PathTrak™

HFC Test & Monitoring Solution

User's Guide

JDSU

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Table of Contents

About This Guide

Purpose and scope

The purpose of this guide is to help you successfully use the PathTrak™ features and capabilities. This guide includes task-based instructions that describe how to use the PathTrak™ HFC Test & Monitoring Solution. Additionally, this guide provides a complete description of JDS Uniphase Corporation's warranty, services, and repair information, including terms and conditions of the licensing agreement.

Assumptions

This guide is intended for novice, intermediate, and experienced users who want to use the PathTrak™ HFC Test & Monitoring Solution effectively and efficiently. We are assuming that you have basic computer and mouse/track ball experience and are familiar with basic telecommunication concepts and terminology.

Related information

Use this guide in conjunction with the following information:

– JDS Uniphase Corporation PathTrak Server/Client HFC Test & Monitoring Solution Installation Guide (P/N 6510-30-0416)

– JDS Uniphase Corporation PathTrak™ RPM1000 Installation Guide
(P/N 6510-30-0415)

– JDS Uniphase Corporation PathTrak™ RPM2000 Installation Guide
(P/N 6510-30-0423)

Technical assistance

If you need assistance or have questions related to the use of this product, call or e-mail JDS Uniphase Corporation's Technical Assistance Center for customer support.

Table 1 Technical assistance centers

Region	Phone Number	
Americas	1 866 228 3762 1 301 353 1550 (World Wide)	tac@jdsu.com
Cable TV/Multimedia Products	1 800 428 4424 Ext. 8350 (America) 1 317 788 9351 Ext. 8350 (World Wide)	catv.support@jdsu.com
Europe, Africa, and Mid-East	+49 (0) 7121 86 1345 (Europe)	hotline.europe@jdsu.com
	+800 882 85822 (European Freephone)	support.uk@jdsu.com
	+49 (0) 6172 59 11 00 (JDS Uniphase Corporation Germany)	hotline.germany@jdsu.com
	+33 (0) 1 39 30 24 24 (JDS Uniphase Corporation France)	hotline.germany@jdsu.com
Asia and the Pacific	+852 2892 0990 (Hong Kong)	
	+86 10 6655 5988 (Beijing-China)	
All others	1 866 228 3762	tac@jdsu.com

During off-hours, you can request assistance by doing one of the following: leave a voice mail message at the Technical Assistance number in your region; e-mail North American Technical Assistance Center, tac@jdsu.com, or European Technical Assistance Center, support.uk@jdsu.com; or submit your question using our online Technical Assistance Request form at www.jdsu.com.

Conventions

This guide uses naming conventions and symbols, as described in the following tables.

Table 2 Typographical conventions

Description	Example
User interface actions appear in this **typeface**.	On the Status bar, click **Start**.
Buttons or switches that you press on a unit appear in this **TYPEFACE**.	Press the **ON** switch.
Code and output messages appear in this `typeface`.	`All results okay`
Text you must type exactly as shown appears in this **`typeface`**.	Type: **`a:\set.exe`** in the dialog box
Variables appear in this ***typeface***.	Type the new ***hostname***.
Book references appear in this ***typeface***.	Refer to ***Newton's Telecom Dictionary***
A vertical bar | means "or": only one option can appear in a single command.	`platform [a|b|e]`
Square brackets [ ] indicate an optional argument.	`login [platform name]`
Slanted brackets < > group required arguments.	`<password>`

Table 3 Keyboard and menu conventions

Description	Example
A plus sign + indicates simultaneous keystrokes.	Press **Ctrl+s**
A comma indicates consecutive key strokes.	Press **Alt+f,s**
A slanted bracket indicates choosing a submenu from menu.	On the menu bar, click **Start > Program Files**.

Table 4 Symbol conventions

	This symbol represents a general hazard.
	This symbol represents a risk of electrical shock.
	NOTE This symbol represents a Note indicating related information or tip.

Table 5 Safety definitions

	**WARNING** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
	**CAUTION** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Introduction

1

This chapter provides a general description of the PathTrak™ HFC Test & Monitoring Solution and Return Path Monitoring. Topics discussed in this chapter include the following:

About PathTrak™ HFC Test & Monitoring Solution

The JDS Uniphase Corporation PathTrak™ HFC Test & Monitoring Solution enables users to maintain advanced communications networks more effectively and efficiently. The system empowers both office-based personnel and field technicians with improved ability to maintain and operate their two-way networks. An intelligent, network-ready software system provides personnel with interactive live views and “smart” historical summaries of system performance from a remote PC. Through faster troubleshooting, easy remote analysis, and proactive notification of problem conditions maintenance, costs are drastically reduced and quality of service is improved.

The PathTrak™ System is a multi-input, high-speed spectrum analyzer integrated with a sophisticated database. The system scans the individual return paths of an HFC system, logging spectral performance over time, displaying live and historical spectrum data, and notifying users when noise, ingress, and other reverse path impairments are developing. The PathTrak™ System provides early warning of potential return path problems, quick isolation of problems to a specific return path, and it allows interactive remote analysis of system performance. Since the typical task of the user is to fix ingress and impairment problems, tools are included in the system to help isolate and probe both the data and suspected source or location. Integrating the PathTrak™ System and the Stealth Digital Analyzer (SDA) or Digital Service Activation Meter (DSAM) field units allows field technicians to compare the spectrum of a node at both the headend and in the field. Performing this comparative analysis can significantly reduce the time required to locate the source of ingress and verify that an ingress problem has been fixed.

What is return path monitoring?

The return path Hybrid-Fiber-Coaxial (HFC) and tree-and-branch coaxial architectures of cable television (CATV) networks are utilized to carry signals (such as high-speed data, telephony, and set-top box information) from the home to the cable system headend. Due to the noise funneling nature of the return path, impairments such as thermal noise, common mode distortion, narrow band ingress, and broadband impulse ingress are significant obstacles to deploying advanced, two-

way services. The scale of these problems creates a situation where extensive and dedicated maintenance practices need to be implemented.

Continuous monitoring and performance analysis of the return path spectrum are used to:

– Characterize actual plant performance for network design purposes.
– Evaluate when networks or individual return paths are ready for service activation.
– Notify users when problems are developing that may adversely affect service.
– Troubleshoot, find, and fix problems after they are identified.
– Perform long-run trend analysis on performance.

PathTrak™ infrastructure

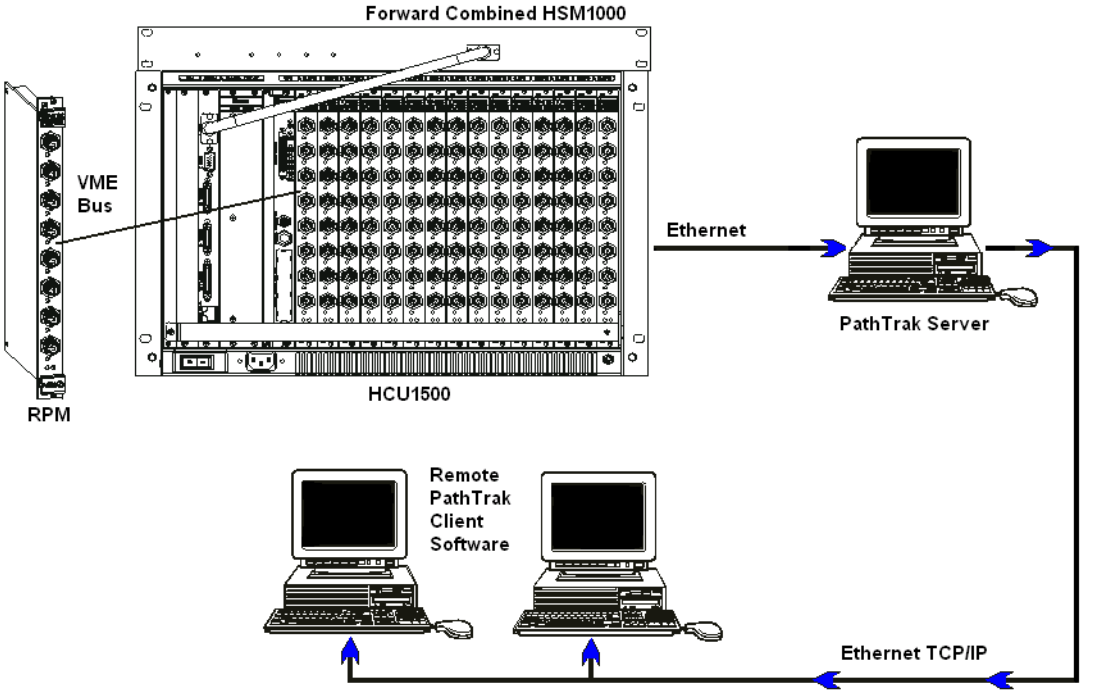

Figure 1 PathTrak™ system infrastructure

Features and capabilities

Flexible Measurement

The system is designed to monitor many isolated return paths by connecting individual return paths—or small groups of return paths—to individual ports on the RPM modules.

The RPM modules act as a spectrum analyzer and quickly sweep through the 5-65 MHz reverse spectrum for each port with user-definable measurement parameters.

The control system logs to a database the spectrum measurement data with a time stamp, performs calculations, and analyzes the measured RF levels.

The monitoring process occurs 24 hours a day, 7 days a week.

The Client software displays multiple views of system status, including live spectrum views of multiple ports at one time or a view of alarm status/history.

The user has complete control over the following measurement parameters used for monitoring:

– Frequency ranges or bands for scanning
– Increment step size
– Resolution bandwidth
– Dwell time
– Video bandwidth
– Maximum or minimum detection

In a monitoring plan, you can vary by spectrum frequency each of these measurement parameters, or you can skip any bands. Having the flexibility to vary measurement parameters by frequency band can help you make specific measurements based on expected signals and can speed and improve accuracy. New configurations can be remotely downloaded via system software.

Comparative Analysis

Because ingress problems are often intermittent, it can be difficult for field technicians to find and fix them. Providing field technicians with spectrum data collected both at the headend and in the field enables them to:

– Isolate an ingress problem to a specific node
– Verify that the ingress problem has been fixed

Intelligent Thresholds

One purpose of this system is to quickly detect that a problem condition either currently exists or has already happened. If done intelligently, this process can find minor faults before a service outage occurs.

In the PathTrak™ System, flexible, advanced alarm facilities identify these minor problems while minimizing false alarms.

Not only are the basic alarms triggered when a measured frequency exceeds user-programmed levels (or exceeds a level for a certain amount of time), advanced alarm limits may be set to track more subtle average noise floor changes over a period of time. These advanced alarms are intended to help you take aggressive control over potential minor problems before major a outage happens. The goal is to prevent severe affects on service.

Alarm parameters

Signals exceeding a level threshold (high) Identify when higher than desired noise and ingress problems are occurring on a return path. Qualifiers are available to help you identify consistent ingress and filter out alarms for single bursts or minor problems.

User-specified number of consecutive scans in violation of a threshold Set to 1 and the alarm triggers immediately on a single burst of noise. Set to more than 1 and noise must be measured continuously for that number of measurements.

User-specified number of violations of a threshold over time You can set an alarm to be generated only when the system measures a specific number of threshold violations during the preceding specified number of measurements. For example, you can set an alarm to generate only when there were 10 threshold violations in the preceding 50 measurements.

Signals exceeding a level threshold (low) Identifies loss of signal or complete loss of return path. If noise levels completely disappear it is likely that there is some equipment failure. The same qualifiers are available as with threshold high limits.

Average power for a set period (i.e. 15 minutes) over a level threshold

Used to alert you when there's a shift in average noise or noise floor over an extended time. This can be more effective than single level thresholds are at seeing more severe or emerging problems and can also filter out isolated spikes.

Alarm Severity Ratings

It is important for a monitoring system to help sort and rate alarm severity to minimize human efforts in determining where and when major problems occur. Too many insignificant alarms and a user may begin to ignore alarms or be overwhelmed. The PathTrak™ System provides multiple methods to distinguish major problems from minor ones and of clearly alerting the user to the most significant problems in the network.

A total of four separate thresholds may be used. These thresholds would typically be defined at different levels. Alarm severity for any individual threshold can be assigned classification of critical, major, minor, warning, or none. For example, for a given frequency range a limit violation over a threshold set at –20 dBmV may be set to a "minor" alarm. A limit violation over a threshold set at -10 dBmV for 5 straight sec may be set to a "major" alarm. An average noise floor level for a 15-minute time period over a -20 dBmV threshold may be assigned a "critical" severity. This severity rating is used in the alarm view to rank and sort the most important alarms.

In addition, PathTrak™ provides an Enhanced Alarms Viewer that allows you to see in detail the conditions existing on a port when a threshold violation occurred.

With Enhanced Alarms, you can view the following information about a threshold violation event:

– a list of frequencies in violation on the port during the scan that triggered the alarm and that have data associated with them
– the thresholds as they were set at the time of the alarm, including information about the level the of the frequency when the alarm was triggered and the difference between the level of the violation and threshold as set
– A graph showing the minimum, maximum, and average levels 1 to 2 minutes surrounding the alarm (30-60 sec before and after the event)

– A graph that identifies the severity of the violations to help you identify problem areas

Automatic Notification

Of course, the user must be effectively notified when a problem condition is detected. The PathTrak™ System can designate certain events to be triggered based either on a threshold being exceeded or on internal system or communication faults. Notification is primarily through e-mail and visual/aural alarms to the Client PC. Paging field or remote personnel through e-mail notification is also possible. The notification action may be designated and varied by alarm type or severity. Thus, appropriate notifications and actions can automatically be taken based on the priority of the problem reducing manual efforts.

Remote Spectrum Analysis

After notification of a problem, you can analyze spectral performance from a PC to help you organize an appropriate response. With PathTrak™'s powerful Spectrum Analyzer Tool and Monitoring View Tools, you can probe deeply through live data from an individual return path or simultaneously view the performance of multiple return paths.

The Spectrum Analyzer Tool in the Client software provides fully interactive control of measurement parameters and live display of measurement data for any port in the system. From a remote PC, you can dynamically control all typical spectrum measurement parameters such as resolution bandwidth, dwell time, frequency ranges, and so on, and display the results in real-time on the PC monitor. You can then perform in-depth analysis of the current performance of any specific return path test port in the system. As an additional benefit, this process does not stop on-going monitoring and data collection for any ports.

Monitoring View tools provide a more passive view of the on-going monitoring process and measurements in 2D and 3D graphics. The Monitoring View Tools just display data as it is being collected according to the monitoring plan setup. The spectral performance of any one or multiple return paths may simultaneously be displayed on a remote PC. This occurs with no interruption to the monitoring process.

Statistical Archiving

The PathTrak™ System employs intelligent archiving and data management to accurately characterize performance while minimizing data overload.

The PathTrak™ System continually summarizes performance data over short time intervals as a standard method for compressing data. These Performance History files contain statistical information on the spectrum performance over a short time period (i.e. 15-minute intervals). Statistical information archived over each 15-minute period at each monitored frequency includes the following:

- Maximum level
- Average level
- Minimum level
- Percent of measurements exceeding each of four user-defined threshold levels

These statistical summaries provide users an easier to understand and clearer picture of performance over time than just individual scans of data at a single point in time. Performance Histories may be used to:

- Correlate network performance error reports (i.e. BER reports) from cable modem management systems or telephony management systems
- Review historical spectral performance by port for long term trend analysis
- Commission or approve a specific return path for service activation by determining if it meets acceptable performance levels over time
- Pro actively or manually look for network problems

Flexible Recalling and Viewing

You can recall Performance History files over any desired time frame and by any specific recorded measurement statistic.

- Historical performance data can easily be summarized over any user-defined period (1 hour, 2 days, 1 week, 1 month, and so on) and by any or all stored statistical parameters such as peak, average, minimum,% of total measurements over -20 dBmV

threshold. By customizing the look and time frame of the data, you can create meaningful reports that display actual network RF performance for the time and port of interest.

– As an example of the flexibility you have, you can set a port, date range, and frequency display range, and the system can display a single 3D graph showing average power at 7:00-7:30 PM each day for two weeks to help you pinpoint or analyze a time-related problem.

Security and Customizable Access Levels

Each user has a unique username and password to access the system software and database. The system software keeps a record of the user who makes a change or acknowledges an alarm. A “system administrator or manager” has the ability to assign individuals access to all or part of the system capability. For example, where this restriction is appropriate, certain users can be given the right to launch Monitoring View, but not the Spectrum Analyzer. In addition, individual viewing configurations and preferences can be set.

Communications and Remote Access

Communications from the central PathTrak Server to remote HCU controllers is achieved via Ethernet connections. The Ethernet connection provides optimal usage because of its speed and the constant connection. The remote HCUs act as the main database and the central PathTrak Server is the point of contact for all other remote PC’s wanting access to the system software and data. Each remote Client PC connects to the PathTrak Server via Ethernet or phone network. The remote client connection can provide full or limited access to the system, depending on access rights and the communications link, and allows simultaneous access by multiple users.

Hardware

Headend Controller Unit (HCU)

The HCU is a 19-in rack-mounted control chassis that provides local data storage, intelligence, and the communications interface point. The VME-based chassis contains either 15 available slots (HCU1500) or four available slots (HCU400) for monitoring RPM modules. This hardware provides a customizable and scaleable system platform

from which to build. This approach allows the user to designate the number and type of monitoring modules desired now, and provides capability to expand with additional monitoring modules as user needs and networks develop.

Headend Stealth Modem (HSM)

The HSM1000 Modem enables the field technician to solve return path ingress problems by comparing local (field) spectrum measurements with remote (headend HCU) spectrum measurements. This hardware broadcasts spectrum data sent from the HCU to field units with the PathTrak™ Field View option via the forward RF telemetry path.

Return Path Monitor (RPM) modules

The RPM modules provide programmable, high-speed spectrum analyzer functions for the 5-65 MHz frequency range. Each RPM module has eight discrete input ports with an integrated, high-speed switch that serves to isolate return paths for individual testing.

Software

Server software

PathTrak™ Performance Monitoring Software uses a server/client architecture to provide the primary user and communications interface, data storage, and intelligence.

The PathTrak Server contains an advanced, object-oriented database capable of handling the data generated by return path monitoring. The server contains communications software to manage and collect data from the headend controllers and acts as a server for all PathTrak™ Clients, supplying the security and data necessary to make the client applications function properly.

The PathTrak Server's software is maintained through the Administration dialog box. The PathTrak Server is responsible for implementing event logging and alarm management, which are configured in the Alarm Setup screen. All events in the system are tracked using the Event Log.

Client software

Although PathTrak Server software is responsible for many aspects of the PathTrak™ system's behavior, it has no user interface of its own. All configuration of the PathTrak™ system is performed using the PathTrak™ Client software. The Client software can be installed on the PathTrak Server PC and any other PC that meets the minimum requirements and is connected to the PathTrak Server via a network.

Backup Client software

The Backup Client software is a significant safety net for your system, enabling you to perform full or incremental, scheduled or on-demand backups of your mission critical data. The Backup Client is installed on the PathTrak Server and can be configured to run without impact on your daily operations.

Firmware

The system's firmware contains the detailed instructions those devices need to perform their functions. The firmware functions with little or no maintenance. The only time it should need attention is when the system is upgraded with new features or patches.

System Administration

2

This chapter describes how to prepare the PathTrak™ for operation. The PathTrak™ System is self-maintaining. Once the system has been properly configured, it should take very little time to maintain the system. However, some system management is required as determined by the user during normal system operation.

The topics discussed in this chapter include the following:

About the Client setup

Before logging in to PathTrak Client software, be sure that the Client PC is equipped with either the *Client for Microsoft Networking* (for Windows 98) or *Microsoft Networking* (for Windows NT/2000/2003/XP).

To set-up a PathTrak™ Client PC:

1. Log in to the PathTrak™ Client software.
2. Add HCUs to the PathTrak Server.
3. Verify (or update to) the latest versions of software and firmware:
   - Server software
   - Client software
   - Backup Client software
   - HCU firmware
   - RPM firmware

Logging in to Client software

For security purposes, each user must have an established user account including a unique username and password before they can gain access to the system.

To log in to the Client software:

1. On the desktop, double click the **PathTrak™ icon**.
   The following Log-in Screen is displayed.

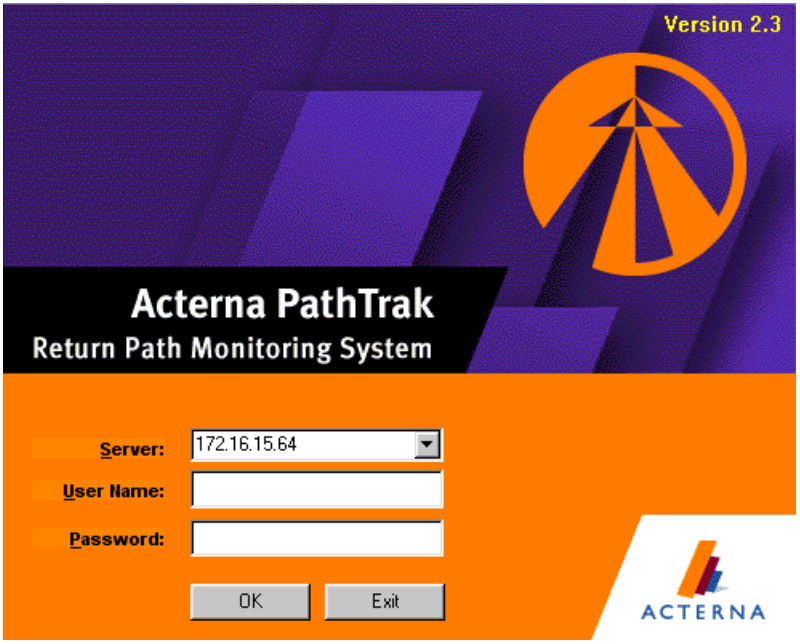

Figure 2 Log-in screen

2 Verify the **Server Name**.

NOTE

Click the **down arrow** on the Server drop-down box to display up to ten of the up to sixty servers that can be available on the PathTrak system. When more than ten are available, use the scroll bar to display additional servers.

3 Type in a **valid username and password** in the appropriate fields.

4 Click **OK**.

NOTE

Passwords ARE case-sensitive. The initial login username is “admin”; there is no password required (leave that field blank).

Logging off Client software

To log off the Client software

1 From the System menu, click **Exit**.

The Client closes.

Configuring Client preferences

After you have created user accounts, each PathTrak™ Client can be configured for individual users. The Local Client Options are preferences for viewing certain PathTrak™ data. These parameters can be set differently for each PathTrak™ Client and can be changed at any time.

To configure user preferences

1 From the System menu, select **Local Client Options**.

The following Options dialog box is displayed.

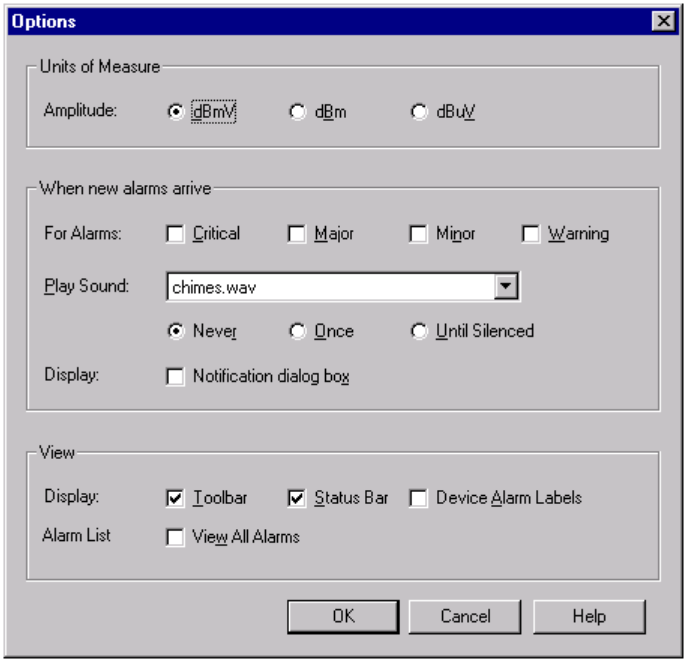

Figure 3 Options (Local Client) dialog box

2 Select the appropriate options for your work practices as described in Table 6.

3 Click **OK**.

Table 6 (Local Client) Options dialog box

Field name	Description
Units of Measure	**Amplitude** - Choose from dBmV, dBm, and dBuV.
When new alarms arrive	**For Alarms** - Choose the alarm severity at which the client should notify the user. **Play Sound** - Choose a sound (.wav file) from the drop-down list to play when an alarm is created and select the duration of the sound.
View	**Display** - Check **Toolbar** and **Status bar** to display these elements on the main screen. Check the **Device Alarm Labels** to display alarm icon tags in the System View. **Alarm List** - Check **View All Alarms** to display all alarms in the Alarm List. If this box is checked, every alarm in the system will be displayed in a separate row in the Alarm List. If this box is not checked, every row in the Alarm List represents a single network element and may contain more than one alarm. Alarms are “stacked” on top of each other in the row, with the highest severity alarm for that network element appearing on top.

Using online Help

To use online Help

1 From the Help menu, select **PathTrak™ Help**.

The Help Topics dialog box is displayed.

Displaying software/firmware versions

PathTrak software and firmware versions are displayed in convenient locations within the PathTrak system. This section shows you where to find the software or firmware version for the

- Server
- Client software
- Backup Client software
- Headend Controller Unit (HCU)
- Return Path Monitor (RPM), and the
- Headend Stealth Modem (HSM).

Displaying the Server software version

To display the latest version of server software

1 Right click on the **PathTrak Server icon**, select **Properties**.
The following PathTrak Server Properties dialog box is displayed.

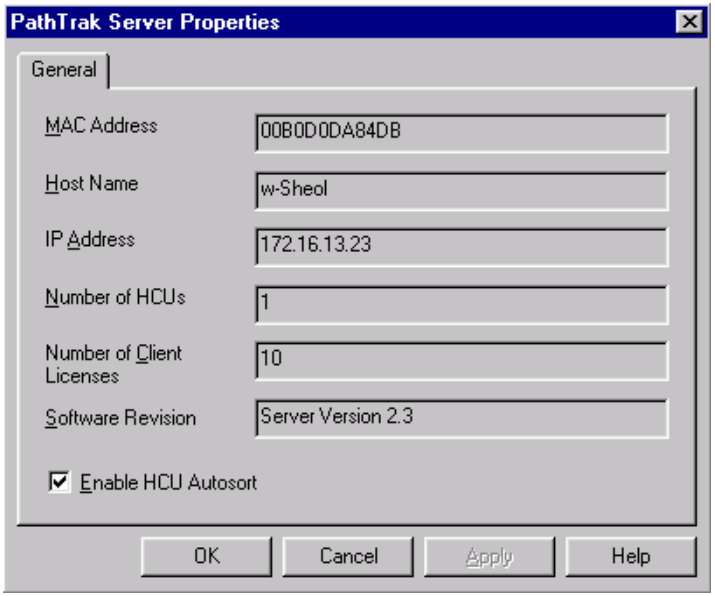

Figure 4 PathTrak Server Properties dialog box

Sorting HCUs

Click the **Enable HCU Autosort** checkbox on the PathTrak Server Properties dialog box to select or deselect the automatic sorting of HCUs in the system view. When the box is checked, HCUs will be automatically displayed alphabetically. When the box is unchecked, HCUs will appear in the order that they are added, with the most recently added units at the bottom of the list.

Displaying the Client software version

To display the latest version of client software

1 From the Help menu, select **About**.

The following About JDS Uniphase Corporation PathTrak dialog box displays the current version and build number of the PathTrak Client software.

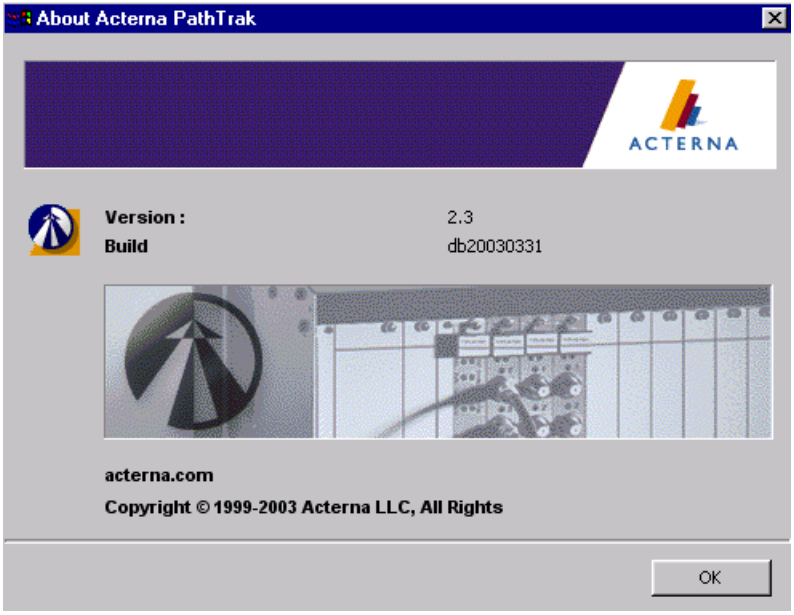

Figure 5 About JDS Uniphase Corporation PathTrak™ dialog box

Displaying the Backup Client software version

To display the latest version of Backup Client software

The version of Backup Client software is viewable on the desktop icon. OR.

1 To launch the system, double click the **desktop icon**.

The version is viewable on the splash screen.

Displaying the HCU firmware version

To display the latest version of HCU firmware

1 In the PathTrak™ client software System View, right click on an **HCU icon**, select **Properties**.

2 Select the **Hardware** tab.

The following Headend Controller Properties dialog box Hardware tab is displayed.

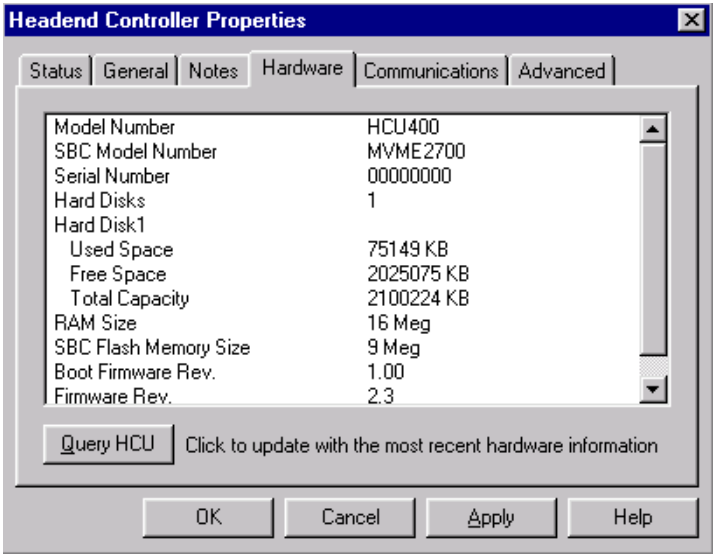

Figure 6 Headend Controller Properties dialog box, Hardware tab

Updating hardware information

PathTrak Client users with permission to modify network elements can click the **Query HCU** button on the Headend Controller Properties dialog box Hardware tab to refresh the display with the latest firmware information. This is especially useful following a firmware upgrade to confirm the successful installation of the upgrade on the PathTrak Server.

Displaying the RPM firmware version

To display the latest version of RPM firmware

1. In the PathTrak™ Client software System View, right click on the **RPM icon**, select **Properties**.
2. Select the **Hardware** tab.

   The following RPM Properties dialog box Hardware tab is displayed.

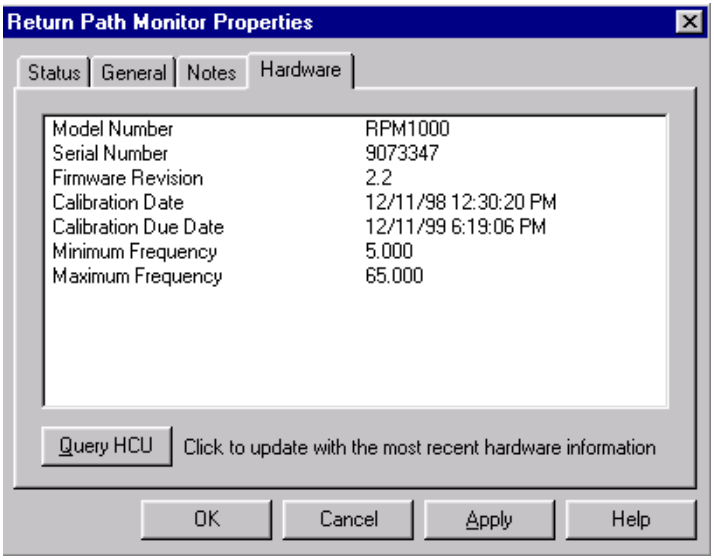

Figure 7 Return Path Monitor Properties dialog box, Hardware tab

Updating hardware information

PathTrak Client users with permission to modify network elements can click the **Query HCU** button on the Return Path Monitor Properties dialog box Hardware tab to refresh the display with the latest HCU firmware information. This is especially useful following an HCU firmware upgrade to confirm the successful installation of the upgrade on the PathTrak Server.

Displaying the HSM firmware version

To display the latest version of HSM firmware

1. In the PathTrak™ client software System View, right click on an **HSM icon**, select **Properties**.
2. Select the **Hardware** tab.

   The following Stealth Modem Properties dialog box Hardware tab is displayed.

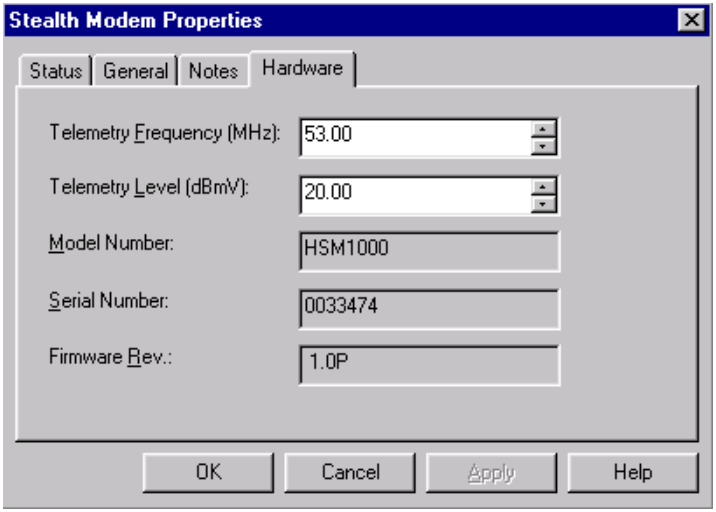

Figure 8 Stealth Modem Properties dialog box, Hardware tab

System maintenance

Maintain your PathTrak system by upgrading your software and firmware as needed to take full advantage of available system improvements and by configuring PathTrak components to meet your needs.

To install/upgrade PathTrak software or firmware, see the JDS Uniphase Corporation PathTrak Server/Client HFC Test & Monitoring Solution Installation Guide (Product Number 6510-30-0416).

To configure PathTrak components to meet your needs, review the following sections discussing the viewing and editing of Headend Controller properties, Return Path Monitor properties, Return Path Monitor Port properties, and Headend Stealth Modem properties.

Viewing/editing Headend Controller properties

The properties of each Headend Controller Unit (HCU) are detailed on the Headend Controller Properties dialog box, which is comprised of the following six tabs:

- Status
- General
- Notes
- Hardware
- Communications
- Advanced

Headend Controller Properties dialog box -- Status tab

To view/edit Headend Controller status properties:

1. From the System View, select an **HCU**.
2. From the Edit menu, select **Properties**.

   The following Status tab is displayed. (See Table 7 for HCU Status tab functionality.)

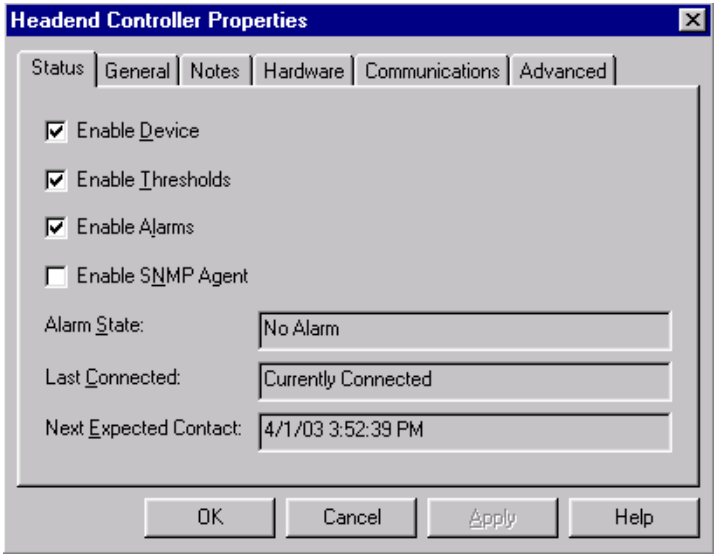

Figure 9 Headend Controller Properties dialog box, Status tab

Table 7 HCU Status tab functionality

Field name	Description
Enable Device	Check box to allow communication with the device.
Enable Thresholds	Check box to enable thresholds for each RPM module in the HCU.
Enable Alarms	Check box to enable alarms associated with the device.
Enable SNMP Agent	When the Enable SNMP Agent option (purchased separately) is enabled, management applications (outside of PathTrak) can register to receive traps from the HCU through Simple Network Management Protocol (SNMP).
Alarm State	Displays the most severe alarm associated with this device.
Last Connected	Displays connected status or the last time communication occurred between the device and PathTrak Server.

Table 7 HCU Status tab functionality (Continued)

Field name	Description
Next Expected Contact	Displays the time and date for the next expected connection.

Headend Controller Properties dialog box -- General tab

To view/edit Headend Controller general properties:

1. From the System View, select an **HCU**.
2. From the Edit menu, select **Properties**.
3. Select the **General** tab.

   The following General tab is displayed. (See Table 8 for HCU General tab functionality.)

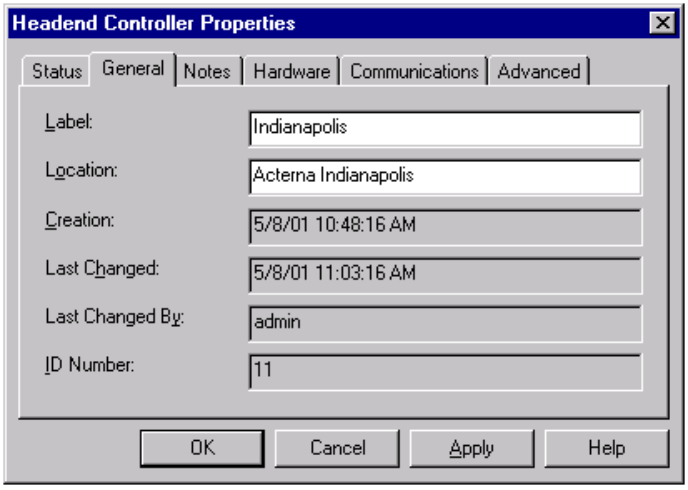

Figure 10 Headend Controller Properties dialog box, General tab

Table 8 HCU General tab functionality

Field name	Description
Label	Enter a name for the device.
Location	Enter the location of the device.

Table 8 HCU General tab functionality (Continued)

Field name	Description
Creation	Displays the date and time the device was added to the system. (read-only)
Last Changed	Displays the date and time the properties were last changed. (read-only)
Last Changed By	Displays the username of the person who last changed the properties. (read-only)
ID Number	Displays a unique identification number assigned to the device. (read-only)

Headend Controller Properties dialog box -- Notes tab

To view/edit Headend Controller notes properties:

1. From the System View, select an **HCU**.
2. From the Edit menu, select **Properties**.
3. Select the **Notes** tab.

   The following Notes tab is displayed. Use the space provided to enter notes about the selected HCU.

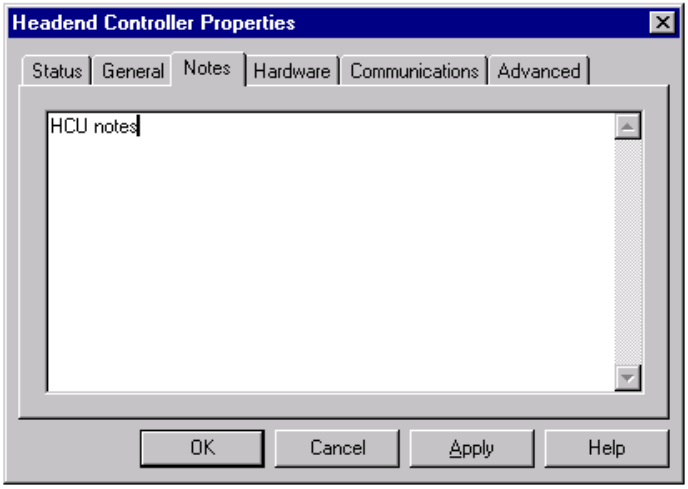

Figure 11 Headend Controller Properties dialog box, Notes tab

Headend Controller Properties dialog box - Hardware tab

To view/edit Headend Controller hardware properties:

1. From the System View, select an **HCU**.
2. From the Edit menu, select **Properties**.
3. Select the **Hardware** tab.

   The following Hardware tab displays the (read-only) hardware profile of the device.

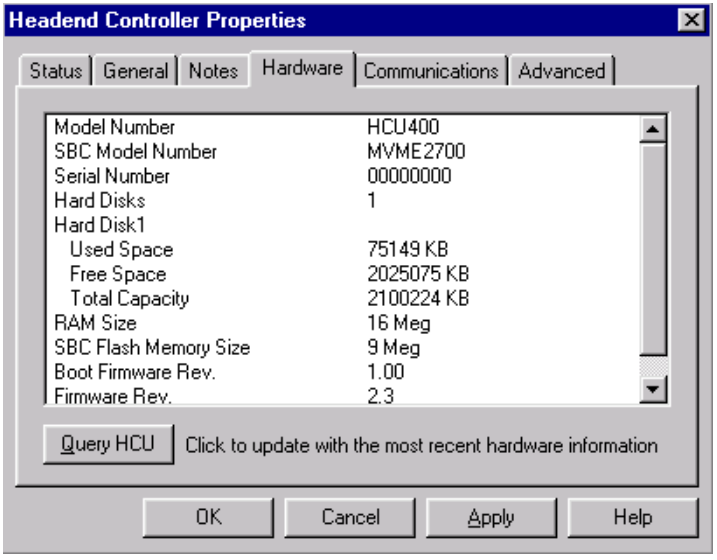

Figure 12 Headend Controller Properties dialog box, Hardware tab

Updating hardware information

PathTrak Client users with permission to modify network elements can click the **Query HCU** button on the Headend Controller Properties dialog box Hardware tab to refresh the display with the latest firmware information. This is especially useful following a firmware upgrade to confirm the successful installation of the upgrade on the PathTrak Server.

