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NIC ONA Online Help User's Guide

October 2005

Document No. CO 005669D – Version 4.4

This document is provided so that you can print specific online help topics. It contains the same information that appears in the unit's online help file, which is accessed by selecting the HELP tab on the unit's screen.

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Introduction

Welcome!

Digital Lightwave, Inc. is pleased to present the Network Information Computer (NIC) Optical Analyzer Online Help. Select **ONA Overview** for a shortcut to specific ONA topics.

To view and select topics, press the folder icons and topics on the left. Use your finger or a blunt object, such as a pencil eraser or the back of a pen, to select touch screen items.

Have questions regarding your NIC ONA unit? Contact our Technical Support personnel.

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Version Information

NIC ONA Online Help Document Number: CO 005669D - Version 4.4

Last updated: October 2005

For unit's hardware serial number and software release information, see How to Display Serial Numbers and Software Revision.

In addition, this information is also available on the unit's rear label.

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Product Overview

The NIC Optical Network Analyzer (ONA) is a portable test unit that provides C- and L-Band monitoring of DWDM systems using the Optical Spectrum Analyzer (OSA) circuit pack.

The NIC ONA can also be factory configured with a NIC 10G circuit pack to analyze STM-64/OC-192 optical networks. This circuit pack can be optioned for 10G mapping, which allows various SDH and SONET mappings to be configured using a single 10G optical interface.

The unit's Graphical User Interface (GUI) allows a network technician to quickly scan a system, and then easily monitor and obtain its total broadband power, individual channel power, wavelength, frequency, and deviation measurements.

Features

The NIC ONA offers the following features and enhancements:

OSA

- Autoscan – which performs a spectrum sweep and detects all available channels.
- C-Band support ranging from 1529 nm to 1561 nm.
- L-Band support ranging from 1570 nm to 1603 nm.
- Alarm threshold detection based on SNR, drift, low power, and high power values.
- Graph magnification which allows you to zoom-in on specific graph areas.
- Spectrum comparison – which allows quick comparisons by displaying live or stored data as two distinct graphs.
- 50 GHz, 100 GHz, and 200 GHz channel spacing
- Compare and fine-tune channels based on a single reference channel's readings.

NIC 10G

- Simultaneous and independent testing of STM-64/OC-192
- 10G Mapping – which allows C-4-64c bulk through C-3 bulk/STS-192c bulk through STS-1 bulk mappings using a single 10G interface
- STM-64/OC-192 1310/1550 nm wavelength laser
- Packet over SDH/SONET (POS) for 10G
- Auto configuration to pattern level

Optical Network Analyzer (ONA) Overview

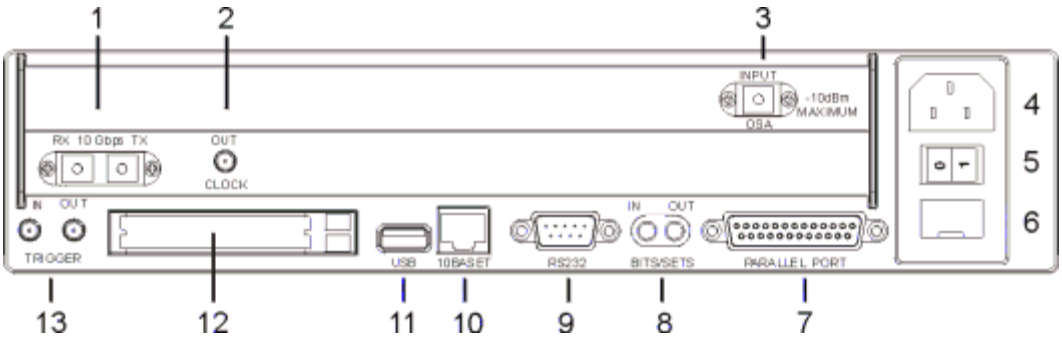
The ONA unit contains the Optical Spectrum Analyzer (OSA) module.
This section of the online help system has topics that discuss:

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- OSA Specific Tasks
- OSA Screen and Function Descriptions
- OSA Frequency and Wavelength Tables
- OSA Circuit Pack Technical Specifications
- ONA Connector Panel

Connector Panel

The NIC ONA connector panel contains a variety of auxiliary interfaces as described below.



Note: Actual connectors may vary based on your unit's hardware configuration.

	Connector	Description
1	10 Gbps RX and TX	Optical output and input connectors for SONET and SDH optical rates. The unit supports the following optical connectors: SC, ST, and FC. **Note:** These connectors appear if your unit is configured with the optional 10G Mapping function.
2	Clock Out	SMA connector that allows a trigger output for use of optical SONET/SDH eye diagram analysis. **Note:** This connector appears if your unit is configured with the optional 10G Mapping function.
3	OSA Input	SC optical input connector for Optical Spectrum Analyzer operation. **Note:** To avoid damaging the unit, do not exceed the maximum input power of -10 dBm.
4	Power Cord	AC input connector. Accepts a 3-

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	Connector	prong, grounded Type 13 connector.
5	Power Switch	Turns unit on or off (0=off, 1=on).
6	Fuse Compartment	Contains two 1.5 amp Slo-Blo fuses. **Note:** Fuses are not field serviceable.
7	Parallel Port	25-pin female connector for parallel printer.
8	BITS/SETS In and Out	Bantam jacks for external timing equipment. BITS clocking supports 1.544 Mhz. SETS clocking supports 2.048 Mhz.
9	RS232	9-pin male connector for SCPI RS232 Direct and SCPI RS232 modem.
10	10BaseT	8-pin modular jack for Ethernet connection.
11	USB	Universal Serial Bus for USB product support.
12	PCMCIA (PC Card)	Dual-slot PC card slot that accepts two Type II cards. Approved cards are: • Modem: None • Flash: SanDisk 48 Mbyte Flash • GPIB: National Instruments model number PCMCIA-GPIB.NI-488.2 for Windows NT
13	Trigger In and Out	SMA connectors used for trigger operation.

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Product Specifications

The following is a list of technical specifications for the NIC ONA.
Select OSA Techincal Specifications for OSA specifications.

Physical Characteristics

Operating Temperature: 0° to 40° C @ 85% Relative Humidity

Storage Temperature: -20° to 60° C @ 95% Relative Humidity

Power Requirements: 100–120, 200–240 VAC, 50–60 Hz

Dimensions: 13.7" H x 13.0" W x 7.9" D (348 mm x 330 mm x 201 mm)

Weight: Approximately 20 to 25 pounds, depending on configuration.

Auxiliary Interfaces

OSA Optical Connector: SC

10G and 2.5G Optical Connectors: Supports SC, ST, and FC

RS-232: DB-9 male

Parallel Port: DB-25 female

USB: Universal Serial Bus. Type A female

Input/Output Trigger: SMA

10G and 2.5G Clock Out: SMA

BITS/SETS Clock: Bantam (1.544 Mhz/2.048 Mhz)

PC Card (PCMCIA): Dual-slot PC card slot that accepts two Type II cards.
Approved cards are:

- Modem: None
- Flash: SanDisk 48 Mbyte Flash
- GPIB: National Instruments model number PCMCIA-GPIB.NI-488.2 for Windows NT

10BaseT: RJ45

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OSA Specific Tasks

OSA Specific Tasks

This section includes tasks that are specific to the OSA protocol processor. For general tasks, refer to the **Common Tasks** section located under **Getting Started/Common Tasks**.

Please use the **Contents** tab and window (left side of the screen) to select, open, and view OSA Specific Tasks.

OSA Specific Tasks

This section includes tasks that are specific to the OSA protocol processor. For general tasks, refer to the **Common Tasks** section located under **Getting Started/Common Tasks**.

Please use the **Contents** tab and window (left side of the screen) to select, open, and view OSA Specific Tasks.

Autoscan

Autoscan performs a spectrum sweep and detects the active channels. By automatically scanning channels, this function reduces the time needed to manually enter a channel range using the User Defined span function.

To use Autoscan:

1. Select **Spectrum**.
2. Select **SET**.
3. Select **Autoscan**.
4. The range of active channels appear in the graph. In addition, the beginning and ending channels appear for the **Start** and **Stop** functions.
5. If necessary, configure the X- and Y-axis parameters using the **Wavelength Settings** and **Power Settings** functions.

Comparing Graphs

Two spectrum graphs (snapshots) can be selected and displayed simultaneously to view differences between power levels.

To compare graphs:

1. Select **Spectrum**.
2. Select **Compare**.

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3. Select **Graph Selection** to select the first graph used in the comparison. Select **Color Choice** to assign a color to the first graph.
4. Select **Graph Selection 2** to select the second graph to compare. Select **Color Choice** to assign a color to the second graph.
5. Select **Operation** to determine the action that the comparison graph displays. The following operations are available:
    - Add: The comparison graph displays the sum of the two graphs.
    - Subtract: The comparison graph displays the difference of the two graphs.
    - Overlay: The comparison graph is superimposed on a previous graph. This is helpful when monitoring power differences over a period of time.
6. Select **Color Choice** to assign a color to the comparison graph.
7. The graphs appear on the screen.

Configuring an OSA Alarm

You can configure specific thresholds for each channel. When a threshold is exceeded, an alarm is generated and logged. The functions appearing on the Alarm screen allow you to add and remove channels to monitor. Alarm results can be viewed using the Channel Results screen.

To configure an OSA alarm:

1. Select **Channel**.
2. Select **Alarm**.
3. Select one or all channels using **Channel Number**.
4. Set the SNR, drift, low power, and high power threshold values.
5. Select **Add**. The channels appear in the table.

To remove a channel from the alarm list:

1. Select a channel number (**Channel #** column) from the table.
2. Select **Remove**.

To remove all channels from the alarm list:

- Select **Remove All**.

Configuring Channel Settings

The Channel Settings screen determines how channel functions appear in graphs and tables. Using these settings, you can narrow the range of C-band and L-band channels (appearing along the X-axis) in the Channel graphs and tables.

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The unit has a default channel table consisting of:

- 80 channels
- A channel spacing of 50 GHz (0.05 THz)
- A C-band channel range from 1525 nm to 1561 nm
- An L-band channel range from 1570 nm to 1603 nm

To change the parameters of the X-axis and channels displayed in tables:

1. Select **Channel**.
2. Select **Set**.
3. Select **First Channel** to set the starting channel. Channels range from 1 to 80.
4. Select **Channel Count** to set the number of channels. The channel count ranges from 1 to 80. However, the maximum channel count that can be entered varies based on the First Channel value.
5. Select **Channel Spacing** to change the channel spacing to one of three Gigahertz values. The default is 50 GHz.

Configuring Spectrum Settings

The Spectrum Settings screen determines how spectrum information is represented and displayed on your screen. After customizing a view, it can be saved using the Snapshot function. The newly created view is entirely local and does not change data on the unit.

Use the Spectrum Settings to:

- Select a wavelength channel-band to monitor
- Perform an autoscan to quickly determine the available channels
- Define units of measure for the X- and Y-axis
- Narrow the range of interest by specifying the starting and ending channel range

To configure Spectrum graph settings:

1. Select **Spectrum**.
2. Select **SET**.
3. Use the **Wavelength Settings** to configure the graph's X-axis and channel range.
    - Select **Span** to display C-band or L-band channel ranges.



If an Autoscan is performed, User Defined appears as the Span value. Use **Start** and **Stop** to set the beginning and ending channels that appear on the graph.

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- Select **X Unit of Measure** to set the unit of measure to nanometers or terahertz.
- Select **Center** to center the graph on a specific channel.

4. User **Power Settings** to configure the graph's Y-axis and displayed power level range.
    - Select **Reference Level** to set the uppermost limit for the Y-axis.
    - Select **dB/Division** to set the vertical scale (divisions) of the Y-axis.
5. After configuring the Wavelength Settings and Power Settings, the new parameters appear for the graph.
6. Select **Scan Rate (sec)** to set the graph's refresh rate.
7. Select **Snapshot** to save the new graph parameters.

Fine-Tuning Channels

Using the **OSA Graph screen**, you can select a single channel, which will be your reference channel, and then compare and fine-tune the remaining channels based on the reference channel's values.

1. Select **Reference Channel** and enter a channel that appears in the table above the graph.
2. Select **Deviation** and to set the type of deviation (power, SNR, or wavelength/frequency deviation) to monitor.
3. A bar chart appears showing the other channels' deviations compared to the reference channel.

Overlapping Graphs

Graphs can be displayed over a period of time using the Spectrum Overlap functions.

To overlap graphs:

1. Select **Spectrum**.
2. Select **Overlap**.
3. Select **Graph Type** and set the graph format.
4. Select **High Color Choice** (Max.) and **Low Color Choice** (Min.) to assign colors to each graph type.
5. As the unit completes a spectrum sweep, power levels, based on the Graph Type setting, appear in the graph. Subsequent spectrum sweeps will appear on the graph and be superimposed on the previous graph. This provides a visual comparison of the spectrum sweep.

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Snapshot and View

The Snapshot and View functions allow you to save or restore graph parameters for the Spectrum Settings graph and the Channel Settings graph.

To select a snapshot:

1. Select **View** from the Spectrum Settings screen or Channel Settings screen. The Select View window appears.
2. Select a snapshot. The snapshot's parameters appear in the graph.

To save a snapshot:

1. Select **Snapshot**. The Snapshot Configuration window appears.
2. Select **Snapshot Name**. A keypad appears allowing you to enter a unique 24-character name for the snapshot.
3. Select **Enter** (on the keypad) to save the snapshot name.
4. Select **Add** to add the new snapshot to the Snapshot Configuration list.
5. Select **OK** to save the new snapshot.

To delete a snapshot

1. Select **Snapshot**. The Snapshot Configuration window appears.
2. Select a snapshot from the Snapshot Configuration list.
   (Select the snapshot number that appears in the View column.)
3. Select **Remove**. The snapshot is deleted and appears as **<Empty>** in the list.
4. Select **OK** to close the window.

Using Zoom

You can increase or decrease an OSA graph's view magnification using the Zoom In and Zoom Out functions. You can observe greater detail, regarding a particular point on the graph, by zooming-in. Zooming-out restores the graph to its initial settings.

Zoom In

To zoom in on a specific area of the graph using a touch screen:

- Drag your finger diagonally across the screen to select and magnify an area of the graph.

To zoom in on a specific area of the graph using the Remote Control Application:

1. Right-click and drag your mouse pointer across an area of the graph.

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2. Release the mouse button.

Zoom Out

To zoom out and restore the graph's initial view magnification using a touch screen:

- Press your finger twice (double click) on the graph.

To zoom out and restore the graph's initial view magnification using the Remote Control Application:

- Select **Zoom Out**.

Viewing Broadband Power

To view the power levels across the entire bandwidth:

1. Select **Spectrum**.
2. Select **SET**.
3. Select **Span**.
4. Select **C-Band** or **L-Band**.
5. The aggregate broadband power value appears in the upper left corner of the screen.

Related Topic:

Viewing Channel Power

Viewing Channel Power

1. Select **Channel**.
2. Select **Set**.
3. The Channel Power screen appears and contains a channel list table (based on the Channel Set configuration) and channel power graph.

   The power level for each channel appears in the **Ch Pwr** column. The graph provides a visual display of the peak power for all channels in the list.
4. Select **View** to view a full-screen Channel Power table.

Related Topic:

Viewing Broadband Power

Viewing Alarms (Channel Results)

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The Channel Results table displays a list of all channels reporting alarms. The alarm thresholds are based on settings configured using the Channel Alarm screen.

To view results:

1. Select **Channel**.
2. Select **Results**
3. The Channel Results table appears. If an alarm condition exists, the following is reported:

    - Channel number, which indicates the C-band or L-band channel reporting the alarm
    - Alarm type, which indicates the type of alarm reported (for example, Drift, SNR, Power High, and Power Low)
    - Current alarm value:
        - For Drift alarms, the channel's current drift value appears in picometers (pm).
        - For Power High or Power Low alarms, the channel's current power level (dBm) appears.
        - For SNR alarms, the channel's current signal-to-noise ratio (dB) appears.


These statistics are cleared when the unit is restarted.

Viewing Signal-to-Noise Ratio

1. Select **Channel**.
2. Select **Set**.
3. The Channel Power screen appears and contains a channel list table (based on the Channel Set configuration) and channel power graph.

    The SNR for each channel appears in the **S/N** column. The graph provides a visual display of the peak power for all channels in the list.

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OSA Screen and Functions Descriptions

OSA Screen and Functions Overview

The OSA GUI consists of the following components:

- OSA Spectrum
- OSA Channel
- OSA Test

OSA Screen and Functions Overview

The OSA GUI consists of the following components:

- OSA Spectrum
- OSA Channel
- OSA Test

OSA Spectrum

The Spectrum screen contains the following:

- View
- Set
- Compare
- Overlap

OSA Channel

The Channel screen contains the following functions:

- View
- Set
- Alarm
- Graph
- Result

OSA Test

The Test screen configures test parameters associated with a protocol processor.

The Test screen contains the following functions:

- SET 1

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OSA Default Frequencies and Wavelengths

The following tables list the OSA's default C-Band frequencies and wavelengths.

- 80-channel table with 50 GHz spacing
- 40-channel table with 100 GHz spacing
- 20-channel table with 200 GHz spacing

The following tables list the OSA's default L-Band frequencies and wavelengths.

- 80-channel table with 50 GHz spacing
- 40-channel table with 100 GHz spacing
- 20-channel table with 200 GHz spacing

OSA Technical Specifications

Parameters	**Specifications**
Wavelength Range	C and L band 1529 nm – 1561 nm (C-band) 1570 nm – 1603 nm (L-band)
Channel Number	160
Channel Spacing	50 GHz / 0.2 nm
Wavelength Accuracy	0.015 nm
Dynamic Range	60 dB
Channel Input Power Range	-50 dBm to -10 dBm
Channel Power Repeatability	+/- 0.2 dB
Channel Power Accuracy	+/- 0.5 dB
Polarization Dependance Loss	< 0.3 dB

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Power Resolution	0.1 dB
Noise Floor	-60 dBm
Peak to Valley	25 dB
OSNR	30 dB +/- 1.0
Response Time	< 20 ms
Detectors	512 array
Operating Temperature	-5º to 70º C
Optical Connectors	SC

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Common Tasks and Functions

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GETTING STARTED

Overview

This section includes information to help you to use your system. It is broken into the following topics:

Getting Started: Contains sections on screen components, powering on and off the unit, and product information.

Common Tasks: Includes general tasks.

Troubleshooting: Includes resolutions to common user interface problems.

Please use the Online Help **Contents** tab to select and open topics.

Getting Started

Screen Components

The main screen is the user interface to the system. Through this display, you can view the configuration of the test unit, start and stop numerous tests, and collect a variety of statistics about test unit performance.

If you are using a portable product that has a touch screen, place you finger directly onto the screen to select tabs and buttons associated with a specific function. **A blunt object, such as the back of a pen or pencil eraser, can also be used to select touch screen functions.**


Warning: Avoid using sharp instruments, such as pen tips, pencil tips, keys, and paper clips. These objects may scratch and mark the touch screen.

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Common Tasks and Functions

The following is an example of the main screen (STM-16 mode is shown) with the main regions labeled.



The main screen contains five main regions:

- Quick Status LEDs
- Protocol Processor and Function Tabs
- PP Name/Go To Area
- Work Area
- Common Function Buttons

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Technical Support

Our Technical Support representatives are available to help at the following toll-free numbers:

- 1-877-929-HELP (4357)
- 1-800-548-9283

Note: International customers, call 1-727-519-2860.

Standard Service Hours

8:00 am to 6:30 pm ET, Monday through Friday.

Extended Service Hours

24 hours a day, 7 days a week

Note: Extended Service is available to all premier accounts free of charge. Ask your account manager for details.

Email

You may also contact our Technical Support reps via email at support@lightwave.com

Agency Approvals

TUV Rheinland of North America is the test laboratory used.

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For NIC 2.5G and NIC 10G:

TUV Safety File No. E2073411.01/E2073412.01/E2073414.01/.02

EMC Report File (NIC 10G) P2071068.01

EMC Report File (NIC 2.5G) P2071251.01/.02

CU License No. CU2071103.01

CDRH Accession No. 0021615

For NIC Plus:

TUV Safety File No. E2173656.01/E2173655.01

EMC Report File No. P2171264.01

CE Report File No. E2173659.01

CB Report File No. E2173657.01

CU License No. CU2173522.01

For NAA IV:

TUV Safety File No. E2171119.01/E2171120.01/E2171121.01

EMC Report No. P2171118.01

CU License No. CU2173727

GS License No. S2173726

CDRH Accession No. 9922616

For DCA 425:

TUV Safety File No. E2173405.01/E2173406.01

EMC Report File No. P2171005.01

CU License No. CU2179070.01/.02

CDRH Accession No. 9922616

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Standards products were tested to:

EMC Standards

- EN 55024
- EN 55022
- EN 61326-1
- EN 55011
- EN 300386-2 (NAA IV only)

Safety Standards

- EN 60950
- IEC950/UL1950/IEC60950
- CSA 22.2 No. 950

Safety Guidelines for Portable Products

The following safety precautions are provided to avoid injury and prevent damage to this product or any products connected to it during normal operation. Only qualified maintenance personnel should perform service procedures.

- **Use Proper Power Cord:** To avoid fire hazard, only use the power cord specified for this instrument. For use in North America, use a power cord (maximum 6-foot length) with a type SJT, 18 AWG, two conductor with ground, IEC 320 connector on one end and a NEMA 5-15 connector on the other end.

  For use outside of North America, use an HO5VV-F power cord with a 1-mm^2, two conductor plus ground, IEC 320 connector on one end, and a wall-socket plug on the other end that is certified for use in the country of installation.


The entire cord set must be certified for use in the country of installation.

- **Avoid electric overload.** This unit is designed to be powered from 100–120 and 200–240 VAC, 50–60 Hz. To avoid electric shock, fire hazard, or damage to the instrument, do not apply a higher voltage.
- **Ground the instrument.** The unit is grounded through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections

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to the input or output terminals of the instrument, ensure that the product is properly grounded.

- **Do Not Operate in Hazardous Conditions.** To avoid injury or fire hazard, do not operate this instrument in wet, damp, or other hazardous condition. Do not operate this instrument in an explosive atmosphere.
- **Eye Protection.** Users should never stare into unterminated connectors or broken fibers. In addition, fiber cables and interfaces should always be handled as if they were emitting laser light. Always leave protective covers on optical connectors to prevent damage and prevent laser emissions.
- **Field Service:** This equipment is not intended to be serviced in the field. All service is intended to be completed by Digital Lightwave, Inc.

Warning: This is a Class A product per EN55022. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures. Cables used should be less than 3-meters long for compliance with EMC directive.

- **Environmental Statement:** This product may contain lead-based solder materials and a lithium battery for computer support. Please return all Digital Lightwave products to the factory for proper disposal. Operation of this product is not hazardous to the environment.
- **Laser Safety:** The unit contains Class 1 laser devices (21 CFR 1040.10 and 1040.11 Compliant; EN60825-1:1993+A11+A2). Never look into an unterminated fiber. Always place dust caps on the optical ports when fiber is not attached to the optical ports.



Class 1 Laser Product



Use of controls or adjustments or procedures other than those specified herein may result in hazardous radiation exposure.

CDRH Accession Numbers

NIC10G/NIC 2.5G: 0021615

DCA 425: 9922616

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Safety Guidelines for Rackmount Products

Read and follow all warnings, cautions, and instructions marked on the product and included in this document. Only qualified personnel should perform installation or service.

This unit is designed to be NEBS Level 3 Conformant per Telcordia/Bellcore GR-1089-CORE and GR-63-CORE.

1. Always wear an ESD wriststrap and follow appropriate ESD procedures when installing or servicing the unit and its components.
2. The unit is suitable for connection to intra-building or non-exposed cabling only per Telcordia/Bellcore NEBS GR-1089-CORE.
3. Turn off the unit's subpanel circuit breakers when making power input connections.
4. Verify that the input power requirements (-42 VDC to -56 VDC) are correct before installing the unit. This product is intended to operate from a -48 VDC source derived from batteries, SELV, or an NEC Class II device.
5. Do not attempt to lift and install the unit alone. A fully configured unit can weigh up to 58 pounds (26.31 kgs.).
6. The unit is configured and shipped to mount into a 23- or 19-inch rack. A minimum of four mounting screws are required to attach the unit to a rack's mounting rails. Eight mounting screws are recommended. Mounting screws are the responsibility of the customer.
7. Always make sure that a component is installed into the correct slot. (Use the label, visible when components are removed, to verify the slot position.)
8. An empty slot should never be exposed. Always have an empty slot covered by the appropriate blank faceplate when a component is removed for any period of time. This is required for NEBS GR-1089-CORE and EMC conformance.
9. The optical circuit packs contain Class 1 laser devices. Never look into an unterminated fiber. Always place shutters on the optical ports when fiber is not attached to the optical ports. The unit contains Class 1 laser devices CDRH Accession Number: 9922616; 21CFR 1040.10 and 1040.11 compliant; EN60825-1:1993+A11+A2.

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Class 1 Laser Product

NOTICE

Unterminated optical connectors may emit laser radiation. Do not view with optical instruments.

Use of controls or adjustments or procedures other than those specified herein may result in hazardous radiation exposure.

Fiber-Optic Cleaning Procedure



With fiber optics, the tolerance to dirt is near zero. Oils, greases, airborne particles of dust, lint, and other debris are all very harmful to fiber-optic cables. They can scratch and damage fiber-optic connectors if not removed. Not only can scratches and debris harm the connectors, but they also can jeopardize the integrity and accuracy of the optical signal.

The ferrule end faces of fiber optic patch cords and receptacle connectors are some of the most critical components for fiber optical networks. *Prior to inserting any patch cord into the test equipment's receptacle connector, clean and examine the patch cord's and the receptacle's connectors to verify the quality of each.*

Inspect the Ferrule End Face of a Patch Cord Connector

WARNING: Never look into the end of a fiber, through a microscope or your bare eye, if the other end is connected to an operating piece of network or test equipment!

1. Prior to inserting any patch cord into the microscope, verify that the other end is not connected to an operating piece of network equipment.
2. Visually examine the end face of the connector using a fiber-optic microscope.
3. If the end face of the connector is unacceptable, properly clean the connector prior to use.

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4. If the end faces are acceptable, then use the fiber-optical patch cord as intended. If the end faces are not acceptable, then clean the connectors and reexamine them again.

To Clean a Patch Cord Connector Using Lint-Free Tissue and Alcohol

1. Using the pressurized canned air, blow away any dust particles that may be on the exterior surface of the connector, particularly the sides and end face of the ferrule. Hold the can approximately two inches from the surface to be cleaned and apply three to five short blasts of air.
2. Next, using an Optic Prep (or any lens-grade lint-free tissue moistened with isopropyl alcohol), gently and slowly slide the tissue across the tip of the ferrule end face in one sweeping move.
3. Repeat the last step again using a clean section of the tissue.

WARNING: Only isopropyl alcohol should be used because some solvents might attack epoxy.

Performing Periodic Maintenance on the Patch Cord Connector Using a CLETOP Cleaner

CLETOP cleaners provide a thorough and easy method of cleaning optical connectors. It uses a reel-type cassette of dry, woven polyester, alcohol-free, cloth film. It is a fast and reliable remover of dirt, lint, and debris from the ferrule end face of the optical connector. This cleaner should be used on the patch cord periodically if the patch cord is frequently inserted and removed from the test equipment.

1. To clean the ferrule end face of the connector, advance a clean portion of the reel by depressing the side lever with your thumb.
2. Gently stroke the tip of the connector along the exposed film in the manner according to the directions on the label.
3. While sliding the connector along the blue film, slightly twist the connector between your thumb and finger to assure a thorough cleaning.

If the end-face of the patch cord is damaged or scratched beyond cleaning or repair, replace the patch cord with a new one whose end faces are acceptable.

4. Inspect the connector receptacle of the network test equipment.

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WARNING: Always turn the test equipment's laser OFF before inserting the video micro-scope into the receptacle, or looking directly into the receptacle of the test equipment!

5. Prior to inserting the video microscope, verify that either the unit or its laser is turned OFF.
6. Using the pressurized canned air, blow away any dust particles that may be on the interior surface of the receptacle. If dirt is present inside the receptacle, it can scratch the lens of the video microscope, or the end-face of the connector.
7. Insert the video microscope into the receptacle. Using the monitor, visually examine the receptacle's end face of the connector.
8. If the receptacle's end face has a build up of dust, dirt, or any debris, clean the receptacle according to the next procedure.

To Clean a Connector Receptacle (also referred to as a bulkhead or adapter)

1. Using the pressurized canned air, blow away any dust particles that may be on the interior surface of the receptacle, particularly the inside walls of the alignment sleeve. Hold the can approximately two inches from the receptacle to be cleaned and apply three to five short blasts of air.
2. Moisten the end of a 2.5-mm foam swab with isopropyl alcohol, and insert it into one side of the receptacle. Move the swab in and out two or three times and then remove it.
3. Moisten the end of a NEW swab with alcohol, and insert it into the open side of the receptacle. Rotate the swab back and forth 90-degrees twice and then remove it.
4. Dry the inside of the receptacle by holding the pressurized canned air approximately two inches from the end of the receptacle and applying three to five short blasts of air.

Only use foam swabs; cotton swabs leave particles and threads behind.

Return Shipping Instructions

If it is necessary to return the unit, obtain a **Return Material Authorization (RMA)** number and return shipping address by contacting Customer Service between 8:30 A.M. and 6:30 P.M. eastern time, Monday through Friday.

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Please enclose a letter that briefly describes the reason for returning the unit and include the following information:

- Unit Serial Number
- Customer name and shipping address
- Customer contact name and telephone number
- Secondary customer contact name and telephone number
- Customer supplied purchase order number (if applicable)

Shipping with the Original Container

If you have the original shipping container (box):

1. Place the unit (and letter that describes the reason for the return) into the canvas carry bag, and pack it into the original Digital Lightwave, Inc. shipping container. Do **not** include personal items such as jumper cords or connectors. Digital Lightwave, Inc. will not be responsible for these items. Use the original foam inserts to protect all six sides of the unit.
2. Securely seal the shipping container and mark **FRAGILE** on the container to ensure careful handling.
3. Include the RMA number on the outside of the shipping container.
4. Contact Technical Support for the Repair Department's return shipping address.

Shipping Without the Original Container

If you do not have the original shipping container:

- You may purchase a shipping container from Digital Lightwave, or
- You can pack the unit (and letter describing the reason for return) into the canvas carry bag, and use the following general instructions to repack the unit using commercially available materials:
    1. Use a strong shipping container, similar to the original unit shipping box. Verify that the substitute container is rated at 350 lbs. per square inch pressure durable.
    2. Make sure that the unit is satisfactorily protected by using a layer of ESD-protected short absorbing foam material. The foam padding must be three to four inches in thickness (70 to 100 mm) and applied to all six sides of the unit to provide adequate protection.

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Make sure that the canvas bag and unit cannot move or shift within the container.

3. Securely seal the shipping container and mark **FRAGILE** on the container to ensure careful handling.
4. Include the RMA number on the outside of the shipping container.
5. Contact Technical Support for the Repair Department's return shipping address.

When service is complete, your unit will be returned to you postage paid if the shipment is within the United States. You are responsible for paying all shipping charges, duties, taxes, and other charges for products returned to Digital Lightwave, Inc. from any location within or outside of the United States.

Warranty and Repair

Limited Warranty for Equipment

Seller warrants to the first purchaser of this Digital Lightwave, Inc. product that all components of the product will function in accordance with Seller's published specifications under normal conditions of use for a period of three (3) years from the date of shipment. Seller warrants to the first purchaser of this Digital Lightwave, Inc. product that the laser transmitter unit will function in accordance with Seller's published specifications under normal conditions of use for a period of three (3) years from the date of shipment. During the warranty period, Seller's liability is expressly limited, at Seller's election, to repairing or replacing the product or component not complying with this Limited warranty as determined by Seller's inspection, or to the repayment of, or crediting the first purchaser with, an amount equal to the purchase price of the product, whether the first purchaser's claims are for breach of warranty or negligence. The foregoing remedy as provided herein shall be the sole and exclusive remedy of the first purchaser.

Limited Warranty for Software and Firmware

Seller warrants to the first purchaser of this Digital Lightwave, Inc. product that each item of Software and Firmware included in the Product, in its unaltered form, will conform substantially to the then-current functional specifications for three (3) years from its installation date, provided such Software or Firmware is used in a manner consistent with Seller's applicable minimum equipment and software or firmware configuration specifications. Seller will make reasonable efforts to correct any errors reflecting significant deviations from the functional specifications as are reported by first purchaser to Seller during such warranty period. Because not all errors in Software or Firmware can or need be corrected, Seller does not warrant the all Software or Firmware defects will be corrected. Similarly, Seller does not warrant that the Software or Firmware will meet first

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purchaser's requirements or that the Software or Firmware will operate in combinations selected for use by first purchaser.

Limitations of all Warranties

All Equipment, Software and Firmware Limited Warranties apply only to the first purchaser of this Digital Lightwave, Inc. product and are not transferable without the express written permission of Seller. Any claim under any of these Limited Warranties shall be deemed waived unless submitted to Seller in writing within one hundred eighty (180) days from the date the first purchaser discovered, or should have discovered, the facts giving rise to the claim.

The foregoing Limited Warranties shall not apply to problems caused by or resulting from improper or inadequate maintenance, acts or omissions of first purchaser, first purchaser supplied software or interfacing, unauthorized modification or misuse, breaking the seals or otherwise attempting to open the plastic and/or metal housing, operation outside of the environment specifications for the products, improper site preparation or maintenance. Seller is not responsible for any damages caused by any person or entity through misuse, neglect or accident.

For warranty service or repair, this product must be returned in accordance with the Seller's Return Policies to a service facility designated by Seller. The first purchaser shall prepay shipping charges to Digital Lightwave, and if Digital Lightwave discovers a breach of the Limited Warranty, Digital Lightwave shall pay shipping charges to return the product to first purchaser. However, first purchaser shall pay all shipping charges, duties and taxes for products returned by Digital Lightwave to first purchaser outside the United States.

Return Policies

Approval must be obtained from Seller, prior to return of any merchandise. All material returned without a Seller Return Material Authorization (RMA) number will be refused automatically. The first purchaser must return the product in original package and in good condition, without its serial numbers or any part thereof altered, defaced or removed and accompanied by a specification in writing of the defects involved. The first purchaser shall notify Seller in each instance when first purchaser intends to return goods which first purchaser believes are not in accordance with this Limited Warranty and Seller shall be entitled, at Seller's option, to examine such goods at first purchaser's facilities prior to return.

EXCEPT FOR THE WARRANTIES EXPRESSLY SET FORTH IN WRITING IN THIS LIMITED WARRANTY AND IN OUR TERMS AND CONDITIONS OF SALE, SELLER MAKES NO OTHER WARRANTY, WHETHER WRITTEN, ORAL OR IMPLIED. ANY IMPLIED WARRANTY OF MERCHANTABILITY,

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SELLER SHALL NOT BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL LOSSES, DAMAGES OR EXPENSES, DIRECTLY OR INDIRECTLY ARISING FROM THE SALE, HANDLING OR USE OF THE PRODUCTS, OR FROM ANY OTHER CAUSE WITH RESPECT TO THE PRODUCTS OR THIS LIMITED WARRANTY. WHETHER SUCH CLAIM IS BASED UPON BREACH OF CONTRACT, BREACH OF WARRANTY, NEGLIGENCE, STRICT LIABILITY IN TORT OR OTHER LEGAL THEORY. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

Screen Components

The main screen is the user interface to the system. Through this display, you can view the configuration of the test unit, start and stop numerous tests, and collect a variety of statistics about test unit performance.

If you are using a portable product that has a touch screen, place you finger directly onto the screen to select tabs and buttons associated with a specific function. **A blunt object, such as the back of a pen or pencil eraser, can also be used to select touch screen functions.**

Warning: Avoid using sharp instruments, such as pen tips, pencil tips, keys, and paper clips. These objects may scratch and mark the touch screen.

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The following is an example of the main screen (STM-16 mode is shown) with the main regions labeled.



The main screen contains five main regions:

- Quick Status LEDs
- Protocol Processor and Function Tabs
- PP Name/Go To Area
- Work Area
- Common Function Buttons

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Quick Status LEDs

The left side of the screen provides an at-a-glance view of the current protocol processor's LEDs and Laser ON/Off button. The LEDs report incoming error and alarm activity, current status, and event history.

This portion of the screen allows you to quickly scan and target potential problem areas. It is broken down into the following areas:

- **Laser On/Off button:** Enables you to turn the laser on and off.
- **LEDs:** The LEDs that appear are dependent on which protocol processor is selected.
- **All Tests:** Provides a shortcut to the **All Test Status** screen (located under the System tab) which shows a general status summary of all circuit packs installed in the unit.

Turning the Laser On or Off

Warning: The optical Transmit output is produced by a laser device. You should never, under any circumstances, look into an unterminated fiber.

Laser operation is controlled from the **Quick Status LEDs** area. The **Laser** button indicates if the laser is on or off. When the unit is powered on, the laser is off by default.

Laser Safety

The unit contains Class 1 laser devices. Never look into an unterminated fiber. Always place dustcaps on the optical ports when fiber is not attached to the optical ports. CDRH Accession numbers are listed in Agency Approvals.



Class 1 Laser Product

NOTICE

Unterminated optical connectors may emit laser radiation. Do not view with optical instruments.

To turn the laser on:

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- Select the **Laser** button in the **Quick Status LEDs** area. The laser status indicates **ON**.

To turn the laser off:

- Select the **Laser** button. The laser status indicates **OFF**.

SDH and SONET laser operation can be defined using the Initial Laser Setting function which controls whether the laser is on or off when the unit is turned on.

From the **Transmit** screen, select **Initial Laser Setting** and choose one of the following:

- **Off** – The unit's laser will be off when the unit is turned on.
- **On** – The unit's laser will be on when the unit is turned on.
- **Restore Previous State** – When the unit is turned on, the laser will be on or off based on its previous setting before the unit was turned off.

LED Quick Status Area

The system uses LEDs to report alarm, error, and event activity. These visual cues help to narrow the focus if problems are detected on the incoming protocol processors' signals and provide a starting point when trying to diagnose problems.

There are two ways to view LEDs from the screen: the **Quick Status LEDs**, which are located on the left side of the screen, and the **Large LEDS** tab. The following tables describe what is indicated by the LED color.

For LED descriptions for a specific protocol processor, go to the appropriate protocol processor section of the online help and navigate to **Screen Functions and Definitions** > **LEDs**.

Quick Status LEDs Color Description

If the LED is ...	Then this indicates ...
Green with white text	Normal operation. The LED is

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	used as a status indicator.
White with white text	Normal operation, no errors or alarms. The LED is used as an error and alarm indicator.
Red with **red** text	An error or alarm event is in progress. The LED is used as an error and alarm indicator.
White with **red** text	An error or alarm event was detected, but is now cleared. The text serves as a history indicator.

Large LED Tab Color Description

If the LED color is ...	**Then this indicates ...**
Green with **black** text	The specific function is active and OK.
Red with **red** text	An error or alarm event is in progress.
White with **red** text	This function experienced an error or alarm event. This event is cleared by selecting **Restart**.
White with **black** text	No activity from this specific function.

All Test Status

Displays a general status summary for all circuit packs (which appear as protocol processor tabs) installed in the unit. A maximum of 12 circuit packs can appear on the screen. If a circuit pack has more than one port (for example, a Quad RX circuit pack), then a status summary for all ports on the circuit pack appears.

If a unit contains more than 12 circuit packs, refer to the All Test (1 to 12) section below for status screen operation.

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When in this mode, each circuit pack is polled. You may notice a slight delay in status reporting based on your unit's configuration.

The following appears for each circuit pack installed:

- Protocol processor tab name
- Elapsed time
- General status. A **green** Summary LED indicates normal operation. A **red** Summary LED indicates that an alarm or error is in progress.

If the **Summary** LED text is selected (the word Summary), the LEDs associated with that specific protocol processor tab appear. To clear the LED window, select **OK**.

All Test (1 to 12)

When a unit contains more than 12 circuit packs (protocol processor tabs), the All Test Status screen operates using the following guidelines:

- Circuit packs appear on the screen in groups of 12.
- The **All Test** button indicates which group is currently displayed, i.e., **All Test (1 to 12)**, **All Test (13 to 24)**, and so on.
- The status screen can be refreshed manually, by selecting the **All Tests** button. When a screen refresh occurs, the next group of circuit packs appear along with any new LED status activity.

Protocol Processor and Function Tabs

The Protocol Processor and Function tabs are the first row of tabs located on the top of the screen. They remain static on the screen regardless of which tab is selected.

These tabs allow you to easily navigate and switch between protocol processor modes and functions. When a Protocol Processor and Function tab is selected, the information and option tabs displayed on the screen will change and correspond to that particular function.

The protocol processor tabs that appear depend on your hardware setup

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and protocol processor mode. You can toggle between various protocol processor modes using the **System** tab. In addition, protocol processor tabs can be customized. For more information, select **Changing a Tab Name**.

The following tabs are available:

- Protocol Processor tabs: Please see the appropriate protocol processor online help section for more information.
- Switch Matrix
- System
- Help: Accesses the online help system
- Back and Forward Scroll Arrows

System Tab

The System tab contains functions used to establish unit preferences, set up tests, and configure input and output settings in order to perform software upgrades, file transfers, and I/O port configurations.

The System screen contains the following function tabs:

- Misc
- I/O Settings
- File Services
- Security
- User Preference
- All Test Status
- Service Disruption
- Monitor
- Chat
- Faults

Changing a Tab Name for the Go To Label

1. From the **System** tab, select **User Preference**.
2. Under **Label Preferences**, select **Local** or **Global**.

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- Local – Only changes the tab label for your session. Other users will not see the tab name that you enter.
- Global – Changes the tab label on the unit so that all users see the same tab name that you enter.

3. Select a tab name from the **Assigned Name** column of the list box.
4. Under **PP Label Information**, enter a name in the **Assigned Name** text field. (When using the touch screen, select ... to open a keypad.)
5. Select **Update List Entry**, to add the name to the User Defined Name column of the list box.
6. Repeat steps 3 through 5 to continue adding user-defined names, as desired.
7. Select **Save All List Entries**. The new tab names appear in the PP Name/Go To area of the screen when the protocol processor tab is selected.
8. Select **PP Name / Go To**, located in the top-left corner of the touch screen. The Select Protocol Processor Entry dialog box appears displaying the new name.

When the protocol is selected the new name appears below the PP Name text on the touch screen; however, the name on the tab remains the same.

To restore tab names, select Restoring Default Tab Names for the Go To Label.

PP Name/Go To Area

The **PP Name** indicates which protocol processor (PP) tab or system function (such as System and Help tabs) on the user interface is currently selected.

For portable units, the tab position and description appear.

For rackmount units (for example, NAA IV), the slot position and description appear.

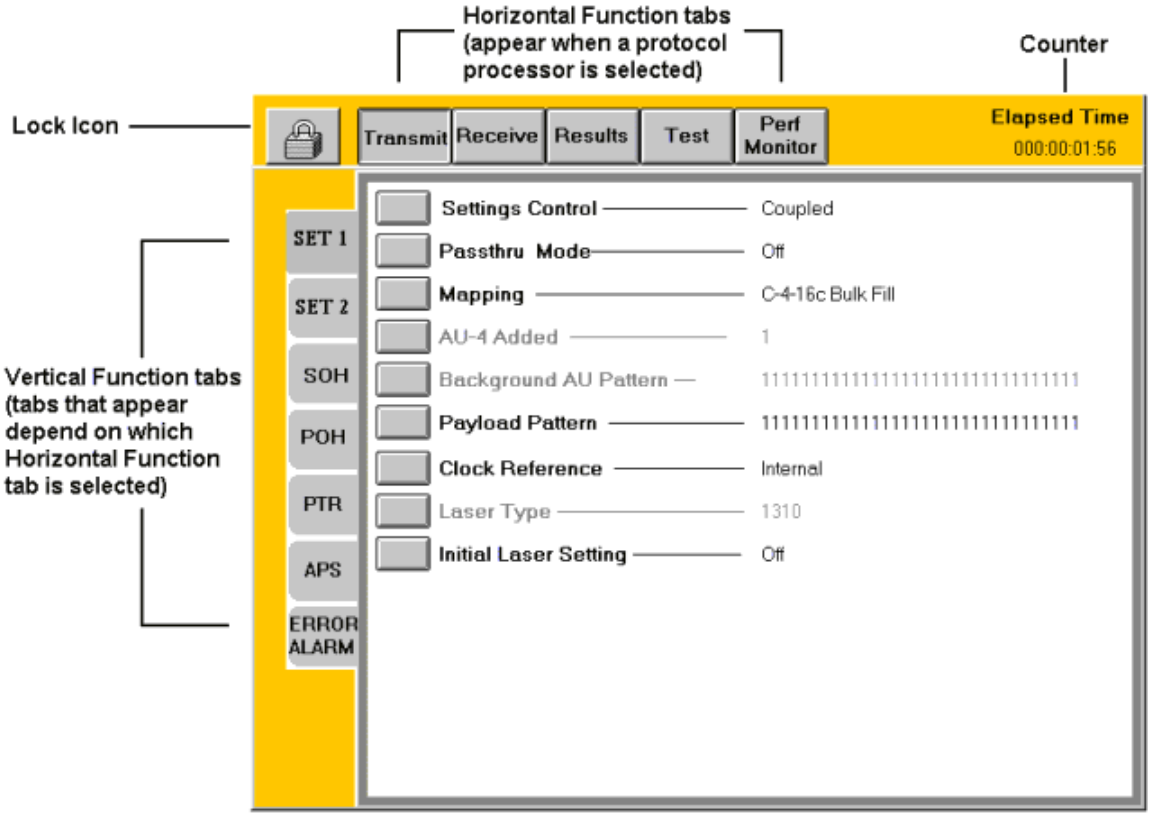
The number of protocol processor tabs that appear on the user interface will vary based on the configuration of your system. In addition, protocol processor tabs can be assigned specific names. For information, select Changing a Tab Name for the Go To Label.

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Use the **Go To** button to select and quickly jump to any tabbed function that appears on the user interface.

Work Area

The work area consumes the majority of the screen. All functions are accessed from the work area and displayed in the form of tabs or buttons. Using these tabs, you can view incoming error and alarm statistics and configure the system for operation. Select Lock Icon for locking and unlocking information.



Lock Icon

Overview

The unit's multi-user functionality allows up to eight (8) simultaneous users to be connected to a portable unit. This includes one (1) local user, via the unit's touch screen, and seven (7) remote users using the Remote Control Application (remote GUI), SCPI commands, or TL1 commands.

To prevent users from interfering with each other, an individual user can "lock" and take control of a test set. This is done using the Lock icon that appears on the GUI. Permission levels determine the user's ability to lock and unlock a test set. When you lock the test set, you can configure protocol processors, start

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tests, and perform general product functions without the worry of contending for resources with another user.

Using the Lock Icon

The following guidelines describe how to lock and unlock a test set using the Lock icon. See Locking and Unlocking a Test Set for more information. For setting the default lock state, see Configuring the Lock on Startup.)

If I see this icon on my GUI,	It means
	The test set is unlocked and available. No individual user has control of it. I can lock the test set by selecting this icon and choosing **Lock** or **Lock and Exit** from the Lock/Unlock dialog box.
	I have the test set locked. I currently control the test set and can configure protocol processors. I can unlock the test set by selecting the icon. Other users will see  on their GUI.
	The test set is locked by another user. I can only view protocol processor screens. **If I have Admin privileges –** I can select this icon and force an unlock. **If I do not have the proper user privilege –** A message appears stating that the protocol processor is locked by the current owner. For example, "Protocol Processor locked by User X."
	The circuit pack (and its associated protocol processors) is **out of service**. A counter appears indicating how long the circuit pack

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	has been out of service. A fault is also logged.

Configuring the Lock on Startup

To control the Lock's default state when the unit is started:

1. From the **System** tab, select **User Preference.**
2. Select **Startup Locking State**.
    - Select **Lock** to automatically lock the unit when it is started.
    - Select **Unlock** to make the unit available to anyone when it is started.

Common Function Buttons

The bottom of the touch screen contains task-oriented buttons. These buttons do not appear when using the System or Help tabs. Additionally, buttons that do not pertain to a protocol will not appear when that protocol tab is selected.



The Common Function Buttons include:

- Error Insert
- Stop
- Restart
- Print Report
- Presets
- Auto Conf
- Save
- Restore
- Clear History
- Off/Lock

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Error Insert

The **Error Insert** button injects single errors into the transmitted protocol processor signal. Error parameters are defined using the Error to Insert function.

Stopping a Test

The Stop common function button stops the reporting of received data and takes a snapshot of error, alarm, and event activity.

When the Stop button is selected, the following occurs:

- All statistics logged and reported by the Performance Monitoring function stop.
- All alarm, error, and event statistics logged and reported by the Results function stop.
- All elapsed time and duration counters stop.


The LEDs will continue to update and indicate current activity.

To stop a test:

- Select the **Stop** common function button located at the bottom of the touch screen.

To restart test activity and statistic reporting, select the **Restart** button.

Restarting an Error, Alarm, or Event Test

The Restart common function button is used to initiate the following test activities:

- **Clears and resets** error, alarm, and event activity counters, statistics, and LEDs for the current protocol processor.
- **Starts** error, alarm, or event activity that was stopped using the Stop button.

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To restart a test or reset statistics:

- Select the **Restart** common function button located at the bottom of the touch screen. Configured testing on the current protocol processor is restarted.

Destination Printer

The Destination Printer function prints a report directly to a printer.

For local printing (which means that you are using the touch screen), you must have a printer attached to the unit's parallel port or serial port.

For remote printing (which means that you are using the Remote Control software to operate a unit from a PC), the standard Print dialog box opens, allowing you to choose a printer name.

Printer Port Configuration

The unit supports both parallel and serial printers.

For Parallel Printing:

- Attach a parallel printer cable (with a 25-pin male connector on one end) to the unit's **Parallel Port** connector. This is a DB-25 female connector.

For Serial Printing:

Important: The following steps must be performed from the NIC unit touch screen. "Printer" is not an available Serial port assignment from the Remote Control Application.

1. Attach a serial printer cable (with a 9-pin female connector on one end) to the unit's **RS-232** port connector. This is a DB-9 male connector.
2. From the **System** tab, select **I/O Settings**.
3. Select the **Serial** button.
4. Select the **Port Assignment** button and choose **Printer**.

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Printing a Report

The Print Report Common Function Button allows you to print reports to a printer or file.

1. Select **Print Report**. The Report Setup menu appears.
2. Choose one of the following:
    - From **Destination Printer**, select one or multiple reports to print directly to a printer. If printing a report from the NIC unit, make sure that a printer is attached to the unit's parallel or serial port. The following reports are available:

        ▸ **Settings** - (.set extension) Reports current values for all Transmit and Receive Set functions.

        ▸ **Statistics** - (.stat extension) Reports results for the Scan, Errors, Alarms, and PTR.

        ▸ **Events** - (.evt extension) Reports a detailed summary of events, such as alarms, errors, and pointer activity. This report includes the event, the number of events logged, the start and stop time of the event, and the duration of the event.

        ▸ **APS** - (.aps extension) Reports the results of the K1 and K2 byte sequences received by the unit.

        ▸ **Performance** - (.perf extension) Reports Performance Monitor results.

    - From **Destination File**, choose one or multiple reports to print to a file. The File Browser dialog box appears.

The **Comma Delimiter** option can be applied to the Settings To File and Statistics To File reports.

▸ Enter a filename and select **OK**.

Important: Files saved when working with the Remote Control Application will not be accessible from the NIC unit touch-screen and visa-versa. The remote application saves the files to the Remote Control (GalaxyNIC) directory on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

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3. In the **User Comment** box, select the **Input** button to enter notes that will display in the report. A keyboard opens.
4. Enter comment text using the keyboard. When working from NIC test set use the touch screen keyboard. Select **Enter**.

> To clear comment text, select the **Clear** button.

5. Select **OK**.

For information on retrieving saved files, see Print or View Saved Files.

Files that are created when using the Remote Control Application are saved on your PC in the Remote Control directory. This directory can be overwritten when connecting to other remote units that have the same compatibility level, but are different models (for example, a NIC Plus, a NIC 10G, and so on).

If you want to keep these files, copy and save the following to a backup directory on your PC that is not in the Remote Control Application directory's path:

- Any file with the .set, .stat, .evt, .aps, .perf, or .rep extension.
- The client.prop file. Changes to this file are only needed if the remote unit uses a PCMCIA modem for its dial-up connection.

Destination File

The Destination File functions allow you to print reports to a file. This saves the report file either locally on the unit or remotely on a PC.

Using the Destination File Functions:

1. After selecting **Print Report**, the Report Setup screen appears.
2. Select any combination of reports from the **Destination File** functions.
3. Select **OK**. The File Browser appears, which allows you to name and save the report file.
4. After naming the file and deciding which subdirectory to store the file, click **OK**. The report is saved. It can be retrieved later using File Services.

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Printing or Viewing Saved Files

While running tests, you have the option to save the information to a file. The instructions below tell you where and how to print or view a saved file.

Important: Files saved when working with the Remote Control Application will not be accessible from the NIC unit touch-screen and visa-versa. The remote application saves the files to the Remote Control (GalaxyNIC) directory on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

To print or view a saved file:

1. From the **System** tab, select **File Services**.
2. Select a file from the **Disk** directory box. The desired report may display in the main Disk directory, or it may be stored in one of the folders in the directory. Folder names are enclosed in brackets **[foldername]**. To return to the main Disk directory after opening a folder, select **[. .]** or the **Disk** button.

Important: Real-time reports generated from the NIC unit touch-screen, using the Action after Duration function, are automatically stored in the [APP] folder. Select the folder to display those reports.

The following is a list of file extension used for files generated from the Print Report, Graph, or Action after Duration functions:

- **.aps** - APS Report
- **.evt** - Event Report
- **.perf** - Performance Report
- **.real** - Real-time Test Report (Stored in [APP} folder on NIC unit.)
- **.rep** - Graph Report, BERT Analysis, RFC Thru Put Analysis
- **.set** - Settings Report
- **.stat** - Results Report
- **.statE** - Event Report
- **.grp** - Graph (This is not a text file. It can only be viewed as a graph by selecting **Results,** pointing to **Graph** and choosing the **Replay Graphs** button.)

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3. Choose one of the following

To **Print** the file:

a. Select **Print**. A standard Print dialog box appears.


If you want to print a report directly from the NIC unit, make sure that a printer is attached to the unit's parallel or serial port.

b. Select the printer **Name** and choose **OK**.

To **View** the file:

a. Select **View**. The View File window appears. Use the **Display Hex** / **Display ASCII** toggle button to display the file in Hex or ASCII format.


The following file details display below the File List box.

- File name
- File size and date
- File attributes

b. Select **Exit** to close the View File window.

Presets Function

The Presets function provides a quick and convenient way to set up the system for operation. Using Presets involves selecting a starting protocol and its interface, and then making an internal connection to another protocol. See Adding/Dropping SDH/PDH Signals for more information.

To set up a connection using the Presets function:

1. Select **Presets** from the Common Function Buttons row.
2. Select **Interface**. All line interfaces available for your unit appear.
3. Select an interface as a starting point.
4. Select **Configuration**. The protocols available for the selected interface appear.

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5. Select a protocol to connect to the interface. If required, select the **Configuration** button again to create additional connections.

If you make a mistake while creating connections, simply select **Interface** and reenter the interface value. This action erases any previously entered interface or configuration values.

6. Select **Apply**. The unit takes a few moments to apply the new protocol connections. Use the Switch Matrix to view the new connections.

To disengage the configured protocol connections:

- Select **All to Tx/Rx**. This globally disconnects any internal connections between multiple protocol processors. A protocol processor will now expect to receive a signal using its line interface.

Adding/Dropping SDH and PDH Signals

The NIC allows you to set up single, or multiple test sets, and provides multiplexing and demultiplexing functionality for signal levels. Using the NIC's Preset mode, you can add or drop a signal from optical/electrical SDH and SONET, or electrical PDH into another protocol processor's signal levels in order to monitor for error and alarm conditions. For additional information on test units see Understanding Test Units.

Important: When the NIC/NAA has multiple test units you must first select the desired **test unit** protocol tab before selecting the Presets button. The configuration options available through the Preset Selection screen are dependent on the test set that is selected.

1. Select the protocol processor.
2. Select **Presets**. The Apply Presets dialog box appears. Several examples are provided below.

- **To add an STM-4 signal into an STM-16 signal:**

a. Select the **Interface** button and choose **STM-16**.

b. Select the **Configuration** button and choose **STM-4 A/D**.

Multiple signals can be added to the interface by selecting the Configuration button again and choosing another signal before selecting Apply.

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c. Select **Apply**.

- **To add an E1 into an E3 signal:**

c. Select the **Interface** button and choose **E3**.

d. Select the **Configuration** button and choose **E1 #1 A/D** or **E1 #2 A/D**.

Multiple signals can be added to the interface by selecting the Configuration button again and choosing another signal before selecting Apply.

c. Select **Apply**.

- **To add a E1 #2 A/D LI into an E3 signal:**

c. Select the **Interface** button and choose **E3**.

d. Select the **Configuration** button and choose **E1 #2 A/D LI.**

Multiple signals can be added to the interface by selecting the Configuration button again and choosing another signal before selecting Apply.

c. Select **Apply**.

3. The unit is configured for Add/Drop mode. Go to the next section to specify different frames and patterns for the added signal.

If you make a mistake while creating connections, simply select **Interface** and reenter the interface value. This action erases any previously entered interface or configuration values.

Specify Frames and Patterns for the Added Signal

If you have added an STM-4 signal into an STM-16 signal:

1. Select **STM-4**.
2. Select **Transmit**.
3. Select **SET 2**. The Mapping options appears.
4. Select the options on the screen to specify the **Foreground** and **Background** AU and TUG patterns and HP and LP signal labels to be added to the signal.

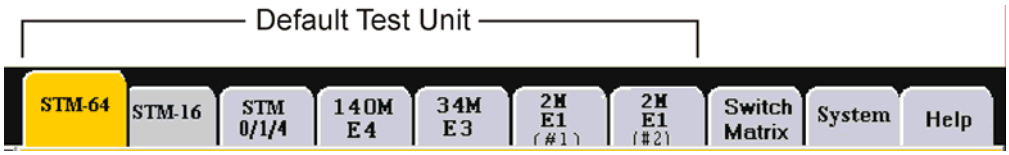
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If you have added an E3 signal to an E4 signal:

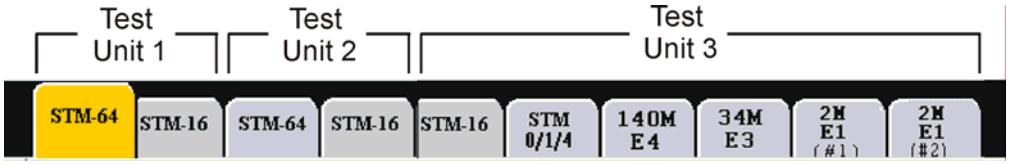
1. Select **E3**.
2. Select **Transmit**.
3. Select **SET 2**. The E3 Transmit Mapping screen appears.
4. Select **E1#1 Channel Inserted** and select from channels 1 through 16 for E1 #1.
5. Select **E1#2 Channel Inserted** and select from channels 1 through 16 for E1 #2.
6. Select **E1 Background Frame** and select the background frame (Unframed, PCM30, PCM30CRC, PCM31, PCM31CRC) for the specified channel.
7. Select **E1 Background Pattern** and select up to a 32-bit background pattern for the specified channel.

Understanding Test Units

A test unit is a series of adjacent circuit packs that are installed in a NIC/NAA (test set). The test unit is based on a circuit pack's internal addressing and starts from the highest to the lowest speed.



For example, a test set can contain multiple circuit packs of the same type (two 10Gbps circuit packs). When this type of configuration occurs, the first instance of the higher speed circuit pack is considered a test unit. Any lower speed circuit packs immediately to the right of this card are included in the test unit.



However, when the second instance of a higher speed circuit pack is encountered, it is considered the beginning of the second test unit. The image displayed to the right shows a NIC that has eight protocol tabs, representing four test units.

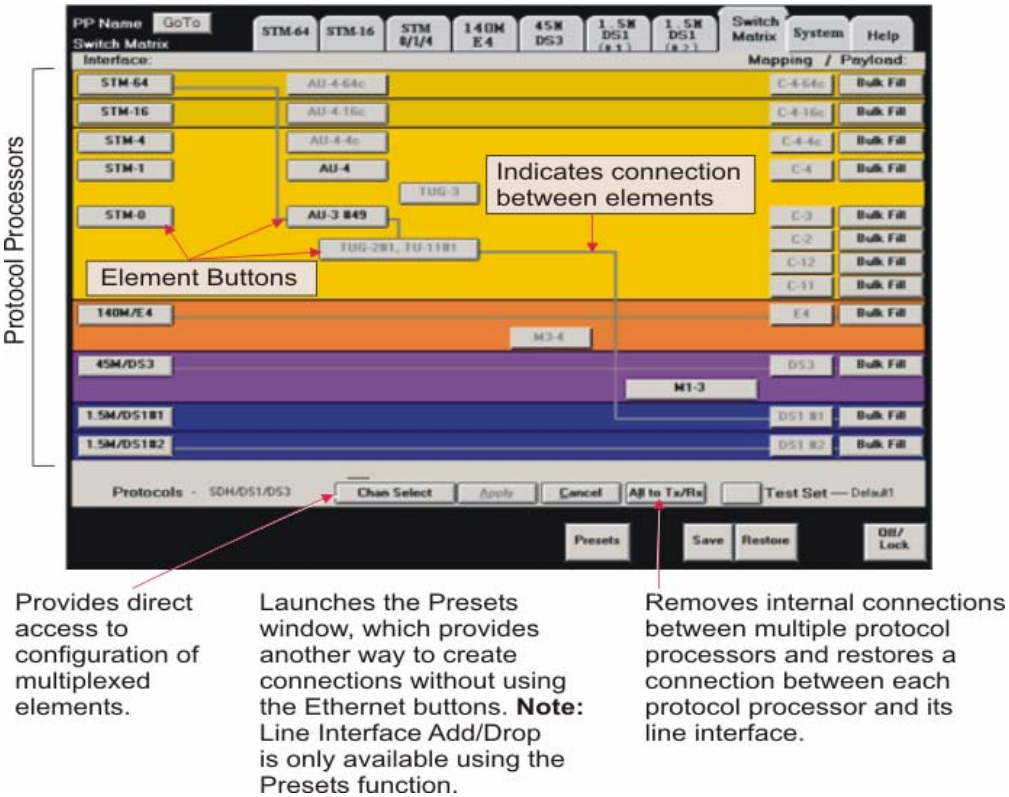
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Preset configuration options that appear will be those available for the specified test unit. When the NIC/NAA has multiple test units you must first select the desired test unit protocol tab before selecting the Presets button.

Switch Matrix

The Switch Matrix allows you to display and define a protocol processor's multiplexing structure from a single screen. This fast and convenient configuration method lets you select a protocol processor interface, route the signal through available mappings, drop the signal to other protocol processors, and select a payload to use within the signal. (See Switch Matrix Guidelines.)

The following is an example of the Switch Matrix in SDH mode.



Switch Matrix Guidelines

When using the Switch Matrix:

- ALWAYS start from left to right by first selecting an **Interface** button.
- NEXT, after selecting an interface, its available Container, Mapping, and Payload buttons are enabled to help you create a valid signal configuration.

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- LAST, after making the connections between elements, select the **Apply** button for the new configuration and connections to take affect.

Auto Conf

The Auto Conf function allows you to quickly configure the unit to match the parameters of an incoming signal. This function uses the same mapping, framing, line coding, and pattern characteristics as the incoming signal without having to manually configure the unit.

To automatically configure the unit:

1. Make sure that the unit is receiving a valid input signal.
2. Select a Protocol Processor mode that corresponds to the network and the incoming signal. (The Protocol function appears under the **Misc** tab when the **System** tab is selected.)
3. Select the protocol processor tab (located at the top of the screen) that corresponds to the signal that you want to configure.
4. Select **Auto Conf** from the Common Function Buttons that appear at the bottom of the touch screen. The Select Type of Auto Configuration dialog box appears.
5. Select the type of auto configuration to perform. See the table below for a description of the options.

   The unit starts detecting parameters about the incoming signal, such as signal rate, mapping, and payload pattern, and configures the unit accordingly. This process may take a few minutes to complete.

   The following is a list of auto configuration types; availability is based on your unit's hardware configuration.

