DominoGigabit®

Interface Guide

Domino

BN 9316/96.03

WAVETEK
WANDEL
GOLTERMANN

Communications Test Solutions

Notice
Specifications and functions described in this document are subject to change without notice.

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Contents

Preface

Thank you for purchasing the DominoGigabit® DA-380 Internetwork Analyzer. The DominoGigabit Internetwork Analyzer is a versatile, portable protocol analyzer that provides you with the ability to maintain 1000 Mbps networks and test Gigabit Ethernet equipment in those networks.

About This Book

This book provides an overview of the DominoGigabit Internetwork Analyzer and presents information on using the DominoGigabit analyzer interface for analyzing and transmitting network traffic on a Gigabit Ethernet network.

This book assumes that you are familiar with the basic terminology and procedures for using Microsoft® Windows™ 98, Windows NT, or Windows 2000. It also assumes that you have a basic understanding of personal computers, computer networks, and network protocols.

Document Conventions

The *DominoGigabit Interface Guide* uses some special keyboard reference and text conventions as well as symbols to indicate tips, notes, cautions, and warnings.

Keyboard Conventions

Convention	Description
Keys	All key names are shown as they appear on the laptop computer keyboard, for example, Ctrl, Esc, PgUp, and PgDn.
Key Combinations and Sequences	Keystroke combinations and sequences are used to invoke commands or perform operations. Key combinations are shown as Key+Key, for example, Shift+F1, which means to hold down the Shift key while pressing F1. Key sequences are shown as a comma-separated series, for example, Alt, F, A, which means to press and release each of these keys in order: first Alt, then F, then A.
Arrow Keys	The term "arrow keys" is the collective name for the Up Arrow, Down Arrow, Left Arrow, and Right Arrow keys.

Text Conventions

Convention	Description
Text That You Type	Specific text that you are to type is shown in boldface. For example, if the book says to type **win** you type the lowercase letters "win." What you type is always shown in lowercase letters, unless it must be typed in uppercase letters to work properly.
Filenames and Directories	Filenames and directories are shown in uppercase. For example, AUTOEXEC.BAT.
Nodenames and Programming Examples	Nodenames and programming examples are shown in Courier, a monospaced font, to more closely resemble their on-screen appearance. For example: `Smith.John`

Special Information

Convention	Description
	A tip conveys information on shortcuts or convenient procedures that are not required, but make tasks easier.
NOTE:	A note conveys information, which if overlooked may seriously inconvenience you, but will not cause any permanent or unrecoverable errors.
	A caution message alerts you to the possibility of damage to the instrument. In some cases it describes the nature of the potential damage and provides steps to avoid the problem.
	A warning alerts you to the possibility of injury to the user of the instrument, such as from electrocution. Steps to avoid injury are part of the warning text.

Related Publications

The DominoGigabit Internetwork Analyzer includes the following documentation.

Documentation	Description
DominoGigabit Interface Help	Provides detailed information about the DominoGigabit Internetwork Analyzer, including context-sensitive Help (available by pressing F1 or the Help button) for dialog boxes and results windows.
DominoGigabit Interface Guide (this manual)	Provides safety, connection, and setup information for the DominoGigabit Internetwork Analyzer. This document is available in both a printed version and in portable document format (.PDF) on the installation CD-ROM.

The following additional Domino publications are included with the DominoGigabit DA-380 Internetwork Analyzer package.

Domino Getting Started	Introduces you to the Domino Internetwork Analyzer and its user interface, and provides the information that you need to set up one or more Dominos. This document is available in both a printed version and in portable document format (.PDF) on the installation CD-ROM.
Domino Operating Guide	Contains background information, procedures, and examples for using the Domino software. This document is available in both a printed version and in portable document format (.PDF) on the installation CD-ROM.
Domino Core or DominoNAS Release Note	Provides the latest product installation information, and other late-breaking information about the Domino Core software and related products. This document is available in hardcopy only.
Domino Core or DominoNAS Readme Help	Provides the latest product information online, including a description of known problems and their workarounds when available.
Online Help	Provides detailed information about the Domino Core software, network interfaces, protocol software, and applications.

Customer Support

To report a problem with Domino hardware or software, contact your local sales office.

When reporting a problem:

Be at your computer with the Domino analyzer running, and be prepared to provide the following information:

1. The name and version number of the Domino software that you are using.
2. The type and serial number of the WWG hardware that you are using.
3. The type of network hardware you are using.
4. The specifications of the computer that you are using, including:
   - Make and model number
   - Processor speed
   - Amount of installed RAM
   - Available hard drive space
   - Operating system (Windows NT, Windows 98, or Windows 2000)
5. The exact wording of any messages that appeared on your screen.
6. What happened and what you were doing when the problem occurred.

Visit our Web site

For information on products, services and support, training, and how to contact your local sales office, visit WWG's Web site at:

www.wg.com

1. Introduction to the DominoGigabit Analyzer

This chapter provides an overview of the DominoGigabit Internetwork Analyzer features, a description of the DominoGigabit analyzer components, and extensive information about product safety, specifications, and the operational environment for the analyzer.

1.1. DominoGigabit Analyzer Features

The DominoGigabit Internetwork Analyzer features provide the capability for monitoring, troubleshooting, emulation, and interconnect device testing on 1000 Mbps Ethernet networks.

Key features of the DominoGigabit analyzer include:

- Full-duplex, full line-rate monitoring and real-time analysis of Gigabit Ethernet networks.
- Multiport synchronized analysis (with multiple Domino analyzers) for testing network devices.
- Full line-rate, real-time filters and triggers for received network frames that include network-level pattern matches for addressing and protocol filters. Frames can be filtered by frame type, addressing type (MAC, IP, or IPX), specific network addresses, and error condition. Custom filter setup also is provided.
- Online decoding for over 400 protocols (including all major LAN and WAN protocols, 802.1p, and 802.1q), plus the powerful Examine application to analyze captured data.
- WWG Mentor interactive expert analysis support.
- Link auto-negotiation status and testing, providing control of the DominoGigabit analyzer's advertised capabilities and monitoring of the results of link negotiation.
- Full line-rate frame transmission (and faster), with frame setup wizard for Ethernet frame formats and addressing, including higher-level protocol encapsulation options.
- Over 100 statistics, including graphical presentations of network utilization, top station talkers, protocol distribution, frame rate, and frame size distribution.
- Hot-swappable optical transceivers for single mode or multimode media.

1.2. DominoGigabit Analyzer Components

The DominoGigabit Internetwork Analyzer consists of a chassis that contains an interface with two removable, hot-swappable interface transceivers to support either multimode or single mode fiber connections to the network.

Your DominoGigabit analyzer comes with the following required equipment:

- A DominoGigabit chassis (9316/07) pre-installed with one of the following gigabit interfaces: Single mode (9316/90.19) or Multimode (9316/90.20)
- A Domino-to-PC cable (K9123) for connecting the analyzer to a personal computer
- A power cable, North American (K9139) or European (K9140)
- A fiber optic cable, single mode (K9203) or multimode (K9167) with duplex SC connectors

1.3. Important Safety Instructions

The DominoGigabit Internetwork Analyzer utilizes and connects to a variety of electrical energy levels and must therefore be operated by trained, qualified personnel to avoid property damage, serious injury, or death. To ensure this level of proficiency, operating personnel must:

- Read fully and understand the *Domino Getting Started* guide and the *DominoGigabit Interface Guide* before attempting to connect this equipment to any electrical power source.
- Be designated as a qualified user by their employer.

In addition, operating personnel must be aware of the following safety information:

CLASS 1 LASER PRODUCT

DominoGigabit Single Mode Interface (BN 9316/90.19)

DominoGigabit Multimode Interface (BN 9316/90.20)

Warning:

- There are no user controls or adjustments on the DominoGigabit analyzer. Any attempts to modify controls or adjustments, or performance of procedures other than those specified herein, may result in hazardous radiation exposure.
- Only use the DominoGigabit analyzer for its intended purpose.
- This product complies to the applicable requirements of:

  21 CFR 1040.10 and 21 CFR 1040.11.
- The IBM SOC-1250-LW Single Mode Module, BN 9316/90.19 and IBM SOC-1063N Multi-Mode Module, BN 9316/90.20 use Class III b laser radiation diodes with internal control and limiting circuitry. These modules contain no serviceable parts. To maintain laser safety, no attempt should be made to open or service these modules.

1.3.1. Laser Radiation Specifications

The DominoGigabit GBIC transceivers have the following laser radiation specifications:

Description	Specification
Class 1 laser product	WWG BN 9316/90.19; IBM SOC-1250N-LW Single Mode Module WWG BN 9316/90.20; IBM SOC-1063N Multi-Mode Module
Spectral center wavelength	IBM SOC-1250N-LW: 1300 nm IBM SOC-1063N: 780 nm
Launched average optical power	IBM SOC-1250N-LW: ≤ 1.97 mW IBM SOC-1063N: ≤ 0.305 mW
Type of laser light	Continuous

1.3.2. Power Supply

The DominoGigabit analyzer has an internal AC switching power supply that automatically adjusts to input voltage within this range: from 100 volts AC to 240 volts AC.

The DominoGigabit analyzer does not have a power on/off switch. The IEC AC power inlet must remain readily accessible.

1.3.3. Operating Voltage

The device has universal input and accepts an input range of 100 to 240 VAC 50/60 HZ, 150 VA. Do not connect the unit to a power source that exceeds the voltage rating of the unit.

1.3.4. Safety Class

The DominoGigabit analyzer (BN 9316/90.19 or BN 9316/90.20) meets the following safety specifications:

- FDA 21 CFR 1040.10/11
- CAN/CSA No. C22.2 1010.1-92
- UL 3111-1
- EN-61010-1 and EN-60825
- IEC-825 and IEC-1010-1

For additional safety information, see the *Domino Getting Started* guide.

1.3.5. CE Mark Conformity

The DominoGigabit analyzer conforms with the requirements of the European EMC Directive (89/336/EEC) as amended by Directive 92/31/EEC and 93/68/EEC.

The following European standards apply:

- EN 55 022 (1994) (CISPR 22): Limits and methods of measurement of radio disturbance characteristics of Information Technology Equipment.
- EN 50 082-1: Electromagnetic Compatibility - Generic Immunity Standard part 1: Residential, commercial, and light industry.

In addition, this instrument complies with the requirements of the Low Voltage Directive (73/23/EEC) as amended by Directive 93/68/EEC, applying one of the following European standards:

- EN 61010-1 (IEC1010-1): Safety regulations for electrical measuring, control and laboratory instruments: Part 1: general requirements.
- EN 950 (IEC 950): Safety of Information technology equipment, including electrical office machines.

The EC declaration of Conformity is issued by the following:

Wandel and Goltermann Ltd.
Burrington Way
Plymouth
Devon PL5 3LZ
Great Britain

1.3.5.1. Equipment Used in Compliance Testing

- DominoGigabit DA-380 Internetwork Analyzer, BN 9316/07, S/N 0001
- IBM SOC-1250N-LW Single Mode Module, BN 9316/90.19
- IBM SOC-1063N Multi-Mode Module, BN 9316/90.20
- Laptop: IBM 380ED Thinkpad, S/N 78YF511 with associated power supply P/N 85G65709

The following accessories were used for compliance testing.

BN Number	Part Number	Equipment Description
K9139	9314-8537.002	110v power cable for North America
K9140	9314-8538.001	220v power cable for Europe
K9123	9314-8520.006	0.45 m PC-to-Domino cable
K9127	9314-8523.003	Domino-to-Domino cable (This cable is now K9194)
K9125	9314-8521.005	1 m Domino-to-printer cable
K9167	9305-8581.009	Multimode fiber optic cable with duplex SC connectors

NOTES:

- EMC compliance was achieved with the above support equipment. If any other support equipment is used, compliance is not guaranteed.
- The single mode and multimode fiber optic transceiver modules are manufactured by IBM Corporation, Highway 52 & N.W. 37th Street, Rochester, MN 55901 USA.

1.3.6. Clearance Requirements

The DominoGigabit analyzer is forced-air cooled. Both sides of the case have ventilation openings to increase air flow. The clearance requirements follow.

DominoGigabit Analyzer Area	Clearance
Top	No clearance required.
Bottom	.6 cm (.25 in) provided by the feet.
Back	10 cm (4 in) for cable connections.
Sides	2.5 cm (1 in).

1.4. EMC Information

No regularly scheduled maintenance is necessary to ensure EMC compliance.

1.5. Environmental Specifications

The DominoGigabit analyzer is subject to the environmental specifications below.

Condition	Specification
Installation category	Transient Overvoltage Category II
Pollution Degree	2
Operating Temperature	+5 to 40°C
Storage and Transport Temperature	-20 to +60°C
Air Humidity	Up to 30°C, relative humidity 20-80%; over 30°C, absolute humidity: ≤25 g/m; no guarantee for continuous operation in a warm, damp environment.
Altitude	Up to 2000 M (6562 ft)

1.6. Cleaning the DominoGigabit Analyzer

To clean the external case of the DominoGigabit analyzer, wipe the surface with a dry cloth to remove dust. For more extensive cleaning, use a damp cloth moistened with a mild detergent solution. Do not use any abrasive cleaners or allow any liquid to enter the ventilation openings.

2. Getting Started

This chapter will help you get up and running quickly with your DominoGigabit Internetwork Analyzer. It provides an overview of the minimum steps to set up the DominoGigabit analyzer and start monitoring or transmitting network traffic.

2.1. Inspect the Parts

If you have ordered a new DominoGigabit Internetwork Analyzer, then the single mode or multimode interface hardware is pre-installed along with the removable, hot-swappable GBIC transceivers.

The DominoGigabit analyzer consists of the following parts:

- A DominoGigabit chassis (9316/07) pre-installed with one of the following gigabit interfaces: Single mode (9316/90.19) or Multimode (9316/90.20)
- A Domino-to-PC cable (K9123) for connecting the analyzer to a personal computer
- A power cable, North American (K9139) or European (K9140)
- A fiber optic cable, single mode (K9203) or multimode (K9167) with duplex SC connectors
- CD-ROM disks that contain the installation software, online Help, and portable document formats (.PDF) of the Domino publications
- DominoGigabit or DominoNAS Release Note
- *DominoGigabit Interface Guide* (this manual)

2.2. Read the Release Notes and Readme Help

The DominoNAS Release Note and Readme Help file contain the latest product information. Read the release notes and the README.HLP prior to operating your DominoGigabit analyzer for any special requirements or exceptions that may affect your equipment, including the latest installation information.

NOTE:

There may be more than one release note and Readme file for the WWG products that you have ordered.

2.3. Install the Software

The DominoGigabit analyzer software is part of the Domino Core software package, and automatically installs with the Domino Core software. General information about installing and uninstalling the Domino Core software can be found in the *Domino Getting Started* guide.

For the latest information about requirements and operating the Domino Core software and the DominoGigabit interface software, see the Domino Core or DominoNAS Release Note and Readme file.

2.4. Set Up the Domino Hardware

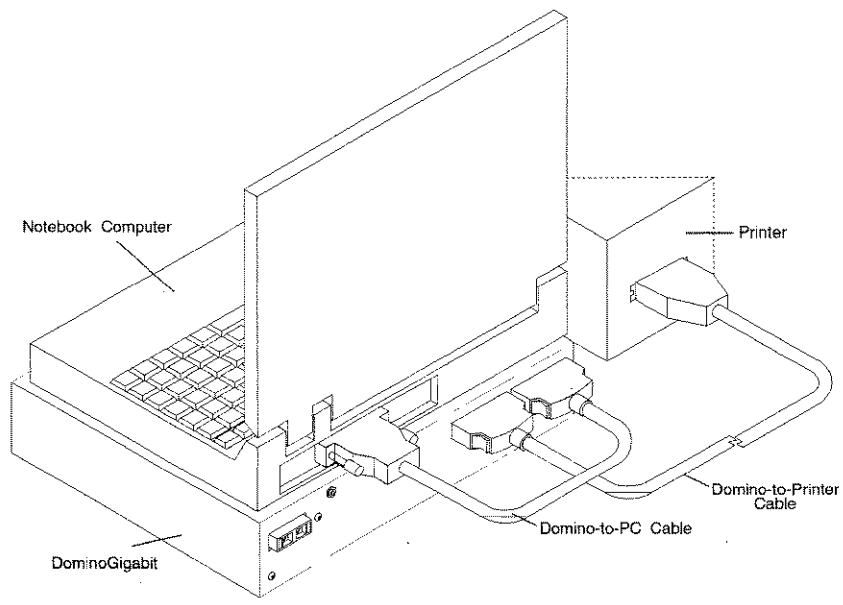

Figure 2-1. DominoGigabit Analyzer hardware configuration

The basic Domino hardware configuration consists of one Domino Internetwork Analyzer, such as the DominoGigabit analyzer, and a computer (standard PC or notebook), and a network interface connection. The Domino Core software and analyzer software that provide the user interface are installed on the computer.

Additional configurations support stacks of multiple Domino analyzer units and a printer connection.

For information about the minimum personal computer configuration required for operating the DominoGigabit analyzer, see the WWG web site at http://www.wg.com.

For information about connecting the DominoGigabit analyzer to your computer, and connecting to one or more (up to seven) other Domino analyzers, see the "Setting Up Domino" chapter in the *Domino Getting Started* guide.

2.5. Connect the DominoGigabit Network Cables

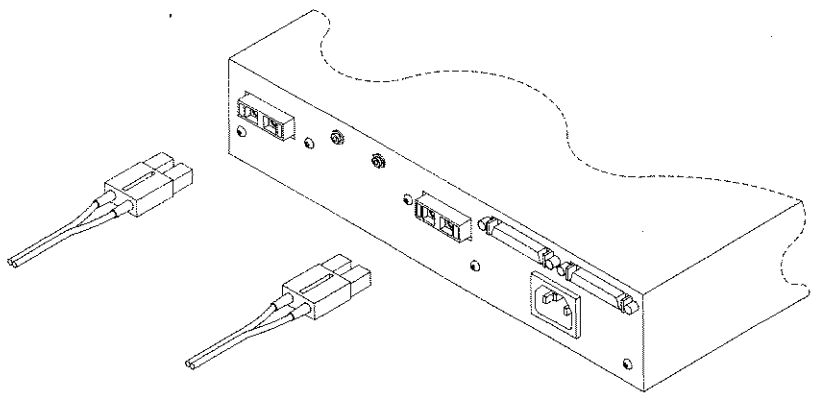

Figure 2-2. DominoGigabit Analyzer Network Cables

Two cables (with duplex SC connectors on either end) are required to connect the DominoGigabit analyzer to the network. The DominoGigabit analyzer is shipped with one of these cables (either single mode or multimode) depending on the type of interface that you ordered:

- Optical single mode cable with duplex SC connectors (K9203)
- Optical multimode cable with duplex SC connectors (K9167)

You must supply the second cable to be connected between your Gigabit Ethernet network equipment and the DominoGigabit analyzer.

For detailed information about connecting the DominoGigabit analyzer to the network, see the "Connecting to the Network" chapter.

2.6. Power Up the Analyzer and Display the Workbench

When you power up the DominoGigabit analyzer, the system performs a self-test and starts the system software. After the Microsoft Windows operating system starts, the Workbench screen (Figure 2-3) appears. If it does not, choose the Domino Core icon in the DominoNAS start-up group to open the Workbench screen.

From the Workbench, you can access all functions of the Domino Core software, the DominoGigabit analyzer software, and additional analysis applications.

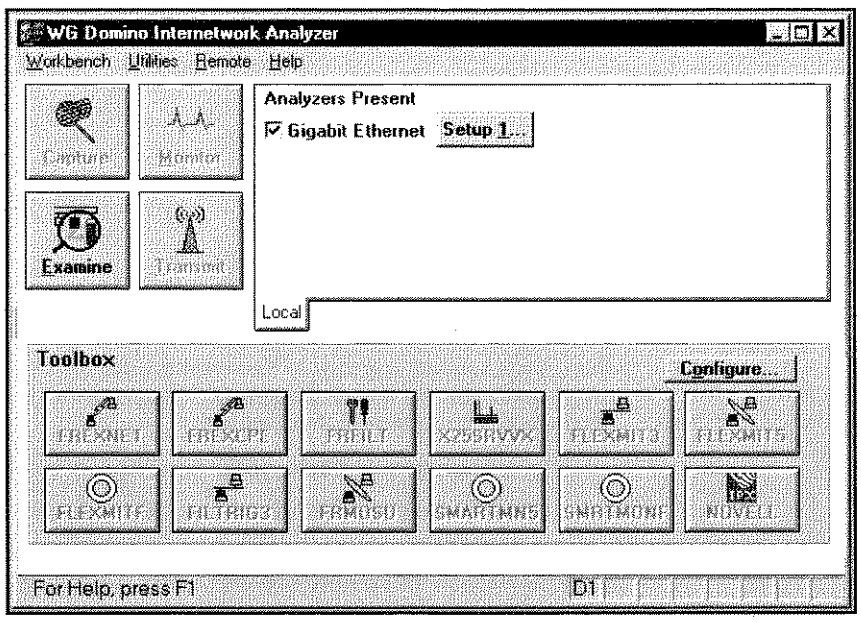

Figure 2-3. Domino Workbench screen with DominoGigabit analyzer installed

For more information about starting Domino and using the Workbench screen, see the *Domino Getting Started* guide.

2.7. Configure the Network Interface (optional)

The DominoGigabit analyzer interface is pre-configured for the Emulate connection mode, in which the analyzer is set up to transmit and receive network traffic. As long as you have connected the DominoGigabit analyzer to the network as an emulating device (not as a pass-through monitor), then you can

use the default analyzer interface configuration to begin monitoring network traffic.

If you are connected for pass-through monitoring and need to set up a different connection mode, or change other interface options, you can follow the basic procedure below to set up the DominoGigabit analyzer.

