860 DSP & 860 DSPi Multifunction Interactive Cable Analyzer

Section II: Installer Functions

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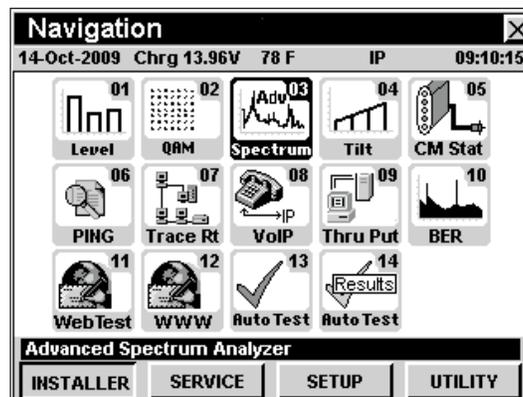# Installer Functions Overview ◢1◣

Introduction

The instrument enables you to select from numerous testing and measurement procedures. The instruments features several Installer Functions which come with the instrument, and it may have one or more optional functions.

This section will provide you with instructions on how to utilize the functions available in the **Installer** Menu of the instrument:

Note: The labels and the arrangement of the icons in this section are the default settings of the instrument. The user's display appearance may be customized and therefore may differ from the **Installer** Menu shown in this section. WorkBench software is required for customizing. See the WorkBench operation manual for more details.

Mode	Description	860 DSP Option	860 DSPi Option
Level	Displays the amplitude of the carriers included in a single channel, or the amplitude of a signal at a selected frequency.	Standard	Standard
QAM Lite	Analyzes and displays the signal qualities of digitally modulated signals displayed using a bar graph of signal level and numeric values for MER and pre/post FEC BER. **YOU MAY NOT HAVE THIS ICON, SEE NOTE 1**	N/A	Standard

Mode	Description	860 DSP Option	860 DSPi Option
QAM	Performs all of the QAM Lite features plus it will also display constellation, equalizer tap diagram, and BER graph. **YOU MAY NOT HAVE THIS ICON, SEE NOTE 1**	QA-1	PP-1 and QA-2
	The addition of the Enhanced Digital Video Retrofit Option (IL-1 or IL-2) provides extended measurements of errored seconds and code word errors in the QA-1 Option for the 860 DSP and the QA-2 Option for the 860 DSPi.	IL-1 or IL-2	IL-1 or IL-2
Spectrum Analyzer	Displays the amplitude of all carrier, beats, and other RF sources in the user-selectable spectrum from 4.0 MHz to 1.0 GHz with a resolution bandwidth of 300 kHz. **YOU MAY NOT HAVE THIS ICON, SEE NOTE 2**	Standard	PP-1
Return Spectrum Analyzer	Displays the amplitude of all carrier, beats, and other RF sources in the user-selectable spectrum from 4.0 MHz to 65.0 MHz with a resolution bandwidth of 300 kHz. **YOU MAY NOT HAVE THIS ICON, SEE NOTE 2**	N/A	Standard
Advanced Spectrum Analyzer	Displays the amplitude of all carrier, beats, and other RF sources in the user-selectable spectrum from 4.0 MHz to 1.0 GHz with a user-selectable resolution bandwidth from 10.0 KHz to 3.0 MHz, and includes a Zero Span Function. **YOU MAY NOT HAVE THIS ICON, SEE NOTE 2**	SA-1	PP-1 and SA-1
Tilt	Measures the amplitudes of a pre-selected group of carriers, and also computes the difference in amplitude between two selectable channels in the group.	Standard	Standard

Mode	Description	860 DSP Option	860 DSPi Option
DOCSIS 2.0 CM Statistics	Used to perform a quick view of the DOCSIS 1.X and DOCSIS 2.0 cable modem information. **NOT AVAILABLE FOR 860 DSP, SEE NOTE 3**	N/A	Standard on DOCSIS 1.X and 2.0 Equipped Devices
DOCSIS 3.0 CM Statistics	Used to perform a quick view of the DOCSIS 3.0 cable modem information. **NOT AVAILABLE FOR 860 DSP, SEE NOTE 3**	N/A	Standard on DOCSIS 3.0 Equipped Devices
VoIP	Used to measure various parameters that impact call quality, and provides results to reveal proximity to potential failure. (Works with ACTS Advanced Communication Test Server located in the cable network.)	CI-1, CI-2, CI-3, or CI-4	Standard
Thru Put	Tests the effective data rate of both the upstream and downstream channels of a cable modem connection.	CI-1, CI-2, CI-3, or CI-4	Standard
Digital BER	Used to test the ratio of corrupted bits versus total bits of data for a selected channel.	QA-1	Standard
	The addition of the Enhanced Digital Retrofit Option (IL-1 or IL-2) provides deep interleave support to BER Mode.	IL-1 or IL-2	Standard
Web Connectivity Test	Used to perform a quick Web Browser connectivity test without entering the Web Browser menu.	CI-1, CI-2, CI-3, or CI-4	PP-1

Mode	Description	860 DSP Option	860 DSPi Option
Web Browser	Used to access information from the internet.	CI-1, CI-2, CI-3, or CI-4	PP-1
Automatic Test	Performs a sequence of operations specified by a user-defined "macro".	Standard	Standard
Automatic Test Shortcut	Used as a shortcut to a user-defined "macro" that is saved on the 860 DSP or 860 DSPi using the WorkBench software, and displays an icon title that is the name of the user-defined "macro" that is referenced.	Requires WorkBench Software	Requires WorkBench Software
Automatic Test Results	Used to recall stored results of an AutoTest.	Standard	Standard
PING	Provides the ability to PING the network connection to check network connectivity between network devices.	CI-1, CI-2, CI-3, or CI-4	Standard
Trace Rt	This is a network utility which plots a route from source to destination displaying all routers along the way in addition to the round trip time from the source to the router. It also attempts to do a reverse domain name look up to display the registered name of each router.	CI-1, CI-2, CI-3, or CI-4	Standard

Note 1: The QAM Lite icon will appear on the 860 DSPi as a default setting. The QAM Lite icon will be replaced with the QAM icon when the QAM Option (QA-1 or QA-2) is installed.

Note 2: The Return Spectrum Analyzer icon will appear on the 860 DSPi as a default setting and will not appear on the 860 DSP in any configuration. The Return Spectrum Analyzer icon will be replaced on the 860 DSPi with the Spectrum Analyzer icon when the Power Pack Option (PP-1) is installed. The Spectrum Analyzer icon will appear on the 860 DSP as a default setting. The Spectrum Analyzer icon will be replaced on the 860 DSP and 860 DSPi with the Advanced Spectrum Analyzer icon when the Spectrum Analyzer Option (SA-1) is installed.

Note 3: Although this icon will appear on the 860 DSP, this mode is not available for the 860 DSP. The 860 DSP must be upgraded to an 860 DSPi by installing the DOCSIS 2.0 modem to access this mode.

Each mode of the instrument can be accessed by selecting the corresponding icon as shown in the previous table. Some modes may be inaccessible based on the options that have been installed on the instrument. Optional modes for the 860 DSP and 860 DSPi are indicated by an option code that is described in detail in **Section I: The Basics**, Chapter 7: Optional Software and Hardware.

This section assumes you are at least familiar with the basic operation of the navigational tools used in the instrument, so be sure to review **Section I: The Basics**, Chapter 4: Basic Navigation before proceeding through this section.

To use some installer functions, you may have to set up some basic parameters. Be sure you have completed **Section I: The Basics**, Chapter 5: Initial Setup before proceeding through this section.

To use some installer functions, you will need to connect your instrument to your cable system.

Level Mode 2

Introduction

In **Level** Mode the instrument displays the amplitude of the carriers included in a single channel, or the amplitude of a signal at a selected frequency. The basic 860 DSP and 860 DSPi come equipped with the **Level** Mode as a standard feature.