Auto Config Type	Description
Master Configuration	The unit detects the highest line rate, mapping, framing, and pattern of the incoming signal and configures the protocol processor to match these parameters. If successful, the unit then attempts to drop a signal to tributary protocol processors. This process continues until the lowest tributary is configured. If the auto configuration process is

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	unsuccessful, the process terminates.  For the STM-0/1/4 and the OC-1/3/12 protocol processors, Master Configuration detection starts with the incoming optical signals. For auto configuration of STM-0/1/4 and OC-1/3/12 electrical signals, refer to Master Electrical.
Configure STM-64 Only	Detects the parameters of the incoming STM-64 signal, and configures the STM-64 protocol processor to these parameters.
Configure STM-16 Only	Detects the parameters of the incoming STM-16 signal, and configures the STM-16 protocol processor to these parameters.
Configure OC-192 Only	Detects the parameters of the incoming OC-192 signal, and configures the OC-192 protocol processor to these parameters.
Configure OC-48 Only	Detects the parameters of the incoming OC-48 signal, and configures the OC-48 protocol processor to these parameters.
SDH Only	Detects the parameters of the incoming STM-0/1/4 optical signals, and configures the protocol processors to these parameters.
SDH Electrical	Detects the parameters of the incoming STM-1e or STM-0e electrical signals, and configures the protocol processors to these parameters.
SONET Only	Detects the parameters of the incoming OC-1/3/12 optical signals, and configures the protocol processors to these parameters.
SONET Electrical	Detects the parameters of the

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	incoming STS-3 or STS-1 electrical signals, and configures the protocol processors to these parameters.
Master Electrical	Detects the parameters of the incoming SDH or SONET electrical signal, and configures the protocol processor to match these parameters. If successful, the unit then attempts to drop a signal to the E3, E1, DS3, or DS1 protocol processors. This process continues until the lowest tributary is configured. If the auto configuration process is unsuccessful, the process terminates.
E4 Only	Detects the parameters of the incoming E4 signal, and configures the E4 protocol processor to these parameters.
E3 Only	Detects the parameters of the incoming E3 signal, and configures the E3 protocol processor to these parameters.
DS3 Only	Detects the parameters of the incoming DS3 signal, and configures the DS3 protocol processor to these parameters.

Configuring a Protocol Mode

The unit can be configured to operate in SONET, SDH, PDH, or DS3/DS1 networks.


The options that appear on this screen are determined by your hardware configuration.

1. Select the **System** tab and choose **Misc**.
2. Select the **Protocols** button.
3. The following options appear:

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- **SONET, SDH:** These options appear if your unit contains one or more SONET/SDH boards, but no PDH board.
- **DS1/DS3, E1/DS3, E1/E3:** These options appear if your unit contains a PDH board, but no SONET/SDH boards.
- **SONET/DS1/DS3, SONET/E1/DS3, SDH/E1/E3, SDH/E1/DS3, SDH/DS1/DS3:** These options appear if your unit contains a PDH board and one or more SONET/SDH boards.

4. Select a protocol mode. The screen is updated to reflect the mode selected.

Common Function Buttons

The bottom of the touch screen contains task-oriented buttons. These buttons do not appear when using the System or Help tabs. Additionally, buttons that do not pertain to a protocol will not appear when that protocol tab is selected.



The Common Function Buttons include:

- Error Insert
- Stop
- Restart
- Print Report
- Presets
- Auto Conf
- Save
- Restore
- Clear History
- Off/Lock

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Saving a Customized Settings Configuration

Saves a customized configuration for all protocol processors' Transmit or Receive settings. For example, when a customized settings configuration is saved while in a particular protocol processor mode (for example, STM-4), the settings currently configured for other protocol processors (for example, E1, E3, STM-16, etc.) will also be saved with that setting configuration.

To save a configuration:

1. Create a test configuration using the Transmit and Receive Settings screens.
2. Once you are done, select **Save** from the common function buttons. The File Browser window appears.
3. Select **File Name**.
4. Enter a name for the configuration to be saved, and select **Enter** when done. The file is saved with an automatic file extension of .set.

Restoring a Settings Configuration or Factory Defaults

This function allows you to perform the following actions:

- Restore the unit's factory default settings.
- Restores or recalls any saved configurations for all protocol processor Receive or Transmit settings.

To restore a settings configuration:

1. Select **Restore** from the common function buttons. The Select Type of Restore window appears with the following options:
    - **Factory Defaults:** Restores the unit's default settings. If this option is selected, the default settings are immediately restored. (See Factory Default Mode to set the unit's default Protocol Processor mode.)
    - **User File:** Recalls any saved configurations for a protocol processor's Receive or Transmit settings. If this option is selected, go to Step 2.
2. If User File is selected, the File Browser window appears. From the **File** list, select the name of the settings configuration to be restored.
3. Click **OK**. The User File settings configuration selected is restored.

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Common Function Buttons

The bottom of the touch screen contains task-oriented buttons. These buttons do not appear when using the System or Help tabs. Additionally, buttons that do not pertain to a protocol will not appear when that protocol tab is selected.



The Common Function Buttons include:

- Error Insert
- Stop
- Restart
- Print Report
- Presets
- Auto Conf
- Save
- Restore
- Clear History
- Off/Lock

Factory Default Mode

This function determines the Protocol Processor mode that the unit returns to after restoring the unit's factory default settings.

To set the Factory Default mode:

1. From the **System** tab, select **Misc**.
2. Select **Factory Default Protocol**. The Select Factory Protocol Mode dialog box appears.
3. Select a Protocol Processor mode.

When factory default settings are restored, the unit will default to the selected Protocol Processor mode of operation.

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Clear History

The Clear History button resets all LEDs and Status Indicators (the LED text).

Refer to Using LEDs for LED color descriptions.

The Clear History button does not reset error counts, alarm counts, or data that appear in graphs. To clear this data, use the Restart button.

LED Quick Status Area

The system uses LEDs to report alarm, error, and event activity. These visual cues help to narrow the focus if problems are detected on the incoming protocol processors' signals and provide a starting point when trying to diagnose problems.

There are two ways to view LEDs from the screen: the **Quick Status LEDs**, which are located on the left side of the screen, and the **Large LEDS** tab. The following tables describe what is indicated by the LED color.

For LED descriptions for a specific protocol processor, go to the appropriate protocol processor section of the online help and navigate to **Screen Functions and Definitions** > **LEDs**.

Quick Status LEDs Color Description

If the LED is ...	Then this indicates ...
Green with white text	Normal operation. The LED is used as a status indicator.
White with white text	Normal operation, no errors or alarms. The LED is used as an error and alarm indicator.
Red with **red** text	An error or alarm event is in progress. The LED is used as an error and alarm indicator.
White with **red** text	An error or alarm event was detected, but is now cleared. The

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	text serves as a history indicator.

Large LED Tab Color Description

If the LED color is ...	Then this indicates ...
Green with **black** text	The specific function is active and OK.
Red with **red** text	An error or alarm event is in progress.
White with **red** text	This function experienced an error or alarm event. This event is cleared by selecting **Restart**.
White with **black** text	No activity from this specific function.

Restarting an Error, Alarm, or Event Test

The Restart common function button is used to initiate the following test activities:

- **Clears and resets** error, alarm, and event activity counters, statistics, and LEDs for the current protocol processor.
- **Starts** error, alarm, or event activity that was stopped using the Stop button.

To restart a test or reset statistics:

- Select the **Restart** common function button located at the bottom of the touch screen. Configured testing on the current protocol processor is restarted.

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Common Function Buttons

The bottom of the touch screen contains task-oriented buttons. These buttons do not appear when using the System or Help tabs. Additionally, buttons that do not pertain to a protocol will not appear when that protocol tab is selected.



The Common Function Buttons include:

- Error Insert
- Stop
- Restart
- Print Report
- Presets
- Auto Conf
- Save
- Restore
- Clear History
- Off/Lock

Off/Lock Button

The Off/Lock button provides the following functions:

- Lock and Unlock the unit. Locking the unit disables the unit's touch screen.
- Reboot - Allows the system to write unsaved data to the disk and reboot the unit.
- Shut Down - Allows the system to write unsaved data to the disk before shutting down.

Locking/Unlocking Screen Access

The test set screen can be disabled to prevent user access by others. This function requires a user ID and password to lock and unlock the screen. When unlocking the screen, the unit will only accept the last user ID and password entered, or the unit's original user ID and password.

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To lock the screen:

1. Select **Off/Lock** from the common function buttons. The Unlock Login dialog box appears.
2. Enter your **User ID**.

   On a portable unit, press ... to open a keyboard to enter the user ID.
3. Enter your **Password**.

   On a portable unit, press ... to open a keyboard to enter the password.
4. Select **OK**. The Locked Unit dialog box appears. This dialog box remains on the screen until the screen is unlocked.

If the unit is locked because critical testing is in progress, select the **Unlock** button and enter the **User ID** and **Password** again. Select **OK**.

The unit will only accept the last User ID and Password entered or the unit's original User ID and Password. An error message appears if an invalid ID or Password in entered.

To unlock the screen:

1. Select the **Unlock** button from the **Locked Unit** dialog box. The Unlock Login dialog box appears.
2. Enter your **User ID.**

   On a portable unit, press ... to open a keyboard to enter the user ID.
3. Enter your **Password**.

   On a portable unit, press ... to open a keyboard to enter the password.

The unit will only accept the last User ID and Password entered or the unit's original User ID and Password. An error message appears if an invalid ID or Password in entered.

4. Select **OK**.

Rebooting the Test Set

This function allows the system to write unsaved data to the disk before you reboot the unit. You can perform this task from the System I/O window or by selecting the Off/Lock button on a protocol processor tab.

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Important: Rebooting the test set must be done from the NIC touch screen.

To reboot the unit from the System, I/O Settings window:

1. Select the **System** tab and choose **I/O Settings**.
2. Select **Ethernet** and choose **Reboot**. The Reboot dialog box appears.
3. Select **OK** to continue with the reboot process, or Cancel to keep the unit on. The Shutdown in Progress message box appears.
4. After all unsaved data is written to the disk, the unit restarts.

Important: If the unit does not successfully reboot turn it off manually by toggling the On/Off switch to **Off**.

To reboot the unit from a protocol processor tab:

1. Select the **Off/Lock** common function button. The Unlock Login dialog box appears.

Important: Do not enter the User ID or Password.

2. Select **Reboot**. The Reboot dialog box appears.
3. Select **OK** to continue with the reboot process, or Cancel to keep the unit on. The Shutdown in Progress message box appears.
4. After all unsaved data is written to the disk, the unit restarts.

Important: If the unit does not successfully reboot turn it off manually by toggling the On/Off switch to **Off**.

Turning the Test Set On and Off

To turn the test set on:

1. Connect the proper power cord to the AC receptacle in the connector panel and then plug into an AC power source.
2. Press the power switch to the **On** (1) position.
3. After powering on the test set, listen for fan rotation to make sure that the cooling fans are operating properly.

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4. As the test set boots, it performs internal diagnostics.
5. When this is complete, a colorful user interface appears on the touch screen.
6. Verify that the touch screen is operational. For example, select the Help tab located at the top of the touch screen.

Turning the Test Set Off

The procedure described below allows the system to write unsaved data to the disk before you shutdown the test set. This task is performed by selecting the Off/Lock common function button on a protocol processor tab or Switch Matrix.

This can only be performed locally from a portable test set's touch screen.

Important: It is important to use the procedure described below when shutting down the test set. Failure to do so may result in lost data and corrupt system files.

To shut down the test set from a protocol processor tab or Switch Matrix:

1. Select the **Off/Lock** common function button. The Unlock Login dialog box appears.

Important: Do not enter the User ID or Password.

2. Select **Shut Down**. The Shutdown? dialog box appears.
3. Select **OK** to continue with the shutdown process, or Cancel to keep the test set on.
4. After all unsaved data is written to the disk, the Shutdown Computer dialog box appears.

Important: The Shutdown Computer dialog box is a standard Windows® message. NIC test sets DO NOT support the Restart option.

5. Toggle the **power switch** on the top of the test set to the off position.

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Common Tasks Overview

This section lists common tasks that are performed the same for each protocol processor mode. For tasks that are protocol processor specific, refer to the appropriate protocol processor section.

Please use the **Contents** tab and window (left side of the screen) to select, open, and view both common tasks and protocol specific tasks.

Troubleshooting

This topic is intended to aid in resolving common user interface problems. For additional assistance, please contact Customer Service.

Interface	Symptom	Resolution
Power	No power (fans silent)	• Check input power cord seating on both ends. • Ensure input voltage and frequency is correct (100-120 VAC and 200-240 VAC, 50-60Hz). • Check the fuse. If fuse is blown, contact Customer Service.
Touch Screen	Will not respond	Remove anything resting against the screen (cables, etc.) and restart the unit if it is still not responding.

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Touch Screen	Too much or too little sensitivity.	Adjusting the touch screen sensitivity must be done by a trained Digital Lightwave representative. Contact Customer Support for assistance.
Speaker	Volume too loud or too soft	Adjust desired volume from the System, Misc screen.
Optical	SONET B1, B2 errors appearing when locally looped.	• Inspect and clean fiber-optic surfaces. • Check the Receive signal status and ensure that the optical power is -2dBm to -14dBm for OC-192/STM-64 and -2dBm to -26dBm for OC-48/STM-16. Also that the frequency is within +/- 100ppm. **Note:** Attenuation is required for local loopback of OC-48/STM-16.
Optical	Loss of signal or power level low	Check for optical connector tightness and eliminate any fiber kinks or knots.

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Ethernet	Device not communicating	• Ensure cable is the correct type (*Direct* if connected to a LAN, and *Crossover* connected to a computer. • Set up a valid IP address in the System, I/O, Settings screen. • IP addresses 192.168.138.000 through 192.168.138.255 are reserved and should not be used. A system conflict can occur if these IP addresses are entered.
Serial RS232	Device not communicating	• Ensure the connecting cable is a null modem cable. • Ensure communication settings of baud, bit, stop, and parity are set up correctly in the System, I/O, Settings screen.
Printer	Printing device will not print	• Verify that the printer is in "standard text" print mode. • Check that the cable is a "standard

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		printer" cable.
PCMCIA	Card will not function in slot	Contact Customer Support to ensure the PCMCIA is properly licensed and enabled.
BITS	Unit not synchronizing up to timing source	• Check that the cables are connected correctly (IN/OUT). • Ensure the clock source is set to "BITS" from the System, Misc screen and enabled on the protocol processor's Transmit screen, Clock Reference option. • Verify that the input clock source is a clean signal with a frequency of 1.544 MHz into a 100-ohm termination.

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Clock out	Not triggering properly	• Ensure that "trigger out" options are properly enabled. • Ensure that the clock signal is terminated into a 50-ohm load.
SETS	Unit not synchronizing up to timing source	• Check that the cables are connected correctly (IN/OUT). • Ensure the clock source is set to "SETS" from the System, Misc screen and enabled on the protocol processor's Transmit screen, Clock Reference option. • Verify that the input clock source is a clean signal with a frequency of 2.048 MHz into a 120-ohm termination.

Technical Support

Our Technical Support representatives are available to help at the following toll-free numbers:

- 1-877-929-HELP (4357)
- 1-800-548-9283

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Note: International customers, call 1-727-519-2860.

Standard Service Hours

8:00 am to 6:30 pm ET, Monday through Friday.

Extended Service Hours

24 hours a day, 7 days a week

Note: Extended Service is available to all premier accounts free of charge. Ask your account manager for details.

Email

You may also contact our Technical Support reps via email at support@lightwave.com

Increasing or Decreasing Speaker Volume

This function allows you to increase or decrease the speaker volume in order to hear the touch screen beep.

To increase or decrease speaker volume:

1. From the **System** tab, choose **Misc**.
2. From **Speaker Volume**, select the **Low** arrow to decrease the volume, or **High** arrow to increase the volume.

Fiber-Optic Cleaning Procedure



With fiber optics, the tolerance to dirt is near zero. Oils, greases, airborne particles of dust, lint, and other debris are all very harmful to fiber-optic cables. They can scratch and damage fiber-optic connectors if not removed. Not only can scratches and debris harm the connectors, but they also can jeopardize the integrity and accuracy of the optical signal.

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The ferrule end faces of fiber optic patch cords and receptacle connectors are some of the most critical components for fiber optical networks. *Prior to inserting any patch cord into the test equipment's receptacle connector, clean and examine the patch cord's and the receptacle's connectors to verify the quality of each.*

Inspect the Ferrule End Face of a Patch Cord Connector

WARNING: Never look into the end of a fiber, through a microscope or your bare eye, if the other end is connected to an operating piece of network or test equipment!

1. Prior to inserting any patch cord into the microscope, verify that the other end is not connected to an operating piece of network equipment.
2. Visually examine the end face of the connector using a fiber-optic microscope.
3. If the end face of the connector is unacceptable, properly clean the connector prior to use.
4. If the end faces are acceptable, then use the fiber-optical patch cord as intended. If the end faces are not acceptable, then clean the connectors and reexamine them again.

To Clean a Patch Cord Connector Using Lint-Free Tissue and Alcohol

1. Using the pressurized canned air, blow away any dust particles that may be on the exterior surface of the connector, particularly the sides and end face of the ferrule. Hold the can approximately two inches from the surface to be cleaned and apply three to five short blasts of air.
2. Next, using an Optic Prep (or any lens-grade lint-free tissue moistened with isopropyl alcohol), gently and slowly slide the tissue across the tip of the ferrule end face in one sweeping move.
3. Repeat the last step again using a clean section of the tissue.

WARNING: Only isopropyl alcohol should be used because some solvents might attack epoxy.

Performing Periodic Maintenance on the Patch Cord Connector Using a CLETOP Cleaner

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CLETOP cleaners provide a thorough and easy method of cleaning optical connectors. It uses a reel-type cassette of dry, woven polyester, alcohol-free, cloth film. It is a fast and reliable remover of dirt, lint, and debris from the ferrule end face of the optical connector. This cleaner should be used on the patch cord periodically if the patch cord is frequently inserted and removed from the test equipment.

1. To clean the ferrule end face of the connector, advance a clean portion of the reel by depressing the side lever with your thumb.
2. Gently stroke the tip of the connector along the exposed film in the manner according to the directions on the label.
3. While sliding the connector along the blue film, slightly twist the connector between your thumb and finger to assure a thorough cleaning.

If the end-face of the patch cord is damaged or scratched beyond cleaning or repair, replace the patch cord with a new one whose end faces are acceptable.

4. Inspect the connector receptacle of the network test equipment.

WARNING: Always turn the test equipment's laser OFF before inserting the video micro-scope into the receptacle, or looking directly into the receptacle of the test equipment!

5. Prior to inserting the video microscope, verify that either the unit or its laser is turned OFF.
6. Using the pressurized canned air, blow away any dust particles that may be on the interior surface of the receptacle. If dirt is present inside the receptacle, it can scratch the lens of the video microscope, or the end-face of the connector.
7. Insert the video microscope into the receptacle. Using the monitor, visually examine the receptacle's end face of the connector.
8. If the receptacle's end face has a build up of dust, dirt, or any debris, clean the receptacle according to the next procedure.

To Clean a Connector Receptacle (also referred to as a bulkhead or adapter)

1. Using the pressurized canned air, blow away any dust particles that may be on the interior surface of the receptacle, particularly the inside walls of

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the alignment sleeve. Hold the can approximately two inches from the receptacle to be cleaned and apply three to five short blasts of air.

2. Moisten the end of a 2.5-mm foam swab with isopropyl alcohol, and insert it into one side of the receptacle. Move the swab in and out two or three times and then remove it.
3. Moisten the end of a NEW swab with alcohol, and insert it into the open side of the receptacle. Rotate the swab back and forth 90-degrees twice and then remove it.
4. Dry the inside of the receptacle by holding the pressurized canned air approximately two inches from the end of the receptacle and applying three to five short blasts of air.


Only use foam swabs; cotton swabs leave particles and threads behind.

I/O Settings

The I/O Settings tab allows you to configure and control the unit's communications port parameters, and reboot the test set.

The following port options are available on the I/O Settings screens:

- Ethernet Configuration
- Wireless Configuration
- Serial Configuration
- GPIB Configuration

Rebooting the Test Set

This function allows the system to write unsaved data to the disk before you reboot the unit. You can perform this task from the System I/O window or by selecting the Off/Lock button on a protocol processor tab.


Important: Rebooting the test set must be done from the NIC touch screen.

To reboot the unit from the System, I/O Settings window:

1. Select the **System** tab and choose **I/O Settings**.
2. Select **Ethernet** and choose **Reboot**. The Reboot dialog box appears.

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3. Select **OK** to continue with the reboot process, or Cancel to keep the unit on. The Shutdown in Progress message box appears.
4. After all unsaved data is written to the disk, the unit restarts.

> Important: If the unit does not successfully reboot turn it off manually by toggling the On/Off switch to **Off**.

To reboot the unit from a protocol processor tab:

1. Select the **Off/Lock** common function button. The Unlock Login dialog box appears.

> Important: Do not enter the User ID or Password.

2. Select **Reboot**. The Reboot dialog box appears.
3. Select **OK** to continue with the reboot process, or Cancel to keep the unit on. The Shutdown in Progress message box appears.
4. After all unsaved data is written to the disk, the unit restarts.

> Important: If the unit does not successfully reboot turn it off manually by toggling the On/Off switch to **Off**.

Ethernet Configuration

> If Ethernet port parameters are changed, the test set must be rebooted for the changes to take affect.

The following configures the Ethernet port's parameters:

- **Obtain an IP address from a DHCP server:** The unit will uses the network's Dynamic Host Connection Protocol (DHCP) server to dynamically assign it an IP address. ***When selected, the IP Address, Subnet Address, Router, Host Name, and Domain Name functions are disabled, but will be populated by the DHCP server.***
- **Specify an IP address:** Allows a static IP address to be entered using the IP Address, Subnet Address, Router, Host Name, and Domain Name functions.
- **IP Address:** Enter the unit's IP address using dotted decimal notation. For example, **nnn.nnn.nnn.nnn**, where **nnn** is a value from 0 to 255.

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IP addresses **192.168.138.000 through 192.168.138.255** are reserved and should not be used. A serious system conflict can occur if these IP addresses are entered.

If you must use an IP address in the range of **192.168.x.y** (where x is not equal to 138), then you must set the Subnet Address to **255.255.255.0**.

- **Subnet Address:** Enter the subnet address using dotted decimal notation.
- **Router:** Enter the Router address using dotted decimal notation.
- **Host Name:** Enter the unit's host name (for example, NICPLUS). This is an optional parameter.
- **Domain Name:** Enter the unit's domain name (for example, lightwave.com). This is an optional parameter.
- **Port Assignment:** Displays what has been assigned, by way of default or license. SCPI is automatically listed. If the unit is licensed for TL1, then TL1 is also displayed on the assignment line.

The **Host Name** and **Domain Name** parameters defined for Ethernet Configuration screen also apply to the Wireless Configuration screen. Any changes made to these parameters on one screen will also be made on the other screen.

Wireless Configuration

The unit only supports the HP 11-Mbps Wireless LAN PC Card. This card is inserted into the unit's PCMCIA slot.

The unit can connect to a wireless network using an 802.11 compliant wireless LAN PC card. The following describes the wireless configuration parameters:

- **Access Point ID:** Enter the wireless LAN's name/ID. The Access Point ID can be up to 32-characters in length.
- **Obtain an IP address from a DHCP server:** The unit will uses the network's Dynamic Host Connection Protocol (DHCP) server to dynamically assign it an IP address. ***When selected, the IP Address, Subnet Address, Router, Host Name, and Domain Name functions are disabled, but will be populated by the DHCP server.***

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- **Specify an IP address:** Allows a static IP address to be entered using the IP Address, Subnet Address, Router, Host Name, and Domain Name functions.
- **IP Address:** Enter the unit's IP address using dotted decimal notation. For example, **nnn.nnn.nnn.nnn**, where **nnn** is a value from 0 to 255.

Warning: IP addresses **192.168.138.000 through 192.168.138.255** are reserved and should not be used. A serious system conflict can occur if these IP addresses are entered.

If you must use an IP address in the range of **192.168.x.y** (where x is not equal to 138), then you must set the Subnet Address to **255.255.255.0**.

- **Subnet Address:** Enter the subnet address using dotted decimal notation.
- **Router:** Enter the Router address using dotted decimal notation.
- **Host Name:** Enter the unit's host name (for example, NICPLUS). This is an optional parameter.
- **Domain Name:** Enter the unit's domain name (for example, lightwave.com). This is an optional parameter.

The **Host Name** and **Domain Name** parameters defined for Wireless Configuration screen also apply to the Ethernet Configuration screen. Any changes made to these parameters on one screen will also be made on the other screen.

Serial Configuration

Before changing serial port parameters, you must first disable the serial port by setting its assignment to **None**. After changing parameters, you can reset the serial port to its previous assignment. Refer to Port Assignment for a list of serial port interfaces.

The following configures the Serial port's parameters:

- **Baud Rate:** Set to 19200, 14400, 9600, 4800, 2400, or 1200.
- **Parity:** Set to None, Odd, or Even.

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- **Data Bits:** Set to 7 or 8.
- **Stop Bits:** Set to 1 or 2.
- **Port Assignment:** Sets the serial port to one of the following interfaces – None, SCPI, TL1, or Printer.

GPIB Configuration

The following configures the GPIB Port's parameters.

- **GPIB Port:** Sets the GPIB port address from 0 to 30. The primary address must match the GPIB host or communications cannot be established.
- **Port Assignment:** The unit can be controlled using SCPI commands through the unit's GPIB port. The Port Assignment line of the GPIB screen automatically displays SCPI as its assignment.

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COMMON TASKS

Common Tasks Overview

This section lists common tasks that are performed the same for each protocol processor mode. For tasks that are protocol processor specific, refer to the appropriate protocol processor section.

Please use the **Contents** tab and window (left side of the screen) to select, open, and view both common tasks and protocol specific tasks.

Adding a New User

If the System Lock function is enabled, only one user with Read and Write permissions (this includes Calibration and Admin users) can be logged in at a time. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read permissions only.

1. From the **System** tab, select **Security**.
2. From the **User Name** column, select **NEW USER**.
3. From **Account Information**, select ..., next to the **User Name** field. A keypad appears.
4. Enter the **user name**.
5. Select ..., next to the **Password** field. A keypad appears.
6. Enter a **password**.
7. Select ..., next to the **Permission** field. The Select User Permissions window appears.
8. Select one of the following user permissions:

    - **Read:** Allows the user read-only privileges.
    - **Read/Write:** Allows the user to read and update information.
    - **Calibrate:** Allows the user read and write privileges and the ability to perform calibration procedures on the unit.
    - **Admin:** Allows the user to perform network administrator tasks such as calibrating, adding, deleting, and updating user profiles.

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9. Select **Update**. The new user profile is added and appears on the User List.

Adding/Dropping SDH and PDH Signals

The NIC allows you to set up single, or multiple test sets, and provides multiplexing and demultiplexing functionality for signal levels. Using the NIC's Preset mode, you can add or drop a signal from optical/electrical SDH and SONET, or electrical PDH into another protocol processor's signal levels in order to monitor for error and alarm conditions. For additional information on test units see Understanding Test Units.

Important: When the NIC/NAA has multiple test units you must first select the desired **test unit** protocol tab before selecting the Presets button. The configuration options available through the Preset Selection screen are dependent on the test set that is selected.

1. Select the protocol processor.
2. Select **Presets**. The Apply Presets dialog box appears. Several examples are provided below.

- **To add an STM-4 signal into an STM-16 signal:**

a. Select the **Interface** button and choose **STM-16**.

b. Select the **Configuration** button and choose **STM-4 A/D**.

Multiple signals can be added to the interface by selecting the Configuration button again and choosing another signal before selecting Apply.

c. Select **Apply**.

- **To add an E1 into an E3 signal:**

c. Select the **Interface** button and choose **E3**.

d. Select the **Configuration** button and choose **E1 #1 A/D** or **E1 #2 A/D**.

Multiple signals can be added to the interface by selecting the Configuration button again and choosing another signal before selecting Apply.

c. Select **Apply**.

- **To add a E1 #2 A/D LI into an E3 signal:**

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c. Select the **Interface** button and choose **E3**.

d. Select the **Configuration** button and choose **E1 #2 A/D LI.**

Multiple signals can be added to the interface by selecting the Configuration button again and choosing another signal before selecting Apply.

c. Select **Apply**.

3. The unit is configured for Add/Drop mode. Go to the next section to specify different frames and patterns for the added signal.

If you make a mistake while creating connections, simply select **Interface** and reenter the interface value. This action erases any previously entered interface or configuration values.

Specify Frames and Patterns for the Added Signal

If you have added an STM-4 signal into an STM-16 signal:

1. Select **STM-4**.
2. Select **Transmit**.
3. Select **SET 2**. The Mapping options appears.
4. Select the options on the screen to specify the **Foreground** and **Background** AU and TUG patterns and HP and LP signal labels to be added to the signal.

If you have added an E3 signal to an E4 signal:

1. Select **E3**.
2. Select **Transmit**.
3. Select **SET 2**. The E3 Transmit Mapping screen appears.
4. Select **E1#1 Channel Inserted** and select from channels 1 through 16 for E1 #1.
5. Select **E1#2 Channel Inserted** and select from channels 1 through 16 for E1 #2.
6. Select **E1 Background Frame** and select the background frame (Unframed, PCM30, PCM30CRC, PCM31, PCM31CRC) for the specified channel.

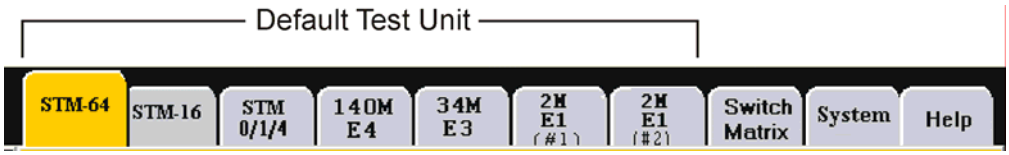
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7. Select **E1 Background Pattern** and select up to a 32-bit background pattern for the specified channel.

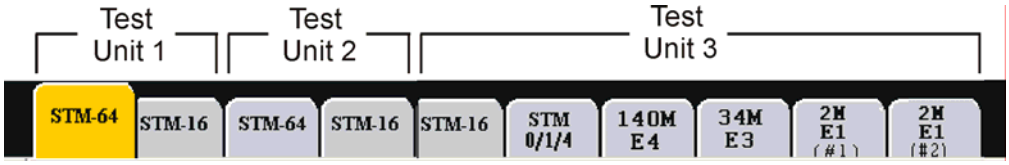
Understanding Test Units

A test unit is a series of adjacent circuit packs that are installed in a NIC/NAA (test set). The test unit is based on a circuit pack's internal addressing and starts from the highest to the lowest speed.

For example, a test set can contain multiple circuit packs of the same type (two 10Gbps circuit packs). When this type of configuration occurs, the first instance of the higher speed circuit pack is considered a test unit. Any lower speed circuit packs immediately to the right of this card are included in the test unit.



However, when the second instance of a higher speed circuit pack is encountered, it is considered the beginning of the second test unit. The image displayed to the right shows a NIC that has eight protocol tabs, representing four test units.



Preset configuration options that appear will be those available for the specified test unit. When the NIC/NAA has multiple test units you must first select the desired test unit protocol tab before selecting the Presets button.

Adding Notes to a Test Unit

When you lock a test unit, you can add notes to the Add/Lock dialog box that are pertinent to the test set. Different test units can carry their own specific notes.

To add notes to the Lock/Unlock dialog box for a test unit:

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1. Choose the desired protocol processor and select the **Lock** icon. The Lock/Unlock dialog box appears.

If the test unit is locked by someone else, select **Force Unlock** and choose **Lock and Exit** or **Lock**.

2. Select **Circuit Info:** and/or **Contact Info:**. The Enter User String keyboard opens.
3. Type notes and select **Enter**. The notes appear in their associated information box.
4. Select **Exit** to close the Lock/Unlock dialog box.

To edit notes on the Lock/Unlock dialog box for a test unit:

To edit the notes, the test unit must be placed in locked mode by the immediate user.

1. Choose the desired protocol processor and select the **Lock** icon. The Lock/Unlock dialog box appears.
2. Select **Circuit Info:** and/or **Contact Info:** and make appropriate changes using the Enter User String keyboard. Select **Enter**.
3. Select **Exit**.

Locking and Unlocking a Test Set

To prevent users from interfering with each other, an individual user can "lock" and take control of a test set. This is done using the Lock icon that appears on the GUI. Permission levels determine the user's ability to lock and unlock a test set. When you lock the test set, you can configure protocol processors, start tests, and perform general product functions without the worry of contending for resources with another user.

When a test set is locked by someone else, the icon is displayed.

To unlock a test set locked by someone else:

1. Select the Lock icon. The Lock/Unlock dialog box appears.
2. Select **Force Unlock**. The command buttons change to "Lock and Exit" and "Lock."

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You must have **Admin** privileges to be able to force the unlock.

3. Selecting one of the following causes the command buttons to change to "Unlock and Exit" and "Unlock", and the information boxes become available.
    - **Lock and Exit** - Locks the unit and automatically closes the dialog box. To enter notes after the dialog box closes, select the locked icon to reopen the dialog box.
    - **Lock** - Allows you to enter note information in the Circuit Info: and Contact Info: boxes before closing the dialog box. The notes carry over to all protocol processors in the test set. When a different test set is locked the user can enter notes pertinent to it.
4. To enter note information, select **Circuit Info:** and/or **Contact Info:**. The Enter User String keyboard opens.
5. Type notes and select **Enter**. The notes appear in their associated information box.
6. Select **Exit** to close the Lock/Unlock dialog box.

When you have the test set locked, the  icon is displayed.

To unlock a test set that you have locked:

1. Select the icon. The Lock/Unlock dialog box appears.
2. Selecting one of the following causes the command buttons to change to "Lock and Exit" and "Lock":
    - **Unlock and Exit** - Unlocks the unit and automatically closes the dialog box.
    - **Unlock** - Unlocks the unit without closing the dialog box. Select **Exit** to close the Lock/Unlock dialog box.

When the test set is unlocked, the  icon is displayed.

To lock a test set:

1. Select the icon. The Lock/Unlock dialog box appears.

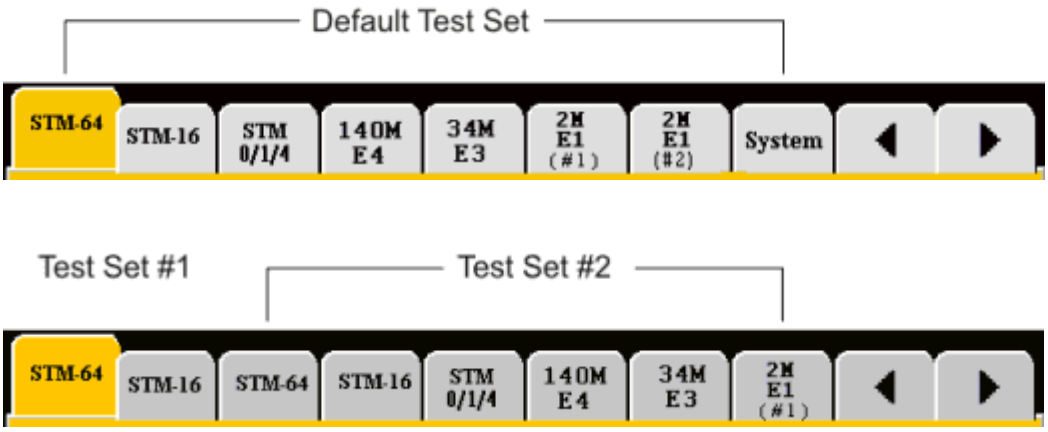
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2. Selecting one of the following causes the command buttons to change to "Unlock and Exit" and "Unlock", and the information boxes become available.

    - **Lock and Exit** - Locks the unit and automatically closes the dialog box.
    - **Lock** - Allows you to enter note information in the **Circuit Info:** and **Contact Info:** boxes before closing the dialog box. The notes carry over to all protocol processors in the test set. When a different test set is locked the user can enter notes pertinent to it. Select **Exit** to close the dialog box.

Test Set

A Test Set is a series of adjacent circuit packs (based on a circuit pack's internal addressing and starting from the highest to the lowest speed) that are installed in a unit.



A unit can contain multiple circuit packs of the same type (for example, two 10Gbps circuit packs). When this type of configuration occurs, the first instance of the higher speed circuit pack is considered a test set. Any lower speed circuit packs adjacent to this card are included in the test set. When the second instance of the higher speed circuit pack is encountered, it is considered the beginning of the second test set. Likewise, any subsequent lower speed circuit packs are included as part of the second test set.

The following table provides additional information for this example.

Circuit Pack and physical location	**(Associated Protocol Processors that appear on GUI tabs)**	**Test Set grouping**

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10 Gbps	STM-64/OC-192	Test Set #1
2.5 Gbps	STM-16/OC-48	Test Set #1
10 Gbps	STM-64/OC-192	Test Set #2
2.5 Gbps	STM-16/OC-48	Test Set #2
SDH	STM-0/1/4 and OC-1/3/12	Test Set #2
PDH	E4, E3, E1 and DS3, DS1	Test Set #2

Lock Icon

Overview

The unit's multi-user functionality allows up to eight (8) simultaneous users to be connected to a portable unit. This includes one (1) local user, via the unit's touch screen, and seven (7) remote users using the Remote Control Application (remote GUI), SCPI commands, or TL1 commands.

To prevent users from interfering with each other, an individual user can "lock" and take control of a test set. This is done using the Lock icon that appears on the GUI. Permission levels determine the user's ability to lock and unlock a test set. When you lock the test set, you can configure protocol processors, start tests, and perform general product functions without the worry of contending for resources with another user.

Using the Lock Icon

The following guidelines describe how to lock and unlock a test set using the Lock icon. See Locking and Unlocking a Test Set for more information. For setting the default lock state, see Configuring the Lock on Startup.)

If I see this icon on my GUI,	**It means**
	The test set is unlocked and available. No individual user has control of it. I can lock the test set by selecting this icon and choosing **Lock** or **Lock and Exit** from the Lock/Unlock dialog box.

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	I have the test set locked. I currently control the test set and can configure protocol processors. I can unlock the test set by selecting the icon. Other users will see  on their GUI.
	The test set is locked by another user. I can only view protocol processor screens. **If I have Admin privileges –** I can select this icon and force an unlock. **If I do not have the proper user privilege –** A message appears stating that the protocol processor is locked by the current owner. For example, "Protocol Processor locked by User X."
	The circuit pack (and its associated protocol processors) is **out of service**. A counter appears indicating how long the circuit pack has been out of service. A fault is also logged.

Configuring the Lock on Startup

To control the Lock's default state when the unit is started:

1. From the **System** tab, select **User Preference.**
2. Select **Startup Locking State**.
    - Select **Lock** to automatically lock the unit when it is started.
    - Select **Unlock** to make the unit available to anyone when it is started.

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Faults

The unit maintains a fault log of critical hardware problems reported by circuit packs.

If a circuit pack is out of service, the  icon appears.

To view system faults:

1. Select **System**.
2. Select **Faults**. If a fault has been logged, the following appears in the Fault Messages window:
    - Date and time that the fault occurred.
    - Fault description
    - Card – The circuit pack that is reporting the problem.

To clear the system fault log:

- Select **Clear**.

Setting the Alarm Beeper Status

This function associates a WAV file sound with an alarm event. When using the unit's touch screen, a total of 10 sounds are available. When using the remote GUI, up to a total of 16 sounds can be used. This includes customized WAV files that can be added by copying the new file to the Remote Control's installation directory on your PC.

To assign an audible notification to an alarm:

1. From the **System** tab, select **User Preference**.
2. Select **Alarm Beeper Status**.
3. Select **On** or **Maintenance**. The Alarm Beep Definition dialog box appears.
4. Select an alarm type to display the Select Alarms Sound dialog box.
5. Select a sound. The sound selection uses the WAV file's name. For example, chord.wav appears as CHORD.
6. If desired, select **Test** to hear the sound.
7. Select **Apply**.

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To turn off all alarm sounds:

1. Select **Alarm Beeper Status**.
2. Select **Off**.

To add new WAV files to the Remote NIC on your PC:

1. Make sure that your Remote NIC application is closed.
2. Place a copy of the WAV file into the Compat folder that you are running the Remote NIC from.

   To locate the Compat folder:

   a. Open the Remote NIC (**GalaxyNIC**) directory. For example, the default directory is C:\Program Files\GalaxyNIC.

   b. Locate the **Compat** folder from which the Remote NIC is running. The folder name represents the Feature Set operating on the NIC unit. For example, the Compat folder for Feature Set 4.1.28 appears in the GalaxyNIC directory as Compat400010028.

There can be more than one Compat folder in the GalaxyNIC directory. To determine the correct folder, check the Feature Set version operating on the NIC test set that you want to add the WAV file to by selecting its **System** tab, choosing **Misc**, and pointing to **About this product**. The **Feature Set** version is located near the top of the **About NIC** dialog box.

3. After the WAV file has been added to the appropriate Compat folder, open the Remote NIC application.
4. From the **System** tab, select **User Preference**.
5. Select **Alarm Beeper Status**.
6. Select **On** or **Maintenance**. The Alarm Beep Definition dialog box appears.
7. Select an alarm type to display the Select All Alarms Sound dialog box. The new WAV files appear in the dialog box. Only the first 16 sounds will appear in the selection window. The sound files that appear use the WAV file's name.
8. Select the new WAV file and choose **Apply**.

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Displaying All Test Status

Use the All Test Status function to view the current status of all protocol processors installed in the unit.

1. From the **System** tab, select **All Test Status**. A general summary screen appears. A maximum of 12 protocol processor tabs can appear on the screen. The elapsed time (in minutes) and general status Summary LED for each protocol processor appears.

Select he **Summary** LED text is selected (the word Summary), to display the LEDs associated with that specific protocol processor tab. To clear the LED window, select **Close**.

2. If the unit contains more than 12 circuit packs (protocol processor tabs), the protocol processor tabs appear in groups of 12. Select the All Test button (**All Test (1 to 12)**) to scroll through the various groups.

For information about current and past events for specific protocol processors, refer to Display History.

Display History

The system maintains a log of errors and alarms detected on the incoming protocol processor's signal. This history of past and current events can be viewed using the **LEDs** or **Results** button.

The LEDs provide a visual indicator of current and past activity, and are used to quickly narrow the focus of what is received and possible problem areas of the network.

The **Results** button provides broad details of error and alarm activity.

To display history using the Results button:

1. Select a protocol processor.
2. Select the **Results** button.
3. Events can be viewed on the **Scan**, **Err**, **Alarm**, **PTR**, or **Graphs** screens.

The **Scan** button displays a list of received alarms and errors, along with the number of seconds that the event occurred. This summary identifies a general area to investigate when an error or alarm is detected.

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The **Errors** button provides the following details about received errors:

- Error count using an 11-digit format
- Average error rate over the error duration using an N.NNe-N format
- Current error rate using an N.NNe-N format
- Error free seconds using an 8-digit format
- Errored seconds using an 8-digit format
- Severely errored seconds
- Unavailable errored seconds

The **Alarm** button displays the number of seconds that an alarm was present.

The **PTR** button provides the following details about received Pointer adjustments:

- Positive Justification: Indicates the number of positive Pointer adjustments
- Negative Justification: Indicates the number of negative Pointer adjustments
- Pointer Justification Seconds: Indicates the duration of a Pointer adjustment in seconds
- NDF Count: Indicates the number of New Data Flags received
- Receive Pointer Value: Indicates the Pointer value

The **Graphs** button provides an additional view of error and alarm results for the selected protocol processor. Graphs show the test history for either the current test or a previously saved test.

Auto Conf

The Auto Conf function allows you to quickly configure the unit to match the parameters of an incoming signal. This function uses the same mapping, framing, line coding, and pattern characteristics as the incoming signal without having to manually configure the unit.

To automatically configure the unit:

1. Make sure that the unit is receiving a valid input signal.

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2. Select a Protocol Processor mode that corresponds to the network and the incoming signal. (The Protocol function appears under the **Misc** tab when the **System** tab is selected.)
3. Select the protocol processor tab (located at the top of the screen) that corresponds to the signal that you want to configure.
4. Select **Auto Conf** from the Common Function Buttons that appear at the bottom of the touch screen. The Select Type of Auto Configuration dialog box appears.
5. Select the type of auto configuration to perform. See the table below for a description of the options.

   The unit starts detecting parameters about the incoming signal, such as signal rate, mapping, and payload pattern, and configures the unit accordingly. This process may take a few minutes to complete.

   The following is a list of auto configuration types; availability is based on your unit's hardware configuration.

Auto Config Type	**Description**
Master Configuration	The unit detects the highest line rate, mapping, framing, and pattern of the incoming signal and configures the protocol processor to match these parameters. If successful, the unit then attempts to drop a signal to tributary protocol processors. This process continues until the lowest tributary is configured. If the auto configuration process is unsuccessful, the process terminates.  For the STM-0/1/4 and the OC-1/3/12 protocol processors, Master Configuration detection starts with the incoming optical signals. For auto configuration of STM-0/1/4 and OC-1/3/12 electrical signals, refer to Master Electrical.
Configure STM-64 Only	Detects the parameters of the incoming STM-64 signal, and

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	configures the STM-64 protocol processor to these parameters.
Configure STM-16 Only	Detects the parameters of the incoming STM-16 signal, and configures the STM-16 protocol processor to these parameters.
Configure OC-192 Only	Detects the parameters of the incoming OC-192 signal, and configures the OC-192 protocol processor to these parameters.
Configure OC-48 Only	Detects the parameters of the incoming OC-48 signal, and configures the OC-48 protocol processor to these parameters.
SDH Only	Detects the parameters of the incoming STM-0/1/4 optical signals, and configures the protocol processors to these parameters.
SDH Electrical	Detects the parameters of the incoming STM-1e or STM-0e electrical signals, and configures the protocol processors to these parameters.
SONET Only	Detects the parameters of the incoming OC-1/3/12 optical signals, and configures the protocol processors to these parameters.
SONET Electrical	Detects the parameters of the incoming STS-3 or STS-1 electrical signals, and configures the protocol processors to these parameters.
Master Electrical	Detects the parameters of the incoming SDH or SONET electrical signal, and configures the protocol processor to match these parameters. If successful, the unit then attempts to drop a signal to the E3, E1, DS3, or DS1 protocol processors. This process continues until the lowest tributary is configured.

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	If the auto configuration process is unsuccessful, the process terminates.
E4 Only	Detects the parameters of the incoming E4 signal, and configures the E4 protocol processor to these parameters.
E3 Only	Detects the parameters of the incoming E3 signal, and configures the E3 protocol processor to these parameters.
DS3 Only	Detects the parameters of the incoming DS3 signal, and configures the DS3 protocol processor to these parameters.

Configuring a Protocol Mode

The unit can be configured to operate in SONET, SDH, PDH, or DS3/DS1 networks.

The options that appear on this screen are determined by your hardware configuration.

1. Select the **System** tab and choose **Misc**.
2. Select the **Protocols** button.
3. The following options appear:

    - **SONET, SDH:** These options appear if your unit contains one or more SONET/SDH boards, but no PDH board.
    - **DS1/DS3, E1/DS3, E1/E3:** These options appear if your unit contains a PDH board, but no SONET/SDH boards.

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- **SONET/DS1/DS3, SONET/E1/DS3, SDH/E1/E3, SDH/E1/DS3, SDH/DS1/DS3:** These options appear if your unit contains a PDH board and one or more SONET/SDH boards.

4. Select a protocol mode. The screen is updated to reflect the mode selected.

Common Function Buttons

The bottom of the touch screen contains task-oriented buttons. These buttons do not appear when using the System or Help tabs. Additionally, buttons that do not pertain to a protocol will not appear when that protocol tab is selected.



The Common Function Buttons include:

- Error Insert
- Stop
- Restart
- Print Report
- Presets
- Auto Conf
- Save
- Restore
- Clear History
- Off/Lock

Enabling Boot Sound

Enabling the Boot Sound option allows a .wav sound file to play that acknowledges when the NIC unit is fully booted and available.

To enable the boot sound:

1. From the **System** tab, select **Misc**.

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2. From **System Setting**, select the **Boot Sound Enabled** check box.

To disable the Boot Sound, simply clear the Boot Sound Enabled check box.

Calibrating a Protocol Processor

Calibrating the system's optical power should be done carefully. To keep unauthorized users from changing calibration settings, the Update Signal Calibration button on the protocol processor's Receive SIG screen is unavailable by default. To change the setting, a user with Admin or Calibrate privileges must enable the calibration mode. Once calibration has been enabled, each protocol processor has its own calibration procedure.

To enable protocol processor calibration:

1. From the **System** tab, select **Misc**.
2. From **Local Settings**, select **Enable Calibration**.

The user must have Admin or Calibrate privileges to enable the calibration mode.

The **Update Signal Calibration** button is now available on the protocol processor's **Receive SIG** screen.

Protocol processors have their own calibration procedures. You can find the procedures in **Specific Tasks** section of the protocol's **Online Help**.

To view a calibration procedure described in the online help file:

1. From the **NIC Online Help**, select the **Contents** tab and choose the desired protocol processor.
2. Expand the protocol processor's **Overview** book and select **Specific Tasks**.
3. Select the **Calibrate** topic.

For local touch screen calibration procedures, select Calibrating the Touch Screen.

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Calibrating Clock Frequency

Important: The following procedure is for use by qualified Digital Lightwave personnel. It is used to tune the exact frequency of the unit's Stratum III clock. It is assumed that you have already measured the frequency offset that must be entered into the unit.

To enter and adjust the frequency of the Stratum III clock:

1. From the **System** tab, select **Misc**.
2. Select **Oscillator Value**. A keypad appears. The unit's internal clock frequency can be adjusted in 255 steps, where **0** is the lowest frequency, **128** is the center frequency, and **255** is the highest frequency.
3. Using the keypad, enter a value, and select **OK** when you are done. The new Oscillator Value is set.

Calibrating the Touch Screen

Touch screen calibration is performed on all portable units prior to shipping from the factory. However, if your unit's touch screen requires recalibration, perform the procedure described below.

Although touch screen calibration can be performed using your finger, a pointing device, such as a stylus, is recommended for greater accuracy.

Calibrating the touch screen can only be performed from the NIC test set.

To calibrate the touch screen:

1. From the **System** tab, select **Misc**.
2. Select **Recalibrate Touch Screen**. The MtsCal dialog box appears.

The Recalibrate Touch Screen button does not appear when you are connected to the unit using the Remote Control software.

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3. Select **5-point Calibration**.

   Five touch screen targets (calibration points) appear on the screen.

   The hand icon indicates which target to select.

4. Place and hold your pointing device as close to the center of the target as possible.

5. The message **Touch Enabled** appears when calibration for that specific point is complete.

6. The hand icon moves to the next target. Repeat step 4 for the four remaining targets.

If the screen is not touched for a 20-second period or longer, the current calibration process is canceled. The calibration must be restarted using the first touch screen target.

7. When touch screen calibration is complete, a completion message briefly appears on the screen and the MtsCal dialog box reappears. Select **Close**.

Capturing Screens

This function allows you to print the currently displayed screen. The image is converted to a bitmap (.bmp) image, which is saved to your test set or PC's hard drive in the GalaxyNIC folder.

Important: You cannot print or view a saved .bmp from the System File Services list box. You must locate the .bmp in the GalaxyNIC directory on your PC. To locate the .bmp:

a. Open the Remote NIC (**GalaxyNIC**) directory. For example, the default directory is C:\Program Files\GalaxyNIC.
b. Locate the **Compat** folder from which the Remote NIC is running. The folder name represents the Feature Set operating on the NIC unit. For example, the Compat folder for Feature Set 4.1.28 appears in the GalaxyNIC directory as Compat400010028.
c. Open the .bmp file and print to a local printer.

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To capture a screen:

1. Select the **Print Report** common function button.
2. Select **Screen Capture**. The image is saved as Screen.bmp.

A screen capture image will automatically overwrite an existing Screen.bmp file. To save previous screen capture images, use the File Services' Rename function.

3. If you are capturing screens using a portable unit, you must transfer the file from the unit to your PC to print the bitmap image. Refer to Uploading a File for file transfer procedures. After the file is copied to your PC, it can be opened and printed.

Renaming a File

1. From the **System** tab, select **Files Services**.
2. Select a file from the File List box.
3. Select **Rename**. A keyboard appears. Enter the new file name with extension. (Do not use spaces in file names.)
    - SET is the default extension for a Settings report.
    - STAT is the default extension for a Statistics report. (This includes tests produced using the Action After Duration button.)
    - EVT is the default extension for an Event report.
    - APS is the default extension for an APS report.
    - GRP is the default extension for a Graph report.
    - BMP is the default extension for a Print Screen image.
    - PERF is the default extension for a Performance Monitor report.
4. Select **Enter** from the keyboard. The file is renamed.

The extensions above are default file extensions. You are able change these to .txt (text) files using the **Rename** function.

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Common Function Buttons

The bottom of the touch screen contains task-oriented buttons. These buttons do not appear when using the System or Help tabs. Additionally, buttons that do not pertain to a protocol will not appear when that protocol tab is selected.



The Common Function Buttons include:

- Error Insert
- Stop
- Restart
- Print Report
- Presets
- Auto Conf
- Save
- Restore
- Clear History
- Off/Lock

Uploading a File

A file can be transferred from the unit to a remote device (for example a PC) or to a local device (a PCMCIA storage card). If using the FTP function, make sure you have the IP address of the receiving device. If using the PCMCIA function, make sure that a PC Card is installed in the PCMCIA slot before selecting the File Services button. When the PC card is inserted, an audible tone indicates that the card and PCMCIA drivers are qualified.

1. From the **System** tab, select **Files Services**.
2. From the right File List box, select the upload method (**FTP** or **PCMCIA**).
    - If using *FTP*,

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a. Enter the IP Address of the device that will receive the file (unless you are using the Remote Control Software; then enter the test set address) in the **FTP Site Information** box.

b. If this device is secured with a User ID and Password, then enter this information.

c. Enter an FTP session on the connecting device.

- If using *PCMCIA*,

▸ Select a target directory from the File List box.

3. From the left File List box, select the current location of the file (**Disk** or **PCMCIA**).

4. Select a file from the File List box.

5. Select  (upload). The file is transferred.

Warning: When the unit is powered off, the FTP directory is automatically purged.

FTP Processing

File Transfer Protocol can be used to copy files to and from the unit.

- If using the Remote Control Application or DLI Software Upgrade program, make sure that FTP service is enabled.
- To upload files using FTP, select Upload a File
- To download files using FTP, select Download a File.

Remote Control Application

The Remote Control Application software is a graphical user interface that allows you to remotely connect to and control portable and rackmount products from a PC.

Before using the Remote Control Application:

- Verify the minimum software and hardware requirements.
- Verify that the Ethernet parameters have been entered into your unit.

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- Verify that you have security access to the unit.
- Verify that FTP service is enabled on the unit.
- Install the Remote Control Application on to your PC.
- If the remote unit uses a PCMCIA modem for dial-up connectivity, configure the Remote Control Application for PCMCIA operation.

To start the Remote Control Application:

1. Select the Remote Control Application shortcut icon that appears on your PC's desktop.
2. Enter the remote unit's IP address, and your user ID and password.
3. Select **OK**.
4. Once the connection is made, the remote unit's GUI appears. The title bar contains the product name and connection method. Use your mouse to select functions.

   To automate the log on process, select Automating the Remote Control Icon for more information.

Important: Files that are created when using the Remote Control Application are saved on your PC in the Remote Control's compatibility directory. This directory can be overwritten when connecting to other remote units that have the same compatibility level, but are different models (for example, a NIC Plus, a NIC 10G, and so on).

If you want to keep these files, copy and save the following to a backup directory on your PC that is not in the compatibility directory's path:

- Any file with the .set, .stat, .evt, .aps, .perf, or .rep extension.
- The client.prop file. Changes to this file are only needed if the remote unit uses a PCMCIA modem for its dial-up connection.

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Remote Control Application Requirements

Software

The minimum software requirements are:

- Windows NT 4.0, Windows XP, Windows 2000, or Windows 98 operating systems.
- Microsoft Internet Explorer 5.0 or greater.
- Host domain and IP address information for LAN access.
  Make sure that this information is entered into your unit. Refer to Ethernet Port Configuration for more information.
- TCP/IP Network Protocol

Hardware

The minimum hardware requirements are:

- A personal computer with a 300-MHz Pentium processor or faster.
- 128 MB RAM (256 MB RAM recommended for optimum performance)
- 60 MB of free disk space
- An SVGA monitor with a minimum screen resolution of 800 by 600 pixels and 256 colors (1025 by 768 recommended for optimum viewing).
- A CD-ROM drive (if installing from a CD-ROM) or web browser (if installing from the DLI web site) for software installation.
- A standard 10BaseT Ethernet cable for connectivity between the unit and the network.


If you connect the unit directly to your PC, you will need the following:

- A network interface card installed in your PC.
- A crossover 10BaseT Ethernet cable for connectivity between the unit and the PC's network interface card.

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Ethernet Port Configuration

To configure the unit's Ethernet port:

If Ethernet port parameters are changed, the unit must be rebooted for the changes to take affect.

1. Select **System**.
2. Select **I/O Settings**.
3. Enter the unit's **IP Address**, **Subnet Address**, and **Router Address** from the Ethernet Configuration functions.

IP addresses **192.168.138.000 through 192.168.138.255** are reserved and should not be used. A system conflict can occur if these IP addresses are entered.

Ethernet Configuration

If Ethernet port parameters are changed, the test set must be rebooted for the changes to take affect.

The following configures the Ethernet port's parameters:

- **Obtain an IP address from a DHCP server:** The unit will uses the network's Dynamic Host Connection Protocol (DHCP) server to dynamically assign it an IP address. ***When selected, the IP Address, Subnet Address, Router, Host Name, and Domain Name functions are disabled, but will be populated by the DHCP server.***
- **Specify an IP address:** Allows a static IP address to be entered using the IP Address, Subnet Address, Router, Host Name, and Domain Name functions.
- **IP Address:** Enter the unit's IP address using dotted decimal notation. For example, **nnn.nnn.nnn.nnn**, where **nnn** is a value from 0 to 255.

IP addresses **192.168.138.000 through 192.168.138.255** are reserved and should not be used. A serious system conflict can occur if these IP addresses are entered.

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If you must use an IP address in the range of **192.168.x.y** (where x is not equal to 138), then you must set the Subnet Address to **255.255.255.0**.

- **Subnet Address:** Enter the subnet address using dotted decimal notation.
- **Router:** Enter the Router address using dotted decimal notation.
- **Host Name:** Enter the unit's host name (for example, NICPLUS). This is an optional parameter.
- **Domain Name:** Enter the unit's domain name (for example, lightwave.com). This is an optional parameter.
- **Port Assignment:** Displays what has been assigned, by way of default or license. SCPI is automatically listed. If the unit is licensed for TL1, then TL1 is also displayed on the assignment line.

The **Host Name** and **Domain Name** parameters defined for Ethernet Configuration screen also apply to the Wireless Configuration screen. Any changes made to these parameters on one screen will also be made on the other screen.

Rebooting the Test Set

This function allows the system to write unsaved data to the disk before you reboot the unit. You can perform this task from the System I/O window or by selecting the Off/Lock button on a protocol processor tab.

Important: Rebooting the test set must be done from the NIC touch screen.

To reboot the unit from the System, I/O Settings window:

1. Select the **System** tab and choose **I/O Settings**.
2. Select **Ethernet** and choose **Reboot**. The Reboot dialog box appears.
3. Select **OK** to continue with the reboot process, or Cancel to keep the unit on. The Shutdown in Progress message box appears.
4. After all unsaved data is written to the disk, the unit restarts.

Important: If the unit does not successfully reboot turn it off manually by toggling the On/Off switch to **Off**.

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To reboot the unit from a protocol processor tab:

1. Select the **Off/Lock** common function button. The Unlock Login dialog box appears.

> Important: Do not enter the User ID or Password.

2. Select **Reboot**. The Reboot dialog box appears.
3. Select **OK** to continue with the reboot process, or Cancel to keep the unit on. The Shutdown in Progress message box appears.
4. After all unsaved data is written to the disk, the unit restarts.

> Important: If the unit does not successfully reboot turn it off manually by toggling the On/Off switch to **Off**.

Security Settings

Security is an administrative function and only appears if you are logged on as an Administrator. This screen is divided into the following main sections: User Security Information, System Services, NT/FTP Administrator, and Reset System.

> Important: The Security option is not available unless you have Admin privileges.

User Security Information

This function allows you to view the following security information on system users:

- **User Name**
- **Permissions**: Read Only, Read/Write, Calibrate, or Admin
- **Active**: Displays “Yes” for user’s currently logged in to the test set.
- **Current**: Displays permissions of active users.
- **Default User**: This column only appears on the local GUI and is linked directly to the “User Login Required” setting on the System Misc screen. When User Login Required is not selected the default user appears in the Login dialog box.

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Default User only appears on the NIC touch screen.

The Security function also enables a user with administrator privileges to perform the following tasks:

- Add a User
- Delete a User
- Update a User Profile
- Enable/Disable Security System Lock
- Establish a Default Login
- Establish a Required Login

Selecting the Security System Lock check box prevents other people from logging onto the test set. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read-Only permissions only. When the user logs on with Read-Only permissions, all functionality will be disabled with the exception of the online help and the About this product function.

System Services

System Services allows an administrator to disable specific network services to meet their network's security policies. To enable a system service, select its check box. To disable a system service, clear the check box.

NT/FTP Administrator

NT/FTP Administrator assigns a user ID and password so that a user can log in to a remote computer and transfer files using the file transfer protocol service.

Reset System

Reset System restores default Security settings.

Adding a New User

If the System Lock function is enabled, only one user with Read and Write permissions (this includes Calibration and Admin users) can be logged in at a

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time. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read permissions only.

1. From the **System** tab, select **Security**.
2. From the **User Name** column, select **NEW USER**.
3. From **Account Information**, select , next to the **User Name** field. A keypad appears.
4. Enter the **user name**.
5. Select , next to the **Password** field. A keypad appears.
6. Enter a **password**.
7. Select , next to the **Permission** field. The Select User Permissions window appears.
8. Select one of the following user permissions:
    - **Read:** Allows the user read-only privileges.
    - **Read/Write:** Allows the user to read and update information.
    - **Calibrate:** Allows the user read and write privileges and the ability to perform calibration procedures on the unit.
    - **Admin:** Allows the user to perform network administrator tasks such as calibrating, adding, deleting, and updating user profiles.
9. Select **Update**. The new user profile is added and appears on the User List.

Establishing a Default User Login

This function allows an administrator to establish a default login, which results in users not having to enter a user ID and password each time they use the unit.

Important: The default login function is only applicable for the NIC unit. When connecting to a NIC via the Remote NIC application, a user ID and password are required. Establishing a default login user can only be done from the NIC touch screen.

To establish a default login user:

1. From the **System** tab, select **Security**.

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2. From the User Name list box, select the **User Name** that you wish to make the default upon login.
3. Select **Set as Default**. Under the Default User column, a "Yes" appears, indicating that the user has been established as default user.

The Set as Default button is only available from the NIC touch screen.

To disable a default login:

1. From the **System** tab, select **Misc**.
2. From **Local Settings**, clear the **User Login Required** check box. A cleared check box, indicates that User Login Required is disabled.

The User Login Required check box is only available from the NIC touch screen.

3. Reboot the unit for changes to take affect. When the unit restarts, a login box appears.

   If you do not wish to reset a Default Login user, there is no need to continue to the next step.

4. If you wish to set another default user, log in as an Admin user and repeat the steps above under, *To establish a default login*.

Updating a User Profile

If the System Lock function is enabled, only one user with Read and Write permissions (this includes Calibration and Admin users) can be logged in at a time. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read permissions only.

1. From the **System** tab, select **Security**.
2. From the User Name list box, select the user profile to be updated. The user name, password, and permission appears in the Account Information box.
3. Select , next to the field to be updated.

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- If *Password* was selected, a keypad appears, allowing you to modify the current information. Press **Enter** when you are done.
- If *Permissions* was selected, the Select User Permissions window appears. Select the updated permissions that you wish to apply.

4. When you are done updating the user's profile, select **Update**. The updated information appears on the User List.

Enabling/Disabling Security System Lock

This function allows an administrator to enable a Security System Lock that only allows one user with Read and Write permissions (this includes Calibration and Admin users) to be logged in at a time. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read Only permissions only. When the user logs on with Read Only permissions, all functionality will be disabled with the exception of the online help and the About this product function.

To enable Security System Lock:

1. From the **System** tab, select **Security**.
2. From **Default Entry**, select the **Security System Lock** check box. A checked box indicates that the Security System Lock function is enabled.

To disable Security System Lock:

1. From the **System** tab, select **Security**.
2. From **Default Entry**, clear the **Security System Lock** check box. A cleared check box indicates that the Security System Lock function is disabled.

Displaying Serial Numbers and Software Revision

This function displays the following information:

- Copyright Information
- Feature set number
- Graphical User Interface Version
- Customer Service Information
- Circuit Pack Information
    - Product Serial Number

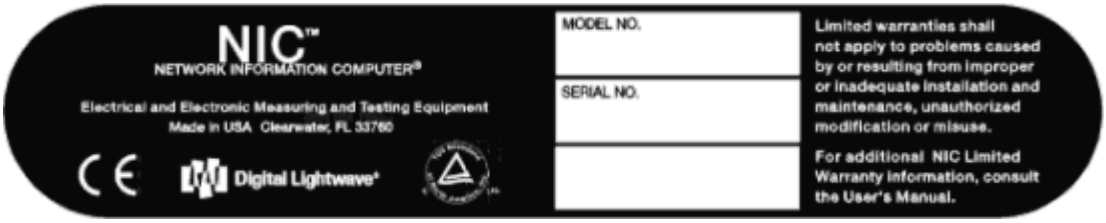
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- Kit Number
- System Control Version
- SCPI Version
- TL1 Version
- SNMP Version
- OmniOrb Version
- UPX Version
- zlib Version
- Kit Numbers and Versions

To view this information:

1. From the **System** tab, choose **Misc**.
2. Select **About this product**. The software revision number and hardware serial numbers appear.
3. To close the **About this product** box, select **OK**.

You may obtain some of the product information by viewing the product label located on the unit. For example:



Establishing a Default User Login

This function allows an administrator to establish a default login, which results in users not having to enter a user ID and password each time they use the unit.