To configure the network interface:

1. From the Workbench screen (Figure 2-3), click the **Setup** button next to the DominoGigabit interface that you want to configure.
2. From the Gigabit Ethernet Main Setup dialog box (Figure 2-4), you can disable link configuration, select the **Connection** mode, or choose a command button to make changes to other setup options.

Figure 2-4. Gigabit Ethernet Main Setup dialog box

3. To set up advanced options, including the Protocol Stack and certain RAM and disk capture options, click **Advanced**.
4. To select how traffic that is captured in the RAM buffer will be displayed in Examine or as saved in Real Time, click **Capture**. To learn more about this option, see 9.4.1, "Selecting RAM Capture View by Receiver."
5. From the Gigabit Ethernet Main Setup dialog box, click **OK**.

For more detailed information on customizing the network interface setup, such as using filters or triggers, or setting up the advertised link capabilities, see the other related chapters of this guide.

For more information about setting up the advanced Domino Core software options, see the *Domino Operating Guide* and the Domino Core online Help.

2.8. Monitor Network Traffic

You can run the pre-defined Monitor application from the Workbench to quickly begin analyzing network traffic on the network, with minimal, if any, network interface setup required.

To monitor network traffic:

1. From the Workbench screen (Figure 2-1), click **Monitor**.

   The Monitor application starts (using the Workbench setup options) and the Network Status window and Events are displayed.

2. From the Monitor screen you can display other results windows including network and error statistics, or if you are in the emulate connection mode, you can set up the interface to transmit frames.

For more information about analyzing and transmitting network traffic, see the other related chapters in this guide.

2.9. Set Up Applications

Access to the Capture, Monitor, Examine, and Transmit applications is available from the Workbench. The Capture, Monitor, and Transmit applications allow you to quickly access the real-time environment for transmitting and analyzing network traffic.

You can modify the DominoGigabit interface setup for an application, either before running the application or from within Real Time when you are running the application. A restart of the application is required for the interface setup changes to take affect from within Real Time.

For more information about capturing, monitoring, and examining network traffic, see Chapter 9, "Analyzing Network Traffic and Status." For detailed information on the Domino analyzer applications, see the *Domino Operating Guide*.

2.10. Analyze Network Traffic

Real-Time Analysis

With the DominoGigabit analyzer, you can run applications such as Monitor and Capture to perform real-time analysis on the network. Real-time analysis allows you to view network traffic and statistics as they are being captured by the DominoGigabit analyzer.

Post-Capture Analysis

You can also save traffic captured from the network and perform post-capture analysis using Examine. Examine does not provide the capability to review network data as it is being captured from the network.

2.11. View the Results

The DominoGigabit interface provides a number of statistics windows and status windows from which you can analyze network status and traffic in the real-time environment. Some windows, such as the Network Status and Events windows, are automatically displayed when you run Monitor or Capture. Other results windows, such as the Link Capability Advertisement Status, are available from the menu bar or toolbar in the Real Time.

Frame Summary, Protocol Summary, and Hexadecimal Trace windows in the Examine application provide a detailed view of the content of your captured network traffic.

You can use all of the results windows along with the front panel LED indicators to obtain a comprehensive view of your network status and traffic.

For more information about the DominoGigabit interface results windows, see Section 9.6, "Viewing Network Traffic and Statistics" in Chapter 9 of this guide. You can obtain specific information about a particular results window while you have it opened by pressing F1 to access the extensive Help for the Domino Core and DominoGigabit software.

3. Connecting to the Network

3.1. Installing and Removing GBIC Transceivers

The standard DominoGigabit® DA-380 analyzer is shipped with two multimode, Gigabit Interface Converter (GBIC) transceivers. You can optionally order the DominoGigabit analyzer with single mode, GBIC transceivers. Both types of GBIC transceivers are "hot-swappable" modules, which means that you can remove and install them (Figure 3-1) while the DominoGigabit analyzer is powered on and connected to the network. The transceiver ports for the transmitters and receivers for both single mode and multimode are duplex SC connectors.

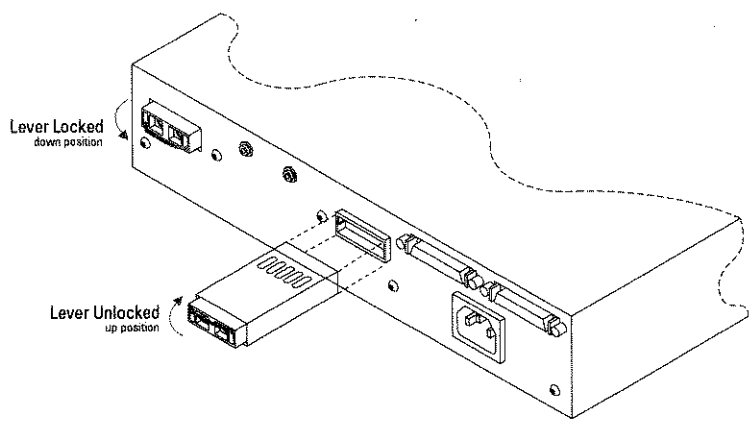

Figure 3-1. Hot-swappable GBIC transceivers in the DominoGigabit analyzer

Be careful to ensure that the handle on the GBIC transceiver is in the unlocked or "up" position before attempting to install or remove the transceiver in the analyzer. Damage to the locking mechanism can result if the transceiver is installed with the lever in the locked or "down" position.

To remove a GBIC transceiver:

1. Disconnect the fiber cables attached to the GBIC transceiver.
2. Lift the lever up to unlock the GBIC module and pull the transceiver out of the slot while holding the lever (as shown in the middle of Figure 3-1).

To install a GBIC transceiver:

1. Be sure that the lever is in the upward position and slide the transceiver into the empty slot until it is seated properly.
2. Push the lever down to lock the GBIC transceiver into place.

See Figure 3-1 for an illustration of an installed GBIC transceiver with the locking mechanism in place, and another GBIC transceiver unlocked and removed.

3.2. Rear Panel Connectors

The rear panel of the DominoGigabit analyzer (Figure 3-2) provides the following ports for device connection:

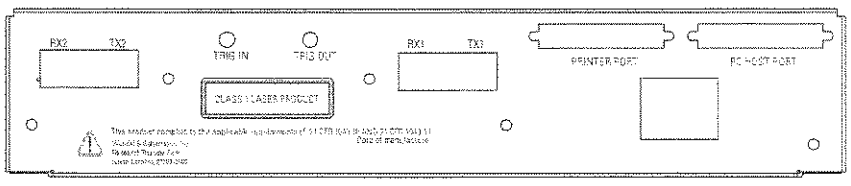

Figure 3-2. DominoGigabit DA-380 analyzer rear panel

Printer Port

The printer port enables you to connect the DominoGigabit analyzer to a second Domino analyzer in the stack using a Domino-to-Domino cable (K9127), or to a printer using a Domino-to-Printer cable (K9125).

PC Host Port

The PC host port enables you to connect the DominoGigabit analyzer to the parallel port on your notebook computer using a Domino-to-PC cable (K9123 or K9137), or to another Domino analyzer in a stack, using a Domino-to-Domino cable (K9127).

Trig In

The Trigger In jack accepts a TTL pulse, which causes the DominoGigabit analyzer to begin data capture.

Trig Out

The Trigger Out jack produces a TTL pulse that you can use to synchronize with other equipment.

TX2

The transmitter 2 port is an SC connector for fiber connections. The TX2 port connects the DominoGigabit analyzer to a network device when the analyzer is set up for pass-through monitoring. TX2 used internally to the analyzer to regenerate the optical signal for RX1 when the analyzer is operating in this mode.

RX2

The receiver 2 port is an SC connector for fiber connections. The RX2 port connects the DominoGigabit analyzer to a network device when the analyzer is set up for frame transmission, the RX2 port remains disconnected and is used internally to maintain statistics for frames being transmitted from the analyzer's TX1 port.

TX1

The transmitter 1 port is an SC connector for fiber connections. The TX1 port connects the DominoGigabit analyzer to the network when the analyzer is set up for frame transmission. When the analyzer is set up for pass-through monitoring, the TX1 port is used to connect to a network device and is used internally to regenerate the optical signal for RX2.

RX1

The receiver 1 port is an SC connector for fiber connections. The RX1 port connects the DominoGigabit analyzer to a network device when the analyzer is set up for either pass-through monitoring or frame transmission.

3.3. Front Panel LED Indicators

The LED indicators that appear on the front panel of the DominoGigabit analyzer (Figure 3-3) provide you with a quick way to assess the status of your analyzer's network links.

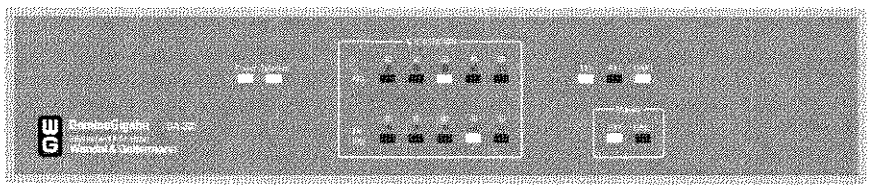

Figure 3-3. DominoGigabit DA-380 analyzer front panel

The LED indicators display the following information:

Power

Indicates that the DominoGigabit analyzer is connected to an AC power source.

Selected

Indicates that the analyzer is selected as an active analyzer. (You can select the active analyzers on the Workbench screen, which is the first screen that is displayed when you start the Domino software.)

% Utilization (two rows of five)

Indicates the percentage of bandwidth being used on the network according to the analyzer's current connection mode (Emulate or Monitor), which is specified on the Gigabit Ethernet Main Setup dialog box. Each row of five LEDs is interpreted independently, and represents a different set of bandwidth utilization measurements.

The first row of LEDs always displays the percent of the network bandwidth utilized by frames received on receiver port 1 (RX1) in either Emulate or Monitor mode. The second row of utilization LEDs displays the percent of the network bandwidth utilized either by:

- Frames received on receiver port 2 (RX2) in Monitor mode.
- Frames transmitted on transmitter port 1 (TX1) in Emulate mode.

Interpreting the LED Colors

The LEDs are read from left to right, with the percent utilization represented by the colors green or orange.

All LEDs are green. The utilization percentage is less than or equal to 50%. The actual utilization is indicated by the right-most LED that is illuminated green. The utilization value is determined by reading the top number in the group of numbers directly above the right-most, green LED.

Some or all LEDs are orange. The utilization percentage is greater than 50%, and you may see both green and orange LEDs illuminated in the row. The actual utilization is indicated by the right-most LED that is illuminated orange. The utilization value is determined by reading the bottom number in the group of numbers directly above the right-most, orange LED. When all LEDs are orange, network utilization is 100%.

TX1

Used only when the analyzer is in Emulate mode, this LED flashes green when the analyzer is transmitting frames on the analyzer's TX1 port.

RX1

Used in both Emulate and Monitor mode, this LED flashes green when the analyzer is receiving frames from a network device connected to the analyzer's RX1 port.

LINK1

Used in both Emulate and Monitor mode to indicate link status for the network link on port 1 (RX1). The available states are:

Green. Indicates that the analyzer is connected to the network (Emulate mode), or the analyzer is connected to the network device on port 1 (Monitor mode).

Off. Indicates that the analyzer is not connected to the network (Emulate mode), or the analyzer is not connected to the network device on port 1 (Monitor mode).

RX2

Used only when the analyzer is in Monitor mode, this LED flashes green when the analyzer is receiving frames from a network device connected to the analyzer's RX2 port.

LINK2

Used in both Emulate and Monitor mode, this LED indicates the status of the network link from the device connected to the analyzer's port 2 (RX2). The available states are:

Green. Indicates that the analyzer is connected with an internal loopback between TX1 and RX2 (Emulate mode), or the analyzer is connected to the network device on port 2 (Monitor mode).

Off. Indicates that the analyzer is not connected for internal loopback between TX1 and RX2 (Emulate mode), or the analyzer is not connected to the network device on port 2 (Monitor mode).

3.4. Connecting as a Pass-Through Monitor

When you want to analyze traffic between two network devices, you can connect the DominoGigabit analyzer to operate as a pass-through monitor between those devices.

Use the TX1, RX1, TX2, and RX2 ports to connect the DominoGigabit analyzer to operate as a pass-through monitor (Figure 3-4). In this mode, the transmitter ports (TX) are used internally to the analyzer to regenerate the optical signal from the receiver ports. You cannot transmit frames from the DominoGigabit analyzer when connected to the network in this mode.

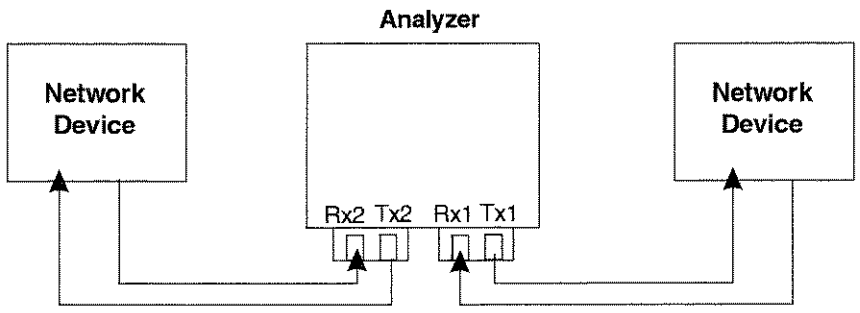

Figure 3-4. Signal path in Monitor connection mode

The DominoGigabit analyzer displays statistics for the network devices that you are monitoring by identifying the RX1 and RX2 port names on the statistics windows. Therefore, you may want to remember which device is connected to the RX1 or RX2 side of the analyzer.

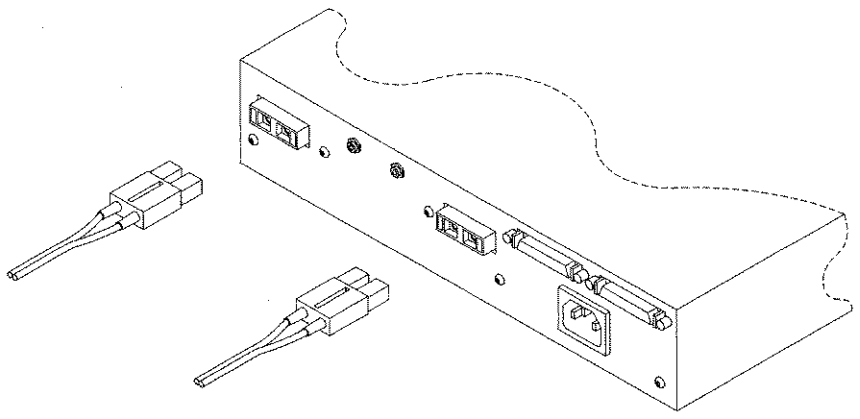

Figure 3-5. Connecting optical cables to the DominoGigabit analyzer

When you connect the DominoGigabit analyzer for pass-through monitoring, you need two cables (Figure 3-5):

- For multimode connections, use two multimode fiber cables with duplex SC connectors (WWG cable number K9167).
- For single mode connections, use two single mode fiber cables with duplex SC connectors (WWG cable number K9203).

NOTE:

WWG ships an extra cable for multimode or single mode fiber (either K9167 or K9203) with your DominoGigabit analyzer.

To connect as a pass-through monitor:

1. Disconnect the cable between the two network devices that you want to monitor.
2. Attach the disconnected end of that cable to the TX1 and RX1 transceiver ports on the rear panel of the DominoGigabit analyzer.

   The analyzer is connected to the first network device.
3. Attach an end of a second fiber cable (K9167 or K9203) to the TX2 and RX2 transceiver ports on the rear panel of the DominoGigabit analyzer.
4. Then, attach the free end of that cable to the ports on the second network device.

   The analyzer is now connected between the first network device and the second network device.
5. Under **Connection** on the Gigabit Ethernet Main Setup dialog box, choose **Monitor** and click **OK**.

3.5. Connecting for Frame Transmission

When you want to analyze and transmit traffic on the network, you can connect the DominoGigabit analyzer to operate in Emulate mode for frame transmission.

Use the TX1 and RX1 ports to connect the DominoGigabit analyzer to operate on the network as a transmitting device. In this mode, the TX2 and RX2 ports remain disconnected from the network. The RX2 port is used internally to the analyzer to maintain statistics for frames being transmitted from the analyzer's TX1 port. The RX1 port receives traffic from the network (Figure 3-6).

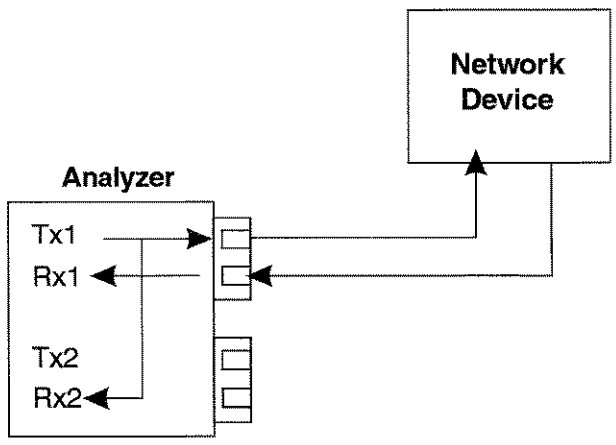

Figure 3-6. Signal path in Emulation connection mode

The DominoGigabit analyzer displays statistics for these devices by identifying the TX and RX1 port names on the statistics windows.

When you connect the DominoGigabit analyzer for frame transmission, you will need one cable:

- For a multimode connection, use a multimode fiber cable with duplex SC connectors (WWG cable number K9167).
- For a single mode connection, use a single mode fiber cable with duplex SC connectors (WWG cable number K9203).

To connect for frame transmission:

1. Attach an end of the fiber cable (K9167 or K9203) to the TX1 and RX1 transceiver ports on the rear panel of the DominoGigabit analyzer.
2. Then, attach the free end of the fiber cable to the available ports on the network device (such as a switch or full-duplex repeater).
3. Under **Connection** on the Gigabit Ethernet Main Setup dialog box, choose **Emulate** and click **OK**.

   The analyzer is now connected to the network as an emulating device, capable of monitoring and transmitting network traffic.

4. Setting Up the DominoGigabit Interface

4.1. Main Setup Overview

Use the Gigabit Ethernet Main Setup dialog box (Figure 4-1) to set up global configuration parameters for the DominoGigabit analyzer. The basic configuration options for the analyzer include the connection mode and whether or not you want the analyzer to negotiate its link configuration with the network devices to which it connects.

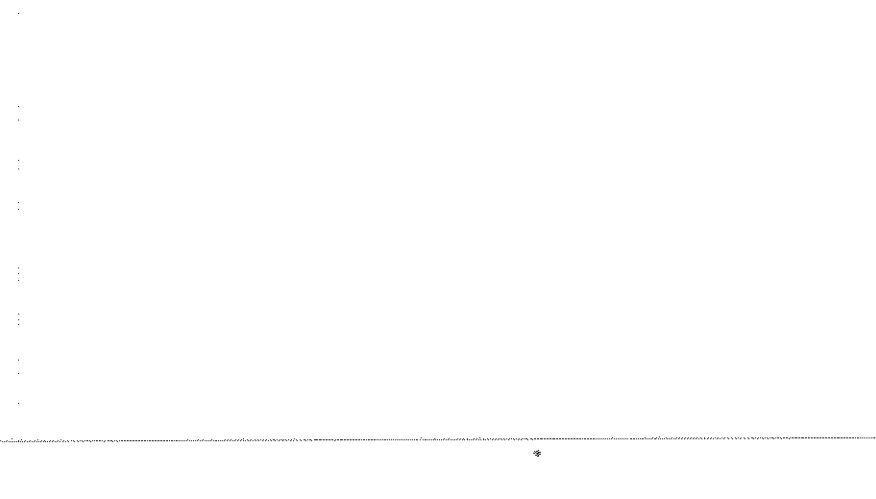

Figure 4-1. Gigabit Ethernet Main Setup dialog box

The **Connection** options designate the type of network connection and the operating mode for the analyzer.

The analyzer setup dialogs have a hierarchical structure, where the Gigabit Ethernet Main Setup dialog box is the top-level, or "parent," dialog box that is the main entry point for all of the setup options. The lower level dialog boxes accessed from the main setup dialog box are the "child" setup dialog boxes.

Using command buttons from the main setup dialog, you can access the following child setup dialogs:

- Line Setup dialog box—Allows you to select MAC-level transmit and receive options for the DominoGigabit analyzer.
- Filter/Trigger Setup dialog box—Allows you to specify the filter/trigger conditions and pattern matches to be applied to received traffic.
- Link Capability Advertisement dialog box—Allows you to specify the type of pause capability and transmission mode that you want to advertise for the DominoGigabit analyzer to the remote device.
- Advanced Setup dialog box—Provides access to procedures for setting up non-interface-specific setup parameters, such as setting up the protocol stack and RAM/Disk capture options.
- Capture RAM Selection dialog box— Allows you to specify the receivers from which you want to view captured frames in Examine or save captured frames in real time. You can also synchronize capture data from both receivers for viewing in Examine, or for saving capture data in real time, when you select the Synchronized View option.

If the child setup dialog box selections are not modified, the default selections, or the last dialog box selections saved, are used.

You must click **OK** in both the child setup dialog box and the Gigabit Ethernet Main Setup dialog box to save changes made to the setup selections. In real time, changes to setup selections are activated when the real time application is restarted.

4.2. Selecting the Connection Mode

You connect the DominoGigabit analyzer between network devices for pass-through monitoring, or for emulation of a network device using either the single mode or multimode transceiver ports located on the rear panel. You configure the analyzer for the type of network connection by choosing an option in the **Connection** box on the Gigabit Ethernet Main Setup dialog box.

To select the connection mode:

1. Under **Connection** on the Gigabit Ethernet Main Setup dialog box, do one of the following:

   - Choose **Monitor**.

