860 DSPh™
Remote Head-End Analyzer

Operation Manual

think ahead.

TRILITHIC

Trilithic Company Profile

Trilithic is a privately held manufacturer founded in 1986 as an engineering and assembly company that built and designed customer-directed products for telecommunications, military, and industrial customers. From its modest beginnings as a two-man engineering team, Trilithic grew over the years and broadened its offerings of RF and microwave components by adding broadband solutions to its product line. This was accomplished with the acquisition of components manufacturer Cir-Q-Tel and instruments manufacturer Texscan.

Today, Trilithic is an industry leader providing telecommunications solutions for major broadband, RF, and microwave markets around the world. As an ISO 9000:2001 certified company with over 40 years of collective expertise in engineering and custom assembly, Trilithic is dedicated to providing quality products, services, and communications solutions that exceed customer expectations.

Trilithic is comprised of five major divisions:

- **Broadband Instruments and Systems**
  Offers test, analysis, and quality management solutions for the major cable television systems worldwide.
- **Telecom Solutions**
  Offers affordable, easy-to-use instruments for testing and measurement of Telecom networks.
- **RF Microwave Components**
  Provides components and custom subsystems for companies specializing in cellular, military, and other wireless applications.
- **Emergency Alert Systems**
  Leading supplier of government-mandated emergency alert systems used by broadcast TV, cable TV, IPTV, DBS, and radio stations.
- **XFTP**
  Offers a specialty line of field technical products for cable operators and technicians, as well as a line of products for installing electronics in the home of the future.

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Table of Contents

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Chapter 1

General Information

Helpful Website

The following website contains general information which may be of interest to you:

http://www.trilithic.com

Trilithic's website contains product specifications and information, tips, release information, marketing information, Frequently Asked Questions (FAQs), bulletins and other technical information. You can also check this website for product updates.

Where to Get Technical Support

Trilithic technical support is available Monday through Friday from 8:00 AM to 5:00 PM EST. Callers in North America can dial 317-895-3600 or 800-344-2412 (toll free). International callers should dial 317-895-3600 or fax questions to 317-895-3613. You can also e-mail technical support at *techsupport@trilithic.com*.

For quicker support response when calling or sending e-mail, please provide the following information:

- Your name and your company name.
- The technical point of contact (name, phone number, e-mail).
- Product name, model number, and serial number.
- A detailed description of the problem you are having, including any error or information messages.

How this Manual is Organized

This manual is divided into the following chapters:

- Chapter 1, “General Information” provides Trilithic contact information and describes how this Operation Manual is structured.
- Chapter 2, “Introduction” introduces what the 860 DSPh is and what the 860 DSPh does. This chapter discusses the practical application of the 860 DSPh. Finally, this chapter will also explain the connections and controls of the 860 DSPh.
- Chapter 3, “Installation” describes the steps needed to install the 860 DSPh.
- Chapter 4, “Initial Configuration” describes the steps needed to perform the initial configuration of the 860 DSPh.
- Chapter 5, “WorkBench Setup” describes the steps needed to perform the setup of the 860 DSPh using the WorkBench software.
- Chapter 6, “Viewing Information” describes how to view and analyze measurements from the 860 DSPh.
- Chapter 7, “Specifications” shows the technical specifications of the 860 DSPh.

Conventions Used in this Manual

This manual has several standard conventions for presenting information.

- Connections, menus, menu options, and user-entered text and commands appear in **bold**.
- Section names, web and e-mail addresses appear in *italics*.

A <u>WARNING</u> alerts you to any condition that could cause personal injury.

A <u>CAUTION</u> alerts you to any condition that could cause a mechanical failure or potential loss of data.

A <u>NOTE</u> is information that will be of assistance to you related to the current step or procedure.

Precautions

A strong electromagnetic field may affect the accuracy of the 860 DSPh measurements.

Exposure of data cables to a field with high-voltage and fast transient signals may cause measurement errors in the 860 DSPh.

A shielded CAT-5 cable is recommended for Ethernet connection.

Do not use the 860 DSPh in any manner not recommended by the manufacturer.

Chapter 2
Introduction

This chapter:

- Describes the purpose of the 860 DSPh
- Lists the features of the 860 DSPh

Purpose

The 860 DSPh monitors downstream RF spectrum information in your headend or distribution hub. It is a network accessible 5 MHz to 1,000 MHz measurement device and has 4 standard inputs (16 with the optional input expander) that can each be independently configured as test points with a channel plan and a set of alarm limits. Whenever your 860 DSPh detects that a channel has exceeded one of its alarm limits, it sends an SNMP trap message to your network management software package (for example, Trilithic's Interrogator software).

Features

- 24/7 Monitoring - Catches problems early by automatically scanning levels and other key parameters.
- Issues SNMP Traps to notify user of problems
- Remote control lets user take a closer look without driving to the location
- Remote access with browser enables analysis of head-end or distribution hub levels with browser-equipped analyzer

Available Configurations

Trilithic offers two different models of the 860 DSPh.

- **US Unit** - with Internal Power Supply (P/N 2011006001)
- **European Unit** - with External Power Supply (P/N 2011006003)

Optional Equipment

The 860 DSPh comes standard with four measurement inputs. For systems that require more than four measurement inputs, Trilithic offers the 860 DSPh Input Expander (P/N 2011013000). The 860 DSPh Input Expander increases the total number of measurement inputs to sixteen.

Equipment Supplied with the 860 DSPh

US Units (P/N 2011006001)

Include the following equipment:

- Rack-mounted 5 to 1,000 MHz Remote Head-End Analyzer
- RS-232 Serial Cable (9-pin straight through)
- 90 to 240 VAC US power cable with internal power supply
- WorkBench Lite configuration software
- User's manual

European Units (P/N 2011006003)

Include the following equipment:

- Rack-mounted 5 to 1,000 MHz Remote Head-End Analyzer
- RS-232 Serial Cable (9-pin straight through)
- 90 to 240 VAC US and Euro power cables with external AC to DC power adapter
- WorkBench Lite configuration software
- User's manual

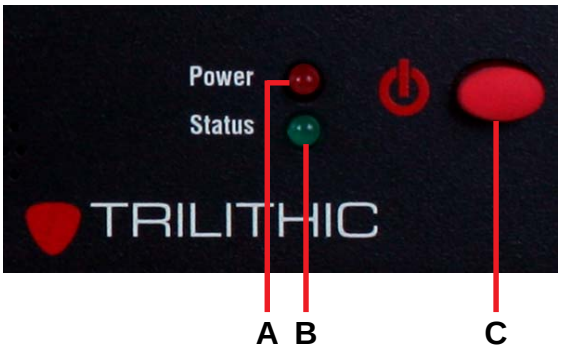
Equipment Supplied with the 860 DSPh Input Expander

The 860 DSPh Input Expander (P/N 2011013000) includes the following equipment:

- Rack-mounted Input Expander with 16 measurement inputs
- Installation Guide
- Four (4) RF Jumper Cables
- 860 DSPh to 860 DSPh Input Expander Control Cable

Overview of the 860 DSPh

Front Panel View



A. Power Indicator LED (Red)
This LED will blink if there is a problem with the unit. The blink sequence is ON for 1 second with the corresponding number of blinks during the next second as follows.

- 0 Blinks: No problems needing attention.
- 1 Blink: Check for user configuration connection; WorkBench or HyperTerminal is talking or a serial cable is connected to the RS-232 port.
- 2 Blinks: Check for user configuration problem; no channel plan or no network configuration.
- 3 Blinks: Check for hardware malfunction; tuner not responding.
- 4 Blinks: Should only be seen at factory.
- 5 Blinks: Should only be seen at factory.

B. Status Indicator LED (Green)
This LED will blink when the unit is taking measurements.

C. Reset Button
This button is used to reset the unit power when needed.

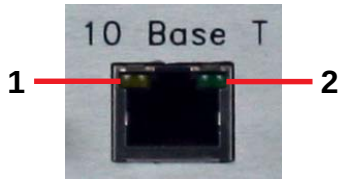
Rear Panel View

A. **Expansion** - Control cable connection for optional 860 DSPh Input Expander

B. **RS-232** - Serial cable communications connection (Initial configuration)

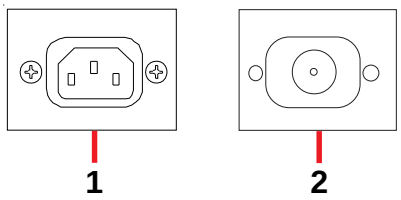
C. **ETHERNET** - Network communications connection (RJ-45)
This ethernet connection has two LEDs that show the following states.

1. Rx LED (Yellow) - The LED will blink when network communication is taking place.
2. Tx LED (Green) - The LED will blink when 860 DSPh communication is taking place.



D. **Measurement Inputs** - RF signal input connection 1 through 4

E. **Power Supply** - The 860 DSPh includes one of the following power connectors:



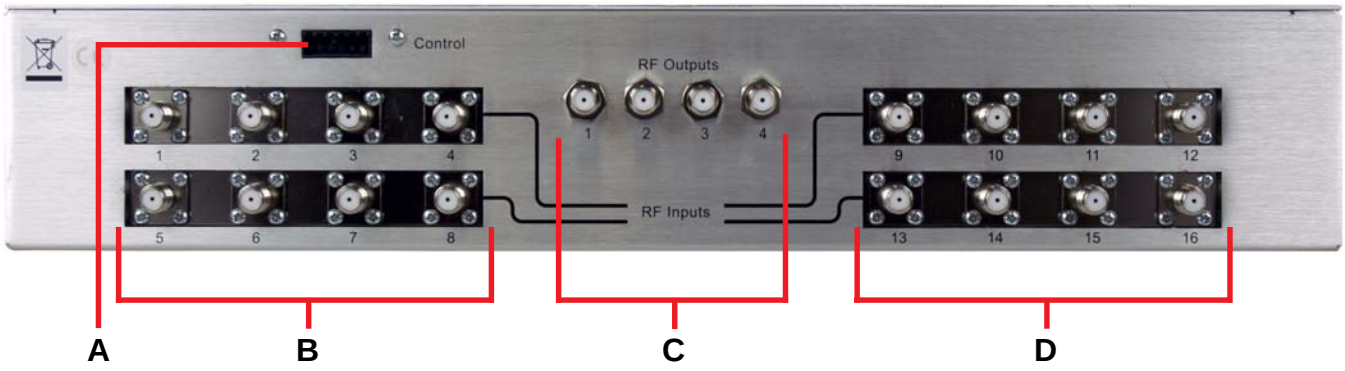
1. **100-240 VAC (US Units)** - AC Power Connector using 110-240 VAC 1A line voltage. This option includes a built-in transformer which is set to the specified line voltage at the factory.
2. **15 VDC (European Units)** - DC Power Connector using 15 VDC from an external power adapter that may be used with AC MAINS of 110-240 VAC.

Overview of the 860 DSPh Input Expander

Front Panel View

Power Indicator LED (Red) - This LED be ON when the 860 DSPh Input Expander is connected to a powered 860 DSPh using the included control cable.

Rear Panel View



A. **Control** - Control cable from the 860 DSPh Remote Head-End Analyzer

B. **Measurement Inputs** - RF signal input connection 1 through 8

C. **Measurement Outputs** - RF signal output connection 1 through 4 (to the 860 DSPh)

D. **Measurement Inputs** - RF signal input connection 9 through 16

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Chapter 3
Installation

This chapter:

- Provides information on the installation of the 860 DSPh and 860 DSPh Input Expander (Optional).

Prerequisites

Equipment and Software Required to Install the 860 DSPh:

- Laptop or PC with one available serial port.
- 9 pin to 9 pin straight through serial cable

Integration of the 860 DSPh Into Your System

Because there is no right or wrong place in your cable system to integrate your DSPh, you should determine locations that best fit the needs of your particular system.

One suggestion would be to test at different points in the combining network to get a picture of how the different zones within your network are operating. Another would be to monitor the downstream output to specific nodes.

Also, keep in mind that since each node/input can be configured with a different set of limits, the user may effectively increase or decrease limit granularity by connecting the same combining network test point to multiple DSPh inputs/nodes.

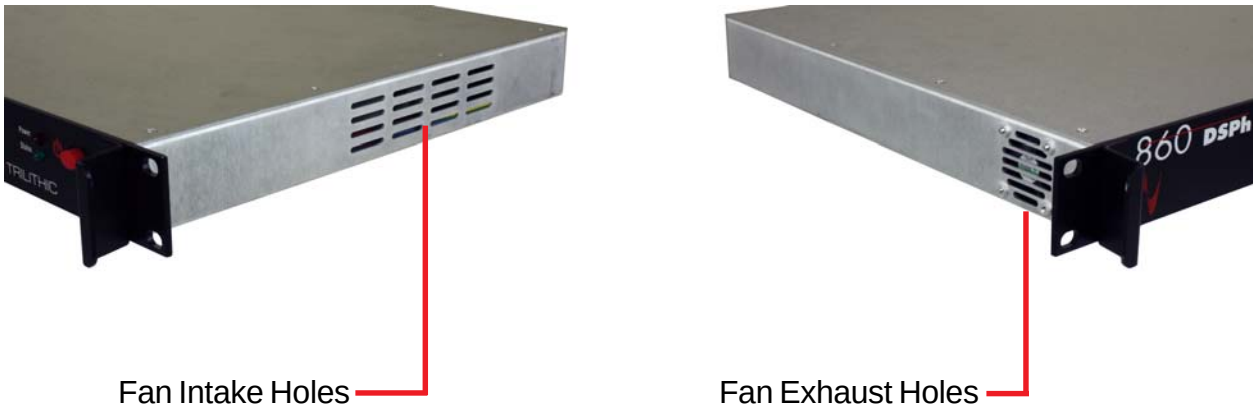
Installing the 860 DSPh and Input Expander

The following section explains the procedure used to physically install the 860 DSPh and 860 DSPh Input Expander. In order to properly setup the 860 DSPh the following steps must be completed in this order. Do not skip any steps.

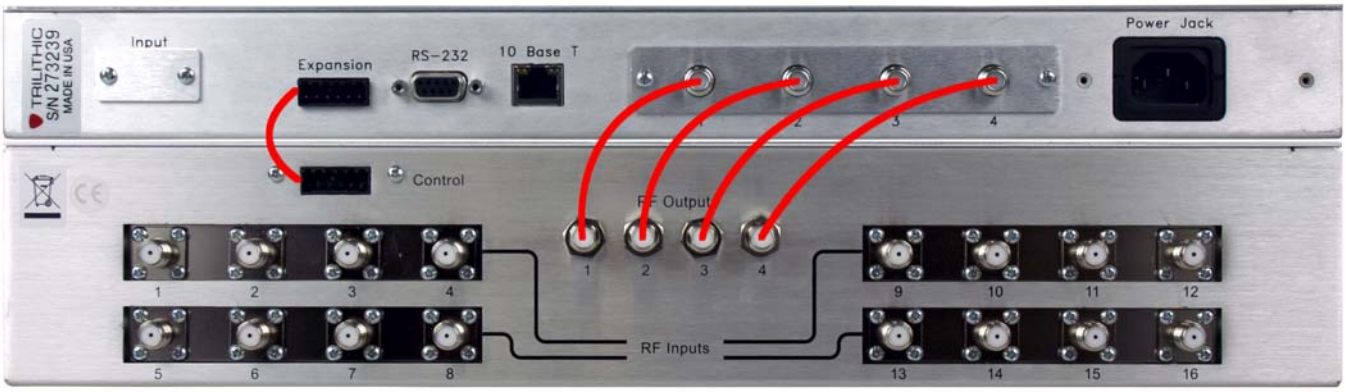
DO NOT plug in the 860 DSPh power cord until instructed to.

1. Mount the 860 DSPh in a standard rack using four retaining screws. If you are not installing an 860 DSPi Input Expander, proceed to Step 4.

> **CAUTION** ***Make sure the fan intake holes on the right of the 860 DSPh and the fan exhaust holes on the left of the 860 DSPh remain unblocked.***



2. Mount the 860 DSPh Input Expander in a standard rack directly below the 860 DSPh using four retaining screws.
3. Connect the Control Cable and RF Jumper Cables that are included with the 860 DSPh Input Expander to the 860 DSPh as shown in the following image.



4. Connect the **ETHERNET** Connection of the 860 DSPh to the ethernet connection of a laptop or PC. This is a standard 10/100 Base-T connection.
5. Connect a serial cable (9 pin to 9 pin straight through) from the **RS-232** connection of the 860 DSPh to the serial port of a laptop or PC. (This port will be used for initial configuration.)
6. Connect the 860 DSPh to an AC power source. When power is supplied to 860 DSPh, the red LED on the front of the 860 DSPh and 860 DSPh Input Expander (optional) is illuminated.

If the red LED is not illuminated upon connecting power to the 860 DSPh, call Trilithic Application Support at 1-800-344-2412 for assistance.

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Chapter 4
Initial Configuration

This Chapter:

- Perform initial configuration and testing of the 860 DSPh network settings

Before Beginning

Network Information

The following network information will be needed before the 860 DSPh can be configured:

- 860 DSPh IP Address (default = 192.168.0.100) _____
- 860 DSPh Subnet Mask (default = 255.255.0.0) _____
- 860 DSPh Gateway (default = 192.168.0.1) _____
- 860 DSPh Primary DNS (no default) _____
- 860 DSPh Secondary DNS (no default) _____
- 860 DSPh Web Port (default = 80) _____

Input Information

The following input information will be needed before the 860 DSPh can be configured:

Input Number	Input Name	Input Channel Plan Name	Input Test Point Value (dB)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			

Initial Configuration Using a Terminal Emulator

The initial network settings can be set using a terminal emulator as follows:

NOTE

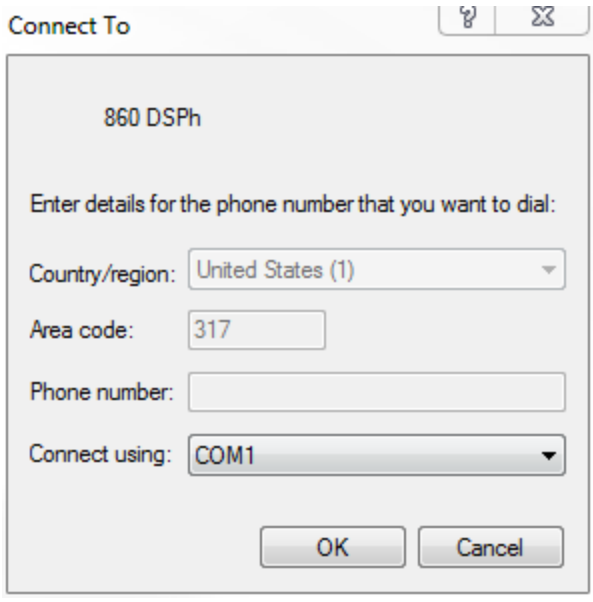
This part of the configuration MUST be done onsite with the 860 DSPh connected to a laptop or PC via the serial port connection.

NOTE

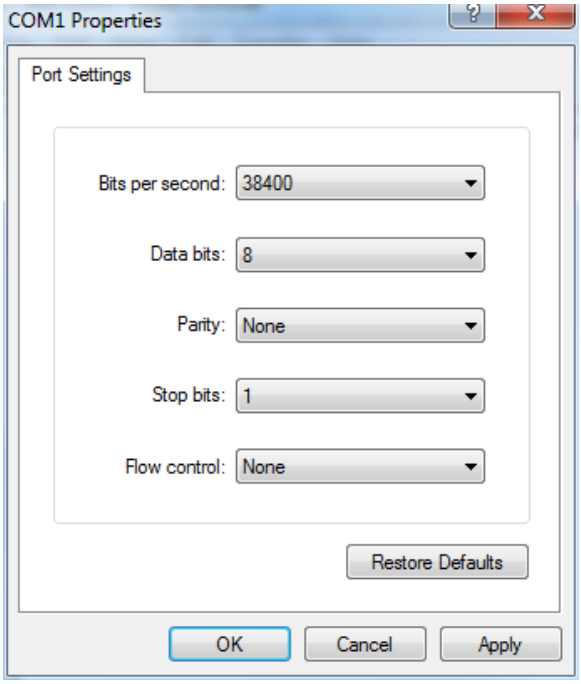
HyperTerminal is used for illustration purposes only, any terminal emulator will work with this setup procedure.

Initial Connection Using a Serial Port

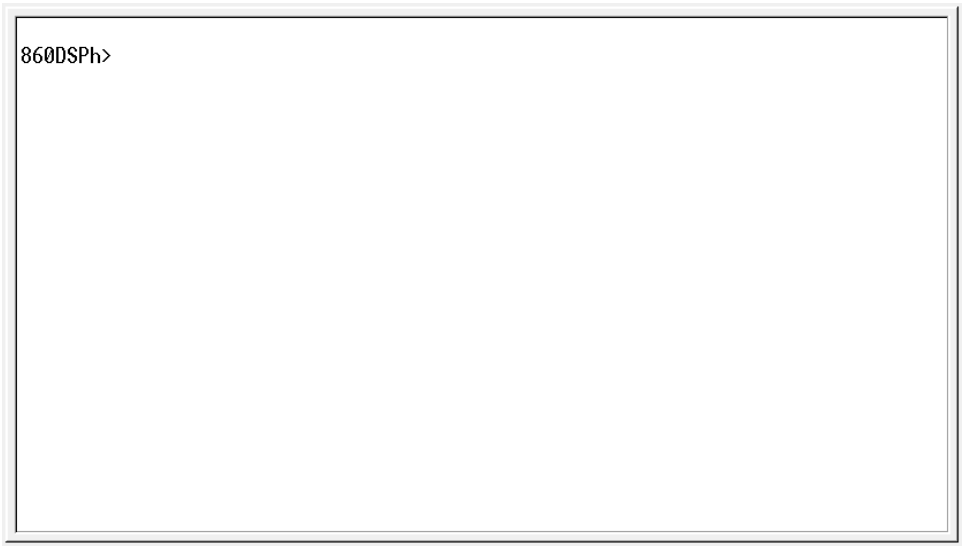
1. Start a HyperTerminal session for the serial port (COM 1) that the 860 DSPh has been connected to on a laptop or PC.