This section will provide you with the basic understanding of how to use **Level** Mode including:

- Required Setup

- Setting Reference Level

- Setting Vertical Resolution

- Adjusting Channels and Frequencies

- Setting Channel Plan

- Setting Frequency Step

- Using the Goto Function
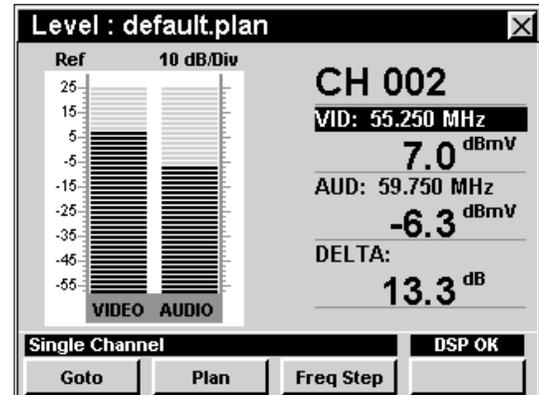
- Function Menu Options

Note: If your instrument does not include all of the features shown in this chapter, go on-line to *www.trilithic.com* to update your firmware for free. This will allow you to use all of the newest features that are included in this mode.

Required Setup

To use **Level** Mode, you will need to set up some basic parameters. Be sure you have completed **Section I: The Basics**, Chapter 5: Initial Setup before proceeding through this chapter.

To use **Level** Mode, you will need to set up **Level** Mode. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Measurement Settings* before proceeding through this chapter.

For SECAM L channels, you will need to set the **Optimal Modulation**; see **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Measurement Settings*.
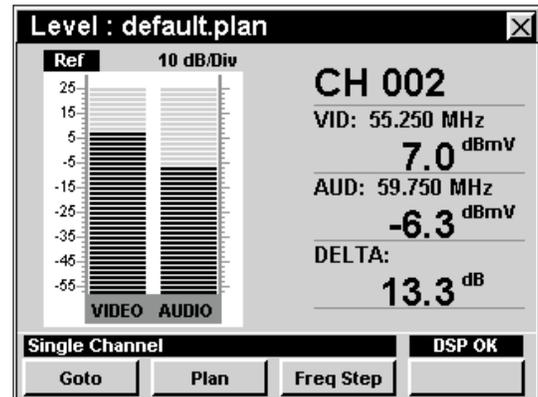
Setting Reference Level

On the bar graph, vertical displacement represents signal strength. The amplitude represented by the top horizontal line on the graph is the reference level.

To change the reference level, use the ◄ ► buttons to highlight **Ref** and then adjust the current value using the ▲ ▼ buttons.

To quickly bring off scale signals on screen, press the (Fn) button, and then select **Auto Range** by pressing (4).
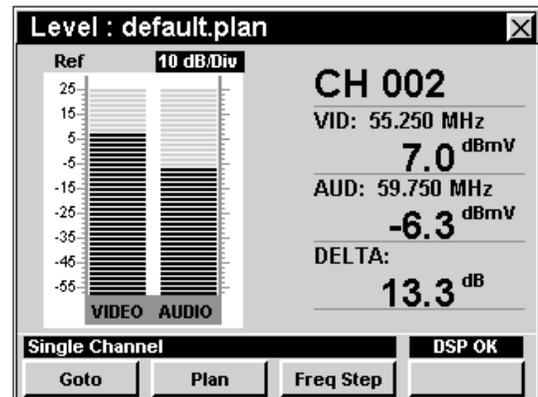
Setting Vertical Resolution

The **XX dB/Div** sets the vertical resolution for the graph. To change the vertical resolution, use the ◄ ► buttons to highlight **XX dB/Div** and then use the ▲ ▼ buttons to set the vertical resolution to 1 dB, 2 dB, 5 dB, or 10 dB per division as desired.

Selecting a low value will magnify the differences in the amplitudes of the displayed signals, but will limit the range of amplitudes that will fit on the graph.

To quickly bring off scale signals on screen, press the (Fn) button, and then select **Auto Range** by pressing (4).

Adjusting Channels and Frequencies

To change the channel or frequency, use the ◄ ► buttons to highlight the channel number or frequency, use the ▲ ▼ buttons to increment the value up and down or enter the desired channel number or frequency using the alphanumeric keypad, and then press the (Ent) button.
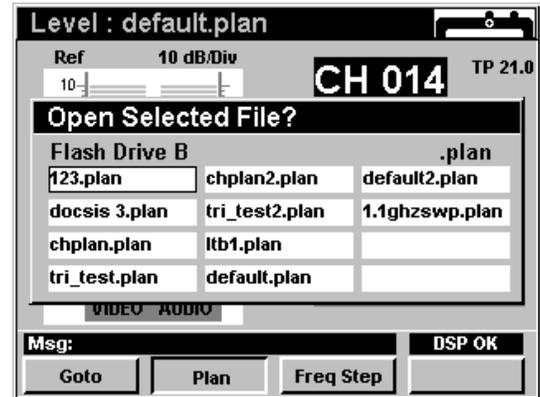
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Level

Setting Channel Plan

The instrument tunes channels according to a predefined channel plan. The currently selected plan is displayed in the title bar. To change the channel plan press the [Plan] softkey. The **Open File** window will open. Use the ◀ ▶ ▲ ▼ buttons to select the channel plan you want from the list of channel plans available, and then press the (Ent) button.

You must have a system channel plan that is up to date in order to view the channels in your system.

Changing Frequency Step Size

To change the frequency step size, press the [Freq Step] softkey, use the ▲ ▼ buttons to select the frequency step size you want from the list of frequency steps, and then press the (Ent) button. You may also select the desired frequency step size by pressing the corresponding alphanumeric button.

The first frequency step, in this case 100.000 MHz, is the channel spacing that is configured in **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Level Mode Settings*.

The frequency step, in this case 100.000 MHz, that is marked with and asterisk (*) is the currently selected frequency step.
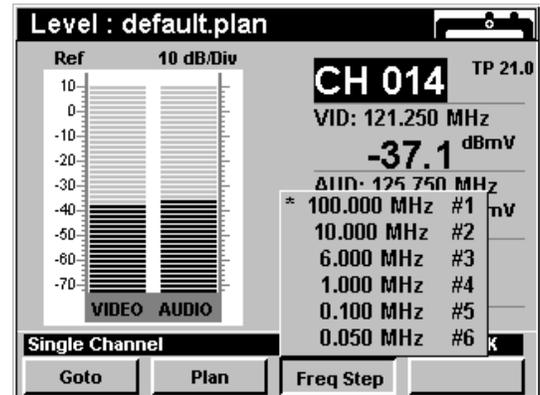
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Level

Using the Goto Function

The [Goto] softkey gives you rapid access to related measurement functions.

Goto Spectrum

From **Level** Mode you can jump to **Spectrum** Mode with the spectrum analyzer settings automatically set to display the current channel or frequency.

To change to **Spectrum** Mode, press the [Goto] softkey, use the (▲) (▼) buttons to select **Spectrum**, and then press the (Ent) button. You may also select **Spectrum** by pressing ①.

Once in **Spectrum** Mode, you may change any of the analyzer settings as described in Chapter 4: Spectrum Mode of this section of the manual.

Pressing the (Bk) button will return you to **Level** Mode at the originally selected channel.
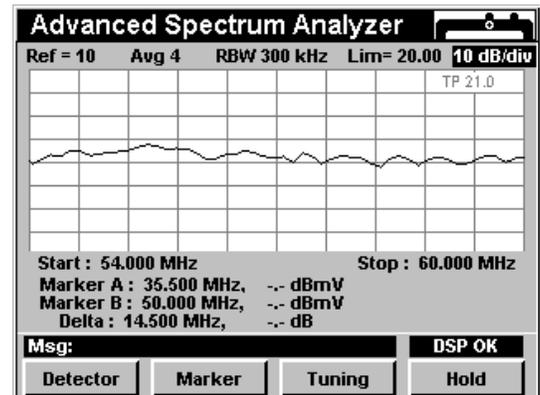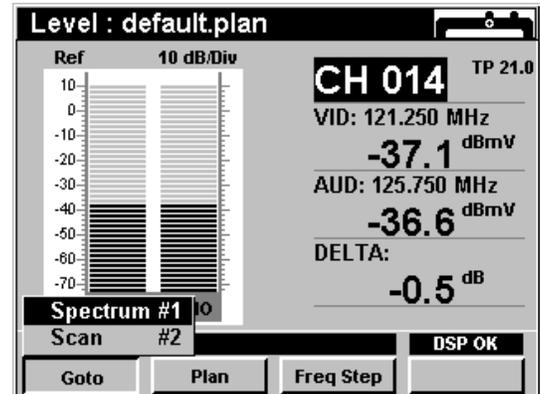
Goto Scan

If you are tuned to a channel, you can also jump to **Scan** Mode with the marker automatically set to the currently selected channel.