     The analyzer is configured to receive network data only. In Monitor mode, receiver ports 1 and 2 on the rear panel of the DominoGigabit analyzer are configured as straight-through connections to the transmitter ports. The transmitter ports are used internally to regenerate the optical signal from the receiver ports back onto the network.

   - Choose **Emulate**.

     The analyzer is configured to emulate a network device and can support transmission of frames. In Emulate mode, transmitter port 1 and receiver port 1 are used to connect the analyzer to the network. This is the default selection.

2. Click **OK**.

   The setup selections are saved, and you return to the Workbench screen or to the Real Time screen. From Real Time, a prompt appears asking if you want to restart your application before returning you to the Real Time screen.

4.3. Saving Setup Selections

Save the setup selections for the DominoGigabit analyzer by clicking **OK** on the Gigabit Ethernet Main Setup dialog box (Figure 4-1). The **OK** button on the Gigabit Ethernet Main Setup dialog box saves both the main setup selections, and all of the selections on the Gigabit Ethernet Main Setup child dialog boxes.

If you have made changes to any of the options on a child setup dialog box, you must first click **OK** on the child setup dialog box to accept your selections. Then, you can save those selections by clicking **OK** on the Gigabit Ethernet Main Setup dialog box.

In real time, changes to setup selections are activated when the Real Time application is restarted.

To save setup selections:

1. From a Gigabit Ethernet Main Setup child dialog box, click **OK**.

   The child setup dialog box selections are accepted, and you return to the Gigabit Ethernet Main Setup dialog box.

2. Click **OK**.

   The setup selections are saved, and you return to the Workbench screen or to the Real Time screen. From Real Time, a prompt is issued about whether to restart your application before returning you to the Real Time screen.

NOTE:

You can also save the options on the Filter/Trigger Setup dialog by clicking **Save**. However, once the **Save** button has been used, the filter/trigger selections are stored in the filter file, and the **OK** and **Cancel** buttons are no longer valid for those selections.

5. Setting Up the DominoGigabit Interface Line

5.1. Line Setup Overview

You can use the Line Setup dialog box (Figure 5-1) to select MAC-Layer transmit and receive options.

Figure 5-1. Line Setup dialog box

The transmit setup options allow you to pad the data field of a transmit frame to 46 bytes and add a preamble pattern to transmit frames.

The receive setup options allow you to ignore the three least significant bits of the destination address in received frames and filter received network traffic by frame type.

To configure the line setup:

1. From the Gigabit Ethernet Main Setup dialog box, click **Line**.

   The Line Setup dialog box is displayed.

2. Select and enter the corresponding transmit and receive options that are suitable for your application.

   A checkmark is displayed in the checkbox, or the radio button is filled in, beside the option(s) that you enabled. An empty checkbox or radio button indicates that the option is disabled.

3. Click **OK**.

   The options that you selected are accepted, and you return to the Gigabit Ethernet Main Setup dialog box.

4. Click **OK**.

   The setup selections are saved, and you return to the Workbench screen or to the Real Time screen. From Real Time, a prompt is issued about whether to restart your application before returning you to the Real Time screen.

5.2. Enabling the Transmit AutoPad Option

You can set up the DominoGigabit interface to automatically pad short frames that are to be transmitted by the analyzer by enabling the Transmit AutoPad option on the Line Setup dialog box (Figure 5-1). When the Transmit AutoPad option is enabled, transmit frames with Data fields of less than 46 bytes are padded with bytes containing hexadecimal 00 patterns so that the Data field is exactly 46 bytes long (for a minimum valid frame size of 64 bytes total).

To enable the Transmit Autopad option:

1. Under **TX Setup** on the Line Setup dialog box, select the **Tx AutoPad Enable** option.

   Tx AutoPad Enable is a toggle option. A checkmark appears in the box beside the option when it is enabled.

2. Click **OK**.

   The options that you selected are accepted, and you return to the Gigabit Ethernet Main Setup dialog box.

3. Click **OK**.

   The setup selections are saved, and you return to the Workbench screen or to the Real Time screen. From Real Time, a prompt is issued about whether to restart your application before returning you to the Real Time screen.

5.3. Enabling the Transmit Preamble Option

You can insert a preamble pattern in frames to be transmitted by the analyzer by enabling the Transmit Preamble option on the Line Setup dialog box. A preamble indicates the beginning of frame transmission and provides a means of signal synchronization for a receiver.

When the Transmit Preamble option is enabled, a group of seven bytes each containing the pattern 10101010 is added to the beginning of the transmit frame prior to the start-of-frame delimiter. The Transmit Preamble option is enabled as a default option.

To enable the Transmit Preamble option:

1. Under **TX Setup** on the Line Setup dialog box, select the **Tx Preamble Enable** option.

   Tx Preamble Enable is a toggle option. A checkmark appears in the box beside the option when it is enabled.

2. Click **OK**.

   The options that you selected are accepted, and you return to the Gigabit Ethernet Main Setup dialog box.

3. Click **OK**.

   The setup selections are saved, and you return to the Workbench screen or to the Real Time screen. From Real Time, a prompt is issued about whether to restart your application before returning you to the Real Time screen.

5.4. Enabling the Receive Group Address Option

You can specify that the three least significant bits of the destination address be ignored in frames received by the analyzer by enabling the Receive Group Address option on the Line Setup dialog box.

When the Receive Group Address option is enabled, the three least-significant bits of the destination address are ignored when filtering the address to determine whether or not the network frame is designated for the DominoGigabit analyzer.

To enable the Receive Group Address option:

1. Under **RX Setup** on the Line Setup dialog box, select the **Rx Grp Addr Enable** option.

   Rx Grp Addr Enable is a toggle option. A checkmark appears in the box beside the option when it is enabled.

2. Click **OK**.

   The options that you selected are accepted, and you return to the Gigabit Ethernet Main Setup dialog box.

3. Click **OK**.

   The setup selections are saved, and you return to the Workbench screen or to the Real Time screen. From Real Time, a prompt is issued about whether to restart your application before returning you to the Real Time screen.

NOTE:

This option has no effect when the **All Frames** receive mode option is selected.

5.5. Filtering Network Traffic by Frame Type

You can specify the type of frames to be received by the analyzer by using the Receive Mode option on the Line Setup dialog box. You can receive all network frames, filter in station and broadcast frames, or filter in multicast frames.

NOTE:

To filter network traffic for pause frame types, use the Protocol Filter/Trigger Setup dialog box. See Section 6.3.2.3., "Filtering Network Traffic for Pause Frames" in the "Filtering and Triggering" chapter.

To filter network traffic by frame type:

1. Under **Receive Mode** on the Line Setup dialog box, do one of the following:
   - Select the **All Frames** option.

     Specifies that the analyzer is to receive all network frames.
   - Select the **Station & Broadcast Frames** option.

     Specifies that the analyzer is to receive frames with its own destination address and all broadcast frames.
   - Select the **Multicast Frames** option.

     Specifies that the analyzer is to receive frames with its own destination address, all broadcast frames, and all multicast frames.
2. Click **OK**.

   The options that you selected are accepted, and you return to the Gigabit Ethernet Main Setup dialog box.
3. Click **OK**.

   The setup selections are saved, and you return to the Workbench screen or to the Real Time screen. From Real Time, a prompt is issued about whether to restart your application before returning you to the Real Time screen.

NOTE:

The Receive Group Address option has no effect when the **All Frames** receive mode option is selected.

6. Filtering and Triggering

6.1. Working With Filters and Triggers

Network frames are first received by the DominoGigabit analyzer and filtered according to the RX Setup options on the Line Setup dialog box before being processed by the analyzer's filter/trigger utility. The filter/trigger utility allows you to create up to eight definitions that can be applied simultaneously as filter and trigger criteria to received network traffic. Multiple filter/trigger definitions are applied to received data using a logical-OR methodology.

The filter function scans received network traffic for the specified filter criteria and either saves the data to the capture buffer or discards it, depending on the selected filter method. The trigger function scans received network traffic for the specified trigger criteria or event, and sets the trigger point in the capture buffer when it occurs, filling the capture buffer according to the specified trigger criteria.

The Filter/Trigger Setup dialog box offers two basic options for filter/trigger definitions: Method and Post Trigger Capture. The filter Method option applies only to designated filter criteria, and the Post Trigger Capture option applies only to designated trigger criteria. When both filters and triggers are defined, these two options together determine the disposition of data in the capture buffer.

Using Filters Only

When using filters only, the entire capture buffer is used to store filtered network data. The Method option determines the disposition of data in the capture buffer.

If you are filtering in network data, then data matching any of the specified filter criteria is stored in the capture buffer. If you are filtering out network data, then data matching any of the specified filter criteria is excluded from the capture buffer.

Once the capture buffer is full (at 100%), the buffer begins to wrap and newly captured data overwrites the oldest data in the buffer.

Using Triggers Only

When using triggers only, the received data is screened for any of the specified trigger conditions. The analyzer uses the entire capture buffer for storing network data until any of the specified trigger conditions are met.

The Post Trigger Capture option determines the percentage of the capture buffer that is used to store network data after a trigger event occurs. Capturing stops when the specified Post Trigger Capture condition is met. The remainder of the capture buffer contains network data received prior to the trigger event.

Using Both Filters and Triggers

When using both filters and triggers, the analyzer always processes the received network data according to the specified filter conditions, whether or not a trigger event has occurred.

The analyzer uses the entire capture buffer for storing filtered data until any of the specified trigger conditions are met. Once a trigger event occurs, then that percentage of the capture buffer selected in the Post Trigger Capture option is used to store filtered network data since the trigger event occurred. Network data is still processed in or out of the capture buffer according to the filter Method option and the defined filter conditions.

Capturing stops when the specified Post Trigger Capture condition is met. So, part of the buffer contains filtered data captured prior to the trigger event, and part of the buffer contains filtered data captured after the trigger event, where the percentages are determined by the Post Trigger Capture option.

NOTES:

- The 128 MB capture RAM (64 MB on each receiver) consists of 512 pages of storage, with each page storing 128 kilobytes of data. If you specify a post trigger capture of 0%, the analyzer completes filling the current page of RAM storage when the trigger event occurs. Therefore, the last frame in the capture buffer is not necessarily the trigger frame, depending on how much data has already been stored in the current page of RAM.
- Trigger events are displayed in the Events Window.
- The number of frames that match the filter or trigger patterns that you have defined are displayed on the Detailed Capture Statistics window. These statistics are maintained even if you are not currently filtering your captured network traffic (for example, you have not selected the filter/trigger definition as a filter or a trigger).

For information about setting up the DominoGigabit interface line to filter frame types, see Section 5.5, "Filtering Network Traffic by Frame Type" in the "Setting Up the DominoGigabit Interface Line" chapter.

6.2. Setting Up Filtering and Triggering

You can use the Filter/Trigger Setup dialog box (Figure 6-1) to specify the filter/trigger criteria to be applied to received network traffic.

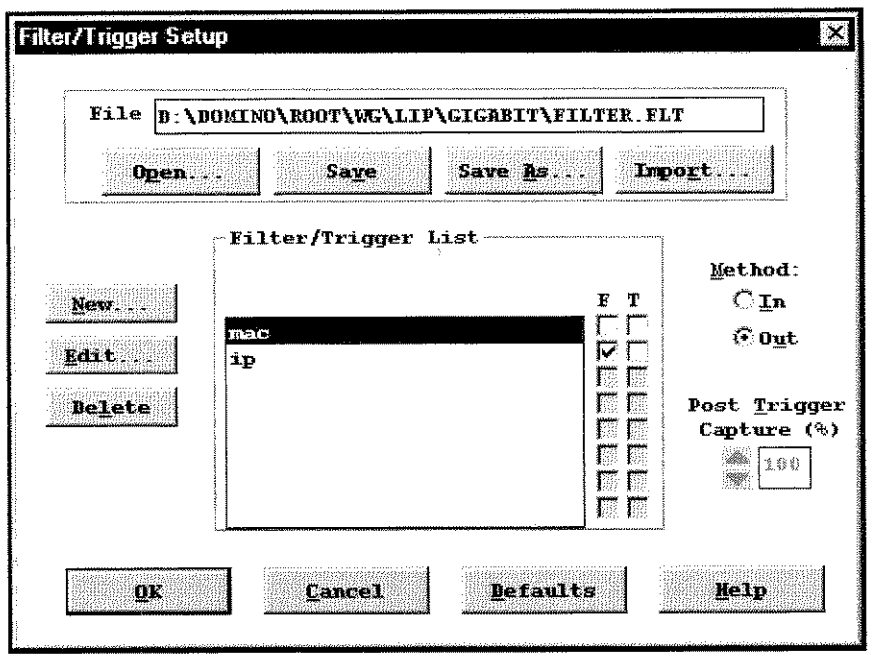

Figure 6-1. Filter/Trigger Setup dialog box

You can specify up to eight definitions at one time to be applied as both filters and triggers to the received data. Multiple filter/trigger definitions are applied to the received data using a logical-OR methodology.

Other filter/trigger utility options include the ability to filter network traffic in or out of the capture buffer and to specify the percentage of the capture buffer to be filled after a trigger event.

To set up the filter/trigger:

1. From the Gigabit Ethernet Main Setup Dialog Box click **Filt/Trig**.

   The Filter/Trigger Setup dialog box is displayed.

2. To define a new filter/trigger definition, click **New** and create a filter/trigger definition.

   The filter/trigger definitions that you create are displayed in the **Filter/Trigger List**.

3. To copy filter/trigger definitions from another filter file, click **Import**.

   The filter/trigger definitions that you copy are displayed in the **Filter/Trigger List**.

4. If you have set up a filter, select the filter **Method**.

   The received network data will be filtered into or out of the capture buffer according to the option that you selected.

5. If you have set up a trigger, specify the **Post Trigger Capture** buffer percentage.

   The default selection is 100 percent. When a trigger occurs, the percentage of the capture buffer that you specified is used to store filtered data since the trigger event. The disposition of data in the remaining percentage of the capture buffer depends upon the applied criteria.

6. Click **OK**.

   The filter/trigger utility options that you set up are temporarily accepted, and you return to the Gigabit Ethernet Main Setup dialog box. Setup selections are not stored in the filter/trigger file until you click **OK** on the Gigabit Ethernet Main Setup dialog box.

7. Click **OK**.

   The main setup dialog box and all of the child setup dialog box selections are saved. Filter/trigger setup selections are saved in the filter/trigger file. You return to the Workbench screen or to the Real Time screen. From Real Time, a prompt is issued about whether to restart your application before returning you to the Real Time screen.

NOTES:

- The 128 MB capture RAM (64 MB on each receiver) consists of 512 pages of storage, with each page storing 128 kilobytes of data. If you specify a post trigger capture of 0%, the analyzer completes filling the current page of RAM storage when the trigger event occurs. Therefore, the last frame in the capture buffer is not necessarily the trigger frame, depending on how much data has already been stored in the current page of RAM.
- You can also filter received network traffic using the Rx Setup options on the Line Setup dialog box. Network frames are first received by the analyzer and filtered according to the Rx Setup options before being sent to the capture buffer.

6.2.1. Selecting the Filter Method

You can include or exclude network data from the capture buffer using the Method option on the Filter/Trigger Setup dialog box. The Method option applies only to filters.

Your choices for the filter Method are In (default) or Out. When you choose In, the network data matching the specified filtering criteria is collected in the capture buffer. When you choose Out, all of the network data except that matching the specified filtering criteria is collected in the capture buffer.

To select the filter method:

- From the Filter/Trigger Setup dialog box, do one of the following:
  - Choose **In**.

    Network data matching the filter criteria is filtered into the capture buffer. This is the default selection.
  - Choose **Out**.

    Network data matching the filter criteria is filtered out of the capture buffer.

6.2.2. Setting Up the Post Trigger Capture

You can specify the percentage of the capture buffer to be used for collecting network data after a selected trigger event occurs using the Post Trigger Capture option on the Filter/Trigger Setup dialog box. This option applies only to triggers.

You can select the percentage using the spin buttons, or you can enter a percentage between 0 and 100 directly in the edit box. 100 percent is the default selection.

The disposition of data in the capture buffer is determined by the defined filters and triggers, and post trigger capture percentage. If the analyzer is filtering only, then the entire capture buffer is used to store data according to the filtering criteria and filter Method option.

If both filters and triggers are defined, then the analyzer uses the entire capture buffer for storing filtered data until the trigger criteria are met. Then, according to the selected post trigger capture percentage, that percentage of the capture buffer is used to store filtered network data captured after the trigger event occurred. So, part of the buffer contains filtered data captured prior to the trigger event, and part of the buffer contains filtered data captured after the trigger event.

To set up the post trigger capture:

- From the Filter/Trigger Setup dialog box, do one of the following:
  - Use the spin arrow buttons next to the **Post Trigger Capture** edit box to select a percentage number.

    The box displays the percentage number that you selected.
  - Enter a value from **0** to **100** directly into the **Post Trigger Capture** edit box.

    The box displays the percentage number that you selected.

NOTES:

- The size of the actual capture RAM used may be one percent larger or smaller than the number that you selected in the Post Trigger Capture option.
- The 128 MB capture RAM (64 MB on each receiver) consists of 512 pages of storage, with each page storing 128 kilobytes of data. If you specify a post trigger capture of 0%, the analyzer completes filling the current page of RAM storage when the trigger event occurs. Therefore, the last frame in the capture buffer is not necessarily the trigger frame, depending on how much data has already been stored in the current page of RAM.

6.3. Creating a Filter/Trigger Definition

The filter/trigger utility allows you to specify up to eight definitions at one time to be applied as both filters and triggers to received data. You can create filter/trigger definitions or copy them from another filter file using the Import option. Multiple filter/trigger definitions are applied to the received data using a logical-OR methodology.

To create a filter/trigger definition, you can specify byte patterns that you want to screen for in received frames. You can use X values as wildcard characters in these patterns to ignore the contents in that location during filtering of a frame.

The filter/trigger utility allows you to set up a filter/trigger definition by protocol and encapsulation type, or to set up a custom filter/trigger. The protocol setup method provides a template that allows you to set up a filter on the source and destination address fields of a frame according to the protocol type that you select, and to filter by frame error condition. The custom setup method displays a list of the 112 byte patterns for the filter/trigger definition and allows you to edit the definition using binary, decimal, or hexadecimal formats.

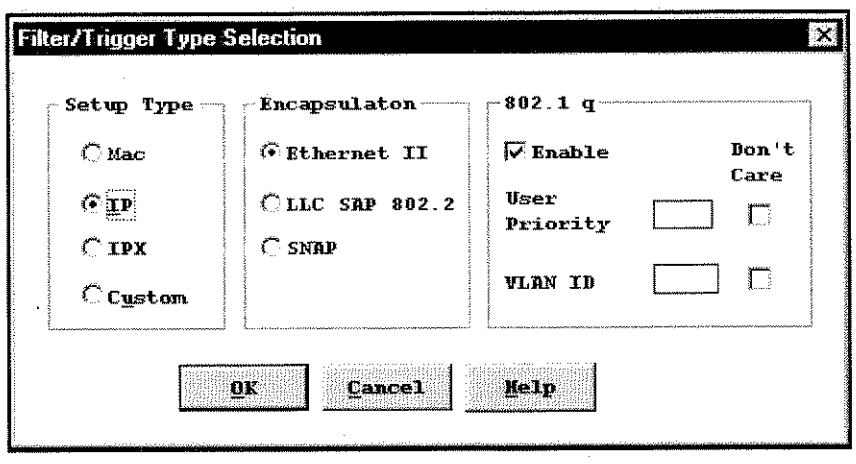

Figure 6-2. Filter/Trigger Type Selection dialog box

After you create a filter/trigger definition using the protocol method, you can also view or edit the contents of the definition using the custom method.

To create a filter/trigger definition:

1. From the Filter/Trigger Setup dialog box, click **New**.

   The Filter/Trigger Type Selection dialog box is displayed.

2. Do one of the following:

   - To set up a protocol filter/trigger definition, select the **MAC**, **IP**, or **IPX** option. Depending on the protocol that you select, you can choose a protocol encapsulation option, enable the 802.1q option, and specify a VLAN ID and User Priority.
   - To set up a custom filter/trigger definition, select the **Custom** option.

3. Click **OK**.

   The Protocol Filter/Trigger Setup dialog box or the Custom Filter/Trigger Setup dialog box is displayed according to the options that you selected.

6.3.1. Defining a Filter/Trigger Using the Custom Setup Method

You can use the Custom Filter/Trigger Setup dialog box (Figure 6-3) to specify byte patterns as filter/trigger criteria for the first 112 bytes of a frame. The byte patterns can be entered in hexadecimal, decimal, or binary format.