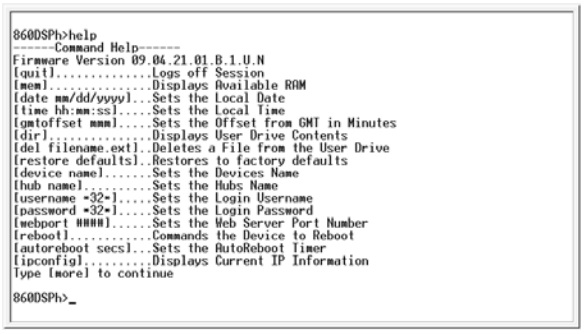
2. Configure the port setting properties for the HyperTerminal session as follows;
    - **Bits per second:** 38400
    - **Data bits:** 8
    - **Parity:** None
    - **Stop bits:** 1
    - **Flow control:** None



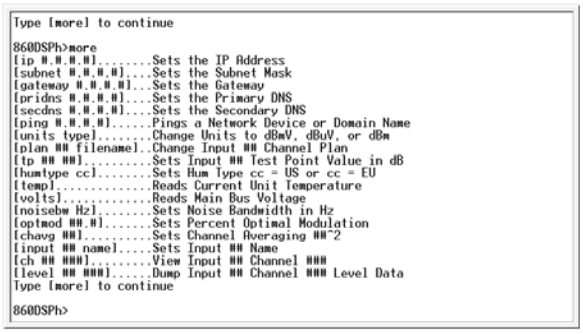
3. Connect to the 860 DSPh by selecting **OK** and then press **ENTER**. The 860 DSPh prompt will be displayed as follows;



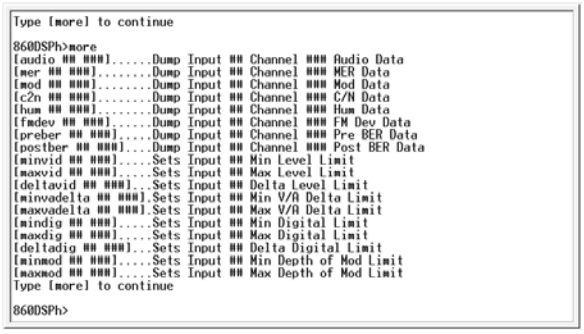
4. For a list of supported commands type **help** at the prompt. A list of the supported commands will be displayed as follows, type **more** and then press **ENTER** to see additional pages.



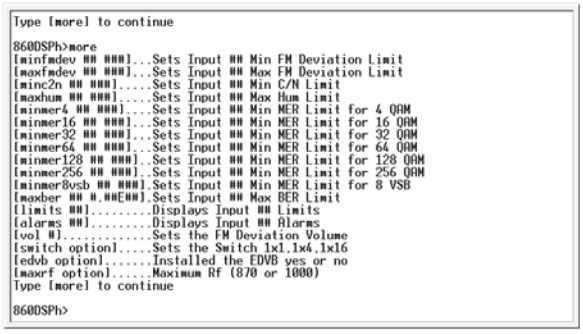
Help Screen 1



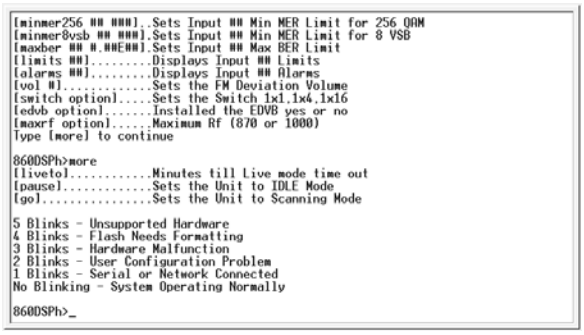
Help Screen 2



Help Screen 3



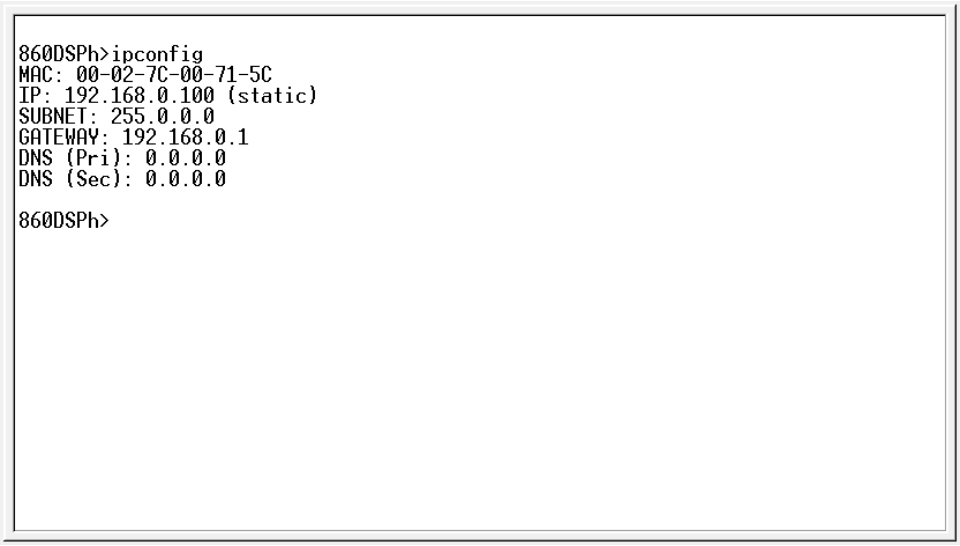
Help Screen 4



Help Screen 5

Changing Network Settings

1. To view the network configuration information, type **ipconfig** and then press **ENTER**. The network configuration information will be displayed as follows;



2. Setup the connectivity parameters by entering the IP address, Subnet address, and Gateway address as follows;
    - Type in your IP address at the prompt using the format **ip #.#.#.#** and then press **ENTER.**
    - Type in your Subnet address at the prompt using the format **subnet #.#.#.#** and then press **ENTER.**
    - Type in your Gateway address at the prompt using the format **gateway #.#.#.#** and then press **ENTER.**

NOTE

Entering an an address of 0.0.0.0 for the parameters above will allow the 860 DSPh to use DHCP protocol automatically obtain your IP, Subnet, and Gateway addresses from your DHCP server.

3. Proceed to Step 4 if you plan to send SNMP traps to named destinations instead of IP addresses. Otherwise, proceed to Step 6.
4. Type in your Primary DNS address at the prompt using the format **pridns #.#.#.#** and then press **ENTER**.
5. Type in your Secondary DNS address at the prompt using the format **secdns #.#.#.#** and then press **ENTER**.
6. When done changing the network configuration of the 8300 FST, type **reboot** and then press **ENTER**.


NOTE

Changes to the Connectivity Parameters will not take affect until the 860 DSPh is rebooted.

Initial Configuration Using WorkBench

The initial network settings can be set using the WorkBench configuration software as follows:

> NOTE
>
> ***This part of the configuration MUST be done onsite with the 860 DSPh connected to a laptop or PC via the serial port connection.***

Initial Connection Using a Serial Port

To add a new 860 DSPh to WorkBench perform the following steps:

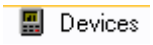
1. Perform one of the following steps to create a new connection:

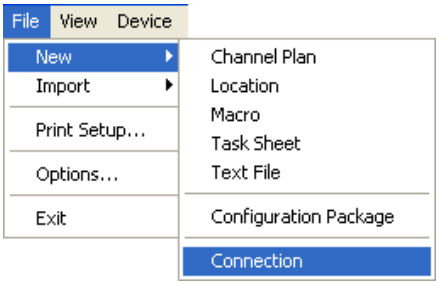
   From the **File** menu hover over **New**, and then select **Connection**.

   OR

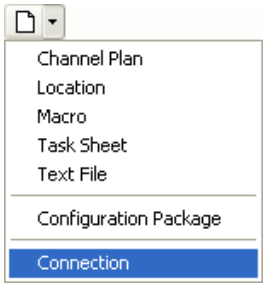
   From the Toolbar click on the  icon and then select **Connection**.

   OR

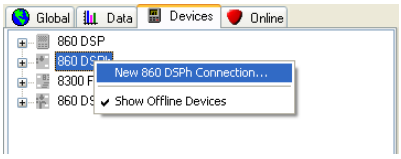
   From the  tab, right-click on 860 DSPh, and then select **New 860 DSPh Connection**.



File Menu

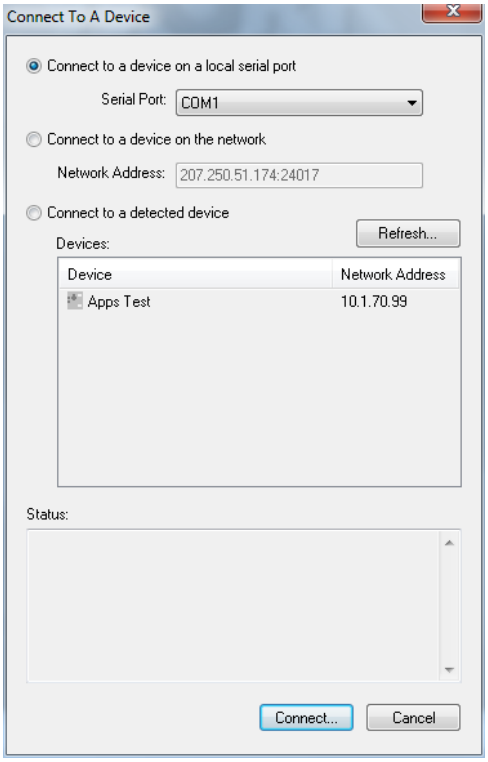


Toolbar

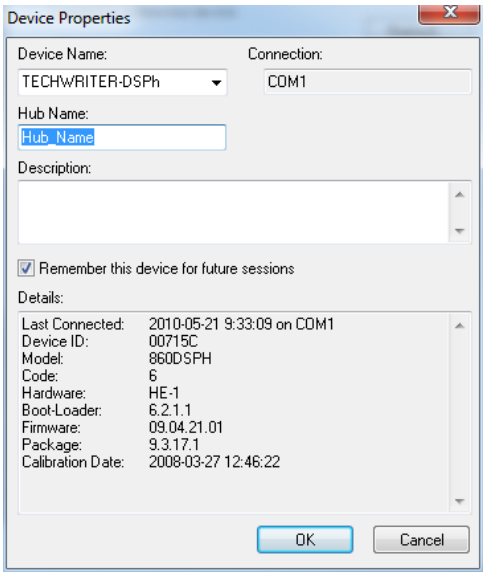


Devices Tab

2. The **Connect To a Device** window will appear. From this window you will choose how to connect to a device. Select the **Connect to a device on a local serial port** option to connect to the 860 DSPh using the serial port. From the **Serial Port** drop-down list select the serial port to which your device is connected and then select the **Connect** button.



3. When WorkBench makes a connection with your device, the software will display the **Device Properties** window for the 860 DSPh.



   Enter the following information into the corresponding fields in the **Device Properties** window:

   Device Name - Enter the name of the device.

   Hub Name - Enter the hub location of the device.

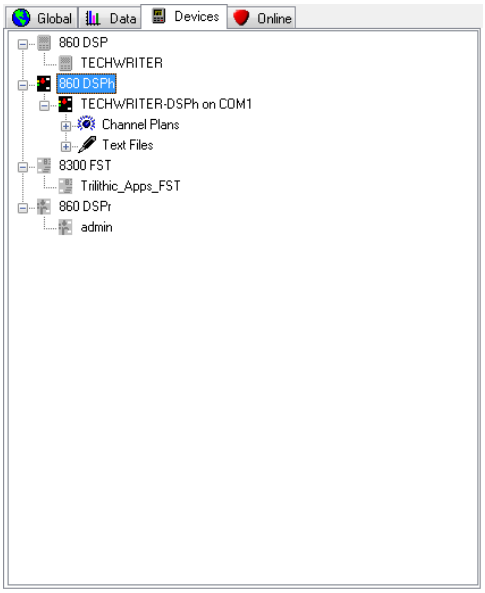
   Description - Enter any description desired to help remember important aspects of this device.

   Remember this device for future sessions - Select this check-box (selected by default if auto-connecting) if you would like WorkBench to remember this device in the future.

NOTE

The Details and Connections fields are a read-only area of the window that are provided for information purposes only.

4. When you have completed entering the information in the **Device Properties** window, select the OK button. The new device will now appear in the list of devices in the Devices tab of the **Navigator** Window as shown to the right.



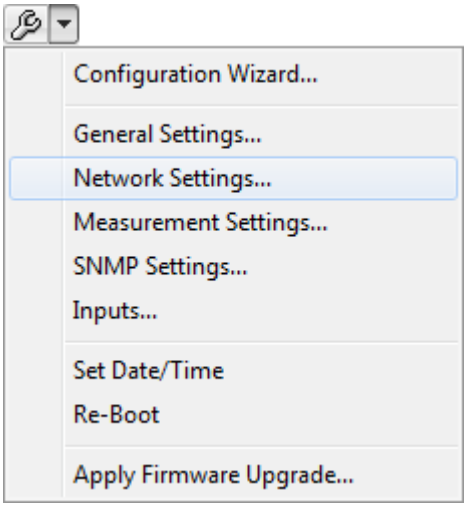
Changing Network Settings

1. To change the network configuration parameters, perform one of the following steps on the selected 860 DSPh:

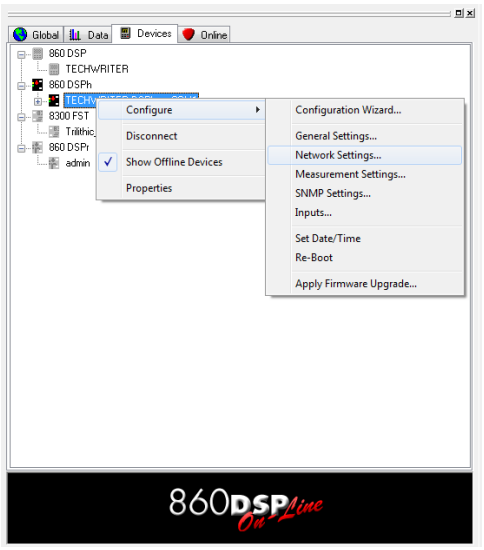
   From the Toolbar click on the down arrow next to the  button and then select **Network Settings.**.

   OR

   From the  tab, right-click on the name of the connected device, hover over **Configure**, and then select **Network Settings.**

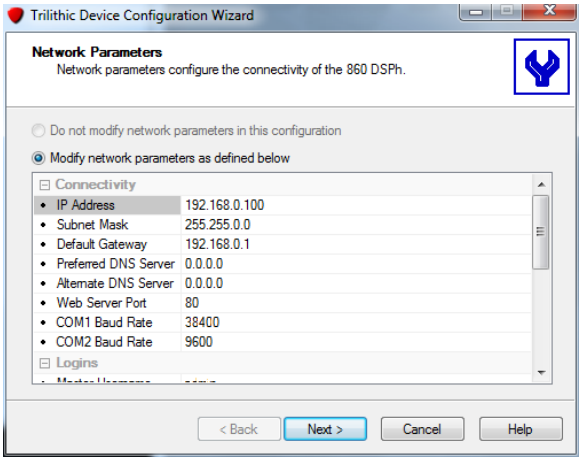


Toolbar

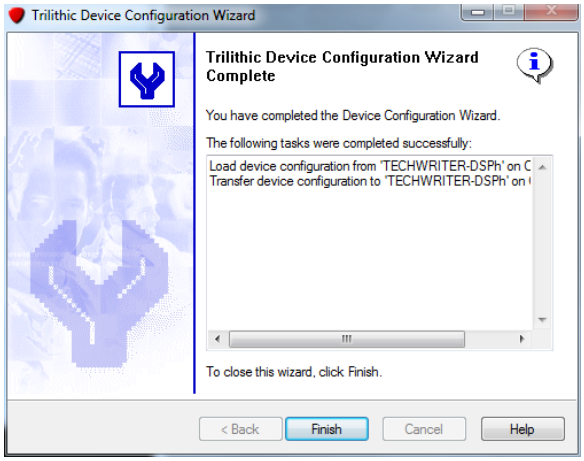


Devices Tab

2. The **Network Parameters** window will appear, make any desired changes and then select the Next > button to send the configuration parameter that you chose to modify to the connected 860 DSPh or select the Cancel button to exit without changing the network parameters.



3. After the transfer process is complete, select the Finish button.



NOTE

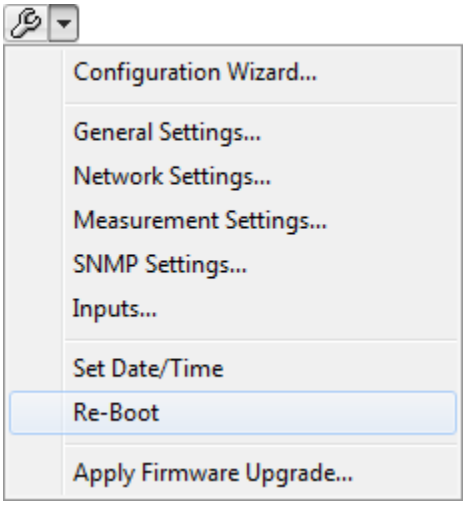
Changes to the Connectivity Parameters will not take affect until the 860 DSPh is rebooted.

4. To reboot the 860 DSPh, perform one of the following steps:

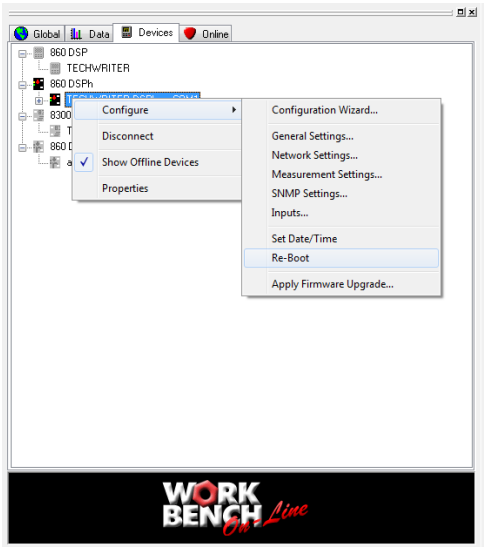
   From the Toolbar click on the down arrow next to the button and then select **Re-Boot**.

   OR

   From the Devices tab, right-click on the name of the connected device, hover over **Configure**, and then select **Re-Boot**.



Toolbar



Devices Tab

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Chapter 5
WorkBench Setup

This Chapter:

- Perform configuration of the 860 DSPh using the WorkBench configuration software

Channel Plans

A channel plan is a list of channels, frequencies, and other parameters. You may have a different channel plan for each 860 DSPh, depending on its location.

Creating Channel Plans

You can create a new channel plan or create a channel plan from an existing channel plan.

To create a channel plan, perform the following steps:

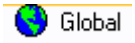
1. Perform one of the following steps to create a new channel plan:

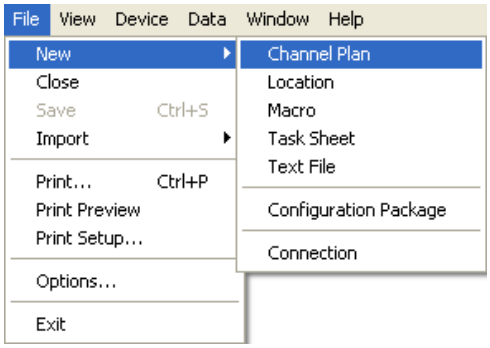
   From the **File** menu, hover over **New**, and then select **Channel Plan**.

   OR

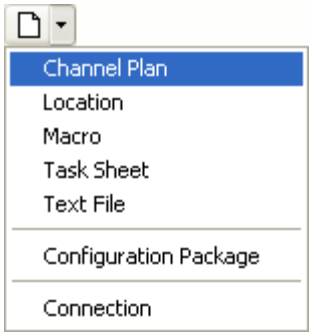
   From the Toolbar click on the  button and then select **Channel Plan**.

   OR

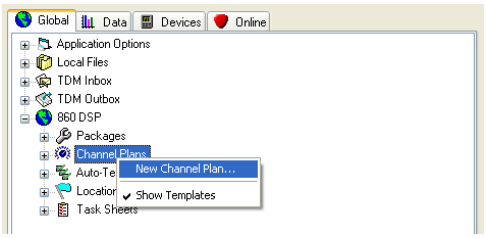
   From the  tab, right-click on **Channel Plans**, and then select **New Channel Plan**.