Headend Controller Properties dialog box - Communications tab

To view Headend Controller communications properties:

1. From the System View, select an **HCU**.
2. From the Edit menu, select **Properties**.
3. Select the **Communications** tab.

   The following Communications tab displays the (read-only) IP address of the devise.

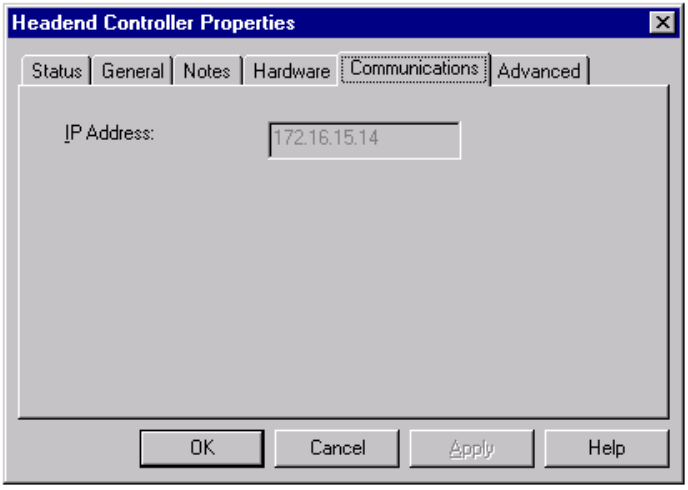

Figure 13 Headend Controller Properties dialog box, Communications tab

Headend Controller Properties dialog box - Advanced tab

To view/edit Headend Controller advanced properties:

1. From the System View, select an **HCU**.
2. From the Edit menu, select **Properties**.
3. Select the **Advanced** tab.

The following Advanced tab is displayed. (See Table 9 for HCU Advanced tab functionality.)

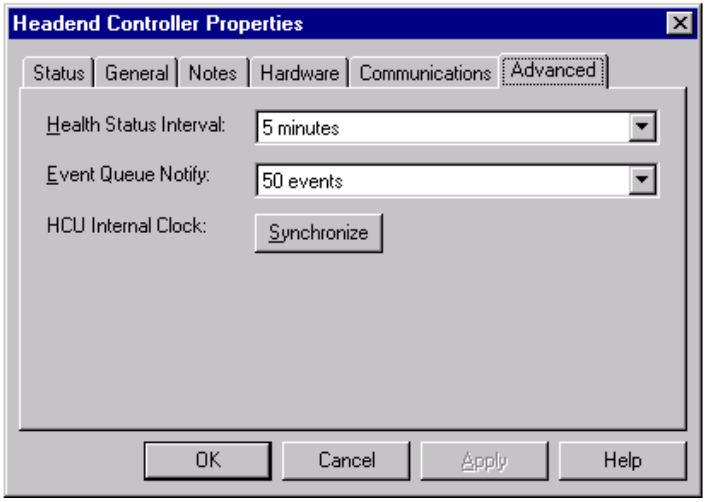

Figure 14 Headend Controller Properties dialog box, Advanced tab

Table 9 HCU Advanced tab functionality

Field name	Description
Health Status Interval	Select the amount of time the HCU can go without connecting to the PathTrak Server.
Event Queue Notify	Select the number of events that can queue before a connection to the PathTrak Server is forced.
HCU Internal Clock	To align the HCU's internal clock with the PathTrak Server, click **Synchronize**.

Viewing/editing RPM module properties

The properties of each Return Path Monitor (RPM) module are detailed on the Return Path Monitor Properties dialog box, which is comprised of the following four tabs:

- Status
- General
- Notes
- Hardware

Return Path Monitor Properties dialog box - status tab

To view/edit RPM status properties:

1. From the System View, select an **RPM**.
2. From the Edit menu, select **Properties**.

   The following Status tab is displayed. (See Table 10 for RPM Status tab functionality.)

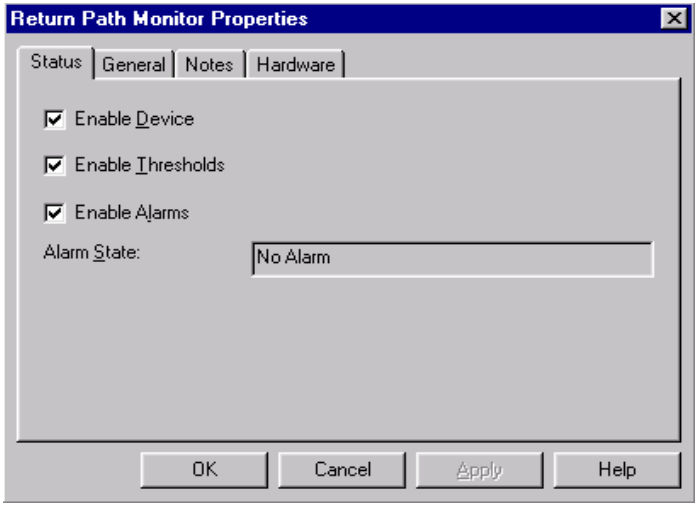

Figure 15 Return Path Monitor Properties dialog box, Status tab

Table 10 RPM Status tab functionality

Field name	Description
Enable Device	Check box to allow communication with the device.
Enable Thresholds	Check box to enable thresholds for each RPM port.
Enable Alarms	Check box to enable alarms associated with the device.
Alarm State	Displays the most severe alarm associated with this device.

Return Path Monitor Properties dialog box - General tab

To view/edit RPM general properties:

1. From the System View, select an **RPM**.
2. From the Edit menu, select **Properties**.
3. Select the **General** tab.

   The following General tab is displayed. (See Table 11 for RPM General tab functionality.)

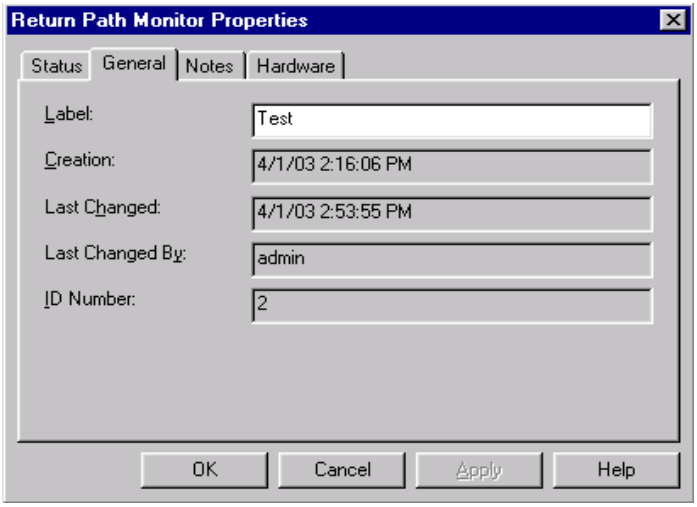

Figure 16 Return Path Monitor Properties dialog box, General tab

Table 11 RPM General tab functionality

Field name	Description
Label	Enter a name for the device.
Creation	Displays the date and time the device was added to the system. (read-only)
Last Changed	The time and date when the properties of the device were last changed.
Last Changed By	The username of the person who last changed the properties of the device.
ID Number	A unique identification number for the device.

Return Path Monitor Properties dialog box - Notes tab

To view/edit RPM notes properties:

1. From the System View, select an **RPM**.
2. From the Edit menu, select **Properties**.
3. Select the **Notes** tab.

   The following Notes tab is displayed. Use the space provided to enter notes about the selected RPM.

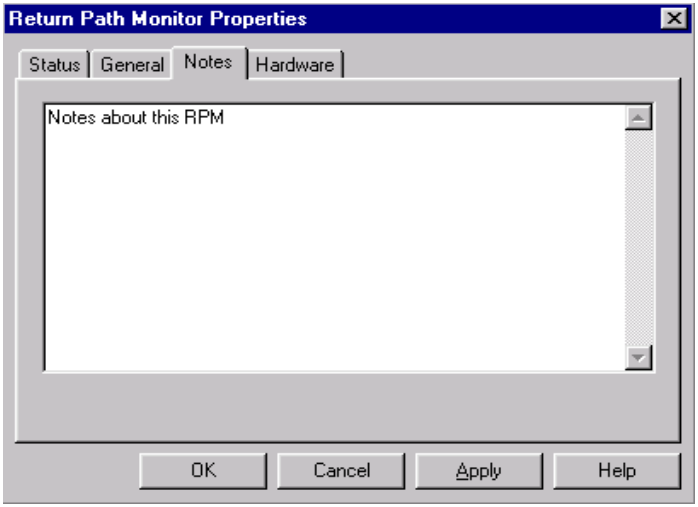

Figure 17 Return Path Monitor Properties dialog box, Notes tab

Return Path Monitor Properties dialog box - Hardware tab

To view RPM hardware properties:

1. From the System View, select an **RPM**.
2. From the Edit menu, select **Properties**.
3. Select the **Hardware** tab.

   The following Hardware tab displays the (read-only) hardware profile of the device.

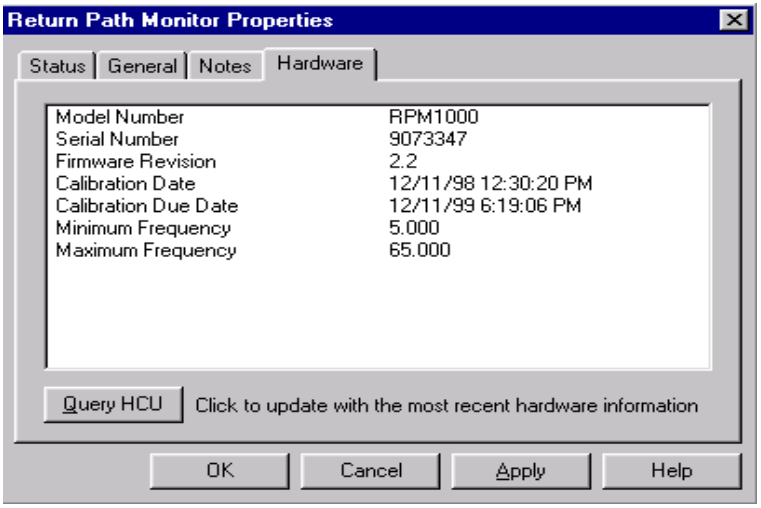

Figure 18 Return Path Monitor Properties dialog box, Hardware tab

Updating hardware information

PathTrak Client users with permission to modify network elements can click the **Query HCU** button on the Return Path Monitor Properties dialog box Hardware tab to refresh the display with the latest HCU firmware information. This is especially useful following an HCU firmware upgrade to confirm the successful installation of the upgrade on the PathTrak Server.

Viewing/editing RPM port properties

The properties of each Return Path Monitor (RPM) port are detailed on the Return Path Monitor Port Properties dialog box, which is comprised of the following five tabs:

- Status
- General
- Notes
- Hardware
- History

Return Path Monitor Port Properties dialog box -- Status tab

To view/edit RPM port status properties:

1 From the System View, select an **RPM port**.

2 From the Edit menu, select **Properties**.

The following Status tab is displayed. (See Table 12 for RPM port Status tab functionality.)

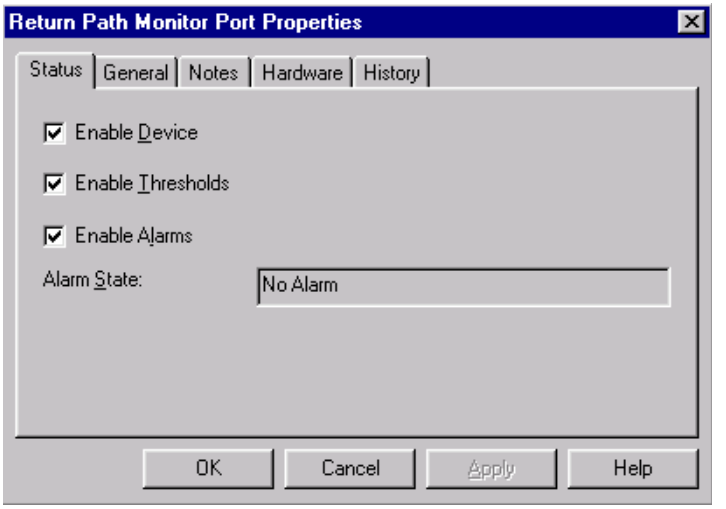

Figure 19 Return Path Monitor Port Properties dialog box, Status tab

Table 12 RPM port Status tab functionality

Field name	Description
Enable Device	Check box to allow communication with the device.
Enable Thresholds	Check box to enable thresholds for associated RPM Ports.
Enable Alarms	Check box to enable alarms associated with the device.
Alarm State	Displays the most severe alarm associated with this device.

Return Path Monitor Port Properties dialog box -- General tab

To view/edit RPM port general properties:

1. From the System View, select an **RPM port**.
2. From the Edit menu, select **Properties**.
3. Select the **General** tab.

   The following General tab is displayed. (See Table 13 for RPM port General tab functionality.)

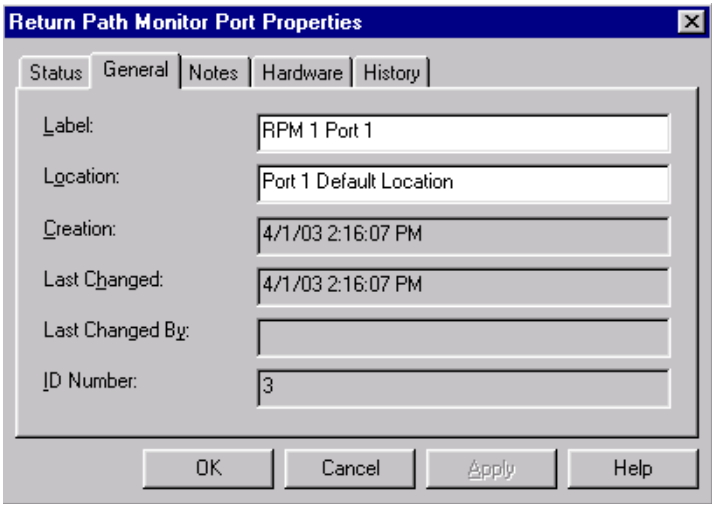

Figure 20 Return Path Monitor Port Properties dialog box, General tab

Table 13 RPM port General tab functionality

Field name	Description
Label	Enter a name for the device.
Location	The location of the origination of the signal.
Creation	The time and date when the device was added to the system.
Last Changed	The time and date when the port properties were last changed.
Last Changed By	The username of the person who last changed the port properties.

Table 13 RPM port General tab functionality (Continued)

Field name	Description
ID Number	A unique identification number for the port.

Return Path Monitor Port Properties dialog box -- Notes tab

To view/edit RPM port notes properties:

1. From the System View, select an **RPM port**.
2. From the Edit menu, select **Properties**.
3. Select the **Notes** tab.

   The following Notes tab is displayed. Use the space provided to enter notes about the selected RPM port.

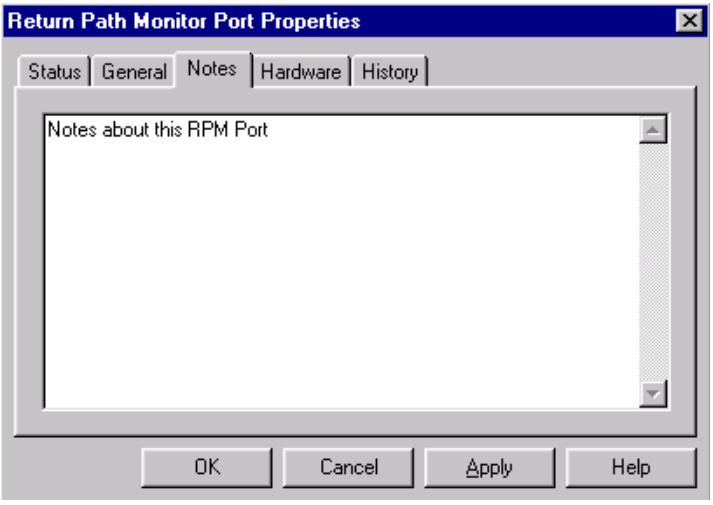

Figure 21 Return Path Monitor Port Properties dialog box, Notes tab

Return Path Monitor Port Properties dialog box -- Hardware tab

To view/edit RPM port hardware properties:

1. From the System View, select an **RPM port**.
2. From the Edit menu, select **Properties**.
3. Select the **Hardware** tab.

The following Hardware tab is displayed. See Table 14 for RPM port Hardware tab functionality.)

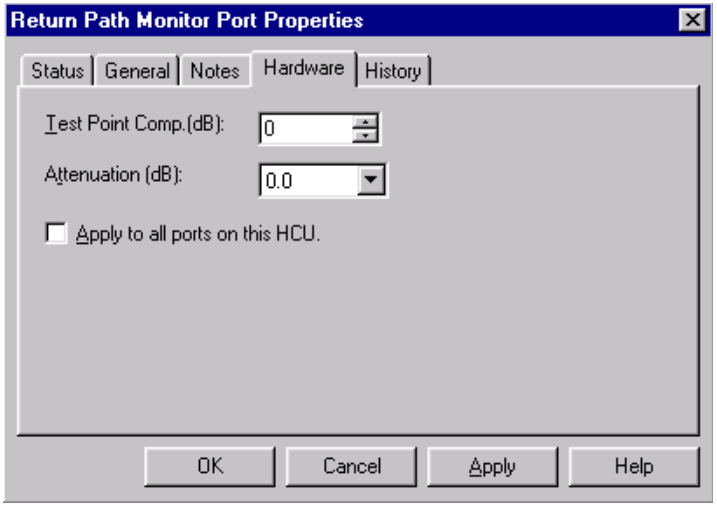

Figure 22 Return Path Monitor Port Properties dialog box, Hardware tab

Table 14 RPM port Hardware tab functionality

Field name	Description
Test Point Comp.	Set the test point compensation for the signal tap.
Attenuation	Set the attenuation from 0.0 to 50.0 dB.
Apply to all ports on this HCU	Check box to apply these hardware settings to all ports on this HCU.

Return Path Monitor Port Properties dialog box -- History tab

To view/edit RPM port history properties:

1 From the System View, select an **RPM port**.

2 From the Edit menu, select **Properties**.

3 Select the **History** tab.

The following History tab is displayed. (See Table 15 for RPM port History tab functionality.)

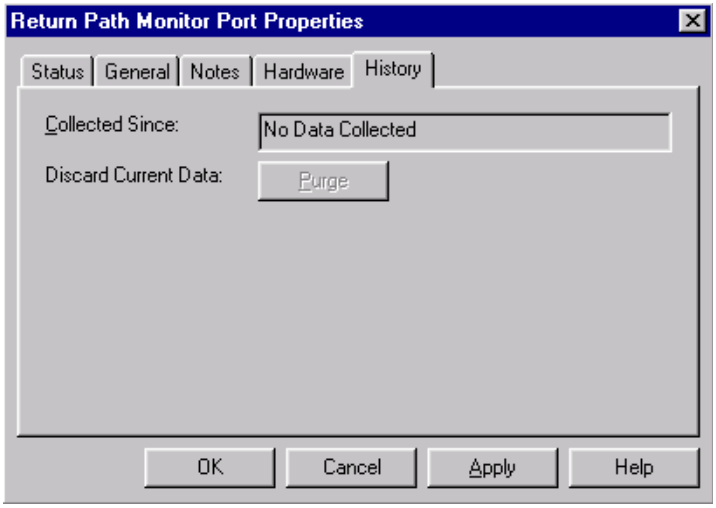

Figure 23 Return Path Monitor Port Properties dialog box, History tab

Table 15 RPM port History tab functionality

Field name	Description
Collected Since	Indicates the start date and time for Performance History statistics
Discard Current Data	To delete all of the performance data that has been collected, click **Purge**.

Viewing/editing HSM 1000 properties

The properties of each Headend Stealth Modem (HSM) are detailed on the Headend Stealth Modem Properties dialog box, which is comprised of the following four tabs:

- Status
- General
- Notes
- Hardware

Headend Stealth Modem Properties dialog box - Status tab

To view/edit HSM 1000 status properties:

1 From the System View, select an **HSM**.

2 From the Edit menu, select **Properties**.

The following Status tab is displayed. (See Table 16 for HSM 1000 Status tab functionality.)

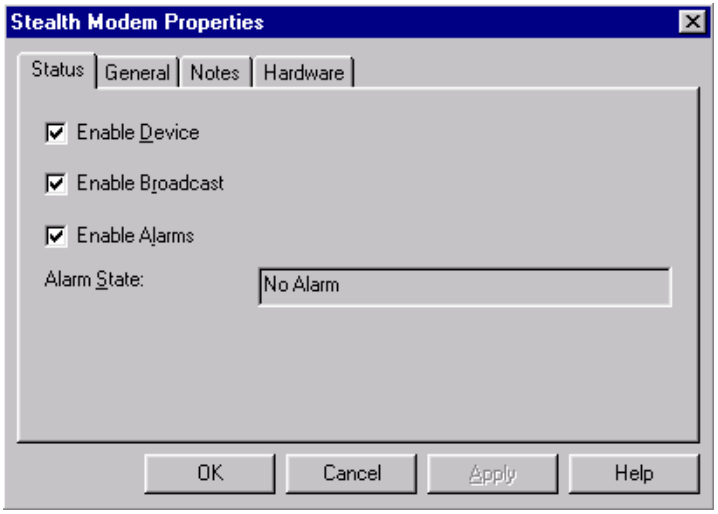

Figure 24 Stealth Modem Properties dialog box, Status tab

Table 16 HSM 1000 Status tab functionality

Field name	Description
Enable Devise	Check box to allow communication with the device.
Enable Broadcast	Checking this box allows continued transmission of data to field units via the HSM. The telemetry frequency and telemetry level must be set on the Hardware tab before this box can be checked.
Enable Alarms	Check this box to allow alarms associated with this device to be created. To prevent false alarms, uncheck this box when performing service.

Table 16 HSM 1000 Status tab functionality (Continued)

Field name	Description
Alarm State	The severity of the most severe alarm that is currently associated with this device.

Headend Stealth Modem Properties dialog box -- General tab

To view/edit HSM 1000 general properties:

1. From the System View, select an **HSM**.
2. From the Edit menu, select **Properties**.
3. Select the **General** tab.

   The following General tab is displayed. (See Table 17 for HSM 1000 General tab functionality.)

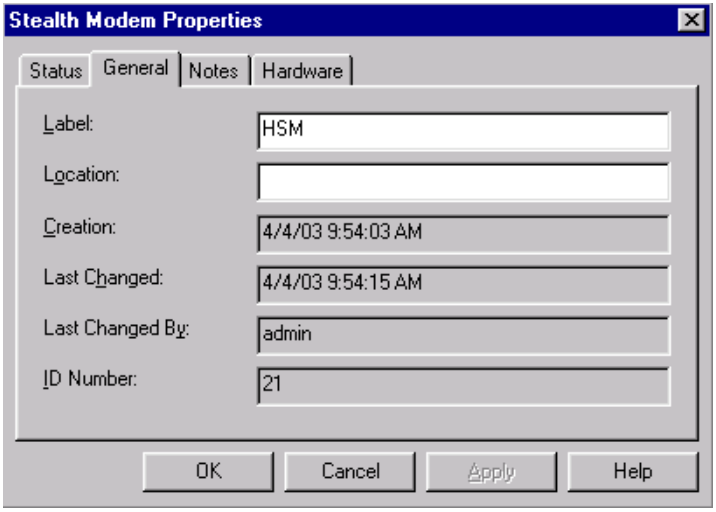

Figure 25 Stealth Modem Properties dialog box, General tab

Table 17 HSM 1000 General tab functionality

Field name	Description
Label	Enter a name for the device.
Location	Enter the location of the device.

Table 17 HSM 1000 General tab functionality (Continued)

Field name	Description
Creation	The time and date when the device was added to the system.
Last Changed	The time and date when the properties of the devise were last changed.
Last Changed By	The username of the person who last changed the properties of the device.
ID Number	A unique identification number for the device.

Headend Stealth Modem Properties dialog box - Notes tab

To view/edit HSM 1000 notes properties:

1. From the System View, select an **HSM**.
2. From the Edit menu, select **Properties**.
3. Select the **Notes** tab.

   The following Notes tab is displayed. Use the space provided to enter notes about the selected HSM.

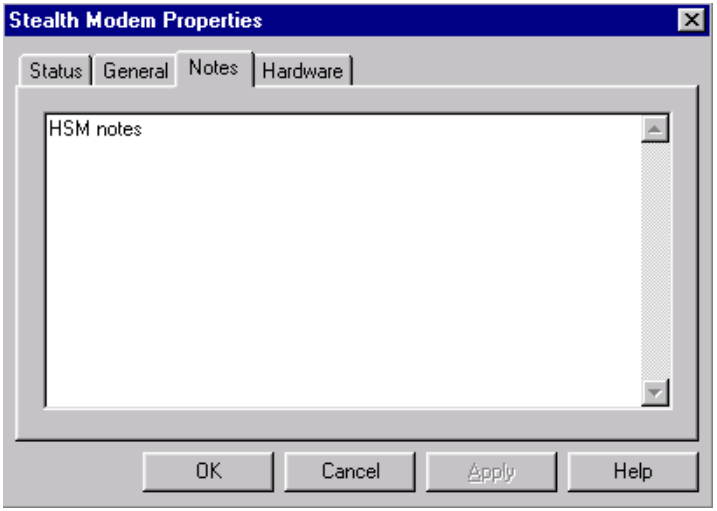

Figure 26 Stealth Modem Properties dialog box, Notes tab

Headend Stealth Modem Properties dialog box - Hardware tab

To view/edit HSM 1000 hardware properties:

1. From the System View, select an **HSM**.
2. From the Edit menu, select **Properties**.
3. Select the **Hardware** tab.

   The following Hardware tab is displayed. (See Table 18 for HSM 1000 Hardware tab functionality.)

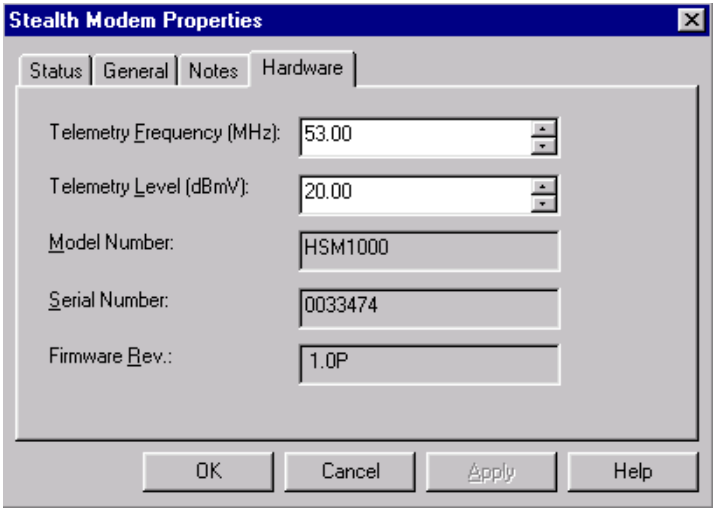

Figure 27 Stealth Modem Properties dialog box, Hardware tab

Table 18 HSM 1000 Hardware tab functionality

Field name	Description
Telemetry Frequency	Set the frequency (between 5 MHz and 1000MHz) used by the HSM to transmit data to the SDA or DSAM field meters.
Telemetry Level	Set the strength of the signal (between 20 dBmV and 50 dBmV) that is transmitted at the telemetry frequency
Model Number	HSM model number (read-only)
Serial Number	HSM serial number (read-only)

Table 18 HSM 1000 Hardware tab functionality

Field name	Description
Firmware Rev.	HSM firmware version (read-only)

Managing PathTrak users

Administrators can categorize access users among groups and assign access permissions to groups, thereby restricting system access on a group basis. The user's accessibility level depends on the group to which he belongs.

PathTrak™ user account privileges and passwords are established during system setup. However, there may be times when a user's privileges need to be changed in order expand or reduce access rights, or a password needs to be changed because of security reasons. User accounts can only be viewed and edited by a user with Administrator access privileges.

Managing user accounts

Manage user accounts by creating accounts for new users, creating user profiles, editing these profiles, or deleting users from the system.

Creating new user accounts

To create user accounts

1 From the System menu, select **Administration**.

The following Administration dialog box is displayed.

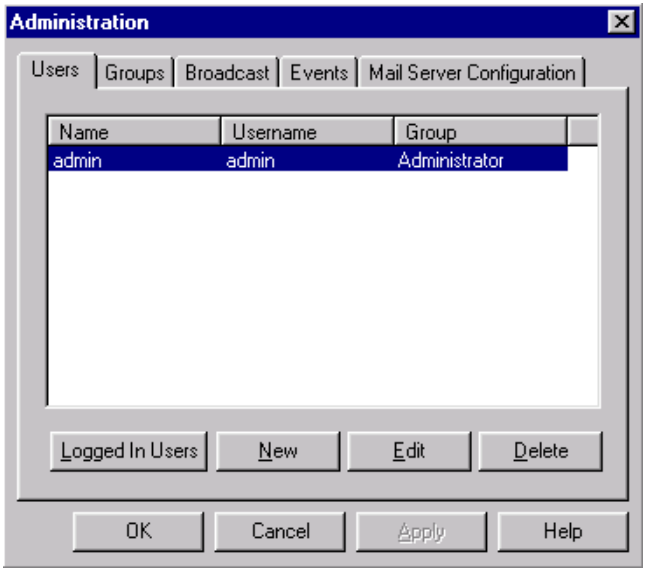

Figure 28 Administration dialog box, Users tab

2 On the Users tab, click **New**.

The following New User dialog box is displayed.

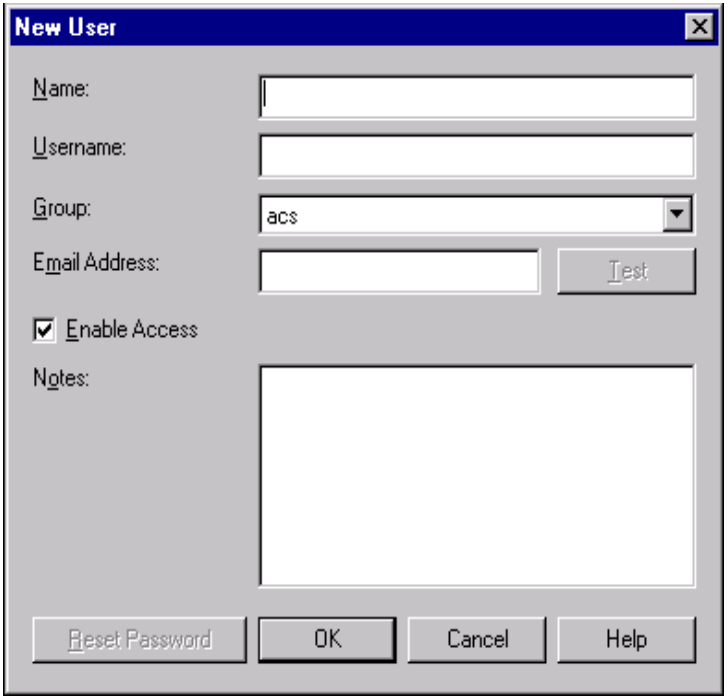

Figure 29 New User dialog box

3 Provide the **information** as described in Table 19.

4 From the System menu, select **Logout**.

5 Complete the **procedure**, “Creating a user profile” on page 46 to activate the user account.

Table 19 New User dialog box

Item	Description
Name	Enter the user’s full name.
Username	Enter a unique username. This username does not have to match the Windows username.
Group	Select the group to which the user is to belong. There are three default groups: Administrators, Power Users, and Users.

Table 19 New User dialog box (Continued)

Item	Description
Email Address	Enter the user's email address. If this field is left blank, the user's full name does not appear in the Notify field in the Alarm Setup dialog box.
Enable Access	Un-check this option to prevent the user from logging in (without deleting the user's account).
Test	Click this button to send test email. Test email are not sent until the Mail Server Configuration dialog box has been completed.
Notes	Enter any additional information here.
Reset Password	(Disabled in the New User dialog box. Enabled in the Edit User dialog box.)

Creating a user profile

After the user's account is created, the user must log in and complete a User Profile. The User Profile includes a password.

To activate a new user account

1 Log in to **Client software** using the **new username**.

2 From the System menu, select **User Profiles**.

The following User Profile dialog box is displayed.

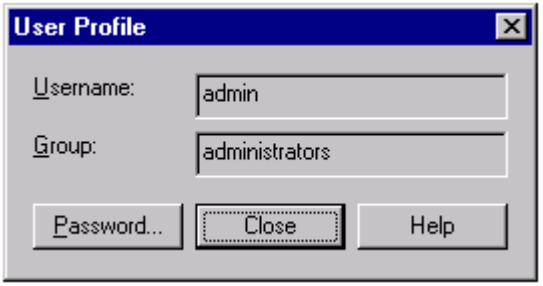

Figure 30 User Profile dialog box

3 Click **Password...**.

The following Change Password dialog box is displayed.

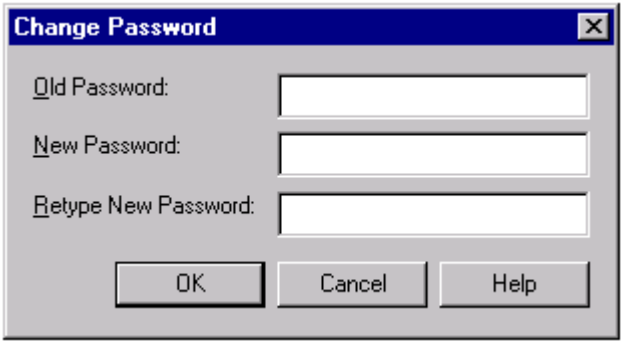

Figure 31 Change Password dialog box

4 Provide the **information** as described in Table 20 on page 47.

5 Click **OK**.

Table 20 Change Password dialog box

Field name	Description
Old Password	Type the old password. (Asterisks are displayed for each character of the password.)
New Password	Type the new password. (Asterisks are displayed for each character of the password.)
Retype New Password	Retype the new password. (Asterisks are displayed for each character of the password.)

Resetting a user profile

To reset a user profile (password)

1 From the System menu, select **Administration**.

2 On the Users tab, select the **appropriate user**.

3 Click **Reset Password**.

The user profile password is reset to nothing.

Editing users

To editing users

1 From the System menu, select **Administration**.

The Administration dialog box displayed. Refer to Figure 28 on page 44.

2 On the Users tab, select the **user** you would like to edit.

3 Click **Edit**.

The following Edit User dialog box is displayed.

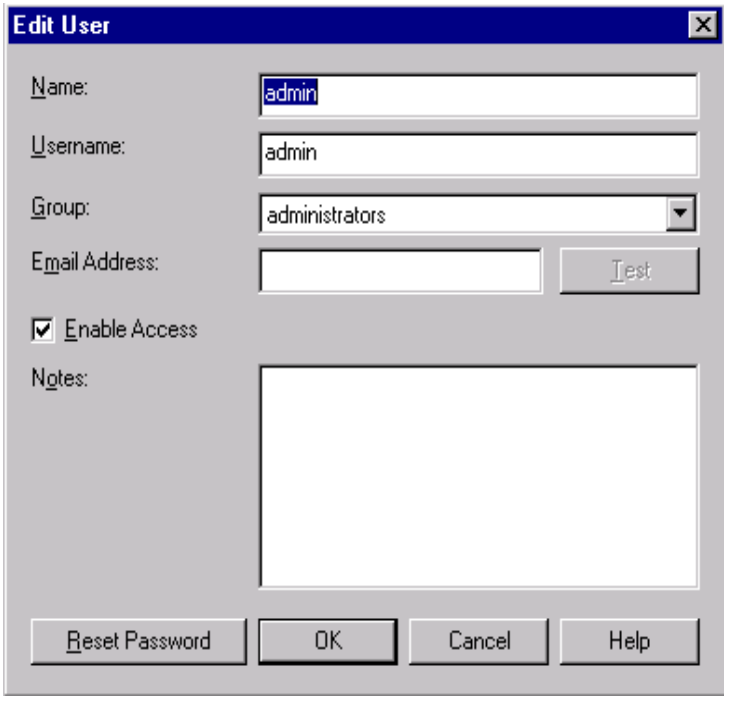

Figure 32 Edit User dialog box

Table 21 Edit User dialog box

Item	Description
Name	Enter the user's full name.
Username	Enter a unique username. This username does not have to match the Windows username.

Table 21 Edit User dialog box

Item	Description
Group	Select the group to which the user is to belong. There are three default groups: Administrators, Power Users, and Users. Refer to "Creating new groups" on page 51 to add groups.
Email Address	Enter the user's email address. If this field is left blank, the user's full name does not appear in the Notify field in the Alarm Setup dialog box.
Enable Access	Uncheck this option to prevent the user from logging in (without deleting the user's account).
Test	Click this button to send test email. Test email are not sent until the Mail Server Configuration dialog box has been completed.
Notes	Enter any additional information here.
Reset Password	Click this button to reset the user's password to nothing.

Deleting users

To delete users

1. From the System menu, select **Administration**.
   The Administration dialog box displayed.
2. On the Users tab, select the **user** you would like to delete.
3. Click **Delete**.

Managing user access

Manage user access to the PathTrak system by viewing the users currently logged-in to the system and by disabling their access as required.

Viewing logged-in users

To view logged in users

1. From the System menu, select **Administration**.
2. From the **Users** tab, click **Logged in Users**.

The following Logged In Users dialog box displays all users currently logged-in to the PathTrak system.

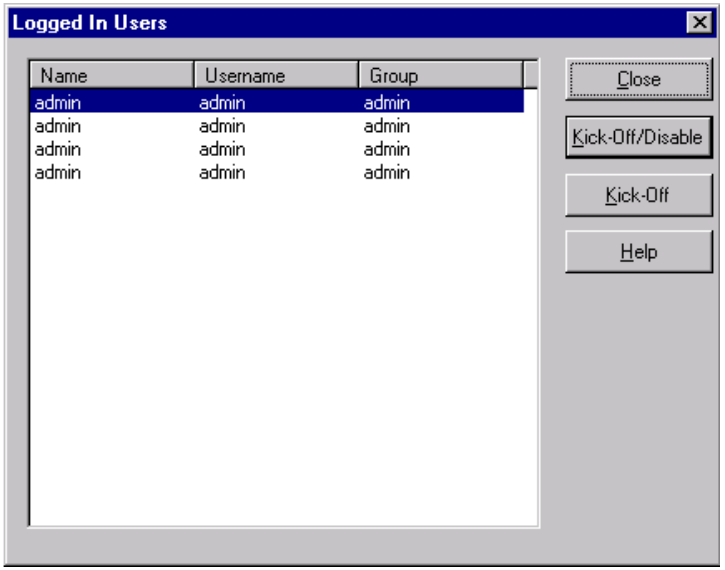

Figure 33 Logged In Users dialog box

Kicking-off logged-in users

The administrator has the ability to log-off (disable) any user's access to the system at any time.

To kick off logged-in users

1. From the System menu, select **Administration**.
2. From the Users tab, click **Logged In Users**. The Logged In Users dialog box is displayed.
3. Select the **logged-in user** that you would like to kick-off.
4. Click **Kick-Off/Disable**. The user is logged-off the system.

Managing user groups

User groups allow the system administrator to assign specific permissions to groups of people.

Creating new groups To create a new group

1 From the System menu, select **Administration**.

2 On the Administration dialog box, select the **Groups** tab.
The following Administration Groups tab is displayed:

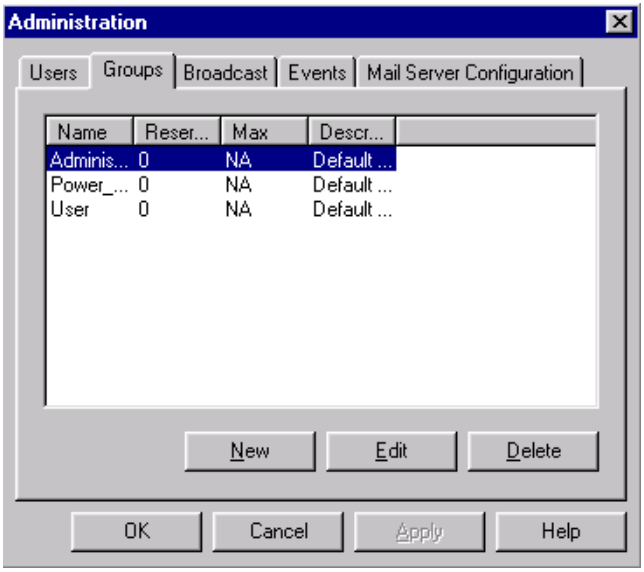

Figure 34 Administration dialog box, Groups tab

3 On the Groups tab, click **New.**
The following New Group dialog box is displayed:

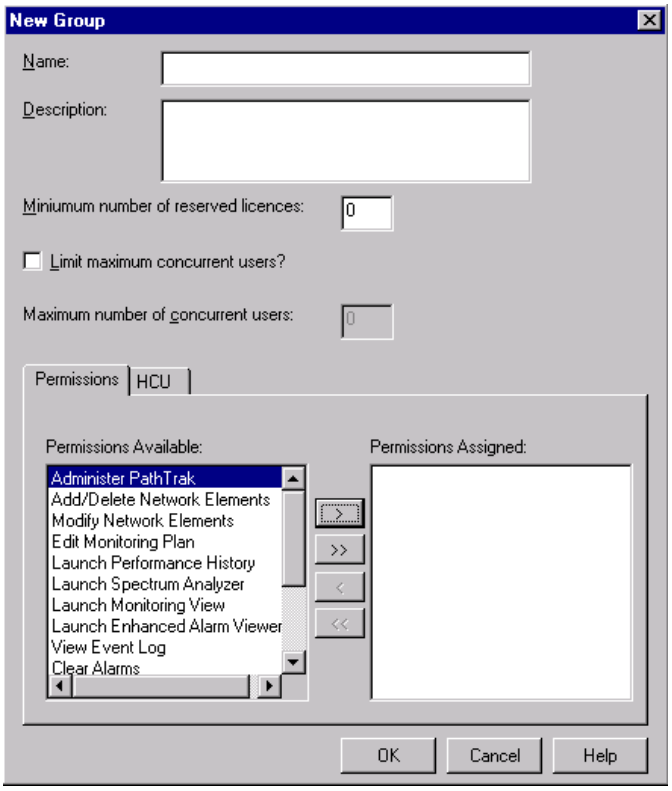

Figure 35 New Group dialog box

4 Provide the necessary information in the appropriate fields as described in Table 22. See Table 23 on page 54 for descriptions about the various permission types.