Important: The default login function is only applicable for the NIC unit. When connecting to a NIC via the Remote NIC application, a user ID and password are required. Establishing a default login user can only be done from the NIC touch screen.

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To establish a default login user:

1. From the **System** tab, select **Security**.
2. From the User Name list box, select the **User Name** that you wish to make the default upon login.
3. Select **Set as Default**. Under the Default User column, a "Yes" appears, indicating that the user has been established as default user.

The Set as Default button is only available from the NIC touch screen.

To disable a default login:

1. From the **System** tab, select **Misc**.
2. From **Local Settings**, clear the **User Login Required** check box. A cleared check box, indicates that User Login Required is disabled.

The User Login Required check box is only available from the NIC touch screen.

3. Reboot the unit for changes to take affect. When the unit restarts, a login box appears.

   If you do not wish to reset a Default Login user, there is no need to continue to the next step.

4. If you wish to set another default user, log in as an Admin user and repeat the steps above under, *To establish a default login*.

Establishing a Required User Login

This function allows an administrator to establish a required login, which results in the user having to enter a user ID and password each time they use the unit.

Important: Establishing a required user login can only be done from the NIC touch screen.

To establish a required login:

1. From the **System** tab, choose **Misc**.
2. From **Local Setting**, select the **User Login Required** check box. When this box is checked, a required login has been established.

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To disable the required login, clear the **User Login Required** check box.

The User Login Required check box is only available from the NIC touch screen.

System Services

The following system services can be enabled or disabled by an Administrator.

A unit reboot is required if any changes are made to system services.

To enable or disable a system service:

1. From the **System** tab, select **Security**.
2. From **System Services**, enable the following services by selecting the check box, or disable the service by clearing the check box.

    - **Internet Information.** The IIS (Internet Information Server) service provides the ability to host a simple web server, which uses port 80 (http). This function can be disabled (deselect the checkbox) to prevent unauthorized access to the port.
    - **File Transfer Protocol.** The FTP service allows a user to remotely log in to the unit and transfer files. Disabling this function can prevent unauthorized access to ports 20 and 21.

      FTP service must be enabled if you use the Remote Control Application or the DLI Software Upgrade software. You can not connect to the unit using these applications if FTP service is disabled.

    - **Remote Procedure Call.** This protocol allows an application on one PC to request a service from another application located on a different PC within in a LAN. Disabling this function can prevent unauthorized users from using the unit to access other equipment in a customer's network.
    - **Telnet.** The Telnet service allows a user to log in to a remote system. Disabling this function can prevent unauthorized users from using the unit to access a customer's network.

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- **NetBIOS.** The NetBIOS (Network Basic Input/Output System) program allows applications to use port 139 to communicate to different PCs within a LAN. This function can be disabled to prevent unauthorized access to the port.
- **SCPI.** The SCPI (Standard Commands for Programmable Instruments) service uses port 8090 to send and receive SCPI commands to the unit. Disabling this function will prevent unauthorized access to the port.
- **TL1.** The TL1 (Transaction Language 1) service uses port 8080 to send and receive TL1 commands to the unit. Disabling this function will prevent unauthorized access to the port.
- **SNMP.** The SNMP (Simple Network Management Protocol) service uses ports 161 and 162 to transfer commands and traps to and from the unit. Disabling this function will prevent unauthorized access to these ports.

Rebooting the Test Set

This function allows the system to write unsaved data to the disk before you reboot the unit. You can perform this task from the System I/O window or by selecting the Off/Lock button on a protocol processor tab.

Important: Rebooting the test set must be done from the NIC touch screen.

To reboot the unit from the System, I/O Settings window:

1. Select the **System** tab and choose **I/O Settings**.
2. Select **Ethernet** and choose **Reboot**. The Reboot dialog box appears.
3. Select **OK** to continue with the reboot process, or Cancel to keep the unit on. The Shutdown in Progress message box appears.
4. After all unsaved data is written to the disk, the unit restarts.

Important: If the unit does not successfully reboot turn it off manually by toggling the On/Off switch to **Off**.

To reboot the unit from a protocol processor tab:

1. Select the **Off/Lock** common function button. The Unlock Login dialog box appears.

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Important: Do not enter the User ID or Password.

2. Select **Reboot**. The Reboot dialog box appears.
3. Select **OK** to continue with the reboot process, or Cancel to keep the unit on. The Shutdown in Progress message box appears.
4. After all unsaved data is written to the disk, the unit restarts.

Important: If the unit does not successfully reboot turn it off manually by toggling the On/Off switch to **Off**.

Resetting the System

This Administrator function clears and restores default settings to the following:

- User Accounts - Deletes all user accounts and restores the default Admin account.
- FTP Administrator - Deletes the FTP account and restores the default FTP user ID and password.
- System Services - Restores all default system service settings.

User files, such as the protocol processor's transmit and receive settings, report statistics, graphs, and test results, are not deleted. These files are managed using File Services.

To reset the system:

1. From the **System** tab, select **Security**.
2. Select **Reset System**.
3. A message asking to confirm that you want to reset the system appears. Select **Yes**.
4. A message stating that the system must be restarted for changes to take affect appears. Select **OK**.
5. Reboot the system.

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Security Settings

Security is an administrative function and only appears if you are logged on as an Administrator. This screen is divided into the following main sections: User Security Information, System Services, NT/FTP Administrator, and Reset System.

Important: The Security option is not available unless you have Admin privileges.

User Security Information

This function allows you to view the following security information on system users:

- **User Name**
- **Permissions**: Read Only, Read/Write, Calibrate, or Admin
- **Active**: Displays “Yes” for user’s currently logged in to the test set.
- **Current**: Displays permissions of active users.
- **Default User**: This column only appears on the local GUI and is linked directly to the “User Login Required” setting on the System Misc screen. When User Login Required is not selected the default user appears in the Login dialog box.

Default User only appears on the NIC touch screen.

The Security function also enables a user with administrator privileges to perform the following tasks:

- Add a User
- Delete a User
- Update a User Profile
- Enable/Disable Security System Lock
- Establish a Default Login
- Establish a Required Login

Selecting the Security System Lock check box prevents other people from

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logging onto the test set. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read-Only permissions only. When the user logs on with Read-Only permissions, all functionality will be disabled with the exception of the online help and the About this product function.

System Services

System Services allows an administrator to disable specific network services to meet their network's security policies. To enable a system service, select its check box. To disable a system service, clear the check box.

NT/FTP Administrator

NT/FTP Administrator assigns a user ID and password so that a user can log in to a remote computer and transfer files using the file transfer protocol service.

Reset System

Reset System restores default Security settings.

Adding a New User

If the System Lock function is enabled, only one user with Read and Write permissions (this includes Calibration and Admin users) can be logged in at a time. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read permissions only.

1. From the **System** tab, select **Security**.
2. From the **User Name** column, select **NEW USER**.
3. From **Account Information**, select ..., next to the **User Name** field. A keypad appears.
4. Enter the **user name**.
5. Select ..., next to the **Password** field. A keypad appears.
6. Enter a **password**.
7. Select ..., next to the **Permission** field. The Select User Permissions window appears.
8. Select one of the following user permissions:

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- **Read:** Allows the user read-only privileges.
- **Read/Write:** Allows the user to read and update information.
- **Calibrate:** Allows the user read and write privileges and the ability to perform calibration procedures on the unit.
- **Admin:** Allows the user to perform network administrator tasks such as calibrating, adding, deleting, and updating user profiles.

9. Select **Update**. The new user profile is added and appears on the User List.

Deleting a User

If the System Lock function is enabled, only one user with Read and Write permissions (this includes Calibration and Admin users) can be logged in at a time. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read permissions only.

1. From the **System** tab, select **Security**.
2. From the User List, select the **User Name** to be deleted.
3. With the user name highlighted, select **Delete**. The user is removed from the User List.

Updating a User Profile

If the System Lock function is enabled, only one user with Read and Write permissions (this includes Calibration and Admin users) can be logged in at a time. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read permissions only.

1. From the **System** tab, select **Security**.
2. From the User Name list box, select the user profile to be updated. The user name, password, and permission appears in the Account Information box.
3. Select , next to the field to be updated.

- If *Password* was selected, a keypad appears, allowing you to modify the current information. Press **Enter** when you are done.

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- If *Permissions* was selected, the Select User Permissions window appears. Select the updated permissions that you wish to apply.

4. When you are done updating the user's profile, select **Update**. The updated information appears on the User List.

Enabling/Disabling Security System Lock

This function allows an administrator to enable a Security System Lock that only allows one user with Read and Write permissions (this includes Calibration and Admin users) to be logged in at a time. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read Only permissions only. When the user logs on with Read Only permissions, all functionality will be disabled with the exception of the online help and the About this product function.

To enable Security System Lock:

1. From the **System** tab, select **Security**.
2. From **Default Entry**, select the **Security System Lock** check box. A checked box indicates that the Security System Lock function is enabled.

To disable Security System Lock:

1. From the **System** tab, select **Security**.
2. From **Default Entry**, clear the **Security System Lock** check box. A cleared check box indicates that the Security System Lock function is disabled.

Displaying Serial Numbers and Software Revision

This function displays the following information:

- Copyright Information
- Feature set number
- Graphical User Interface Version
- Customer Service Information
- Circuit Pack Information
    - Product Serial Number
    - Kit Number

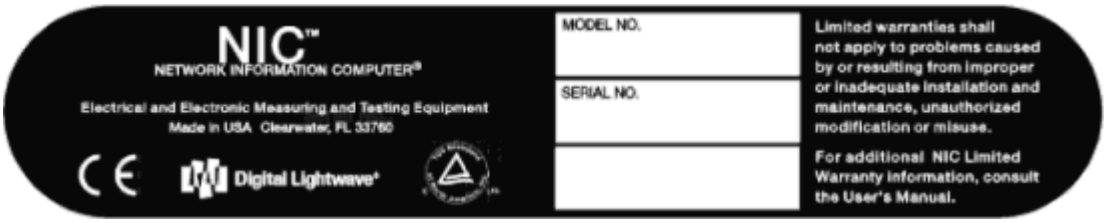
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- System Control Version
- SCPI Version
- TL1 Version
- SNMP Version
- OmniOrb Version
- UPX Version
- zlib Version
- Kit Numbers and Versions

To view this information:

1. From the **System** tab, choose **Misc**.
2. Select **About this product**. The software revision number and hardware serial numbers appear.
3. To close the **About this product** box, select **OK**.

You may obtain some of the product information by viewing the product label located on the unit. For example:



Establishing a Default User Login

This function allows an administrator to establish a default login, which results in users not having to enter a user ID and password each time they use the unit.

Important: The default login function is only applicable for the NIC unit. When connecting to a NIC via the Remote NIC application, a user ID and password are required. Establishing a default login user can only be done from the NIC touch screen.

To establish a default login user:

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1. From the **System** tab, select **Security**.
2. From the User Name list box, select the **User Name** that you wish to make the default upon login.
3. Select **Set as Default**. Under the Default User column, a "Yes" appears, indicating that the user has been established as default user.

The Set as Default button is only available from the NIC touch screen.

To disable a default login:

1. From the **System** tab, select **Misc**.
2. From **Local Settings**, clear the **User Login Required** check box. A cleared check box, indicates that User Login Required is disabled.

The User Login Required check box is only available from the NIC touch screen.

3. Reboot the unit for changes to take affect. When the unit restarts, a login box appears.

   If you do not wish to reset a Default Login user, there is no need to continue to the next step.

4. If you wish to set another default user, log in as an Admin user and repeat the steps above under, *To establish a default login*.

Rebooting the Test Set

This function allows the system to write unsaved data to the disk before you reboot the unit. You can perform this task from the System I/O window or by selecting the Off/Lock button on a protocol processor tab.

Important: Rebooting the test set must be done from the NIC touch screen.

To reboot the unit from the System, I/O Settings window:

1. Select the **System** tab and choose **I/O Settings**.
2. Select **Ethernet** and choose **Reboot**. The Reboot dialog box appears.
3. Select **OK** to continue with the reboot process, or Cancel to keep the unit on. The Shutdown in Progress message box appears.

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4. After all unsaved data is written to the disk, the unit restarts.

> Important: If the unit does not successfully reboot turn it off manually by toggling the On/Off switch to **Off**.

To reboot the unit from a protocol processor tab:

1. Select the **Off/Lock** common function button. The Unlock Login dialog box appears.

> Important: Do not enter the User ID or Password.

2. Select **Reboot**. The Reboot dialog box appears.
3. Select **OK** to continue with the reboot process, or Cancel to keep the unit on. The Shutdown in Progress message box appears.
4. After all unsaved data is written to the disk, the unit restarts.

Important: If the unit does not successfully reboot turn it off manually by toggling the On/Off switch to **Off**.

Resetting the System

This Administrator function clears and restores default settings to the following:

- User Accounts - Deletes all user accounts and restores the default Admin account.
- FTP Administrator - Deletes the FTP account and restores the default FTP user ID and password.
- System Services - Restores all default system service settings.

User files, such as the protocol processor's transmit and receive settings, report statistics, graphs, and test results, are not deleted. These files are managed using File Services.

To reset the system:

1. From the **System** tab, select **Security**.
2. Select **Reset System**.

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3. A message asking to confirm that you want to reset the system appears. Select **Yes**.
4. A message stating that the system must be restarted for changes to take affect appears. Select **OK**.
5. Reboot the system.

System Services

The following system services can be enabled or disabled by an Administrator.

A unit reboot is required if any changes are made to system services.

To enable or disable a system service:

1. From the **System** tab, select **Security**.
2. From **System Services**, enable the following services by selecting the check box, or disable the service by clearing the check box.

    - **Internet Information.** The IIS (Internet Information Server) service provides the ability to host a simple web server, which uses port 80 (http). This function can be disabled (deselect the checkbox) to prevent unauthorized access to the port.
    - **File Transfer Protocol.** The FTP service allows a user to remotely log in to the unit and transfer files. Disabling this function can prevent unauthorized access to ports 20 and 21.

    FTP service must be enabled if you use the Remote Control Application or the DLI Software Upgrade software. You can not connect to the unit using these applications if FTP service is disabled.

    - **Remote Procedure Call.** This protocol allows an application on one PC to request a service from another application located on a different PC within in a LAN. Disabling this function can prevent unauthorized users from using the unit to access other equipment in a customer's network.
    - **Telnet.** The Telnet service allows a user to log in to a remote system. Disabling this function can prevent unauthorized users from using the unit to access a customer's network.

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- **NetBIOS.** The NetBIOS (Network Basic Input/Output System) program allows applications to use port 139 to communicate to different PCs within a LAN. This function can be disabled to prevent unauthorized access to the port.
- **SCPI.** The SCPI (Standard Commands for Programmable Instruments) service uses port 8090 to send and receive SCPI commands to the unit. Disabling this function will prevent unauthorized access to the port.
- **TL1.** The TL1 (Transaction Language 1) service uses port 8080 to send and receive TL1 commands to the unit. Disabling this function will prevent unauthorized access to the port.
- **SNMP.** The SNMP (Simple Network Management Protocol) service uses ports 161 and 162 to transfer commands and traps to and from the unit. Disabling this function will prevent unauthorized access to these ports.

File Services

This function provides file management of saved reports. It allows you to:

- Print any saved report file
- Upload report files from the unit
- Download report files to the unit
- View any report printed to file
- Rename report files
- Delete report files
- View file details (size and modification date)
- Create a new directory for file storage

Printing or Viewing Saved Files

While running tests, you have the option to save the information to a file. The instructions below tell you where and how to print or view a saved file.

Important: Files saved when working with the Remote Control Application will not be accessible from the NIC unit touch-screen and visa-versa. The remote application saves the files to the Remote Control (GalaxyNIC) directory on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

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To print or view a saved file:

1. From the **System** tab, select **File Services**.
2. Select a file from the **Disk** directory box. The desired report may display in the main Disk directory, or it may be stored in one of the folders in the directory. Folder names are enclosed in brackets **[foldername]**. To return to the main Disk directory after opening a folder, select **[. .]** or the **Disk** button.

Important: Real-time reports generated from the NIC unit touch-screen, using the Action after Duration function, are automatically stored in the [APP] folder. Select the folder to display those reports.

The following is a list of file extension used for files generated from the Print Report, Graph, or Action after Duration functions:

- **.aps** - APS Report
- **.evt** - Event Report
- **.perf** - Performance Report
- **.real** - Real-time Test Report (Stored in [APP} folder on NIC unit.)
- **.rep** - Graph Report, BERT Analysis, RFC Thru Put Analysis
- **.set** - Settings Report
- **.stat** - Results Report
- **.statE** - Event Report
- **.grp** - Graph (This is not a text file. It can only be viewed as a graph by selecting **Results,** pointing to **Graph** and choosing the **Replay Graphs** button.)

3. Choose one of the following

To **Print** the file:

a. Select **Print**. A standard Print dialog box appears.

If you want to print a report directly from the NIC unit, make sure that a printer is attached to the unit's parallel or serial port.

b. Select the printer **Name** and choose **OK**.

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To **View** the file:

a. Select **View**. The View File window appears. Use the **Display Hex** / **Display ASCII** toggle button to display the file in Hex or ASCII format.


The following file details display below the File List box.

- File name
- File size and date
- File attributes

b. Select **Exit** to close the View File window.

Printing a Report

The Print Report Common Function Button allows you to print reports to a printer or file.

1. Select **Print Report**. The Report Setup menu appears.
2. Choose one of the following:
   - From **Destination Printer**, select one or multiple reports to print directly to a printer. If printing a report from the NIC unit, make sure that a printer is attached to the unit's parallel or serial port. The following reports are available:

     Settings - (.set extension) Reports current values for all Transmit and Receive Set functions.

     Statistics - (.stat extension) Reports results for the Scan, Errors, Alarms, and PTR.

     Events - (.evt extension) Reports a detailed summary of events, such as alarms, errors, and pointer activity. This report includes the event, the number of events logged, the start and stop time of the event, and the duration of the event.

     APS - (.aps extension) Reports the results of the K1 and K2 byte sequences received by the unit.

     Performance - (.perf extension) Reports Performance Monitor results.

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- From **Destination File**, choose one or multiple reports to print to a file. The File Browser dialog box appears.

The **Comma Delimiter** option can be applied to the Settings To File and Statistics To File reports.

▶ Enter a filename and select **OK**.

Important: Files saved when working with the Remote Control Application will not be accessible from the NIC unit touch-screen and visa-versa. The remote application saves the files to the Remote Control (GalaxyNIC) directory on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

3. In the **User Comment** box, select the **Input** button to enter notes that will display in the report. A keyboard opens.
4. Enter comment text using the keyboard. When working from NIC test set use the touch screen keyboard. Select **Enter**.

To clear comment text, select the **Clear** button.

5. Select **OK**.

For information on retrieving saved files, see Print or View Saved Files.

Files that are created when using the Remote Control Application are saved on your PC in the Remote Control directory. This directory can be overwritten when connecting to other remote units that have the same compatibility level, but are different models (for example, a NIC Plus, a NIC 10G, and so on).

If you want to keep these files, copy and save the following to a backup directory on your PC that is not in the Remote Control Application directory's path:

- Any file with the .set, .stat, .evt, .aps, .perf, or .rep extension.
- The client.prop file. Changes to this file are only needed if the remote unit uses a PCMCIA modem for its dial-up connection.

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Common Function Buttons

The bottom of the touch screen contains task-oriented buttons. These buttons do not appear when using the System or Help tabs. Additionally, buttons that do not pertain to a protocol will not appear when that protocol tab is selected.



The Common Function Buttons include:

- Error Insert
- Stop
- Restart
- Print Report
- Presets
- Auto Conf
- Save
- Restore
- Clear History
- Off/Lock

Destination Printer

The Destination Printer function prints a report directly to a printer.

For local printing (which means that you are using the touch screen), you must have a printer attached to the unit's parallel port or serial port.

For remote printing (which means that you are using the Remote Control software to operate a unit from a PC), the standard Print dialog box opens, allowing you to choose a printer name.

Printer Port Configuration

The unit supports both parallel and serial printers.

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For Parallel Printing:

- Attach a parallel printer cable (with a 25-pin male connector on one end) to the unit's **Parallel Port** connector. This is a DB-25 female connector.

For Serial Printing:

Important: The following steps must be performed from the NIC unit touch screen. "Printer" is not an available Serial port assignment from the Remote Control Application.

1. Attach a serial printer cable (with a 9-pin female connector on one end) to the unit's **RS-232** port connector. This is a DB-9 male connector.
2. From the **System** tab, select **I/O Settings**.
3. Select the **Serial** button.
4. Select the **Port Assignment** button and choose **Printer**.

Destination File

The Destination File functions allow you to print reports to a file. This saves the report file either locally on the unit or remotely on a PC.

Using the Destination File Functions:

1. After selecting **Print Report**, the Report Setup screen appears.
2. Select any combination of reports from the **Destination File** functions.
3. Select **OK**. The File Browser appears, which allows you to name and save the report file.
4. After naming the file and deciding which subdirectory to store the file, click **OK**. The report is saved. It can be retrieved later using File Services.

Using Graphs

Use the **Graph** button to view error and alarm results for the selected protocol processor. Graphs show the test history for either the current test or a previously saved test.

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To use the graphs function:

1. Select a protocol processor that has been configured for Error Alarm testing.
2. From **Results**, select **Graph**. The Graph screen appears. It contains two graphs which allow you to display incoming alarms and errors.
3. Use the following buttons to control graphing parameters:

    - **Sample Rate** - Sets the timing for graph results at increments of 1 Second, 1 Minute, or 15 Minutes.
    - **Change Scale** - Compresses or expands the displayed time scale for the graphed errors and alarms at time intervals of 30 minutes, 90 minutes, 3 hours, 6 hours, 12 hours, 24 hours, or 72 hours.
    - **Change Upper** - Sets the type of errors or alarms that appear in the upper graph.
    - **Change Lower** - Sets the type of errors or alarms that appear in the lower graph.
    - **Shift Left and Shift Right** - Adjusts the graph's time scale to an earlier or later time.
    - **Print Report** - Prints a graph report to printer or file.
    - **Save Graphs** - Saves a graph to file as a .grp file that can be replayed at a later time.

    Important: This is not a text file; when replayed, it appears as the original graph plot. Choose *Print a Graph to Report* if you desire graph information that can be printed out.)

    - **Replay Graphs/Stop Replay** - Replays or stops saved graphs (.grp).

Action after Duration

Action after Duration defines what activities occur at the conclusion of a timed test. It allows several different options, including printing results to a printer or recording them to a file; repeating a test or just processing one test. Test results appear in a columned report format; however, there is one option available to record the statistics using a delimiter.

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To determine how long a test will run, refer to Duration.

Print Options

When a print option is chosen, the report prints directly to a printer. If you are using the NIC touch-screen, a printer must be attached to the NIC's parallel or serial port. (See Printer Port Configuration.)

Record Options

When a record option is chosen, the results are saved to a file with one of the following extensions:

- **.evt** - Event Report. A detailed summary of alarms, errors, and pointer activity.
- **.statE** - Event Report. Used when the *Record Statistics/Events and Repeat Test* option is selected.
- **.stat** - Results Report. A statistics report of the Scan, Errors, Alarms, and PTR functions.
- **.real** - Real-time Test Report. Real-time reports generated only from the NIC touch screen.

The file naming convention is: **xxhhmmss.<extension>** (where **xx** is the protocol processor, **hh** is hours, **mm** is minutes, **ss** is seconds). For example, a file named "OC163035.evt" represents an OC-192/48/12 test event that was recorded at 16:30:35.

To learn how to print or view a saved file, see the topic Print or View Saved Files.

The table below describes the Action after Duration options.

Repeat Test and Realtime Test Options	Description
None	No action occurs at the end of the test duration.
Print Current Statistics	Test statistics are printed to a printer at the end of a timed test. The test does not repeat.

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Record Current Statistics	Test statistics are printed to a file (.stat) at the end of a timed test. The test does not repeat.
Record Current Statistics using a delimiter	Test statistics are printed to a file (.stat) at the end of a timed test. The results appear in a quote/comma-report format, meaning that error and/or alarm values are enclosed in quotes (") and separated by commas (,). The test does not repeat.
Print Statistics and Repeat Test  This option appears when **Repeat Actions** is selected.	Test statistics are printed to a printer at the end of the timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Record Statistics and Repeat Test  This option appears when **Repeat Actions** is selected.	Test statistics are printed to a file (.stat) at the end of a timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Print Events and Repeat Test  This option appears when **Repeat Actions** is selected.	Test events are printed to a printer at the end of the timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Record Events and Repeat Test  This option appears when **Repeat Actions** is selected.	Test events are printed to a file (.evt) at the end of a timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Print Statistics/Events and Repeat	Both test statistics and events are

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Test This option appears when **Repeat Actions** is selected.	automatically printed to a printer at the end of the timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Record Statistics/Events and Repeat Test This option appears when **Repeat Actions** is selected.	Both test statistics (.stat) and events (.statE) are printed to a file at the end of a timed test and the test repeats. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value. Both **.statE** and **.stat** files are recorded.
Print Events and Repeat Test This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit. When the test duration expires, the test restarts.
Record Events and Repeat Test This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a file (.evt). When the test duration expires, the test restarts.
Print and Record Events and Repeat Test This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit and prints to a file (.evt). When the test duration expires, the test restarts.
Print Events This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit. The test does not repeat.

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Record Events This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a file (.evt). The test does not repeat.
Print and Record Events This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit and prints to a file (.evt). The test does not repeat.

Duration

This function configures how long a timed test runs. The following options are available:

Options	Description
Continuous	Test is untimed, and unit is always collecting data.
5 Minutes	Test runs for 5 minutes.
15 Minutes	Test runs for 15 minutes.
1 Hour	Test runs for 1 hour.
2 Hours	Test runs for 2 hours.
24 Hours	Test runs for 24 hours.
72 Hours	Test runs for 72 hours.
1 Week	Test runs for 1 week.
2 Weeks	Test runs for 2 weeks.
User Defined	Allows a specific test duration to be entered using a touch screen keypad. The minimum duration is 1 minute. The maximum duration is 99 days, 23 hours, and 59 minutes.

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Printer Port Configuration

The unit supports both parallel and serial printers.

For Parallel Printing:

- Attach a parallel printer cable (with a 25-pin male connector on one end) to the unit's **Parallel Port** connector. This is a DB-25 female connector.

For Serial Printing:

Important: The following steps must be performed from the NIC unit touch screen. "Printer" is not an available Serial port assignment from the Remote Control Application.

1. Attach a serial printer cable (with a 9-pin female connector on one end) to the unit's **RS-232** port connector. This is a DB-9 male connector.
2. From the **System** tab, select **I/O Settings**.
3. Select the **Serial** button.
4. Select the **Port Assignment** button and choose **Printer**.

Creating a New Directory

1. From the System tab, select **File Services**.
2. Select **New Dir**. A keypad appears.
3. Enter a directory name (do not use spaces in directory or file names) and select **Enter**. The new directory appears at the bottom of the File List box.

Rebooting the Test Set

This function allows the system to write unsaved data to the disk before you reboot the unit. You can perform this task from the System I/O window or by selecting the Off/Lock button on a protocol processor tab.

Important: Rebooting the test set must be done from the NIC touch screen.

To reboot the unit from the System, I/O Settings window:

1. Select the **System** tab and choose **I/O Settings**.
2. Select **Ethernet** and choose **Reboot**. The Reboot dialog box appears.

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3. Select **OK** to continue with the reboot process, or Cancel to keep the unit on. The Shutdown in Progress message box appears.
4. After all unsaved data is written to the disk, the unit restarts.

Important: If the unit does not successfully reboot turn it off manually by toggling the On/Off switch to **Off**.

To reboot the unit from a protocol processor tab:

1. Select the **Off/Lock** common function button. The Unlock Login dialog box appears.

Important: Do not enter the User ID or Password.

2. Select **Reboot**. The Reboot dialog box appears.
3. Select **OK** to continue with the reboot process, or Cancel to keep the unit on. The Shutdown in Progress message box appears.
4. After all unsaved data is written to the disk, the unit restarts.

Important: If the unit does not successfully reboot turn it off manually by toggling the On/Off switch to **Off**.

Resetting the System

This Administrator function clears and restores default settings to the following:

- User Accounts - Deletes all user accounts and restores the default Admin account.
- FTP Administrator - Deletes the FTP account and restores the default FTP user ID and password.
- System Services - Restores all default system service settings.

User files, such as the protocol processor's transmit and receive settings, report statistics, graphs, and test results, are not deleted. These files are managed using File Services.

To reset the system:

1. From the **System** tab, select **Security**.

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2. Select **Reset System**.
3. A message asking to confirm that you want to reset the system appears. Select **Yes**.
4. A message stating that the system must be restarted for changes to take affect appears. Select **OK**.
5. Reboot the system.

System Services

The following system services can be enabled or disabled by an Administrator.


A unit reboot is required if any changes are made to system services.

To enable or disable a system service:

1. From the **System** tab, select **Security**.
2. From **System Services**, enable the following services by selecting the check box, or disable the service by clearing the check box.

    - **Internet Information.** The IIS (Internet Information Server) service provides the ability to host a simple web server, which uses port 80 (http). This function can be disabled (deselect the checkbox) to prevent unauthorized access to the port.
    - **File Transfer Protocol.** The FTP service allows a user to remotely log in to the unit and transfer files. Disabling this function can prevent unauthorized access to ports 20 and 21.


FTP service must be enabled if you use the Remote Control Application or the DLI Software Upgrade software. You can not connect to the unit using these applications if FTP service is disabled.

    - **Remote Procedure Call.** This protocol allows an application on one PC to request a service from another application located on a different PC within in a LAN. Disabling this function can prevent unauthorized users from using the unit to access other equipment in a customer's network.

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- **Telnet.** The Telnet service allows a user to log in to a remote system. Disabling this function can prevent unauthorized users from using the unit to access a customer's network.
- **NetBIOS.** The NetBIOS (Network Basic Input/Output System) program allows applications to use port 139 to communicate to different PCs within a LAN. This function can be disabled to prevent unauthorized access to the port.
- **SCPI.** The SCPI (Standard Commands for Programmable Instruments) service uses port 8090 to send and receive SCPI commands to the unit. Disabling this function will prevent unauthorized access to the port.
- **TL1.** The TL1 (Transaction Language 1) service uses port 8080 to send and receive TL1 commands to the unit. Disabling this function will prevent unauthorized access to the port.
- **SNMP.** The SNMP (Simple Network Management Protocol) service uses ports 161 and 162 to transfer commands and traps to and from the unit. Disabling this function will prevent unauthorized access to these ports.

Security Settings

Security is an administrative function and only appears if you are logged on as an Administrator. This screen is divided into the following main sections: User Security Information, System Services, NT/FTP Administrator, and Reset System.

Important: The Security option is not available unless you have Admin privileges.

User Security Information

This function allows you to view the following security information on system users:

- **User Name**
- **Permissions**: Read Only, Read/Write, Calibrate, or Admin
- **Active**: Displays “Yes” for user’s currently logged in to the test set.
- **Current**: Displays permissions of active users.
- **Default User**: This column only appears on the local GUI and is linked directly to the “User Login Required” setting on the System Misc screen.

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When User Login Required is not selected the default user appears in the Login dialog box.


Default User only appears on the NIC touch screen.

The Security function also enables a user with administrator privileges to perform the following tasks:

- Add a User
- Delete a User
- Update a User Profile
- Enable/Disable Security System Lock
- Establish a Default Login
- Establish a Required Login


Selecting the Security System Lock check box prevents other people from logging onto the test set. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read-Only permissions only. When the user logs on with Read-Only permissions, all functionality will be disabled with the exception of the online help and the About this product function.

System Services

System Services allows an administrator to disable specific network services to meet their network's security policies. To enable a system service, select its check box. To disable a system service, clear the check box.

NT/FTP Administrator

NT/FTP Administrator assigns a user ID and password so that a user can log in to a remote computer and transfer files using the file transfer protocol service.

Reset System

Reset System restores default Security settings.

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Adding a New User

If the System Lock function is enabled, only one user with Read and Write permissions (this includes Calibration and Admin users) can be logged in at a time. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read permissions only.

1. From the **System** tab, select **Security**.
2. From the **User Name** column, select **NEW USER**.
3. From **Account Information**, select ..., next to the **User Name** field. A keypad appears.
4. Enter the **user name**.
5. Select ..., next to the **Password** field. A keypad appears.
6. Enter a **password**.
7. Select ..., next to the **Permission** field. The Select User Permissions window appears.
8. Select one of the following user permissions:
    - **Read:** Allows the user read-only privileges.
    - **Read/Write:** Allows the user to read and update information.
    - **Calibrate:** Allows the user read and write privileges and the ability to perform calibration procedures on the unit.
    - **Admin:** Allows the user to perform network administrator tasks such as calibrating, adding, deleting, and updating user profiles.
9. Select **Update**. The new user profile is added and appears on the User List.

Deleting a User

If the System Lock function is enabled, only one user with Read and Write permissions (this includes Calibration and Admin users) can be logged in at a time. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read permissions only.

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1. From the **System** tab, select **Security**.
2. From the User List, select the **User Name** to be deleted.
3. With the user name highlighted, select **Delete**. The user is removed from the User List.

Updating a User Profile

If the System Lock function is enabled, only one user with Read and Write permissions (this includes Calibration and Admin users) can be logged in at a time. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read permissions only.

1. From the **System** tab, select **Security**.
2. From the User Name list box, select the user profile to be updated. The user name, password, and permission appears in the Account Information box.
3. Select , next to the field to be updated.
   - If *Password* was selected, a keypad appears, allowing you to modify the current information. Press **Enter** when you are done.
   - If *Permissions* was selected, the Select User Permissions window appears. Select the updated permissions that you wish to apply.
4. When you are done updating the user's profile, select **Update**. The updated information appears on the User List.

Enabling/Disabling Security System Lock

This function allows an administrator to enable a Security System Lock that only allows one user with Read and Write permissions (this includes Calibration and Admin users) to be logged in at a time. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read Only permissions only. When the user logs on with Read Only permissions, all functionality will be disabled with the exception of the online help and the About this product function.

To enable Security System Lock:

1. From the **System** tab, select **Security**.

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2. From **Default Entry**, select the **Security System Lock** check box. A checked box indicates that the Security System Lock function is enabled.

To disable Security System Lock:

1. From the **System** tab, select **Security**.
2. From **Default Entry**, clear the **Security System Lock** check box. A cleared check box indicates that the Security System Lock function is disabled.

Displaying Serial Numbers and Software Revision

This function displays the following information:

- Copyright Information
- Feature set number
- Graphical User Interface Version
- Customer Service Information
- Circuit Pack Information
    - Product Serial Number
    - Kit Number
    - System Control Version
    - SCPI Version
    - TL1 Version
    - SNMP Version
    - OmniOrb Version
    - UPX Version
    - zlib Version
    - Kit Numbers and Versions

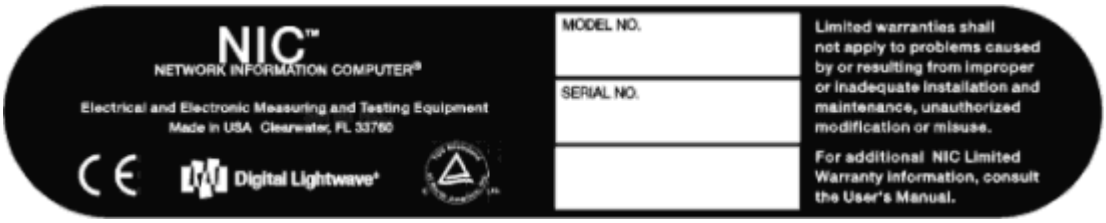
To view this information:

1. From the **System** tab, choose **Misc**.
2. Select **About this product**. The software revision number and hardware serial numbers appear.

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3. To close the **About this product** box, select **OK**.

You may obtain some of the product information by viewing the product label located on the unit. For example:



Establishing a Default User Login

This function allows an administrator to establish a default login, which results in users not having to enter a user ID and password each time they use the unit.

Important: The default login function is only applicable for the NIC unit. When connecting to a NIC via the Remote NIC application, a user ID and password are required. Establishing a default login user can only be done from the NIC touch screen.

To establish a default login user:

1. From the **System** tab, select **Security**.
2. From the User Name list box, select the **User Name** that you wish to make the default upon login.
3. Select **Set as Default**. Under the Default User column, a "Yes" appears, indicating that the user has been established as default user.

The Set as Default button is only available from the NIC touch screen.

To disable a default login:

1. From the **System** tab, select **Misc**.
2. From **Local Settings**, clear the **User Login Required** check box. A cleared check box, indicates that User Login Required is disabled.

The User Login Required check box is only available from the NIC touch

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screen.

3. Reboot the unit for changes to take affect. When the unit restarts, a login box appears.

   If you do not wish to reset a Default Login user, there is no need to continue to the next step.

4. If you wish to set another default user, log in as an Admin user and repeat the steps above under, *To establish a default login*.

Rebooting the Test Set

This function allows the system to write unsaved data to the disk before you reboot the unit. You can perform this task from the System I/O window or by selecting the Off/Lock button on a protocol processor tab.

Important: Rebooting the test set must be done from the NIC touch screen.

To reboot the unit from the System, I/O Settings window:

1. Select the **System** tab and choose **I/O Settings**.
2. Select **Ethernet** and choose **Reboot**. The Reboot dialog box appears.
3. Select **OK** to continue with the reboot process, or Cancel to keep the unit on. The Shutdown in Progress message box appears.
4. After all unsaved data is written to the disk, the unit restarts.

Important: If the unit does not successfully reboot turn it off manually by toggling the On/Off switch to **Off**.

To reboot the unit from a protocol processor tab:

1. Select the **Off/Lock** common function button. The Unlock Login dialog box appears.

Important: Do not enter the User ID or Password.

2. Select **Reboot**. The Reboot dialog box appears.
3. Select **OK** to continue with the reboot process, or Cancel to keep the unit on. The Shutdown in Progress message box appears.

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4. After all unsaved data is written to the disk, the unit restarts.

Important: If the unit does not successfully reboot turn it off manually by toggling the On/Off switch to **Off**.

Resetting the System

This Administrator function clears and restores default settings to the following:

- User Accounts - Deletes all user accounts and restores the default Admin account.
- FTP Administrator - Deletes the FTP account and restores the default FTP user ID and password.
- System Services - Restores all default system service settings.

User files, such as the protocol processor's transmit and receive settings, report statistics, graphs, and test results, are not deleted. These files are managed using File Services.

To reset the system:

1. From the **System** tab, select **Security**.
2. Select **Reset System**.
3. A message asking to confirm that you want to reset the system appears. Select **Yes**.
4. A message stating that the system must be restarted for changes to take affect appears. Select **OK**.
5. Reboot the system.

System Services

The following system services can be enabled or disabled by an Administrator.

A unit reboot is required if any changes are made to system services.

To enable or disable a system service:

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1. From the **System** tab, select **Security**.
2. From **System Services**, enable the following services by selecting the check box, or disable the service by clearing the check box.

    - **Internet Information.** The IIS (Internet Information Server) service provides the ability to host a simple web server, which uses port 80 (http). This function can be disabled (deselect the checkbox) to prevent unauthorized access to the port.
    - **File Transfer Protocol.** The FTP service allows a user to remotely log in to the unit and transfer files. Disabling this function can prevent unauthorized access to ports 20 and 21.


FTP service must be enabled if you use the Remote Control Application or the DLI Software Upgrade software. You can not connect to the unit using these applications if FTP service is disabled.

    - **Remote Procedure Call.** This protocol allows an application on one PC to request a service from another application located on a different PC within in a LAN. Disabling this function can prevent unauthorized users from using the unit to access other equipment in a customer's network.
    - **Telnet.** The Telnet service allows a user to log in to a remote system. Disabling this function can prevent unauthorized users from using the unit to access a customer's network.
    - **NetBIOS.** The NetBIOS (Network Basic Input/Output System) program allows applications to use port 139 to communicate to different PCs within a LAN. This function can be disabled to prevent unauthorized access to the port.
    - **SCPI.** The SCPI (Standard Commands for Programmable Instruments) service uses port 8090 to send and receive SCPI commands to the unit. Disabling this function will prevent unauthorized access to the port.
    - **TL1.** The TL1 (Transaction Language 1) service uses port 8080 to send and receive TL1 commands to the unit. Disabling this function will prevent unauthorized access to the port.
    - **SNMP.** The SNMP (Simple Network Management Protocol) service uses ports 161 and 162 to transfer commands and traps to and from the unit. Disabling this function will prevent unauthorized access to these ports.

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File Services

This function provides file management of saved reports. It allows you to:

- Print any saved report file
- Upload report files from the unit
- Download report files to the unit
- View any report printed to file
- Rename report files
- Delete report files
- View file details (size and modification date)
- Create a new directory for file storage

Printing or Viewing Saved Files

While running tests, you have the option to save the information to a file. The instructions below tell you where and how to print or view a saved file.

Important: Files saved when working with the Remote Control Application will not be accessible from the NIC unit touch-screen and visa-versa. The remote application saves the files to the Remote Control (GalaxyNIC) directory on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

To print or view a saved file:

1. From the **System** tab, select **File Services**.
2. Select a file from the **Disk** directory box. The desired report may display in the main Disk directory, or it may be stored in one of the folders in the directory. Folder names are enclosed in brackets **[foldername]**. To return to the main Disk directory after opening a folder, select **[. .]** or the **Disk** button.

Important: Real-time reports generated from the NIC unit touch-screen, using the Action after Duration function, are automatically stored in the [APP] folder. Select the folder to display those reports.

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The following is a list of file extension used for files generated from the Print Report, Graph, or Action after Duration functions:

- **.aps** - APS Report
- **.evt** - Event Report
- **.perf** - Performance Report
- **.real** - Real-time Test Report (Stored in [APP} folder on NIC unit.)
- **.rep** - Graph Report, BERT Analysis, RFC Thru Put Analysis
- **.set** - Settings Report
- **.stat** - Results Report
- **.statE** - Event Report
- **.grp** - Graph (This is not a text file. It can only be viewed as a graph by selecting **Results,** pointing to **Graph** and choosing the **Replay Graphs** button.)

3. Choose one of the following

To **Print** the file:

a. Select **Print**. A standard Print dialog box appears.


If you want to print a report directly from the NIC unit, make sure that a printer is attached to the unit's parallel or serial port.

b. Select the printer **Name** and choose **OK**.

To **View** the file:

a. Select **View**. The View File window appears. Use the **Display Hex** / **Display ASCII** toggle button to display the file in Hex or ASCII format.


The following file details display below the File List box.

- File name
- File size and date
- File attributes

b. Select **Exit** to close the View File window.

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Printing a Report

The Print Report Common Function Button allows you to print reports to a printer or file.

1. Select **Print Report**. The Report Setup menu appears.
2. Choose one of the following:
   - From **Destination Printer**, select one or multiple reports to print directly to a printer. If printing a report from the NIC unit, make sure that a printer is attached to the unit's parallel or serial port. The following reports are available:
     - **Settings** - (.set extension) Reports current values for all Transmit and Receive Set functions.
     - **Statistics** - (.stat extension) Reports results for the Scan, Errors, Alarms, and PTR.
     - **Events** - (.evt extension) Reports a detailed summary of events, such as alarms, errors, and pointer activity. This report includes the event, the number of events logged, the start and stop time of the event, and the duration of the event.
     - **APS** - (.aps extension) Reports the results of the K1 and K2 byte sequences received by the unit.
     - **Performance** - (.perf extension) Reports Performance Monitor results.
   - From **Destination File**, choose one or multiple reports to print to a file. The File Browser dialog box appears.


The **Comma Delimiter** option can be applied to the Settings To File and Statistics To File reports.

- Enter a filename and select **OK**.


Important: Files saved when working with the Remote Control Application will not be accessible from the NIC unit touch-screen and visa-versa. The remote application saves the files to the Remote Control (GalaxyNIC) directory on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

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3. In the **User Comment** box, select the **Input** button to enter notes that will display in the report. A keyboard opens.
4. Enter comment text using the keyboard. When working from NIC test set use the touch screen keyboard. Select **Enter**.

> To clear comment text, select the **Clear** button.

5. Select **OK**.

For information on retrieving saved files, see Print or View Saved Files.

> Files that are created when using the Remote Control Application are saved on your PC in the Remote Control directory. This directory can be overwritten when connecting to other remote units that have the same compatibility level, but are different models (for example, a NIC Plus, a NIC 10G, and so on).
>
> If you want to keep these files, copy and save the following to a backup directory on your PC that is not in the Remote Control Application directory's path:
>
> - Any file with the .set, .stat, .evt, .aps, .perf, or .rep extension.
> - The client.prop file. Changes to this file are only needed if the remote unit uses a PCMCIA modem for its dial-up connection.

Common Function Buttons

The bottom of the touch screen contains task-oriented buttons. These buttons do not appear when using the System or Help tabs. Additionally, buttons that do not pertain to a protocol will not appear when that protocol tab is selected.



The Common Function Buttons include:

- Error Insert
- Stop

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- Restart
- Print Report
- Presets
- Auto Conf
- Save
- Restore
- Clear History
- Off/Lock

Destination Printer

The Destination Printer function prints a report directly to a printer.

For local printing (which means that you are using the touch screen), you must have a printer attached to the unit's parallel port or serial port.

For remote printing (which means that you are using the Remote Control software to operate a unit from a PC), the standard Print dialog box opens, allowing you to choose a printer name.

Printer Port Configuration

The unit supports both parallel and serial printers.

For Parallel Printing:

- Attach a parallel printer cable (with a 25-pin male connector on one end) to the unit's **Parallel Port** connector. This is a DB-25 female connector.

For Serial Printing:

Important: The following steps must be performed from the NIC unit touch screen. "Printer" is not an available Serial port assignment from the Remote Control Application.

1. Attach a serial printer cable (with a 9-pin female connector on one end) to the unit's **RS-232** port connector. This is a DB-9 male connector.
2. From the **System** tab, select **I/O Settings**.
3. Select the **Serial** button.

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4. Select the **Port Assignment** button and choose **Printer**.

Destination File

The Destination File functions allow you to print reports to a file. This saves the report file either locally on the unit or remotely on a PC.

Using the Destination File Functions:

1. After selecting **Print Report**, the Report Setup screen appears.
2. Select any combination of reports from the **Destination File** functions.
3. Select **OK**. The File Browser appears, which allows you to name and save the report file.
4. After naming the file and deciding which subdirectory to store the file, click **OK**. The report is saved. It can be retrieved later using File Services.

Using Graphs

Use the **Graph** button to view error and alarm results for the selected protocol processor. Graphs show the test history for either the current test or a previously saved test.

To use the graphs function:

1. Select a protocol processor that has been configured for Error Alarm testing.
2. From **Results**, select **Graph**. The Graph screen appears. It contains two graphs which allow you to display incoming alarms and errors.
3. Use the following buttons to control graphing parameters:

    - **Sample Rate** - Sets the timing for graph results at increments of 1 Second, 1 Minute, or 15 Minutes.
    - **Change Scale** - Compresses or expands the displayed time scale for the graphed errors and alarms at time intervals of 30 minutes, 90 minutes, 3 hours, 6 hours, 12 hours, 24 hours, or 72 hours.
    - **Change Upper** - Sets the type of errors or alarms that appear in the upper graph.
    - **Change Lower** - Sets the type of errors or alarms that appear in the lower graph.

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- **Shift Left and Shift Right** - Adjusts the graph's time scale to an earlier or later time.
- **Print Report** - Prints a graph report to printer or file.
- **Save Graphs** - Saves a graph to file as a .grp file that can be replayed at a later time.

Important: This is not a text file; when replayed, it appears as the original graph plot. Choose *Print a Graph to Report* if you desire graph information that can be printed out.)

- **Replay Graphs/Stop Replay** - Replays or stops saved graphs (.grp).

Action after Duration

Action after Duration defines what activities occur at the conclusion of a timed test. It allows several different options, including printing results to a printer or recording them to a file; repeating a test or just processing one test. Test results appear in a columned report format; however, there is one option available to record the statistics using a delimiter.

To determine how long a test will run, refer to Duration.

Print Options

When a print option is chosen, the report prints directly to a printer. If you are using the NIC touch-screen, a printer must be attached to the NIC's parallel or serial port. (See Printer Port Configuration.)

Record Options

When a record option is chosen, the results are saved to a file with one of the following extensions:

- **.evt** - Event Report. A detailed summary of alarms, errors, and pointer activity.
- **.statE** - Event Report. Used when the *Record Statistics/Events and Repeat Test* option is selected.
- **.stat** - Results Report. A statistics report of the Scan, Errors, Alarms, and PTR functions.

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- **.real** - Real-time Test Report. Real-time reports generated only from the NIC touch screen.

The file naming convention is: **xxhhmmss.<extension>** (where **xx** is the protocol processor, **hh** is hours, **mm** is minutes, **ss** is seconds). For example, a file named "OC163035.evt" represents an OC-192/48/12 test event that was recorded at 16:30:35.

To learn how to print or view a saved file, see the topic Print or View Saved Files.

The table below describes the Action after Duration options.

Repeat Test and Realtime Test Options	**Description**
None	No action occurs at the end of the test duration.
Print Current Statistics	Test statistics are printed to a printer at the end of a timed test. The test does not repeat.
Record Current Statistics	Test statistics are printed to a file (.stat) at the end of a timed test. The test does not repeat.
Record Current Statistics using a delimiter	Test statistics are printed to a file (.stat) at the end of a timed test. The results appear in a quote/comma-report format, meaning that error and/or alarm values are enclosed in quotes (") and separated by commas (,). The test does not repeat.
Print Statistics and Repeat Test This option appears when **Repeat Actions** is selected.	Test statistics are printed to a printer at the end of the timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Record Statistics and Repeat Test This option appears when **Repeat**	Test statistics are printed to a file (.stat) at the end of a timed test and the test restarts. This cycle

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Actions is selected.	continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Print Events and Repeat Test This option appears when **Repeat Actions** is selected.	Test events are printed to a printer at the end of the timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Record Events and Repeat Test This option appears when **Repeat Actions** is selected.	Test events are printed to a file (.evt) at the end of a timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Print Statistics/Events and Repeat Test This option appears when **Repeat Actions** is selected.	Both test statistics and events are automatically printed to a printer at the end of the timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Record Statistics/Events and Repeat Test This option appears when **Repeat Actions** is selected.	Both test statistics (.stat) and events (.statE) are printed to a file at the end of a timed test and the test repeats. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value. Both **.statE** and **.stat** files are recorded.
Print Events and Repeat Test This option only appears on the	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit.

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NIC unit's touch screen when **Realtime Actions** is selected.	When the test duration expires, the test restarts.
Record Events and Repeat Test This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a file (.evt). When the test duration expires, the test restarts.
Print and Record Events and Repeat Test This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit and prints to a file (.evt). When the test duration expires, the test restarts.
Print Events This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit. The test does not repeat.
Record Events This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a file (.evt). The test does not repeat.
Print and Record Events This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit and prints to a file (.evt). The test does not repeat.

Duration

This function configures how long a timed test runs. The following options are available:

Options	**Description**

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Continuous	Test is untimed, and unit is always collecting data.
5 Minutes	Test runs for 5 minutes.
15 Minutes	Test runs for 15 minutes.
1 Hour	Test runs for 1 hour.
2 Hours	Test runs for 2 hours.
24 Hours	Test runs for 24 hours.
72 Hours	Test runs for 72 hours.
1 Week	Test runs for 1 week.
2 Weeks	Test runs for 2 weeks.
User Defined	Allows a specific test duration to be entered using a touch screen keypad. The minimum duration is 1 minute. The maximum duration is 99 days, 23 hours, and 59 minutes.

Printer Port Configuration

The unit supports both parallel and serial printers.

For Parallel Printing:

- Attach a parallel printer cable (with a 25-pin male connector on one end) to the unit's **Parallel Port** connector. This is a DB-25 female connector.

For Serial Printing:

Important: The following steps must be performed from the NIC unit touch screen. "Printer" is not an available Serial port assignment from the Remote Control Application.

1. Attach a serial printer cable (with a 9-pin female connector on one end) to the unit's **RS-232** port connector. This is a DB-9 male connector.
2. From the **System** tab, select **I/O Settings**.

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3. Select the **Serial** button.
4. Select the **Port Assignment** button and choose **Printer**.

Uploading a File

A file can be transferred from the unit to a remote device (for example a PC) or to a local device (a PCMCIA storage card). If using the FTP function, make sure you have the IP address of the receiving device. If using the PCMCIA function, make sure that a PC Card is installed in the PCMCIA slot before selecting the File Services button. When the PC card is inserted, an audible tone indicates that the card and PCMCIA drivers are qualified.

1. From the **System** tab, select **Files Services**.
2. From the right File List box, select the upload method (**FTP** or **PCMCIA**).

- If using *FTP*,

  a. Enter the IP Address of the device that will receive the file (unless you are using the Remote Control Software; then enter the test set address) in the **FTP Site Information** box.

  b. If this device is secured with a User ID and Password, then enter this information.

  c. Enter an FTP session on the connecting device.

- If using *PCMCIA*,

  ▶ Select a target directory from the File List box.

3. From the left File List box, select the current location of the file (**Disk** or **PCMCIA**).
4. Select a file from the File List box.
5. Select  (upload). The file is transferred.

Warning: When the unit is powered off, the FTP directory is automatically purged.

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Downloading a File

A file can be transferred from a remote device (for example, a PC) to the unit or from a local device (a PCMCIA storage card). If using the FTP function, make sure you have the IP address of the receiving device.

1. From the **System** tab, select **File Services**.
2. From the right File List box, select the download method (**FTP** or **PCMCIA**).
    - If using *FTP*,

a. Enter the IP Address of the device that will receive the file (unless you are using the Remote Control Software; then enter the test set address).

b. If this device is secured with a User ID and Password, then enter this information.

c. Enter an FTP session on the connecting device.

- If using *PCMCIA*,

    ▶ Make sure the PC Card is installed in the PCMCIA slot before selecting the File Services button. When the PC card is inserted, an audible tone indicates that the card and PCMCIA drivers are qualified.

3. From the left File List box, select the destination directory.
4. Select  (download). The file is transferred to the unit.

Warning: When the unit is powered off, the FTP directory is automatically purged.

Printing or Viewing Saved Files

While running tests, you have the option to save the information to a file. The instructions below tell you where and how to print or view a saved file.

Important: Files saved when working with the Remote Control Application will not be accessible from the NIC unit touch-screen and visa-versa. The remote application saves the files to the Remote Control (GalaxyNIC) directory on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

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To print or view a saved file:

1. From the **System** tab, select **File Services**.
2. Select a file from the **Disk** directory box. The desired report may display in the main Disk directory, or it may be stored in one of the folders in the directory. Folder names are enclosed in brackets **[foldername]**. To return to the main Disk directory after opening a folder, select **[. .]** or the **Disk** button.

Important: Real-time reports generated from the NIC unit touch-screen, using the Action after Duration function, are automatically stored in the [APP] folder. Select the folder to display those reports.

The following is a list of file extension used for files generated from the Print Report, Graph, or Action after Duration functions:

- **.aps** - APS Report
- **.evt** - Event Report
- **.perf** - Performance Report
- **.real** - Real-time Test Report (Stored in [APP} folder on NIC unit.)
- **.rep** - Graph Report, BERT Analysis, RFC Thru Put Analysis
- **.set** - Settings Report
- **.stat** - Results Report
- **.statE** - Event Report
- **.grp** - Graph (This is not a text file. It can only be viewed as a graph by selecting **Results,** pointing to **Graph** and choosing the **Replay Graphs** button.)

3. Choose one of the following

To **Print** the file:

a. Select **Print**. A standard Print dialog box appears.

If you want to print a report directly from the NIC unit, make sure that a printer is attached to the unit's parallel or serial port.

b. Select the printer **Name** and choose **OK**.

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To **View** the file:

a. Select **View**. The View File window appears. Use the **Display Hex** / **Display ASCII** toggle button to display the file in Hex or ASCII format.


The following file details display below the File List box.

- File name
- File size and date
- File attributes

b. Select **Exit** to close the View File window.

Printing a Report

The Print Report Common Function Button allows you to print reports to a printer or file.

1. Select **Print Report**. The Report Setup menu appears.
2. Choose one of the following:
   - From **Destination Printer**, select one or multiple reports to print directly to a printer. If printing a report from the NIC unit, make sure that a printer is attached to the unit's parallel or serial port. The following reports are available:

     Settings - (.set extension) Reports current values for all Transmit and Receive Set functions.

     Statistics - (.stat extension) Reports results for the Scan, Errors, Alarms, and PTR.

     Events - (.evt extension) Reports a detailed summary of events, such as alarms, errors, and pointer activity. This report includes the event, the number of events logged, the start and stop time of the event, and the duration of the event.

     APS - (.aps extension) Reports the results of the K1 and K2 byte sequences received by the unit.

     Performance - (.perf extension) Reports Performance Monitor results.

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- From **Destination File**, choose one or multiple reports to print to a file. The File Browser dialog box appears.

The **Comma Delimiter** option can be applied to the Settings To File and Statistics To File reports.

▶ Enter a filename and select **OK**.

Important: Files saved when working with the Remote Control Application will not be accessible from the NIC unit touch-screen and visa-versa. The remote application saves the files to the Remote Control (GalaxyNIC) directory on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

3. In the **User Comment** box, select the **Input** button to enter notes that will display in the report. A keyboard opens.
4. Enter comment text using the keyboard. When working from NIC test set use the touch screen keyboard. Select **Enter**.

To clear comment text, select the **Clear** button.

5. Select **OK**.

For information on retrieving saved files, see Print or View Saved Files.

Files that are created when using the Remote Control Application are saved on your PC in the Remote Control directory. This directory can be overwritten when connecting to other remote units that have the same compatibility level, but are different models (for example, a NIC Plus, a NIC 10G, and so on).

If you want to keep these files, copy and save the following to a backup directory on your PC that is not in the Remote Control Application directory's path:

- Any file with the .set, .stat, .evt, .aps, .perf, or .rep extension.
- The client.prop file. Changes to this file are only needed if the remote unit uses a PCMCIA modem for its dial-up connection.

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Destination Printer

The Destination Printer function prints a report directly to a printer.

For local printing (which means that you are using the touch screen), you must have a printer attached to the unit's parallel port or serial port.

For remote printing (which means that you are using the Remote Control software to operate a unit from a PC), the standard Print dialog box opens, allowing you to choose a printer name.

Destination File

The Destination File functions allow you to print reports to a file. This saves the report file either locally on the unit or remotely on a PC.

Using the Destination File Functions:

1. After selecting **Print Report**, the Report Setup screen appears.
2. Select any combination of reports from the **Destination File** functions.
3. Select **OK**. The File Browser appears, which allows you to name and save the report file.
4. After naming the file and deciding which subdirectory to store the file, click **OK**. The report is saved. It can be retrieved later using File Services.

Renaming a File

1. From the **System** tab, select **Files Services**.
2. Select a file from the File List box.
3. Select **Rename**. A keyboard appears. Enter the new file name with extension. (Do not use spaces in file names.)
    - SET is the default extension for a Settings report.
    - STAT is the default extension for a Statistics report. (This includes tests produced using the Action After Duration button.)
    - EVT is the default extension for an Event report.
    - APS is the default extension for an APS report.
    - GRP is the default extension for a Graph report.
    - BMP is the default extension for a Print Screen image.

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- PERF is the default extension for a Performance Monitor report.

4. Select **Enter** from the keyboard. The file is renamed.

The extensions above are default file extensions. You are able change these to .txt (text) files using the **Rename** function.

Printing or Viewing Saved Files

While running tests, you have the option to save the information to a file. The instructions below tell you where and how to print or view a saved file.

Important: Files saved when working with the Remote Control Application will not be accessible from the NIC unit touch-screen and visa-versa. The remote application saves the files to the Remote Control (GalaxyNIC) directory on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

To print or view a saved file:

1. From the **System** tab, select **File Services**.
2. Select a file from the **Disk** directory box. The desired report may display in the main Disk directory, or it may be stored in one of the folders in the directory. Folder names are enclosed in brackets **[foldername]**. To return to the main Disk directory after opening a folder, select **[. .]** or the **Disk** button.

Important: Real-time reports generated from the NIC unit touch-screen, using the Action after Duration function, are automatically stored in the [APP] folder. Select the folder to display those reports.

The following is a list of file extension used for files generated from the Print Report, Graph, or Action after Duration functions:

- **.aps** - APS Report
- **.evt** - Event Report
- **.rep** - Graph Report, BERT Analysis, RFC Thru Put Analysis
- **.set** - Settings Report

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- **.perf** - Performance Report
- **.real** - Real-time Test Report (Stored in [APP} folder on NIC unit.)
- **.stat** - Results Report
- **.statE** - Event Report
- **.grp** - Graph (This is not a text file. It can only be viewed as a graph by selecting **Results,** pointing to **Graph** and choosing the **Replay Graphs** button.)

3. Choose one of the following

To **Print** the file:

a. Select **Print**. A standard Print dialog box appears.


If you want to print a report directly from the NIC unit, make sure that a printer is attached to the unit's parallel or serial port.

b. Select the printer **Name** and choose **OK**.

To **View** the file:

a. Select **View**. The View File window appears. Use the **Display Hex** / **Display ASCII** toggle button to display the file in Hex or ASCII format.


The following file details display below the File List box.

- File name
- File size and date
- File attributes

b. Select **Exit** to close the View File window.

Deleting a File

1. From the **System** tab, select **File Services**.
2. Select a file from the File List box.
3. Select **Delete**. A confirmation message appears.
4. Select **Yes**. The file is deleted.

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If you do not have authorization to delete files, the **Access Denied** message appears.

Printer Port Configuration

The unit supports both parallel and serial printers.

For Parallel Printing:

- Attach a parallel printer cable (with a 25-pin male connector on one end) to the unit's **Parallel Port** connector. This is a DB-25 female connector.

For Serial Printing:

Important: The following steps must be performed from the NIC unit touch screen. "Printer" is not an available Serial port assignment from the Remote Control Application.

1. Attach a serial printer cable (with a 9-pin female connector on one end) to the unit's **RS-232** port connector. This is a DB-9 male connector.
2. From the **System** tab, select **I/O Settings**.
3. Select the **Serial** button.
4. Select the **Port Assignment** button and choose **Printer**.

Creating a New Directory

1. From the System tab, select **File Services**.
2. Select **New Dir**. A keypad appears.
3. Enter a directory name (do not use spaces in directory or file names) and select **Enter**. The new directory appears at the bottom of the File List box.

Rebooting the Test Set

This function allows the system to write unsaved data to the disk before you reboot the unit. You can perform this task from the System I/O window or by selecting the Off/Lock button on a protocol processor tab.

Important: Rebooting the test set must be done from the NIC touch screen.

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To reboot the unit from the System, I/O Settings window:

1. Select the **System** tab and choose **I/O Settings**.
2. Select **Ethernet** and choose **Reboot**. The Reboot dialog box appears.
3. Select **OK** to continue with the reboot process, or Cancel to keep the unit on. The Shutdown in Progress message box appears.
4. After all unsaved data is written to the disk, the unit restarts.

Important: If the unit does not successfully reboot turn it off manually by toggling the On/Off switch to **Off**.

To reboot the unit from a protocol processor tab:

1. Select the **Off/Lock** common function button. The Unlock Login dialog box appears.

Important: Do not enter the User ID or Password.

2. Select **Reboot**. The Reboot dialog box appears.
3. Select **OK** to continue with the reboot process, or Cancel to keep the unit on. The Shutdown in Progress message box appears.
4. After all unsaved data is written to the disk, the unit restarts.

Important: If the unit does not successfully reboot turn it off manually by toggling the On/Off switch to **Off**.

Chatting

Use the Chat function to send brief messages to other networked units.

To send a message:

1. From the **System** tab, select **Chat**.
2. Enter your message in the **Input Message** box.
   - Select 

 if using the touch screen on a portable unit. A keypad appears allowing you to enter the message. Select **Enter** when done. The message appears in the Input Message window.

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- If using the Remote Control Application, place your mouse cursor in the Input Message box and type the message.

> Pressing the Enter key on your keyboard will delete the message. To avoid this, select **Multi Lines** before starting to type the message. In addition, if you have a long message, select Multi Lines so that you can use the Enter key to keep your message within the Input Message window.

3. You can assign a **High Priority** level to the message, or you can require that the recipient respond to the message (**Reply Required**).

> Another user will not see the Chat message unless High Priority or Reply Required is selected.

4. Select **Send**.

Clearing History and Results

The unit uses the following functions to log event, alarm, and error activity monitored on the incoming signal:

- LEDs as displayed in the **Quick Status LEDs** area and the **Large LEDs** tab
- The **Results** function

To only clear LEDs and Status Indicator history:

- Select the **Clear History** common function button that appears at the bottom of the touch screen.

To clear recorded history (results):

- Select the **Restart** common function button that appears at the bottom of the touch screen. The LEDs' history clears, and the statistics collected under the Results function resets to 0.

Restarting an Error, Alarm, or Event Test

The Restart common function button is used to initiate the following test activities:

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- **Clears and resets** error, alarm, and event activity counters, statistics, and LEDs for the current protocol processor.
- **Starts** error, alarm, or event activity that was stopped using the Stop button.

To restart a test or reset statistics:

- Select the **Restart** common function button located at the bottom of the touch screen. Configured testing on the current protocol processor is restarted.

Communications Port Assignment

The unit has Ethernet, serial, and GPIB ports that can be assigned for a specific operation (for example, SCPI commands, TL1 commands, or serial printing).