File Menu



Toolbar



Global Tab

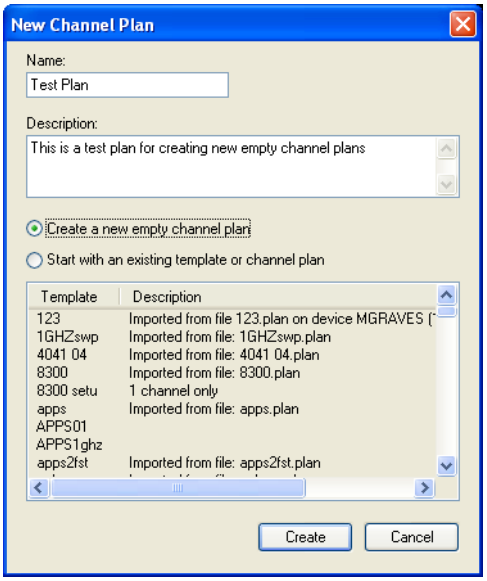
2. The **New Channel Plan** window will appear.
3. Enter the **Name** of the channel plan. This can be up to 9 alphanumeric characters.
4. Enter a **Description** of the channel plan. This can be up to 254 alphanumeric characters.

5. Perform one of the following steps to select the type of channel plan to create:

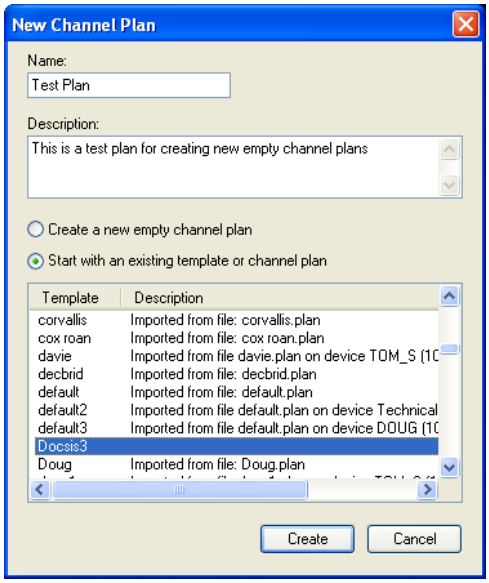
   Create a new empty channel plan - select this option to create a new channel plan starting with no information in it.

   OR

   Start with an existing template or channel plan - select this option to create a new channel plan by modifying the settings of an existing channel plan. You must also select the name of the channel plan that you wish to replicate and revise from the list at the bottom of the **New Channel Plan** window.



Empty Channel Plan



Existing Channel Plan

6. When you have completed the steps above, select the Create button to create the channel plan, or select the Cancel button to exit without creating a new channel plan.
7. The new channel plan will be displayed.

NOTE

In order to see the entire channel plan, you can hide the Navigator window by selecting the button from the toolbar.

NOTE

For more information on setting up the channels in the channel plan, see the following section.

CAUTION

After making changes to a channel plan, you must select the button from the toolbar or Save from the File menu before closing the channel plan. Otherwise, if you try to close the channel plan before saving, WorkBench will prompt you to save the channel plan.

Channel Plan Settings

The following types of channels and tests can be included in a Channel Plan:

Type	Detail	Test Types
Custom NTSC PAL B, D, G, H, I, K, M & N SECAM B, D, G, H, I, K & L Single	(Normal)	Tilt Carrier-to-Noise Hum Depth of Modulation FM Deviation
	Sync Suppressed	
	Sync Suppressed – Drop Field	
	Sync Suppressed – Drop Vertical	
	Split Sync – No Suppression	
Digital	Annex A QPSK (USER)	Tilt MER BER Pulse
	Annex A 16 QAM (USER)	
	Annex A 32 QAM (USER)	
	Annex A 64 QAM (USER)	
	Annex A 128 QAM (USER)	
	Annex A 256 QAM (USER)	
	Annex A QPSK (USER)	
	Annex C 64 QAM (USER)	
	Annex B 64 QAM (DOCSIS)	
	Annex B 256 QAM (DOCSIS)	
	Annex A 64 QAM (EURODOCSIS)	
	Annex A 256 QAM (EURODOCSIS)	
	Annex D 8 VSB (ATSC)	
	Annex A 16 QAM (1.740 msps)	
	Annex A 16 QAM (3.480 msps)	
	Annex A 16 QAM (6.840 msps)	
	Annex A 64 QAM (1.740 msps)	
	Annex A 64 QAM (3.420 msps)	
	Annex A 64 QAM (6.890 msps)	
	Annex A 64 QAM (6.925 msps)	
	Annex A 256 QAM (6.925 msps)	

Channel Settings

You can modify the following fields for each channel in a channel plan:

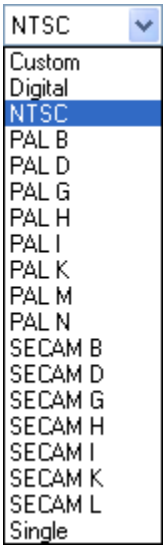
Vid/Ctr: Enter the carrier frequency of the channel in this field.

Type: Enter the type of channel in this field by performing one of the following steps:

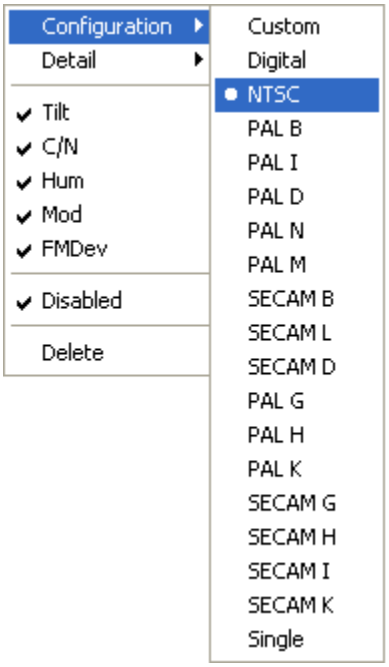
Select the channel you wish to modify and from the drop-down list select the channel type.

OR

Right-click on the channel you wish to modify, hover over **Configuration**, and then select the type from the list that appears.



Drop-Down List



Right-Click Menu

NOTE

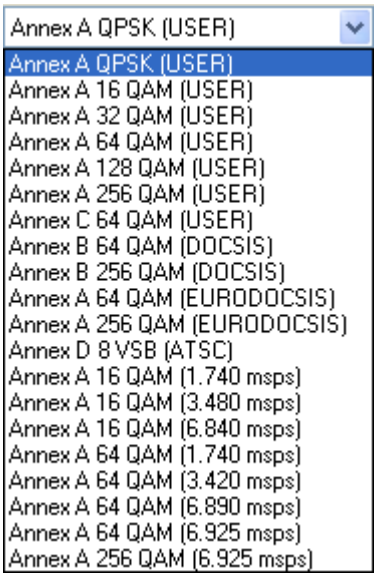
When digital channels are selected in the channel plan, the carrier frequency will default to the center frequency. Also, the label for the Vid/Ctr field will change to Ctr.

Detail: Enter the modulation details of the channel in this field by performing one of the following steps:

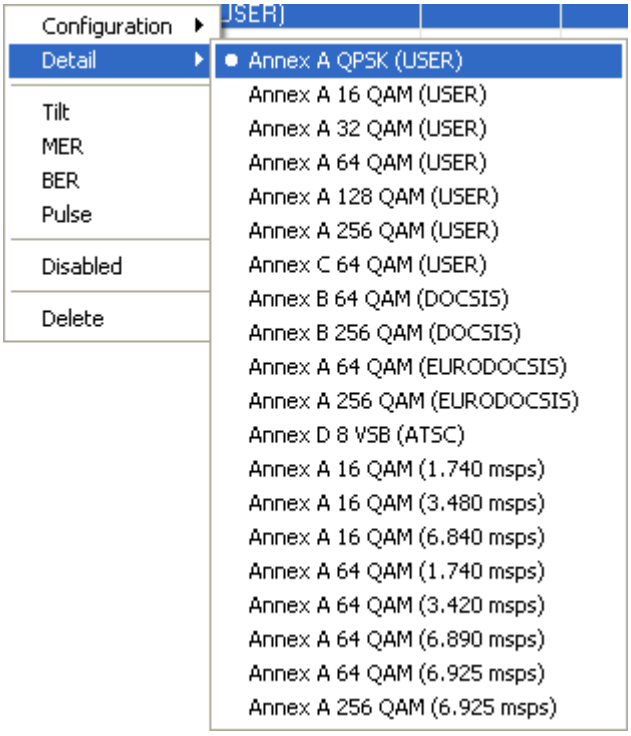
Select the channel you wish to modify and from the drop-down list select the modulation details.

OR

Right-click on the channel you wish to modify, hover over **Details**, and then select the modulation details from the list that appears.



Drop-Down List



Right-Click Menu

Aud/BW: Enter the audio frequency in this field by performing one of the following steps:

If **Type** is set to any analog analog channel type, the audio channel frequency is based on the modulation details of the channel and cannot be changed.

OR

If **Type** is set to **Digital**, enter a bandwidth between **2.00 MHz** and **8.00 MHz** in this field.

OR

If **Type** is set to **Custom**, enter a bandwidth between **5.00 MHz** and **1000.00 MHz** in this field.

OR

If **Type** is set to **Single**, this field is disabled.

When digital channels are selected in the channel plan, the carrier frequency will default to the center frequency. Also, the label for the Aud/BW field will change to BW.

SAP/SR: Enter the auxiliary audio channel of the channel in this field. If **Type** is set to **Single**, this field is disabled.

Channel: Enter the channel lineup number in this field.

Label: Enter the channel name in this field. This field allows upper and lower case alphanumeric characters as well as a variety of non-aplhanumerical characters.

You can enter another channel in the channel plan by pressing the Tab key on your keyboard or by clicking the first field in the next line.

Test Settings

Enable any of the tests shown below by performing one of the following steps:

Select the check-box in the corresponding channel plan column.

OR

Right-click on the channel you wish to modify, and then select the type of test to enable from the list that appears.

The following test are avaiable in the channel plan:

Tilt: Select this field to include the selected channel in a system tilt measurement. This field is not used by the 860 DSPh.

C/N: Select this field to enable Carrier-to-Noise measurements for analog channels.

Hum: Select this field to enable Hum measurements for analog channels.

Mod: Select this field to enable Depth of Modulation measurements for analog channels.

MER: Select this field to enable MER measurements for digital channels.

FM Dev Select this field to enable FM Deviation measurements for analog channels.

BER: Select this field to enable BER measurements for digital channels.

Pulse: Select this field to enable an 8300 FST pulse channel for the digital channel. Pulse channels are not used by the 860 DSPh and will be skipped while scanning (monitoring).

Disabling Channels

To disable a channel in the channel plan, select the corresponding check-box in the **Disable** column.

After making changes to a channel plan, you must select the button from the toolbar or Save from the File menu before closing the channel plan. Otherwise, if you try to close the channel plan before saving, WorkBench will prompt you to save the channel plan.

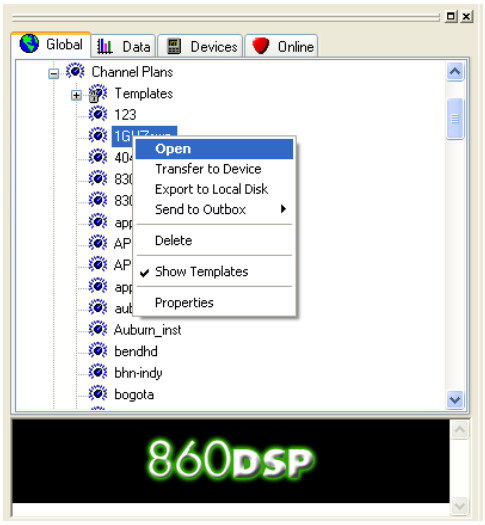
Opening & Closing Channel Plans

You can use the WorkBench software to open any of the included channel plan templates or any channel plans that you have created. To open any channel plan, perform one of the following actions:

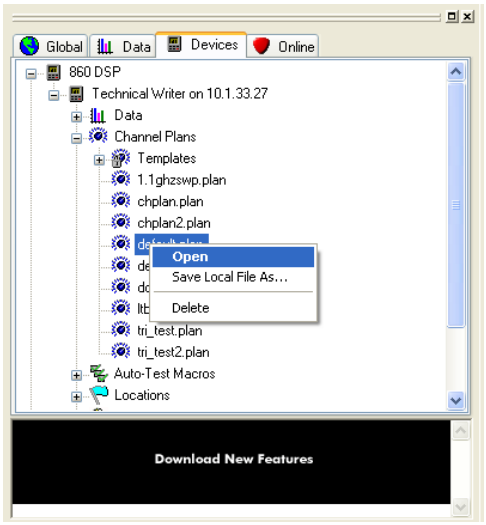
From the Global tab, right-click on the channel plan(s) to open, and then select **Open**.

OR

From the Devices tab, right-click on the channel plan(s) to open, and then select **Open**.



Global Tab



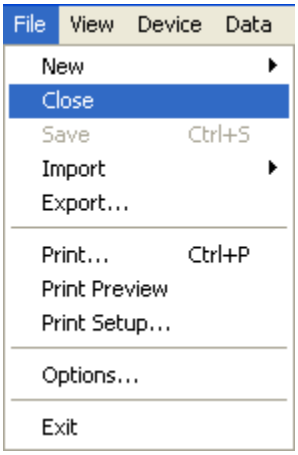
Devices Tab

To close any channel plan that is open, perform one of the following actions:

From the **File** menu, select **Close**.

OR

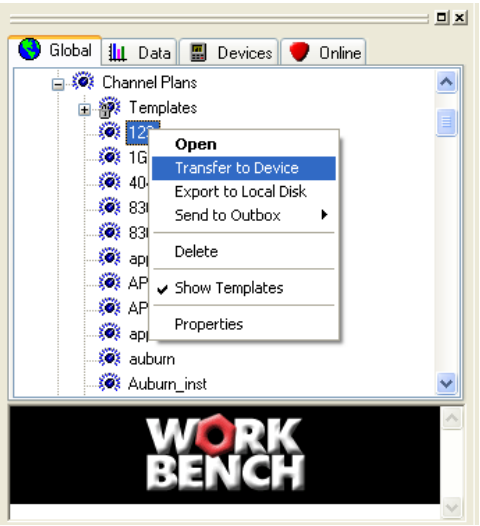
Select the gray "X" in the upper right corner of the **Data** window.



Transferring Channel Plans to Devices

You can use the WorkBench software to transfer any channel plan templates or channel plan to a connected device. To transfer any channel plan, perform the following actions:

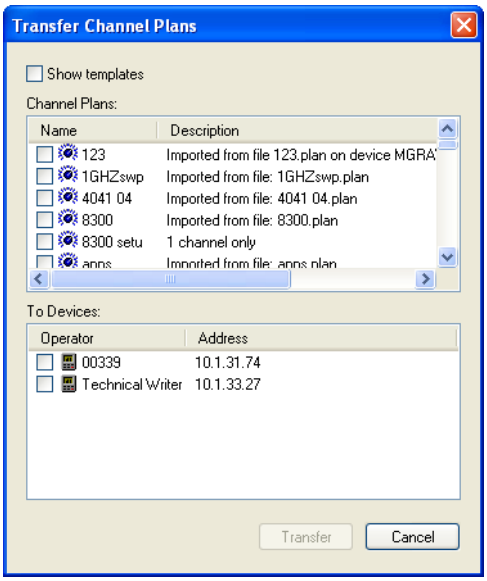
1. From the Global tab, right-click on the desired channel plan(s) to transfer, and then select **Transfer to Device**.



NOTE

If only one device is connected, the channel plan will automatically be transferred to the device without any other user interaction.

2. If more than one device is connected the **Transfer Channel Plans** window will appear.
3. Select the channel plans you wish to send.
4. Select the device(s) that you wish to send the selected channel plans to.
5. Select the Transfer button to transfer the channel plans or select the Cancel button to exit without transferring.



Saving Channel Plans to a Local File

You can save channel plans to your local drive to allow you to move data from one WorkBench software installation to other WorkBench software installations within your company.

Perform the following steps to save a local copy of any of the channel plans described earlier in this chapter:

1. Perform one of the following steps to select the channel plan(s) to save:

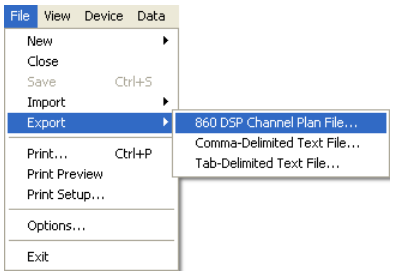
   After opening a channel plan, from the **File** menu hover over **Export**, and then select **860 DSP Channel Plan File**.

   OR

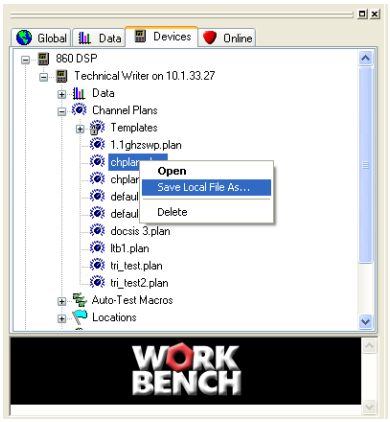
   After connecting to a device, from the Devices tab, right-click on the desired channel plan(s) to save, and then select **Save Local File As**.

   OR

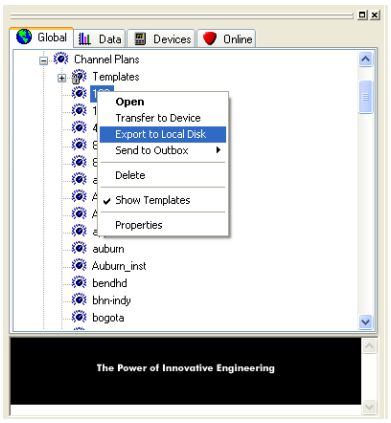
   From the Global tab, right-click on the desired channel plan(s) to save, and then select **Export to Local Disk**.



File Menu



Devices Tab



Global Tab

NOTE

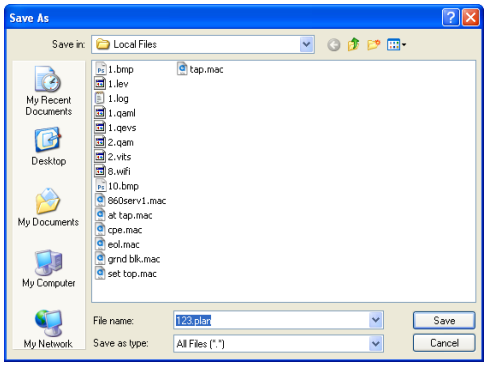
To select more than one channel plan at once for batch processing, select the first channel plan that you would like to save, and then hold the CTRL key on your keyboard while using your mouse to select the other channel plans.

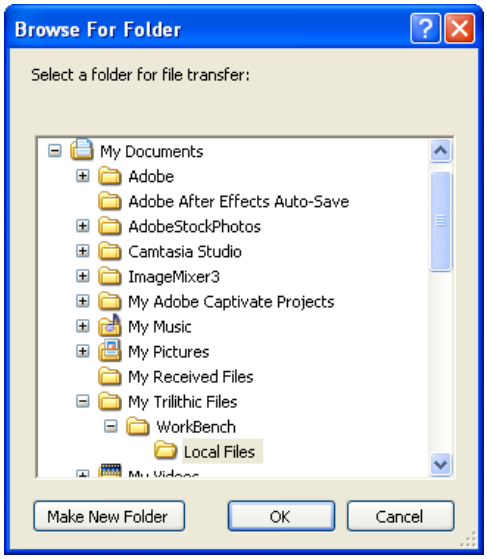
2. Perform one of the following steps to save the local channel plan file(s):

   If you selected only one file to save, The **Save** window will appear. From this window you will choose the location and name of the channel plan to save and then select the Save button.

   OR

   If you selected more than one file to save, The **Browse For Folder** window will appear. From this window you will choose the location to save the channel plans to and then select the OK button.



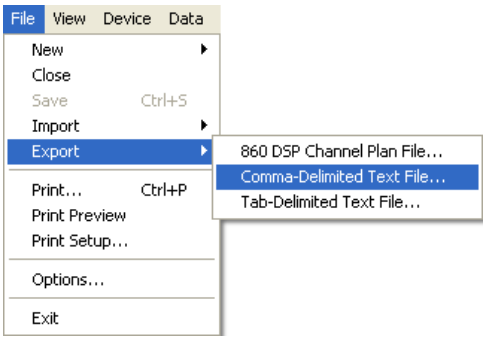


Exporting Channel Plans to a Text File

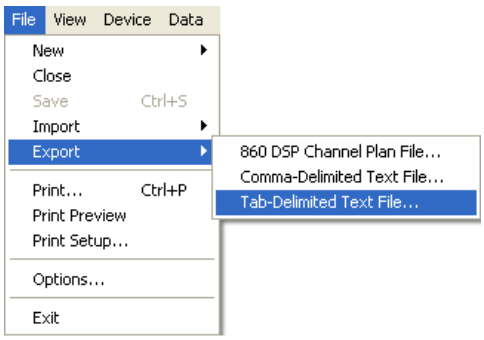
You can export channel plans to text files for use outside of WorkBench.

