the monitor operates. For example, you can determine:

- How the monitor monitors the network
- How the monitor collects statistics
- How the monitor presents statistics

The monitor is shipped with default option settings that you can use to start a monitoring session. However, it may become necessary to customize these settings to suit the needs of your network. Familiarize yourself with these options so that you can interpret and use the statistics efficiently.

This chapter describes the following:

- Starting the monitor.
- Configuring the monitor. (More information on how to further customize the monitor is given in subsequent chapters.)
- Interacting with the monitor.
- Running the monitor in the background.

Outline of the Getting-Started Procedure

The following list outlines the steps for getting started with the monitor:

1. Start the Sniffer Network Analyzer.
2. Select **Token-Ring Monitor** from the Main Selection Menu.
3. Configure the Token-Ring Monitor. (This step can be skipped since the default configuration can be used unchanged.)
4. Start the Token-Ring Monitor.
5. Specify whether the monitor gathers information from all stations or a particular station.
6. Specify the types of frames to be monitored.
7. Specify the station for which history statistics are to be collected.
8. Start a monitoring session.

The following sections describe these tasks in detail.

Starting the Sniffer Network Analyzer

There are two different methods of starting the Sniffer Network Analyzer. The Sniffer Network Analyzer starts:

- Automatically when the PC is booted up
- When you type MENU at a DOS prompt

Figure 2–1 shows the Main Selection Menu which is displayed on the screen once the Sniffer Network Analyzer is started. From this menu, you can start the monitor or analyzer, return to the operating system, or perform other tasks.

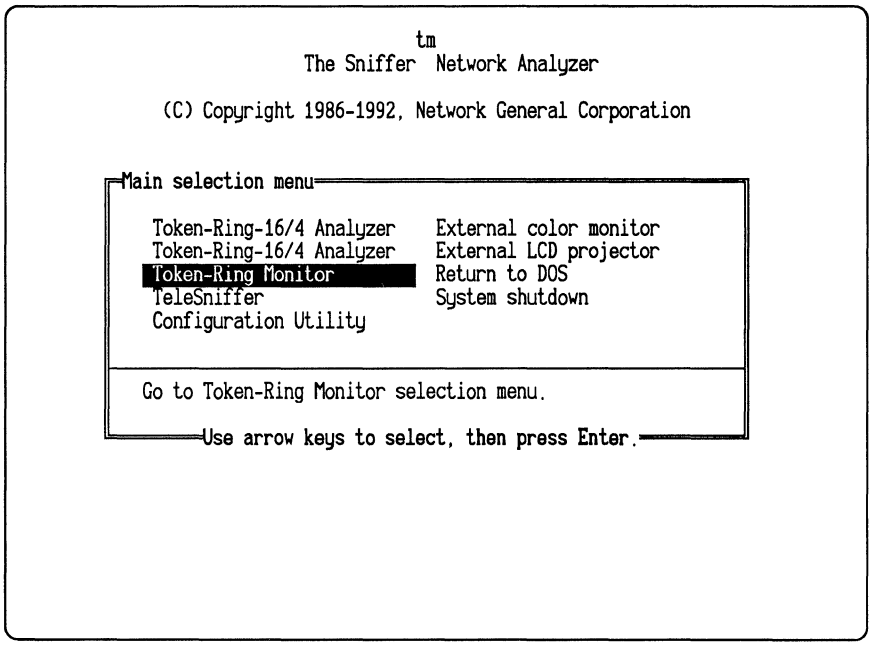


Figure 2–1. Main Selection Menu

Select the Token-Ring Monitor

When you select **Token-Ring Monitor** from the Sniffer Network Analyzer Main Selection Menu, Figure 2–2 is displayed on the screen. From this menu you can start, configure, or run a demo of the Token-Ring Monitor. You can also return to the Sniffer Network Analyzer Main Selection Menu.

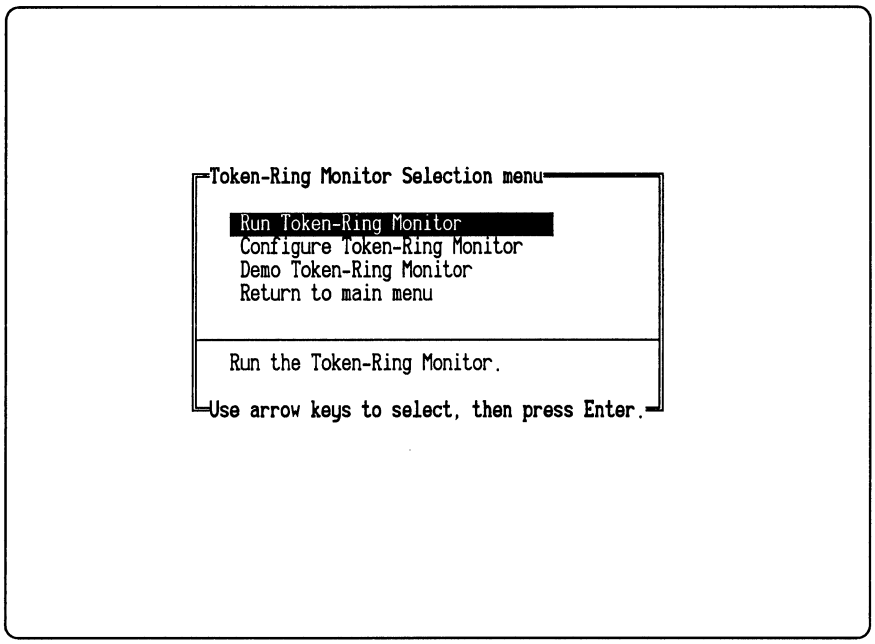


Figure 2–2. Token-Ring Monitor Selection Menu

Configuring the Token-Ring Monitor

The configuration settings for the Token-Ring Monitor include the network card settings and the monitor settings. Since the default settings will work for most systems, you can skip to the next section unless you want to change the default settings.

The network card settings used by the network interface card must be unique; that is, no other cards in your system, or devices attached to your system, can use the same settings. If you purchase a complete system, the software and network interface card are properly configured at the factory. If you buy a module and the software, or receive an update, these settings are automatically configured to work with the network interface card as originally configured at the factory. You do not have to change them unless they conflict with other devices.

The monitor settings determine the maximum number of stations to be monitored and the number of history intervals to be recorded. Keep in mind that changing the number of stations on the network or the number of intervals stored affects the amount of RAM used. For example, if you monitor 1024 stations for 1750 15-minute intervals (the default), the TRMONDRV program requires about 138K of RAM. If you decrease the number of stations monitored to 75, only about 85K of RAM is required.

You can easily make configuration changes later as your needs change. However, the statistics from the most recent monitoring session are erased.

To configure the Token-Ring Monitor:

1. From the Token-Ring Monitor Selection Menu, move to **Configure Token-Ring Monitor** and press Enter. The Configuration Options menu appears (see Figure 2–3).

   The **Configure Token-Ring Monitor** option appears in the selection menu only when the monitoring program is not loaded; you cannot change the configuration while the Token-Ring Monitor is running. You must first select **Exit** from the Token-Ring Main Menu and then select **Terminate Token-Ring Monitor** from the Token-Ring Monitor Selection Menu.

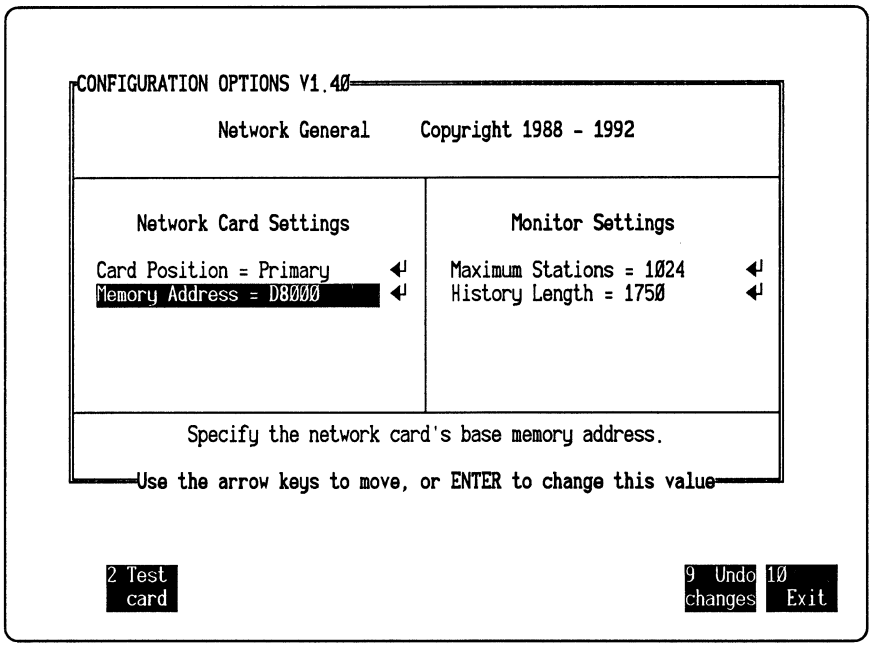


Figure 2–3. Configuration Options Menu

2. Use the Arrow keys to move to the setting you want to change. Press Enter to display a list of options or a dialog box that lets you enter a value.
3. Move to the correct value or type a value and press Enter. Press Esc to abort without changing the value.
4. Repeat these steps for any other settings you want to change.
5. Press F2 to run the card test. If the network interface card can operate with the new settings, a message appears indicating that the card passed all tests.

   If there is a problem, a dialog box identifies the problem so that you can correct it. (If necessary, refer to Appendix A, "Error and Warning Messages," for information on the displayed message.) Depending on the problem, it may be necessary to change the value of a setting or the configuration of the card. Once you have corrected the problem, repeat the card test.

6. Press F10 to exit the configuration menu and return to the Token-Ring Monitor Selection Menu. The Token-Ring Monitor automatically saves the settings you defined to the file C:\TRSNIFF\TRMON.CFG.

Network Card Settings

The following list describes the network card settings in the Configuration Options view.

Card Position — Specifies whether the Token-Ring network card is the primary or alternate network card. The setting must match the hardware configuration on the card.

The possible values are **Primary** and **Alternate**. The default is Primary.

Memory Address — Specifies the starting address of the shared RAM that resides on the network interface card, which is used to send data between the network and the PC.

The possible memory base address ranges from 80000 to F3000 (hex). The default is D8000. The value you enter must be a multiple of 1000 (hex).

Be sure that the memory address does not overlap the ROM address, which is determined by the switch settings on the network interface card.

Monitor Settings

The following list describes the monitor settings:

Maximum Stations — Determines the maximum number of stations that can be monitored. The possible value ranges from 1 to 1024. The default is 1024.

History Length — Determines the number of history intervals for which the Token-Ring Monitor stores history statistics. For example, if you specify that each history interval is 15 minutes ("Specifying History Interval" in Chapter 3 describes how to set this value), and that **History Length** is 20, the Token-Ring Monitor stores statistics for the last 20 time periods, each of which is 15 minutes. The possible value ranges from 5 to 1750. The default is 1750.

The following is a list of guidelines for changing the monitor settings:

- Initially, set **Maximum Stations** to a value that is 10% to 20% higher than the number of current stations, to allow for growth and for the needs of the Token-Ring Monitor software. (If you will not be running other DOS applications while the monitor is in the background, you can leave this setting at 1024.) A Token-Ring network segment supports up to approximately 250 stations.

- Each group address is regarded as a station. When setting **Maximum Stations** for the first time, you should assume that there are about 10 to 20 group addresses on the network. After monitoring the network for several days, you will know the actual number of group addresses, and you can adjust the maximum number of stations accordingly.
- Remember to count remote stations when setting **Maximum Stations**.
- Increasing the number of stations to be monitored or collecting more intervals increases the amount of RAM used by the TRMONDRV program. This reduces the amount of RAM available for other foreground programs. (TRMONDRV allocates about 60 bytes to each station and about 40 bytes to each history interval.)

Starting the Monitor

When you start the monitor, the following occur:

- The monitor driver is loaded into memory. The driver is a memory-resident program used to monitor the network, and can run in the background to continue monitoring while you are running another DOS application.
- The monitor application program is loaded into memory, which displays the Main Menu (Figure 2–5). From this menu, you can start a monitoring session, configure option settings, and use other features of the monitor.

To start the Token-Ring Monitor:

1. From the Token-Ring Monitor Selection Menu, move to **Run Token-Ring Monitor** and press Enter. The Initialization prompt appears (Figure 2–4).
2. Press any key. The Token-Ring Monitor Main Menu appears (Figure 2–5).

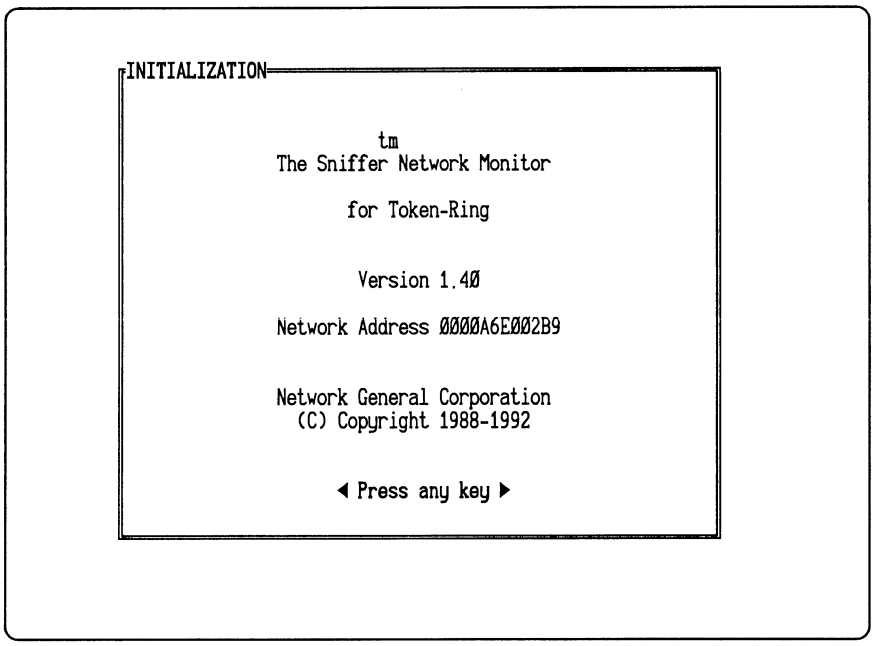


Figure 2–4. Initialization Prompt.

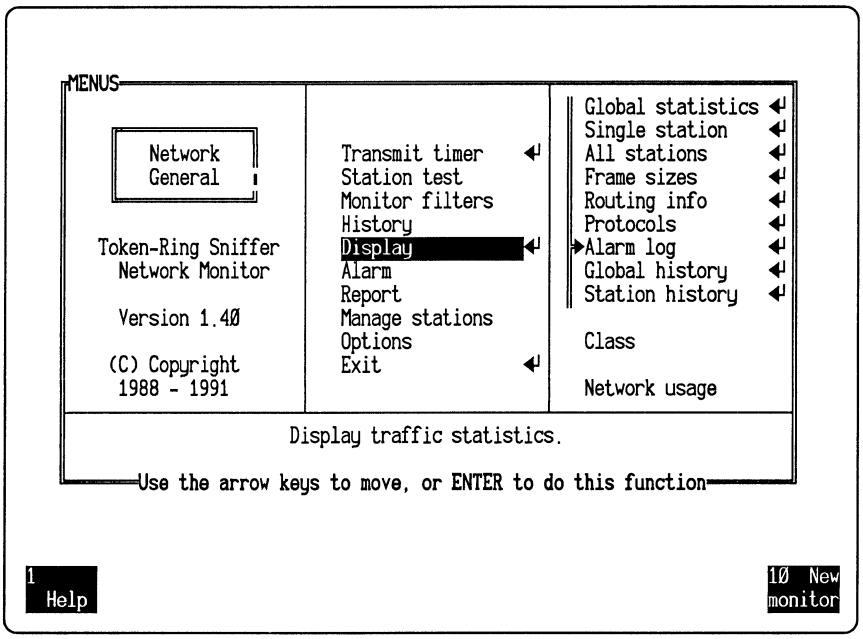


Figure 2–5. Token-Ring Monitor Main Menu.

Interacting with the Monitor

This section describes the notations used in the monitor menus, and how you select options and values. For specific tasks (for example, displaying statistics for a particular station), refer to the chapters that follow.

The Menu Structure

All functions of the monitor, except configuration, are accessible through the Main Menu, which is the center panel in Figure 2–5. When the Main Menu first appears, the **Display** option is highlighted. Options associated with the **Display** option are listed in the panel to its right. This organization is consistent throughout the monitor's menu structure; options associated with any highlighted option in the center panel always appear to its right. Some options, however, may not be visible until you move into the panel and scroll.

In this manual, a list of options displayed in a panel is called a menu; the name of the menu is the highlighted option in the center panel. For example, in Figure 2–5, the highlighted option is **Display**, and the right panel is the **Display** menu.

A back slash is used in this manual to specify the location of an option if more than one level of menu is involved. For example, to refer to the **Numeric** option associated with the **Global statistics** option in the **Display** menu, the manual uses this notation: the **Numeric** option in the **Display\Global statistics** menu.

Moving Through the Menus

You can move through the menu structure both vertically and horizontally. A highlight shows your current location. Move through the menus by:

- Pressing the cursor keys:

  For example, when **Display** is highlighted, pressing Cursor Up deselects **Display** and highlights **History**.

- Pressing the Page Up, Page Down, Home, and End keys:

  For example, if your current selection is **Display**, pressing Page Up or Home selects the first command, **Transmit timer**. Pressing Page Down or End selects the last option in the list, **Exit**.

- Typing the first letter of the command's name:

  If two or more options start with the same letter, the monitor selects the first one that follows the current command. For example, if the command currently highlighted is **Display**, pressing M selects **Manage stations**; but if **Station test** is the current selection, pressing M selects **Monitor filters**.

Options in the Main Menu

In the Main Menu, a carriage return symbol (↵) appears to the right of **Transmit Timer**, **Display**, and **Exit**. The symbol indicates that you can press Enter to trigger an action when the option is selected. That is, if **Display** is highlighted,

pressing Enter displays one type of statistic; if **Exit** is highlighted, pressing Enter leaves the Main Menu and returns to the Main Selection Menu.

When the carriage return symbol appears next to a menu item that is a settable parameter, the symbol indicates that you can edit the parameter by pressing Enter.

Other items in the center panel are not followed by carriage return symbols. They are names of submenus that display options and specify values. For example, when **History** is highlighted, pressing Enter does not trigger any action. Highlighting **History** displays the **History** menu, which shows the current settings that determine how the monitor accumulates history statistics. If necessary, use the cursor keys to move to the next submenu and/or desired parameter.

Choosing Menu Options and Defining Values

After selecting an option that triggers an action, you can press Enter to execute it. If you select a menu item that does not generate an action, move to one of its options.

Regardless of the type of option selected, if you highlight an option followed by a carriage return symbol and press Enter, one of the following happens:

- An action is triggered. For example, if you move to **Clear** in the **Report** menu, the monitor removes the report script from memory.
- A list of values or a dialog box appears. The value you specify in the list or dialog box affects how a future action works. For example, if you move to **Stn** in the **History** menu, a list of station addresses appears for you to select the desired station for which history statistics are to be gathered. Refer to the section, "Choosing Among Values," for further information on how to assign a value to an option.

The monitor "remembers" the values you assign even after you exit the program or turn off the Sniffer Network Analyzer. The next time you start the monitor, the same settings appear on the menu. However, if the Sniffer Network Analyzer is powered off or rebooted while the monitor is running, it loses the new values that you assigned during the session.

Choosing Among Menu Options

A list containing mutually exclusive options is identified by a vertical bar to its left. To select an item, move to it and press the Spacebar or Enter key. If an item is selected, an arrowhead is moved next to it. For example, if **Alarm log** is selected, the symbol "▶" appears to its left, as shown in Figure 2–6.

Not all options are included in a list. For example, the **Class** option in the **Display** menu appears by itself, since it logically modifies other options. Selecting **Class** displays another menu, which lists mutually exclusive values (**To**, **From**, and **Both**) that determine the type of traffic to be displayed. To select the desired value, move to the value and press the Spacebar or Enter key.

If you select an option with the Enter key, and the option is associated with an action in the menu panel to its left, the action is performed automatically.

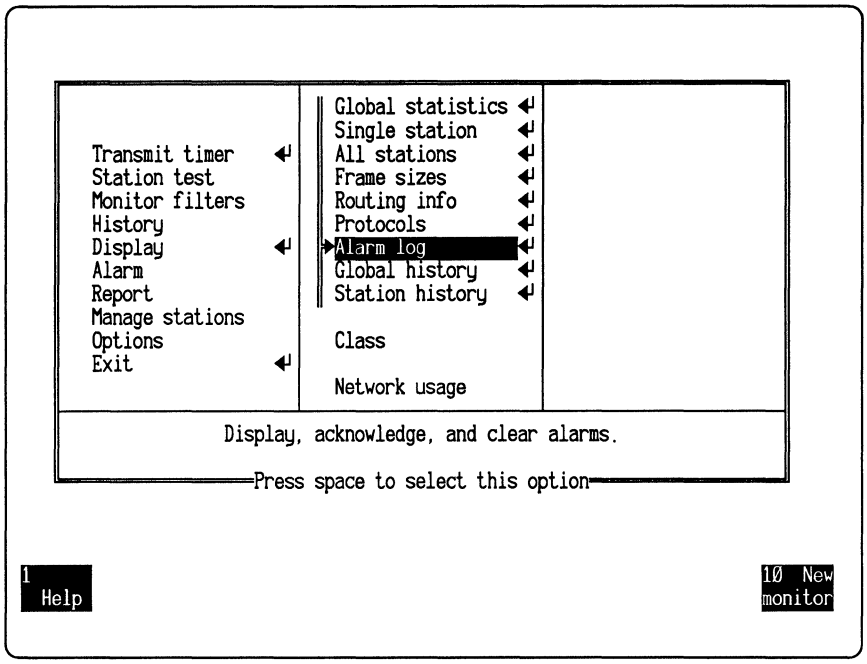


Figure 2–6. Alarm log option in the Display menu.

Choosing Among Values

For some options you can assign values, and the assigned value is displayed after an equal sign. For example, one of the options in the **Alarm** menu is displayed as **Auto clear = 01:00**. It means that the value 1 hour has been assigned to the **Auto clear** option.

To assign a value, move to the option and press Enter. Then one of the following happens:

- A dialog box appears, prompting you to type a value.

  Type a value within the permissible range and press Enter.

- A list of values appears. Move to the desired value and press Enter.

If you do not want to enter or select a value after the dialog box is opened, press Esc to close the box and return to the menu.

Figure 2–7 is an example showing a station list from which you choose a station.

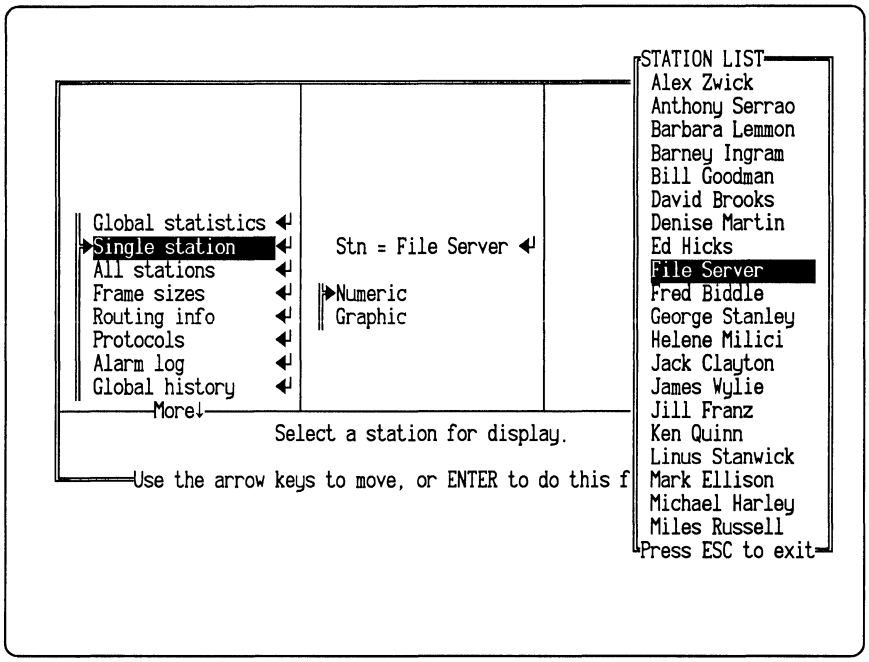


Figure 2–7. Station list.

Toggling Values

Some options can be toggled; that is, you can either select or deselect them. For example, if you select the **All stations** option in the **Display** menu, the option **Active stns only**, preceded by a √ mark, appears in the right panel. This option determines the type of station to be included in the display, and the √ mark indicates that it has been selected.

To select an option, move to highlight it and then press the Spacebar. A √ mark precedes a selected option. Pressing the Spacebar again deselects an item, displaying an x mark next to it. (The Enter key has no effect here.)

If you press Alt and the Spacebar simultaneously, the √ and x marks are reversed for all items in the same menu. This is very useful when selecting many items in long menus.

Figure 2–8 shows the configuration of the **All stations** option in the **Display** menu.

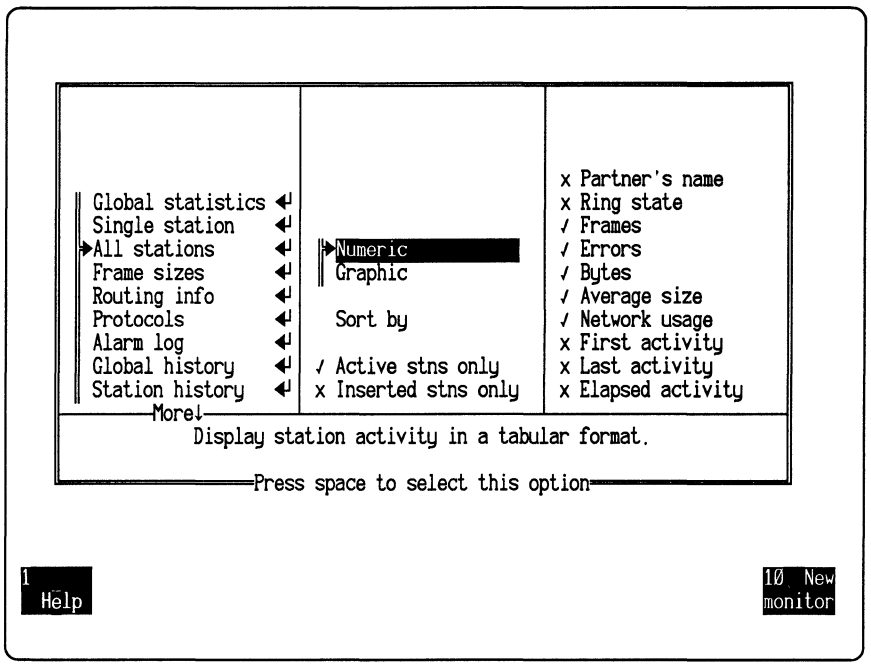


Figure 2–8. Configuration of the All stations option.

Using the Function Keys

When the monitor displays a menu or statistical display, you can use the function keys to manipulate the display or perform various monitor functions.

From menus, you can use the following function keys:

- F1 (Help) displays the main **Help** menu. For further information on the **Help** menu, refer to the section, "Using On-Line Help" on page 2–15.
- F3 (Display) displays the statistics according to the options associated with **Display**. This key is applicable only after you start a monitoring session.
- F10 (New monitor/Stop monitor) starts or stops a monitoring session. This key toggles between the two functions.

From views, you can use the following function keys to navigate between menus and options. Other function keys may be available, depending on the view being displayed. Those keys are described in the chapters corresponding to the views.

- F5 (Menus) returns you to the Main Menu.
- F6 (Display options/Return) lets you display and edit options without returning to the Main Menu. This key toggles with "Return," which returns you to the view.

In addition to using the function keys, you can press Esc to go back to the previous screen.

Using On-Line Help

The monitor provides an on-line help facility that displays information about the following topics:

- Moving around the menu tree
- Selecting menu options
- Using the function keys
- Testing the transmit wait time
- Running protocol-specific station tests
- Monitoring network traffic
- Setting monitor filters
- Specifying history information
- Displaying statistics
- Working with alarms
- Using the report writer
- Managing station information

To use on-line help:

1. Press F1 (Help) to display the **Help** menu or relevant submenu. If you press F1 when one of the monitor views is displayed, a description of that view appears.
2. In a **Help** menu, move to the topic for which you want additional information and press Enter.

   To scroll through help text, press Cursor Up, Cursor Down, Page Up, or Page Down.
3. Press Esc to return to the **Help** menu. Press Esc again to return to the screen display before you used on-line help.

Preparing for a Monitoring Session

Before starting a monitoring session from the Main Menu, you should:

- Verify the network speed.
- Specify the type of frames to be monitored (Logical Link Control frames, Medium Access Control frames, or both).
- Specify the station for which you wish to collect history statistics.
- Specify the stations you wish to monitor (all stations or a single address).

Monitoring only one station means that you restrict monitoring to the frames from or to a particular station. Remember that the statistics the monitor compiles are based on these frames only. For example, if you choose to monitor

Station A and it has not been sending or receiving frames, the monitor shows no global statistics even though other stations are active during this monitoring session. The monitor filters out traffic from, or to, other stations.

If you restrict monitoring to a single station, familiarize yourself with how the monitor generates alarms by reading the section "Interpreting Alarms When Using Monitor Filters" on page 5–7.

Verifying the Network Speed

The Token-Ring network interface card can transmit and capture data at either 4Mbps or 16Mbps. The Token-Ring network interface card must be set to the same speed as the network that it monitors. A network interface card entering the network at the wrong speed will bring down the network.

You can modify the network interface card's monitoring speed through the **Options** menu. To change the transmit speed, you must change the setting on the network interface card. For further information on setting the transmit speed, refer to the *Sniffer Network Analyzer: Installation Guide.*

To modify the monitoring speed:

1. Move to **Options** in the Main Menu.
2. Move to the appropriate speed and press the space bar to select the speed.

Specifying Which Stations to Monitor

Monitoring all stations gives you the option of displaying statistics for any or all stations. If you have not started a monitoring session before, it is recommended that you monitor all stations. The maximum number of stations is set in the Configuration Menu.

To specify which stations to monitor:

1. You can specify the stations only when the monitor is not monitoring. Make sure that the key label for F10 is "New monitor." The key label "Stop monitor" indicates that a monitoring session is in progress. To stop a session, press F10.

   Move to **Monitor filters** in the Main Menu.

2. To monitor all stations, move to the **All stations** option and press the Spacebar.

   To monitor a particular station, move to the **Stn** option and press Enter to display the station list. Move to the station to be monitored, and press Enter. The monitor observes only the frames to or from the specified station.

   The station list contains the same station names that are in the STARTUP.TRD file in the TRSNIFF directory, which is also used by the analyzer. Refer to "The Station List" on page 2–18 for further information

on how the monitor adds station addresses to the list as it monitors the network.

The new setting takes effect in the next monitoring session.

Specifying the Types of Frames to Be Monitored

You can configure the monitor to monitor only the MAC frames, the LLC frames, or both. The MAC frames contain information on the network status, and are generated automatically by network interface cards on the Token-Ring network. The LLC frames are data frames sent by the host computers on the network.

To specify the types of frames to be monitored:

1. Stop the monitor if a monitoring session is in progress. Move to **Monitor filters** in the Main Menu.
2. To monitor both MAC and LLC frames, move to **All frames**. To monitor either type of frame, move to **LLC frames** or **MAC frames**. Press the Spacebar to choose the option.

The new setting takes effect in the next monitoring session.

Specifying History Options

History statistics provide an overview of when the network was busy, at what time of the day stations generated errors, and so on. You can configure the monitor to collect history statistics for a specified address. This is different from global history which is the overall network traffic history.

Be sure that the station for which the statistics are collected is also a station that the monitor monitors. Suppose it monitors the traffic to and from ServerA only and you specify that history statistics be collected for ServerB. Unless the servers communicate with each other, the monitor displays no station history statistics for ServerB. However, if ServerB communicates with ServerA, that activity is recorded under ServerA traffic.

To select the station for which the monitor will collect history statistics:

1. Move to the **Stn** option in the **History** menu.
2. Press Enter to display the station list.
3. Move to the station that you want to collect history statistics for and press Enter.

Using the Monitor with the IBM LAN Manager

If you are running the IBM® LAN Network Manager on the network, it must be configured so that the Token-Ring Monitor can monitor the network. If the LAN Network Manager is not configured properly, it will remove the monitor from the network. For further information on configuration, refer to IBM's

documentation on the LAN Network Manager. (The LAN Network Manager described here is a program from IBM that manages a local area network; it is not the LAN Manager developed by Microsoft®, which is a network operating system.)

Starting a Monitoring Session

The monitor is ready to monitor the network after you configured it according to the instructions in the previous sections.

To start a monitoring session:

Press F10 (New monitor). The monitor displays these messages, one after the other:

```
Resetting the network card.
Entering the ring.
```

After a monitoring session starts, the key label on the screen for F10 changes to "Stop monitor."

You can examine the statistics gathered in a monitoring session in various ways. For example, you can display statistics, generate statistical reports, view the alarm log, and so on. You can do this while the monitor is running or after you have stopped it. The chapters that follow describe these tasks in detail.

The monitor can automatically start a monitoring session every time it prints a report. This is controlled by the **Restart monitor** option in the **Report\Auto print** menu. Refer to "Printing a Report Automatically" on page 6–18 for more information on restarting a monitoring session.

The Station List

When you first run the monitor, the station list contains the station names in STARTUP.TRD, a station data file that is also used by the analyzer. The station list remains in memory until you terminate the monitor. If you want to monitor or collect statistics for a particular station, choose the station from this station list.

Once the monitor starts a monitoring session, it can detect unnamed stations on the network. If you set **Monitor filters** to **All stations**, it detects any station that transmits frames on the network during the monitoring session. If the **Stn** option is selected instead of **All stations**, and **Stn** is set to an address, the monitor detects those stations that have sent frames to, or received frames from, the specified address. In either case, the monitor adds the detected station to the station list until the list is full. When the list is full, the monitor adds stations based on priority. Local stations have priority over remote, unnamed stations in the station list. That is, if a local station is to be added to a full station list, a remote, unnamed station is removed from the list.

If a station you want to collect statistics for does not appear on the list after monitoring the network for a while, check to make sure that the station is

powered on and sending frames. If the station's address still does not appear in the station list, this may indicate a connectivity problem between the station and the network.

Figure 2–9 illustrates how the monitor uses the station list.

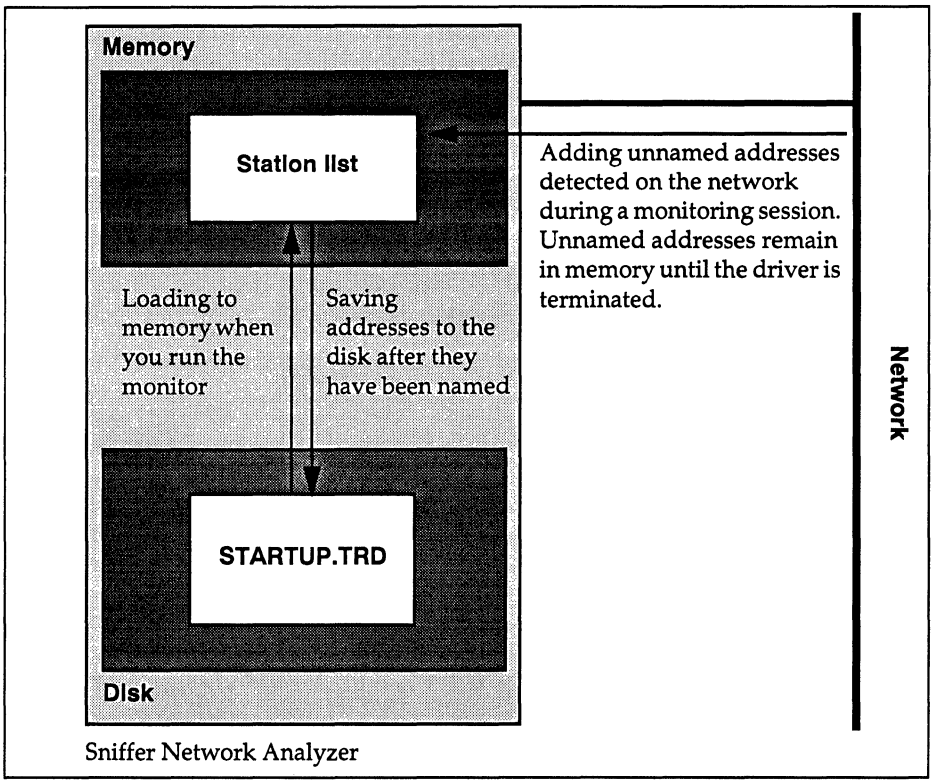


Figure 2–9. The monitor loads and modifies the station list.

For further information on naming stations and STARTUP.TRD, refer to Chapter 4, "Managing the Station Data Files." The *Sniffer Network Analyzer: Analyzer Operations* manual also describes the station data file.

Naming Stations

You are not required to name all stations on the network before starting a monitoring session. However, it is recommended that you name the stations for these reasons:

- When the monitor detects a station on the network that has not been assigned a name, the monitor may generate an unknown station alarm. (The unknown station alarm is disabled by default; so this happens only if you have enabled it. For more information on controlling alarms, refer to Chapter 5, "Working with Alarms.") This alarm alerts you to intruders or to possible problems with network bridges or malfunctioning network interface cards. It is useful only if all the legitimate stations have been named.

- The unnamed station addresses are lost when you remove the monitor driver from memory or start a new monitoring session.
- The monitor loads the station names into the station list in memory when you start the monitoring application and adds unnamed stations to the list once it starts monitoring. But if more than 1,024 stations exist on the network, the monitor stops adding unnamed stations to the list. Any station not in the station list cannot be monitored.