When an operation is assigned to a port, that specific operation cannot be used by other ports.

Select the following links for:

- Ethernet port configuration
- GPIB port configuration
- Serial port configuration and assignment procedures

Configuring the Ethernet Port

The unit can be controlled using SCPI or TL1 (when licensed) commands through the unit's Ethernet port. The unit supports dynamic IP addressing, using Dynamic Host Connection Protocol (DHCP) and static IP addressing.


This must be performed from the touch screen. When Ethernet port parameters are changed, the test set must be restarted for the changes to take affect.

To configure the Ethernet port for a static IP address:

1. From the **System** tab, select **I/O Settings**.
2. Select **Ethernet**.

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3. Select **Specify an IP address** from the **Ethernet Configuration** functions.
4. Enter the unit's **IP Address**, **Subnet Address**, and **Router Address**.

IP addresses **192.168.138.000 through 192.168.138.255** are reserved and should not be used. A system conflict can occur if these IP addresses are entered.

If you must use an IP address in the range of **192.168.x.x**, then you **must** set the Subnet Address to **255.255.255.0**.

5. Restart the unit for changes to take affect.

To configure the Ethernet port for a dynamic IP address using DHCP:

1. From the **System** tab, select **I/O Settings**.
2. Select **Ethernet**.
3. From **Ethernet Configuration**, select **Obtain an IP address from a DHCP server**. The unit will use the network's DHCP server to dynamically assign it an IP address.
4. Reboot the unit for changes to take affect.

To view the Ethernet port assignment:

The Ethernet port assignment is automatically enabled for SCPI. When licensed for TL1, it also appears on the Port Assignment line.

1. From the **System** tab, select **I/O Settings**.
2. Select **Ethernet**.
3. The **Port Assignment** line displays what has been assigned, by way of default or license. SCPI is automatically listed. If the unit is licensed for TL1, then TL1 is also displayed on the assignment line.

Configuring GPIB Port

The unit can be controlled using SCPI commands through the unit's GPIB port. The Port Assignment line on the GPIB screen automatically displays SCPI as its assignment.

To configure the GPIB port address:

1. From the **System** tab, select **I/O Settings**.

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2. Select **GPIB**.
3. Select **GPIB Port** and enter the primary address for the GPIB interface. Address values are from 0 to 30. The primary address must match the GPIB host or communications cannot be established.
4. Select **OK**.

Configuring and Assigning the Serial Port

The unit's serial port is a physical interface that can be used to:

- Transfer SCPI or TL1 commands to and from the unit.
- Connect a serial printer to the unit.

To configure and assign the serial port:

1. Select the **System** tab.
2. Select **I/O Settings** and choose **Serial**.
3. If required, select the **Baud Rate**, **Parity**, **Data Bits**, and **Stop Bits** serial configuration parameters and make the appropriate changes.
4. Select **Port Assignment**. The Select Serial Port Assignment dialog box appears.


The Printer option only displays when configuring from the NIC touch screen. The **TL1** option only displays if the unit is licensed for TL1.

5. Select the desired port assignment.

Serial Configuration


Before changing serial port parameters, you must first disable the serial port by setting its assignment to **None**. After changing parameters, you can reset the serial port to its previous assignment. Refer to Port Assignment for a list of serial port interfaces.

The following configures the Serial port's parameters:

- **Baud Rate:** Set to 19200, 14400, 9600, 4800, 2400, or 1200.
- **Parity:** Set to None, Odd, or Even.

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- **Data Bits:** Set to 7 or 8.
- **Stop Bits:** Set to 1 or 2.
- **Port Assignment:** Sets the serial port to one of the following interfaces – None, SCPI, TL1, or Printer.

Configuring TCM for Receive Mode

When transmitting or monitoring errors and alarms the unit must be configured for TCM operation.

To configure the unit for TCM monitor operation:

1. Select an SDH or SONET protocol processor.
2. Select **Receive** and choose **SET 2**.
3. Select the **TC Error/Alarm Processing** function and select **Enable**.
4. The unit is configured to monitor for incoming TCM errors, alarms, and traces.
   Select **Monitoring the TC Trace** for more information about incoming trace patterns.

To monitor for TC-TIM alarms:

- Select **Receive**.
- Select **SET 2**.
- Select the **TIM Alarm Reporting** function and select **Enable**.

Related Topics:

Monitoring TCM Results

Monitoring the TC Trace

Monitoring the TC Trace

Before monitoring TC trace:

- Make sure the unit is configured for TCM receive mode.

To view the TC trace:

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1. Select an SDH or SONET protocol processor.
2. Select **Receive**.
3. Select **POH** to view the incoming TC trace, which appears at the bottom of the screen.


A TC-TIM alarm occurs if the incoming TC trace does not match the expected TC Trace. The alarm's duration appears on the Results' Alarm screen.

Monitoring TCM Errors and Alarms

Incoming TCM errors and alarms are available in a number of TCM The Results function

Before monitoring TCM traffic:

- Make sure the unit is configured for TCM receive mode.
- Check to see if the TC Summary LED is red. If so, the unit is receiving (or has received) TCM activity. Use the following procedures to view TCM error and alarm activity in more detail.

To view TCM results:

1. Select an SDH or SONET protocol processor.
2. Select **Results**. Various Results functions appear on the screen.
3. Select the following Results tabs to monitor events:
    - Select **Scan** to view a summary count of current TCM error and alarm activity.
    - Select **Err** to view the following details about incoming TCM errors (TC-IEC, TC-REI, TC-OEI):
        - Error count using an 11-digit format.
        - Average error rate over the total error duration using an N.NNe-N format.
        - Current error rate using an N.NNe-N format.

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- Select **Alarms** to view TCM alarm's duration in seconds. TCM alarms include TC-RDI, TC-ODI, TC-AIS, TC-UNEQ, TC-TIM, and TC-LOF).
- Select **Event** to view a time-stamp of the TCM event.
- Select **Graph** to view a graph of TCM alarms or error counts:

  ▶ Once the graph appears, select **Change Upper** or **Change Lower**.

  ▶ Select **Alarm 3** to display TCM alarms.

  ▶ Select **TC-IEC Counts**, **TC-REI Counts**, or **TC-OEI Counts** to display TCM error counts.

Configuring TCM for Receive Mode

When transmitting or monitoring errors and alarms the unit must be configured for TCM operation.

To configure the unit for TCM monitor operation:

1. Select an SDH or SONET protocol processor.
2. Select **Receive** and choose **SET 2**.
3. Select the **TC Error/Alarm Processing** function and select **Enable**.
4. The unit is configured to monitor for incoming TCM errors, alarms, and traces.
   Select **Monitoring the TC Trace** for more information about incoming trace patterns.

To monitor for TC-TIM alarms:

- Select **Receive**.
- Select **SET 2**.
- Select the **TIM Alarm Reporting** function and select **Enable**.

Related Topics:

Monitoring TCM Results

Monitoring the TC Trace

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Configuring TCM for Transmit Mode

When transmitting or monitoring errors and alarms the unit must be configured for TCM operation.

To configure the unit for TCM transmit operation:

1. Select an SDH or SONET protocol processor.
2. Select **Transmit**.
3. Select **SET 2**.
4. Select the **TC Overhead Processing** function and select **Enable**.
5. The unit is configured for transmit TCM mode, which now permits the transmission of TCM errors, alarms, and traces.

Related Topics:

Transmitting TCM errors

Transmitting TCM alarms

Transmitting a TC trace

Transmitting TCM Errors

Once in TCM mode, you can create and send TCM failures and errors on your network.

Before generating TCM traffic:

- Make sure the unit is configured for TCM operation.

To insert errors in TCM mode:

1. Select an SDH or SONET protocol processor.
2. Select **Transmit**.
3. Select **Error Alarm**.
4. Select **Error to Insert**. The Select Error to Insert window appears.
5. Select one of the following TCM errors:
    - TC-IEC

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- TC-REI
- TC-OEI

6. Select **Error Insert Rate**. The Select Error Insert Rate window appears.
7. Select an error rate. The system starts transmitting errors.

To stop TCM error transmission:

1. Select **Error to Insert**. The Select Error to Insert window appears.
2. Select **None**. Error transmission stops.

Configuring TCM for Transmit Mode

When transmitting or monitoring errors and alarms the unit must be configured for TCM operation.

To configure the unit for TCM transmit operation:

1. Select an SDH or SONET protocol processor.
2. Select **Transmit**.
3. Select **SET 2**.
4. Select the **TC Overhead Processing** function and select **Enable**.
5. The unit is configured for transmit TCM mode, which now permits the transmission of TCM errors, alarms, and traces.

Related Topics:

Transmitting TCM errors

Transmitting TCM alarms

Transmitting a TC trace

Transmitting TCM Alarms

The unit can transmit alarms to simulate various TCM alarm conditions. This can help determine if receiving Tandem Connection equipment can detect an alarm in the incoming signal.

Before generating TCM traffic:

- Make sure the unit is configured for TCM operation.

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To insert alarms in TCM mode:

1. Select an SDH or SONET protocol processor.
2. Select **Transmit**.
3. Select **Error Alarm**.
4. Select **Alarm Generated**. The Select Alarm to Insert window appears.
5. Select one of the following TCM alarms:
    - TC-RDI
    - TC-ODI
    - TC-AIS
    - TC-UNEQ
    - TC-LOF
6. The unit starts transmitting alarms.

To stop alarm transmission:

1. Select **Alarm Generated**. The **Select Alarm to Insert** window appears.
2. Select **Off**. Alarm transmission stops.

Transmitting a TC trace

A Tandem Connection (TC) trace can be generated to verify the connection between TCM equipment. The TC Trace is a 16-byte, ASCII-character pattern that can be continuously transmitted.

Before generating a TC trace:

- Make sure the unit is configured for TCM operation.

To create a TC trace:

1. Select an SDH or SONET protocol processor.
2. Select **Transmit**.
3. Select **POH**.
4. Select **TC Trace**.
5. Select:

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- **Default:** selects the 16-byte Digital Lightwave ASCII message as the TC trace pattern.
- **All Ones (16 byte):** selects a 16-byte All Ones pattern as the TC trace pattern.
- **All Zeros (16 byte)**: selects a 16-byte All Zeros pattern as the TC trace pattern.
- **User Defined:** creates a 16-byte user-defined ASCII message as the TC trace pattern.

6. The unit uses this pattern as the TC trace.

Configuring the Wireless Port


The unit only supports the HP 11-Mbps Wireless LAN PC Card. This card is inserted into the unit's PCMCIA slot.

The unit can connect to a wireless network using an 802.11 compliant wireless LAN PC card. The unit supports static IP addressing and dynamic IP addressing, using Dynamic Host Connection Protocol (DHCP). For information about the wireless parameters listed below, select Wireless Configuration.

Initial wireless configuration:

1. Insert the wireless LAN PC card into the unit's PCMCIA slot. An audible tone indicates that the LAN card and PCMCIA drivers are initialized.
2. Select **System**.
3. Select **I/O Settings**.
4. Select **Wireless**. The wireless configuration parameters appear.
5. Select **Access Point ID** and enter the wireless LAN's name/ID.
6. Select one of the following:
   - **Obtain an IP address from a DHCP server**. The test set will use the network's DHCP server to dynamically assign it an IP address. The remaining wireless parameters that appear on the screen are disabled.
   - **Specify an IP address**. The Enter Default IP Information dialog box appears
     a. Select **IP Address**. The Enter IP Address keypad appears.

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b. Enter the new IP address for the test set and select **OK**.

> IP addresses **192.168.138.000 through 192.168.138.255** are reserved and should not be used. A serious system conflict can occur if these IP addresses are entered.
>
> If you must use an IP address in the range of **192.168.x.y** (where x is not equal to 138), then you must set the Subnet Address to **255.255.255.0**.

c. Select **Subnet Address**. A keypad appears.

d. Enter the Subnet address and select **OK**.

e. Select **Router**. A keypad appears.

f. Enter the Router address and select **OK**.

g. Configuring the **Host Name** and **Domain Name** is optional. If you choose to change the current setting, select its button to open a keypad that allows you to enter a new name.

7. Select **Ethernet** and choose **Reboot**. The Shutdown? dialog box appears.
8. Select **OK**.
9. After all unsaved data is written to the disk, the test set restarts.

> If the test set does not successfully reboot turn it off manually by toggling the On/Off switch to Off and restarting it.

Configuring a Protocol Mode

The unit can be configured to operate in SONET, SDH, PDH, or DS3/DS1 networks.

> The options that appear on this screen are determined by your hardware configuration.

1. Select the **System** tab and choose **Misc**.
2. Select the **Protocols** button.
3. The following options appear:

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- **SONET, SDH:** These options appear if your unit contains one or more SONET/SDH boards, but no PDH board.
- **DS1/DS3, E1/DS3, E1/E3:** These options appear if your unit contains a PDH board, but no SONET/SDH boards.
- **SONET/DS1/DS3, SONET/E1/DS3, SDH/E1/E3, SDH/E1/DS3, SDH/DS1/DS3:** These options appear if your unit contains a PDH board and one or more SONET/SDH boards.

4. Select a protocol mode. The screen is updated to reflect the mode selected.

Configuring and Transmitting OC-1/3/12 and STM-0/1/4 APS Commands

For OC-1/3/12 and STM-0/1/4 mode, the APS function appears on a multifunctional screen that displays both Transmit and Receive APS commands.

To configure K1 and K2 byte values:

1. Select **STM-0/1/4** or **OC-1/3/12**.
2. Select **Transmit**.
3. Select **APS**. The initial APS screen appears containing a table of the K1 and K2 byte sequences that can be transmitted.

   The three columns (User Setup, Transmit, and Receive) on the screen display the current bit value for the K1 and K2 bytes. Any changes made to the K1 and K2 bytes are automatically updated in the User Setup column.

   The Transmit column displays the bit values transmitted when you select either **Transmit User**, **Transmit Default**, or **Transmit Illegal**. The Receive Column displays the bit values received for the K1 and K2 bytes.

4. Select **APS Mode** to configure APS commands for Linear protection switching mode or Ring APS signaling mode.
5. Edit the K1 byte. The K1 byte is a request for switch action. There are three functions that allow you to edit the K1 byte:
   - **K1 Full Byte** - Sets all eight bits of the K1 byte at once.

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- **K1 Bits 1-4** - Sets the first four bits of the K1 byte.
- **K1 Bits 5-8** - Sets the last four bits of the K1 byte.

6. Edit the K2 byte. The K2 byte provides additional information about SONET or SDH network architecture and alarm conditions. There are four functions that allow you to edit the K2 byte:

   - **K2 Full Byte** - Sets all eight bits of the K2 byte at once.
   - **K2 Bits 1-4** - Sets the first four bits of the K2 byte.
   - **K2 Bit 5 (provisioned)** - Sets the fifth bit of the K2 byte.
   - **K2 Bits 6-8** - Sets the last three bits of the K2 byte.

7. Use the following options to transmit bit values:

   - Use the **Transmit User** button to transmit the bit values that appear in the User Setup column. When pressed, the User Setup values are transmitted and appear in the Transmit column. You can edit the transmitted K1 and K2 bytes directly from the SOH function screen.

   - Use the **Transmit Default** button to transmit the default bit values (10101010) for the K1 and K2 bytes. When pressed, the default bit values appear in the Transmit column.
   - Use the **Transmit Illegal** button to transmit the illegal bit values (11111111) for the K1 and K2 bytes. When pressed, the illegal bit values appear in the Transmit column.

Configuring and Transmitting OC-192/STM-64 and OC-48/STM-16 APS Commands


The following only applies to OC-192/STM-64 and OC-48/STM-16 protocol processors.

Automatic Protection Switching (APS) is a function that allows an LTE to switch to a backup (or protection) channel in case errors or failures occur on the working channel. APS commands can be configured for either Linear- or Ring-based SONET and SDH networks and are transmitted using the K1 and K2 bytes of the Line Overhead.

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You can test your network's APS response by generating a condition that is likely to cause APS switching. You also have the capability to generate specific APS messages and monitor the response by configuring the K1 and K2 bytes.

You can create up to 16 different K1 and K2 byte configurations (known as byte sequences) to measure and stress your equipment's APS switching capabilities.

To configure K1 and K2 byte values:

1. Select a OC-192/STM-64 or OC-48/STM-16 protocol processor.
2. Select the **Transmit** button.
3. Select the **APS** button. The initial APS screen appears containing a table of the K1 and K2 byte sequences that can be transmitted. A total of 16 K1 and K2 byte sequences can appear in the table.
4. To make a new entry:
   - Select **New Item**

   To edit an item:
   - Select **Item <#>**, for example, Item 12.

   The Apply Maintenance to Entry screen appears, which contains functions used to configure and set the measurement criteria of the K1 and K2 bytes.
5. Select **APS Mode**. The APS Mode dialog box appears.
6. Choose **Linear** protection switching mode or **Ring** APS signaling mode.
7. Select a **K1** byte/bit. A value dialog box associated with the K1 selection appears

   The K1 byte is a request for switch action. There are three functions that allow you to edit the K1 byte:
   - Use the **K1 Full Byte** function to set all eight bits of the K1 byte at once.
   - Use the **K1 Bits 1-4** function to set the first four bits of the K1 byte.
   - Use the **K1 Bits 5-8** function to set the last four bits of the K1 byte.
8. Select a K2 byte/bit. A value dialog box associated with the K2 selection appears.

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The K2 byte provides additional information about SONET network architecture and alarm conditions. There are four functions that allow you to edit the K2 byte:

- Use the **K2 Full Byte** function to set all eight bits of the K2 byte at once.
- Use the **K2 Bits 1-4** function to set the first four bits of the K2 byte.
- Use the **K2 Bit 5 (provisioned)** function to set the fifth bit of the K2 byte.
- Use the **K2 Bits 6-8** function to set the last three bits of the K2 byte.

9. Select the desired K1 and/or K2 byte/bit value.
10. From the Apply Maintenance to Entry dialog box, select **Duration in Frames** to set up the number of frames that will be transmitted containing the newly configured K1 and K2 bytes.
11. Select **Update**. The initial APS screen appears on the touch screen.
12. To configure additional K1 and K2 bytes, repeat steps 3-11 as described above. Otherwise, proceed to the next section to transmit K1 and K2 bytes.

To transmit K1 and K2 bytes:

1. Make sure that K1 and K2 byte sequences are configured as described above.
2. Select **Start** to transmit the K1 and K2 bytes.

To stop transmitting K1 and K2 bytes:

1. Select a protocol processor mode.
2. Select the **Transmit** button.
3. Select the **APS** button. The initial APS screen appears.
4. Select **Stop**.

Creating a New Directory

1. From the System tab, select **File Services**.
2. Select **New Dir**. A keypad appears.

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3. Enter a directory name (do not use spaces in directory or file names) and select **Enter**. The new directory appears at the bottom of the File List box.

Deleting a User

If the System Lock function is enabled, only one user with Read and Write permissions (this includes Calibration and Admin users) can be logged in at a time. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read permissions only.

1. From the **System** tab, select **Security**.
2. From the User List, select the **User Name** to be deleted.
3. With the user name highlighted, select **Delete**. The user is removed from the User List.

Deleting a File

1. From the **System** tab, select **File Services**.
2. Select a file from the File List box.
3. Select **Delete**. A confirmation message appears.
4. Select **Yes**. The file is deleted.

If you do not have authorization to delete files, the **Access Denied** message appears.

Downloading a File

A file can be transferred from a remote device (for example, a PC) to the unit or from a local device (a PCMCIA storage card). If using the FTP function, make sure you have the IP address of the receiving device.

1. From the **System** tab, select **File Services**.
2. From the right File List box, select the download method (**FTP** or **PCMCIA**).
    - If using *FTP*,

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a. Enter the IP Address of the device that will receive the file (unless you are using the Remote Control Software; then enter the test set address).

b. If this device is secured with a User ID and Password, then enter this information.

c. Enter an FTP session on the connecting device.

- If using *PCMCIA*,

  ▶ Make sure the PC Card is installed in the PCMCIA slot before selecting the File Services button. When the PC card is inserted, an audible tone indicates that the card and PCMCIA drivers are qualified.

3. From the left File List box, select the destination directory.

4. Select  (download). The file is transferred to the unit.

Warning: When the unit is powered off, the FTP directory is automatically purged.

FTP Processing

File Transfer Protocol can be used to copy files to and from the unit.

- If using the Remote Control Application or DLI Software Upgrade program, make sure that FTP service is enabled.
- To upload files using FTP, select Upload a File
- To download files using FTP, select Download a File.

Dropping and Inserting an STM-64/16/4

This procedure is applicable to systems configured with STM-64/16/4 or OC-192/48/12 protocol processors.

This function allows you to drop an STM-16 signal from an STM-64 signal, and then an STM-4 signal from an STM-16 signal. Conversely, this procedure can also be performed in SONET mode (i.e., drop an OC-48 signal from an OC-192, and an OC-12 from an OC-48). Dropping signals does not need to be performed in any particular protocol processor order.

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1. Select **Presets**. The Apply Presets window appears.
2. Select **Interface**. All line interfaces available for your unit appear.
3. Select **STM-64** as the interface starting point.
4. Select **Configuration**. The protocols available for the selected interface appear.
5. Select **STM-4 A/D.**
6. Select **Apply**. The unit takes a few moments to apply the new protocol connections. Use the Switch Matrix to view the new connections.

> If you make a mistake while creating connections, simply select **Interface** and reenter the interface value. This action erases any previously entered interface or configuration values.

To disengage the configured protocol connections:

- Select **All to Tx/Rx.** This globally disconnects any internal connections between multiple protocol processors. All protocol processors will now expect to receive a signal using its line interface.

Sending Email Alerts

Before using the email alert feature, check with your Network Administrator to verify that your email account is set up to accept and forward SMTP mail.

> Important: After setting the email alert options, the protocol tab for which the error/alarms have been configured must be selected, or you must be in All Tests mode. Email alert messages will not be generated if these conditions are not met.

To set up email alerts:

1. From the **System** tab, select **User Preference**.
2. From **Mail Notification**, select the **Mail From**.
3. Using the keypad that appears, enter the sender's email address and press **Enter**.
4. From **Mail Notification**, select the **Mail Server**.

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5. Using the keypad that appears, enter the email server address (for example, ms1) and press **Enter**.

6. From **Mail Notification**, select the **Mail To**.

7. Using the keypad that appears, enter the recipient's email address and press **Enter**.

8. From **Mail Notification**, select the **Mail Interval**. The Select Duration of Test dialog box appears.

9. Select the desired test duration period. The test duration determines when the system checks for an error or alarm.

   For example, when you set up a mail interval of 15 minutes on OC-1/3/12 for all error/alarms and then select the OC-1/3/12 tab, the result is, at the first live error/alarm incident an email message is sent to the recipient. After 15 minutes has elapsed the system looks for the next live error/alarm incident and sends another email message. This 15-minute loop continues until you reset the email notification configuration.

This process is not active unless the configured protocol tab or All Tests is selected.

10. From the **Processor/Mail Notify** section, select the protocol processor that you want monitored. The Select Error/Alarm Mail Notification window appears.

You can configure additional protocols for email notification by selecting another protocol processor after choosing the error/alarm type.

Important: To activate the email notification function for *multiple protocols* you must select **All Tests** after the configurations are completed.

11. Select a desired error/alarm type or All errors and alarms. When monitoring multiple protocols, each protocol can be configured for its own error/alarm type.

Important: These configuration settings DO NOT persist after the unit has been restarted.

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To terminate email alerts:

1. From the **System** tab, select **User Preference**. The User Preference screen appears.
2. Select the **Mail Interval** button. The Select Duration of Test dialog box appears.
3. Select **OFF**.

Setting the External Clock

This function allows you to set the external clock to Bits or SETS.

To set the external clock:

1. Select **System** and choose **Misc**.
2. Select **External Clock**. The External Clock dialog box appears.
3. Select **BITS** or **SETS**.

FTP Processing

File Transfer Protocol can be used to copy files to and from the unit.

- If using the Remote Control Application or DLI Software Upgrade program, make sure that FTP service is enabled.
- To upload files using FTP, select Upload a File
- To download files using FTP, select Download a File.

Remote Control Application

The Remote Control Application software is a graphical user interface that allows you to remotely connect to and control portable and rackmount products from a PC.

Before using the Remote Control Application:

- Verify the minimum software and hardware requirements.
- Verify that the Ethernet parameters have been entered into your unit.
- Verify that you have security access to the unit.
- Verify that FTP service is enabled on the unit.

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- Install the Remote Control Application on to your PC.
- If the remote unit uses a PCMCIA modem for dial-up connectivity, configure the Remote Control Application for PCMCIA operation.

To start the Remote Control Application:

1. Select the Remote Control Application shortcut icon that appears on your PC's desktop.
2. Enter the remote unit's IP address, and your user ID and password.
3. Select **OK**.
4. Once the connection is made, the remote unit's GUI appears. The title bar contains the product name and connection method. Use your mouse to select functions.

   To automate the log on process, select Automating the Remote Control Icon for more information.

Important: Files that are created when using the Remote Control Application are saved on your PC in the Remote Control's compatibility directory. This directory can be overwritten when connecting to other remote units that have the same compatibility level, but are different models (for example, a NIC Plus, a NIC 10G, and so on).

If you want to keep these files, copy and save the following to a backup directory on your PC that is not in the compatibility directory's path:

- Any file with the .set, .stat, .evt, .aps, .perf, or .rep extension.
- The client.prop file. Changes to this file are only needed if the remote unit uses a PCMCIA modem for its dial-up connection.

Uploading a File

A file can be transferred from the unit to a remote device (for example a PC) or to a local device (a PCMCIA storage card). If using the FTP function, make sure you have the IP address of the receiving device. If using the PCMCIA function, make sure that a PC Card is installed in the PCMCIA slot before selecting the File Services button. When the PC card is inserted, an audible tone indicates that the card and PCMCIA drivers are qualified.

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1. From the **System** tab, select **Files Services**.
2. From the right File List box, select the upload method (**FTP** or **PCMCIA**).
   - If using *FTP*,
     a. Enter the IP Address of the device that will receive the file (unless you are using the Remote Control Software; then enter the test set address) in the **FTP Site Information** box.
     b. If this device is secured with a User ID and Password, then enter this information.
     c. Enter an FTP session on the connecting device.
   - If using *PCMCIA*,
     ▸ Select a target directory from the File List box.
3. From the left File List box, select the current location of the file (**Disk** or **PCMCIA**).
4. Select a file from the File List box.
5. Select  (upload). The file is transferred.

Warning: When the unit is powered off, the FTP directory is automatically purged.

Downloading a File

A file can be transferred from a remote device (for example, a PC) to the unit or from a local device (a PCMCIA storage card). If using the FTP function, make sure you have the IP address of the receiving device.

1. From the **System** tab, select **File Services**.
2. From the right File List box, select the download method (**FTP** or **PCMCIA**).
   - If using *FTP*,

a. Enter the IP Address of the device that will receive the file (unless you are using the Remote Control Software; then enter the test set address).

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b. If this device is secured with a User ID and Password, then enter this information.

c. Enter an FTP session on the connecting device.

- If using *PCMCIA*,

  ▶ Make sure the PC Card is installed in the PCMCIA slot before selecting the File Services button. When the PC card is inserted, an audible tone indicates that the card and PCMCIA drivers are qualified.

3. From the left File List box, select the destination directory.

4. Select  (download). The file is transferred to the unit.

Warning: When the unit is powered off, the FTP directory is automatically purged.

Using Graphs

Use the **Graph** button to view error and alarm results for the selected protocol processor. Graphs show the test history for either the current test or a previously saved test.

To use the graphs function:

1. Select a protocol processor that has been configured for Error Alarm testing.
2. From **Results**, select **Graph**. The Graph screen appears. It contains two graphs which allow you to display incoming alarms and errors.
3. Use the following buttons to control graphing parameters:

   - **Sample Rate** - Sets the timing for graph results at increments of 1 Second, 1 Minute, or 15 Minutes.
   - **Change Scale** - Compresses or expands the displayed time scale for the graphed errors and alarms at time intervals of 30 minutes, 90 minutes, 3 hours, 6 hours, 12 hours, 24 hours, or 72 hours.
   - **Change Upper** - Sets the type of errors or alarms that appear in the upper graph.

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- **Change Lower** - Sets the type of errors or alarms that appear in the lower graph.
- **Shift Left and Shift Right** - Adjusts the graph's time scale to an earlier or later time.
- **Print Report** - Prints a graph report to printer or file.
- **Save Graphs** - Saves a graph to file as a .grp file that can be replayed at a later time.

Important: This is not a text file; when replayed, it appears as the original graph plot. Choose *Print a Graph to Report* if you desire graph information that can be printed out.)

- **Replay Graphs/Stop Replay** - Replays or stops saved graphs (.grp).

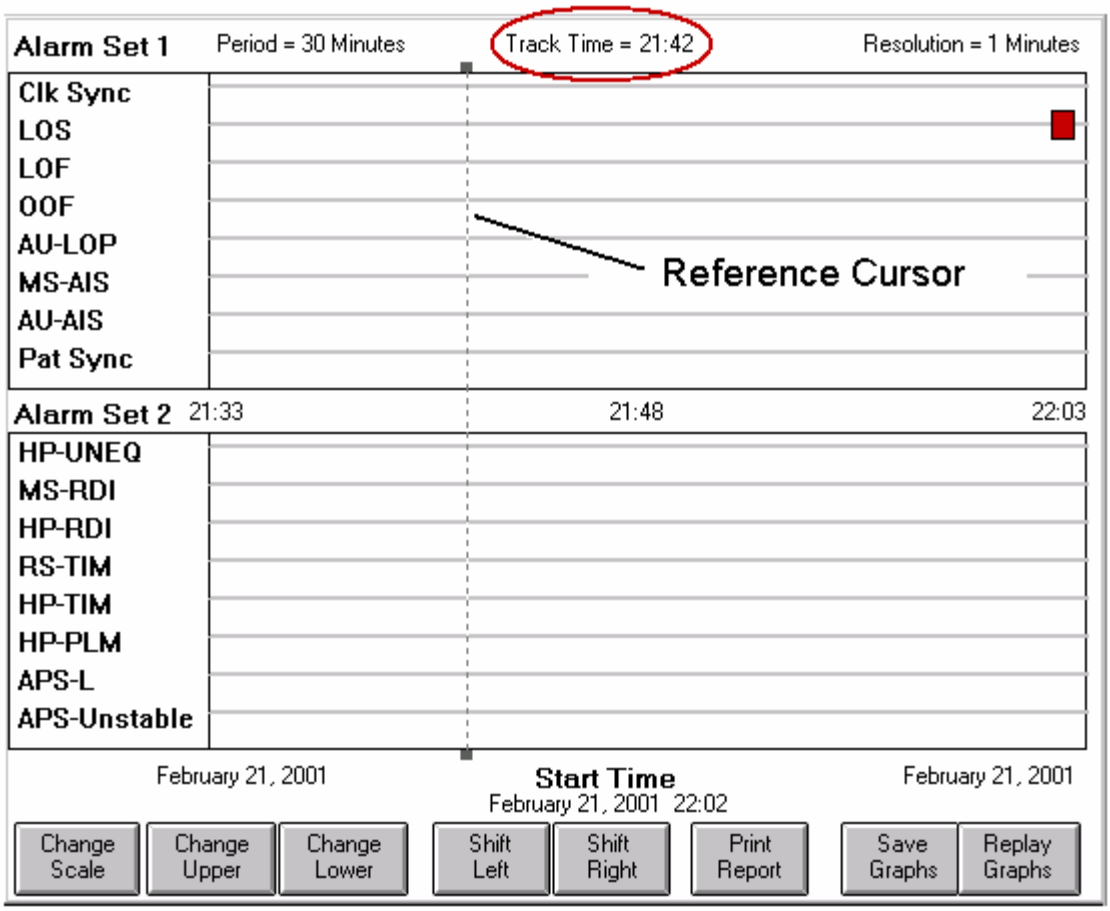
Shift Left and Shift Right

Use these buttons to adjust the graph's time scale to an earlier or later time.

- Selecting **Shift Left** moves the graph's reference cursor to the left and displays earlier events.
- Selecting **Shift Right** move the graph's reference cursor to the right and displays later events.

You may also adjust the graph's time scale by using your finger and dragging the reference cursor to the desired time scale. As you drag the reference cursor, the Track Time field will reflect the period of time you are selecting and displays the errors and alarms that occurred during that time. An example of an SDH graphing results is shown below.

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Printing a Graph Report

To print a graph report:

1. Select the protocol processor running the test for which you want to print the graph.
2. From the **Results** tab, select **Graph**.
3. Select the Graph screen's **Print Report** command button. The Report Setup menu appears.
4. Choose one of the following:
    - From **Destination Printer**, select **Graphs** to print reports to a printer.

If printing a report from the NIC unit, make sure that a printer is attached to the unit's parallel or serial port.

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- From **Destination File**, select **Graphs to File** to print reports to a file. The File Browser dialog box appears.

▶ Enter a filename and select **OK**. The file extension for a graph is .rep.

Important: Files saved when working with the Remote Control Application will not be accessible from the NIC unit touch-screen and visa-versa. The remote application saves the files to the Remote Control (GalaxyNIC) directory on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

5. Select **OK**.

For information on retrieving a graph saved to file, see Print or View Saved Files.

Destination Printer

The Destination Printer function prints a report directly to a printer.

For local printing (which means that you are using the touch screen), you must have a printer attached to the unit's parallel port or serial port.

For remote printing (which means that you are using the Remote Control software to operate a unit from a PC), the standard Print dialog box opens, allowing you to choose a printer name.

Printer Port Configuration

The unit supports both parallel and serial printers.

For Parallel Printing:

- Attach a parallel printer cable (with a 25-pin male connector on one end) to the unit's **Parallel Port** connector. This is a DB-25 female connector.

For Serial Printing:

Important: The following steps must be performed from the NIC unit touch screen. "Printer" is not an available Serial port assignment from the Remote Control Application.

1. Attach a serial printer cable (with a 9-pin female connector on one end) to the unit's **RS-232** port connector. This is a DB-9 male connector.

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2. From the **System** tab, select **I/O Settings**.
3. Select the **Serial** button.
4. Select the **Port Assignment** button and choose **Printer**.

Destination File

The Destination File functions allow you to print reports to a file. This saves the report file either locally on the unit or remotely on a PC.

Using the Destination File Functions:

1. After selecting **Print Report**, the Report Setup screen appears.
2. Select any combination of reports from the **Destination File** functions.
3. Select **OK**. The File Browser appears, which allows you to name and save the report file.
4. After naming the file and deciding which subdirectory to store the file, click **OK**. The report is saved. It can be retrieved later using File Services.

Printing or Viewing Saved Files

While running tests, you have the option to save the information to a file. The instructions below tell you where and how to print or view a saved file.

Important: Files saved when working with the Remote Control Application will not be accessible from the NIC unit touch-screen and visa-versa. The remote application saves the files to the Remote Control (GalaxyNIC) directory on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

To print or view a saved file:

1. From the **System** tab, select **File Services**.
2. Select a file from the **Disk** directory box. The desired report may display in the main Disk directory, or it may be stored in one of the folders in the directory. Folder names are enclosed in brackets **[foldername]**. To return to the main Disk directory after opening a folder, select **[. .]** or the **Disk** button.

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Important: Real-time reports generated from the NIC unit touch-screen, using the Action after Duration function, are automatically stored in the [APP] folder. Select the folder to display those reports.

The following is a list of file extension used for files generated from the Print Report, Graph, or Action after Duration functions:

- **.aps** - APS Report
- **.evt** - Event Report
- **.perf** - Performance Report
- **.real** - Real-time Test Report (Stored in [APP} folder on NIC unit.)
- **.rep** - Graph Report, BERT Analysis, RFC Thru Put Analysis
- **.set** - Settings Report
- **.stat** - Results Report
- **.statE** - Event Report
- **.grp** - Graph (This is not a text file. It can only be viewed as a graph by selecting **Results,** pointing to **Graph** and choosing the **Replay Graphs** button.)

3. Choose one of the following

To **Print** the file:

a. Select **Print**. A standard Print dialog box appears.

If you want to print a report directly from the NIC unit, make sure that a printer is attached to the unit's parallel or serial port.

b. Select the printer **Name** and choose **OK**.

To **View** the file:

a. Select **View**. The View File window appears. Use the **Display Hex** / **Display ASCII** toggle button to display the file in Hex or ASCII format.

The following file details display below the File List box.

- File name
- File size and date

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- File attributes

b. Select **Exit** to close the View File window.

Saving Graphs for Replay

Select the Save Graphs button to save the graphed results to a file for replay at a later time. The graph is saved with a .grp extension.

To view the graph select the **Replay Graphs** button and choose the desired .grp file from the Browser dialog box.

Important: Files saved when working with the Remote Control Application will not be accessible from the NIC unit touch-screen and visa-versa. The remote application saves the files to the Remote Control (GalaxyNIC) directory on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

For instructions on accessing a saved file see Print or View Saved Files.

Display History

The system maintains a log of errors and alarms detected on the incoming protocol processor's signal. This history of past and current events can be viewed using the **LEDs** or **Results** button.

The LEDs provide a visual indicator of current and past activity, and are used to quickly narrow the focus of what is received and possible problem areas of the network.

The **Results** button provides broad details of error and alarm activity.

To display history using the Results button:

1. Select a protocol processor.
2. Select the **Results** button.
3. Events can be viewed on the **Scan**, **Err**, **Alarm**, **PTR**, or **Graphs** screens.

The **Scan** button displays a list of received alarms and errors, along with the number of seconds that the event occurred. This summary identifies a general area to investigate when an error or alarm is detected.

The **Errors** button provides the following details about received errors:

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- Error count using an 11-digit format
- Average error rate over the error duration using an N.NNe-N format
- Current error rate using an N.NNe-N format
- Error free seconds using an 8-digit format
- Errored seconds using an 8-digit format
- Severely errored seconds
- Unavailable errored seconds

The **Alarm** button displays the number of seconds that an alarm was present.

The **PTR** button provides the following details about received Pointer adjustments:

- Positive Justification: Indicates the number of positive Pointer adjustments
- Negative Justification: Indicates the number of negative Pointer adjustments
- Pointer Justification Seconds: Indicates the duration of a Pointer adjustment in seconds
- NDF Count: Indicates the number of New Data Flags received
- Receive Pointer Value: Indicates the Pointer value

The **Graphs** button provides an additional view of error and alarm results for the selected protocol processor. Graphs show the test history for either the current test or a previously saved test.

Inserting Payload Patterns

The system supports a number of PRBS patterns for transmission in the signal's payload.

To insert a payload pattern:

1. Select a protocol processor mode.
2. Select **Transmit**.
3. For *SONET*, *SDH* and *E1*, select **SET 1**. For *E3* and *E4*, select **SET 2.**
4. Select **Payload Pattern**. The **Select Payload Pattern** window appears.
5. Select a pattern. The system will transmit this pattern as the payload.

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To insert a user-defined pattern:

1. Select a protocol processor mode.
2. Select **Transmit**.
3. For *SONET*, *SDH,* and *E1*, select **SET 1**. For *E3* and *E4*, select **SET 2.**
4. Select **Payload Pattern**.
5. Select **User Defined**. A touch screen keypad appears. Use the keypad to enter a pattern up to 32-bits in length.
6. Select **OK**. The system will transmit this pattern as the payload.

Inserting Alarms

The system can transmit alarms to simulate various alarm conditions. One reason for transmitting alarms is to determine if the receiving equipment can detect an alarm in the incoming signal.

To insert alarms:

1. Select a protocol processor**.**
2. Select **Transmit** and choose **Error Alarm**.
3. Select **Alarm Generated**. The Select Alarm to Insert window appears.
4. Select an alarm. The system starts transmitting alarms.

To stop alarm transmission:

1. Select the protocol processor mode.
2. Select **Transmit** and choose **Error Alarm**.
3. Select **Alarm Generated**. The Select Alarm to Insert window appears.
4. Select **Off**. Alarm transmission stops.

Inserting Multiple Errors

Various errors can be transmitted by the system. One reason for transmitting errors is to determine if the receiving equipment can detect an error in the incoming signal. Inserting multiple errors not only allows you to initiate a continuous test, but it also allows you to set up a specific test duration and action to take when the duration ends. For example, you could set the test duration to run for five minutes, the action after test to repeat the test, and print the statistics to a file or printer.

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To insert multiple errors:

1. Select a protocol processor mode.
2. Select **Transmit** and choose **Error Alarm**.
3. Select **Error to Insert**. The Select Error to Insert window appears.
4. Select an error.
5. Select **Error Insert Rate**. The Select Error Insert Rate window appears.
6. Select an error rate. The system starts transmitting errors.

 Selecting **None** will stop the error transmission.

To set up duration and after test actions:

1. Choose **Test**. The Test window appears, which provides the Duration and Action After Test options.
2. Select **Duration** and choose how long you want to run the test for.
3. Select **Action After Duration** button and choose the desired actions.

Duration

This function configures how long a timed test runs. The following options are available:

Options	Description
Continuous	Test is untimed, and unit is always collecting data.
5 Minutes	Test runs for 5 minutes.
15 Minutes	Test runs for 15 minutes.
1 Hour	Test runs for 1 hour.

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2 Hours	Test runs for 2 hours.
24 Hours	Test runs for 24 hours.
72 Hours	Test runs for 72 hours.
1 Week	Test runs for 1 week.
2 Weeks	Test runs for 2 weeks.
User Defined	Allows a specific test duration to be entered using a touch screen keypad. The minimum duration is 1 minute. The maximum duration is 99 days, 23 hours, and 59 minutes.

Action after Duration

Action after Duration defines what activities occur at the conclusion of a timed test. It allows several different options, including printing results to a printer or recording them to a file; repeating a test or just processing one test. Test results appear in a columned report format; however, there is one option available to record the statistics using a delimiter.

To determine how long a test will run, refer to Duration.

Print Options

When a print option is chosen, the report prints directly to a printer. If you are using the NIC touch-screen, a printer must be attached to the NIC's parallel or serial port. (See Printer Port Configuration.)

Record Options

When a record option is chosen, the results are saved to a file with one of the following extensions:

- **.evt** - Event Report. A detailed summary of alarms, errors, and pointer activity.
- **.statE** - Event Report. Used when the *Record Statistics/Events and Repeat Test* option is selected.
- **.stat** - Results Report. A statistics report of the Scan, Errors, Alarms, and PTR functions.

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- **.real** - Real-time Test Report. Real-time reports generated only from the NIC touch screen.

The file naming convention is: **xxhhmmss.<extension>** (where **xx** is the protocol processor, **hh** is hours, **mm** is minutes, **ss** is seconds). For example, a file named "OC163035.evt" represents an OC-192/48/12 test event that was recorded at 16:30:35.

To learn how to print or view a saved file, see the topic Print or View Saved Files.

The table below describes the Action after Duration options.

Repeat Test and Realtime Test Options	**Description**
None	No action occurs at the end of the test duration.
Print Current Statistics	Test statistics are printed to a printer at the end of a timed test. The test does not repeat.
Record Current Statistics	Test statistics are printed to a file (.stat) at the end of a timed test. The test does not repeat.
Record Current Statistics using a delimiter	Test statistics are printed to a file (.stat) at the end of a timed test. The results appear in a quote/comma-report format, meaning that error and/or alarm values are enclosed in quotes (") and separated by commas (,). The test does not repeat.
Print Statistics and Repeat Test This option appears when **Repeat Actions** is selected.	Test statistics are printed to a printer at the end of the timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Record Statistics and Repeat Test This option appears when **Repeat**	Test statistics are printed to a file (.stat) at the end of a timed test and the test restarts. This cycle

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Actions is selected.	continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Print Events and Repeat Test This option appears when **Repeat Actions** is selected.	Test events are printed to a printer at the end of the timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Record Events and Repeat Test This option appears when **Repeat Actions** is selected.	Test events are printed to a file (.evt) at the end of a timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Print Statistics/Events and Repeat Test This option appears when **Repeat Actions** is selected.	Both test statistics and events are automatically printed to a printer at the end of the timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Record Statistics/Events and Repeat Test This option appears when **Repeat Actions** is selected.	Both test statistics (.stat) and events (.statE) are printed to a file at the end of a timed test and the test repeats. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value. Both **.statE** and **.stat** files are recorded.
Print Events and Repeat Test This option only appears on the	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit.

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NIC unit's touch screen when **Realtime Actions** is selected.	When the test duration expires, the test restarts.
Record Events and Repeat Test This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a file (.evt). When the test duration expires, the test restarts.
Print and Record Events and Repeat Test This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit and prints to a file (.evt). When the test duration expires, the test restarts.
Print Events This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit. The test does not repeat.
Record Events This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a file (.evt). The test does not repeat.
Print and Record Events This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit and prints to a file (.evt). The test does not repeat.

Inserting Single Errors

Various errors can be transmitted by the system. One reason for transmitting errors is to determine if the receiving equipment can detect an error in the incoming signal. After defining the error parameters, the Error Insert button injects single errors into the transmitted protocol processor's signal.

To insert single errors:

1. Select a protocol processor and choose **Transmit**.

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2. Select **Error Alarm**.
3. Select **Error to Insert**. The Select Error to Insert window appears.
4. Select an error.

Important: DO NOT set Error Insert Rate when inserting a single error.

Important: Select **Restart** from the Common Function buttons to clear any previously collected data.

5. Select **Error Insert** from the Common Function buttons to inject the error.
6. To view the event statistics, choose the protocol's **Results** button.
7. To print or record the statistics, see the topic Print Report.

Printing a Report

The Print Report Common Function Button allows you to print reports to a printer or file.

1. Select **Print Report**. The Report Setup menu appears.
2. Choose one of the following:
   - From **Destination Printer**, select one or multiple reports to print directly to a printer. If printing a report from the NIC unit, make sure that a printer is attached to the unit's parallel or serial port. The following reports are available:

     Settings - (.set extension) Reports current values for all Transmit and Receive Set functions.

     Statistics - (.stat extension) Reports results for the Scan, Errors, Alarms, and PTR.

     Events - (.evt extension) Reports a detailed summary of events, such as alarms, errors, and pointer activity. This report includes the event, the number of events logged, the start and stop time of the event, and the duration of the event.

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- **APS** - (.aps extension) Reports the results of the K1 and K2 byte sequences received by the unit.

- **Performance** - (.perf extension) Reports Performance Monitor results.

- From **Destination File**, choose one or multiple reports to print to a file. The File Browser dialog box appears.

The **Comma Delimiter** option can be applied to the Settings To File and Statistics To File reports.

- Enter a filename and select **OK**.

Important: Files saved when working with the Remote Control Application will not be accessible from the NIC unit touch-screen and visa-versa. The remote application saves the files to the Remote Control (GalaxyNIC) directory on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

3. In the **User Comment** box, select the **Input** button to enter notes that will display in the report. A keyboard opens.
4. Enter comment text using the keyboard. When working from NIC test set use the touch screen keyboard. Select **Enter**.

To clear comment text, select the **Clear** button.

5. Select **OK**.

For information on retrieving saved files, see Print or View Saved Files.

Files that are created when using the Remote Control Application are saved on your PC in the Remote Control directory. This directory can be overwritten when connecting to other remote units that have the same compatibility level, but are different models (for example, a NIC Plus, a NIC 10G, and so on).

If you want to keep these files, copy and save the following to a backup directory on your PC that is not in the Remote Control Application directory's path:

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- Any file with the .set, .stat, .evt, .aps, .perf, or .rep extension.
- The client.prop file. Changes to this file are only needed if the remote unit uses a PCMCIA modem for its dial-up connection.

Displaying Large LEDs

1. Select a protocol processor tab.
2. Select the **Results** button.
3. Select **Large LEDs**.

Entering a License Key

The License Key function allows you to enable functionality that you may not have initially purchased. If you wish to obtain more functionality for your NIC unit, contact your Digital Lightwave sales representative for a PO number. Then contact Digital Lightwave Customer Service for a License Key that will activate the requested features.

To enter a new license key:

1. From the **System** tab, select **Misc**.
2. Select **License Key**. A keypad appears.
3. Enter the new license key into the text box.
4. Select **Enter** when done.
5. Restart the unit for the new functions to take effect.

Locking and Unlocking a Test Set

To prevent users from interfering with each other, an individual user can "lock" and take control of a test set. This is done using the Lock icon that appears on the GUI. Permission levels determine the user's ability to lock and unlock a test set. When you lock the test set, you can configure protocol processors, start tests, and perform general product functions without the worry of contending for resources with another user.

When a test set is locked by someone else, the  icon is displayed.

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To unlock a test set locked by someone else:

1. Select the Lock icon. The Lock/Unlock dialog box appears.
2. Select **Force Unlock**. The command buttons change to "Lock and Exit" and "Lock."

You must have **Admin** privileges to be able to force the unlock.

3. Selecting one of the following causes the command buttons to change to "Unlock and Exit" and "Unlock", and the information boxes become available.
    - **Lock and Exit** - Locks the unit and automatically closes the dialog box. To enter notes after the dialog box closes, select the locked icon to reopen the dialog box.
    - **Lock** - Allows you to enter note information in the Circuit Info: and Contact Info: boxes before closing the dialog box. The notes carry over to all protocol processors in the test set. When a different test set is locked the user can enter notes pertinent to it.
4. To enter note information, select **Circuit Info:** and/or **Contact Info:**. The Enter User String keyboard opens.
5. Type notes and select **Enter**. The notes appear in their associated information box.
6. Select **Exit** to close the Lock/Unlock dialog box.

When you have the test set locked, the  icon is displayed.

To unlock a test set that you have locked:

1. Select the icon. The Lock/Unlock dialog box appears.
2. Selecting one of the following causes the command buttons to change to "Lock and Exit" and "Lock":
    - **Unlock and Exit** - Unlocks the unit and automatically closes the dialog box.
    - **Unlock** - Unlocks the unit without closing the dialog box. Select **Exit** to close the Lock/Unlock dialog box.

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When the test set is unlocked, the  icon is displayed.

To lock a test set:

1. Select the icon. The Lock/Unlock dialog box appears.
2. Selecting one of the following causes the command buttons to change to "Unlock and Exit" and "Unlock", and the information boxes become available.
    - **Lock and Exit** - Locks the unit and automatically closes the dialog box.
    - **Lock** - Allows you to enter note information in the **Circuit Info:** and **Contact Info:** boxes before closing the dialog box. The notes carry over to all protocol processors in the test set. When a different test set is locked the user can enter notes pertinent to it. Select **Exit** to close the dialog box.

Locking/Unlocking Screen Access

The test set screen can be disabled to prevent user access by others. This function requires a user ID and password to lock and unlock the screen. When unlocking the screen, the unit will only accept the last user ID and password entered, or the unit's original user ID and password.

To lock the screen:

1. Select **Off/Lock** from the common function buttons. The Unlock Login dialog box appears.
2. Enter your **User ID**.

   On a portable unit, press  to open a keyboard to enter the user ID.
3. Enter your **Password**.

   On a portable unit, press  to open a keyboard to enter the password.
4. Select **OK**. The Locked Unit dialog box appears. This dialog box remains on the screen until the screen is unlocked.

 If the unit is locked because critical testing is in progress, select the **Unlock** button and enter the **User ID** and **Password** again. Select **OK**.

The unit will only accept the last User ID and Password entered or the unit's original User ID and Password. An error message appears if an invalid ID or Password in entered.

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To unlock the screen:

1. Select the **Unlock** button from the **Locked Unit** dialog box. The Unlock Login dialog box appears.
2. Enter your **User ID.**

   On a portable unit, press  to open a keyboard to enter the user ID.
3. Enter your **Password**.

   On a portable unit, press  to open a keyboard to enter the password.

The unit will only accept the last User ID and Password entered or the unit's original User ID and Password. An error message appears if an invalid ID or Password in entered.

4. Select **OK**.

Establishing User Login Parameters

This function allows an administrator to establish the user login parameters. The login parameters allow for the following:

- A **default login**, which means when the test set is booted up a default user name already appears in the User Name of the login dialog box. However, the user must enter a password.
- A **required login**, which means when the test set is booted up the user is required to enter a user name and password.

Important: The login function is only applicable for the NIC unit. When connecting to a NIC via the Remote NIC application, the NIC IP Address, User ID, and Password are required.

Measuring Service Disruption Activity

The NIC unit can measure service disruption switching intervals in your network and can be configured to monitor for a specific event that will cause a service disruption switch. When this event occurs, the duration in both seconds and frames is logged. These statistics can be used to determine how long it takes for your network equipment to react to an service disruption event and switch to a backup path.

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The SDH/SONET/OTN service disruption measurement has an accuracy of 1 µs (microsecond). GigE service disruption tests show an accuracy of 0.1 ms (millisecond).

To measure Service Disruption activity:

1. Select a protocol processor.
2. Select the **Test** button.
3. Select the **Service Disruptn** button. The Service Disruption measurement screen appears.
4. From **Protection Switch Criteria**, select the alarms, errors, and patterns to use for triggering a service disruption.


The Protection Switch Criteria for PDH protocols is automatically set.

5. The measurement parameters that appear on the Service Disruption screen are dependant upon the protocol. A description of the possible parameters is provided below. Selecting the parameter button displays a key pad, from which you will enter the desired setting.

    - **Consecutive Good Time Required**: This function allows you to enter the time-duration (in milliseconds) of consecutive error-free frames to elapse before Protection Switch measurements stop accumulating. The range is 0.106 to 27.133 milliseconds and is entered using a keypad. The Good Time and Good Frames settings are coupled.
    - **Consecutive Good Frames Required**: This function allows you to enter the number of consecutive error-free frames to occur before Protection Switch measurements stop accumulating. The range is 1 to 255 frames and is entered using a keypad.
    - **Consecutive Bad Time Required**: This function allows you to enter the time-duration (in milliseconds) of consecutive errored frames to elapse before Protection Switch measurements begin to accumulate. The range is 0.106 to 27.133 milliseconds and is entered using a keypad. The Bad Time and Bad Frames settings are coupled.
    - **Consecutive Bad Frames Required**: This function allows you to enter the number of consecutive errored frames to occur before Protection Switch measurements begin to accumulate. The range is 1 to 255 frames and is entered using a keypad.

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6. From **Action**, select **State.** The Select APS Action dialog box appears.
7. Select **Single APS** or **Continuous APS** to begin measuring. The unit will begin monitoring the incoming signal for the event. If it occurs, the protection switch state and time will appear in both seconds and frames present. The results will not include the number of good frames, but the number of errored frames that occur before the first good frame. This is based on the previously selected criteria for the consecutive time and frame requirements.

A history of event is recorded in the History Recent Milli Seconds and History Recent Frames fields. The complete summary of event can be viewed on the Service Disruption Summary screen.

To stop monitoring Service Disruption measurement activity:

1. From **Action**, select **State.** The Select APS Action dialog box appears.
2. Select **Stop APS**.

To view the Service Disruption Summary:

1. Select the **System** tab.
2. Select the **Service Disruption** button. The Service Disruption Summary screen appears.

Service Disruption

This functionality allows the NIC unit to measure service disruption intervals in your network.
The unit can be configured to monitor for a specific event that will cause a service disruption. When the service disruption event occurs, the duration in both seconds and frames is logged. These statistics can be used to determine how long it takes for your network equipment to react to a service disruption event and switch to a backup path. This function also allows you to set a specific event as a trigger for service disruption activity.

The SDH/SONET/OTN service disruption measurement has an accuracy of 1 µs (microsecond). GigE service disruption tests show an accuracy of 0.1 ms (millisecond).

Monitoring the Incoming J0, J1, or J2 Trace


Select Monitoring the TC Trace for information about the TC Trace.

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1. Select an SDH or SONET protocol processor mode.
2. Select **Receive**.
3. Select **SOH** to view the incoming J0 Trace, which appears at the bottom of the screen.
4. Select **POH** to view the incoming J1 Trace or J2 Trace, which appears at the bottom of the screen.

   (The J2 Trace only applies to the STM-4 and OC-12 protocol processors.)

Monitoring the TC Trace

Before monitoring TC trace:

- Make sure the unit is configured for TCM receive mode.

To view the TC trace:

1. Select an SDH or SONET protocol processor.
2. Select **Receive**.
3. Select **POH** to view the incoming TC trace, which appears at the bottom of the screen.

 A TC-TIM alarm occurs if the incoming TC trace does not match the expected TC Trace. The alarm's duration appears on the Results' Alarm screen.

Configuring TCM for Receive Mode

When transmitting or monitoring errors and alarms the unit must be configured for TCM operation.

To configure the unit for TCM monitor operation:

1. Select an SDH or SONET protocol processor.
2. Select **Receive** and choose **SET 2**.
3. Select the **TC Error/Alarm Processing** function and select **Enable**.
4. The unit is configured to monitor for incoming TCM errors, alarms, and traces.

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Select **Monitoring the TC Trace** for more information about incoming trace patterns.

To monitor for TC-TIM alarms:

- Select **Receive**.
- Select **SET 2**.
- Select the **TIM Alarm Reporting** function and select **Enable**.

Related Topics:

Monitoring TCM Results

Monitoring the TC Trace

Monitoring Incoming Errors, Alarms, or Pointer Activity

1. Select a protocol processor mode.
2. Select **Results**.
3. Select the following Results tabs to monitor events:
    - The **Scan** button functions appear on the touch screen. A summary count of current error, alarm, and event activity is reported. If no activity is reported, the message "No Errors or Alarms" appears.
    - Select **Err** to view more details about incoming errors. This function reports the following:
        - Error count using an 11-digit format
        - Average error rate over the total error duration using an N.NNe-N format
        - Current error rate using an N.NNe-N format
        - Errored seconds using an 8-digit format
        - The percentage of seconds in which the error was present
        - The total number of error-free seconds using an 8-digit format

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- The percentage of seconds that the error was not present

- Select **Alarm** to view more details about incoming alarms. This function reports the number of seconds that an alarm is present.
- Select **PTR** to view more details about incoming Pointer events (this function is only applicable to SONET/SDH protocol processors). This function reports the following:
  - The number of positive Pointer adjustments
  - The number of negative Pointer adjustments
  - The duration of a Pointer adjustment (in seconds)
  - The number of New Data Flags (NDF)
  - The number of invalid NDFs
- Select **Event** to view a summary of events (alarms, errors, and Pointer activity) recorded by the unit. For more information, refer to the Recording in the Event Log section.
- Select **APS** to display the incoming bit values of the K1 and K2 bytes. For more information, refer to the Monitoring SONET/SDH APS Commands section.
- Select **Large LEDs** displays LED error and alarm indicators in a large, easy-to-read format, which covers the entire touch screen area. This is useful for viewing errors or alarms from a long distance, such as across the room from a test bay.
- Select **Graph** displays incoming errors and alarms in the form of a line or bar graph.

Recording in the Event Log

The Event Log is a table that displays events recorded by the unit. A scroll bar is available, allowing you to scroll up and down to view an extended history.

To use the Event Log:

1. Select a protocol processor tab.
2. Select the **Results** button.
3. Select **Event**. As events occur (such as alarms, errors, or Pointer activity) they appear and continuously scroll in the table.

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Events display in a ascending order from the most recent event to the oldest event. The Descending button indicates that events appear in descending order. (This button switches between descending event order appearance and ascending event order appearance. The current label of the button indicates the event order.)

4. Select **Pause**, to stop the scrolling action and then use the scroll bar to view events. Select **Resume** to restart the event log.

5. To display events in an ascending order, select **Descending**. The button changes to Ascending and the events appear from the oldest event to the most recent event.

6. Select **Resume**, to continue Event Log reporting.

Monitoring SONET/SDH APS Commands

The following only applies to SONET and SDH protocol processors.

When testing APS functionality, the system can log and display the bit values of the incoming K1 and K2 bytes.

The following information appears in the APS report for the last 16 K1 and K2 byte sequences received by the unit:

- The HEX value of the K1 byte.
- The HEX value of the K2 byte.
- The number of frames received that contain the K1 and K2 bytes.
- The elapsed time of the frames that contain the K1 and K2 bytes.

To monitor APS commands:

1. Select a SONET or SDH protocol processor.
2. Select the **Results** button.
3. Select the **APS** button. The incoming K1 and K2 byte values appear. A total of 16 byte sequences can appear.

Per GR-253-CORE, only the upper 12 bits of the K1/K2 bytes (K1 bits 1-8 and the K2 bits 1-4) are used for APS operation. K2 bit 5 sets the APS mode type (1+1, 1:n) and cannot be changed during operation. K2 bits 6-8 are for

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alarms. Any changes to the lower four bits of the K2 byte do not affect APS operation. The Results APS table only starts and displays a new entry item if the upper 12 K1/K2 bits stabilize on a new value for a minimum of three consecutive frames.

Monitoring Signal Status

1. Select **Receive**.
2. Select **SIG**. The Receive Signal Status window appears.
    - In *PDH* mode, Peak Positive and Negative Pulse voltage, power in dBm and dBdsx, line frequency, and line frequency offset information appears.
    - In *SDH* and *SONET* mode, frequency, optical power, and line frequency offset received information appears.

Monitoring SCPI or TL1 Commands

The Monitor screen is a command window that allows you to view SCPI or TL1 commands issued to the unit, command responses (for valid commands entered), and the error code (if an invalid command is entered).

To use the Monitor feature, the communications port must be configured. The Ethernet and GPIB ports are always enabled for SCPI commands and, when licensed, they are automatically enabled for TL1. However, the port assignment for the Serial port must be configured.

To open the monitor:

1. From the **System** tab, select **Monitor**.
2. Choose **Select Command Processor** and select **SCPI** or **TL1**.

To issue SCPI commands to the unit:

- Refer to the *SCPI Command Reference Guide* for procedures. The guide can be found in the Technical Documentation Library at http://www.lightwave.com.

To issue TL1 commands to the unit

- Refer to the *TL1 Command Reference Guide* for procedures. The guide can be found in the Technical Documentation Library at http://www.lightwave.com.

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Monitoring SONET/SDH APS Commands

The following only applies to SONET and SDH protocol processors.

When testing APS functionality, the system can log and display the bit values of the incoming K1 and K2 bytes.

The following information appears in the APS report for the last 16 K1 and K2 byte sequences received by the unit:

- The HEX value of the K1 byte.
- The HEX value of the K2 byte.
- The number of frames received that contain the K1 and K2 bytes.
- The elapsed time of the frames that contain the K1 and K2 bytes.

To monitor APS commands:

1. Select a SONET or SDH protocol processor.
2. Select the **Results** button.
3. Select the **APS** button. The incoming K1 and K2 byte values appear. A total of 16 byte sequences can appear.

Per GR-253-CORE, only the upper 12 bits of the K1/K2 bytes (K1 bits 1-8 and the K2 bits 1-4) are used for APS operation. K2 bit 5 sets the APS mode type (1+1, 1:n) and cannot be changed during operation. K2 bits 6-8 are for alarms. Any changes to the lower four bits of the K2 byte do not affect APS operation. The Results APS table only starts and displays a new entry item if the upper 12 K1/K2 bits stabilize on a new value for a minimum of three consecutive frames.

Configuring the Ethernet Port

The unit can be controlled using SCPI or TL1 (when licensed) commands through the unit's Ethernet port. The unit supports dynamic IP addressing, using Dynamic Host Connection Protocol (DHCP) and static IP addressing.

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This must be performed from the touch screen. When Ethernet port parameters are changed, the test set must be restarted for the changes to take affect.

To configure the Ethernet port for a static IP address:

1. From the **System** tab, select **I/O Settings**.
2. Select **Ethernet**.
3. Select **Specify an IP address** from the **Ethernet Configuration** functions.
4. Enter the unit's **IP Address**, **Subnet Address**, and **Router Address**.

IP addresses **192.168.138.000 through 192.168.138.255** are reserved and should not be used. A system conflict can occur if these IP addresses are entered.

If you must use an IP address in the range of **192.168.x.x**, then you **must** set the Subnet Address to **255.255.255.0**.

5. Restart the unit for changes to take affect.

To configure the Ethernet port for a dynamic IP address using DHCP:

1. From the **System** tab, select **I/O Settings**.
2. Select **Ethernet**.
3. From **Ethernet Configuration**, select **Obtain an IP address from a DHCP server**. The unit will use the network's DHCP server to dynamically assign it an IP address.
4. Reboot the unit for changes to take affect.

To view the Ethernet port assignment:

The Ethernet port assignment is automatically enabled for SCPI. When licensed for TL1, it also appears on the Port Assignment line.

1. From the **System** tab, select **I/O Settings**.
2. Select **Ethernet**.
3. The **Port Assignment** line displays what has been assigned, by way of default or license. SCPI is automatically listed. If the unit is licensed for TL1, then TL1 is also displayed on the assignment line.

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Ethernet Configuration

If Ethernet port parameters are changed, the test set must be rebooted for the changes to take affect.

The following configures the Ethernet port's parameters:

- **Obtain an IP address from a DHCP server:** The unit will uses the network's Dynamic Host Connection Protocol (DHCP) server to dynamically assign it an IP address. ***When selected, the IP Address, Subnet Address, Router, Host Name, and Domain Name functions are disabled, but will be populated by the DHCP server.***
- **Specify an IP address:** Allows a static IP address to be entered using the IP Address, Subnet Address, Router, Host Name, and Domain Name functions.
- **IP Address:** Enter the unit's IP address using dotted decimal notation. For example, **nnn.nnn.nnn.nnn**, where **nnn** is a value from 0 to 255.

IP addresses **192.168.138.000 through 192.168.138.255** are reserved and should not be used. A serious system conflict can occur if these IP addresses are entered.