Perform the following steps to export any of the channel plans described earlier in this chapter:

1. Open the channel plan that you wish to export.
2. From the **File** menu hover over **Export**, and then select one either of the following options **Comma-Delimited Text File** or **Tab-Delimited Text File**.

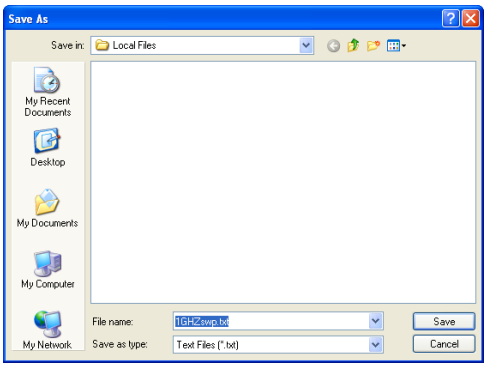


Comma-Delimited



Tab-Delimited

3. The **Save As** window will appear. From this window you will choose the location and name of the channel plan to save and then select the Save button.

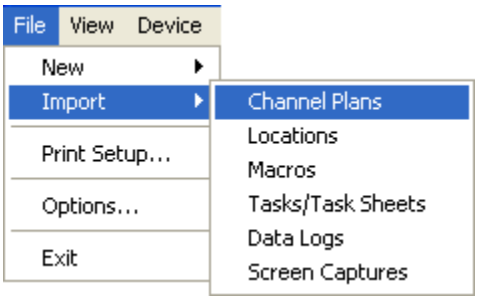


Importing Channel Plans from a Local File

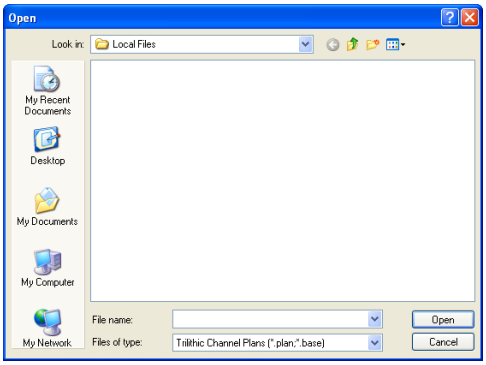
You can import channel plans to allow you to move data from one WorkBench software installation to other WorkBench software installations within your company.

Perform the following steps to import any of the channel plans described earlier in this chapter:

1. From the **File** menu hover over **Import**, and then select **Channel Plans**.



2. The **Open** window will appear. From this window you will choose which channel plan(s) to import and then select the Open button.



Deleting Channel Plans

You can delete channel plans that are no longer needed.

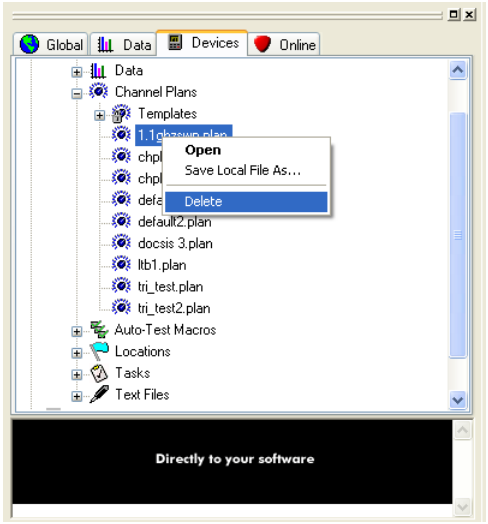
Perform the following steps to delete any of the channel plans described earlier in this chaper:

1. Perform one of the following steps to select the channel plan(s) to delete:

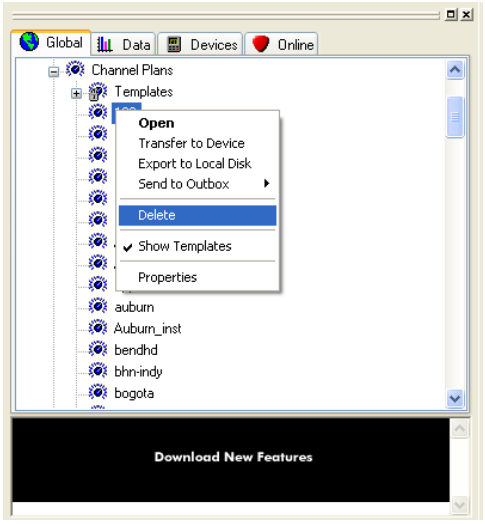
   From the Devices tab, right-click on the desired channel plan(s) to delete, and then select **Delete**.

   OR

   From the Global tab, right-click on the desired channel plan(s) to delete, and then select **Delete**.



Devices Tab



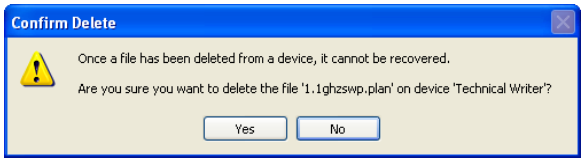
Global Tab

NOTE

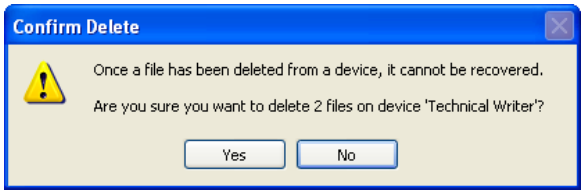
To select more than one channel plan at once for batch processing, select the first channel plan that you would like to delete, and then hold the CTRL key on your keyboard while using your mouse to select the other channel plans.

2. The **Confirm Delete** window will appear based on how you choose to delete the channel plan(s) as shown below:

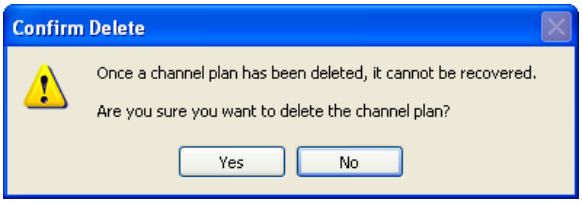
- Devices Tab - Single File Selected



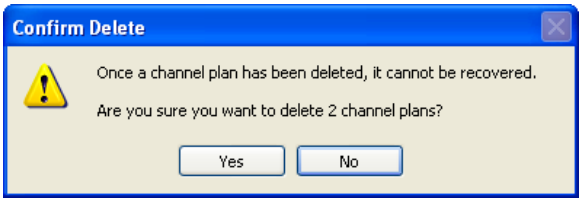
- Devices Tab - Multiple Files Selected



- Global Tab - Single File Selected



- Global Tab - Multiple Files Selected



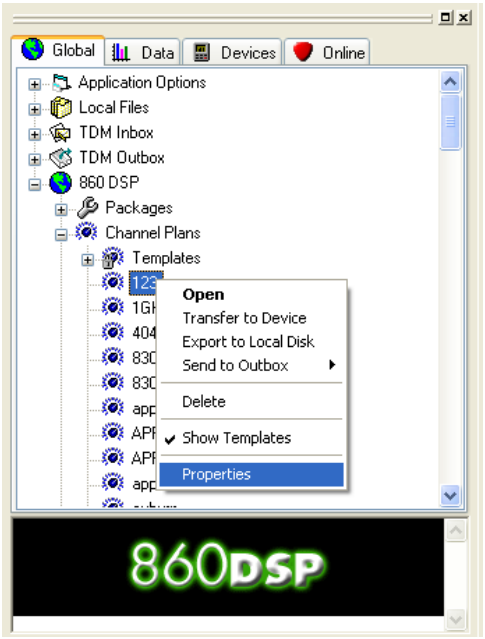
3. From this window you will confirm whether to delete the channel plan(s) by selecting the Yes button, or you can exit without deleting the channel plan(s) by selecting the No button.

CAUTION

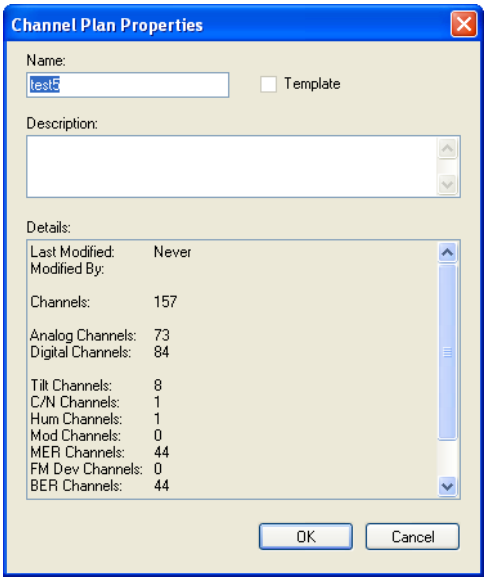
Be very careful when deleting files. Once a file has been deleted the file cannot be recovered.

Channel Plan Properties

After a channel plan has been opened, the Channel Plan Properties can be displayed by selecting the button from the toolbar at the top of the Data window or from the Global tab, right-click the Location, and then select **Properties**. An example of the **Channel Plan Properties** window is shown to the right.



The fields displayed in the **Channel Plan Properties** window are as follows:



Name: Displays the file name of the channel plan.

Template: This check-box will be checked when opening a template file

Description: Displays the file name, device name, and IP address of the device in which the channel plan was retrieved from or the name of the channel plan that was imported.

Last Modified: Displays the date that the channel plan was last modified.

Modified By: Displays the name of the user that last modified the channel plan.

Channels: Displays the total number of channels in the channel plan.

Analog Channels: Displays the total number of analog channels in the channel plan.

Digital Channels: Displays the total number of digital channels in the channel plan.

Tilt Channels: Displays the total number of tilt test channels in the channel plan. This field is not used by the 860 DSPh.

C/N Channels: Displays the total number of C/N test channels in the channel plan.

Hum Channels: Displays the total number of Hum test channels in the channel plan.

Mod Channels: Displays the total number of Mod test channels in the channel plan.

MER Channels: Displays the total number of MER test channels in the channel plan.

FM Dev Channels: Displays the total number of FM Dev test channels in the channel plan.

BER Channels: Displays the total number of BER test channels in the channel plan.

Pulse Channels: Displays the total number of 8300 FST Pulse channels in the channel plan. Pulse channels are not used by the 860 DSPh and will be skipped while scanning (monitoring).

Disabled Channels: Displays the total number of disabled channels in the channel plan.

Printing Channel Plans

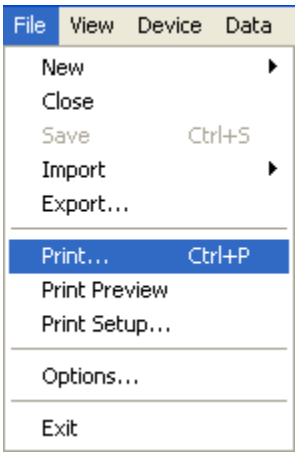
NOTE

Before printing you may want to setup your printer by first selecting Printer Setup... from the File Menu. WorkBench will use the settings of your default Windows printer if you choose to skip this step.

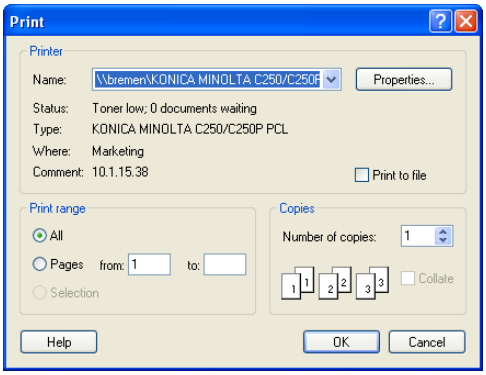
Printing Without Preview

To print any channel plan that is open without a preview, perform the following steps:

1. Press the Ctrl+P keys on your keyboard or from the **File** menu, select **Print**.

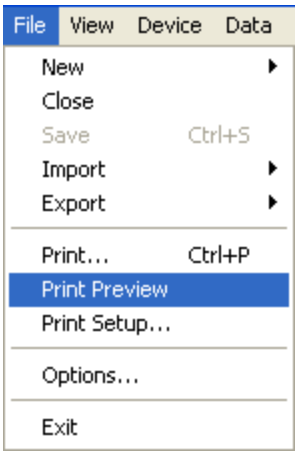


2. The **Print** window will appear.
3. If you wish to change any printer settings do so at this point.
4. Once you are satisfied with you printer settings, select the OK button to print the document or select the Cancel button to exit without printing.



Printing With Preview

To print any channel plan that is open with a preview, perform the following steps:



1. From the **File** menu, select **Print Preview**.
2. A new print preview window will appear in the **Data** window. You can then use the buttons at the top of the print preview screen as follows:

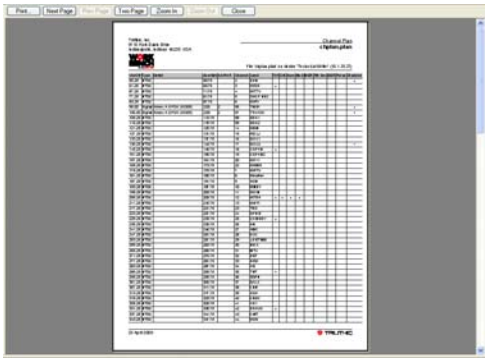
   [Print...] - Use this button to print the document.

   [Next Page] or [Prev Page] - Use these buttons to scroll through multiple page channel plans.

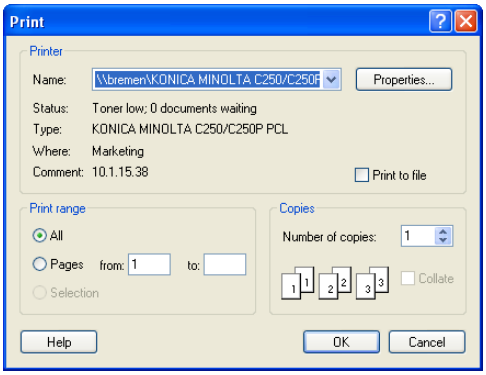
   [One Page] or [Two Page] - Use these buttons to change the view from one page to two pages.

   [Zoom In] or [Zoom Out] - Use these buttons to zoom in and out on the document.

   [Close] - Use this button to close without printing.



3. After you have selected the [Print...] button, the **Print** window will appear.
4. If you wish to change any printer settings do so at this point.
5. Once you are satisfied with you printer settings, select the [OK] button to print the document or select the [Cancel] button to exit without printing.



TRILITHIC

Text Files

Creating a Text File

To create a text file, perform the following steps:

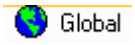
1. Perform one of the following steps to create a new text file:

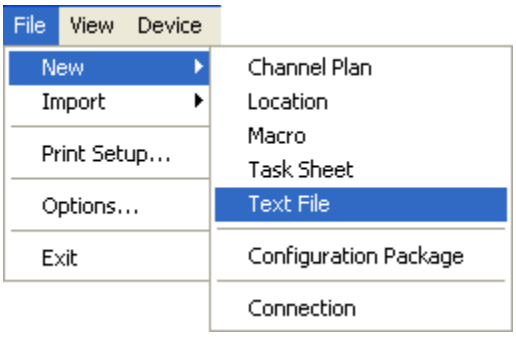
   From the **File** menu, hover over **New**, and then select **Text File**.

   OR

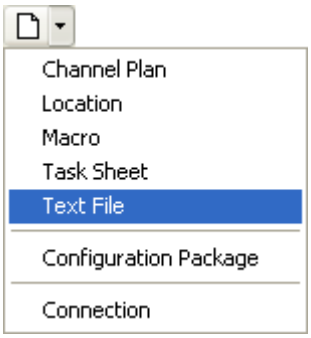
   From the Toolbar click on the  button and then select **Text File**.

   OR

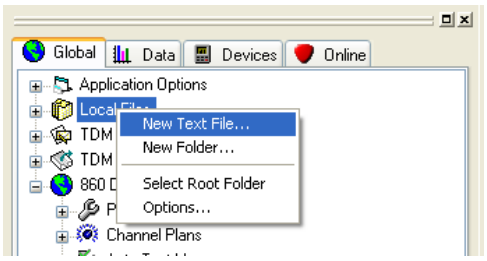
   From the  tab, right-click on **Local Data**, and then select **New Text File**.



File Menu

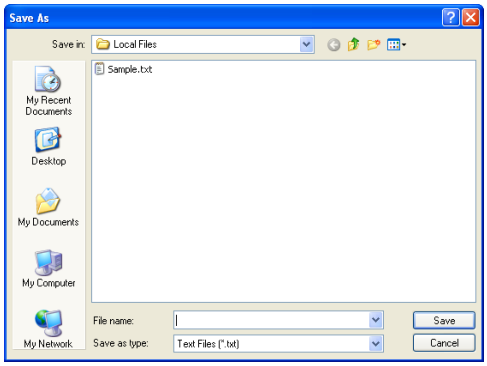


Toolbar



Global Tab

2. The **Save As** window will appear. From this window you will choose the location and name of the text file to save and then select the Save button.
3. A new blank text file will appear, enter any text that you wish to appear.



CAUTION

After making changes to a text file, you must select the button from the toolbar or Save from the File menu before closing the text file. Otherwise, if you try to close the text file before saving, WorkBench will prompt you to save the text file.

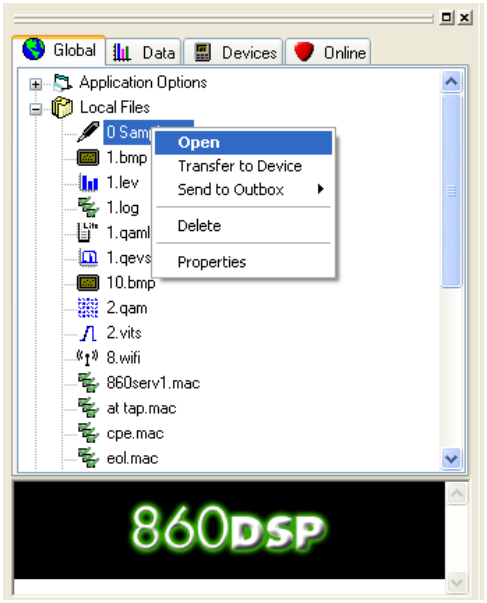
Opening & Closing Text File

You can use the WorkBench software to open the text files that you have created. To open any text files, perform one of the following actions:

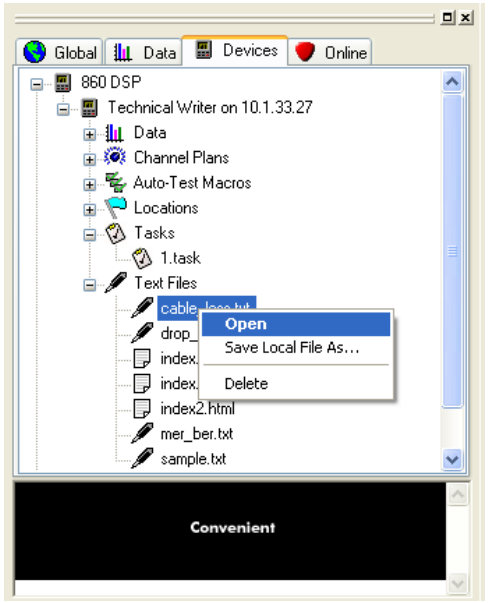
From the Global tab, right-click on the desired text file(s) to open, and then select **Open**.

OR

From the Devices tab, right-click on the desired text file(s) to open, and then select **Open**.



Global Tab



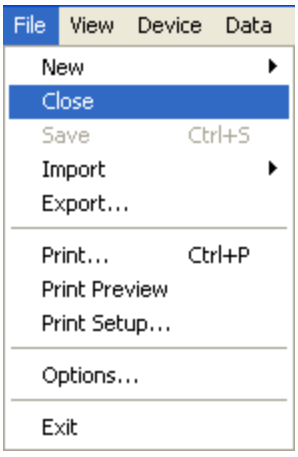
Devices Tab

To close any text file that is open, perform one of the following actions:

From the **File** menu, select **Close**.

OR

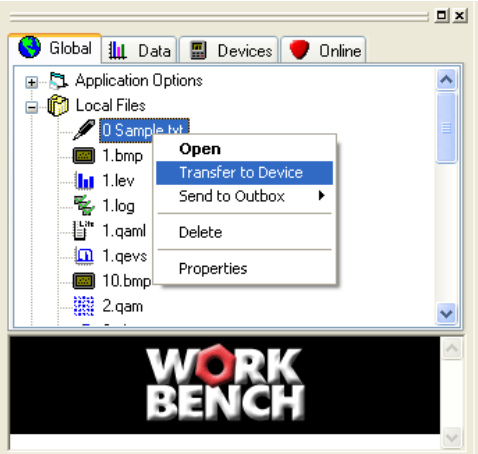
Select the gray "X" in the upper right corner of the **Data** window.