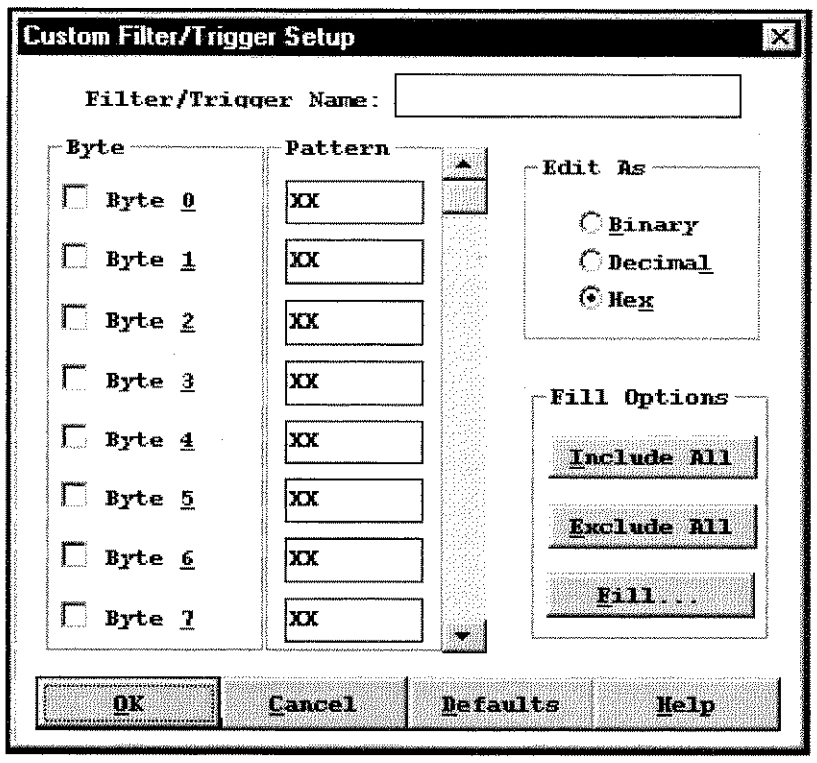

Figure 6-3. Custom Filter/Trigger Setup dialog box

Values can be entered in the byte **Pattern** boxes by either specifying values for individual bytes or by using the Custom Filter/Trigger Fill Setup dialog box. The Custom Filter/Trigger Fill Setup dialog box allows you to quickly replicate a specified pattern in a range of bytes, or in all 112 bytes of the filter/trigger definition.

You can select certain bit or byte patterns as wildcard characters to be ignored in the filter by placing an X in the corresponding field position. Received frames can contain any value in the positions specified with an X to match the filter condition. These X values are the default entries for the custom filter/trigger fields.

To define a filter/trigger using the custom setup method:

1. From the Filter/Trigger Setup dialog box, click **New**.

   The Filter/Trigger Type Selection dialog box is displayed.

2. Select the **Custom** option and click **OK**.

   The Custom Filter/Trigger Setup dialog box is displayed.

3. In the **Byte** boxes, choose the checkboxes of the bytes you want to select for the filter/trigger definition.

   The checkboxes of the bytes that you selected contain a checkmark.

4. In the **Edit As** box, select a format.

   The pattern values are displayed and edited in the format that you selected.

5. To enter values in the byte **Pattern** boxes, do one of the following:

   - Enter values directly into the individual byte **Pattern** boxes.
   - Click **Fill**, to use the Custom Filter/Trigger Fill Setup dialog box.

   The received frames will be filtered according to the values specified in the byte locations that you selected.

6. In the **Filter/Trigger Name** box, enter a name for the filter/trigger definition.

   The name that you specified is displayed in the Filter/Trigger Name box.

7. Click **OK**.

   The dialog box selections are accepted, and you return to the Filter/Trigger Setup dialog box. The filter name is displayed in the **Filter/Trigger List**.

8. In the **Filter/Trigger List**, select the **F** or **T** (or **both**) checkbox beside the filter name.

   A checkmark appears in the box that you selected, and the definition is set up as a filter (F), a trigger (T), or both a filter and a trigger. The corresponding filter Method or Post Trigger Capture option is enabled.

NOTES:

- When single X bits are specified in binary, and you change the format to hexadecimal, a message box appears notifying you of an invalid conversion. The conversion is not performed. To avoid invalidating your data when specifying binary X bit values, select a format and maintain its use throughout the editing of the custom filter/trigger.
- The number of frames that match the filter or trigger patterns that you have defined are displayed on the Detailed Capture Statistics window. These statistics are maintained even if you are not currently filtering your captured network traffic (for example, you have not selected the filter/trigger definition as a filter or a trigger).

If you want to change formats when entering patterns and also specify binary X bit values, edit all the patterns that are not going to have X bit values first, in hexadecimal or decimal format. Select the **Binary** format last to enter the final patterns, including the X bit values.

6.3.1.1. Using the Edit As Option

The Edit As option allows you to select the format (hexadecimal, decimal, or binary) in which to display and edit the byte patterns on the custom Filter/Trigger Setup dialog box.

You are not restricted to editing all patterns in a single format; however, all patterns will always be displayed in the last format that you selected.

When you change the Edit As format option after entering some patterns, the values that you have already entered in the pattern boxes are converted to the newly selected format. This conversion works best when you are not specifying X values for any bits in the field values.

If you have specified single X bits in binary, and you change the format to hexadecimal, a message box is displayed notifying you of an invalid conversion. The conversion is not performed. To avoid invalidating your data when specifying binary X bit values, select a format and maintain its use throughout the editing of the custom filter/trigger.

If you want to change formats when entering patterns and also specify binary X bit values, edit all the patterns that are not going to have X bit values first, in hexadecimal or decimal format. Select the **Binary** format last to enter the final patterns, including the X bit values.

6.3.1.2. Selecting a Fill Pattern

You can specify a value, or pattern, to be replicated in a range of bytes or in all 112 bytes of the filter/trigger definition, using the Custom Filter/Trigger Fill Setup dialog box (Figure 6-4).

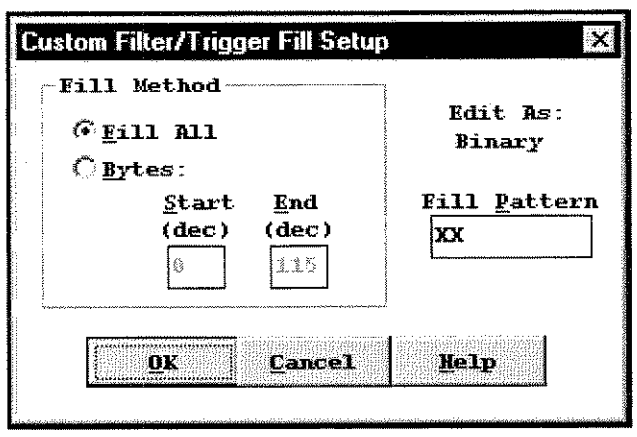

Figure 6-4. Custom Filter/Trigger Fill Setup dialog box

The filter fill function is useful when you want to set up most (or a large group) of the filter bytes with the same pattern. You can fill the entire filter with the specified pattern, and then go back to edit the specific bytes that you want to change.

The pattern can be entered in hexadecimal, decimal, or binary format.

To select a fill pattern:

1. In the **Edit As** box, choose the format in which you want to display and edit the byte patterns.

   The patterns are displayed and edited in the format that you selected.

2. In the **Fill Options** box, click **Fill**.

   The Custom Filter/Trigger Fill Setup dialog box is displayed.

3. In the **Fill Pattern** box, specify a value to be replicated in the filter/trigger definition.

   The value to be replicated is displayed in the Fill Pattern box.

4. In the **Fill Method** box, do one of the following:
   - To enter the **Fill Pattern** in all 112 bytes of the definition, select the **Fill All** option.
   - To enter the **Fill Pattern** in a specific byte range, select the **Bytes** option. Then enter the beginning and ending bytes (decimal) in the Start and End boxes.
5. Click **OK**.

   The Fill Pattern that you specified is entered in the bytes that you selected, and you return to the Custom Filter/Trigger Setup dialog box.

6.3.2. Defining a Filter/Trigger Using the Protocol Setup Method

The protocol setup method provides a convenient way to select protocol-specific information in a filter/trigger definition.

6.3.2.1. Filtering Network Traffic by Protocol Address

You can use the Protocol Filter/Trigger Setup dialog box (Figure 6-5) to set up filtering of received data by the source and destination address fields of a frame. The contents of the filter/trigger definition that you create using the protocol method can also be displayed and edited using the custom method.

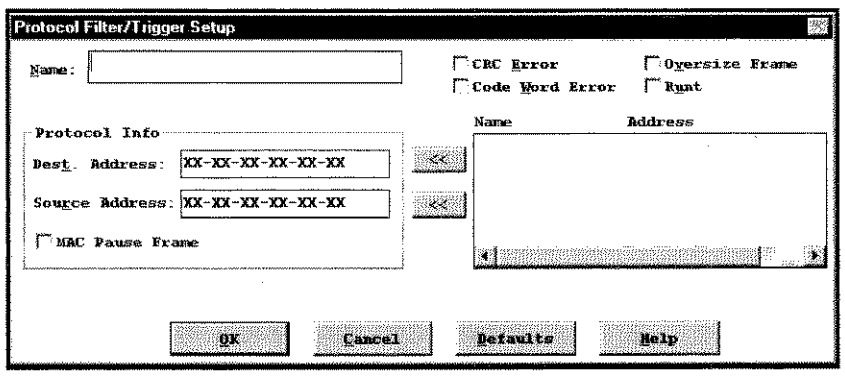

Figure 6-5. Protocol Filter/Trigger Setup dialog box

To filter network traffic by protocol address:

1. From the Filter/Trigger Setup dialog box, click **New**.

   The Filter/Trigger Type Selection dialog box is displayed.

2. Select the **MAC**, **IP**, or **IPX Setup Type** and click **OK**.

   The Protocol Filter/Trigger Setup dialog box is displayed. The addressing format appears according to the **Setup Type** that you selected.

3. To filter on a specific protocol destination and source address, do one of the following:

   - Select the symbolic name of the station in the list and click the arrow button to automatically add the corresponding address to the destination or source address box.
   - Or, you can specify the address directly in the **Dest. Address** or **Source Address** edit boxes.

4. In the **Name** box, enter a name for the filter/trigger definition.

5. Click **OK**.

   The dialog box selections are accepted, and you return to the Filter/Trigger Setup dialog box. The filter name is displayed in the **Filter/Trigger List**.

6. In the **Filter/Trigger List**, select the **F** or **T** (or **both**) checkbox beside the filter name.

   A checkmark is displayed in the box that you selected, and the definition is set up as a filter (F), a trigger (T), or both a filter and a trigger. The corresponding filter Method or Post Trigger Capture option is enabled.

NOTE:

The number of frames that match the filter or trigger patterns that you have defined are displayed on the Detailed Capture Statistics window. These statistics are maintained even if you are not currently filtering your captured network traffic (for example, you have not selected the filter/trigger definition as a filter or a trigger).

6.3.2.2. Filtering Network Traffic by Frame Error Condition

You can use the Protocol Filter/Trigger Setup dialog box (Figure 6-5) to set up filtering of received data by the frame error condition. The available options are CRC Error, Code Word Error, Oversize Frame, and Runt.

The frame error options on the Protocol Filter/Trigger Setup dialog box are specified in an additive fashion, so they are logically ANDed. Therefore, multiple option selections specify that a frame must meet all of the selected conditions in order to match the filter conditions. For example, selection of **CRC Error** and **Oversize Frame** specifies that a frame must be greater than 1518 bytes AND contain a CRC error to match the filter.

The contents of the frame error condition criteria that you create using the protocol setup method cannot be displayed or edited on the Custom Filter/Trigger Setup dialog box.

To filter network traffic by frame error condition:

1. From the Filter/Trigger Setup dialog box, click **New**.

   The Filter/Trigger Type Selection dialog box is displayed.

2. Select a **Setup Type** (other than Custom) and click **OK**.

   The Protocol Filter/Trigger Setup dialog box is displayed.

3. Select the type of frame conditions that you want to define.

   Multiple frame error conditions are logically ANDed for the filter conditions.

4. In the **Name** box, enter a name for the filter/trigger definition.

5. Click **OK**.

   The dialog box selections are accepted, and you return to the Filter/Trigger Setup dialog box. The filter name is displayed in the **Filter/Trigger List**.

6. In the **Filter/Trigger List**, select the **F** or **T** (or **both**) checkbox beside the filter name.

   A checkmark is displayed in the box that you selected, and the definition is set up as a filter (F), a trigger (T), or both a filter and a trigger. The corresponding filter Method or Post Trigger Capture option is enabled.

NOTE:

The number of frames that match the filter or trigger patterns that you have defined are displayed on the Detailed Capture Statistics window. These statistics are maintained even if you are not currently filtering your captured network traffic (for example, you have not selected the filter/trigger definition as a filter or a trigger).

6.3.2.3. Filtering Network Traffic for Pause Frames

You can use the Protocol Filter/Trigger Setup dialog box (Figure 6-5) to filter pause frames in the data received by the analyzer.

To filter network traffic for pause frames:

1. From the Filter/Trigger Setup dialog box, click **New**.

   The Filter/Trigger Type Selection dialog box is displayed.

2. Select **MAC** and click **OK**.

   The Protocol Filter/Trigger Setup dialog box is displayed.

3. Select the **MAC Pause Frame** option.

4. In the **Name** box, enter a name for the filter/trigger definition.

5. Click **OK**.

   The dialog box selections are accepted, and you return to the Filter/Trigger Setup dialog box. The filter name is displayed in the Filter/Trigger List.

6. In the **Filter/Trigger List**, select the **F** or **T** (or **both**) checkbox beside the filter name.

   A checkmark is displayed in the box that you selected, and the definition is set up as a filter (F), a trigger (T), or both a filter and a trigger. The corresponding filter Method or Post Trigger Capture option is enabled.

NOTE:

The number of frames that match the filter or trigger patterns that you have defined are displayed on the Detailed Capture Statistics window. These statistics are maintained even if you are not currently filtering your captured network traffic (for example, you have not selected the filter/trigger definition as a filter or a trigger).

6.3.3. Naming or Renaming a Filter/Trigger Definition

You can specify a name or description for a filter/trigger definition, or rename a filter/trigger definition, to identify it in the Filter/Trigger List on the Filter/Trigger Setup dialog box (Figure 6-1).

To name or rename a filter/trigger definition:

1. From the Filter/Trigger Setup dialog box, do one of the following:
   - Click **New** and select a setup method to create a new filter/trigger definition.
   - Select an existing filter/trigger definition and click **Edit**.
2. In the **Name** box on the Custom Filter/Trigger Setup dialog box or Protocol Filter/Trigger Setup dialog box, specify a name or description for the filter/trigger definition.

3. Click **OK**.

   The dialog box selections are accepted and the name appears in the **Filter/Trigger List** on the Filter/Trigger Setup dialog box.

NOTE:

A filter name is only used to identify a single filter/trigger definition (displayed in the **Filter/Trigger List**) within a filter/trigger file and is not the name of the filter file itself. The default DominoGigabit filter filename, FILTER.FLT, is stored on the hard disk. The FILTER.FLT file (or any filter file that you create) can contain up to eight filter/trigger definitions.

6.4. Modifying a Filter/Trigger Definition

You can use either the protocol or custom setup method to change the content of or rename an existing filter/trigger.

To modify a filter/trigger definition:

1. In the **Filter/Trigger List** box on the Filter/Trigger Setup dialog box, select the name of the filter/trigger that you want to modify.

   The name of the filter/trigger that you selected is highlighted.

2. Click **Edit**.

   The Filter/Trigger Type Selection dialog box is displayed.

3. Do one of the following:

   - Select the **Protocol** option and click **OK**.

     The Protocol Filter/Trigger Setup dialog box is displayed, which allows you to modify the protocol address fields of the filter/trigger definition.

   - Select the **Custom** option and click **OK**.

     The Custom Filter/Trigger Setup dialog box is displayed, which allows you to modify the 112 byte fields of the filter/trigger definition.

4. Modify the name or content of the filter/trigger definition.

5. Click **OK**.

   The dialog box selections are accepted, and you return to the Filter/Trigger Setup dialog box.

6.5. Saving Filter/Trigger Utility Selections

There are two ways in which the filter/trigger setup and all of its child setup dialog boxes can be saved to the current filter/trigger file:

- By clicking **Save** on the Filter/Trigger Setup dialog box.
- By clicking **OK** on both the Filter/Trigger Setup dialog box and the Gigabit Ethernet Main Setup Dialog Box.

You can save the filter/trigger selections to another filter/trigger filename by choosing the **Save As** button.

To save filter/trigger selections:

1. From the filter/trigger child setup dialog box, click **OK**.

   The dialog box selections on the child setup dialog box are accepted, and you return to the Filter/Trigger Setup dialog box.

2. Do one of the following:

   - Click **Save**.

     The filter/trigger setup and all of its child setup dialog box selections are saved to the current file displayed in the **File** box. You remain in the Filter/Trigger Setup dialog box.

   - Click **Save As**.

     The Save As dialog box is displayed, which allows you to save the filter/trigger selections to another filename (with extension .FLT) and location.

   - Click **OK** on both the Filter/Trigger Setup dialog box and the Gigabit Ethernet Main Setup dialog box.

     The filter/trigger setup and all of its child setup dialog box selections are accepted, and after choosing **OK** on the main setup dialog box, are saved to the current filter file.

NOTE:

The cancel operation is no longer valid if you have saved the dialog box selections to the filter/trigger file prior to clicking **Cancel** on the Filter/Trigger Setup dialog box.

6.6. Cancelling Filter/Trigger Utility Selections

You can use the **Cancel** button on the Filter/Trigger Setup dialog box to cancel the Filter/Trigger Setup dialog box selections, and all of its child setup dialog box selections.

The **OK** and **Cancel** buttons on the Filter/Trigger Setup dialog box determine the disposition of all of the filter/trigger setup dialog box selections. If the **OK** button has been selected on a child setup dialog box, those child setup dialog box selections can be removed by choosing the **Cancel** button on the Filter/Trigger Setup dialog box.

To cancel filter/trigger utility selections:

1. To cancel filter/trigger selections on an individual child setup dialog box, click **Cancel** from the filter/trigger child setup dialog box.

   The selections on the child dialog box are not accepted, and you return to the Filter/Trigger Setup dialog box.

2. To cancel all filter/trigger setup dialog box selections (including all child setup selections), click **Cancel** from the Filter/Trigger Setup dialog box.

   None of the filter/trigger dialog box selections since the last save operation are accepted, and you return to the Gigabit Ethernet Main Setup Dialog Box.

NOTE:

The cancel operation is no longer valid if you have saved the dialog box selections to the filter/trigger file prior to clicking **Cancel** on the Filter/Trigger Setup dialog box.

6.7. Managing the Filter/Trigger List

Up to eight filter/trigger definitions can be set up in the **Filter/Trigger List** of a filter file. You can add or delete filter/trigger definitions from the **Filter/Trigger List** on the Filter/Trigger Setup dialog box.

6.7.1. Adding a New Definition to the Filter/Trigger List

You can add a new definition to the **Filter/Trigger List** on the Filter/Trigger Setup dialog box by creating a filter/trigger definition or copying a definition from another filter/trigger file to the **Filter/Trigger List**.

6.7.2. Copying a Definition to the Filter/Trigger List

You can copy a filter/trigger definition from another filter/trigger file using the Import Filter/Triggers dialog box (Figure 6-6).

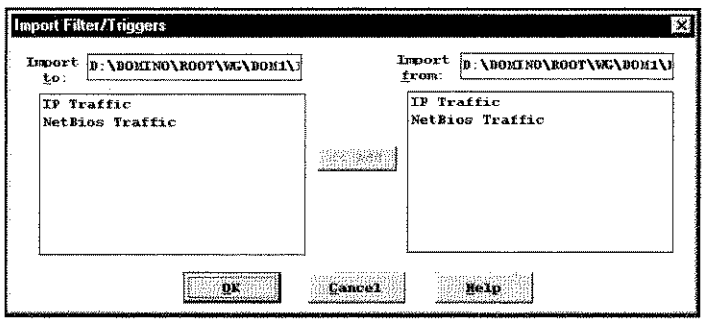

Figure 6-6. Import Filter/Triggers dialog box

To copy a definition to the filter/trigger list:

1. From the Filter/Trigger Setup dialog box, click **Import**.

   The Open dialog box is displayed, and the filter/trigger files with extension .FLT are displayed in the file list box.

2. Select the filter filename and location from which you want to copy and click **OK**.

   The Import Filter/Triggers dialog box is displayed to copy existing filter/trigger definitions to the current filter file.

3. From the **Import From** list, select the filter/trigger definition you want to add to the current filter/trigger file (**Import To**).

   The filter/trigger definition that you selected is highlighted.

4. Click **Add**.

   The filter/trigger definition that you selected in the **Import From** list is copied to the file displayed in the **Import To** box.

5. Click **OK**.

   The filter/trigger definitions that you copied are added and displayed in the **Filter/Trigger List**. You return to the Filter/Trigger Setup dialog box.

NOTE:

The filter/trigger definition remains intact in the filter file from which it was copied.

6.7.3. Deleting a Definition From the Filter/Trigger List

You can remove a definition from the **Filter/Trigger List** using the **Delete** button on the Filter/Trigger Setup dialog box.

To delete a definition from the filter/trigger list:

1. In the **Filter/Trigger List** box on the Filter/Trigger Setup dialog box, select the filter/trigger definition that you want to delete.

   The filter/trigger definition that you selected is highlighted.

2. Click **Delete**.

   The filter/trigger definition is removed from the filter/trigger list.

6.8. Managing Filter/Trigger Files

The default filter/trigger file for the DominoGigabit analyzer is called FILTER.FLT. Every time you set up a filter/trigger for a new application, the FILTER.FLT file is opened as the default file.

In addition to the default FILTER.FLT file, you can open and save other filter/trigger files (with extension .FLT) from the Filter/Trigger Setup dialog box. Filter/trigger files can be opened from or saved to any directory location. You can also import, or copy, filter/trigger definitions between filter/trigger files.

6.8.1. Opening a Filter/Trigger File

You can open an existing filter/trigger file using the **Open** button on the Filter/Trigger Setup dialog box.