If you must use an IP address in the range of **192.168.x.y** (where x is not equal to 138), then you must set the Subnet Address to **255.255.255.0**.

- **Subnet Address:** Enter the subnet address using dotted decimal notation.
- **Router:** Enter the Router address using dotted decimal notation.
- **Host Name:** Enter the unit's host name (for example, NICPLUS). This is an optional parameter.
- **Domain Name:** Enter the unit's domain name (for example, lightwave.com). This is an optional parameter.
- **Port Assignment:** Displays what has been assigned, by way of default or license. SCPI is automatically listed. If the unit is licensed for TL1, then TL1 is also displayed on the assignment line.

The **Host Name** and **Domain Name** parameters defined for Ethernet Configuration screen also apply to the Wireless Configuration screen. Any changes made to these parameters on one screen will also be made on the other screen.

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Configuring GPIB Port

The unit can be controlled using SCPI commands through the unit's GPIB port. The Port Assignment line on the GPIB screen automatically displays SCPI as its assignment.

To configure the GPIB port address:

1. From the **System** tab, select **I/O Settings**.
2. Select **GPIB**.
3. Select **GPIB Port** and enter the primary address for the GPIB interface. Address values are from 0 to 30. The primary address must match the GPIB host or communications cannot be established.
4. Select **OK**.

Configuring and Assigning the Serial Port

The unit's serial port is a physical interface that can be used to:

- Transfer SCPI or TL1 commands to and from the unit.
- Connect a serial printer to the unit.

To configure and assign the serial port:

1. Select the **System** tab.
2. Select **I/O Settings** and choose **Serial**.
3. If required, select the **Baud Rate**, **Parity**, **Data Bits**, and **Stop Bits** serial configuration parameters and make the appropriate changes.
4. Select **Port Assignment**. The Select Serial Port Assignment dialog box appears.

The Printer option only displays when configuring from the NIC touch screen. The **TL1** option only displays if the unit is licensed for TL1.

5. Select the desired port assignment.

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Serial Configuration

Before changing serial port parameters, you must first disable the serial port by setting its assignment to **None**. After changing parameters, you can reset the serial port to its previous assignment. Refer to Port Assignment for a list of serial port interfaces.

The following configures the Serial port's parameters:

- **Baud Rate:** Set to 19200, 14400, 9600, 4800, 2400, or 1200.
- **Parity:** Set to None, Odd, or Even.
- **Data Bits:** Set to 7 or 8.
- **Stop Bits:** Set to 1 or 2.
- **Port Assignment:** Sets the serial port to one of the following interfaces – None, SCPI, TL1, or Printer.

Monitoring the TC Trace

Before monitoring TC trace:

- Make sure the unit is configured for TCM receive mode.

To view the TC trace:

1. Select an SDH or SONET protocol processor.
2. Select **Receive**.
3. Select **POH** to view the incoming TC trace, which appears at the bottom of the screen.

A TC-TIM alarm occurs if the incoming TC trace does not match the expected TC Trace. The alarm's duration appears on the Results' Alarm screen.

Configuring TCM for Receive Mode

When transmitting or monitoring errors and alarms the unit must be configured for TCM operation.

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To configure the unit for TCM monitor operation:

1. Select an SDH or SONET protocol processor.
2. Select **Receive** and choose **SET 2**.
3. Select the **TC Error/Alarm Processing** function and select **Enable**.
4. The unit is configured to monitor for incoming TCM errors, alarms, and traces.
   Select **Monitoring the TC Trace** for more information about incoming trace patterns.

To monitor for TC-TIM alarms:

- Select **Receive**.
- Select **SET 2**.
- Select the **TIM Alarm Reporting** function and select **Enable**.

Related Topics:

Monitoring TCM Results

Monitoring the TC Trace

Setting Oscillator Value

1. Select **System** and choose **Misc**.
2. Select **Oscillator Value**. The Enter User Data keypad appears.
3. Enter a value between 1 and 255 and select **OK**.

Pausing/Resuming a Test

To pause a test:

1. Select the protocol processor running the test that you want to pause.
2. Select **Test** and choose **Set 1**.
3. Select **Pause Test**. When Pause is selected, the system stops collecting data, but the Elapsed Time counter continues. Additionally, when Pause is selected, a red **Test Paused** LED appears in the LEDs/Quick Status area.

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To resume a test:

- Select **Resume Test**.

  The Test Paused LED turns white with red text, indicating that the test was paused earlier. A restart or new test will clear the LED's history.


The events occurring while in pause mode will be recorded in the Event Log.

Making Pointer Adjustments

The beginning of a SONET or SDH payload is identified by a **Pointer**. It consists of the H1 and H2 Pointer bytes. You can stress a network by manually adjusting the Pointer using the Increment and Decrement Pointer buttons. By performing this task, you can stress your SONET or SDH equipment to verify if it can tolerate Pointer adjustments, and how your equipment will react and report these adjustments.

There are several Pointer parameters that must be configured before making a positive or negative Pointer adjustment.

To make Pointer adjustments:

1. Select a protocol processor mode.
2. Select **Transmit** and choose **PTR**.
3. Configure the Pointer Adjustment parameters. For example,
   - Select **NDF Flag** to allow a New Data Flag to be set when a new Pointer value has been transmitted.
   - Select **Pointer Value** to change the Pointer value from 0 to 782.
   - Select **Frequency Offset** to increase or decrease the speed of the Pointer adjustments.
   - Select **Pointer Action** to select the type of Pointer activity that occurs when the Increment Pointer or Decrement Pointer buttons are selected.
   - Use **Burst Count** to set the number of repetitions for Pointer adjustments.
4. Select **INC Pointer** to make a positive pointer adjustment, or select **DEC Pointer** to make a negative pointer adjustment.

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These buttons generate and control Pointer movements within the transmitted signal. You can stress test a network by changing pointers or introducing an offset that continuously adjusts the STS or AU Pointer.

Presets Function

The Presets function provides a quick and convenient way to set up the system for operation. Using Presets involves selecting a starting protocol and its interface, and then making an internal connection to another protocol. See Adding/Dropping SDH/PDH Signals for more information.

To set up a connection using the Presets function:

1. Select **Presets** from the Common Function Buttons row.
2. Select **Interface**. All line interfaces available for your unit appear.
3. Select an interface as a starting point.
4. Select **Configuration**. The protocols available for the selected interface appear.
5. Select a protocol to connect to the interface. If required, select the **Configuration** button again to create additional connections.


If you make a mistake while creating connections, simply select **Interface** and reenter the interface value. This action erases any previously entered interface or configuration values.

6. Select **Apply**. The unit takes a few moments to apply the new protocol connections. Use the Switch Matrix to view the new connections.

To disengage the configured protocol connections:

- Select **All to Tx/Rx**. This globally disconnects any internal connections between multiple protocol processors. A protocol processor will now expect to receive a signal using its line interface.

Adding/Dropping SDH and PDH Signals

The NIC allows you to set up single, or multiple test sets, and provides multiplexing and demultiplexing functionality for signal levels. Using the NIC's Preset mode, you can add or drop a signal from optical/electrical SDH and SONET, or electrical PDH into another protocol processor's signal levels in order to monitor for error and alarm conditions. For additional information on test units see Understanding Test Units.

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Important: When the NIC/NAA has multiple test units you must first select the desired **test unit** protocol tab before selecting the Presets button. The configuration options available through the Preset Selection screen are dependent on the test set that is selected.

1. Select the protocol processor.
2. Select **Presets**. The Apply Presets dialog box appears. Several examples are provided below.

- **To add an STM-4 signal into an STM-16 signal:**

a. Select the **Interface** button and choose **STM-16**.

b. Select the **Configuration** button and choose **STM-4 A/D**.

Multiple signals can be added to the interface by selecting the Configuration button again and choosing another signal before selecting Apply.

c. Select **Apply**.

- **To add an E1 into an E3 signal:**

c. Select the **Interface** button and choose **E3**.

d. Select the **Configuration** button and choose **E1 #1 A/D** or **E1 #2 A/D**.

Multiple signals can be added to the interface by selecting the Configuration button again and choosing another signal before selecting Apply.

c. Select **Apply**.

- **To add a E1 #2 A/D LI into an E3 signal:**

c. Select the **Interface** button and choose **E3**.

d. Select the **Configuration** button and choose **E1 #2 A/D LI.**

Multiple signals can be added to the interface by selecting the Configuration button again and choosing another signal before selecting Apply.

c. Select **Apply**.

3. The unit is configured for Add/Drop mode. Go to the next section to specify different frames and patterns for the added signal.

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If you make a mistake while creating connections, simply select **Interface** and reenter the interface value. This action erases any previously entered interface or configuration values.

Specify Frames and Patterns for the Added Signal

If you have added an STM-4 signal into an STM-16 signal:

1. Select **STM-4**.
2. Select **Transmit**.
3. Select **SET 2**. The Mapping options appears.
4. Select the options on the screen to specify the **Foreground** and **Background** AU and TUG patterns and HP and LP signal labels to be added to the signal.

If you have added an E3 signal to an E4 signal:

1. Select **E3**.
2. Select **Transmit**.
3. Select **SET 2**. The E3 Transmit Mapping screen appears.
4. Select **E1#1 Channel Inserted** and select from channels 1 through 16 for E1 #1.
5. Select **E1#2 Channel Inserted** and select from channels 1 through 16 for E1 #2.
6. Select **E1 Background Frame** and select the background frame (Unframed, PCM30, PCM30CRC, PCM31, PCM31CRC) for the specified channel.
7. Select **E1 Background Pattern** and select up to a 32-bit background pattern for the specified channel.

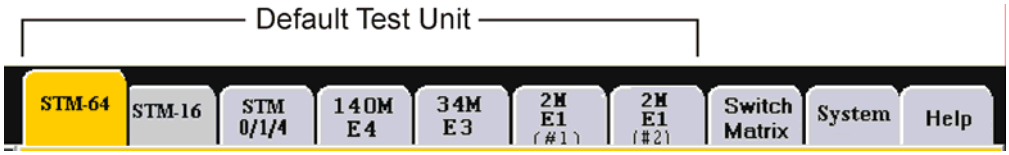
Understanding Test Units

A test unit is a series of adjacent circuit packs that are installed in a NIC/NAA (test set). The test unit is based on a circuit pack's internal addressing and starts from the highest to the lowest speed.

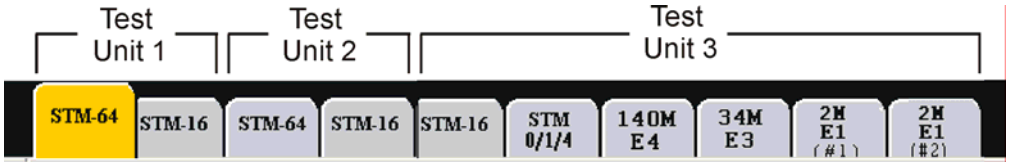
For example, a test set can contain multiple circuit packs of the same type (two 10Gbps circuit packs). When this type of configuration occurs, the first instance

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of the higher speed circuit pack is considered a test unit. Any lower speed circuit packs immediately to the right of this card are included in the test unit.



However, when the second instance of a higher speed circuit pack is encountered, it is considered the beginning of the second test unit. The image displayed to the right shows a NIC that has eight protocol tabs, representing four test units.



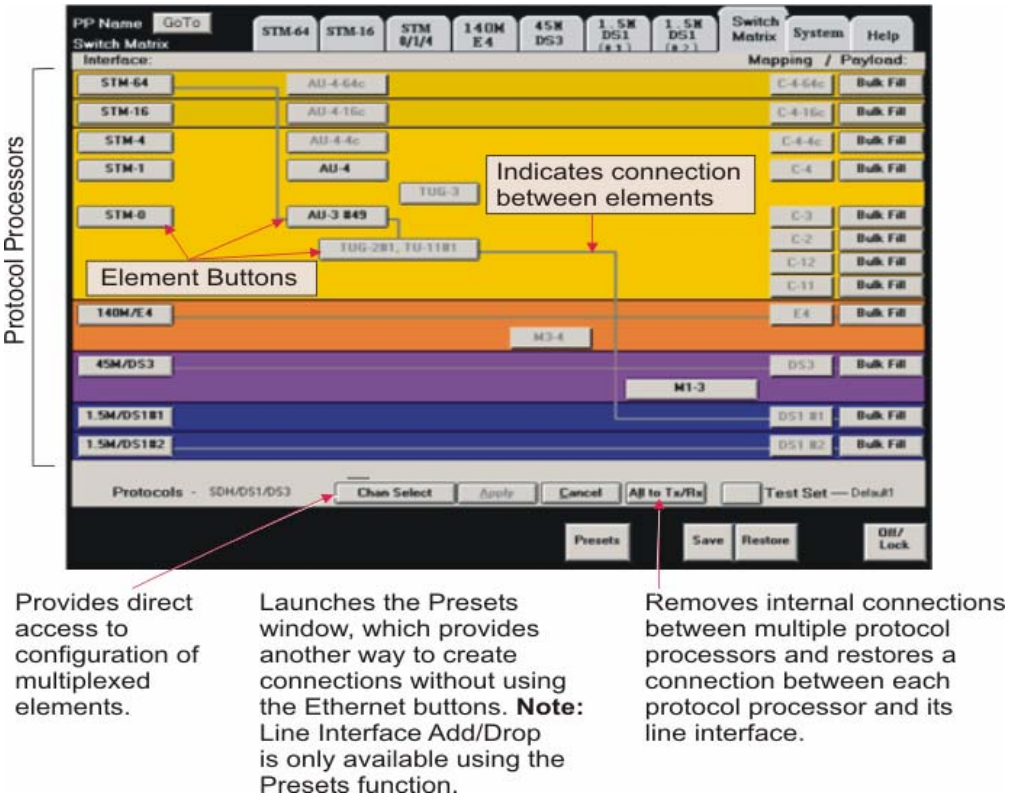
Preset configuration options that appear will be those available for the specified test unit. When the NIC/NAA has multiple test units you must first select the desired test unit protocol tab before selecting the Presets button.

Switch Matrix

The Switch Matrix allows you to display and define a protocol processor's multiplexing structure from a single screen. This fast and convenient configuration method lets you select a protocol processor interface, route the signal through available mappings, drop the signal to other protocol processors, and select a payload to use within the signal. (See Switch Matrix Guidelines.)

The following is an example of the Switch Matrix in SDH mode.

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Switch Matrix Guidelines

When using the Switch Matrix:

- ALWAYS start from left to right by first selecting an **Interface** button.
- NEXT, after selecting an interface, its available Container, Mapping, and Payload buttons are enabled to help you create a valid signal configuration.
- LAST, after making the connections between elements, select the **Apply** button for the new configuration and connections to take affect.

Printer Port Configuration

The unit supports both parallel and serial printers.

For Parallel Printing:

- Attach a parallel printer cable (with a 25-pin male connector on one end) to the unit's **Parallel Port** connector. This is a DB-25 female connector.

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For Serial Printing:

Important: The following steps must be performed from the NIC unit touch screen. "Printer" is not an available Serial port assignment from the Remote Control Application.

1. Attach a serial printer cable (with a 9-pin female connector on one end) to the unit's **RS-232** port connector. This is a DB-9 male connector.
2. From the **System** tab, select **I/O Settings**.
3. Select the **Serial** button.
4. Select the **Port Assignment** button and choose **Printer**.

Printing a Graph Report

To print a graph report:

1. Select the protocol processor running the test for which you want to print the graph.
2. From the **Results** tab, select **Graph**.
3. Select the Graph screen's **Print Report** command button. The Report Setup menu appears.
4. Choose one of the following:
   - From **Destination Printer**, select **Graphs** to print reports to a printer.

     If printing a report from the NIC unit, make sure that a printer is attached to the unit's parallel or serial port.

   - From **Destination File**, select **Graphs to File** to print reports to a file. The File Browser dialog box appears.

     Enter a filename and select **OK**. The file extension for a graph is .rep.

Important: Files saved when working with the Remote Control Application will not be accessible from the NIC unit touch-screen and visa-versa. The remote application saves the files to the Remote Control (GalaxyNIC) directory

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on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

5. Select **OK**.

For information on retrieving a graph saved to file, see Print or View Saved Files.

Destination Printer

The Destination Printer function prints a report directly to a printer.

For local printing (which means that you are using the touch screen), you must have a printer attached to the unit's parallel port or serial port.

For remote printing (which means that you are using the Remote Control software to operate a unit from a PC), the standard Print dialog box opens, allowing you to choose a printer name.

Printer Port Configuration

The unit supports both parallel and serial printers.

For Parallel Printing:

- Attach a parallel printer cable (with a 25-pin male connector on one end) to the unit's **Parallel Port** connector. This is a DB-25 female connector.

For Serial Printing:

Important: The following steps must be performed from the NIC unit touch screen. "Printer" is not an available Serial port assignment from the Remote Control Application.

1. Attach a serial printer cable (with a 9-pin female connector on one end) to the unit's **RS-232** port connector. This is a DB-9 male connector.
2. From the **System** tab, select **I/O Settings**.
3. Select the **Serial** button.
4. Select the **Port Assignment** button and choose **Printer**.

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Destination File

The Destination File functions allow you to print reports to a file. This saves the report file either locally on the unit or remotely on a PC.

Using the Destination File Functions:

1. After selecting **Print Report**, the Report Setup screen appears.
2. Select any combination of reports from the **Destination File** functions.
3. Select **OK**. The File Browser appears, which allows you to name and save the report file.
4. After naming the file and deciding which subdirectory to store the file, click **OK**. The report is saved. It can be retrieved later using File Services.

Printing or Viewing Saved Files

While running tests, you have the option to save the information to a file. The instructions below tell you where and how to print or view a saved file.

Important: Files saved when working with the Remote Control Application will not be accessible from the NIC unit touch-screen and visa-versa. The remote application saves the files to the Remote Control (GalaxyNIC) directory on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

To print or view a saved file:

1. From the **System** tab, select **File Services**.
2. Select a file from the **Disk** directory box. The desired report may display in the main Disk directory, or it may be stored in one of the folders in the directory. Folder names are enclosed in brackets **[foldername]**. To return to the main Disk directory after opening a folder, select **[. .]** or the **Disk** button.

Important: Real-time reports generated from the NIC unit touch-screen, using the Action after Duration function, are automatically stored in the [APP] folder. Select the folder to display those reports.

The following is a list of file extension used for files generated from the Print Report, Graph, or Action after Duration functions:

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- **.aps** - APS Report
- **.evt** - Event Report
- **.perf** - Performance Report
- **.real** - Real-time Test Report (Stored in [APP} folder on NIC unit.)
- **.rep** - Graph Report, BERT Analysis, RFC Thru Put Analysis
- **.set** - Settings Report
- **.stat** - Results Report
- **.statE** - Event Report
- **.grp** - Graph (This is not a text file. It can only be viewed as a graph by selecting **Results,** pointing to **Graph** and choosing the **Replay Graphs** button.)

3. Choose one of the following

To **Print** the file:

a. Select **Print**. A standard Print dialog box appears.


If you want to print a report directly from the NIC unit, make sure that a printer is attached to the unit's parallel or serial port.

b. Select the printer **Name** and choose **OK**.

To **View** the file:

a. Select **View**. The View File window appears. Use the **Display Hex** / **Display ASCII** toggle button to display the file in Hex or ASCII format.


The following file details display below the File List box.

- File name
- File size and date
- File attributes

b. Select **Exit** to close the View File window.

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Printing a Report

The Print Report Common Function Button allows you to print reports to a printer or file.

1. Select **Print Report**. The Report Setup menu appears.
2. Choose one of the following:
    - From **Destination Printer**, select one or multiple reports to print directly to a printer. If printing a report from the NIC unit, make sure that a printer is attached to the unit's parallel or serial port. The following reports are available:

        ▸ **Settings** - (.set extension) Reports current values for all Transmit and Receive Set functions.

        ▸ **Statistics** - (.stat extension) Reports results for the Scan, Errors, Alarms, and PTR.

        ▸ **Events** - (.evt extension) Reports a detailed summary of events, such as alarms, errors, and pointer activity. This report includes the event, the number of events logged, the start and stop time of the event, and the duration of the event.

        ▸ **APS** - (.aps extension) Reports the results of the K1 and K2 byte sequences received by the unit.

        ▸ **Performance** - (.perf extension) Reports Performance Monitor results.

    - From **Destination File**, choose one or multiple reports to print to a file. The File Browser dialog box appears.

The **Comma Delimiter** option can be applied to the Settings To File and Statistics To File reports.

▸ Enter a filename and select **OK**.

Important: Files saved when working with the Remote Control Application will not be accessible from the NIC unit touch-screen and visa-versa. The remote application saves the files to the Remote Control (GalaxyNIC) directory on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

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3. In the **User Comment** box, select the **Input** button to enter notes that will display in the report. A keyboard opens.
4. Enter comment text using the keyboard. When working from NIC test set use the touch screen keyboard. Select **Enter**.

> To clear comment text, select the **Clear** button.

5. Select **OK**.

For information on retrieving saved files, see Print or View Saved Files.

> Files that are created when using the Remote Control Application are saved on your PC in the Remote Control directory. This directory can be overwritten when connecting to other remote units that have the same compatibility level, but are different models (for example, a NIC Plus, a NIC 10G, and so on).
>
> If you want to keep these files, copy and save the following to a backup directory on your PC that is not in the Remote Control Application directory's path:
>
> - Any file with the .set, .stat, .evt, .aps, .perf, or .rep extension.
> - The client.prop file. Changes to this file are only needed if the remote unit uses a PCMCIA modem for its dial-up connection.

Printing a Real-Time Test

> Important: Real-time test reporting is only available locally (from the touch screen) on portable units.

A real-time test records and generates a report of any events (alarms, errors, or power interruptions) that occur while the unit is monitoring a customer's circuit. The reports, generated in real time, can be sent to an attached printer, a file, or both.

The report contains the following information:

- A user-defined header
- A brief list of product settings
- Test start time and date

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- Event activity as it occurs during the test
- A "print alive" message, which can be configured at a specified time to ensure the user that the real-time test is still active
- A statistical report, produced at the conclusion of the test, providing a summary of reported events. If no events occur during the test duration, a completion message, indicating that no problems were found, is printed.

Real-time test settings and accumulated results are not discarded if a power interruption occurs. The results are saved in 15-minute increments. When power is restored to the unit, the real-time test continues from where it was prior to the power interruption. The power interruption event will appear in the real-time report.

To set up and start a real-time test:

1. Select **Test**.
2. Select **SET 1**. The Duration and Action After Duration functions appear.
3. Select **Action After Duration**, and then select **Realtime Actions**. The Select Realtime Actions after Test dialog box appears.
4. Select one of the following real-time test options:
    - Print Events and Repeat Test
    - Record Events and Repeat Test
    - Print and Record Events and Repeat Test
    - Print Events
    - Record Events
    - Print and Record Events
5. The Realtime Setup Parameters dialog box appears. Select **User Header**. The Enter User String keyboard appears.
6. Type a header name using the keypad that appears and select **Enter**. The header, which can be up to 64-bytes in length, serves as a brief description of the test.
7. Select **Print Alive** message. The Enter Duration window appears.
8. Set the time parameter, which determines if and when a Print Alive message is generated. A value of 0 disables the messaging function. Select **OK**. The header name and duration setting appear on the Realtime Setup Parameters window.

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9. Select **OK**. The Realtime Setup Parameters window closes.
10. Select **Duration** and enter how long the test will run.
11. Select the **Restart** button to start the real-time test. The Elapsed Time counter, located in the top right corner, resets to 0.

Important: When a real-time test begins, the unit is locked as indicated by the screen lock message. Other users cannot access the unit and change settings. However, if the Unlock button is selected during a test, anyone can then access the touch screen and change product settings. This action can disrupt real-time test results.

Action after Duration

Action after Duration defines what activities occur at the conclusion of a timed test. It allows several different options, including printing results to a printer or recording them to a file; repeating a test or just processing one test. Test results appear in a columned report format; however, there is one option available to record the statistics using a delimiter.

To determine how long a test will run, refer to Duration.

Print Options

When a print option is chosen, the report prints directly to a printer. If you are using the NIC touch-screen, a printer must be attached to the NIC's parallel or serial port. (See Printer Port Configuration.)

Record Options

When a record option is chosen, the results are saved to a file with one of the following extensions:

- **.evt** - Event Report. A detailed summary of alarms, errors, and pointer activity.
- **.statE** - Event Report. Used when the *Record Statistics/Events and Repeat Test* option is selected.
- **.stat** - Results Report. A statistics report of the Scan, Errors, Alarms, and PTR functions.
- **.real** - Real-time Test Report. Real-time reports generated only from the NIC touch screen.

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The file naming convention is: **xxhhmmss.<extension>** (where **xx** is the protocol processor, **hh** is hours, **mm** is minutes, **ss** is seconds). For example, a file named "OC163035.evt" represents an OC-192/48/12 test event that was recorded at 16:30:35.

To learn how to print or view a saved file, see the topic Print or View Saved Files.

The table below describes the Action after Duration options.

Repeat Test and Realtime Test Options	**Description**
None	No action occurs at the end of the test duration.
Print Current Statistics	Test statistics are printed to a printer at the end of a timed test. The test does not repeat.
Record Current Statistics	Test statistics are printed to a file (.stat) at the end of a timed test. The test does not repeat.
Record Current Statistics using a delimiter	Test statistics are printed to a file (.stat) at the end of a timed test. The results appear in a quote/comma-report format, meaning that error and/or alarm values are enclosed in quotes (") and separated by commas (,). The test does not repeat.
Print Statistics and Repeat Test This option appears when **Repeat Actions** is selected.	Test statistics are printed to a printer at the end of the timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Record Statistics and Repeat Test This option appears when **Repeat Actions** is selected.	Test statistics are printed to a file (.stat) at the end of a timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the

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	Action After Duration value.
Print Events and Repeat Test This option appears when **Repeat Actions** is selected.	Test events are printed to a printer at the end of the timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Record Events and Repeat Test This option appears when **Repeat Actions** is selected.	Test events are printed to a file (.evt) at the end of a timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Print Statistics/Events and Repeat Test This option appears when **Repeat Actions** is selected.	Both test statistics and events are automatically printed to a printer at the end of the timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Record Statistics/Events and Repeat Test This option appears when **Repeat Actions** is selected.	Both test statistics (.stat) and events (.statE) are printed to a file at the end of a timed test and the test repeats. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value. Both **.statE** and **.stat** files are recorded.
Print Events and Repeat Test This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit. When the test duration expires, the test restarts.

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Record Events and Repeat Test This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a file (.evt). When the test duration expires, the test restarts.
Print and Record Events and Repeat Test This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit and prints to a file (.evt). When the test duration expires, the test restarts.
Print Events This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit. The test does not repeat.
Record Events This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a file (.evt). The test does not repeat.
Print and Record Events This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit and prints to a file (.evt). The test does not repeat.

Duration

This function configures how long a timed test runs. The following options are available:

Options	Description
Continuous	Test is untimed, and unit is always collecting data.
5 Minutes	Test runs for 5 minutes.

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15 Minutes	Test runs for 15 minutes.
1 Hour	Test runs for 1 hour.
2 Hours	Test runs for 2 hours.
24 Hours	Test runs for 24 hours.
72 Hours	Test runs for 72 hours.
1 Week	Test runs for 1 week.
2 Weeks	Test runs for 2 weeks.
User Defined	Allows a specific test duration to be entered using a touch screen keypad. The minimum duration is 1 minute. The maximum duration is 99 days, 23 hours, and 59 minutes.

Printing a Report

The Print Report Common Function Button allows you to print reports to a printer or file.

1. Select **Print Report**. The Report Setup menu appears.
2. Choose one of the following:
    - From **Destination Printer**, select one or multiple reports to print directly to a printer. If printing a report from the NIC unit, make sure that a printer is attached to the unit's parallel or serial port. The following reports are available:

        Settings - (.set extension) Reports current values for all Transmit and Receive Set functions.

        Statistics - (.stat extension) Reports results for the Scan, Errors, Alarms, and PTR.

        Events - (.evt extension) Reports a detailed summary of events, such as alarms, errors, and pointer activity. This report includes the event, the number of events logged, the start and stop time of the event, and the duration of the event.

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- **APS** - (.aps extension) Reports the results of the K1 and K2 byte sequences received by the unit.

- **Performance** - (.perf extension) Reports Performance Monitor results.

- From **Destination File**, choose one or multiple reports to print to a file. The File Browser dialog box appears.

The **Comma Delimiter** option can be applied to the Settings To File and Statistics To File reports.

- Enter a filename and select **OK**.

Important: Files saved when working with the Remote Control Application will not be accessible from the NIC unit touch-screen and visa-versa. The remote application saves the files to the Remote Control (GalaxyNIC) directory on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

3. In the **User Comment** box, select the **Input** button to enter notes that will display in the report. A keyboard opens.
4. Enter comment text using the keyboard. When working from NIC test set use the touch screen keyboard. Select **Enter**.

To clear comment text, select the **Clear** button.

5. Select **OK**.

For information on retrieving saved files, see Print or View Saved Files.

Files that are created when using the Remote Control Application are saved on your PC in the Remote Control directory. This directory can be overwritten when connecting to other remote units that have the same compatibility level, but are different models (for example, a NIC Plus, a NIC 10G, and so on).

If you want to keep these files, copy and save the following to a backup directory on your PC that is not in the Remote Control Application directory's path:

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- Any file with the .set, .stat, .evt, .aps, .perf, or .rep extension.
- The client.prop file. Changes to this file are only needed if the remote unit uses a PCMCIA modem for its dial-up connection.

Capturing Screens

This function allows you to print the currently displayed screen. The image is converted to a bitmap (.bmp) image, which is saved to your test set or PC's hard drive in the GalaxyNIC folder.

Important: You cannot print or view a saved .bmp from the System File Services list box. You must locate the .bmp in the GalaxyNIC directory on your PC. To locate the .bmp:

a. Open the Remote NIC (**GalaxyNIC**) directory. For example, the default directory is C:\Program Files\GalaxyNIC.
b. Locate the **Compat** folder from which the Remote NIC is running. The folder name represents the Feature Set operating on the NIC unit. For example, the Compat folder for Feature Set 4.1.28 appears in the GalaxyNIC directory as Compat400010028.
c. Open the .bmp file and print to a local printer.

To capture a screen:

1. Select the **Print Report** common function button.
2. Select **Screen Capture**. The image is saved as Screen.bmp.

A screen capture image will automatically overwrite an existing Screen.bmp file. To save previous screen capture images, use the File Services' Rename function.

3. If you are capturing screens using a portable unit, you must transfer the file from the unit to your PC to print the bitmap image. Refer to Uploading a File for file transfer procedures. After the file is copied to your PC, it can be opened and printed.

Renaming a File

1. From the **System** tab, select **Files Services**.
2. Select a file from the File List box.

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3. Select **Rename**. A keyboard appears. Enter the new file name with extension. (Do not use spaces in file names.)
    - SET is the default extension for a Settings report.
    - STAT is the default extension for a Statistics report. (This includes tests produced using the Action After Duration button.)
    - EVT is the default extension for an Event report.
    - APS is the default extension for an APS report.
    - GRP is the default extension for a Graph report.
    - BMP is the default extension for a Print Screen image.
    - PERF is the default extension for a Performance Monitor report.
4. Select **Enter** from the keyboard. The file is renamed.

The extensions above are default file extensions. You are able change these to .txt (text) files using the **Rename** function.

Uploading a File

A file can be transferred from the unit to a remote device (for example a PC) or to a local device (a PCMCIA storage card). If using the FTP function, make sure you have the IP address of the receiving device. If using the PCMCIA function, make sure that a PC Card is installed in the PCMCIA slot before selecting the File Services button. When the PC card is inserted, an audible tone indicates that the card and PCMCIA drivers are qualified.

1. From the **System** tab, select **Files Services**.
2. From the right File List box, select the upload method (**FTP** or **PCMCIA**).
    - If using *FTP*,
        a. Enter the IP Address of the device that will receive the file (unless you are using the Remote Control Software; then enter the test set address) in the **FTP Site Information** box.
        b. If this device is secured with a User ID and Password, then enter this information.
        c. Enter an FTP session on the connecting device.

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- If using *PCMCIA*,

  ▸ Select a target directory from the File List box.

3. From the left File List box, select the current location of the file (**Disk** or **PCMCIA**).

4. Select a file from the File List box.

5. Select  (upload). The file is transferred.

Warning: When the unit is powered off, the FTP directory is automatically purged.

Printing or Viewing Saved Files

While running tests, you have the option to save the information to a file. The instructions below tell you where and how to print or view a saved file.

Important: Files saved when working with the Remote Control Application will not be accessible from the NIC unit touch-screen and visa-versa. The remote application saves the files to the Remote Control (GalaxyNIC) directory on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

To print or view a saved file:

1. From the **System** tab, select **File Services**.
2. Select a file from the **Disk** directory box. The desired report may display in the main Disk directory, or it may be stored in one of the folders in the directory. Folder names are enclosed in brackets **[foldername]**. To return to the main Disk directory after opening a folder, select **[. .]** or the **Disk** button.

Important: Real-time reports generated from the NIC unit touch-screen, using the Action after Duration function, are automatically stored in the [APP] folder. Select the folder to display those reports.

The following is a list of file extension used for files generated from the Print Report, Graph, or Action after Duration functions:

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- **.aps** - APS Report
- **.evt** - Event Report
- **.perf** - Performance Report
- **.real** - Real-time Test Report (Stored in [APP} folder on NIC unit.)
- **.rep** - Graph Report, BERT Analysis, RFC Thru Put Analysis
- **.set** - Settings Report
- **.stat** - Results Report
- **.statE** - Event Report
- **.grp** - Graph (This is not a text file. It can only be viewed as a graph by selecting **Results,** pointing to **Graph** and choosing the **Replay Graphs** button.)

3. Choose one of the following

To **Print** the file:

a. Select **Print**. A standard Print dialog box appears.


If you want to print a report directly from the NIC unit, make sure that a printer is attached to the unit's parallel or serial port.

b. Select the printer **Name** and choose **OK**.

To **View** the file:

a. Select **View**. The View File window appears. Use the **Display Hex** / **Display ASCII** toggle button to display the file in Hex or ASCII format.


The following file details display below the File List box.

- File name
- File size and date
- File attributes

b. Select **Exit** to close the View File window.

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Printing a Report

The Print Report Common Function Button allows you to print reports to a printer or file.

1. Select **Print Report**. The Report Setup menu appears.
2. Choose one of the following:
    - From **Destination Printer**, select one or multiple reports to print directly to a printer. If printing a report from the NIC unit, make sure that a printer is attached to the unit's parallel or serial port. The following reports are available:

        ▸ **Settings** - (.set extension) Reports current values for all Transmit and Receive Set functions.

        ▸ **Statistics** - (.stat extension) Reports results for the Scan, Errors, Alarms, and PTR.

        ▸ **Events** - (.evt extension) Reports a detailed summary of events, such as alarms, errors, and pointer activity. This report includes the event, the number of events logged, the start and stop time of the event, and the duration of the event.

        ▸ **APS** - (.aps extension) Reports the results of the K1 and K2 byte sequences received by the unit.

        ▸ **Performance** - (.perf extension) Reports Performance Monitor results.

    - From **Destination File**, choose one or multiple reports to print to a file. The File Browser dialog box appears.

The **Comma Delimiter** option can be applied to the Settings To File and Statistics To File reports.

▸ Enter a filename and select **OK**.

Important: Files saved when working with the Remote Control Application will not be accessible from the NIC unit touch-screen and visa-versa. The remote application saves the files to the Remote Control (GalaxyNIC) directory on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

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3. In the **User Comment** box, select the **Input** button to enter notes that will display in the report. A keyboard opens.
4. Enter comment text using the keyboard. When working from NIC test set use the touch screen keyboard. Select **Enter**.

> To clear comment text, select the **Clear** button.

5. Select **OK**.

For information on retrieving saved files, see Print or View Saved Files.

> Files that are created when using the Remote Control Application are saved on your PC in the Remote Control directory. This directory can be overwritten when connecting to other remote units that have the same compatibility level, but are different models (for example, a NIC Plus, a NIC 10G, and so on).
>
> If you want to keep these files, copy and save the following to a backup directory on your PC that is not in the Remote Control Application directory's path:
>
> - Any file with the .set, .stat, .evt, .aps, .perf, or .rep extension.
> - The client.prop file. Changes to this file are only needed if the remote unit uses a PCMCIA modem for its dial-up connection.

Using Graphs

Use the **Graph** button to view error and alarm results for the selected protocol processor. Graphs show the test history for either the current test or a previously saved test.

To use the graphs function:

1. Select a protocol processor that has been configured for Error Alarm testing.
2. From **Results**, select **Graph**. The Graph screen appears. It contains two graphs which allow you to display incoming alarms and errors.
3. Use the following buttons to control graphing parameters:

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- **Sample Rate** - Sets the timing for graph results at increments of 1 Second, 1 Minute, or 15 Minutes.
- **Change Scale** - Compresses or expands the displayed time scale for the graphed errors and alarms at time intervals of 30 minutes, 90 minutes, 3 hours, 6 hours, 12 hours, 24 hours, or 72 hours.
- **Change Upper** - Sets the type of errors or alarms that appear in the upper graph.
- **Change Lower** - Sets the type of errors or alarms that appear in the lower graph.
- **Shift Left and Shift Right** - Adjusts the graph's time scale to an earlier or later time.
- **Print Report** - Prints a graph report to printer or file.
- **Save Graphs** - Saves a graph to file as a .grp file that can be replayed at a later time.

Important: This is not a text file; when replayed, it appears as the original graph plot. Choose *Print a Graph to Report* if you desire graph information that can be printed out.)

- **Replay Graphs/Stop Replay** - Replays or stops saved graphs (.grp).

Action after Duration

Action after Duration defines what activities occur at the conclusion of a timed test. It allows several different options, including printing results to a printer or recording them to a file; repeating a test or just processing one test. Test results appear in a columned report format; however, there is one option available to record the statistics using a delimiter.

To determine how long a test will run, refer to Duration.

Print Options

When a print option is chosen, the report prints directly to a printer. If you are using the NIC touch-screen, a printer must be attached to the NIC's parallel or serial port. (See Printer Port Configuration.)

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Record Options

When a record option is chosen, the results are saved to a file with one of the following extensions:

- **.evt** - Event Report. A detailed summary of alarms, errors, and pointer activity.
- **.statE** - Event Report. Used when the *Record Statistics/Events and Repeat Test* option is selected.
- **.stat** - Results Report. A statistics report of the Scan, Errors, Alarms, and PTR functions.
- **.real** - Real-time Test Report. Real-time reports generated only from the NIC touch screen.

The file naming convention is: **xxhhmmss.<extension>** (where **xx** is the protocol processor, **hh** is hours, **mm** is minutes, **ss** is seconds). For example, a file named "OC163035.evt" represents an OC-192/48/12 test event that was recorded at 16:30:35.

To learn how to print or view a saved file, see the topic Print or View Saved Files.

The table below describes the Action after Duration options.

Repeat Test and Realtime Test Options	**Description**
None	No action occurs at the end of the test duration.
Print Current Statistics	Test statistics are printed to a printer at the end of a timed test. The test does not repeat.
Record Current Statistics	Test statistics are printed to a file (.stat) at the end of a timed test. The test does not repeat.
Record Current Statistics using a delimiter	Test statistics are printed to a file (.stat) at the end of a timed test. The results appear in a quote/comma-report format, meaning that error and/or alarm values are enclosed in

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	quotes (") and separated by commas (,). The test does not repeat.
Print Statistics and Repeat Test This option appears when **Repeat Actions** is selected.	Test statistics are printed to a printer at the end of the timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Record Statistics and Repeat Test This option appears when **Repeat Actions** is selected.	Test statistics are printed to a file (.stat) at the end of a timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Print Events and Repeat Test This option appears when **Repeat Actions** is selected.	Test events are printed to a printer at the end of the timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Record Events and Repeat Test This option appears when **Repeat Actions** is selected.	Test events are printed to a file (.evt) at the end of a timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Print Statistics/Events and Repeat Test This option appears when **Repeat Actions** is selected.	Both test statistics and events are automatically printed to a printer at the end of the timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Record Statistics/Events and Repeat	Both test statistics (.stat) and events (.statE) are printed to a file at the

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Test This option appears when **Repeat Actions** is selected.	end of a timed test and the test repeats. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value. Both **.statE** and **.stat** files are recorded.
Print Events and Repeat Test This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit. When the test duration expires, the test restarts.
Record Events and Repeat Test This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a file (.evt). When the test duration expires, the test restarts.
Print and Record Events and Repeat Test This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit and prints to a file (.evt). When the test duration expires, the test restarts.
Print Events This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit. The test does not repeat.
Record Events This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a file (.evt). The test does not repeat.
Print and Record Events	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is

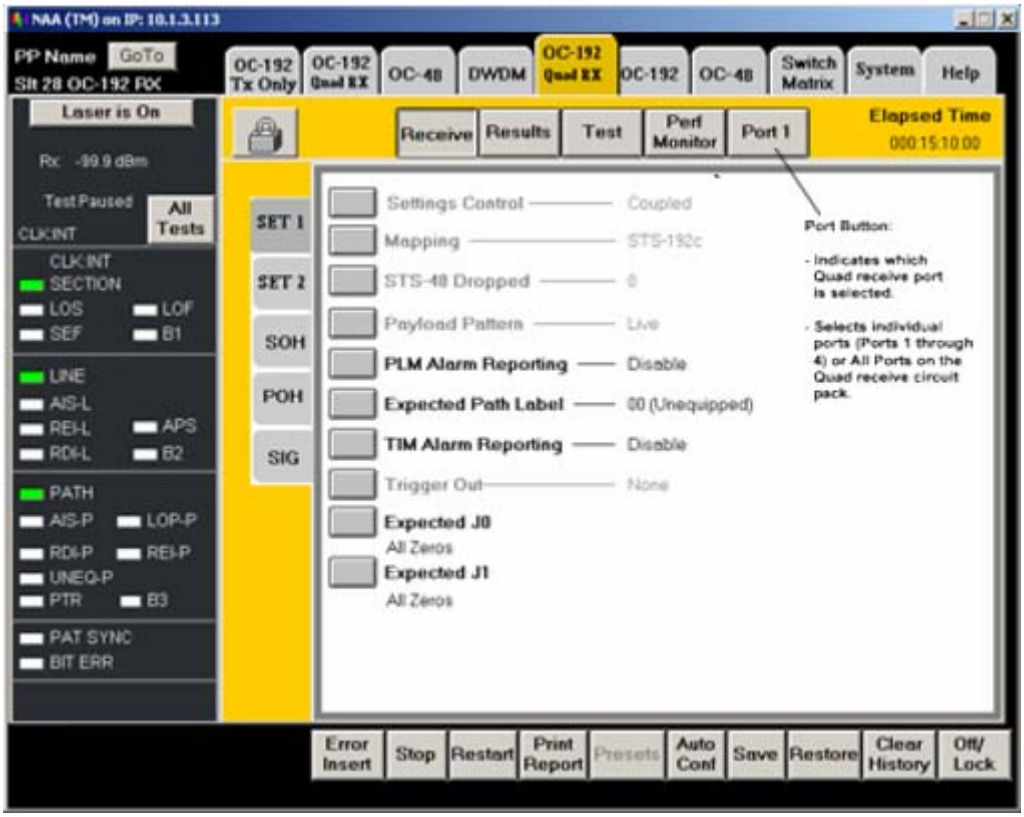
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This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	attached to the NIC unit and prints to a file (.evt). The test does not repeat.

Quad Port Selection

This procedure is only valid for units that have a Quad receive circuit pack installed.

A Quad receive circuit pack can accept up to four separate incoming optical channels. The following example illustrates a Quad receive circuit pack configured for SONET.



To select one of four Quad receive ports:

1. Select the **Quad RX** tab. The protocol processor's receive functions appear.
2. Use the **Port** button to select one of the four ports on the Quad receive circuit pack. (The receive functions associated with that port appear.)

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The **All Ports** option allows changes to be made simultaneously to all ports on a Quad receive circuit pack; however, all of the ports must be locked.

To lock the ports before using the All Ports option:

a. Select the **Port <#>** button and choose a port from the Select Port dialog box.

b. Select the **Lock** icon. See Locking and Unlocking a Test Set for information about using the Lock/Unlock dialog box.

c. Repeat Steps a and b until all ports are locked.

d. Select the **Port <#>** button and choose **All Ports**.

Important: When in All Ports mode, the results that appear when the **Results** button is selected only apply to the current port. The current port appears on the Port button, for example, All (Port 1).

When a Quad receive circuit pack is selected, the **Transmit** button and **APS** functions are not available.

Locking and Unlocking a Test Set

To prevent users from interfering with each other, an individual user can "lock" and take control of a test set. This is done using the Lock icon that appears on the GUI. Permission levels determine the user's ability to lock and unlock a test set. When you lock the test set, you can configure protocol processors, start tests, and perform general product functions without the worry of contending for resources with another user.

When a test set is locked by someone else, the  icon is displayed.

To unlock a test set locked by someone else:

1. Select the Lock icon. The Lock/Unlock dialog box appears.
2. Select **Force Unlock**. The command buttons change to "Lock and Exit" and "Lock."

You must have **Admin** privileges to be able to force the unlock.

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3. Selecting one of the following causes the command buttons to change to "Unlock and Exit" and "Unlock", and the information boxes become available.

    - **Lock and Exit** - Locks the unit and automatically closes the dialog box. To enter notes after the dialog box closes, select the locked icon to reopen the dialog box.
    - **Lock** - Allows you to enter note information in the Circuit Info: and Contact Info: boxes before closing the dialog box. The notes carry over to all protocol processors in the test set. When a different test set is locked the user can enter notes pertinent to it.

4. To enter note information, select **Circuit Info:** and/or **Contact Info:**. The Enter User String keyboard opens.
5. Type notes and select **Enter**. The notes appear in their associated information box.
6. Select **Exit** to close the Lock/Unlock dialog box.

When you have the test set locked, the  icon is displayed.

To unlock a test set that you have locked:

1. Select the icon. The Lock/Unlock dialog box appears.
2. Selecting one of the following causes the command buttons to change to "Lock and Exit" and "Lock":

    - **Unlock and Exit** - Unlocks the unit and automatically closes the dialog box.
    - **Unlock** - Unlocks the unit without closing the dialog box. Select **Exit** to close the Lock/Unlock dialog box.

When the test set is unlocked, the  icon is displayed.

To lock a test set:

1. Select the icon. The Lock/Unlock dialog box appears.
2. Selecting one of the following causes the command buttons to change to "Unlock and Exit" and "Unlock", and the information boxes become available.

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- **Lock and Exit** - Locks the unit and automatically closes the dialog box.
- **Lock** - Allows you to enter note information in the **Circuit Info:** and **Contact Info:** boxes before closing the dialog box. The notes carry over to all protocol processors in the test set. When a different test set is locked the user can enter notes pertinent to it. Select **Exit** to close the dialog box.

Rebooting the Test Set

This function allows the system to write unsaved data to the disk before you reboot the unit. You can perform this task from the System I/O window or by selecting the Off/Lock button on a protocol processor tab.

Important: Rebooting the test set must be done from the NIC touch screen.

To reboot the unit from the System, I/O Settings window:

1. Select the **System** tab and choose **I/O Settings**.
2. Select **Ethernet** and choose **Reboot**. The Reboot dialog box appears.
3. Select **OK** to continue with the reboot process, or Cancel to keep the unit on. The Shutdown in Progress message box appears.
4. After all unsaved data is written to the disk, the unit restarts.

Important: If the unit does not successfully reboot turn it off manually by toggling the On/Off switch to **Off**.

To reboot the unit from a protocol processor tab:

1. Select the **Off/Lock** common function button. The Unlock Login dialog box appears.

Important: Do not enter the User ID or Password.

2. Select **Reboot**. The Reboot dialog box appears.
3. Select **OK** to continue with the reboot process, or Cancel to keep the unit on. The Shutdown in Progress message box appears.
4. After all unsaved data is written to the disk, the unit restarts.

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Important: If the unit does not successfully reboot turn it off manually by toggling the On/Off switch to **Off**.

Replaying Graphs

Use the **Replay Graphs** button to open any previously saved graph (.GRP) that is stored on the system.

Use the **Stop Replay** button to close the graph file.

Using Graphs

Use the **Graph** button to view error and alarm results for the selected protocol processor. Graphs show the test history for either the current test or a previously saved test.

To use the graphs function:

1. Select a protocol processor that has been configured for Error Alarm testing.
2. From **Results**, select **Graph**. The Graph screen appears. It contains two graphs which allow you to display incoming alarms and errors.
3. Use the following buttons to control graphing parameters:

    - **Sample Rate** - Sets the timing for graph results at increments of 1 Second, 1 Minute, or 15 Minutes.
    - **Change Scale** - Compresses or expands the displayed time scale for the graphed errors and alarms at time intervals of 30 minutes, 90 minutes, 3 hours, 6 hours, 12 hours, 24 hours, or 72 hours.
    - **Change Upper** - Sets the type of errors or alarms that appear in the upper graph.
    - **Change Lower** - Sets the type of errors or alarms that appear in the lower graph.
    - **Shift Left and Shift Right** - Adjusts the graph's time scale to an earlier or later time.
    - **Print Report** - Prints a graph report to printer or file.
    - **Save Graphs** - Saves a graph to file as a .grp file that can be replayed at a later time.

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> Important: This is not a text file; when replayed, it appears as the original graph plot. Choose *Print a Graph to Report* if you desire graph information that can be printed out.)

- **Replay Graphs/Stop Replay** - Replays or stops saved graphs (.grp).

Recording in the Event Log

The Event Log is a table that displays events recorded by the unit. A scroll bar is available, allowing you to scroll up and down to view an extended history.

To use the Event Log:

1. Select a protocol processor tab.
2. Select the **Results** button.
3. Select **Event**. As events occur (such as alarms, errors, or Pointer activity) they appear and continuously scroll in the table.

   Events display in a ascending order from the most recent event to the oldest event. The Descending button indicates that events appear in descending order. (This button switches between descending event order appearance and ascending event order appearance. The current label of the button indicates the event order.)

4. Select **Pause**, to stop the scrolling action and then use the scroll bar to view events. Select **Resume** to restart the event log.
5. To display events in an ascending order, select **Descending**. The button changes to Ascending and the events appear from the oldest event to the most recent event.
6. Select **Resume**, to continue Event Log reporting.

Remote Control Application

The Remote Control Application software is a graphical user interface that allows you to remotely connect to and control portable and rackmount products from a PC.

Before using the Remote Control Application:

- Verify the minimum software and hardware requirements.

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- Verify that the Ethernet parameters have been entered into your unit.
- Verify that you have security access to the unit.
- Verify that FTP service is enabled on the unit.
- Install the Remote Control Application on to your PC.
- If the remote unit uses a PCMCIA modem for dial-up connectivity, configure the Remote Control Application for PCMCIA operation.

To start the Remote Control Application:

1. Select the Remote Control Application shortcut icon that appears on your PC's desktop.
2. Enter the remote unit's IP address, and your user ID and password.
3. Select **OK**.
4. Once the connection is made, the remote unit's GUI appears. The title bar contains the product name and connection method. Use your mouse to select functions.

   To automate the log on process, select Automating the Remote Control Icon for more information.

Important: Files that are created when using the Remote Control Application are saved on your PC in the Remote Control's compatibility directory. This directory can be overwritten when connecting to other remote units that have the same compatibility level, but are different models (for example, a NIC Plus, a NIC 10G, and so on).

If you want to keep these files, copy and save the following to a backup directory on your PC that is not in the compatibility directory's path:

- Any file with the .set, .stat, .evt, .aps, .perf, or .rep extension.
- The client.prop file. Changes to this file are only needed if the remote unit uses a PCMCIA modem for its dial-up connection.

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Remote Control Application Requirements

Software

The minimum software requirements are:

- Windows NT 4.0, Windows XP, Windows 2000, or Windows 98 operating systems.
- Microsoft Internet Explorer 5.0 or greater.
- Host domain and IP address information for LAN access.
  Make sure that this information is entered into your unit. Refer to Ethernet Port Configuration for more information.
- TCP/IP Network Protocol

Hardware

The minimum hardware requirements are:

- A personal computer with a 300-MHz Pentium processor or faster.
- 128 MB RAM (256 MB RAM recommended for optimum performance)
- 60 MB of free disk space
- An SVGA monitor with a minimum screen resolution of 800 by 600 pixels and 256 colors (1025 by 768 recommended for optimum viewing).
- A CD-ROM drive (if installing from a CD-ROM) or web browser (if installing from the DLI web site) for software installation.
- A standard 10BaseT Ethernet cable for connectivity between the unit and the network.


If you connect the unit directly to your PC, you will need the following:

- A network interface card installed in your PC.
- A crossover 10BaseT Ethernet cable for connectivity between the unit and the PC's network interface card.

Ethernet Port Configuration

To configure the unit's Ethernet port:

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If Ethernet port parameters are changed, the unit must be rebooted for the changes to take affect.

1. Select **System**.
2. Select **I/O Settings**.
3. Enter the unit's **IP Address**, **Subnet Address**, and **Router Address** from the Ethernet Configuration functions.

IP addresses **192.168.138.000 through 192.168.138.255** are reserved and should not be used. A system conflict can occur if these IP addresses are entered.

Ethernet Configuration

If Ethernet port parameters are changed, the test set must be rebooted for the changes to take affect.

The following configures the Ethernet port's parameters:

- **Obtain an IP address from a DHCP server:** The unit will uses the network's Dynamic Host Connection Protocol (DHCP) server to dynamically assign it an IP address. ***When selected, the IP Address, Subnet Address, Router, Host Name, and Domain Name functions are disabled, but will be populated by the DHCP server.***
- **Specify an IP address:** Allows a static IP address to be entered using the IP Address, Subnet Address, Router, Host Name, and Domain Name functions.
- **IP Address:** Enter the unit's IP address using dotted decimal notation. For example, **nnn.nnn.nnn.nnn**, where **nnn** is a value from 0 to 255.

IP addresses **192.168.138.000 through 192.168.138.255** are reserved and should not be used. A serious system conflict can occur if these IP addresses are entered.

If you must use an IP address in the range of **192.168.x.y** (where x is not equal to 138), then you must set the Subnet Address to **255.255.255.0**.

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- **Subnet Address:** Enter the subnet address using dotted decimal notation.
- **Router:** Enter the Router address using dotted decimal notation.
- **Host Name:** Enter the unit's host name (for example, NICPLUS). This is an optional parameter.
- **Domain Name:** Enter the unit's domain name (for example, lightwave.com). This is an optional parameter.
- **Port Assignment:** Displays what has been assigned, by way of default or license. SCPI is automatically listed. If the unit is licensed for TL1, then TL1 is also displayed on the assignment line.

 The **Host Name** and **Domain Name** parameters defined for Ethernet Configuration screen also apply to the Wireless Configuration screen. Any changes made to these parameters on one screen will also be made on the other screen.

Security Settings

Security is an administrative function and only appears if you are logged on as an Administrator. This screen is divided into the following main sections: User Security Information, System Services, NT/FTP Administrator, and Reset System.

Important: The Security option is not available unless you have Admin privileges.

User Security Information

This function allows you to view the following security information on system users:

- **User Name**
- **Permissions**: Read Only, Read/Write, Calibrate, or Admin
- **Active**: Displays “Yes” for user’s currently logged in to the test set.
- **Current**: Displays permissions of active users.
- **Default User**: This column only appears on the local GUI and is linked directly to the “User Login Required” setting on the System Misc screen. When User Login Required is not selected the default user appears in the Login dialog box.

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Default User only appears on the NIC touch screen.

The Security function also enables a user with administrator privileges to perform the following tasks:

- Add a User
- Delete a User
- Update a User Profile
- Enable/Disable Security System Lock
- Establish a Default Login
- Establish a Required Login

Selecting the Security System Lock check box prevents other people from logging onto the test set. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read-Only permissions only. When the user logs on with Read-Only permissions, all functionality will be disabled with the exception of the online help and the About this product function.

System Services

System Services allows an administrator to disable specific network services to meet their network's security policies. To enable a system service, select its check box. To disable a system service, clear the check box.

NT/FTP Administrator

NT/FTP Administrator assigns a user ID and password so that a user can log in to a remote computer and transfer files using the file transfer protocol service.

Reset System

Reset System restores default Security settings.

System Services

The following system services can be enabled or disabled by an Administrator.

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A unit reboot is required if any changes are made to system services.

To enable or disable a system service:

1. From the **System** tab, select **Security**.
2. From **System Services**, enable the following services by selecting the check box, or disable the service by clearing the check box.

    - **Internet Information.** The IIS (Internet Information Server) service provides the ability to host a simple web server, which uses port 80 (http). This function can be disabled (deselect the checkbox) to prevent unauthorized access to the port.
    - **File Transfer Protocol.** The FTP service allows a user to remotely log in to the unit and transfer files. Disabling this function can prevent unauthorized access to ports 20 and 21.

    FTP service must be enabled if you use the Remote Control Application or the DLI Software Upgrade software. You can not connect to the unit using these applications if FTP service is disabled.

    - **Remote Procedure Call.** This protocol allows an application on one PC to request a service from another application located on a different PC within in a LAN. Disabling this function can prevent unauthorized users from using the unit to access other equipment in a customer's network.
    - **Telnet.** The Telnet service allows a user to log in to a remote system. Disabling this function can prevent unauthorized users from using the unit to access a customer's network.
    - **NetBIOS.** The NetBIOS (Network Basic Input/Output System) program allows applications to use port 139 to communicate to different PCs within a LAN. This function can be disabled to prevent unauthorized access to the port.
    - **SCPI.** The SCPI (Standard Commands for Programmable Instruments) service uses port 8090 to send and receive SCPI commands to the unit. Disabling this function will prevent unauthorized access to the port.

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- **TL1.** The TL1 (Transaction Language 1) service uses port 8080 to send and receive TL1 commands to the unit. Disabling this function will prevent unauthorized access to the port.
- **SNMP.** The SNMP (Simple Network Management Protocol) service uses ports 161 and 162 to transfer commands and traps to and from the unit. Disabling this function will prevent unauthorized access to these ports.

Remote Control Application Installation

The Remote Control Application is supplied on the Software and Remote CD. Install the application from the CD upon first use of the application or when there is a major Feature Set change. For example from Feature Set 4.1 to 4.2.

Important: Uninstall previous versions of the Remote Control Application software from your PC before upgrading to a newer version.

To install from a CD:

1. Close any applications running on your PC before installing the software.
2. Insert the CD into the CD-ROM drive.
3. The Auto-Run feature starts and displays the Welcome screen.

If the Auto-Run feature is disabled on your system, open **Windows Explorer** and select the **CD-ROM** drive, to display the contents of the CD. Select the **DLIInstall.exe** file to launch the Welcome screen.

4. From the **Software** tab, select **Remote Control Application** and click **Install**.
5. Select **Next** and follow the on-screen instructions to install the software into a directory and create a program folder. The default directory is C:\Program Files\GalaxyNIC.
6. To complete the installation, you must restart your PC. A dialog box appears asking whether you want to restart your PC now or later**.** Select **Yes** to restart and **Finish** to complete installation.
7. After restarting your PC, a shortcut icon appears on the desktop and a GalaxyNIC program folder is created for the Remote Control Application. Open the application by clicking the **Remote NIC** icon.

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8. This completes the installation.

Automating the Remote Control Application Icon

The Remote Control Application software is a graphical user interface (GUI) that allows you to remotely control portable and rackmount products from a PC. An icon for the Remote Control Application software is created and placed on your desktop when the software is installed.

You can add IP address, user ID, and password parameters to the icon to automate the log on process.

1. From the desktop, right click on the **Remote Control Application** icon.
2. Select **Properties** and choose the **Shortcut** tab.
3. Place the cursor at the end of the **Target** text box.
4. Press the space bar and type:

   ip=*x.x.x.x*,uid=*y*,pw=*z*

   where, *x.x.x.x* is the system's IP address
   y is the system's user ID (case sensitive)
   z is the system's password (case sensitive)
5. Click **OK**.
6. When you double click the Remote Control Application's icon, a connection is made and the remote system's GUI appears.

If an invalid parameter is entered, the automatic log on will fail, and you must enter the appropriate data.

Security Settings

Security is an administrative function and only appears if you are logged on as an Administrator. This screen is divided into the following main sections: User Security Information, System Services, NT/FTP Administrator, and Reset System.

Important: The Security option is not available unless you have Admin privileges.

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User Security Information

This function allows you to view the following security information on system users:

- **User Name**
- **Permissions**: Read Only, Read/Write, Calibrate, or Admin
- **Active**: Displays “Yes” for user’s currently logged in to the test set.
- **Current**: Displays permissions of active users.
- **Default User**: This column only appears on the local GUI and is linked directly to the “User Login Required” setting on the System Misc screen. When User Login Required is not selected the default user appears in the Login dialog box.


Default User only appears on the NIC touch screen.

The Security function also enables a user with administrator privileges to perform the following tasks:

- Add a User
- Delete a User
- Update a User Profile
- Enable/Disable Security System Lock
- Establish a Default Login
- Establish a Required Login


Selecting the Security System Lock check box prevents other people from logging onto the test set. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read-Only permissions only. When the user logs on with Read-Only permissions, all functionality will be disabled with the exception of the online help and the About this product function.

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System Services

System Services allows an administrator to disable specific network services to meet their network's security policies. To enable a system service, select its check box. To disable a system service, clear the check box.

NT/FTP Administrator

NT/FTP Administrator assigns a user ID and password so that a user can log in to a remote computer and transfer files using the file transfer protocol service.

Reset System

Reset System restores default Security settings.

Adding a New User

If the System Lock function is enabled, only one user with Read and Write permissions (this includes Calibration and Admin users) can be logged in at a time. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read permissions only.

1. From the **System** tab, select **Security**.
2. From the **User Name** column, select **NEW USER**.
3. From **Account Information**, select ..., next to the **User Name** field. A keypad appears.
4. Enter the **user name**.
5. Select ..., next to the **Password** field. A keypad appears.
6. Enter a **password**.
7. Select ..., next to the **Permission** field. The Select User Permissions window appears.
8. Select one of the following user permissions:

    - **Read:** Allows the user read-only privileges.
    - **Read/Write:** Allows the user to read and update information.
    - **Calibrate:** Allows the user read and write privileges and the ability to perform calibration procedures on the unit.

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- **Admin:** Allows the user to perform network administrator tasks such as calibrating, adding, deleting, and updating user profiles.

9. Select **Update**. The new user profile is added and appears on the User List.

Establishing a Default User Login

This function allows an administrator to establish a default login, which results in users not having to enter a user ID and password each time they use the unit.

Important: The default login function is only applicable for the NIC unit. When connecting to a NIC via the Remote NIC application, a user ID and password are required. Establishing a default login user can only be done from the NIC touch screen.

To establish a default login user:

1. From the **System** tab, select **Security**.
2. From the User Name list box, select the **User Name** that you wish to make the default upon login.
3. Select **Set as Default**. Under the Default User column, a "Yes" appears, indicating that the user has been established as default user.

The Set as Default button is only available from the NIC touch screen.

To disable a default login:

1. From the **System** tab, select **Misc**.
2. From **Local Settings**, clear the **User Login Required** check box. A cleared check box, indicates that User Login Required is disabled.

The User Login Required check box is only available from the NIC touch screen.

3. Reboot the unit for changes to take affect. When the unit restarts, a login box appears.

   If you do not wish to reset a Default Login user, there is no need to continue to the next step.

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4. If you wish to set another default user, log in as an Admin user and repeat the steps above under, *To establish a default login*.

Deleting a User

If the System Lock function is enabled, only one user with Read and Write permissions (this includes Calibration and Admin users) can be logged in at a time. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read permissions only.

1. From the **System** tab, select **Security**.
2. From the User List, select the **User Name** to be deleted.
3. With the user name highlighted, select **Delete**. The user is removed from the User List.

Updating a User Profile

If the System Lock function is enabled, only one user with Read and Write permissions (this includes Calibration and Admin users) can be logged in at a time. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read permissions only.

1. From the **System** tab, select **Security**.
2. From the User Name list box, select the user profile to be updated. The user name, password, and permission appears in the Account Information box.
3. Select , next to the field to be updated.
    - If *Password* was selected, a keypad appears, allowing you to modify the current information. Press **Enter** when you are done.
    - If *Permissions* was selected, the Select User Permissions window appears. Select the updated permissions that you wish to apply.
4. When you are done updating the user's profile, select **Update**. The updated information appears on the User List.

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Enabling/Disabling Security System Lock

This function allows an administrator to enable a Security System Lock that only allows one user with Read and Write permissions (this includes Calibration and Admin users) to be logged in at a time. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read Only permissions only. When the user logs on with Read Only permissions, all functionality will be disabled with the exception of the online help and the About this product function.

To enable Security System Lock:

1. From the **System** tab, select **Security**.
2. From **Default Entry**, select the **Security System Lock** check box. A checked box indicates that the Security System Lock function is enabled.

To disable Security System Lock:

1. From the **System** tab, select **Security**.
2. From **Default Entry**, clear the **Security System Lock** check box. A cleared check box indicates that the Security System Lock function is disabled.

Establishing a Required User Login

This function allows an administrator to establish a required login, which results in the user having to enter a user ID and password each time they use the unit.

Important: Establishing a required user login can only be done from the NIC touch screen.

To establish a required login:

1. From the **System** tab, choose **Misc**.
2. From **Local Setting**, select the **User Login Required** check box. When this box is checked, a required login has been established.

To disable the required login, clear the **User Login Required** check box.

The User Login Required check box is only available from the NIC touch screen.