Transferring Text Files to Devices

You can use the WorkBench software to transfer text files to a connected device. To transfer any text file, perform the following actions:

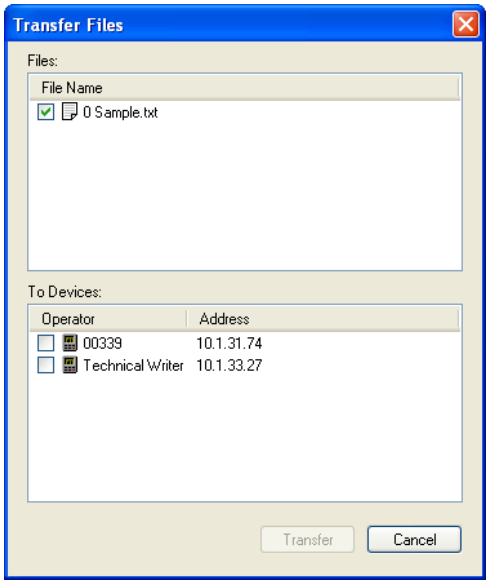
1. From the Global tab, right-click on the desired text file(s) to transfer, and then select **Transfer to Device**.



NOTE

If only one device is connected, the text file will automatically be transferred to the device without any other user interaction.

2. If more than one device is connected the **Transfer Files** window will appear.
3. Select the text files you wish to send.
4. Select the device(s) that you wish to send the selected text files to.
5. Select the Transfer button to transfer the text files or select the Cancel button to exit without transferring.

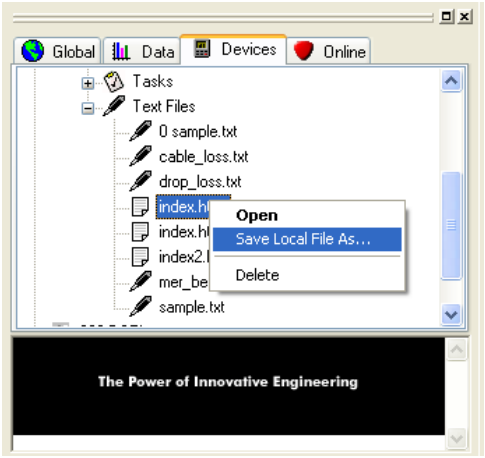


Saving Text Files to a Local File

You can save text files from the 860 DSPh to your local drive to allow you to move data from one WorkBench software installation to other WorkBench software installations within your company.

Perform the following steps to save a local copy of any of the text files described earlier in this chapter:

1. After connecting to a device, from the Devices tab, right-click on the desired text file(s) to save, and then select **Save Local File As**.



NOTE

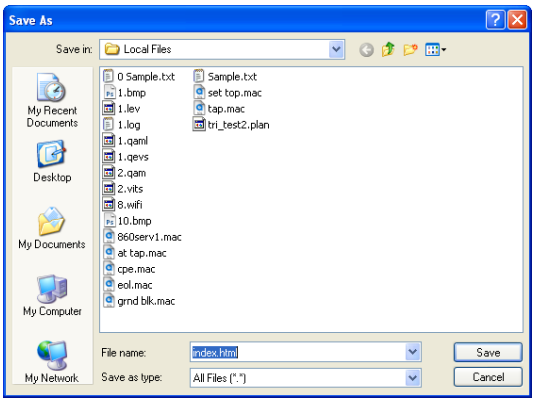
To select more than one text file at once for batch processing, select the first text file that you would like to save, and then hold the CTRL key on your keyboard while using your mouse to select the other text file.

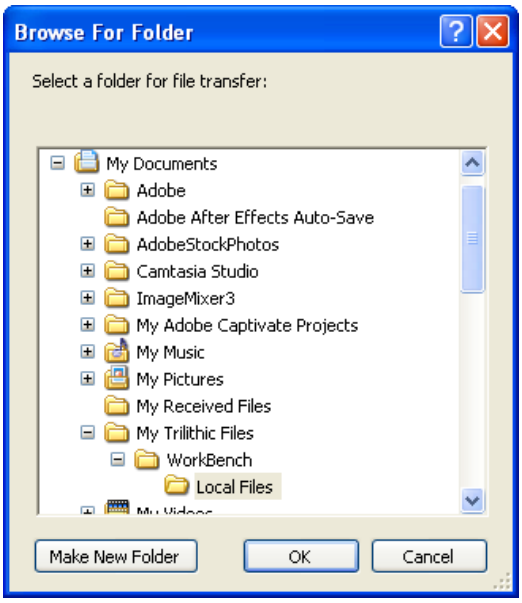
2. Perform one of the following steps to save the local text file(s):

   If you selected only one file to save, The **Save** window will appear. From this window you will choose the location and name of the text file to save and then select the Save button.

   OR

   If you selected more than one file to save, The **Browse For Folder** window will appear. From this window you will choose the location to save the text file to and then select the OK button.





Deleting Text Files

You can delete text files that are no longer needed.

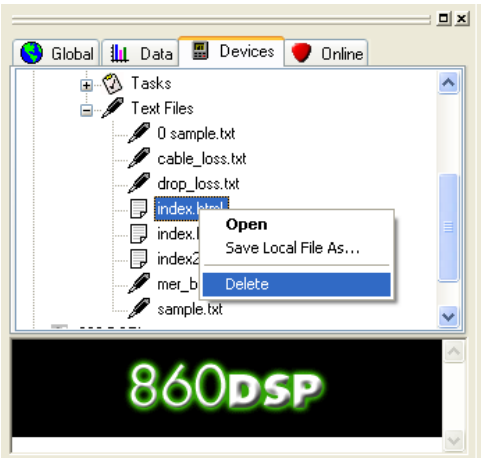
Perform the following steps to delete any of the text files described earlier in this chaper:

1. Perform one of the following steps to select the text file(s) to delete:

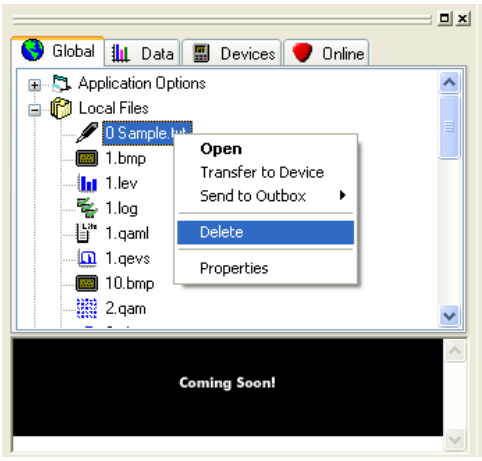
   From the Devices tab, right-click on the desired text file(s) to delete, and then select **Delete**.

   OR

   From the Global tab, right-click on the desired text file(s) to delete, and then select **Delete**.



Devices Tab



Global Tab

NOTE

To select more than one text file at once for batch processing, select the first text file that you would like to delete, and then hold the CTRL key on your keyboard while using your mouse to select the other text file.

Printing Text Files

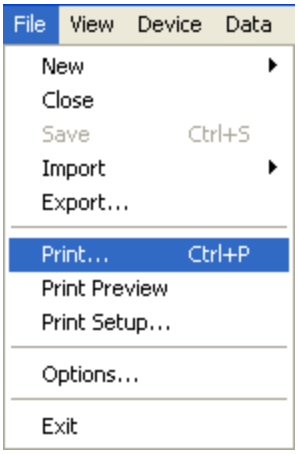
NOTE

Before printing you may want to setup your printer by first selecting Printer Setup... from the File Menu. WorkBench will use the settings of your default Windows printer if you choose to skip this step.

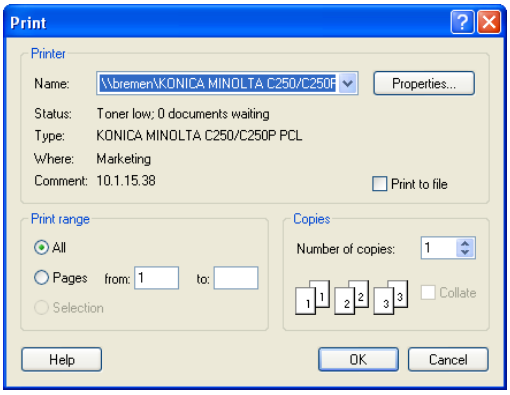
Printing Without Preview

To print any text file that is open without a preview, perform the following steps:

1. Press the Ctrl+P keys on your keyboard or from the **File** menu, select **Print**.



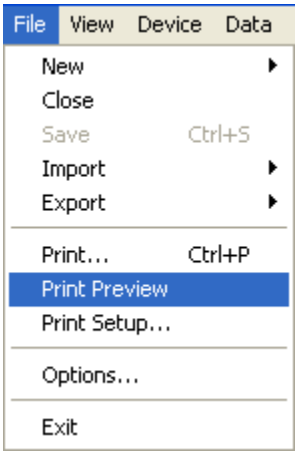
2. The **Print** window will appear.
3. If you wish to change any printer settings do so at this point.
4. Once you are satisfied with you printer settings, select the OK button to print the document or select the Cancel button to exit without printing.



TRILITHIC

Printing With Preview

To print any text file that is open with a preview, perform the following steps:



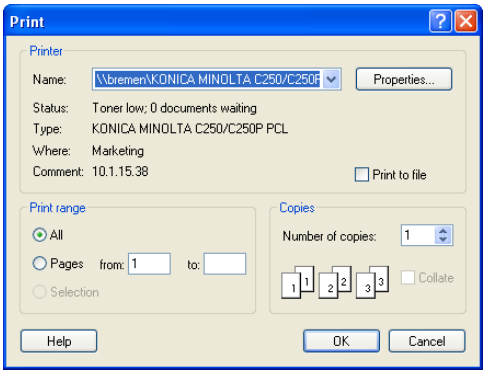
1. From the **File** menu, select **Print Preview**.
2. A new print preview window will appear in the **Data** window. You can then use the buttons at the top of the print preview screen as follows:

   Print... - Use this button to print the document.

   Zoom In or Zoom Out - Use these buttons to zoom in and out on the document.

   Close - Use this button to close without printing.

3. After you have selected the Print... button, the **Print** window will appear.
4. If you wish to change any printer settings do so at this point.
5. Once you are satisfied with you printer settings, select the OK button to print the document or select the Cancel button to exit without printing.



Device Configuration

Editing Configuration Parameters

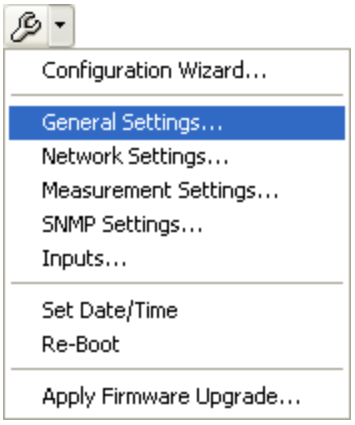
Each of the configuration parameters shown in this chapter can be edited individually from any connected 860 DSPh as follows:

1. Select the name of the connected 860 DSPh from the Devices tab.
2. Perform one of the following steps to edit individual configuration parameters on the selected 860 DSPh:

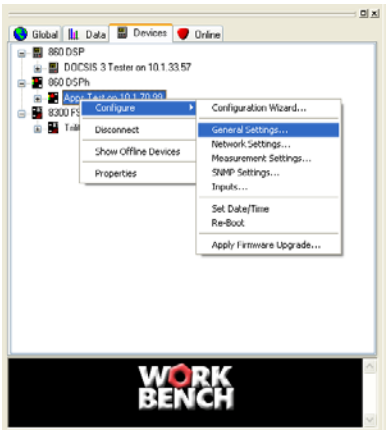
   From the Toolbar click on the down arrow next to the button and then select the configuration parameter that you wish to edit.

   OR

   From the Devices tab, right-click on the name of the connected device, hover over **Configure**, and then select the configuration parameter that you wish to edit.



Toolbar



Devices Tab

3. The corresponding configuration parameter window will appear, make any desired changes and then select the Next > button to send the configuration parameter that you chose to modify to the connected 860 DSPh or select the Cancel button to exit without changing the configuration parameter.
4. After the transfer process is complete, select the Finish button.

Editing Configuration Packages

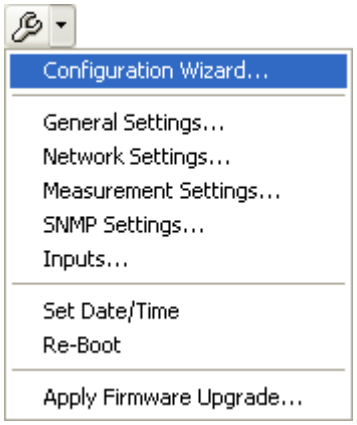
Perform the following steps to modify the current configuration package on any connected 860 DSPh:

1. Select the name of the connected 860 DSPh from the Devices tab.
2. Perform one of the following steps to edit the configuration package on the selected 860 DSPh:

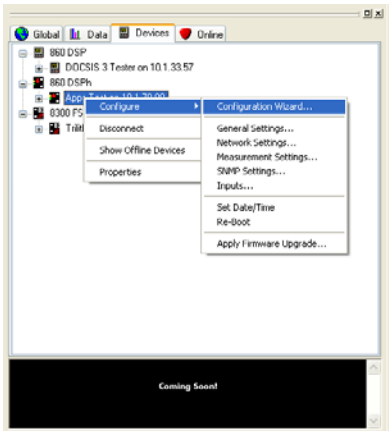
   From the Toolbar click on the down arrow next to the button and then select **Configuration Wizard**.

   OR

   From the Devices tab, right-click on the name of the connected device, hover over **Configure**, and then click on **Configuration Wizard**.



Toolbar

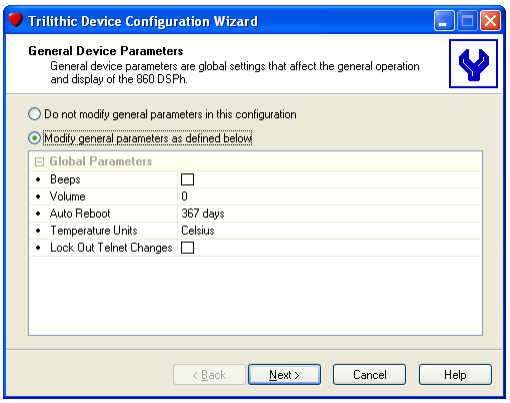


Devices Tab

3. WorkBench will now load the existing configuration from the connected 860 DSPh and will then display the **General Device Parameters** window, proceed to the following section to edit the configuration packages.

General Device Parameters

The general device parameters are global settings that affect the general operation and display of the 860 DSPh. To modify the parameters for this section, select the radio button corresponding to **Modify general parameters as defined below** in the Configuration Wizard window then enter information in the fields as follows:



Beeps: Check this box to turn SNMP trap beeps on or off.

Volume: Enter the volume from 0 to 9 (0 = off; 9 = maximum) for FM Deviation measurements.

Auto Reboot: Enter the number of days the unit will operate for before automatically rebooting. (Enter 0 to turn off automatic rebooting.)

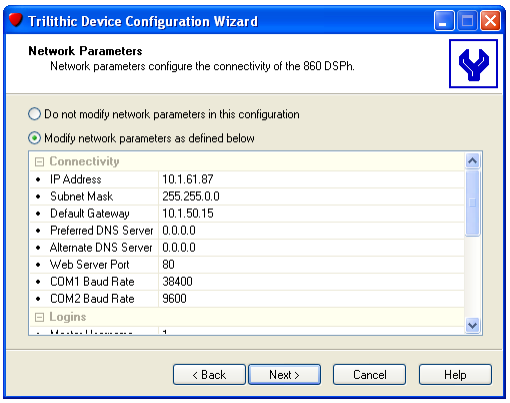
Temperature Units: Select Celsius or Fahrenheit.

Lock Out Telnet Changes: Select this check box to disable change to the device configuration via a Telnet connection.

When you are satisfied with your entries, click **Next** to continue with the Network parameters.

Network Parameters

The network parameters configure the connectivity of the 860 DSPh. To modify the parameters for this section, select the radio button corresponding to **Modify network parameters as defined below** in the Configuration Wizard window then enter information in the fields as follows:



Connectivity

IP Address: Enter the IP address of the 860 DSPh.

Subnet Mask: Enter the subnet mask of the 860 DSPh.

Default Gateway: Enter the gateway the 860 DSPh needs to use.

Preferred DNS Server: Enter the preferred DNS server's IP address. (This field is required if trap destinations are set as text instead of IP addressed.)

Alternate DNS Server: Enter the alternate DNS server's IP address. (This field is required if trap destinations are set as text instead of IP addressed.)

Web Server Port: Enter the remove control network port (the default port is 80.)

COM1 Baud Rate: Select the COM1 baud rate.

COM2 Baud Rate: Select the COM2 baud rate.

Logins

Master Username: Enter the master username.

Master Password: Enter the master password.

Web Username: Enter the web browser username.

Web Password: Enter the web browser password.

Telnet Username: Enter the telnet username.

Telnet Password: Enter the telnet password.

User 1 Username: Enter the User1 username.

User 1 Password: Enter the User1 password.

User 2 Username: Enter the User2 username.

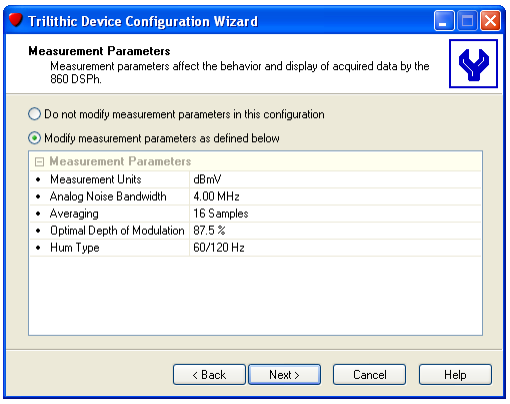
User 2 Password: Enter the User2 password.

User 3 Username: Enter the User3 username.

User 3 Password: Enter the User3 password.

When you are satisfied with your entries, click **Next** to continue with the Measurement parameters.

Measurement Parameters



The measurement parameters affect the behavior and display of acquired data by the 860 DSPh. To modify the parameters for this section, select the radio button corresponding to **Modify measurement parameters as defined below** from the Configuration Wizard window then enter information in the fields as follows:

Measurement Units: Select the measurement unit from the drop-down list. You can select dBmV, dBuV, or dBm.

Analog Noise Bandwidth: Enter the bandwidth used for carrier-to-noise calculations.

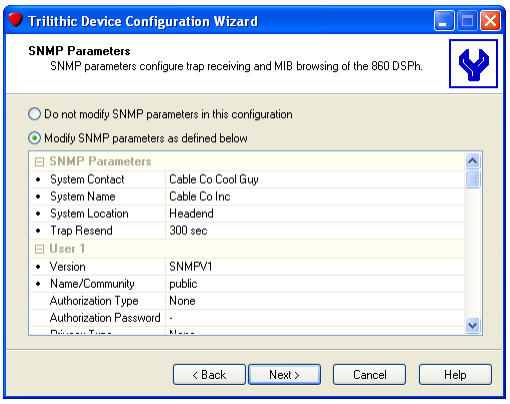
Averaging: Select from the drop-down list the number of times data is averaged before reading (1 to 1024).

Optimal Depth of Modulation: Enter the percentage for the optimal depth of modulation.

Hum Type: Select the hum type (either 50/100Hz or 60/120Hz) from the drop-down list.

When you are satisfied with your entries, click **Next** to continue with the SNMP Parameters.

SNMP Parameters



The SNMP parameters configure trap receiving and MIB browsing of the 860 DSPh. To modify the parameters for this section, select **Modify SNMP parameters as defined below**, then enter information in the fields as follows:

SNMP Parameters

System Contact: Enter the name of the person responsible for this device.

System Name: Enter the name of the system.

System Location: Enter the location of the system.

Trap Resend: Enter the time between resending of alarms in case the packets are being lost on the network. This is also the time between the unit sending “Hello, I’m alive” messages.

User 1 to 8

There are eight identical groups of fields for setting up users. Each user can set up their parameters for accessing the SNMP data as well as the format of the SNMP trap.

Version: Select the SNMP option (SNMPV1, SNMPV2c, or SNMPV3_USM) used by the SNMP monitoring software from the drop-down list. Unused User (the default) identifies that this is not an active user.

The 860 DSPh only ships from the factory with SNMPV1. SNMPV2c and SNMPV3_USM require a firmware update, contact the Trilithic Applications department to obtain this optional firmware.

Name/Community: Enter the user or community name.

Authorization Type: Select the authorization type from the drop-down list. (Authorization and privacy options are used for secure SNMP access.)

Authorization Password: Enter the authorization password for this user.

Privacy Type: Select the privacy type from the drop-down list.

Privacy Password: Enter the privacy password for this user.

Read Only: Select this check box to make the SNMP values read only for this user

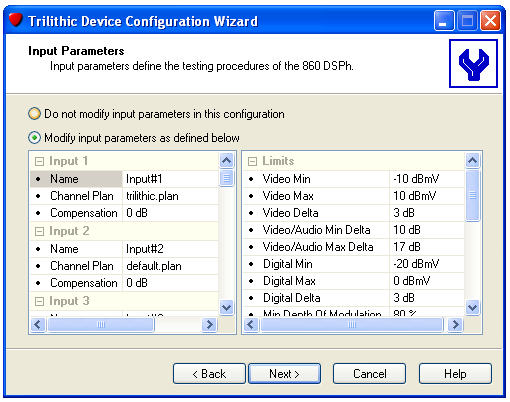
Trap Destination: Enter IP address of the trap destination.

When you are satisfied with your entries, click **Next** to continue with the Input parameters.