To change to **Scan** Mode, press the ▭ Goto ▭ softkey, use the ▲ ▼ buttons to select **Scan**, and then press the (Ent) button. You may also select **Scan** by pressing (2).

While in **Scan** Mode you can move the marker to another channel of interest and then press (Bk) to return to **Level** Mode tuned to the new channel.
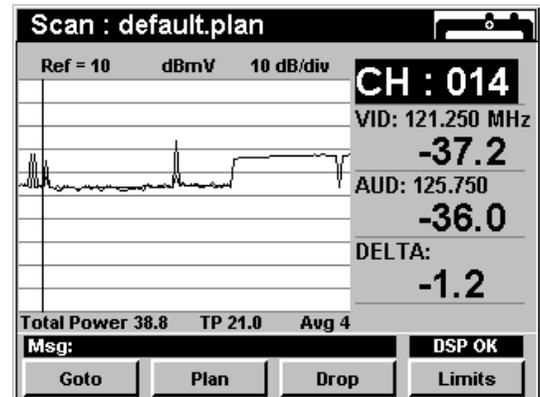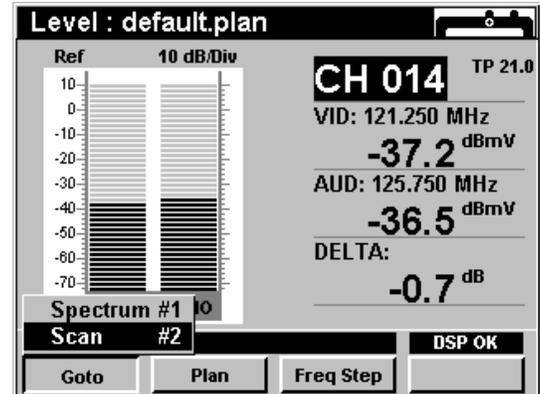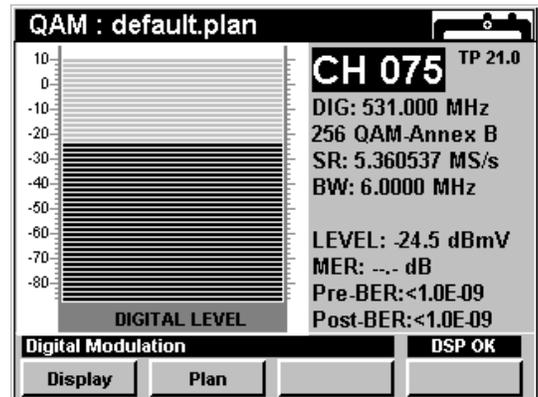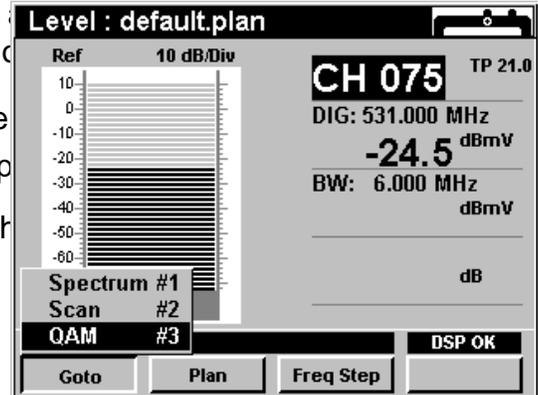
Level

Goto QAM

When tuned to a digital channel in **Level** Mode you can ~~~~ settings automatically set to display the current channel ~~~~

To change to **QAM** Mode, press the [Goto] softkey, use ~~~~ then press the (Ent) button. You may also select **QAM** by p~~~~

You may change the channel in **QAM** Mode, however wh~~~~ you will return to the originally selected channel.

Note: QAM Lite Mode is a standard function of the 860 DSPi and **QAM** Mode is an optional function of the 860 DSP and 860 DSPi. To view the installed functions on your instrument, see **Section IV: Setup Functions**, Chapter 5: Instrument Information Mode. If you do not have **QAM Lite** or **QAM** Mode installed in your instrument, you may call Trilithic at (800) 344-2412 to order this option and start using it today.
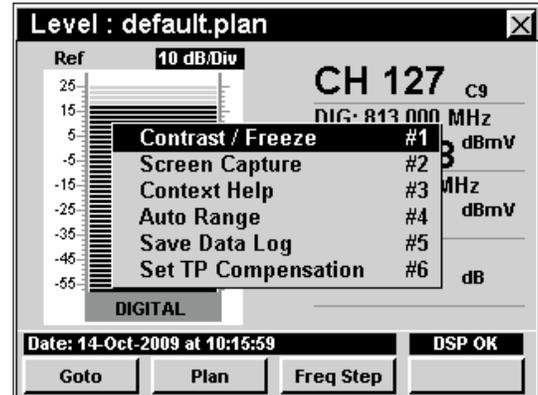
Level

Function Menu Options

The **Function** Menu can be accessed by pressing the
(Fn) button while in the **Level** Mode.

The following **Function** Menu options can be accessed
while in **Level** Mode:

- Contrast / Freeze

- Screen Capture

- Context Help

- Auto Range

- Save Data Log

- Set Test Point Compensation


Basic Function Menu Options

The following functions are described in **Section I: The Basics**, Chapter 6: Basic Function
Menu Options:

- Contrast / Freeze

- Screen Capture

- Context Help

- Save Data Log

Auto Range Option

This option is used to quickly bring off scale signals
on screen by automatically adjusting the reference
level and vertical resolution.

To use this option, press the (Fn) button, use the
(▲)(▼) buttons to highlight **Auto Range**, and then
press the (Ent) button. You may also select **Auto
Range** by pressing (4).
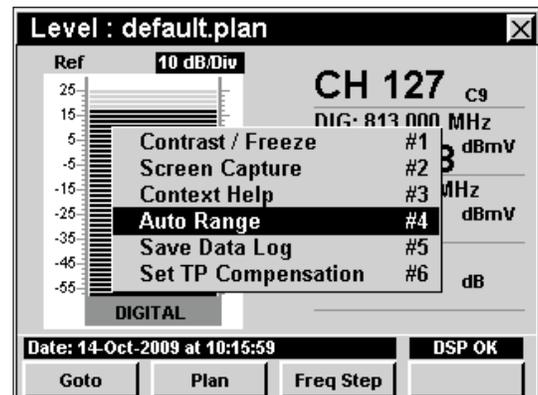
Level

Set Test Point Compensation Feature

This feature allows the user to enter an offset that will be added to all measurements made in **Level** Mode.

To use this option, press the (Fn) button, use the (▲) (▼) buttons to highlight **Set TP Compensation**, and then press the (Ent) button. You may also select **Set TP Compensation** by pressing (6).

- The **Function** Menu will close and the **Forward Compensation** window will open.

  - To enter an offset value for the test point or probe, use the (◄) (►) buttons to highlight **Test Point** or **Probe**, enter the value using the alphanumeric keypad, and then press the (Ent) button.

  - To enable test point compensation, use the (◄) (►) buttons to highlight **TP Mode**, and then use the (▲) (▼) buttons to change between **Enabled** and **Disabled**.

  - To resume measurement, press the (Bk) button.