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Remote Control Application Removal

Important: Reports that were saved to the Compat4030 folder, located in the Remote Control Application directory (for example, C:\Program Files\GalaxyNIC\Compat4030) will be deleted during the uninstall process. To save historical reports, copy the data files to a folder located outside of the Remote Control Application directory before proceeding with the uninstall process.

To remove the Remote Control Application

1. Close the Remote Control Application.
2. Click the **Windows Start** button and choose **Settings**.
3. Select **Control Panel** and choose **Add/Remove Programs**.
4. Select **Remote NIC** and click the **Add/Remove** button.
5. Follow the on-screen instructions.
6. Open Windows Explorer and locate the Remote Control Application (GalaxyNIC) directory. For example, C:\Program Files\GalaxyNIC.
7. Delete the **GalaxyNIC** folder.
8. Install the new Remote Control Application.

Renaming a File

1. From the **System** tab, select **Files Services**.
2. Select a file from the File List box.
3. Select **Rename**. A keyboard appears. Enter the new file name with extension. (Do not use spaces in file names.)
    - SET is the default extension for a Settings report.
    - STAT is the default extension for a Statistics report. (This includes tests produced using the Action After Duration button.)
    - EVT is the default extension for an Event report.
    - APS is the default extension for an APS report.
    - GRP is the default extension for a Graph report.
    - BMP is the default extension for a Print Screen image.

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- PERF is the default extension for a Performance Monitor report.

4. Select **Enter** from the keyboard. The file is renamed.

The extensions above are default file extensions. You are able change these to .txt (text) files using the **Rename** function.

Resetting the System

This Administrator function clears and restores default settings to the following:

- User Accounts - Deletes all user accounts and restores the default Admin account.
- FTP Administrator - Deletes the FTP account and restores the default FTP user ID and password.
- System Services - Restores all default system service settings.

User files, such as the protocol processor's transmit and receive settings, report statistics, graphs, and test results, are not deleted. These files are managed using File Services.

To reset the system:

1. From the **System** tab, select **Security**.
2. Select **Reset System**.
3. A message asking to confirm that you want to reset the system appears. Select **Yes**.
4. A message stating that the system must be restarted for changes to take affect appears. Select **OK**.
5. Reboot the system.

Restarting an Error, Alarm, or Event Test

The Restart common function button is used to initiate the following test activities:

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- **Clears and resets** error, alarm, and event activity counters, statistics, and LEDs for the current protocol processor.
- **Starts** error, alarm, or event activity that was stopped using the Stop button.

To restart a test or reset statistics:

- Select the **Restart** common function button located at the bottom of the touch screen. Configured testing on the current protocol processor is restarted.

Restoring a Settings Configuration or Factory Defaults

This function allows you to perform the following actions:

- Restore the unit's factory default settings.
- Restores or recalls any saved configurations for all protocol processor Receive or Transmit settings.

To restore a settings configuration:

1. Select **Restore** from the common function buttons. The Select Type of Restore window appears with the following options:
    - **Factory Defaults:** Restores the unit's default settings. If this option is selected, the default settings are immediately restored. (See Factory Default Mode to set the unit's default Protocol Processor mode.)
    - **User File:** Recalls any saved configurations for a protocol processor's Receive or Transmit settings. If this option is selected, go to Step 2.
2. If User File is selected, the File Browser window appears. From the **File** list, select the name of the settings configuration to be restored.
3. Click **OK**. The User File settings configuration selected is restored.

Round-Trip Delay Testing

The round-trip delay function allows you to transmit a known frame into your network and measure how long it takes for the frame to return to the unit.

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To generate and measure round-trip delay:

1. Select an SDH or SONET protocol processor.
2. Select **Test**.
3. Select **RTD**. The Round-Trip Delay screen appears.
4. To fine-tune the measurement, select **Consecutive Good Time Required** or **Consecutive Good Frames Required** (these parameters are coupled). Otherwise, continue to step 5.

   If one of the following is selected, a keypad appears.

   - If *Consecutive Good Time Required* is selected, enter the duration (in milliseconds) of valid frames to occur before the round-trip delay function is confirmed to be activated. The range is 0.125 to 2047.875 milliseconds.
   - If *Consecutive Good Frames Required* is selected, enter the number of valid frames to occur before the round-trip delay function is confirmed to be activated. The range is 1 to 16383 frames.
5. Select **Action State**. The round-trip delay options appear.
6. Select **Single Round-Trip Delay** or **Continuous Round-Trip Delay** to start the round-trip delay function.

   - If *Single Round-Trip Delay* is selected, an AIS alarm is inserted into a frame and transmitted once through your network. The frame's transmission through the network is measured in frame counts and milliseconds. Frame counts indicates the number of frames received before the AIS frame is received by the unit. Milliseconds indicates how long it took for the AIS frame to travel out and return to the unit.
   - If *Continuous Round-Trip Delay* is selected, an AIS alarm is inserted into a frame and continuously transmitted through your network. The current frame count and duration appear in the **Current** column. The fastest round trip appears in the **Minimum** column and the slowest round trip appears in the **Maximum** column.

To stop the round-trip delay function:

1. Select **Action State**.
2. Select **Stop Round-Trip Delay**.

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Saving a Customized Settings Configuration

Saves a customized configuration for all protocol processors' Transmit or Receive settings. For example, when a customized settings configuration is saved while in a particular protocol processor mode (for example, STM-4), the settings currently configured for other protocol processors (for example, E1, E3, STM-16, etc.) will also be saved with that setting configuration.

To save a configuration:

1. Create a test configuration using the Transmit and Receive Settings screens.
2. Once you are done, select **Save** from the common function buttons. The File Browser window appears.
3. Select **File Name**.
4. Enter a name for the configuration to be saved, and select **Enter** when done. The file is saved with an automatic file extension of .set.

Saving Graphs for Replay

Select the Save Graphs button to save the graphed results to a file for replay at a later time. The graph is saved with a .grp extension.

To view the graph select the **Replay Graphs** button and choose the desired .grp file from the Browser dialog box.

Important: Files saved when working with the Remote Control Application will not be accessible from the NIC unit touch-screen and visa-versa. The remote application saves the files to the Remote Control (GalaxyNIC) directory on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

For instructions on accessing a saved file see Print or View Saved Files.

Printing or Viewing Saved Files

While running tests, you have the option to save the information to a file. The instructions below tell you where and how to print or view a saved file.

Important: Files saved when working with the Remote Control Application will not be accessible from the NIC unit touch-screen and visa-versa. The

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remote application saves the files to the Remote Control (GalaxyNIC) directory on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

To print or view a saved file:

1. From the **System** tab, select **File Services**.
2. Select a file from the **Disk** directory box. The desired report may display in the main Disk directory, or it may be stored in one of the folders in the directory. Folder names are enclosed in brackets **[foldername]**. To return to the main Disk directory after opening a folder, select **[. .]** or the **Disk** button.

Important: Real-time reports generated from the NIC unit touch-screen, using the Action after Duration function, are automatically stored in the [APP] folder. Select the folder to display those reports.

The following is a list of file extension used for files generated from the Print Report, Graph, or Action after Duration functions:

- **.aps** - APS Report
- **.evt** - Event Report
- **.perf** - Performance Report
- **.real** - Real-time Test Report (Stored in [APP} folder on NIC unit.)
- **.rep** - Graph Report, BERT Analysis, RFC Thru Put Analysis
- **.set** - Settings Report
- **.stat** - Results Report
- **.statE** - Event Report
- **.grp** - Graph (This is not a text file. It can only be viewed as a graph by selecting **Results,** pointing to **Graph** and choosing the **Replay Graphs** button.)

3. Choose one of the following

To **Print** the file:

a. Select **Print**. A standard Print dialog box appears.

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If you want to print a report directly from the NIC unit, make sure that a printer is attached to the unit's parallel or serial port.

b. Select the printer **Name** and choose **OK**.

To **View** the file:

a. Select **View**. The View File window appears. Use the **Display Hex** / **Display ASCII** toggle button to display the file in Hex or ASCII format.

The following file details display below the File List box.

- File name
- File size and date
- File attributes

b. Select **Exit** to close the View File window.

Configuring the Screen Saver

The screen saver can be turned off or configured to activate after a set period of time. When the screen saver is operating, you can clear it by touching anywhere on the touch screen.

To enable the screen saver:

1. From the **System** tab, select **Misc**.
2. Select **Start Screen Saver**. The Select Screen Saver Delay dialog box appears.
3. Select the desired delay period.

To disable the screen saver:

1. From the **System** tab, select **Misc**.
2. Select **Start Screen Saver** and choose **Off**.

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Changing SONET or SDH Overhead Bytes


The following only applies to SONET and SDH protocol processors.

The SOH and POH functions allow you to stress a SONET or SDH network by directly editing overhead (OH) bytes to simulate errors, alarms, and other stress conditions.

A specific slot can be selected, and its OH bytes can be changed for transmission out of the system.

- **SONET overhead** includes Section, Line and Path overhead bytes.
- **SDH overhead** includes Regenerator Section (RS), Multiplex Section (MS), and Higher-Order Path (HP) overhead bytes.

Altering the OH bytes allows other equipment to detect, and if necessary, react to these changes.

To change overhead bytes:

1. Select a SONET or SDH protocol processor.
2. Select the **Transmit** and choose **SOH** or **POH** to display overhead bytes.
    - In *SDH* mode, select a slot using the **Showing** button.
    - In *SONET* mode, select a slot using the **STS** button.
3. Select an **OH** byte.

    A keypad appears allowing the byte's 8-bit pattern to be edited. The byte appears in binary notation by default. Use the keypad's 1 and 0 buttons to change the bit value. Bit values are changed from the least significant bit to the most significant bit (from right to left).

    The byte can also appear in HEX or decimal notation by select the **HEX** or **DEC** button on the keypad.


The bit value can also be erased from the keypad using the **Clear** button.

4. When editing is complete, select **OK** to save the new value. (**Cancel** discards any changes made to the byte and restores the previous value.)

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SOH and POH Modes

If...	is selected for...	then
SOH	SDH mode	Regenerator Section and Multiplex Section overhead bytes appear.
SOH	SONET mode	Section and Line overhead bytes appear.
POH	SDH mode	Higher-Order Path overhead bytes appear.
POH	SONET mode	Path overhead bytes appear.

Displaying SDH/SONET Overhead Bytes

The following only applies to SDH and SONET protocol processors.

The system allows you to view Overhead bytes that are transmitted and received on the SDH or SONET signal.

To view transmitted Overhead bytes:

1. Select a SONET or SDH protocol processor.
2. Select the **Transmit** button.
3. Select the **SOH** or **POH** button to display OH bytes.

   The Overhead bytes for the current SOH slot or STS-1 slot appear.

   From this screen, the Overhead bytes can be edited as described in **Changing SONET and SDH Overhead Bytes**.
4. To view Overhead bytes for other slots, select the **Showing** or **STS** button and enter a slot (1 to 192 for OC-192 or STM-64; 1 to 48 for OC-48 or STM-16; 1 to 12 for OC-12 or STM-4, and so on). Select **OK**, and the bytes for that specific slot appear.

To monitor incoming Overhead bytes:

1. Select an SDH or SONET protocol processor mode.
2. Select the **Receive** button.

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3. Select the **SOH** or **POH** button to display OH bytes.

   The Overhead bytes for the selected slot (of the incoming SONET or SDH signal) appear.

   Use the **Showing** or **STS** button to view Overhead bytes for other slots.


Overhead bytes and trace bytes cannot be edited from this screen.

Changing SDH/SONET Overhead Bytes in Passthru Mode


The following only applies to SONET and SDH protocol processors.

Passthru mode allows an incoming signal to pass through the unit without altering the data in the signal. However, the overhead bytes (A1/A2, K1/K2, D1-D3, D4-D12, E1, F1, M1, and E2) can be changed to simulate errors, alarms, and other stress conditions such as Pointer Adjustments. This lets you verify if equipment in the SONET or SDH network can detect changed overhead bytes.

To configure the unit for Passthru mode:

1. Select a SONET or SDH protocol processor.
2. Select the **Transmit** and choose **SET 1**.
3. Select the **Passthru Mode**. The Select Passthru Mode dialog box appears.
4. For STM-64/16 or OC-192/48, select **On** to enable Passthru mode.

   For STM-4 or OC-12, select **Intrusive** or **Intrusive Add/Drop** to enable Passthru mode.

To change Overhead bytes in Passthru mode:

1. Select the SOH or **POH** button.

   When Passthru mode is enabled:

   - The OH bytes are passed-through (looped) the system without being altered. (These bytes are disabled on the touch screen.)
   - The **Intrusive Overhead** buttons appear. These buttons allow you to select a specific OH byte and change its value.

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2. Select an **Intrusive Overhead** button. For example, select F1 Pass.

   The selected Intrusive Overhead button changes to indicate that a specific byte has been selected. For example, F1 Pass now appears as F1 Intrude. In addition, the OH byte is now enabled and displays its value.

3. Select the same OH byte (from the left side of the touch screen) that you selected for Passthru mode (on the right side of the touch screen). For example, select the F1 byte.

   A touch screen keypad appears allowing the byte's 8-bit pattern to be edited. The byte appears in binary notation by default. Use the keypad's 1 and 0 buttons to change the bit value. Bit values are changed from the least significant bit to the most significant bit (from right to left).

   The byte can also appear in HEX or decimal notation by selecting the **HEX** or **DEC** button on the keypad.

4. When editing is complete, select **OK** to save the new value which will be transmitted out of the unit.
5. Repeat steps 2-4 to reconfigure other OH bytes.

SDH/SONET Signal Notification


The following only applies to SDH and SONET protocol processors.

The unit can use SS bits to determine if it is receiving an SDH or SONET signal. If the received signal does not match the expected signal, the SS Bits Mismatch LED turns red. The SS bits are bits 5 and 6 of the H1 Pointer byte. These bits determine if the H1 byte is configured for SDH or SONET operation.

To configure the unit for SDH/SONET signal detection:

1. Select an SDH or SONET protocol processor.
2. Select **Receive**.
3. Select **SET 2**.
4. Select the **Expected SS Bits** function. The Select Expected SS Bit window appears.
5. Select an SS bits option.
6. Select the **SS Bits Alarm Reporting** function and select **Enable**.

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An alarm is reported if the incoming SS bits on the received signal do not match the expected SS bits.

Security Settings

Security is an administrative function and only appears if you are logged on as an Administrator. This screen is divided into the following main sections: User Security Information, System Services, NT/FTP Administrator, and Reset System.

Important: The Security option is not available unless you have Admin privileges.

User Security Information

This function allows you to view the following security information on system users:

- **User Name**
- **Permissions**: Read Only, Read/Write, Calibrate, or Admin
- **Active**: Displays “Yes” for user’s currently logged in to the test set.
- **Current**: Displays permissions of active users.
- **Default User**: This column only appears on the local GUI and is linked directly to the “User Login Required” setting on the System Misc screen. When User Login Required is not selected the default user appears in the Login dialog box.

Default User only appears on the NIC touch screen.

The Security function also enables a user with administrator privileges to perform the following tasks:

- Add a User
- Delete a User
- Update a User Profile
- Enable/Disable Security System Lock
- Establish a Default Login
- Establish a Required Login

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Selecting the Security System Lock check box prevents other people from logging onto the test set. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read-Only permissions only. When the user logs on with Read-Only permissions, all functionality will be disabled with the exception of the online help and the About this product function.

System Services

System Services allows an administrator to disable specific network services to meet their network's security policies. To enable a system service, select its check box. To disable a system service, clear the check box.

NT/FTP Administrator

NT/FTP Administrator assigns a user ID and password so that a user can log in to a remote computer and transfer files using the file transfer protocol service.

Reset System

Reset System restores default Security settings.

Establishing a Default User Login

This function allows an administrator to establish a default login, which results in users not having to enter a user ID and password each time they use the unit.

Important: The default login function is only applicable for the NIC unit. When connecting to a NIC via the Remote NIC application, a user ID and password are required. Establishing a default login user can only be done from the NIC touch screen.

To establish a default login user:

1. From the **System** tab, select **Security**.
2. From the User Name list box, select the **User Name** that you wish to make the default upon login.
3. Select **Set as Default**. Under the Default User column, a "Yes" appears, indicating that the user has been established as default user.

The Set as Default button is only available from the NIC touch screen.

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To disable a default login:

1. From the **System** tab, select **Misc**.
2. From **Local Settings**, clear the **User Login Required** check box. A cleared check box, indicates that User Login Required is disabled.


The User Login Required check box is only available from the NIC touch screen.

3. Reboot the unit for changes to take affect. When the unit restarts, a login box appears.

   If you do not wish to reset a Default Login user, there is no need to continue to the next step.

4. If you wish to set another default user, log in as an Admin user and repeat the steps above under, *To establish a default login*.

Enabling/Disabling Security System Lock

This function allows an administrator to enable a Security System Lock that only allows one user with Read and Write permissions (this includes Calibration and Admin users) to be logged in at a time. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read Only permissions only. When the user logs on with Read Only permissions, all functionality will be disabled with the exception of the online help and the About this product function.

To enable Security System Lock:

1. From the **System** tab, select **Security**.
2. From **Default Entry**, select the **Security System Lock** check box. A checked box indicates that the Security System Lock function is enabled.

To disable Security System Lock:

1. From the **System** tab, select **Security**.
2. From **Default Entry**, clear the **Security System Lock** check box. A cleared check box indicates that the Security System Lock function is disabled.

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System Services

The following system services can be enabled or disabled by an Administrator.


A unit reboot is required if any changes are made to system services.

To enable or disable a system service:

1. From the **System** tab, select **Security**.
2. From **System Services**, enable the following services by selecting the check box, or disable the service by clearing the check box.

    - **Internet Information.** The IIS (Internet Information Server) service provides the ability to host a simple web server, which uses port 80 (http). This function can be disabled (deselect the checkbox) to prevent unauthorized access to the port.
    - **File Transfer Protocol.** The FTP service allows a user to remotely log in to the unit and transfer files. Disabling this function can prevent unauthorized access to ports 20 and 21.


FTP service must be enabled if you use the Remote Control Application or the DLI Software Upgrade software. You can not connect to the unit using these applications if FTP service is disabled.

    - **Remote Procedure Call.** This protocol allows an application on one PC to request a service from another application located on a different PC within in a LAN. Disabling this function can prevent unauthorized users from using the unit to access other equipment in a customer's network.
    - **Telnet.** The Telnet service allows a user to log in to a remote system. Disabling this function can prevent unauthorized users from using the unit to access a customer's network.
    - **NetBIOS.** The NetBIOS (Network Basic Input/Output System) program allows applications to use port 139 to communicate to different PCs within a LAN. This function can be disabled to prevent unauthorized access to the port.
    - **SCPI.** The SCPI (Standard Commands for Programmable Instruments) service uses port 8090 to send and receive SCPI

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commands to the unit. Disabling this function will prevent unauthorized access to the port.

- **TL1.** The TL1 (Transaction Language 1) service uses port 8080 to send and receive TL1 commands to the unit. Disabling this function will prevent unauthorized access to the port.
- **SNMP.** The SNMP (Simple Network Management Protocol) service uses ports 161 and 162 to transfer commands and traps to and from the unit. Disabling this function will prevent unauthorized access to these ports.

Action after Duration

Action after Duration defines what activities occur at the conclusion of a timed test. It allows several different options, including printing results to a printer or recording them to a file; repeating a test or just processing one test. Test results appear in a columned report format; however, there is one option available to record the statistics using a delimiter.


To determine how long a test will run, refer to Duration.

Print Options

When a print option is chosen, the report prints directly to a printer. If you are using the NIC touch-screen, a printer must be attached to the NIC's parallel or serial port. (See Printer Port Configuration.)

Record Options

When a record option is chosen, the results are saved to a file with one of the following extensions:

- **.evt** - Event Report. A detailed summary of alarms, errors, and pointer activity.
- **.statE** - Event Report. Used when the *Record Statistics/Events and Repeat Test* option is selected.
- **.stat** - Results Report. A statistics report of the Scan, Errors, Alarms, and PTR functions.
- **.real** - Real-time Test Report. Real-time reports generated only from the NIC touch screen.

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The file naming convention is: **xxhhmmss.<extension>** (where **xx** is the protocol processor, **hh** is hours, **mm** is minutes, **ss** is seconds). For example, a file named "OC163035.evt" represents an OC-192/48/12 test event that was recorded at 16:30:35.

To learn how to print or view a saved file, see the topic Print or View Saved Files.

The table below describes the Action after Duration options.

Repeat Test and Realtime Test Options	**Description**
None	No action occurs at the end of the test duration.
Print Current Statistics	Test statistics are printed to a printer at the end of a timed test. The test does not repeat.
Record Current Statistics	Test statistics are printed to a file (.stat) at the end of a timed test. The test does not repeat.
Record Current Statistics using a delimiter	Test statistics are printed to a file (.stat) at the end of a timed test. The results appear in a quote/comma-report format, meaning that error and/or alarm values are enclosed in quotes (") and separated by commas (,). The test does not repeat.
Print Statistics and Repeat Test This option appears when **Repeat Actions** is selected.	Test statistics are printed to a printer at the end of the timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Record Statistics and Repeat Test This option appears when **Repeat Actions** is selected.	Test statistics are printed to a file (.stat) at the end of a timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the

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	Action After Duration value.
Print Events and Repeat Test This option appears when **Repeat Actions** is selected.	Test events are printed to a printer at the end of the timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Record Events and Repeat Test This option appears when **Repeat Actions** is selected.	Test events are printed to a file (.evt) at the end of a timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Print Statistics/Events and Repeat Test This option appears when **Repeat Actions** is selected.	Both test statistics and events are automatically printed to a printer at the end of the timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Record Statistics/Events and Repeat Test This option appears when **Repeat Actions** is selected.	Both test statistics (.stat) and events (.statE) are printed to a file at the end of a timed test and the test repeats. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value. Both **.statE** and **.stat** files are recorded.
Print Events and Repeat Test This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit. When the test duration expires, the test restarts.

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Record Events and Repeat Test This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a file (.evt). When the test duration expires, the test restarts.
Print and Record Events and Repeat Test This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit and prints to a file (.evt). When the test duration expires, the test restarts.
Print Events This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit. The test does not repeat.
Record Events This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a file (.evt). The test does not repeat.
Print and Record Events This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit and prints to a file (.evt). The test does not repeat.

Duration

This function configures how long a timed test runs. The following options are available:

Options	Description
Continuous	Test is untimed, and unit is always collecting data.
5 Minutes	Test runs for 5 minutes.

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15 Minutes	Test runs for 15 minutes.
1 Hour	Test runs for 1 hour.
2 Hours	Test runs for 2 hours.
24 Hours	Test runs for 24 hours.
72 Hours	Test runs for 72 hours.
1 Week	Test runs for 1 week.
2 Weeks	Test runs for 2 weeks.
User Defined	Allows a specific test duration to be entered using a touch screen keypad. The minimum duration is 1 minute. The maximum duration is 99 days, 23 hours, and 59 minutes.

Stopping a Test

The Stop common function button stops the reporting of received data and takes a snapshot of error, alarm, and event activity.

When the Stop button is selected, the following occurs:

- All statistics logged and reported by the Performance Monitoring function stop.
- All alarm, error, and event statistics logged and reported by the Results function stop.
- All elapsed time and duration counters stop.

The LEDs will continue to update and indicate current activity.

To stop a test:

- Select the **Stop** common function button located at the bottom of the touch screen.

To restart test activity and statistic reporting, select the **Restart** button.

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Restarting an Error, Alarm, or Event Test

The Restart common function button is used to initiate the following test activities:

- **Clears and resets** error, alarm, and event activity counters, statistics, and LEDs for the current protocol processor.
- **Starts** error, alarm, or event activity that was stopped using the Stop button.

To restart a test or reset statistics:

- Select the **Restart** common function button located at the bottom of the touch screen. Configured testing on the current protocol processor is restarted.

Pausing/Resuming a Test

To pause a test:

1. Select the protocol processor running the test that you want to pause.
2. Select **Test** and choose **Set 1**.
3. Select **Pause Test**. When Pause is selected, the system stops collecting data, but the Elapsed Time counter continues. Additionally, when Pause is selected, a red **Test Paused** LED appears in the LEDs/Quick Status area.

To resume a test:

- Select **Resume Test**.

  The Test Paused LED turns white with red text, indicating that the test was paused earlier. A restart or new test will clear the LED's history.

The events occurring while in pause mode will be recorded in the Event Log.

Displaying Serial Numbers and Software Revision

This function displays the following information:

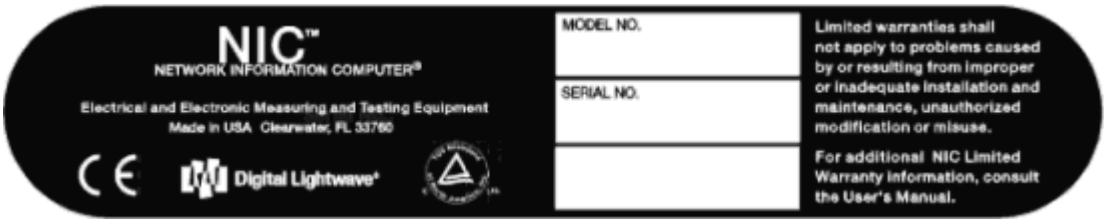
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- Copyright Information
- Feature set number
- Graphical User Interface Version
- Customer Service Information
- Circuit Pack Information
    - Product Serial Number
    - Kit Number
    - System Control Version
    - SCPI Version
    - TL1 Version
    - SNMP Version
    - OmniOrb Version
    - UPX Version
    - zlib Version
    - Kit Numbers and Versions

To view this information:

1. From the **System** tab, choose **Misc**.
2. Select **About this product**. The software revision number and hardware serial numbers appear.
3. To close the **About this product** box, select **OK**.

You may obtain some of the product information by viewing the product label located on the unit. For example:



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Increasing or Decreasing Speaker Volume

This function allows you to increase or decrease the speaker volume in order to hear the touch screen beep.

To increase or decrease speaker volume:

1. From the **System** tab, choose **Misc**.
2. From **Speaker Volume**, select the **Low** arrow to decrease the volume, or **High** arrow to increase the volume.

Starting a Test

The Duration and Action After Duration functions determine how long a test runs and what activities occur at the end of the test.

To start a test:

1. Select the protocol processor that is running the test.
2. Select **Test**. The Duration and Action After Duration functions appear under **SET 1**.
3. Select **Duration**. The Select Duration of a Test dialog box appears.
4. Select how long you want the test to run.
5. Select **Action After Duration**. The Select Action After Test dialog box appears.
6. Choose the desired action that will occur at the end of the test. When you select **Repeat Actions**, the Select Repeat Action after Test dialog box appears. When you select **Realtime Actions**, the Select Realtime Actions after Test dialog box appears.

Real-time test reporting is only available locally (from the touch screen) on portable test sets.

To stop a test before the test duration expires:

- Select the **Stop** common function button. All statistics and events logged and reported by the Performance Monitoring and Results functions stop. In addition, the Elapsed Time and Duration counts stop.

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To restart a test:

- Select the **Restart** common function button. The test and statistics clear and the Elapsed Time counter restarts at zero.

To pause a test:

- Select **Pause Test**. When Pause is selected, the system will stop collecting data, but the elapsed time counter will continue.

To resume a paused test:

- Select **Resume Test**.

Using the Switch Matrix

The **Switch Matrix** is a graphical display of the unit's current interface and mapping connections. It allows you to configure the unit from a single screen using the following methods:

- Switch Matrix components
- Presets button

To configure the unit using the Switch Matrix components:

1. Select the **Switch Matrix** tab.
2. Starting from the left, select an **Interface** button. After selecting an interface, the appropriate Mapping, Container, and Payload buttons are enabled on the Switch Matrix. This will help you create a valid configuration.
3. From the **Mapping** and **Payload** columns, select the desired, and available, Mapping and Payload buttons.
4. Select **Apply**. The unit applies the new configuration. Signal lines appear to illustrate the new data flow.

To disengage the configured protocol connections:

- Select **All to Tx/Rx**. This globally disconnects any internal connections between multiple protocol processors. A protocol processor will now expect to receive a signal using its line interface.

To configure the unit using the Presets button:

1. Select the **Switch Matrix** tab.

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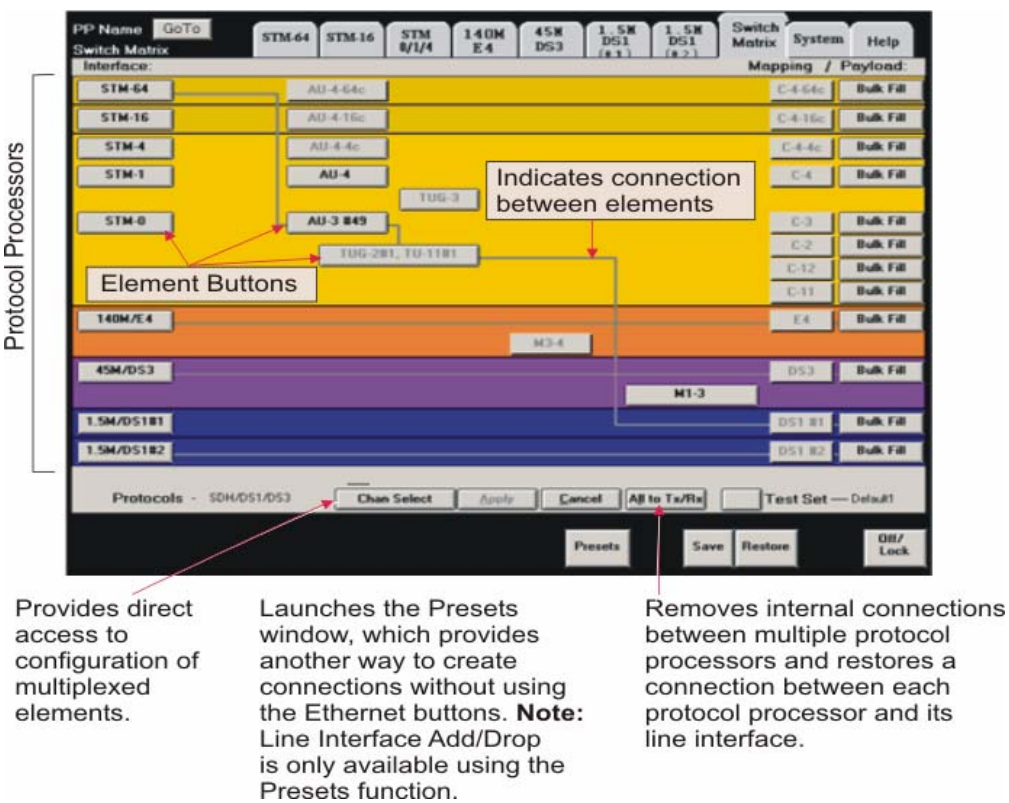
2. Select the **Presets** button located below the Switch Matrix. The Presets window appears.
3. Select the **Interface** button and choose an interface as a starting point.
4. Select the **Configuration** button and choose a protocol to connect to the selected interface. If necessary, select the Configuration button again to create additional connections.
5. Select the **Apply** button. The unit takes a few moments to apply the new protocol connections. When complete, the mappings and configurations associated with the selected Preset are automatically made. Signal lines appear to illustrate the new data flow.

   For more information, see Presets.

Switch Matrix

The Switch Matrix allows you to display and define a protocol processor's multiplexing structure from a single screen. This fast and convenient configuration method lets you select a protocol processor interface, route the signal through available mappings, drop the signal to other protocol processors, and select a payload to use within the signal. (See Switch Matrix Guidelines.)

The following is an example of the Switch Matrix in SDH mode.



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Switch Matrix Guidelines

When using the Switch Matrix:

- ALWAYS start from left to right by first selecting an **Interface** button.
- NEXT, after selecting an interface, its available Container, Mapping, and Payload buttons are enabled to help you create a valid signal configuration.
- LAST, after making the connections between elements, select the **Apply** button for the new configuration and connections to take affect.

Enabling/Disabling Security System Lock

This function allows an administrator to enable a Security System Lock that only allows one user with Read and Write permissions (this includes Calibration and Admin users) to be logged in at a time. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read Only permissions only. When the user logs on with Read Only permissions, all functionality will be disabled with the exception of the online help and the About this product function.

To enable Security System Lock:

1. From the **System** tab, select **Security**.
2. From **Default Entry**, select the **Security System Lock** check box. A checked box indicates that the Security System Lock function is enabled.

To disable Security System Lock:

1. From the **System** tab, select **Security**.
2. From **Default Entry**, clear the **Security System Lock** check box. A cleared check box indicates that the Security System Lock function is disabled.

Displaying Serial Numbers and Software Revision

This function displays the following information:

- Copyright Information
- Feature set number
- Graphical User Interface Version

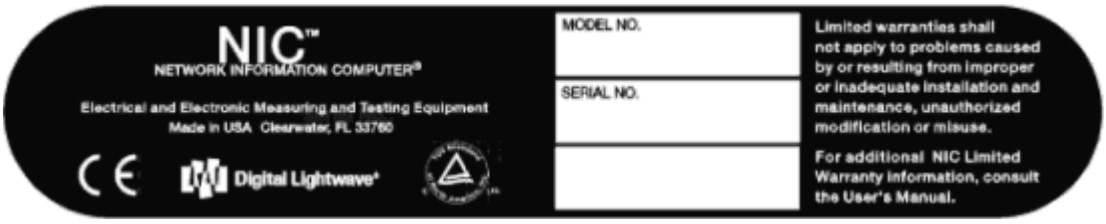
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- Customer Service Information
- Circuit Pack Information
    - Product Serial Number
    - Kit Number
    - System Control Version
    - SCPI Version
    - TL1 Version
    - SNMP Version
    - OmniOrb Version
    - UPX Version
    - zlib Version
    - Kit Numbers and Versions

To view this information:

1. From the **System** tab, choose **Misc**.
2. Select **About this product**. The software revision number and hardware serial numbers appear.
3. To close the **About this product** box, select **OK**.

You may obtain some of the product information by viewing the product label located on the unit. For example:



Changing a Tab Name for the Go To Label

1. From the **System** tab, select **User Preference**.
2. Under **Label Preferences**, select **Local** or **Global**.

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- Local – Only changes the tab label for your session. Other users will not see the tab name that you enter.
- Global – Changes the tab label on the unit so that all users see the same tab name that you enter.

3. Select a tab name from the **Assigned Name** column of the list box.
4. Under **PP Label Information**, enter a name in the **Assigned Name** text field. (When using the touch screen, select ... to open a keypad.)
5. Select **Update List Entry**, to add the name to the User Defined Name column of the list box.
6. Repeat steps 3 through 5 to continue adding user-defined names, as desired.
7. Select **Save All List Entries**. The new tab names appear in the PP Name/Go To area of the screen when the protocol processor tab is selected.
8. Select **PP Name / Go To**, located in the top-left corner of the touch screen. The Select Protocol Processor Entry dialog box appears displaying the new name.

When the protocol is selected the new name appears below the PP Name text on the touch screen; however, the name on the tab remains the same.

To restore tab names, select Restoring Default Tab Names for the Go To Label.

Restoring Default Tab Names for the Go To Label

1. From the **System** tab, select **User Preferences**.
2. Under Label Preferences, select **Default**.
3. Select **Save All List Entries**. The default tab names are restored.

To change tab names, select Changing a Tab Name for the Go To Label.

TCM

The unit supports Tandem Connection Monitoring (TCM) mode for SDH and SONET protocol processors. When configured for TCM mode, the unit can transmit and monitor errors, alarms, and trace pattern activity between your network's TC equipment.

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For more information about TCM transmit and receive procedures:

- Select **Configuring TCM Transmit Mode** for transmit preparation procedures and links to error, alarm, and trace generation.
- Select **Configuring TCM Receive Mode** for receive preparation procedures and links to error, alarm, trace, and overhead monitoring.
- Select **TC Summary LED** for information about the TCM LEDs,

Configuring TCM for Transmit Mode

When transmitting or monitoring errors and alarms the unit must be configured for TCM operation.

To configure the unit for TCM transmit operation:

1. Select an SDH or SONET protocol processor.
2. Select **Transmit**.
3. Select **SET 2**.
4. Select the **TC Overhead Processing** function and select **Enable**.
5. The unit is configured for transmit TCM mode, which now permits the transmission of TCM errors, alarms, and traces.

Related Topics:

Transmitting TCM errors

Transmitting TCM alarms

Transmitting a TC trace

Transmitting TCM Errors

Once in TCM mode, you can create and send TCM failures and errors on your network.

Before generating TCM traffic:

- Make sure the unit is configured for TCM operation.

To insert errors in TCM mode:

1. Select an SDH or SONET protocol processor.

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2. Select **Transmit**.
3. Select **Error Alarm**.
4. Select **Error to Insert**. The Select Error to Insert window appears.
5. Select one of the following TCM errors:
    - TC-IEC
    - TC-REI
    - TC-OEI
6. Select **Error Insert Rate**. The Select Error Insert Rate window appears.
7. Select an error rate. The system starts transmitting errors.

To stop TCM error transmission:

1. Select **Error to Insert**. The Select Error to Insert window appears.
2. Select **None**. Error transmission stops.

Transmitting TCM Alarms

The unit can transmit alarms to simulate various TCM alarm conditions. This can help determine if receiving Tandem Connection equipment can detect an alarm in the incoming signal.

Before generating TCM traffic:

- Make sure the unit is configured for TCM operation.

To insert alarms in TCM mode:

1. Select an SDH or SONET protocol processor.
2. Select **Transmit**.
3. Select **Error Alarm**.
4. Select **Alarm Generated**. The Select Alarm to Insert window appears.
5. Select one of the following TCM alarms:
    - TC-RDI
    - TC-ODI
    - TC-AIS

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- TC-UNEQ
- TC-LOF

6. The unit starts transmitting alarms.

To stop alarm transmission:

1. Select **Alarm Generated**. The **Select Alarm to Insert** window appears.
2. Select **Off**. Alarm transmission stops.

Transmitting a TC trace

A Tandem Connection (TC) trace can be generated to verify the connection between TCM equipment. The TC Trace is a 16-byte, ASCII-character pattern that can be continuously transmitted.

Before generating a TC trace:

- Make sure the unit is configured for TCM operation.

To create a TC trace:

1. Select an SDH or SONET protocol processor.
2. Select **Transmit**.
3. Select **POH**.
4. Select **TC Trace**.
5. Select:
   - **Default:** selects the 16-byte Digital Lightwave ASCII message as the TC trace pattern.
   - **All Ones (16 byte):** selects a 16-byte All Ones pattern as the TC trace pattern.
   - **All Zeros (16 byte)**: selects a 16-byte All Zeros pattern as the TC trace pattern.
   - **User Defined:** creates a 16-byte user-defined ASCII message as the TC trace pattern.
6. The unit uses this pattern as the TC trace.

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Transmitting a TC trace

A Tandem Connection (TC) trace can be generated to verify the connection between TCM equipment. The TC Trace is a 16-byte, ASCII-character pattern that can be continuously transmitted.

Before generating a TC trace:

- Make sure the unit is configured for TCM operation.

To create a TC trace:

1. Select an SDH or SONET protocol processor.
2. Select **Transmit**.
3. Select **POH**.
4. Select **TC Trace**.
5. Select:
    - **Default:** selects the 16-byte Digital Lightwave ASCII message as the TC trace pattern.
    - **All Ones (16 byte):** selects a 16-byte All Ones pattern as the TC trace pattern.
    - **All Zeros (16 byte)**: selects a 16-byte All Zeros pattern as the TC trace pattern.
    - **User Defined:** creates a 16-byte user-defined ASCII message as the TC trace pattern.
6. The unit uses this pattern as the TC trace.

Monitoring the TC Trace

Before monitoring TC trace:

- Make sure the unit is configured for TCM receive mode.

To view the TC trace:

1. Select an SDH or SONET protocol processor.
2. Select **Receive**.
3. Select **POH** to view the incoming TC trace, which appears at the bottom of the screen.

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A TC-TIM alarm occurs if the incoming TC trace does not match the expected TC Trace. The alarm's duration appears on the Results' Alarm screen.

TC Summary

The **TC Summary** LED indicates if a TCM error or alarm has been detected.

- If the LED is red, select the **TC Summary** text to display the TC LEDs



The TC LEDs appear in the center of the screen. The following describes the TC LEDs.

LED	Description
TC-AIS	Tandem Connection-Alarm Indication Signal. Indicates if IEC bits 1110 are being received from upstream TCM equipment. (Bits 1-4 of the N1 byte are the IEC bits.) This is an alarm LED.
TC-IEC	Tandem Connection-Incoming Error Count. Indicates a B3 error count is being received from downstream TCM equipment. Bits 1-4 of the N1 byte are used for this indicator. This is an error LED.
TC-LOF	Tandem Connection-Loss of Frame. Indicates the loss of a valid multiframe frame alignment signal (FAS) pattern from upstream TCM equipment. This is an alarm LED.
TC-ODI	Tandem Connection-Outgoing Defect

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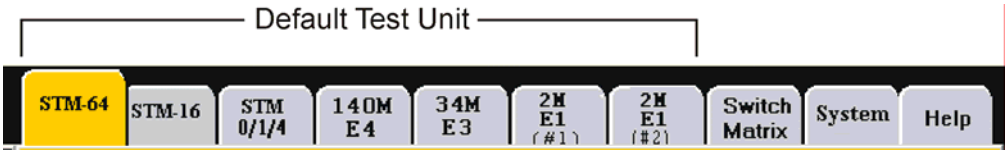
	Indicator. Indicates that the unit is sending an ODI alarm to upstream TCM equipment. Bit 7 in multiframe 74 of the N1 byte is used for this indicator. This is an alarm LED.
TC-OEI	Tandem Connection-Outgoing Error Indication. Indicates that the unit is sending an OEI error to upstream TCM equipment. Bit 6 of the N1 byte is used for this indicator. This is an error LED.
TC-RDI	Tandem Connection-Remote Defect Indication. Indicates that a defect has occurred at the downstream TCM equipment. The unit is receiving an alarm. Bit 8 in multiframe 73 of the N1 byte is used for this indicator. This is an alarm LED.
TC-REI	Tandem Connection-Remote Error Indication. Indicates that an error has occurred at the downstream TCM equipment. The unit is receiving an error. Bit 5 of the N1 byte is used for this indicator. This is an error LED.
TC-TIM	Tandem Connection-Trace Identifier Mismatch. Indicates that the incoming TC trace does not match the expected TC trace. This appears as an alarm count on the Results' Alarm screen.
TC-UNEQ	Tandem Connection-Unequipped. Indicates that a 00h pattern has been detected in the N1 byte of a Tandem Connection. This is an alarm LED.

Understanding Test Units

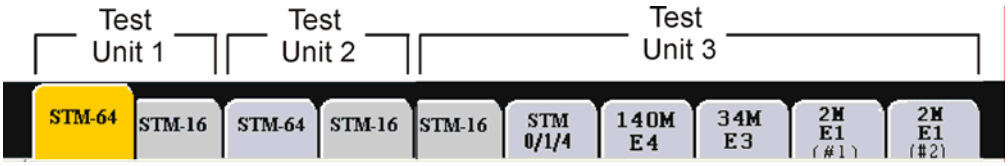
A test unit is a series of adjacent circuit packs that are installed in a NIC/NAA (test set). The test unit is based on a circuit pack's internal addressing and starts from the highest to the lowest speed.

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For example, a test set can contain multiple circuit packs of the same type (two 10Gbps circuit packs). When this type of configuration occurs, the first instance of the higher speed circuit pack is considered a test unit. Any lower speed circuit packs immediately to the right of this card are included in the test unit.



However, when the second instance of a higher speed circuit pack is encountered, it is considered the beginning of the second test unit. The image displayed to the right shows a NIC that has eight protocol tabs, representing four test units.



Preset configuration options that appear will be those available for the specified test unit. When the NIC/NAA has multiple test units you must first select the desired test unit protocol tab before selecting the Presets button.

Setting Time and Date

The system uses touch screen keypads for time and date configuration. Time is entered in a **HH/MM/SS** format. Date is entered in a **DD/MM/YYYY** format.

To set the time:

1. From the **System** tab, select **Set Unit's Date and Time**. The Set Date and Time window appear.
2. Select the **Time** button.
3. Select **Hour** and enter the hour using 2-digit, 24-hour, military time format.
4. Select **Minutes** and enter the minutes using a 2-digit format.
5. Select **Seconds** and enter the seconds using a 2-digit format.
6. Select **Set**. The time change appears in the LED/Quick Status area.

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To set the date:

1. From the **System** tab, select **Set Unit's Date and Time**. The Set Date and Time window appear.
2. Select the **Date** button.
3. Select **Month** and enter the month using a 2-digit format.
4. Select **Day** and enter the day using a 2-digit format.
5. Select **Year** and enter the year using a 4-digit format.
6. Select **Set**. The date change appears next to the Set Unit's Date and Time field.

Adjusting Touch Screen Brightness

Adjusting the touch screen brightness can only be performed from the NIC touch screen.

To adjust a portable unit's touch screen intensity:

1. From the **System** tab, choose **Misc**.
2. Select **Backlight Intensity**. A keypad appears.
3. Enter the intensity setting. Valid values range from **0** (brightest setting) to **255** (dimmest setting).
4. Select **OK**.

Turning the Laser On or Off

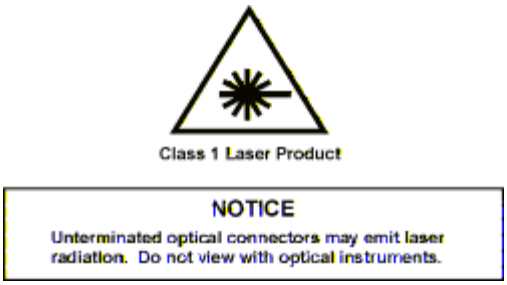
Warning: The optical Transmit output is produced by a laser device. You should never, under any circumstances, look into an unterminated fiber.

Laser operation is controlled from the **Quick Status LEDs** area. The **Laser** button indicates if the laser is on or off. When the unit is powered on, the laser is off by default.

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Laser Safety

The unit contains Class 1 laser devices. Never look into an unterminated fiber. Always place dustcaps on the optical ports when fiber is not attached to the optical ports. CDRH Accession numbers are listed in Agency Approvals.



To turn the laser on:

- Select the **Laser** button in the **Quick Status LEDs** area. The laser status indicates **ON**.

To turn the laser off:

- Select the **Laser** button. The laser status indicates **OFF**.

SDH and SONET laser operation can be defined using the Initial Laser Setting function which controls whether the laser is on or off when the unit is turned on.

From the **Transmit** screen, select **Initial Laser Setting** and choose one of the following:

- **Off** – The unit's laser will be off when the unit is turned on.
- **On** – The unit's laser will be on when the unit is turned on.
- **Restore Previous State** – When the unit is turned on, the laser will be on or off based on its previous setting before the unit was turned off.

Configuring and Transmitting OC-1/3/12 and STM-0/1/4 APS Commands

For OC-1/3/12 and STM-0/1/4 mode, the APS function appears on a multifunctional screen that displays both Transmit and Receive APS commands.

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To configure K1 and K2 byte values:

1. Select **STM-0/1/4** or **OC-1/3/12**.
2. Select **Transmit**.
3. Select **APS**. The initial APS screen appears containing a table of the K1 and K2 byte sequences that can be transmitted.

   The three columns (User Setup, Transmit, and Receive) on the screen display the current bit value for the K1 and K2 bytes. Any changes made to the K1 and K2 bytes are automatically updated in the User Setup column.

   The Transmit column displays the bit values transmitted when you select either **Transmit User**, **Transmit Default**, or **Transmit Illegal**. The Receive Column displays the bit values received for the K1 and K2 bytes.

4. Select **APS Mode** to configure APS commands for Linear protection switching mode or Ring APS signaling mode.
5. Edit the K1 byte. The K1 byte is a request for switch action. There are three functions that allow you to edit the K1 byte:

   - **K1 Full Byte** - Sets all eight bits of the K1 byte at once.
   - **K1 Bits 1-4** - Sets the first four bits of the K1 byte.
   - **K1 Bits 5-8** - Sets the last four bits of the K1 byte.

6. Edit the K2 byte. The K2 byte provides additional information about SONET or SDH network architecture and alarm conditions. There are four functions that allow you to edit the K2 byte:

   - **K2 Full Byte** - Sets all eight bits of the K2 byte at once.
   - **K2 Bits 1-4** - Sets the first four bits of the K2 byte.
   - **K2 Bit 5 (provisioned)** - Sets the fifth bit of the K2 byte.
   - **K2 Bits 6-8** - Sets the last three bits of the K2 byte.

7. Use the following options to transmit bit values:

   - Use the **Transmit User** button to transmit the bit values that appear in the User Setup column. When pressed, the User Setup values are transmitted and appear in the Transmit column. You can edit the transmitted K1 and K2 bytes directly from the SOH function screen.

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- Use the **Transmit Default** button to transmit the default bit values (10101010) for the K1 and K2 bytes. When pressed, the default bit values appear in the Transmit column.
- Use the **Transmit Illegal** button to transmit the illegal bit values (11111111) for the K1 and K2 bytes. When pressed, the illegal bit values appear in the Transmit column.

Configuring and Transmitting OC-192/STM-64 and OC-48/STM-16 APS Commands


The following only applies to OC-192/STM-64 and OC-48/STM-16 protocol processors.

Automatic Protection Switching (APS) is a function that allows an LTE to switch to a backup (or protection) channel in case errors or failures occur on the working channel. APS commands can be configured for either Linear- or Ring-based SONET and SDH networks and are transmitted using the K1 and K2 bytes of the Line Overhead.

You can test your network's APS response by generating a condition that is likely to cause APS switching. You also have the capability to generate specific APS messages and monitor the response by configuring the K1 and K2 bytes.

You can create up to 16 different K1 and K2 byte configurations (known as byte sequences) to measure and stress your equipment's APS switching capabilities.

To configure K1 and K2 byte values:

1. Select a OC-192/STM-64 or OC-48/STM-16 protocol processor.
2. Select the **Transmit** button.
3. Select the **APS** button. The initial APS screen appears containing a table of the K1 and K2 byte sequences that can be transmitted. A total of 16 K1 and K2 byte sequences can appear in the table.
4. To make a new entry:
   - Select **New Item**

   To edit an item:
   - Select **Item <#>**, for example, Item 12.

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The Apply Maintenance to Entry screen appears, which contains functions used to configure and set the measurement criteria of the K1 and K2 bytes.

5. Select **APS Mode**. The APS Mode dialog box appears.
6. Choose **Linear** protection switching mode or **Ring** APS signaling mode.
7. Select a **K1** byte/bit. A value dialog box associated with the K1 selection appears

   The K1 byte is a request for switch action. There are three functions that allow you to edit the K1 byte:

   - Use the **K1 Full Byte** function to set all eight bits of the K1 byte at once.
   - Use the **K1 Bits 1-4** function to set the first four bits of the K1 byte.
   - Use the **K1 Bits 5-8** function to set the last four bits of the K1 byte.

8. Select a K2 byte/bit. A value dialog box associated with the K2 selection appears.

   The K2 byte provides additional information about SONET network architecture and alarm conditions. There are four functions that allow you to edit the K2 byte:

   - Use the **K2 Full Byte** function to set all eight bits of the K2 byte at once.
   - Use the **K2 Bits 1-4** function to set the first four bits of the K2 byte.
   - Use the **K2 Bit 5 (provisioned)** function to set the fifth bit of the K2 byte.
   - Use the **K2 Bits 6-8** function to set the last three bits of the K2 byte.

9. Select the desired K1 and/or K2 byte/bit value.
10. From the Apply Maintenance to Entry dialog box, select **Duration in Frames** to set up the number of frames that will be transmitted containing the newly configured K1 and K2 bytes.
11. Select **Update**. The initial APS screen appears on the touch screen.
12. To configure additional K1 and K2 bytes, repeat steps 3-11 as described above. Otherwise, proceed to the next section to transmit K1 and K2 bytes.

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To transmit K1 and K2 bytes:

1. Make sure that K1 and K2 byte sequences are configured as described above.
2. Select **Start** to transmit the K1 and K2 bytes.

To stop transmitting K1 and K2 bytes:

1. Select a protocol processor mode.
2. Select the **Transmit** button.
3. Select the **APS** button. The initial APS screen appears.
4. Select **Stop**.

Upgrading Test Set Software from CD

The instructions outlined below provide a quick set of steps for upgrading your NIC/NAA test set and troubleshooting a cancelled upgrade. For more in-depth information, see the NIC/NAA Software Upgrade Online Help.

Warning: You must have the **Java® Runtime Environment (JRE)** installed on your PC before proceeding with the upgrade.

To upgrade the test set software from the CD:

1. Turn the NIC test set **On**.
2. From the **System** tab, select **I/O Settings**.

If the NIC test set is not on the network, use a cross-over cable to connect it to the PC.

3. Insert the **Software and Remote CD**, which you received with your NIC test set, into your computer's CD-ROM drive. The CD should automatically open the Remote NIC Software window.
4. From the **Software** tab, select **Upgrade NIC Software**.
5. Select **Install**. A DOS prompt window displays and then the Digital Lightwave's Software Upgrade dialog box appears. No action is required for the DOS prompt window.

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6. From the Software Upgrade dialog box, select **Device Logon**. The Device Logon dialog box appears.
7. In the **New IP Address** box, type the IP Address for the NIC test set that is being upgraded. You can find the IP Address on the NIC test set's I/O screen.
8. Select **Add IP to List**. The address appears in the IP Address List box.


Up to 32 device IP Addresses can be stored in the IP Address List box.

9. Select the **IP Address** and click the > button. The IP Address moves to the IP Addresses Selected box.


Warning: Do not attempt to upgrade more than one test unit (device) at a time. Devices moved into the IP Addresses Selected box are scheduled for upgrade. Therefore, select only one device from the IP Address List box before proceeding to the next step.

10. Select **OK**. The upgrade software connects to the NIC test set and then the Scheduled Upgrades Notice dialog box appears.
11. Select **OK**. The notice box closes and you are returned to the Software Upgrade dialog box.
12. Select **Upgrade**. The Upgrade Activity Status dialog box appears and then the Upgrade Alert! dialog box.


This automatically upgrades all circuit packs in the NIC test set. The upgrade process may take several minutes.

13. Select **OK**.
14. Toggle the test set's On/Off switch to **Off**.


Warning: Leave the test set off for a minimum of 10 seconds before rebooting it.

15. Turn the test set **On**.
16. From the NIC Common Function buttons, select **Restore**. The Select Type of Restore dialog box appears.

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17. Select **Factory Defaults**.
18. This completes the software upgrade.

Uploading a File

A file can be transferred from the unit to a remote device (for example a PC) or to a local device (a PCMCIA storage card). If using the FTP function, make sure you have the IP address of the receiving device. If using the PCMCIA function, make sure that a PC Card is installed in the PCMCIA slot before selecting the File Services button. When the PC card is inserted, an audible tone indicates that the card and PCMCIA drivers are qualified.

1. From the **System** tab, select **Files Services**.
2. From the right File List box, select the upload method (**FTP** or **PCMCIA**).

- If using *FTP*,

  a. Enter the IP Address of the device that will receive the file (unless you are using the Remote Control Software; then enter the test set address) in the **FTP Site Information** box.

  b. If this device is secured with a User ID and Password, then enter this information.

  c. Enter an FTP session on the connecting device.

- If using *PCMCIA*,

  ▶ Select a target directory from the File List box.

3. From the left File List box, select the current location of the file (**Disk** or **PCMCIA**).
4. Select a file from the File List box.
5. Select  (upload). The file is transferred.

Warning: When the unit is powered off, the FTP directory is automatically purged.

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Updating a User Profile

If the System Lock function is enabled, only one user with Read and Write permissions (this includes Calibration and Admin users) can be logged in at a time. If a user with Read and Write permissions is already logged in, a window will appear giving you the option of logging in with Read permissions only.

1. From the **System** tab, select **Security**.
2. From the User Name list box, select the user profile to be updated. The user name, password, and permission appears in the Account Information box.
3. Select , next to the field to be updated.
   - If *Password* was selected, a keypad appears, allowing you to modify the current information. Press **Enter** when you are done.
   - If *Permissions* was selected, the Select User Permissions window appears. Select the updated permissions that you wish to apply.
4. When you are done updating the user's profile, select **Update**. The updated information appears on the User List.

Printing or Viewing Saved Files

While running tests, you have the option to save the information to a file. The instructions below tell you where and how to print or view a saved file.

Important: Files saved when working with the Remote Control Application will not be accessible from the NIC unit touch-screen and visa-versa. The remote application saves the files to the Remote Control (GalaxyNIC) directory on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

To print or view a saved file:

1. From the **System** tab, select **File Services**.
2. Select a file from the **Disk** directory box. The desired report may display in the main Disk directory, or it may be stored in one of the folders in the directory. Folder names are enclosed in brackets **[foldername]**. To return to the main Disk directory after opening a folder, select **[. .]** or the **Disk** button.

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Important: Real-time reports generated from the NIC unit touch-screen, using the Action after Duration function, are automatically stored in the [APP] folder. Select the folder to display those reports.

The following is a list of file extension used for files generated from the Print Report, Graph, or Action after Duration functions:

- **.aps** - APS Report
- **.evt** - Event Report
- **.perf** - Performance Report
- **.real** - Real-time Test Report (Stored in [APP} folder on NIC unit.)
- **.rep** - Graph Report, BERT Analysis, RFC Thru Put Analysis
- **.set** - Settings Report
- **.stat** - Results Report
- **.statE** - Event Report
- **.grp** - Graph (This is not a text file. It can only be viewed as a graph by selecting **Results,** pointing to **Graph** and choosing the **Replay Graphs** button.)

3. Choose one of the following

To **Print** the file:

a. Select **Print**. A standard Print dialog box appears.

If you want to print a report directly from the NIC unit, make sure that a printer is attached to the unit's parallel or serial port.

b. Select the printer **Name** and choose **OK**.

To **View** the file:

a. Select **View**. The View File window appears. Use the **Display Hex** / **Display ASCII** toggle button to display the file in Hex or ASCII format.

The following file details display below the File List box.

- File name
- File size and date

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- File attributes

b. Select **Exit** to close the View File window.

Printing a Report

The Print Report Common Function Button allows you to print reports to a printer or file.

1. Select **Print Report**. The Report Setup menu appears.
2. Choose one of the following:
   - From **Destination Printer**, select one or multiple reports to print directly to a printer. If printing a report from the NIC unit, make sure that a printer is attached to the unit's parallel or serial port. The following reports are available:

     ▸ **Settings** - (.set extension) Reports current values for all Transmit and Receive Set functions.

     ▸ **Statistics** - (.stat extension) Reports results for the Scan, Errors, Alarms, and PTR.

     ▸ **Events** - (.evt extension) Reports a detailed summary of events, such as alarms, errors, and pointer activity. This report includes the event, the number of events logged, the start and stop time of the event, and the duration of the event.

     ▸ **APS** - (.aps extension) Reports the results of the K1 and K2 byte sequences received by the unit.

     ▸ **Performance** - (.perf extension) Reports Performance Monitor results.

   - From **Destination File**, choose one or multiple reports to print to a file. The File Browser dialog box appears.


The **Comma Delimiter** option can be applied to the Settings To File and Statistics To File reports.

▸ Enter a filename and select **OK**.


Important: Files saved when working with the Remote Control Application

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will not be accessible from the NIC unit touch-screen and visa-versa. The remote application saves the files to the Remote Control (GalaxyNIC) directory on the PC. The NIC unit saves the files to its default D:\DLI... drive on the test unit.

3. In the **User Comment** box, select the **Input** button to enter notes that will display in the report. A keyboard opens.
4. Enter comment text using the keyboard. When working from NIC test set use the touch screen keyboard. Select **Enter**.

To clear comment text, select the **Clear** button.

5. Select **OK**.

For information on retrieving saved files, see Print or View Saved Files.

Files that are created when using the Remote Control Application are saved on your PC in the Remote Control directory. This directory can be overwritten when connecting to other remote units that have the same compatibility level, but are different models (for example, a NIC Plus, a NIC 10G, and so on).

If you want to keep these files, copy and save the following to a backup directory on your PC that is not in the Remote Control Application directory's path:

- Any file with the .set, .stat, .evt, .aps, .perf, or .rep extension.
- The client.prop file. Changes to this file are only needed if the remote unit uses a PCMCIA modem for its dial-up connection.

Using Graphs

Use the **Graph** button to view error and alarm results for the selected protocol processor. Graphs show the test history for either the current test or a previously saved test.

To use the graphs function:

1. Select a protocol processor that has been configured for Error Alarm testing.

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2. From **Results**, select **Graph**. The Graph screen appears. It contains two graphs which allow you to display incoming alarms and errors.
3. Use the following buttons to control graphing parameters:

    - **Sample Rate** - Sets the timing for graph results at increments of 1 Second, 1 Minute, or 15 Minutes.
    - **Change Scale** - Compresses or expands the displayed time scale for the graphed errors and alarms at time intervals of 30 minutes, 90 minutes, 3 hours, 6 hours, 12 hours, 24 hours, or 72 hours.
    - **Change Upper** - Sets the type of errors or alarms that appear in the upper graph.
    - **Change Lower** - Sets the type of errors or alarms that appear in the lower graph.
    - **Shift Left and Shift Right** - Adjusts the graph's time scale to an earlier or later time.
    - **Print Report** - Prints a graph report to printer or file.
    - **Save Graphs** - Saves a graph to file as a .grp file that can be replayed at a later time.

    Important: This is not a text file; when replayed, it appears as the original graph plot. Choose *Print a Graph to Report* if you desire graph information that can be printed out.)

    - **Replay Graphs/Stop Replay** - Replays or stops saved graphs (.grp).

Action after Duration

Action after Duration defines what activities occur at the conclusion of a timed test. It allows several different options, including printing results to a printer or recording them to a file; repeating a test or just processing one test. Test results appear in a columned report format; however, there is one option available to record the statistics using a delimiter.

To determine how long a test will run, refer to Duration.

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Print Options

When a print option is chosen, the report prints directly to a printer. If you are using the NIC touch-screen, a printer must be attached to the NIC's parallel or serial port. (See Printer Port Configuration.)

Record Options

When a record option is chosen, the results are saved to a file with one of the following extensions:

- **.evt** - Event Report. A detailed summary of alarms, errors, and pointer activity.
- **.statE** - Event Report. Used when the *Record Statistics/Events and Repeat Test* option is selected.
- **.stat** - Results Report. A statistics report of the Scan, Errors, Alarms, and PTR functions.
- **.real** - Real-time Test Report. Real-time reports generated only from the NIC touch screen.

The file naming convention is: **xxhhmmss.<extension>** (where **xx** is the protocol processor, **hh** is hours, **mm** is minutes, **ss** is seconds). For example, a file named "OC163035.evt" represents an OC-192/48/12 test event that was recorded at 16:30:35.

To learn how to print or view a saved file, see the topic Print or View Saved Files.

The table below describes the Action after Duration options.

Repeat Test and Realtime Test Options	**Description**
None	No action occurs at the end of the test duration.
Print Current Statistics	Test statistics are printed to a printer at the end of a timed test. The test does not repeat.
Record Current Statistics	Test statistics are printed to a file (.stat) at the end of a timed test. The test does not repeat.

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Record Current Statistics using a delimiter	Test statistics are printed to a file (.stat) at the end of a timed test. The results appear in a quote/comma-report format, meaning that error and/or alarm values are enclosed in quotes (") and separated by commas (,). The test does not repeat.
Print Statistics and Repeat Test  This option appears when **Repeat Actions** is selected.	Test statistics are printed to a printer at the end of the timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Record Statistics and Repeat Test  This option appears when **Repeat Actions** is selected.	Test statistics are printed to a file (.stat) at the end of a timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Print Events and Repeat Test  This option appears when **Repeat Actions** is selected.	Test events are printed to a printer at the end of the timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Record Events and Repeat Test  This option appears when **Repeat Actions** is selected.	Test events are printed to a file (.evt) at the end of a timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value.
Print Statistics/Events and Repeat Test  This option appears when **Repeat Actions** is selected.	Both test statistics and events are automatically printed to a printer at the end of the timed test and the test restarts. This cycle continues until the test is stopped by selecting **Stop**

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	from the Common Function Buttons, or by changing the Action After Duration value.
Record Statistics/Events and Repeat Test This option appears when **Repeat Actions** is selected.	Both test statistics (.stat) and events (.statE) are printed to a file at the end of a timed test and the test repeats. This cycle continues until the test is stopped by selecting **Stop** from the Common Function Buttons, or by changing the Action After Duration value. Both **.statE** and **.stat** files are recorded.
Print Events and Repeat Test This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit. When the test duration expires, the test restarts.
Record Events and Repeat Test This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a file (.evt). When the test duration expires, the test restarts.
Print and Record Events and Repeat Test This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit and prints to a file (.evt). When the test duration expires, the test restarts.
Print Events This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit. The test does not repeat.
Record Events This option only appears on the	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a file

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NIC unit's touch screen when **Realtime Actions** is selected.	(.evt). The test does not repeat.
Print and Record Events  This option only appears on the NIC unit's touch screen when **Realtime Actions** is selected.	Enables real-time reporting. Any event that occurs during a real-time test automatically prints to a printer that is attached to the NIC unit and prints to a file (.evt). The test does not repeat.

Printer Port Configuration

The unit supports both parallel and serial printers.

For Parallel Printing:

- Attach a parallel printer cable (with a 25-pin male connector on one end) to the unit's **Parallel Port** connector. This is a DB-25 female connector.