SNMP MIB is available for your SNMP Management Software, if needed contact the Trilithic Applications department .

Input Parameters

The input parameters define the testing procedures of the 860 DSPh. To modify the parameters for this section, select **Modify input parameters as defined below**, then enter information in the fields as follows:



Input

Select the measurement input for which you want to set test limits. The right pane of the screen shows the limits defined for the selected input.

Name: Enter the name of the input**.**

Channel Plan: Enter the name of the channel plan used for this input.

Compensation: Enter the test point loss value in this input is connected through a test point or pad.

Limits

The following options are related to analog channels:

Video Min: Enter the minimum acceptable video level.

Video Max: Enter the maximum acceptable video level.

Video Delta: Enter the video level drift.

Video/Audio Min Delta: Enter the minimum acceptable video-to-audio difference.

Video/Audio Max Delta: Enter the maximum acceptable video-to-audio difference.

The following options are related to digital channels:

Digital Min: Enter the minimum acceptable digital carrier level.

Digital Max: Enter the maximum acceptable digital carrier level.

Digital Delta: Enter the maximum.

The following options are used for analog channels:

Min Depth Of Modulation: Enter the minimum depth of modulation.

Max Depth Of Modulation: Enter the maximum depth of modulation.

Max Hum: Enter the maximum allowable hum.

Min C/N: Enter the minimum carrier-to-noise ratio.

The following options are used for digital channels:

QAM4 Min MER: Enter the QAM4 minimum modulation error ratio.

QAM16 Min MER: Enter the QAM16 minimum modulation error ratio.

QAM32 Min MER: Enter the QAM32 minimum modulation error ratio.

QAM64 Min MER: Enter the QAM64 minimum modulation error ratio.

QAM128 Min MER: Enter the QAM128 minimum modulation error ratio.

QAM256 Min MER: Enter the QAM256 minimum modulation error ratio.

VSB8 Min MER: Enter the ATSC (8 VSB) minimum modulation error ratio.

Max BER: Enter the maximum allowable bit error rate.

The following options are used for analog channels:

Min FM Deviation: Enter the minimum FM deviation.

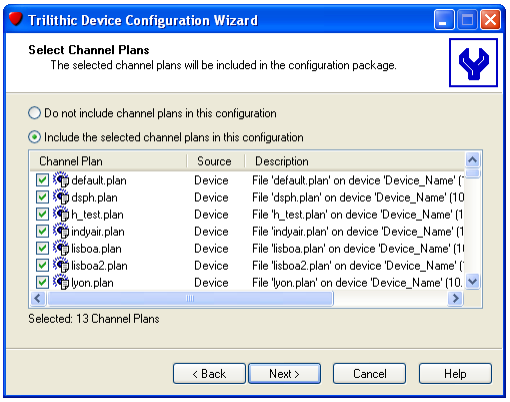
Max FM Deviation: Enter the maximum FM deviation.

When you are satisfied with your entries, click **Next** to continue with Select Channel Plans.

Select Channel Plans

You use this screen to select the channel plans that will be included in the configuration package for downloading to the 860 DSPh. To modify the parameters for this section, select **Include the selected channel plans in this configuration**, then check the boxes for the channel plans you want to include.

When you are satisfied with your entries, click **Next** to continue with Package Transfer Mode.



Package Transfer Mode

You use this screen to tell WorkBench how to transfer information to the 860 DSPh. Select one of the two following options to transfer files and information in the configuration package to the 860 DSPh:

Add Selected Items - Select this option (the default) to transfer the files and information in the configuration package without deleting existing files. Files with the same name will be overwritten, but files that are not included in the configuration package will not be deleted.

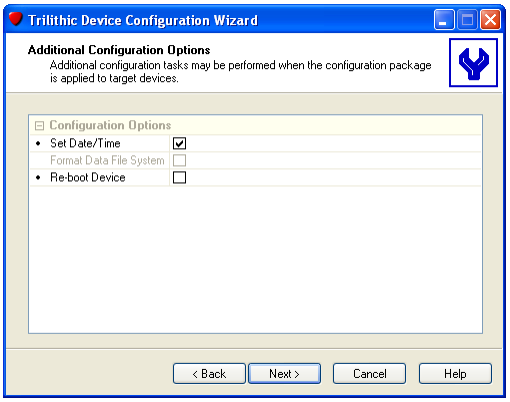
Add Selected Items and Delete All Other Items - Select this option to transfer the information in the configuration package to the 860 DSPh and deletes any other files on the 860 DSPh. At the end of the transfer process, the only files and information on the 860 DSPh will be the files and information contained in the configuration package. This option is useful for ensuring that 860 DSPhs are configured to a standard and that no unauthorized or unacceptable files are included on them.

WARNING

Selecting the second option may delete information from the 860 DSPh. Ensure that the files in the 860 DSPh are backed up and that the configuration package being loaded is complete.

When you are satisfied with your entries, click **Next** to continue with the Additional Configuration Options.

Additional Configuration Options

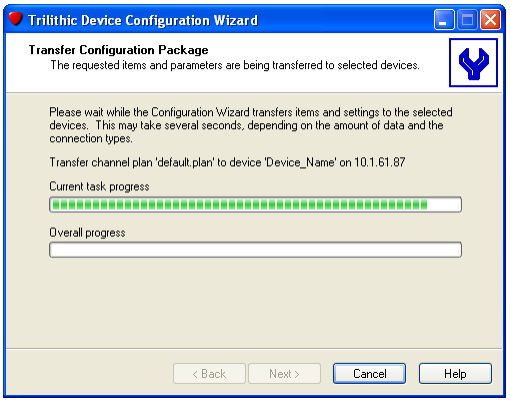


This screen lets you perform a few additional configuration tasks when you download the configuration package to the 860 DSPh. To modify the parameters for this section, enter information in the fields as follows:

Set Date/Time: Check this box to synchronize the 860 DSPh's clock to the clock on the WorkBench computer.

Format Data File System: Check this box to reformat the 860 DSPh's flash disk prior to transferring the selected files. This option may be desired for periodic maintenance, but is not necessary (and probably should not be performed) each time a device is configured. This option is only available if you have selected Add Selected Items and Delete All Other Items on the Packet Mode Transfer screen shown in the previous step.

Reboot Device: Check this box to reboot the 860 DSPh after the configuration package has been downloaded. Some options require the 860 DSPh to be rebooted for the options to be applied.

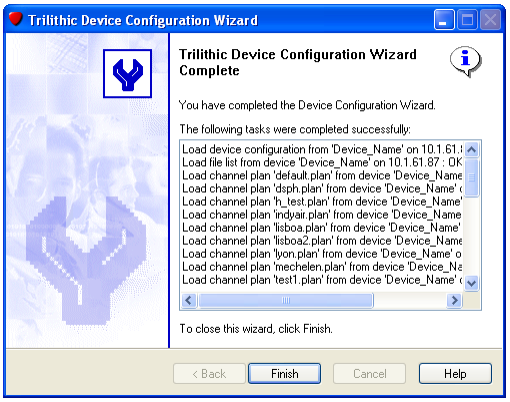


When you are satisfied with your entries, click **Next** to transfer the configuration package to the selected 860 DSPh.

The Transfer Configuration Package window will appear, indicating the progress of the configuration transfer to the connected 860 DSPh.

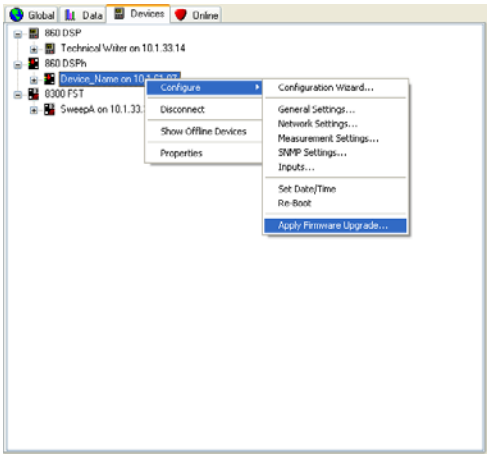
After the configuration package has been transferred to the 860 DSPh, the Device Configuration Wizard Complete window will be displayed.

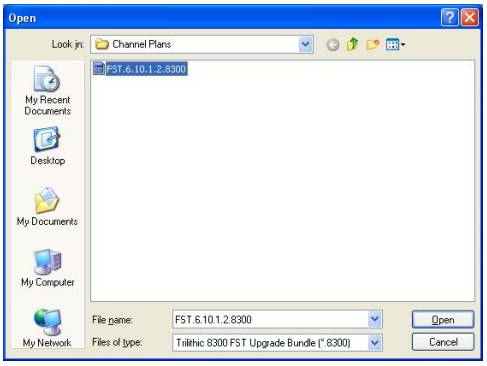
Click the **Finish** button to close the Configuration Wizard.



Applying Firmware Upgrades to the 860 DSPh

1. To apply a firmware upgrade to the 860 DSPh, choose the **Devices** tab.
2. Right-click on the name of the appropriate 860 DSPh and hover over **Configure**.
3. Then select **Apply Firmware Upgrade...**.
4. Select the appropriate folder and file name.
5. Then select **Open**.





Chapter 6
Viewing Information

This Chapter:

- Use a Telnet Connection to view the information generated by the 860 DSPh
- Use an Internet browser to view the information generated by the 860 DSPh

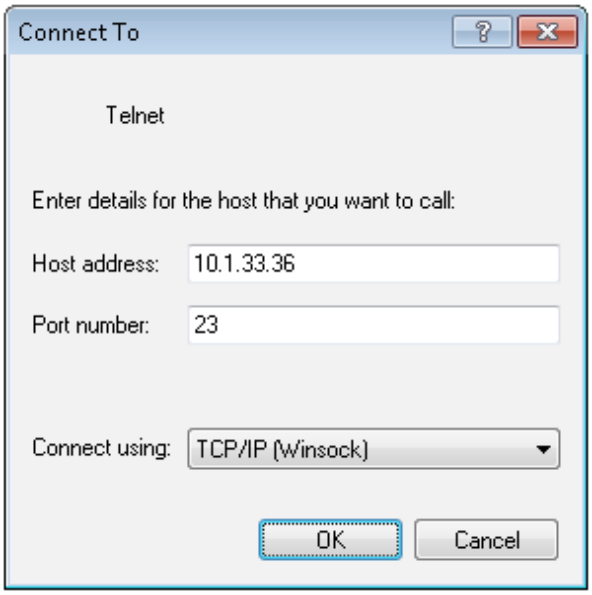
Telnet Connection

The advantage of using a Telnet connection is that you can see a history of the data collected by the 860 DSPh.

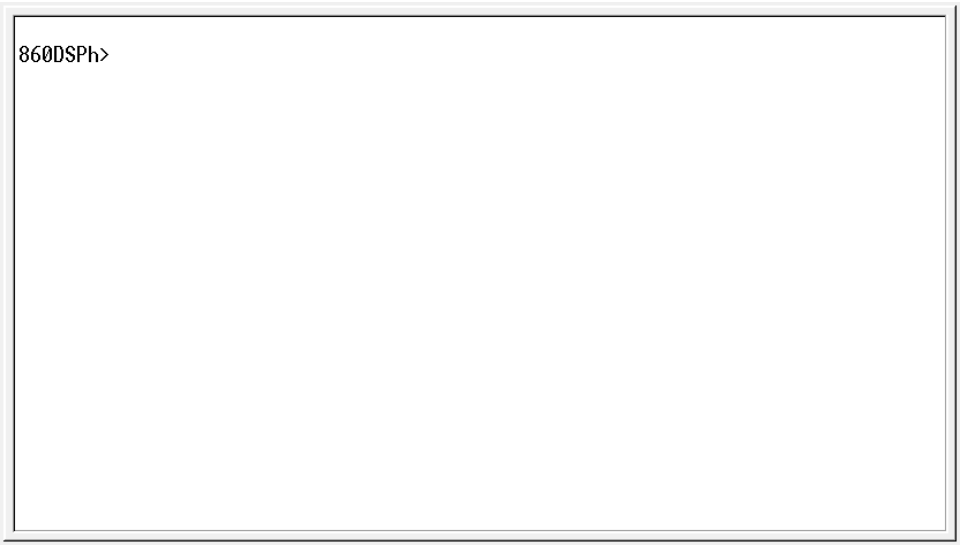
The Telnet connection will not function if the **Lock Out Telnet Change** option is selected in the General Device Parameters during configuration using WorkBench.

Perform the following steps to perform a Telnet connection:

1. Start a HyperTerminal session for the 860 DSPh.
2. Select TCP/IP (Winsock) from the **Connect Using** dropdown box.
3. Enter the IP address and port number (Default = 23) of the 860 DSPh.



4. Connect to the 860 DSPh by selecting **OK** and then press **ENTER**. The 860 DSPh prompt will be displayed as follows;



5. For a list of supported commands type **help** at the prompt. A list of the supported commands will be displayed as follows, type more and press ENTER to see additional pages.

```
860DSPh>help
------Command Help------
Firmware Version 09.04.21.01.B.1.U.N
[quit].............Logs off Session
[mem]..............Displays Available RAM
[date mm/dd/yyyy]...Sets the Local Date
[time hh:mm:ss].....Sets the Local Time
[gmtoffset mmm].....Sets the Offset from GMT in Minutes
[dir]..............Displays User Drive Contents
[del filename.ext]..Deletes a File from the User Drive
[restore defaults]..Restores to factory defaults
[device name].......Sets the Devices Name
[hub name]..........Sets the Hubs Name
[username =32=].....Sets the Login Username
[password =32=].....Sets the Login Password
[webport #####].....Sets the Web Server Port Number
[reboot]............Commands the Device to Reboot
[autoreboot secs]...Sets the AutoReboot Timer
[ipconfig]..........Displays Current IP Information
Type [more] to continue

860DSPh>_
```

Help Screen 1

```
Type [more] to continue

860DSPh>more
[ip #.#.#.#]........Sets the IP Address
[subnet #.#.#.#]....Sets the Subnet Mask
[gateway #.#.#.#]...Sets the Gateway
[pridns #.#.#.#]....Sets the Primary DNS
[secdns #.#.#.#]....Sets the Secondary DNS
[ping #.#.#.#]......Pings a Network Device or Domain Name
[units type]........Change Units to dBmV, dBuV, or dBm
[plan ## filename]..Change Input ## Channel Plan
[tp ## ###].........Sets Input ## Test Point Value in dB
[humtype cc]........Sets Hum Type cc = US or cc = EU
[temp]..............Reads Current Unit Temperature
[volts].............Reads Main Bus Voltage
[noisebw Hz]........Sets Noise Bandwidth in Hz
[optmod ##.#].......Sets Percent Optimal Modulation
[chavg ##]..........Sets Channel Averaging ##^2
[input ## name].....Sets Input ## Name
[ch ## ###].........View Input ## Channel ###
[level ## ###]......Dump Input ## Channel ### Level Data
Type [more] to continue

860DSPh>
```

Help Screen 2

```
Type [more] to continue

860DSPh>more
[audio ## ###]......Dump Input ## Channel ### Audio Data
[mer ## ###]........Dump Input ## Channel ### MER Data
[mod ## ###]........Dump Input ## Channel ### Mod Data
[c2n ## ###]........Dump Input ## Channel ### C/N Data
[hum ## ###]........Dump Input ## Channel ### Hum Data
[fmdev ## ###]......Dump Input ## Channel ### FM Dev Data
[preber ## ###].....Dump Input ## Channel ### Pre BER Data
[postber ## ###]....Dump Input ## Channel ### Post BER Data
[minvid ## ###].....Sets Input ## Min Level Limit
[maxvid ## ###].....Sets Input ## Max Level Limit
[deltavid ## ###]...Sets Input ## Delta Level Limit
[minvadelta ## ###].Sets Input ## Min V/A Delta Limit
[maxvadelta ## ###].Sets Input ## Max V/A Delta Limit
[mindig ## ###].....Sets Input ## Min Digital Limit
[maxdig ## ###].....Sets Input ## Max Digital Limit
[deltadig ## ###]...Sets Input ## Delta Digital Limit
[minmod ## ###].....Sets Input ## Min Depth of Mod Limit
[maxmod ## ###].....Sets Input ## Max Depth of Mod Limit
Type [more] to continue

860DSPh>
```

Help Screen 3

```
Type [more] to continue

860DSPh>more
[minfmdev ## ###]...Sets Input ## Min FM Deviation Limit
[maxfmdev ## ###]...Sets Input ## Max FM Deviation Limit
[minc2n ## ###].....Sets Input ## Min C/N Limit
[maxhum ## ###].....Sets Input ## Max Hum Limit
[minmer4 ## ###]....Sets Input ## Min MER Limit for 4 QAM
[minmer16 ## ###]...Sets Input ## Min MER Limit for 16 QAM
[minmer32 ## ###]...Sets Input ## Min MER Limit for 32 QAM
[minmer64 ## ###]...Sets Input ## Min MER Limit for 64 QAM
[minmer128 ## ###]..Sets Input ## Min MER Limit for 128 QAM
[minmer256 ## ###]..Sets Input ## Min MER Limit for 256 QAM
[minmer8vsb ## ###].Sets Input ## Min MER Limit for 8 VSB
[maxber ## #.##E##].Sets Input ## Max BER Limit
[limits ##].........Displays Input ## Limits
[alarms ##].........Displays Input ## Alarms
[vol #].............Sets the FM Deviation Volume
[switch option].....Sets the Switch 1x1,1x4,1x16
[edvb option].......Installed the EDVB yes or no
[maxrf option]......Maximum RF (870 or 1000)
Type [more] to continue

860DSPh>
```

Help Screen 4

```
[minmer256 ## ###]..Sets Input ## Min MER Limit for 256 QAM
[minmer8vsb ## ###].Sets Input ## Min MER Limit for 8 VSB
[maxber ## #.##E##].Sets Input ## Max BER Limit
[limits ##].........Displays Input ## Limits
[alarms ##].........Displays Input ## Alarms
[vol #].............Sets the FM Deviation Volume
[switch option].....Sets the Switch 1x1,1x4,1x16
[edvb option].......Installed the EDVB yes or no
[maxrf option]......Maximum RF (870 or 1000)
Type [more] to continue

860DSPh>more
[liveto]............Minutes till Live mode time out
[pause].............Sets the Unit to IDLE Mode
[go]................Sets the Unit to Scanning Mode

5 Blinks - Unsupported Hardware
4 Blinks - Flash Needs Formatting
3 Blinks - Hardware Malfunction
2 Blinks - User Configuration Problem
1 Blinks - Serial or Network Connected
No Blinking - System Operating Normally

860DSPh>_
```

Help Screen 5

Connecting to the 860 DSPh Internet Homepage

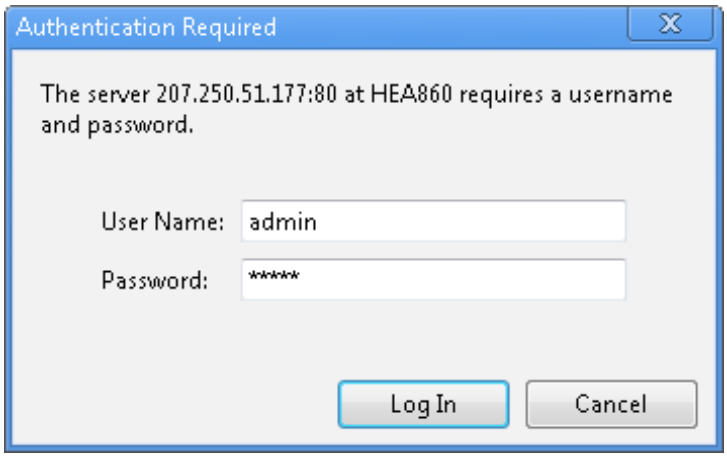
Browser access to the 860 DSPh provides a simple, informative view of the RF signal characteristics at a remote point in the network from any PC without requiring a proprietary client application.

One advantage of using the 860 DSPh Internet Homepage is that the data is easy to view on field devices because it is formatted for small screens. Also, you can put your 860 DSPh into Live Mode, where you can see the current channel activity.

NOTE

If the 860 DSPh homepage cannot be accessed via an internet connection, the network settings ARE NOT correct.

1. Type the URL of the 860 DSPh into the address line of an internet web browser. This URL will be in the following format: **http://#.#.#.#:port#**.
    - **#.#.#.#** is the IP address of the 860 DSPh
    - **port #** is only used if the port is anything other than 80
2. Enter a **User Name:** and **Password:** and click on **Log In**.