For further information on naming stations, refer to Chapter 4, "Managing the Station Data Files."

Stopping a Monitoring Session

When you stop a monitoring session, the driver stops monitoring, but remains in RAM.

To stop a monitoring session:

1. Press F10 (Stop monitor). The following message appears:

   ```
   The Sniffer Network Monitor will stop monitoring if you proceed. Press ENTER
   to proceed. Press ESC to cancel.
   ```

2. Press Enter. The following happen:
   - The label of F10 on the screen changes to "New monitor."
   - If you display a statistics view, the clock in the upper right corner shows "ENDED," followed by the time at which you pressed F10.
   - The statistics gathered during the monitoring session that you just terminated are still available for display. They are lost, however, once you start another monitoring session, remove the monitor driver from memory, or reboot the computer. To save the statistics, generate reports according to the instructions in Chapter 6, "Creating Reports."

Monitoring in the Background

You can run the monitor in the background, without displaying the Main Menu or any statistical view.

However, monitoring in the background has these limitations:

- You cannot display statistics.
- When you stop the monitoring session, the monitor loses the statistics collected (unless you bring it first to the foreground).
- You cannot save history statistics and reports to the disk.
- When the monitor generates an alarm, it does not appear on the display, however, audible alarms can still be heard while monitoring in the background. (For more information on alarms, refer to Chapter 5, "Working with Alarms.")

To monitor the network in the background:

1. Start the monitor and initiate a monitoring session as you normally would, following the instructions provided earlier in this chapter.
2. Move to **Exit** on the monitor's Main Menu and press Enter.

   The Main Selection Menu appears. The driver continues to monitor network traffic, but you can now perform other tasks.

You might want to bring the monitor back to the foreground after a period of background monitoring, for example, to display statistics or alarms.

To bring the monitor to the foreground:

1. At the DOS prompt, type MENU and press Enter. The Main Selection Menu appears.
2. Select **Token-Ring Monitor** and press Enter. The Monitor Service Menu appears.
3. Select **Run the User Interface** and press Enter. The monitor's Initialization screen appears.
4. Press any key to display the monitor's Main Menu. The key label for F10 on the screen is "Stop monitor," which indicates that the monitoring session is in progress.

To stop a background monitoring session:

1. Bring the monitor to the foreground.
2. From the monitor's Main Menu, press F10 (Stop monitor).

Alternatively, you can stop a background monitoring session and remove the driver at the same time. This procedure is described in the section, "Removing the Driver from Memory."

Removing the Driver from Memory

The monitor's driver program is loaded into memory when you start the monitor. To use the analyzer application, the driver must first be removed from memory. If you try to start the analyzer application without removing the monitor driver, you are prompted that the monitor driver will be removed from memory if you continue.

To remove the driver from memory:

1. Display the Sniffer Network Analyzer Main Selection Menu.
2. Select **Token-Ring Monitor** and press Enter. The Token-Ring Monitor Selection Menu appears.
3. Select **Terminate Token-Ring Monitor** and press Enter. The following messages appear:

```
Removing the monitor driver from memory...
TRMONDRV removed from memory
```

After a few seconds, the Main Selection Menu is displayed.

Removing the driver from memory terminates the monitoring session and erases from memory all statistics that the monitor has gathered. To save the statistics, you can print out or save a report to disk. For further information on report writing, refer to Chapter 6, "Creating Reports."

CHAPTER THREE: DISPLAYING STATISTICS 3

Displaying Statistics

Overview

This chapter describes how to display the statistics the monitor gathers during a monitoring session. You can choose what you see and how you see it.

The following are examples of what you can display:

- Traffic statistics for the entire network (global statistics)
- Traffic statistics for a single station
- Traffic statistics for every station on the network

The monitor sorts all these statistics according to your specifications.

This chapter describes the general display options and discusses the display for each type of statistic. For various types of information in each view, refer to Chapter 9, "The Monitor Menu Items."

Display Options

A number of options are available for customizing statistical views. This section describes only the ones that apply to more than one type of statistic. More specific options (for example, **Route path** and **Route length**, which apply only to **Routing info**) are discussed in the sections that follow.

The following is a list of general options that determine a statistical view's contents and format:

- Type of statistic to display (for example, **Global statistics** or **Alarm log**).
- Format of the display (that is, whether statistics are displayed numerically or graphically). This applies to some types of statistics only.
- Class of traffic (that is, traffic to or from the station, or both).
- Network usage (that is, relative or absolute).

After you start monitoring, pressing F3 (Display) displays the statistics according to the options you specified.

Numeric vs. Graphic Display

You can configure the monitor to provide either a numeric or graphic display for the following types of statistics:

- Global statistics
- Single station

- All stations
- Global history
- Station history

The numeric display consists of columns of numbers; the graphic display presents values in a histogram for a visual summary of network usage.

For each graphic view, you can scale the usage axis using these methods:

- Pressing F7 or Cursor Up scales up the axis, which makes the bars in the graph longer to show a greater level of detail.
- Pressing F8 or Cursor Down scales down the axis, which makes the bars in the graph shorter.

If a bar is longer than the axis, the monitor displays a triangle at the upper end of the bar.

Class Option: To, From, or Both

The **Class** option applies to the following types of statistics:

- Single station (for the graphic display only)
- All stations
- Station history

For each station, the **Class** option determines whether statistics are displayed for received frames (**To**), transmitted frames (**From**), or both (**Both**).

Network Usage Option: Absolute vs. Relative

The **Network usage** option applies to the following types of statistics:

- Single station
- All stations
- Station history

The **Network usage** option can be set to one of the following:

Absolute — Statistics are measured as a portion of the total network capacity, which remains constant. For example, if all stations together use 10% of the total capacity, absolute usage is 10%.

Relative — Statistics are measured as a portion of the total traffic. For example, if one station accounts for all the traffic on the network, its relative usage is 100%; if four stations generate traffic in equal amounts, relative usage for each is 25%.

It is possible that a station accounts for a high percentage of relative network usage but a low percentage of absolute network usage. For example, if there are

only two active stations on the network, which generate about the same amount of traffic, their relative usage is approximately 50% each. But if these stations rarely generate traffic, their absolute network usage can be as low as 1%. In this case, about 99% of the network capacity is unused.

Only absolute network usage is displayed in global statistics views. The **Relative** option does not take effect, for example, when you display global statistics or global history.

The value of network usage is rounded up to two decimals if it is less than 0.01%. For example, the absolute network usage is 0.01% for a station that received and transmitted a total of two frames, although these frames did not use as much as 0.01% of the network capacity.

If you choose the **Both** option in the **Display\Class** menu, the relative network usage percentage can add up to 200% because the monitor counts each frame twice: once for the source address and once for the destination address.

Freezing the Screen Display

When a statistical view is displayed during a monitoring session, pressing F9 (Freeze display) temporarily stops updates to the screen to make it easier to study specific statistics. The clock in the upper- right corner is stopped as well. In the background, however, the monitor continues collecting statistics, logging alarms, and generating reports (if these functions have been enabled). To redisplay the current statistics, press F9 again.

Scrolling the Screen Display

If there are more stations than a screen can contain in a view, use F3 (Prev station) or F4 (Next station) to view the previous or next station. In a numeric view, Cursor Up and Cursor Down perform the same function as F3 and F4, respectively.

To look at the first screen of information, press Home; to look at the last screen, press End.

Displaying Global Statistics

The Global Statistics view displays traffic statistics for the entire network as they are updated, either in numeric or graphic format.

Figure 3–1 is an example of the numeric Global Statistics view. The numeric view presents three categories of statistics:

Traffic counts Counts on the left show the amount of cumulative activity since the beginning of the monitoring session. Counts on the right show activity during the last second.

Error counts

The Error Counts column indicates the overall condition of the network, the number of oversized frames, the number of ring purges, and the number of soft error report frames. For further information on error counts, refer to Chapter 9, "The Monitor Menu Items."

To check which stations report most of the soft error frames, select the **All stations** option in the **Display** menu once you return to the Main Menu.

Timestamps

The timestamps include the time when monitoring started and the time when the first and last network activities took place. The monitor also shows the duration of a monitoring session.

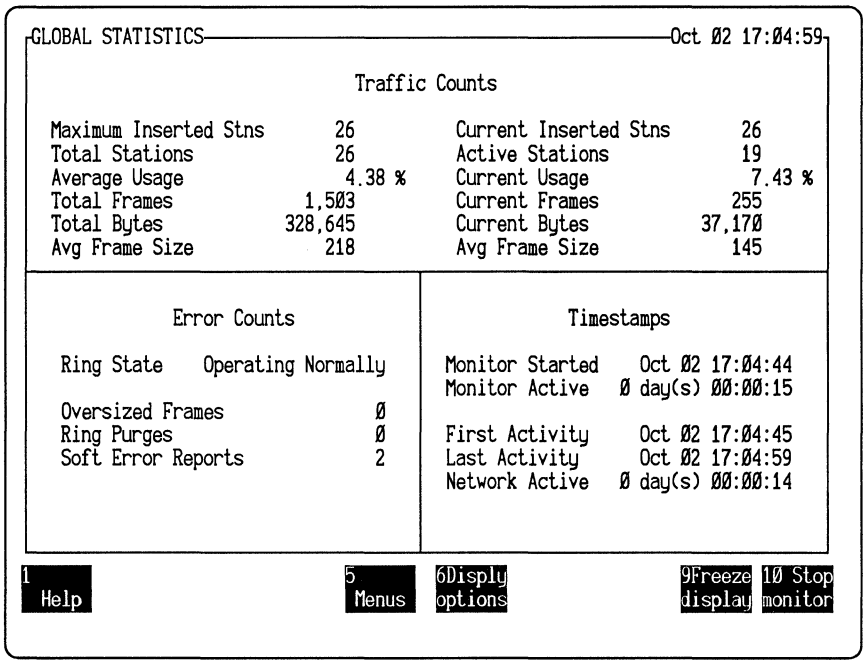


Figure 3–1. Global statistics (numeric view).

Figure 3–2 is an example of the Global Statistics view in graphic format. As in the numeric view, the top portion of the graphic view shows traffic counts, both cumulative and for the last second. The bottom portion shows absolute network usage plotted as a graph and updated at one-second intervals.

To display global statistics:

1. Move to the **Global statistics** option in the **Display** menu and press the Spacebar.
2. Move to the **Numeric** or **Graphic** option in the **Display\Global statistics** menu and press the Spacebar.
3. Press F3 (Display) to display the statistics.

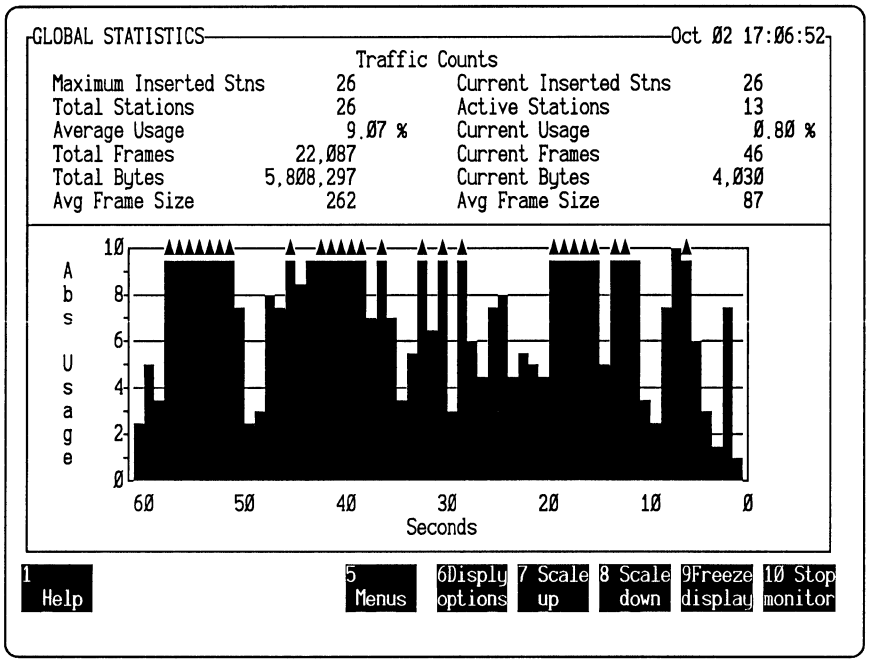


Figure 3–2. Global statistics (graphic view).

Displaying Station Statistics

The Single Station view displays traffic statistics to and from specific stations as they are updated, either in numeric or graphic format.

In the numeric view, there are three columns:

- The top-left column identifies the station to which these statistics apply, as well as the station's two most recent partners.
- The top-right column shows combined transmission and reception activity. The current usage percentage represents the usage during the past second; other statistics are cumulative since the beginning of the monitoring session.
- The lower-left portion shows transmission activity, and the lower-right portion shows reception activity. These portions show the same types of statistics, except that the lower-left portion includes the number of errors reported by the station. This error count is not included in the lower-right portion because soft error reports are not sent to individual stations.

Figure 3–3 displays traffic to and from a single station.

Transmission statistics are based on frames sent from the specified station; reception statistics are based on frames sent to the specified station. To illustrate this distinction, display the station statistics for the broadcast address. Since the broadcast address is only used as a destination address, you only see traffic in the "Traffic TO Station" category.

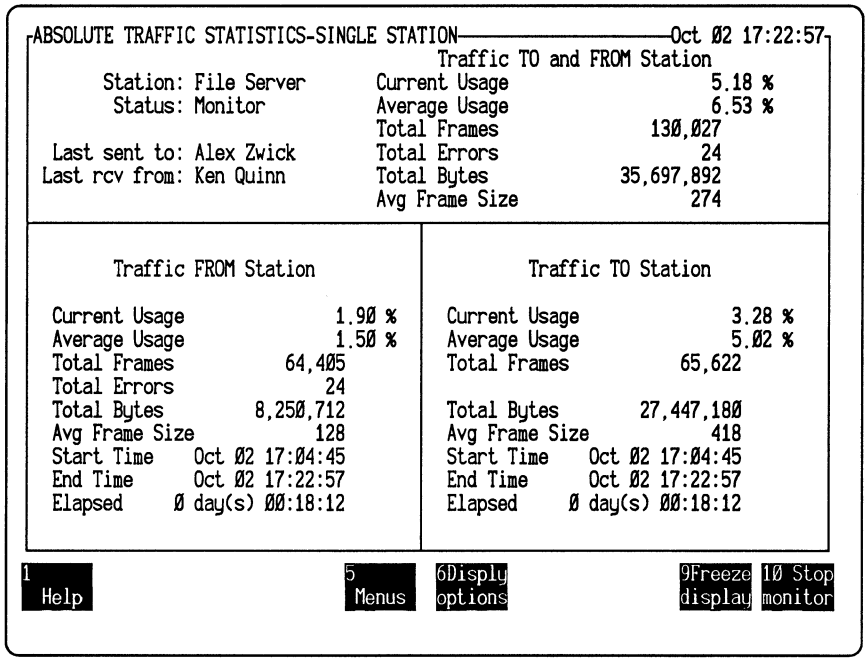


Figure 3–3. Traffic statistics for a single station (numeric view).

In the graphic view, the top portion displays either receptions, transmissions, or both, depending on whether you selected **To, From,** or **Both** with the **Class** option. The bottom portion shows either absolute or relative network usage plotted as a graph and updated at one-second intervals. The bars in the graph also indicate the class of statistics. For example, on a color monitor, the yellow portion of the bar represents receptions, and the blue portion represents transmissions. Figure 3–4 shows a graphic view of statistics for a single station.

To display station statistics:

1. Move to the **Single station** option in the **Display** menu and press the Spacebar.
2. Move to the **Stn** option in the **Display\Single station** menu and press Enter to display the station list. Move to the station you want to display statistics for and press Enter.
3. Define how statistics are displayed.
   a. Move to the **Numeric** or **Graphic** option and press the Spacebar.
   b. To display the **Class** and **Network usage** options, press Cursor Left to move back to the **Display** menu.
   c. Press Page Down to move to **Network usage**. Then move to **Absolute** or **Relative** in the **Display\Network usage** menu, depending on whether you want to show statistics as a portion of total network capacity or current traffic. Press the Spacebar to select the option.

d. If you select the **Graphic** option, you can also define the **Class** options. Move to **To, From,** or **Both** in the **Display\Class** menu, depending on whether you want to display statistics for receptions, transmissions, or both. Press the Spacebar.

4. Press F3 (Display) to display the statistics.

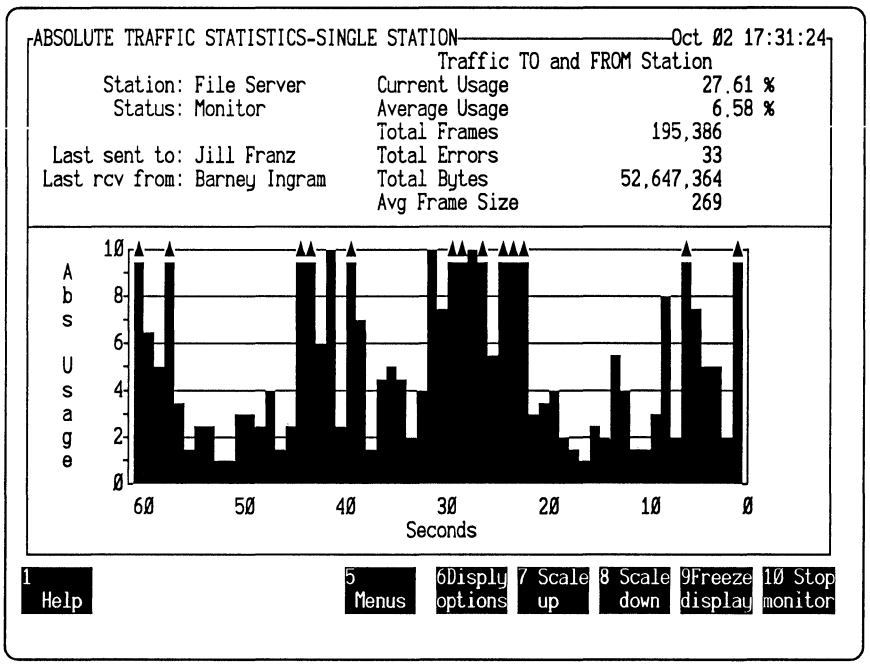


Figure 3–4. Traffic statistics for a single station (graphic view).

Displaying Sorted Statistics for All Stations

The statistical view for all stations contains various types of statistics for each station. You can customize the display by specifying the following in the Main Menu:

- How the statistics are sorted
- Whether the statistics are displayed in ascending or descending order
- What statistics are displayed in the view
- Whether the display is in numeric or graphic format

Figure 3–5 shows a numeric example of sorted statistics that include the station, the number of frames, errors, bytes, average frame size, and the percentage of absolute network usage. These statistics are sorted in descending order by the number of bytes.

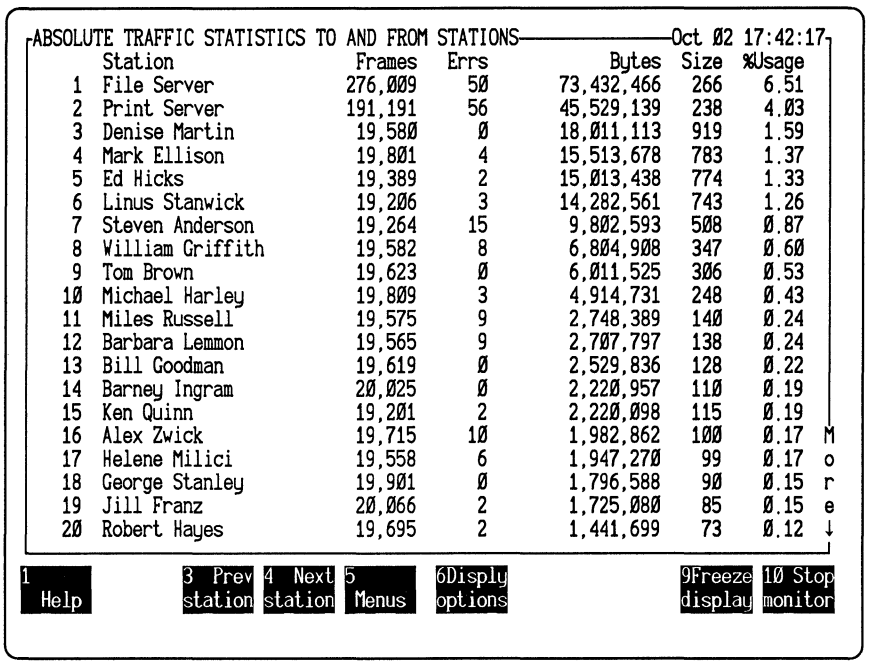


Figure 3–5. Traffic statistics for all stations (numeric view).

Sorting Statistics

The monitor can sort statistics in a variety of ways. This is useful for comparing stations or for finding stations that match certain criteria. The following is a list of sort keys for both numeric and graphic displays:

Name	Name of the station. If a station is not named, the address is used.
Partner's name	Last station that communicated with the station.
Ring order	Order in which the stations are located on the Token-Ring network.
Frames	Total number of frames transmitted or received, or both transmitted and received during a monitoring session.
Errors	Total number of soft error report frames transmitted. (If the setting of the **Class** option is **To**, you are not allowed to sort by errors.)
Bytes	Total number of bytes transmitted, received, or both.
Average size	Average size of frames transmitted, received, or both.
Network usage	Percentage of network usage.
First activity	Time when the first frame was sent or received.
Last activity	Time when the most recent frame was sent or received.
Elapsed activity	Time between the first and last activity.

Types of Statistics Included in the View

The **Display\All stations** menu includes two options that limit the displayed statistics to particular stations, whether you select the numeric or graphic format:

Active stns only — Stations that have sent or received frames on the network since the monitoring session started.

Inserted stns only — Stations whose station status is active monitor, standby monitor, or snooper. (For further information on station status, refer to the section "All Stations Statistics in Numeric Format" on page 9–16.)

If both options are selected, a station, to be included in the view, must be an inserted station that has sent or received frames; if neither option is selected, all stations are included.

If you select the numeric format, you can also select the types of statistics to be included in the display. The following list contains the statistic types. Most of the items in the list are the same as the sort keys. Refer to the previous section "Sorting Statistics" for information on those statistic types.

- Partner's name
- Station status (For further information on station status, refer to the section "All Stations Statistics in Numeric Format" on page 9–16.)
- Frames
- Errors
- Bytes
- Average size
- Network usage
- First activity
- Last activity
- Elapsed activity

If you select more options than can fit in the statistical view, use Cursor Left or Cursor Right to scroll hidden portions of the screen into view. Pressing Control and a cursor key moves you to the far right or left of any screen.

Numeric vs. Graphic Display

The numeric display can include various types of statistics according to your specification. Refer to the "Types of Statistics Included in the View" section for more information.

The graphic display shows the network usage of up to 10 stations at a time. The percentages are represented both graphically and numerically. To see more than the 10 stations, press Cursor Right or Cursor Left.

The graphic display also indicates the class of traffic from which the statistics are derived. Specify the value of the **Class** option (**To, From,** or **Both**) in the **Display\Class** menu.

Figure 3–6, for example, shows the stations with the highest amount of relative network usage for both transmissions and receptions. The statistics below the graph are derived from the transmission and reception counts, while the graph shows all three classes (**To, From,** and **Both**) for each of the listed stations.

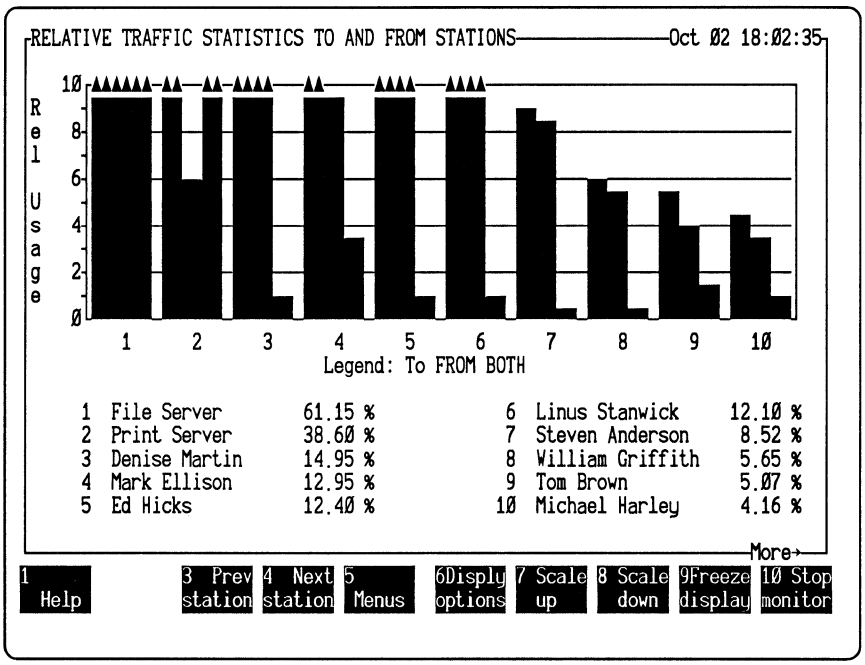


Figure 3–6. Traffic statistics for all stations (graphic view).

Procedure for Displaying Statistics for All Stations

To display and sort selected statistics:

1. Move to **All stations** in the **Display** menu and press the Spacebar.
2. Follow these steps to define the type of traffic and network usage:
   a. Press C to move to the **Class** option.
   b. Move to **To, From,** or **Both** in the **Display\Class** menu. Press the Spacebar to select one of the options.
   c. Move to the **Display\Network usage** menu. Press the Spacebar to select either **Absolute** or **Relative.**
3. To specify the format of the display, move to the **Numeric** or **Graphic** option in the **Display\All stations** menu and press the Spacebar.
4. If you select **Numeric,** a list appears in the right panel, which allows you to select the types of statistics to be included in the view. Move to any options in the list and press the Spacebar to select the options.

5. To specify how the statistics are sorted, move to **Sort by** in the **Display\All stations** menu. Two lists of options appear to its right.
   a. Move to the **Ascending** or **Descending** option in the first list and press the Spacebar.
   b. Move to the sort key displayed in the second list and press the Spacebar.

      For example, if you select **Frames**, the monitor sorts all stations by the number of frames and displays them from highest to lowest or vice versa, depending on whether you chose the **Descending** or **Ascending** option.
6. To specify the types of stations to be included in the view, move to the **Display\All stations** menu.

   If you want the view to include only the stations that have sent or received traffic, select **Active stns only**.

   If you want the view to include only the inserted stations, select **Inserted stn only**.
7. Press F3 (Display) to display the sorted statistics you specified. If there are too many options to fit on the screen in the numeric view, use Cursor Right or Cursor Left to scroll them into view.

   To display stations either higher or lower in the sort order, press F3 (Prev station) or F4 (Next station).

Displaying Frame Sizes

This view shows how many frames fall into each of the predefined size categories and what percentage of frames each size category comprises. The graph illustrates these numbers for a visual summary. This information is useful for determining how to configure your network's data buffers. Figure 3–7 is an example of the Frame Sizes view on a 4-Mb/s network.

To display frame sizes:

1. Move to **Frame sizes** in the **Display** menu and press the Spacebar.
2. Press F3 (Display) to display the frame size distribution.

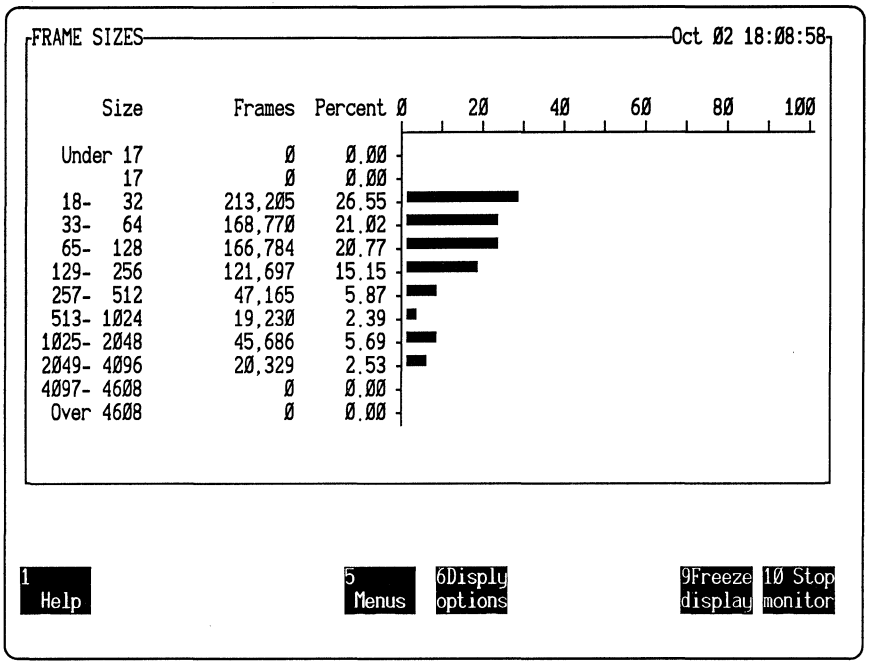


Figure 3–7. Frame sizes view.

Displaying Routing Information

The monitor provides two views that contain routing information. The Routing Paths view shows the amount of traffic routed to and from the local ring. The Routing Lengths view breaks down the number of routed frames by the length of the route, which is equal to the number of Token-Ring bridges a frame has traversed.

Figure 3–8 and Figure 3–9 are examples of the Routing Paths view and Routing Lengths view at a given time.

To display routing information:

1. Move to **Routing info** in the **Display** menu and press the Spacebar.
2. Move to **Route path** or **Route length** in the **Display\Routing info** menu and press the Spacebar.
3. Press F3 (Display) to display the routing information.

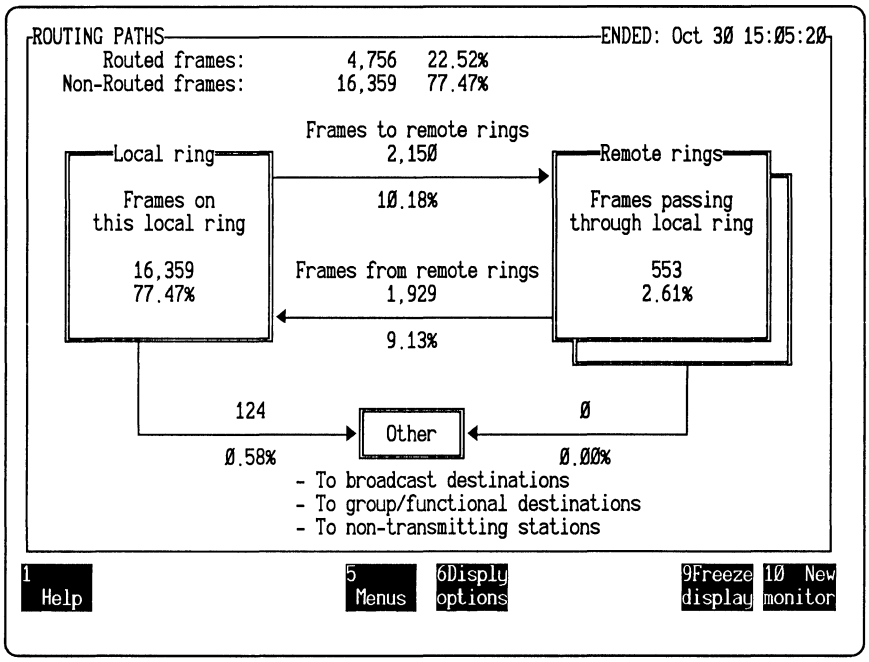


Figure 3–8. Routing Paths view.

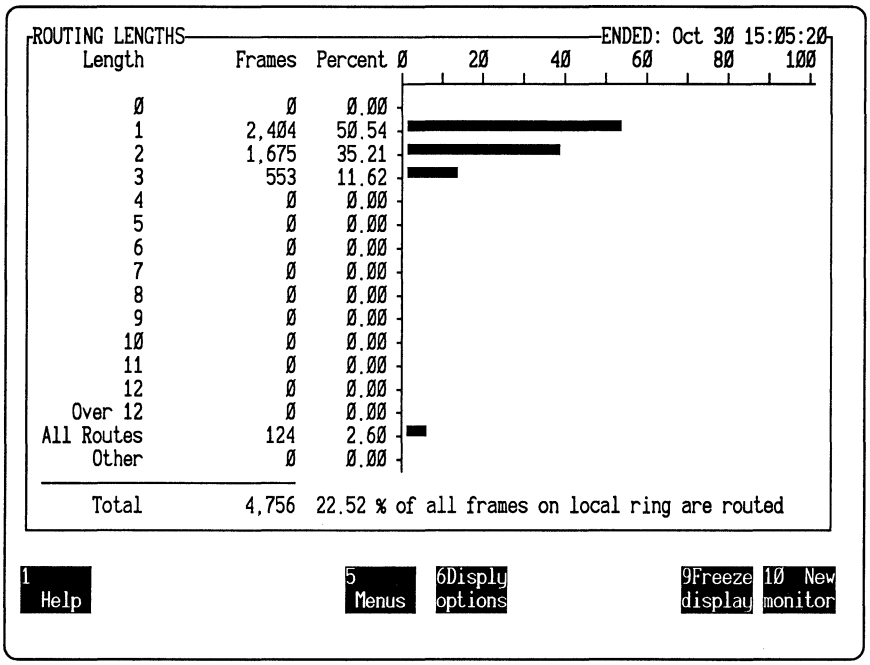


Figure 3–9. Routing Lengths view.

Displaying Protocols

This view shows a distribution of protocol types used on the network. The number and percentage of either bytes or frames can be displayed for all:

- SAP (Service Access Point) protocol types
- Ethertypes (in SNAP SAP) embedded in the type field

The percentages indicate how the frames or bytes are distributed among the protocol types monitored. The view also illustrates these numbers in a bar graph.

For both the Ethertypes and SAP protocol types views, you can choose to display the number of bytes or frames on the network. For the Ethertypes view, you can choose to display the percentages based on all frames counted or on only SNAP frames counted. (When displaying the number of bytes, the percentages are based on the number of bytes in either all frames counted or only the SNAP frames counted.)

Figure 3–10 and Figure 3–11 are examples of the Display Protocol view (SAPs and Ethertypes) that show the distribution of bytes by protocol type.

The monitor reads the STARTUP.TRT file for the SAP values. If you want breakdowns for protocol types other than those shown, use the DOS command, EDLIN, to add protocols to STARTUP.TRT. The file can contain up to 64 entries (32 SAP and 32 Ethertype). The maximum number of labels for each type (SAP and Ethertype) is 16. Each label can have 4 SAP numbers.

For information on SAP, refer to the *Token-Ring Network, Architecture Reference.*

To display the SAP protocol type view:

1. Move to **Protocols** in the **Display** menu and press the Spacebar.
2. Move to **SAP Protocols** and press the Spacebar.
3. Move to the **Bytes** or **Frames** option and press the Spacebar.
4. Press F3 (Display) to display the Protocol Types (SAPs) view.

To display the Ethertype view:

1. Move to **Protocols** in the **Display** menu and press the Spacebar.
2. Move to **Ethertype Protocol** and press the Spacebar.
3. Move to the **Bytes** or **Frames** option and press the Spacebar.
4. Move to the **All Frames** or **SNAP Frames** option and press the Spacebar. (Percentages are based on either all frames or SNAP frames.)
5. Press F3 (Display) to display the Protocol Types (SAPs) view.

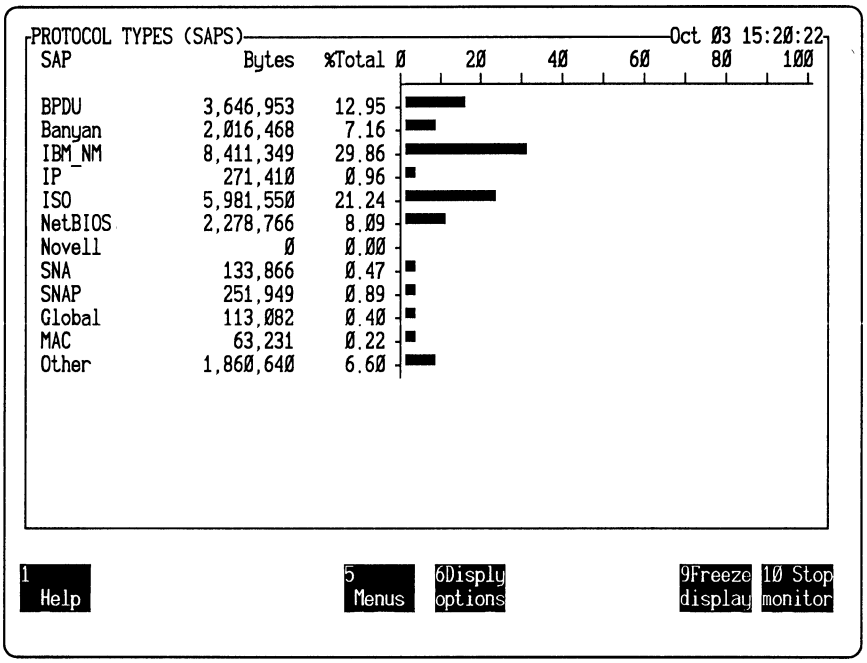


Figure 3–10. SAP Protocol Types view.