5 Click **OK**.

NOTE

There are three default groups: Administrator, Power User, and User. This allows for an easy upgrade from version 2.1 to 2.2.

Table 22 New Group dialog box

Item	Description
Name	Enter the group name for the new group.

Table 22 New Group dialog box (Continued)

Item	Description
Description	Enter the description for the new group.
Minimum number of reserved licenses	Indicate the number of reserved licenses for this group. Reserving licenses guarantees license availability to members of a group. Other groups will not be able to access these licenses.
Limit maximum number of concurrent users	Check this box to enable the **Maximum number of concurrent users** field.
Maximum number of concurrent users	Indicate the maximum number of users from this group that can concurrently be logged into the system. The number cannot be greater than 30 or less than the number indicated as the **Minimum number of reserved licenses**.
Permissions Available	Select from this list all the permissions that you want to apply to this new group. Use the buttons to transfer the permissions from the **Permissions Available** list to the **Permissions Assigned** list.
Permissions Assigned	Lists all the permissions assigned to this new group. Use the buttons to transfer the permissions from the **Permissions Assigned** list to the **Permissions Available** list.
HCUs Visible	Lists all the available HCUs in the cable network. Select all the HCUs that members of the group can see within the cable network. Use the buttons to transfer the HCUs from the **HCUs Visible** list to the **HCUs Hidden** list.
HCUs Hidden	Lists all the HCUs that the group cannot see within the cable network. Use the buttons to transfer the HCUs from the **HCUs Hidden** list to the **HCUs Visible** list.

NOTE

If 30 of the client licenses are being used at a given time, you cannot add a new group until one of the users logs off and makes a license available. However, you can use the Kick-off Logged in Users feature.

Table 23 Permissions Available, New Group dialog box

Assigning Permission...	Allows the user to...
Add/Delete Network Elements	Add or remove any HCUs, RPMs, HSMs to the system.
Clear Alarms	Clear an alarm in the alarm view.
Configure Alarms	Set up alarms (map thresholds to severity, etc.)
Edit Broadcast Properties	Set up broadcast parameters such as frequency range or dwell time used.
Edit Monitoring Plan	Make changes to monitoring plan.
Launch Enhanced Alarm Viewer	Launch Enhanced Alarm Viewer.
Launch Monitoring View	Launch Monitoring View.
Launch Performance History	Launch Performance History.
Launch Spectrum Analyzer	Launch Spectrum Analyzer.
Modify Network Elements	Make changes to the properties of a network element. (Change fields in the properties dialog box of an HCU, RPM, or HSM.)
Perform Backup	Log in to the Backup Client.
Reboot Network Element	Choose “reboot” when a network element is selected.
Update Firmware	Update the firmware of any network element.
View Event Log	View events in the Event Log.

NOTE

If a user does NOT have a particular permission, the menu item allowing access to that action is disabled. For example, a user who cannot clear alarms would find that specific menu item is not available to them when they right click on an **alarm**.

However, users can still view properties that they may not be able to edit. For example, a user who does NOT have “Edit Monitoring Plan” permissions can view a monitoring plan, but cannot make changes.

Editing groups

To edit groups

1. From the System menu, select **Administration**.
2. From the Groups tab, select the **group to be edited**.
3. Click **Edit**.

   The following Edit Group dialog box displayed.

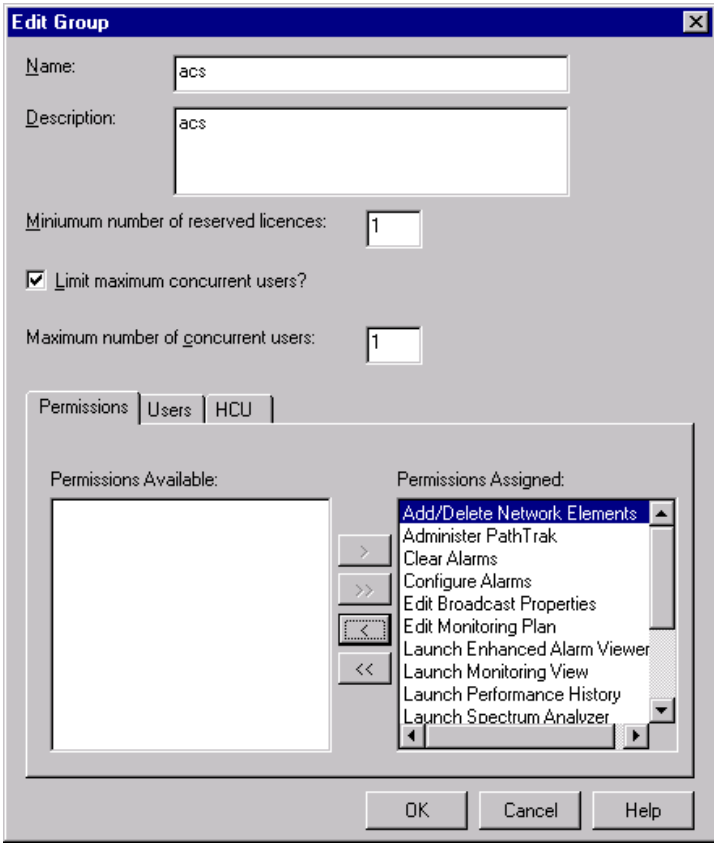

Figure 36 Edit Group dialog box

4 Make the **necessary changes** to the **appropriate fields** as described in Table 24. See Table 23 on page 54 for descriptions about the various permission types.

5 Click **OK**.

Table 24 Edit Group dialog box

Item	Description
Name	Enter the group name for the new group.
Description	Enter the description for the new group.

Table 24 Edit Group dialog box (Continued)

Item	Description
Minimum number of reserved licenses	Indicate the number of reserved licenses for this group. Reserving licenses guarantees license availability to members of a group. Other groups will not be able to access these licenses.
Limit maximum number of concurrent users	Check this box to enable the **Maximum number of concurrent users** field.
Maximum number of concurrent users	Indicate the maximum number of users from this group that can concurrently be logged into the system. The number cannot be greater than 30 or less than the number indicated as the **Minimum number of reserved licenses**.
Permissions Available	Select from this list all the permissions that you want to apply to this new group. Use the buttons to transfer the permissions from the **Permissions Available** list to the **Permissions Assigned** list.
Permissions Assigned	Lists all the permissions assigned to this new group. Use the buttons to transfer the permissions from the **Permissions Assigned** list to the **Permissions Available** list.
HCUs Visible	Lists all the available HCUs in the cable network. Select all the HCUs that members of the group can see within the cable network. Use the buttons to transfer the HCUs from the **HCUs Visible** list to the **HCUs Hidden** list.
HCUs Hidden	Lists all the HCUs that the group cannot see within the cable network. Use the buttons to transfer the HCUs from the **HCUs Hidden** list to the **HCUs Visible** list.

Assigning users to groups

To assign users to groups

1 From the System menu, select **Administration**.

The Administration dialog box is displayed.

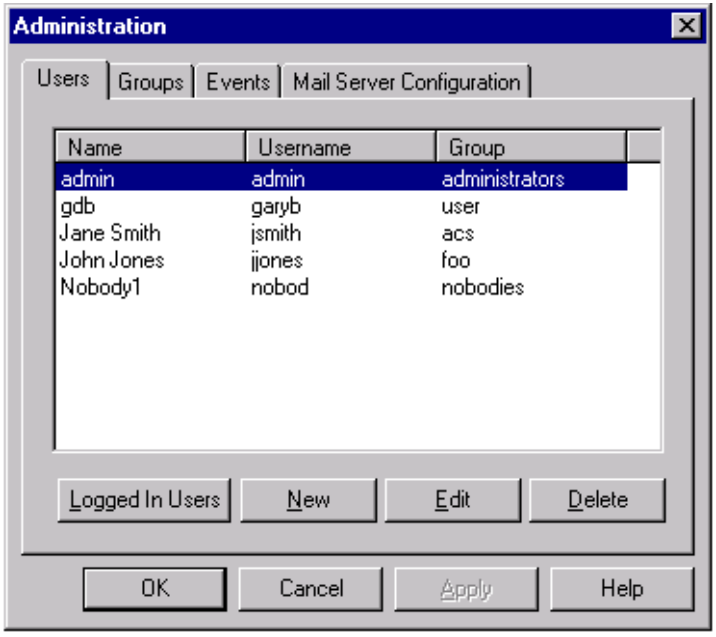

Figure 37 Administration dialog box

2 To add a new user, click **New**.

OR

3 To edit an existing user, click **Edit**.

4 If New is selected the New User dialog box is displayed.

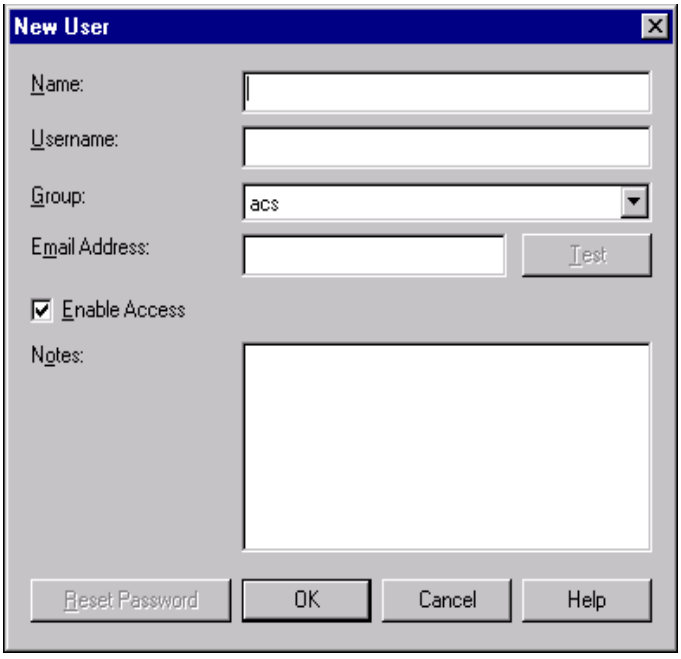

Figure 38 New User dialog box

OR

5 If Edit is selected the Edit User dialog box is displayed.

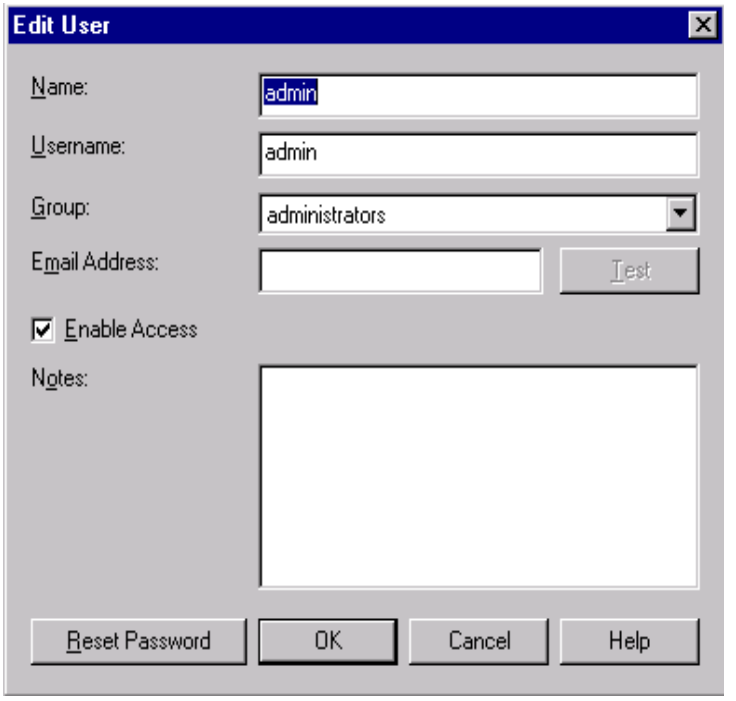

Figure 39 Edit User dialog box

6 From the Group drop-down list, select the **appropriate group**.

7 Click **OK**.

Deleting groups To delete groups

1 From the System menu, select **Administration**.

2 On the Groups tab, select the **group** to be deleted.

3 Click **Delete**.

CAUTION:

If you delete a group while users are still assigned to the group, then the user accounts are deleted as well. Refer to "Creating new user accounts" on page 43 to re-establish user accounts.

Communicating with users

During the course of maintaining or modifying the PathTrak software configuration, it may be necessary to alert users of upcoming changes. Users with administrative permissions can send a message from any PathTrak Client to all other PathTrak Clients that are logged on.

To broadcast a message:

1 From the System menu, select **Administration**.

2 On the Administration dialog box, select the **Broadcast** tab.

The Administration dialog box Broadcast tab (Figure 40) is displayed with a blank text box.

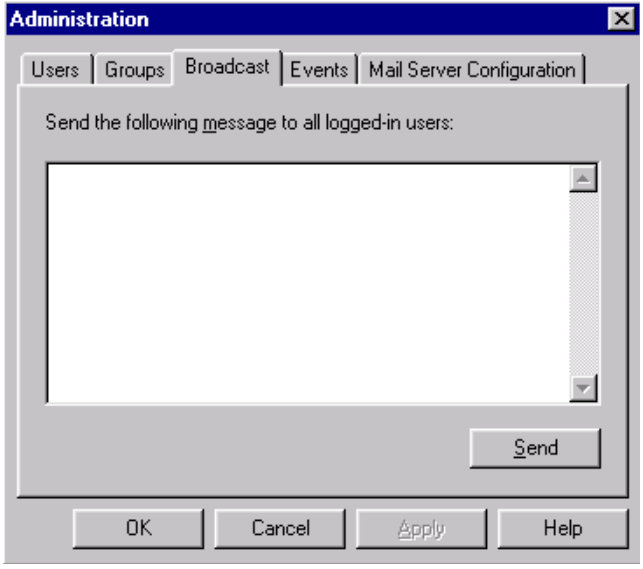

Figure 40 Administration dialog box, Broadcast tab

3 Type the message in the text box.

4 Click Send.

Managing events and configuring alarm notification

Managing the event database

The PathTrak System stores all logged events in a database on the PathTrak Server. If left unbound, the events would eventually fill the entire hard disk. It is the responsibility of the PathTrak System Administrator to ensure that limits are set on the amount of data stored in the database.

To limit the size of the Event database:

1 From the System menu, select **Administration**.

2 On the Administration dialog box, select the **Events** tab.

The Administration dialog box Events tab (Figure 41) is displayed

Figure 41 Administration dialog box, Events tab

3 Edit the Events tab to meet your requirements. (See Table 25 for Events tab functionality.)

Table 25 Administration dialog box Events tab functionality

Field name	Description
Always disregard events older than	Select this option to limit events by age. Choose a maximum age from the dropdown list.
Limit events to a total of	Select this option to limit events by number. Choose a total from the dropdown list.
Set the maximum disk usage to	Select this option to limit events by hard disk space. Choose a space limitation from the dropdown list.
Purge	Click this button to remove all the events currently in the database.

Configuring email notification of system alarms

JDS Uniphase Corporation recommends that you configure the PathTrak Server for email notification of system alarms.

To set up email notification:

NOTE

This procedure is performed from the PathTrak™ Client that receives the notification.

This procedure only enables the PathTrak Server to dispatch email notifications to designated users.

1 From the System menu, select **Administration**.

2 Select the **Mail Server Configuration** tab.

The following Mail Server Configuration tab is displayed. (See Table 26 for Mail Server Configuration tab functionality.)

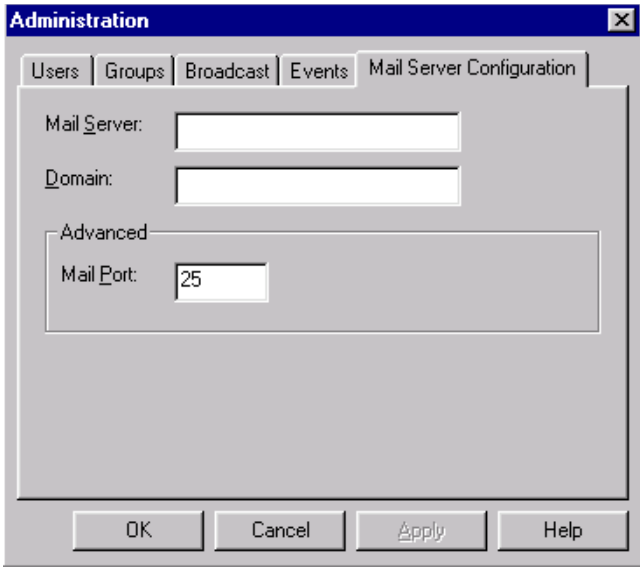

Figure 42 Administration dialog box, Mail Server Configuration tab

Table 26 Mail Server Configuration tab functionality

Field name	Description
Mail Server	Enter the DNS or IP address of the computer that dispatches the email notification. This must be an SMTP mail server.
Domain	Enter the domain name used for email messages.
Mail Port	Enter the port used to submit email. The default setting is 25.

Getting Started

3

This chapter describes the PathTrak™ system graphical user interface (GUI) functionality. Topics discussed in this chapter include the following:

About the application

Logging in to Client software

For security purposes, each user must have an established user account including a unique username and password before they can gain access to the system. For more information, refer to “Managing PathTrak users” on page 43.

To log in to the Client software

1 On the desktop, double click on the **PathTrak™ icon**.

The log-in screen is displayed.

Figure 43 Log-in Screen

2 Verify the **Server name**.

NOTE

Click the **down arrow** on the Server drop-down box to display up to ten of the up to sixty servers that can be available on the PathTrak system. When more than ten are available, use the scroll bar to display additional servers.

3 In the appropriate fields, type a **valid username and password**.

NOTE

Passwords ARE case-sensitive. The initial login username is “admin”; there is no password required (leave that field blank).

4 Click **OK**.

Logging off Client software

To log off the Client software

1 From the System menu, select **Exit**.

The Client closes.

Using the Help system

To use the help system

1 From the Help menu, select one of the following:

– **PathTrak™ Help** to view online help topics.

OR

– **About PathTrak™** to view application information.

User interface

When you log in to the Client software, the Main Screen (Figure 44 on page 68) is displayed.

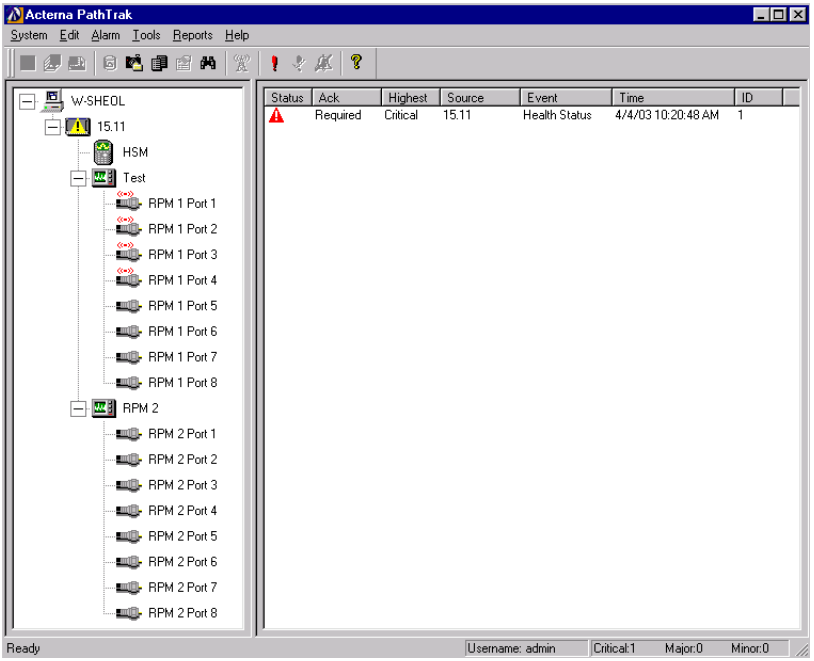

Figure 44 Main Screen

In Figure 44, the PathTrak Server (which, in this example, is named “W-SHEOL”) is shown at the top of the left pane of the Main Screen, which is the System View. Main Screen elements are outlined in Table 27.

Table 27 Main screen elements

Area	Location
System View	Left-side pane of Main Screen
Alarm List	Right-side pane of Main Screen
Menu bar	Across the top of the Main Screen
Toolbar	Below the menu bar
Status bar	Across the bottom of the Main Screen

System View

The System View displays and manages all return path monitoring hardware components. The System View displays the components as a tree hierarchy in the left-side pane of the Main Screen. All system components are represented in relation to other system hardware.

NOTE

When you log in to the Client software the first time, the PathTrak Server is the only hardware component displayed in the tree hierarchy. You must add the other devices.

Alarm List

The Alarm List displays a comprehensive list of all alarm instances. As new alarm conditions occur, the Alarm List is updated, adding or removing alarms accordingly. In contrast, the Event Log is maintained in the background on the PathTrak™ Server and it contains a complete history of current and past events. For more information, refer to the “Event Log and Alarm Notification” on page 90.

Menu bar

The menu bar provides drop-down menu of commands. The menus include:

- System
- Edit
- Alarm
- Tools
- Reports
- Help

Toolbar

The toolbar consists of icons that provide shortcuts to various PathTrak™ operations.

Figure 45 Main Screen: toolbar

The toolbar icons are named and described in the following table:

NOTE

You can pass the mouse pointer over the icon to see its description.

Table 28 Main Screen: toolbar icons

Icon	Name	Description
	Monitoring View	Displays the Monitoring View.
	3D Monitoring View	Displays the 3D Monitoring View.
	Spectrum Analyzer	Displays the Spectrum Analyzer.
	Performance History	Displays the Performance History Properties window.
	Snapshots	Displays the List of Snapshots.
	Event Log	Displays the Events Log window.
	Properties	Displays the Properties dialog box for selected HCU, RPM, or RPM Port.
	Locate Device	Highlights the RPM port, or node, associated with the selected alarm.
	Locate Device By Name	Provides a list and highlights the RPM port, or node, associated with the selected alarm.
	Add to Broadcast List	Adds the selected node to the set of nodes being broadcast through the HSM1000.
	Configure Alarms	Displays the Alarm Setup dialog box.
	Clear Alarm	Clears a selected alarm.

Table 28 Main Screen: toolbar icons (Continued)

Icon	Name	Description
	Silence Alarms	Silences a selected alarm.
	JDS Uniphase Corporation PathTrak™ Help	Displays the online Help.

Status bar

The Status bar (Figure 46) displays the system's status, including username and alarm status. The alarm status displays he current number of alarm instances in the system by type. For more information, refer to "Event types" on page 89.

Figure 46 Status bar

Components in System View

Now that you have setup your PathTrak™ System and are familiar with the Client's Main Screen, you are ready to add system components (HCU, HSM, PRM, and RPM ports) to the System View.

The process for adding components to the System View is outlined in the following stages:

1. Prepare **site**.
2. Install **hardware**.
3. Establish **communications**.
4. Add **components to System View**.

Expanding/ collapsing the tree hierarchy

In the System View, click the **plus sign (+)** next to a device to expand the branch or click the **minus sign (-)** next to a device to collapse a device.

Adding an HCU

To add an HCU to the PathTrak Server

1. In the System View, select the **PathTrak Server icon**.
2. From the System menu, select **New Device>New Headend Controller**.
3. Set the **Communications Properties** (IP Address of the CPU).
4. Click **Next>**.

   The connection process begins and displays the Connecting to HCU window. When the connection is established the following New HCU: General Properties dialog box is displayed.

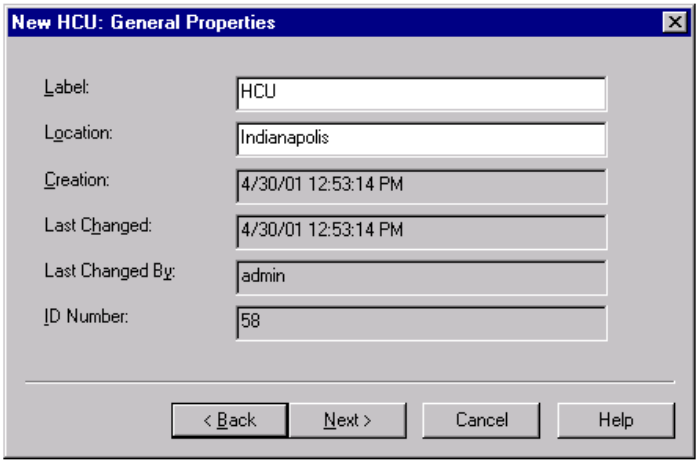

Figure 47 New HCU: General Properties dialog box

5. Set the **General Properties** as described in Table 29 on page 72.

Table 29 New HCU: General Properties dialog box

Field name	Description
Label	Enter a name for the HCU.
Location	Enter the location of the HCU.
Creation	Displays the date and time the device was added to the system. (read-only)

Table 29 New HCU: General Properties dialog box

Field name	Description
Last Changed	Displays the date and time the properties were last changed. (read-only)
Last Changed By	Displays the username of the person who last changed the properties. (read-only)
ID Number	Displays a unique identification number assigned to the HCU. (read-only)

6 Click **Next>**.

The following New HCU: Notes dialog box is displayed.

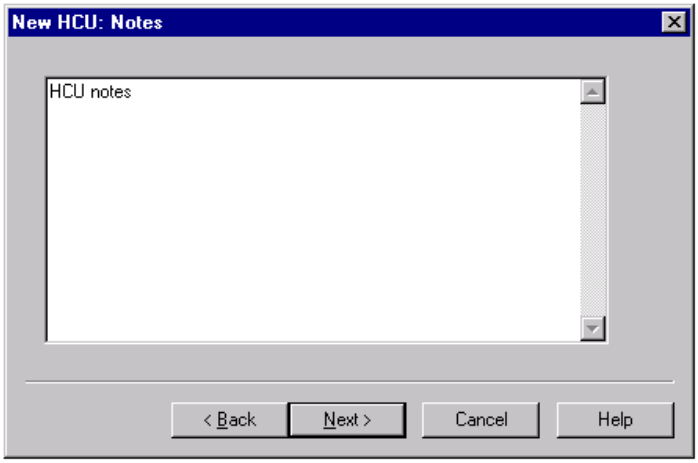

Figure 48 New HCU: Notes dialog box

7 Using the text field, enter **any desired notes**.

8 Click **Next>**.

The following New HCU: Status dialog box is displayed.

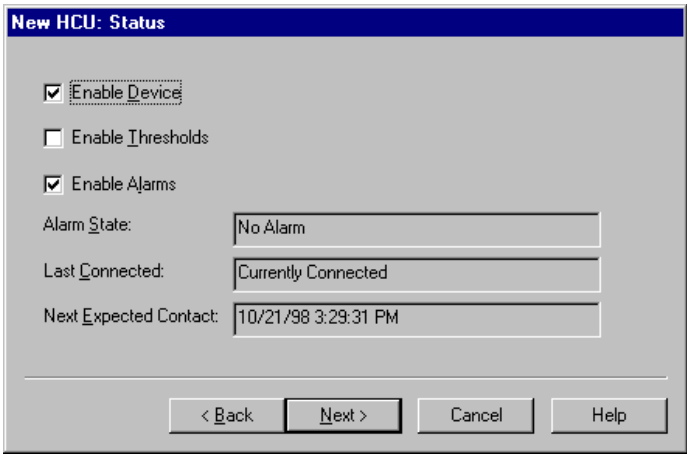

Figure 49 New HCU: Status dialog box

9 Set the **Status properties** as described in Table 30 on page 74.

Table 30 New HCU: Status dialog box

Field name	Description
Enable Device	Check to allow communication with the HCU.
Enable Thresholds	Check to enable thresholds for each RPM in the HCU.
Enable Alarms	Check to enable alarms associated with the HCU.
Alarm State	Displays the most severe alarm associated with this device.
Last Connected	Displays the last time communication occurred between the HCU and PathTrak Server.
Next Expected Contact	Displays the time and date for the next expected connection.

10 Click **Next>**.

The following New HCU: Hardware Properties dialog box is displayed. This is a read-only field describing the hardware profile of the device.

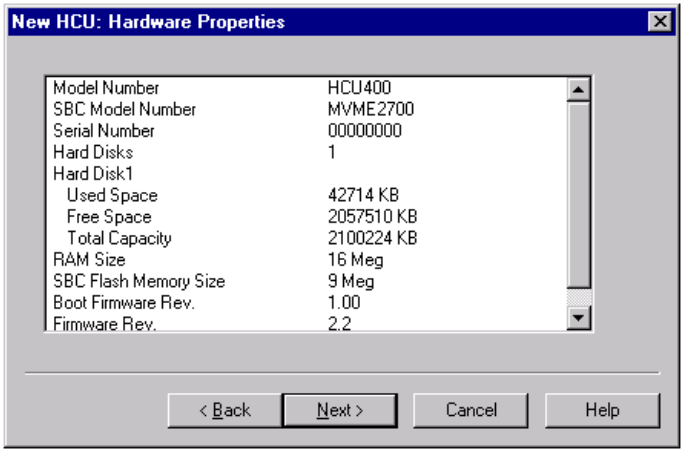

Figure 50 New HCU: Hardware Properties dialog box

11 Click **Next>**.

The following New HCU: Advanced dialog box is displayed.

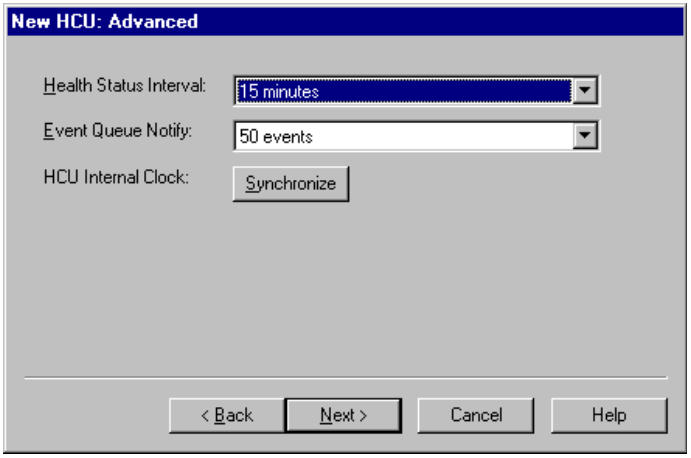

Figure 51 New HCU: Advanced dialog box

12 Set the **Advanced properties** as described in Table 31 on page 76.

Table 31 New HCU: Advanced dialog box

Field name	Description
Health Status Interval	Select the amount of time the HCU can go without connecting to the PathTrak Server.
Event Queue Notify	Select the number of events that can queue before a connection to the PathTrak Server is forced.
HCU Internal Clock	Click **Synchronize** to align the HCU's internal clock with the PathTrak Server.

NOTE

When an HCU is added to the System View, the HSM and RPMs connected to that HCU are automatically added to the PathTrak Server.

13 Click **Next>**.

14 Click **Finish**.

Adding an HSM

You can add only one HSM per HCU. Perform this procedure only when an HSM is added after initial setup.

To add an HSM

1 In the System View, select the **HCU to which the HSM is being added**.

2 From the System menu, select **New Device > New Stealth Modem**.

The following Add Stealth Modem: General dialog box is displayed.

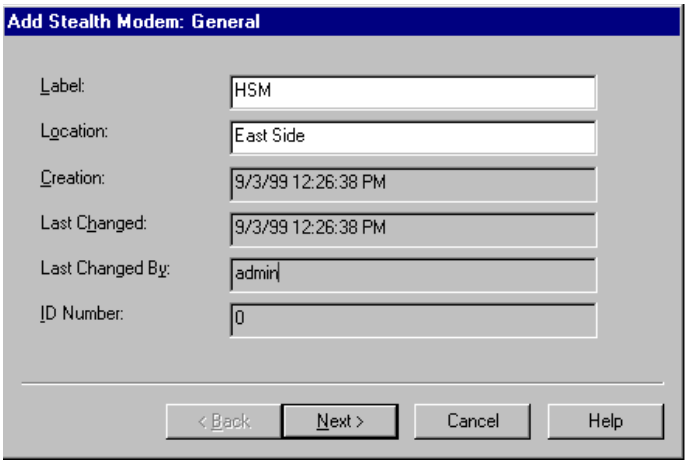

Figure 52 Add Stealth Modem: General dialog box

3 Set the **General Properties** as described in Table 32 on page 77.

Table 32 Add Stealth Modem: General dialog box

Field name	Description
Label	Enter a name for the HSM.
Location	Enter the location of the HSM.
Creation	Displays the date and time the device was added to the system. (read-only)
Last Changed	Displays the date and time the properties were last changed. (read-only)
Last Changed By	Displays the username of the person who last changed the properties. (read-only)
ID Number	Displays a unique identification number assigned to the HSM. (read-only)

4 Click **Next>**.

The following Add Stealth Modem: Status dialog box is displayed.

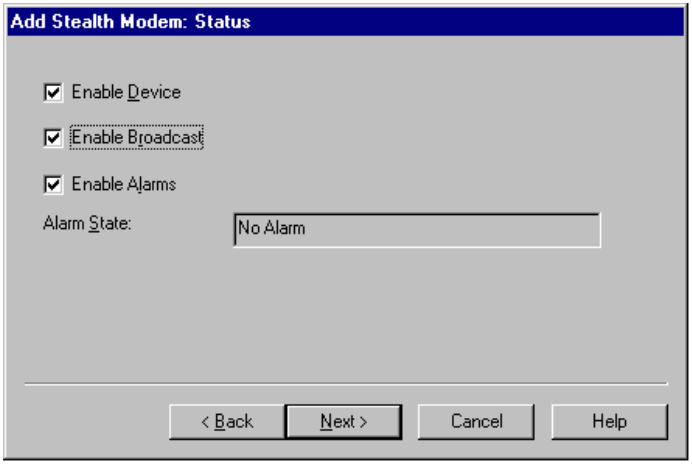

Figure 53 Add Stealth Modem: Status dialog box

5 Set the **Status properties** as described in Table 33 on page 78.

Table 33 Add Stealth Modem: Status dialog box

Field name	Description
Enable Device	Check to allow communication with the HSM.
Enable Thresholds	Check to allow continued transmission of data to the SDA or DSAM field meters via the HSM. Ensure the telemetry frequency and telemetry levels are set in the Hardware Information dialog box before enabling the broadcast state.
Enable Alarms	Check to enable alarms associated with the HSM.
Alarm State	Displays the most severe alarm associated with this device.

6 Click **Next>**.

7 The following New HCU: Notes dialog box is displayed.

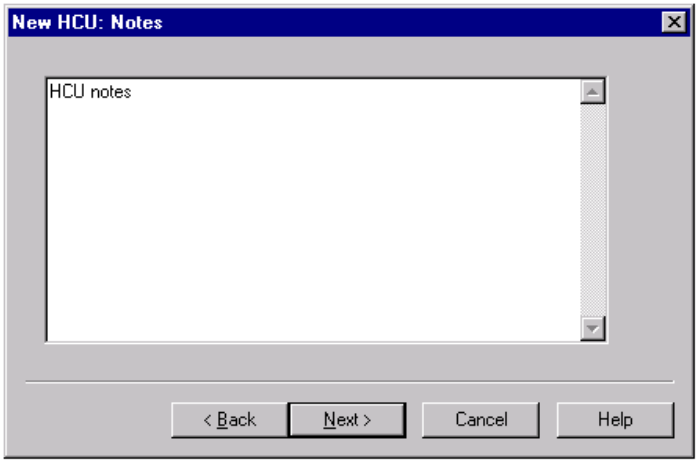

Figure 54 New HCU: Notes dialog box

8 Using the text field, enter **any desired notes**.

9 Click **Next>**.

The following Add Stealth Modem: Hardware dialog box is displayed.

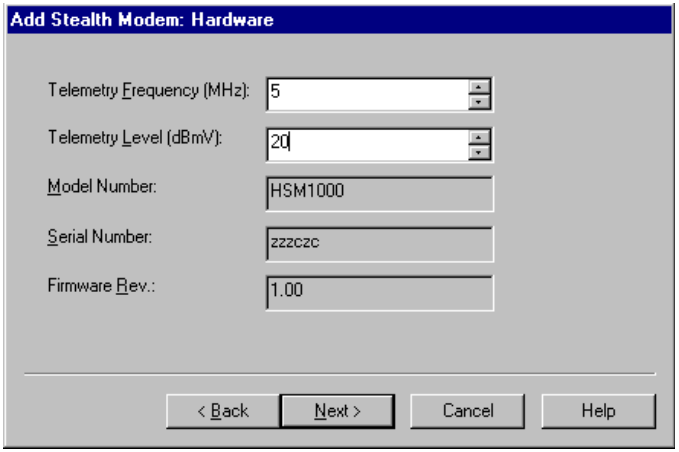

Figure 55 Add Stealth Modem: Hardware dialog box

10 Set the **Hardware properties** as described in Table 34 on page 80.

Table 34 Add Stealth Modem: Hardware dialog box

Field name	Description
Telemetry Frequency (MHz)	Displays the model number of the HSM. (read-only)
Telemetry (dBmV)	Set the strength of the signal transmitted at the telemetry frequency. The telemetry level range is between 20 dBmV and 50 dBmV.
Model Number	Enter the frequency used by the HSM to transmit data to the SDA or DSAM field meters. The frequency range is between 5 MHz and 1000 MHz.
Serial Number	Displays the serial number of the HSM. (read-only)
Firmware Rev.	Displays the firmware version of the HSM. (read-only)

11 Click **Next>**.

12 Click **Finish**.

Adding an RPM

To add an RPM to the System View

1 In the System View, select the **HCU to which the RPM is being added**.

2 From the System menu, select **New Device > New RPM**.

The following Add RPM: General Properties dialog box is displayed.

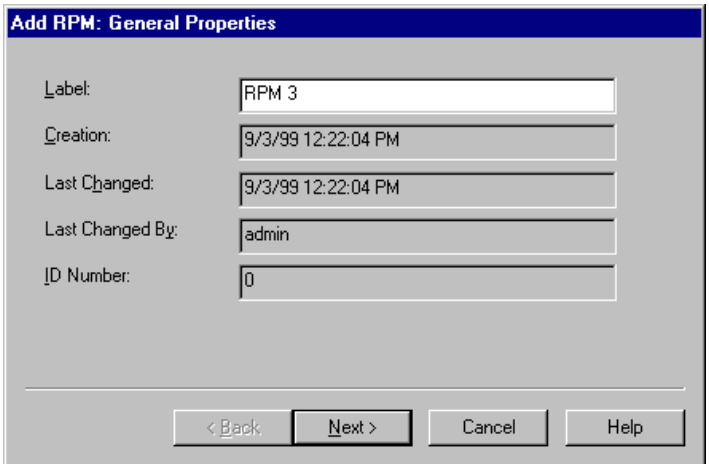

Figure 56 Add RPM: General Properties dialog box

3 Set the **General Properties** as described in Table 35 on page 81.

Table 35 Add RPM: General Properties dialog box

Field name	Description
Label	Enter a name for the RPM.
Location	Enter the location of the RPM.
Creation	Displays the date and time the device was added to the system. (read-only)
Last Changed	Displays the date and time the properties were last changed. (read-only)
Last Changed By	Displays the username of the person who last changed the properties. (read-only)
ID Number	Displays a unique identification number assigned to the RPM. (read-only)

4 Click **Next>**.

The following Add RPM: Slot Table Manager dialog box is displayed.

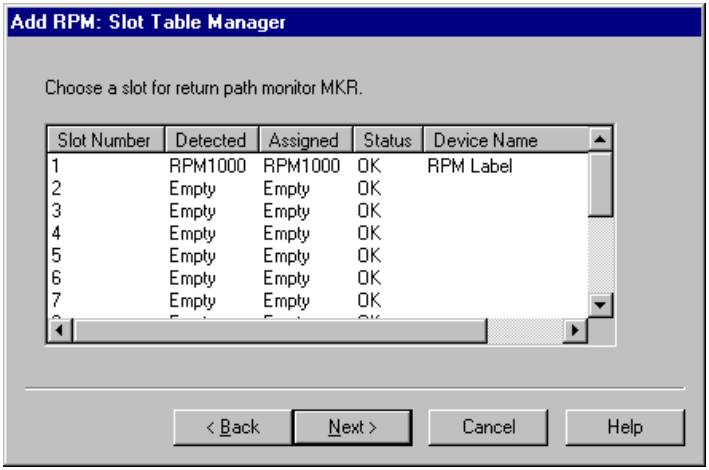

Figure 57 Add RPM: Slot Table Manager dialog box

5 From the slot list, choose the **RPM slot**.

6 Click **Next>**.

The following New RPM: Status dialog box is displayed.

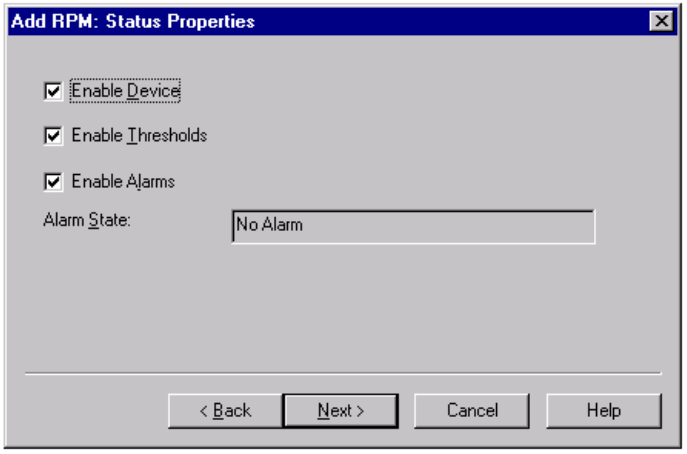

Figure 58 New RPM: Status dialog box

7 Set the **Status properties** as described in.

Table 36 Add RPM: Status Properties dialog box

Field name	Description
Enable Device	Check to allow communication with the RPM.
Enable Thresholds	Check to enable thresholds for each RPM in the HCU.
Enable Alarms	Check to enable alarms associated with the RPM.
Alarm State	Displays the most severe alarm associated with this device.