- The **Forward Compensation** window will close and the **Level** Mode will display the combined (**Test Point** and **Probe**) test point compensation value next to the channel number.
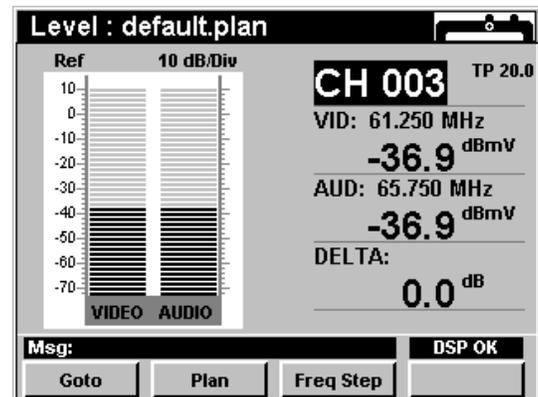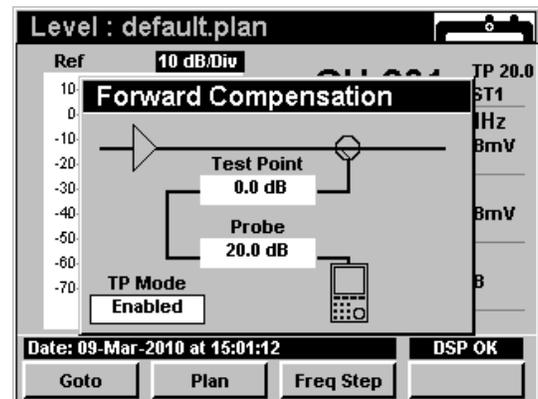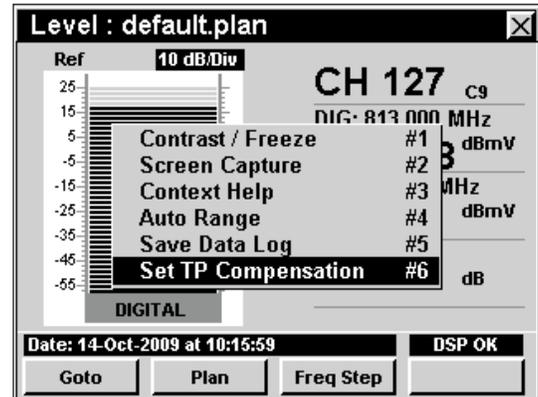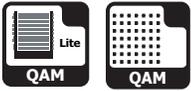
Introduction

QAM Mode analyzes and displays the signal qualities of digitally modulated signals. The 860 DSP and 860 DSPi come equipped with two different versions of the QAM analyzer as follows:

- **QAM Lite** Mode - The basic 860 DSPi comes equipped with this mode as the standard QAM analyzer. This mode displays a bar graph of the signal level and numeric values for MER and pre and post FEC BER. This mode is not available for the 860 DSP in any configuration.

- **QAM** Mode - The 860 DSP and 860 DSPi can be upgraded to this mode by purchasing the QAM Option (QA-1 or QA-2) respectively. This mode includes all of the features of **QAM Lite** Mode plus digital constellation, equalizer tap diagram, and BER graph.
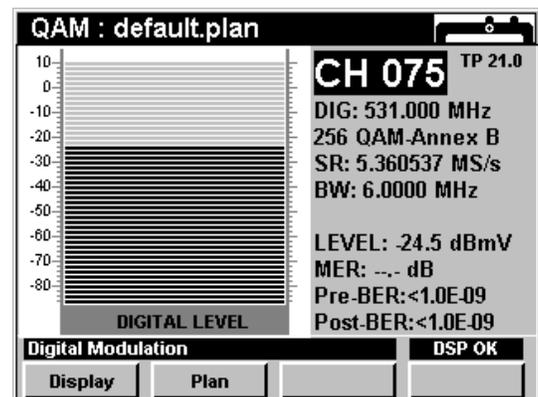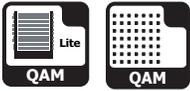
> **Note:** Before the 860 DSPi can be upgraded to the **QAM** Mode by purchasing the QAM Option (QA-2), you must first purchase the Power Pack Option (PP-1).

- You can also upgrade the **QAM** Mode with the addition of the Enhanced Digital Video Retrofit Option (IL-2). This option will provide support for decoding interleaved QAM channels in the QA-1 Option for the 860 DSP and the QA-2 Option for the 860 DSPi. This retrofit option is for instruments that were built before March 2005. Any instruments built since this date are equipped with the IL-1 or IL-2 Retrofit Option as a standard feature.

This section will provide you with the basic understanding of how to use **QAM** Mode including:

- Required Setup
- Setting Channel Plan
- Adjusting Channels and Frequencies
- Changing Digital Modulation Settings
- Setting the Display Mode
- Function Menu Options

Note: QAM Lite Mode is a standard function of the 860 DSPi and **QAM** Mode is an optional function of the 860 DSP and 860 DSPi. To view the installed functions on your instrument, see **Section IV: Setup Functions**, Chapter 5: Instrument Information Mode. If you do not have **QAM Lite** or **QAM** Mode installed in your instrument, you may call Trilithic at (800) 344-2412 to order this option and start using it today.

Note: If your instrument does not include all of the features shown in this chapter, go on-line to *www.trilithic.com* to update your firmware for free. This will allow you to use all of the newest features that are included in this mode.

Required Setup

To use **QAM** Mode, you will need to set up some basic parameters. Be sure you have completed **Section I: The Basics**, Chapter 5: Initial Setup before proceeding through this chapter.

To use **QAM** Mode, you will need to set up some **QAM** Mode. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Digital Settings* before proceeding through this chapter.

To use the distance to fault function of the equalizer tap diagram in **QAM** Mode, you will need to set up the cable velocity factor. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Fwd Sweep Settings* before proceeding through this chapter.
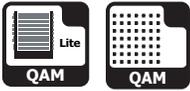
Setting Channel Plan

The instrument tunes channels according to a predefined channel plan. The currently selected plan is displayed in the title bar. To change the channel plan press the [Plan] softkey. The **Open File** window will open. Use the ◀ ▶ ▲ ▼ buttons to select the channel plan you want from the list of channel plans available, and then press the (Ent) button.

The instrument will tune to and measure QAM parameters for channels defined as digital in your channel plan.

You must have a system channel plan that is up to date in order to view the channels in your system.
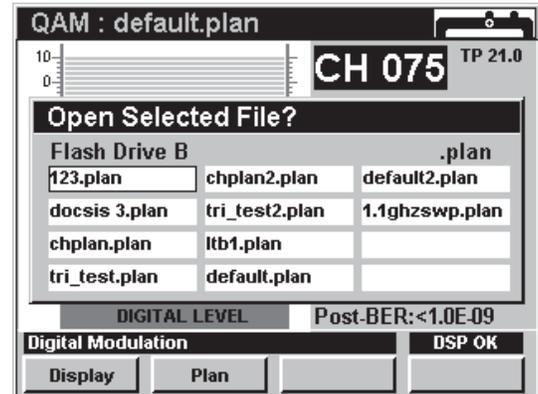
Adjusting Channels and Frequencies

To change the channel or frequency, use the ◀ ▶ buttons to highlight the channel number or

frequency, use the ▲ ▼ buttons to increment the value up and down or enter the desired channel number or frequency using the alphanumeric keypad, and then press the (Ent) button.

You may enter any channel number in your plan. If the channel is not designated as digital in your plan, the message **Not A Digital Channel** will be displayed in the message bar at the bottom of the screen and the instrument will beep.

The instrument will default to 64 QAM when tuning by frequency. To temporarily change the modulation type you must first enter a new frequency.
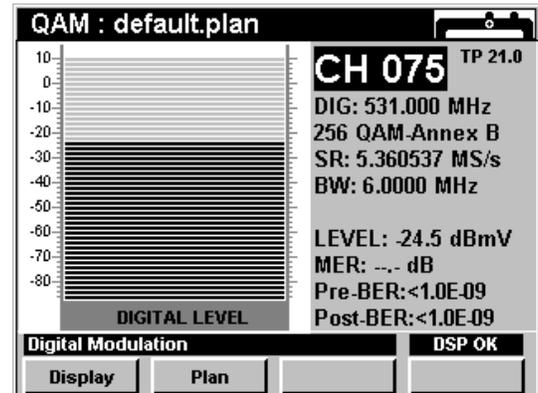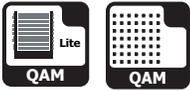
Changing Digital Modulation Settings

To change the digital modulation settings, tune to a channel by frequency, use the ◄ ► buttons to highlight the desired setting and then use the ▲ ▼ buttons to increment the value up and down or enter the desired value using the alphanumeric keypad and then press the (Ent) button.

Select from the following modulation types:

- **QPSK, 16, 32, 64, 128, and 256 QAM-Annex A:** Euro modulation

- **64 and 256 QAM-Annex B:** US DOCSIS modulation
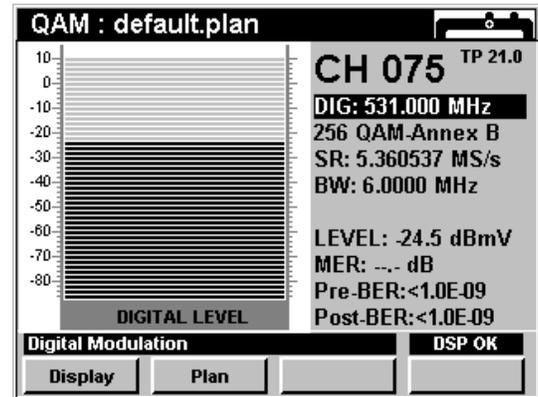
Setting the Display Mode

QAM Mode has four display options; bar graph, digital constellation, equalizer tap diagram, and BER graph. To change display modes use the [Display] softkey to toggle between the displays.