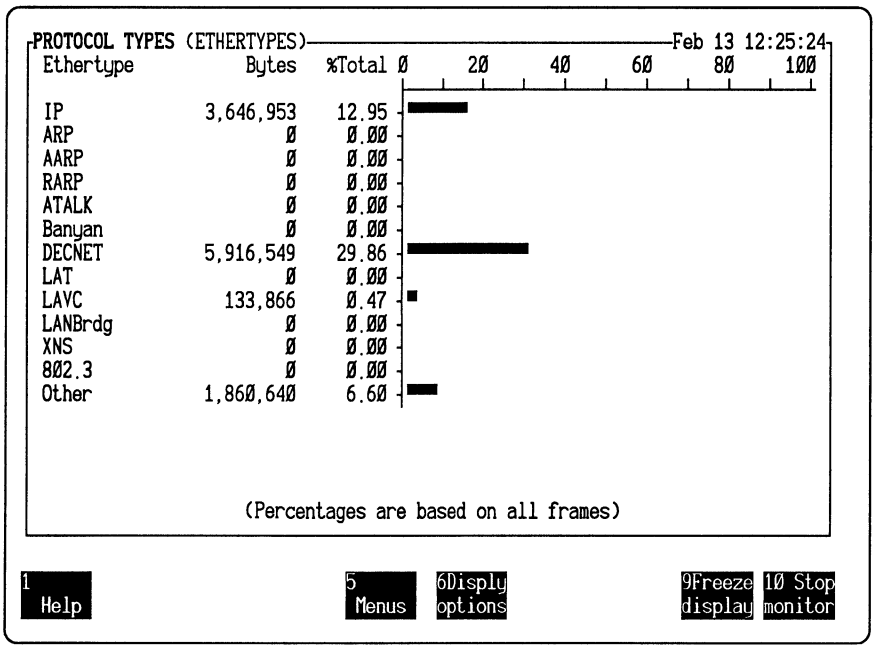


Figure 3–11. Ethertypes Protocol Types view.

Displaying the Alarm Log

The Alarm Log view shows the alarms in the alarm buffer. Figure 3–12 is an example of the Alarm Log view.

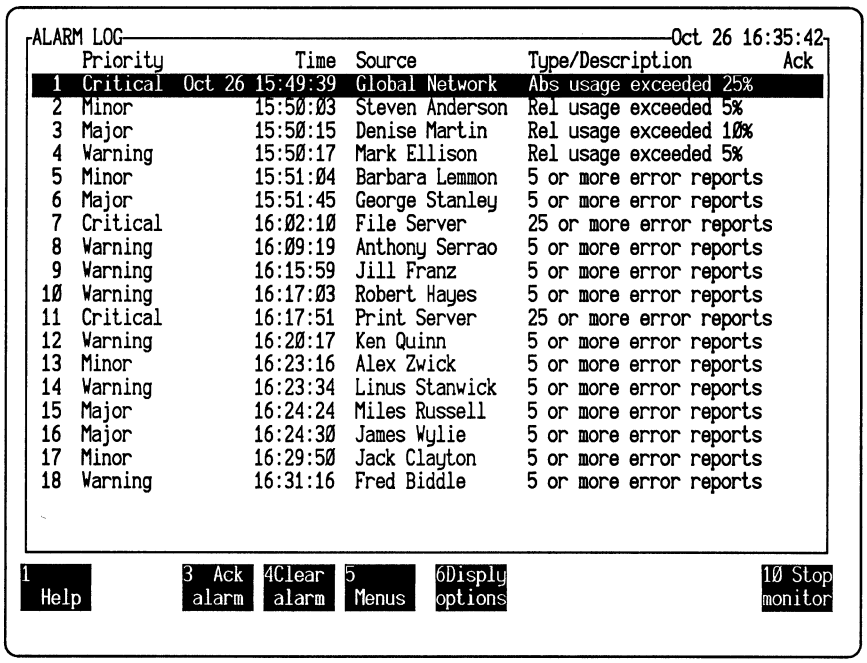


Figure 3–12. Alarm Log view.

When the Alarm Log view is displayed, you can do the following:

- Use Cursor Up or Cursor Down to highlight any alarm. Then acknowledge the highlighted alarm by pressing F3 (Ack alarm), which puts a √ mark in the right column.
- Clear the alarm by pressing F4 (Clear alarm), which deletes it from the alarm buffer. (For a complete discussion of alarms and the alarm buffer, see Chapter 5, "Working with Alarms.")

To display the alarm log:

1. Move to **Alarm log** in the **Display** menu and press the Spacebar.
2. Press F3 (Display). The Alarm Log view appears.

Displaying Global History Statistics

The statistics in this view show the amount of network activity and number of soft error report frames during each history interval. (You can specify the length of the history interval; refer to the section "History" on page 9–5 for further information on the **History** option.) The monitor can collect history statistics for up to 1,024 history intervals. History statistics are particularly useful for troubleshooting and network maintenance tasks, such as determining periods of low activity to schedule downtime.

History statistics are erased from memory when you start a new monitoring session or when you change the history interval during a monitoring session.

The numeric view (Figure 3–13) shows the following types of information for each interval:

- Interval number
- Timestamp
- Number of frames, errors, and bytes
- Average frame size
- Percentage of absolute network usage

GLOBAL HISTORY STATISTICS — Oct 26 16:36:53

	Time	Frames	Errs	Bytes	Size	%Usage
21	Oct 26 16:36:43	17,468	12	4,533,409	259	7.75
20	16:34:43	28,984	3	7,229,993	249	12.38
19	16:32:43	24,326	6	5,747,665	236	9.86
18	16:30:43	22,886	15	5,740,709	250	9.83
17	16:28:43	24,973	3	6,687,986	267	11.43
16	16:26:43	25,069	15	6,382,022	254	10.92
15	16:24:43	26,788	23	6,407,011	239	10.99
14	16:22:43	25,063	11	6,571,694	262	11.24
13	16:20:43	25,359	13	6,205,828	244	10.63
12	16:18:43	24,168	12	6,140,575	254	10.51
11	16:16:43	26,289	10	6,781,064	257	11.60
10	16:14:43	26,366	9	6,715,119	254	11.49
9	16:12:43	26,969	13	6,152,979	228	10.56
8	16:10:43	26,091	7	6,511,299	249	11.15
7	16:08:43	22,652	3	5,513,472	243	9.45
6	16:06:43	26,378	6	6,595,404	250	11.30
5	16:04:43	24,485	9	6,095,834	248	10.44
4	16:02:43	22,415	14	5,471,446	244	9.38

M o r e ↓

1 Help | 3 View earlier | 4 View later | 5 Menus | 6Disply options | 10 Stop monitor

Figure 3–13. Global history statistics (numeric view).

The graphic view (Figure 3–14) shows the following types of information:

- Interval number
- Timestamp
- Percentage of absolute network usage in numeric and graphic formats

To display global history statistics:

1. Move to **Global history** in the **Display** menu and press the Spacebar.
2. Move to the **Numeric** or **Graphic** option in the **Display\Global history** menu and press the Spacebar.
3. Press F3 (Display) to display the history statistics.

Press F3 (View earlier) or F4 (View later) to view intervals recorded earlier or later.

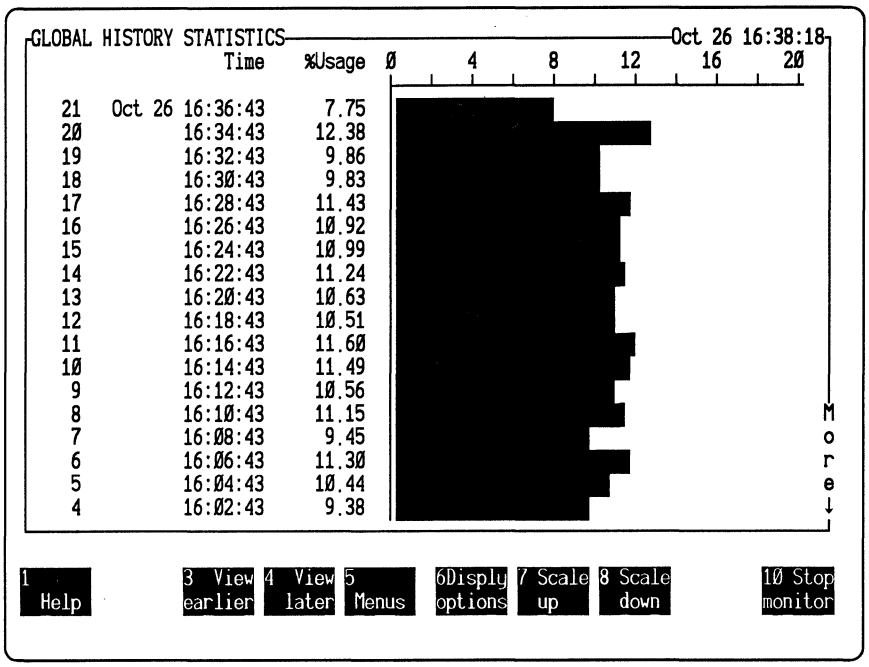


Figure 3–14. Global history statistics (graphic view).

Displaying Station History Statistics

The monitor collects and displays history statistics for the station you specified with the **Stn** option in the **History** menu.

Although the numeric and graphic Station History views include the same types of information as the Global History views, you can customize the Station History views further to show whether:

- History statistics include transmissions, receptions, or both
- Network usage shown is absolute or relative

You can collect station history statistics for only one station at a time. Also, history statistics are erased when you start a new monitoring session or if you change the history interval during a monitoring session. If you need to save them, generate a report or save them to disk. (Refer to "Generating a Report" on page 6–16 for information on creating reports; refer to "History" on page 9–5 for information on saving history statistics to disk.)

Figure 3–15 and Figure 3–16 illustrate the history statistics for the station "File Server" in numeric and graphic formats, respectively. They both show the station's transmission and reception traffic compared to the network capacity (that is, absolute network usage).

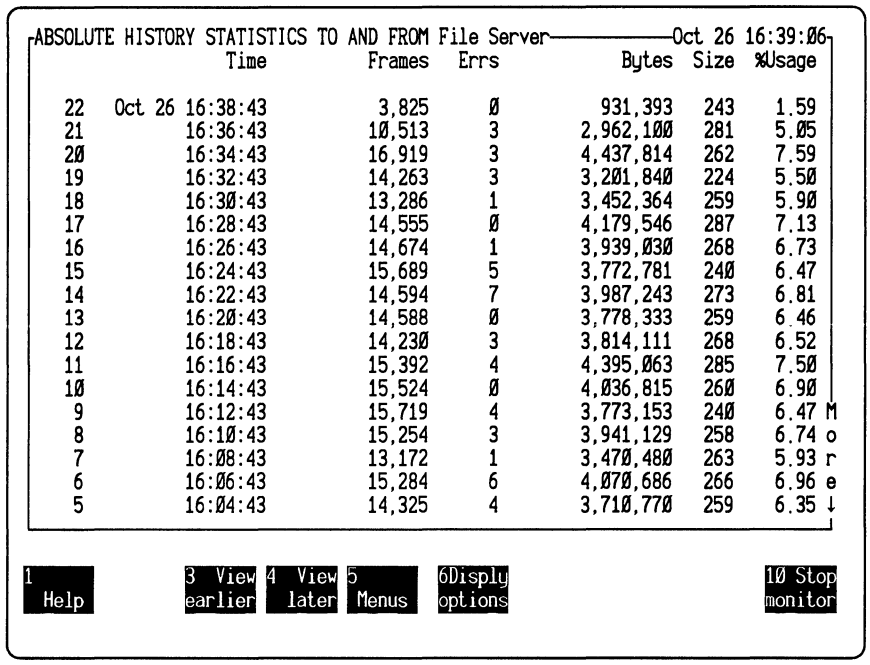


Figure 3–15. History statistics for "File Server" (numeric view).

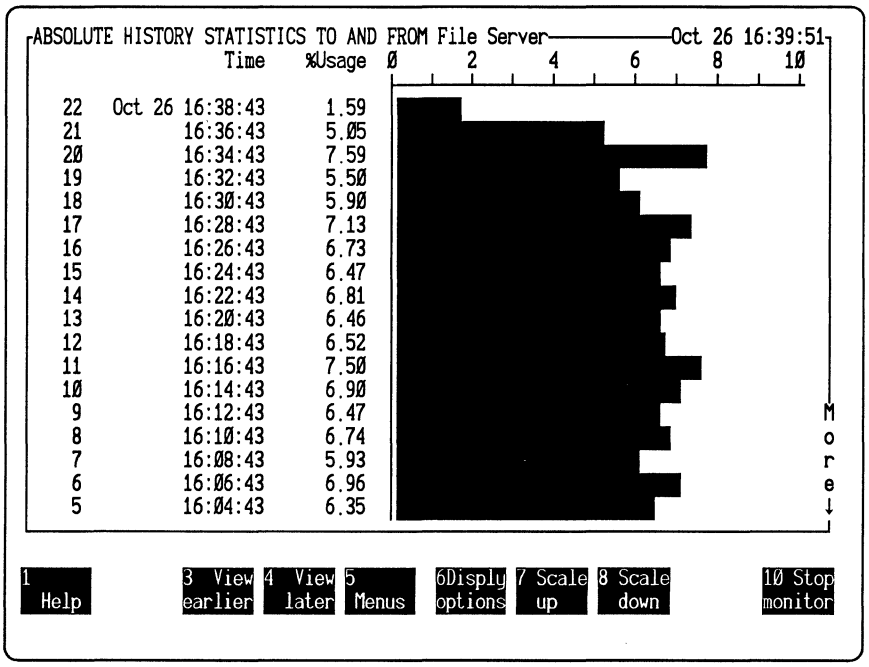


Figure 3–16. History statistics for "File Server" (graphic view).

To display the station history:

1. Move to **Station history** in the **Display** menu and press the Spacebar.
2. Define how statistics are displayed.
   a. Move to the **Numeric** or **Graphic** option in the **Display\Station history** menu and press the Spacebar.
   b. Move back to the **Display** menu, and press C to select the **Class** option.
   c. Move to **To, From,** or **Both,** depending on whether you want to display statistics for receptions, transmissions, or both. Press the Spacebar.
   d. Move to **Network usage** in the **Display** menu, and then to either **Absolute** or **Relative,** depending on whether you want to show statistics as a portion of the total network capacity or as a portion of the current total traffic. Press the Spacebar.
3. Press F3 (Display) to display the history for a selected station.

Press F3 (View earlier) or F4 (View later) to view intervals recorded earlier or later.

CHAPTER FOUR: MANAGING THE STATION DATA FILES 4

Managing the Station Data Files

Overview

The station data files in the C:\TRSNIFF directory contain station-specific information. The STARTUP.TRD file contains station addresses and names. The STARTUP.TRA file contains the alarm thresholds for each station; it is created the first time you change station information. (For further information on alarms, refer to Chapter 5, "Working with Alarms.") As the monitor observes the network, it modifies these files by adding addresses that have been named. The monitor also assigns the default station alarm settings to these stations.

The analyzer and monitor use the same name file. They can modify STARTUP.TRD, and the change affects the operations of both. For further information on how the analyzer uses or changes the name file, refer to the *Sniffer Network Analyzer: Analyzer Operations* manual.

You can add stations manually by editing STARTUP.TRD with the DOS command, EDLIN. This lets you name stations that are not yet active on the network.

This chapter describes how you customize the settings associated with each station in the data files. The description includes:

- Displaying station information
- Identifying stations
- Assigning names
- Assigning station alarm thresholds
- Deleting stations
- Returning to an earlier version of the data file

Displaying and Editing Station Information

The **Edit** option in the **Manage station** menu displays the Manage Station Information view (Figure 4–1), in which you modify the station data files. Any changes you make are automatically saved when you exit this view. You can also display the Manage Station Information view by choosing **Edit** in the **Alarm** menu.

The monitor automatically creates a backup copy of each data file the first time you modify it after starting the monitor. The backup data files are named BACKUP.TRD and BACKUP.TRA, and are stored in the C:\TRSNIFF directory.

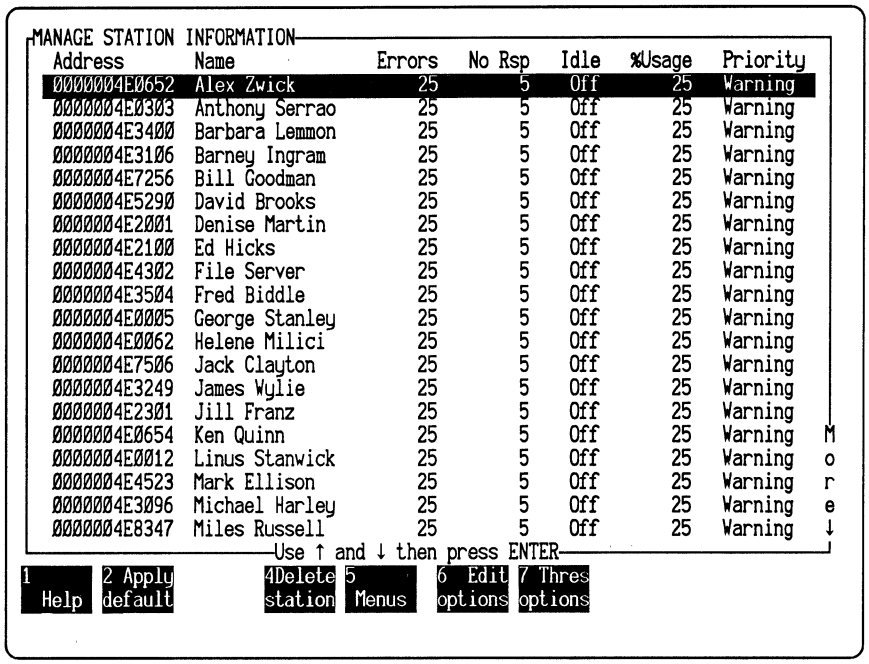


Figure 4–1. Manage Station Information view.

How the Monitor Identifies Stations

The monitor identifies stations by examining the 12-character strings that form the station addresses. You should assign names to station addresses for the following reasons:

- In a statistical view, names are easier to identify than addresses.
- You cannot save changes to station alarm thresholds for unnamed stations.
- Unnamed stations are deleted from the station list if you remove the monitor's driver program from memory.
- Unnamed stations trigger alarms when they generate traffic. If you do not assign names to the stations, you are unable to tell whether an alarm has been caused by an unnamed station, an intruder, or a network problem. (Refer to Chapter 5, "Working with Alarms," for further information on unknown station alarms.)

If the address of an unnamed station is specified in any menu item before you remove the monitor driver from memory, the monitor keeps the address in the station list the next time you start the monitor. For example, if the **Stn** option in the **Monitor filters** menu is set to 000000123456 before you remove the monitor driver from memory, this address remains in the station list the next time you run the monitor. The address is also included in the USERLIST report and the Manage Station Information view. Such an address, although unnamed, does not cause an unknown station alarm.

The section, "Editing Station Information," describes different ways of naming stations.

Editing Station Information

Editing station information involves assigning names and alarm thresholds. After you assign station names, these names identify the stations in other views.

Naming Stations Automatically

If you installed a second network interface card that runs NetBIOS software, and if the stations you want to name are active and are running NetBIOS, you can name them automatically. This feature saves you considerable time.

To name stations automatically with NetBIOS:

1. Move to **Manage stations** in the Main Menu.
2. Move to the **Probe for names** option and press Enter.

   NetBIOS transmits a query to each unnamed address in the station list, and the monitor displays messages about the query. For example, for the unnamed address "IBM 788172," the monitor displays this message:

   ```
   Attempting to name IBM 788172
   ```

   If the unnamed station does not respond, the monitor displays this message:

   ```
   IBM 788172 did not respond
   ```

   If it receives a response, the monitor assigns a name to the station. After the monitor has finished the naming process, the message "Done" appears. To interrupt the process, press Esc.

Naming Stations Manually

Before naming stations, you must determine which address belongs to which station. The USERLIST report helps you identify all stations on the network. After knowing what stations exist on the network, you can add the names via the Manage Station Information view.

Generating the USERLIST Report

To run the USERLIST report:

1. Monitor activity for several hours.
2. Move to **Report** in the Main Menu. Then select the **Load** option.
3. A window containing a list of reports appears. Move to **USERLIST.SCR** and press Enter. The monitor displays the information message, "Loading report script," and returns to the Main Menu.
4. Move to the **Report\Print** menu.

5. To view the station addresses on screen, select the **Screen** option. You can also print out the station list by selecting **LPT1** or **LPT2**. For further information on printing a report, refer to the section "Printing a Report Manually" on page 6–17.
6. Press Cursor Left to move back to the **Print** option. Press Enter to print the USERLIST report. It contains a list of station addresses detected by the monitor and the corresponding names. If an address is unnamed, the address itself appears in the name field. For each unnamed address, write down a name you want to assign to it. You will need the name when following the instructions in the next section.

Naming a Station in the Manage Station Information View

The Manage Station Information view contains alarm threshold information for all the stations listed in the USERLIST report. You can name a station or change an alarm threshold for a station in this view.

To move to a station, use Cursor Up and Cursor Down. You can also type the first character of a station name or address to move to the station. However, if a station is named, you must type the first character of the name. For example, if the address "C00000000010" is named "Error monitor," typing E selects it, but typing C does not. If the address "000065333333" is unnamed, press 0 to select it.

To name a station:

1. Move to **Manage stations** in the Main Menu.
2. Move to the **Edit** option and press Enter to display the Manage Station Information view.
3. Move to the station you want to name and press Enter. A dialog box appears with a list of the fields you can edit, as shown in the example in Figure 4–2.
4. Move to the **Name** field and press Enter. Another dialog box appears.
5. Type the station name in the dialog box. Station names can be up to 16 characters long; all printable characters are allowed. After you finish typing, press Enter.
6. To return to the Manage Station Information view, press F6 (Return); to change other values in the dialog box, go to the next section, "Changing Station Alarm Thresholds."

The name is saved automatically when you exit the Manage Station Information view.

The Manage Station Information view alphabetizes the stations according to the station names. If a station does not have a name, its address is used for sorting. For example, the unnamed address "IBM 784B1A" is listed after the station named "Error Monitor" and before the station named "LAN Manager." Also, numerals are listed before letters. For example, the unnamed address "000065333333" appears before the station named "Active Monitor."

The stations may not be in the correct alphabetical order immediately after you edited the names. You can see the sorted names only after you exit the view and then display it again.

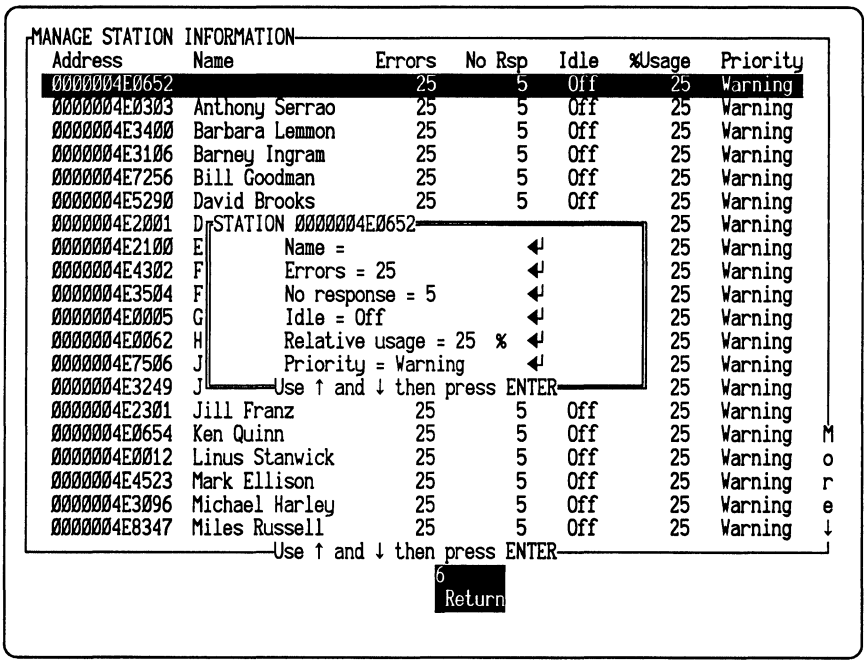


Figure 4–2. Dialog box for editing station information.

Changing Station Alarm Thresholds

In the Manage Station Information view, you can display a dialog box for editing station alarm thresholds as shown in Figure 4–2. For further information on alarms, refer to Chapter 5, "Working with Alarms." Be sure to follow the guidelines in that chapter when changing alarm thresholds.

To change the station alarm thresholds:

1. Move to the **Edit** option in the **Manage stations** menu and press Enter. The Manage Station Information view appears.
2. Move to the station whose settings you want to change and press Enter. A dialog box appears with a list of fields you can edit.
3. Move to the desired field and press Enter to display an additional dialog box. Select or type a value and press Enter. For example, in Figure 4–3, a list of possible Errors threshold settings is displayed.

   Repeat this step for each threshold setting for the selected station.
4. Press F6 (Return) to return to the Manage Station Information view.
5. Repeat steps 2, 3, and 4 for all the stations you want to edit.

Changing alarm thresholds during a monitoring session can lead to unexpected results. For example, if you change a threshold that has already triggered an

alarm, no new alarm is triggered when the new threshold is reached. Therefore, it is best to make any changes before you start monitoring.

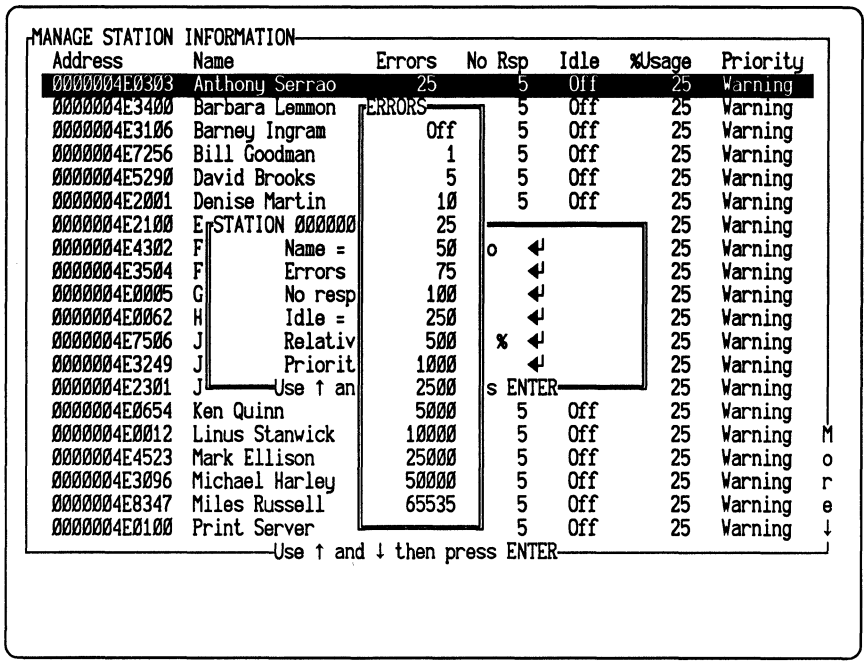


Figure 4–3. Errors threshold for station alarms.

Global Alarm Thresholds and Default Station Alarm Thresholds

When the Manage Station Information view is displayed, you can change other alarm thresholds in addition to the ones described in the previous section. For example, press F6 to reset the station alarm thresholds to the default settings, or F7 to change the global alarm thresholds and station default thresholds. You can also change these settings with **Alarms** in the monitor's Main Menu. For more information on thresholds and how to change them, refer to Chapter 5, "Working with Alarms."

Deleting Stations

You can delete stations from the Manage Station Information view. The changes are made to STARTUP.TRD and STARTUP.TRA as soon as you exit the Manage Station Information view.

To avoid unpredictable results, stop the monitor before deleting a station. If a monitoring session is in progress and the Manage Station Information view is displayed, press F5 to go to the Main Menu. Then press F10 to stop the monitor. (F10 is labeled New monitor on the screen when the monitor is off.)

If the monitor detects the station that you have deleted, it generates an unknown station alarm (provided that this type of alarm is enabled).

To delete a station:

1. Move to **Manage stations** in the Main Menu.
2. Move to the **Edit** option and press Enter. The Manage Station Information view appears.
3. Move to the station you want to delete and press F4 (Delete station).

Saving Alarm Threshold Information

When you make a change in the Manage Stations Information view, the change is saved to the STARTUP.TRA and STARTUP.TRD files as soon as you exit the view. The first time you modify these files after starting the monitor, the monitor creates backup copies of these files (BACKUP.TRA and BACKUP.TRD) so that you can always return to the previous station data files.

You can save the station information (station names, addresses, and alarm thresholds) of specific networks (or segments) by copying the STARTUP.TRA and STARTUP.TRD files for each network. This is a convenient way to retain station information when the Sniffer Network Analyzer is moved from one network, or network segment, to another. For example, you could copy the files to NET1.TRA and NET1.TRD. To restore the station information of NET1, copy the files NET1.TRA and NET1.TRD to STARTUP.TRA and STARTUP.TRD before booting up the Sniffer Network Analyzer.

To return to the previous station data files:

1. Move to **Exit** in the Main Menu and press Enter. The Main Selection Menu appears.
2. Select the **Return to DOS** option. The DOS prompt appears.
3. Change directory to C:\TRSNIFF.
4. Type COPY BACKUP.TRA STARTUP.TRA at the DOS prompt and then press Enter.
5. Type COPY BACKUP.TRD STARTUP.TRD at the DOS prompt and then press Enter.
6. To return to the Main Selection Menu, type MENU at the DOS prompt.

The next time you start the monitor, it uses the settings that were in the station data files before they were changed.

CHAPTER FIVE: WORKING WITH ALARMS 5

Network General

Working with Alarms

Overview

This chapter explains how alarms work and describes how to use them. It includes instructions for the following tasks:

- Changing alarm thresholds
- Displaying the alarm log
- Acknowledging and clearing alarms
- Printing alarms
- Saving alarms to disk

Overview of Alarms

Figure 5–1 shows how the monitor processes alarms.

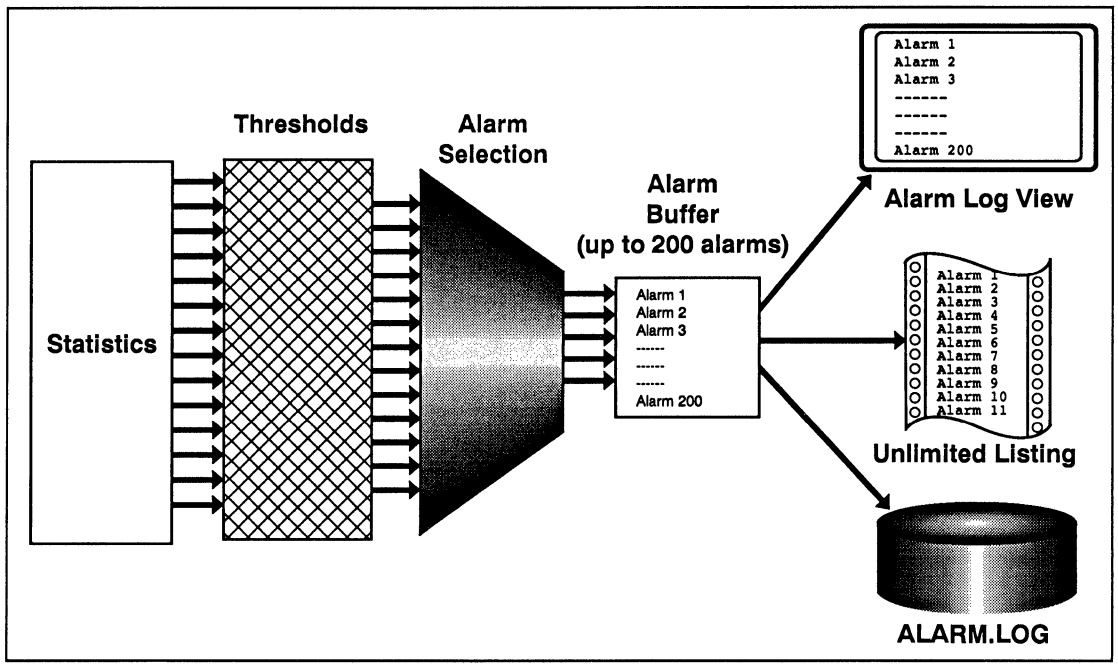


Figure 5–1. Alarm processing.

When a measured network parameter (for example, the amount of idle time or the number of soft error frames) exceeds a predefined threshold, the monitor triggers an alarm and sends it to the alarm buffer. You can display the alarms in the buffer, save them to the disk, or print them on a printer.

Alarm Thresholds

The monitor is shipped with threshold settings for the entire network and for individual stations. You can change both the global and station threshold settings. For station thresholds, you can change these settings:

- Thresholds for stations that are already on the network
- Default thresholds that will be assigned to new stations when they are detected

The monitor generates three global alarms for which you cannot set thresholds. These alarms are explained in the section "Global Alarms" below.

Priority Levels of Alarms

You can assign a priority level to each station on the network, which represents the importance of the alarms the station causes. You can also assign a priority level to each global alarm. The priority levels are:

- Inform
- Warning
- Minor
- Major
- Critical

An "Inform" alarm is the least important, and a "Critical" alarm is the most important. For example, if you consider the file server an important station on the network, you can specify that the alarms caused by the file server are labeled Critical. In this way, you can easily distinguish the more important alarms from others when viewing the alarm log.

The alarm priority levels also correspond to the audible alarm levels. For more information on audible alarms refer to "Setting Audible Alarm Thresholds" on page 5–15

Global Alarms

The Token-Ring Monitor generates eight global alarms. Each global alarm can be turned on or off independently of the others. For each global alarm, you can set the priority level. For all global alarms, except "Unknown station," "Oversized frame," and "Active Poll fail," you can set a threshold and a time interval to which the threshold applies.

Alarms are generated when counts exceed the thresholds. For example, after you set the Frame errors threshold to 100 and the interval to 60 seconds, the monitor triggers an alarm if it detects 100 or more frames with errors during each 60-second period. The eight global alarms are (see Figure 5–2):

Unknown station	Generates an alarm when an unnamed station transmits traffic. By default, the unknown station alarm is disabled. There is no threshold setting for this error.
Oversized frame	Generates an alarm when a station sends a frame that exceeds 4,608 bytes for 4 Mbps and 18,432 bytes for 16 Mbps. There is no threshold setting for this error.
Broadcast storm	Defines the number of broadcast frames (1 to 65,535) that triggers an alarm. You can set the time interval to which this threshold applies (5 seconds to 60 minutes). By default, the number of broadcast frames is 100 and the interval is 5 seconds.
Network idle	Defines the length of time (5 seconds to 60 minutes) the network can be inactive before generating an alarm. By default, the length of time is 15 minutes.
Network usage	Defines the percentage (1 to 100%) of absolute network usage that triggers an alarm. You can set the time interval to which this threshold applies (5 seconds to 60 minutes). By default, the percentage is 50 and the interval is 5 seconds.
Soft error reports	Defines the number (1 to 65,535) of soft error report frames that triggers an alarm. You can set the time interval to which this threshold applies (5 seconds to 60 minutes). By default, the number of errors is 20 and the interval is 30 seconds.
Ring beaconing	Defines the length of time (5 seconds to 60 minutes) the ring can beacon before generating an alarm. By default, the length of time is 30 seconds.
Active Poll fail	Generates an alarm if there is a ring poll failure. There is no threshold setting for this error.

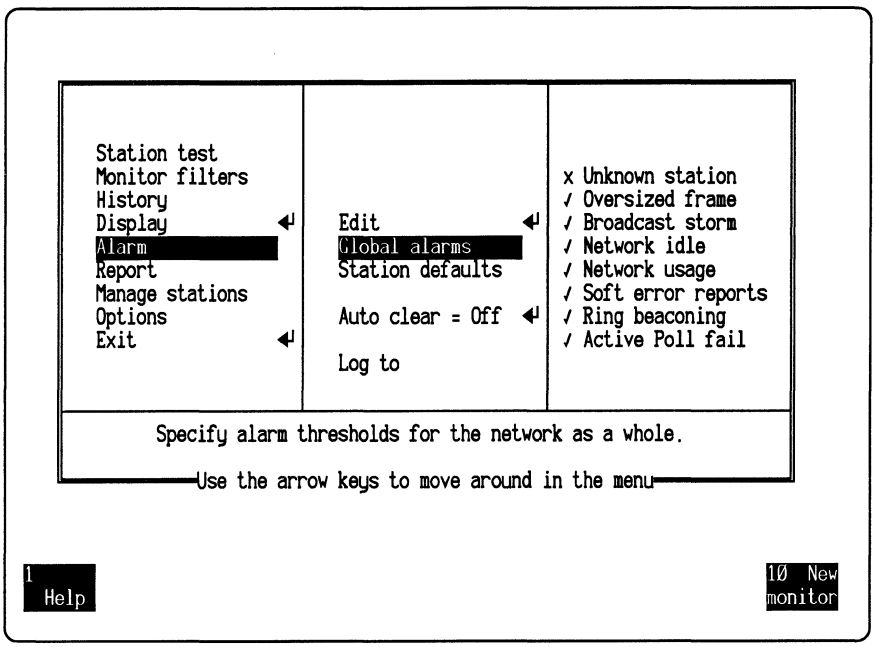


Figure 5–2. Global alarms.

Alarms for Which You Cannot Set Thresholds

You cannot set thresholds for the "Unknown station," "Oversized frame," and "Active Poll fail" global errors. Figure 5–3 describes how these alarms are represented in the Alarm Log view. When you display the view, you will see the actual station name or address under the headings "Alarm Type/Description" and "Source."

Alarm Type/Description	Source	Cause of the Alarm
1 or more oversized frame.	***Station that sent the oversized frame.***	A station sent a frame that exceeds 4,608 bytes on a 4 Mb/s network or 18,432 bytes on a 16 Mb/s network.
Beacon at ***station.***	***Station that sent the Beacon frame.***	A station sent a Beacon frame, after detecting a hard error that renders the network inoperable. The ***station*** in the alarm description is the upstream neighbor of the station that sent the Beacon frame.
Poll Fail at ***station.***	***Active Monitor***	The active monitor sent a Ring Poll Failure frame after an error occurred during a ring poll process. The station in the alarm description is the last station that sent an Active Monitor Present or Standby Monitor Present frame for the failed ring poll.

Figure 5–3. Types of alarms for which you cannot set thresholds.

Station Alarm Threshold Options

For each station, you can determine the default alarm thresholds for these parameters:

Errors — Defines the number of soft error reports (1 to 65,535) a station can transmit before triggering an alarm. The default is 100.