8 Click **Next>**.

The following New HCU: Notes dialog box is displayed.

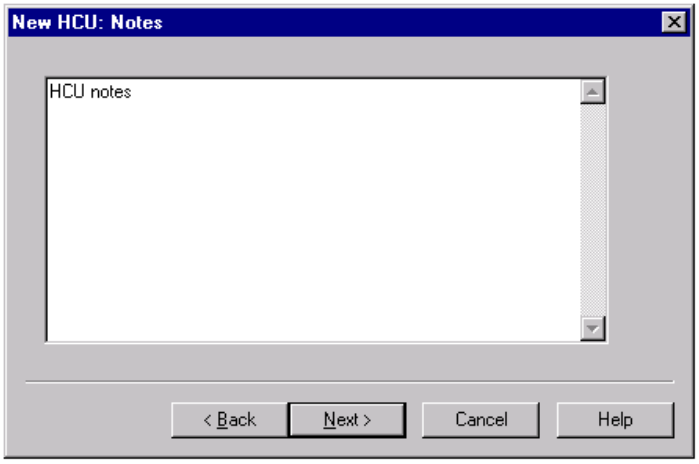

Figure 59 New HCU: Notes dialog box

9 Using the text field, enter **any desired notes**.

10 Click **Next>**.

The New HCU: Hardware Properties dialog box is displayed. This is a read-only field describing the hardware profile of the device.

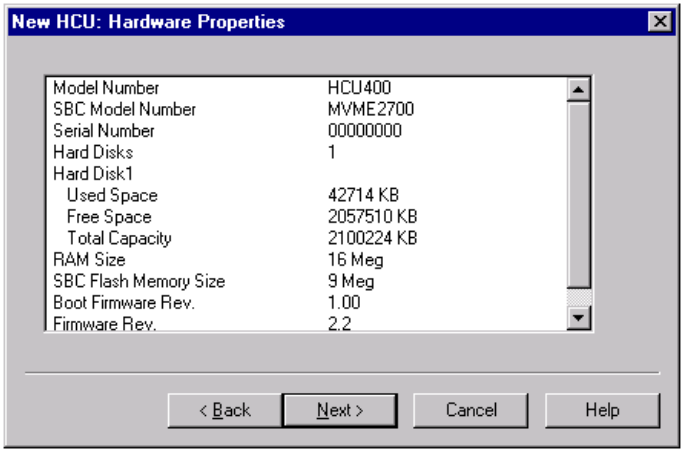

Figure 60 New HCU: Hardware Properties dialog box

11 Click **Next>**.

12 Click **Finish**.

NOTE

To add an RPM, you can also right click the **appropriate HCU** and select **New RPM**.

Enabling all RPM ports

To enable RPM ports

1 From the System View, select an **RPM**.

2 From the Edit menu, select **Enable All Ports**.

NOTE

To enable all ports of an RPM, you can also right click an **RPM icon** in the System View and select **Enable All Ports**.

Selecting all RPM ports

Certain actions may be applied to all RPM ports associated with a particular HCU. These actions include accessing the 3D monitoring view, opening snapshots, accessing the event log, and (when applicable) pasting a monitoring plan to each port.

To select all RPM ports:

1. In the System View, right click the **HCU** associated with the ports you intend to select.
2. Click **Select All Ports**.
3. Right click the selected ports area (highlighted) to display the following menu options:

– 3D Monitoring View (must be limited to eight ports or less)
– Open Snapshots
– Event Log
– Paste Monitoring Plan (available when a plan has been copied to the clipboard)

4. Select the menu item that you wish to apply to all selected ports.

Enabling hardware one at a time

To enable hardware one at a time

1. In the System View, right click on a **hardware icon**, select **Properties**.
2. Check **Enable Device**.

Disabling hardware one at a time

To disable hardware one at a time

1. In the System View, right click on a **hardware icon**, select **Properties**.
2. Un-check **Enable Device**.

Locating Devices

The PathTrak™ operator can quickly locate the desired RPM port by using the Locate Device or Locate Device By Name feature.

NOTE

Each device (HCU, HSM, RPM, and RPM port) that is contained in your PathTrak™ System is automatically assigned a unique ID number. that number is located in the General Properties dialog box.

Locating devices by ID

To locate devices by ID.

1. From the Tools menu, select **Locate Device**.
2. For the requested RPM port, enter the **Device ID number**.
3. Click **OK**.

   The selected RPM port is highlighted in the System View.

Locating devices by device name

To locate devices by device name.

1. From the Tools menu, select **Locate Device By Name**.

   A “Device Search by Name“ dialog box is displayed.
2. Enter **search string**.
3. Click **Find**.

   All devices containing the search string shall be displayed.
4. Double click on **one of the listed devices** to open the device hierachy.

   The selected device is displayed, highlighted in the System View.

Event and Alarm Management

4

After you have added all components to the PathTrak™ System hierarchy (System View). You are ready to configure the system's parameters. This chapter includes task-based instructions using the Event and Alarm Management features. Topics discussed in this chapter include the following:

Event basics

The PathTrak™ System maintains a record of events detected by the system. Events are messages sent through the network from the HCU to the PathTrak Server. Each PathTrak™ System hardware component has a set of predefined events that can occur and transmit an event message. Events can be:

– Internal (PathTrak™ System/hardware component-related), or
– Network (return path performance)-related.

With the exception of those events you have elected not to log, all events are time-stamped and stored in a single comprehensive Event Log maintained by the PathTrak™ Server software on the PathTrak Server. Because entries in the Event Log include information about the source (system hardware component) and cause of the event, information stored in the Event Log can be helpful when researching, troubleshooting, and diagnosing PathTrak™ System and network behavior.

By default, there is no notification when new events occur. However, you can configure PathTrak™ so that events trigger visual and aural alarms as well as E-mail notifications to promptly alert you to potential problems. In addition, the PathTrak™ Client can be configured to send pop-up alarm notification in case an alarm condition occurs when the operator is working in the System View. Any event detected by the system can be set to trigger an alarm. Typically, alarms are created for events where special attention is desired. They are used to notify maintenance staff of developing performance problems, and PathTrak™ System administrators of system-related problems.

Alarms are prominently displayed in the Alarm List (right pane) of the main screen. The Alarm List is more visible than the Event Log and more focused on current conditions. As new conditions change, the Alarm List is updated, adding and removing alarms accordingly. By contrast, the Event Log is a complete history of current and past events.

Event types

The system hardware possibly affected and types of events are listed and described in the following table:

Table 37 Event types for various hardware

Event	Description	HCU	HSM	RPM	RPM Ports
Configuration Modified	Indicates any changes to the hardware configuration or if a user uses a remote utility to change the hardware's basic configuration (labels, etc.).	X	X	X	X
Hardware Failure	Indicates any detectable hardware failure. i.e., a hard drive	X		X	
Configuration Error	Occurs if the configuration file on the RPM gets corrupted. If this error occurs, the PathTrak Server restores the current configuration.	X		X	
Online/offline	Indicates the hardware has just completed its boot sequence and is ready to accept connections (online) or that the connections to the hardware have been dropped (offline).	X			
New Device	Occurs when an RPM module is added.	X			
Communications Error	Indicates the HCU failed to respond on time for the Health Status heartbeat. (See Health Status below.) Generated by the PathTrak Server.	X	X	X	
Fan Failure	Occurs when the hardware cooling fan has failed and requires immediate attention to prevent overheating.	X			
Health Status	Indicates HCU is "alive and well" at the rate specified in the HCU Advanced Properties dialog box. Generated by the HCU.	X			

Table 37 Event types for various hardware (Continued)

Event	Description	HCU	HSM	RPM	RPM Ports
Calibration Required	Occurs when the RPM is due for calibration or the hardware detects that the internal calibration algorithm is unable to maintain calibration. This event occurs daily beginning the first day the RPM loses calibration.			X	
Threshold (Enabled/Disabled)	Occurs any time a user or remote user changes a threshold enabled state.				X
Threshold Violation (1,2,3,4 or Interval)	Occurs any time the monitored signal level exceeds the threshold (as specified in the Monitoring Plan).				X
Measurement Over-range	Occurs when the input level tot he RPM port is so high that it is causing compression or clipping of the measured signal. To prevent RPM clipping, the use should modify the Max Input Level field in the RPM Port Properties dialog box.				X

Event Log and Alarm Notification

During system setup, you should establish the basic criteria for logging events and alarm notifications using the Alarm Setup dialog box. When the PathTrak™ Server detects an event, it checks the criteria established there to determine what action it should take. JDS Uniphase Corporation recommends that all PathTrak™ events be logged for diagnostics and troubleshooting purposes.

NOTE

All events are logged in the Event Log by default. The default setting for alarm notification of every event is None.

The PathTrak™ Server can be programmed to send E-mail messages via the PathTrak Server as alarms are received. E-mail messages may be sent to any E-mail account that the operator's network mail server has access. E-mail messages can be sent to different accounts based on the type of alarm.

EXAMPLE: Network performance related problems could be sent to maintenance or dispatch personnel and PathTrak™ System-related alarm messages could be sent to the PathTrak™ System administrator.

Event E-mail messages contain detailed information on the alarm source, time-date, type, and so on. The PathTrak™ Server creates the event messages, then passes them to the mail server on the operator's network on which the PathTrak™ PathTrak Server resides. The E-mail messages are then sent out via the mail server on the operator's network. All E-mail accounts must be set up on the operator's mail server and the PathTrak™ Server.

Configuring events for alarm notification

To mark events for logging

1 On the Alarm menu, select **Configure Alarms**.

The following Alarm Setup dialog box is displayed.

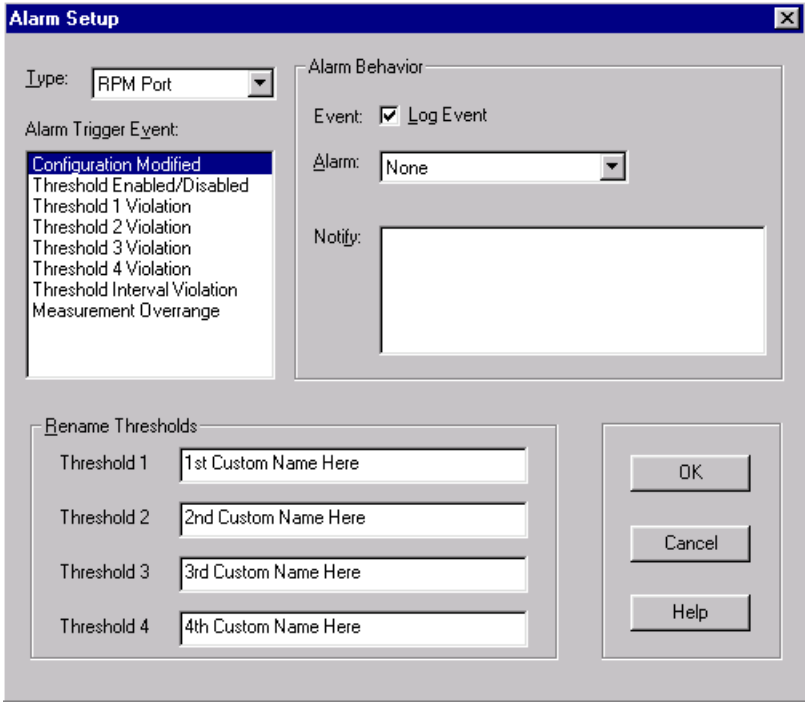

Figure 61 Alarm Setup dialog box

2 From the Type drop-down list, choose a **device or port**.

3 On the Alarm Trigger Event list, choose an **Event**.

4 To log all events of the chosen type, check the **Log Event box**.

OR

5 To disable logging, un-check the **Log Event box**.

6 From the Alarm drop-down list, choose a **severity rating**.

7 In the Notify box, click the **check box next to the user(s) to be notified**.

8 In the Rename Thresholds area, use up to 20 alphanumeric characters per name to enter up to four customized threshold names (see Figure 61). These customized threshold names will appear in the alarm view, on alarm reports, and on monitoring plan, event log, and other dialog boxes.

9 Click **OK**.

Event Log

All events are stored in the PathTrak Server. When the Event Log window is opened, the events matching the filter criteria are displayed. Events may be sorted or filtered by many parameters, including source and type. Filtering the Event Log can be useful to constrain the list to a more manageable size.

Viewing/filtering the Event Log

To view or filter the Event Log

1 To filter by that source from the System View, select **hardware icons**.

OR

2 To show events from all sources, click **outside the System View**.

3 On the Tools menu, select **Event Log**.

The following Event Log dialog box is displayed.

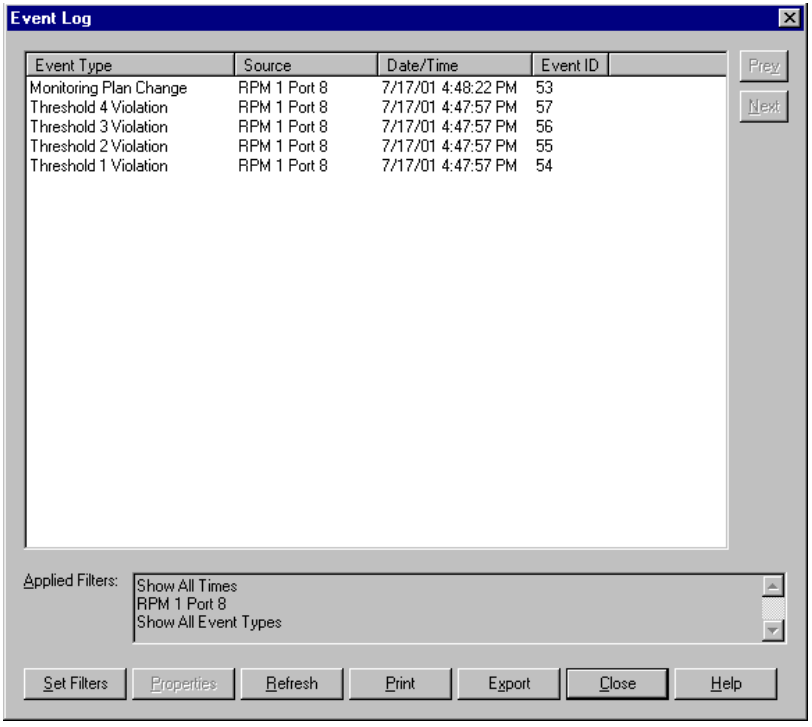

Figure 62 Event Log dialog box

4 To retrieve additional events from the server, click on **Prev** and **Next**.

5 Click **Set Filters**.

The following Event Log Filters dialog box is displayed.

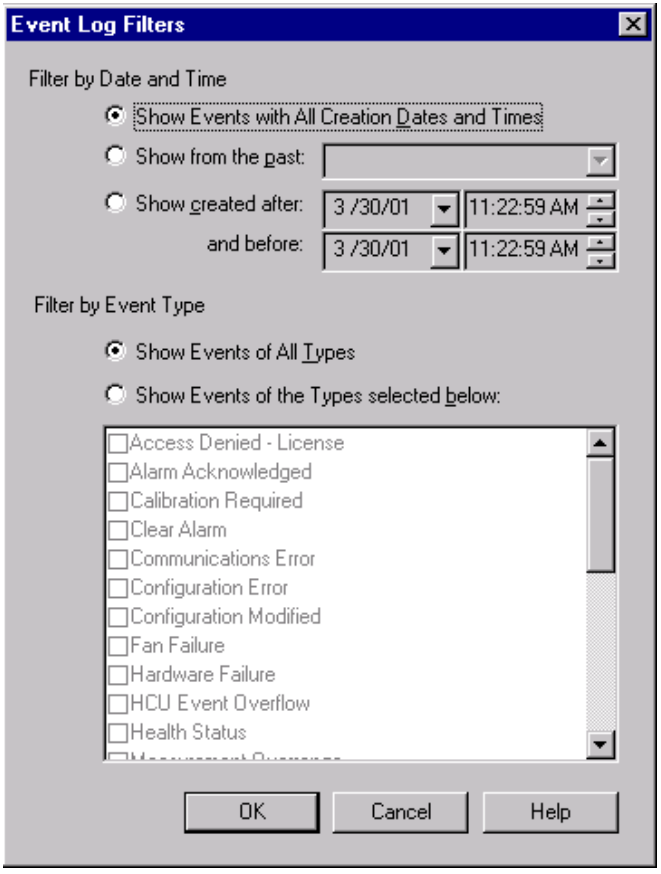

Figure 63 Event Log Filters dialog box

6 Configure the **filter criteria** as described in Table 38 on page 95.

Table 38 Event Log Filters dialog box

Field name	Description
Filter by Date and Time	Select **Show events with all creations dates and times** to show every event. OR Select **Show from the past** to show events form the past 1 hour, 1 day, 1 week, 1 month, or 6 months. OR Select **Show created after and before** to show events in a specific range of time.
Filter by Event Type	Select **Show events of all types** to show every event, regardless of type. OR Select **Show events of the types selected below** to show events of the type you select from the list.

Viewing event properties

As events are logged in the system, the PathTrak Server assigns properties to them. Any user can view event properties that contain information about the event's source, type, creation time, along with a detailed description.

To view event properties

1 From the Tools menu, select **Event Log**.

The following Event Log viewer is displayed.

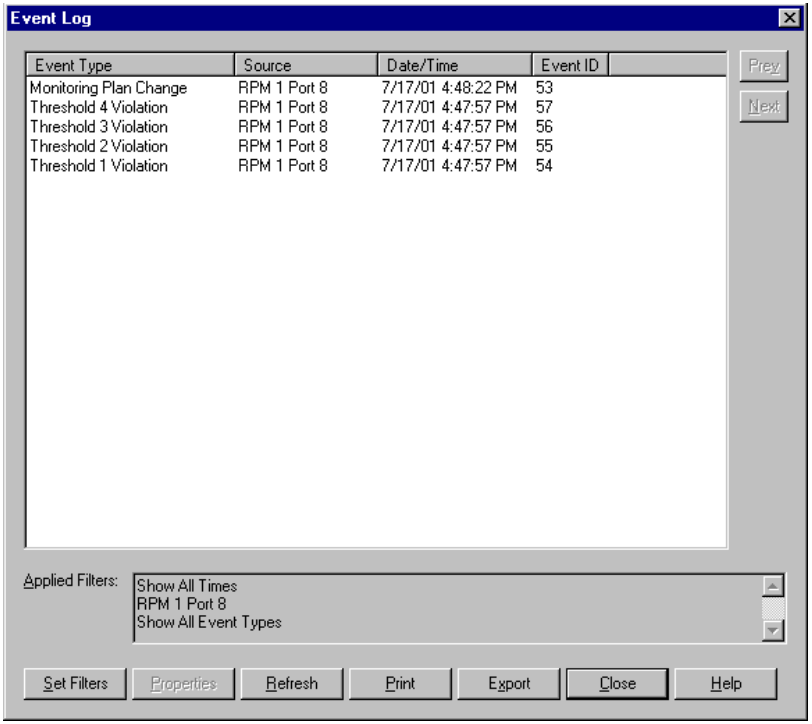

Figure 64 Event Log dialog box

2 From the list, select an **event**.

3 Click **Properties**.

The following Event Properties dialog box is displayed.

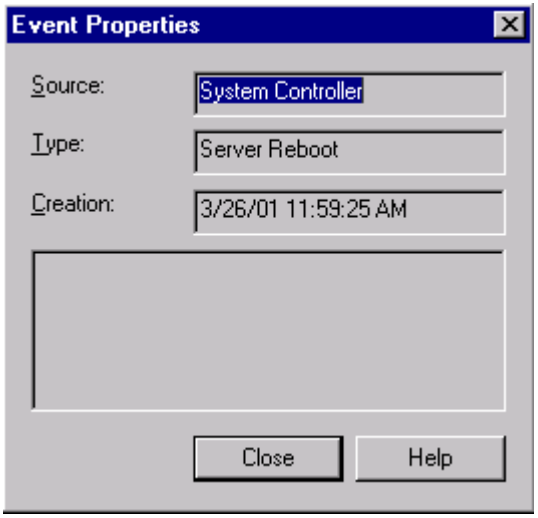

Figure 65 Event Properties dialog box

Printing an Event Log

Users can print the current data.

To print an Event Log

1 From the Reports menu, select **Page Setup**.
The following Page Setup dialog box is displayed.

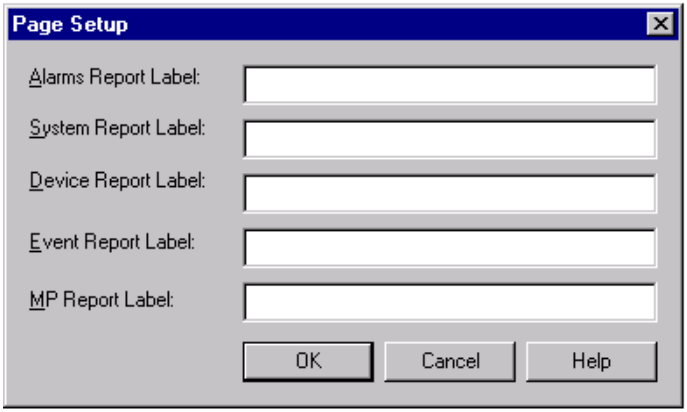

Figure 66 Page Setup dialog box

2 For the appropriate report type, type a **label**.

3 Click **OK**.

Exporting an Event Log

Users can export the current data to file. The file is a .csv format. The entire contents of the query is included.

To export Event Log data

1 From the Event Log viewer, click **Export**.
The following Save As... dialog box is displayed.

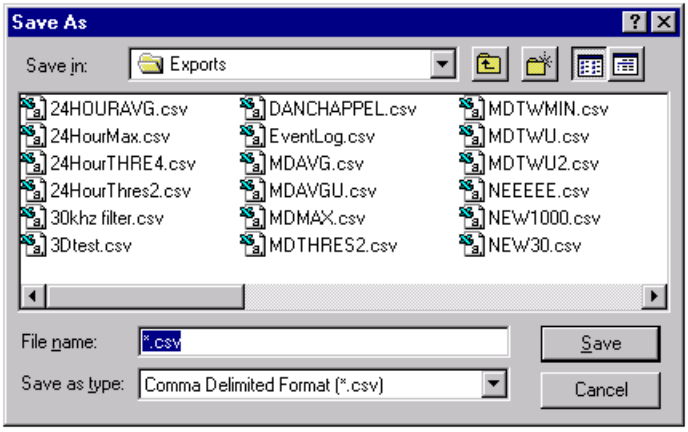

Figure 67 Save As... dialog box

2 Type a **filename**.

3 Click **Save**.

The file is saved in the default directory, PathTrak™\Exports.

The PathTrak™ alarms are triggered by event messages. You set events to trigger alarms by assigning an alarm severity rating. A visual alarm indicator displays a message that an alarm has been added to the alarm list. An aural indicator either sounds a beep or plays a .wav file when there is a new alarm.

Each PathTrak™ Client has control over how and when the visual or aural new alarm indicators are enacted. Individual users select, by the severity level of the alarm., if the visual/aural indicators are invoked on their Client application. For example: User A could set their individual Client application so that aural alarms sound for all occurrences. User B could set their Client so that visual and aural messages occur only for alarms rated at critical severity. User C set their Client so that no visual or aural indicator appear when new alarms occur.

During setup, you map events to one of five alarm severity levels. Your choices, in order of severity, are:

– None
– Warning
– Minor
– Major
– Critical

Alarm Tags are visual icons showing the alarm severity rating. Alarm Tags are used to both the Alarm List and the System View.

The Alarm List displays a comprehensive list of all alarm instances. As new alarm conditions occur, the Alarm List is updated, adding or removing alarms accordingly. In contrast, the Event Log is maintained in the background on the PathTrak™ Server and it contains a complete history of current and past events. For more information, refer to the “Event Log and Alarm Notification” on page 90.

In the Alarm List, the icon is located in the left-most column. In the PathTrak Server, the icon is superimposed on the device icon. If the System View tree hierarchy is collapsed, the icon is placed on the next highest device that is displayed in the System View. In cases where multiple devices are in alarm under a higher level device in the hierarchy, the most severe Alarm Tag (of those under the higher level device) is displayed on the higher level device.

Viewing all alarms

Users may view all Alarms separately as its on line entry in the Alarm List or view the highest priority alarms for each node in the Alarm List. Refer to “Configuring Client preferences” on page 16.

To view all alarms

1 From the System menu, select **Local Client options**.

The following (Local Client) Options dialog box displayed.

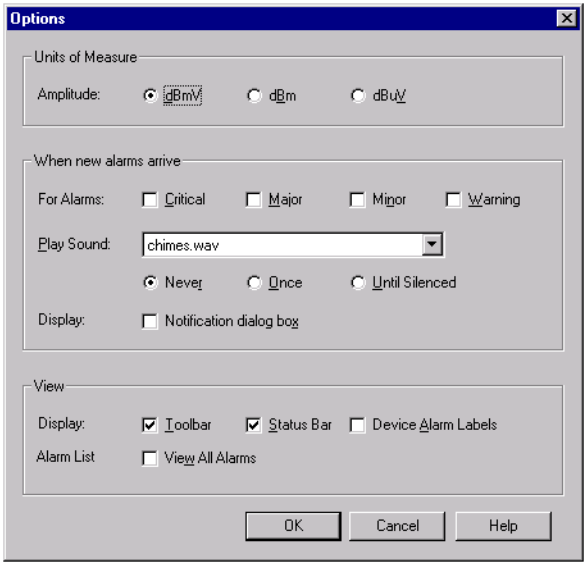

Figure 68 Options (Local Client) dialog box

2 Click the **View All Alarms check box**.

NOTE

JDS Uniphase Corporation recommends that you configure your event and alarm notifications for all events except Threshold Violations prior to establishing a monitoring plan. After you have collected enough history data to develop an effective monitoring plan, you can set alarm notifications for Threshold Violations.

The various alarm types, tags, and their respective descriptions are outlined in the following table:

Table 39 Alarm descriptions

Alarm type	Alarm tag	Description
None		If None is selected, the event does not generate an alarm.
Warning	(Yellow triangle)	Warning alarms are considered the lowest severity level that is displayed in the Alarm View.

Table 39 Alarm descriptions

Alarm type	Alarm tag	Description
Minor	 (Green triangle)	Minor alarms are more severe than Warning alarms and escalate the alarm level of a device from the Warning level to the Minor level. This level of severity can be used for informational notifications that do not require immediate action. Events like “calibration due” and “configuration changed” are good candidates for this type of alarm type.
Major	 (Blue triangle)	Major alarms are more sever that Minor alarms and escalate the alarm level of a device from the Warning and Minor levels to the Major level.
Critical	 (Red triangle)	Critical alarms are the most severe and escalate the alarm level of a device from any other alarm level to the Critical level.

Alarm Management

In addition to managing event on a daily basis, the alarms associated with each event must also be managed. One of the primary functions of the PathTrak™ System is to track and display alarm conditions. The Alarm List on the Client main screen displays all current alarms. The alarm condition of PathTrak™ devices is indicated in the System View with alarm tags specifying the severity of the alarm. As new alarms occur or conditions change, the Alarm List is updated.

PathTrak™ System alarms operate in two modes:

– Latched
– Unlatched

In the Latched Mode, alarms are deleted from the Alarm View when the alarm condition is cleared. These alarms require no user intervention. In Latched Mode, the alarms are displayed in the Alarm View until

you clear the alarm from the Client. Clearing the alarm clears it from the Alarm View and signals the source device that it is again free to send events.

NOTE

Clearing an alarm that is not resolved results in another alarm the next time the device makes a measurement.

You can configure alarms generated from threshold violations as either Latched or Unlatched in the Monitoring Plan Options menu. The following paragraphs present advantages and disadvantages of both alarm types to help you decide the type of alarm that works best for different situations.

Alarm type	Advantage	Disadvantage
Latched	These alarms remain in the Alarm view until you clear them. In this mode, alarms cannot be ignored or missed, and are therefore useful for important or critical events that require you to take action to correct. They are also useful for limiting network traffic that would be generated by events that might toggle between Alarm and Clear status.	These alarms remain in the Alarm View until cleared even if the condition has been cleared.
Unlatched	Unlatched alarms are useful for displaying the status of noncritical parameters or conditions that do NOT require your action to correct. Unlatched alarms can be cleared by the system when the alarm condition is no longer present.	These alarms can generate excessive network traffic if the condition is set so the at measurement noise causes the condition to rapidly transition between Alarm and Clear status.

Configuring events and alarms

To configuring events and alarms

1 From the Alarm menu, select **Configure Alarms**.

The following Alarm Setup dialog box is displayed.

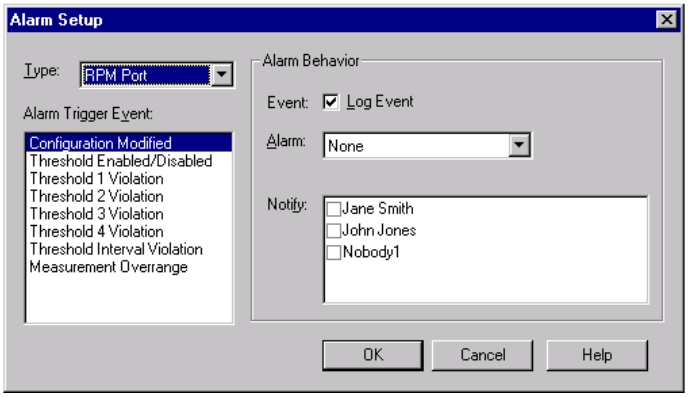

Figure 69 Alarm Setup dialog box

Table 40 Alarm Setup dialog box

Item	Description
Type	Select a device.
Alarm trigger event	Select an event.
Event	Check this box to log all events of a particular type.
Alarm	Select the alarm severity.
Notify	Check the box(es) next to the name(s) of those to be notified.

Locating source of alarms

To locate the source of alarms

1 From the Alarm List in the Main Screen, select the **alarm**.

2 From the Alarm menu, select **Locate Source**.

The device that is the source of the alarm is highlighted on the System View.

Clearing alarms

To clearing alarms

1. From the Alarm List, select an **alarm**.
2. From the Alarm menu, select **Clear**.

   OR
3. In the toolbar, click the **Clear Alarm icon**.

Clearing nodes

There are two ways to clear the node of all alarms, from the System View and from the Alarm List.

From System view

To clear a node from System view

1. In the System View, select a **Node**.
2. From the Alarm menu, select Clear **Node**.

From Alarm list

To clear a node from the Alarm list

1. In the Alarm List, right click **on an alarm**, select **Clear Node**.

Silencing alarms

The PathTrak™ Client can be configured to sound either a single or a continuous series of beeps when a new alarm occurs.

To silence alarms

1. From the Alarm menu, select **Silence Alarms**.

   OR
2. In the toolbar, click the **Silence Alarms icon**.

Enhanced Alarm view

The Enhanced Alarm View is used to view the extended data about the alarm. The Enhanced Alarm View window has a menu, toolbar, and three panes:

– Violations List
– Frequency Table
– Graph (Analysis and Performance Mode)

Toolbar

The Enhanced Alarm View's toolbar consists of five buttons that correspond with menu items. The toolbar button names and descriptions are outlined in the following table:

Figure 70 Enhanced Alarm View: toolbar

Table 41 Enhanced Alarm Viewer: toolbar icons

Icon	Name	Description
	Copy	Copies the current graph to the Windows clipboard in .wmf format. The .wmf image size is adjustable once you have it in an appropriate program.
	Export	Opens the Save As... dialog box. Enter a filename (the file extension is .csv). The default directory for files saved from this dialog box is PathTrak™\Exports.
	Properties	Opens the Properties dialog box.
	Performance	Toggles graph mode to the Performance Mode.
	Analysis	Toggles graph mode to the Analysis Mode.

Menus

The Enhanced Alarm View has seven menus across the top of the window. The following menus are outlined.

– "Graph menu" on page 107
– "View menu" on page 107

– "Trace menu" on page 107
– "Marker menu" on page 108
– "Mode menu" on page 108
– "Tools menu" on page 109
– "Help menu" on page 109

Graph menu The Graph menu items are described in the following table:

Table 42 Enhanced Alarm View: Graph menu

Name	Description
Export	Opens the Save As... dialog box. Enter a filename (the file extension is .csv). The default directory for files saved from this dialog box is PathTrak™\Exports.
Copy	Copies the current graph to the Windows clipboard in .wmf format. The .wmf image size is adjustable once you have it in an appropriate program.
Exit	Exits the Enhanced Alarm View window.

View menu The View menu items are described in the following table:

Table 43 Enhanced Alarm View: View menu

Name	Description
Thresholds	Controls the display of the thresholds on the graph.
Toolbars	Displays the Toolbars submenu.
Reset Chart Properties	Resets Chart Properties to the default values.
Properties	Opens the Properties dialog box.

Trace menu In the Performance Mode, the following menu options are enabled:

Table 44 Enhanced Alarm View: Trace menu

Name	Description
Average	Displays of the average trace.
Maximum	Displays the maximum trace.
Minimum	Displays the minimum trace.

In the Analysis Mode, the following menu options are enabled:

Table 45 Enhanced Alarm View: Trace menu

Name	Description
Relative to Threshold	Displays the Relative to Threshold trace.
% Exceeded	Displays the % Exceeded Threshold trace.
% Triggered	Displays the % Triggered Threshold trace.
% Severity	Displays the % Severity Threshold trace.

Marker menu The Marker menu items are described in the following table:

Table 46 Enhanced Alarm View: Marker menu

Name	Description
Average	Toggles the display of the average marker.
Maximum	Toggles the display of the maximum marker.
Minimum	Displays the display of the minimum marker.
% Exceeding Threshold	Toggles the display of the % exceeding threshold marker.
Threshold	Toggles the display of the threshold marker.

Mode menu The Mode menu items are described in the following table:

Table 47 Enhanced Alarm View: Mode menu

Name	Description
Performance	Toggles graph mode to the Performance mode.
Analysis	Toggles graph mode to the Analysis mode.

Tools menu

The Tools menu items are described in the following table:

Table 48 Enhanced Alarm View: Tools menu

Name	Description
Performance History	Launches the Performance History on the current port with the Start Date/Time set to the alarm date/time and the Stop Date/Time to the current date/time.
Spectrum Analyzer	Launches the Spectrum Analyzer on the appropriate port.

Help menu

The Help menu items are described in the following table:

Table 49 Enhanced Alarm View: Help menu

Name	Description
PathTrak™ Help	Displays online help topics.
About PathTrak™	Displays application information.

Violations List pane

The Violations List pane displays all the latched alarms that have occurred on the port. This feature is located on the left-side of the window. Using the buttons at the top of each list, you can sort by event type (T1, T2, T3, T4) or chronologically. When you select a new violation, the Frequency Table and Graph change to reflect the new selection.

Frequency Table pane

The Frequency Table pane is located below the Violation List pane and displays each frequency that triggered the alarm selected in the Violations List. You can sort this by frequency, level, or violation delta using the buttons at the top of each list.

Graph pane

The Graph pane shows a view of either:

– Frequency versus level (in Performance Mode)

OR

– Frequency versus severity (in Analysis Mode).

This feature occupies the right-side pane of the window. You can toggle between the graph modes using the appropriate buttons in the toolbar.

Performance Mode

The Performance Mode graph is similar to the Performance History Tool graph. This graph shows:

– Minimum level trace,
– Maximum level trace,
– Average level trace, and
– Threshold trace.

The frequency axis is scaled to show all points in the Monitoring Plan. Frequencies in violation of an upward threshold is shown crossing the threshold trace with a maximum level trace; those in violation of a downward threshold is shown crossing the threshold trace with a minimum level trace.

NOTE

You can set the properties for the Performance graph from the Performance Properties dialog box. This dialog allows you to set the start and stop frequencies displayed, as well as the scale (dB/div) and reference level step size (MHz). To access this dialog box, select Properties from the View menu.

Analysis Mode

In the Analysis Mode, the graph shows the same threshold data as in Performance Mode, but in this mode the data is compared to the Monitoring Plan parameters. This view uses four traces for analyzing the data: level relative to threshold and three percentage traces. Only one percentage trace can be displayed on the graph at a time. The three percentage traces are threshold exceeded, triggering, and severity.

Table 50 Analysis mode traces

Trace name	Description
Level Relative to Threshold	This trace shows the maximum value relative to an upward threshold and the minimum value relative to a downward threshold. The scale displayed uses zero level as the threshold level, with measured levels deviating from that in relative increments on either side of the zero trace, which is displayed in the middle of the graph.
% Threshold Exceeded	This trace shows the percentage of time that measurements for the frequency have exceeded the threshold.
% Triggering	The percent triggering trace displays the percentage of measurements exceeding the threshold compared to the count value in the monitoring plan required to trigger an alarm. If the count value is high, a high percent exceeding threshold is required to trigger an alarm.
% Severity	This trace calculates the severity of the alarm condition for a frequency based on characteristics of the threshold value and percent triggering value. Severity is always scaled so that the maximum calculated value is 100% severity.

NOTE

Peak labeling can be turned on or off from the Analysis Properties dialog box. To open this dialog, select Properties form the View menu when you are in Analysis Mode.

Viewing Enhanced Alarm information

To view the Enhanced Alarm information

1 In the System View tree hierarchy, right click **on a port**, select **Enhanced Alarm View**.

OR

2 In the Alarm List, double click an **alarm**.

OR

3 In the Alarm List, right click **on an alarm**, select **Enhanced Alarm View**.

Setting Enhanced Alarm properties

To set the Enhanced Alarm properties

1 From the View menu, select **Properties**.

The following Enhanced Alarm Properties dialog box is displayed.

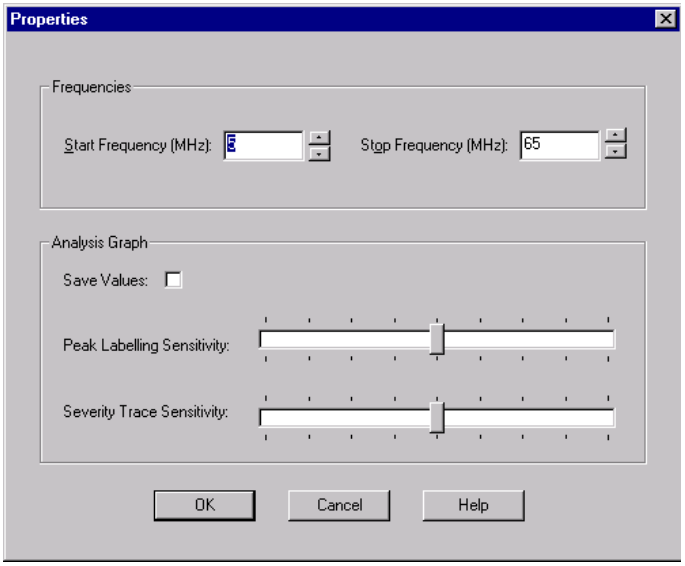

Figure 71 Enhanced Alarm Properties dialog box

2 Provide the **appropriate information** as described in Table 51 on page 113.

Table 51 Enhanced Alarm Properties dialog box

Field name	Description
Start Frequency	Sets the starting point for the range of frequencies that is displayed.
Stop Frequency	Sets the end point for the range of frequencies that is displayed.
Save Values	Check the box to save Peak Labelling Sensitivity and Severity Trace Sensitivity when the application exits.
Peak Labelling Sensitivity	Sliding this to the right increases the number of peaks that are highlighted.
Severity Trace Sensitivity	Sliding this to the right increases the sensitivity to changes in the monitoring plan. (This feature attempts to highlight problems that are found near carrier signals, assuming that your monitoring plan changes near carrier signals.)

Monitoring Plan Development

5

This chapter includes task-based instructions for developing a monitoring plan using the PathTrak™ system features. Topics discussed in this chapter include the following:

About Monitoring Plan Development

The Monitoring Plan is the foundation of successful return path monitoring. Specifically, it is a series of measurements and performance thresholds that allow you to collect, filter, measure, and analyze that data that is relevant to your cable network.

You must develop a Monitoring Plan for each RPM port during initial system setup. The same Monitoring Plan may be used for each RPM port, or you can vary the plans to anticipate ingress problems at particular frequencies. Any port can be disabled at any time which stops the monitoring process. This is useful during maintenance to minimize false alarms.

Effective Monitoring Plans are tailored through the proper use of Event Qualifiers. Event Qualifiers are generally used to filter out isolated and randomly occurring ingress and noise bursts to capture and record consistent and sustained events. The user may choose any combination of these criteria to qualify. The guidelines described in the following sections help you tailor your plan for your network.

You create a monitoring plan by adding one new measurement at a time, or by adding measurements in a series. Your needs determine the method you use, but regardless of the method, it is a good habit to always check the measurement default before creating new measurements.

Thresholds

You can specify up to 250 frequencies in the return path spectrum to measure. Frequency levels are measured by comparing the levels with threshold values you assign. Thresholds serve two purposes:

– Serve as criteria for generating alarms and events.
– Allow you to view how often and on what frequencies the levels exceed your network's optimum performance specifications during a specific time interval.

There are five types of thresholds. The first four types are regular thresholds. The fifth type is an interval threshold. You can apply any combination of the five thresholds.

Regular thresholds

The four regular thresholds are graphically displayed in the Threshold graph. These thresholds are continually checked for any event creation. Measurements that violate a threshold generate an event provided they meet requirements set by Event Qualifiers.

Interval thresholds

The Interval threshold is unique in that it only checks for violations at the end of every 15-minute archiving period. The objective is to look for patterns of signal behavior that is more meaningful than single isolated occurrences. For this purpose, data is recorded over the entire archiving period (15 minutes, for example). At the end of the archiving period, the performance data is checked against defined Interval Threshold for event generation. You set the following parameters for the Interval Threshold:

- Statistic (Minimum, Maximum, and Average)
- Interval Threshold Value
- Above/Below for each of the Regular Thresholds (i.e., The user may choose to set an event to occur in the system if the average noise floor over 15 minutes exceeds a user-set threshold.)