NOTE

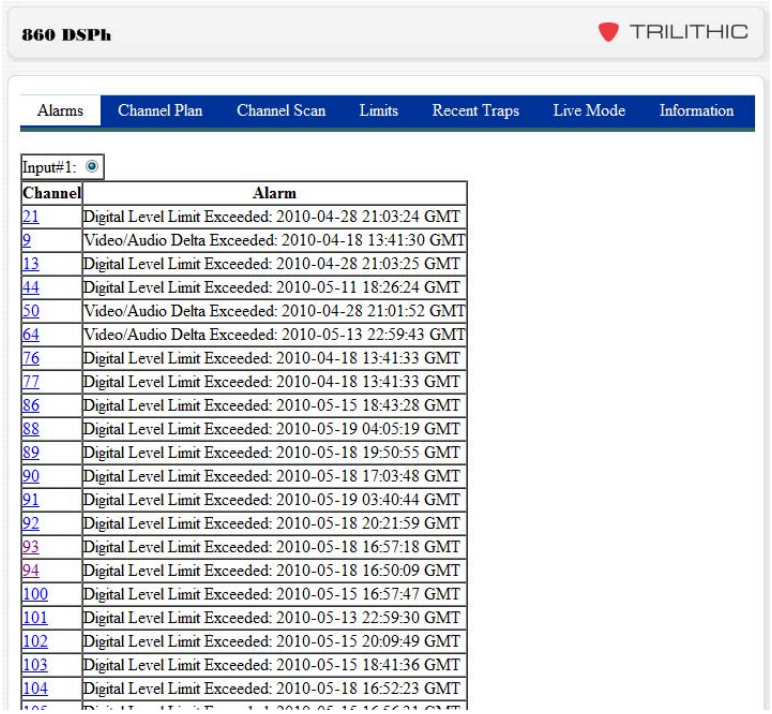
The default user name and password is "admin" for access to all home page menu options and is "1234" for access to all menu options except the Live Mode.

3. The 860 DSPh Internet Homepage will be displayed.
4. The default display at login is the Alarms Display. To change the Display Mode, select any of the tabs located at the top of the display. See the following sections for more specific information about each Display Mode.

Alarms Display

This displays the channels that currently have an alarm and the type of alarm for each input.

- Inputs that have been configured will be displayed at the top of the display, while any unused inputs will not appear.
- Select the radio button next to the input name to view the alarms associated with this input.
- Select the channel number to view the channel details as shown below.



Channel	Alarm
21	Digital Level Limit Exceeded: 2010-04-28 21:03:24 GMT
9	Video/Audio Delta Exceeded: 2010-04-18 13:41:30 GMT
13	Digital Level Limit Exceeded: 2010-04-28 21:03:25 GMT
44	Digital Level Limit Exceeded: 2010-05-11 18:26:24 GMT
50	Video/Audio Delta Exceeded: 2010-04-28 21:01:52 GMT
64	Video/Audio Delta Exceeded: 2010-05-13 22:59:43 GMT
76	Digital Level Limit Exceeded: 2010-04-18 13:41:33 GMT
77	Digital Level Limit Exceeded: 2010-04-18 13:41:33 GMT
86	Digital Level Limit Exceeded: 2010-05-15 18:43:28 GMT
88	Digital Level Limit Exceeded: 2010-05-19 04:05:19 GMT
89	Digital Level Limit Exceeded: 2010-05-18 19:50:55 GMT
90	Digital Level Limit Exceeded: 2010-05-18 17:03:48 GMT
91	Digital Level Limit Exceeded: 2010-05-19 03:40:44 GMT
92	Digital Level Limit Exceeded: 2010-05-18 20:21:59 GMT
93	Digital Level Limit Exceeded: 2010-05-18 16:57:18 GMT
94	Digital Level Limit Exceeded: 2010-05-18 16:50:09 GMT
100	Digital Level Limit Exceeded: 2010-05-15 16:57:47 GMT
101	Digital Level Limit Exceeded: 2010-05-13 22:59:30 GMT
102	Digital Level Limit Exceeded: 2010-05-15 20:09:49 GMT
103	Digital Level Limit Exceeded: 2010-05-15 18:41:36 GMT
104	Digital Level Limit Exceeded: 2010-05-18 16:52:23 GMT

9 ( ) - NTSC

VF: 187.250 MHz, AF: 191.750 MHz
LEVEL

Input	Test	Now	Min	Avg	Max	Err
1	Level	-1.18	-1.62	-1.18	-0.95	Data Valid
	Audio	-6.10	-6.55	-6.12	-5.59	Data Valid
	C/N	0.00	0.00	0.00	0.00	Not Ready
	HUM	0.00	0.00	0.00	0.00	Not Ready
	MOD	0.00	0.00	0.00	0.00	Not Ready
	FM Dev	0	0	0	0	Not Ready

Previous Next
Home

Analog Channel Details

21 ( ) - Digital,256 QAM

CF: 165.000 MHz, BW: 6.000 MHz, SR: 5.360537 MSPS
LEVEL, MER, BER

Input	Test	Now	Min	Avg	Max	Err
1	Level	3.64	3.44	3.64	3.79	Data Valid
	MER	26.99	26.12	26.77	27.07	Data Valid
	Pre BER	4.95E-04	4.84E-04	1.19E-03	3.39E-03	Data Valid
	Post BER	1.00E-09	1.00E-09	4.93E-05	4.84E-04	Data Valid

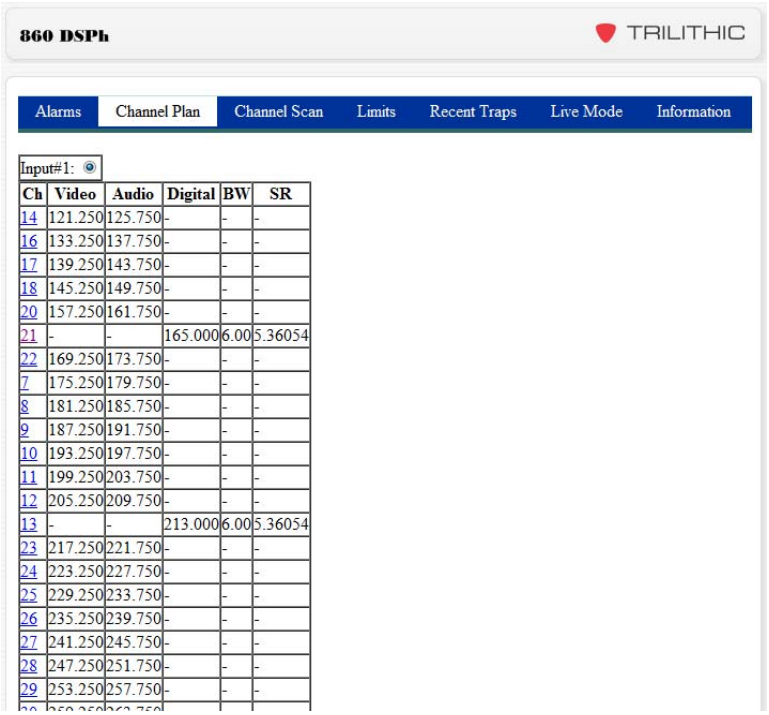
Previous Next
Home

Digital Channel Details

Channel Plan Display

This displays the inputs that have been configured and their corresponding channel plans.

- Inputs that have been configured will be displayed at the top of the display, while any unused inputs will not appear.
- Select the radio button next to the input name to view the channel plan associated with this input.
- Select the channel number to view the channel details as shown in the Alarms Display section.

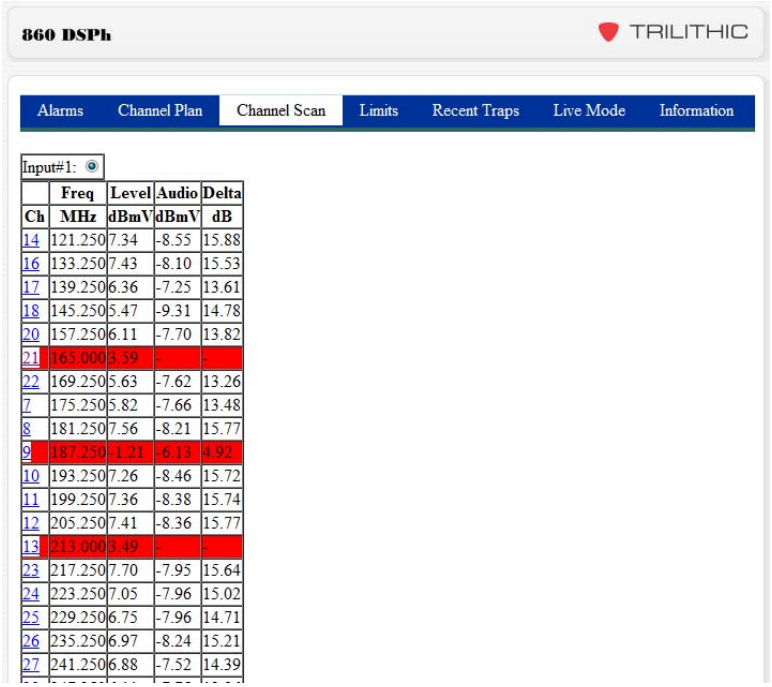


Ch	Video	Audio	Digital	BW	SR
14	121.250	125.750	-	-	-
16	133.250	137.750	-	-	-
17	139.250	143.750	-	-	-
18	145.250	149.750	-	-	-
20	157.250	161.750	-	-	-
21	-	-	165.000	6.00	5.36054
22	169.250	173.750	-	-	-
7	175.250	179.750	-	-	-
8	181.250	185.750	-	-	-
9	187.250	191.750	-	-	-
10	193.250	197.750	-	-	-
11	199.250	203.750	-	-	-
12	205.250	209.750	-	-	-
13	-	-	213.000	6.00	5.36054
23	217.250	221.750	-	-	-
24	223.250	227.750	-	-	-
25	229.250	233.750	-	-	-
26	235.250	239.750	-	-	-
27	241.250	245.750	-	-	-
28	247.250	251.750	-	-	-
29	253.250	257.750	-	-	-

Channel Scan Display

This displays the channel scan signal level measurements for each input.

- Inputs that have been configured will be displayed at the top of the display, while any unused inputs will not appear.
- Select the radio button next to the input name to view the channel scan signal level measurements associated with this input.
- Select the channel number to view the channel details as shown in the Alarms Display section.

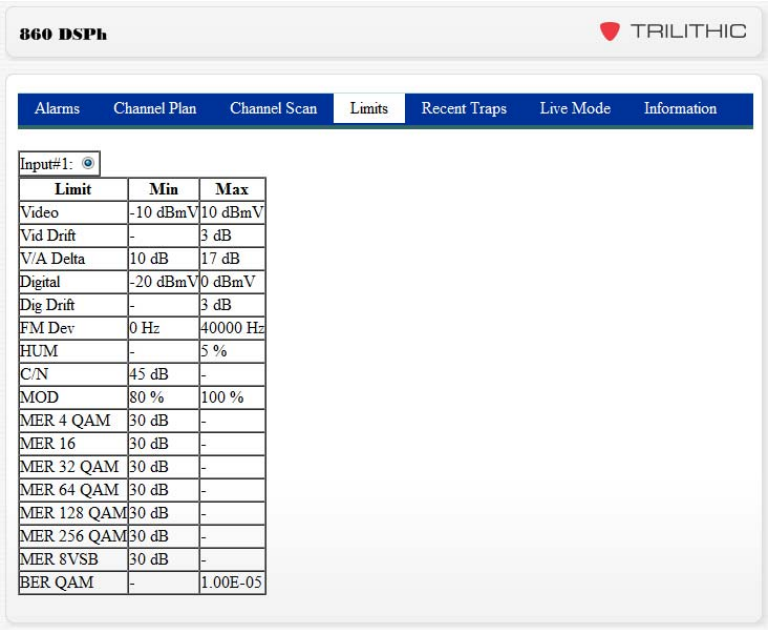


	Freq	Level	Audio	Delta
Ch	MHz	dBmV	dBmV	dB
14	121.250	7.34	-8.55	15.88
16	133.250	7.43	-8.10	15.53
17	139.250	6.36	-7.25	13.61
18	145.250	5.47	-9.31	14.78
20	157.250	6.11	-7.70	13.82
21	165.000	3.59	-	-
22	169.250	5.63	-7.62	13.26
7	175.250	5.82	-7.66	13.48
8	181.250	7.56	-8.21	15.77
9	187.250	-1.21	-6.13	4.92
10	193.250	7.26	-8.46	15.72
11	199.250	7.36	-8.38	15.74
12	205.250	7.41	-8.36	15.77
13	213.000	3.49	-	-
23	217.250	7.70	-7.95	15.64
24	223.250	7.05	-7.96	15.02
25	229.250	6.75	-7.96	14.71
26	235.250	6.97	-8.24	15.21
27	241.250	6.88	-7.52	14.39

Limits Display

This displays the minimum (lowest) and maximum (highest) levels beyond which an alarm will be displayed for each input.

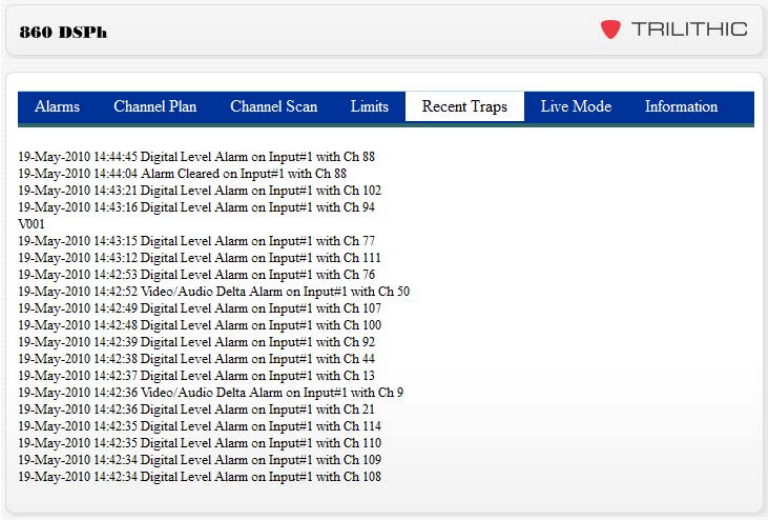
- Inputs that have been configured will be displayed at the top of the display, while any unused inputs will not appear.
- Select the radio button next to the input name to view the alarm limits.



Limit	Min	Max
Video	-10 dBmV	10 dBmV
Vid Drift	-	3 dB
V/A Delta	10 dB	17 dB
Digital	-20 dBmV	0 dBmV
Dig Drift	-	3 dB
FM Dev	0 Hz	40000 Hz
HUM	-	5 %
C/N	45 dB	-
MOD	80 %	100 %
MER 4 QAM	30 dB	-
MER 16	30 dB	-
MER 32 QAM	30 dB	-
MER 64 QAM	30 dB	-
MER 128 QAM	30 dB	-
MER 256 QAM	30 dB	-
MER 8VSB	30 dB	-
BER QAM	-	1.00E-05

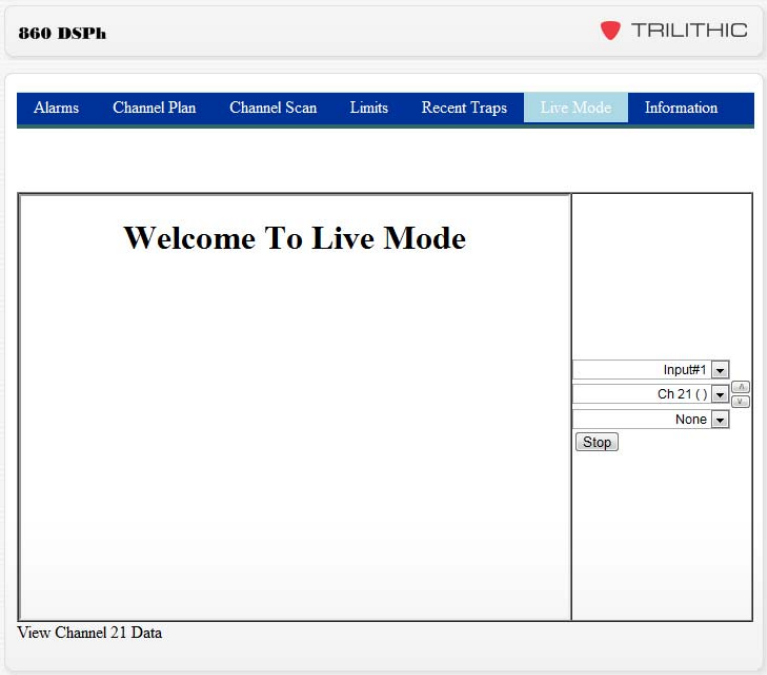
Recent Traps Display

This displays the last 20 to 25 SNMP traps sent by the 860 DSPh.

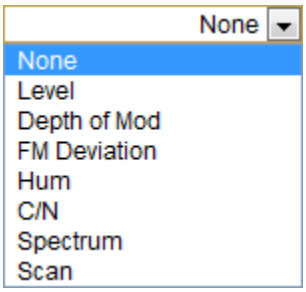


Live Mode Display

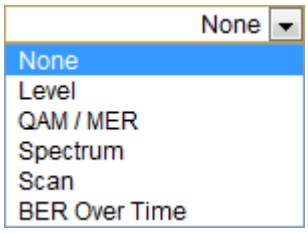
The Live View measurement displays analog and digital channels to provide a real-time visual of the signal quality through the 860 DSPh analyzer. Rapid changes in the measurement results for a channel are detected through the modes that are available and will assist in analyzing the signal problems with the channel.



- Select the input that you wish to measure.
- Select the the channel number that you wish to measure.
- Select the name of the measurement that you wish to perform. Depending on whether you chose an analog or digital channel, you will see one of the following dropdown lists.



Analog Measurements



Digital Measurements

- Select the Stop button to stop the measurement, the 860 DSPh will start automatic scanning (monitoring) again.
- Select the Start button to re-run the measurement.

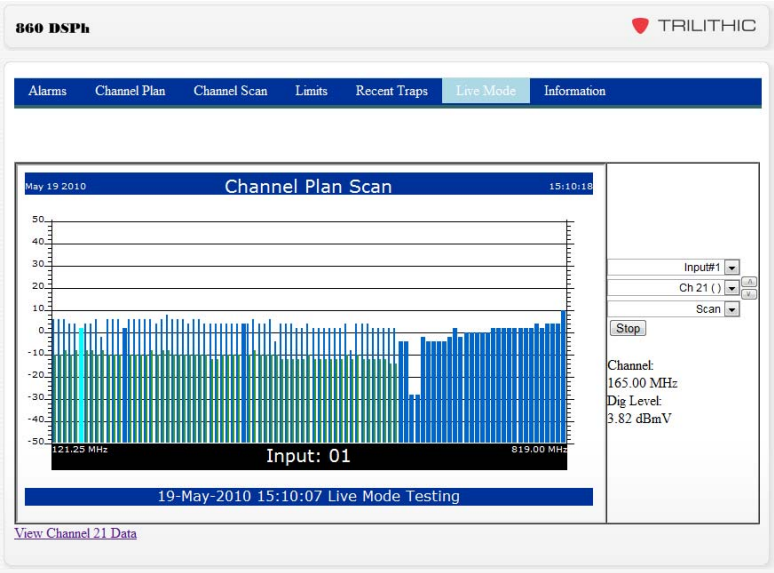
Advanced Spectrum Analyzer

The Spectrum Measurement is used to perform full spectrum analysis. This measurement mode displays the amplitude of all carriers, beats, and other RF sources present in a selected span of frequencies.

- When a time-varying signal is subjected to frequency analysis, it is transformed from the time domain to the frequency domain. The frequency-domain representation of the signal is called the *spectrum*, and the time domain representation is called the *waveform*.
- The RF amplitude is displayed as a power versus frequency line graph. On the Spectrum graph, vertical displacement represents signal strength. The horizontal axis represents a range of frequencies.
- The resolution bandwidth (RBW) setting determines how close together in frequency two signals can be and still be represented individually on the spectrum display.
- To set markers, enter the desired marker frequency in the Marker A or Marker B field. The level of the associated marker will be displayed directly to the right of the marker frequency.
- When two markers are set, the Delta frequency and level will be displayed to the right of the marker level.
- Select the *View Channel # Data* link to view the channel details as shown in the Alarms Display section.

Channel Plan Scan

The Channel Plan Scan is used to perform a full scan of the entire channel plan. This measurement mode displays amplitudes of *ALL* Visual and Aural carriers of the selected channel.



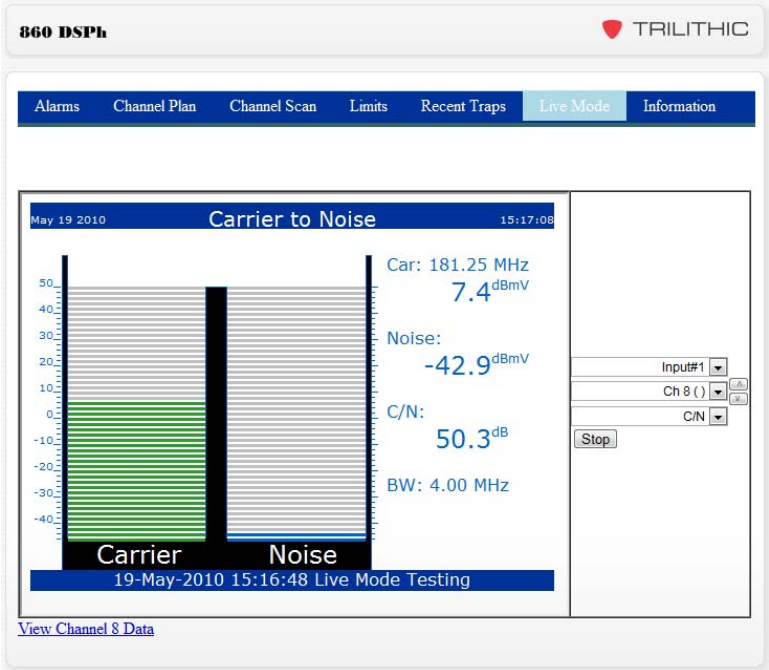
- Values are displayed as two simultaneous line graphs or as bar graph.
- On the Scan graph, vertical displacement represents signal strength. The amplitude is represented numerically at the left of the bar graph.
- The default measurement setting is to average 16 times and can be set from 1 to 1024 times. See **Chapter 5: WorkBench Setup**, Device Configuration, *Measurement Parameters* for more information on how to adjust the average settings.
- Select the *View Channel # Data* link to view the channel details as shown in the Alarms Display section.