No response — Defines how long a station can be sent frames without responding before triggering an alarm. To turn the alarm off, choose 0 (the default). The possible value can range from 1 to 7 seconds. For further information on when the monitor generates a no-response alarm, refer to the section "Alarm" on page 9–27.

Idle — Defines the length of time (1 to 120 minutes) a station can be inactive (not transmitting) before triggering an alarm. To turn the alarm off, choose 0 (the default).

Usage — Defines the percentage of relative network traffic (1 to 100%) the station can transmit before triggering an alarm. The default is off.

Priority — Defines the priority level of station alarms. The default is Warning.

Interpreting Alarms When Using Monitor Filters

When you are interpreting alarms, remember that the setting of the **Monitor filters** option affects alarm generation in the following ways:

- If **Monitor filters** is set to **MAC frames** or **All frames**, the monitor does not generate an idle alarm for a station as long as its network interface card transmits MAC frames. That is, you are not notified if a station has failed to transmit LLC frames.
- If **Monitor filters** is set to one station, the monitor monitors only the frames that contain this station's address. As a result, the monitor considers only this station and its partners active. It generates idle alarms for any stations that are not communicating with the monitored station, regardless of whether they have been transmitting frames on the network.

Strategies for Setting Alarm Thresholds

This section provides some basic strategies for setting thresholds. However, finding the thresholds that best suit your particular network and preferences requires adjustments as you go along and as your network grows.

Changing alarm thresholds during a monitoring session can lead to unexpected results. For example, if you change a threshold that has already triggered an alarm, no new alarm is triggered when the new threshold is reached. Therefore,

it is best to make any changes before you start monitoring. You can also stop monitoring, make changes, and restart monitoring.

Strategies for Setting Global Alarm Thresholds

To get started, follow these steps:

1. Move to the **History** option in the Main Menu.
2. Select the broadcast address as the station for which the monitor collects history statistics.
3. Set the **Intrvl** option to 15 minutes.
4. Monitor traffic over a period of time, such as an 8-hour business day. This gives you an overview of your network's traffic patterns.

The following is a list of suggestions for setting various global thresholds and handling alarms:

- Network usage and soft error reports thresholds

  Display the Global History view and note the highest number of errors and usage percentage. Then set each threshold of these categories to about 50% higher than the highest recorded number.

- Broadcast storm threshold

  Display the Station History view and note the highest number of frames sent to the Broadcast station. Then set the threshold to about 50% higher.

- Network idle threshold

  Take into consideration the way your network software operates. For example, if your software package automatically transmits traffic every five minutes, setting the idle threshold to six minutes alerts you to any problems within one minute.

- Unknown station alarms

  To avoid triggering the unknown station alarm for legitimate stations, be sure to name all known stations. This alarm then alerts you to any intruders or new stations. Since faulty bridges or bad network interface cards usually generate numerous unknown station alarms, this is also a good way to detect problems with bridges and cards.

Be prepared to adjust the thresholds to higher values if you get too many alarms. If the alarms that are generated do not alert you to potential problems quickly enough, adjust the thresholds to lower values.

To change the global alarm thresholds:

1. Move to the **Alarm\Global alarms** menu, which lists the global alarm settings as shown in Figure 5–4.
2. Select the global alarm you want the monitor to generate by moving to the alarm and pressing the Spacebar. An x preceding the alarm indicates that the alarm is disabled; a √ indicates that an alarm is generated. Pressing the Spacebar toggles the value of this option.

3. Move to the next options list and specify an appropriate priority and threshold for the alarm. Press Enter to display a dialog box or a list of values. Type or select a value, and press Enter again.
4. Repeat steps 2 and 3 for each alarm.

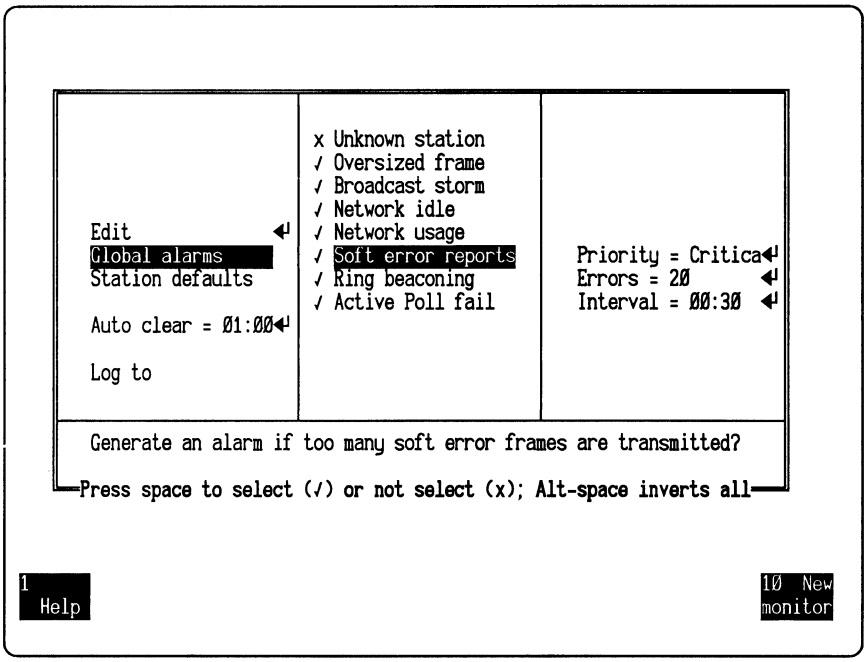


Figure 5–4. Threshold options for global alarms.

Strategies for Setting Station Alarm Thresholds

When setting alarm thresholds for individual stations, pay particular attention to devices that handle a lot of traffic, such as file servers and gateways. Since these devices are so important to the entire network, it is important to adjust their thresholds so that you are alerted to potential problems quickly without getting unnecessary alarms. Also, assign priority levels to individual stations according to the stations' importance.

The following is a list of suggestions for setting various station alarm thresholds:

- Errors threshold

  Monitor the network for approximately 24 hours. Then generate the ERRORS report. (For further information on generating reports, refer to Chapter 6, "Creating Reports.") Obtain the highest error count from the report and increase it by 50%. Use this number as the errors threshold. However, you should adjust this value according to the length of a normal monitoring session. For example, if you restart a monitoring session every two days, set the threshold to twice the value calculated above. Also, if you think the error counts in the ERRORS report are abnormally high, you should solve the problems that caused the errors before determining the errors threshold.

- Idle threshold

  For devices such as file servers, set the idle threshold as low as 1 minute to alert you quickly to potential problems. For stations that are likely to be turned on and off periodically, set the idle threshold to "Off."

- Usage threshold

  To identify any stations that use large portions of the network's resources, set a low usage threshold for individual stations. Use this information to redistribute heavy users onto different network segments to prevent degradation of service to other users.

As with the global alarm thresholds, be prepared to make adjustments.

To change the station alarm thresholds and priority level:

1. Move to the **Edit** option in the **Alarm** menu and press Enter. The Manage Station Information view appears.
2. Move to the station whose settings you want to change and press Enter. A dialog box appears with a list of fields you can edit.
3. Move to the desired field and press Enter to display an additional dialog box. Select or type a value and press Enter. For example, in Figure 5–5, a list showing the possible errors threshold settings is displayed. Repeat this step until you finish modifying the threshold settings.

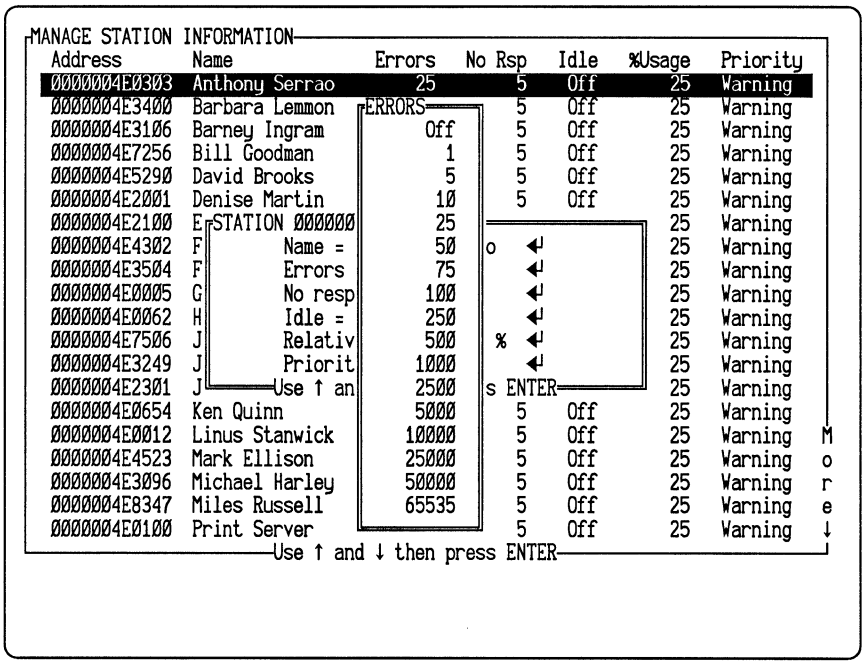


Figure 5–5. Threshold settings for the station errors alarm.

4. Move to **Priority =** in the dialog box and press Enter. A window titled "Station Priority" opens. Move to the desired priority level and press Enter.
5. Press Esc to return to the Manage Station Information view.

Changing the Default Station Alarm Thresholds

When the monitor detects new stations on the network, it assigns the default alarm thresholds to the stations as it adds them to the station list. If you change these default settings, any stations added to the network are assigned the new defaults. If you assign names to these stations, the threshold information, together with the station addresses, is saved in STARTUP.TRA.

To change the station default alarm thresholds and priority level:

1. Move to the **Alarms\Station defaults** menu, which lists the default station thresholds as shown in Figure 5–6.
2. Move to the threshold setting or priority level you want to change and press Enter. A dialog box or a list of values appears. Type in or select a value, and press Enter.

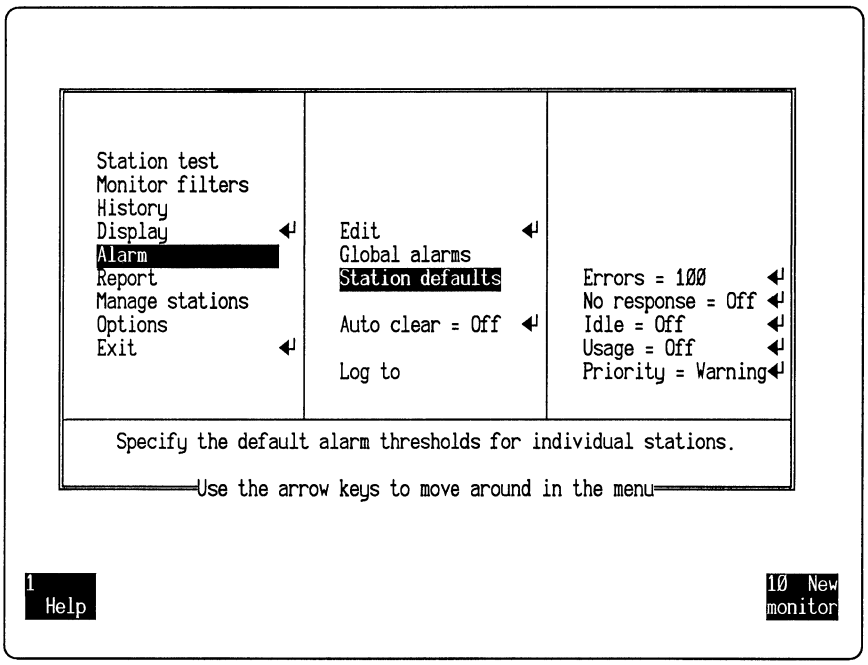


Figure 5–6. Station default alarm thresholds.

Resetting Station Alarm Thresholds to Default Values

After you changed the station alarm thresholds for a monitoring session, you can easily restore the default thresholds, either for a single station or for all stations. Be sure to stop monitoring before resetting alarm thresholds.

To reset the alarm thresholds to defaults for a single station:

1. Move to **Edit** in the **Alarm** menu and press Enter. The Manage Station Information view appears.
2. Move to the station you want to reset and press F2 (Apply default). The threshold settings for that station change to the default values.

To reset the alarm thresholds to defaults for all stations:

1. Move to the **Reset thresholds** option in the **Manage stations** menu and press Enter. The monitor displays this message:

   ```
   Any changes made to station alarm configurations will be lost if you
   proceed. Press ENTER to proceed. Press ESC to cancel.
   ```

2. Press Enter. The monitor displays this message:

   ```
   Resetting alarm thresholds.
   ```

Displaying the Alarm Log

The Alarm Log view displays the contents of the alarm buffer. It lists alarms in the order they occurred and shows their priority, the time they occurred, the source of the alarm, and the type of alarm.

Once the Alarm Log view is displayed, you can acknowledge alarms or clear them from the alarm buffer.

To display the Alarm Log view:

1. Move to **Alarm log** in the **Display** menu and press the Spacebar.
2. Press F3 (Display) or press Enter to display the Alarm Log view.

Acknowledging Alarms

To keep track of which alarms have been investigated, you can mark (acknowledge) those alarms in the monitor's Alarm Log view. It is, however, recommended that you acknowledge alarms in the alarm log.

Acknowledging an alarm in the monitor's alarm log affects the level of the audible alarm. Suppose the monitor's alarm log contains two alarms, one with priority level Critical and the other Major. Before the critical alarm is acknowledged, the audible alarm level is Critical. After you acknowledge the critical alarm, the alarm level changes to Major.

To acknowledge an alarm:

1. Display the Alarm Log view.
2. Move to the alarm you want to acknowledge and press F3 (Ack alarm).

   A √ mark appears in the right column to indicate that you have acknowledged the alarm.

Clearing Alarms

The alarm buffer can contain up to 200 alarms. When the buffer is full, new alarms are deferred until you clear some of the existing alarms in the buffer. However, a deferred alarm is lost when the condition that caused it no longer exists. In this case, there is no record that the deferred alarm occurred because

alarms are printed or saved to disk only as they are placed in the monitor's alarm buffer.

Effects of Clearing Alarms

Whether an alarm will recur after you clear it depends on the alarm type, as described below:

- Soft error reports, network usage, broadcast storm, ring beaconing, or active poll fail alarm:

  An alarm is triggered only the first time the threshold is exceeded. Additional instances of this event are ignored unless you clear the alarm. That is, if the threshold is exceeded again after the clearing, the monitor generates a new alarm.

- Network idle, station idle, station usage, or station no response alarm:

  An alarm is triggered only the first time the threshold is exceeded. Additional instances of this event are ignored unless the alarm has been cleared *and* the condition that caused the alarm has been removed. For example, a station alarm is generated because a station has been idle for 15 minutes. If it continues to be idle after you clear the alarm, no new alarms are generated. However, if the station transmits at least once and then becomes inactive again for more than 15 minutes, the monitor will generate a new alarm for this station.

- Unknown station or station errors alarm:

  Even if the alarm is cleared from the buffer, the same condition does not cause an alarm to appear in the alarm log.

Different Ways to Clear Alarms

Clear alarms only when the monitor is running in the foreground. You can clear alarms in one of two ways:

- Manually clear alarms one at a time. Clear the alarms as soon as you deal with them.

- Use the **Auto clear** option. The monitor automatically clears each alarm after it is in the buffer for a specified period of time. This method is recommended because it slows down the speed at which the alarms approach the 200-alarm limit.

  When you use **Auto clear**, you should also enable the **Log to** option, which automatically prints or saves to disk a record of alarms generated while the network is unattended. By default, **Auto clear** is set to 1 hour, and the alarms are logged to disk. If you are concerned that the alarms occupy too much disk space, disable the **File** option in the **Alarm\Log to** menu or remove the alarm log file regularly. The logging function is described in the section, "Using the Monitor's Logging Function."

When you start a new monitoring session, the monitor automatically removes all the alarms in the alarm buffer that were generated in the last session.

To clear individual alarms manually:

1. Display the Alarm Log view.
2. Press F3 (Display) or press Enter to display the alarm log.
3. Move to the alarm you want to clear and press F4 (Clear alarm). The alarm is cleared from the alarm buffer.

To clear alarms automatically:

1. Move to **Alarm** in the Main Menu.
2. Move to **Auto clear =** and press Enter.
3. In the dialog box, type a value between 1 minute and 99 hours and press Enter.

Using the Monitor's Logging Function

The monitor's logging function automatically prints and saves alarms as they are sent to the alarm buffer. This assures that there is a record of alarms, even after they are cleared from the buffer and the Alarm Log view. By default, the monitor saves alarms to the disk.

Printing Alarms

You can save the alarms for each monitoring session to disk and print them as necessary. Alternatively, you can print each alarm on a designated printer as it occurs.

To print alarms automatically:

1. Move to the **Alarm\Log to** menu.
2. Make sure a √ mark appears to the left of the **Printer** option. If not, press the Spacebar to display the √ mark.
3. Move to the **Alarm\Log to\Printer** menu, which includes six ports (COM1, COM2, LPT1, LPT2, LPT3, and LPT4). Move to the desired printer port and press the Spacebar.
4. To specify the number of lines per page, move to **Page size =** in the **Alarm\Log to\Printer** menu and press Enter. A dialog box appears.
5. Type the number of lines to be printed on a page and press Enter. The number can range from 1 to 256. The default is 58.

If the number you specify is greater than the number of lines that fit on a page, the printing overlaps the page breaks, which might make the hard copy difficult to read.

Saving Alarms to Disk

In addition to, or instead of, printing alarms as they occur, you can save them to the file ALARM.LOG in the C:\TRALARMS directory. You can either append

the alarms to those saved during previous sessions or reinitialize the file each time the monitor starts monitoring.

It is recommended that you save only the alarms from the current session and deal with alarms as they happen. Use the **append** option only for collecting historical information about alarms. Otherwise, the ALARM.LOG file eventually becomes huge.

To save alarms automatically:

1. Move to the **Alarm \ Log to** menu.
2. Move to the **File** option.
3. If necessary, press the Spacebar to make sure a √ mark appears to the left of the **File** option.
4. Move to **Clear alarm file** in the **Alarm \ Log to \ File** menu. To append the current alarms to existing alarms from previous monitoring sessions, press the Spacebar to display the x mark to the left of the option. To overwrite previous alarms, press the Spacebar to display a √ mark.

   The monitor saves the current alarms in ALARM.LOG in the C:\TRALARMS directory.

To view ALARM.LOG:

1. Select the **Exit** option in the Main Menu and press Enter. The Monitor Selection Menu appears.
2. Select the **Exit to the Operating System** option. When the DOS prompt appears, use the DOS command, TYPE, to view the ALARM.LOG file.

   To return to the Monitor Service Menu after viewing the file, type MENU at the DOS prompt and press Enter.

The ALARM.LOG file is not updated while you are viewing it in DOS (or at any other time the monitor application is not running in the foreground).

Setting Audible Alarm Thresholds

You can specify the level of unacknowledged alarms that generate audible alarms. There are five different audible alarms that can be generated, one for each level of alarm (Inform, Warning, Minor, Major, and Critical). Each level of alarm generates a specific audible alarm at a different pitch. The more severe the alarm, the higher the pitch. The five audible alarms are:

- Inform — one beep
- Warning — two beeps
- Minor — three beeps
- Major — four beeps
- Critical — five beeps

Audible alarms are generated when the Token-Ring Monitor is running in the foreground as well as in the background.

To set the audible alarms:

1. Move to **Options** in the Main Menu.
2. Move to **Audible Alarms** (see Figure 5–7) and press the space bar to turn the audible alarms on or off.
3. Move to the desired alarm level and press the space bar to select the alarm level. You can select any combination of alarm level.

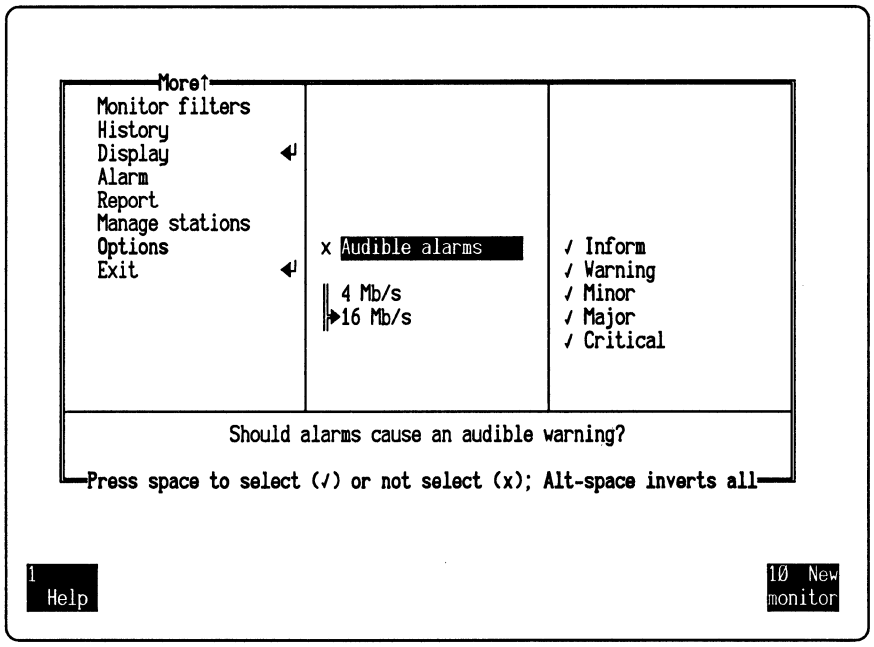


Figure 5–7. Audible Alarms.

CHAPTER SIX: CREATING REPORTS 6

Network General

Creating Reports

Overview

In addition to viewing network statistics, you can create customized reports that show these statistics in any combination, sorted and arranged according to your preferences. You can use these reports to document your network activities, justify the need for hardware upgrades, compare network performance over time, and so on.

This chapter provides an overview of the sample report scripts shipped with the monitor and describes the following tasks:

- Loading a report script
- Previewing a report
- Printing or saving a report to disk, in either normal or CSV (comma-separated values) file format
- Creating or editing a report script

Sample Reports: An Overview

The monitor comes with report scripts you can use or modify. A report script is a template that defines which statistics are included in the report and how these statistics are arranged on the screen or page. When you generate a report from a report script, the monitor supplies the statistics, inserts them into the report script, and then prints or saves the report to disk.

You can use the same report script over and over. The types of statistics and the format of the report remain constant; only the statistics change each time you print a report.

When you use the monitor for the first time, the only report scripts you can use are the sample report scripts shipped with the product, which are described later in this chapter. If none of these report scripts suits your needs, create a new report script or edit an existing script. Then save this new report script for future reports. You must name and save this newly created script before you can use it.

These are the script files stored in the directory C:\TRREPORT\SCRIPTS:

- ERRORS.SCR
- FRAMSIZE.SCR
- HISTORY.SCR
- LISTENRS.SCR
- RINGORDR.SCR
- ROUTELEN.SCR
- ROUTEPTH.SCR

- SAPS.SCR
- TALKERS.SCR
- USERLIST.SCR
- USERS.SCR
- USERSCSV.SCR

ERRORS.SCR

The report based on ERRORS.SCR shows the 10 stations that transmitted the most soft error report frames. The stations are sorted in descending order by the number of errors. Only the stations that have sent at least 5 soft error report frames are included.

Figure 6–1 is an example of a report based on ERRORS.SCR.

```
                              Top 10 Errors

   This report provides statistics for the 10 stations which have
   transmitted the most soft error report frames.  Stations must have
   transmitted at least 5 soft error report frames to be included in
   this report.

   Monitoring Started:    Oct 04 09:52:32          Total Stations:      26
   Monitoring Stopped:    Oct 04 09:56:03
   Elapsed Time:        0 day(s) 00:03:31

      Name                    Frames   Errs          Bytes  Size   % Abs

    1 Print Server             8,838     13        627,706    71    0.59
    2 File Server             12,841     10      1,685,407   131    1.59
    3 William Griffith           843      6        472,134   560    0.44

Hit Esc to quit, any key to continue
```

Figure 6–1. Errors report.

The report shows the following types of statistics:

- Time monitoring started
- Time monitoring stopped
- Duration of the monitoring session (elapsed time)
- Total number of stations

Information displayed for each station includes:

- Sort position
- Station's name

- Number of frames from the station
- Number of soft error report frames from the station
- Number of bytes from the station
- Average size of the frames from the station
- Percentage of absolute network usage by the traffic from the station

FRAMSIZE.SCR

The report based on FRAMSIZE.SCR shows the frame size distribution. It includes the frame size categories, the number of frames per category, and the percentage per category. The report also contains a graph that illustrates the percentages. The report contains the same information and has the same format as the display generated when you select **Frame sizes** in the **Display** menu. Figure 6–2 is an example of a report based on FRAMSIZE.SCR.

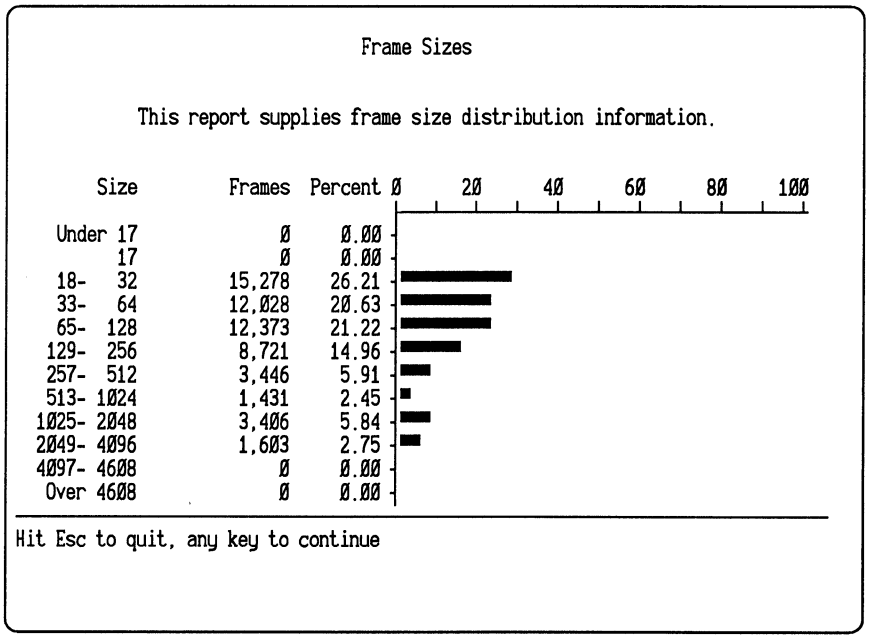


Figure 6–2. Frame sizes report.

HISTORY.SCR

The report based on HISTORY.SCR shows absolute network usage during each history interval. This report includes a graph with a scale of 10% to illustrate the network usage percentages. Figure 6–3 is an example of a report based on HISTORY.SCR.

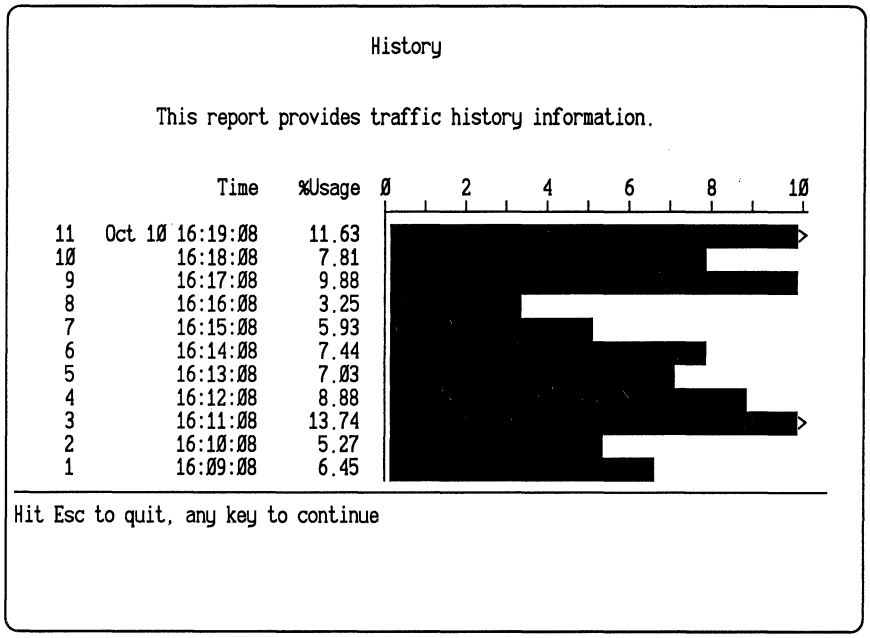


Figure 6–3. History report.

LISTENRS.SCR

The report based on LISTENRS.SCR shows statistics for the 10 stations that received the most traffic during the most recent monitoring session.

Stations are sorted in descending order by the number of bytes received and filtered by sort position to display the 10 stations that received and transmitted the most bytes.

The report shows the following types of overall information:

- Time monitoring started
- Time monitoring stopped
- Duration of the monitoring session (elapsed time)

Information shown for each station includes:

- Sort position
- Station's name
- Number of frames to the station
- Number of bytes to the station
- Average size of the frames to the station
- Percentage of relative network usage by the frames to the station

Figure 6–4 is an example of a report based on LISTENRS.SCR.

Top 10 Listeners

This report provides statistics for the 10 stations which have received the most traffic. The stations are sorted by bytes received.

Monitoring Started: Oct 29 14:38:01
Monitoring Stopped: Oct 29 14:38:12
Elapsed Time: 0 day(s) 00:00:11

	Name	Frames	Bytes	Size	% Rel
1	File Server	271	90,888	335	39.49
2	Print Server	181	81,384	449	35.18
3	Mark Ellison	22	12,049	547	5.19
4	Tom Brown	22	4,264	193	1.88
5	Ken Quinn	16	4,056	253	1.77
6	Miles Russell	26	3,714	142	1.65
7	David Brooks	23	3,578	155	1.59
8	Wes Harding	23	3,264	141	1.45
9	Ed Hicks	24	3,166	131	1.41

Hit Esc to quit, any key to continue

Figure 6–4. Listeners report.

RINGORDR.SCR

The report based on RINGORDR.SCR shows the relative usage information for all stations. The stations are sorted by the ring order in descending order. The active monitor is displayed first, followed by the standby monitors. Other stations are arranged according to the station status in this order: snooper, removed, remote, inactive, and group. For information on station statuses, refer to Chapter 9, "The Monitor Menu Items."

The report shows the following types of statistics for each station:

- Sort position
- Station status
- Percentage of relative network usage by the frames from the station

The graph in the report illustrates the percentages. The scale of the graph is 100%. Figure 6–5 is an example of a report based on RINGORDR.SCR.

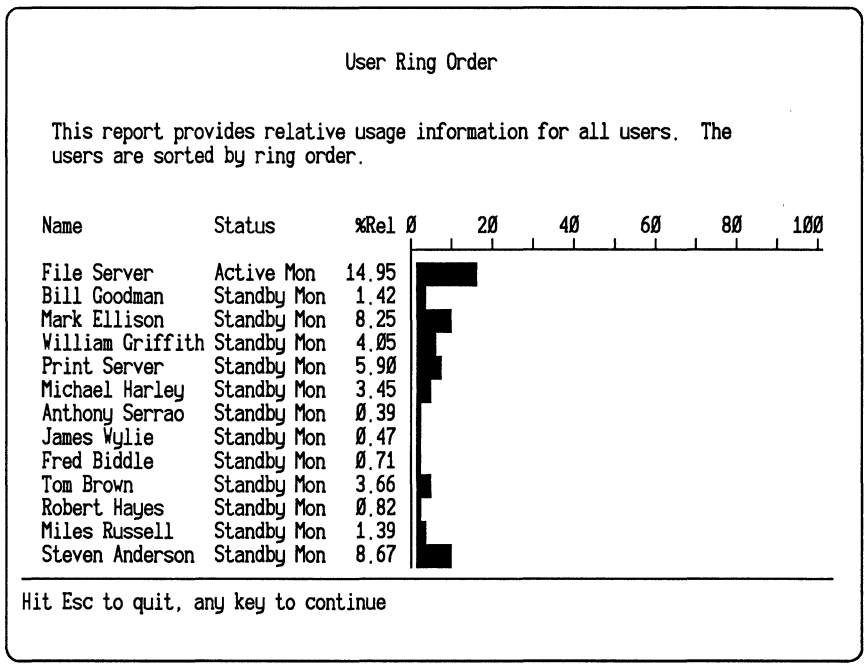


Figure 6–5. Ring order report.

ROUTELEN.SCR

The report based on ROUTELEN.SCR shows the route length distribution information. It shows the number of frames that have different route lengths and indicates the percentages of these frames. The graph illustrates the percentages. Figure 6–6 is an example of a report based on ROUTELEN.SCR.

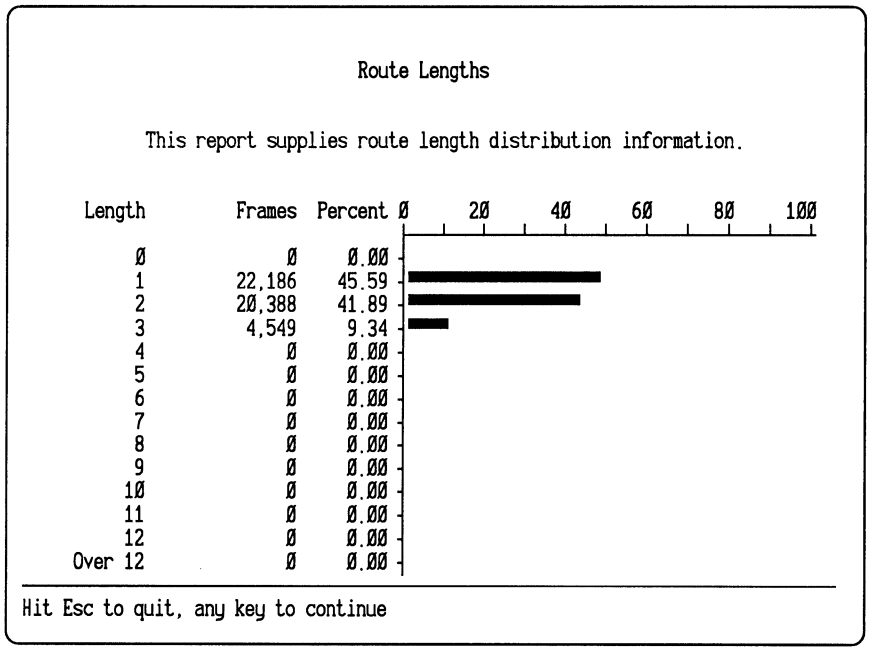


Figure 6–6. Route lengths report.

ROUTEPTH

The report based on ROUTEPTH.SCR shows the route path distribution information. It shows the number of frames moving between the local and remote networks. Figure 6–7 is an example of a report based on ROUTEPTH.SCR.

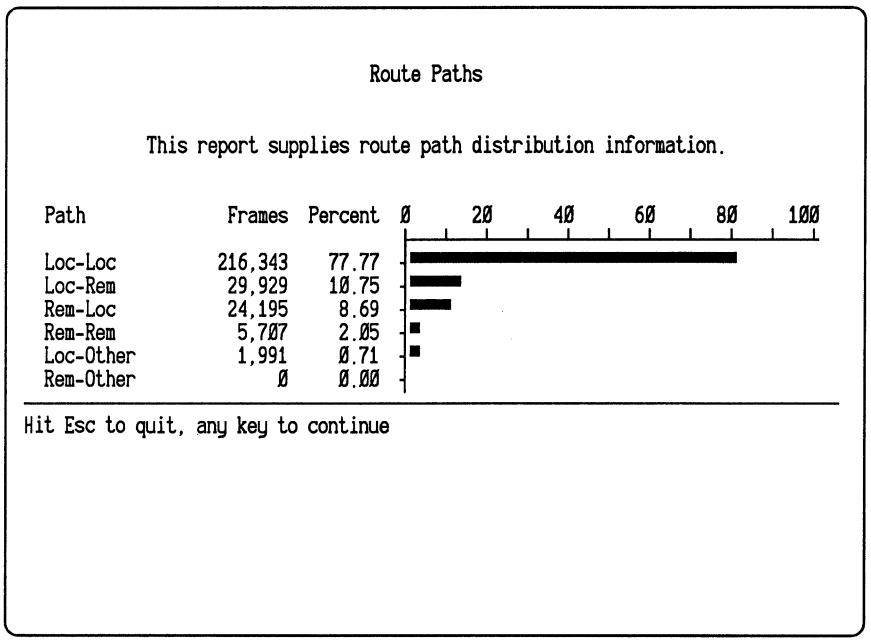


Figure 6–7. Route paths report.

SAPS.SCR

The report based on SAPS.SCR shows the SAP protocol type distribution information. It includes a list of SAP protocols, the number of bytes per SAP protocol type, and the percentage of each protocol type. The graph illustrates the percentages. Figure 6–8 is an example of a report based on SAPS.SCR.

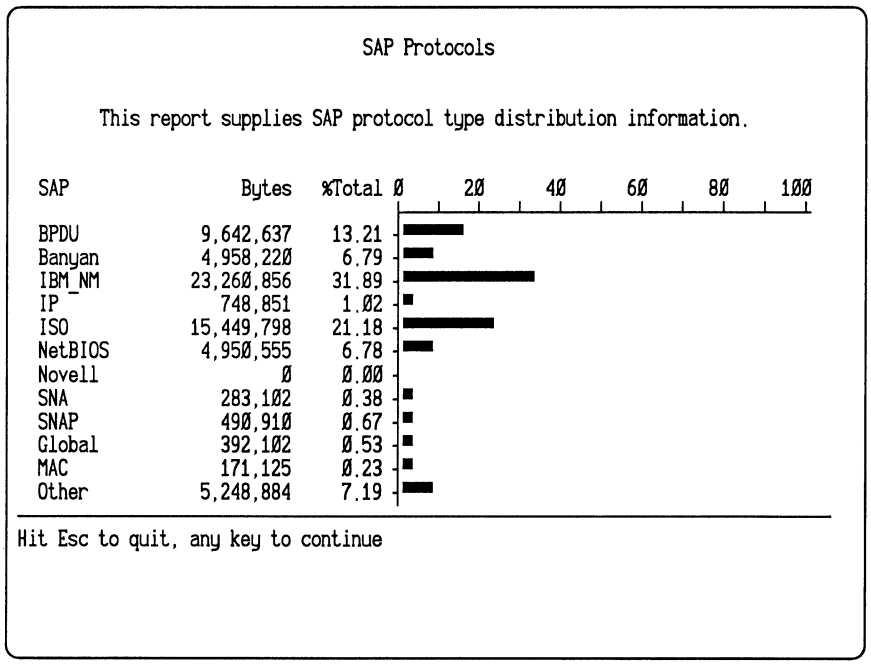


Figure 6–8. SAP protocols report.