Using the Bar Graph Display

The bar graph display is useful for quickly determining the level and quality of a digital signal. The level is displayed as a bar graph with an associated numerical value. Verifying that a digital channel's level MER and BER are within acceptable limits is usually all that is necessary to insure that a digital channel will operate properly.
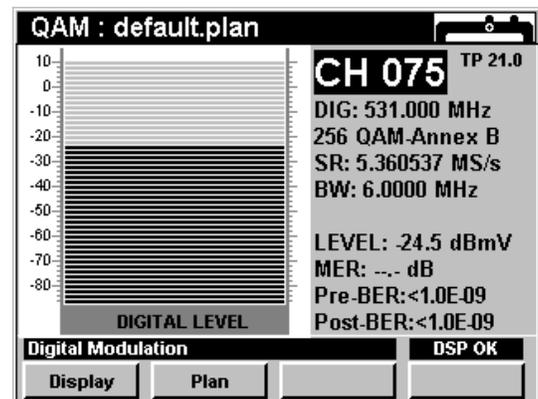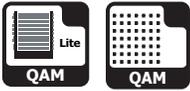
Using the Constellation Display

The constellation display graphs symbol values on an I and Q grid. The constellation 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 center indicate coherent interference like CSO/CTB, 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.
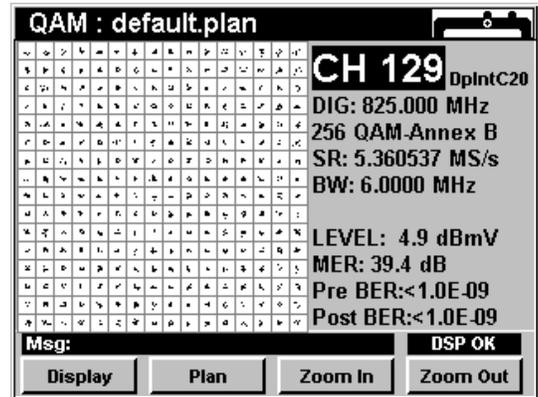
Using the Zoom Feature

The instrument allows you to easily zoom in or out on a constellation display.

To zoom in on a constellation display, press the Zoom In softkey. A selection window will appear in the display.

Use the ◄ ► ▲ ▼ buttons to place the selection window on the desired location then press the Zoom In softkey. If the selection window still appears, you can continue to zoom in by positioning the window and pressing the Zoom In softkey.
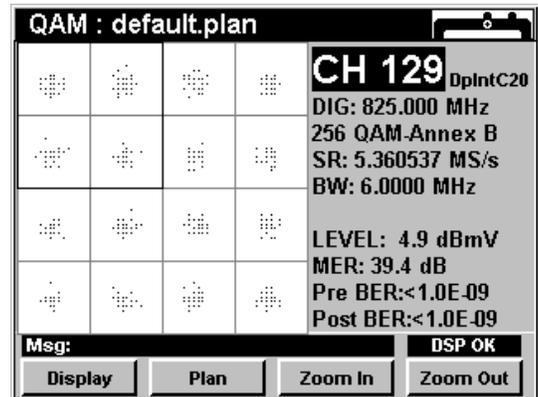
To zoom out from a constellation display press the Zoom Out softkey. Press the Zoom Out softkey repeatedly to zoom out further.

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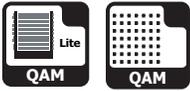
Using the Equalizer Tap Diagram

The equalizer tap diagram shows the relative amplitude of the equalizer taps needed to correct phase and amplitude distortions in the QAM signal.

The equalizer tap diagram is useful in determining presence of reflections. You can get an approximate distance to fault indication by using the **Eq Left** or **Eq Right** softkeys to place the indicator on the tap of interest.
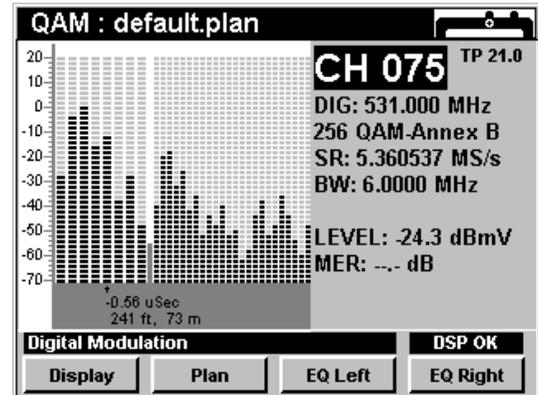
Using the BER Graph

The BER graph shows the ratio of corrupted bits to total bits in the QAM signal. The analyzer dwells on the selected channel, counting good bits and watching for individual corrupted bits. The BER graph shows errored bits as vertical lines that expand horizontally across the display with advancing time.

- **Gray:** These lines indicate repaired bits

- **Black:** These lines represent unrepairable bits
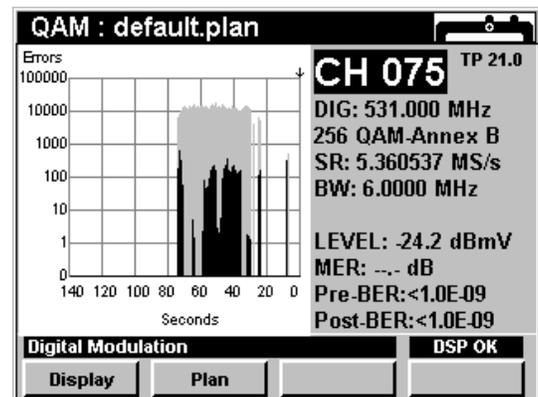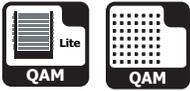
Function Menu Options

The **Function** Menu can be accessed by pressing the
(Fn) button while in the **QAM** Mode.

The following **Function** Menu options can be accessed
while in **QAM** Mode:

- Contrast / Freeze

- Screen Capture

- Context Help

- Auto Range

- Save Data Log

- Set Test Point Compensation

Basic Function Menu Options

The following functions are described in **Section I: The Basics**, Chapter 6: Basic Function
Menu Options:

- Contrast / Freeze

- Screen Capture

- Context Help

- Save Data Log

Auto Range Option

This option is used to quickly bring off scale signals
on screen.

To use this option, press the (Fn) button, use the
(▲) (▼) buttons to highlight **Auto Range**, and then
press the (Ent) button. You may also select **Auto
Range** by pressing (4).

Set Test Point Compensation Option

This option is used to enter an offset that will be added to all level measurements.

To use this option, press the (Fn) button, use the (▲) (▼) buttons to highlight **Set TP Compensation**, and then press the (Ent) button. You may also select **Set TP Compensation** by pressing (6).

- The **Function** Menu will close and the **Forward Compensation** window will open.

  - To enter an offset value for the test point or probe, use the (◄) (►) buttons to highlight **Test Point** or **Probe**, enter the value using the alphanumeric keypad, and then press the (Ent) button.

  - To enable test point compensation, use the (◄) (►) buttons to highlight **TP Mode**, and then use the (▲) (▼) buttons to change between **Enabled** and **Disabled**.

  - To resume measurement, press the (Bk) button.