NOTE

JDS Uniphase Corporation recommends that you create a basic, preliminary monitoring plan which allows the system to collect data for at least 24 hours. That should provide enough data to develop a permanent monitoring plan tailored to your needs.

After establishing a permanent monitoring plan, ensure that you set alarm severity ratings for threshold violations.

Setting measurement defaults

To set measurement defaults

1. In the System View, right click on an **RPM port**, select **Monitoring Plan**.

   OR

2. In the System View, select an **RPM port** then from the Edit menu, select **Monitoring Plan**.
3. On the Measurement menu, click **New**.

4 Set the **measurement defaults** as described in Table 52 on page 118.

5 Click **OK**.

Table 52 Measurement Configuration dialog box

Field name	Description
Frequency (MHz)	This is the frequency to be measured and is not applicable to defaults.
Dwell Time (µS)	This determines how much time is spent on a single frequency measurement.
Detector Mode	This determines the mode of detection. You can choose Minimum or Maximum from the drop-down menu.
Resolution Bandwidth (kHz)	This selection defines the frequency spread around the center frequency. This can be set to 30, 300, 1000 kHz, or Auto (Auto value is 1000 kHz).
Video Bandwidth (kHz)	This is the spread around the center video frequency. This can be set to 10, 30, 100, 300, or 1000 kHz.

NOTE

Any time a new measurement is created with either the New or New Series commands, its parameters are equal to the default measurement.

NOTE

Monitoring view and Spectrum Analyzer view may look different due to Resolution and Video Bandwidth settings.

Creating a new measurement

To create one new measurement

1 In the System View, right click on an **RPM port**, select **Monitoring Plan**.

OR

2 In the System View, select an **RPM port** then from the Edit menu, select **Monitoring Plan**.

3 From the Measurement menu, select **New**.

The following Measurement Configuration dialog box is displayed.

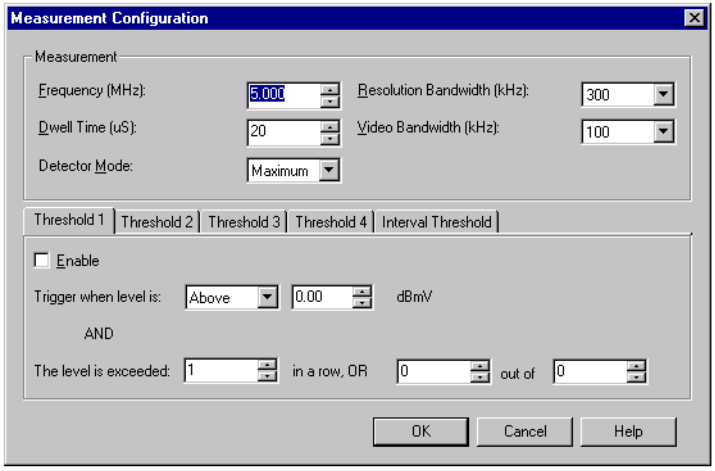

Figure 72 Measurement Configuration dialog box

4 Set the **measurement values** accordingly. Refer to Table 53 on page 119.

Table 53 Measurement Configuration dialog box

Field name	Description
Frequency (MHz)	This is the frequency to be measured and is not applicable to defaults.
Dwell Time (µS)	This determines how much time is spent on a single frequency measurement.
Detector Mode	This determines the mode of detection. You can choose Minimum or Maximum from the drop-down menu.
Resolution Bandwidth (kHz)	This selection defines the frequency spread around the center frequency. This can be set to 30, 300, 1000 kHz, or Auto (Auto value is 1000 kHz).
Video Bandwidth (kHz)	This is the spread around the center video frequency. This can be set to 10, 30, 100, 300, or 1000 kHz.

NOTE

Monitoring view and Spectrum Analyzer view may look different due to Resolution and Video Bandwidth settings.

5 Click **OK**.

Creating a new series of measurements

To create a new series of measurements

1 In the System View, right click on an **RPM port**, select **Monitoring Plan**.

OR

2 In the System View, select an **RPM port** then from the **Edit menu**, select **Monitoring Plan**.

3 On the Measurement menu, select **New Series**.

4 Set the **measurement values** as described Table 54.

5 Click **OK**.

Table 54 New Measurement Series dialog box

Field name	Description
Start Frequency (MHz)	Sets the starting point for the range of frequencies that is displayed.
Stop Frequency (MHz)	Sets the ending point for the range of frequencies that is displayed.
Step Size (MHz)	Determines the increment, in MHz, that the system steps through for the designated frequency series.

Creating a plan from performance history data

To create a monitoring plan based upon a performance history data file:

1 In the System View, right click an **RPM port**, select **Monitoring Plan**.

OR

2 In the System View, select an RPM port then from the **Edit menu**, select **Monitoring Plan**.

3 Select **Measurement** on the Monitoring Plan dialog box Menu bar.

4 Select **Create From Performance History** to display the File Selection dialog box shown in Figure 73 on page 121.

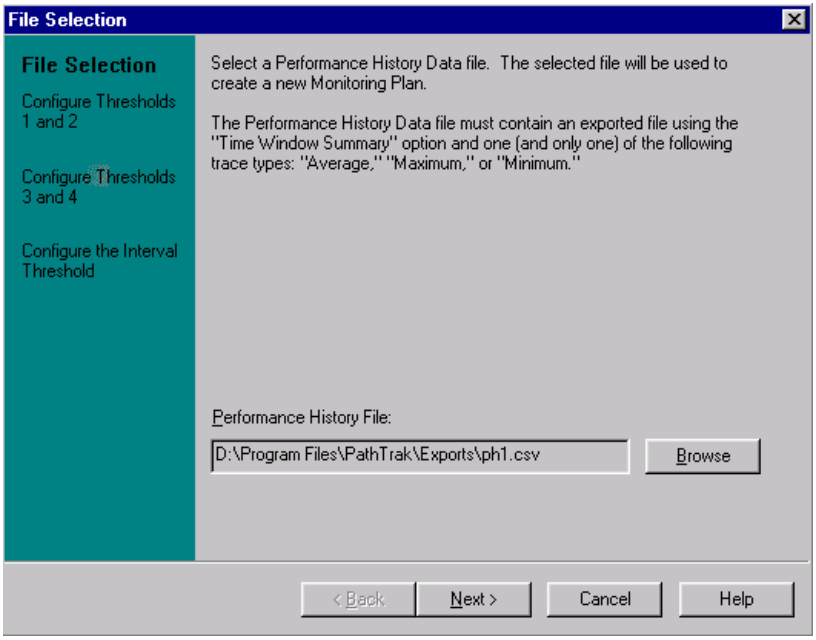

Figure 73 File Selection dialog box

5 Click **Browse** on the File Selection dialog box to locate the performance history data file (*.CSV) to be used to create the new monitoring plan.

6 Click **Next** to display the Thresholds 1&2 dialog box shown in Figure 74 on page 122.

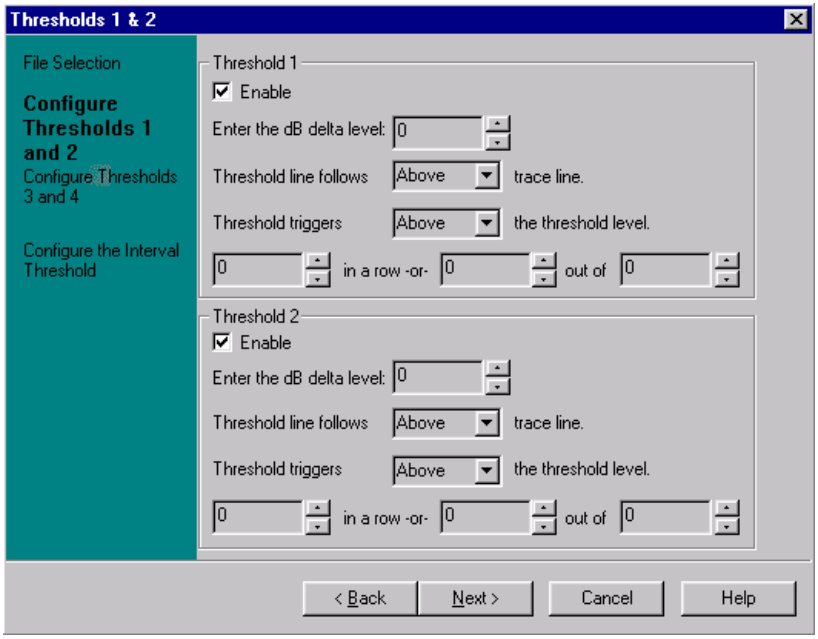

Figure 74 Thresholds 1 & 2 dialog box

7 Configure the parameters of threshold #1 (see Table 55).

8 Configure the parameters of threshold #2 in the same manner as the configuration of threshold #1, and click **Next**.

9 Configure the parameters of thresholds #3 and #4 in the same manner as the configuration of threshold #1, and click **Next**.

Table 55 Configuring a single threshold

Field Name	Description
Enable	Check box to **enable** this threshold and to open the parameters in this dialog box for configuration.
Enter the dB delta level	This determines the **distance** (from 0 to 198 dB) that the threshold line will be (above or below) from the original Performance History Data File trace line.

Table 55 Configuring a single threshold (Continued)

Field Name	Description
Threshold line follows above/below the trace line	This determines the **placement** of the new threshold line in relation to the original Performance History Data File trace line (above it or below it).
Threshold triggers above/below the threshold level	This determines the **area** in which an alarm trigger **can** occur. A measurement can exceed the threshold level by registering **above** the threshold line or by registering **below** the threshold line, as configured here. NOTE The occurrence of an alarm is also contingent upon the **frequency of occurrence** that a threshold is exceeded (as configured in the next parameter).
(#) in a row **OR** (#) out of (#)	This is **how many times** a measurement must exceed the threshold level in order to trigger an alarm.

10 On the Interval Threshold dialog box (Figure 75 on page 124), configure the interval threshold and click **Finish** to generate a new monitoring plan using your specified parameters.

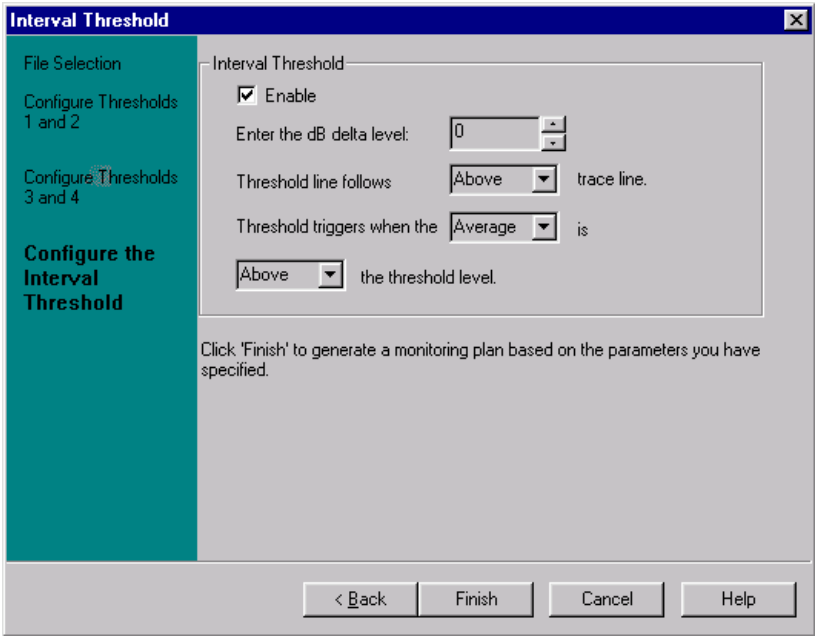

Figure 75 Interval Threshold dialog box

Changing measurements

After you have collected enough data from your initial monitoring plan, you probably need to change some of the previously established measurements. In a monitoring plan, each measurement may be configured individually or in bands. Any of the measurement values may be varied for each frequency or any bands may be skipped altogether.

To change measurements

1. In the System View, right click an **RPM port**, select **Monitoring Plan**.

   OR

2. In the System View, select an **RPM port** then from the Edit menu, select **Monitoring Plan**.
3. From the Monitoring Plan window list, select **one or more measurements**.

NOTE

Hold down the CTRL or SHIFT key while you click on a measurement to select multiple measurements.

4 From the Measurement menu, select **Edit**.

The following Measurement Configuration dialog box is displayed.

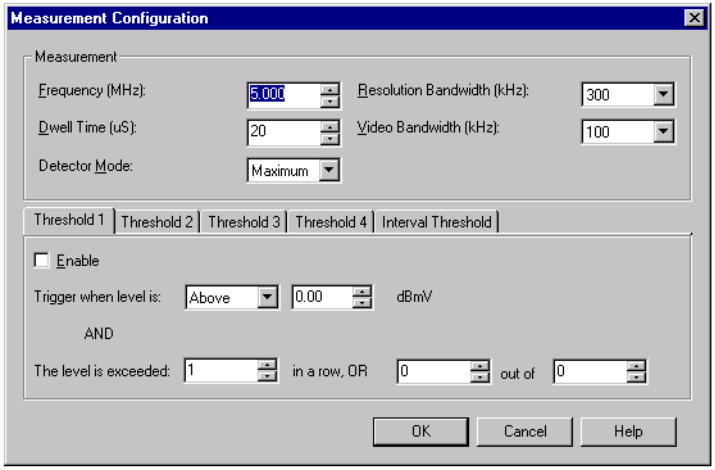

Figure 76 Measurement Configuration dialog box

5 Set the **measurement configuration** options.

6 Set the **measurement values** accordingly. Refer to Table 56.

Table 56 Measurement Configuration dialog box

Field name	Description
Frequency (MHz)	This is the frequency to be measured and is not applicable to defaults.
Dwell Time (µS)	This determines how much time is spent on a single frequency measurement.
Detector Mode	This determines the mode of detection. You can choose Minimum or Maximum from the drop-down menu.

Table 56 Measurement Configuration dialog box

Field name	Description
Resolution Bandwidth (kHz)	This selection defines the frequency spread around the center frequency. This can be set to 30, 300, 1000 kHz, or Auto (Auto value is 1000 kHz).
Video Bandwidth (kHz)	This is the spread around the center video frequency. This can be set to 10, 30, 100, 300, or 1000 kHz.

NOTE

Monitoring view and Spectrum Analyzer view may look different due to Resolution and Video Bandwidth settings.

7 To accept the changes, click **OK**.

Enabling/ disabling plan measurements

To enable/disable plan measurements

1 In the System View, select an **RPM port**.

2 From the Edit menu, select **Monitoring Plan**.

The following Monitoring Plan window for that RPM is displayed.

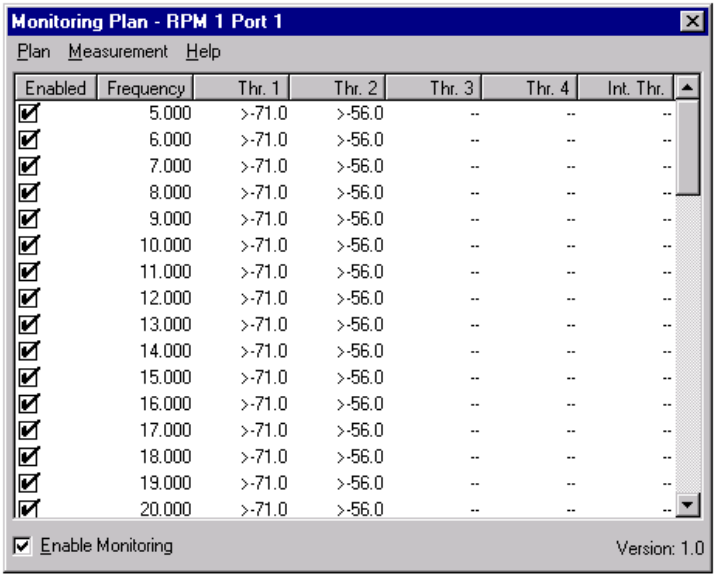

Figure 77 Monitoring Plan window

3 From the Monitoring Plan window list, select **one or more measurements**.

NOTE

Hold down the CTRL or SHIFT key while you click on a measurement to select multiple measurements.

4 On the Measurement menu, select **Enabled**.

NOTE

The box is empty when the measurement is disabled.

Deleting measurements

Measurements can be deleted individually or in bands.

To delete measurements

1 In the System View, select an **RPM port**.

2 From the Edit menu, select **Monitoring Plan**.

The Monitoring Plan window for that RPM is displayed.

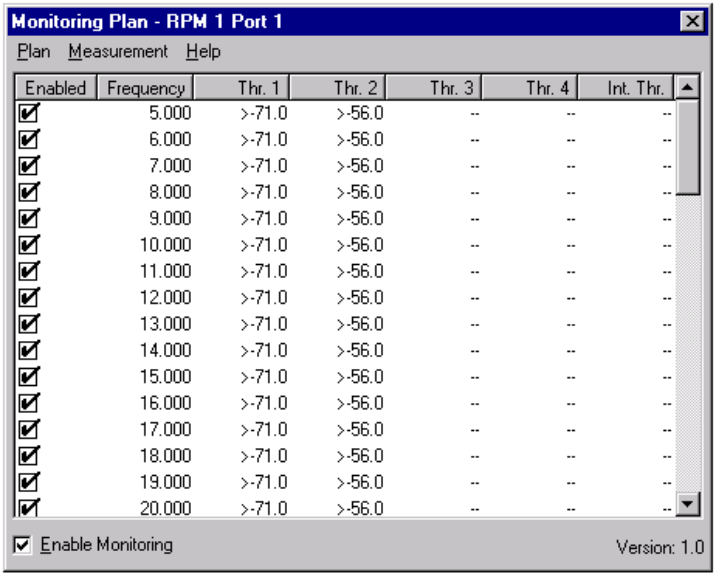

Figure 78 Monitoring Plan window example

3 From the Monitoring Plan window list, select the o**ne or more measurements**.

NOTE

Hold down the CTRL or SHIFT key while you click on a measurement to select multiple measurements.

4 On the Measurement menu, select **Delete**.

Copying monitoring plans between ports

An entire monitoring plan can be copied from one RPM port to others.

To copy monitoring plans between ports

1 In the System View, right click an **RPM port**, select **Copy Monitoring Plan**.

OR

2 In the System View select an **RPM port** then from the Edit menu, select **Copy Monitoring Plan**.

3 From System View, select **one or more ports**.

NOTE

Hold down the CTRL or SHIFT key while you click on a port to select multiple ports.

4 Either right click **on the selected ports**, select **Past Monitoring Plan**.

OR

5 In the System View select an **RPM port** then from the Edit menu, select **Past Monitoring Plan**.

6 From the Plan menu, select **Save**.

NOTE

You must save a monitoring plan before they take effect.

Importing a monitoring plan

When a single RPM port is selected, a monitoring plan can be imported to that port.

1 In the System View, right click an **RPM port**, select **Import Monitoring Plan**.

OR

2 In the System View, select an RPM port then from the **Edit menu**, select **Import Monitoring Plan**.

3 Use the Open dialog box to locate the plan you intend to import and click **Open** to import the selected plan to the selected RPM port.

Exporting a monitoring plan

When a single RPM port is selected *and* that port has a monitoring plan, the monitoring plan file can be exported for use on another port.

1 In the System View, right click an **RPM port**, select **Export Monitoring Plan**.

OR

2 In the System View, select an RPM port then from the **Edit menu**, select **Export Monitoring Plan**.

3 Use the Save As dialog box to name the plan to be exported and to select a folder to receive the exported plan. Then click **Save**.

Viewing threshold graphs

After the measurements and thresholds have been configured, PathTrak™ is able to generate a graphical representation of the monitoring plan's threshold settings.

To view threshold graphs

1 In the System View, select an **RPM port**.

2 From the Edit menu, select **Monitoring Plan**.

The Monitoring Plan window for that RPM is displayed.

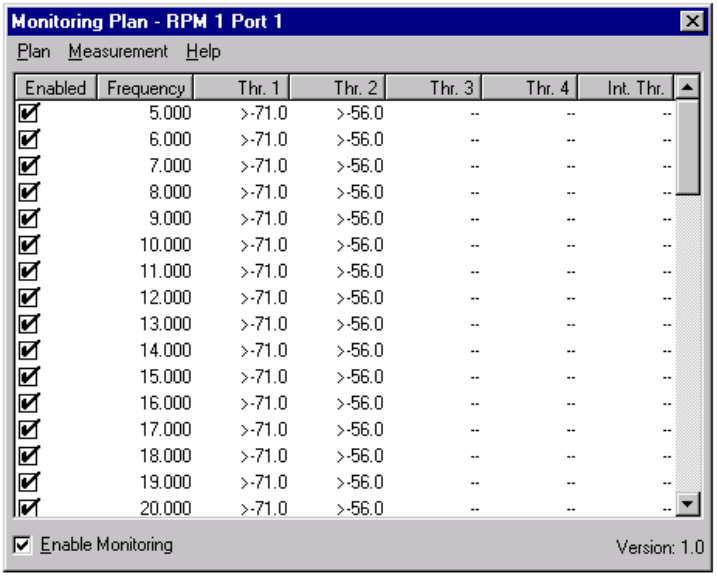

Figure 79 Monitoring Plan window example

3 From the Plan menu, select **Threshold Graph**.

4 Check the **Thresholds** you wish to view.

5 Click **Close**.

Setting monitoring plan options

Certain options and properties apply to the entire monitoring plan rather than to individual measurements. This information is located in the Options dialog box.

To set monitoring plan options

1 In the System View, select an **RPM port**.

2 From the Edit menu, select **Monitoring Plan**.

3 From the Plan menu, select **Options**.

The following Options dialog box is displayed.

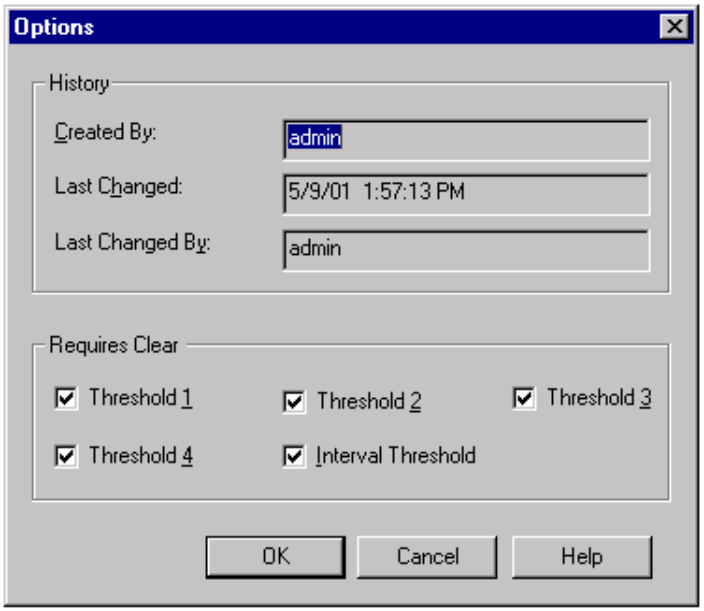

Figure 80 Options dialog box

4 Set the **Options** as described Table 57 on page 131.

Table 57 Options dialog box

Filed name	Description
History	

Table 57 Options dialog box

Filed name	Description
Created By	The user ID of the person who first created the monitoring plan.
Last Changed	The date and time the monitoring plan was last changed.
Last Changed By	The user ID of the person who last changed the monitoring plan.
Requires Clearing	
Threshold 1 - 4 and Interval Threshold	Check this box to indicate that the user should specifically clear this event/alarm associated with this threshold.

HSM Broadcast

The PathTrak™ System operator is responsible for configuring the HSM to broadcast spectrum data to the SDA or DSAM field meter. Basic configuration setup is done at initial installation; however, you perform changes to the HSM configuration as requested by the SDA or DSAM operator.

Broadcast Default Properties

Broadcast default properties are established by the system during installation and are subsequently applied to each RPM port that is added to the Broadcast List. If the default properties are changed, all RPM ports currently in the Broadcast List retain their original properties. However, all new additions to the Broadcast List are assigned the new default properties.

Setting default broadcast properties

To set the default broadcast properties

1 From the Edit menu, select **Broadcast > Default Properties**.

2 Edit the **properties**. Refer to Table 58 on page 133.

The Default Broadcast Properties dialog box contains the following field:

Table 58 Default Broadcast Properties dialog box

Item	Description
Frequency Range	This field allows you to broaden or narrow the spectrum broadcast to the SDA or DSAM receiver. The frequency ranges available are 5-45 MHz, 5-55 MHz, and 5-65 MHz.
Dwell Time	This setting determines how much time is spent on a single frequency measurement. Two settings are available: 100 and 400.
Notes	Use this field to enter any information associated RPM port.

Broadcast List

The PathTrak™ operator is responsible for adding RPM ports to the Broadcast List as requested by the SDA or DSAM operator. A maximum of four RPM ports per RPM module, with a total of 15 RPM ports per HCU, may be contained in the Broadcast List at one time. The SDA or DSAM operator provides the PathTrak™ operator with the device ID number of the desired RPM port. The PathTrak™ operator can quickly locate the desired RPM port by using the Locate Device or Locate Device By Name feature.

NOTE

Each device (HCU, HSM, RPM, and RPM port) that is contained in your PathTrak™ System is automatically assigned a unique ID number. that number is located in the General Properties dialog box.

Locating devices by ID

To locate devices by ID.

1. From the Tools menu, select **Locate Device**.
2. For the requested RPM port, enter the **Device ID number**.
3. Click **OK**.

   The selected RPM port is highlighted in the System View.
4. Once you have located the device, add it to the **Broadcast List**. Refer to “Adding ports to Broadcast List” on page 134.

Locating devices by device name

To locate devices by device name.

1. From the Tools menu, select **Locate Device By Name**.

   A “Device Search by Name“ dialog box is displayed.

2. Enter **search string**.

3. Click **Find**.

   All devices containing the search string shall be displayed.

4. Double click on **one of the listed devices** to open the device hierachy.

   The selected device is displayed, highlighted in the System View.

5. Once you have located the device, add it to the **Broadcast List**. Refer to “Adding ports to Broadcast List” on page 134.

Adding ports to Broadcast List

To add ports to the broadcast list

1. In the System View, select the **RPM port**.

2. From the Edit menu, select **Broadcast > Add**.

NOTE

Due to a limited number of RPM ports allowed in the Broadcast List, it may be necessary to remove ports from the Broadcast List in order to allow for new ports.

Removing ports from Broadcast List

To remove ports from the Broadcast List

1. In the System View, select the **RPM port**.

2. From the Edit menu, select **Broadcast > Remove**.

NOTE

You may also choose to use the Broadcast List to remove ports from the listing or to individually edit the broadcast properties of selected ports.

Viewing Broadcast List

To view the Broadcast List

1. In the System View, right click on an **HSM**, select **Broadcast List**.
   Broadcast List window is displayed.
2. To sort based on the header criterion, click **on the column header**.
3. To sort in the reverse order, click a **second time**. (Port, Started, Device ID, or Notes)

Editing Broadcast Properties

To edit the Broadcast List

1. From the Broadcast List, select the **port**.
2. Click **Edit**.
   The following HSM Broadcast Properties dialog box is displayed.

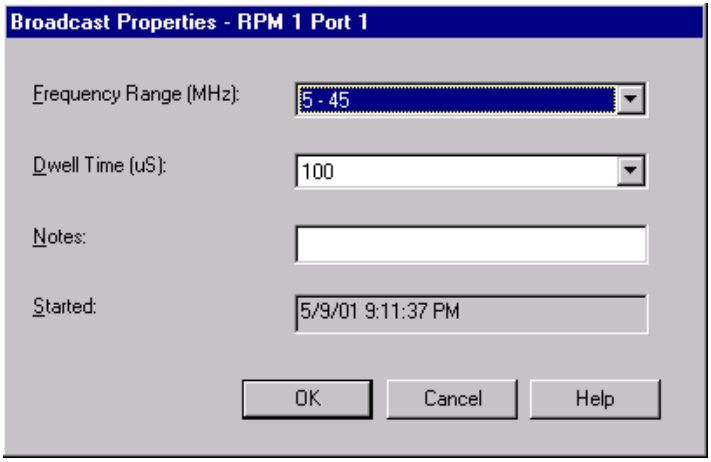

Figure 81 HSM Broadcast Properties dialog box

3. Edit **properties** as appropriate.

Monitoring View User Interface

6

This chapter includes task-based instructions using the PathTrak™ features. Topics discussed in this chapter include the following:

Monitoring View User Interface

About Monitoring View

The Monitoring View tool in the PathTrak™ System provides the user the ability to probe deeply through live data from an individual return path or simultaneously view performance of multiple return paths. The Monitoring View tool provides a passive view of the on-going monitoring process and measurements. The Monitoring View tool displays data just as it is being collected, according to the monitoring plan setup. The spectral performance of any one or multiple return paths may simultaneously be displayed on a remote PC. This occurs with minimal interruption to the monitoring process.

Main screen

The Monitoring View main screen is displayed in Figure 82.

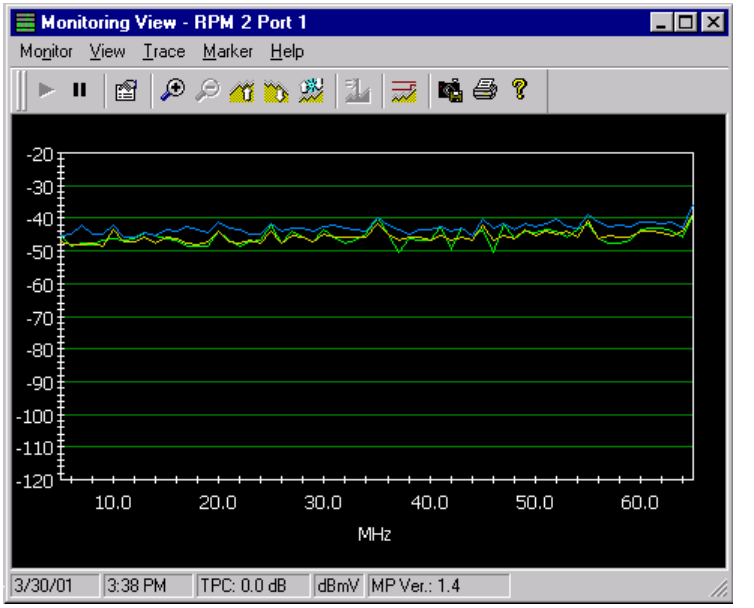

Figure 82 Monitoring View main screen

Icon toolbar

The icon toolbar provides a shortcut to many of the functions in the Monitoring View. A description of each window (from left to right) is given in Table 59:

Figure 83 Monitoring View: toolbar

Table 59 Monitoring View: toolbar icons

Icon	Name	Description
	Run	Restarts the Monitoring View.
	Pause	Stops the Monitoring View.
	Properties	Displays the Properties dialog box.
	Increase Zoom	Magnifies the viewable area of the graph.
	Decrease Zoom	Reduces the viewable area of the graph.
	Decrease Reference Level	Moves the reference level down.
	Increase Reference Level	Moves the reference level up.
	Auto Reference Level	Automatically sets the reference level.
	Center Marker	Center the marker.

Table 59 Monitoring View: toolbar icons (Continued)

Icon	Name	Description
	Display Thresholds	Displays the four regular thresholds.
	Save Snapshot	Saves a picture of the graph to Snapshot List.
	Print	Prints the Monitoring View.
	Help	Displays online help contents.

Menus

The Monitoring View provides Monitor, View, Trace, Marker, and Help menus. A description of each menu item is provided in Table 60 through Table 64.

Monitor menu

The Monitor menu items are described in the following table:

Table 60 Monitoring View: Monitor menu items

Menu item	Description
Run	Restarts the Monitoring View.
Pause	Stops the Monitoring View.
Save Snapshot...	Saves a picture of the graph to the Snapshot List.
Copy	Copies the Monitoring View and places the image on the clipboard in .wmf format.
Export...	Exports the data from the Monitoring View and saves it as a .csv file.
Start Recording...	Records the Monitoring View.
Stop Recording	Stop recording Monitoring View

Table 60 Monitoring View: Monitor menu items (Continued)

Menu item	Description
Page Setup...	Provides page setup options for printing the Monitoring View.
Print Preview...	Displays a preview of the Monitoring View.
Print	Prints the Monitoring View.
Exit	Exits the Monitoring View.

View menu The View menu items are described in the following table:

Table 61 Monitoring View: View menu items

Menu item	Description
Collapse Controls	Hides the toolbar and status bar.
Increase Zoom	Magnifies the viewable area of the graph.
Decrease Zoom	Reduces the viewable area of the graph.
Increase Ref Level	Moves the reference level up.
Decrease Ref Level	Moves the reference level down.
Auto Reference	Automatically sets the reference level.
Reset	Resets the zoom and reference level to the default setting.
Reset Chart Properties	Resets the Chart Properties to the default settings.
Thresholds	Controls the display of the thresholds on the graph. Display: Toggles the display of thresholds on and off. All: Shows all thresholds. Threshold 1 - 4 and Interval: Toggles each threshold on and off.
Toolbar	Toggles the display of the Standard toolbar and status bar on and off.
Properties	Shows the properties dialog box.

Trace menu The Trace menu items are described in the following table:

Table 62 Monitoring View: Trace menu items

Menu item	Description
Normal	Displays the Normal trace.
Average	Displays the Average trace.
Maximum Hold	Displays the Maximum Hold trace.
Reset Max Hold	Resets the Maximum Hold trace.

Marker menu The Marker menu items are described in the following table:

Table 63 Monitoring View: Marker menu items

Menu item	Description
Normal Trace	Displays Normal Trace marker.
Average Trace	Displays Average Trace marker.
Max Hold Trace	Displays Maximum Hold Trace marker.
Center Marker	Centers the marker.
Delta Marker	Displays the Delta marker. **NOTE:** The Delta marker displays the differences between the frequency and the level compared to the active marker.

Help menu The Help menu items are described in the following table:

Table 64 Monitoring View: Help menu items

Menu item	Description
Online Help	Displays online help topics.
About PathTrak™	Displays application information.

Monitoring View Operation

7

This chapter includes task-based instructions using the PathTrak™ features. Topics discussed in this chapter include the following:

Monitoring View Operation

The Monitoring View can be run using any RPM port that is both enabled and actively monitoring.

Starting Monitoring View

To start the Monitoring View

1. In the System View, select an **RPM port**.
2. From the Tools menu, select the **Monitoring View**.

   OR

3. In the toolbar, click the **Monitoring View icon**.

Stopping Monitoring View

To stop the Monitoring View

1. From the Monitor menu, select **Pause**.

   OR

2. In the toolbar, click the **Pause icon**.

Restarting Monitoring View

To restart the Monitoring View

1. From the Monitor menu, select **Run**.

   OR

2. In the toolbar, click the **Run icon**.

Quitting Monitoring View

To quit the Monitoring View

1. From the Monitor menu, select **Exit**.

Setting properties

The Monitoring View has properties that control the behavior of the graph.

To set view properties for the Monitoring View

1 From the View menu, select **Properties**.

2 To verify properties, select the **appropriate tab**.

3 To close the Properties dialog box, click **OK**.

Configuring view settings

To configure view settings

1 From the View menu, select **Properties**.

Configuring chart properties

Graph properties can be changed using the chart property editor.

To configure chart properties

1 Right click on the **chart**, select **Chart Properties**.

OR

2 To revert to the default settings, select **View menu** then select **Reset Chart Properties**.

NOTE

When using the Spectrum Analyzer, Monitoring View, the styles of the traces can only be changed when the view is in the Pause mode.

Displaying traces

The Monitoring View traces style can be displayed or hidden.

To display traces

1 From the Trace menu, select **one of the menu items** described below.

– **Normal**: Displays/hides Normal trace.
– **Average**: Displays/hides Average trace.
– **Max Hold**: Displays/hides Max Hold trace.
– **Reset Max** Hold: Resets Max Hold trace.

NOTE

At least one trace style must be selected at all times. If only one trace style is selected, it may not be deselected (until another style is selected).

Using markers

The Monitoring View provides a marker that can be set to any of the traces.

To use markers

1 From the Marker menu, select **one of the menu items** described below.

– **Normal**: Place the marker on the Normal trace.
– **Average**: Place the marker on the Average trace.
– **Max Hold**: Place the marker on the Max Hold trace.
– **Center Marker**: Place the marker in the center of the spectrum.
– **Delta Marker**: Place the marker on desired frequency.

Moving markers

To moving marker

1 To move it to a new position, **left-click and drag the marker**.

2 To set the marker in the new position, **left-click again**.

Centering markers

To center markers

1 From the Marker menu, select **Center Marker**.

The marker is centered on the displayed graph.

Printing Monitoring View graphs

To print or print preview a Monitoring View graph, you must have a default printer selected for your computer.

To print Monitoring View graphs

1 From the Monitor menu, select **Page Setup**.

2 For the printout, type a **label**.

3 From the Monitor menu, select **Print to print immediately.**

OR

4 To preview the document on screen before printing, select **Print Preview.**

Copying Monitoring View graphs

Users can copy the current graph to the Windows clipboard. The file is a .wmf format. The .wmf file size can be adjusted once the image is pasted in an appropriate program.

To copying Monitoring View graphs

1 From the Monitor menu, select **Copy.**

Exporting Monitoring View graphs

Users can export the current graph to file. The file is a .csv format.

To export Monitoring View graphs

1 From the Monitor menu, select **Export**.

The following Save As... dialog box is displayed.

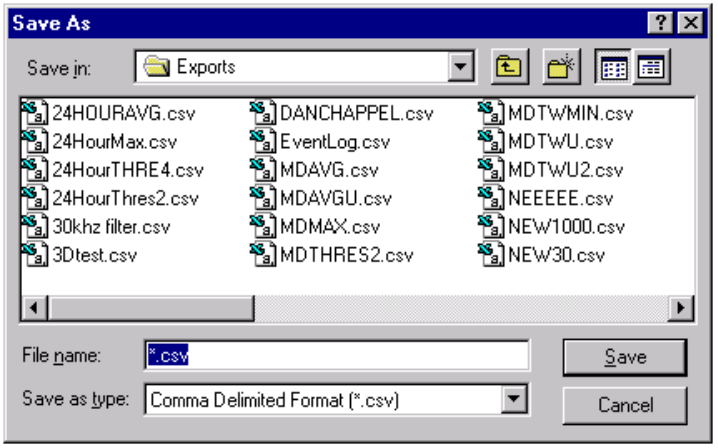

Figure 84 Save As... dialog box example

2 Type a **filename**.

3 Click **Save**.

The file is saved in the default directory, PathTrak™\Exports.

Exporting Max Hold files

The Monitoring View records maximum values to file. The information is captured every minute for each frequency. The data is stored in a format that is easily imported into spreadsheet applications.

To export Max Hold files

1 From the Monitor menu, select **Start Recording**.

The following Save As dialog box is displayed.

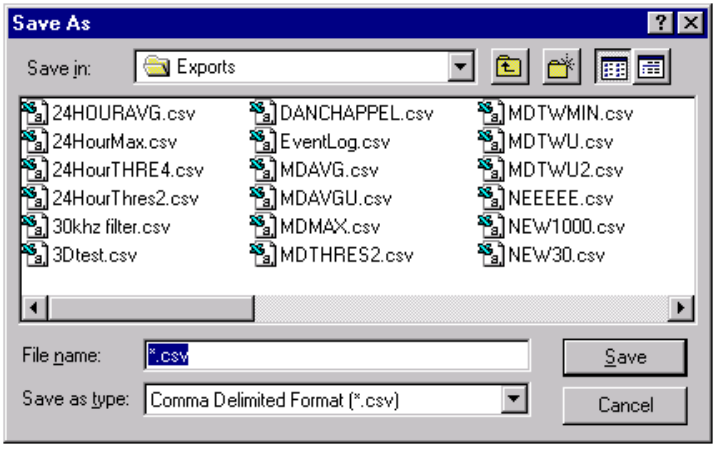

Figure 85 Save As... dialog box example

2 Enter a **file name**.

3 Click **Save**.

Maximum value of the signal over the last minute is saved to the file. This repeats every minute.

4 From the Monitor menu, select **Stop Recording**.

OR

5 Select **Pause**.

OR

6 Select **Exit**.

OR

7 Make a **change** to the Monitoring Plan.

3D Monitoring View User Interface

8

This chapter includes task-based instructions using the PathTrak™ features. Topics discussed in this chapter include the following:

3D Monitoring View

About 3D Monitoring View

The 3D Monitoring View in the PathTrak™ System provides the ability to view a graphical representation of data collected on a single RPM port or multiple RPM ports. Regardless, of the view, the 3D Monitoring View allows the user to easily compare multiple traces.

The 3D Monitoring View provides an active view of the on-going monitoring process and measurements. The 3D Monitoring View displays data as it is being collected, according to the monitoring plan setup. This occurs with minimal interruption to the monitoring process.

Main screen

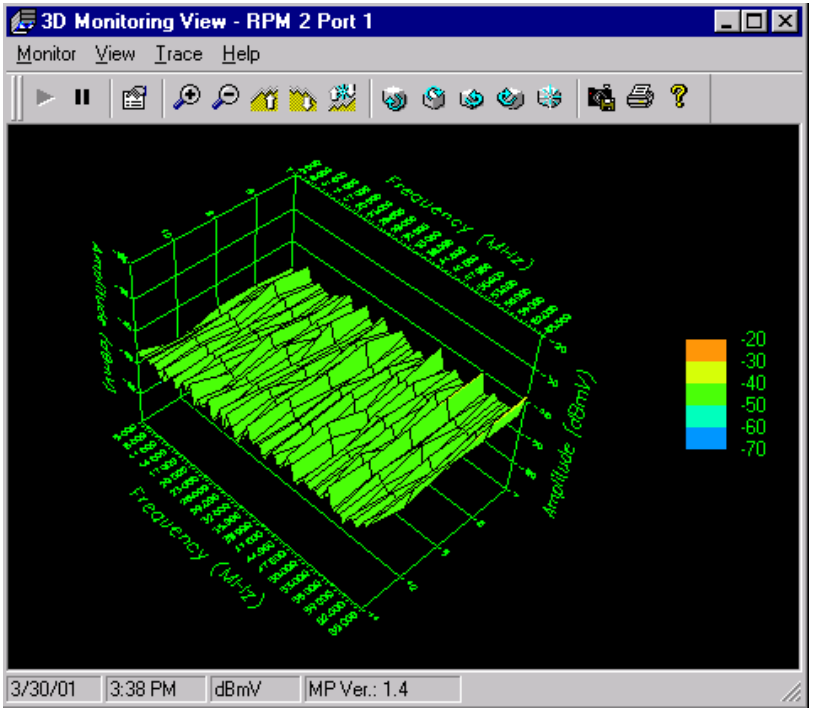

Figure 86 3D Monitoring View main screen

Icon toolbar

The icon toolbar provides a shortcut to many of the functions in the 3D Monitoring View. A description of each window (from left to right) is given in the Table 65:

NOTE

On screen, pass your mouse over an icon in the toolbar to see a label.