TALKERS.SCR

The report based on TALKER.SCR shows statistics for the 10 stations that transmitted the most traffic during the most recent monitoring session.

Stations are sorted in descending order by the number of bytes transmitted and filtered by sort position. The report includes the 10 stations that transmitted most traffic.

Figure 6–9 is an example of a report based on TALKERS.SCR.

```
                         Top 10 Talkers

This report provides statistics for the 10 stations which have
transmitted the most traffic.  The stations are sorted by bytes
transmitted.

Monitoring Started:    Oct 04 09:52:32          Total Stations:      26
Monitoring Stopped:    Oct 04 10:19:17
Elapsed Time:        0 day(s) 00:26:45

Report Generated:      Oct 04 10:19:17

      Name                          Bytes   Errors    Size     % Rel

  1   Denise Martin            11,190,778        0    1748     14.46
  2   File Server              11,127,643       30     126     14.38
  3   Ed Hicks                  9,177,893        2    1477     11.86
  4   Linus Stanwick            8,549,913        3    1362     11.05
  5   Mark Ellison              7,455,412        3    1138      9.63
  6   Steven Anderson           6,103,827       12     975      7.89
  7   Print Server              4,351,201       38      72      5.62

Hit Esc to quit, any key to continue
```

Figure 6–9. Talkers report.

The report shows the following general information:

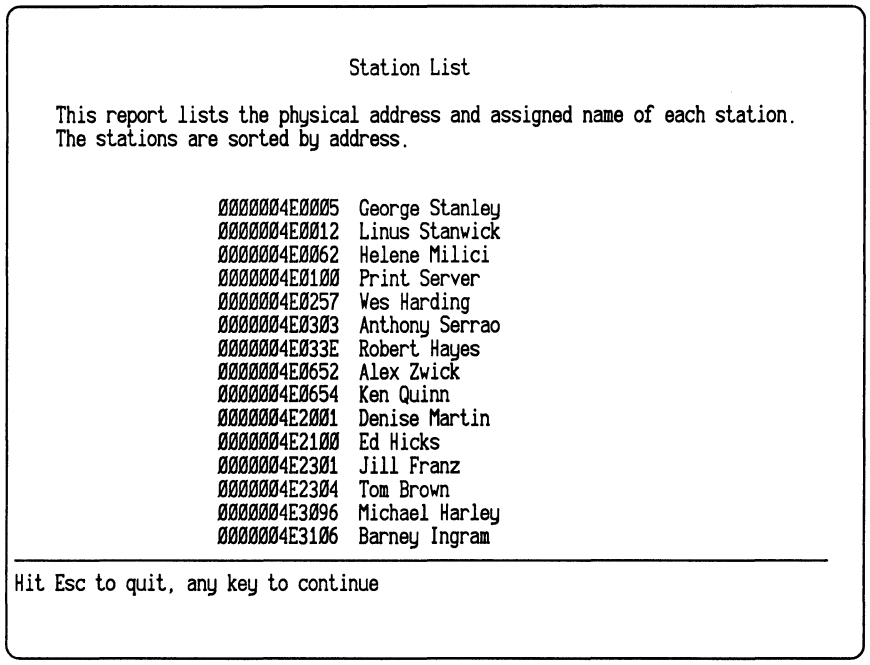
- Time monitoring started
- Time monitoring stopped
- Duration of the monitoring session (elapsed time)
- Total number of stations
- Time when the report was generated

Statistics shown for each station include:

- Sort position
- Station's name
- Number of bytes from the station
- Number of soft error report frames from the station
- Average size of the frames from the station
- Percentage of relative network usage by the frames from the station

USERLIST.SCR

The report based on USERLIST.SCR lists the physical addresses and names of all stations that are in the station list, sorted by address in ascending order. No filters are used to limit the number of stations. This report is useful for you to view the names assigned to addresses. You can use it to set up the monitor station data file, STARTUP.TRD. Figure 6–10 is an example of a report based on USERLIST.SCR.



```
                              Station List

This report lists the physical address and assigned name of each station.
The stations are sorted by address.


                    0000004E0005  George Stanley
                    0000004E0012  Linus Stanwick
                    0000004E0062  Helene Milici
                    0000004E0100  Print Server
                    0000004E0257  Wes Harding
                    0000004E0303  Anthony Serrao
                    0000004E033E  Robert Hayes
                    0000004E0652  Alex Zwick
                    0000004E0654  Ken Quinn
                    0000004E2001  Denise Martin
                    0000004E2100  Ed Hicks
                    0000004E2301  Jill Franz
                    0000004E2304  Tom Brown
                    0000004E3096  Michael Harley
                    0000004E3106  Barney Ingram

Hit Esc to quit, any key to continue
```

Figure 6–10. User list report.

USERS.SCR

The report based on USER.SCR shows transmission and reception statistics for all stations, sorted in ascending order (alphabetically) by name. No filters are used to limit the number of stations.

The report shows the following types of statistics:

- Time monitoring started
- Time monitoring stopped
- Duration of the monitoring session (elapsed time)

Statistics shown for each station include:

- Sort position
- Station's name
- Number of frames from and to the station
- Number of soft error report frames to and from the station
- Number of bytes from and to the station
- Average size of frames from and to the station
- Percentage of relative network usage by the frames from and to the station

Figure 6–11 is an example of a report based on USERS.SCR.

All Users

This report provides combined transmit and receive statistics for all stations. The stations are sorted by name.

Monitoring Started: Oct Ø4 Ø9:52:32
Monitoring Stopped: Oct Ø4 1Ø:28:52
Elapsed Time: Ø day(s) ØØ:36:2Ø

	Name	Frames	Errs	Bytes	Size	% Rel
1	Alex Zwick	15,922	7	1,622,561	1Ø1	1.69
2	Anthony Serrao	16,333	2	779,2Ø4	47	Ø.81
3	Barbara Lemmon	15,62Ø	6	2,157,874	138	2.25
4	Barney Ingram	15,922	Ø	1,79Ø,93Ø	112	1.86
5	Bill Goodman	15,6Ø3	Ø	1,988,423	127	2.Ø7
6	David Brooks	15,73Ø	1	1,122,354	71	1.17
7	Denise Martin	15,692	Ø	14,538,327	926	15.17
8	Ed Hicks	15,438	2	12,Ø76,394	782	12.6Ø
9	File Server	22Ø,991	36	59,133,Ø79	267	61.72
1Ø	Fred Biddle	16,135	Ø	1,Ø22,437	63	1.Ø6

Hit Esc to quit, any key to continue

Figure 6–11. Users report.

USERSCSV.SCR

The report based on USERSCSV.SCR shows the same information as the USERS report, but in a comma-separated-values (CSV) format that allows you to import the information into spreadsheets, databases, or other applications that use the CSV format. The CSV format is also called "delimited format." Refer to "Report File Format" on page 6–15 for more information on definitions of different formats.

Figure 6–12 is an example of a report based on the USERSCSV script.

```
"Name","Frames","Errs","Bytes","Size","% Rel"
"Active Mon.      ",          Ø,     Ø,          Ø,     Ø,   Ø.ØØ
"All Bridges      ",          Ø,     Ø,          Ø,     Ø,   Ø.ØØ
"All Fs Broadcast",         24,     Ø,       7272,   3Ø3,   9.73
"Broadcast        ",       1644,     Ø,      526Ø8,    32,  83.86
"Config Srv       ",          Ø,     Ø,          Ø,     Ø,   Ø.ØØ
"Error Mon.       ",          4,     Ø,        192,    48,   Ø.28
"IBM   78Ø6ØC     ",         61,     Ø,       1952,    32,   3.11
"IBM   78ØB93     ",         61,     Ø,       1952,    32,   3.11
"IBM   78ØBB7     ",         61,     Ø,       1952,    32,   3.11
"IBM   781EBA     ",         61,     Ø,       1952,    32,   3.11
"IBM   78241D     ",         61,     Ø,       1952,    32,   3.11

Hit Esc to quit, any key to continue
```

Figure 6–12. Users report (delimited format).

Report File Format

A report can be in normal format or delimited format. The only sample report script in delimited format is USERCSV.SCR.

Normal Format

The normal file format is the default format. Numbers that are 1,000 or greater are printed with embedded commas (for example, 1,100,000) in normal file format. Figure 6–1 is an example of an Errors report in normal file format.

Delimited Format

A report in delimited format contains no page breaks and embedded commas within fields. Figure 6–12 is an example of a report in delimited format.

The delimited format allows you to import the file into other applications, such as spreadsheets and databases. For example, you might want to show the comparative usage of your network servers in a pie chart. After creating a report that provides those statistics and then importing that report into a spreadsheet application program, use the spreadsheet program's graphics capabilities to create a pie chart based on your report.

To separate the fields from each other, insert a comma between the fields in the report script. Also, if a field is a character string (for example, a station name), use quotation marks to enclose the character string.

If the application program into which you want to import data requires additional formatting, make these changes in your report script. Refer to the application's documentation for details about required filenames, field formats, and other considerations.

Refer to "Creating or Modifying a Report Script" on page 6–20 for information on specifying a report script's file format.

Generating a Report

To generate a report, you must first load into memory the report script that specifies the statistics you want to include. When you display, print, or save this report, the monitor automatically inserts the statistics from the current monitoring session.

Loading a Report Script

To load a report script:

1. Move to the **Report** menu.
2. Select the **Load** option and press Enter to display the list of available reports, including the sample report scripts and any other report scripts that have been saved.
3. Move to the report you want to load and press Enter.

You can edit a report script once you load it. In addition, you can do any of the following to the report generated by the script:

- Preview it on the screen.
- Print it on a printer.
- Save it to the disk.
- Clear its contents.

Previewing a Report

You can preview a report by printing it to the screen.

To preview a report:

1. Load the desired report script.
2. Move to **Edit** in the **Report** menu and press Enter to display the Report Script Editor view, which contains the script you loaded.
3. Press F9 (Screen test) to display the report generated by the script. If the report consists of more than one screen, press any key to see the next screen. To return to the script, press Esc.

Printing a Report Manually

You can print the report on a printer you designate. You can also specify the number of lines to be printed before the monitor inserts a page break and report header if the report is in normal format. Refer to "Report File Format" on page 6–15 for more information on report formats.

To print a report manually:

1. Load the desired report script.
2. Move to the **Report\Print** menu to select the device to which the report is printed. You can select among these options:
   - **Screen** displays the report on the screen.
   - **Device COM1** sends the report to port COM1.
   - **Device COM2** sends the report to port COM2.
   - **Device LPT1** sends the report to port LPT1.
   - **Device LPT2** sends the report to port LPT2.
   - **Device LPT3** sends the report to port LPT3.
   - **Device LPT4** sends the report to port LPT4.
   - **File** saves the report to the disk. (Refer to "Saving a Report to Disk" on page 6–19 for more information.)
3. If **Delimited format** in the **Report\Edit** menu is enabled, go to step 4.

   Do you need to change the number of lines per page?
   - If yes, move to **Page size =**, and press Enter. In the dialog box that appears, type the desired number of lines, or turn off the option by typing 0, then press Enter.

     When the monitor inserts a page break, it also prints the header text (for example, the title of the report or a description of the report as defined in the report script). If this option is turned off, the monitor does not insert any page breaks in the printout.

     If the number of lines you specify exceeds the length of the page, the monitor prints the number of lines you specified, overlapping the page break.
   - If no, go to step 4.
4. Move to **Print** in the **Report** menu and press Enter.
5. A dialog box appears. Type the filename under which the report is saved.

Printing a Report Automatically

You can specify that the monitor prints out a report regularly. This feature is available only if the monitor application is operating in the foreground.

To print a report automatically:

1. Load the report script:
   a. Move to the **Report\Auto print** menu.
   b. Select the **Report =** option and press Enter. A list of report scripts appears.
   c. Move to the desired report script and press Enter.
2. Specify the time when the print interval is to start:
   a. Move to **Start time =** and press Enter. A dialog box appears.
   b. Do you want to start printing the report immediately? If yes, type 00:00. If no, specify the time in ***hh:mm*** format. Press Enter when you finish typing.
3. Specify how often the report is printed:
   a. Move to **Interval =** and press Enter. A dialog box appears.
   b. Type the time interval in ***hh:mm*** format and press Enter.
4. To print to disk, go to step 5.

   To print to a printer:
   a. Enable the **Print to device** option.
   b. Specify the printer port and page size in the **Report\Auto print\Print to device** menu.
   c. Go to step 6.
5. To print to disk:
   a. Enable the **Print to disk** option.
   b. Move to the **Report\Auto print\Print to disk** menu. To specify that the monitor prints each report to a separate file, select **Multiple files;** to specify that the monitor prints all reports on the same day to one file, select **Single file.**
6. To restart a monitoring session after a report is printed, move back to the **Report\Auto print** menu to enable the **Restart monitor** option.

For information on how the monitor names the reports generated automatically, refer to the section, "Filenames for Automatically Generated Reports."

Terminating Automatic Report Generation

When the monitor is printing a report automatically, this message appears:

```
Generating automatic report.
```

If you want to terminate the automatic report generation, press the Esc key while the above message is displayed. The monitor stops printing immediately and displays the following message:

```
Automatic report generation aborted.
```

Subsequent report generation is not affected. For example, if **Interval** is set to 1:00 and **Restart monitor** is enabled, the monitor prints a report every hour and starts a new monitoring session after each printing, regardless of whether you have aborted automatic report generation.

Filenames for Automatically Generated Reports

The monitor names the automatically generated reports according to the file creation dates in either of these forms: AR*YYMMDD*.RPT. and *YYMMDDNN*.RPT. (The extension is CSV if the report is in delimited format. Refer to "Report File Format" on page 6–15 for more information on different file formats, and "Creating or Modifying a Report Script" on page 6–20 for selecting the desired format.)

For example, if you specify that all reports are automatically printed to a single file, a file created on April 28, 1991, is named AR910428.RPT. The monitor creates a new file after midnight. In this example, the new file created after midnight is named AR910429.RPT.

If you specify that each report is automatically printed to a separate file, the number of the report follows the date. For example, the first report generated on April 28, 1991, is named 91042801.RPT, the second report on the same day is named 91042802.RPT, and so on.

Reports generated automatically are stored in the C:\TRREPORT directory.

Saving a Report to Disk

You can save a report to preserve the statistics generated during a monitoring session.

To save a report to disk:

1. Load the desired report script.
2. Move to **Print**, then to **File**, and press the Spacebar.
3. To save the report in the normal file format, make sure that an x displays to the left of the **Delimited format** option. To save the report in CSV format, make sure that a √ mark appears to the left of the option. If necessary, press the Spacebar to toggle the setting of **Delimited format**.
4. Move back to **Print** and press Enter to display the dialog box.
5. Type a filename without the extension and press Enter.

The monitor saves the report in the C:\TRREPORT\SCRIPTS directory and appends the extension RPT or CSV to its filename, depending on the file format.

Creating or Modifying a Report Script

If existing report scripts do not meet your needs, you can create a new report script or modify an existing script. For example, to replace the "Bytes" column in the TALKERS report script with "Frames," simply change the column heading and the associated code. You can make any substitutions you wish in this way to create customized reports.

The procedure of editing a report script includes the following tasks:

- Clear the contents of an existing report script in the Report Script Editor view if one is loaded.
- Enter text.
- Define which statistics (fields) to include in the report.
- Define which field to use to sort the report, in either ascending or descending order.
- Define one or two filters to further refine the report so that the report contains only the stations that you are interested in.
- Define the report format.
- Determine the report's appearance by adding or deleting blank lines, or by adding special characters such as horizontal and vertical lines.
- Preview the report.
- Save and rename the report script for future use.

To create a blank report script:

1. Select the **Edit** option in the **Report** menu.

   Have you loaded a report script?

   If yes, the script appears. Follow steps 2 through 4 to clear the script.

   If no, a blank report script appears in the Report Script Editor view. Go to the next procedure to edit the fields in a report script.

2. To clear an existing report script, press F6 (Edit options). The edit options appear.
3. Move to **Clear** and press Enter. This message appears:

   ```
   Clearing report script.
   ```

4. Press F6 (Return) to display a blank report script.

To edit the fields in a report script:

The types of statistics in a report depends on what report fields are included in the script. The following procedure shows how to edit the fields. The TALKERS report script is used as an example. The procedure shows just one way to edit a report script. Once a report script displays, you can vary the order in which you do various tasks or skip those tasks not relevant to your needs.

1. To define which statistics to include, position the cursor where you want the field to appear. Then press F2 (Insert field) to display the list of available fields. The screen shown in Figure 6–13 appears. (For definitions of the report fields, refer to Appendix B, "Report Fields.")
2. Move to the first field you want to display and press Enter.

   Some of the fields provide several options for you to further customize the field. For example, after you select the **% Usage** field, a window appears, which contains **Absolute** and **Relative**. These options correspond to the absolute and relative percentage of network usage. Use the cursor keys to move to the appropriate option and press Enter.

   A code (for example, @ss@) appears on the screen. When the monitor compiles the report, it automatically substitutes a value for that code.

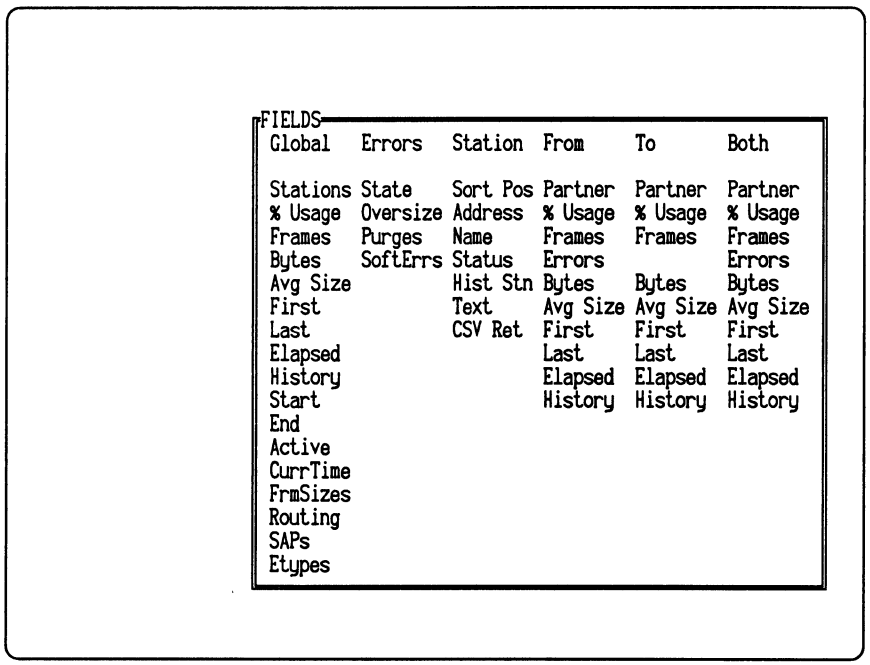


Figure 6–13. Report fields that can be inserted into a report script.

3. Position the cursor where you want the next field to appear. There must be at least one space after the previous field. Also, be sure that the end of the field does not exceed the end of the line.
4. Press F2, select the second field you want to display, and press Enter. (For the Talkers report, you would select **Name** under the heading **Station**).

   Repeat steps 2, 3, and 4 until you have defined all the fields.
5. To enter text, use the cursor keys to move the cursor to the desired place and start typing. For example, you might want to enter explanatory text or headers for the fields you selected. The upper-right corner identifies the cursor position by row and column to help you place the cursor precisely. The DEL key deletes the current character. The Ins (Insert) key

inserts characters; if you have not pressed Ins, the character you type overwrites the current one.

Figure 6–14 shows the codes for the fields of the TALKERS report and the explanatory text. Each report script can contain up to 58 lines.

When you enter the @ symbol in your report, the monitor displays @@ to differentiate your input from the keyboard from the @ symbols used as delimiters in the field codes. When you send the report to the printer, the report correctly prints the @ sign you typed.

```
-REPORT SCRIPT EDITOR----------TALKERS.SCR----------Row:   1—Col:   1-

                          Top 1Ø Talkers

   This report provides statistics for the 1Ø stations which have
   transmitted the most traffic.  The stations are sorted by bytes
   transmitted.

   Monitoring Started:    @GMON START...@          Total Stations:    @GS@
   Monitoring Stopped:    @GMON END.....@
   Elapsed Time:        @GMON ACTIVE.....@

   Report Generated:      @GCURRENT TIME@

   +-------+-----------------------+-----------+--------+--------+--------+
   |       | Name                  |     Bytes | Errors |   Size | % Rel  |
   +-------+-----------------------+-----------+--------+--------+--------+
   | @SS@  | @SNAME.........@      | @FBYTE.....@ | @FER@  | @FAV@  | @FUR@  |
   +-------+-----------------------+-----------+--------+--------+--------+

1 Help  2Insert field  3Insert line  4Delete line  5 Menus  6 Edit options  7 Chars  8Repeat char  9Screen test
```

Figure 6–14. Talkers report script.

To sort and filter statistics in a report:

1. When the Report Script Editor view is displayed, press F6 (Edit options). A list of edit options appears.
2. Move to **Report settings**, and then to **Sort by** to display the sort options. A display as shown in Figure 6–15 appears.

   Follow these steps to specify how the statistics are sorted:

   a. Move to and select the **To, From,** or **Both** option by pressing the Spacebar. This option is applicable if the sort key (to be selected in step c) is related to the traffic direction. For example, if the sort key is Frames, the **To, From,** or **Both** option determines whether frames sent to, received by, or both, are used as the sort key. If the sort key is Name, this option does not affect how the stations are sorted.

      For the TALKERS report, select the **From** option to sort the stations according to the amount of traffic from the stations.

   b. Move to and select either **Ascending** or **Descending** to select the sort order.

For the TALKERS report, select the **Descending** option.

c. Move into the list of sort keys and press the Spacebar.

For the TALKERS report, select **Bytes**.

By selecting these options, the Talkers report displays the stations that transmit the most bytes in descending order.

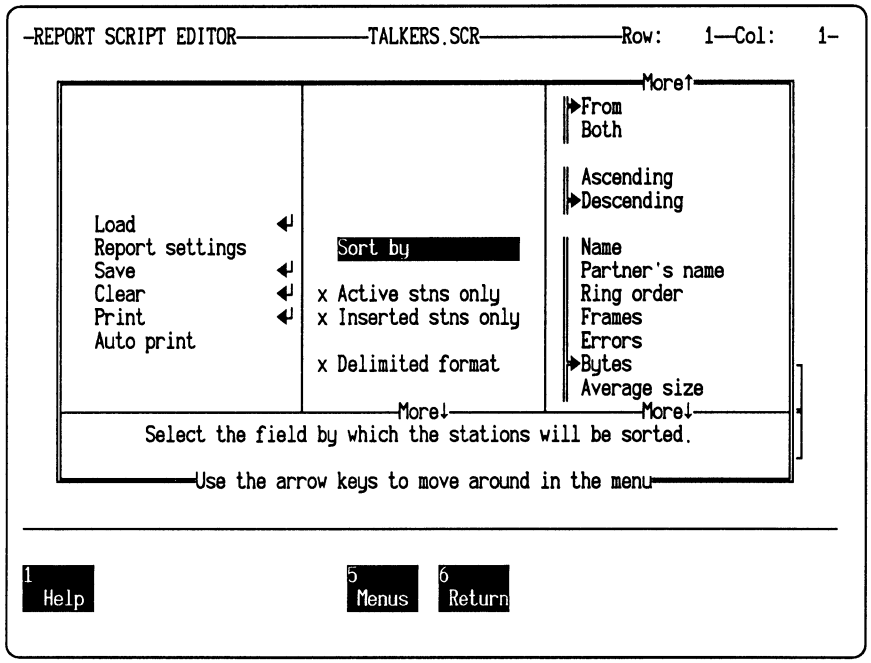


Figure 6–15. Options for sorting statistics in a report.

3. Choose the type of station to be included in the report:

   a. To include only the stations that have sent or received frames, select the **Active stn only** option for **Report settings**. A √ mark preceding the option indicates that it is selected. An x mark indicates that it is not selected. If the option is not selected, every station, regardless of whether it has received or sent traffic, is included.

   b. To include only the inserted station, select **Inserted stns** only. A √ mark preceding the option indicates that it is selected. An x mark indicates that it is not selected. A station whose station status is active monitor, standby monitor, or snooper is considered an inserted station.

4. Select filters to limit the stations to be displayed in the report. Follow either of these steps to choose the filter, depending on the number of filters you need:

   - To use one filter, move to **Filter 1**. If necessary, press the Spacebar to display the √ mark. Then move to **Filter 2**. If necessary, press the Spacebar to display the x mark to disable the second filter.
   - If you want to use a second filter, decide whether you want the statistics to pass either filter or both filters, and select the appropriate

operator option (**OR** or **AND**). Then move to **Filter 2** and make sure it is selected (that is, a √ mark should precede the **Filter 2** option).

If you select two filters with the **AND** option, the station must fulfill the conditions defined by both filters to be included in the report. If you select the **OR** option, the station is displayed if it meets the conditions of either filter.

5. To specify the conditions for a filter, move to the panel to the right of the **Filter** option. There are two lists on the panel. Follow these steps to select the items on the lists:

   a. You can limit the stations to be included in the report based on any of these criteria: **Sort Position, Name, Partner's name, Frames, Errors, Bytes, Average size, First activity, Last activity, Elapsed activity, Address, Absolute usage,** and **Relative usage**. They are shown in the second list on the panel.

   For example, you can specify that the station be included only if its average frame size is between 100 and 1,000.

   To specify a criterion, follow these steps:

   1) Move to the desired item on the second list and press Enter. A dialog box appears. The dialog box shows the default minimum and maximum values.

   2) Move to the value you want to modify, then press Enter. Another dialog box appears.

   3) Type the desired value and then press Enter. The dialog box with the values that you set appears. Press Esc or F6 to return to the menu.

   (For the Talkers report, you would select the **Sort Position** as **Filter 1** and specify a minimum value of **1** and a maximum value of **10** to include the top 10 users.)

   b. The first list determines the direction of traffic to which the criterion you specified in step a applies. If you specified **Frames** in step a, determine whether this condition should apply to the traffic from or to the station, or the traffic in both directions. For example, you can specify that the monitor count only the stations transmitting frames whose average size is between 100 and 1,000 bytes.

   To specify the direction, move to **To, From,** or **Both** in the first list. Then press the Spacebar.

   After changing a filter value, immediately press Cursor Left to return to the **Filter 1** option. This ensures that you do not accidentally change the new value by viewing other filter values.

   If you are specifying two filters, repeat this step for the second filter.

To define a report's file format:

In the **Report settings** menu, press the Spacebar to enable or disable the **Delimited format** option. (If the Main Menu is currently displayed, go to the **Report\Edit** menu to set the **Delimited format** option.)

To refine a report's appearance :

1. Add or delete blank lines or special characters like up, down, right, or left ruling lines.
   a. To add or delete lines, use the F3 (Insert line) or F4 (Delete line) keys.
   b. To add headers, use the cursor keys to position the cursor above the fields you want to describe. Then type in the text.
   c. To add special characters, press F7 (Chars) to display a list of available characters. Move to the desired character and press Enter. To repeat the character, use the cursor keys to position the cursor on the character and press F8 (Repeat chars) to make a continuous line or other special display.
2. To see how the report will appear with statistics, press F9 (Screen test).
3. Press Esc to return to the script. You can now make any additional changes to the report script.

To print or save the report, press F6 (Edit options). A list of edit options appears. Move to **Print**, and then either designate a printer or choose **File**. (See "Printing a Report Manually" on page 6–17 and "Saving a Report to Disk" on page 6–19 for a description of the associated options.)

Recommendations on Report Editing

The following is a list of recommendations that might help you edit a report script:

- If you are modifying an existing report script, remember to edit the text preceding the statistics after you set up the fields so that the text correctly describes the report.
- When you view the statistics, it would be helpful if the sort key is consistent with one of the fields included in the report script.

  For example, the LISTENRS report script includes the TBYTE field, which represents the number of bytes sent to each of the stations in the report. It is recommended that you sort the statistics using the **To** option. In this way, the statistics represented by TBYTE are sorted in descending or ascending order, depending on your choice.

  If you sort the statistics using the **From** option, the stations are arranged according to the amount of traffic *transmitted*. This makes the report hard to read because none of the statistics in the report are related to transmissions.
- Use the AND operator carefully if you are defining two filters. When used correctly, it can eliminate the stations that you are not interested in. However, it may yield unexpected results if you inadvertently define conflicting conditions for the filters.

  The following are examples showing how the filters interact with the AND operator for the LISTENRS report script:

Example 1

For filter 1, **To** and **Average size** are selected. The minimum and maximum frame sizes are 0 and 500, respectively.

For filter 2, **To** and **Errors** are selected. The minimum and maximum numbers of errors are 1 and 65,535, respectively.

The report generated by the LISTENRS report script counts only the stations that have received frames whose average size is 500 bytes or less and that have received between 1 and 65,535 error frames. You are eliminating the stations that have not transmitted error frames as well as the stations that transmit large frames.

Example 2

Filter 1 has the same conditions as in Example 1.

For filter 2, **To** and **Average size** are selected. The minimum frame size is 600; the maximum is a value that is greater than 600 (for example, 1,000).

The report generated by the LISTENRS report script contains no statistics because no station can meet the criteria defined by these filters. That is, no station can receive frames whose average size is 500 bytes or less *and* 600 bytes or more.

Example 3

For filter 1, **Sort position** is selected. The minimum and maximum values are 1 and 5, respectively.

For filter 2, **To** and **Errors** are selected. The minimum and maximum numbers of errors are 100 and 500, respectively.

The report generated by the LISTENRS report script would probably contain no statistics. If the statistics are sorted by the frames received by the stations, a station is displayed only if it is one of the top 5 stations that receive most traffic and it has transmitted between 100 and 500 error frames.

Saving a Report Script

When you finish editing a report script, you can save that script for future use. The original script you used as a basis is not changed; instead, you save the edited version under a new name.

To save a report script:

1. With the report script displayed, press F6 (Report Options), move to **Save**, and press Enter.
2. In the dialog box that appears, type the report script name and press Enter.

   The monitor saves the report script and assigns it the extension SCR. The next time you try to load a report script, this script appears on the list of scripts available.

CHAPTER SEVEN: ESTABLISHING A BASELINE FOR YOUR NETWORK 7

Network General

Establishing a Baseline for Your Network

Overview

Determining what is wrong with the network is much easier when you are familiar with typical network patterns *before* a problem occurs. Significant deviations from these patterns often indicate a problem. To decide whether such deviations exist, do the following:

- Name the stations on the network.

  For further information on how to name stations, refer to Chapter 4, "Managing the Station Data Files."

- Become familiar with normal traffic patterns.

This chapter describes the tests that produce results to be used as a baseline for your network. It does not, however, provide detailed interpretation of statistical displays and views generated by the monitor. This information is provided in Chapter 9, "The Monitor Menu Items."

The procedures in this chapter assume that you already know how to move through menus, select options, and define values.

Gathering History Statistics

To establish a picture of typical network traffic patterns:

1. Monitor all stations at 30-minute history intervals over a period of time, between one day to one week.

   Longer intervals like 30 minutes are often more meaningful because they reduce the effects of short-term fluctuations.

2. Select **Global history** in the **Display** menu to look at the Global History Statistics view. The statistics allow you to analyze the network usage during various time periods.

Alternatively, enable the **Log to disk** option in the **History** menu. The file HISTORY.LOG is created in the C:\TRHIST directory, which stores the statistics in the Global History Statistics view.

It might be useful to log history statistics at different times of the year to discern network usage patterns. For example, you might want to know whether network traffic is heavier toward the end of each fiscal quarter within your organization.

To display history statistics for a particular station:

1. After monitoring the network over a period of time, select **Stn** in the **History** menu.
2. From the station list, select a station for which history statistics will be displayed.

3. Select **Station history** in the **Display** menu to look at the history statistics for the selected station.

When you display a station's history statistics, you can specify whether the statistics are compiled according to the amount of traffic received or transmitted by the station, or both.

In most cases, use the **Both** option to show a more accurate picture of network activity. With this option, the monitor displays history statistics that reflect the traffic to and from the station. You can use this information to balance the load among network stations.

The **From** option is useful when you display or sort by errors. It provides the most accurate picture of which stations are transmitting soft error report frames. The **To** option might be useful for comparing the sizes of frames sent to the file servers to those transmitted by the file servers.

To generate a history report for a particular station:

To maintain a permanent record of the history statistics for a particular station, create a report script and generate a report for these statistics.

For example, if ServerA generates the most traffic on the network, you might want to know its network usage at different times of the day over a period of time (for example, a week). To generate a history report for ServerA, follow these steps:

1. Select **Edit** in the **Report** menu to display a blank report.
2. Enter text that describes the content of the report.
3. Insert fields such as the current time, frames from and to ServerA, absolute network usage, and error frames.
4. Press F6 to display the edit options.
5. Select **Report settings** to set **Filter 1**. Select **Name** to limit the report to ServerA. (That is, set both the minimum and maximum values of **Name** to "ServerA.") Make sure that **Filter 2** is disabled.
6. Select **Save** to save the script under a filename of your choice.
7. Select **Auto print** to print the report to a single file on the disk every hour. Set **Start time** to a time when you want the monitor to start printing the report.
8. Enable the **Restart monitor** option so that the monitor starts a new monitoring session each time it prints the report to the disk.

After monitoring the network for a week, print out the file that contains the report. The report consists of the hourly history statistics for ServerA in the past week. You can now see the traffic patterns of this server at different times of the day.

Protocol-Specific Station Tests

It is useful to test protocols to which each station responds so that when connectivity problems occur in the future, you know which station normally responds to a particular type of test frame.

To perform a protocol-specific station test:

1. Stop monitoring.
2. Select **Station test**.
3. Choose a station from the station list.
4. Select the protocol with which you want to test the selected station. The available protocols are MAC, IEEE 802.2, NetWare, and NetBIOS. (The **NetWare** and **NetBIOS** options are available only if you have a second network interface card with either the NetWare or NetBIOS software.)

   The monitor displays a message indicating whether the station responded. If you started a NetBIOS station test and the station responded, the Network Adapter Status screen appears. An example of this screen is shown in Figure 7–1.
5. Record the test result.

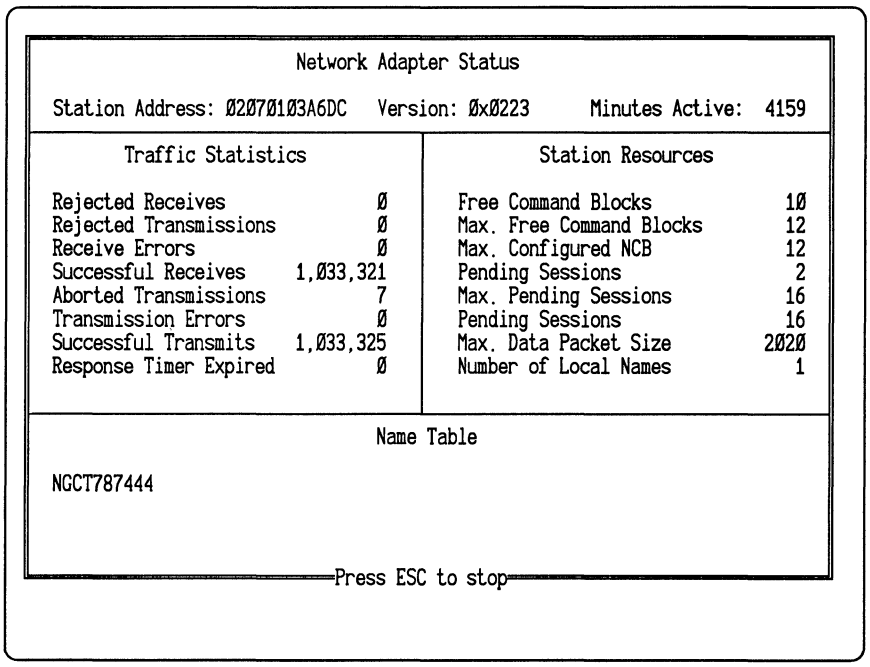


Figure 7–1. Sample Network Adapter Status screen.

Examining Typical Frame Size Distributions

It is useful to know the typical frame size patterns on the network. Suppose a majority of the frames on your network typically fall in the range between 33 and 64 bytes. After installing a new network application (for example, a file

transfer program), most frames fall in the range between 2,049 and 4,096 bytes. This change indicates that the introduction of the program had an impact on network traffic. This information can help you decide whether modification of the network configuration is required.

To examine the frame size distribution, monitor the network over a period of time. Then select **Frame sizes** in the **Display** menu to look at the Frame Size view. If you want to look at the frame size distribution over a period of time, generate reports based on FRAMSIZE.SCR regularly.

If you want to know the average frame size for each station, select **All stations** in the **Display** menu. Specify that the statistics be sorted by the average frame size.

Examining the Transmit Timer

With the access control scheme on a Token-Ring network, a token is always in circulation. If a message is already on its way from one station to another, the token is set as a busy token. A station must first get a free token before it can transmit on the network.

The time a station needs to wait for a free token before transmitting a frame is longer as the network becomes busier. The transmit timer on the monitor indicates the length of time between two frames sent to the network, one after another.