- The **Forward Compensation** window will close and the **QAM** Mode will display the combined (**Test Point** and **Probe**) test point compensation value next to the channel number.
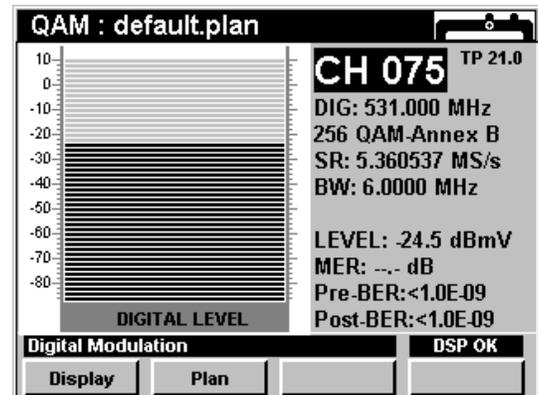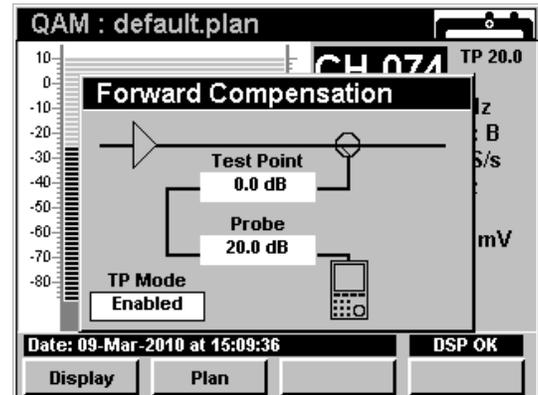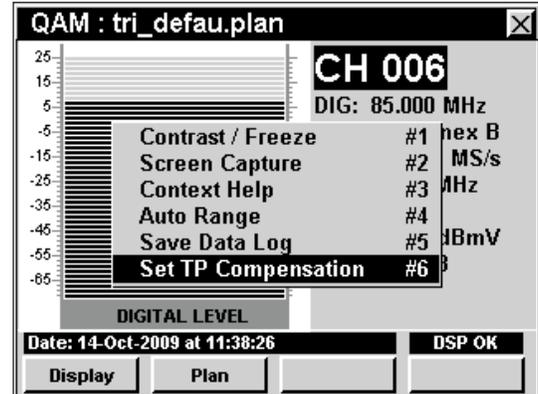
Introduction

The **Spectrum** Mode displays the amplitude of all carriers, beats and other RF sources in a user-selectable spectrum. In this mode the instrument displays RF amplitude as a power-vs-frequency line graph. Also displayed are the frequencies selected for the two markers, the RF amplitude of any signals at those frequencies and the difference between the amplitudes. An automatic marker identifies the highest amplitude signal in the displayed spectrum.

The **Spectrum** Mode draws a graph of all of the RF sources present in a selected span of frequencies. **Spectrum** Mode differs from **Scan** Mode in that the sources do not have to be included in a pre-selected channel plan.

The 860 DSP and 860 DSPi come equipped with three different versions of the spectrum analyzer as follows:

- **Spectrum** Mode - The basic 860 DSP comes equipped with this mode as the standard spectrum analyzer. This mode includes a frequency range of 4 MHz to 1.0 GHz and is limited to a fixed bandwidth set at 300 kHz. The 860 DSPi can be upgraded to this mode by purchasing the Power Pack Option (PP-1).

- **Return Spectrum** Mode - The basic 860 DSPi comes equipped with this mode as the standard spectrum analyzer. This mode includes a frequency range of 4 MHz to 65 MHz and is limited to a fixed bandwidth set at 300 kHz. This mode is not available for the 860 DSP in any configuration.

- **Advanced Spectrum** Mode - The 860 DSP and 860 DSPi can be upgraded to this mode by purchasing the Spectrum Analyzer Option (SA-1). This mode includes an adjustable bandwidth that can be set as narrow as 10 kHz to as wide as 3 MHz, zero span capabilities, and a frequency range of 4 MHz to 1.0 GHz.

> **Note:** To view the installed functions on your instrument, see **Section IV: Setup Functions**, Chapter 5: Instrument Information Mode. If you do not have **Spectrum** Mode or **Advanced Spectrum** Mode installed in your instrument, you may call Trilithic at (800) 344-2412 to order these options and start using them today.

This section will provide you with the basic understanding of how to use **Spectrum** Mode including:

- Required Setup
- Setting Reference Level
- Setting Resolution Bandwidth
- Setting Amplitude Limits
- Setting Vertical Resolution
- Detector Settings
- Marker Settings
- Setting Frequency Parameters
- Zero Span Measurements
- Hold Settings
- Function Menu Options
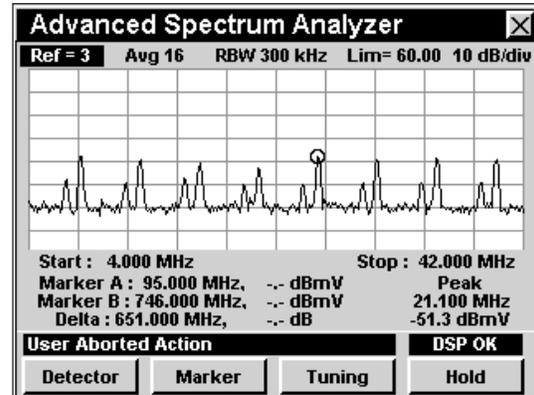
Advanced Spectrum Analyzer

Ref = 3   Avg 16   RBW 300 kHz   Lim= 60.00 10 dB/div

Start : 4.000 MHz   Stop : 42.000 MHz
Marker A : 95.000 MHz,   -.- dBmV   Peak
Marker B : 746.000 MHz,   -.- dBmV   21.100 MHz
   Delta : 651.000 MHz,   -.- dB   -51.3 dBmV

User Aborted Action   DSP OK

Detector   Marker   Tuning   Hold

Note: If your instrument does not include all of the features shown in this chapter, go on-line to *www.trilithic.com* to update your firmware for free. This will allow you to use all of the newest features that are included in this mode.

Required Setup

To use **Spectrum** Mode, you are not required to perform any setup procedures.

Setting Reference Level

On the spectrum graph, vertical displacement represents signal strength. The horizontal axis represents a range of frequencies, with the lowest represented frequency on the left edge of the graph, the highest on the right edge.

The amplitude represented by the top horizontal line on the graph is the reference level. In this mode the reference level also controls gain in the RF front end. It is possible to overload the RF front end if the reference level is too low.

To change the reference level, use the ◄ ► buttons to highlight **Ref**, and then adjust the current value using the ▲ ▼ buttons.

Advanced Spectrum Analyzer ☒

| Ref = 16 | Avg 32 | RBW 300 kHz | Lim= 20.00 | 10 dB/div |

Start : 54.000 MHz   Stop : 60.000 MHz
Marker A : 35.500 MHz,   -.- dBmV   Peak
Marker B : 50.000 MHz,   -.- dBmV
   Delta : 14.500 MHz,   -.- dB

| Advanced Spectrum Analyzer | | | DSP OK |
| Detector | Marker | Tuning | Hold |
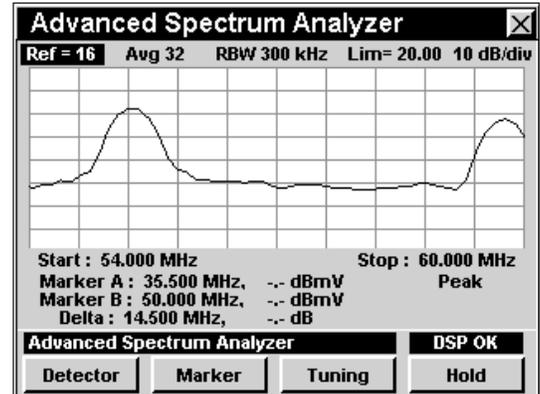
Note: If **Overload** appears in the bottom right message bar it is because the input signals are overloading the instrument. Increase the reference level until the message disappears or use the Auto Range Function by pressing the (Fn) button and then selecting (4).

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Setting Resolution Bandwidth

The resolution bandwidth setting determines how close together in frequency two signals can be and still be represented individually on the spectrum display.

Instruments with **Spectrum** Mode and **Return Spectrum** Mode have a resolution that is fixed at 300 kHz, a useful bandwidth for most wide-span spectrum scans.

Instruments with **Advanced Spectrum** Mode can be set to resolutions of 10 kHz, 30 kHz, 100 kHz, 300 kHz, 1 MHz, or 3 MHz.

The **RBW XXX kHz** and **RBW XXX MHz** sets the resolution bandwidth for the graph. To change the resolution bandwidth, first use the ◀ ▶ buttons to highlight **RBW XXX kHz** or **RBW XXX MHz**, then use the ▲ ▼ buttons to set the resolution bandwidth as desired.

Narrow resolution bandwidth settings are most useful for tests run at narrow frequency spans, such as hunting for spurious or reverse ingress, especially at frequencies near RF carriers.