Figure 87 3D Monitoring View: toolbar

Table 65 3D Monitoring View: toolbar icons

Icon	Name	Description
	Run	Restarts the Monitoring View.
	Pause	Stops the Monitoring View.
	Properties	Displays the Properties dialog box.
	Increase Zoom	Magnifies the viewable area of the graph.
	Decrease Zoom	Reduces the viewable area of the graph.
	Decrease Reference Level	Moves the reference level down.
	Increase Reference Level	Moves the reference level up.
	Auto Reference Level	Automatically sets the reference level.

Table 65 3D Monitoring View: toolbar icons (Continued)

Icon	Name	Description
	Rotate Up	Rotates view up.
	Rotate Down	Rotates view down.
	Rotate Right	Rotates view right.
	Rotate Left	Rotates view left.
	Reset Orientation	Resets the view orientation.
	Save Snapshot	Saves a picture of the graph to Snapshot List.
	Print	Prints the 3D Monitoring View.
	Help	Displays online help contents.

Menus

The 3D Monitoring View provides Monitor, View, Trace, and Help menus. A description of each menu item is provided in Table 66 through Table 69.

Monitor menu

The Monitor menu items are described in the following table:

Table 66 3D Monitoring View: Monitor menu items

Menu item	Description
Run	Restarts the Monitoring View.

Table 66 3D Monitoring View: Monitor menu items

Menu item	Description
Pause	Stops the Monitoring View.
Save Snapshot...	Saves a picture of the graph to the Snapshot List.
Copy	Copies the Monitoring View and places the image on the clipboard in .wmf format.
Export...	Exports the data from the Monitoring View and saves it as a .csv file.
Page Setup...	Provides page setup options for printing the Monitoring View.
Print Preview...	Displays a preview of the Monitoring View.
Print	Prints the Monitoring View.
Exit	Exits the Monitoring View.

View menu The View menu items are described in the following table:

Table 67 3D Monitoring View: View menu items

Menu item	Description
Increase Zoom	Magnifies the viewable area of the graph.
Decrease Zoom	Reduces the viewable area of the graph.
Increase Ref Level	Moves the reference level up.
Decrease Ref Level	Moves the reference level down.
Auto Reference	Automatically sets the reference level.
Rotate Up	Rotates view up.
Rotate Down	Rotates view down.
Rotate Right	Rotates view right.
Rotate Left	Rotates view left.
Reset Orientation	Resets orientation to default setting.
Reset Zoom	Resets zoom to default setting.

Table 67 3D Monitoring View: View menu items (Continued)

Menu item	Description
Reset Chart Properties	Resets the Chart Properties to the default settings.
Thresholds	**Display**: Toggles the display of the thresholds on and off. **All**: Displays all thresholds. **Threshold 1 - 4 and Interval**: Toggles each threshold on and off.
Toolbar	Toggles the display of the Standard toolbar and status bar on and off.
Properties	Shows the properties dialog box.

Trace menu The Trace menu items are described in the following table:

Table 68 3D Monitoring View: Trace menu items

Menu item	Description
Surface	Displays all traces on a single surface graph with no space in between ribbons
Ribbon	Displays each trace as a separate ribbon.

Help menu The Help menu items are described in the following table:

Table 69 3D Monitoring View: Help menu items

Menu item	Description
Online Help	Displays online help topics.
About PathTrak™	Displays application information.

3D Monitoring View Operation

9

This chapter includes task-based instructions using the PathTrak™ features. Topics discussed in this chapter include the following:

3D Monitoring View Operation

The 3D Monitoring View can be run using any one to eight RPM ports that are both enabled and actively monitoring.

NOTE

All ports must be on the same HCU.

Starting 3D Monitoring View

To start the 3D Monitoring View

1. From the System View, select **one to eight RPM ports**.
2. On the Tools menu, select **3D Monitoring View**.

   OR
3. On the Toolbar, click the **3D Monitoring View icon**.

Stopping 3D Monitoring View

To stop 3D Monitoring View

1. From the Monitor menu, select **Pause**.

Restarting 3D Monitoring View

To restart 3D Monitoring View

1. From the Monitor menu, select **Run**.

Quitting 3D Monitoring View

To quit 3D Monitoring View

1. From the Monitor menu, select **Exit**.

Setting properties

The 3D Monitoring View has several properties that control the behavior of the graph.

To set the view properties

1. From the View menu, select **Properties**.

2 Configure the **properties** as described below:

– **Start Frequency**: Sets the beginning frequency.

– **Stop Frequency**: Sets the end frequency.

– **Number of Traces**: Number of ribbons to display on the graph at one time.

– **Range**: Range (in dB) between the lowest and highest level on the graph.

– **Ref Level Step**: Amount by which (in dB) to increase or decrease reference level.

Configuring view settings

The view settings for the 3D Monitoring View show, hide, or manipulate aspects of the 3D Monitoring View tool.

To configure the view settings

1 From the View menu, select **one of the menu items** described below.

– **Increase Zoom & Decrease Zoom**: Zooms the graph in or out.

– **Increase Ref Level & Decrease Ref Level**: Moves the reference level up or down.

– **Auto Reference**: Automatically sets the reference level to a suitable level to view the data.

– **Rotate Up, Down, Right and Left**: Rotates the graph in the chosen direction.

– **Reset Orientation**: Resets the rotation and reference level to the standard values.

– **Reset Zoom**: Resets the zoom.

– **Reset Chart Properties**: Resets the chart properties to the default settings.

– **Toolbar**: Toggles the display of the Standard toolbar and the Status Bar on and off.

– **Properties**: Shows the properties dialog.

Configuring chart properties

The 3D Monitoring View graph properties can be changed using the chart property editor.

To configure chart properties

1. Right click **on the chart**, select **Properties**.
2. To revert to the default settings select the **View menu** then select the **Reset Chart Properties**.

Setting trace style

The 3D Monitoring View's trace settings show, hide, or reset the traces.

1. From the Trace menu, select **Surface**.
2. To view the traces as separate ribbons, select the **Trace menu** then select **Ribbon**.

Printing a 3D Monitoring View graph

To print or print preview a Monitoring View graph, you must have a default printer selected for your computer.

To print Monitoring View graphs

1. From the Monitor menu, select **Page Setup**.
2. For the printout, type a **label**.
3. From the Monitor menu, select **Print to print immediately**

   OR
4. To preview the document on screen before printing, click **Print Preview**.

Copying 3D Monitoring View graphs

Users can copy the current graph to the Windows clipboard. The file is a .wmf format. The .wmf file size can be adjusted once the image is pasted in an appropriate program.

To copy 3D Monitoring View graphs

1. From the Monitor menu, select **Copy**.

Exporting 3D Monitoring View graphs

Users can export the current graph to file. The file is a .csv format.

To export 3D Monitoring View graphs

1 From the Monitor menu, select **Export**.

The following Save As... dialog box is displayed.

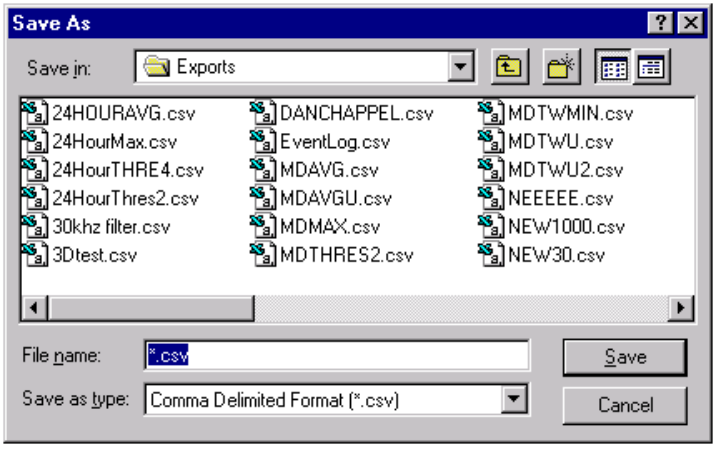

Figure 88 Save As... dialog box example

2 Type a **filename**.

3 Click **Save**.

The file is saved in the default directory, PathTrak™\Exports.

Spectrum Analyzer User Interface

10

This chapter provides user interface descriptions for the PathTrak™ Spectrum Analyzer. Topics discussed in this chapter include the following:

Spectrum Analyzer

About Spectrum Analyzer

The Spectrum Analyzer tool provides fully interactive control of measurement parameters and live display of measurement data for any one RPM port in the system. It allows the user to control all typical spectrum measurement parameters such as resolution bandwidth, dwell time, frequency range(s), etc. and displays the results in a real-time manner. This process does not stop the on-going monitoring and data collection for any RPM port.

Main Screen

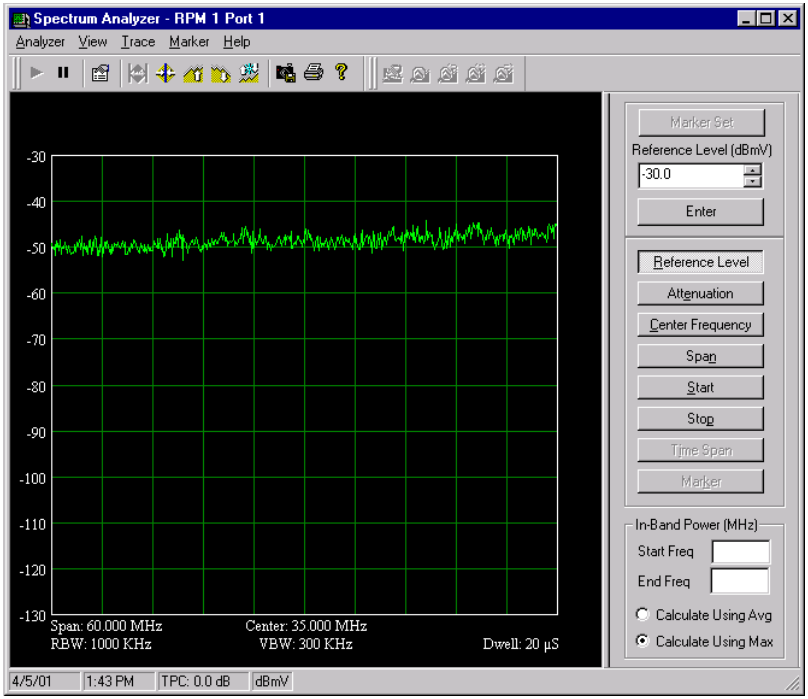

Figure 89 Spectrum Analyzer main screen

Icon toolbar

The icon toolbar provides a shortcut to many of the functions in the Monitoring View. A description of each window (from left to right) is given in the following table:

Figure 90 Spectrum Analyzer: toolbar

Table 70 Spectrum Analyzer: toolbar icons

Icon	Name	Description
	Run	Starts/Restarts the Spectrum Analyzer.
	Pause	Pauses the Spectrum Analyzer.
	Properties	Displays the Properties dialog box.
	Full Span	Sets the Spectrum Analyzer to Full Span (5-65 MHz).
	Zero Span	Sets the Spectrum Analyzer to Zero Span.
	Decrease Reference Level	Moves the reference level up.
	Increase Reference Level	Moves the reference level down.
	Auto Reference Level	Automatically sets the reference level.
	Save Snapshots	Takes a picture and saves it to the Snapshots List.
	Print	Prints the screen.

Table 70 Spectrum Analyzer: toolbar icons (Continued)

Icon	Name	Description
	Help Contents	Displays online help topics.
	Center Markers	Center the Marker on the graph.
	Peak Search	Finds the maximum amplitude of the trace that is above the Peak search threshold.
	Find Next Peak	Finds the maximum amplitude of the trace that is above the Peak Search Threshold and is less than the current marker amplitude.
	Next Peak Left	Finds the maximum amplitude of the trace that is above the Peak Search Threshold, is less than the current marker amplitude and is to the left of current marker.
	Next Peak Right	Finds the maximum amplitude of the trace that is above the Peak Search Threshold, is less than the current marker amplitude and is to the right of current marker.

Control panel

The control panel is located on the right-side of the Spectrum Analyzer main screen. The controls are described in the following table:

Table 71 Control Panel descriptions

Control name	Description
Marker Set	Sets the Marker to the value displayed in the editable box of selected control (Reference Level, Center Frequency, Span, Start, Stop, etc.). **NOTE:** Marker must be active.
Editable Text Box	Provides value of selected control (Reference Level, Center Frequency, Span, Start, Stop, etc.).

Table 71 Control Panel descriptions

Control name	Description
Enter	Enters the value.
Reference Level	Indicates the reference level (value of the graph's top line).
Attenuation	Indicates the attenuation level.
Center Frequency	Indicates Center frequency of the Spectrum Analyzer graph.
Span	Indicates the span of the Spectrum Analyzer graph.
Start	Indicates start frequency of the Spectrum Analyzer graph.
Stop	Indicates stop frequency of the Spectrum Analyzer graph.
Time Span	Indicates the time span of the Spectrum Analyzer graph. **NOTE:** Available only in Zero Span mode. See "**NOTE: Zero Span".**
Marker	Indicates the frequency to place the marker at.
In-Band Power (MHz)	**Start Frequency**: Indicates the start frequency for In-Band Power. **End Frequency**: Indicates the End Frequency for In-Band Power. **Calculate using Avg**: Click to indicate that the Average Trace is being graphed. **Calculate using Max**: Click to indicate the Maximum Trace is being graphed.

NOTE: Zero Span

Zero Span mode of operation shows signal variation over time at a single frequency. The Zero Span View, also called Oscilloscope mode, provides menus that enable the user to manipulate the display.

Menus

The Spectrum Analyzer View provides Analyzer, View, Trace, Marker, and Help menus. A description of each menu item is provided in Table 72 through Table 76.

Analyzer menu

The Analyzer menu items are described in the following table:

Table 72 Spectrum Analyzer: Analyzer menu items

Menu item	Description
Run	Starts/Restarts the Spectrum Analyzer.
Pause	Stops the Spectrum Analyzer.
Save Snapshot...	Takes and picture and saves it to the Snapshots List.
Copy	Copies the graph to the clipboard (.wmf format).
Export...	Exports the graph as a .csv file.
Page Setup...	Provides page setup options for printing the Spectrum Analyzer graph.
Print Preview...	Displays a preview of the Spectrum Analyzer graph.
Print	Prints the Spectrum Analyzer graph.
Single Sweep	Displays only one sweep at a time. To repeat, click **Run**.
Continuous Sweep	Displays a continuous sweep.
Exit	Exits the Spectrum Analyzer graph.

View menu

The View menu items are described in the following table:

Table 73 Spectrum Analyzer: View menu items

Menu item	Description
Full Span	Sets the Spectrum Analyzer to Full Span (5-65 MHz).
Zero Span	Sets the Spectrum Analyzer to Zero Span.

Table 73 Spectrum Analyzer: View menu items

Menu item	Description
Increase Ref Level	Moves the reference level down.
Decrease Ref Level	Moves the reference level up.
Auto Reference	Automatically sets the reference level.
Reset Chart Properties	Resets the Chart Properties.
Toolbars	Toggles the display of the Standard, Markers, and Controls toolbars as well as the Status Bar on and off.
Properties	Displays the Properties dialog.

Trace menu The Trace menu items are described in the following table:

Table 74 Spectrum Analyzer: Trace menu

Menu item	Description
Normal	Displays the Normal trace.
Average	Displays the Average trace.
Maximum Hold	Displays the Minimum Hold trace.
Minimum Hold	Displays the Maximum Hold trace.
Trace Reset Max	Resets the Maximum Hold trace
Trace Reset Max	Resets the Minimum Hold trace

Marker menu The Marker menu items are described in the following table:

Table 75 Spectrum Analyzer: Marker menu items

Menu item	Description
Peak Search	Finds the maximum amplitude of the trace that is above the Peak search threshold.

Table 75 Spectrum Analyzer: Marker menu items

Menu item	Description
Find Next Peak	Finds the maximum amplitude of the trace that is above the Peak Search Threshold and is less than the current marker amplitude.
Next Peak Right	Finds the maximum amplitude of the trace that is above the Peak Search Threshold, is less than the current marker amplitude and is to the right of current marker.
Next Peak Left	Finds the maximum amplitude of the trace that is above the Peak Search Threshold, is less than the current marker amplitude and is to the left of current marker.
Normal Trace	Displays Normal Trace marker.
Average Trace	Displays Average Trace marker.
Max Hold Trace	Displays Maximum Hold Trace marker.
Min Hold Trace	Displays Minimum Hold Trace marker.
Delta	Displays the Delta marker. **NOTE:** The Delta marker displays the differences between the frequency and the level compared to the active marker.
Center Marker(s)	Centers the marker.
Marker Set	Sets marker to: – Center Frequency, – Reference Level, – Start Frequency, and – Stop Frequency.

Help menu The Help menus items are outline in the following table:

Table 76 Spectrum Analyzer: Help menus items

Menu item	Description
Online Help	Displays online help topics.
About PathTrak™	Displays application information.

Spectrum Analyzer Operation

11

This chapter includes task-based instructions for operation of the PathTrak™ Spectrum Analyzer. Topics discussed in this chapter include the following:

Spectrum Analyzer

The Spectrum Analyzer can be run using any RPM port that is enabled.

To start the Spectrum Analyzer

1. From the System View, select an **RPM port**.
2. From the Tools menu, select the **Spectrum Analyzer**.

   OR

3. In the toolbar, click the **Spectrum Analyzer icon**.

NOTE:

Monitoring view and Spectrum Analyzer view may look different due to Resolution and Video Bandwidth settings.

NOTE:

When using the Spectrum Analyzer the styles of the traces can only be changed when the view is in the Pause mode.

Stopping Spectrum Analyzer

To stop Spectrum Analyzer

1. From the Analyzer menu, select **Pause**.

Restarting Spectrum Analyzer

To restart Spectrum Analyzer

1. From the Analyzer menu, select **Run**.

Quitting Spectrum Analyzer

To quit Spectrum Analyzer

1. From the Analyzer menu, select **Exit**.

Setting properties

The Spectrum Analyzer has several properties that control the behavior of the graph.

To set the view properties

1. From the View menu, select **Properties**.
2. Configure the **properties** as described in Table 77 on page 173.

Table 77 View Properties tab descriptions

Tab	Field name	Description
Graph		
	Level Units	Sets the units of measure for the energy levels displayed on the graph.
	Trace Average count	The number of traces averaged to form the average trace point. (For example, if this value is set to 10, the Monitoring View averages the past 10 normal traces to draw the average trace.)
	Scale (dB/div)	The distance between the Y-axis divisions on the Monitoring View graph.
Step Size		
	Reference Level (dB)	The distance that the graph travels when the Increase Reference Level or Decrease Reference Level commands are invoked. Also, sets the step for the spin control in the Control panel.
	Center Frequency (MHz)	Sets the step for the center frequency Control Panel.
	Span (MHz)	Sets the step for the span in the Control Panel.
	Start Frequency (MHz)	Sets the start frequency in the Control Panel.
	Stop Frequency (MHz)	Sets the stop frequency in the Control Panel.
	Time Span (µS)	Sets the Time Span in the Control Panel.
	Marker (MHz)	Sets the Marker in the Control Panel.
Markers		
	Peak Search Threshold (dBmV)	The level below which the Peak Search, Find Next Peak, Next Peak Right, and Next Peak Left commands stops looking for peaks.

Table 77 View Properties tab descriptions (Continued)

Tab	Field name	Description
	Marker Style	Set the marker to either a vertical line or a large dot.
Measure-ment		
	Detector Mode	Determines the mode of detection during dwell. Choose either Maximum or Minimum.
	Resolution Bandwidth	Defines the frequency the frequency spread around the center frequency. This can be set at 30, 300, 1000 kHz, or Auto (Default Setting = 1000 kHz).
	Video Bandwidth	Defines the frequency the frequency spread around the center video frequency. This can be set at 10, 30, 100, 300, 1000 kHz, or Auto.
	Dwell Time	Determines how much time is spent on a single frequency measurement. This can be set from 0 sec to 0.1 sec. This is also known as Measurement Time.
Zero Span		
	Trigger Method	Defines the method by which the Spectrum Analyzer is triggered when it is in zero span mode. Choose Auto, Level, Rising, or Falling.
	Trigger Level	Determines the level at which the Spectrum Analyzer waits after it is triggered when it is in zero span mode.
	Trigger Delay	Sets the delay in microseconds that the Spectrum Analyzer waits after it is triggered before displaying data.

NOTE: Zero Span

Zero Span mode displays signal variation over time at a single specified frequency. The Zero Span View is similar to operating a Oscilloscope. If triggering is set properly, Zero Span can be used to analyze the signal characteristic (AM, FM, or Noise under a Modem Carrier) of a specified frequency.

Configuring the Spectrum Analyzer

The Control tools are located on the Spectrum Analyzer main screen, to the right of the graph area.

To configure the Spectrum Analyzer

1. Click on the appropriate button, either **Reference Level, Attenuation, Center Frequency, Span, Start Frequency, Stop Frequency, Time Span, or Marker**.

   The current value for this parameter is displayed in the edit box.

   A trace setting must be selected from the Marker menu in order to view the Marker value.
2. Type a **new value** into the edit box.
3. To set the new value, click **Enter**.

   OR
4. To set the parameters of either the Center Frequency, Reference Level, Start Frequency, or Stop Frequency to that of the selected marker, click **Marker Set**.
5. To change the start and end frequencies of In-Band Power measurement, type **new values** in the edit boxes provided.
6. Press **Enter**.

Configuring view settings

The Spectrum Analyzer's view settings show, hide, or manipulate aspects of the Spectrum Analyzer tool.

To configuring the view settings

1. From the View menu, select a **menu item**. (Table 78)

Table 78 Spectrum Analyzer: View menu

Menu item	Description
Full Span	Sets the Spectrum Analyzer to Full Span (5-65 MHz).
Zero Span	Sets the Spectrum Analyzer to Zero Span.
Increase Ref Level	Moves the reference level down.

Table 78 Spectrum Analyzer: View menu

Menu item	Description
Decrease Ref Level	Moves the reference level up.
Auto Reference	Automatically sets the reference level.
Reset Chart Properties	Resets the Chart Properties.
Toolbars	Toggles the display of the Standard, Markers, and Controls toolbars as well as the Status Bar on and off.
Properties	Displays the Properties dialog.

NOTE: Zero Span

Zero Span mode displays signal variation over time at a single specified frequency. The Zero Span View is similar to operating a Oscilloscope. If triggering is set properly, Zero Span can be used to analyze the signal characteristic (AM, FM, or Noise under a Modem Carrier) of a specified frequency. (Refer to Table 78 for trigger info.)

Configuring chart properties

The graph properties can be changed using the chart property editor.

To configure chart properties

1 Right click **on the chart**.

The following 2D Chart Properties window is displayed.

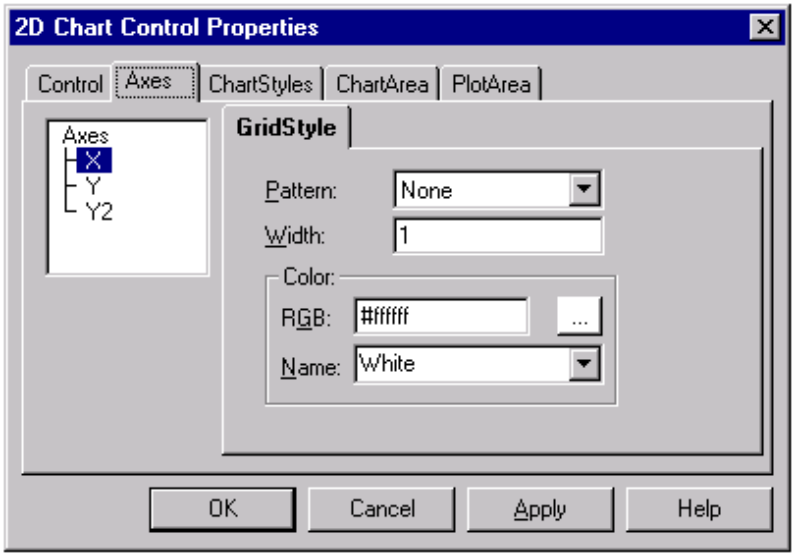

Figure 91 2D Chart properties window

2 To revert to the default settings, select the **View menu** then select the **Reset Chart Properties**.

NOTE:

When using the Spectrum Analyzer, Monitoring View, the styles of the traces can only be changed when the view is in the Pause mode.

Setting sweep style

The Spectrum Analyzer can display traces either continuously or one at a time.

To set sweep style

1 To view the traces continually, select the **Analyzer menu** then select **Continuous Sweep**.

2 To view the traces one at a time select the **Analyzer menu** then select **Single Sweep**.

Displaying traces

The Spectrum Analyzer's traces can be shown or hidden.

To display traces

1 From the Trace menu, select **one of the menu items** described below.

– **Normal**: Displays/hides Normal (live) trace.
– **Average**: Displays/hides Average trace.
– **Min Hold**: Displays/hides Min Hold trace.
– **Max Hold**: Displays/hides Max Hold trace.
– **Reset Min Hold**: Resets Min Hold trace.
– **Reset Max Hold**: Resets Max Hold trace.

NOTE:

At least one trace style must be selected at all times. If only one trace style is selected, it may not be deselected (until another style is selected).

Using markers

To use markers

From the Marker menu select **one of the menus** described in Table 79.

Table 79 Spectrum Analyzer Marker menu

Menu item	Description
Peak Search	Finds the maximum amplitude of the trace that is above the Peak search threshold.
Find Next Peak	Finds the maximum amplitude of the trace that is above the Peak Search Threshold and is less than the current marker amplitude.
Next Peak Right	Finds the maximum amplitude of the trace that is above the Peak Search Threshold, is less than the current marker amplitude and is to the right of current marker.

Table 79 Spectrum Analyzer Marker menu

Menu item	Description
Next Peak Left	Finds the maximum amplitude of the trace that is above the Peak Search Threshold, is less than the current marker amplitude and is to the left of current marker.
Normal Trace	Displays Normal (Live) Trace marker.
Average Trace	Displays Average Trace marker.
Max Hold Trace	Displays Maximum Hold Trace marker.
Min Hold Trace	Displays Minimum Hold Trace marker.
Delta	Displays the Delta marker. **NOTE:** The Delta marker displays the differences between the frequency and the level compared to the active marker.
Center Marker(s)	Centers the marker.
Marker Set	Sets marker to: – Center Frequency, – Reference Level, – Start Frequency, and – Stop Frequency.

Centering markers

To center markers

1 From the Marker menu, select **Center Marker**.

The marker is centered on the displayed graph.

Setting parameters to markers' locations

To set parameters to markers' locations

1 In the control panel, click **Marker**.

The text on the control panel edit dialog box displays Marker.

2 To place the marker at a set frequency, enter the **frequency**.

3 Press **Enter**.

The marker is moved to the new frequency location.

Using In-Band Power (MHz)

The In-Band Power measurement calculates integrated power using Average or Maximum trace over two specified frequencies. The In-Band Power measurement will display when the resolution bandwidth is set at 300 KHz, the Average or Maximum trace is being displayed, and the span is greater than 1.5 MHz. The level of the measured signal is displayed in the top of the graph. The start and end frequencies of the level measurement are displayed in the side controls. Refer to "Setting properties" on page 173.

NOTE:

The Calculating using Average or Maximum options in In-Band Power area of the Control Panel needs to reflect the trace displayed (either Average or Maximum).

The frequency range of In-Band power measurement can be changed in two ways.

To use In-Band Power

1 While holding the **SHIFT key**, **click and drag over the graph**.

A rectangular region forms over the chart that indicates the region of measurement. Start and End Frequencies in the Control Panel are updated. The In Band Power value is displayed above the graph's top right corner.

OR

2 In the In-Band Power measurement edit boxes provided in the Control Panel, type new **Start and End Frequencies**.

3 Click **Enter**.

4 To verify current value in the Control Panel edit box, click on the appropriate button **Reference Level, Center Frequency, Span, Start Frequency, Stop Frequency, or Time Span**.

NOTE:

When the Start and End frequencies of traces are changed using the buttons provided in the side controls, In-Band Power Start and End Frequencies are modified to always remain within the frequency range of the displayed signal. The In-Band Power measurement is only enabled when the resolution bandwidth is set to 300 kHz.

Printing a Spectrum Analyzer graph

To print a Spectrum Analyzer graph

1. From the Analyzer menu, select **Page Setup**.
2. For the printout, type a label.
3. From the Analyzer menu, select **Print to print immediately**.

   OR
4. To preview the document on screen before printing, select **Print Preview**.

Copying a Spectrum Analyzer graph

To copy a Spectrum Analyzer graph

1. From the Analyzer menu, select **Copy**.

Exporting a Spectrum Analyzer graph

To export a Spectrum Analyzer graph

1. From the Analyzer menu, select **Export**.

   The Save As... dialog box is displayed.

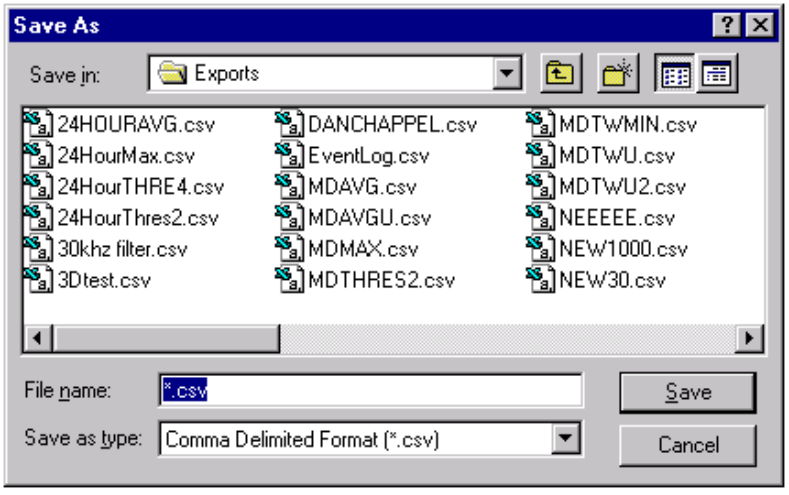

Figure 92 Save As... dialog box example

2. Type a **filename**.

3 Click **Save**.

The file is saved in the default directory, PathTrak™\Exports.

Performance Archiving and Analysis Tools

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This chapter describes performance history data archiving. During the monitoring process, PathTrak™ collects and archives data. The goal of archiving is to allow the user to extract key information from the data. Topics discussed in this chapter include the following:

Statistical summarizing

PathTrak™ stores the following statistical characteristics for each monitored frequency over the base archive interval, which is 15 minutes. The top of the hour marks the beginning of the archive period and then subsequently at 15 minute, 30 minute, and 45 minute marks. As raw data is collected, it is converted to the seven key statistics (Max, Min, Ave, and Thresholds 1-4). At the end of the archive interval, the key statistics are stored as a single file on the HCU hard drive.

Table 80 Archiving levels

Item	Description
Maximum level	This is the highest level measured during the archive interval.
Average level	This is the mean of all levels measured during the archive interval.
Minimum level	This is the lowest level measured during the archive interval.
% of Measure-ments over each of four thresholds	This records fractions of measurements over each of the thresholds during the archive interval.

Data compression

To further reduce the required data storage space (increase storage capacity), PathTrak™ uses a compression technique. The basic idea is that the older the data, the less the time resolution.

The following steps outline the archiving scheme.

Table 81 Archiving scheme

Item	Description
Days 1 - 31	Performance history data is stored for the base archive interval of 15 minutes. During this period, the user can access any 15-minute summary.

Table 81 Archiving scheme

Item	Description
Days 32 - 365	Performance history data is compressed into daily summaries. All 15-minute summaries within a 24-hour period are automatically combined to provide a single-day summary of performance. The user can process any single-day summary during this period. The 15-minute summaries can no longer be accessed.

the same performance statistics are kept through all summaries. All data is stored on the HCU hard drive. The system stores on year's worth of performance data independent of user-set parameters or the number of RPM ports in the system. At the end of one year, the system begins top delete the oldest files and write new data over it.

About Performance History Tool

The user can recall any od the archived performance history data according to user interests. PathTrak™ provides pre-defined base graphing tools to make the recalling quick, easy and flexible. The graphing tools display results through powerful 2D and 3D views.

Types of performance history graphs include:

– Time Window Summary Performance History
– One Frequency Time Window Performance History
– Time Window Detail Performance History
– 24 Hour Performance History
– Multi Day Performance History
– Multi Day Time Window Performance History

User Interface

The User Interface consists of the following components:

Icon toolbar

The icon toolbar provides a shortcut to many of the functions in the Performance History. A description of each window (from left to right) is given in the Table 82 on page 186:

Table 82 Performance History: toolbar icons

Icon	Name	Description
	New Graph	Creates new Performance History graph.
	Properties	Displays the Properties dialog box.
	Increase Zoom	Magnifies the viewable area of the graph.
	Decrease Zoom	Reduces the viewable area of the graph.
	Decrease Reference Level	Moves the reference level down.
	Increase Reference Level	Moves the reference level up.
	Auto Reference Level	Automatically sets the reference level.
	Center Marker	Center the marker.

Table 82 Performance History: toolbar icons (Continued)

Icon	Name	Description
	Display Thresholds	Displays the four regular thresholds.
	Rotate Up	Rotates view up.
	Rotate Down	Rotates view down.
	Rotate Right	Rotates view right.
	Rotate Left	Rotates view left.
	Reset Orientation	Resets the view orientation.
	Print	Prints the 3D Monitoring View.
	Help	Displays online help contents.

Menus

The following Performance History menus are available.

- “Graph menu” on page 187
- “View menu” on page 188
- “Marker menu” on page 189
- “Help menu” on page 190

Graph menu

The Graph menu items are described in the following table:

Table 83 Performance History: Graph menu

Field name	Description
Graph Property	Type: Sets the type of graph. Frequency: Sets the frequency for the one frequency graph.
Time Property	Start Date & Start Time: Sets the start date and time for the graph. End Date & End Time: Sets the End date and time for the graph.
Increment	Set the precision of the graph along the time axis.
Up to the Second	Check this option to allow for up to the second performance history results. Selecting this option grays out the End Date and End time fields. The query uses the current date and time. ***Example***: I f you request data at 12:03 and select this option, you receive data from 12:00 to 12:03. PathTrak™ archives every 15 minutes. This feature allows you to view data not otherwise archived for monitoring purposes.
Statistics Property	**Average**: Plots the average amplitude value for the given frequency and time span. **Maximum**: Plots the maximum amplitude value for the given frequency and time span. **Minimum**: Plots the minimum amplitude value for the given frequency and time span. **% Measurements Exceeding Thresholds 1 - 4**: Check one or more of these options. Plots the percentage of all measurements for the frequency and time span that have exceeded the threshold.

View menu The View menu items are described in the following table:

Table 84 Performance History: View menu

Menu item	Description
Increase Zoom	Magnifies the viewable area of the graph.
Decrease Zoom	Reduces the viewable area of the graph.

Table 84 Performance History: View menu

Menu item	Description
Reset Zoom	Resets zoom to default setting.
Increase Ref Level	Moves the reference level up.
Decrease Ref Level	Moves the reference level down.
Auto Reference	Automatically sets the reference level.
Rotate Up	Rotates view up.
Rotate Down	Rotates view down.
Rotate Right	Rotates view right.
Rotate Left	Rotates view left.
Reset Orientation	Resets orientation to default setting.
Reset Chart Properties	Resets the Chart Properties to the default settings.
Toolbar	Toggles the display of the Standard toolbar and status bar on and off.
Properties	Shows the properties dialog box.
Thresholds	Controls the display of the thresholds on the graph. **Display**: Toggles the display of thresholds on and off. **All**: Shows all thresholds. **Threshold 1 - 4 and Interval**: Toggles each threshold on and off.

Marker menu The Marker menu items are described in the following table:

Table 85 Performance History: Marker menu

Menu item	Description
Average Trace	Displays average trace.
Maximum Trace	Displays maximum trace.
Minimum Trace	Displays minimum trace.

Table 85 Performance History: Marker menu

Menu item	Description
Threshold 1	Displays the percentage of time threshold 1 hold level was exceeded.
Threshold 2	Displays the percentage of time threshold 2 hold level was exceeded.
Threshold 3	Displays the percentage of time threshold 3 hold level was exceeded.
Threshold 4	Displays the percentage of time threshold 4 hold level was exceeded.
Center Marker	Centers the marker.
Delta Marker	Displays the Delta marker. **NOTE:** The Delta marker displays the differences between the frequency and the level compared to the active marker.

Help menu The Help menu items are described in the following table:

Table 86 Performance History Help menu

Menu item	Description
Online Help	Displays the online help topics.
About PathTrak™	Displays application information.

Performing User Interface functions

The section provides instructional steps to perform the following User Interface functions:

– “Starting Performance History Tool” on page 191
– “Setting the view properties” on page 192
– “Configuring the view settings” on page 193
– “Configuring the chart properties” on page 194
– “Using markers” on page 195

Starting Performance History Tool

The Monitoring View can be run using any RPM port that is both enabled and actively monitoring.

To start the Monitoring View

1. In the System View, select an **RPM port**.
2. From the Tools menu, select **Performance History**.

   OR
3. On the toolbar, click the **Performance History icon**.

   The following New Graph dialog box is displayed.

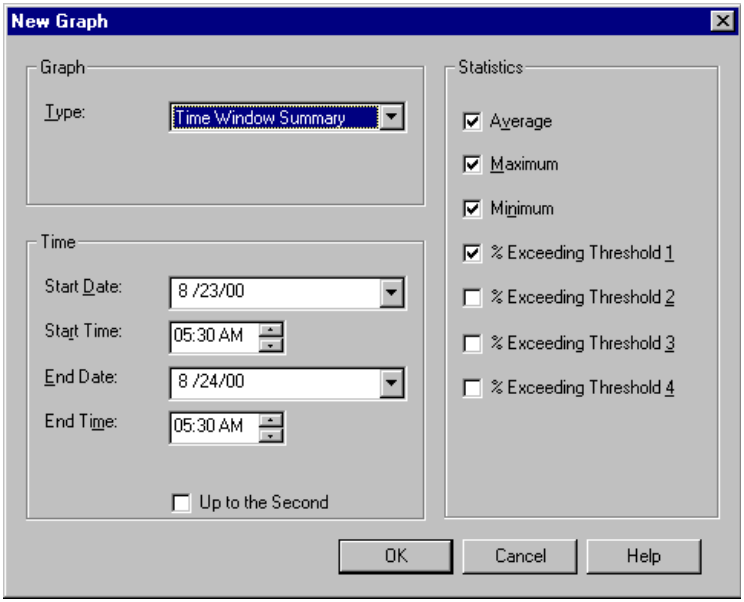

Figure 93 New Graph dialog box

4. Provide **information** as described in Table 87 on page 192.

Table 87 New Graph dialog box

Field name	Description
Graph Property	Type: Sets the type of graph. Frequency: Sets the frequency for the one frequency graph.
Time Property	Start Date & Start Time: Sets the start date and time for the graph. End Date & End Time: Sets the End date and time for the graph.
Increment	Set the precision of the graph along the time axis.
Up to the Second	Check this option to allow for up to the second performance history results. Selecting this option grays out the End Date and End time fields. The query uses the current date and time. **Example**: I f you request data at 12:03 and select this option, you receive data from 12:00 to 12:03. PathTrak™ archives every 15 minutes. This feature allows you to view data not otherwise archived for monitoring purposes.
Statistics Property	**Average**: Plots the average amplitude value for the given frequency and time span. **Maximum**: Plots the maximum amplitude value for the given frequency and time span. **Minimum**: Plots the minimum amplitude value for the given frequency and time span. **% Measurements Exceeding Thresholds 1 - 4**: Check one or more of these options. Plots the percentage of all measurements for the frequency and time span that have exceeded the threshold.

NOTE:

The Time Window Summary and the One Frequency Time Window graphs can plot more than one statistic. All other graphs can plot only one statistic.

Setting the view properties

The Performance History tool has several properties that control the behavior of the graph.

To set the view properties

1 From the View menu, select **Properties**.

2 Set the properties as described in Table 88 on page 193.

Table 88 2D or 3D Graph Properties dialog box fields

Field name	Description
Frequencies	**Start Frequency (MHz)**: Sets the starting point for the range frequencies that is displayed. **Stop Frequency (MHz)**: Sets the end point for the range of frequencies that is displayed.
Amplitude	**Range (dB)**: sets the distance between the maximum and the minimum on the amplitude axis. **Ref. Level Step (MHz)**: Sets the amount by which the amplitude axis on increasing or decreasing the reference level.

Configuring the view settings

The Performance History Tool's view settings show, hide, or manipulate aspects of the Performance History Tool.

To configure the view settings

1 From the View menu, select the **appropriate option** as described in Table 89 on page 193.

Table 89 Performance History: View menu

Menu item	Description
Increase Zoom	Magnifies the viewable area of the graph.
Decrease Zoom	Reduces the viewable area of the graph.
Reset Zoom	Resets zoom to default setting.
Increase Ref Level	Moves the reference level up.
Decrease Ref Level	Moves the reference level down.
Auto Reference	Automatically sets the reference level.

Table 89 Performance History: View menu

Menu item	Description
Rotate Up	Rotates view up.
Rotate Down	Rotates view down.
Rotate Right	Rotates view right.
Rotate Left	Rotates view left.
Reset Orientation	Resets orientation to default setting.
Reset Chart Properties	Resets the Chart Properties to the default settings.
Toolbar	Toggles the display of the Standard toolbar and status bar on and off.
Properties	Shows the properties dialog box.
Thresholds	Controls the display of the thresholds on the graph. **Display**: Toggles the display of thresholds on and off. **All**: Shows all thresholds. **Threshold 1 - 4 and Interval**: Toggles each threshold on and off.