It is recommended that you record the length of the waiting time during normal and peak hours. In the future, if you notice that the waiting time has become significantly longer, you might want to consider changing the network configuration to speed up the transmission process. For example, you might want to divide one network segment into two or three segments.

To examine the transmit timer, stop the monitoring session and then select **Transmit Timer** on the Main Menu. A screen display shows the amount of time the monitor waits between the transmission of two frames. The time is measured in milliseconds.

CHAPTER EIGHT: THE MONITOR DATA FILES 8

Network General

The Monitor Data Files

Overview

This chapter describes data files on the Sniffer Network Analyzer that are used by the monitor. Some of the files are shipped with the product; some are created when you execute particular commands in the monitor's menus. This chapter, however, does not describe those files that are used exclusively for the operation of the monitor and that you would not typically view in DOS.

Data Files

The following list shows the different directories that contain the data files:

C:\TRSNIFF	STARTUP.TRA STARTUP.TRD STARTUP.TRI STARTUP.TRT
C:\TRALARMS	ALARM.LOG
C:\TRHIST	HISTORY.LOG HISTORY.CSV
C:\TRREPORT	*.RPT *.CSV
C:\TRREPORT\SCRIPTS	*.SCR

The monitor creates duplicates of the STARTUP.TRA and STARTUP.TRD files when you change these files for the first time after starting the monitor. The duplicates are called BACKUP.TRA and BACKUP.TRD, respectively. As a result, you can return to the previous version of the data files.

The STARTUP.TRD and STARTUP.TRI files are also used by the analyzer.

STARTUP.TRA

File type: ASCII.

Content: Station addresses and alarm thresholds. This file is not shipped with the monitor; instead, it is created during the first monitoring session, when the monitor adds any named stations to this file and assigns them the default alarm thresholds.

The following is an example of an entry:

station C00000000001 alarms (usage 20%, badpkts 5, idle 1 mins, norsp 7 secs, priority 1)

Refer to "Station Alarm Threshold Options" on page 5–7 for information on interpreting the alarm thresholds.

Read: When you start a monitoring session.

Written: When you exit the Manage Station Information view after making changes.

STARTUP.TRD

File type: ASCII.

Content: Station names and addresses. You can enter station names automatically (if you use NetBIOS), with the Manage Stations Information view, or with a text editor.

The following is an example of an entry:

station "NetBIOS" = c00000000080

Read: When you start a monitoring session. It is also read by the analyzer when you use the analysis function.

Written: When you use the **Probe for names** function to add station names.

When you exit the Manage Station Information view after editing names.

When you edit the file with a text editor.

You cannot delete the broadcast address, c000fffffffff, from this file, because, without the address, statistics cannot be kept properly. You can, however, change the name for this address. The default name is Broadcast.

STARTUP.TRI

File type: ASCII.

Content: Vendor addresses, each of which makes up the first six hexadecimal numbers of a station's address. The monitor is shipped with a set of addresses in STARTUP.TRI. The following is an example of an entry:

manuf "Vtalnk" = 48007c

If a monitor display includes the station whose address is, for example, 48007c123456, the monitor displays "Vtalnk123456" instead of the 12 hexadecimal digits.

The maximum number of entries is 225.

Read: When you start the monitor. It is also read by the analyzer if you use its analysis function.

Written: When you save changes made with a text editor. (The monitor does not automatically change this file.)

STARTUP.TRT

File type: ASCII.

Content: SAP values in hexadecimal numbers. The monitor is shipped with default SAP values in STARTUP.TRT. You can assign more than one SAP value to a protocol type as shown in these examples:

```
sap "SNA" = 04
sap "SNA" = 08
```

The maximum number of entries is 64 (32 SAP and 32 Ethertype); the maximum number of SAP labels for each type (SAP and Ethertype) is 16. Each label can have 4 SAP numbers.

Read: When you start the monitor.

Written: When you save changes made with a text editor. (The monitor does not automatically change this file.)

ALARM.LOG

File type: ASCII.

Content: Alarms in the monitor's alarm buffer.

Read: When you use a word processor to read the file.

Written: The monitor saves alarms from the alarm buffer to the file if you enable the **File** option in the **Alarm\Log to** menu.

HISTORY.LOG and HISTORY.CSV

The monitor saves history statistics to C:\TRHIST\HISTORY.LOG if you do not specify the delimited (spreadsheet-compatible) format; it saves the statistics to C:\TRHIST\HISTORY.CSV if you choose the delimited format.

File type: ASCII.

Content: Global history statistics.

Read: When you use a text editor to read the file.

Written: The monitor saves global history statistics regularly to the file if you enable the **Log to disk** option in the **History** menu.

*.CSV and *.RPT

The *.CSV and *.RPT files are reports stored in the C:\TRREPORT directory. Figure 8–1 lists the different forms of filenames.

Report Format	Generated Automatically	Generated Manually
Delimited	AR*YYMMDD*.CSV or *YYMMDDNN*.CSV	*FILENAME*.CSV
Not delimited	AR*YYMMDD*.RPT or *YYMMDDNN*.RPT	*FILENAME*.RPT

Figure 8–1. Filenames in the C:\TRREPORT directory.

You specify ***FILENAME*** when you manually generate the report. If the monitor generates the report automatically, the filename indicates the file creation date.

File type: ASCII.

Content: The report generated.

Read: When you use a text editor to open it.

Written: When a report is automatically or manually generated.

*.SCR

There are several report script files under the C:\TRREPORT\SCRIPTS directory (for example, HISTORY.SCR, ERRORS.SCR).

File type: Binary.

Content: Report script that the monitor uses as a template when generating a report.

Read: When you choose **Load** in the **Report** menu.

Written: When you choose **Save** in the **Report** menu.

CHAPTER NINE: THE MONITOR MENU ITEMS 9

Network General

The Monitor Menu Items

Overview

This chapter describes each menu item in the order it appears in the monitor's Main Menu, along with any associated options. For options that display additional information, such as the Global Statistics view associated with the **Display** option, there is also an explanation of each item in the view.

This chapter does not discuss the use of function keys in each view (for example, F9 for freezing the screen). It assumes that you have learned how to use the function keys from the previous chapters.

Transmit Timer

Generates the Transmit Wait Time view, which shows the amount of time the monitor takes to acquire the token before each transmission. Select **Transmit Timer** only when the monitor is not monitoring. Figure 9–1 is an example of the Transmit Wait Time view.

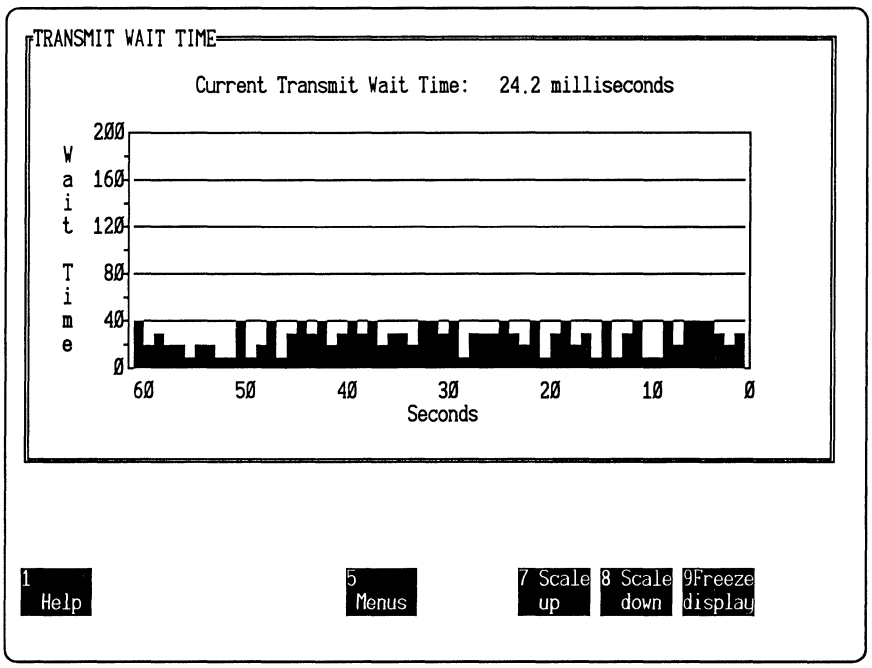


Figure 9–1. Transmit Wait Time view.

The following list explains the terms used in the display:

- Current Transmit Wait Time is the amount of time in milliseconds that the monitor waited to acquire the token for the most recent transmission.

- Wait Time is used on the vertical axis of the bar graph. It indicates the amount of time in milliseconds that the monitor waited to acquire the token for each transmission in the past 60 seconds. The monitor transmits 20 frames per second and averages the wait times. The time intervals are marked on the horizontal axis of the graph.

Station Test

Tests for station response, using the protocols listed below.

If the station responds to a NetBIOS test frame, the Network Adapter Status screen appears. Refer to Figure 7–1 for an example.

If you use other protocols, the monitor displays a message similar to the following to indicate that the station responded:

```
File Server responded.
```

Options

To =	Displays the name or address of the station to be tested. If you press Enter after selecting this option, a list appears. Choose the station you want to test. To move through the list quickly, type the first character of the station's name.
MAC	Sends a test frame at the MAC level.
IEEE 802.2	Sends an 802.2 test frame.
NetWare	Performs a NetWare configuration request command. This option operates only when you have installed a second network interface card with the NetWare software.
NetBIOS	Performs a NetBIOS remote status request command. This option operates only when you have installed a second network interface card with the NetBIOS software.

The monitor can perform a station test using the NetWare or NetBIOS protocol when it is monitoring the network. You must, however, stop the monitor before initiating a station test for the MAC or IEEE 802.2 protocol.

Monitor Filters

Determines which stations and which types of frames are to be monitored. You can change the settings of **Monitor filters** only when the monitor is not monitoring.

Options

All stations	Monitors all stations.

Stn =	Displays the name or address of the station to be monitored. If you press Enter when this option is selected, a station list appears. Choose the station you want to monitor. To move through the list quickly, type the first character of the station's name.
All frames	Monitors both LLC and MAC frames.
LLC frames	Monitors only LLC frames.
MAC frames	Monitors only MAC frames.

By default, **Monitor filters** is set to **All stations** and **All frames**.

History

Specifies the history interval and designates a station for which history statistics are collected. The history interval determines how often the monitor records history statistics. The total number of intervals is set in the Configuration Menu. The default is 1,750.

Changing the setting of a **History** option erases any previous history statistics in memory. To save them, generate a report or log history statistics to disk.

Options

Stn	Displays the name of a station for which the monitor collects statistics. If you press Enter when this option is selected, a station list appears for you to choose a station. To move through the list quickly, type the first character of the station's name.
Intrvl	Specifies the length of a time interval during which the monitor accumulates statistics. It also affects when the monitor starts collecting history statistics, as explained in Figure 9–2. To specify the value, press Enter to display a dialog box. Specify the time in the *hh:mm:ss* format. The value can range from 5 seconds to 24 hours.
Align history	If it is not selected, the monitor starts collecting history statistics immediately. If it is selected, the monitor starts collecting history statistics on the next interval boundary. For example, if you set **Intrvl** to 10 minutes and the current time is 02:21:00, the monitor starts collecting statistics at 02:30:00. Figure 9–2 describes how the value of **Intrvl** affects the time the monitor starts history statistics collection.

If Intrvl is set to ...	History statistics collection starts at...
24 hours	Midnight.
12 hours	Noon or midnight.
Any number of hours (for example, 1, 2)	Beginning of the next hour.
5, 10, 15, 20, or 30 minutes	Next specified boundary. For example, if the current time is 05:13:00 and you set **Intrvl** to 30 minutes, statistics collection starts at 05:30:00.
Any number of minutes other than the ones described above	Beginning of the next minute. For example, if the current time is 05:13:00 and you set **Intrvl** to 2 minutes, statistics collection starts at 05:14:00.
5, 10, 15, 20, or 30 seconds	Next specified boundary. For example, if the current time is 05:13:25, and you set **Intrvl** to 15 seconds, statistics collection starts at 05:13:30.
Any value other than the ones described above	Immediately.

Figure 9–2. Relationship between Intrvl and history alignment.

Log to disk When selected, this option writes global history statistics at each history interval to a file on disk named HISTORY.LOG, which is in the C:\TRHIST directory. At midnight, this file is renamed to GH*YYMMDD*.LOG (*YYMMDD* represents the year, month, and day). The monitor then clears the contents of HISTORY.LOG so that it can store to this file the history statistics for the next day. (If the file is in delimited format, the file extension is CSV instead of LOG.)

When **Delimited format** is selected, the file's format is compatible with spreadsheet applications. That is, embedded commas within numbers are eliminated, and the fields are separated from each other by commas. The name of the file is HISTORY.CSV.

Both HISTORY.LOG and HISTORY.CSV contain the same information as shown in the numeric Global History Statistics view.

By default, **Stn** is set to Broadcast and **Intrvl** to 00:15:00. **Align history** is selected, but **Log to disk** is not.

Display

Display generates a variety of screens containing network statistics. Each display is called a "view." The exact information in each view depends on the options you choose. All views include the current date and time in the upper-right corner of the screen.

Options

The following is a list of options for **Display**, which allow you to specify the type of view to be generated:

Global statistics	Displays traffic statistics for the network as a whole.
Single station	Displays traffic statistics for a specific station.
All stations	Displays selected statistics, sorted according to your specifications, for all stations.
Frame sizes	Displays a distribution of frame sizes.
Routing info	Displays statistics on routed frames.
SAP protocol types	Displays the numbers of frames or bytes according to the type of SAP.
Alarm log	Displays a list of alarms generated in the current monitoring session that have not been cleared.
Global history	Displays a history of activity for the entire network.
Station history	Displays a history of activity for a specific station.

For all options, except **Frame sizes** and **Alarm log**, you can determine how statistics are displayed (for example, in numeric or graphic format). The following subsections describe the views generated by these options.

The **Class** option specifies whether the statistics in a view are based on the frames sent to the station, from the station, or both. This option applies when you display a single station (in the graphic format), all stations, or station history.

The **Network Usage** option specifies whether the statistics are absolute (a portion of the total network capacity) or relative (a portion of the total network traffic). This option applies when you display a single station, all stations, or station history.

Display Global Statistics

The Global Statistics view provides a high-level view of network activity for all stations for the current monitoring session.

Options

Numeric	Displays global statistics as columns of numbers, including updated traffic counts, error counts, and timestamps. Numeric is the default setting.
Graphic	Displays traffic counts in the top portion and a graph of absolute network usage over a 60-second period in the bottom portion.

Global Statistics in Numeric Format

Figure 9–3 is an example of a Global Statistics view in the numeric format.

Traffic Counts

The Traffic Counts column is divided into two parts.

The following list explains the terms in the left column. All the statistics in this column have been accumulated since the current monitoring session started.

Maximum Inserted Stns	Highest number of inserted stations at one time in the current monitoring session. An inserted station is one whose status is active monitor, standby monitor, or snooper. For further information on station status, refer to "All Stations Statistics in Numeric Format" on page 9–16.
Total Stations	Number of stations that have transmitted in the current monitoring session. This number is equal to or greater than Maximum Inserted Stns.
Average Usage	Average utilization of the network's capacity.
Total Frames	Total number of frames transmitted.
Total Bytes	Total number of bytes transmitted.
Avg Frame Size	Average size of transmitted frames (that is, total bytes divided by total frames).

The following list explains the terms in the right column. All the statistics in this column pertain to the last second:

Current Inserted Stns	Number of inserted stations.
Active Stations	Number of stations that have transmitted frames of any type.
Current Usage	Utilization of the network's capacity.
Current Frames	Number of frames transmitted.
Current Bytes	Number of bytes transmitted.
Avg Frame Size	Average size of transmitted frames (that is, current bytes divided by current frames).

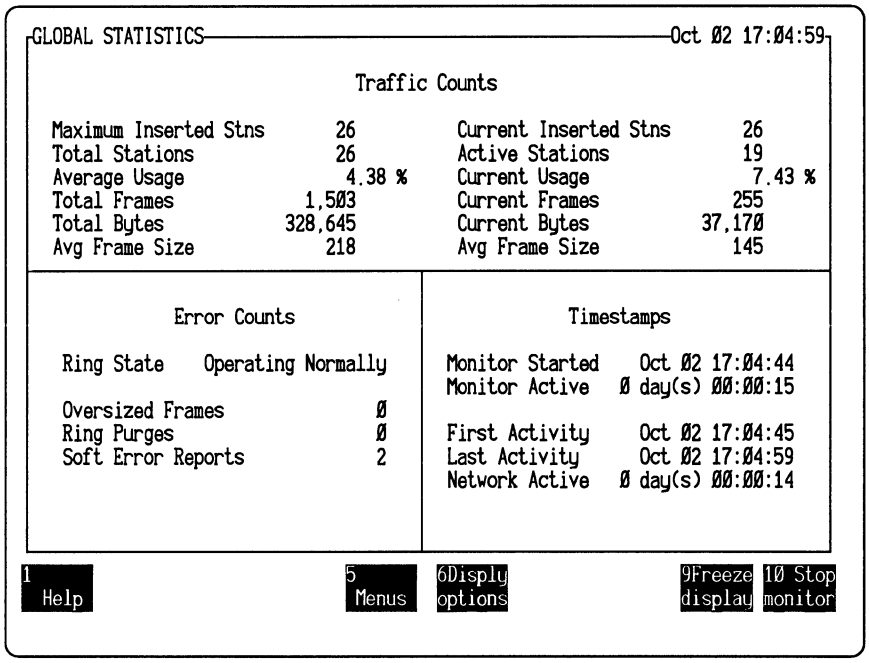


Figure 9–3. Global statistics view (numeric format).

Error Counts

The Error Counts column shows the overall condition of the network and the numbers of errors.

Ring State

The general condition of the network. The following explains the possible messages displayed for Ring State:

"Beaconing" indicates that the network is inoperable. A network can be in the beaconing state because of a physical break in the network or a time-out during monitor contention.

"Monitor Contention" indicates that the network is in the process of selecting a new active monitor. This happens when the current active monitor has not received its Ring Purge MAC frame within one second of its transmission.

"No Receive Signal" indicates that the monitor receives no signals from the network. This happens when the monitor station is disconnected from the network.

"Operating Normally" indicates that the network is in normal operation. (That is, an active monitor is present, and a token is being circulated on the network.)

"Removed from Ring" indicates that the monitor is prevented from entering the Token-Ring because the IBM LAN Manager program is not configured to allow a monitoring device to be present on the network.

	"Ring Purge" indicates that the active monitor has sent out a Ring Purge MAC frame because it detected that a token has been lost. "Not monitoring" indicates that the monitor is not monitoring the network.
Oversized Frames	Number of frames that exceed 4,608 bytes on a 4 Mb/s network or that exceed 18,432 bytes on a 16 Mb/s network.
Ring Purges	Number of times the active monitor purges any circulating information from the ring because it has not seen a free token or a good frame within 10 milliseconds.
Soft Error Reports	Number of intermittent errors counted and reported by the Token-Ring adapters on the network. There are different types of soft errors. For example, a line error indicates that there was an invalid character in a frame or token or that there was a checksum error in a frame; a lost frame error indicates that a station that transmitted a frame failed to receive the frame.

For further information on soft errors and error recovery, refer to the *TMS380 Adapter Chipset User's Guide* or *Token-Ring Network, Architecture Reference.*

Timestamps

Monitor Started	Date and time the current monitoring session started.
Monitor Active	Length of the current monitoring session.
First Activity	Date and time the first frame was transmitted.
Last Activity	Date and time the most recent frame was transmitted.
Network Active	Amount of time between the first and most recent frames transmitted.

Global Statistics in Graphic Format

Figure 9–4 is an example of a Global Statistics view in the graphic format.

The top portion of the view displays traffic counts identical to those in the numeric view. The graph in the bottom portion shows absolute network usage (in percentage) over a 60-second period. The graph updates at one-second intervals, moving across the view from right to left. The current time and date display in the upper-right corner of the view.

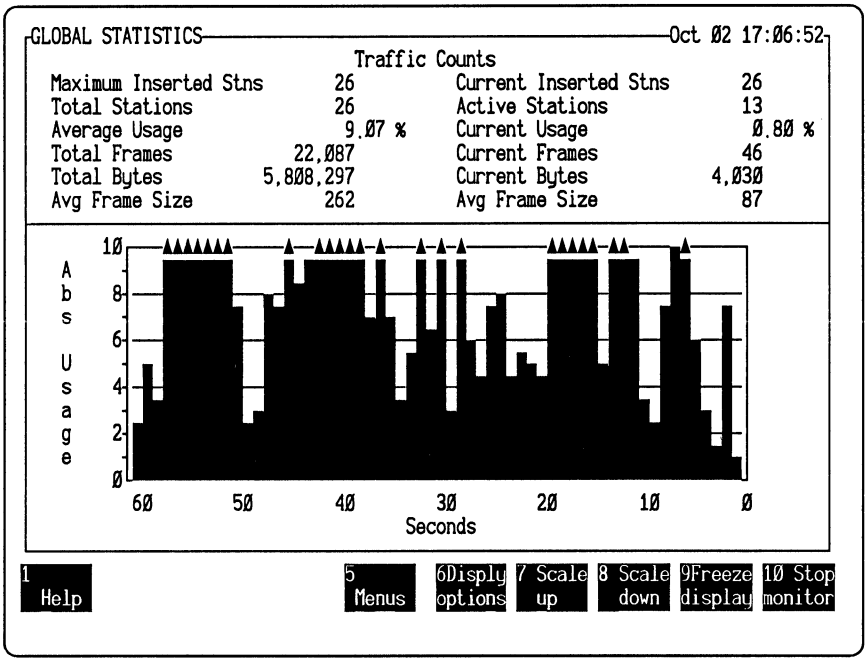


Figure 9–4. Global statistics (graphic format).

Recommendations

The monitor can display accurate statistics up to certain values. It displays "Ovrflw" instead of the numeric value when a statistic has exceeded the maximum value.

The maximum value of Total Frames is 4,294,967,295; the maximum value of Total Bytes is 999,999,999,999. The maximum value of each type of error count is 65,535. Reset the monitor immediately after "Ovrflw" appears. This way, you can examine the accurate statistics in the Global Statistics view for the current session.

Display Single Station

This view provides a high-level view of current activity for a selected station.

Options

Stn — The name of the station for which the monitor displays statistics. If you press Enter after selecting this option, a station list appears. Choose a station from the list.

Numeric — Displays traffic statistics for the selected station as columns of numbers, including transmissions, receptions, or both (Figure 9–5).

Graphic — Displays traffic statistics for transmissions, receptions, or both, depending on the **Class** option you choose. The graph in the bottom portion shows either absolute or

relative network usage by the station over a 60-second period (Figure 9–6).

Single Station Statistics in Numeric Format

Figure 9–5 is an example of the display for a single station.

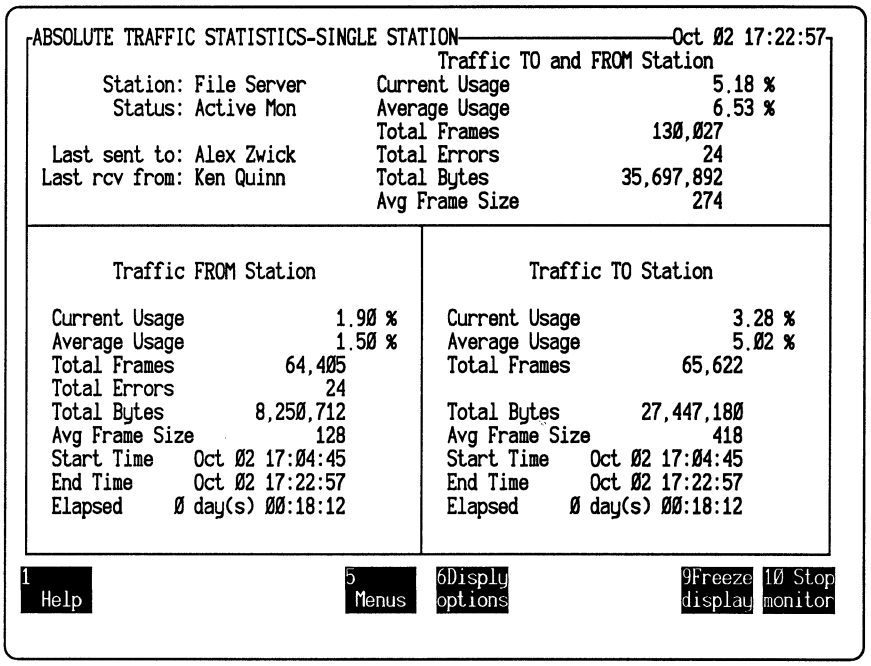


Figure 9–5. Single station statistics (numeric format).

The top portion shows traffic counts for both transmissions and receptions for a selected station. The lower-left portion shows counts for transmissions; the lower-right portion shows counts for receptions.

The left column in the top portion displays the following types of general information:

Station	Address or name of the station for which statistics appear.
Last sent to	Address or name of the station to which the most recent frame was transmitted.
Last rcv from	Address or name of the station from which the most recent frame was received.

Traffic TO and FROM Station

Current Usage	Percentage of utilization in the last second for both transmissions and receptions.
Average Usage	Average percentage of utilization for both transmissions and receptions in this monitoring session.
Total Frames	Total number of frames transmitted and received.

Total Errors	Total number of soft error report frames transmitted.
Total Bytes	Total number of bytes transmitted and received.
Avg Frame Size	Average size of frames transmitted and received.
FROM Station	
Current Usage	Percentage of network utilization for transmissions in the last second.
Average Usage	Average percentage of utilization for transmissions in this monitoring session.
Total Frames	Total number of frames transmitted.
Total Errors	Total number of soft error reports transmitted.
Total Bytes	Total number of bytes transmitted.
Avg Frame Size	Average size of frames transmitted.
Start Time	Date and time the first frame was transmitted.
End Time	Date and time the most recent frame was transmitted.
Elapsed	Amount of time between the transmission of the first and most recent frames.
TO Station	
Current Usage	Percentage of utilization for receptions in the last second.
Average Usage	Average percentage of utilization for receptions in this monitoring session.
Total Frames	Total number of frames received.
Total Bytes	Total number of bytes received.
Avg Frame Size	Average size of frames received.
Start Time	Date and time the first frame was received.
End Time	Date and time the most recent frame was received.
Elapsed	Amount of time between the first and most recent frames received.

Single Station Statistics in Graphic Format

Figure 9–6 is an example of the display for a single station in the graphic format.

The statistics in the top portion of the graphic view are similar to those displayed in one of the portions in the numeric view. However, they do not always describe the traffic both to and from the station; the statistics displayed depend on the **Class** option you choose.

For example, if you choose **To** for the **Class** option, the display does not include the address or name of the station to which the most recent frame was

transmitted (the "Last sent to" field). The number of errors (the "Total Errors" field) is displayed only if **Both** or **From** is selected for **Class**.

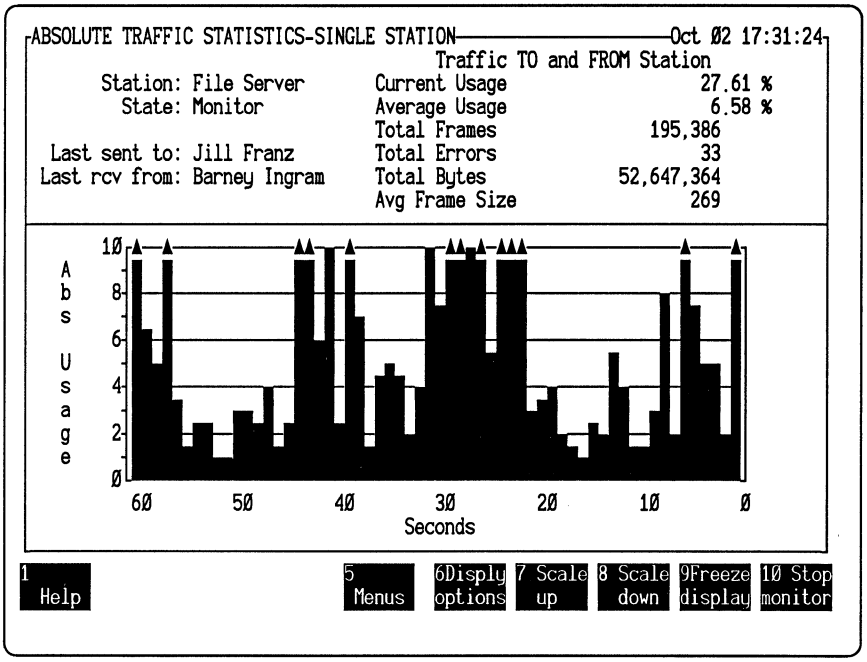


Figure 9–6. Single station statistics (graphic format).

The graph in the bottom portion of the Single Station view (Figure 9–6) shows either absolute or relative network usage (in percentage) by the station over a 60-second period. The graph updates at one-second intervals, moving across the view from right to left.

If you select **Both** for the **Class** option, a bar in the graph representing both reception and transmission statistics is made up of two portions. The upper portion represents the reception statistics; the lower portion represents the transmission statistics. A color monitor displays reception statistics in yellow and transmission statistics in blue.

Recommendations

As with the global statistics, the monitor can display accurate statistics for a single station up to certain values. If a statistic for both reception and transmission exceeds the maximum value, the monitor displays "Ovrflw" instead of the numeric value. For example, "Ovrflw" appears when Total Frames in the Traffic TO and FROM Station column exceeds 4,294,967,295.

However, if the number of the transmitted frames or received frames exceeds the maximum value, the monitor does not display "Ovrflw." In this case, the numeric value displayed is still inaccurate.

If you display the numeric view, reset the monitor once "Ovrflw" is displayed. If you display the graphic view for transmission or reception traffic only, there is no warning about the overflow of the frame counts. In this case, it is important

that you reset the monitor once "Ovrflw" is displayed for Total Frames in the Global Statistics view. When Total Frames overflows, it is possible that the frame counts for one or more stations are inaccurate.

Display All Stations

This view shows statistics for each station across the network, sorted according to your specification.

Options

Numeric Displays statistics as columns of numbers, for up to 20 stations at a time. You can choose which statistics to display (see "All Stations Statistics in Numeric Format" on page 9–16), how to display them, and how to sort them.

Graphic Displays a graph and lists 10 stations at a time. (Refer to "All Statistics in Graphic Format" later in this section for a description of the view.)

Sort by Specifies the order in which the statistics are arranged and the key by which the statistics are sorted. The options available are described below:

Ascending displays statistics from the lowest to the highest, as defined by the sort key.

Descending displays statistics from the highest to the lowest, as defined by the sort key.

Name sorts the stations by their names.

Partner's name sorts the stations by the names of their partners. A station's partner is the last station it communicated with.

Ring order sorts the stations according to the order of the stations on the Token- Ring. When **Ring order** is selected, the active monitor is displayed first, followed by the standby monitors. The standby monitors are arranged in such order that each station is followed by its upstream neighbor.

After the standby monitors, the rest of the stations are grouped by station status in this order: snooper, removed, remote, inactive, and group. Refer to "All Stations Statistics in Numeric Format" on page 9–16 for more information on station status.

The monitor displays a warning message if it cannot determine the ring order.

Frames sorts the stations by the number of frames transmitted, received, or both.

Errors sorts the stations by the number of soft error frames transmitted. Do not sort by errors if the setting of the **Class** option is To, or an error message appears.

Bytes sorts the stations by the total number of bytes transmitted, received, or both.

Average size sorts the stations by the average size of frames transmitted, received, or both.

Network usage sorts the stations by their network usage. The usage percentage might fall in the range between 100 and 200 if the class of traffic is **Both** because the monitor counts each frame for its source *and* destination.

First activity sorts the stations by the date and time that the first frame was transmitted or received.

Last activity sorts the stations by the date and time that the most recent frame was transmitted or received.

Elapsed activity sorts the stations by the amount of time between the first and last activity.

Active stns only Displays only stations that have sent or received traffic since the beginning of the current monitoring session.

Inserted stns only Displays only stations whose station status is active monitor, standby monitor, or snooper.

All Stations Statistics In Numeric Format

The numeric view always includes the station names. Other types of statistics that can be included are: **Partner's name, Station status, Frames, Errors, Bytes, Average size, Network usage, First activity, Last activity,** and **Elapsed activity**.

For definitions of these terms except **Station status**, refer to the description of **Sort by** earlier in this section.

Station status refers to the status of the station, which can be one of the following:

Active monitor — The station serves as the active monitor, which initiates the token transmission and provides the soft-error recover facility.

Standby monitor — The station serves as a standby monitor, which can detect failures in the active monitor and traffic disruptions on the network. A standby monitor may become the active monitor if the active monitor fails.

Snooper — The station is currently sending Trace Tool Present frames. (The monitor's station status is snooper; it sends out a Trace Tool Present frame every minute.)

Removed — The station was previously inserted but has left the ring.

Remote — The station is on a remote Token-Ring network.

Inactive	The station has never transmitted a frame.
Group	The address is not station-specific. For example, it is a broadcast address.

Network usage shows the relative or absolute usage of the network in percentage.The percentage might fall in the range between 100 and 200 if the class of traffic is **Both**, because the monitor counts each frame for its source *and* destination.

Figure 9–7 is an example of a numeric view showing the statistics for all stations.

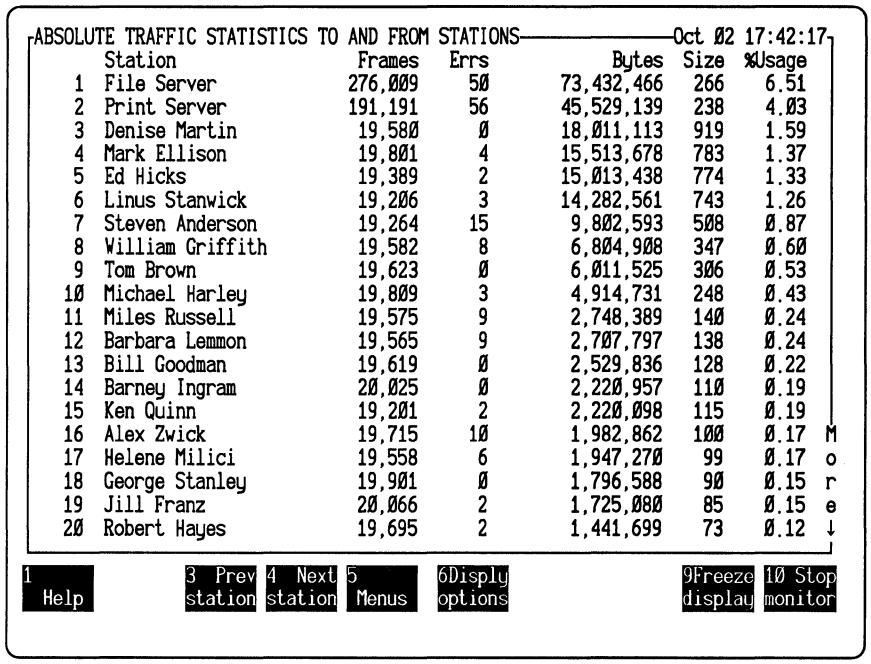


Figure 9–7. Statistics for all stations (numeric format).

All Stations Statistics in Graphic Format

Figure 9–8 is an example of a graphic view showing the statistics for all stations. The categories of statistics in the graphic view cannot be changed. For example, you cannot display the names of the stations' partners.

The bottom portion of the graphic view displays absolute or relative network usage (in percentage) for up to 10 stations at a time, sorted by the key you selected.

The top portion of the graphic view shows statistics for the displayed stations as a graph, with transmissions, receptions, and both counts appearing in different colors or intensities.

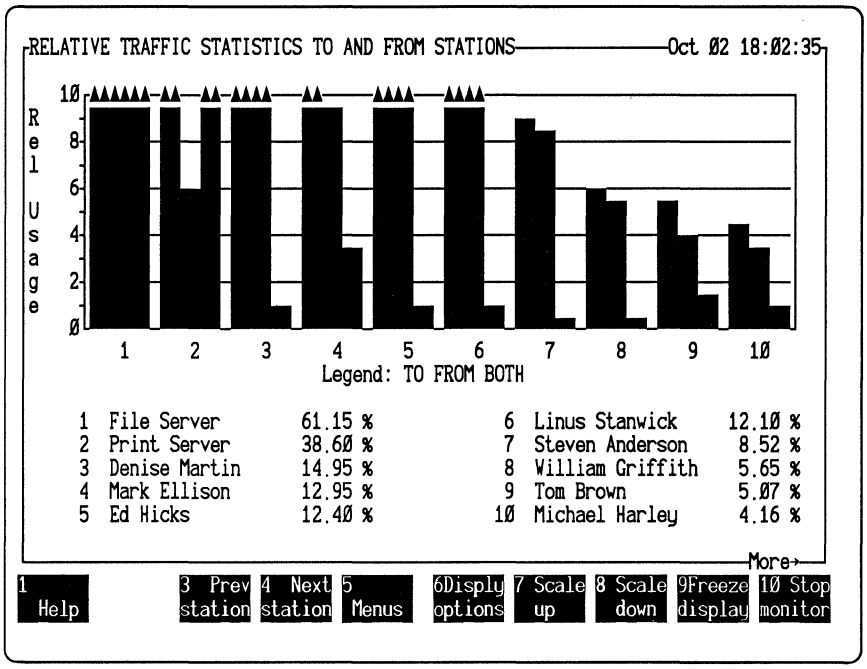


Figure 9–8. Statistics for all stations (graphic format).

Display Frame Sizes

Figure 9–9 is an example of the Frame Sizes view on a 4 Mb/s network.