NOTE

When changing analyzer parameters, the changes will not be applied until the user selects the Submit button.

Carrier-to-Noise Measurement

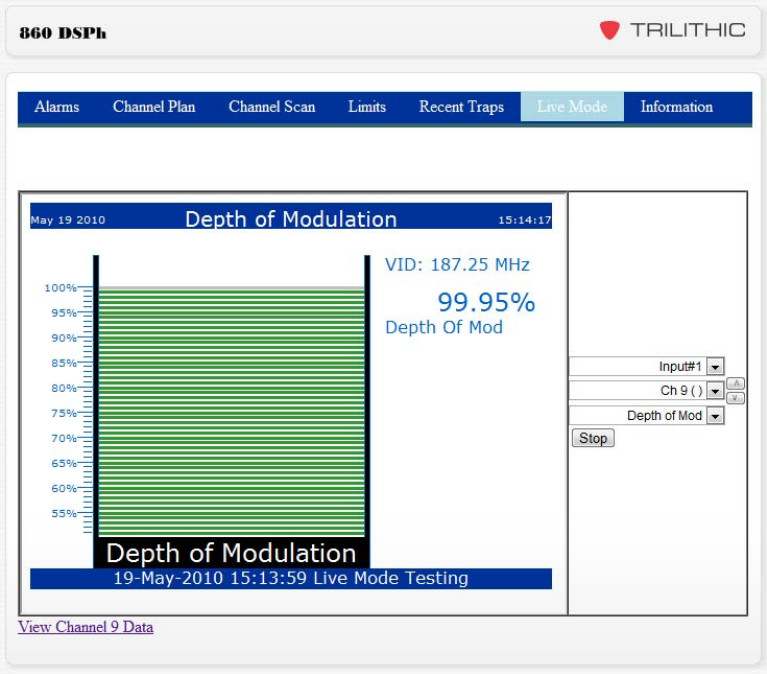
The Carrier-to-Noise measurement can be performed on analog channels. The C/N measurement is the decibels between the amplitude of a video carrier and the rms (rootmean-square) amplitude of system noise in a specified bandwidth (or ratio value between carrier level and noise level measured in units of decibels) within a single, selected channel.



- The **Carrier-to-noise** mode displays the selected channel number, frequency, amplitudes of the video carrier, corrected bandwidth noise, and ratio of the two measurements.
- Values are displayed both numerically and as a bar graph.
- High carrier-to-noise ratios provide better quality of communications.
- The 860 DSPh requires a minimum signal level greater than 10 dBmV.
- The default Analog Noise Bandwidth is 4.00 MHz. See **Chapter 5: WorkBench Setup**, Device Configuration, *Measurement Parameters* for more information on how to adjust the Analog Noise Bandwidth.
- Select the *View Channel # Data* link to view the channel details as shown in the Alarms Display section.

Depth of Modulation Measurement

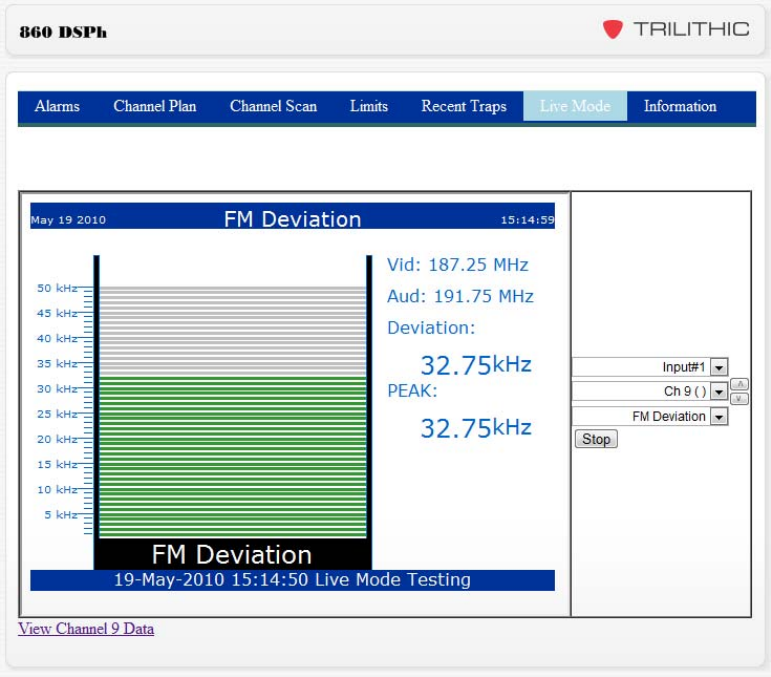
The Depth of Modulation Measurement can be performed on analog channels. This measurement displays the percentage of video modulation for the visual carrier of a single, user-selected channel.



- Overmodulation shows up as nonlinear distortions such as differential phase and gain. Undermodulation often results in degraded signal-to-noise performance.
- Values are displayed both numerically and as a bar graph.
- The default Optional Depth of Modulation percentage is 87.5%. See **Chapter 5: WorkBench Setup**, Device Configuration, *Measurement Parameters* for more information on how to adjust the Optimal Depth of Modulation Percentage.
- Select the *View Channel # Data* link to view the channel details as shown in the Alarms Display section.

FM Deviation Measurement

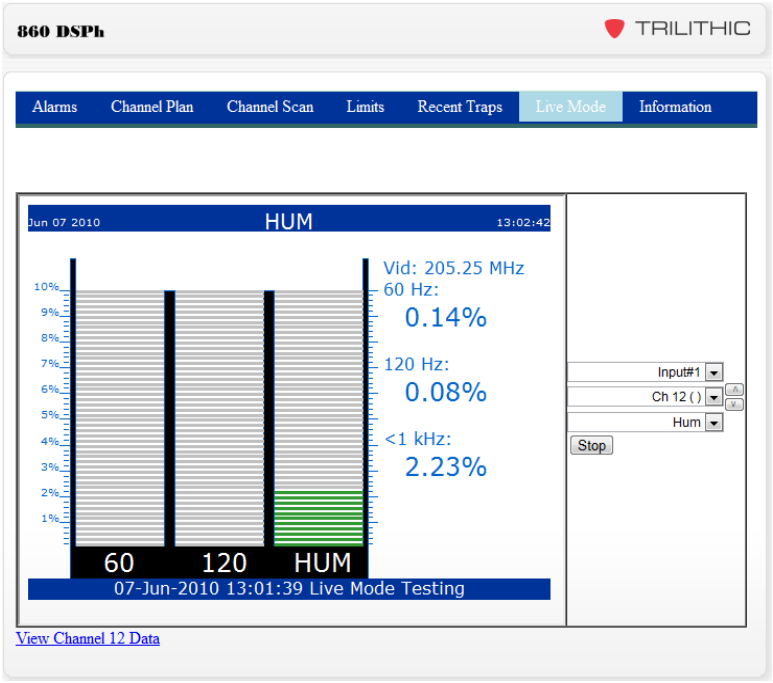
The FM Deviation Measurement can be performed on analog channels.



- This displays the current and maximum FM deviation on the audio carrier of a single, user-selected channel.
- The selected channel number and detected FM deviation (current and the maximum) are displayed both numerically and as a bar graph.
- The FM audio is also sent to the front panel speaker if the volume is set above zero (0). See **Chapter 5: WorkBench Setup**, Device Configuration, *General Device Parameters* for more information on how to adjust the front panel speaker volume.
- Select the *View Channel # Data* link to view the channel details as shown in the Alarms Display section.

HUM Measurement

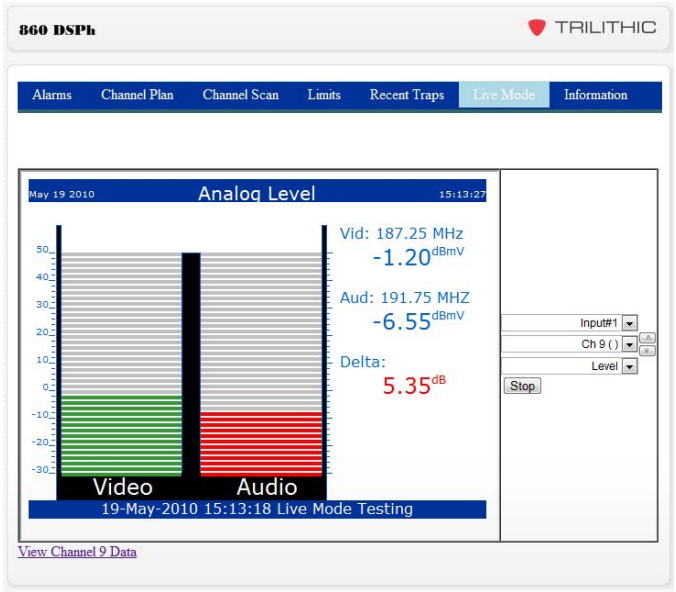
The HUM Measurement can be performed on analog channels.

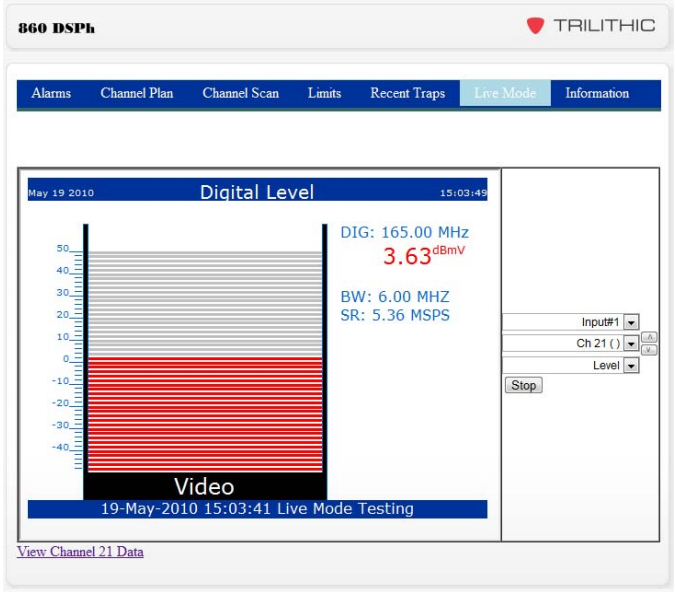


- This displays the amplitude of the 50/60 Hz, 100/120 Hz and <1kHz low frequency interference present on the video carrier of a single selected channel.
- Measurements are displayed both numerically and as a bar graph.
- The selected channel number and the amplitudes of the hum and low frequency interference are displayed as percentages.
- The HUM measurement requires a minimum signal level of -20 dBmv.
- The default HUM setting is 50/60 Hz and can also be set to 100/120 Hz. See **Chapter 5: WorkBench Setup**, Device Configuration, *Measurement Parameters* for more information on how to adjust the HUM settings.
- Select the *View Channel # Data* link to view the channel details as shown in the Alarms Display section.

Level Measurement

The Level Measurement can be performed on both analog and digital channels.



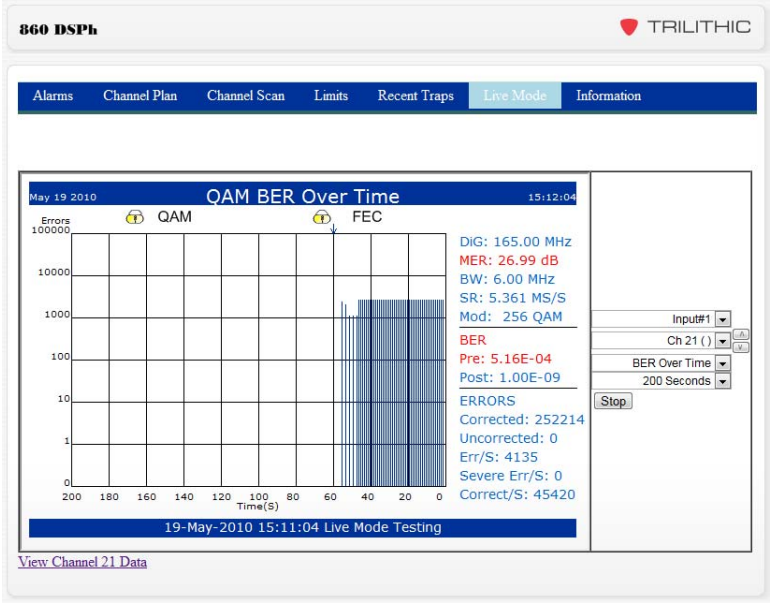


- For analog and digital channels, the 860 DSPh displays the amplitude (signal voltage or current size) of the video carriers included in a single channel, or the amplitude of a signal at a selected frequency.
- For analog channels, the 860 DSPh displays the same information for the audio amplitude of the carriers included in a single channel.
- Measurements are displayed both numerically and as a bar graph.
- The vertical bar represents the signal strength and the amplitude is represented numerically at the left of the bar graph. The amplitude and frequency of each bar are also displayed numerically to the right of the bar graph along with the channel number.
- The default measurement setting is to average 16 times and can be set from 1 to 1024 times. See **Chapter 5: WorkBench Setup**, Device Configuration, *Measurement Parameters* for more information on how to adjust the average settings.
- Select the *View Channel # Data* link to view the channel details as shown in the Alarms Display section.

QAM BER Over Time Measurement

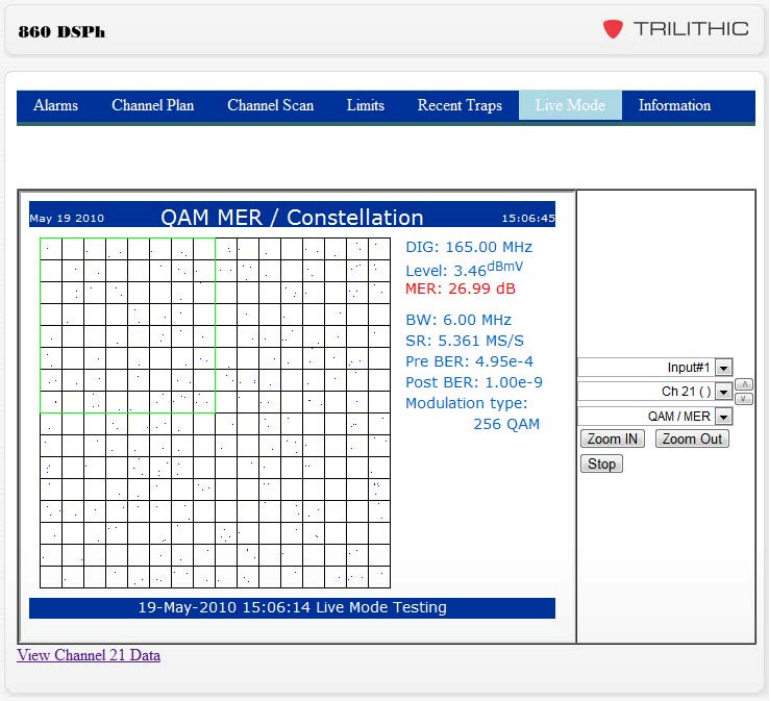
The QAM BER Over Time Measurement can be performed on digital channels. This measurement mode analyzes and displays the signal qualities of digitally modulated signals.

- BER (Bit Error Rate) is useful for as an aid to identify short-term signal degradation.
- The QAM and FEC lock symbols will be displayed above the bar graph.
- Select the *View Channel # Data* link to view the channel details as shown in the Alarms Display section.



QAM MER Constellation Measurement

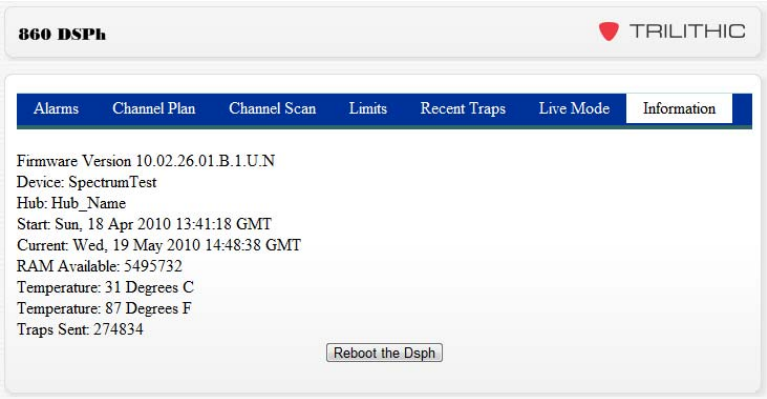
The QAM MER Constellation Measurement can be performed on digital channels. This measurement mode analyzes and displays the signal qualities of digitally modulated signals.



- The MER (Modulation Error Rate) measurements are able to measure small changes in transmitter and system performance.
- MER is the ratio of the power of the signal to the power of the error vectors expressed in dB. It is an early indicator of the ability of the receiver to correctly decode the transmitted signal.
- MER compares the actual location of a received symbol to its ideal location. As the signal degrades the received symbols are located further from their ideal location.
- The QAM measurements are displayed as a Constellation Diagram. The constellation display graphs symbol values on an I and Q grid. The display is useful for observing impairments in the digital signal.
- An optimum constellation has symbol clusters that are compact dots in the center of each symbol box. By observing the shape of the symbol clusters and their location relative to their optimum location in the constellation, it is possible to draw some conclusions about the nature of an impairment.
- For example, broadband noise causes symbol clusters to enlarge. Symbol clusters with a hole in the enter indicate coherent interference, spurs or ingress. Phase noise in headend converters causes the symbol clusters to appear as arcs particularly those near the edges of the constellation. A constellation with the corner symbol clusters drawn inward indicates gain compression.
- Select the *View Channel # Data* link to view the channel details as shown in the Alarms Display section.

Information Display

The Information display provides general information about the 860 DSPh.



- The firmware version, device name, and hub name of the 860 DSPh are displayed.
- The 860 DSPh scan start date and time are displayed along with the current date and time.
- The total RAM available onboard the 860 DSPh is displayed.
- The internal temperature of the device in both Centigrade and Farenheit are displayed.
- The total number of SNMP traps that the 860 DSPh has sent are displayed.
- Press the **Reboot the DSPh** button to restart the 860 DSPh.

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Chapter 7
Specifications

General Specifications

Frequency Range	5 to 1,000 MHz, standard Tuned by channel Frequency specified in 25 kHz increments
Channel Plans	Any number of channel plans can be stored; only one per input can be active at a time (16 active channel plans of 140 channels each).
Modulation Compatibility	Compatible with NTSC, PAL, SECAM, signals, common scrambling formats, QPSK, and QAM signals. User-definable power bandwidth for digital signals.

Monitored Parameters

Signal Level

Measurement Range	-40 to +50 dBmV with 0.1 dB resolution
Measurement Accuracy	±0.75 dB absolute @ 25° C (77° F) ±2.0 dB @ -18° to +50° C (0° to 122° F)
Digital Signals	± > 0.5 dB additional

Hum

Range	0 to 5% ± 0.5% 50/60 Hz + 100/200 Hz + 1 kHz lowpass

C/N

Range	> 50 dB with +10 dBmV carrier level

Depth of Modulation

Range	50 to 100% with 0.5% resolution

FM Deviation

Range	≤ 35 kHz with 1 kHz accuracy

MER

Modulations Supported	QPSK, 16, 32, 64, 128, and 256 QAM
Range	-6 to +38 dB

Mechanical Specifications

Size	1U (1.75”)
Weight	5 lbs maximum, with options
Principal Interface	Ethernet (TCP/IP, HTTP, and SNMP)
Secondary Interface	RS-232 38400, 8, 1, no flow control
Power	90 to 240 VAC 50 to 60 Hz

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Warranty Information

Trilithic, Inc. warrants that each part of this product will be free from defects in materials and workmanship, under normal use, operating conditions and service for a period of two (2) years from date of delivery. Trilithic, Inc.'s obligation under this Warranty shall be limited, at Trilithic, Inc.'s sole option, to replacing the product, or to replacing or repairing any defective part, F.O.B. Indianapolis, Indiana; provided that the Buyer shall give Trilithic, Inc. written notice.

Batteries are not included or covered by this Warranty.

The remedy set forth herein shall be the only remedy available to the Buyer under this Warranty and in no event shall Trilithic, Inc. be liable for incidental or consequential damages for any alleged breach of this Warranty. This Warranty shall not apply to any part of the product which, without fault of Trilithic, Inc., has been subject to alteration, failure caused by a part not supplied by Trilithic, Inc., accident, fire or other casualty, negligence or misuse, or to any cause whatsoever other than as a result of a defect.

Except for the warranty and exclusions set forth above, and the warranties, if any, available to the Buyer from those who supply Trilithic, Inc., there are no warranties, expressed or implied (including without limitation, any implied warranties of merchantability of fitness), with respect to the condition of the product or its suitability for any use intended for it by the Buyer or by the purchaser from the Buyer.

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