Configuring the chart properties

Chart properties can be changed using the chart Property Editor.

To configure chart properties

1 Right click **the graph**.

2 The following Chart Property Editor is displayed.

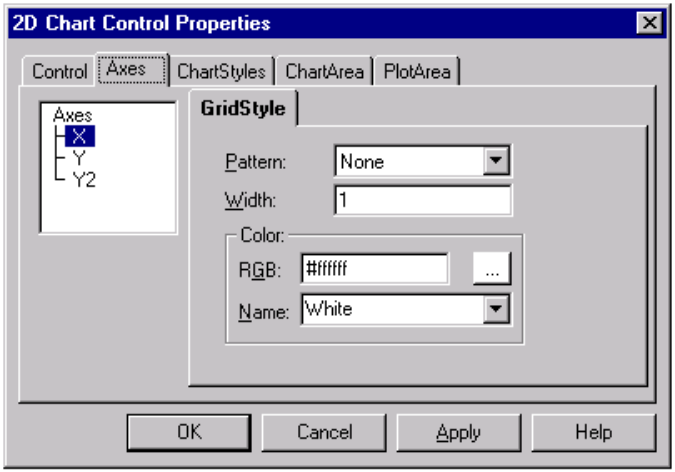

Figure 94 Chart Property Editor

3 To revert to the default settings, select the **View menu** then select the **Reset Chart Properties**.

NOTE:

The styles can be changed only when the view is in Pause mode. (This applies only for Spectrum Analyzer, Monitoring View, and 3D Monitoring View.)

Using markers

The Performance History Tool provides a marker that can be set to any of the traces.

From the Markers menu, select the appropriate option as described in "Performance History: Marker menu" on page 195.

Table 90 Performance History: Marker menu

Menu item	Description
Average Trace	Displays average trace.
Maximum Trace	Displays maximum trace.
Minimum Trace	Displays minimum trace.

Table 90 Performance History: Marker menu

Menu item	Description
Threshold 1	Displays the percentage of time threshold 1 hold level was exceeded.
Threshold 2	Displays the percentage of time threshold 2 hold level was exceeded.
Threshold 3	Displays the percentage of time threshold 3 hold level was exceeded.
Threshold 4	Displays the percentage of time threshold 4 hold level was exceeded.
Center Marker	Centers the marker.
Delta	Displays the Delta marker. **NOTE:** The Delta marker displays the differences between the frequency and the level compared to the active marker.

NOTE:

Click and drag the marker to a new location. Click a second time to position the marker.

User Interface Graphs

General instructions of the return path monitoring graphs are described in this section, including:

Time Window Summary

The Time Window Summary graph displays multiple amplitude and percentage traces by frequency for a time span. The X-axis displays a frequency range. Data is averaged over the time span chosen. There can be two Y-axes depending on the statistics chosen to plot. Average, Maximum, and Minimum amplitude statistics are plotted against the Y-axis on the left. The percentage of measurements violating Thresholds 1-4 is plotted against the Y-axis on the right.

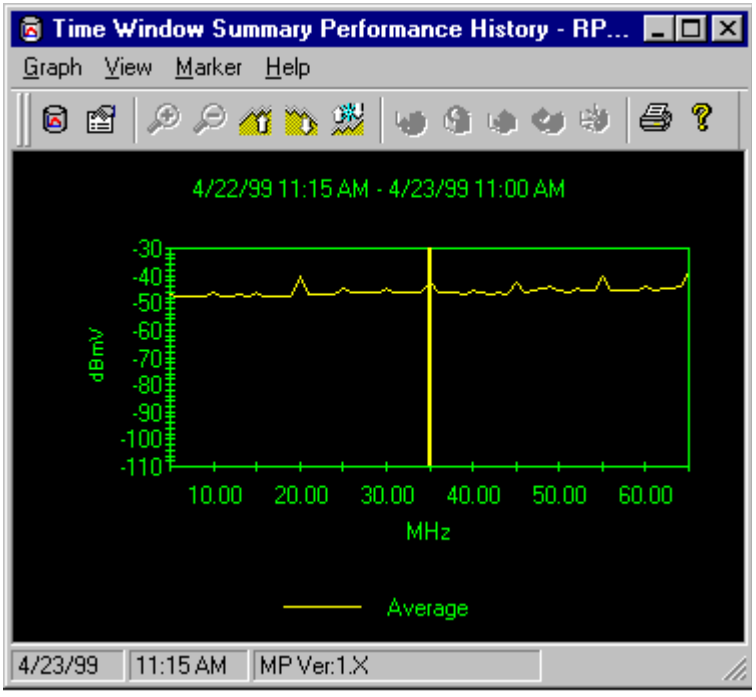

Figure 95 Time Window Summary Performance History graph

One Frequency Time Window

The One Frequency Time Window graph displays multiple amplitude and percentage traces by time for a single frequency. The X-axis displays time. Data is displayed for one frequency only. There can only be one or two Y-axes depending on the statistics chosen to plot. Average, Maximum, and Minimum amplitude statistics are plotted against the Y-axis on the left. The percentages of measurements violating Thresholds 1-4 are plotted against the Y-axis on the right.

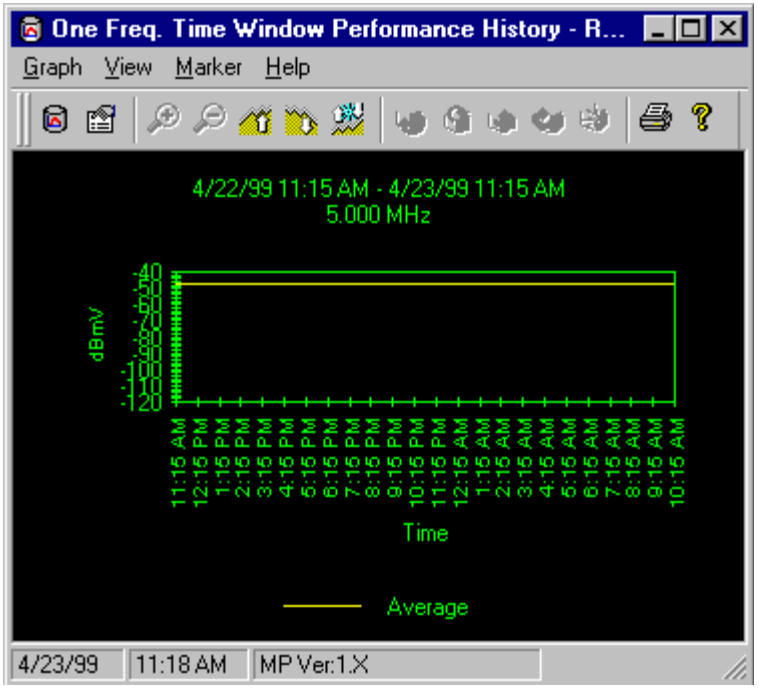

Figure 96 One Frequency Time Window Performance History graph

Time Window Detail

The Time Window Detail displays multiple amplitude and percentage traces by frequency and time. Each scan represents data summarized by the time increment selected. The X-axis displays a frequency range. The Y-axis displays amplitude. The Z-axis displays time.

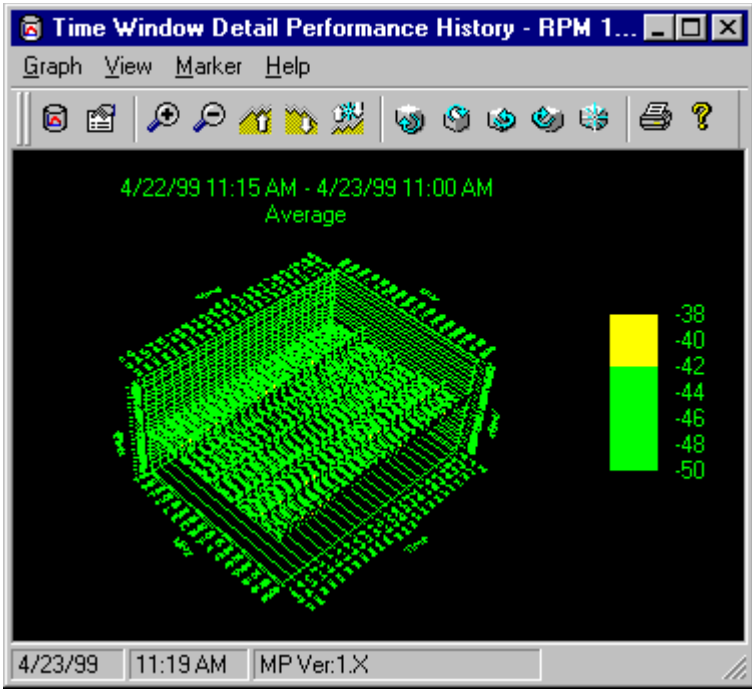

Figure 97 Time Window Detail Performance History graph

24 Hour

The 24 Hour graph displays multiple amplitude and percentage traces by frequency and time. The X-axis displays a frequency range. The Y-axis displays amplitude. The Z-axis displays time. Unlike the Time Window Detail graph, the time span and data interval for this graph are fixed. It quickly and easily generates a useful graph showing the chosen statistic by frequency over a 24-hour period. The 24 Hour graph is a specialized or short cut version of the Time Window Detail graph. The graph displays (by default) the last 24 hours of performance data with one-hour summaries. Each individual scan represents a one-hour summary. A total of 24 scans is displayed. The user need only select a statistic.

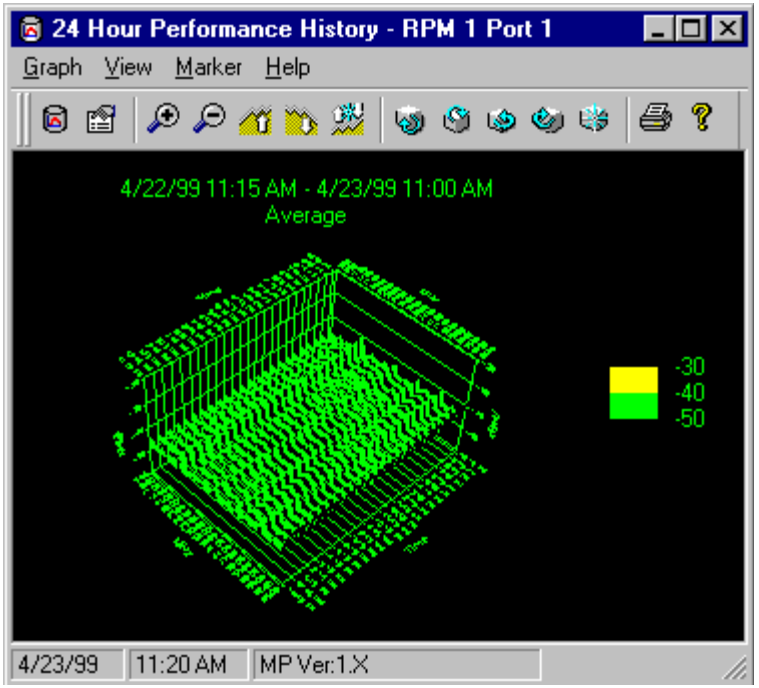

Figure 98 24 Hour Performance History graph

Multi Day

The Multi Day graph displays multiple amplitude and percentage traces by frequency and time. The X-axis displays a frequency range. The Y-axis displays amplitude. The Z-axis displays time.

Unlike the Time Window Detail graph, the time span and data interval for this graph are fixed. It quickly and easily generates a useful graph showing the chosen statistic by frequency over a multi-day period.

The Multi Day graph is a specialized version of the Time Window Detail graph. It displays performance data over a range of days in individual one-day summaries. Each scan represents a summary of data over a single day. The user need only specify the data range.

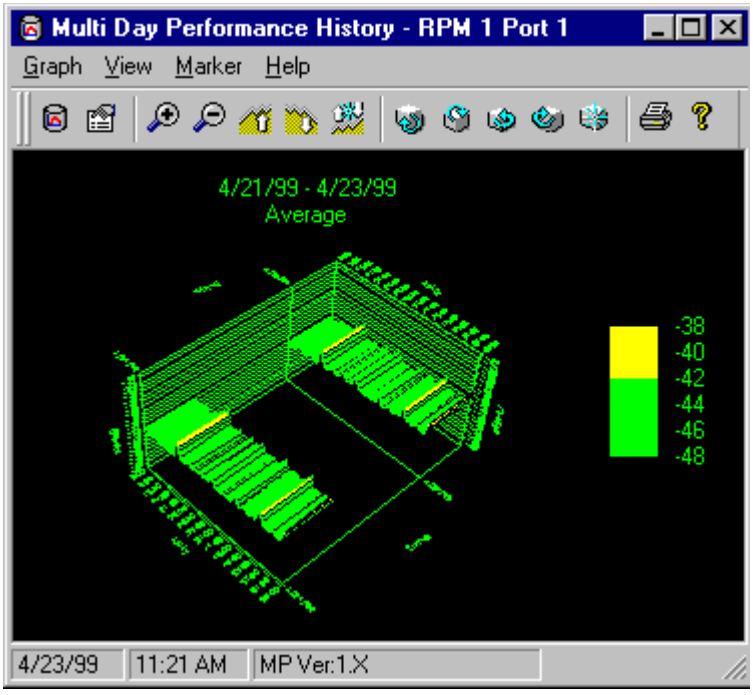

Figure 99 Multi Day Performance History graph

Multi Day Time Window

The Multi Day Time Window graph displays multiple amplitude and percentage traces by frequency and time. The X-axis displays a frequency range. The Y-axis displays amplitude. The Z-axis displays time.

The Multi Day Time Window graph displays performance data for a specific time window within a day over multiple days.

Unlike the Time Window Detail graph, the time span and data interval for this graph are fixed. Each scan of the 3D graph represents a summary of data over the selected time window within a given day. The number of scans is equal to the number of days selected.

Example: This type of graph could show the average amplitude of all measured frequencies from 5 p.m. to 7 p.m. for each day between 6/25/01 and 6/29/01.

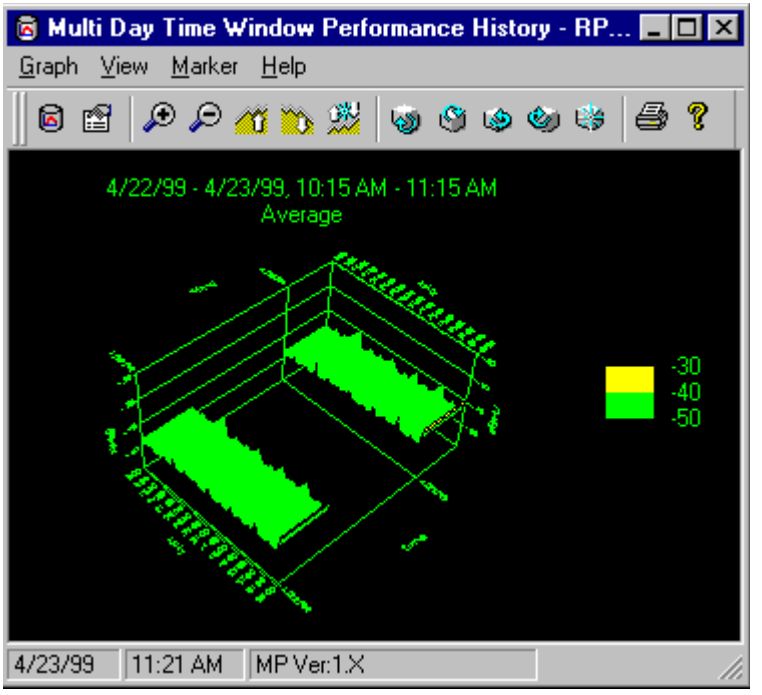

Figure 100 Multi Day Time Window Performance History graph

Performing various Graph functions

Each of the return path monitoring graphs can be exported, printed and copied.

General instructions for how to export, print and copy are described in this section, including:

– "Exporting graph data" on page 203
– "Printing Performance History graph" on page 203
– "Copying Performance History graph" on page 204
– "Exporting Performance History graph" on page 204

Exporting graph data

The Performance History Tool exports graphs as .csv files.

To export graph data

1 From the Graph menu, select **Export**.
The Save As... dialog box is displayed.

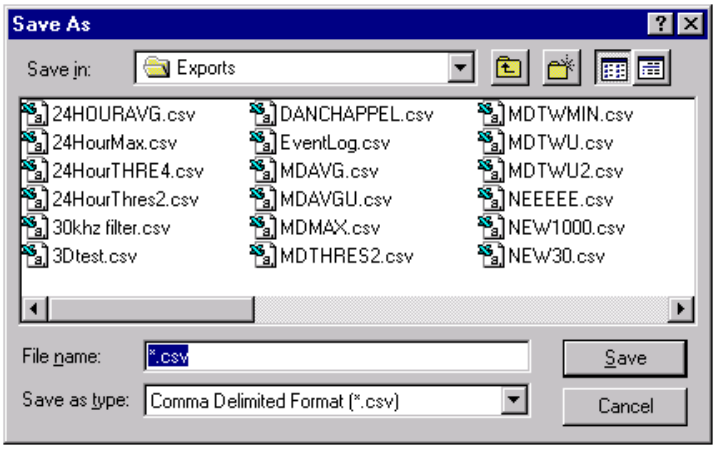

Figure 101 Save As... dialog box

2 Type in a **filename**.

3 Click **Save**.

Printing Performance History graph

To print or print preview a Performance History graph

NOTE:
You must have a default printer selected for your computer.

1 From the Graph menu, select **Page Setup**.

2 For the printed page header, type a **label**.

3 To print immediately, select the **Graph menu** then select **Print**.
OR

4 To preview the printed page prior to printing, select **Print Preview**.

Copying Performance History graph

Users can copy the current graph to the Windows clipboard. The file is a .wmf format. The .wmf file size can be adjusted once the image is pasted in an appropriate program.

To copy Performance History Tool graphs

1 From the Graph menu, select **Copy**.

Exporting Performance History graph

Users can export the current graph to file. The file is a .csv format.

To export Performance History Tool graphs

1 From the Monitor menu, select **Export**.
The Save As... dialog box is displayed.

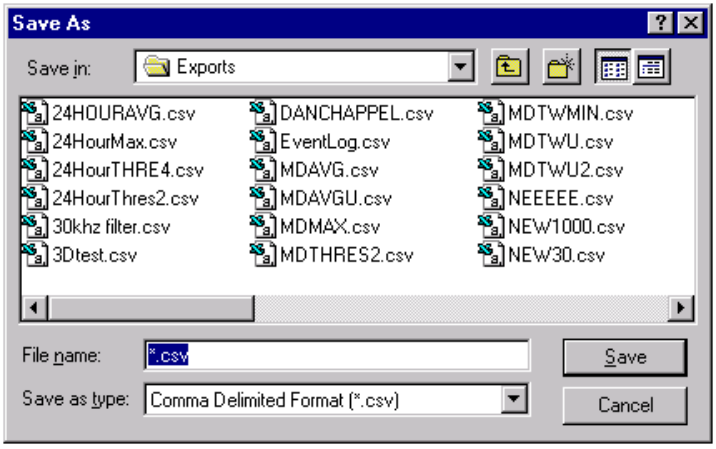

Figure 102 Save As... dialog box example

2 Type a **filename**.

3 Click **Save**.
The file is saved in the default directory, PathTrak™\Exports.

Analysis Tools

Each of the return path monitoring tools have shared capabilities that provide additional data analysis.

General instructions for how to use the analysis tools are described in this section, including:

– "Snapshots" on page 205
– "Reports" on page 209

Snapshots

Each of the live data tools--Monitoring View, 3D Monitoring View, and Spectrum Analyzer--can save images, or snapshots, of their current data graphs. These snapshots are saved on the PathTrak Server so that any PathTrak™ Client can access them.

Saving a snapshot

Saving a snapshot stores all of the data and settings from the current graph onto the PathTrak Server for later retrieval by any PathTrak™ Client.

To save a snapshot

1 From the Tools menu, launch either the **Monitoring View, 3D Monitoring View, or Spectrum Analyzer**.

2 From the Monitor/Analyzer menu, select **Save Snapshot**.

OR

3 In the toolbar, click the **Snapshot icon**.

The following Save Snapshot dialog box is displayed.

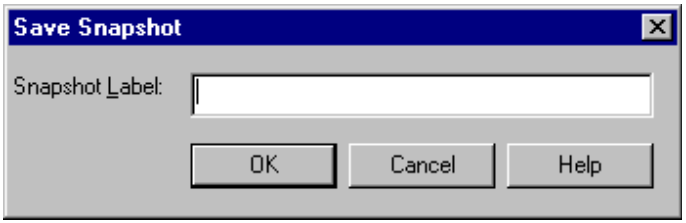

Figure 103 Save Snapshot dialog box

4 Type a **label or a note** to be associated with the snapshot.

5 To confirm, click **OK**.

Viewing snapshot list

All snapshots are stored on the PathTrak Server. When the PathTrak™ Client's Snapshot List window is opened, the Snapshots that match the filter criteria are displayed. Snapshots may be sorted or filtered by many parameters such as source or type.

To view a snapshot list

1 From the Tools menu, select **Open Snapshot**.

The following Snapshots list dialog box is displayed.

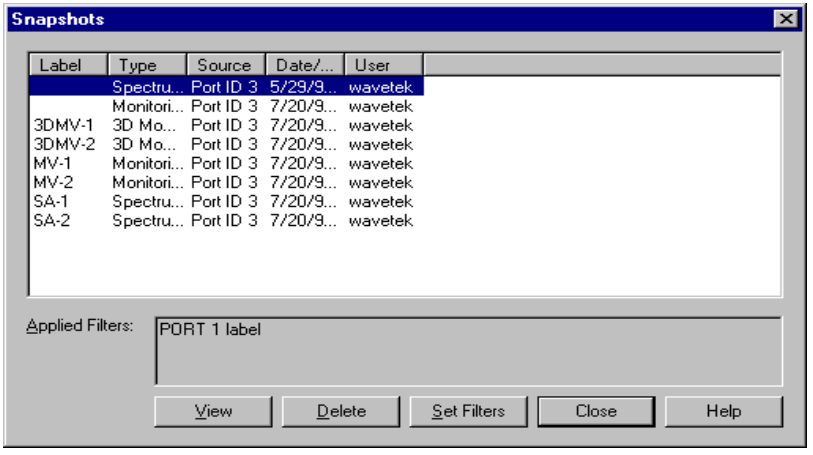

Figure 104 Snapshots list dialog box

2 To sort by criterion, click on the **column header Label, Type, Source, Date/Time, and User**.

3 To sort in the reverse order, click **again**.

Filtering snapshot list

Filtering the Snapshot List can be useful to constrain the list to a more manageable size. Filtering can be done by one of the following criteria:

– Creation time

– Source

– Tool type

To filter a snapshot list

1 To filter the Snapshot List by that source, **select one or more items** in the System View.

2 To display snapshots from all sources, click **outside of the System View.**

3 From the Tools menu, select **Open Snapshot**.

4 Click **Set Filters**.

The following Snapshot Filters dialog box is displayed.

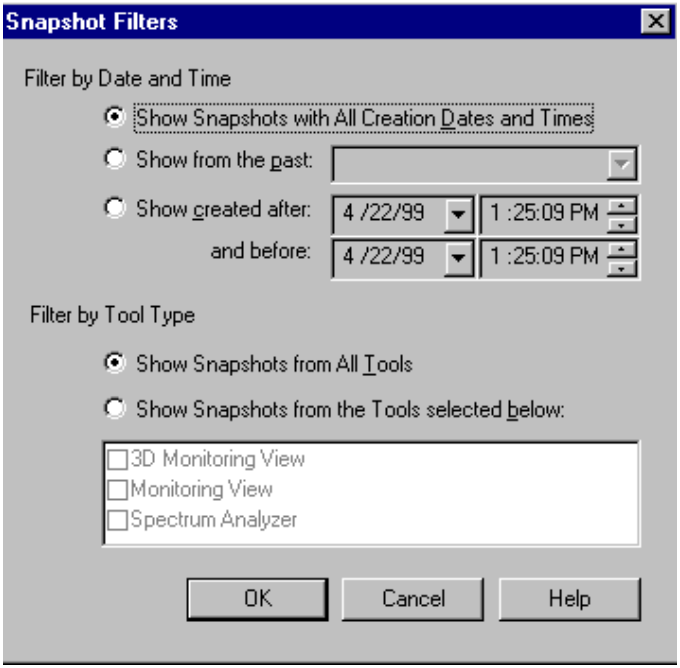

Figure 105 Snapshot Filters dialog box

5 Configure the **criteria** as described in Table 91 on page 208.

Table 91 Snapshot Filters dialog box

Field name	Description
Date and Filter Criteria	**All Creation Dates and Times**: Displays every snapshot, regardless of creation time. **From the Past**: Displays snapshots from past hour, day, week, month, or 6 months. **Created After and Before**: Displays snapshots in a specific range of time.
Tool Type Filter	**All Tools**: Displays every snapshot, regardless of the type of tool used to save it. **Tools Selected Below**: Displays snapshots only from the tools selected form the list. Multiple selection ARE allowed.

Opening snapshot

Opening a snapshot recreates the saved graph in its original tool. Many functions such as markers, zooming and rotation are still available.

To open a snapshot

1 From the Tools menu, select **Open Snapshots**.

The Snapshots list dialog box is displayed.

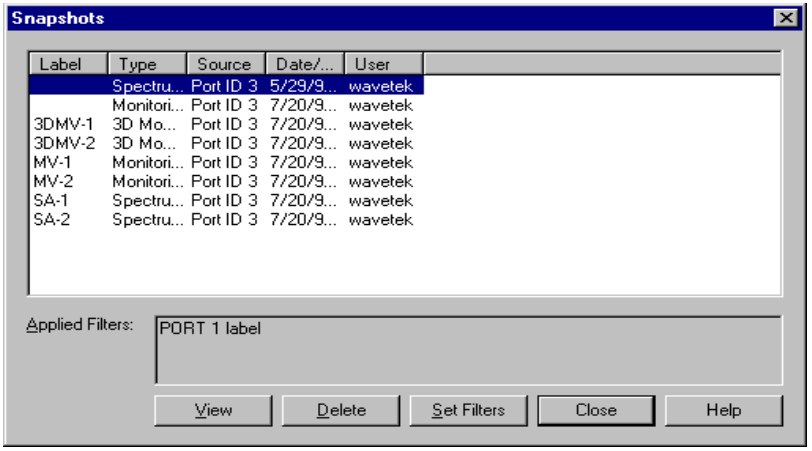

Figure 106 Snapshots list dialog box

2 From the Snapshot List, select a **snapshot**.

3 Click **View.**

Deleting snapshot Deleting a snapshot removes it from the PathTrak Server.

To delete a snapshot

1 From the Tools menu, select **Open Snapshots**.
The Snapshots list dialog box is displayed.

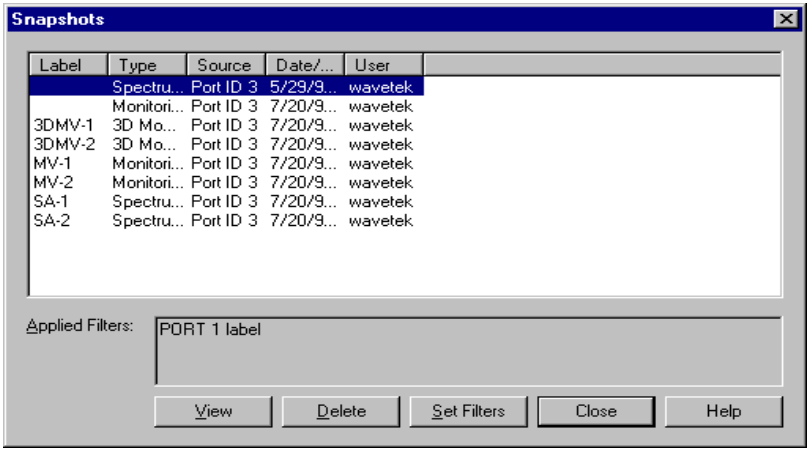

Figure 107 Snapshots list dialog box

2 From the Snapshot List, select a **snapshot**.

3 Click **Delete**.

CAUTION:

Deleting a snapshot is irreversible.

Reports

The PathTrak™ System is capable of generating several different reports that assist the operator in analyzing system or return path activity. The types of reports are described in the following table:

Table 92 Types of reports

Report name	Description
Alarms Report	Generates a printed copy of all the information contained in the Alarm List.
System Configuration Report	Generates a printed copy of the configuration data for the PathTrak™ System.
Device/Port Configuration Report	Lists the properties of each of the selected HCUs, HSMs, RPMs, and RPM ports.
Event Report	Refer to "Printing an Event Log" on page 97.
Monitoring Plan Report	Generates a printed copy of all the information contained in the Monitoring Plan for the chosen RPM port.

Printing reports To print a report

1 From the Reports menu, select **Page Setup**.

The Page Setup dialog box is displayed.

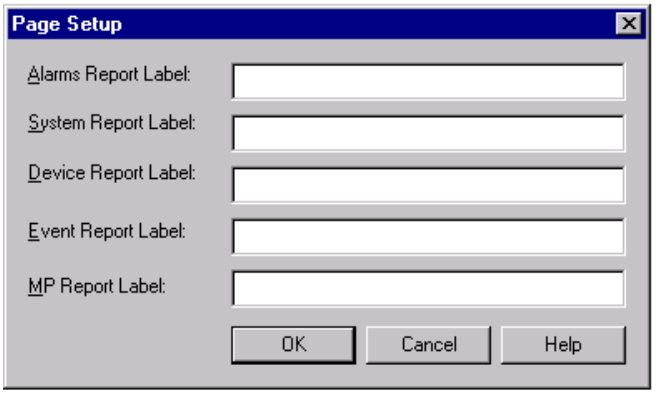

Figure 108 Page Setup dialog box

2 For the appropriate report type, type a **label.**

3 Click **OK**.

4 Are you printing a Device/Port Configuration?

– **YES**: Select **one or more devices and ports** from the System View.

NOTE:

Hold down the CTRL or SHIFT key while you click on a device or port to select multiple devices or ports.

– **NO**: Continue to **Step 6**.

5 From the Reports menu, select the **appropriate type of report** from the following types of reports:

- **Alarms**
- **System Configuration**
- **Device/Port Configuration**
- **Event**
- **Monitoring Plan**

6 Click **Print**.

Backup Client 2.3

13

This chapter includes task-based instructions using the PathTrak™ features. Topics discussed in this chapter include the following:

Introduction

The PathTrak™ System monitors the individual return paths of your system 24 hours a day, 7 days a week, gathering and displaying live data and logging and displaying historical performance information. This historical data—the live data that is filed away—is critical to PathTrak™'s mission of helping you locate and correct problems. Without this information, it would be very difficult for you to conduct the trend analysis, troubleshooting, and commissioning tasks that you need to do in order to maintain and develop your system. Your system's performance history is only one type of data PathTrak™ archives. Information about your monitoring plans, alarm details, the system's configuration, and so on, is also kept in the database.

Of course, all this information is stored on PathTrak™'s hard drives. While PathTrak™ uses state-of the-art equipment, and despite advances in computer technology, hardware failures can strike any system. In addition, software failures, natural disasters, viruses, and so on, are also threats to your data. For these reasons, PathTrak™ provides backup to help you safeguard your mission critical data.

This chapter guides you through the configuration and operation of the PathTrak™ Backup Client. The backup feature enables you to perform full or incremental, scheduled or on-demand backups, and to restore the databases of your HCUs, including monitoring plans and other archived data, and other configuration data. The client displays a log of the backup or restore process as it's happening, and you can check the status of the last operation (*Never Backed Up*, *Pass*, or *Fail*) at any time by displaying the HCU's property page.

Quick Start — Performing Your First Backup

This section takes you quickly through the essential steps of the backup procedure so you'll immediately be protected. “Starting the Backup Client” explains how to create your first backup, and later you can consider the configuration options you want to set to create your permanent backup plan.

The following sections go into greater detail about the options and features offered by the client so you can customize your backup plan to your needs.

NOTE:

Be aware that the backup procedure requires a significant amount of bandwidth while it's running. Because of the burden on system resources, it's best to backup at night or during other periods when demand on the network is light. You can use scheduled backup if necessary.

Installing the Backup Client

To install/upgrade PathTrak Backup Client software, see the JDS Uniphase Corporation PathTrak HFC Test & Monitoring Solution Installation Guide (Product Number 6510-30-0416).

Starting the Backup Client

To start the Backup Client

1 On your desktop, double click the **Backup Client shortcut icon**.

Figure 109 Backup Client shortcut icon

OR

2 Select **Start>Programs>Acterna PathTrak™>PathTrak™ Backup Client**.

The following Login screen is displayed.

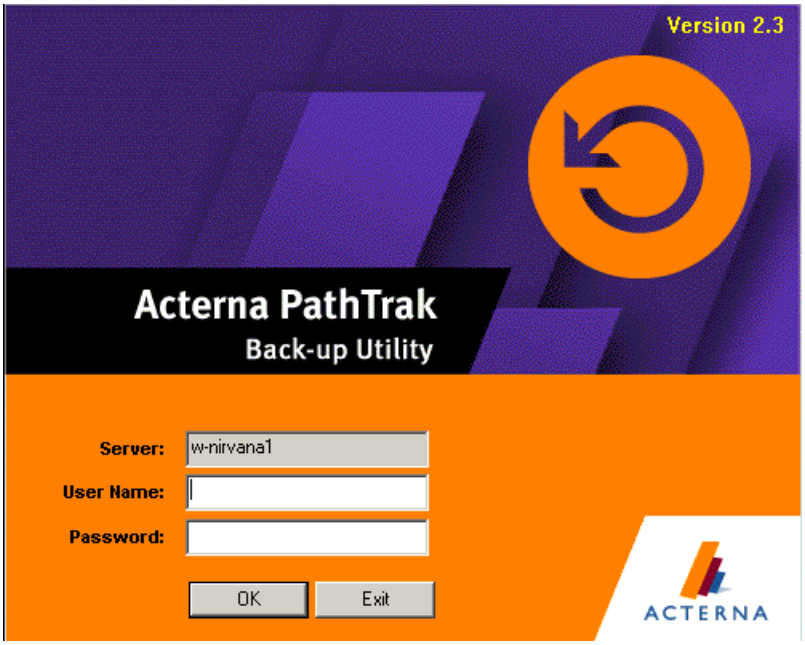

Figure 110 Login dialog box

3 Type the **following information** in the provided text fields.
   - **PathTrak™ System's server name,**
   - **your username, and**
   - **your password.**

4 Click **OK**.

   The following main PathTrak™ Backup Client main window is displayed.

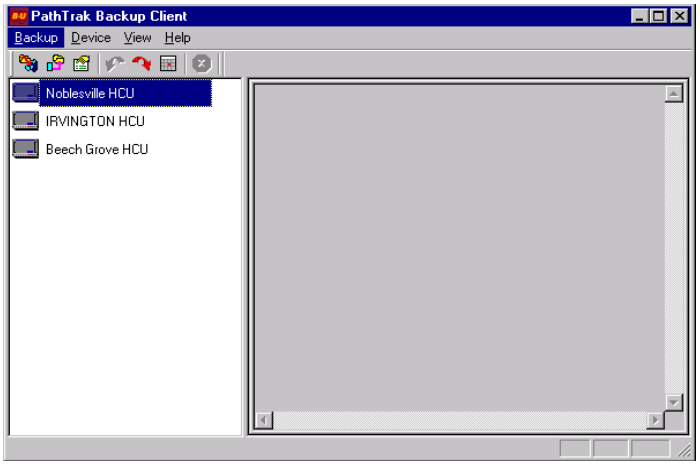

Figure 111 Backup Client main window

The PathTrak™ Backup Client main window is divided into two panes: the left pane shows the HCUs connected to your system, and the right pane is empty (for now).

NOTE:

To access the system, you must have administrator level access rights.

NOTE:

At this time you should go to the Setup screen to enter the path where you want the backup files to be stored. You access the Setup dialog by opening the Backup menu and clicking Setup.

The other options on this screen are explained in “Running Scheduled Backups” on page 230.

Starting the Backup

To start the Backup

1. Launch **Backup Client**.
2. From the System View, select the **HCUs** you want to back up.

NOTE:

To select multiple HCUs hold down the Ctrl key, then click each HCU.

3 From the Device menu, select **Backup**.

OR

4 Press **Ctrl + B**.

OR

5 From the System View, select the **HCUs** then right click and select **Backup**.

The following Confirm Backup dialog box.

Figure 112 Confirm Backup dialog box

You are prompted to select either Full or Incremental backup.

6 Select the type of backup:

- **Full**: If you select Full, the Backup Client Full Backup dialog box is displayed. Since this backup procedure places a heavy demand on the network's bandwidth, consider whether or not this is a good time to run back up.
- **Incremental**: If you select this option, only those files that have been changed since the HCU was last backed up are processed. If the HCU has not been backed up before, this option backs up all files.

7 If this the first time you have run a backup. select **Full Backup**.

The back up procedure begins and the right pane displays the logged operations. As each RPM module in the current HCU is backed up, its status is recorded and displayed. When the backup operation for the HCU is complete (either successfully or not), its status is logged as “Well”.

NOTE:

It’s generally better to select a network location for the files. Select the Setup option from the Backup menu. In last line on the Setup dialog box, enter (or browse to) the path where you want the files stored.

NOTE:

At any time while the backup is running, you can abort the operation. To do so, either open the Backup menu and select Abort, or click icon in the toolbar.

Checking Backup Status

You might not be around the entire time the backup is in progress, and you could miss seeing the success or failure message in the log for one or more of the HCUs.

To check the backup status

1. Right click on an **HCU** and select **Properties**.

   OR

2. Select an **HCU** and select **Properties** from the Device menu.

NOTE:

A red “X” by an HCU icon in the System View indicates that the backup attempt failed, or that the HCU has never been successfully backed up.

Exploring the Interface

PathTrak™'s backup client is easy to learn and use. All its functions can be accessed from the main window, with additional information provided through popup dialog boxes that are themselves uncomplicated yet informative. This section introduces you to the main window, menus, buttons, and dialog boxes that make up the user interface.

Main Window

The PathTrak™ Backup Client main window displayed in the following is the program's nerve center. The menus and buttons here enable you to access all the program's features.

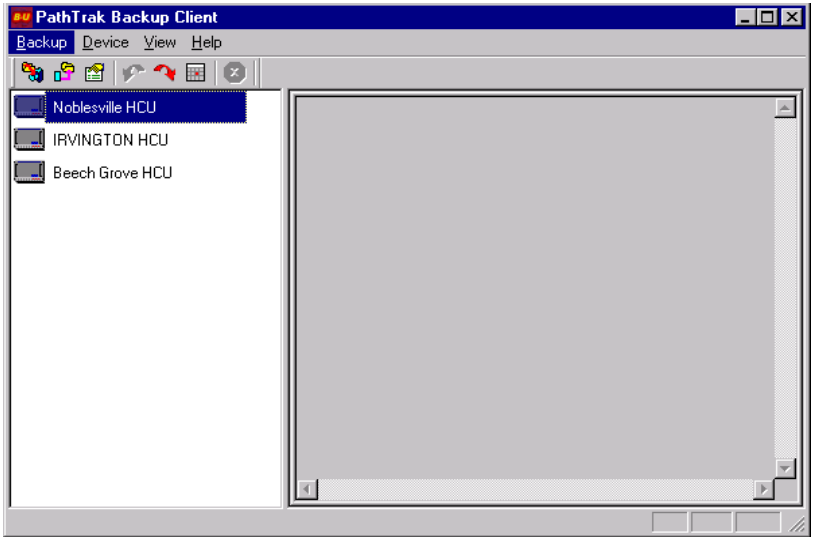

Figure 113 Backup Client main window

The main window has a menu bar, a button bar below the menu bar, a left-hand pane showing your HCUs, a right-hand pane that displays the log for the current backup or restore, and a status bar at the bottom that displays information as appropriate.

Menus

Each menu and command available to you can be accessed in several ways. If you're familiar with the Windows 95/98/NT interface, you'll have no problem finding your way around.

- The menu bar has four menus. Each menu is accessible by clicking it, or through a hot key combination (Alt + <the underlined letter in the menu name>).
- Options on the menus are accessible by clicking them or by using the hotkey combination indicated next to the option on the drop-down. For example, you can open the Setup dialog box directly by pressing Ctrl + S, which is the key combination on the Backup menu next to the command that calls this dialog box.
- All commands are available from the menus in the menu bar and through hotkey combinations.
- Many common commands are available by clicking a button on the icon toolbar

Figure 114 Backup Client: toolbar

Table 93 Backup Client: toolbar icons

Icon	Name	Description
	Backup	Runs the Backup.
	Restore	Restores data after HCU or PathTrak Server failure.
	Properties	Allows you to deselect script or batch files to run after the backup or designate the file location when saving files.
	Enable	Enables scheduled backups.
	Disable	Disable scheduled backups.

Table 93 Backup Client: toolbar icons (Continued)

Icon	Name	Description
	Set Schedule	Create or modify scheduled backup plan.
	Abort	Aborts a backup or a restore that is in progress.

– The commands in the Device menu are available by right clicking an HCU icon in the System View.

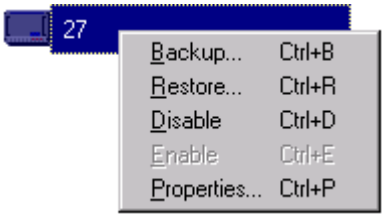

Figure 115 HCU context menu

The following sections describe the menus and their associated options.

Backup Menu

This menu controls the basic functioning of the client and includes options for configuring scheduled backups, aborting backups that are in progress, and exiting the program.

Table 94 Backup Client: Backup menu

Item	Description
Setup	This option opens the Setup dialog box, where you can enable or disable scheduled backups, and create or modify the schedule for your backup plan, including selecting the days and times that backups will be made. You can also select a script or batch file to run after the backup is finished. Finally, you can select the location for backup files.

Table 94 Backup Client: Backup menu

Item	Description
Abort	When a backup is in progress, selecting this option stops its execution. The log for an aborted session states that the backup failed, and the HCU's properties are modified to reflect this.
Exit	This option shuts down the client.

Device Menu

The Device menu provides options for controlling the backup and restore of your HCUs. You can also enable or disable HCUs for backup and restore, and you can open the properties page for an individual HCU.