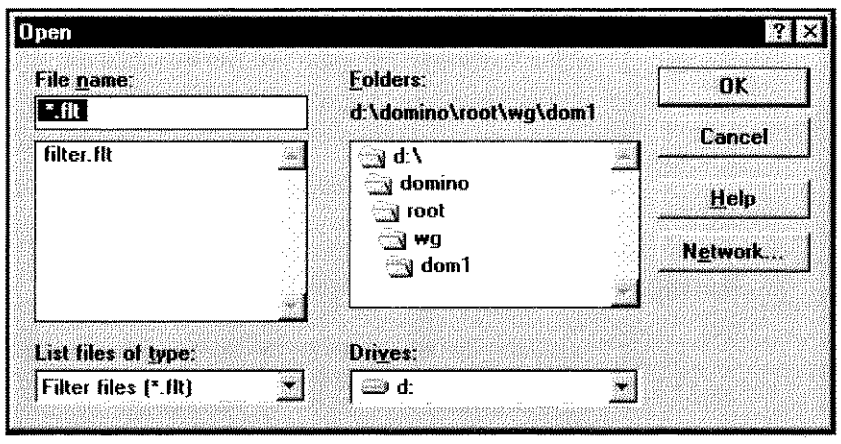

Figure 6-7. Open Dialog Box for Filter/Trigger Files

To open a filter/trigger file:

1. From the Filter/Trigger Setup dialog box, click **Open**.

   The Open dialog box is displayed (Figure 6-7), and the filter/trigger files with extension .FLT are displayed in the file list box.

2. Select the location and name of the filter/trigger file that you want to open, and click **OK**.

   You return to the Filter/Trigger Setup dialog box. The name of the filter/trigger file that you opened is displayed in the **File** box, and the contents of the filter/trigger file that you opened is displayed.

6.8.2. Saving a Filter/Trigger File

You can save all of the filter/trigger dialog box selections to the filter/trigger file that is currently open by clicking **OK** or **Save** on the Filter/Trigger Setup dialog box.

You can save the current filter/trigger file to another filter/trigger file with a new name and location using the **Save As** button on the Filter/Trigger Setup dialog box.

To save the current filter/trigger file as another filter/trigger file:

1. From the Filter/Trigger Setup dialog box, click **Save As**.

   The Save As dialog box is displayed.

2. Enter the location and name of the filter/trigger file that you want to save, and click **OK**.

   The contents of the open filter/trigger file is saved to the filter/trigger filename and location that you selected. You return to the Filter/Trigger Setup dialog box, where the newly saved filter/trigger file is displayed.

NOTE:

The contents of the filter/trigger file from which the Save As operation was performed remains intact with its original filename and location.

6.8.3. Importing a Filter/Trigger File

You can import, or copy, custom filter/trigger definitions between filter/trigger files using the Import Filter/Triggers dialog box. A maximum of eight filter/trigger definitions can be stored in a filter/trigger file. You can only copy definitions to the filter/trigger file if the destination filter/trigger file contains less than seven custom filter/trigger definitions.

Definitions can only be copied between filter/trigger files in one direction—from the second filter/trigger file (Import From) to the original filter/trigger file opened in the Filter/Trigger Setup dialog box (Import To).

7. Setting Up Link Configuration

7.1. Link Configuration Advertisement Overview

The DominoGigabit interface supports the auto-negotiation algorithm according to the IEEE 802.3z specification, to establish a compatible link between the DominoGigabit analyzer and the network device to which it is connected.

When the DominoGigabit analyzer interface is configured for the Emulate connection mode, the analyzer supports advertisement of its pause capability and half or full-duplex operation. You can enable or disable negotiation of the link configuration using the Enable Link Configuration option on the Gigabit Ethernet Main Setup dialog box. Link configuration options are specified on the Link Capability Advertisement dialog box (Figure 7-2).

To monitor the status of link configuration and the network device and analyzer link settings, you can use the Link Capability Advertisement Status window (Figure 7-1).

Link Capability Advertisement Status - Gigabit Ethernet:D1

	REMOTE (RX1)	LOCAL (TX)
Signal Detect	No	n/a
8B-10B Sync	No	n/a
Link Config ACK	No	n/a
Remote Fault	-	None
Pause Capable	-	No
Half Duplex	-	No
Full Duplex	-	Yes
Link Adv Status	In Progress	Done
Remote Link Restart	No	No

Figure 7-1. Link Capability Advertisement Status window

NOTE:

The DominoGigabit analyzer always operates in full-duplex mode, but can advertise that it is operating in half-duplex mode for testing purposes.

7.2. Setting Up Link Configuration Advertisement Options

Use the Link Capability Advertisement dialog box options to set up the flow control and duplex mode of operation characteristics that you want to advertise for the DominoGigabit network link.

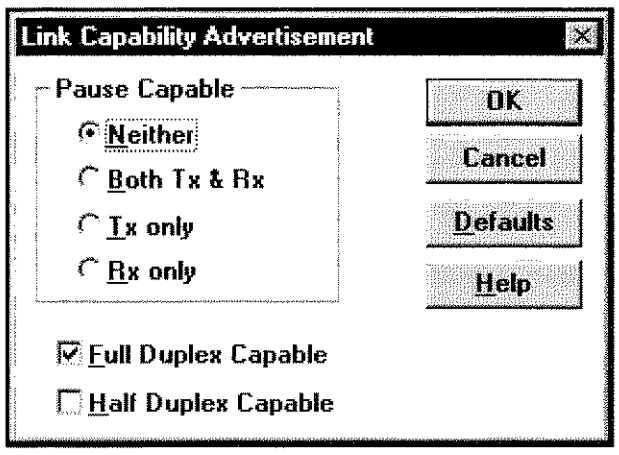

Figure 7-2. Link Capability Advertisement dialog box

To set up link configuration advertisement options:

1. From the Gigabit Ethernet Main Setup dialog box, select the **Enable Link Configuration** option and click **Link Cfg**.

   The Link Capability Advertisement dialog box is displayed.

2. Under **Pause Capable**, select the type of flow control that you want to advertise for the DominoGigabit transmitter and receivers.

3. Select the type of duplex transmission that you want to advertise.

   The DominoGigabit analyzer always operates in full-duplex mode, regardless of the mode that you choose to advertise on the network.

4. Click **OK**.

   The options that you selected are accepted, and you return to the Gigabit Ethernet Main Setup dialog box.

For information about monitoring the status of the link configuration, see Section 9.3, "Monitoring Link Status" in Chapter 9, "Analyzing Network Traffic and Status."

8. Transmitting Network Traffic

8.1. Frame Transmission Overview

The DominoGigabit analyzer allows you to define, import, and transmit test frames at speeds of 1000 Mbps on a gigabit Ethernet network when the analyzer is configured for Emulate mode.

There are three main functions to perform when setting up the analyzer for frame transmission:

- Setting up transmit frames.
- Setting up the transmit queue.
- Setting up the transmit method.

The Transmit Screen is the main window from which all of the frame transmit functions are performed. The Transmit Screen allows you to select available frames for the transmit queue and to start and stop transmission of the queue.

From the Transmit Screen, you can access the following setup dialog boxes:

- Transmit Frame Setup dialog box to define and edit frames.
- Capture Frame Selections dialog box to import frames from an opened capture file.
- Transmit Queue Setup dialog box to set up the transmit queue and additional frame parameters.
- Transmit Method Setup dialog box to specify the frequency of transmission for the entire transmit queue.

All frame transmit parameters are saved to a default transmission file called TRANSMIT.GTX, which is stored in the root directory for the corresponding analyzer number, such as C:\DOMINO\DOMx.

8.2. Understanding the Transmit Buffer

The DominoGigabit analyzer uses a transmit buffer to transmit the frames that you have selected on the Transmit Screen. In setting up the analyzer to transmit frames, it is important to understand the size limits for the transmit buffer and how the buffer works.

The transmit buffer holds each frame that you have selected for transmission on the Transmit Screen, up to a total of 256 KB. The buffer does not hold all of the available frames that you have created or imported on the Transmit Screen--only those frames that you have selected.

You will exceed the transmit buffer capacity by either selecting too many frames, whose total byte count exceeds 256 KB, or by modifying the size of a selected frame that would increase the total byte count for all selected frames above 256 KB.

NOTE: The number of available bytes remaining in the 256 KB transmit buffer is displayed in the **Bytes Free** field on the Transmit Screen and the Transmit Queue Setup dialog box.

8.3. Setting Up to Transmit Frames

Use the Transmit Screen to set up the analyzer to transmit frames. Once you have defined or imported frames for transmission, the most basic transmit setup procedure involves selecting from the available frames for transmission and starting the transmit queue. In this case, the default transmit queue options and transmit method options are used.

Figure 8-1. Transmit Screen

From the Transmit Screen, you can access additional setup dialog boxes to define new or edit existing frames, import frames from a capture file, and modify the default transmit queue and transmit method options.

To set up the analyzer to transmit frames:

1. Be sure the analyzer is configured for an **Emulate** connection.

   You choose the connection type on the Gigabit Ethernet Main Setup dialog box.

2. If the frame you want to transmit is not in the list of frames on the Transmit Screen, set up a new transmit frame, modify an existing frame, or import a frame from a capture file.

   The available frames for the transmit queue are displayed in the frame list on the Transmit Screen.

3. From the Transmit Screen, select the frames that you want to transmit.

   The boxes next to the frames you want to transmit contain a checkmark, and the selected frame is placed into the transmit buffer and queue.

NOTE:

After you have selected frames for the queue, you can start frame transmission. The queue will be transmitted according to the default transmit queue options and transmit method options. If you are currently transmitting frames, you must stop and restart frame transmission to apply the new setup changes.

4. To set up the transmitter to respond to flow control frames, select the **Pause Control Compliant** checkbox.
5. To set up the transmitter for a lower limit of 96 ns for the interframe gap, select the **Minimum IFG Compliant** checkbox. (The specific size of the interframe gap is set on the Transmit Queue Setup dialog box. See 8.10.4.3, "Selecting the Interframe Gap.")

   For example, when you select 4 for the interframe gap with the **Minimum IFG Compliant** option selected, the corresponding 80 ns gap (4 times 20 ns) that you selected is translated to 96 ns for the frame transmission. However, if 6 is selected for the interframe gap, a 120 ns gap will be used.
6. If you want to modify the queue order or edit a queue entry, set up the transmit queue options. See 8.10, "Setting Up the Transmit Queue."
7. If you want to modify the number of times the queue is transmitted, set up the transmit method option. See 8.11, "Setting Up the Transmit Method."
8. If you are currently transmitting frames, you must stop and restart frame transmission to apply the new setup changes.

NOTES:

- Frames are selected for transmission on the Transmit Screen, but the order in which they are actually transmitted is determined by the transmit queue.
- If you do not save the transmit file, the frame setup and all transmit dialog box selections are only available for the current transmit session.

8.4. Selecting Frames for Transmission

You can select all available frames or you can individually select frames for transmission on the Transmit Screen up to the limits of the transmit buffer (256 KB). The order in which selected frames are actually transmitted is determined by the transmit queue.

The Transmit Screen displays the frame number, frame size, preamble size, and the first 16 bytes of each available transmit frame. A checkbox next to each frame specifies whether or not the frame is selected for the transmit buffer and queue. You can use the **Bytes Free** display field on the Transmit Screen to track the amount of available space (in bytes) in the 256 KB transmit buffer.

When you choose the **All** button from the **Selections** box on the Transmit Screen, the analyzer attempts to sequentially load as many frames as it can completely fit within the transmit buffer and queue. If the transmit buffer capacity or queue capacity is reached before all frames can be loaded, a message is issued. You may be able to individually select additional frames to fit into the remaining area of the transmit buffer.

To select/clear frames for transmission:

1. From the Transmit Screen, use the scroll box or scroll arrows to display the available frame you want to select or clear.

   Up to ten available transmit frames are displayed at one time, in numerical frame order, on the Transmit Screen.

2. Do one of the following:

   - To individually select or clear a transmit frame, select the checkbox next to the frame.

     A checkmark is displayed in the box next to the frame that you selected, and the frame is entered into the transmit buffer and added to the bottom of the transmit queue. When you clear a frame, the checkmark is removed and the frame is cleared from the transmit buffer and queue.

   - To select all transmit frames, click **All** in the **Selections** box.

     The analyzer sequentially loads as many frames as it can fit into the transmit buffer and the transmit queue. A checkmark is displayed in the box next to each selected frame.

   - To clear all transmit frames, click **None** in the **Selections** box.

     The analyzer clears all frames from the transmit buffer and queue.

3. If you are currently transmitting frames, you must stop and restart frame transmission to apply the new setup changes.

8.5. Importing Capture Frames for Transmission

You can use the Capture Frame Selections dialog box to import frames from a capture file to the transmit list on the Transmit Screen.

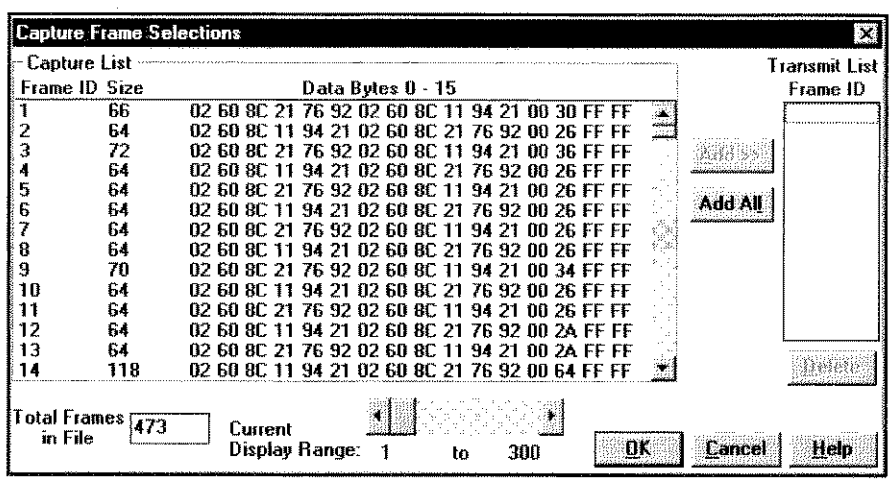

Figure 8-2. Capture Frame Selections dialog box

The range of capture frames that are displayed from the capture file is controlled by the **Current Display Range** scroll bar, which allows you to select and display 300-frame blocks from the capture file. You can use the vertical scroll box to the right of the capture list to view other frames within the selected 300-frame block.

You can import up to the first 1536 bytes of original data for each captured frame. Once you have imported capture frames for transmission, they are available for selection to the transmit queue from the Transmit Screen. When a capture frame with length greater than 1536 is selected for the transmit queue, the first 1536 bytes of data are retained, and the remainder of the frame is padded with the hexadecimal value of the last byte found in the Data field of the frame. For example, if the last byte in the Data field has a hexadecimal value of "CC," then the interface will repeat the value "CC" in the remaining bytes of the Data field to complete the total frame length.

To import capture frames for transmission:

1. From the Transmit Screen, click **Import** and open the capture file from which you want to copy frames.

   The Capture Frame Selections dialog box is displayed.

2. Select the 300-block range of capture frames that you want to display.

   You can use the **Current Display Range** scroll bar to change the range of frames available for display in the Capture Frame Selections dialog box.

3. Select and add capture frames.

   The Frame ID of the capture frames that you added are displayed in the **Transmit List** on the Capture Frame Selections dialog box. You can add up to 300 frames at one time. Repeat the process to add additional frames.

4. Click **OK**.

   You return to the Transmit Screen and the capture frames that you imported are displayed in the transmit list.

5. Select the frames that you want to transmit.

8.5.1. Opening a Capture File

You can open a Domino capture file to import capture frames for the DominoGigabit interface using the **Import** button on the Transmit Screen.

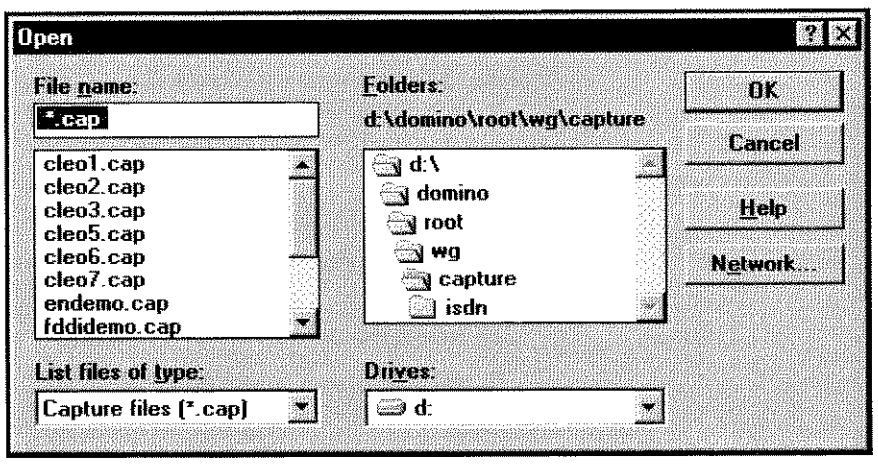

Figure 8-3. Open dialog box for capture files

To open a capture file:

1. From the Transmit Screen, click **Import**.

   The Open dialog box is displayed (Figure 8-3), and the capture files in the root installation directory with extension .CAP are displayed in the file list box.

2. Select the location and name of the capture file that you want to open, and click **OK**.

   The Capture Frame Selections dialog box is displayed (Figure 8-2).

8.5.2. Displaying Capture Frames

You can select the range of capture frames in the open capture file to be displayed on the Capture Frame Selections dialog box using the **Current Display Range** scroll bar.

The total number of frames that are contained in the capture file is displayed in the **Total Frames in File** box. Not all of the capture frames from a large capture file can be displayed at one time in the **Capture List** box. The **Current Display Range** scroll bar allows you to page down proportionally through the frames in the capture file to select a 300-block range of frames for display.

The numbers to the left and right of the **Current Display Range** scroll bar represent the frame IDs of the first frame in the range and the last frame in the range, respectively. (Note that if the frame IDs between the first and last frames are not numbered consecutively, it may not appear that 300 frames are being displayed.)

The **Capture List** box displays the frame ID, size, and the first 16 bytes of each captured frame in the specified range of the capture file. You can use the vertical scroll box to the right of the capture list to view other frames in the selected range.

To select the current display range:

- In the **Current Display Range** scroll bar, do one of the following:
  - To adjust the range up or down by a single frame at a time, select the left or right scroll arrow.
  - To adjust the range proportionally within the capture file, move the scroll box.
  - To select the next block of 300 frames, select any area within the horizontal scroll bar to the right of the scroll box.

To display frames in the current range:

- In the **Capture List** box, select the up or down scroll arrow or move the scroll box to view other frames in the selected 300-block range.

8.5.3. Adding a Capture Frame to the Transmit List

You can add 300 capture frames at a time to the **Transmit List** using the **Add** or **Add All** buttons on the Capture Frame Selections dialog box.

You can select a single frame, multiple frames, or all frames to be added to the transmit list. The Capture Frame Selections dialog box supports extended selection, so you can select multiple frames using a Shift-click, Ctrl-click, or hold and drag sequence with the left mouse button. The same capture frame cannot be added to the transmit list more than one time.

When a capture frame has been selected for the transmit list, the frame is set up with its original size, but only the first 1536 bytes of the original data are retained in the frame. When the frame is selected for the transmit queue, the remaining bytes are padded with the hexadecimal value found in the last byte of the Data field to complete the full capture frame length.

To add a capture frame to the transmit list:

- Do one of the following:
  - To add a single frame or group of frames to the transmit list, select the frames that you want to add and click **Add**.

    The frames that you selected are highlighted, and the frame ID of the frames that you added are displayed in the **Transmit List** box.
  - To add all frames to the transmit list, click **Add All**.

    The frame ID of the frames that you added are displayed in the **Transmit List** box.

You can double-click with the mouse on a single frame that you want to select to automatically add it to the transmit list.

8.5.4. Deleting a Capture Frame From the Transmit List

You can remove one or more capture frames that you just imported to the transmit list using the **Delete** button on the Capture Frame Selections dialog box. The Capture Frame Selections dialog box supports extended selection, so you can select multiple frames using a Shift-click, Ctrl-click, or hold and drag sequence with the left mouse button. The delete function removes the frame ID from the transmit list but leaves the original frame in the capture file intact.

If you want to delete a capture frame after you have already imported and added it to the transmit list on the Transmit Screen, you can use the **Delete** button on the Transmit Screen.

To delete a capture frame from the transmit list:

1. From the **Transmit List** box, select the frame ID or group of frame IDs that you want to delete.

   The frame IDs that you selected are highlighted.

2. Click **Delete**.

   The selected frame IDs are removed from the transmit list.

8.6. Creating a Transmit Frame

You can use the Transmit Frame Setup dialog box (Figure 8-4) and the Frame Setup Wizard to create a new frame. From the Transmit Frame Setup dialog box, you can define a frame between 16 and 10, 240 bytes long, specify its preamble size, and use the Fill Control options to specify a hexadecimal pattern to be replicated within the frame.

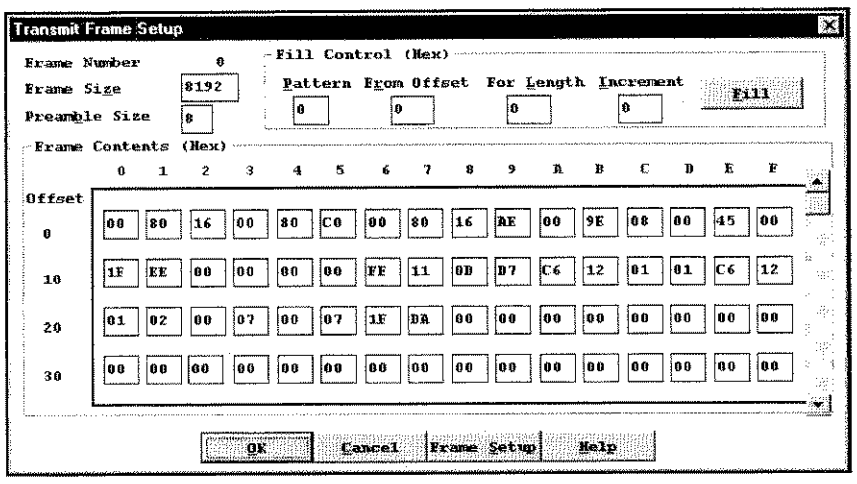

Figure 8-4. Transmit Frame Setup dialog box

If you define a frame that is greater than 1536 bytes long, then the analyzer pads the remainder of the Data field to complete the total frame length that you specified. The padding character used by the analyzer is taken from the hexadecimal value found in the last byte of the Data field. For example, if the last byte found in a transmit frame's Data field has a hexadecimal value of "CC," then the analyzer will repeat the value "CC" in the remaining bytes of the Data field.