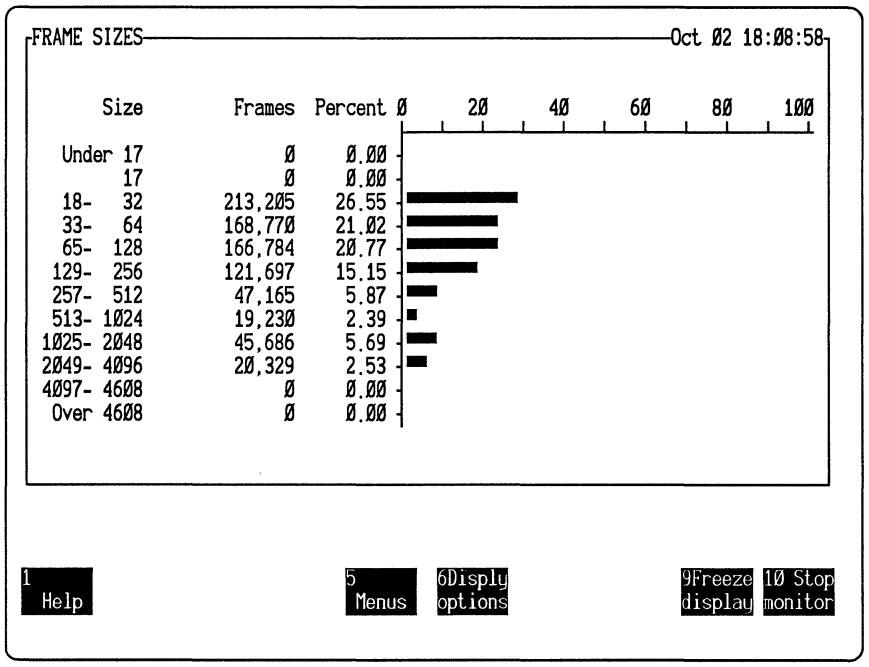


Figure 9–9. Frame Sizes view.

The Frame Sizes view shows how many frames fall into each predefined size category and what percentage of frames each size category comprises. The size categories are different on a monitor running at 16 Mb/s.

Size	Displays the size categories (in bytes) used to classify the frames. The minimum frame size is 17. The first size category is "Under 17", which counts the number of fragments that are smaller than the minimum size.
Frames	Displays the total number of frames for each size category.
Percent	Displays the percentage of frames for each size category. The graph illustrates these percentages.

Display Routing Info

Shows the number of frames routed to and from the local Token-Ring network. You can display the Routing Paths view or the Routing Lengths view.

Routing Paths View

Figure 9–10 is an example of the Routing Paths view.

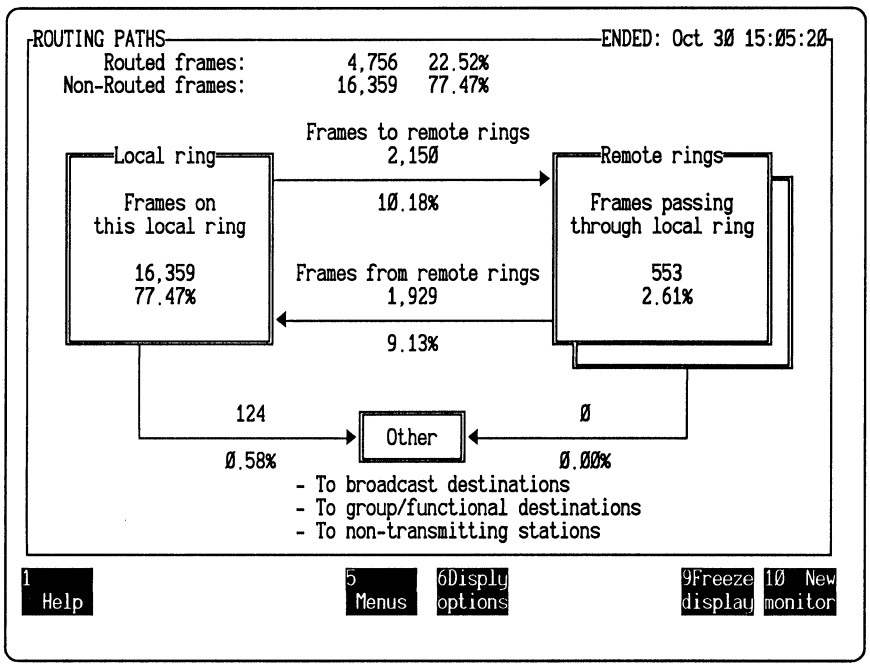


Figure 9–10. Routing Paths view.

The first two lines of the display show the numbers and percentages of routed and non-routed frames. A frame's source address indicates whether a frame is routed or non-routed. If the RII bit (bit 0 of byte 0 in the source address) is 0, the frame is non-routed. For further information on source addresses, refer to *Token-Ring Network, Architecture Reference.*

The rest of the display breaks down the statistics further. It shows the numbers and percentages of routed frames between the local network and the remote networks. The box named "Local ring" contains the number and percentage of non-routed frames. The box named "Remote rings" contains the number and percentage of frames that pass through the local Token-Ring network from remote networks.

Between the "Local ring" and "Remote rings" boxes are two types of statistics. "Frames to remote rings" shows the number and percentage of frames sent from the local network to a remote network. "Frames from remote rings" shows the number and percentage of routed frames that are destined for the local network.

The frames sent to "Other" can be any of the following types:

- Broadcast frames from the local or remote networks
- Frames that are destined for a group address
- Frames that have been sent to non-transmitting stations

Routing Lengths View

Figure 9–11 shows an example of the Routing Lengths view.

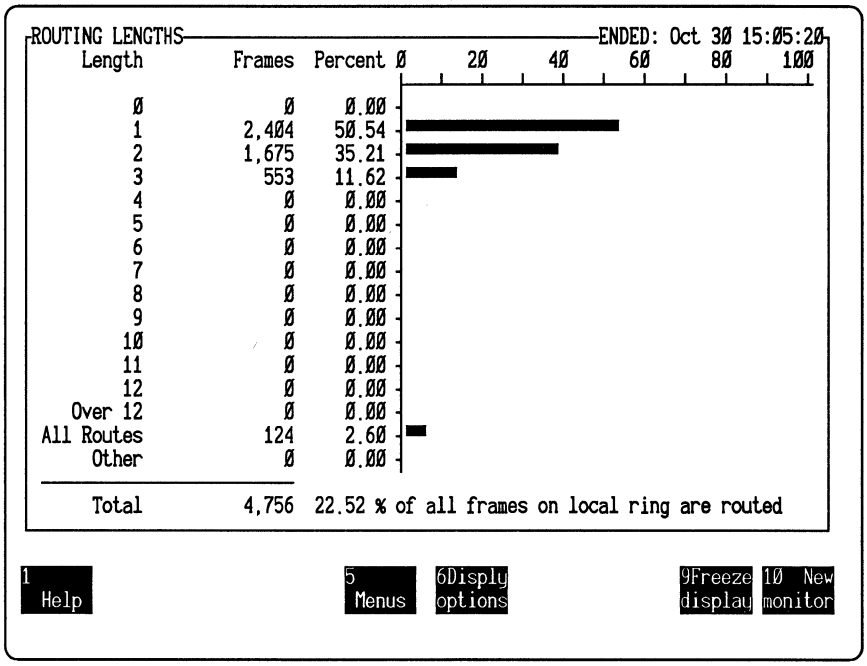


Figure 9–11. Routing Lengths view.

The display categorizes the frames according to the length of the route. The length is the number of Token-Ring bridges that a frame has traversed. In the display, the length can range from 0 to over 12.

If a frame's routing length is 0, it means that the frame includes the Routing Information field, but the Length Bits in the frame are 0. For further information

on the Routing Information field and Length Bits, refer to *Token-Ring Network, Architecture Reference.*

The category "All Routes" represents the all-routes broadcast frames. These frames are sent to all Token-Ring networks that are interconnected with the local network by bridges.

The "Other" category includes these types of frames:

- The number of bridges a frame has traversed cannot be determined, and the frame has a destination or source address that does not exist on the local network.
- The frame is non-source-routed but it is sent to or received from a non-local station.

The percentages in the display are the percentages of all routed frames. The graph illustrates these percentages.

Display Protocols

This view shows a distribution of protocol types used on the network. The number and percentage of either bytes or frames can be displayed for all:

- SAP (Service Access Point) protocol types
- Ethertypes (in SNAP SAP) embedded in the type field

The options **SAP Protocols** and **Ethertype Protocol** determine the protocol types displayed. The options **Bytes** and **Frames** determine whether the statistics are displayed in bytes or frames. The percentages indicate how the frames or bytes are distributed among the protocol types monitored. The view also illustrates these numbers in a bar graph.

For the Ethertypes view, the options **All Frames** and **SNAP Frames** determine whether the percentages are based on all frames counted or on only SNAP frames counted. When displaying the number of bytes, the percentages are based on the number of bytes in either all frames counted or only the SNAP frames counted.

The monitor reads the STARTUP.TRT file for the SAP values. If you want breakdowns for protocol types other than those shown, use the DOS command, EDLIN, to add protocols to STARTUP.TRT. The file can contain up to 64 entries (32 SAP and 32 Ethertype); the maximum number of labels for each type (SAP and Ethertype) is 16. Each label can have 4 SAP numbers.

Figure 9–12 is an example of the SAP Display Protocol view that shows the distribution of bytes by protocol type.

The terms used in the display are:

SAP/Ethertype	Protocol type to which the frame being counted belongs.
Bytes/Frames	Number of bytes or frames that fall into a particular protocol category.

%Total	Percentage of frames or bytes of a particular protocol type. The graph illustrates these percentages.

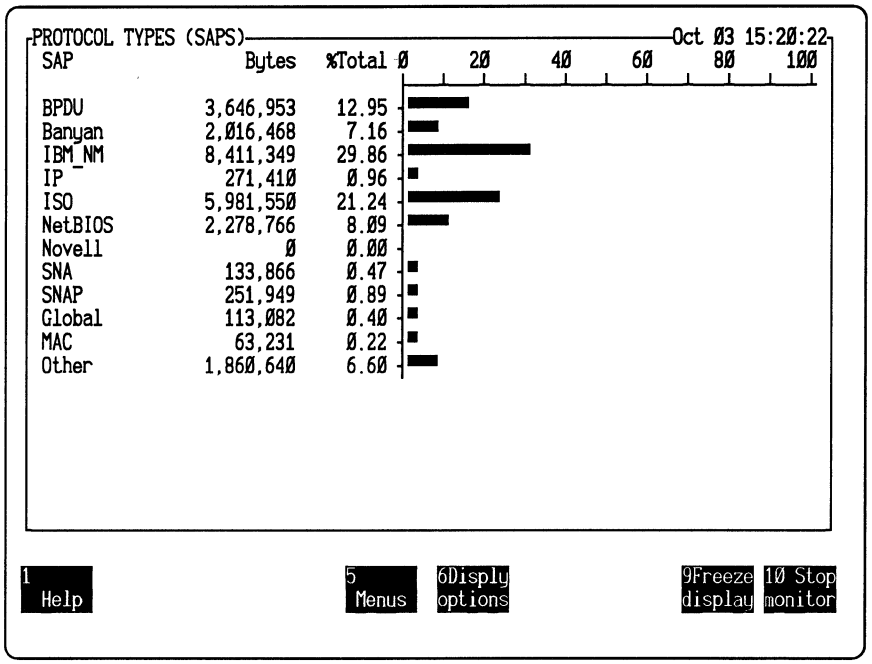


Figure 9–12. SAP Protocol Types view.

When displaying SAP protocol types, LLC frames that contain the Ethertype value in the SNAP (Sub-Network Access Protocol) header are shown as SNAP frames regardless of the Ethertype. For example, if the monitor detects an LLC frame that encapsulates the Ethertype IP in the SNAP header, it increases the byte or frame count under SNAP, not IP, in the Protocol Types (SAPs) view.

When displaying Ethertypes, LLC frames that contain the Ethertype value in the SNAP header are counted as frames in the appropriate protocol type.

You are allowed to specify multiple values for a protocol type (up to 4 SAP numbers for each label). For example, STARTUP.TRT can contain the following entries:

sap "SNA" = 04
sap "SNA" = 08

When the monitor displays the SAP protocol types, there is one entry for SNA. The count under this entry includes all the frames that have the SAP value equal to 04 or 08.

Display Alarm Log

The Alarm Log view lists up to 200 alarms generated in the current monitoring session that have not been cleared. From the Alarm Log view, you can

acknowledge an alarm by pressing F3 (Ack alarm), and clear it by pressing F4 (Clear alarm).

Figure 9–13 is an example of the Alarm Log view. The following list explains the fields in the Alarm Log view:

Priority	Priority level of the network event that triggered the alarm.
Time	Time and date the event occurred.
Source	Name of the station that triggered the alarm. "Global Network" is displayed if the alarm is a global alarm.
Type/Description	Type of event that triggered the alarm.
Ack	Whether the alarm has been acknowledged (indicated by a √ mark).

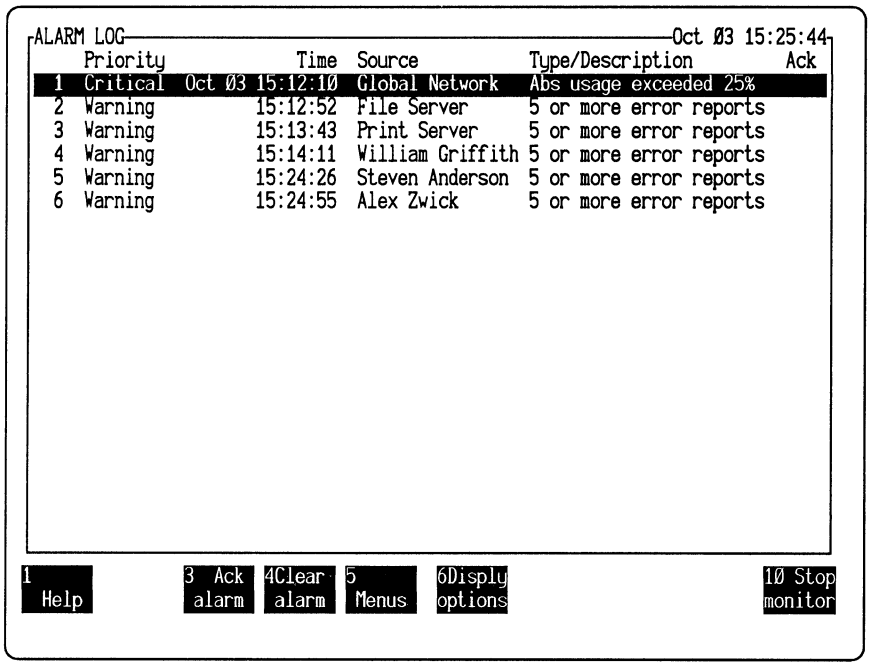


Figure 9–13. Alarm Log view.

Display Global History

Displays a history of activity for the entire network at intervals you determine.

Options

Numeric	Displays history statistics as columns of numbers.
Graphic	Displays the usage of the network in a graph.

Global History Statistics in Numeric Format

Figure 9–14 is an example of the Global History Statistics view.

The leftmost column of numbers identifies the interval number, with the most recently recorded interval at the top of the screen.

The following list explains the fields in the numeric Global History Statistics view:

Time	Date and time of each interval. The date is not displayed if it is the same as the one above it.
Frames	Number of frames recorded for each interval.
Errs	Number of soft error report frames recorded for each interval.
Bytes	Number of bytes recorded for each interval.
Size	Average size of the frames recorded for each interval.
%Usage	Absolute network usage (in percentage) for each interval.

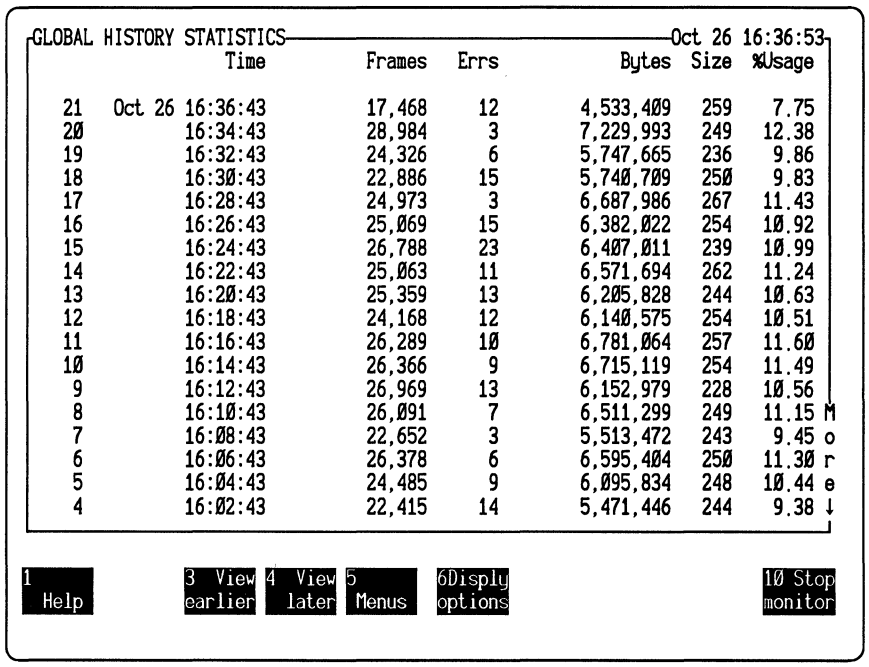


Figure 9–14. Global history statistics (numeric format).

Global History Statistics in Graphic Format

Figure 9–15 is an example of the graphic Global History Statistics view.

The graphic view contains the interval number, the time, and the network usage. The graph illustrates the percentages of network usage.

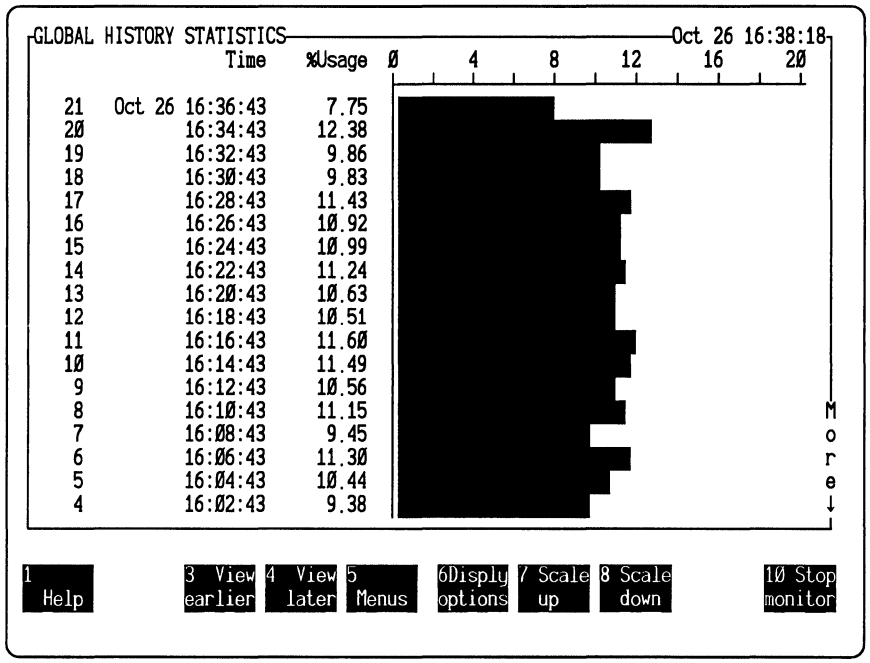


Figure 9–15. Global history statistics (graphic format).

Display Station History

Displays a history of activity for a selected station or address at intervals you determine. The title identifies the station as well as whether statistics represent transmissions, receptions, or both, and whether they show absolute or relative network usage. If you do not select a station, these statistics are collected for the default address (Broadcast).

Options

Numeric	Displays station history statistics as columns of numbers.
Graphic	Displays station history statistics in a graph.

Station History Statistics in Numeric Format

Figure 9–16 is an example of the history statistics view for a station named "File Server" in numeric format. The statistics displayed in the view pertain to the traffic transmitted or received (or both) by the station, depending on the setting of the **Class** option in the **Display** menu.

The leftmost column consists of the interval numbers, with the most recently recorded interval at the top of the column.

Time	Date and time of each interval.
Frames	Number of frames recorded for each interval.
Errs	Number of errors recorded for each interval.

Bytes	Number of bytes recorded for each interval.
Size	Average size of the frames recorded for each interval.
%Usage	Percentage of absolute or relative network usage for each interval.

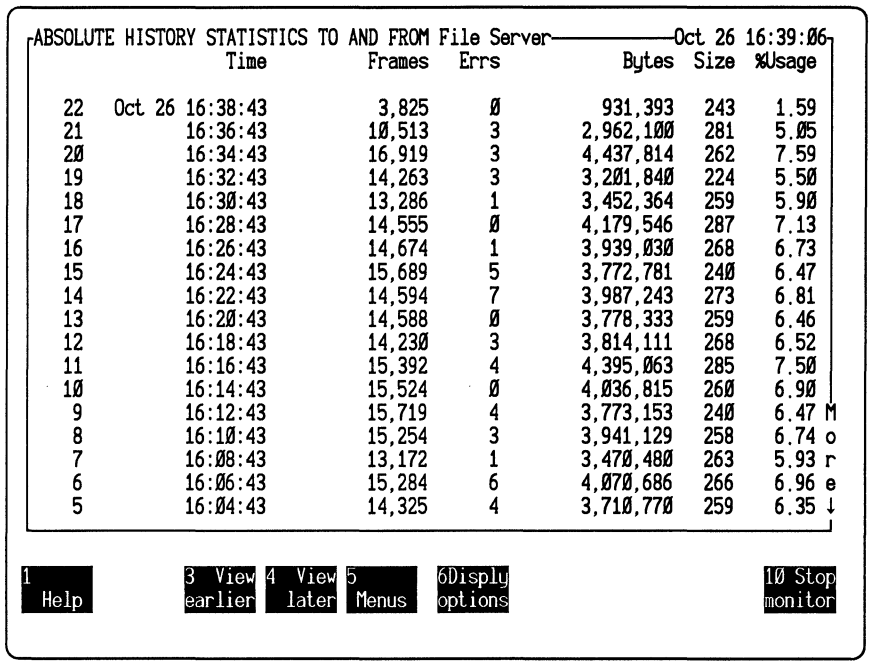


Figure 9–16. Station history statistics (numeric format).

Station History Statistics in Graphic Format

Figure 9–17 is an example of the station history view for a station named "File Server" in graphic format.

The leftmost column consists of the interval numbers, with the most recently recorded interval at the top of the column.

Time	Date and time of each interval.
%Usage	Percentage of absolute or relative network usage for each interval. The graph illustrates the percentages.

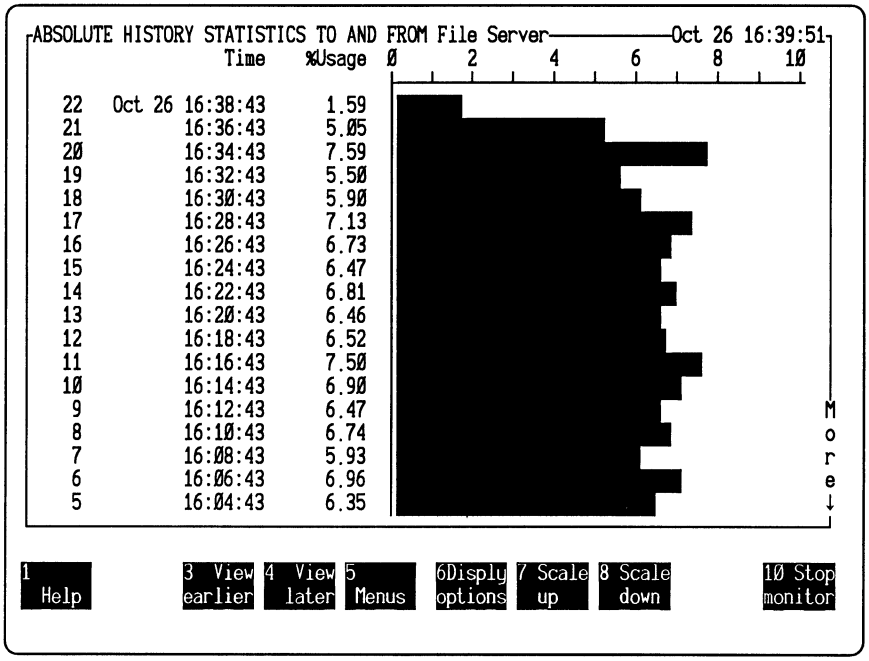


Figure 9–17. History statistics for "File Server" (graphic format).

Alarm

Clears alarms from the alarm buffer automatically, sets alarm thresholds, and determines where to send the alarm log.

Options

Edit

Displays the Manage Station Information view, in which you can edit station information. For further information on station information, refer to "Manage Stations" on page 9–36.

Global Alarms

Determines the types of network events that cause global alarms. For all options except **Unknown station**, **Oversized frame**, and **Active Poll fail**, you can set a threshold and define an interval (5 seconds to 60 minutes) to which the threshold applies. After each interval, the count resets to 0. The priority level of each Global alarm can be individually set. Options for **Global alarms** are:

Unknown station triggers an alarm when an unnamed station transmits a frame.

Oversized frame generates an alarm when a station sends a frame that exceeds 1,514 bytes. There is no threshold setting for this error.

Broadcast storm defines the number of broadcast frames (1 to 65,535) that triggers an alarm. You can set the time

interval to which this threshold applies (5 seconds to 60 minutes). By default, the number of broadcast frames is 100 and the interval is 5 seconds.

Network idle defines the length of time (5 seconds to 60 minutes) the network can be inactive before generating an alarm. By default, the length of time is 15 minutes.

Network usage defines the percentage (1 to 100%) of absolute network usage that triggers an alarm. You can set the time interval to which this threshold applies (5 seconds to 60 minutes). By default, the percentage is 50 and the interval is 5 seconds.

Soft errors defines the number (1 to 65,535) of soft error report frames that triggers an alarm. You can set the time interval to which this threshold applies (5 seconds to 60 minutes). By default, the number of errors is 20 and the interval is 30 seconds.

Ring beaconing defines the length of time (5 seconds to 60 minutes) the ring can beacon before generating an alarm. By default, the length of time is 30 seconds.

Active Poll fail generates an alarm if there is a ring poll failure. There is no threshold setting for this error.

Station defaults assigns the default threshold settings to new stations as they are detected on the network. The thresholds are described below:

Errors defines the number (1 to 65,535) of soft error frames a station can transmit before triggering an alarm. The default number is 100.

No response determines when the monitor generates a no-response alarm. The default setting of **No response** is Off. The monitor does not generate a no-response alarm each time the specified number of seconds has elapsed since a station received a frame. Instead, it makes sure that the station it generates the alarm for has been receiving but not transmitting. For example, if **No response** is 5 seconds, the monitor generates the alarm when either of the following conditions occurs:

- A station's last reception happened at least 5 seconds after the last transmission, and it has received 3 frames since the last transmission.
- A station's last reception happened at least 5 seconds after the last transmission, and 5 seconds have elapsed since the last reception.

Idle defines the length of time (1 to 120 minutes) the station can go without transmitting before triggering an alarm. The default setting is Off. That is, the monitor does

not generate an alarm regardless of how long a station has been idle.

Usage defines the percentage of relative network traffic (1 to 100%) the station can generate before triggering an alarm. The default setting is Off.

Priority defines the importance of alarms for a given station. The priority levels are **Inform, Warning, Minor, Major,** and **Critical**. The default value is Warning.

Auto clear — Sets an interval (1 minute to 99 hours) at which the monitor automatically clears each alarm to make room in the alarm buffer. To make sure alarms are not lost, use **Log to** for printing out the alarms or storing to disk. To turn **Auto clear** off, choose 0. The default value is 1 hour. The monitor can clear alarms automatically only when it runs in the foreground.

Log to — Specifies where to send the alarm log. You can select either or both of the following:

- **Printer**, which sends the alarm log to the specified printer.

  Select the appropriate device in the **Alarm\Log to\Printer** menu to print on the printer port (COM1, COM2, LPT1, LPT2, LPT3, or LPT4). Specify the number of lines (0 to 256) on each page with the **Page size** option. If you specify 0, no page break is inserted. The default page size is 58.

- **File**, which sends the alarm log to a disk file (ALARM.LOG).

  The **Clear alarm file** option in the **Alarm\Log to\File** menu determines whether the monitor appends the current alarm log to the previous log file or clears the log file each time it starts monitoring. A preceding √ mark indicates that the file is cleared at the beginning of each monitoring session.

Report

Generates reports based on report scripts. You can print the resulting reports and save them as files, in either standard or CSV (comma-separated values) format. The Report Script Editor view lets you modify report scripts to customize reports to your needs.

Options

Load — Loads an existing report script which you can use to generate a report or edit before generating a report. (The monitor looks for report scripts in the C:\TRREPORT\SCRIPTS directory.)

The monitor comes with the following report scripts:

ERRORS.SCR provides statistics for the 10 stations that transmitted the most frames with errors during the most recent monitoring session. A station must have transmitted at least five frames with errors to be included in the report.

FRAMSIZE.SCR shows the frame size distribution. The statistics provided include the number and percentage of frames that fall in each frame size category. A graph illustrates the percentages.

HISTORY.SCR shows the absolute network usage in percentages for all the history intervals.

LISTENRS.SCR provides statistics for the 10 stations that received the most traffic during the most recent monitoring session.

RINGORDR.SCR provides statistics for the relative usage of the network by all stations. The stations are sorted by ring order. For further information on ring order, refer to "Display All Stations" earlier in this chapter.

ROUTELEN.SCR provides statistics for different route lengths. The report shows the number and percentage of frames of each route length. The information in the report is the same as the Route Lengths view.

ROUTEPTH.SCR provides statistics for route path distribution. The report shows the number and percentage of frames for each type of route path. In the display, "Loc" represents local; "Rem" represents remote; and "Other" represents other routes. For further information on route paths, refer to "Display Routing Info" earlier in this chapter.

SAPS.SCR provides statistics for the SAP protocol type distribution. The report shows the number of bytes that belong to each SAP protocol type and the percentage of network usage by these bytes.

TALKERS.SCR provides statistics for the 10 stations that transmitted the most traffic during the most recent monitoring session.

USERLIST.SCR lists the physical addresses and names of all stations, sorted in descending order by name.

USERS.SCR provides transmit and receive statistics for all stations, sorted in ascending order by name.

USERSCSV.SCR provide the same information as the USERS report, but in a delimited format that allows you to import the information into spreadsheets and other applications.

(For more information on these reports, see "Sample Reports: An Overview" on page 6–3.)

Edit

Displays the Report Script Editor view, which contains the last report script loaded and the function keys with which you modify the script. Refer to "Report Script Editor View" on page 9–35 for further information on how to use the function keys.

The **Edit** option also specifies how the statistics are sorted and what statistics are to be included in an existing report script.

The following are the various options by which a report sorts the statistics:

To refers to the frames the station receives.

From refers to the frames the station sends.

Both refers to the frames the station sends and receives.

Note: The **To, From,** and **Both** options determine the type of traffic to which the sort key applies. Therefore, they do not affect how a report orders the stations if it sorts them by name or address. These options, however, determine whether a station is considered active. Refer to the description for **Active stns only** later in this section for information on including only active stations in a report.

Ascending specifies that the stations be displayed in ascending order.

Descending specifies that the stations be displayed in descending order.

Name is the station's name.

Partner's name is the name of the station's partner. A station's partner is the station that it communicated with most recently.

Ring order is the order the stations are inserted in the network. Refer to "Display All Stations" on page 9–15 for information on ring order.

Frames is the total number of frames.

Errors is the total number of soft error frames.

Bytes is the total number of bytes.

Average size is the average frame size.

Network usage is the percentage of network usage by the station.

First activity is the time when the station first sends or receives traffic.

Last activity is the time when the station last sends or receives traffic.

Elapsed activity is the amount of time between the first and last activity.

Address is the station's address.

The following describes the options that determine what types of statistics are to be included in a report:

Active stns only specifies that a station is included in a report only if it has sent or received a frame, depending on how the stations are sorted. For example, if they are sorted by the frames received (when the **To** option in the **Report\Edit\Sort by** menu is selected), a station is considered active if it has received traffic.

Inserted stns only specifies that a station is included in a report only if it is connected to the local network. That is, the station status of the station must be active monitor, standby monitor, or snooper.

Delimited format specifies that the report is in spreadsheet-compatible format. A report in this format does not include embedded commas in numbers. Also, when you print out the report, the monitor does not insert any page breaks.

Filter 1 and **Filter 2** determine whether the monitor uses filters to exclude stations from a report if they do not meet certain criteria. How the filters interact with each other depends on the **AND** and **OR** options. If **AND** is selected, the monitor includes only the stations fulfilling the requirements of both filters; if **OR** is selected, it includes the stations that meet the requirements defined by either filter.

For examples that illustrate the filters' interaction, refer to "Creating or Modifying a Report Script" on page 6–20 and "Recommendations on Report Editing" on page 6–25.

The **To**, **From**, and **Both** options associated with the filters determine whether the monitor filters out stations from a report based on the traffic received, sent, or both, respectively. These options do not take effect if the stations are filtered by sort position, name, partner's name, or address.

Other options associated with the filters are described below. Each option defines a range of values.

Sort position is the position of the station in the report. The permissible range is 1 through 1,024. For example, if you specify that the minimum is 1 and maximum is 20, the top 20 stations are included in the report.

Name is the station's name. It specifies the alphabetical range to which the station's name must belong if the station is to be included in the report. The minimum value is "" and the maximum is "~~~~~~~~~~~~~~~~". That is, the minimum or maximum value can be up to 16 characters. For example, you can define "bb" as the minimum value and "kk" as the maximum. If a station's name is bobby, it fulfills the requirement of the filter. If a station's name is kristen, it is outside the specified range and the station will not be included in the report. Numerals are considered smaller than letters. For example, you can define the minimum to be "123" and maximum to be "abc." The sorting of the name strings is not case-sensitive.

Partner's name is the name of the station with which a station communicated most recently. For a station to be included in the report, its partner's name must belong to the alphabetical range defined by **Partner's name**. The rules for specifying the range are the same as those for **Name**.

Frames is the total number of frames. The permissible range is 0 through 4,294,967,295.

Errors is the number of soft error report frames. The permissible range is 0 through 65,535.

Bytes is the number of bytes. The permissible range is 0 through 999,999,999,999.

Average size is the average frame size. The permissible range is 17 through 18,432.

First activity is the date and time when the first activity takes place. The minimum time is 0 days; the maximum time is 49 days 17:02:47.295. A station is included only if its first activity happened in the time period specified. For example, suppose the monitoring session started at 1 p.m. If you specify that the minimum value of **First activity** is 2 hours, and that the maximum value is 7 hours, a station is included in the report only if its first activity happens between 3 p.m and 8 p.m.

Last activity is the date and time when the last activity takes place. It has the same permissible range as **First activity**.

Elapsed activity is the time between the first and last activity. It has the same permissible range as **First activity**. For example, if you set minimum value to 0 and maximum value to 2 days, only the stations whose first and last activities happened within 2 days meet the requirement of the filter.

Address is the station's address. The permissible range is 000000000000 through FFFFFFFFFFFF.

Absolute usage is the percentage of absolute network usage by the station. The permissible range is 0 through 100%. For example, if you specify minimum to be 10% and maximum 100%, only the stations whose traffic accounts for at least 10% of the network capacity meet the requirement of the filter.

Relative usage is the percentage of relative network usage by the station. The permissible range is 0 through 100%. For example, if you specify minimum to be 10% and maximum 100 percent, only the stations whose traffic accounts for at least 10% of the network traffic meet the requirement of the filter.

Save — Saves a report script you created or modified. The report script must be stored in the C:\TRREPORT\SCRIPTS directory.

Clear — Erases the contents of the report editor.

Print — Prints the report based on the report script that has been loaded.

The **Screen** option displays the report on the screen.

The **Device** option is the printer port. You can choose between COM1, COM2, LPT1, LPT2, LPT3, or LPT4. If you send the report to a printer, you can specify the number of lines per page. The default is 58.

The **File** option saves the report to disk under a filename of your choice. The monitor attaches the extension .RPT or .CSV (if the report is in delimited format) to the filename.

The **Page size** option is applicable if **Delimited format** in the **Report\Edit** menu is disabled, and the report is printed to a file or device. It defines the number of lines printed before the monitor inserts a page break. The number ranges from 1 to 256. If you want no page breaks, set this option to 0. When the monitor inserts a page break, it also prints the header text in the report (for example, the report title).

Auto print — Prints out the report at each interval until midnight; restarts printing at the time specified by the **Start time** option. The monitor must be running in the foreground for **Auto print** to function. The following describes the options:

Report specifies the file to be printed.

Start time determines when the first report of each day is printed. For example, if **Start time** is set to 12:00, and the current time is 8 a.m., the monitor will print the first

report at noon. If the start time is already past (for example, it is set to 08:00 and the current time is 2 p.m.), the first report is printed at the next interval boundary, which is determined by the **Interval** option. For example, if **Interval** is 15 minutes, the first report is printed at 2:15 p.m. To disable this function, specify 00:00. By default, **Start time** is disabled, which means that the first report is generated immediately.

Interval determines how often the monitor prints a report. Specify a time between 1 minute and 24 hours. The default value is 1 hour.

Print to device specifies the printer port the monitor uses to print out the file (either COM1, COM2, LPT1, LPT2, LPT3, or LPT4). You can specify the number of lines per page. The default is 58; selecting 0 disables page breaks. When the monitor produces a page break, it also prints the header text (for example, the title of the report).

Print to disk specifies that the monitor print the report to a file in the C:\TRREPORT directory. If **Single file** is selected, all reports are appended to one file. The filename is AR*YYMMDD*.RPT (*YYMMDD* represents the year, month, and day). If **Multiple files** is selected, each report is printed to a separate file. The filename for each report is *YYMMDDNN*.RPT (*NN* represents the number of the report). You can print reports to up to 99 files.

Restart monitor determines whether the monitor starts a new monitoring session once it printed out a report.

By default, **Print to device, Print to disk, Multiple files,** and **Restart monitor** are not selected.