Table 95 Backup Client: Device menu

Item	Description
Backup	This option begins the backup process for the HCUs you've selected.
Restore	Selecting this option starts the restore process for the selected HCU. You're taken to the Confirm Restore dialog box, and can then start restoring your data.
Disable	If this option is selectable, clicking it disables the currently selected HCUs for scheduled backup operations.
Enable	When not grayed out, this option enables the selected HCUs for scheduled backup operations.
Properties	This option displays the properties dialog box for any single HCU. If you have multiple HCUs selected, this option is grayed out. You can display properties for only one HCU at a time.

NOTE:

If you have multiple HCUs selected when you click either Disable or Enable, all those HCUs will become either disabled or enabled. For example, if you've selected four HCUs, and one of them is already disabled, selecting Disable will not change the state of the currently disabled HCU. All four will be disabled.

View menu

This menu lets you refresh the HCU (left-hand) pane. You can also use Notepad to view the log of the current backup or restore operation.

Table 96 Backup Client: View menu

Item	Description
View Log File	With this option, you can view the contents of the logging (right-hand) pane with Notepad. Then you can perform any operations on the log that Notepad allows.
Refresh HCUs	This option refreshes the left-hand pane view, updating it with any changes such as added, removed, or renamed HCUs.

Setting the Headend Controller Properties

Select the Properties option from the View menu to set the Headend Controller Properties.

Table 97 View menu: Properties dialog box

Item	Description
Enable for Scheduled Backup	Enables schedule backup function.
Backup Path	Specifies the location where this HCUs backup files are stored. If this field is blank, the default HCU Backup Path is used.
Backup Path Last Backup	Contains the time of the last successful backup. If this field is blank, the HCU has never been successfully backed up.

Table 97 View menu: Properties dialog box (Continued)

Item	Description
ID Number	Contains the ID of the HCU. This matches the ID found on the HCU Properties dialog in the Path-Trak™ Client.
IP Address	Contains the IP address of the HCU.
Serial Number	Contains the serial number of the HCU.
Backup Status	Contains the backup state of the HCU. This field can be set to “Never Been Backed Up” which means the HCU has never been successfully backed up, “Last Backup failed” which means the HCU has been successfully backed up in the past, but that the last backup failed, or “Last Back Up Successful” which means the last backup of this HCU was successful.

Help Menu

The Help menu items are described in the following table.

Table 98 Backup Client Help menu

Item	Description
Backup Client Help	This option opens the main Help screen from which you can view the help contents, performs searches, and open the help file’s index.
About	This option opens the About JDS Uniphase Corporation Back-up Utility dialog box, which displays the software version and build numbers (See Figure 116).

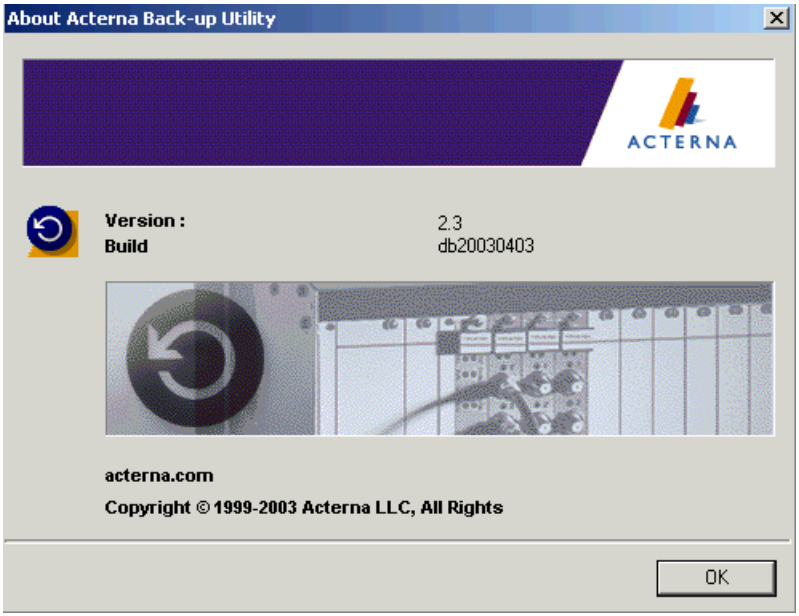

Figure 116 About JDS Uniphase Corporation Back-up Utility dialog box

Backup Options

The PathTrak™ Backup Client can perform both immediate, on-demand backups and scheduled, unattended backups. In addition to these options, you can also choose to run a post-backup script or batch file, and you can store the backed up database to any path, local or network, that can be reached by the machine on which the client resides. Each of the backup types is useful for different reasons:

Table 99 Backup Options

Backup type	Description
On-demand	On-demand backups are most useful for getting data backed up initially, when you first install the backup client, and for those times when a potential problem is imminent and you need to save your data quickly.

Table 99 Backup Options

Backup type	Description
Scheduled	Scheduled backups are more configurable and can be run when network traffic is lightest and without someone present to actually issue the commands. In addition, you can specify a script or batch file to run after the backup is finished.

Running Backup On-Demand

An on-demand backup is the easiest backup procedure to set up. It involves only selecting the HCUs you want to backup and issuing the command to proceed. There is very little in the way of configuration that you need to do.

You can back up any HCU connected to your system at any time by performing an on-demand backup. The following steps take you through the process.

NOTE:

Before you perform an on-demand backup, make sure that the files will be stored where you want them. The default location is C:\Backup\backupimage. However, to avoid limiting the hard drive size and reliability of the PathTrak™ server, it is generally better to select a network location for the files. To have the files sent to another location, select Setup from the Backup menu. In the Setup dialog box, either edit the pathname or browse to the location in the **Default HCU Backup Path** text box at the bottom of the screen. (Figure 122 on page 233)

1 Launch the **Backup Client**.

The Login screen is displayed.

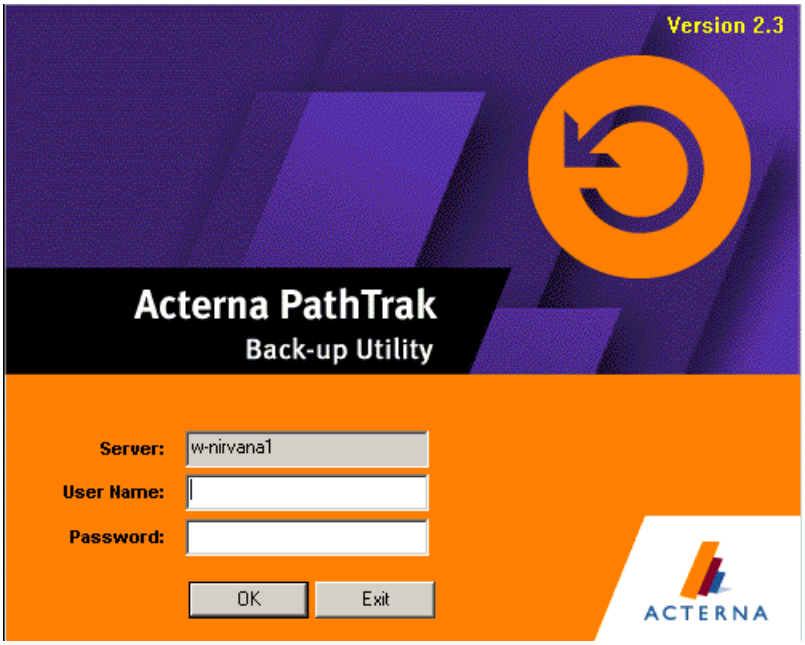

Figure 117 Login dialog box

2 Type the **following information**:
   - **PathTrak™ System's server name,**
   - **Your username, and**
   - **Your password.**

3 Click **OK**.

4 From the System View, select the **HCUs you want to back up**.

5 From the Device menu, select **Backup**.
   The following Confirm Backup dialog box.

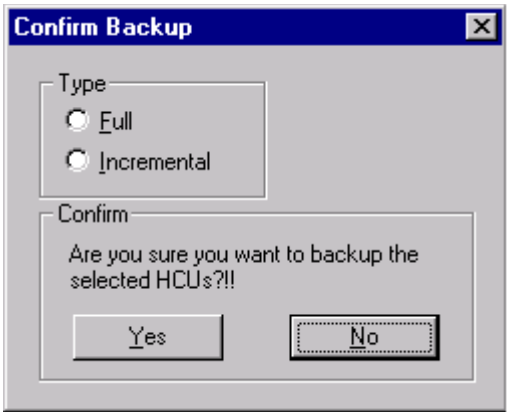

Figure 118 Confirm Backup dialog box

6 Select the type of backup:

- **Full**: If you select Full, the Backup Client Full Backup dialog box is displayed. Since this backup procedure places a heavy demand on the network's bandwidth, consider whether or not this is a good time to run back up.
- **Incremental**: If you select this option, only those files that have been changed since the HCU was last backed up are processed. If the HCU has not been backed up before, this option backs up all files.

7 Click **Yes**.

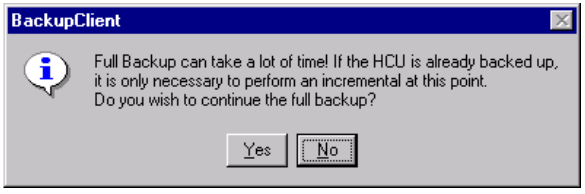

Figure 119 Backup Client Full Backup dialog box

The backup procedure begins. During the backup, the right pane logs the progress. When finished, the log states whether the backup was a success, failure, or aborted.

NOTE:

To access the system, you must have administrator level access rights.

Aborting Backups

To abort backups

1. In the icon toolbar, click the **Abort button**.

   OR

2. From the Backup menu, select **Abort**.

NOTE:

While the backup is in progress, you cannot perform other operations on the HCU (such as altering the monitoring plan); however, you can still bring up data views.

Running Scheduled Backups

Scheduled backups give you more control over the backup procedure than on-demand backups and, once set up, they are virtually maintenance-free. Because of the ease with which you can configure scheduled backups and since they run unattended, they are the best choice if you are going to do regular backups.

There are several things that you have to do to run scheduled backups on any of your HCUs:

- Enable the HCUs for scheduled backup.
- Determine the times and days to run the backups.
- Ensure that any removable storage device or tape drive to which you want to copy the backup files is operating properly.
- Create and enable any batch files or scripts that you want to run after the backup is finished.

To run scheduled backups

1. Launch the **Backup Client**.
2. From the System View, select the **HCUs** you want to enable for scheduled backup.

NOTE:

To select multiple HCUs hold down the Ctrl key, then in System view, click each HCU.

3 Right click the **selected HCUs**.

A context menu is displayed.

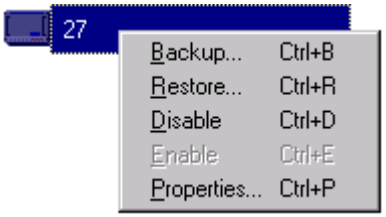

Figure 120 HCU context menu

4 Select the **Enabled option**.

NOTE:

If all HCUs are already enabled, then this option is not available.

If three HCUs are already enabled for scheduled backup, the context menu is displayed as showed in Figure 121.

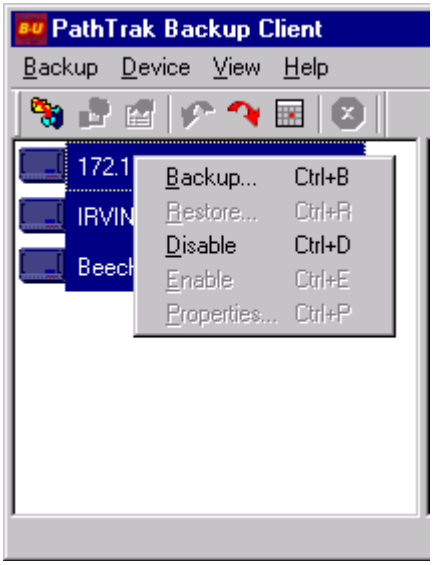

Figure 121 Backup Client showing multiple enabled HCUs

5 After all HCUs that are to be included in your scheduled backup plan are enabled, select **Setup from the Backup menu**.

The following Setup dialog box is displayed.

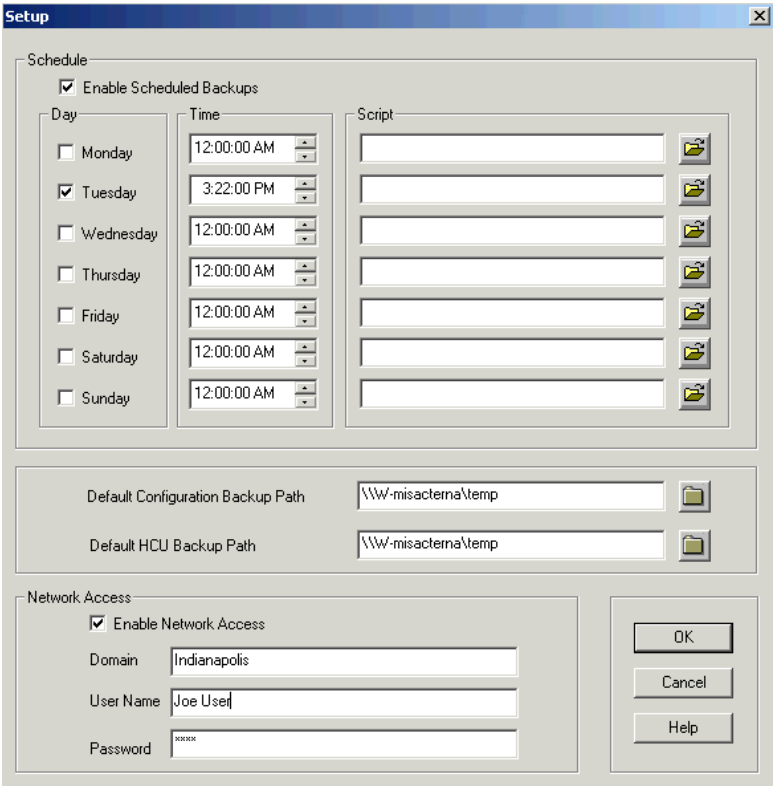

Figure 122 Setup dialog box

NOTE:

If you have enabled the HCU for backup the Enable Scheduled Backup box is checked.

6 Select the **times** when you want the backups to run. (This can be a different time for each day.)

7 Enter the **path or browse** using the folder icon to any script, executable, or batch file that you want to run after the backup is complete.

For example, you might want to copy the backup file to a tape drive or other removable media to store off-site.

8 Enter the **path or accept** the default location where you want the backup files stored.

9 Enter the **path** where you want the system configuration files to be stored.

10 Configure the Network Access settings.

NOTE:

Configuring Network Access

The back-up server does not have the security context to access a remote computer. The **Network Access** feature establishes a user account to provide this security context, allowing the back-up server to reside on one machine and the back-up files to reside on another remote computer.

If you use remote folders you must enable **Network Access** to gain accessibility. Although a variety of network, user group, or domain scenarios can influence the specific content of the user account configured here, it is recommended that the **Network Access** fields are completed using the same domain, user name, and password used when logging on to the interactive desktop of your PC. If this user account does not provide the required security access, contact your IT administrator to determine the content of an appropriate user account.

11 When you're satisfied that the information you've entered is correct, click **OK**.

Your backup plan is ready to run.

NOTE:

You can enable HCUs from several locations:

– Context menus displayed in Figure 120 on page 231.
– HCUs properties dialog boxes, and
– Setup dialog boxes displayed in Figure 122 on page 233.

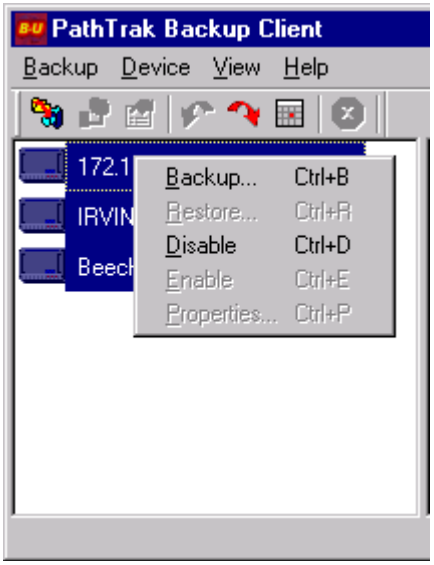

Figure 123 Backup Client showing multiple enabled HCUs

NOTE:

In Figure 123, the Restore, Enable, and Properties options are all grayed out. This is because:

– You cannot restore more than one HCU at a time.

– The HCUs are all enabled, so you can only disable them.

– You cannot view the properties page for more than one HCU at a time.

NOTE:

You can also get to the Setup dialog box from the Set Schedule button on the button bar:

Figure 124 Button bar

NOTE:

Remember when setting the time for backup to run that the operation places a considerable demand on system resources. Setting the backup to run when network traffic is lightest is generally a good idea.

Keep in mind also that while a backup is in progress, you can't change HCU configuration (like changing the monitoring plan), although you can still bring up data views.

NOTE:

Scheduled backups always run as an incremental rather than a full type. Only those files that have changed since the last backup will be processed.

Restoring your Data

Restoring your data from the backup files will be necessary in the rare event of a hard drive failure in an HCU or the PathTrak Server. You can restore archived data such as performance history from the backup file for that HCU. Any archived data gathered between the last successful backup and the failure will not be restored.

NOTE:

Contact the JDS Uniphase Corporation Technical Assistance Center to restore JDS Uniphase Corporation PathTrak Server databases.

NOTE:

When an HCU's hard drive fails, contact JDS Uniphase Corporation to get a replacement.

Restoring an HCU

To restore operations in the event of either an HCU or a PathTrak Server failure.

1 Start the **Backup client** and select the **HCU** to be restored from the list in the HCU (right-hand) pane.

NOTE:

You can restore only one HCU at a time.

2 Right click the **selected HCU** and choose **Restore** from the context menu.

OR

3 From the Device menu, you can also choose the **restore command**.

A Confirm Restore dialog box is displayed.

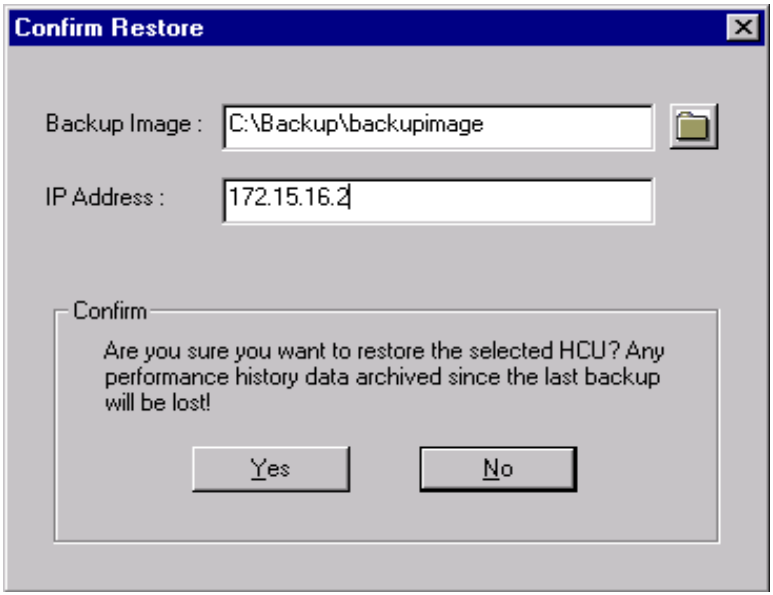

Figure 125 Confirm Restore dialog box

4 Click **Yes**.

The restore process starts. While the restore is running, you cannot make changes to it (such as altering the monitoring plan).

NOTE:

Be aware that, if you are restoring to an HCU that has not failed, all existing data on its hard drive is purged before the restore process starts. For this reason, it is important to be sure you've selected the correct HCU to restore.

The right-hand pane of the client window logs the restore process. When it is finished, the log reports the success or failure of the operation.

NOTE:

If the PathTrak Server fails, you'll need to contact JDS Uniphase Corporation Customer Service to have JDS Uniphase Corporation personnel restore your system.

Specifications

A

This appendix describes the PathTrak™ HFC Test & Monitoring Solution specifications. Topics discussed in this appendix include the following:

Site requirements

Before you or a recommended JDS Uniphase Corporation Authorized Application Engineer conducts the initial installation and configuration of the PathTrak™ system, you need the items listed in the following tables at your location.

NOTE:

JDS Uniphase Corporation does not provide requirements defined as Customer Site Requirements and Customer Personnel Requirements.

Table 100 Customer Site/Personnel Requirements (not-provided by JDS Uniphase Corporation)

Requirement	Description
19-in equipment rack	One 6-ft. rack can accommodate 5 HCUs.
AC power	100-265 VAC; 47-63 Hz; 7A max per fully loaded HCU.
Return Path test points	Signal levels must be between -40 dBmV and +50 dBmV.
	**WARNING:** Signals exceeding +60 dBmV damage the RPM port even if the HCU is turned off.
Test Point connections	RG-6 jumper cables are required to connect test points to the RPM modules. Test points must be labeled with: – node name, – number, – test point loss, and – related information
Coaxial cable	Required between the HSM to the forward combined input port, cable length depends on the distance.
Ethernet connection at System Controller site	Required between the System Controller and the HCU.

Table 100 Customer Site/Personnel Requirements (not-provided by JDS Uniphase Corporation) (Continued)

Requirement	Description
75-ohm terminations	Required to terminate F-, BNC-, or IEC- connectors on the RPM modules.
Site survey	Completed prior to installation.
Phillips-head screwdriver	Required to remove the back plates of the HCUs to house the RPM modules.
7/16-in open-end wrench or an "over-the-cable" wrench of some type	Used to tighten cables if the RPM module has F connectors.
Crossover category 5 cable	Used to connect System Controller to HCU.
MIS contact	Required for integrating the System Controller into the LAN. The Site Survey helps organize required information including IP addresses, subnet masks, and default gateways. The MIS contact can help verify the network address information for the HCUs.
Designated trainees	Personnel to be trained on the system should be PC-literate.

Table 101 PathTrak Standard Components

Component	Part Number	Description
HCU1500	1010-00-0433	Mounts on 19-in equipment rack.
HCU400	1010-00-0435	Mounts on 19-in equipment rack.
RPM module	1019-00-1145	Inserted into slots on rear of HCU.
HSM1000	1010-00-0427	Connects to HCU via HSM serial cable.
PathTrak™ software	1010-00-0434	Creates and maintains PathTrak™ databases.

Table 101 PathTrak Standard Components (Continued)

Component	Part Number	Description
Installation Guide	6510-30-0416	Describes hardware installation, establishing communications, and software installation.
RPM1000 Installation Guide	6510-30-0415	Describes RPM1000 installation, removal, and set up.
RPM2000 Installation Guide	6510-30-0423	Describes RPM2000 installation, removal, and set up.
User's Guide	6710-00-0001	Describes how to use the Client software.
6P terminator	2112-20-0008	Inserted into mouse port.
HSM serial cable	1217-50-0215	Connects the HSM to the HCU.

Related information

Resources that provide additional, related information pertaining the PathTrak™ system include:

– JDS Uniphase Corporation PathTrak HFC Test & Monitoring Solution Installation Guide (P/N 6510-30-0416)

– JDS Uniphase Corporation PathTrak™ RPM1000 Installation Guide
(P/N 6510-30-0415)

– JDS Uniphase Corporation PathTrak™ RPM2000 Installation Guide
(P/N 6510-30-0423)

HCU400 specifications

Table 102 HCU400 specifications

Parameter	Specification
Height	4 rack units (4U), 6.98 in, 176.9 mm
Width/depth	19-in rack mountable
Module capacity	4 available slots for RPM modules
Data storage capacity	2 GB
Processor	Motorola Power PC single-boars computer CE marked
Communication ports	4 serial RS232, 1 10/100 baseT Ethernet, 1 parallel port
Power supply	AC auto-ranging 90 to 132 VAC and 180 to 246 VAC at 47 to 63 Hz
Operating temperature range	+0 - +50º C, 32 - 122º F

HCU1500 specifications

Table 103 HCU1500 specifications

Parameter	Specification
Height	7 rack units (7U), 12.219 in, 310.4 mm
Width/depth	19-in rack mountable
Module capacity	15 available slots for RPM modules
Data storage capacity	4 GB
Processor	Motorola Power PC single-boars computer CE marked
Communication ports	4 serial RS232, 1 10/100 baseT Ethernet, 1 parallel port

Table 103 HCU1500 specifications (Continued)

Parameter	Specification
Power supply	AC auto-ranging 90 to 132 VAC and 180 to 246 VAC at 47 to 63 Hz
Operating temperature range	+0 - +50º C, 32 - 122º F

HSM1000 modem specifications

Table 104 HSM1000 Modem Transmitter Specification

Parameter	Specification
Frequency range	5 to 1000 MHz
Frequency accuracy	@ 25º C: ±10 ppm
Range over temperature	+ 10 ppm Aging: +3 ppm/year
Tuning resolution	10 kHz
Level range	+20 to +50 dBmV
Level resolution	2 dB
Level accuracy	± 3 dB

Table 105 HSM1000 Modem In-Band Spectral Purity

Parameter	Specification
Harmonics	-30 dBc
Spurious	-35 dBc
Telemetry	Forward telemetry user-defined, 5 - 1000 MHz
Modulation	FSK, 100 kHz deviation
Spectrum required	1 MHz recommended

Table 105 HSM1000 Modem In-Band Spectral Purity

Parameter	Specification
Spectral occupancy	-15 dBc @ 500 kHz offset -34 dBc @ 1 MHz offset -55 dBc @ 2 MHz offset

Table 106 HSM1000 Modem Telemetry Capability

Parameter	Specification
Speed with multiple user	0.5 sec/unique display typical
HCU data interface	Serial, RS232 compatible, up to 57.6 Kbps
Auxiliary data interface	Serial, RS232 compatible, up to 57.6 Kbps

Table 107 HSM1000 Modem Physical/Operational Specification

Parameter	Specification
Height	1 rack unit (1U), 10 in
Width/depth	19-in rack mountable
Weight	7.5 lbs
Operating temperature range	+0 - +50º C, 32 - 122º F
Operating relative humidity	20% to 80% RH

Table 108 HSM1000 Modem Power Requirements

Parameter	Specification
Frequency/ power	47 to 440 Hz/ -10 w
Input voltage	85 to 264 VAC
Input current	1.2 A @ 100 VAC
Fuse	1.25 A, 250 V 5 x 20 mm SLO-BLO (2 required)

Table 108 HSM1000 Modem Power Requirements

Parameter	Specification
Input connector	Integral Combination IEC connector and fuse holder
PathTrak™ RF modem interface	RS232 compatible
RF modem/Stealth protocol	Proprietary RF FSK modem

RPM module specifications

Table 109 RPM Module specifications

Parameter	Specification
Frequency	5 to 65 MHz
Dynamic range	-40 dBmV to 50 dBmV
Resolution bandwidth	Programmable to 30, 300, 1000 kHz
Spur-free dynamic range	40 dB (TYP)
Operational temperature range & accuracy	± 2 dB @ room temperature ± 3 dB drift, -50º C
Video bandwidth	Programmable 10, 30, 100, 300, 1000 kHz
Level accuracy	± 2 dB on signal pulses > 10 µs to 100 ms
Minimum noise burst measurable	<1 µs
Dwell time	Programmable from 1 µs to 100 ms
Monitoring mode	250 maximum points frequency resolution, scan rate depends on measurement settings, typically 3 to 5 scans per sec for every port
Interactive Spectrum Analyzer mode	500 points frequency resolution, 10 measurement scans/sec

Table 109 RPM Module specifications (Continued)

Parameter	Specification
Typical spectrum update rate on remote PC (open Ethernet connection)	5 scans per sec
Recommended input level of active signals	0 to 10 dBmV

Customer Services

B

This chapter describes the customer services available through Acterna. Topics discussed in this chapter include the following:

About our services

Acterna offers an unmatched portfolio of services to deploy, support and innovate purchased equipment through its Customer Care and Global Services and Solutions organizations. Customer Care is standard with every product sale and consists of business hour technical assistance, in-warranty repair, calibration, and upgrade services. Global Services and Solutions provides professional services to optimize product capabilities and maximize efficiencies, including field engineering and deployment, technical training, product support, consulting and custom software development. Together these organizations supply the services necessary successfully utilize purchased equipment.

Customer care

Customer Care is accompanied with the sale of every Acterna product. Customer Care services include:

- Needs Analysis on Products and Services
- Comprehensive Product and Service Literature
- Pre-Sales Consulting
- Technical Assistance (Business Hour)
- Instrument Repair (Under Warranty Repair and Calibration Services)
- Immediate Return Authorizations

Contact a Customer Care representative through your local distributor or by accessing www.jdsu.com for information on upgrades, calibration, warranty policies or any of Global Services and Solutions offerings. Representatives also provide assistance with product repairs and returns.

Technical assistance (business hour)

Expert business hour technical support, including help with product configuration, circuit qualification, and complete network trouble sectionalization is provided with your product (see"Technical assis-

tance" on page xv). For around-the-clock support, 7x24 technical assistance may be purchased through Global Services and Solutions FleetCare program (see "Product support" on page 256).

Instrument repair

Our service centers provide repair, calibration and upgrade services for under warranty equipment. Acterna understands the impact of equipment down time on operations and is staffed to ensure a quick turnaround. Available services include the following:

Product Repair — All equipment returned for service is tested to the same rigorous standards as newly manufactured equipment. This ensures products meet all published specifications, including any applicable product updates.

Calibration — Acterna's calibration methods are ISO 9001 approved and based on NIST standards.

Factory Upgrades — Any unit returned for a hardware feature enhancement will also receive applicable product updates and will be thoroughly tested, ensuring peak performance of the complete feature set.

Additional repair, calibration and upgrade services are available for purchase through Global Services and Solutions (see "Product support" on page 256).

Equipment return instructions

Please contact your local Customer Care location via telephone or web site for Return or Reference Authorization to accompany your equipment. For each piece of equipment returned for repair, attach a tag that includes the following information:

- Owner's name, address, and telephone number.
- The serial number, product type, and model.
- Warranty status. (If you are unsure of the warranty status of your instrument, contact Acterna Customer Care.)
- A detailed description of the problem or service requested.
- The name and telephone number of the person to contact regarding questions about the repair.

– The return authorization (RA) number (US customers), or reference number (European Customers).

If possible, return the equipment using the original shipping container and material. If the original container is not available, the unit should be carefully packed so that it will not be damaged in transit; when needed, appropriate packing materials can be obtained by contacting Acterna Customer Care. Acterna is not liable for any damage that may occur during shipping. The customer should clearly mark the Acterna-issued RA or reference number on the outside of the package and ship it prepaid and insured to Acterna.

Warranty information

The warranties described herein shall apply to all commercially available Acterna products. Any additional or different warranties shall apply only if agreed to by Acterna in writing. These warranties are not transferable without the express written consent of Acterna.

Hardware Warranty — Acterna warrants that Hardware Product sold to customer shall, under normal use and service, be free from defects in materials and workmanship. Information regarding the specific warranty period for this product can be obtained by contacting your local Acterna Customer Service Representative, or at our web site www.jdsu.com. If installation services have been ordered, the warranty period shall begin on the earlier of (1) completion of installation, or (2) thirty (30) days after shipment to Customer. If Installation Services have not been ordered, the warranty period shall begin upon shipment to Customer. Hereafter these periods of time shall be collectively referred to as the “Initial Warranty Period.”

Acterna’s obligation and customer’s sole remedy under this Hardware Warranty is limited to the repair or replacement, at Acterna’s option, of the defective product. Acterna shall have no obligation to remedy any such defect if it can be shown: (a) that the Product was altered, repaired, or reworked by any party other than Acterna without Acterna’s written consent; (b) that such defects were the result of customer’s improper storage, mishandling, abuse, or misuse of Product; (c) that such defects were the result of customer’s use of Product in conjunction with equipment electronically or mechanically incompatible or of an inferior quality; or (d) that the defect was the result of damage by fire, explosion, power failure, or any act of nature.

Acterna performed repairs shall be warranted from defective material and workmanship for a period of one-hundred-eighty (180) days, or until the end of the Initial Warranty Period, whichever is longer. Risk of loss or damage to Product returned to Acterna for repair or replacement shall be borne by customer until delivery to Acterna. Upon delivery of such product, Acterna shall assume the risk of loss or damage until that time that the product being repaired or replaced is returned and delivered to customer. Customer shall pay all transportation costs for equipment or software shipped to Acterna for repair or replacement. Acterna shall pay all transportation costs associated with returning repaired or replaced product to customer.

Software Warranty — Acterna warrants that Software Products licensed to Customer shall, under normal use and service, and for a period of ninety (90) days from the date of shipment of the Software to Licensee (the “Warranty Period”), perform in all material respects in accordance with the published specifications for such Software as established by Acterna. However, Acterna does not warrant that the Software will operate uninterrupted or error free, operate in the combination with other software, meet Customer’s requirements, or that its use will be uninterrupted.

Acterna’s obligation and Customer’s sole and exclusive remedy under this Software Warranty is limited to, at Acterna’s option, either (i) correcting the material errors reported to Acterna in writing by Customer during the Warranty Period and which Acterna is able to reproduce, (ii) replacing such defective Software, provided that Acterna received written notice of such defect within the Warranty Period, or (iii) provided that Acterna received written notice of such defect within the Warranty Period, terminating the License and, upon return to Acterna of the Software, Documentation and all other materials provided by Acterna under the applicable License, providing Customer with a refund of all charges paid with respect thereto. Acterna shall have no warranty obligations hereunder if (a) the Software is altered or modified or is merged with other software by Customer or any third party or (b) all or any part of the Software is installed on any computer equipment other than the Designated Server or used with any operating system for which the Software is not designed.

Services Warranty — Acterna warrants that the Services provided by Acterna, if any, shall be performed promptly, diligently and in a professional manner in accordance with the commercial standards of the industry. Acterna shall not, however, be respon-

sible for any delays that are not due to Acterna's fault or negligence or that could not have reasonably been foreseen or provided against.

WARRANTY DISCLAIMER — FOR HARDWARE, SOFTWARE, AND/OR SERVICES FURNISHED BY ACTERNA, THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTEES AND CONDITIONS, EXPRESS OR IMPLIED. ACTERNA SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, ON ANY HARDWARE, SOFTWARE, DOCUMENTATION OR SERVICES INCLUDING BUT NOT LIMITED TO WARRANTIES RELATING TO QUALITY, PERFORMANCE, NONINFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AS WELL AS THOSE ARISING FROM ANY COURSE OF DEALING, USAGE OR TRADE PRACTICE. UNDER NO CIRCUMSTANCES WILL ACTERNA BE LIABLE FOR ANY INDIRECT OR CONSEQUENTIAL DAMAGES RELATED TO BREACH OF THIS WARRANTY.

Global services and solutions

Global Services and Solutions markets a broad portfolio of services to enable customers to aggressively build their competitive advantage within the markets they serve. Global Services and Solutions innovative offerings respond to our customers' dynamic needs:

– System deployment and field engineering services
– Technical training
– Product support
– Consulting
– Custom software development
– Integrated service programs

Additional information can also be found on our web site under Services.

System deployment and field engineering

Acterna offers a range of support services for our centralized test systems, designed around the needs of the customer's network. Field engineering and deployment services provide a variety of options for implementing the test system into the network.

Deployment — Thorough deployment process covers the initial site survey through hardware and software installation, allowing rapid integration of systems product into customers' environment without the use of their own resources. Deployment includes survey, configuration, installation of hardware and software, site planning, cabling, acceptance testing, staging, certification and system documentation.

Basic Service for Systems — In today's fast-paced world of communications, network operators are deploying increasingly complex communications test and management systems. Acterna's Basic Service for Systems is designed to provide the system experts, support and methodologies to facilitate the integration of systems products into customers' environments. Basic Service for Systems encompasses system deployment, training, software upgrades, technical assistance and repair. This service is subject to availability, please visit www.jdsu.com or contact Customer Care for additional information.

Training

Acterna delivers training in instructor-led or alternative learning formats that are flexible, convenient, and timely. Our training solutions portfolio consists of network-specific test and management tools for optical transport, cable, access, data, and wireless environments.

Instructor-led training:

Public courses (Acterna sites)

Public courses help participants quickly acquire fundamental skills or broaden their communications knowledge with advanced instruction. Our courses deliver the ideal mix of theory and practice.

On-site training (Customer site)

Acterna provides practical, customized instruction at the customer's designated site. Whether your goal is to shorten turn-up times or increase operation-wide efficiency, on-site training can be a cost-effective way to train from one to 10 participants. Prior to training, the instructor contacts the customer to ensure the course content is aligned with the organization's training needs. We conduct step-by-

step reviews of current technologies and products to help both new and experienced technicians translate theory into practical, hands-on expertise.

When scheduling an on-site course, please note that Acterna requires a minimum commitment of two consecutive days of training. Courses that are only one day in duration may either be paired with another course for a minimum total of two training days, or presented on two consecutive days to different groups of participants.

Alternative learning:

Courseware licensing program and train-the-trainer

Recommended for customers with internal training departments, Acterna's Courseware Licensing Program is a fast, affordable alternative that allows our customers to train their own staff using Acterna's courseware. Each course provides comprehensive instructor and participant materials to ensure consistent content delivery for the length of the agreement. A critical part of Courseware Licensing is the Train-the-Trainer program, which prepares the organization's own instructors to deliver Acterna training courses. Courseware Licensing is sold in increments of one, two, or three years.

Computer-based training (CBT)

By blending learning with technology, Acterna's CBT program provides our customers with a cost-effective way to learn technology fundamentals and product applications. Topics include ATM, Frame Relay, ISDN, LAN Basics, Fiber Optics, and more. CBTs are designed to complement both public and on-site training; they can serve to prepare students for classroom Acterna courses or be used after instructor-led training to reinforce learning. In addition to our pre-packaged CBTs, Acterna custom-develops CBTs to meet your organization's training needs.

To enroll in a course or for more information on the variety of Acterna training programs available, call 1-800-638-2049 or visit www.jdsu.com and complete the Training Requirement Form.

Product support

To continue repair, maintenance and upgrades after a product's warranty expires, Acterna offers a variety of product support plans.

FleetCare — Designed for customers with ten or more Acterna products, FleetCare extends each product's initial factory warranty to include repair parts, labor and one-way shipping. FleetCare allows customers to upgrade the base package with a variety of options, including Calibration Plans, Calibration Plan with Manager, Loaners, 7x24 Technical Assistance and Software Enhancement Agreements.

Software Enhancement Agreements — In response to new developments in technology, Acterna continually upgrades and revises the software that drives many of its products. Software Enhancement Agreements automatically ships the latest software revisions, releases and upgrades to ensure products are operating at the most technologically advanced level.

Product Maintenance Agreements — Yearly repair and calibration maintenance agreements simplify billing and help ensure equipment is always operating at optimum levels. Product maintenance agreements can be used to extend a current warranty or provide protection for out-of-warranty units.

Repair Pricing Options — For out-of-warranty repairs, Acterna offers two additional pricing options: time and material pricing and flat rate pricing. Under time and material pricing, customers are billed for the actual cost of the repair, making this a cost-effective method for minor repairs. Under flat rate pricing, customers pay a fixed service charge to repair unit failures (excluding damage or abuse).

Consulting services

To quickly improve our customer's efficiency and productivity, Acterna offers personalized consulting programs designed to meet specific client needs. Our consulting staff will work as part of your team, providing a valuable blend of subject matter proficiency, an in-depth test and measurement systems perspective, and trusted telecommunications industry vision.

Methods and Procedure Development — Acterna's Methods and Procedure Development services include consulting with your staff and assessing your network plant's current test and turn-up procedures. After evaluating the skill level of your workforce in specific technologies and procedures, an Acterna team of experts identifies potential areas of improvement and makes appropriate recommendations in a formal implementation plan. Depending on your staff 's level of expertise, test procedures can be written to any level of detail, from

general methods and procedures to detailed “button-by-button" test and network equipment-specific procedures. In addition, Acterna’s experts offer hands-on training for your field technicians and can resolve specific problems at the central office. Acterna develops test plans and procedures for Service Providers, End-users and Manufacturers of Network Equipment.

Test Automation — With Acterna’s Test Automation Development, a team of experts can develop customized automated and remote testing solutions so that you can keep your network functioning at peak levels. After consulting with you, the Acterna team can determine which of Acterna’s test and analysis equipment and automation platforms can best streamline your testing processes, data analysis, and test result storage methods. The consulting team can develop and integrate automated testing applications on customers’ currently installed computer platforms that match existing methods and procedures. An Acterna team of consultants can assist customers throughout every stage of the development and implementation of automated and remote testing solutions. Services range from developing automated scripts to integrating customized software applications to developing drivers to automated manufacturing tests.

On-site Test and Measurement Service — Acterna On-site Test and Measurement Service provides testing expertise to expedite the implementation, turn-up, and provisioning of network services. Applying their knowledge to your specific network requirements, Acterna’s network consultants can quickly verify transmission systems’ implementation, assess a fiber plant’s suitability for advanced services, future-proof your system. Because incomplete testing often results in crippling losses of revenue, carriers and providers must operate their networks with a very low margin of error. Difficulties in ensuring network performance are further compounded when technicians must employ unfamiliar yet critical test and measurement processes. But with Acterna’s dedicated, highly skilled team of professionals providing communications test and measurement solutions, your staff can concentrate on performing value-added services that will maximize your profitability.

Integrated service programs

Service Dollars (North America only) — To deliver the highest level of support with your product purchase, Acterna offers Service Dollars. Services Dollars can be purchased at anytime, for each Acterna instrument. If purchased at the same time as your product, Service Dollars

are discounted 20 percent. This is a significant savings, as Service Dollars can be used towards the purchase of any of Global Services and Solutions offerings. Service Dollars are also flexible in the fact that they can be purchased at anytime and then used later towards the specific service that best fits your support needs.

Test and Measurement Regional Sales

North America	Latin America	Asia Pacific	EMEA	www.jdsu.com
Toll Free: 1 800 638 2049 Tel: +1 240 404 2999 Fax:+1 240 404 2195	Tel: +55 11 5503 3800 Fax:+55 11 5505 1598	Tel: +852 2892 0990 Fax:+852 2892 0770	Tel: +49 7121 86 2222 Fax:+49 7121 86 1222	

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