For Serial Printing:

Important: The following steps must be performed from the NIC unit touch screen. "Printer" is not an available Serial port assignment from the Remote Control Application.

1. Attach a serial printer cable (with a 9-pin female connector on one end) to the unit's **RS-232** port connector. This is a DB-9 male connector.
2. From the **System** tab, select **I/O Settings**.
3. Select the **Serial** button.
4. Select the **Port Assignment** button and choose **Printer**.

Viewing Added/Dropped Signal Activity

1. Select **Results**.
2. Select the following Results tabs to monitor events:
    - The **Scan** button functions appear on the touch screen. A summary count of current error, alarm, and event activity is reported. If no activity is reported, the message "No Errors or Alarms" appears.
    - Select **Err** to view more details about incoming errors. This function reports the following:

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- Error count using an 11-digit format
- Average error rate over the total error duration using an N.NNe-N format
- Current error rate using an N.NNe-N format
- Errored seconds using an 8-digit format
- The percentage of seconds in which the error was present
- The total number of error-free seconds using an 8-digit format
- The percentage of seconds that the error was not present

- Select **Alarm** to view more details about incoming alarms. This function reports the number of seconds that an alarm is present.
- Select **PTR** to view more details about incoming Pointer events (this function is only applicable to SONET/SDH protocol processors). This function reports the following:
  - The number of positive Pointer adjustments
  - The number of negative Pointer adjustments
  - The duration of a Pointer adjustment (in seconds)
  - The number of New Data Flags (NDF)
  - The number of invalid NDFs
- Select **Event** to view a summary of events (alarms, errors, and Pointer activity) recorded by the unit. For more information, refer to the Recording in the Event Log section.
- Select **APS** to display the incoming bit values of the K1 and K2 bytes. For more information, refer to the Monitoring SONET/SDH APS Commands section.
- Select **Large LEDs** displays LED error and alarm indicators in a large, easy-to-read format, which covers the entire touch screen area. This is useful for viewing errors or alarms from a long distance, such as across the room from a test bay.
- Select **Graph** displays incoming errors and alarms in the form of a line or bar graph.

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Recording in the Event Log

The Event Log is a table that displays events recorded by the unit. A scroll bar is available, allowing you to scroll up and down to view an extended history.

To use the Event Log:

1. Select a protocol processor tab.
2. Select the **Results** button.
3. Select **Event**. As events occur (such as alarms, errors, or Pointer activity) they appear and continuously scroll in the table.

   Events display in a ascending order from the most recent event to the oldest event. The Descending button indicates that events appear in descending order. (This button switches between descending event order appearance and ascending event order appearance. The current label of the button indicates the event order.)

4. Select **Pause**, to stop the scrolling action and then use the scroll bar to view events. Select **Resume** to restart the event log.
5. To display events in an ascending order, select **Descending**. The button changes to Ascending and the events appear from the oldest event to the most recent event.
6. Select **Resume**, to continue Event Log reporting.

Monitoring SONET/SDH APS Commands


The following only applies to SONET and SDH protocol processors.

When testing APS functionality, the system can log and display the bit values of the incoming K1 and K2 bytes.

The following information appears in the APS report for the last 16 K1 and K2 byte sequences received by the unit:

- The HEX value of the K1 byte.
- The HEX value of the K2 byte.
- The number of frames received that contain the K1 and K2 bytes.
- The elapsed time of the frames that contain the K1 and K2 bytes.

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To monitor APS commands:

1. Select a SONET or SDH protocol processor.
2. Select the **Results** button.
3. Select the **APS** button. The incoming K1 and K2 byte values appear. A total of 16 byte sequences can appear.


Per GR-253-CORE, only the upper 12 bits of the K1/K2 bytes (K1 bits 1-8 and the K2 bits 1-4) are used for APS operation. K2 bit 5 sets the APS mode type (1+1, 1:n) and cannot be changed during operation. K2 bits 6-8 are for alarms. Any changes to the lower four bits of the K2 byte do not affect APS operation. The Results APS table only starts and displays a new entry item if the upper 12 K1/K2 bits stabilize on a new value for a minimum of three consecutive frames.

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STM-64 Online Help

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STM-64 Overview

This section of the online help system has topics that discuss:

- STM-64 Specific Tasks
- STM-64 Screen and Function Descriptions

You may also navigate through the topics by using the **Contents** tab and window that appear on the left side of the screen.

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STM-64 Specific Tasks

STM-64 Specific Tasks

This section includes tasks that are specific to STM-64 protocol processor. For a list of general tasks, which apply to all protocol processor modes, see Common Tasks located in the Getting Started section.

Calibrate Optical Power (SDH)

The following procedures describe the system's optical power calibration. While performing this task, you will measure, record, and enter the Zero optical power input and the optical power readings for -20 dBm and -10 dBm.

Before You Begin

- Read these procedures before trying to calibrate the system.

WARNING: Power the unit off before removing the optical connector dust caps to clean the unit's fiber optic ports.

- Before performing optical power calibration, use a fiber-optics cleaning kit to clean the fiber-optic ports on the unit, the optical power meter, the optical attenuator, and the fiber cables. Dirty optical fibers will affect optical measurements.
- The following equipment is required for optical calibration:
  - Two three-foot singlemode, fiber-optic cables
  - Variable optical attenuator
  - Optical power meter
  - Fiber-optics cleaning kit
  - Pencil and paper to record optical power measurements

Restoring Raw Power Readings

The following restores the unit's raw (unconverted) power readings.

1. Make sure that the dust caps are on the unit's TX and RX optical ports.
2. Turn the unit on.
3. From the **STM-64** tab, select the **Receive** button.
4. Select the **Signal Status** button, and then **Update Signal Calibration**.
5. Select **Zero power reading**. A touch screen keypad appears. Enter 0 and select **OK**.
6. Select the **Save** button to restore the raw (unconverted) power reading.

Obtaining Zero Optical Power Input

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1. Make sure that the dust caps are on the unit's TX and RX optical ports, and that the unit is turned on.
2. Make sure that the unit's laser is off.
3. From the **STM-64** tab, select the **Receive** button.
4. Select the **Signal Status** button. Record the **Optical Power** reading. This value is the **Zero power reading**.

Obtaining -20 dBm Power Reading

1. With the unit turned on, connect a fiber-optic cable from the unit's **10 Gbps TX** optical port to the optical attenuator's input connector.
2. Attach a fiber-optic cable from the attenuator's output port to the optical power meter.
3. Turn the unit's laser on.
4. Adjust the attenuator so that the optical power meter reads -20 dBm.
5. Disconnect the fiber-optic cable from the optical power meter, and attach it to the unit's **10 Gbps RX** optical port.
6. From the **STM-64** tab on the unit, select the **RX** button.
7. Select the **Signal Status** button. Record the **Optical Power** reading. This value is the **-20 dBm power reading**.

Obtaining -10 dBm Power Reading

1. Disconnect the fiber-optic cable from the unit's **10 Gbps RX** optical port and attach it to the optical power meter. (You have a direct fiber-optic cable connection from the optical attenuator to the optical power meter.)
2. Adjust the attenuator so that the power meter reads -10 dBm.
3. Disconnect the fiber-optic cable from the optical power meter, and attach it to the unit's **10 Gbps RX** optical port.
4. From the **STM-64** tab on the unit, select the **Receive** button.
5. Select the **Signal Status** button. Record the **Optical Power** reading. This value is the **-10 dBm power reading**.

Entering Optical Power Readings

1. From the **STM-64** tab on the unit, select the **Receive** button.
2. Select the **Signal Status** button and then **Update Signal Calibration**.
3. Select **Zero power reading**. A touch screen keypad appears. Enter the value recorded earlier for the Zero Power Reading and select **OK**.
4. Select **-20 dBm power reading**. A touch screen keypad appears. Enter the value recorded earlier for the -20 dBm Power Reading and select **OK**.
5. Select **-10 dBm power reading**. A touch screen keypad appears. Enter the value recorded earlier for the -10 dBm Power Reading and select **OK**.
6. Select **Save** to save the new calibration values. This completes the optical calibration procedure.

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Screen and Function Descriptions

STM-64 Screen and Function Descriptions Overview

This section of the online help system describes the various functions, buttons, and tabs that control STM-64 configuration and operation.

- STM-64 LEDs
- STM-64 Transmit
- STM-64 Receive
- STM-64 Results
- STM-64 Test
- STM-64 Performance Monitoring

STM-64 LEDs

This section defines the SDH LEDs that appear on the touch screen's **LED area** and when the **Large LEDs** tab is selected.

LED	Definition
APS	Automated Protection Switching. Indicates that the K1 and K2 bytes on the incoming STM signal have changed. This is an alarm LED.
AU-AIS	Administrative Unit - Alarm Indication Signal. Indicates an all-ones characteristic or adapted information signal was detected on the AU. It is generated to replace the normal traffic signal when it contains a defect condition in order to prevent consequential downstream failures being declared or alarms being raised. This is an alarm LED.
AU-LOP	Administrative Unit - Loss of Pointer. Indicates that a consecutive number of invalid pointers or NDFs were received on the AU. This is an alarm LED.
B1 ERR	Regenerator Section BIP-8 Code Violation. Indicates parity errors occurred on one of the eight parity checks when evaluated by byte 1 of the SDH frame. This is an error LED.
B2 ERR	Multiplex Section BIP-8 Code Violation.

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	Indicates that parity errors occurred on any of the parity checks when evaluated by the B2 byte of the SDH frame. This is an error LED.
B3 ERR	Higher-Order Path BIP-8 Code Violation. This is a parity code (even) used to determine if a transmission error has occurred over a path. Its value is calculated over all the bits of the previous virtual container before scrambling and placed in the B3 byte of the current frame. This is an error LED.
BIT ERR	BIT Error. Indicates a bit error was detected in the payload. This is an error LED.
CLK	Clock. Displays the type of transmit clock specified in the setting. Clock settings include: SETS, Bits, Internal, or RCVD. This is an alarm LED.
HP OK	Higher-Order Path OK. This is a status LED.
HP-RDI	Higher-Order Path - Remote Defect Indicator. Indicates a signal was returned to the transmitting HP Terminating Equipment upon detecting a Loss of Signal, Loss of Frame, or AIS defect. This is an alarm LED.
HP-REI	Higher-Order Path - Remote Error Indication. Indicates to the transmitting node that an errored block has been detected at the HP receiving node. This is an error LED.
HP-UNEQ	Higher-Order Path - Unequipped. Indicates that an all-zeros patterns was detected in the C2 byte. This byte is received from the HP terminating equipment. This is an alarm LED.
LOF	Loss of Frame. Indicates that a frame alignment problem with the incoming signal has been detected. An LOF is reported if an Out of Frame (OOF) defect continues for three milliseconds or longer. This is an alarm LED.

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LOS	Loss of Signal. Indicates that a valid STM-4 signal is not being received. If an all-zeros pattern exists for 100 milliseconds or longer on the incoming STM signal, then an LOS is reported. This is an alarm LED.
MS-AIS	Multiplex Section - Alarm Indication Signal. Indicates an all-ones characteristic or adapted information signal was detected on the MS. It is generated to replace the normal traffic signal when it contains a defect condition in order to prevent consequential downstream failures being declared or alarms being raised. This is an alarm LED.
MS OK	Multiplex Section Overhead OK. This is a status LED.
MS-RDI	Multiplex Section - Remote Defect Indicator. Indicates a signal returned to the transmitting MS Terminating Equipment upon detecting a Loss of Signal, Loss of Frame, or AIS defect. This is an alarm LED.
MS-REI	Multiplex Section - Remote Error Indication. An indication returned to a transmitting node that an errored block has been detected at the MS receiving node. This is an error LED.
OOF	Out of Frame. Indicates that four consecutive frames have been received with invalid or errored framing patterns. This is an alarm LED.
PAT SYNC	Indicates a loss of pattern synchronization. This is an alarm LED.
PTR-ADJ	Administrative Unit - Pointer Adjustment. Indicates that there was pointer movement occurring on the AU. This LED flashes red during a Pointer Adjustment event. It is an event LED.
RS OK	Regenerator Section Overhead OK. This is a status LED.

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RX	Displays the received optical power in dBm. For STM-64, the optimum input range is from -2 dBm to -14 dBm. A value of -25 dBm or below indicates no signal. This is a status LED.

STM-64 Transmit

The Transmit screen contains the following functions:

- STM-64 Transmit Settings 1
- STM-64 Transmit Settings 2
- STM-64 Transmit Overhead
- STM-64 Transmit Pointer Generation
- STM-64 Transmit APS
- STM-64 Transmit Error Alarm

STM-64 Transmit APS

The STM-64 Transmit APS functions are used to configure APS transmit activity.

The following APS Transmit functions are available:

- Linear Mode
- Ring Mode
- Duration in Frames

APS is a feature that allows the LTE to switch to a backup line in case of errors or failures on the main line. APS commands can be configured for either Linear- or Ring-based networks and are transmitted using bytes K1 and K2 of the Line overhead.

You can test the network's APS response by generating a condition that is likely to cause APS switching. You also have the capability to generate specific APS messages and monitor the response.

Linear Mode

This function configures the system to transmit APS functions for a Linear (span) network.

- K1 Full Byte (Linear Mode)
- K1 Bits 1-4 (Linear Mode)
- K1 Bits 5-8 (Linear Mode)
- K2 Full Byte (Linear Mode)
- K2 Bits 1-4 (Linear Mode)

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- K2 Bit 5 (Provisioned) (Linear Mode)
- K2 Bits 6-8 (Linear Mode)

Ring Mode

- K1 Full Byte (Ring Mode)
- K1 Bits 1-4 (Ring Mode)
- K1 Bits 5-8 (Ring Mode)
- K2 Full Byte (Ring Mode)
- K2 Bits 1-4 (Ring Mode)
- K2 Bit 5 (Provisioned) (Ring Mode)
- K2 Bits 6-8 (Ring Mode)

Duration in Frames

This function determines the number of frames transmitted that contain specific K1 and K2 bytes. These bytes are configured using the functionality located on the transmit APS screen.

Frame count is entered using a keypad. Values ranging from **1 to 65535** frames can be entered.

STM-64 Transmit Error Alarm

The unit can transmit errors and alarms to simulate various defects and anomalies. One reason for transmitting these defects is to determine if the receiving equipment can detect an error or alarm in the incoming signal.

- Error to Insert
- Error Insert Rate
- Alarm Generated

STM-64 Transmit Overhead

The STM-64 Transmit Overhead screen contains the following functions.

Functions	Description
SOH Slot	Selects a specific Overhead slot within the STM-64 signal. The overhead bytes that appear on the OH screen are associated with this slot. There are 192 SOH slots available in an STM-64 signal.

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AU-4-16c Added	Select 1 to 4, All, or None as the foreground channel.
RSOH	Select and edit the following Overhead bytes: A1, A2, Z0, B1, E1, F1, D1, D2, and D3.
MSOH	Select and edit the following Overhead bytes: H1, H2, H3, B2, K1, K2, D4-D12, Z1, Z2, and E2.
HPOH	Select and edit the following Overhead bytes: B3, J1, C2, G1, F2, H4, Z3, Z4, and Z5.
J0 Trace	Selects a default or customized pattern to be used as the J0 trace.
J1 Trace	Selects a default or customized pattern to be used as the J1 trace.
TC Trace	Selects a default or customized pattern to be used as the Tandem Connection Monitoring trace.

STM-64 Transmit Pointer Generation

The STM-64 Transmit Pointer screen contains the following functions.

Functions	**Description**
Pointer Action	Determines the type of Pointer activity that occurs when the **Inc Pointer** and **Dec Pointer** buttons are selected.
NDF on New Pointer	Specifies whether the New Data Flag bits are set when a new Pointer is present in the generated signal.
Pointer Value	Allows a new Pointer value to be entered. A valid Pointer value is a binary number ranging from 0 to 782.
Burst Count	Determines the number of Pointer location movements that occur when the **Inc Pointer** or **Dec Pointer** buttons are pressed. The Pointer burst count ranges from 1 to 8.

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AU Frequency Offset	Adjusts the rate at which Pointer adjustments are needed in the Administrative Unit (the payload).
Increment/Decrement Pointer	Alternates the Pointer insertion from increment to decrement with a 200-msec delay in between.

Related Topics:

For information about making Pointer adjustments, select *Make Pointer Adjustments* in the Common Tasks section of the online help.

STM-64 Transmit Settings 1

The STM-64 Transmit Settings 1 screen configures the unit's transmit parameters. It contains the following functions.

Functions	Description
Settings Control	If **Coupled** is selected, settings changed on the Transmit screen will automatically change on the Receive screen as well. If **Independent** is selected, settings established on the Transmit screen will only affect Transmit mode.
Passthru Mode	Activates or deactivates pass-thru mode, allowing an incoming STM signal to pass through the unit without altering the data in the signal. The following options are available: **On** and **Off**.
Mapping	Defines the type of signals that are combined to create an STM-64 signal. For example, four C-4-16s can be mapped into an STM-64 signal. If the unit is not licensed for 10 Gbps mapping, the following options appear and are described below: **C-4-64c Bulk**, **C-4-16 A/D**, **C-4-16 A/D LI**, and **C-4-64c POS**.

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	If the unit is licensed for 10 Gbps mapping, it can perform the following mappings using only the 10 Gbps circuit pack (STM-64 protocol processor): **C-4-64c Bulk**, **C-4-16c Bulk**, **C-4-4c Bulk**, **C-4 Bulk**, **C-3 Bulk**, and **C-4-64c POS**. • **C-4-64c Bulk.** Maps a concatenated C-4-64c signal into an STM-64. • **C-4-16 A/D.** Maps four C-4-16s into an STM-64. The C-4-16s are generated internally from the STM-16 protocol processor. (**Note:** This option appears if a separate 2.5G circuit pack (an STM-16 protocol processor) is installed in the unit.) • **C-4-16 A/D LI.** Maps four C-4-16s into an STM-64. The C-4-16s are derived externally and enter the unit using the line interface connectors. (**Note:** This option appears if a separate 2.5G circuit pack (an STM-16 protocol processor) is installed in the unit.) • **C-4-16c Bulk.** Maps a concatenated C-4-16c signal into an STM-64. Four C-4-16s make up an STM-64. (**Note:** This option only appears if the unit is licensed for 10 Gbps mapping.) • **C-4-4c Bulk.** Maps a concatenated C-4-4c signal into an STM-64. Sixteen C-4-4s make up an STM-64. (**Note:** This option only appears if the unit is licensed for 10 Gbps mapping.) • **C-4 Bulk.** Maps a concatenated C-4 signal into an STM-64. Sixty-four C-4s

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	make up an STM-64. (**Note:** This option only appears if the unit is licensed for 10 Gbps mapping.) • **C-3 Bulk.** Maps 192 C-3s into an STM-64 signal. (**Note:** This option only appears if the unit is licensed for 10 Gbps mapping.) • **C-4-64c POS.** Configures the unit for Packet Over SONET/SDH operation.
AU-4-16 Added **Note:** AU-4-16 Added only appears when Mapping is set to C-4-16c Bulk.	Selects a specific AU-4-16 signal as the foreground (or source) channel in the STM-64 signal. The source channel can be used to transmit alarms, errors, or patterns. The unit multiplexes four AU-4-16 signals into a single STM-64 signal. • **1 - 4.** Selects a specific AU-4-16 (AU-4-16 #1 through AU-4-16 #4) as the foreground channel. • **ALL.** Transmit the foreground channel across all four AU-4-16 channels. • **None.** No foreground channel is selected.
AU-4-4 Added **Note:** AU-4-4Added only appears when Mapping is set to C-4-4c Bulk.	Selects a specific AU-4-4 signal as the foreground (or source) channel in the STM-64 signal. The source channel can be used to transmit alarms, errors, or patterns. The unit multiplexes four AU-4-4 signals into a single STM-64 signal. • **1 - 16.** Selects a specific AU-4-4 (AU-4-4 #1 through AU-4-4 #16) as the foreground channel. • **ALL.** Transmit the foreground channel across all 16AU-4-4 channels.

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	• **None.** No foreground channel is selected.
AU-4 Added **Note:** AU-4 Added only appears when Mapping is set to C-4 Bulk.	Selects a specific AU-4-16 signal as the foreground (or source) channel in the STM-64 signal. The source channel can be used to transmit alarms, errors, or patterns. The unit multiplexes four AU-4-16 signals into a single STM-64 signal. • **1 - 64.** Selects a specific AU-4 (AU-4 #1 through AU-4 #64) as the foreground channel. • **ALL.** Transmit the foreground channel across all 64 AU-4 channels. • **None.** No foreground channel is selected.
AU-3 Added **Note:** AU-3 Added only appears when Mapping is set to C-3 Bulk.	Selects one of 192 AU-3 signals as the foreground channel in the STM-64 signal. • **1 - 192.** Selects a specific AU-3 (AU-3 #1 through AU-3 #192) as the foreground channel. • **ALL.** Transmits the foreground channel across all 192 AU-3 channels. • **None.** No foreground channel is selected.
Background AU-4-16 Pattern **Note:** Only appears when Mapping is set to C-4-16c Bulk.	Determines the type of pattern inserted into the three remaining AU-4-16 background channels of an STM-64 signal. The pattern can range from 1 bit to 32 bits and is entered using screen keypad. It can be entered in Hex, decimal, or binary format.
Background AU-4-4 Pattern **Note:** Only appears when Mapping is set to C-4-4c Bulk.	Determines the type of pattern inserted into the 15 remaining AU-4-4 background channels of an STM-64 signal. The pattern can range from 1

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	bit to 32 bits and is entered using screen keypad. It can be entered in Hex, decimal, or binary format.
Background AU-4 Pattern **Note:** Only appears when Mapping is set to AU-4.	Determines the type of pattern inserted into the 63 remaining AU-4 background channels of an STM-64 signal. The pattern can range from 1 bit to 32 bits and is entered using screen keypad. It can be entered in Hex, decimal, or binary format.
Background AU-3 Pattern **Note:** Only appears when Mapping is set to AU-3	Determines the type of pattern inserted into the 191 remaining AU-3 background channels of an STM-64 signal. The pattern can range from 1 bit to 32 bits and is entered using screen keypad. It can be entered in Hex, decimal, or binary format.
Payload Pattern	Select User-defined (32 bit value), PRBS 15, PRBS 15 INV, PRBS 23, PRBS 23 INV, PRBS 31,or PRBS 31 INV.
Clock Reference	Select Internal, Recovered, or Bits/Sets.
Laser Type	Selects either the 1310 nm laser or the 1550 nm laser on the 10G circuit pack (OC-192/STM-64).
Initial Laser Setting	Controls whether the laser is on or off when the unit is turned on. • **Off.** The unit's laser will be off when the unit is turned on. • **On.** The unit's laser will be on when the unit is turned on. • Restore Previous State. When the unit is turned on, the laser will be on or off based on its previous setting before the unit was turned off.

STM-64 Transmit Settings 2

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The STM-64 Transmit Settings 2 screen contains the following functions.

Functions	Description
Line Frequency Offset	Adjusts the offset of the signal frequency of the transmitted SDHsignal. The frequency can be adjusted in parts per million (PPM). The following options are available: **Off** = 0: The frequency cannot be adjusted. **Edit:** Adjusts the signal frequency in PPM. Use the + and - arrow keys to adjust the 00.0 decimal place. The frequency offset ranges from -100.0 to 100.0 in increments of 0.1. The default value is 00.0. After an offset value is entered, the Confirm button on the touch screen keypad must be selected for the new offset value to be accepted.
SS Bits in H1 Label	Set to SONET (00) or SDH (10).
* HP Signal Label	Set the C2 byte to: • Unequipped (00) • Equipped (01) • TUG Structured (02) • Lock TU Mode (03) • Asyn Mapping for 34368 KB (04) • Asyn Mapping for 139264 KB (12) • Map for ATM (13) • Map for DQDB (14) • Map for FDDI (15) • O.181 Test Signal Mapping (FE) • VC-AIS (FF) • User Defined (any eight bit pattern 0 to FF. **Note:** This option is coupled with the

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	C2 byte option in the Transmit Overhead screen. If it is changed in this screen, it will change in the Overhead screen as well.
Synchronization Status (S1)	Sets the S1 byte to: • Quality Unknown: Sets byte value to 00000000. • Rec. G.811: Sets byte value to 00000010. • Rec. G.812 Transmit: Sets byte value to 00000100. • Rec. G.812 Local: Sets byte value to 00001000. • Sync Eqip Timing Src: Sets byte value to 00001011. • User Defined (any eight bit pattern 0 to FF.
Trigger In	Determines how the protocol processor responds when an external pulse is received.
TC Overhead Processing	Enables Tandem Connection Monitoring (TCM) transmit mode. • **Enable:** For SDH, the unit uses its TCM circuitry and the N1 byte to generate errors and alarms between TCM equipment. For SONET, the unit uses the Z5 byte. • **Disable:** TCM mode is disabled, and the N1 and Z5 bytes follow normal operation.

STM-64 Receive

The Receive screen contains the following functions:

- STM-64 Receive Settings 1
- STM-64 Receive Settings 2
- STM-64 Receive Overhead

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- STM-64 Receive Signal Status

STM-64 Receive APS

The unit can measure APS switching intervals in your network. The unit can be configured to monitor for a specific event that will cause an APS switch. When this event occurs, the duration in both seconds and frames is logged. These statistics can be used to determine how long it takes for your network equipment to react to an APS event and switch to a backup path.

Using the Receive APS functionality, you can set a specific event as a trigger for APS activity. The APS measurement has an accuracy of 0.5 milliseconds.

Receive APS functions include:

- **Protection Switch Criteria**
- **State:** Indicates the current condition when monitoring and measuring received APS activity.
- **Protection Switch Time (Frames):** Indicates the number of frames received during the APS switching event.
- **Protection Switch Time (Seconds):** Indicates the duration in seconds that it took for the APS switch event to occur.
- **Consecutive Good Time Required:** This function allows you to enter the duration (in milliseconds) of valid frames to occur before Protection Switching is confirmed to be activated. The range is 0.125 to 2047.875 milliseconds and is entered using a keypad.
- **Consecutive Good Frames Required**: This function allows you to enter the number of valid frames to occur before Protection Switching is confirmed to be activated. The range is 1 to 16383 frames and is entered using a keypad.
- **Start Button:** Starts the Automatic Protection Switching mode. The unit will begin monitoring the incoming signal for this event. If it occurs, the protection switch state and time will appear in both seconds and frames present. The results will not include the number of good frames, but the number of frames that elapsed before the first good frame, meeting the entered criteria, occurred.

For information about measuring APS activity, select *Measure SDH and SONET APS Activity* in the Common Tasks section of the online help.

STM-64 Receive Overhead

The STM-64 Receive Overhead screen contains the following functions.

Function	Options
SOH Slot	Selects a specific SOH slot within the

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	STM-64 signal. The overhead bytes that appear on the OH screen are associated with this slot. There are 192 SOH slots available in an STM-64 signal.
AU-4-16c Dropped	Selects a specific STM-16 signal to monitor in the STM-64 signal.
Regenerator Section OH	Displays the RS Overhead bytes for the selected SOH slot on the incoming STM-64 signal. This is a read-only function.
Multiplex Section OH	Displays the MS Overhead bytes for the selected SOH slot on the incoming STM-64 signal. This is a read-only function.
Higher-Order Path OH	Displays the HP Overhead for the selected SOH slot on the incoming STM-64 signal. This is a read-only function.
J0 Trace	Displays the J0 trace received on the incoming STM-64 signal.
J1 Trace	Displays the J1 trace received on the incoming STM-64 signal.
TC Trace	Displays the TC trace received on the incoming STM-64 signal.

STM-64 Receive Settings 1

This function configures the STM-64 receive mapping, which maps a pattern into the STM-64 interface.


Options marked with an asterisk (*) indicate that the function is coupled with the Transmit settings if Setting Control is set to "Coupled."

The following options appear on the STM-64 Receive SET 1 screen.

Options	**Description**
*Settings Control	If **Coupled** is selected, settings changed on the Receive screen will automatically change on the Transmit screen as well.

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	If **Independent** is selected, settings established on the Receive screen will only affect Receive mode.
*Mapping	Defines the type of signals that are combined to create an STM-64 signal. For example, four C-4-16s can be mapped into an STM-64 signal. If the unit is not licensed for 10 Gbps mapping, the following options appear and are described below: **C-4-64c Bulk**, **C-4-16 A/D**, **C-4-16 A/D LI**, and **C-4-64c POS**. If the unit is licensed for 10 Gbps mapping, it can perform the following mappings using only the 10 Gbps circuit pack (STM-64 protocol processor): **C-4-64c Bulk**, **C-4-16c Bulk**, **C-4-4c Bulk**, **C-4 Bulk**, **C-3 Bulk**, and **C-4-64c POS**. • **C-4-64c Bulk.** Maps a concatenated C-4-64c signal into an STM-64. • **C-4-16 A/D.** Maps four C-4-16s into an STM-64. The C-4-16s are generated internally from the STM-16 protocol processor. (**Note:** This option appears if a separate 2.5G circuit pack (an STM-16 protocol processor) is installed in the unit.) • **C-4-16 A/D LI.** Maps four C-4-16s into an STM-64. The C-4-16s are derived externally and enter the unit using the line interface connectors. (**Note:** This option appears if a separate 2.5G circuit pack (an STM-16 protocol processor) is installed in the unit.) • **C-4-16c Bulk.** Maps a concatenated C-4-16c signal

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	into an STM-64. Four C-4-16s make up an STM-64. (**Note:** This option only appears if the unit is licensed for 10 Gbps mapping.) • **C-4-4c Bulk.** Maps a concatenated C-4-4c signal into an STM-64. Sixteen C-4-4s make up an STM-64. (**Note:** This option only appears if the unit is licensed for 10 Gbps mapping.) • **C-4 Bulk.** Maps a concatenated C-4 signal into an STM-64. Sixty-four C-4s make up an STM-64. (**Note:** This option only appears if the unit is licensed for 10 Gbps mapping.) • **C-3 Bulk.** Maps 192 C-3s into an STM-64 signal. (**Note:** This option only appears if the unit is licensed for 10 Gbps mapping.) • **C-4-64c POS.** Configures the unit for Packet Over SONET/SDH operation. Configures the SDH transmit and receive mapping. This maps an **AU-4-64c** pattern or **AU-4-16** pattern into an STM-64 interface.
AU-4-16 Dropped **Note:** AU-4-16 Dropped only appears when Mapping is set to C-4-16c Bulk.	Selects a specific AU-4-16 signal to monitor in the STM-64 signal. The unit receives an STM-64 signal that is demuxed into four AU-4-16 signals and then processed. • **1 - 4.** Selects a specific AU-4-16 (AU-4-16 #1 through AU-4-16 #4) as the dropped and monitored channel. • **None.** No AU-4-16s are selected.

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AU-4-4 Dropped **Note:** AU-4-4 Dropped only appears when Mapping is set to C-4-4c Bulk.	Selects a specific AU-4-4 signal to monitor in the STM-64 signal. The unit receives an STM-64 signal that is demuxed into 16 AU-4-4 signals and then processed. • **1 - 16.** Selects a specific AU-4-4 (AU-4-4 #1 through AU-4-4 #16) as the dropped and monitored channel. • **None.** No AU-4-4s are selected.
AU-4 Dropped **Note:** AU-4 Dropped only appears when Mapping is set to C-4 Bulk.	Selects a specific AU-4 signal to monitor in the STM-64 signal. The unit receives an STM-64 signal that is demuxed into 64 AU-4 signals and then processed. • **1 - 64.** Selects a specific AU-4 (AU-4 #1 through AU-4 #64) as the dropped and monitored channel. • **None.** No AU-4s are selected.
AU-3 Dropped **Note:** AU-3 Dropped only appears when Mapping is set to C-3 Bulk.	Selects a specific AU-3 signal to monitor in the STM-64 signal. The unit receives an STM-64 signal that is demuxed into 192 AU-3 signals and then processed. • **1 - 192.** Selects a specific AU-3 (AU-3 #1 through AU-3 #192) as the dropped and monitored channel. • **None.** No AU-3s are selected.
Payload Pattern	Selects the type of pattern that the unit expects to receive on the incoming SDH signal. The following options are available: Live (user data is received; no pattern is used), User Defined (range from 1 bit to 32 bits and is entered using a touch screen keypad), PRBS 2^15-1,

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	PRBS 2^15-1 Inverted, PRBS 2^23-1, PRBS 2^23-1 Inverted, PRBS 2^31-1, and PRBS 2^31-1 Inverted.
Trigger Out	Allows the protocol processor to respond to an external "pulse" received. The following options can be selected: None, LOF, OOF, B1, B2, B3, BIT, Frame, MS-RDI, HP-RDI, MS-REI, HP-REI, or Ptr Increment, Ptr Decrement, New Ptr with NDF, or New Ptr without NDF.

STM-64 Receive Settings 2

This function configures the unit's receive STM-64 parameters.

Function	Description
PLM Alarm Reporting	This function enables Higher-Order Path Payload Label Mismatch (HP-PLM) alarm reporting. An HP-PLM alarm occurs when the incoming Higher-Order Path Signal Label (C2 byte) does not match the expected Higher-Order Path Signal Label (C2 byte). The following options are available: • **Enabled:** HP-PLM alarms are recognized and reported. • **Disabled:** HP-PLM alarms are ignored.
Expected HP Signal (C2) Label	Configure to receive a specific value for the C2 byte. The following options are available: • **Unequipped (00):** The expected C2 byte is 00000000. • **Equipped (01):** The expected C2 byte is 00000001. • **TUG Structured (02):** The

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	expected C2 byte is 00000010. • **Lock TU Mode (03):** The expected C2 byte is 00000011. • **Asyn Mapping for 34368 KB (04):** The expected C2 byte is 00000100. • **Asyn Mapping for 139264 KB (12):** The expected C2 byte is 00010010. • **Mapping for ATM (13):** The expected C2 byte is 00010011. • **Mapping for DQDB (14):** The expected C2 byte is 00010100. • **Asyn Mapping for FDDI (15):** The expected C2 byte is 00010110. • **O.181 Test Signal Mapping (FE):** The expected C2 byte is 11111110. • **VC-AIS (FF):** The expected C2 byte is 11111111. • **User Defined:** Allows an 8-bit Path Signal Label, from 00h to FFh, to be entered for the C2 byte value.
TIM Alarm Reporting	An HP Path Trace Identifier Mismatch (HP-TIM) alarm occurs when the incoming J1 trace does not match the expected J1 trace. A Regenerator Section Trace Identifier Mismatch (RS-TIM) alarm occurs when the incoming J0 trace does not match the expected J0 trace. A Tandem Connection Trace Identifier Mismatch (TC-TIM) alarm occurs when the incoming TC trace does not match the expected TC trace. The following options are available: • **Enabled:** TIM alarms are recognized and reported.

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	• **Disabled:** TIM alarms are ignored.
Expected J0	Defines the expected J0 trace received on the incoming SDH signal. The following options are available: Default (64 byte), User Defined (64 byte), All Ones, All Zeros, Default (16 byte), or User Defined (16 byte).
Expected J1	Defines the expected J1 trace received on the incoming SDH signal. The following options are available: Default (64 byte), User Defined (64 byte), All Ones, All Zeros, Default (16 byte), or User Defined (16 byte).
SS Bits Alarm Reporting	Disables or enables SS bits reporting. This function is used in conjunction with the Expected SS Bits function. If enabled, and an SS Bits mismatch is detected on the received signal, the duration in seconds will appear under the Results Scan function.
Expected SS Bits	Selects one of the following as the expected SS Bits value: • 00 (SONET) • 01 (Undefined) • 10 (SDH) • 11 (Undefined)
TC Error/Alarm Processing	Enables or disables Tandem Connection Monitoring (TCM) mode. This function is used in conjunction with the **Expected TC Trace** and **TIM Alarm Reporting** functions. The TC Summary LED turns red if a TCM error or alarm is reported. Select the TC Summary text for more details. • **Enable:** Turns on TCM error and alarm reporting mode. • **Disable:** Turns off TCM error and alarm reporting mode.

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	(**Note:** Disable this option if you are not performing TCM testing. This will prevent false error and alarm reporting.)
Expected TC Trace	Defines the expected TC trace received on the inco9ming signal. For SONET, this is in the Z5 byte. For SDH, this is in the N1 byte. The following options are available: • **Default:** Selects a 16-byte Digital Lightwave ASCII message at the expected TC trace pattern. • **All Ones (16 byte):** Selects a 16-byte All Ones pattern as the TC trace pattern. • **All Zeros (16 byte):** Selects a 16-byte All Zeros pattern as the TC trace pattern. • **User Defined:** Selects a 16-byte user-defined ASCII message as the expected TC trace pattern. The message is entered and saved using a screen keypad.

STM-64 Receive Signal Status

Displays the following measurements of the incoming SDH signal:

- Received optical power in dBm
- Line Frequency in MHz for STM-64
- Frequency offset received in KHz and ppm
- Update Signal Calibration allows you to update the following calibrations:
  - Zero power reading
  - -20 dBm power reading
  - -10 dBm power reading

Select the **Save** button to update the signal calibration.

Related Topics:

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Calibrate Optical Power

Line Frequency Offset

STM-64 Results

All monitored activity that the system receives is eventually reported to the Results screen. This screen provides several layers of granularity for analyzing the incoming signal, pattern, errors, and alarms.

The STM-64 Results screen contains the following functions:

- Scan
- Errors
- Alarms
- PTR
- Event Log
- APS
- Graphs
- Large LEDs

APS Results

The APS results monitor incoming APS activity. It logs and displays the K1 and K2 byte sequences received by the unit. A maximum of 15 byte sequences can appear on the screen.

The following information appears in the APS report for the last 15 K1 and K2 byte sequences received:

- The HEX value of the K1 byte.
- The HEX value of the K2 byte.
- The number of frames received that contain the K1 and K2 bytes.
- The elapsed time of the frames that contain the K1 and K2 bytes.


Per GR-253-CORE, only the upper 12 bits of the K1/K2 bytes (K1 bits 1-8 and the K2 bits 1-4) are used for APS operation. K2 bit 5 sets the APS mode type (1+1, 1:n) and cannot be changed during operation. K2 bits 6-8 are for alarms. Any changes to the lower four bits of the K2 byte do not affect APS operation. The Results APS table only starts and displays a new entry item if the upper 12 K1/K2 bits stabilize on a new value for a minimum of three consecutive frames.

Alarms

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The system can monitor and report alarms and their duration on the incoming SDH signal. The **Alarms** function lists the duration of the alarm in seconds.

The following alarms can be monitored:

- Clock Sync
- LOS (Loss of Signal)
- LOF (Loss of Frame)
- OOF (Out of Frame)
- RS-TIM (Regenerator Section Trace Identifier Mismatch for the J0 byte)
- MS-AIS (Multiplex Section Alarm Indication Signal)
- MS-RDI (Multiplex Section Remote Defect Indicator)
- APS (Automatic Protection Switching)
- AU-AIS (Adminitrative Unit Alarm Indication Signal)
- AU-LOP (Administrative Unit Loss of Pointer)
- HP-UNEQ (Higher-Order Path Unequipped Payload)
- HP-RDI (Higher-Order Path Remote Defect Indicator)
- HP-TIM (Higher-Order Path Trace Identifier Mismatch for the J1 byte)
- HP-PLM (Higher-Order Path Payload Label Mismatch)
- Pattern Sync
- TC-RDI (Tandem Connection-Remote Defect Indicator)
- TC-ODI (Tandem Connection-Outgoing Defect Indicator)
- TC-AIS (Tandem Connection-Alarm Indication Signal)
- TC-UNEQ (Tandem Connection-Unequipped)
- TC-TIM (Tandem Connection-Trace Identifier Mismatch)
- TC-LOF (Tandem Connection-Loss of Frame)

Errors

The system can monitor and report errors on the incoming SDH signal. The **Errors** function provides a detailed analysis of the incoming error as described below.

The errors reported are a result of:

- Incoming errors that are generated by the SDH network, or
- Errors being intentionally generated by the system when it is used in a loopback environment

The following errors can be monitored:

- B1 (Regenerator Section BIP-8)
- B2 (Multiplex Section BIP-8)
- B3 (Higher-Order Path BIP-8)
- MS-REI (Multiplex Section Remote Error Indicator)
- HP-REI (Higher-Order Path Remote Error Indicator)

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- BIT (BIT errors reported in the payload)
- NDF-P (Path New Data Flag counts)
- TC-IEC (Tandem Connection-Incoming Error Count)
- TC-REI (Tandem Connection-Remote Error Indicator)
- TC-OEI (Tandem Connection-Outgoing Error Indicator)

The following parameters are measured for these incoming errors:

- Error count using an 11-digit format
- Average error rate using an N.NNe-N format
- Current error rate using an N.NNe-N format
- Error-free seconds using an 8-digit format
- Errored seconds
- Severely Errored seconds
- Unavailable errored seconds

Event Log

The Event Log provides a detailed summary of alarm, error, Pointer events, and APS activity that have occurred and have been recorded by the unit.

The events appear in a table that lists events, the number of events logged, the start and stop time of the event, and the duration of the event.

Graph

This function allows incoming errors and alarms to be graphed. The graphs can be saved, recalled, and printed from a history file.

For more information about graphs, select *Use Graphs* in the Common Tasks section of the online help.

Large LEDs

This function displays the SDH LEDs in a large, easy-to-read format that covers the entire touch screen area. This is useful for viewing any errors or alarms from a long distance, such as across the room from a test bay.

This function also allows:

- On/Off control of the unit's laser
- Single error insertion into the transmit SDH signal

Related Topics:

LED Definitions

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PTR

This function monitors and reports received Pointer statistics. A count of the following Pointer statistics appear:

- **Pointer Justification:** Indicates the Positive Pointer Justification count.
- **Negative Justification:** Indicates the Negative Pointer Justification count.
- **Positive Justification Seconds:** Indicates the duration of a Pointer adjustment.
- **NDF Count:** Indicates the New Data Flag count.
- **Receive Pointer Value (in decimal):** Valid Pointers range from 0 to 782.

Scan

This function displays a list of received errors and alarms. For **alarms**, the duration is reported as a count in seconds. For **errors**, an error count is reported.

The message **No Errors or Alarms** appears if no events are received by the system.

This function provides a quick summary of incoming errors and alarms. It is effective in identifying a general area to investigate when error or alarm activity is detected.

STM-64 Test

The Test screen configures test parameters associated with a protocol processor.

The Test screen contains the following functions:

- SET 1
- APS
- RTD

Action After Duration

This function defines what activities occur at the conclusion of a timed test. To determine how long a test will run, refer to the Duration function section. The following options are available.

Options	Description
None	No action occurs at the end of the test duration.

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Print Current Statistics	Test results are printed to the attached printer at the end of a timed test. The timed test is not repeated.
Record Current Statistics	Test results are printed to a file at the end of a timed test. Test results appear in a columned report format.
Record Current Statistics Using a Delimiter	Test results are printed to a file at the end of a timed test. Test results appear in a quote/comma-report format, meaning that error and/or alarm values are enclosed in quotes (") and separated by commas (,).
Print Statistics and Repeat Test	**Note:** This option appears when **Repeat Actions** is selected. At the conclusion of a timed test, test statistics (which are results for the Scan, Errors, Alarms, and PTR functions) are automatically printed to a printer, and the timed test is restarted. This cycle continues until the timed test is stopped by selecting **Stop** from the Common Function Buttons row or by changing the value of the Action After Duration function.
Record Statistics and Repeat Test	**Note:** This option appears when **Repeat Actions** is selected. Test statistics are printed to a file at the end of a timed test. Test results appear in a columned report format. The file name convention used is: **xxhhmmss.stat** where, **xx** indicates the current protocol processor (for example, E1=E1, E3=E3, E4=E4, OC=OC-192/48/12, ST=STM-64/16/4). **hhmmss** indicates the current time in hours, minutes, and seconds. **stat** indicates the Statistics file extension.

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Print Events and Repeat Test	**Note:** This option appears when **Repeat Actions** is selected. At the conclusion of a timed test, test events (which are a detailed summary of alarms, errors, and Pointer activity) are automatically printed to a printer, and the timed test is restarted. This cycle continues until the timed test is stopped by selecting **Stop** from the Common Function Buttons row or by changing the value of the Action After Duration function
Record Events and Repeat Test	**Note:** This option appears when **Repeat Actions** is selected. Test statistics are printed to a file at the end of a timed test. Test results appear in a columned report format. The file name convention used is: **xxhhmmss.stat**.
Print Statistics/Events and Repeat Test	**Note:** This option appears when **Repeat Actions** is selected. At the conclusion of a timed test, both test statistics and events are automatically printed to a printer, and the timed test is restarted. This cycle continues until the timed test is stopped by selecting **Stop** from the Common Function Buttons row or by changing the value of the Action After Duration function
Record Statistics/Events and Repeat Test	**Note:** This option appears when **Repeat Actions** is selected. Test statistics and events are printed to a file at the end of a timed test. Test results appear in a columned report format. The file name convention used is: **xxhhmmssE.stat** (E indicates the file contains both statistics and events).

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Print Events and Repeat Test	Enables real-time reporting. Any event that occurs during a real-time test is automatically sent to the attached printer. When the test duration expires, the test restarts. **Note:** This option only appears on the touch screen of portable units when **Realtime Actions** is selected.
Record Events and Repeat Test	Enables real-time reporting. Any event that occurs during a real-time test is automatically printed to a file. When the test duration expires, the test restarts. **Note:** This option only appears on the touch screen of portable units when **Realtime Actions** is selected.
Print and Record Events and Repeat Test	Enables real-time reporting. Any event that occurs during a real-time test is automatically sent to both the attached printer and a report file. When the test duration expires, the test restarts. **Note:** This option only appears on the touch screen of portable units when **Realtime Actions** is selected.
Print Events	Enables real-time reporting. Any event that occurs during a real-time test is automatically sent to the attached printer. **Note:** This option only appears on the touch screen of portable units when **Realtime Actions** is selected.
Record Events	Enables real-time reporting. Any event that occurs during a real-time test is automatically printed to a file. **Note:** This option only appears on the touch screen of portable units when **Realtime Actions** is selected.

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Print and Record Events	Enables real-time reporting. Any event that occurs during a real-time test is automatically sent to both the attached printer and a report file. **Note:** This option only appears on the touch screen of portable units when **Realtime Actions** is selected.

Duration

This function configures how long a timed test runs. The following options are available:

Options	Description
Continuous	Test is untimed, and unit is always collecting data.
5 Minutes	Test runs for 5 minutes.
15 Minutes	Test runs for 15 minutes.
1 Hour	Test runs for 1 hour.
2 Hours	Test runs for 2 hours.
24 Hours	Test runs for 24 hours.
72 Hours	Test runs for 72 hours.
1 Week	Test runs for 1 week.
2 Weeks	Test runs for 2 weeks.
User Defined	Allows a specific test duration to be entered using a touch screen keypad. The minimum duration is 1 minute. The maximum duration is 99 days, 23 hours, and 59 minutes.

Protection Switch Criteria

This is an **APS (RX)** function that is used to measure APS activity.

The **Protection Switch Criteria** function determines the type of alarm, error, or pattern event that is used as a trigger to generate APS activity in your network. The unit monitors the incoming signal for the specified event. If it occurs, its duration in both seconds and frames is measured and logged. The APS measurement has an accuracy of 0.5 milliseconds.

The following options are available:

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Options	Description
B1	An APS is generated if a B1 error is received. The duration in seconds and frames is measured and logged.
OOF	An APS is generated if an Out of Frame alarm is received. The duration in seconds and frames is measured and logged.
MS-AIS	An APS is generated if a Multiplex Section AIS alarm is received. The duration in seconds and frames is measured and logged.
AU-AIS	An APS is generated if an Administrative Unit AIS alarm is received. The duration in seconds and frames is measured and logged.
PRBS	An APS is generated if a PRBS pattern is received with errors. The duration in seconds and frames is measured and logged.

For information about measuring APS activity, select *Measure SDH and SONET APS Activity* in the Common Tasks section of the online help.

APS (Automatic Protection Switch)

The unit can measure APS switching intervals in your network. The unit can be configured to monitor for a specific event that will cause an APS switch. When this event occurs, the duration in both seconds and frames is logged. These statistics can be used to determine how long it takes for your network equipment to react to an APS event and switch to a backup path.

Using the Test APS functionality, you can set a specific event as a trigger for APS activity. The APS measurement has an accuracy of 0.5 milliseconds.

Test APS functions include:

- **Protection Switch Criteria**
- **State:** Starts and stops Automatic Protection Switching mode. The unit will begin monitoring the incoming signal for a single or continuous APS event. If an APS event occurs, the protection switch time will appear in both seconds and frames present. The results will not include the number of good frames, but the number of frames that elapsed before the first good frame, meeting the entered criteria, occurred.

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Single APS - Monitors for a single APS event. Seconds and frames are reported and the State returns to Inactive.

Continuous APS - Constantly monitors for APS events, and updates the seconds and frames reported.

Stop APS - Stops APS monitoring. The State returns to Inactive.

- **Protection Switch Time (Frames):** Indicates the number of frames received during the APS switching event.
- **Protection Switch Time (Seconds):** Indicates the duration in seconds that it took for the APS switch event to occur.
- **Consecutive Good Time Required:** This function allows you to enter the duration (in milliseconds) of valid frames to occur before Protection Switching is confirmed to be activated. The range is 0.125 to 2047.875 milliseconds and is entered using a keypad.
- **Consecutive Good Frames Required**: This function allows you to enter the number of valid frames to occur before Protection Switching is confirmed to be activated. The range is 1 to 16383 frames and is entered using a keypad.

For more information about monitoring APS activity, select *Measuring SDH and SONET APS Activity* in the Common Tasks section of the online help.

RTD (Round-Trip Delay)

The round-trip delay function allows you to transmit a known frame into your network and measure how long it takes for the frame to return to the unit.

Test RTD functions include:

- **State:** Starts and stops round-trip delay mode.

  Single Round-Trip Delay - If selected, an AIS alarm is inserted into a frame and transmitted once through your network. The frame's transmission through the network is measured in frame counts and milliseconds. Frame counts indicates the number of frames received before the AIS frame is received by the unit. Milliseconds indicates how long it took for the AIS frame to travel out and return to the unit.

  Continuous Round-Trip Delay - If selected, an AIS alarm is inserted into a frame and continuously transmitted through your network. The current frame count and duration appear in the **Current** column. The fastest round trip appears in the **Minimum** column and the slowest round trip appears in the **Maximum** column.

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Stop Round-Trip Delay - Stops round-trip delay activity. The State returns to Inactive.

- **Round-trip Delay Time (Frames):** Indicates the number of frames received during the measurement.
- **Round-trip Delay Time (Seconds):** Indicates the duration in seconds that it took for the known frame to return to the unit.
- **Consecutive Good Time Required:** This function allows you to enter the duration (in milliseconds) of valid frames to occur before the round-trip delay function is confirmed to be activated. It is used to fine-tune the measurement. The range is 0.125 to 2047.875 milliseconds and is entered using a keypad.
- **Consecutive Good Frames Required**: This function allows you to enter the number of valid frames to occur before the round-trip delay function is confirmed to be activated. It is used to fine-tune the measurement. The range is 1 to 16383 frames and is entered using a keypad.

For more information about round-trip delay, select *Round-Trip Delay* in the Common Tasks section of the online help.

SET 1

The SET 1 functions determine how long a protocol processor's test runs and what activities occur at the end of the test.

The following appears on the SET 1 screen.

- **Duration**
- **Action After Duration**
- **Pause Test/Resume Test:** This button switches between pausing an active test and continuing an active test. The button's label indicates the action that will happen when it is selected.

For more information about tests, select *Start a Test* in the Common Tasks section of the online help.

STM-64 Performance Monitoring

Performance Monitoring provides greater detail about incoming Regenerator Section, Multiplex Section, and Higher-Order Path errors.

- RS
- MS
- HP
- BIT

Performance Monitoring BIT

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This provides a detailed breakdown for BIT errors detected and logged by the STM-64 protocol processor.

This section is broken down into the following areas:

G.821 BIT Errors

Severely Errored Seconds (SES) by count, rate percentage, and objective percentage.

Unavailable Seconds (UAS) by count, rate percentage, and objective percentage.

G.821 Allocation: Select an allocation percentage from 0 to 100.

Status: Pass, Uncertain, or failure

G.826 BIT Errors

Errored Block (EB) count

Background Block Error (BBE) by count, rate percentage, and objective percentage.

Errored Seconds (ES) by count, rate percentage, and objective percentage.

Severely Errored Seconds (SES) by count, rate percentage, and objective percentage.

Unavailable Seconds (UAS) by count, rate percentage, and objective percentage.

G.826 Allocation: Select an allocation percentage from 0 to 100.

Status: Pass, Uncertain, or failure

M.2101.1 BIT Errors

Errored Seconds (ES) by count, percentage and S1 and S2 percentage.

Severely Errored Seconds (SES) by count, percentage and S1 and S2 percentage.

M.2101.1 Allocation: Select an allocation percentage from 0 to 100.

Status: Pass, Uncertain, or failure

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Performance Monitoring HP

This provides a detailed breakdown for Higher-Order Path errors detected and logged by the STM-64 protocol processor.

This section is broken down into the following areas:

G.826 Near B3 Errors and Far HP REI Errors

Errored Block (EB) count

Background Block Error (BBE) by count, rate percentage, and objective percentage.

Errored Seconds (ES) by count, rate percentage, and objective percentage.

Severely Errored Seconds (SES) by count, rate percentage, and objective percentage.

Unavailable Seconds (UAS) by count, rate percentage, and objective percentage.

G.826 Allocation: Select an allocation percentage from 0 to 100.

Status: Pass, Uncertain, or failure

M.2101.1 Near B3 Errors and Far HP REI Errors

Errored Seconds (ES) by count, percentage and S1 and S2 percentage.

Severely Errored Seconds (SES) by count, percentage and S1 and S2 percentage.

M.2101.1 Allocation: Select an allocation percentage from 0 to 100.

Status: Pass, Uncertain, or failure

Performance Monitoring LP

This provides a detailed breakdown for Lower-Order Path errors detected and logged by the STM-64 protocol processor.

This section is broken down into the following areas:

G.826 Near LP BIP Errors and Far LP REI Errors

Errored Block (EB) count

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Background Block Error (BBE) by count, rate percentage, and objective percentage.

Errored Seconds (ES) by count, rate percentage, and objective percentage.

Severely Errored Seconds (SES) by count, rate percentage, and objective percentage.

Unavailable Seconds (UAS) by count, rate percentage, and objective percentage.

G.826 Allocation: Select an allocation percentage from 0 to 100.

Status: Pass, Uncertain, or failure

M.2101.1 Near LP BIP Errors and Far LP REI Errors

Errored Seconds (ES) by count, percentage and S1 and S2 percentage.

Severely Errored Seconds (SES) by count, percentage and S1 and S2 percentage.

M.2101.1 Allocation: Select an allocation percentage from 0 to 100.

Status: Pass, Uncertain, or failure

Performance Monitoring MS

This provides a detailed breakdown for Multiplexor section errors detected and logged by the STM-64 protocol processor.

This section is broken down into the following areas:

G.826 Near B2 Errors and Far MS REI Errors

Errored Block (EB) count

Background Block Error (BBE) by count, rate percentage, and objective percentage.

Errored Seconds (ES) by count, rate percentage, and objective percentage.

Severely Errored Seconds (SES) by count, rate percentage, and objective percentage.

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Unavailable Seconds (UAS) by count, rate percentage, and objective percentage.

G.826 Allocation: Select an allocation percentage from 0 to 100.

Status: Pass or failure

M.2101.1 Near B2 Errors and Far MS REI Errors

Errored Seconds (ES) by count, percentage and S1 and S2 percentage.

Severely Errored Seconds (SES) by count, percentage and S1 and S2 percentage.

M.2101.1 Allocation: Select an allocation percentage from 0 to 100.

Status: Pass or failure

Performance Monitoring RS

This provides a detailed breakdown for Regenerator Section errors detected and logged by the STM-64 protocol processor.

G.826 Near B1 Errors

Errored Block (EB) count

Background Block Error (BBE) by count, rate percentage, and objective percentage.

Errored Seconds (ES) by count, rate percentage, and objective percentage.

Severely Errored Seconds (SES) by count, rate percentage, and objective percentage.

Unavailable Seconds (UAS) by count, rate percentage, and objective percentage.

G.826 Allocation: Select an allocation percentage from 0 to 100.

Status: Pass, Uncertain, or failure

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OC-192 Online Help

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OC-192 Overview

This section of the online help system has topics that discuss:

- OC-192 Specific Tasks
- OC-192 Screen and Function Descriptions

You may also navigate through the topics by using the **Contents** tab and window that appear on the left side of the screen.

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OC-192 Specific Tasks

OC-192 Specific Tasks

This section includes tasks that are specific to the OC-192 protocol processor. For general tasks, refer to Common Tasks located in the Getting Started section.

Calibrate Optical Power

The following procedures describe the optical power calibration. While performing this task, you will measure, record, and enter the Zero optical power input and the optical power readings for -20 dBm and -10 dBm.

Before You Begin

- Read these procedures before trying to calibrate the system.

WARNING: Power the system off before removing the optical connector dust caps to clean the unit's fiber optic ports.

- Before performing optical power calibration, use a fiber-optics cleaning kit to clean the fiber-optic ports on the unit, the optical power meter, the optical attenuator, and the fiber cables. Dirty optical fibers will affect optical measurements.
- The following equipment is required for optical calibration:
  - Two three-foot singlemode, fiber-optic cables
  - Variable optical attenuator
  - Optical power meter
  - Fiber-optics cleaning kit
  - Pencil and paper to record optical power measurements

Restoring Raw Power Readings

The following restores the raw (unconverted) power readings.

1. Make sure that the dust caps are on the unit's TX and RX optical ports.
2. Turn the unit on.
3. From the **OC-192** tab, select the **Receive** button.
4. Select the **Signal Status** button, and then **Update Signal Calibration**.
5. Select **Zero power reading**. A touch screen keypad appears. Enter 0 and select **OK**.
6. Select the **Save** button to restore the raw (unconverted) power reading.

Obtaining Zero Optical Power Input

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1. Make sure that the dust caps are on the unit's TX and RX optical ports, and that the unit is turned on.
2. Make sure that the laser is off.
3. From the **OC-192** tab, select the **Receive** button.
4. Select the **Signal Status** button. Record the **Optical Power** reading. This value is the **Zero power reading**.

Obtaining -20 dBm Power Reading

1. With the system turned on, connect a fiber-optic cable from the **10 Gbps TX** optical port to the optical attenuator's input connector.
2. Attach a fiber-optic cable from the attenuator's output port to the optical power meter.
3. Turn the laser on.
4. Adjust the attenuator so that the optical power meter reads -20 dBm.
5. Disconnect the fiber-optic cable from the optical power meter, and attach it to the **10 Gbps RX** optical port.
6. From the **OC-192** tab, select the **RX** button.
7. Select the **Signal Status** button. Record the **Optical Power** reading. This value is the **-20 dBm power reading**.

Obtaining -10 dBm Power Reading

1. Disconnect the fiber-optic cable from the unit's **10 Gbps RX** optical port and attach it to the optical power meter. (You have a direct fiber-optic cable connection from the optical attenuator to the optical power meter.)
2. Adjust the attenuator so that the power meter reads -10 dBm.
3. Disconnect the fiber-optic cable from the optical power meter, and attach it to the **10 Gbps RX** optical port.
4. From the **OC-192** tab, select the **Receive** button.
5. Select the **Signal Status** button. Record the **Optical Power** reading. This value is the **-10 dBm power reading**.

Entering Optical Power Readings

1. From the **OC-192** tab, select the **Receive** button.
2. Select the **Signal Status** button, and then **Update Signal Calibration**.
3. Select **Zero power reading**. A touch screen keypad appears. Enter the value recorded earlier for the Zero Power Reading and select **OK**.
4. Select **-20 dBm power reading**. A touch screen keypad appears. Enter the value recorded earlier for the -20 dBm Power Reading and select **OK**.
5. Select **-10 dBm power reading**. A touch screen keypad appears. Enter the value recorded earlier for the -10 dBm Power Reading and select **OK**.
6. Select the **Save** button to save the new calibration values. This completes the optical calibration procedure.

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Screen and Function Descriptions

OC-192 Screen and Function Descriptions Overview

This section describes the various functions that control OC-192 configuration and operation:

- OC-192 LEDs
- OC-192 Transmit
- OC-192 Receive
- OC-192 Results
- OC-192 Test
- OC-192 Performance Monitoring

OC-192 LED Definitions

This section defines the SONET LEDs that appear on the touch screen's **LED area** and when the **Large LEDs** button is selected.


To view TCM LEDs, select the **TC Summary** text that appears in the LED/Quick Status area.

LED	Description
AIS-L	Line Alarm Indication Signal. Indicates if an alarm is being received from upstream Line terminating equipment. This is an alarm LED.
AIS-P	STS Path Alarm Indication Signal. Indicates if an alarm is being received from upstream Path terminating equipment. This is an alarm LED.
APS	Automatic Protection Switching. Indicates that the K1 and K2 bytes on the incoming SONET signal have changed.
B1 ERR	Section BIP-8 Code Violation. Indicates an error in the SONET frame. B1 errors are parity errors. The B1 byte carries the parity information, so a B1 error is a Section error that applies not only to the Section OH, but the entire frame.

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	Any error in the frame will result in a B1 error. This is an error LED.
B2 ERR	Line Overhead BIP-8 Code Violation. Indicates that parity errors were detected at the Line layer of the incoming SONET signal. This is calculated over the Line OH, Path OH, and payload of each STS-1. This is an error LED.
B3 ERR	Path Overhead BIP-8 Code Violations. Indicates that parity errors were detected at the Path layer of the incoming SONET signal. This is calculated over the Path OH and payload of each STS-1. This is an error LED.
BIT ERR	BIT Error. Indicates a Bit error was detected in the payload. This is an error LED.
CLK	Clock. Indicates the timing source for the SONET transmit signal. The timing source is set using the **Clock Reference** function. This is a status LED.
LINE	Line Status. Indicates if errors or alarms are being received from upstream Line terminating equipment. This is a status LED.
LOF	Loss of Frame. Indicates that a frame alignment problem with the incoming SONET signal has been detected. An LOF is reported if a severely errored framing (SEF) defect continues for 3 milliseconds or longer. This is an alarm LED.
LOP-P	Loss of STS Pointer. Indicates that an invalid Pointer has been received or a Pointer loss has been detected on the incoming SONET signal. This is an alarm LED.
LOS	Loss of Signal. Indicates that a valid SONET signal is not being received. If an all zeros pattern exists for 100

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	milliseconds or longer on the incoming SONET signal, then an LOS is reported. This is an alarm LED.
PAT SYNC	Pattern Sync. Indicates a loss of pattern synchronization. This is an alarm LED.
PATH	Path Status. Indicates if errors or alarms are being received from upstream Path terminating equipment. This is a status LED.
PLM-P	STS Payload Label Mismatch. Indicates that a mismatch has been detected for the Path Signal Label . This is an alarm LED. Note: This function will be available in a future release.
PTR ADJ	Pointer Adjustment. Indicates that a Pointer Adjustment has been received. This LED flashes red during a Pointer Adjustment event. It is an event LED.
RDI-L	Line Remote Defect Indicator. Indicates that a downstream defect has occurred along the Line layer. (An RDI is also known as a Far-End Remote Failure, FERF). This is an alarm LED.
RDI-P	STS Path Remote Defect Indicator. Indicates that a remote alarm is being received from downstream Path terminating equipment. The G1 byte of the SONET Path Overhead is used for this indicator. This is an alarm LED.
REI-L	Line Remote Error Indicator. Indicates that an error is occurring at downstream Line terminating equipment. An REI is also known as a Far-End Block Error (FEBE). The M0 and M1 bytes of the SONET Line Overhead are used for this indicator. This is an error LED.
REI-P	Path Remote Error Indicator. Indicates that an error count is being received from downstream Path terminating equipment. An REI is also known as a

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	Far-End Block Error (FEBE). This is an error LED.
RX	Receive Signal. Indicates the value of the received optical signal in dBm. For OC-192, the optimum input range is from -2 dBm to -14 dBm. A value of -25 dBm or below indicates no signal. This is a status LED.
SECTION	Section Status. Indicates current error, alarm, and event activity for the Section layer on the incoming SONET signal. This is a status LED.
SEF	Severely Errored Frame. Declared when four or more consecutive errored frames are detected on the incoming SONET signal. This is an alarm LED.
TC-AIS	Tandem Connection-Alarm Indication Signal. Indicates if IEC bits 1110 are being received from upstream TCM equipment. (Bits 1-4 of the N1 byte are the IEC bits.) This is an alarm LED.
TC-IEC	Tandem Connection-Incoming Error Count. Indicates a B3 error count is being received from downstream TCM equipment. Bits 1-4 of the N1 byte are used for this indicator. This is an error LED.
TC-LOF	Tandem Connection-Loss of Frame. Indicates the loss of a valid multiframe frame alignment signal (FAS) pattern from upstream TCM equipment. This is an alarm LED.
TC-ODI	Tandem Connection-Outgoing Defect Indicator. Indicates that the unit is sending an ODI alarm to upstream TCM equipment. Bit 7 in multiframe 74 of the N1 byte is used for this indicator. This is an alarm LED.
TC-OEI	Tandem Connection-Outgoing Error Indication. Indicates that the unit is sending an OEI error to upstream TCM equipment. Bit 6 of the N1 byte is used for this indicator. This is an error LED.