To easily set up the source and destination address fields and protocol encapsulation information, you can use the Frame Setup Wizard by clicking the **Frame Setup** button.

To create a transmit frame:

1. From the Transmit Screen, click **New** in the Frames box.

   The Transmit Frame Setup dialog box is displayed with the next available frame number.

2. In the **Frame Size** box, enter the size (in bytes, including FCS) of the frame you want to define.

   The frame size is entered in decimal, between 16 and 10240 bytes.

3. In the **Preamble Size** box, type the size (in bytes) of the preamble for the frame.

   The preamble size is entered in decimal, between 2 and 8 bytes. A hexadecimal preamble pattern of 55 is repeated for one byte less than the length that you specified, ending with a hexadecimal D5 in the last byte.

4. To enter hexadecimal values in the bytes of the frame, do one of the following:

   - In the **Fill Control** box, select the options to replicate a fill pattern in the frame.
   - In the **Frame Contents** box, enter the values directly in the byte locations.

   The fill pattern or byte values that you entered are displayed in hexadecimal in the byte locations that you selected.

5. To open the Frame Setup Wizard to specify protocol-specific addressing and encapsulation options, click **Frame Setup**. The Frame Setup Wizard - Ethernet dialog box is displayed (Figure 8-5).

   Select the protocol options that you want to specify, and click **Finish** to return to the Transmit Frame Setup dialog box.

6. Click **OK**.

   Protocol validation is performed on the first 1536 bytes of the transmit frame. If there are any errors, such as a mismatch between the frame length specified in the Ethernet header and the length of the frame in the Transmit Frame Setup dialog box, then you are given an option to correct the problem.

   The frame that you specified is accepted, and you return to the Transmit Screen. The frame number, size, and first 16 bytes of the frame that you set up is displayed in the Transmit Screen.

NOTE:

The specified frame size does not determine how many bytes can be edited in the **Frame Contents** boxes. You can always edit 1536 bytes regardless of the frame size.

For more information about setting up a transmit frame using the Frame Setup Wizard, see Section 8.7, "Using the Frame Setup Wizard" in this chapter.

8.6.1. Selecting the Frame Size

You can select or modify the size of a transmit frame in the Frame Size box on the Transmit Frame Setup dialog box (Figure 8-4). You enter the frame size (in bytes) using a decimal value between 16 and 10240 bytes. The frame size includes the FCS bytes.

To select the frame size:

- In the **Frame Size** box on the Transmit Frame Setup dialog box, enter the size of the frame (as a decimal number of bytes).

  The size that you entered is displayed in decimal in the **Frame Size** box.

8.6.2. Selecting the Preamble Size

You can specify the size of the preamble for a transmit frame in the **Preamble Size** box on the Transmit Frame Setup dialog box. The preamble size (in bytes) is entered in decimal format and can be between 2 and 8 bytes, where the final byte is the start frame delimeter (SFD). The default preamble size is 8 bytes.

To select the preamble size:

1. From the **Line Setup** dialog box, verify that the **Tx Preamble Enable** option is selected. This is the default selection.
2. From the Transmit Frame Setup dialog box, type the size of the preamble (as a decimal number of bytes) in the **Preamble Size** box.

NOTE:

The preamble pattern is not shown in the **Frame Contents** area of the Transmit Frame Setup dialog box.

8.6.3. Selecting a Fill Pattern

You can use the **Fill Control** box on the Transmit Frame Setup dialog box (Figure 8-4) to quickly enter the same hexadecimal data pattern into multiple bytes of the frame. You can also increase the value of each subsequent byte (in the specified range) by an incremental value. All values are specified in hexadecimal format.

For example, a pattern AB from offset 0 for length 10, will fill bytes 0 through 9 with the value AB. A pattern 00 from offset 10 for length 5 with an increment of 2, will fill byte 10 with 00, byte 11 with 02, byte 12 with 04, byte 13 with 06, and byte 14 with 08.

This function is useful when you want to set up most of the frame, or a large group of bytes in the frame, with the same pattern. You can fill the entire frame with the specified pattern and then go back to edit the specific bytes that you want to change.

To select a fill pattern:

1. In the **Pattern** box on the Transmit Frame Setup dialog box, enter the value that you want to repeat in specified bytes of the frame.

   The hexadecimal value that you specified is displayed in the pattern box.

2. In the **From Offset** box, enter the beginning offset of the byte to contain the pattern.

   When the fill is performed, the pattern will be entered in the byte position that you specified.

3. In the **For Length** box, enter the number of bytes from the offset byte to contain the pattern.

   When the fill is performed, the pattern will be replicated for the number of bytes that you specified.

4. In the **Increment** box, enter the value to be added to each previous byte pattern.

   When the fill is performed, the first byte will contain the pattern. Each subsequent byte specified for the fill will contain the replicated value of the previous byte, increased by the value that you specified.

5. Click **Fill**.

   The pattern that you specified is entered in the corresponding bytes of the **Frame Contents** box.

8.7. Using the Frame Setup Wizard

You can use the Frame Setup Wizard to create or modify a frame that you want to transmit from the DominoGigabit analyzer. The Frame Setup Wizard allows you to specify protocol-specific information including source and destination addressing and encapsulation options for your transmit frame. You can access the Frame Setup Wizard from the Transmit Frame Setup dialog box, when you create a new frame or edit an existing transmit frame.

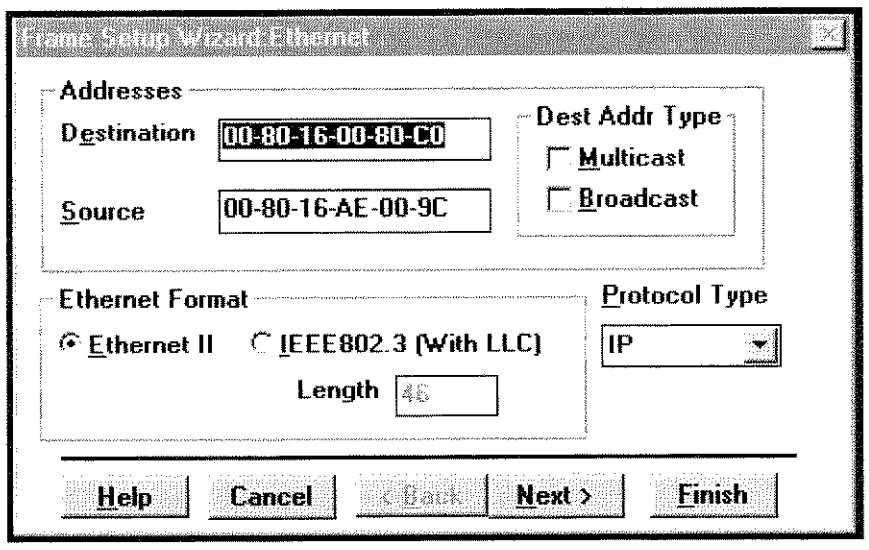

Figure 8-5. Frame Setup Wizard - Ethernet dialog box

The first wizard dialog box (Figure 8-5) allows you to specify the Ethernet options for the transmit frame including MAC addresses, address type, Ethernet frame format, and the next-layer protocol type. From there, depending on the Ethernet frame format that you selected and the next-layer protocol type, you can access the following wizard dialog boxes to set up other protocol information:

- Frame Setup Wizard - IP—Allows you to specify IP source and destination addresses, the total frame length, next layer protocol, and checksum.
- Frame Setup Wizard - UDP—Allows you to specify the UDP source and destination ports and the data length in the header for the UDP frame.
- Frame Setup Wizard - ARP—Allows you to encapsulate an ARP Request or an ARP Reply frame in the Ethernet frame.
- Frame Setup Wizard - MAC Control—Allows you to set up a MAC Pause Control frame.
- Frame Setup Wizard - 802.1q—Allows you to specify values for the user priority and virtual LAN (VLAN) identifier (ID) in the Tag Control Information (TCI) field of the tag header.

If you are modifying an existing frame that contains information for other protocol types in its fields, the Frame Setup Wizard indicates **Unknown** in the **Protocol Type** or **Next Layer Protocol** options. This means that the Frame Setup Wizard detects information that cannot be shown in the wizard setup, but that information will remain intact in the frame.

To use the Frame Setup Wizard:

1. From the Transmit Frame Setup dialog box (Figure 8-4), click **Frame Setup**.

   The Frame Setup Wizard - Ethernet dialog box is displayed (Figure 8-5).

2. Select the Ethernet options. The **Ethernet Format** that you select determines the available choices in **Protocol Type**.

3. Choose one of the following buttons (when available) according to the setup task that you want to perform:

   - To set up additional protocol options (if you selected a next-layer protocol type), click **Next**.
   - To go back to a previous wizard setup dialog box, click **Back**.
   - To accept the setup selections that you made and return to the Transmit Frame Setup dialog box, click **Finish**.
   - To abandon the setup selections that you made and return to the Transmit Frame Setup dialog box, click **Cancel**.
   - To get more information about the options on the wizard dialog box, click **Help**.

8.7.1. Setting Up the Source and Destination Address

You can use the Frame Setup Wizard - Ethernet dialog box (Figure 8-5) to select the destination address type and specify the source and destination address fields for a frame that you want to transmit. From the Frame Setup Wizard - Ethernet dialog box, you can continue to specify higher-level protocol addressing, such as IP, when you choose IP for the Protocol Type option and click **Next**.

To set up the source and destination address:

1. From the Transmit Frame Setup dialog box, click **Frame Setup**.

   The Frame Setup Wizard - Ethernet dialog box is displayed.

2. To specify the destination address type, do one of the following in the Dest Addr. Type box:

   - Select **Multicast**.

     The multicast bit is set in the destination address of the transmit frame.

   - Select **Broadcast**.

     A destination address of FF-FF-FF-FF-FF-FF is specified for the transmit frame.

3. In the **Addresses** box, type the six-byte hexadecimal destination and source address fields (with each byte separated by a hyphen) in the corresponding **Destination** and **Source** edit boxes.

   The default source address is 00-80-16-AE-00-9C, where 00-80-16 is the manufacturer's ID, and the remaining bytes provide a unique identifier that is read from the DominoGigabit analyzer.

4. Click **OK**.

   The dialog box selections are accepted, and you return to the Transmit Frame Setup dialog box. The destination and source address fields that you specified appear in offsets 0 through 11 of the **Frame Contents** box.

8.7.2. Setting Up the Length/Type

Use the Frame Setup Wizard - Ethernet dialog box (Figure 8-5) to specify the length or protocol type of the Ethernet frame that you want to transmit. Depending on the type of Ethernet frame format that you are setting up, you can specify either the frame length (for IEEE 802.3) or the protocol type (for Ethernet II).

To set up the length/type:

1. From the Transmit Frame Setup dialog box, click **Frame Setup**.

   The Frame Setup Wizard - Ethernet dialog box is displayed.

2. To specify the frame length, choose the **IEEE802.3 (With LLC)** format and enter a decimal value (representing the two-byte hexadecimal value) in the Length box for the length of the frame.

3. To specify the protocol type, select a protocol in the **Protocol Type** box.

4. Click **Finish**.

   The dialog box options that you selected are accepted, and you return to the Transmit Frame Setup dialog box. The Length/Type field that you specified appears in offsets 12 and 13 of the **Frame Contents** box.

8.8. Modifying a Transmit Frame

You can select an existing transmit frame on the Transmit Screen to edit the frame size and contents. This is useful for modeling a new frame from an existing transmit frame, or an imported capture frame.

To modify a transmit frame:

1. From the Transmit Screen, move the mouse pointer to the frame you want to modify and double-click on the frame.

   The Transmit Frame Setup dialog box is displayed (Figure 8-4), and you can edit the frame contents.

2. To edit the frame using the Frame Setup wizard, click **Frame Setup**.

   The Frame Setup Wizard - Ethernet dialog box is opened showing the contents of the Ethernet frame header for the frame that you selected.

   - To modify other protocol layer settings, click **Next** until you have completed all of your selections.
   - Then, click **Finish**.

3. When you have completed editing the frame contents, click **OK**.

   The changes that you made to the frame are accepted, and you return to the Transmit Screen.

4. If you are currently transmitting frames, you must stop and restart frame transmission to apply the new setup changes.

NOTE:

If you do not save the transmit file, the frame contents are only saved for the current Transmit session.

8.9. Deleting a Transmit Frame

You can remove one or more existing transmit frames on the Transmit Screen using the Delete button.

To delete a transmit frame:

1. From the Transmit Screen, select the frames that you want to delete. To select multiple transmit frames, use any Windows® extended selection method including Shift-Arrow, Shift-Click, Ctrl-Click, or a hold and drag combination with the left mouse button.

   The frames that you selected are highlighted.

2. In the Frames box, click **Delete**.

   The frames are removed from the Transmit Screen.

3. If you are currently transmitting frames, you must stop and restart frame transmission to apply the new setup changes.

NOTE:

If you do not save the transmit file, the frame is only removed for the current Transmit session.

8.10. Setting Up the Transmit Queue

You can use the Transmit Queue Setup dialog box (Figure 8-6) to do the following:

- Change the order of the queue entries.
- Modify a frame number.
- Specify the number of times to repeat a frame.
- Specify the size of the interframe or interpacket gap.
- Append a frame check sequence or create an invalid FCS.

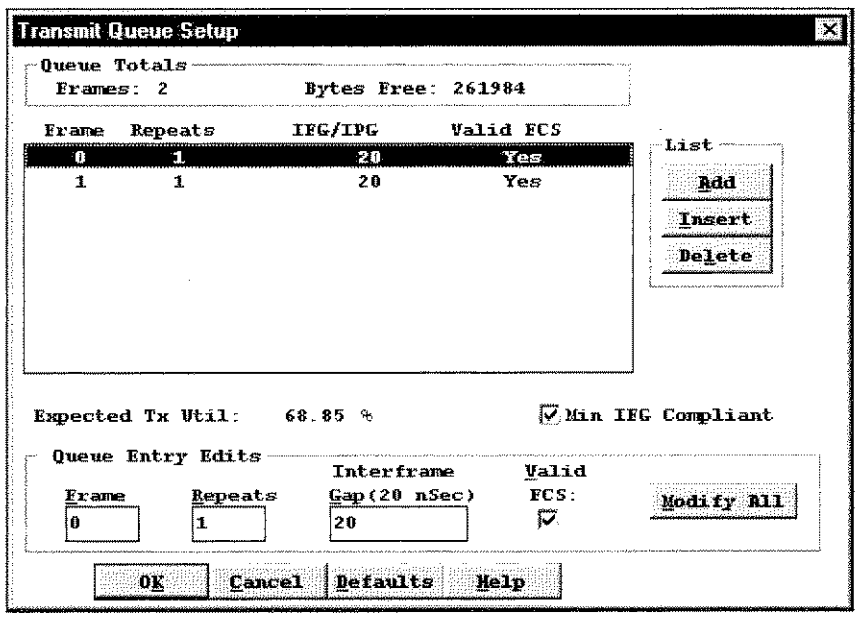

Figure 8-6. Transmit Queue Setup dialog box

Frames that are available for transmission are selected for the transmit queue from the Transmit Screen. The default order that frames are entered into the queue is in sequential order, by frame number. Frames are transmitted from top to bottom of the queue.

If no changes are made to the transmit queue, frames are transmitted in default order using the default queue setup options (1 for Repeats, 5 Interframe Gap units, and addition of a valid FCS for all entries in the queue).

To set up the transmit queue:

1. Under **Transmit Mode** on the Transmit Screen, select **Queue**.

   The **Q Setup** button is enabled.

2. In the **Transmit Control** box on the Transmit Screen, click **Q Setup**.

   The Transmit Queue Setup dialog box is displayed.

3. From the **List** box, modify the list of queue entries.

   The default order for queue entries is in sequential order, by frame number. Frames are transmitted from top to bottom of the queue.

4. In the **Queue Entry Edits** box, specify the queue entry options and do one of the following:
   - To accept the queue entry options that you selected for an individual frame, select another queue entry or click **OK**.
   - To accept the queue entry options that you selected for all frames in the queue, click **Modify All** and then click **OK**.

   The Transmit Queue Setup dialog box options that you selected are accepted, and you return to the Transmit Screen.
5. If you are currently transmitting frames, you must stop and restart frame transmission to apply the new setup changes.

NOTE:

The Transmit Method Setup dialog box allows you to specify the frequency of transmission for the entire queue. See 8.11, "Setting Up the Transmit Method."

8.10.1. Adding a Frame to the Queue

You can add a default entry (frame number 0) to the transmit queue using the **Add** button in the **List** box on the Transmit Queue Setup dialog box (Figure 8-6). The transmit queue can hold the number of frames whose total frame size is no greater than 256 KB, which is the size of the transmit buffer.

To be a valid queue entry, the default frame number must be modified to match one of the frame numbers already selected for the queue on the Transmit Screen.

To add a frame to the queue:

1. In the **List** box on the Transmit Queue Setup dialog box, click **Add**.

   A default entry (frame number 0) is added to the end of the queue.
2. If necessary, edit the frame number of the new queue entry to match one of the frame numbers selected on the Transmit Screen.
3. Click **OK**.

   The Transmit Queue Setup dialog box options that you selected are accepted, and you return to the Transmit Screen.
4. If you are currently transmitting frames, you must stop and restart frame transmission to apply the new setup changes.

8.10.2. Inserting a Frame in the Queue

You can insert a default entry (frame number 0) in the transmit queue using the **Insert** button in the **List** box on the Transmit Queue Setup dialog box (Figure 8-6). The transmit queue can hold the number of frames whose total frame size is no greater than 256 KB, which is the size of the transmit buffer.

To be a valid queue entry, the default frame number must be modified to match one of the frame numbers selected on the Transmit Screen.

To insert a frame in the queue:

1. From the Transmit Queue Setup dialog box, select the queue entry immediately below the position you want to insert the new entry.

   The queue entry that you selected is highlighted.

2. In the **List** box, click **Insert**.

   A default entry (frame number 0) is inserted immediately above the queue entry that you selected.

3. If necessary, edit the frame number of the new queue entry to match one of the frame numbers selected on the Transmit Screen.

4. Click **OK**.

   The Transmit Queue Setup dialog box options that you selected are accepted, and you return to the Transmit Screen.

5. If you are currently transmitting frames, you must stop and restart frame transmission to apply the new setup changes.

8.10.3. Deleting a Frame From the Queue

You can delete an entry from the transmit queue using the **Delete** button in the **List** box on the Transmit Queue Setup dialog box (Figure 8-6).

To delete a frame from the queue:

1. From the Transmit Queue Setup dialog box, select the queue entry that you want to delete.

   The queue entry that you selected is highlighted.

2. In the **List** box, click **Delete**.

   The entry that you selected is removed from the queue.

3. Click **OK**.

   The Transmit Queue Setup dialog box options that you selected are accepted, and you return to the Transmit Screen.

4. If you are currently transmitting frames, you must stop and restart frame transmission to apply the new setup changes.

8.10.4. Editing a Queue Entry

You can use the options in the **Queue Entry Edits** box on the Transmit Queue Setup dialog box (Figure 8-6) to modify a frame number, specify the number of times to repeat a frame, specify the interframe or interpacket gap, and add a frame check sequence to an individual frame or all transmit frames.

To edit a queue entry:

1. From the Transmit Queue Setup dialog box, select the queue entry that you want to edit.

   The queue entry that you selected is highlighted, and the options for the selected queue entry are displayed in the **Queue Entry Edits** box.

2. In the **Queue Entry Edits** box, specify the new queue entry options.

3. Do one of the following:

   - To accept the queue entry options that you selected for an individual frame, select another queue entry or click **OK**.
   - To accept the queue entry options that you selected for all frames in the queue, click **Modify All** and then click **OK**.

   The Transmit Queue Setup dialog box options that you selected are accepted, and you return to the Transmit Screen.

NOTE:

To activate the accepted queue entry options, you must click **OK** to return to the Transmit Screen. If you are currently transmitting frames, you must stop and restart frame transmission to apply the new setup changes.

8.10.4.1.Selecting the Frame Number

You can select the queue entry frame number in the **Frame** box of the **Queue Entry Edits** options on the Transmit Queue Setup dialog box (Figure 8-6). The frame number is entered in decimal format and must match one of the frame numbers already selected for the queue on the Transmit Screen.

To select the frame number:

1. From the Transmit Queue Setup dialog box, select the queue entry that you want to edit.

   The queue entry that you selected is highlighted, and the options for the selected queue entry are displayed in the **Queue Entry Edits** box.

2. In the **Frame** box of the Queue Entry Edits options, enter the new number of the frame.

   The decimal number that you entered is displayed in the **Frame** box.

3. Do one of the following:

   - To accept the queue entry options that you selected for an individual frame, select another queue entry or click **OK**.
   - To accept the queue entry options that you selected for all frames in the queue, click **Modify All** and then click **OK**.

   The Transmit Queue Setup dialog box options that you selected are accepted, and you return to the Transmit Screen.

   If the frame number that you selected is a valid frame number (that is, it is selected for the queue on the Transmit Screen), the frame number is accepted, and it is displayed in the queue list.

NOTE:

To activate the accepted queue entry options, you must click **OK** to return to the Transmit Screen. If you are currently transmitting frames, you must stop and restart frame transmission to apply the new setup changes.