Broad resolution bandwidth settings are most useful for measuring the true power of some digital modulation formats.
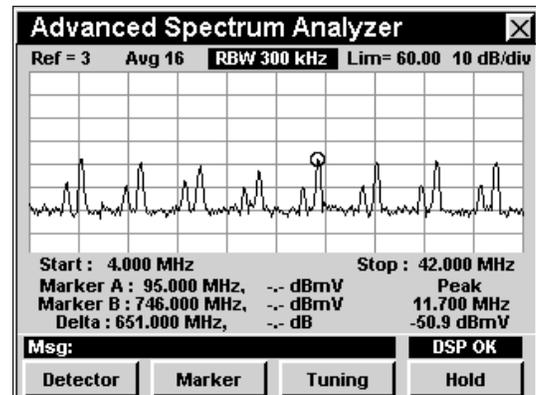
Setting Amplitude Limits

The **Lim = XX** sets an amplitude limit threshold for testing of ingress problems on the return band. When the amplitude of a displayed signal exceeds the limit threshold, the instrument will beep.

To use this option, use the ◄ ► buttons to highlight

Lim = XX, and then press the ▲ ▼ buttons to increase or decrease the amplitude limit threshold.

- A dark horizontal line will appear on the screen when the amplitude limit threshold is lower than the reference level.

- To enable the use of limit beeps, press the (Fn) button, use the ▲ ▼ buttons to highlight **Limit Beeps On**, and then press the (Ent) button. You may also select **Limit Beeps On** by pressing (8).

- To disable the use of limit beeps, press the (Fn) button, use the ▲ ▼ buttons to highlight **Limit Beeps Off**, and then press the (Ent) button. You may also select **Limit Beeps Off** by pressing (8).
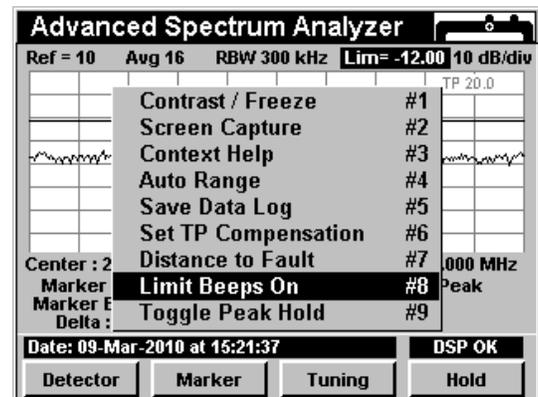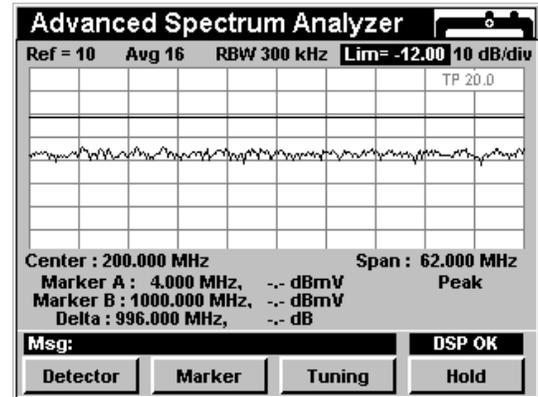
Setting Vertical Resolution

The **XX dB/Div** sets the vertical resolution for the graph. To change the vertical resolution, use the ◄ ► buttons to highlight **XX dB/Div**, and then use the ▲ ▼ buttons to set the vertical resolution to 1 dB, 2 dB, 5 dB, or 10 dB per division as desired.

Selecting a low value will magnify the differences in the amplitudes of the displayed signals, but will limit the range of amplitudes that will fit on the graph.
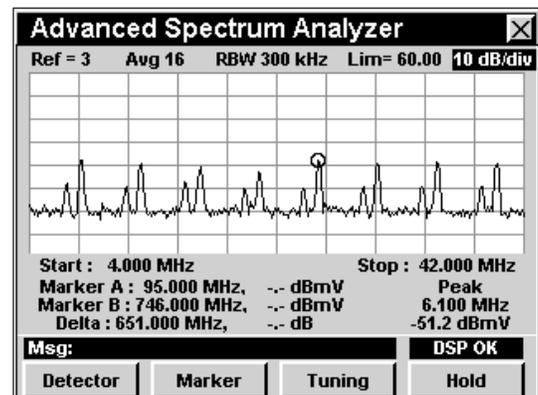
Detector Settings

The number of scans that are averaged is settable in the instrument using the **Detector** settings. The **Detector** settings allows you to smooth out noise "jitter" on the spectrum display by averaging a succession of spectrum scans. Its effect is similar to that of a video filter in a bench-top spectrum analyzer. Reducing display jitter is most useful when you are looking for small signals, such as spurious or common path distortions in the presence of noise.

To use this option, press the [Detector] softkey, use the ▲ ▼ buttons to highlight the desired detector setting of **Averaging**, **Dwell Wide**, or **Dwell Narrow** and then press the (Ent) button. You may also select the desired detector setting by pressing the corresponding alphanumeric button.

- Use the **Averaging** setting to perform measurements of the power of digital signals and to display the noise floor of signals.

- Use the **Dwell Narrow** and **Dwell Wide** settings to catch fast upstream modem bursts and fast noise bursts.

  - **Dwell Narrow** - This setting is slower than **Dwell Wide**, but displays the measurement more like an analog spectrum analyzer display.

  - **Dwell Wide** - This setting is faster than **Dwell Narrow**, but displays the measurement less like an analog spectrum analyzer display.

To change the number of times that the detector dwells on a frequency, use the ◀ ▶ buttons to highlight the detector settings status area shown in the figure, then use the ▲ ▼ buttons to set the value as follows:

- **Averaging** - Norm, Avg 8, Avg 16, Avg 32, Avg 64, Avg 128, and Avg 256

- **Dwell Wide** - Norm, Dwl W 8, Dwl W 16, Dwl W 32, Dwl W 64, Dwl W 128, and Dwl W 256

- **Dwell Narrow** - Norm, Dwl N 8, Dwl N 16, Dwl N 32, Dwl N 64, Dwl N 128, and Dwl N 256

Selecting a low value will decrease the chance of detecting data bursts and provide a faster less accurate result and selecting a high value will increase the chance of detecting data bursts and provide a slower more accurate result.
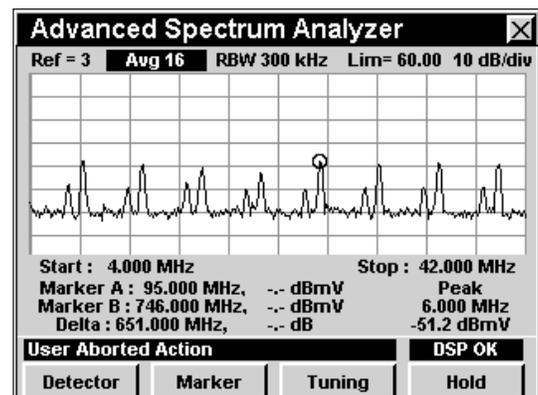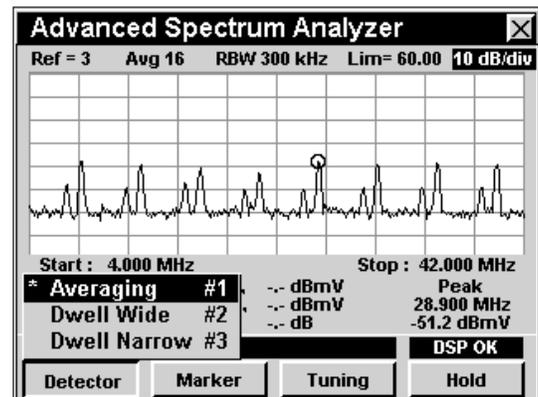
Marker Settings

The instrument displays two frequency-settable markers as dark vertical lines on the scale. These markers can be used to make amplitude measurements of carriers at user-selected frequencies, or to determine the difference (**Delta**) in amplitude between two selected carriers.

To set a marker to a frequency, use the ◀ ▶ buttons to highlight **Marker A** or **Marker B**, then increment the marker to higher or lower frequencies using the ▲ ▼ buttons. You can also enter a frequency directly using the alphanumeric keypad and pressing the (Ent) button.

The [Marker] softkey allows you to set a carrier of interest in the center of the display then conveniently "zoom" in on it by reducing the **Span** setting.

To use this option, press the [Marker] softkey, use the ▲ ▼ buttons to highlight the desired marker setting of **Center => Marker 1**, **Center => Marker 2**, or **Start=M1/Stop=M2** and then press the (Ent) button. You may also select the desired marker setting by pressing the corresponding alphanumeric button. The [Marker] softkey accesses the following functions:

- **Center => Marker 1 -** sets the displayed spectrum's center frequency to the current setting of **Marker A**.