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TC-RDI	Tandem Connection-Remote Defect Indication. Indicates that a defect has occurred at the downstream TCM equipment. The unit is receiving an alarm. Bit 8 in multiframe 73 of the N1 byte is used for this indicator. This is an alarm LED.
TC-REI	Tandem Connection-Remote Error Indication. Indicates that an error has occurred at the downstream TCM equipment. The unit is receiving an error. Bit 5 of the N1 byte is used for this indicator. This is an error LED.
TC SUMMARY	Tandem Connection Summary. Indicates if a TCM error or alarm has been detected. If this LED is red, select the LED text (**TC Summary**) to display the TC LEDs.
TC-UNEQ	Tandem Connection-Unequipped. Indicates that a 00h pattern has been detected in the N1 byte of a Tandem Connection. This is an alarm LED.
UNEQ-P	Unequipped STS Payload. Indicates that a 00h pattern has been detected in the C2 byte. This byte is being received from Path terminating equipment. This is an alarm LED.

OC-192 Transmit

The Transmit screen contains the following functions:

- OC-192 Transmit Settings 1
- OC-192 Transmit Settings 2
- OC-192 Transmit Overhead
- OC-192 Transmit Pointer Generation
- OC-192 Transmit APS
- OC-192 Transmit Error Alarm

OC-192 Transmit APS

The OC-192 Transmit APS functions are used to configure APS transmit activity.

The following APS Transmit functions are available:

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- Linear Mode
- Ring Mode
- Duration in Frames

APS is a feature that allows the LTE to switch to a backup line in case of errors or failures on the main line. APS commands can be configured for either Linear- or Ring-based networks and are transmitted using bytes K1 and K2 of the Line overhead.

You can test the network's APS response by generating a condition that is likely to cause APS switching. You also have the capability to generate specific APS messages and monitor the response.

Linear Mode

This function configures the system to transmit APS functions for a Linear (span) network.

- K1 Full Byte (Linear Mode)
- K1 Bits 1-4 (Linear Mode)
- K1 Bits 5-8 (Linear Mode)
- K2 Full Byte (Linear Mode)
- K2 Bits 1-4 (Linear Mode)
- K2 Bit 5 (Provisioned) (Linear Mode)
- K2 Bits 6-8 (Linear Mode)

Ring Mode

- K1 Full Byte (Ring Mode)
- K1 Bits 1-4 (Ring Mode)
- K1 Bits 5-8 (Ring Mode)
- K2 Full Byte (Ring Mode)
- K2 Bits 1-4 (Ring Mode)
- K2 Bit 5 (Provisioned) (Ring Mode)
- K2 Bits 6-8 (Ring Mode)

Duration in Frames

This function determines the number of frames transmitted that contain specific K1 and K2 bytes. These bytes are configured using the functionality located on the transmit APS screen.

Frame count is entered using a keypad. Values ranging from **1 to 65535** frames can be entered.

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APS Mode

This is an **APS (TX)** function used to configure APS transmit activity.

APS is a feature that allows the LTE to switch to a backup line in case of errors or failures on the main line. APS commands can be configured for either Linear- or Ring-based networks and are transmitted using bytes K1 and K2 of the Line overhead.

You can test the network's APS response by generating a condition that is likely to cause APS switching. You also have the capability to generate specific APS messages and monitor the response.

The following options are available:

Options	Description
Linear	Configures the NIC 10G to transmit APS functions for a Linear (span) network.
Ring	Configures the NIC 10G to transmit APS functions for a Ring network.

APS Overview

APS is a feature that allows the LTE to switch to a backup line in case of errors or failures on the main line. APS functions can be configured for either Linear- or Ring-based networks and are transmitted using bytes K1 and K2 of the Line OH.

You can test the network's APS response by generating a condition that is likely to cause APS switching. You also have the capability to monitor and measure incoming APS switching activity.

This function is located in three general areas of the touch screen:

- The **APS (TX)** button configures the K1 and K2 byte parameters used to create an APS event.
  - APS functions for Linear mode are described in the **Linear APS Mode Functions** section.
  - APS functions for Ring mode are described in the **Ring APS Mode Functions** section.
- The **APS (RX)** button configures and measures criteria used for an APS switching event.
- The **APS (Results)** button monitors K1 and K2 byte activity on an incoming signal that can cause an APS event.

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Duration in Frames

This is an **APS (TX)** function used to configure APS transmit activity.

The **Duration in Frames** function determines the number of frames transmitted that contain specific K1 and K2 bytes. These bytes are configured using the functionality located on the transmit APS screen.

Frame count is entered using a keypad. Values ranging from **1 to 65535** frames can be entered.

OC-192 Transmit Error Alarm

The unit can transmit errors and alarms to simulate various defects and anomalies. One reason for transmitting these defects is to determine if the receiving equipment can detect an error or alarm in the incoming signal.

- Error to Insert
- Error Insert Rate
- Alarm Generated

Alarm Generated

This function configures the system to generate an alarm in the transmit SONET signal. Alarm generation by the system is one way to test if downstream SONET equipment reacts properly to the alarm it receives in the incoming SONET signal.

The following alarms are available:

Option	Description
None	No alarms are generated. Turns alarms off.
LOS	Loss of Signal. An all-zeros pattern is transmitted to simulate a loss of signal or loss of optical power. This forces the downstream SONET equipment to (1) generate an AIS alarm to its downstream network elements (NE), and (2) generate an RDI alarm to its upstream NEs.
LOF	Loss of Frame. An all-zeros pattern is inserted into the A1 and A2 framing bytes of the Section OH. This simulates the absence of a valid framing pattern. This forces the downstream SONET

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	equipment to generate an AIS alarm to its downstream network elements (NE), and generate an RDI alarm to its upstream NEs.
LOP-P	STS Path Loss of Pointer. This simulates a loss of a valid STS Pointer. When the downstream NE receives an LOP-P, it generates a DSn AIS alarm to its downstream equipment and an RDI-P alarm to its upstream equipment.
AIS-L	Line Alarm Indication Signal. The transmission of an AIS-L to a downstream NE forces that NE to send an AIS-P alarm to the next downstream NE. The NE will also send an RDI-L alarm to its upstream equipment. An AIS-L simulates an alarm generated by Line terminating equipment (LTE).
RDI-L	Line Remote Defect Indicator. This generates an RDI-L condition using the K2 byte of the Line OH. This simulates a downstream NE (in this case the NIC) at the Line layer, reporting a failure to an upstream NE. The downstream NE (NIC 10G) has encountered a downstream failure and is alerting upstream SONET equipment. To do this, the NIC 10G changes the pattern of the K2 byte. The NE receiving the RDI-L alarm should detect a change to the K2 byte on the incoming SONET signal. This forces the NE to generate a Remote Alarm Indicator (RAI) to its upstream NEs.
AIS-P	Path Alarm Indication Signal. The transmission of an AIS-P to a downstream NE forces that NE to send an AIS alarm to the next downstream NE. The NE will also send an RDI

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	alarm to its upstream equipment. An AIS-P simulates an alarm generated by Path terminating equipment (PTE).
RDI-P	Path Remote Defect Indicator. This generates an RDI-P condition using the G1 byte of the Path OH. This simulates a downstream NE (in this case, the NIC), at the Path layer, reporting a failure to an upstream NE. To do this, the system changes the pattern of the G1 byte in the Path OH. The NE receiving the RDI-P alarm should detect a change to the G1 byte on the incoming SONET signal.
UNEQ-P	Path Unequipped Alarm. An all-zeros pattern is inserted into the C2 byte of the Path OH. The C2 byte is the STS Path Signal Label. (This type of error is used between Path terminating equipment - PTE) When a PTE receives this alarm, it will generate an AIS to downstream NEs.
TC-RDI	Tandem Connection-Remote Defect Indicator. Generates an alarm to upstream equipment indicating that defects have been detected within the Tandem Connection. The TCM equipment receiving this alarm should detect a change to Bit 8 in multiframe 73 of the N1 byte.
TC-ODI	Tandem Connection-Outgoing Defect Indicator. Generates an alarm to upstream TCM equipment indicating that defects have been detected within the Tandem Connection. The TCM equipment receiving this alarm should detect a change to Bit 7 in multiframe 74 of the N1 byte.
TC-AIS	Tandem Connection-Alarm Indication

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	Signal. Generates an AIS alarm to downstream TCM equipment by setting Bits 1-4 of the N1 byte to 1110.
TC-UNEQ	Tandem Connection-Unequipped. An all-zeros pattern is inserted into the N1 byte of the Path OH.
TC-LOF	Tandem Connection-Loss of Frame. Generates a loss of a valid multiframe pattern to downstream equipment.

After selecting an alarm, the alarm continues until one of the following occurs:

- The alarm is turned off using the **None** option.
- A **Mapping** change occurs.

Error Insert Rate (SONET)

This function sets the error rate for the selected error. The system starts transmitting errors after the insertion rate is selected.


The **Error to Insert** function determines the type of error transmitted.

The following **Error Insert Rate** options are available:

Options	**Descriptions**
Off	Turns error transmission off.
1e-*X*,	X is a value from 3 to 10; for example, 1e-3 through 1e-10. X will vary based on the type of error selected.
Maximum	Generates errors at the maximum rate listed below.

If this error is inserted...	**Then this range of rates is available...**
B1 error	1e-6 to 1e-10; maximum rate is 6.43e-6
B2 error	1e-3 to 1e-10; maximum rate is 1.25e-3
B3 error	1e-6 to 1e-10; maximum rate is 6.65e-6
REI-L error	1e-4 to 1e-10; maximum rate is 2.07e-4
REI-P error	1e-6 to 1e-10; maximum rate is 6.65e-6

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BIT error	1e-3 to 1e-10; maximum rate selection is not available
TC-IEC error	1e-6 to 1e-10; maximum rate is 6.65e-6
TC-REI error	1e-7 to 1e-10; maximum rate is 8.31e-7
TC-OEI error	1e-7 to 1e-10; maximum rate is 8.31e-7

Error to Insert (SONET)

This function determines the type of error transmitted by the unit.

The purpose of generating an error with the unit is to stress the network element that is receiving the error by testing if it can detect the incoming error and then report error statistics such as error counts and rates.

The following options are available:

Options	Descriptions
None	No errors are generated. Turns errors off.
B1 Error	Generates a BIP-8 (Bit Interleaved Parity, 8-bit) error over the Section layer. Bits in the B1 byte are toggled to create an error. This type of simulation allows an NE (in this case, the downstream equipment) to be tested to verify if (1) it can detect incoming errors, and (2) then conduct performance monitoring such as error counts and rates.
B2 Error	Generates a BIP-8 error over the Line layer. Bits in the B2 byte are toggled to create an error. This type of simulation allows an NE (in this case, the downstream equipment) to be tested to verify if (1) it can detect incoming errors, and (2) then conduct performance monitoring such as error counts and rates.
B3 Error	Generates a BIP-8 error over the STS Path layer. Bits in the B3 byte are

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	toggled to create an error. This type of simulation allows an NE (in this case, the downstream equipment) to be tested to verify if (1) it can detect incoming errors, and (2) then conduct performance monitoring such as error counts and rates.
REI-L Error	Generates a Remote Error Indicator over the Line layer. An REI-L is a count of B2 errors received at the far end. When the system transmits this error, it simulates a downstream NE sending an error count back to the source of its incoming SONET signal. The system uses the M1 byte of the Line OH to transmit the error count. This type of simulation allows an NE (in this case, the upstream equipment) to be tested to verify if (1) it can detect incoming remote errors, and (2) then conduct performance monitoring such as error counts and rates. (This type of error was formerly called a Line Far End Block Error - FEBE-L.)
REI-P Error	Generates a Remote Error Indicator over the Path layer. An REI-P is a count of B3 errors received at the far end. When the system transmits this error, it simulates an NE sending an error count back to the source of its incoming SONET signal. The system uses the G1 byte of the Path OH to transmit the error count. This type of simulation allows an NE (in this case, the upstream equipment) to be tested to verify if (1) it can detect incoming remote errors, and (2) then conduct performance monitoring such as error counts and error rates.

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	(This type of error was formerly called a Path Far End Block Error - FEBE-P.)
BIT Error	Generates bit errors. This type of simulation allows an NE (in this case, the downstream equipment) to be tested to verify if (1) it can detect incoming errors, and (2) then conduct performance monitoring such as error counts and error rates.
TC-IEC	Generates a Tandem Connection Incoming Error Count over the Path layer. A TC-IEC is a count of B3 errors received by TCM equipment at the far end. Bits 1-4 of the N1 byte are the IEC bits.
TC-REI	Generates a Tandem Connection Remote Error Indicator over the Path layer between TCM equipment. Bit 5 of the N1 byte is used for this error.
TC-OEI	Generates a Tandem Connection Outgoing Error Indicator over the Path layer between TCM equipment. Bit 6 of the N1 byte is used for this error.

OC-192 Transmit Overhead

The OC-192 Transmit Overhead screen contains the following functions.

Functions	Description
STS-1	Selects a specific STS-1 slot within the OC-192 signal. The overhead bytes that appear on the OH screen are associated with this slot. There are 192 STS-1 slots available in an OC-192 signal.
STS-48 Added	Select 1 to 4, All, or None as the foreground channel.
Section OH	Select and edit the following Overhead bytes: A1, A2, Z0, B1, E1, F1, D1, D2, and D3.
Line OH	Select and edit the following Overhead bytes: H1, H2, H3, B2, K1,

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	K2, D4-D12, Z1, Z2, and E2.
Path OH	Select and edit the following Overhead bytes: B3, J1, C2, G1, F2, H4, Z3, Z4, and Z5.
J0 Trace	Selects a default or customized pattern to be used as the J0 trace.
J1 Trace	Selects a default or customized pattern to be used as the J1 trace.
TC Trace	Selects a default or customized pattern to be used as the Tandem Connection Monitoring trace.

OC-192 Transmit Pointer Generation

The OC-192 Transmit Pointer screen contains the following functions.

Functions	**Description**
Pointer Action	Determines the type of Pointer activity that occurs when the **Inc Pointer** and **Dec Pointer** buttons are selected.
NDF on New Pointer	Specifies whether the New Data Flag bits are set when a new Pointer is present in the generated signal.
Pointer Value	Allows a new Pointer value to be entered. A valid Pointer value is a binary number ranging from 0 to 782.
Burst Count	Determines the number of Pointer location movements that occur when the **Inc Pointer** or **Dec Pointer** buttons are pressed. The Pointer burst count ranges from 1 to 8.
SPE Frequency Offset	Adjusts the rate at which Pointer adjustments are needed in the Synchronous Payload Envelope (the payload).
Increment/Decrement	Alternates the Pointer insertion

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Pointer	from increment to decrement with a 200-msec delay in between.

Related Topic:

For information about making Pointer adjustments, refer to *Make Pointer Adjustments* in the Common Tasks section of the online help.

OC-192 Transmit Settings 1

The OC-192 Transmit Settings 1 screen contains the following functions.


Options marked with an asterisk (*) indicate that the function is coupled with the Receive settings if Setting Control is set to "Coupled."

Functions	Description
*Settings Control	If **Coupled** is selected, settings changed on the Transmit screen will automatically change on the Receive screen as well. If **Independent** is selected, settings established on the Transmit screen will only affect Transmit mode.
Passthru Mode	Activates or deactivates pass-thru mode, allowing an incoming STS signal to pass through the unit without altering the data in the signal. The following options are available: **On** and **Off**.
*Mapping	Defines the type of signals that are combined to create an OC-192 signal. For example, four STS-48s can be mapped into an OC-192 signal. If the unit is not licensed for 10 Gbps mapping, the following options appear and are described below: **STS-192c Bulk**, **STS-48 A/D**, **STS-48 A/D LI**, and **STS-192c POS**.

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	If the unit is licensed for 10 Gbps mapping, it can perform the following mappings using only the 10 Gbps circuit pack (OC-192 protocol processor): **STS-192c Bulk**, **STS-12c Bulk**, **STS-3c Bulk**, **STS-1 Bulk**, and **STS-192c POS**. • **STS-192c Bulk.** Maps a concatenated STS-192 signal into an OC-192. • **STS-48 A/D.** Maps four STS-48s into an OC-192. The STS-48s are generated internally from the OC-48 protocol processor. **Note:** This option appears if a separate 2.5G circuit pack (an OC-48 protocol processor) is installed in the unit. • **STS-48 A/D LI:** Maps four STS-48s into an OC-192. The STS-48s are derived externally and enter the unit using the line interface connectors. **Note:** This option appears if a separate 2.5G circuit pack (an OC-48 protocol processor) is installed in the unit. • **STS-48c Bulk.** Maps a concatenated STS-48 signal into an OC-192. Four STS-48s make up an OC-192. **Note:** This option only appears if the unit is licensed for 10 Gbps mapping. • **STS-12c Bulk.** Maps a concatenated STS-12 signal into an OC-192. Sixteen STS-12s make up an OC-192. **Note:** This option only appears if the unit is licensed for 10 Gbps mapping. • **STS-3c Bulk.** Maps a concatenated STS-3 signal into an OC-192. Sixty-four

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	STS-3s make up an OC-192. **Note:** This option only appears if the unit is licensed for 10 Gbps mapping. • **STS-1 Bulk.** Maps 192 STS-1s into an OC-192 signal. **Note:** This option only appears if the unit is licensed for 10 Gbps mapping. • **STS-192c POS.** Configures the unit for Packet Over SONET/SDH operation.
STS-48 Added **Note:** STS-48 Added only appears when Mapping is set to STS-48c Bulk.	Selects a specific STS-48 signal as the foreground (or source) channel in the STS-192 signal. The source channel can be used to transmit alarms, errors, or patterns. The unit multiplexes four STS-48 signals into a single STS-192 signal. • **1 - 4.** Selects a specific STS-48 (STS-48 #1 through STS-48 #4) to transmit as the source channel. • **ALL.** Transmit the foreground channel across all four STS-48 channels. • **None.** No foreground channel is selected.
STS-12 Added **Note:** STS-12 Added only appears when Mapping is set to STS-12c Bulk.	Selects one of 16 STS-12 signals as the foreground channel in the STS-192 signal. • **1 - 16**. Selects a specific STS-12 (STS-12 #1 through STS-12 #16) as the foreground channel. • **ALL.** Transmits the foreground channel across all 16 STS-12 channels. • **None.** No foreground channel is selected.

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STS-3 Added **Note:** STS-3 Added only appears when Mapping is set to STS-3c Bulk.	Selects one of 64 STS-3 signals as the foreground channel in the STS-192 signal. • **1 - 64.** Selects a specific STS-3 (STS-3 #1 through STS-3 #64) as the foreground channel. • **ALL.** Transmits the foreground channel across all 64 STS-3 channels. • **None.** No foreground channel is selected.
STS-1 Added **Note:** STS-1 Added only appears when Mapping is set to STS-1 Bulk.	Selects one of 192 STS-1 signals as the foreground channel in the STS-192 signal. • **1 - 192.** Selects a specific STS-1 (STS-1 #1 through STS-1 #192) as the foreground channel. • **ALL.** Transmits the foreground channel across all 192 STS-1 channels. • **None.** No foreground channel is selected.
Background STS-48 Pattern **Note:** Only appears when Mapping is set to STS-48c Bulk.	Determines the type of pattern inserted into the three remaining STS-48 background channels of an OC-192 signal. The pattern can range from 1 bit to 32 bits and is entered using screen keypad. It can be entered in Hex, decimal, or binary format.
Background STS-12 Pattern **Note:** Only appears when Mapping is set to STS-12c Bulk.	Determines the type of pattern inserted into the 15 remaining STS-12 background channels of an OC-192 signal. The pattern can range from 1 bit to 32 bits and is entered using screen keypad. It can be entered in Hex, decimal, or binary format.
Background STS-3 Pattern	Determines the type of pattern inserted into the 63 remaining STS-3

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Note: Only appears when Mapping is set to STS-3c Bulk.	background channels of an OC-192 signal. The pattern can range from 1 bit to 32 bits and is entered using screen keypad. It can be entered in Hex, decimal, or binary format.
Background STS-1 Pattern **Note:** Only appears when Mapping is set to STS-1 Bulk.	Determines the type of pattern inserted into the 191 remaining STS-1 background channels of an OC-192 signal. The pattern can range from 1 bit to 32 bits and is entered using screen keypad. It can be entered in Hex, decimal, or binary format.
Payload Pattern	Select User-defined (32 bit value), PRBS 15, PRBS 15 INV, PRBS 23, PRBS 23 INV, PRBS 31,or PRBS 31 INV.
Clock Reference	Select Internal, Recovered, or Bits/Sets.
Laser Type	Selects either the 1310 nm laser or the 1550 nm laser on the 10G circuit pack (OC-192/STM-64).
Initial Laser Setting	Controls whether the laser is on or off when the unit is turned on. • **Off.** The unit's laser will be off when the unit is turned on. • **On.** The unit's laser will be on when the unit is turned on. • **Restore Previous State.** When the unit is turned on, the laser will be on or off based on its previous setting before the unit was turned off.

OC-192 Transmit Settings 2

The OC-192 Transmit Settings 2 screen contains the following functions.

Functions	Description
Line Frequency Offset	Adjusts the offset of the signal

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	frequency of the transmitted SONET signal. The frequency can be adjusted in parts per million (PPM). The following options are available: **Off** = 0: The frequency cannot be adjusted. **Edit:** Adjusts the signal frequency in PPM. Use the + and - arrow keys to adjust the 00.0 decimal place. The frequency offset ranges from -100.0 to 100.0 in increments of 0.1. The default value is 00.0. After an offset value is entered, the Confirm button on the touch screen keypad must be selected for the new offset value to be accepted.
SS Bits in H1 Label	Set to SONET (00) or SDH (10).
Path Signal Label	Set the C2 byte to: • Unequipped (00) • Equipped (01) • VT Structured STS (02) • Lock VT Mode (03) • Asyn Mapping for DS3 (04) • Asyn Mapping for DS4NA (12) • Mapping for ATM (13) • Mapping for DQDB (14) • HDLC Over SONET Mapping (16) • O.181 Test Signal Mapping (FE) • User Defined (any eight bit pattern 0 to FF. **Note:** This option is coupled with the C2 byte option in the Transmit Overhead screen. If it is changed in this screen, it will change in the Overhead screen as well.
Synchronization Status (S1)	Sets the S1 byte to: • Quality Unknown: Sets byte value to 00000000. • Rec. G.811: Sets byte value to

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	00000010. • Rec. G.812 Transmit: Sets byte value to 00000100. • Rec. G.812 Local: Sets byte value to 00001000. • Sync Eqip Timing Src: Sets byte value to 00001011. • User Defined (any eight bit pattern 0 to FF.
Trigger In	Determines how the protocol processor responds when an external pulse is received.
TC Overhead Processing	Enables Tandem Connection Monitoring (TCM) transmit mode. • **Enable:** For SDH, the unit uses its TCM circuitry and the N1 byte to generate errors and alarms between TCM equipment. For SONET, the unit uses the Z5 byte. • **Disable:** TCM mode is disabled, and the N1 and Z5 bytes follow normal operation.

OC-192 Receive

The Receive screen contains the following functions:

- OC-192 Receive Settings 1
- OC-192 Receive Settings 2
- OC-192 Receive Overhead
- OC-192 Receive Signal Status

OC-192 Receive Overhead

The OC-192 Receive Overhead screen contains the following functions.

Function	Options
STS-1	Selects a specific STS-1 slot within the OC-192 signal. The overhead

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	bytes that appear on the OH screen are associated with this slot. There are 192 STS-1 slots available in an OC-192 signal.
STS-48 Dropped	Selects a specific STS-48 signal to monitor in the STS-192 signal.
Section OH	Displays the Section Overhead bytes for the selected STS-1 on the incoming OC-192 signal. This is a read-only function.
Line OH	Displays the Line Overhead bytes for the selected STS-1 on the incoming OC-192 signal. This is a read-only function.
Path OH	Displays the Path Overhead for the selected STS-1 on the incoming OC-192 signal. This is a read-only function.
J0 Trace	Displays the J0 trace received on the incoming OC-192 signal. This is a read-only function.
J1 Trace	Displays the J1 trace received on the incoming OC-192 signal. This is a read-only function.
TC Trace	Displays the Tandem Connection trace received on the incoming OC-192 signal. This is a read-only function.

OC-192 Receive Settings 1

This function allows you to configure the unit's receive parameters for your OC-192 environment.


Options marked with an asterisk (*) indicate that the function is coupled with the Transmit settings if Setting Control is set to "Coupled."

The OC-192 Receive Settings screen contains the following functions.

Function	**Description**
*Settings Control	If **Coupled** is selected, settings

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	changed on the Receive screen will automatically change on the Transmit screen as well. If **Independent** is selected, settings established on the Receive screen will only affect Receive mode.
*Mapping	Defines the type of signals that are combined to create an OC-192 signal. For example, four STS-48s can be mapped into an OC-192 signal. If the unit is not licensed for 10 Gbps mapping, the following options appear and are described below: **STS-192c Bulk**, **STS-48 A/D**, **STS-48 A/D LI**, and **STS-192c POS**. If the unit is licensed for 10 Gbps mapping, it can perform the following mappings using only the 10 Gbps circuit pack (OC-192 protocol processor): **STS-192c Bulk**, **STS-12c Bulk**, **STS-3c Bulk**, **STS-1 Bulk**, and **STS-192c POS**. • **STS-192c Bulk.** Maps a concatenated STS-192 signal into an OC-192. • **STS-48 A/D.** Maps four STS-48s into an OC-192. The STS-48s are generated internally from the OC-48 protocol processor. **Note:** This option appears if a separate 2.5G circuit pack (an OC-48 protocol processor) is installed in the unit. • **STS-48 A/D LI:** Maps four STS-48s into an OC-192. The STS-48s are derived externally and enter the unit using the line interface connectors. **Note:** This option appears if a separate 2.5G circuit pack (an

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	OC-48 protocol processor) is installed in the unit. • **STS-48c Bulk.** Maps a concatenated STS-48 signal into an OC-192. Four STS-48s make up an OC-192. **Note:** This option only appears if the unit is licensed for 10 Gbps mapping. • **STS-12c Bulk.** Maps a concatenated STS-12 signal into an OC-192. Sixteen STS-12s make up an OC-192. **Note:** This option only appears if the unit is licensed for 10 Gbps mapping. • **STS-3c Bulk.** Maps a concatenated STS-3 signal into an OC-192. Sixty-four STS-3s make up an OC-192. **Note:** This option only appears if the unit is licensed for 10 Gbps mapping. • **STS-1 Bulk.** Maps 192 STS-1s into an OC-192 signal. **Note:** This option only appears if the unit is licensed for 10 Gbps mapping. • **STS-192c POS.** Configures the unit for Packet Over SONET/SDH operation.
STS-48 Dropped **Note:** STS-48 Dropped only appears when Mapping is set to STS-48c Bulk.	Selects a specific STS-48 signal to monitor in the STS-192 signal. The unit receives an STS-192 signal that is demuxed into four STS-48 signals and then processed. • **1 - 4.** Selects a specific STS-48 (STS-48 #1 through STS-48 #4) as the dropped and monitored channel. • **None.** No STS-48s are selected.

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STS-12 Dropped **Note:** STS-12 Dropped only appears when Mapping is set to STS-12c Bulk.	Selects a specific STS-12 signal to monitor in the STS-192 signal. The unit receives an STS-192 signal that is demuxed into 16 STS-12 signals and then processed. • **1 - 16.** Selects a specific STS-12 (STS-12 #1 through STS-12 #16) as the dropped and monitored channel. • **None.** No STS-12s are selected.
STS-3 Dropped **Note:** STS-3 Dropped only appears when Mapping is set to STS-3c Bulk.	Selects a specific STS-3 signal to monitor in the STS-192 signal. The unit receives an STS-192 signal that is demuxed into 64 STS-3 signals and then processed. • **1 - 64.** Selects a specific STS-3 (STS-3 #1 through STS-3 #64) as the dropped and monitored channel. • **None.** No STS-3s are selected.
STS-1 Dropped **Note:** STS-1 Dropped only appears when Mapping is set to STS-1 Bulk.	Selects a specific STS-1 signal to monitor in the STS-192 signal. The unit receives an STS-192 signal that is demuxed into 192 STS-1 signals and then processed. • **1 - 192.** Selects a specific STS-1 (STS-1 #1 through STS-1 #192) as the dropped and monitored channel. • **None.** No STS-1s are selected.
Payload Pattern	Selects the type of pattern that the unit expects to receive on the incoming SONET signal. The following options are available: Live (user data is received; no pattern is used), User Defined (range from 1

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	bit to 32 bits and is entered using a touch screen keypad), PRBS 2^15-1, PRBS 2^15-1 Inverted, PRBS 2^23-1, PRBS 2^23-1 Inverted, PRBS 2^31-1, and PRBS 2^31-1 Inverted.
Trigger Out	Allows the protocol processor to respond to an external "pulse" received. The following options can be selected: None, LOF, LOP, B1, B2, B3, BIT, Frame, RDI-L, RDI-P, REI-L, REI-P, or Ptr Increment, Ptr Decrement, New Ptr with NDF, or New Ptr without NDF.

OC-192 Receive Settings 2 (SET 2)

This function configures the OC-192 Receive mapping, which maps a pattern into the OC-192 interface.

The following options appear on the OC-192 Receive SET 2 screen.

Options	Description
PLM Alarm Reporting	This function enables PLM-P alarm reporting. An STS Payload Label Mismatch (PLM-P) alarm occurs when the incoming Higher-Order Path Signal Label (C2 byte) does not match the expected Higher-Order Path Signal Label (C2 byte). The following options are available: • **Enabled:** PLM-P alarms are recognized and reported. • **Disabled:** PLM-P alarms are ignored.
Expected Path Signal Label	Configure to receive a specific value for the C2 byte. The following options are available: • **Unequipped (00):** The

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	expected C2 byte is 00000000. • **Equipped (01):** The expected C2 byte is 00000001. • **VT Structured STS (02):** The expected C2 byte is 00000010. • **Lock VT Mode (03):** The expected C2 byte is 00000011. • **Asyn Mapping for DS3 (04):** The expected C2 byte is 00000100. • **Asyn Mapping for DS4NA (12):** The expected C2 byte is 00010010. • **Mapping for ATM (13):** The expected C2 byte is 00010011. • **Mapping for DQDB (14):** The expected C2 byte is 00010100. • **HDLC Over SONET Mapping (16):** The expected C2 byte is 00010110. • **O.181 Test Signal Mapping (FE):** The expected C2 byte is 11111110. • **User Defined:** Allows an 8-bit Path Signal Label, from 00h to FFh, to be entered for the C2 byte value.
TIM Alarm Reporting	An STS Path Trace Identifier Mismatch (TIM-P) alarm occurs when the incoming J1 trace does not match the expected J1 trace. A Section Trace Identifier Mismatch (TIM-S) alarm occurs when the incoming J0 trace does not match the expected J0 trace. A Tandem Connection Trace Identifier Mismatch (TC-TIM) alarm occurs when the incoming TC trace does not match the expected TC trace. The following options are

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	available: • **Enabled:** TIM alarms are recognized and reported. • **Disabled:** TIM alarms are ignored.
Expected J0	Defines the expected J0 trace received on the incoming SONET signal. The following options are available: • **Default (64 byte):** Selects the Digital Lightwave ASCII message as the expected J0 trace pattern. The message consists of 62 characters appended with a CR and LF. • **User Defined (64 byte):** Selects a user-defined ASCII message as the expected J0 trace pattern. The message is entered and saved using a touch screen keyboard. The message can be up to 64 characters in length (62 characters plus CR and LF). • **All Ones:** Selects an All Ones pattern as the expected J0 trace pattern. • **All Zeros:** Selects an All Zeros pattern as the expected J0 trace pattern. • **Default (16 byte):** Selects the Digital Lightwave ASCII message as the expected J0 trace pattern. The message consists of 16 characters. • **User Defined (16 byte):** Selects a user-defined ASCII message as the expected J0 trace pattern. The message is entered and saved using a touch screen keyboard. The message can be up to 16

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	characters in length.
Expected J1	Defines the expected J1 trace received on the incoming SONET signal. The following options are available: • **Default (64 byte):** Selects the Digital Lightwave ASCII message as the expected J1 trace pattern. The message consists of 62 characters appended with a CR and LF. • **User Defined (64 byte):** Selects a user-defined ASCII message as the expected J1 trace pattern. The message is entered and saved using a touch screen keyboard. The message can be up to 64 characters in length (62 characters plus CR and LF). • **All Ones:** Selects an All Ones pattern as the expected J1 trace pattern. • **All Zeros:** Selects an All Zeros pattern as the expected J1 trace pattern. • **Default (16 byte):** Selects the Digital Lightwave ASCII message as the expected J1 trace pattern. The message consists of 16 characters. • **User Defined (16 byte):** Selects a user-defined ASCII message as the expected J1 trace pattern. The message is entered and saved using a touch screen keyboard. The message can be up to 16 characters in length.
SS Bits Alarm Reporting	Disables or enables SS bits reporting. This function is used in conjunction with the Expected SS Bits function. If enabled, and an SS Bits mismatch is

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	detected on the received signal, the duration in seconds will appear under the Results Scan function.
Expected SS Bits	Selects one of the following as the expected SS Bits value: • 00 (SONET) • 01 (Undefined) • 10 (SDH) • 11 (Undefined)
TC Error/Alarm Processing	Enables or disables Tandem Connection Monitoring (TCM) mode. This function is used in conjunction with the **Expected TC Trace** and **TIM Alarm Reporting** functions. The **TC Summary LED** turns red if a TCM error or alarm is reported. Select the TC Summary text for more details. • **Enable:** Turns on TCM error and alarm reporting mode. • **Disable:** Turns off TCM error and alarm reporting mode. (**Note:** Disable this option if you are not performing TCM testing. This will prevent false error and alarm reporting.)
Expected TC Trace	Defines the expected TC trace received on the incoming signal. For SONET, this is in the Z5 byte. For SDH, this is in the N1 byte. The following options are available: • **Default:** Selects the 16-byte Digital Lightwave ASCII message at the expected TC trace pattern. • **All Ones (16 byte):** Selects a 16-byte All Ones pattern as the expected TC trace pattern. • **All Zeros (16 byte):** Selects a

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	16-byte All Zeros pattern as the expected TC trace pattern. • **User Defined:** Selects a 16-byte user-defined ASCII message as the expected TC trace pattern. The message is entered and saved using a screen keypad.

OC-192 Receive Signal Status

Displays the following measurements of the incoming SONET signal:

- Received optical power in dBm
- Line Frequency in MHz for OC-192
- Frequency offset received in KHz and ppm
- Update Signal Calibration allows you to update the following calibrations:
  - Zero power reading
  - -20 dBm power reading
  - -10 dBm power reading

Select the **Save** button to update the signal calibration.

Related Topics:

Calibrate Optical Power

Line Frequency Offset

OC-192 Results

All monitored activity that the system receives is eventually reported to the Results screen. This screen provides several layers of granularity for analyzing the incoming signal, pattern, errors, and alarms.

The OC-192 Results screen contains the following functions:

- Scan
- Errors
- Alarms
- PTR
- Event Log
- APS

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- Large LEDs
- Graphs

APS Results

The APS results monitor incoming APS activity. It logs and displays the K1 and K2 byte sequences received by the unit. A maximum of 15 byte sequences can appear on the touch screen.

The following information appears in the APS report for the last 15 K1 and K2 byte sequences received:

- The HEX value of the K1 byte.
- The HEX value of the K2 byte.
- The number of frames received that contain the K1 and K2 bytes.
- The elapsed time of the frames that contain the K1 and K2 bytes.


Per GR-253-CORE, only the upper 12 bits of the K1/K2 bytes (K1 bits 1-8 and the K2 bits 1-4) are used for APS operation. K2 bit 5 sets the APS mode type (1+1, 1:n) and cannot be changed during operation. K2 bits 6-8 are for alarms. Any changes to the lower four bits of the K2 byte do not affect APS operation. The Results APS table only starts and displays a new entry item if the upper 12 K1/K2 bits stabilize on a new value for a minimum of three consecutive frames.

Alarms

The system can monitor and report alarms and their duration on the incoming SONET signal. The **Alarms** function lists the duration of the alarm in seconds.

The following alarms can be monitored:

- Clock Sync
- LOS (Loss of Signal)
- LOF (Loss of Frame)
- SEF (Severely Errored Frame)
- TIM-S (Section Trace Identifier Mismatch for the J0 byte)
- AIS-L (Line Alarm Indication Signal)
- RDI-L (Line Remote Defect Indicator)
- APS (Automatic Protection Switching)
- AIS-P (Path Alarm Indication Signal)
- LOP-P (Path Loss of Pointer)
- UNEQ-P (Unequipped STS Payload)
- RDI-P (Path Remote Defect Indicator)
- TIM-P (STS Path Trace Identifier Mismatch for the J1 byte)

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- PLM-P (STS Payload Label Mismatch)
- Pattern Sync
- TC-RDI (Tandem Connection-Remote Defect Indicator)
- TC-ODI (Tandem Connection-Outgoing Defect Indicator)
- TC-AIS (Tandem Connection-Alarm Indication Signal)
- TC-UNEQ (Tandem Connection-Unequipped)
- TC-TIM (Tandem Connection-Trace Identifier Mismatch)
- TC-LOF (Tandem Connection-Loss of Frame)

Errors

The system can monitor and report errors on the incoming SONET signal. The **Errors** function provides a detailed analysis of the incoming error as described below.

The errors reported are a result of:

- Incoming errors that are generated by the SONET network, or
- Errors being intentionally generated by the system when it is used in a loopback environment

The following errors can be monitored:

- B1 (Section BIP-8, also known as a Section Coding Violation - CV-S)
- B2 (Line BIP-8, also known as a Line Coding Violation - CV-L)
- B3 (Path BIP-8, also known as an STS Path Coding Violation - CV-P)
- REI-L (Line Remote Error Indicator; also known as a Line Far End Block Error - FEBE-L)
- REI-P (Path Remote Error Indicator; also known as a Path Far End Block Error - FEBE-P)
- BIT (BIT errors reported in the payload)
- NDF-P (Path New Data Flag counts)
- TC-IEC (Tandem Connection-Incoming Error Count)
- TC-REI (Tandem Connection-Remote Error Indicator)
- TC-OEI (Tandem Connection-Outgoing Error Indicator)

The following parameters are measured for these incoming errors:

- Error count using an 11-digit format
- Average error rate using an N.NNe-N format
- Current error rate using an N.NNe-N format
- Error-free seconds using an 8-digit format
- Errored seconds
- Severely Errored seconds
- Unavailable errored seconds

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Related Topics:

How to Display History

Scan

LED Definitions

Section Analysis

Event Log

The Event Log provides a detailed summary of alarm, error, Pointer events, and APS activity that have occurred and have been recorded by the unit.

The events appear in a table that lists events, the number of events logged, the start and stop time of the event, and the duration of the event.

Graphs

This function allows incoming errors and alarms to be graphed. The graphs can be saved, recalled, and printed from a history file.

For more information about graphs, select *Use Graphs* in the Common Tasks section of the online help.

Large LEDs Overview

This function displays the SONET LEDs in a large, easy-to-read format that covers the entire touch screen area. This is useful for viewing any errors or alarms from a long distance, such as across the room from a test bay.

This function also allows:

- On/Off control of the unit's laser
- Single error insertion into the transmit SONET signal

PTR (SONET)

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This function monitors and reports received STS Pointer statistics. A count of the following Pointer statistics appear:

- Pointer Justification (STS Path Positive Pointer Justification count)
- Negative Justification (STS Path Negative Pointer Justification count)
- Positive Justification Seconds. Indicates the duration of a Pointer adjustment.
- NDF Count. Indicates the STS Path New Data Flag count.
- Receive Pointer Value (in decimal). Valid Pointers range from 0 to 782.

Scan

This function displays a list of received errors and alarms. For **alarms**, the duration is reported as a count in seconds. For **errors**, an error count is reported.

The message **No Errors or Alarms** appears if no events are received by the system.

This function provides a quick summary of incoming errors and alarms. It is effective in identifying a general area to investigate when error or alarm activity is detected.

OC-192 Test

The Test screen configures test parameters associated with a protocol processor.

The Test screen contains the following functions:

- SET 1
- APS
- RTD

Action After Duration

This function defines what activities occur at the conclusion of a timed test. To determine how long a test will run, refer to the Duration function section. The following options are available.

Options	Description
None	No action occurs at the end of the test duration.
Print Current Statistics	Test results are printed to the attached printer at the end of a timed test. The timed test is not repeated.

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Record Current Statistics	Test results are printed to a file at the end of a timed test. Test results appear in a columned report format.
Record Current Statistics Using a Delimiter	Test results are printed to a file at the end of a timed test. Test results appear in a quote/comma-report format, meaning that error and/or alarm values are enclosed in quotes (") and separated by commas (,).
Print Statistics and Repeat Test	**Note:** This option appears when **Repeat Actions** is selected. At the conclusion of a timed test, test statistics (which are results for the Scan, Errors, Alarms, and PTR functions) are automatically printed to a printer, and the timed test is restarted. This cycle continues until the timed test is stopped by selecting **Stop** from the Common Function Buttons row or by changing the value of the Action After Duration function.
Record Statistics and Repeat Test	**Note:** This option appears when **Repeat Actions** is selected. Test statistics are printed to a file at the end of a timed test. Test results appear in a columned report format. The file name convention used is: **xxhhmmss.stat** where, **xx** indicates the current protocol processor (for example, E1=E1, E3=E3, E4=E4, OC=OC-192/48/12, ST=STM-64/16/4). **hhmmss** indicates the current time in hours, minutes, and seconds. **stat** indicates the Statistics file extension.
Print Events and Repeat Test	**Note:** This option appears when

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	Repeat Actions is selected. At the conclusion of a timed test, test events (which are a detailed summary of alarms, errors, and Pointer activity) are automatically printed to a printer, and the timed test is restarted. This cycle continues until the timed test is stopped by selecting **Stop** from the Common Function Buttons row or by changing the value of the Action After Duration function
Record Events and Repeat Test	**Note:** This option appears when **Repeat Actions** is selected. Test statistics are printed to a file at the end of a timed test. Test results appear in a columned report format. The file name convention used is: **xxhhmmss.stat**.
Print Statistics/Events and Repeat Test	**Note:** This option appears when **Repeat Actions** is selected. At the conclusion of a timed test, both test statistics and events are automatically printed to a printer, and the timed test is restarted. This cycle continues until the timed test is stopped by selecting **Stop** from the Common Function Buttons row or by changing the value of the Action After Duration function
Record Statistics/Events and Repeat Test	**Note:** This option appears when **Repeat Actions** is selected. Test statistics and events are printed to a file at the end of a timed test. Test results appear in a columned report format. The file name convention used is: **xxhhmmssE.stat** (E indicates the file contains both statistics and events).
Print Events and Repeat Test	Enables real-time reporting. Any

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	event that occurs during a real-time test is automatically sent to the attached printer. When the test duration expires, the test restarts. **Note:** This option only appears on the touch screen of portable units when **Realtime Actions** is selected.
Record Events and Repeat Test	Enables real-time reporting. Any event that occurs during a real-time test is automatically printed to a file. When the test duration expires, the test restarts. **Note:** This option only appears on the touch screen of portable units when **Realtime Actions** is selected.
Print and Record Events and Repeat Test	Enables real-time reporting. Any event that occurs during a real-time test is automatically sent to both the attached printer and a report file. When the test duration expires, the test restarts. **Note:** This option only appears on the touch screen of portable units when **Realtime Actions** is selected.
Print Events	Enables real-time reporting. Any event that occurs during a real-time test is automatically sent to the attached printer. **Note:** This option only appears on the touch screen of portable units when **Realtime Actions** is selected.
Record Events	Enables real-time reporting. Any event that occurs during a real-time test is automatically printed to a file. **Note:** This option only appears on the touch screen of portable units when **Realtime Actions** is selected.

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Print and Record Events	Enables real-time reporting. Any event that occurs during a real-time test is automatically sent to both the attached printer and a report file. **Note:** This option only appears on the touch screen of portable units when **Realtime Actions** is selected.

Duration

This function configures how long a timed test runs. The following options are available:

Options	**Description**
Continuous	Test is untimed, and unit is always collecting data.
5 Minutes	Test runs for 5 minutes.
15 Minutes	Test runs for 15 minutes.
1 Hour	Test runs for 1 hour.
2 Hours	Test runs for 2 hours.
24 Hours	Test runs for 24 hours.
72 Hours	Test runs for 72 hours.
1 Week	Test runs for 1 week.
2 Weeks	Test runs for 2 weeks.
User Defined	Allows a specific test duration to be entered using a touch screen keypad. The minimum duration is 1 minute. The maximum duration is 99 days, 23 hours, and 59 minutes.

Protection Switch Criteria

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This is an **APS (RX)** function that is used to measure APS activity. The **Protection Switch Criteria** function determines the type of alarm, error, or pattern event that is used as a trigger to generate APS activity in your network. The unit monitors the incoming signal for the specified event. If it occurs, its duration in both seconds and frames is measured and logged. The APS measurement has an accuracy of 0.5 milliseconds.

The following options are available:

Options	Description
B1	An APS is generated if a B1 error is received. The duration in seconds and frames is measured and logged.
SEF	An APS is generated if a Severely Errored Frame is received. The duration in seconds and frames is measured and logged.
AIS-L	An APS is generated if a Line AIS alarm is received. The duration in seconds and frames is measured and logged.
AIS-P	An APS is generated if a Path AIS alarm is received. The duration in seconds and frames is measured and logged.
PRBS	An APS is generated if a PRBS pattern is received with errors. The duration in seconds and frames is measured and logged.

For information about measuring APS activity, select *Measure SDH and SONET APS Activity* in the Common Tasks section of the online help.

APS (Automatic Protection Switch)

The unit can measure APS switching intervals in your network. The unit can be configured to monitor for a specific event that will cause an APS switch. When this event occurs, the duration in both seconds and frames is logged. These statistics can be used to determine how long it takes for your network equipment to react to an APS event and switch to a backup path.

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Using the Test APS functionality, you can set a specific event as a trigger for APS activity. The APS measurement has an accuracy of 0.5 milliseconds.

Test APS functions include:

- **Protection Switch Criteria**
- **State:** Starts and stops Automatic Protection Switching mode. The unit will begin monitoring the incoming signal for a single or continuous APS event. If an APS event occurs, the protection switch time will appear in both seconds and frames present. The results will not include the number of good frames, but the number of frames that elapsed before the first good frame, meeting the entered criteria, occurred.

  Single APS - Monitors for a single APS event. Seconds and frames are reported and the State returns to Inactive.

  Continuous APS - Constantly monitors for APS events, and updates the seconds and frames reported.

  Stop APS - Stops APS monitoring. The State returns to Inactive.
- **Protection Switch Time (Frames):** Indicates the number of frames received during the APS switching event.
- **Protection Switch Time (Seconds):** Indicates the duration in seconds that it took for the APS switch event to occur.
- **Consecutive Good Time Required:** This function allows you to enter the duration (in milliseconds) of valid frames to occur before Protection Switching is confirmed to be activated. The range is 0.125 to 2047.875 milliseconds and is entered using a keypad.
- **Consecutive Good Frames Required**: This function allows you to enter the number of valid frames to occur before Protection Switching is confirmed to be activated. The range is 1 to 16383 frames and is entered using a keypad.

For more information about monitoring APS activity, select *Measuring SDH and SONET APS Activity* in the Common Tasks section of the online help.

RTD (Round-Trip Delay)

The round-trip delay function allows you to transmit a known frame into your network and measure how long it takes for the frame to return to the unit.

Test RTD functions include:

- **State:** Starts and stops round-trip delay mode.

  Single Round-Trip Delay - If selected, an AIS alarm is inserted into a

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frame and transmitted once through your network. The frame's transmission through the network is measured in frame counts and milliseconds. Frame counts indicates the number of frames received before the AIS frame is received by the unit. Milliseconds indicates how long it took for the AIS frame to travel out and return to the unit.

Continuous Round-Trip Delay - If selected, an AIS alarm is inserted into a frame and continuously transmitted through your network. The current frame count and duration appear in the **Current** column. The fastest round trip appears in the **Minimum** column and the slowest round trip appears in the **Maximum** column.

Stop Round-Trip Delay - Stops round-trip delay activity. The State returns to Inactive.

- **Round-trip Delay Time (Frames):** Indicates the number of frames received during the measurement.
- **Round-trip Delay Time (Seconds):** Indicates the duration in seconds that it took for the known frame to return to the unit.
- **Consecutive Good Time Required:** This function allows you to enter the duration (in milliseconds) of valid frames to occur before the round-trip delay function is confirmed to be activated. It is used to fine-tune the measurement. The range is 0.125 to 2047.875 milliseconds and is entered using a keypad.
- **Consecutive Good Frames Required**: This function allows you to enter the number of valid frames to occur before the round-trip delay function is confirmed to be activated. It is used to fine-tune the measurement. The range is 1 to 16383 frames and is entered using a keypad.

For more information about round-trip delay, select *Round-Trip Delay* in the Common Tasks section of the online help.

SET 1

The SET 1 functions determine how long a protocol processor's test runs and what activities occur at the end of the test.

The following appears on the SET 1 screen.

- **Duration**
- **Action After Duration**
- **Pause Test/Resume Test:** This button switches between pausing an active test and continuing an active test. The button's label indicates the action that will happen when it is selected.

For more information about tests, select *Start a Test* in the Common Tasks section of the online help.

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OC-192 Performance Monitoring

Performance Monitoring provides greater detail about incoming Section, Line, and Path errors.

- Section Analysis
- Line Analysis
- Path Analysis

Line Analysis

This function displays a detailed breakdown of incoming **B2** (Line BIP-8, also known as Coding Violations) and Line Remote Error Indicator (REI-L) errors.

The following statistics are reported:

Statistic	Description
Near End Coding Violations (CV-L)	This is an error count of incoming B2 errors.
Near End Errored Seconds (ES-L)	This reports the duration of the incoming B2 errors (in seconds). This statistic also reports the percentage of errored seconds compared to the duration of error-free seconds.
Near End Severely Errored Seconds (SES-L)	This reports the duration of Severely Errored Seconds (SES) on the incoming SONET signal. An SES is reported when 9835 or more B2 errors occur in one second, or when a Severely Errored Frame (SEF) alarm, Loss of Frame (LOF) alarm, Loss of Signal (LOS) alarm, or Line Alarm Indication Signal (AIS-L) alarm occurs.
Near End Unavailable Seconds (UAS-L)	This reports the number of seconds that the Line layer was considered unavailable. A Line is unavailable when 10 consecutive seconds that qualify as SES-L seconds occur.
Far End Coding Violations (CV-LFE or REI-L)	This is an error count of the number of B2 errors detected by the far-end Line Terminating Equipment (LTE). These errors are reported back to the NIC 10G using the M1 byte of the Line overhead. The **M1** byte is also

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	known as the Line Remote Error Indicator - **REI-L**. (A CV-LFE was formerly known as a Line FEBE.)
Far End Errored Seconds (ES-LFE)	This is a counter that indicates the number of seconds that an **REI-L** alarm is reported.
Far End Severely Errored Seconds (SES-LFE)	This reports the duration when 9835 or more REI-L errors are present at the far-end LTE, or when a Line Remote Defect Indicator **(RDI-L)** alarm is present.
Far End Unavailable Seconds (UAS-LFE)	This is a counter that indicates the number of seconds that an **SES-LFE** error was present at the far-end LTE. At least 10 consecutive errored seconds of SES-LFE errors must be present before a UAS-LFE is declared.

Related Topics:

Errors

Alarms

LED Definitions

What causes a B2 error?

Path Analysis

This function displays a detailed breakdown of incoming **B3** (Path BIP-8, also known as Path Coding Violations) and STS Path Remote Error Indicator (REI-P) errors.

The following statistics are reported:

Statistics	**Description**
Near End Coding Violations (CV-P)	This is an error count of incoming B3 errors.
Near End Errored Seconds (ES-P)	This reports the duration of the incoming B3 errors (in seconds). This

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	statistic also reports the percentage of errored seconds compared to the duration of error-free seconds.
Near End Severely Errored Seconds (SES-P)	This reports the duration of Severely Errored Seconds (SES) on the incoming SONET signal. An SES is reported when 2400 or more B3 errors occur in one second, or when an AIS-P alarm, UNEQ-P alarm, LOS alarm, LOF alarm, AIS-L alarm, or LOP-P alarm occurs.
Near End Unavailable Seconds (UAS-P)	This reports the number of seconds that the STS Path layer was considered unavailable. A Path is unavailable when 10 consecutive seconds that qualify as SES-P seconds occur.
Far End Coding Violations (CV-PFE or REI-P)	This is an error count of the number of B3 errors detected by the far-end STS Path Terminating Equipment (PTE). These errors are reported back to the NIC 10G using the G1 byte of the STS Path overhead. The **G1** byte is also known as the STS Path Remote Error Indicator - **REI-P**. (A CV-PFE was formerly known as an STS Path FEBE.)
Far End Errored Seconds (ES-PFE)	This is a counter that indicates the number of seconds that an **REI-P** alarm is reported.
Far End Severely Errored Seconds (SES-PFE)	This reports the duration when 2400 or more REI-P errors are present at the far-end LTE, or when a Line Remote Defect Indicator **(RDI-P)** alarm is present.
Far End Unavailable Seconds (UAS-PFE)	This is a counter that indicates the number of seconds that an **SES-PFE** error was present at the far-end LTE. At least 10 consecutive errored seconds of SES-PFE errors must be present before a UAS-PFE is declared.

Related Topics:

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Errors

Alarms

LED Definitions

What causes a B3 error?

Section Analysis

This function displays a detailed breakdown of incoming **B1** errors (Section BIP-8, also known as Coding Violations).

The following statistics are reported:

Statistics	Description
Near End Coding Violations	This is an error count of incoming B1 errors.
Near End Errored Seconds	This reports the duration of the incoming B1 errors in seconds. This statistic also reports the percentage of errored seconds compared to the duration of error-free seconds.
Near End Severely Errored Seconds	This reports the duration of Severely Errored Seconds (SES) on the incoming SONET signal. An SES is reported when 8554 or more B1 errors occur in one second, or when a Severely Errored Frame (SEF) alarm, Loss of Frame (LOF) alarm, or Loss of Signal (LOS) alarm occurs.

Related Topics:

Errors

Alarms

LED Definitions

What causes a B1 error?

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POS Online Help

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POS Overview

This section of the online help system has topics that discuss:

- Configuring the Unit for POS Mode
- POS Specific Tasks
- POS Screen and Function Descriptions
- Troubleshooting a POS Connection

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POS Specific Tasks

Configuring for POS Mode

To configure the unit for POS operation:

1. Select a protocol processor.
2. Select **Transmit**.
3. Select **Set 1**.
4. Select **Mapping**.
5. Select **POS**.

   The unit is now configured for POS operation. Select the POS tab to access POS functions.

Starting Link Negotiation

In a point-to-point network, you must first negotiate the connection before data can travel across the link.

Before negotiating a link:

- Make sure the unit is configured for POS operation.

To start link negotiation:

1. Select a protocol processor.
2. Select **POS**.
3. Select **Transmit**.
4. Select **PPP**.
5. Use the **SPE Scrambling** function to determine if bytes will be scrambled.
6. Use the **FCS Generation** function to configure error correction.
7. Select the **LCP/IPCP Connect** button to start point-to-point link negotiation. The LCP/IPCP LED is green when the link is established.

 An LCP/IPCP connection cannot be established when transmitting at the maximum bandwidth. If the connection fails to establish (the LCP/IPCP LED is red), reduce the data rate by 1 percent, and try to make the connection again. Bandwidth percentage can be changed using the **Data Rate** function located under **Gen Main**.

Maximum bandwidth (data rate) is dependent on the packet size. As a result, 100 percent bandwidth may not be available due to the packet size.

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Sending POS Traffic

Once in POS mode, you can create and send POS traffic on your network.

Before generating POS traffic:

- Make sure the unit is configured for POS operation.
- Make sure a point-to-point link is established.

To generate POS traffic:

1. Select the **POS** tab.
2. Select **Transmit**.
3. Select **Gen Main**. The main generator screen appears.
4. Enter your:
    - Source IP address
    - Destination IP address
    - Source port
    - Destination port
5. Edit the POS traffic:
    - Select an IP transmit protocol.
    - Enter a packet size.
    - Select a data pattern to transmit.
    - Enter the percentage of bandwidth (**Data Rate**) that will be dedicated to POS transmission.
6. After entering a data rate, the POS traffic is transmitted from the unit.

    To inject errors, refer to Inserting POS Errors.

Inserting POS Errors

Single errors can be inserted into the POS traffic. Before inserting errors, make sure:

- The unit is configured for POS operation.
- The PPP link is established.
- The POS traffic generation has been configured.

To insert errors into POS traffic:

1. Select **Transmit**.
2. Select **Error Alarm**.
3. Select **Error Type**. The **Select Error Type** window appears.
4. Select an error.
5. Select **Error Insert**. The system transmits a single error.

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Receiving POS Traffic

The Receive POS functions configure the unit for the expected POS traffic. If the received signal's criteria does not match the configured receive criteria, an error is logged under the Results functions.

The following Receive functions can be monitored:

- Receiving PPP Traffic
- Filtering and Monitoring a Substream

Troubleshooting a POS Connection

Symptom: The LCP/IPCP LED is red, and an LCP/IPCP connection cannot be established.

Solution: An LCP/IPCP connection cannot be established when transmitting at maximum bandwidth. If the connection fails to establish, reduce the data rate by 1 percent, and try to make the connection again. Bandwidth percentage can be changed using the **Data Rate** function located under **Gen Main**.

Maximum bandwidth (data rate) is dependent on the packet size. As a result, 100 percent bandwidth may not be available due to the packet size.

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Screen and Functions Description

POS Screen and Functions Overview

POS consists of the following components:

- POS LEDs
- POS Transmit
- POS Receive
- POS Results

POS LEDs and Quick Status Indicators

When the POS tab is selected, the following appears in the LEDs/Quick Status Area:

LED/Quick Status	Description
E/A:	Indicates error inserted and alarm generated.
LCP/IPCP (Link Control Protocol/PPP Internet Protocol Control Protocol)	Indicates current link status. • **Green: Link is up.** • **Red: Link is down.**
FCS (Frame Check Sequence)	Flashes red when an FCS error occurs.
IPHC (Internet Protocol Header Checksum)	Flashes red when an IPH checksum error occurs.
UDPC (User Datagram Protocol Checksum)	Flashes red when a UDP checksum error occurs.
BIT	Indicates that a BIT error was detected.

POS Transmit

The POS Transmit screen contains the following functions:

- POS Transmit PPP
- POS Transmit Gen Main
- POS Transmit Error Alarm

Error Alarm

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This function allows you to transmit POS errors and alarms.

The following options are available on the POS Errors and Alarms screen.

Option	Description
Error Type	Inserts an error that is transmitted by POS. The options available are BIT errors, FCS errors, and Invalid UDPs.

Gen Main

Use the Generator Main functions to configure the primary POS transmit traffic generator. These functions determine the type of traffic generated along with the source and destination link addresses.

The following appears on the Generator Main screen.

Function	Description
Source IP Address	Sets the source IP address.
Destination IP Address	Sets the destination IP address.
Source Port	Sets the source port value.
Destination Port	Sets the destination port value.
Transmit Protocol	Selects UDP protocol to use for the transmitted packets.
Packet Size	Sets the number of bytes transmitted in the packet. Values can range from 68 bytes to 1500 bytes.
Data Rate	Determines the percentage of bandwidth used to transmit the traffic. Values can range from 0 percent to 100 percent of bandwidth entered in 1 percent increments. **Note:** An LCP/IPCP connection cannot be established when transmitting at maximum bandwidth. If the connection fails to establish, reduce the data rate by 1 percent, and try to make the LCP/IPCP connection again. Maximum bandwidth (data rate) is

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	dependent on the packet size. As a result, 100 percent bandwidth may not be available due to the packet size.
Pattern	Selects and inserts a data pattern into the packet as data. The following options are available: • PRBS. • User Defined. Allows a user defined pattern to be used as data.

PPP

Use the Point-to-Point Protocol (PPP) functions to set the criteria used when first negotiating a point-to-point link.

In a point-to-point link, each end of the link sends LCP packets to configure and test the data link. Refer to Starting Link Negotiation for link negotiation procedures.

The following functions appear.

Function	**Description**
SPE Scrambling	Allows bytes to be scrambled during transmission. The SPE consists of the Path overhead bytes and the payload. • **On**. Enables scrambling. • **Off**. Bytes are not scrambled and are transmitted normally.
FCS Generation	Allows error correction using a **32**-bit frame check sequence. **Off** disables FCS generation.
LCP/IPCP Connect	Starts the negotiation required to establish a connection in a point-to-point link. When selected, LCP packets are transmitted to configure

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	and test the data link. **Note:** An LCP/IPCP connection cannot be established when transmitting at maximum bandwidth. If the connection fails to establish, reduce the data rate by 1 percent, and try to make the LCP/IPCP connection again. Maximum bandwidth (data rate) is dependent on the packet size. As a result, 100 percent bandwidth may not be available due to the packet size.

POS Receive

The POS Receive screen contains the following function:

- POS Receive Set 1

SET 1

Use the Set 1 functions to configure the expected parameters for the incoming POS signal. This is the criteria that will be used to check the incoming payload data.

PPP Functions	Description
SPE Descrambling	Determines if the unit will descramble the received payload. For example, if the received payload is scrambled, set this function to Enable to unscramble the payload. The following options are available: **Disable:** The received payload is not descrambled. **Enable:** The received payload is descrambled.
FCS Implementation	Determines if the unit will perform a

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	Frame Check Sequence (FCS) on the received payload and report errors. The following options are available: **None:** No error checking is performed. **CRC-32:** A 32-bit (four byte) FCS is calculated. Packets with FCS errors are reported under the Result functions if FCS errors occur.

Substream Functions	**Description**
Pattern	Sets the expected pattern to be received in the payload data. BIT errors are reported if the received pattern is not the same as the expected pattern. The following patterns are available: **Live:** User data is received; no pattern is used. **PRBS 2^31-1:** Configured to receive a proprietary PRBS 2^31-1 pattern. **User Defined:** Allows the creation of a unique pattern as the expected receive pattern. The pattern can range from 1 bit to 32 bits.
Destination IP Address	Sets the IP address of the destination host using dotted decimal notation.
Protocol	Sets an expected protocol for the incoming payload. An error occurs if the incoming protocol is different from what is selected. **UDP** is the only protocol available.

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POS Results

All monitored activity that the system receives is reported to the Results screen. This screen provides several layers of granularity for analyzing the incoming signal, pattern, errors, and alarms.

The Result functions are:

- Scan
- Errors
- Count
- Event Log
- Large LED
- Graphs

Alarms

The system can monitor and report alarms and their duration on the incoming POS signal. The **Alarms** function lists the duration of the alarm in seconds.

The following alarms can be monitored:

- FCS
- PHC
- UDP-C
- TCP-C
- UDP
- TCP

Count

The Count screen displays the following statistics:

Count	Description
Send Frames	Reports the total number of frames sent and the duration in seconds.
Receive Frames	Reports the total number of frames received and the duration in seconds.
Receive Bytes	Reports the total number of bytes received and the duration in seconds.
PPP	Reports the following for PPP packets: • Total number of PPP packets received and the duration in

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	seconds. • Number of valid PPP packets received and the duration in seconds.
IP	Reports the following for IP packets: • Total number of IP packets received and the duration in seconds. • Number of valid IP packets received and the duration in seconds.
UDP	Reports the following for UDP packets: • Total number of UDP packets received and the duration in seconds. • Number of valid UDP packets received and the duration in seconds.

Errors

The system can monitor and report errors on the incoming POS signal. The **Errors** function provides a detailed analysis of the incoming error as described below.

The errors reported are a result of:

- Incoming errors that are generated by the POS network, or
- Errors being intentionally generated by the system when it is used in a loopback environment

The following errors can be monitored:

- **Invalid FCS (Frame Check Sequence).** An invalid FCS can be caused by a BIT error anywhere in the packet.
- **Invalid IPCP (Internet Protocol Control Protocol).** An invalid IPCP can be caused by a BIT error in the IP header.

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- **Invalid UDPC (User Datagram Protocol Checksum).** An invalid UDPC can be caused by a BIT error anywhere in the UDP.
- **BIT**

The following parameters are measured for these incoming errors:

- Error count using an 11-digit format
- Average error rate using an N.NNe-N format
- Current error rate using an N.NNe-N format

Note: Error rates are calculated over the entire OC-192/STM-64 signal's bandwidth.

Event

The Event Log provides a detailed summary of POS activity that has occurred and been recorded by the unit.

The events appear in a table that lists:

- The events
- The number of events logged (count)
- The start and stop time of the event
- The duration of the event.

Events can be displayed in ascending or descending order. For more information about the Event Log, select *Using the Event Log* in the Common Tasks section of the online help.

Graphs

This function allows incoming counts and alarms to be graphed. The graphs can be saved, recalled, and printed from a history file.

For more information about graphs, select *Using Graphs* in the Common Tasks section of the online help.

Large LED

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This screen displays the **POS LEDs** in a large, easy-to-read format that covers the entire touch screen area. This is useful for viewing any errors or alarms from a long distance, such as across the room from a test bay.

Scan

This function provides a quick summary of incoming errors and alarms. It is effective in identifying a general area to investigate when error or alarm activity is detected.

- For **alarms**, the duration is reported as a count in seconds.
- For **errors**, an error count is reported.
- The message **No Errors or Alarms** appears if no events are received by the unit.

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