8.10.4.2.Selecting the Repeat Count

You can select the number of times to repeat transmission of the frame by specifying a number in the **Repeats** box of the **Queue Entry Edits** options on the Transmit Queue Setup dialog box (Figure 8-6). The repeat count is entered in decimal format. You can repeat a frame up to 255 times.

To select the repeat count:

1. From the Transmit Queue Setup dialog box, select the queue entry that you want to edit.

   The queue entry that you selected is highlighted, and the options for the selected queue entry are displayed in the **Queue Entry Edits** box.

2. In the **Repeats** box of the **Queue Entry Edits** options, enter the number of times you want to repeat transmission of the frame.

   The decimal number that you entered is displayed in the **Repeats** box. The default selection is 1.

3. Do one of the following:

- To accept the queue entry options that you selected for an individual frame, select another queue entry or click **OK**.
- To accept the queue entry options that you selected for all frames in the queue, click **Modify All** and then click **OK**.

The Transmit Queue Setup dialog box options that you selected are accepted, and you return to the Transmit Screen.

NOTE:

To activate the accepted queue entry options, you must click **OK** to return to the Transmit Screen. If you are currently transmitting frames, you must stop and restart frame transmission to apply the new setup changes.

8.10.4.3.Selecting the Interframe Gap

Use the Minimum IFG Compliant option and the Interframe Gap option on the Transmit Queue Setup dialog box (Figure 8-6) to select a specific interframe gap (IFG) value. To transmit at full line-rate speeds, the IFG should be 96 nanoseconds. The status of the Minimum IFG Compliant option (selected or cleared) determines whether you want to transmit at gigabit transmission speeds or faster. Either mode allows you to transmit at a slower than gigabit line rate.

The expected network utilization percentage corresponding to the interframe gap options that you selected for the transmit frames is shown in the **Expected Tx Util** field on the Transmit Queue Setup dialog box and the Transmit Screen.

To select the interframe gap:

1. From the Transmit Queue Setup dialog box, do one of the following:
   - To select an IFG less than 96 ns (results in traffic higher than line rate), clear the **Min IFG Compliant** checkbox.
   - To select an IFG greater than 96 ns (results in traffic lower than line rate), you can select or clear the **Min IFG Compliant** checkbox.
2. Select the queue entry that you want to edit.

   The queue entry that you selected is highlighted, and the options for the selected queue entry are displayed in the **Queue Entry Edits** box.
3. In the **Interframe Gap** box of the **Queue Entry Edits** options, do one of the following:
   - To achieve a minimum of exactly gigabit transmission speeds (IFG= 96 ns), select the **Min IFG Compliant** checkbox on the Transmit Screen, and select **4 or less (20-ns interframe gap units)** for the **Interframe Gap** option on the Transmit Queue Setup dialog box. Any value less than or equal to 4 will specify a 96 ns IFG.

- To achieve faster than gigabit transmission speeds (IFG< 96 ns), clear the **Min IFG Compliant** checkbox on the Transmit Screen, and select **4 or less (20-ns interframe gap units)** for the **Interframe Gap** option on the Transmit Queue Setup dialog box.
- To achieve slower than gigabit transmission speeds (IFG> 96 ns), select **5 or greater (up to 4 billion, 20-ns interframe gap units)** on the Transmit Queue Setup dialog box, when the interface is set up with or without the Minimum IFG Compliant option.

The decimal number that you entered is displayed in the **Interframe Gap** box. The default selection is 5 (20-ns interframe gap units), or 100 ns.

4. Do one of the following:
   - To accept the queue entry options that you selected for an individual frame, select another queue entry or click **OK**.
   - To accept the queue entry options that you selected for all frames in the queue, click **Modify All** and then click **OK**.

   The Transmit Queue Setup dialog box options that you selected are accepted, and you return to the Transmit Screen.

NOTES:

- To activate the accepted queue entry options, you must click **OK** to return to the Transmit Screen. If you are currently transmitting frames, you must stop and restart frame transmission to apply the new setup changes.
- If you want to specify a percent utilization for transmission instead of the interframe gap, use the **Utilization** transmit mode option on the Transmit Screen.

8.10.4.4.Appending a Frame Check Sequence

You can append a valid or invalid frame check sequence to an individual transmit frame, or to all transmit frames using the Valid FCS option on the Transmit Queue Setup dialog box (Figure 8-6). The default option is to append a valid FCS to all transmit frames.

To append a frame check sequence to an individual transmit frame:

1. From the Transmit Queue Setup dialog box, select the queue entry to which you want to add the FCS.

   The queue entry that you selected is highlighted, and the options for the selected queue entry are displayed in the **Queue Entry Edits** box.

2. Do one of the following:

   - To append a valid FCS to the transmit frame, select the **Valid FCS** checkbox.
   - To append an invalid FCS to the transmit frame, clear the **Valid FCS** checkbox.

3. Do one of the following:

   - To accept the queue entry options that you selected for an individual frame, select another queue entry or click **OK**.
   - To accept the queue entry options that you selected for all frames in the queue, click **Modify All** and then click **OK**.

   The Transmit Queue Setup dialog box options that you selected are accepted, and you return to the Transmit Screen.

   A frame check sequence will be added to the frames that you selected. Yes is displayed for a valid FCS, and No is displayed for an invalid FCS, beside the frame in the queue list.

NOTE:

To activate the accepted queue entry options, you must click **OK** to return to the Transmit Screen. If you are currently transmitting frames, you must stop and restart frame transmission to apply the new setup changes.

8.11. Setting Up the Transmit Method

You can use the Transmit Method Setup dialog box (Figure 8-7) to specify the number of times to repeat transmission of the entire transmit queue. You can transmit the queue one time, repeat transmission of the queue for a period of up to 999,999,999 seconds, repeat transmission of the queue up to 1 billion times, or continuously repeat transmission of the queue.

If you do not specify a transmit method option, the default option (Single) is selected, and the queue is transmitted one time.

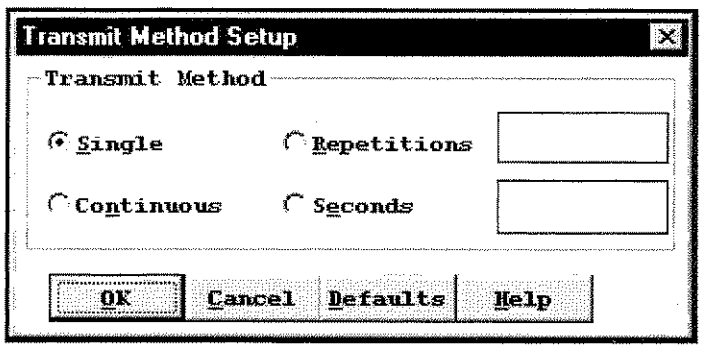

Figure 8-7. Transmit Method Setup dialog box

To set up the transmit method:

1. In the **Transmit Control** box on the Transmit Screen, click **Method**.

   The Transmit Method Setup dialog box is displayed.

2. Do one of the following:

   - To transmit the queue one time only, choose **Single**.

     This is the default selection.

   - To transmit the queue repeatedly without stopping, choose **Continuous**.

   - To transmit the queue a certain number of times, choose **Repetitions** and enter a decimal value between **1** and **1 billion** in the option box.

   - To transmit the queue for a certain period of time (in seconds), choose **Seconds** and enter a decimal value between **1** and **999,999,999** in the option box.

3. Click **OK**.

   The dialog box option that you selected is accepted, and you return to the Transmit Screen.

4. If you are currently transmitting frames, you must stop and restart frame transmission to apply the new setup changes.

8.12. Setting Up the Transmit Mode

Use the Transmit Mode options on the Transmit Screen to specify the method used to set up the frames for transmission and determine the expected transmit utilization percentage.

You can specify one of the following two transmit modes:

- **Queue**—Select this option and click **Q Setup** to modify the order of frames to be transmitted in the queue, specify interframe gap options, repeat the transmission of a particular frame for a specified number of times, or indicate FCS preferences.
- **Utilization**—Select this option to transmit the selected frames in the buffer according to a specific percentage of network utilization. The analyzer automatically determines the corresponding interframe gap for the selected frames and reports the utilization in the **Expected Tx Util** field.

NOTE:

If you want to transmit frames by a specific utilization percentage, and you also want to modify some of the queue setup options, be sure to set up the queue options first. Then select the **Utilization** transmit mode on the Transmit Screen when you are ready to transmit frames.

8.12.1. Transmitting Frames by Percent Utilization

Use the **Utilization** transmit mode option on the Transmit Screen to specify a bandwidth percentage that you want to transmit onto the network. The analyzer automatically calculates the corresponding interframe gap for the frames that you selected in the transmit buffer and shows the expected utilization value in the **Expected Tx** Util field.

To transmit frames by percent utilization:

1. Under **Transmit Mode** on the Transmit Screen, select **Utilization**.

   The default selection is 100% utilization.

2. In the edit box, specify an integer value up to 100 for the percent utilization that you want to transmit.

NOTE:

If you want to transmit frames by a specific utilization percentage, and you also want to modify some of the queue setup options, be sure to set up the queue options first. Then select the **Utilization** transmit mode on the Transmit Screen when you are ready to transmit frames.

8.13. Starting and Stopping Frame Transmission

You can use the **Start/Stop** button in the **Transmit Control** box on the Transmit Screen to begin or end transmission of the frames in the transmit queue. When you click **Start**, frames are transmitted from the queue, according to the options specified in the Transmit Queue Setup dialog box and the Transmit Method Setup dialog box. If you have not specified any options in either the Transmit Queue or Transmit Method setup dialog boxes, the frames selected on the Transmit Screen are transmitted according to the default setup options.

To start frame transmission:

1. Be sure that the analyzer is configured for the Emulate connection mode.

   You choose the connection type on the Gigabit Ethernet Main Setup Dialog Box. See 4.2, "Selecting the Connection Mode."

2. From the Transmit Screen, be sure frames have been selected for the transmit buffer and queue.

   The selected frames for the transmit buffer and queue are checked in the box beside the frame. The **Start** button is enabled in the Transmit Control box.

3. In the **Transmit Control** box, click **Start**.

   Entries in the transmit queue begin transmission according to the options selected in the Transmit Queue Setup and Transmit Method Setup dialog boxes. The **Start** button becomes a **Stop** button, which allows you to end active frame transmission.

To stop frame transmission:

- While the queue is transmitting, click **Stop** in the **Transmit Control** box on the Transmit Screen.

  Transmission of the queue is ended, and the frames that were selected for the transmit queue remain selected.

NOTE:

The **Start** button is disabled if there are no frames selected for the transmit queue. The analyzer must be configured for Emulate in order to transmit frames.

8.14. Saving the Transmission File

Save the transmit frames, queue setup, and transmit method options using the **Save** button on the Transmit Screen. The options are saved to a default file called TRANSMIT.GTX, which is stored in the root directory for the corresponding analyzer number, such as C:\DOMINO\DOMx. So, the transmit file for Domino analyzer number two is found in C:\DOMINO\DOM2. You can save one transmit file for each DominoGigabit analyzer.

If you do not save the transmit frames and options, the dialog box selections are lost when you exit the Transmit Screen from real time.

To save the transmission file:

- In the **Tx Cfg** box on the Transmit Screen, click **Save**.

The transmit frames and queue and transmit method setup options are saved to the TRANSMIT.GTX file.

9. Analyzing Network Traffic and Status

9.1. Capturing Network Traffic

You can use the **Capture** command in the **Workbench** menu on the Workbench screen, or the **Capture** task button on the Workbench screen, to save network traffic in a capture file and display the Real Time screen. From Real Time, you can access Examine, which allows you to examine the contents of the capture buffer.

The DominoGigabit analyzer continuously receives network traffic (subject to any filters and triggers that you may have defined) into its 128-MB capture buffer (64 MB per receiver) at full line rates. During real-time analysis, the analyzer passes a portion of the network data to the PC for online protocol decoding (for example, in the Hexadecimal Trace window).

When the DominoGigabit analyzer receives frames during real-time analysis, frames greater than or equal to 256 bytes are truncated to the first 256 bytes in the Hexadecimal Trace window. You can use Examine to view up to 4088 bytes of a frame.

9.2. Capturing Traffic to Your Computer's Disk

When you want to capture an amount of traffic that you expect will exceed the capacity of the RAM buffer , you can set up the system so that it automatically performs a capture, saves the captured traffic to your computer's disk, and repeats the process. You can specify how and when you want the process to start and to repeat. The cycle of automatic capturing, saving, and repeating can begin:

- Each time the Domino capture buffer is filled to a specified level
- At a specified time, repeating at specified intervals
- Each time a specified trigger occurs during a specified interval

The Capture to Disk feature is one of the options available in the Advanced Setup dialog box (Figure 9-1).

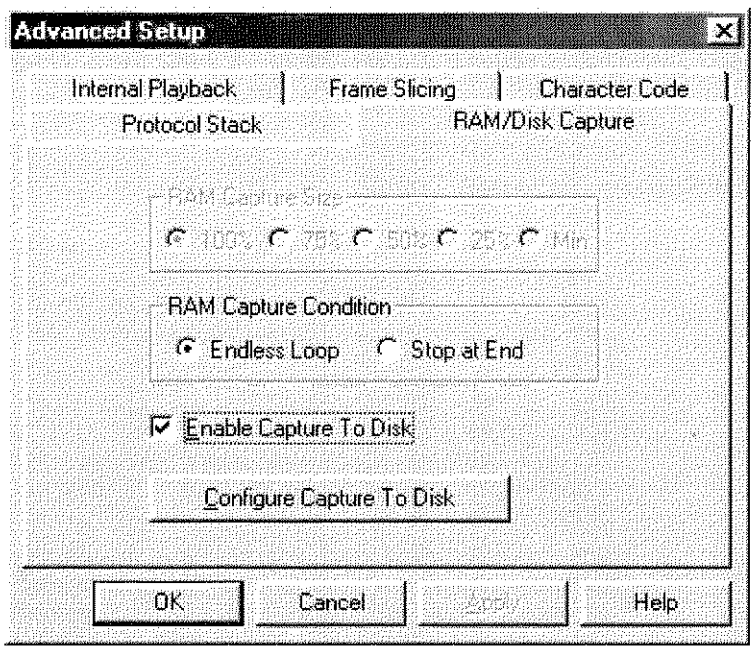

Figure 9-1. Advanced Setup dialog box

To repeat captures to your disk automatically:

1. On the Workbench screen, click the **Setup** button next to the name of the analyzer from which you want to capture traffic.
2. On the Gigabit Ethernet Main Setup dialog box, click **Advanced**.
3. In the Advanced Setup dialog box, click the **RAM/Disk Capture** tab.
4. Select **Enable Capture to Disk**; then click **Configure Capture to Disk**.
   The Configure Capture to Disk dialog box appears (Figure 9-2).

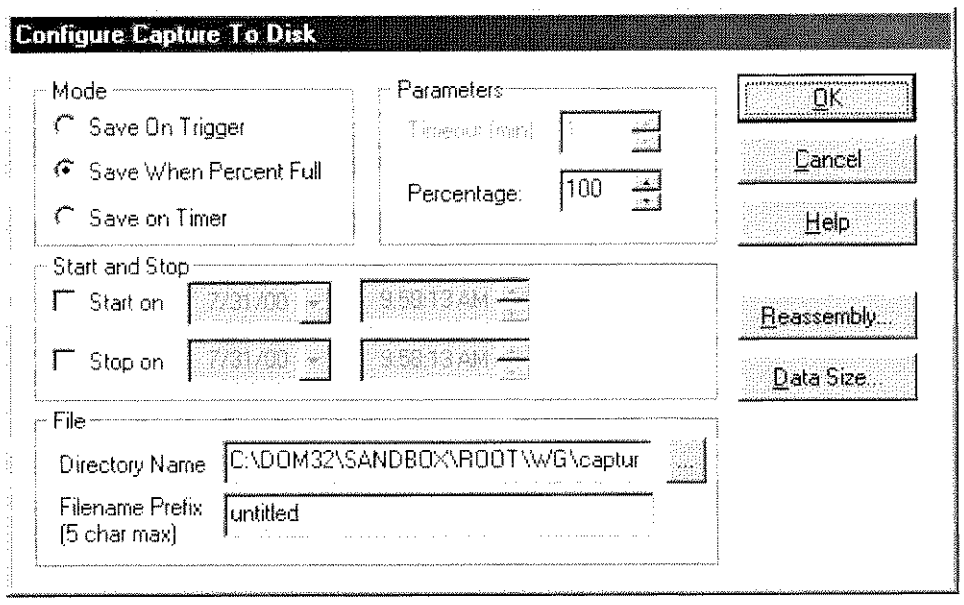

Figure 9-2. Configure Capture to Disk dialog box

5. Under **Mode**, take one of the following actions:

   - To save captured data and clear the Domino capture buffer each time that a trigger condition is met, click **Save on Trigger**. (This option is available for FastEthernet, HSSI, and Gigabit interfaces only.)

     To learn how to set up a trigger, see, 6.2, "Setting up Filtering and Triggering."

   - To save captured data each time the Domino capture buffer is filled to a certain limit, click **Save When Percent Full**. Under **Parameters**, specify the point at which you want to initiate the save action (in terms of the percent of the buffer to be filled.)

   - To save a specified percentage of the RAM buffer at regular intervals, click **Save on Timer**. Under **Parameters**, use **Timeout** to specify how often you want to save the captured data (in minutes). Use **Percentage** to specify how much of the traffic in the buffer to save each time.

     To limit the interval in which the capturing and saving process occurs, specify the dates and times under **Start and Stop**.

6. Under **File**, type a name in the **Filename Prefix** box. (Click the button to browse to the directory that you want.)

   With each successive data capture, a new number is appended to the filename prefix.

7. Click **OK**.

   You return to the Advanced Setup dialog box. The process that you have set up will be activated when you start the analyzer.

9.3. Limiting the Amount of Capture Data that is Saved to Disk

When you set up the Domino system to save captured data to your disk repeatedly, the amount of data that is saved can grow very large. To preserve space on your disk, you can set limits on the total amount of capture data that is saved.

To limit the total amount of capture data:

1. In the Configure Capture to Disk dialog box, click **Data Size**.

   The Data Size dialog box appears, which displays the amount of disk space that is available on your disk.

2. Take one or both of the following actions:

   - To limit the amount of data to be saved to you disk, specify a maximum amount in **Max Data Size**.
   - To limit the amount of disk space to be used, specify a minimum amount of your disk space to keep available in **Min Available Disk Space**.

3. Click **OK** to return to the Configure Capture to Disk dialog box.

9.3.1. Setting Up for Internal Playback

You can enable the DominoGigabit analyzer to play back capture frames from a capture file internally to the analyzer without being connected to the network. When you enable playback, a message box appears providing you the option to transmit the capture file onto the network.

If you accept the option to transmit frames onto the network, then you must be sure to be connected to the network either with a loopback cable or other valid network connection. Transmit statistics only appear if you have selected to playback frames onto the network.

To set up for internal playback:

1. From the DominoGigabit Ethernet Main Setup dialog box, click **Advanced**.

   The Advanced Setup dialog box is displayed.

2. Click the **Internal Playback** tab.

   Internal Playback setup options are displayed.

3. Choose **Enable Internal Playback** and specify the name of the capture file from which you want to replay frames through the analyzer.
4. When the message box appears asking if you want to playback frames onto the network, do one of the following:
   - To retransmit frames onto the network, click **Yes**. Note that you must have a valid network connection to choose this option.
   - To retransmit frames internally to the analyzer only, click **No**.

9.4. Examining Network Traffic

You can use the Examine command to analyze captured network traffic.

Protocol Decodes

For the DominoGigabit analyzer to be able to decode a protocol, the protocol software must be installed, and the protocol must be identifiable by the protocol at the preceding Layer. If the next-Layer protocol cannot be identified in the frame by the protocol at the lower Layer, then you need to set up the Domino protocol stack to specify where the protocols reside. In this case, the protocol can be decoded only if you manually specify both protocols, at their appropriate Layers on the protocol stack.

Hexadecimal Trace Data

The data displayed in the real time Hexadecimal Trace window and the data displayed from a capture file in the Hexadecimal Trace window in Examine may not match if the RAM Capture Stop at End option is in use. The PC stops processing data when the Stop at End option is reached, but the analyzer continues to receive network traffic.

Synchronizing Timestamps

Timestamp synchronization is temporarily lost when a new firmware version for a receiver is downloaded by the software. A message box appears notifying you that "Timestamp synchronization lost during Firmware update."

To recover the timestamp synchronization, exit real time and go to the Workbench screen to reinitialize the Domino stack. Choose Utilities/Reinitialize Dominos from the menu bar.

To examine network traffic:

1. From the Real Time screen menu bar, choose the **Control** menu.

   The Control menu is displayed.

2. Choose the **Examine** command.

   A confirmation box is displayed. Click **Examine** to continue. The Capture RAM Selection dialog box optionally appears (when the Always Prompt option is in use), which allows you to select how to view the capture buffers. After the contents of the capture buffer are prepared, the Examine screen is displayed.

9.4.1. Selecting RAM Capture View by Receiver

The DominoGigabit® analyzer continuously receives network traffic (subject to any filters and triggers that you may have defined) into two 64-MB capture buffers (one per receiver for a 128 MB total capture buffer size) at full line rates.

You can use the Capture RAM Selection dialog box (Figure 9-1) to dynamically select viewing options for RAM capture without having to restart your application in real time. These capture view options include selecting which receivers to view capture data from and synchronization of both receiver capture buffers in Examine.