Report Script Editor View

The Report Script Editor view (invoked by **Edit** in the **Report** menu) lets you modify the last report script that was loaded. Its functions are accessible through special function keys. These keys are described below:

F2 (Insert field)	Displays a list of fields you can include in the report. When you select a field, the monitor inserts a code into the script. Whenever you preview, print, or save a report based on this script, the monitor inserts the current statistics that the code represents. Appendix B provides information on the report fields.
F3 (Insert line)	Inserts a blank line into the report script.
F4 (Delete line)	Deletes the line that contains the cursor from the report script.
F6 (Edit options)	Provides the **Load, Save, Clear, Print,** and **Auto print** options. These options are also available when you select **Report** from the Main Menu.

	In addition, the **Report settings** option specifies how the statistics are sorted, whether only active stations are included, whether only inserted stations are included, and how the filters are used. **Report settings** presents the same menu as the **Report\Edit** menu.
F7 (Chars)	Lists the special characters you can insert in a report script.
F8 (Repeat char)	Repeats special characters for continuous lines or borders.
F9 (Screen test)	Provides a preview of the current report on screen.

Manage Stations

Displays and edits station information such as station names and threshold settings.

Options

Edit	Displays the Manage Station Information view. This view is also generated by **Edit** in the **Alarm** menu. Refer to the "Manage Station Information View" section for further information on the view.
Reset thresholds	Resets all station alarm thresholds to the default settings specified by the current station default thresholds.
Probe for names	Tries to assign names automatically using the NetBIOS remote status command. This option operates only when you have installed a second network interface card with the NetBIOS software. A station responds only if it is active and running the NetBIOS software.

Manage Station Information View

Figure 9–18 is an example of the Manage Station Information view.

To edit a station's information, use the cursor to highlight the corresponding entry. You can also type the first letter of the station's name to move to the entry. Press Enter, and a dialog box appears, which allows you to change the following types of information:

Name	The station name assigned to an address. The name can contain up to 16 printable ASCII characters.
Errors	The number of soft error frames (1 to 65535) a station can transmit before triggering an alarm.
No response	How long a station can be sent frames (broadcast frames excluded) without responding before triggering an alarm. Any value from 1 to 7 seconds is allowed.
Idle	The length of time (1 to 120 minutes) the station can go without transmitting before triggering an alarm.

%Usage	The percentage of network traffic (1 to 100%) the station can generate before triggering an alarm.
Priority	The importance of a station's alarms. The levels are Inform, Warning, Minor, Major, or Critical.

Alternatively, you can use the function keys to edit the station information as described below:

F2 (Delete station)	Removes the station from the monitor data files.
F4 (Apply default)	Changes the threshold settings to the defaults. Specify the defaults with **Alarm** in the Main Menu. Refer to "Alarms" earlier in this chapter for further information on setting station default threshold settings.
F7 (Thres options)	Displays the threshold options, which are the same options displayed by the **Thresholds** options in the **Alarm** menu.

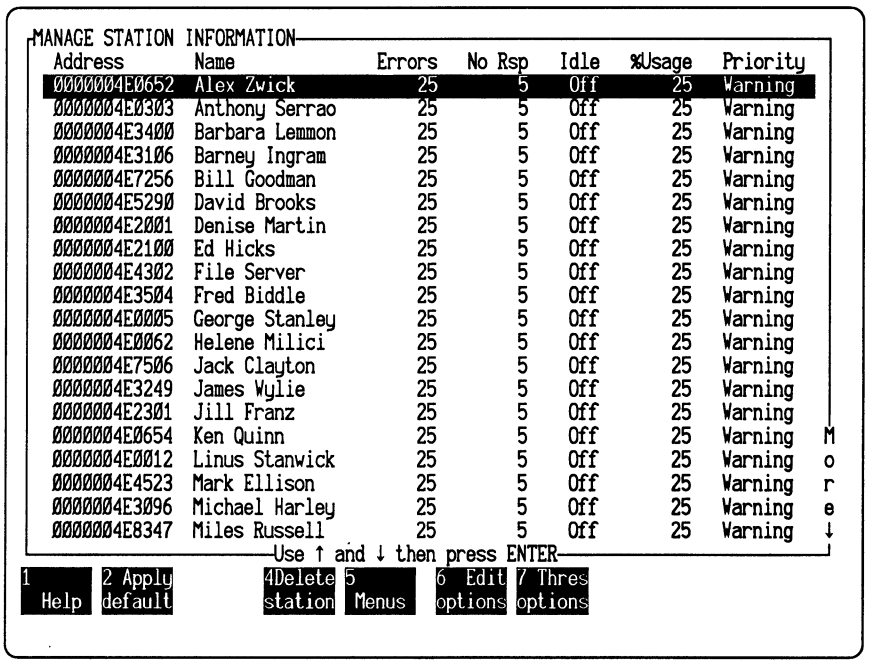


Figure 9–18. Manage Station Information view.

Options

Allows you to set the network monitoring speed and audible alarms.

Audible alarms — You can set the audible alarms on or off. When set on, a different audible alarm (beep) is generated for each level of alarm you select (Inform, Warning, Minor, Major, and Critical). When set off, no audible alarm is generated.

4Mbps / 16Mbps — You can modify the network interface card's monitoring speed, which is either 4 Mb/s or 16 Mb/s. To change the transmit speed, you must change the setting on the network interface card. For further information on setting the transmit speed, refer to the *Sniffer Network Analyzer: Installation Guide.*

Exit

Terminates the monitor's user interface and displays the Main Selection Menu.

Although you can continue to monitor in the background after you terminate the monitor's user interface, you cannot log alarms, clear the alarm log, or print reports automatically.

Upon exit, the monitor writes the STARTUP.TRB file.

APPENDIX A: ERROR AND WARNING MESSAGES A

Appendix A. Error and Warning Messages

This appendix lists the monitor's error and warning messages alphabetically. It explains each message and describes the action you should take when the message appears.

Monitor Error Messages

Error Message	Description
An error was encountered while loading the report script.	Appears when you try to load an invalid report script file. Check your script and reload.
Automatic report generation aborted.	Appears when the user hits the Escape key while a report is being auto-printed.
Automatic report generation failed.	Appears when the monitor tries to print a report automatically but the report script is corrupted. Check the report script file, edit it if necessary, and load it before you regenerate the report.
Automatic report generation failed. Couldn't open report file.	Appears when the monitor tries to print a report automatically but there are problems with the destination disk (for example, the directory structure is damaged). Make sure that your disk is operating properly and that the report scripts are stored under the C:\TRREPORT\SCRIPTS directory.
Automatic report generation failed. Couldn't sort stations.	Appears when the report to be printed is sorted by ring order but the monitor cannot determine the ring order. This happens when the actual number of stations on the network exceeds 1,024.
Automatic report generation failed. Disk full.	Appears when the monitor tries to print a report automatically to the disk but the disk is full. Remove unnecessary files from the disk to make room for the reports.
Automatic report generation failed. Report script not found.	Appears when the monitor tries to print a report automatically but cannot find the report script that the report should be based on. Check to be sure that the script is stored in the C:\TRREPORT\SCRIPTS directory.
Automatic report generation failed to restart monitoring.	Appears if the monitor fails to restart monitoring after generating a report automatically. Check to see whether the hardware configuration is correct. If the monitor still cannot start monitoring, contact NGC for help.

Error Message	Description
Automatic report generation failed to restore report script.	Appears if the monitor cannot restore the report script after generating a report automatically. The changes that you have made to the script with the script editor are lost. Contact NGC for help if this happens.
Can't concatenate fields.	Appears in the Report Script Editor view if you try to place two fields on the same line without any text characters between them. Place at least one text character between any two fields.
Couldn't generate a NetWare echo test.	Appears when the monitor cannot communicate with the NetWare stack installed on the network interface card. Contact NGC for help if this happens.
Couldn't open file.	Usually indicates that you typed the file name incorrectly. Try typing the name again. If you cannot open any files, check the FILES= setting in the DOS file, CONFIG.SYS. Increase the number, and reboot.
Couldn't save station information.	Appears if the disk is full. Make room by deleting other files that may not be essential, such as old history logs.
Fatal Error: Unable to load the monitor configurator! If the problem persists, contact Technical Support.	Appears when the Sniffer Network Analyzer fails to load the monitor configurator. Reboot and try again. If the message appears again, contact Technical Support.
Fatal Error: Unable to load the monitor demo! Reboot the system and configure the monitor again. If the problem persists, contact Technical Support.	Appears when the Sniffer Network Analyzer fails to load the monitor demo. Reboot and try again. If the message appears again, contact Technical Support.
Fatal Error: Unable to determine the monitor state! Reboot the system and configure the monitor again. If the problem persists, contact Technical Support.	Appears when the Sniffer Network Analyzer fails to determine the state of the monitor. Reboot and contact Technical Support if the same message appears the next time you try to start the monitor.
Fatal Error: Unable to load the monitor. Reboot the system and configure the monitor again. If the problem persists, contact Technical Support.	Appears when you attempt to start the monitor but the necessary files are not loaded into memory. Reboot and try again. If the message appears again, contact Technical Support.
Fatal Error: Unable to load the monitor driver. Reboot the system and configure the monitor again. If the problem persists, contact Technical Support.	Appears when you attempt to start the monitor but the necessary files are not loaded into memory. Reboot and try again. If the message appears again, contact Technical Support.

Error Message	Description
Fatal Error: Unable to unload the monitor from memory. Reboot the system and configure the monitor again. If the problem persists, contact Technical Support.	Appears when the Sniffer Network Analyzer fails to remove the monitor driver from memory. Reboot and contact Technical Support if the same message appears again.
Field too long.	Appears in the Report Script Editor view when the end of the field you want to include reaches past the end of a line (column 80). Try positioning the cursor farther to the left before placing the field.
Help file not found.	The monitor could not find the TRMON.HLP file in the C:\TRSNIFF directory. Restore this file from your back-up disk.
Network card not responding.	Indicates a problem with programming the network interface card. Contact NGC for help.
No alarms to process.	Appears if you try to acknowledge or clear an alarm in the Alarm Log view when there are no alarms in the alarm buffer.
No Receive Signal detected. Make sure that you entered the ring at the correct speed.	Appears when the monitor detects a cable or ring speed problem while a new monitoring session is being started.
No report script disk files found.	Appears if you try to load report scripts and the monitor cannot find any report script files. Restore the report scripts from your back-up disk.
No statistics have been collected.	Appears when you try to display statistics but you have not started a monitoring session. Start a monitoring session by pressing **F10** (New monitor).
Not a valid DOS file name.	Appears when you try to enter a filename that contains invalid DOS characters. Try typing the name again, following the DOS filename requirements.
Not enough memory to run test.	Appears when you try to run the NetBIOS station test function and there is no memory available to allocate the NetBIOS statistics structure. Try decreasing the number of history intervals or maximum stations.
Sorting by errors with the Class option set to "To" is invalid. Press F6 to select a different sort option, or press F5 for the Main Menu.	Appears if you try to sort the stations in the All stations view by the number of errors transmitted while the setting of the **Class** option is To. "Errors" is an invalid sort key because soft error frames are received by the error monitor only.
The broadcast address cannot be deleted.	Appears if you try to delete the broadcast address. Reselect the station you want to delete.

Error Message	Description
The current report script contains no information. Use the Report Editor to create a report, or load a report from a disk file.	Appears if you try to print or save a report without first loading or editing a report script. Load the desired report script or create a report script, then try again.
The minimum filter value must be less than or equal to the maximum filter value.	Appears if you try to enter a minimum value for a report filter that exceeds the maximum value. Enter a minimum filter value that is less than or equal to the maximum filter value.
The STARTUP.TRI file has too many entries. The entries at the end of the file were not loaded.	Appears if STARTUP.TRI contains more than 225 entries.
The STARTUP.TRT file has been changed. You must unload TRMONDRV.EXE for the changes to take effect.	Appears if you have used a text editor to modify STARTUP.TRT when TRMONDRV is loaded. In order for the monitor to use consistent SAP information, you must remove TRMONDRV from memory before changing STARTUP.TRT. Then restart the monitor.
The STARTUP.TRT file has too many entries. The entries at the end of the file were not loaded.	Appears when STARTUP.TRT contains more than 32 SAP entries or 32 Ethertype entries.
The STARTUP.TRT file has too many group entries. The entries at the end of the file were not loaded.	Appears when STARTUP.TRT contains more than 16 SAP labels or 16 Ethertype labels.
The value you have entered is not valid for this item.	Appears when you enter an invalid value. Most messages tell you the range of valid values; if not, try entering a lower or higher value.
This is not a Network General network card. What you are doing is illegal!	Appears if you use the monitor software with a network interface card other than that supplied by NGC.
This software has been tampered with. What you have done is illegal!	Your software has been illegally modified and executable files were corrupted. Call NGC for help.
Unable to print alarm log, check printer.	Appears when you try to print the alarm log and the printer does not respond. Make sure the printer is connected to a printer port and that it is turned on and functioning properly.
Write to alarm log failed. Disk full.	Appears if the disk is full when the monitor tries to add alarms to the alarm log on the disk. Make room by deleting other files that are not essential, such as files containing history statistics that you no longer need.
Write to file failed. Disk full.	Appears if the disk is full when you try to store a report to the disk. Make room by deleting other files that may not be essential, such as files containing history statistics that you no longer need.

Error Message	Description
Write to history log failed. Disk full.	Appears if the disk is full when the monitor tries to store the history log to the disk. Remove unnecessary files from the disk to make room for the history log.
You did not enter a file name.	Appears if you try to store a report to the disk but have not specified the filename.
You must load a NetWare shell before you can use this feature.	Appears if the monitor tries to perform a station test but no network interface cards are loaded with NetWare. Check to make sure that more than one network card is installed, and that one of the network cards is using NetWare.
You must load a NetBIOS handler before you can use this feature.	Appears if you try to use **Station test** with the **NetBIOS** or **Probe for Names** option and the monitor cannot find the NetBIOS software. If you are sure that you are running NetBIOS, press Enter to ignore the message. If you cannot proceed, contact NGC for help.
You must specify a unique station.	Appears if you try to send a test frame with either a broadcast or multicast address as the destination address. Select an individual station as the destination address of a test frame.
You must stop monitoring before you can use this feature.	Appears if you try to start a transmit timer or station test when a monitoring session is in progress. Press F10 to stop the monitoring session before starting these monitor functions.
You should not include a file extension.	Appears if you include a file extension when you specify a name of a file to which a report is stored.

Monitor Warning Messages

The following is an alphabetical listing of warning messages that appear during normal operation. They provide a brief explanation of the consequences of proceeding and give you a chance to change your mind.

Warning Message	Description
Any changes made to station alarm configurations will be lost if you proceed.	Appears after you change threshold settings and then try to reset all thresholds to the default settings.
File exists.	Appears when you try to assign a report script filename that already exists. Unless you assign a different filename, the new report script overwrites the existing script.

Warning Message	Description
No Receive Signal detected. Make sure that you entered the ring at the correct speed.	Appears if the monitor enters the Token-Ring network at the wrong speed or if it is the only station on the ring. If the wrong speed has been set, stop the monitor, reset the speed on the network card, and restart the monitor.
The current history statistics will be cleared if this setting is updated.	Appears when you try to change either the station for which history statistics are collected or the history interval during a monitoring session. To prevent losing the statistics, print a report before changing these settings.
The last line of the report script will be lost if this line is inserted. Press ENTER to proceed. Press ESC to cancel.	Appears if you try to create or modify a report script to contain more than 58 lines.
The number of stations being monitored has reached the maximum value set in the configuration program. You should increase this setting to make sure that all stations are being monitored.	Appears when the actual number of stations on the network exceeds the value of **Maximum Stations** in the Configuration Options view. The message appears when you use the **Display** command on the Main Menu.
The number of stations being monitored has reached the Sniffer Network Monitor's maximum value.	Appears when more than 1,024 stations are on the network; 1,024 is the maximum number of stations that the monitor can monitor.
The Sniffer Network Monitor will stop monitoring if you proceed. Press ENTER to proceed. Press ESC to cancel.	Appears after you pressed F10 during a monitoring session. To stop monitoring, press Enter. If you want the monitoring session to continue, press Esc.
These changes will not be saved unless you enter a name for the station.	Appears if you try to save alarm thresholds for a station that is not named. Since the monitor considers unnamed stations as intruders, you must name all legal stations.
This selection will not take effect until the next time the collection of history statistics starts.	Appears if you change the **Align history** option under **History**. The new setting takes effect at the next monitoring session.
The Sniffer Network Monitor has been monitoring for more than 5 weeks. You must start a new monitoring session or the statistics will overflow.	Indicates that the statistics accumulated may not be accurate due to overflow. You should start a new monitoring session.
You have not saved the latest Report Editor session. Any changes will be lost if you proceed.	Appears if you try to exit the monitor's Main Menu without saving the latest report script you edited.
You must stop monitoring before you can change this filter.	Appears if you try to change the option settings for **Monitor filter** when a monitoring session is in progress. Press F10 to stop monitoring before you change the options.

APPENDIX B: REPORT FIELDS B

Appendix B. Report Fields

Overview

This appendix explains the meaning of each field that you can insert or edit in a report script. It also gives the code that represents each field. On the screen, the actual code is preceded and followed by the "at" sign (@).

To display the list of report fields as shown in Figure B–1, press F2 (Insert field) in a Report Script Editor view. This appendix describes the fields in the same order as they appear in Figure B–1. To find out what a particular code in your report script stands for, refer to the list of codes at the end of this appendix.

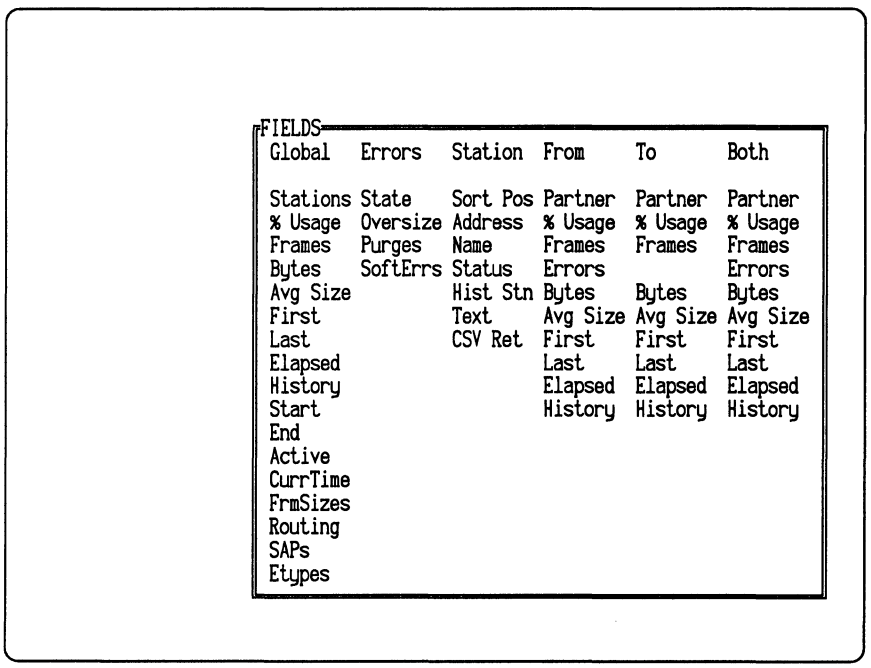


Figure B–1. Report fields.

Global Fields

The fields under the heading "Global" represent information about the entire network. The following list explains the meanings of the Global fields:

Stations Number of stations. It has three options:

Total Stations is the number of all the stations that have transmitted in the current monitoring session. The code is GS.

Maximum Inserted Stns is the maximum number of stations at one time in the current monitoring session, whose station status is active monitor, standby monitor, or snooper. The code is GMI.

	Current Inserted Stns is the number of stations whose station status is active monitor, standby monitor, or snooper at the time the report is generated. The code is GCI.
% Usage	Absolute network usage. It has two options: **Numeric** displays the percentages in numbers (without the percent sign). The code is GUAB. **Graphic** displays the percentages in a graph. You can select the scale used on the axis, which can be 0.4, 2, 10, 20, 50, or 100%. The code is GUSAGE ABS, which is followed by the scale.
Frames	Total number of frames. The code is GFRAME.
Bytes	Total number of bytes. The code is GBYTE.
Avg Size	Average size of the frames in the current monitoring session (total number of bytes divided by the total number of frames). The code is GAV.
First	Time when the first network activity took place. The code is GFIRST.
Last	Time when the last network activity took place. The code is GLAST.
Elapsed	Time elapsed between the first and last network activity. It shows the number of days, hours, minutes, and seconds. The code is GELAPSED.
History	Global history statistics. It has two options: **Numeric** shows the history statistics in the same format as the numeric Global History view. The code is GHISTORY NUMERIC ABS. **Graphic** shows the history statistics in the same format as the graphic Global History view. You can choose the scale used on the axis, which can be 0.4, 2, 10, 20, 50, or 100%. The code is GHISTORY GRAPHIC ABS.
Start	Time the monitoring session started. The code is GMON START.
End	Time the monitoring session stopped. If a monitoring session is in progress when the report is generated, the current time is printed. The code is GMON END.
Active	Duration of the monitoring session. The code is GMON ACTIVE.
CurrTime	Current time. The code is GCURRENT TIME.
FrmSizes	Distribution of the frame sizes. It displays the number of frames that fall in each size category. The format is the same as the Frame Sizes view. The code is GFRAME SIZES.
Routing	Routing information. It has two options:

Paths shows the distribution of frames according to path categories. The categories are listed below:

Loc-to-Loc represents the frames that are originated from and destined for the local network.

Loc-Rem represents the frames that are sent from the local network to a remote network.

Rem-Loc represents the frames that are sent from a remote network to the local network.

Rem-Rem represents the frames whose origin and destination are both on remote networks.

Loc-Other represents the frames that are sent from the local network to a remote network that does not support source routing.

Other-Loc represents the frames that are sent from a remote network that does not support source routing to the local network.

The code is GROUTE.PATHS.

Lengths shows the distribution of frames according to path length categories in the same format as the Routing Lengths view. The code is GROUTE.LENGTH.

SAPs Distribution of traffic according to SAP types. The format is the same as the Protocol Types (SAPs) view. It has two options:

Bytes shows the number of bytes for each SAP type. The code is GSAPS.BYTES.

Frames shows the number of frames for each SAP type. The code is GSAPS.FRAMES.

Etypes Distribution of traffic according to Ethertypes. The format is the same as the Protocol Types (ETHERTYPES) view. It has two sets of options:

Bytes or **Frames** shows the number of bytes or frames for each Ethertype.

All Frames or **SNAP ONLY** bases the percentages shown on either the total number of frames counted or on only the SNAP frames counted.

The codes differ for each combination:

For **Bytes** and **All Frames** —
GETHERTYPES.BYTES.ALL.FRAMES

For **Bytes** and **SNAP ONLY** —
GETHERTYPES.BYTES.SNAP.ONLY

For **Frames** and **All Frames** —
GETHERTYPES.FRAMES.ALL.FRAMES

For **Frames** and **SNAP ONLY** —
GETHERTYPES.FRAMES.SNAP.ONLY

Error Fields

The fields under the heading "Errors" represent different types of errors on the network, which are the same as the ones displayed in the lower-left portion of the numeric Global Statistics view. The following list explains the meanings of the Error fields:

State Overall condition of the network. The code is ESTATE.

Oversize Number of oversize frames. The code is EOV.

Purges Number of ring purges. The code is EPU.

SoftErrs Number of soft errors. The code is ESO.

Station Fields

The fields under the heading "Station" represent station information. The following list explains the meanings of the Station fields:

Sort Pos Sort position of the station. The code is SS.

Address Station address. The code is SADDRESS.

Name Station name. The code is SNAME.

Status Station status. The code is SSTATUS.

Hist Stn Name of station for which the monitor collects history statistics. The code is SHISTORY STN.

Text Text characters. If you want to have characters separating two entries in the report, position the cursor below the line that represents an entry in the script, type the character and insert **Text**. The character is printed below each entry in the generated report, and is replicated four times. For example, if you want to print ##### between each pair of entries in the generated report, type # and select **Text**. The character and the code appear in the report script as #@ST@. If no character precedes the field, the report assumes that character to be a blank, and a blank line appears in the generated report where you insert **Text**.

CSV Ret Carriage return in a report script with CSV format. Use this field if the report contains lines that exceed the maximum width of the script (80 characters). The report suppresses a linefeed where you insert this field. For example, your report contains four fields, each of which has 30 characters. If you insert **CSV Ret** after the second field, the third and fourth fields are printed on the same line as the first two in the generated report. Although the total length of the fields exceeds the width of the report script, they are interpreted as one entry when the report is imported into a spreadsheet program. The code is SC.

From, To, and Both Fields

The headings "From," "To," and "Both" represent the class of traffic. The fields under the headings "From" and "To" are related to traffic transmitted and received by each station in the report. The fields under the heading "Both" are related to the traffic both transmitted and received by the stations. The following list explains the meanings of the fields under these headings. The term "this station" refers to the station that is displayed as a report entry.

Partner

When used as a From field, **Partner** is the most recent station that received traffic from this station. The code is FPARTNER.

When used as a To field, **Partner** is the most recent station that transmitted traffic to this station. The code is TPARTNER.

When used as a Both field, **Partner** is the name of the station that this station most recently transmitted traffic to or received traffic from. The code is BPARTNER.

% Usage

When used as a From field, **% Usage** is the network usage caused by the amount of traffic transmitted from this station.

When used as a To field, **% Usage** is the network usage caused by the amount of traffic sent to this station.

When used as a Both field, **% Usage** is the network usage caused by traffic that is sent from and to this station.

Regardless of the class of traffic, the **% Usage** field has these options:

Absolute represents the absolute network usage; **Relative** represents the relative network usage.

Numeric displays the network usage in numbers (without the percent sign). **Graphic** displays the network usage in a graph. You can choose the scale for the axis, which can be 0.4, 2, 10, 20, 50, or 100%.

The following table lists the codes used for this field.

	Absolute	Relative
From	FUAB	FURE
To	TUAB	TURE
Both	BUAB	BURE

Figure B–2. Codes for the % Usage fields in the numeric format.

	Absolute	Relative
From	FUSAGE ABS	FUSAGE REL
To	TUSAGE ABS	TUSAGE REL
Both	BUSAGE ABS	BUSAGE REL

Figure B–3. Codes for the % Usage fields in the graphic format.

Frames	When used as a From field, **Frames** is the number of frames sent from this station. The code is FFRAME. When used as a To field, **Frames** is the number of frames sent to this station. The code is TFRAME. When used as a Both field, **Frames** is the number of frames sent from and to this station. The code is BFRAME.
Errors	Whether **Errors** is used as a From or Both field, it is the number of soft error report frames sent from this station. This field does not exist as a To field. The codes are FER and BER for the From field and Both field, respectively.
Bytes	When used as a From field, **Bytes** is the number of bytes sent from this station. The code is FBYTE. When used as a To field, **Bytes** is the number of bytes sent to this station. The code is TBYTE. When used as a Both field, **Bytes** is the number of bytes sent to and from this station. The code is BBYTE.
Avg Size	When used as a From field, **Avg Size** is the average size of the frames sent from this station. The code is FAV. When used as a To field, **Avg Size** is the average size of the frames sent to this station. The code is TAV. When used as a Both field, **Avg Size** is the average size of the frames sent to and from this station. The code is BAV.
First	When used as a From field, **First** is the time when this station first sent out traffic during the current monitoring session. The code is FFIRST. When used as a To field, **First** is the time when this station first received traffic during the current monitoring session. The code is TFIRST. When used as a Both field, **First** is the time when this station first received or sent traffic during the current monitoring session. The code is BFIRST.
Last	When used as a From field, **Last** is the time when this station made the most recent transmission. The code is FLAST. When used as a To field, **Last** is the time when the monitor detected the last frame containing this station's address as the destination address. The code is TLAST. When used as a Both field, **Last** is the time when this station made the most recent transmission or when the monitor detected the last frame containing this station's address as the destination address. The code is BLAST.
Elapsed	When used as a From field, **Elapsed** is the length of time between the station's first and last transmission in the current monitoring session. The code is FELAPSED.

When used as a To field, **Elapsed** is the length of time between the monitor's first and last detection of the station's address as a destination address. The code is TELAPSED.

When used as a Both field, **Elapsed** is the length of the time period between the station's first and last network activity, which can be a transmission or reception. The code is BELAPSED.

History Displays the station's history statistics in the same format as the statistics view generated by **Station history** on the monitor's Main Menu.

When used as a From field, the display includes the number of frames sent from this station. The code is FHISTORY.

When used as a To field, the display includes the number of frames sent to this station. The code is THISTORY.

When used as a Both field, the display includes the number of frames both sent to and from this station. The code is BHISTORY.

This field has several options:

Absolute means that all network usage percentages in the report are absolute; **Relative** means that all network usage percentages in the report are relative. The codes are ABS and REL for **Absolute** and **Relative**, respectively.

Numeric displays the station history statistics in numbers. The code is NUMERIC. **Graphic** displays the statistics in a graph. You can choose the scale for the axis, which can be 0.4, 2, 10, 20, 50, or 100%. The code is GRAPHIC.

In the report, the codes for the options are concatenated to form a single code. For example, if you select **History** as a To field, and **Numeric** and **Absolute** as the options, the code for the field is THISTORY NUMERIC ABS.

List of Codes

This section lists all the codes alphabetically that can appear in a report script. They are arranged according to the fields under which they appear.

Both

Code	Report Field
BAV	Avg Size
BBYTE	Bytes
BELAPSED	Elapsed
BER	Errors
BFIRST	First

BFRAME	Frames
BHISTORY GRAPHIC ABS	History (Absolute, Graphic)
BHISTORY GRPHIC REL	History (Relative, Graphic)
BHISTORY NUMERIC ABS	History (Absolute, Numeric)
BHISTORY NUMERIC REL	History (Relative, Numeric)
BLAST	Last
BPARTNER	Partner
BUAB	% Usage (Absolute, Numeric)
BURE	% Usage (Relative, Numeric)
BUSAGE ABS	% Usage (Absolute, Graphic)
BUSAGE REL	% Usage (Relative, Graphic)

Errors

Code	Report Field
EOV	Oversize
EPU	Purges
ESO	SoftErrs
ESTATE	State

From

Code	Report Field
FAV	Avg Size
FBYTE	Bytes
FELAPSED	Elapsed
FER	Errors
FFIRST	First
FFRAME	Frames
FHISTORY GRAPHIC ABS	History (Absolute, Graphic)
FHISTORY GRPHIC REL	History (Relative, Graphic)
FHISTORY NUMERIC ABS	History (Absolute, Numeric)
FHISTORY NUMERIC REL	History (Relative, Numeric)
FLAST	Last
FPARTNER	Partner
FUAB	% Usage (Absolute, Numeric)

FURE	% Usage (Relative, Numeric)
FUSAGE ABS	% Usage (Absolute, Graphic)
FUSAGE REL	% Usage (Relative, Graphic)

Global

Code	Report Field
GAV	Avg Size
GBYTE	Bytes
GCI	Stations (Current Inserted Stns)
GCURRENT TIME	CurrTime
GELAPSED	Elapsed
GETHERTYPES.BYTES. ALL.FRAMES	Ethertypes (Bytes and All Frames)
GETHERTYPES.BYTES. SNAP.ONLY	Ethertypes (Bytes and SNAP only)
GETHERTYPES.FRAMES. ALL.FRAMES	Ethertypes (Frames and All Frames)
GETHERTYPES.FRAMES. SNAP.ONLY	Ethertypes (Frames and SNAP only)
GFIRST	First
GFRAME	Frames
GFRAME SIZES	FrmSizes
GHISTORY GRAPHIC ABS	History (Graphic)
GHISTORY NUMERIC ABS	History (Numeric)
GLAST	Last
GMI	Stations (Maximum Inserted Stns)
GMON ACTIVE	Active
GMON END	End
GMON START	Start
GROUTE.LENGTHS	Routing (Lengths)
GROUTE.PATHS	Routing (Paths)
GS	Stations (Total Stations)
GSAPS.BYTES	SAPs (Bytes)
GSAPS.FRAME	SAPs (Frames)
GUAB	% Usage (Numeric)

GUSAGE ABS	% Usage (Graphic)

Station

Code	Report Field
SADDRESS	Address
SC	CSV RET
SHISTORY STN	Hist Stn
SNAME	Name
SS	Sort Pos
SSTATUS	Status
ST	Text

To

Code	Report Field
TAV	Avg Size
TBYTE	Bytes
TELAPSED	Elapsed
TFIRST	First
TFRAME	Frames
THISTORY GRAPHIC ABS	History (Absolute, Graphic)
THISTORY GRPHIC REL	History (Relative, Graphic)
THISTORY NUMERIC ABS	History (Absolute, Numeric)
THISTORY NUMERIC REL	History (Relative, Numeric)
TLAST	Last
TPARTNER	Partner
TUAB	% Usage (Absolute, Numeric)
TURE	% Usage (Relative, Numeric)
TUSAGE ABS	% Usage (Absolute, Graphic)
TUSAGE REL	% Usage (Relative, Graphic)

APPENDIX C: ETHERTYPE VALUES IN SNAP SAPS C

Appendix C. Ethertype Values in SNAP SAPs

Overview

This appendix lists the hexadecimal values of the various Ethertypes in SNAP SAPs.

Ethertypes

The following is a list of Ethertype values that you can add to the STARTUP.ENT file:

0000-05DC	IEEE 802.3 Length Field
0200	Xerox PUP (conflicts with IEEE 802.3 Length Field range)
0201	Xerox PUP Address Translation (conflicts with IEEE 802.3 Length Field range)
0600	Xerox NS IDP
0800	DOD Internet Protocol (IP)
0801	X.75 Internet
0802	NBS Internet
0803	ECMA Internet
0804	CHAOSnet
0805	X.25 Level 3
0806	Address Resolution Protocol (ARP) (for IP and for CHAOS)
0807	XNS Compatibility
081C	Symbolics Private
0888-088A	Xyplex
0900	Ungermann-Bass network debugger
0A00	Xerox IEEE 802.3 PUP
0A01	Xerox IEEE 802.3 PUP Address Translation
0BAD	Banyan Systems
1000	Berkeley Trailer negotiation
1001-100F	Berkeley Trailer encapsulation for IP
1600	VALID system protocol
4242	PCS Basic Block Protocol
5208	BBN Simnet Private
6000	DEC unassigned, experimental

6001	DEC Maintenance Operation Protocol (MOP) Dump/Load Assistance
6002	DEC Maintenance Operation Protocol (MOP) Remote Console
6003	DECnet Phase IV, DNA Routing
6004	DEC Local Area Transport (LAT)
6005	DEC diagnostic protocol (at interface initialization)
6006	DEC customer protocol
6007	DEC Local Area VAX Cluster (LAVC), System Communication Architecture (SCA)
6008	DEC unassigned
6009	DEC unassigned
6010-6014	3Com
7000	Ungermann-Bass download
7002	Ungermann-Bass diagnostic/loopback
7020-7029	LRT
7030	Proteon
7034	Cabletron
8003	Cronus VLN
8004	Cronus Direct
8005	HP Probe protocol
8006	AT&T
8010	Excelan
8013	Silicon Graphics diagnostic
8014	Silicon Graphics network games
8015	Silicon Graphics reserved
8016	Silicon Graphics XNS NameServer, bounce server
8019	Apollo DOMAIN
802E	Tymshare
802F	Tigan
8035	Reverse Address Resolution Protocol (RARP)
8036	Aeonic Systems
8038	DEC LAN Bridge Management
8039	DEC unassigned
803A	DEC unassigned
803B	DEC unassigned

803C	DEC unassigned
803D	DEC Ethernet CSMA/CD Encryption Protocol
803E	DEC unassigned
803F	DEC LAN Traffic Monitor Protocol
8040	DEC unassigned
8041	DEC unassigned
8042	DEC unassigned
8044	Planning Research Co.
8046	AT&T
8047	AT&T
8049	ExperData
805B	VMTP (Versatile Message Transaction Protocol, RFC-1045) (Stanford)
805C	Stanford V Kernel, version 6.0
805D	Evans & Sutherland
8060	Little Machines
8062	Counterpoint Computers
8065	University of Massachusetts, Amherst
8066	University of Massachusetts, Amherst
8067	Veeco Integrated Automation
8068	General Dynamics
8069	AT&T
806A	Autophon
806C	ComDesign
806D	Compugraphic
806E-8077	Landmark Graphics
807A	Matra
807B	Dansk Data Elektronik
807C	Merit Internodal (or University of Michigan)
807D-807F	Vitalink
8080	Vitalink TransLAN III Management
8081-8083	Counterpoint Computers
809B	EtherTalk (AppleTalk over Ethernet)
809C-809E	Datability
809F	Spider Systems

80A3	Nixdorf Computers
80A4-80B3	Siemens Gammasonics
80C0-80C3	DCA (Digital Comm. Assoc.) Data Exchange Cluster
80C6	Pacer Software
80C7	Applitek
80C8-80CC	Intergraph
80CD-80CE	Harris
80CF-80D2	Taylor Instrument
80D3-80D4	Rosemount
80D5	IBM SNA Services over Ethernet
80DD	Varian
80DE-80DF	Integrated Solutions Transparent Remote File System (TRFS)
80E0-80E3	Allen-Bradley
80E4-80F0	Datability
80F2	Retix
80F3	AppleTalk Address Resolution Protocol (AARP)
80F4-80F5	Kinetics
80F7	Apollo
80FF-8103	Wellfleet
8107	Symbolics Private
8108	Symbolics Private
8109	Symbolics Private
8130	Waterloo Microsystems
8131	VG Laboratory Systems
8137	Novell (old) NetWare IPX (ECONFIG E option)
8138	Novell
8139-813D	KTI
9000	Loopback (Configuration Test Protocol)
9001	Bridge Communications XNS Systems Management
9002	Bridge Communications TCP/IP Systems Management
9003	Bridge Communications
FF00	BBN VITAL-LANBridge cache wakeups

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Network General

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