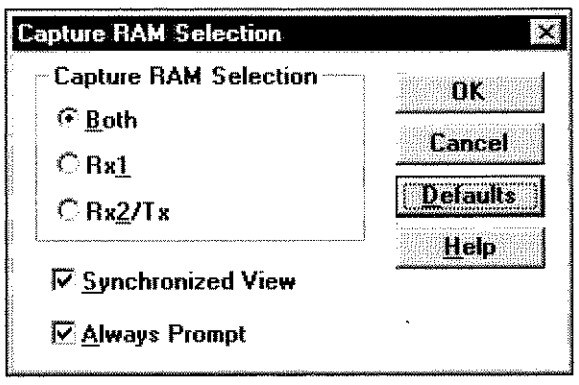

Figure 9-3. Capture RAM Selection dialog box

To select RAM capture view by receiver from main setup:

1. From the Gigabit Ethernet Main Setup dialog box, click **Capture**.

   The Capture RAM Selection dialog box is displayed.

2. To specify which receiver to view capture data from, choose **Both**, **Rx1**, or **Rx2/Tx**.

3. To synchronize the RAM capture buffers for each receiver and limit the display of frames in Examine to a time period in which no frames have been overwritten in either buffer, select **Both** and **Synchronized View**.

   For more information about synchronizing RAM capture, see Section 9.2.2., "Viewing Frames From Both Receivers."

4. To set up the analyzer to automatically open the Capture RAM Selection dialog box whenever you enter Examine or whenever you choose **Save Capture Buffer** from the **Control** menu in Real Time, choose **Always Prompt**.

5. Click **OK**.

   If you accessed the Capture RAM Selection dialog box from within Real Time, your changes are immediately activated and you do not have to restart your application.

NOTES:

- If you access the Capture RAM Selection dialog box from Examine, you must exit Examine and reopen it to enable your changes.
- RAM capture save options (such as the capture buffer stop condition setting) are available through Advanced Setup. Changes made to the RAM capture options in Advanced Setup are activated when you restart the application and apply across all interfaces.

9.4.2. Viewing Frames From Both Receivers

The DominoGigabit analyzer has a separate 64-MB capture buffer for each receiver. When you are capturing data for each of the analyzer's receivers, it is likely that the capture buffers will fill at different rates. When you view the captured data in Examine, it is possible that some of the frames for a particular receiver in a certain time period do not appear in the capture buffer due to wrapping.

You can use the Synchronized View option (selected as default option) on the Capture RAM Selection dialog box to limit the viewable timeframe of the capture buffers of each receiver. Synchronizing RAM capture limits the display of frames in Examine to a time period in which no frames have been overwritten in either buffer (Figure 9-3).

For example, a receiver that is capturing data coming back from a server may have a larger amount of data than the receiver capturing requests from a client. Once the capture buffer fills, older data is overwritten by newer frames (unless the RAM capture Stop at End condition is selected). Therefore, if you are looking for an acknowledgment frame or a request/reply sequence, part of the data may not be available for viewing in Examine. You might only see the request, but the reply came in and was overwritten by newly captured data.

Figure 9-2 shows a view of RAM capture when the Synchronized View option is not selected.

Number	Abs Time	DeltaTime	Rel Time	Size	Destination
265788	12:18:44.68342728	6.5 us	1.8 sec	64	198.18.1.2
265789	12:18:44.68343419	6.9 us	1.8 sec	64	198.18.2.2
265790	12:18:44.68344091	6.7 us	1.8 sec	64	198.18.1.2
265791	12:18:44.68344747	6.6 us	1.8 sec	64	198.18.2.2
265792	12:18:44.68345434	6.9 us	1.8 sec	64	198.18.1.2
265793	12:18:44.68346106	6.7 us	1.8 sec	64	198.18.2.2
265794	12:18:44.68346763	6.6 us	1.8 sec	64	198.18.1.2
265795	12:18:44.68347181	4.2 us	1.8 sec	112	198.12.1.2
265796	12:18:44.68347450	2.7 us	1.8 sec	64	198.18.2.2
265797	12:18:44.68348047	5.9 us	1.8 sec	64	198.10.1.2
265798	12:18:44.68348122	750 ns	1.8 sec	64	198.18.1.2
265799	12:18:44.68348778	6.6 us	1.8 sec	64	198.18.2.2
265800	12:18:44.68349469	6.9 us	1.8 sec	64	198.18.1.2
265801	12:18:44.68349634	1.7 us	1.8 sec	1024	198.18.1.2
265802	12:18:44.68350137	5.0 us	1.8 sec	64	198.18.2.2
265803	12:18:44.68350537	3.9 us	1.8 sec	112	198.12.1.2
265804	12:18:44.68350791	2.5 us	1.8 sec	64	198.18.1.2
265805	12:18:44.68351412	6.2 us	1.8 sec	64	198.10.1.2
265806	12:18:44.68351481	687 ns	1.8 sec	64	198.18.2.2
265807	12:18:44.68352153	6.7 us	1.8 sec	64	198.18.1.2
265808	12:18:44.68352806	6.5 us	1.8 sec	64	198.18.2.2
265809	12:18:44.68352997	1.9 us	1.8 sec	1024	198.18.1.2

Figure 9-4. Examine of RAM capture without Synchronized View option

You can see another view of the same RAM capture with the Synchronized View option selected, which is shown in Figure 9-3. Notice that in this figure the frames before timestamp 12:18:44.68346769 are not shown. In this example, 255393 frames from the Rx1 capture buffer were skipped because no frames were found in the Rx2/Tx capture buffer with older timestamps.

Number	Abs Time	DeltaTime	Rel Time	Size	Destination
1	12:18:44.68346763		0 ns	64	198.18.1.2
2	12:18:44.68347181	4.2 us	4.2 us	112	198.12.1.2
3	12:18:44.68347450	2.7 us	6.9 us	64	198.18.2.2
4	12:18:44.68348047	5.9 us	12.8 us	64	198.10.1.2
5	12:18:44.68348122	750 ns	13.6 us	64	198.18.1.2
6	12:18:44.68348778	6.6 us	20.2 us	64	198.18.2.2
7	12:18:44.68349469	6.9 us	27.1 us	64	198.18.1.2
8	12:18:44.68349634	1.7 us	28.7 us	1024	198.18.1.2
9	12:18:44.68350137	5.0 us	33.7 us	64	198.18.2.2
10	12:18:44.68350537	3.9 us	37.7 us	112	198.12.1.2
11	12:18:44.68350791	2.5 us	40.3 us	64	198.18.1.2
12	12:18:44.68351412	6.2 us	46.5 us	64	198.10.1.2
13	12:18:44.68351481	687 ns	47.2 us	64	198.18.2.2
14	12:18:44.68352153	6.7 us	53.9 us	64	198.18.1.2

Figure 9-5. Examine of RAM capture with Synchronized View option

To view frames from both receivers:

1. From the real time Control menu, choose **Examine**.

   If you selected the **Always Prompt** option on the Capture RAM Selection dialog box, then that dialog box appears when you open Examine. Otherwise, the Examine screen appears and displays frames according to the latest Capture RAM Selection setup. The default options are to display merged frames from both receivers according to a timeframe in which all data is available for both receivers (no frames have been discarded from either receiver due to wrapping).

2. Do one of the following:
   - If the Capture RAM Selection dialog box appears, you can select alternative viewing options for the capture buffer data before you enter Examine.
   - To change the view of the same capture once you are already in Examine, suspend capture from real time by choosing the **Interface/Suspend Capture** command from the menu bar and then change your Capture RAM Selection options before reentering Examine.

NOTE:

If you select the **Stop at End** condition for RAM capture (available from Advanced Setup), then the Synchronized View option on the Capture RAM Selection dialog box is not needed because the buffer does not wrap.

9.5. Monitoring Link Status

You can use the Network Status window, Events window, and the front panel LED indicators to monitor the status of the DominoGigabit analyzer's network links. The Link Capability Advertisement Status window (Figure 7-1) shows you the status of the link negotiation options between the DominoGigabit analyzer and the network device.

The Events window indicates when the link has been successfully established (Figure 9-4). A failed network link can be detected when the Link LED is off, or by the Link Failed event on the Events window.

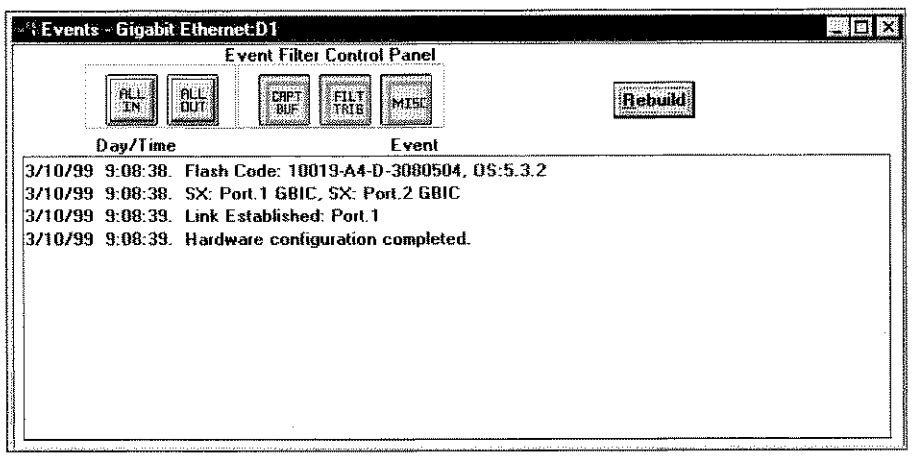

Figure 9-6. Events window

The Network Status window shows the current connection mode and the link status. You can also use the LINK1 and LINK2 LED indicators (Figure 3-2) to determine the link status and activity of the network transmitter and receiver on the DominoGigabit analyzer.

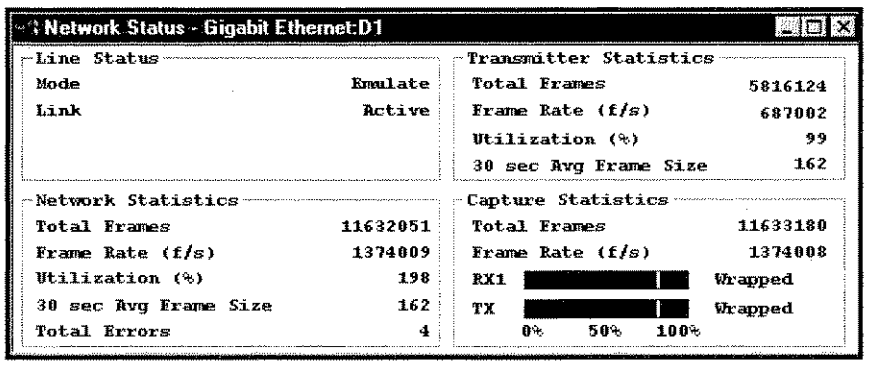

Figure 9-7. Network Status Window

9.6. Monitoring Network Traffic

You can use the **Monitor** command in the **Workbench** menu on the Workbench screen, or the **Monitor** task button on the Workbench screen to display the Real Time screen.

From the Real Time screen, you can display network statistics or you can transmit frames, if the analyzer is configured for the Emulate connection mode. In the Monitor application, certain network statistics, such as Station Statistics, Frame Size, and Protocol Statistics, are sampled from the network receiver. So, these statistics might not initially reflect the actual network environment. However, over longer periods of time, the relative percentages of these statistics more closely reflect the actual representation on the network.

When you display network statistics using the Monitor application, you should interpret these statistics accordingly.

NOTE:

The Monitor button does not have any relationship with the Monitor connection type, an option that is set on the Gigabit Ethernet Main Setup dialog box. When you choose the Monitor task button, the Real Time screen is displayed using the last interface setup that was saved.

9.7. Monitoring Network Utilization

You can use the network statistics results windows and the front panel LED indicators to monitor utilization on the network.

The Network Status window displays values for the current network and transmit utilization. The Detailed Network and Detailed Capture Statistics windows provide current, peak, and average utilization for the DominoGigabit transmitter and receiver.

The %Utilization LED indicators indicate the current network utilization levels as follows. The top row of LEDs always displays the percent of the network bandwidth utilized by frames received on receiver port 1 (RX1), in either Emulate or Monitor mode. The bottom row of utilization LEDs displays the percent of the network bandwidth utilized either by:

- Frames received on receiver port 2 (RX2) in Monitor mode.
- Frames transmitted on transmitter port 1 (TX1) in Emulate mode.

For more information about the LED Indicators, see Section 3.2, "Front Panel LED Indicators" in the "Connecting to the Network" chapter. For detailed information about the DominoGigabit analyzer statistics windows, refer to the Help by pressing F1 while displaying the window.

9.8. Viewing Network Traffic and Statistics

This section describes how to view the network traffic and statistics windows that are specific to the DominoGigabit interface. There are many other results windows and features that are part of the overall Domino Core software, whose details are not provided in this book. For more information about the Domino Core statistics windows, see the *Domino Operating Guide*.

9.8.1. Opening Results Windows

You can open the DominoGigabit interface results windows when you run an application from the Workbench screen. The results windows show network traffic, status, and statistics for the DominoGigabit interface.

The interface-specific network results windows are opened by choosing commands on the Interface menu, or by selecting a DominoGigabit Real Time Toolbar button. Other results windows, such as the Hexadecimal Trace window and Protocol Summary window, are a standard part of the Domino Core software, and are available for all of the network interfaces. These results windows can be opened from other areas of the menu bar and toolbar.

To open results windows:

1. From the menu bar on the Real Time screen, choose the **Interface** command.

   The Interface menu is displayed.

2. Choose a command from the menu or sub-menu.

   The results window that you selected is displayed.

You can use the buttons on the DominoGigabit Real Time Toolbar to quickly open the DominoGigabit interface results windows.

9.9. Results Window Descriptions

The DominoGigabit interface consists of eight interface-specific results windows. The table below provides a brief description of each results window. For detailed information about the DominoGigabit interface results windows and dialog boxes, refer to the interface Help by pressing F1 while displaying the window.

Window Name	Description
Detailed Capture Statistics	Displays comprehensive statistics for frames captured by DominoGigabit analyzer including statistics for the number of frames that match the filter patterns defined in filter/trigger setup. The statistics are shown categorized by receiver and transmitter ports, and by cumulative total.
Detailed Network Statistics	Displays comprehensive network statistics on valid frames, frame rates, network utilization, and average frame size for frames received by the analyzer before filtering and capturing are performed. The statistics are shown categorized by receiver and transmitter ports, and by cumulative total.
Error Statistics	Provides comprehensive error statistics on frames transmitted and received by the analyzer. The statistics are shown categorized by receiver and transmitter ports, and by cumulative total.
Events	Displays tracked events from the Events buffer, which can store up to 500 events at a time. The Events window allows you to select the type of events to be viewed.
Link Capability Advertisement Status	Displays how the remote device is reporting its link capability and how the DominoGigabit analyzer is reporting its link capability.
Network Status	Displays summary network, transmit, and capture statistics, link status, and status of the capture buffer on the DominoGigabit analyzer. Additional statistics are shown on the detailed statistics windows. Additional error statistics are provided on the Error Statistics window.

Table 9-1. Results Window descriptions

Appendix: DominoGigabit Real Time Toolbar

The buttons that control the DominoGigabit interface are displayed on the Real Time Toolbar, in addition to the standard Real Time buttons.

Click		To
	Restart	Restart the application.
	Pause	Pause the scrolling of the statistics windows and the Events window while continuing to monitor subsequent network traffic. When you are finished viewing the traffic, click Pause again to resume the display of traffic. **NOTE:** The Pause button does not apply to the Transmit Screen.
	Network Status	Display the Network Status window.
	Detailed Statistics	Display the Detailed Statistics Selection dialog box.
	Events	Display the Events window.
	Transmit	Display the Transmit Screen.
	Error Statistics	Display the Error Statistics window.
	Link	Display the Link Capability Advertisement Status window.

Click		To
	Reset	Reset the counters to zero on the Network Status, Error Statistics, Detailed Network Statistics, and Detailed Capture Statistics windows.
	Hex Trace	Display the Hexadecimal Trace window for the current frame.
	Top Users	Display the current Top Users pie chart. Available from the Monitor application only.
	Frame Rate	Display the Frame Rate graph. Available from the Monitor application only.
	Network Utilization	Display the Network Utilization graph. Available from the Monitor application only.
	Protocol Distribution	Display the Protocol Distribution pie chart. Available from the Monitor application only.
	Frame Size	Display the Frame Size Distribution area graph. Available from the Monitor application only.

To hide or display the Real Time Toolbar, choose **Options View Toolbar** from the Control menu.

Glossary

30 sec. avg frame size

The 30-second average frame size is calculated using the equation, (Total frame size of valid frames) / (Total frame count of valid frames). The measurement is calculated over the last 30 seconds. For capture statistics, only captured frames are used to calculate the statistic; only transmitted frames are used to calculate the transmit statistics.

address resolution

A process defined by protocols where corresponding types of network addresses are determined from a known address. Address resolution may be used to determine a node's hexadecimal address from the known nodename. Address resolution is used when a network node has more than one address (hardware and protocol) associated with it.

bit times

The duration of bits transferred to and from the Media Access Controller (MAC).

broadcast frames

Network frames that are transmitted to all network stations; such frames all have a destination address of FF-FF-FF-FF-FF-FF.

byte times

The duration of a byte transferred to and from the Media Access Controller (MAC).

capture buffer

A part of the available Domino RAM set aside for the temporary storage of frames as they are received from the network.

child setup dialog box

Describes a setup dialog box that is accessed or "born" from a higher level dialog box, which controls the status of the child setup selections. The Filter/Trigger Setup dialog box is a child dialog of the Gigabit Ethernet Main Setup dialog box. The Custom Filter/Trigger Setup dialog box is a child dialog of the Filter/Trigger Setup dialog box.

detailed statistics windows

The detailed statistics windows are available from Real Time and include the Detailed Network Statistics window and the Detailed Capture Statistics window.

filter

Describes a user-defined set of parameters to be applied to received network data to limit the type of data to be examined in the capture buffer.

filter.flt

The file name for the default filter/trigger definition file.

filter/trigger child setup dialog box

Identifies all of the filter/trigger dialog boxes that are accessed from the Filter/Trigger Setup dialog box including the Custom Filter/Trigger Setup dialog box, Custom Filter/Trigger Fill Setup dialog box, Import Filter/Triggers dialog box, and Protocol Filter/Trigger Setup dialog box.

frame rate

The frame rate is reported in frames per second and is calculated using the equation, (Total frame rate in the last interval) / (Interval). The Interval is approximately 1 second for capture, network, transmit and receive statistics. For capture statistics, the captured frame rates by both DominoGigabit receivers are averaged to calculate the statistic; for transmit statistics, only transmitted frame rates are used.

full-duplex

A method of data transmission that allows simultaneous transmission and receipt of frames over the network link.

half-duplex

A method of data transmission that allows either transmission or receipt of frames over the network link at any one time.

LLC

Logical Link Control. A protocol that was originally defined in the IEEE 802.2 standard and adopted by ISO 8802 that describes functionality in the upper sub-layer of the Data Link Layer. LLC can be used to provide either connection-based or connectionless services in transferring data.

MAC

Media Access Control. A protocol for the Data Link Layer of the OSI model that determines how a device can access the physical media.

multicast frames

Network frames that are sent to a group of network stations using a group destination address, which allows multiple stations to listen to a single address.

network utilization percentage

The actual network load (valid and error frames) expressed as a percentage of the maximum possible network load. In full-duplex mode, because data is transmitted and received simultaneously (effectively doubling the bandwidth), the utilization percentage can be as high as 200%.

operating mode

Describes one of two ways to set up the DominoGigabit analyzer: Monitor or Emulate mode. Monitor mode sets up the analyzer to receive network traffic only. Emulate mode sets up the analyzer to both receive and transmit network traffic.

packet translation

Describes the process of decoding or interpreting the fields contained in a network frame, or packet.

parent dialog

Describes the controlling or top-level dialog from which other dialogs (child dialogs) are accessed; Gigabit Ethernet Main Setup is a parent dialog.

PCS

Physical Coding Sublayer. Part of the Physical Layer implementation for 1000BASE-X Gigabit Ethernet devices that is defined at the upper sub-Layer of the Physical Layer Device (PHY). The PCS uses an 8B/10B coding method.

preamble pattern
A pattern indicating the beginning of frame transmission. The standard preamble consists of a total of 64 bits, or eight octets. The first seven octets contain the bit pattern 10101010. The last octet of the preamble is the start frame delimeter (SFD), with the bit pattern 10101011.

processed frame
A frame that is copied from the capture buffer and sent to the PC.

real time
The part of the Domino® software that monitors network traffic and interfaces with the analyzer and the network interface. Capture, Monitor, Transmit, and the Toolbox applications run over the Real Time software and add their own unique features to those available from Real Time.

runts
Network frames received by the DominoGigabit analyzer that are less than 64 bytes in length.

symbol error
A symbol error occurs when an invalid symbol is received by the Physical Layer. The DominoGigabit analyzer reports the number of symbol errors on the Error Statistics window.

toggle option
An option that is alternatively enabled or disabled when it is selected. A checkmark indicates that the option is enabled. If the option is currently disabled, selecting it enables the option. If the option is currently enabled, selecting it disables the option.

transmit buffer
A hardware buffer that stores up to 256 KB of frames (and their corresponding transmit queue options) that have been selected for transmission on the Transmit Screen.

transmit queue
Another term for the software buffer that contains transmit frames. The transmit queue maintains transmission options such as the transmission order, repetition of frames, FCS, and interframe gap for frames that have been selected for transmission.

transmit.gtx
The file name for the analyzer's transmit file, which is stored in the PC subdirectory C:\DOMINO\DOMx. The extension .GTX distinguishes the DominoGigabit transmit file from other interface files.

trigger
Describes a user-defined set of parameters to be applied to received network data to identify a network event and capture network data for examination in the capture buffer.

unicast frames
Network frames that are transmitted to a single network station destination address.

valid frame
A frame that adheres to the IEEE 802.3 Ethernet frame format.

X Values
Values that can be specified in a filter/trigger definition to indicate wildcard bit patterns, or bit patterns that can contain any value in order to pass the filter/trigger conditions.

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