- **Center => Marker 2** - sets the displayed spectrum's center frequency to the current setting of **Marker B**.

- **Start=M1/Stop=M2 -** sets the far left edge of the displayed spectrum to the current frequency of **Marker A**, and the far right edge to the frequency of **Marker B**. This allows you to select a "slice" of the spectrum then expand it to the full width of the display.
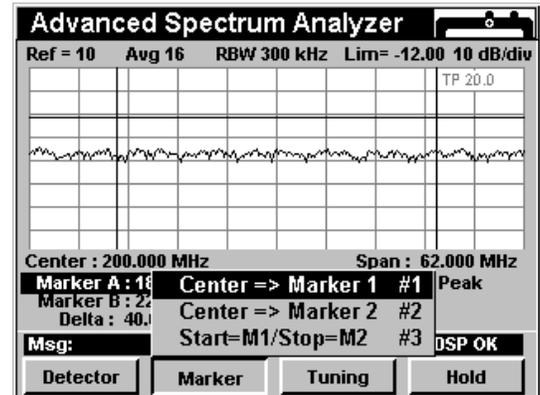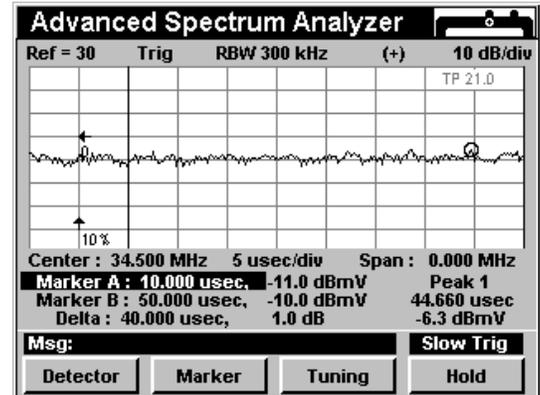
Setting Frequency Parameters

The actual frequency range represented by the horizontal axis of the graph can be set in one of three ways as follows:

Center/Span

This option allows you to enter the frequency represented by the center vertical grid line (**Center**) and the total frequency width of the display (**Span**).

To use this option, press the ⬚Tuning softkey, use the ⬆⬇ buttons to highlight **Center/Span**, and then press the (Ent) button. You may also select **Center/Span** by pressing ①.

- Use the ◀ ▶ buttons to highlight **Center**, and then use the alphanumeric keypad to enter the center frequency, and then press the (Ent) button.

- Use the ◀ ▶ buttons to highlight **Span**, and then use the alphanumeric keypad to enter the span frequency, and then press the (Ent) button.
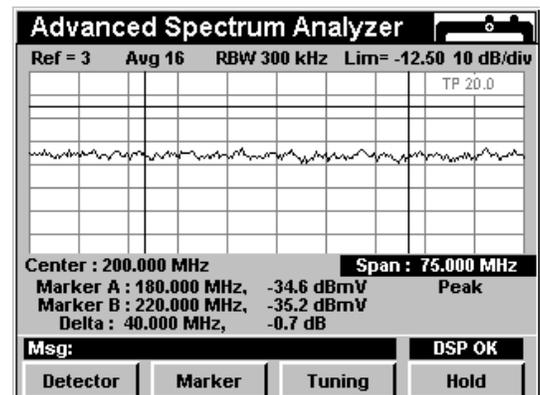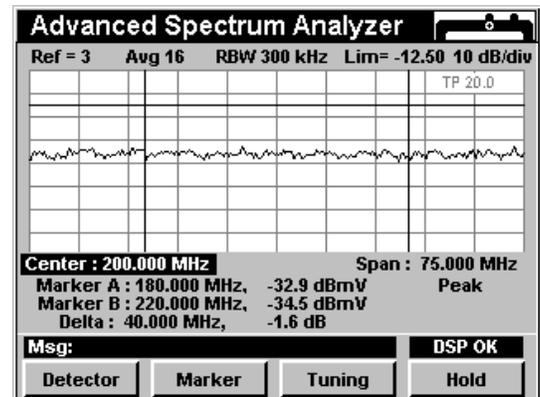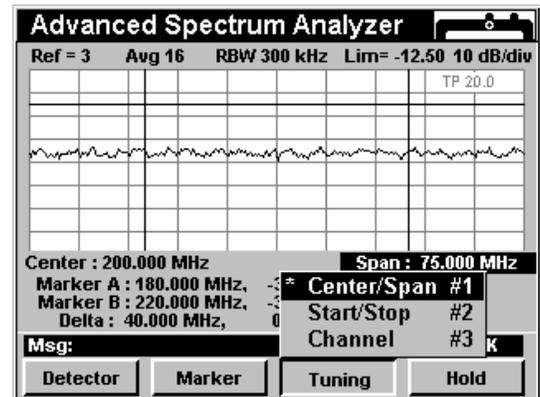
Start/Stop

This option allows you to enter the frequency represented by the farthest left vertical grid line (**Start**) and the farthest right vertical grid line (**Stop**).

To use this option, press the `Tuning` softkey, use the ▲ ▼ buttons to highlight **Start/Stop**, and then press the (Ent) button. You may also select **Start/Stop** by pressing ②.

- Use the ◀ ▶ buttons to highlight **Start**, and then use the alphanumeric keypad to enter the start frequency, and then press the (Ent) button.

- Use the ◀ ▶ buttons to highlight **Stop**, and then use the alphanumeric keypad to enter the stop frequency, and then press the (Ent) button.
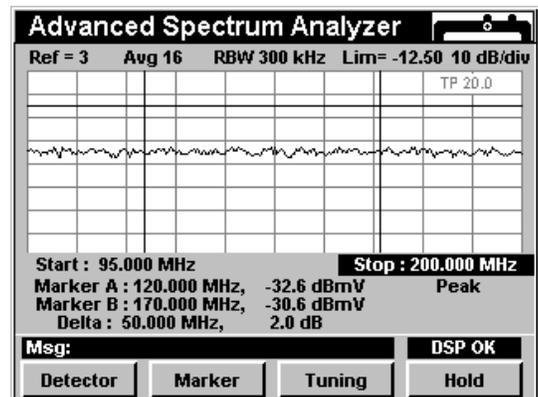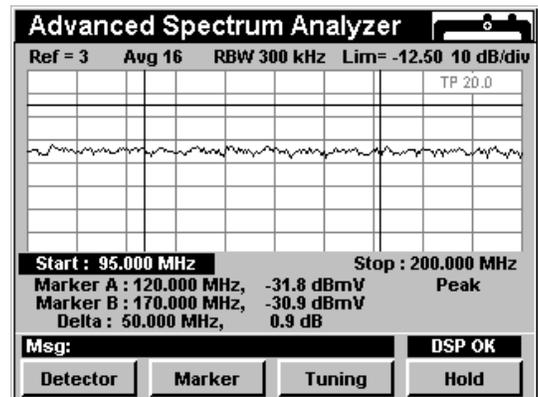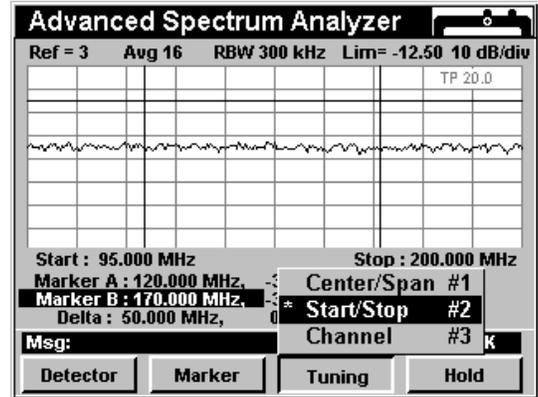
Channel

This option allows you to enter the frequency represented by the farthest left vertical grid line (**Start**) and the farthest right vertical grid line (**Stop**) as well as being able to increment the **Start** or **Stop** frequencies by the selected channel spacing.

To use this option, press the Tuning softkey, use the ▲ ▼ buttons to highlight **Channel**, and then press the (Ent) button. You may also select **Channel** by pressing ③.

- Use the ◄ ► buttons to highlight **Start**, and then use the alphanumeric keypad to enter the center frequency, and then press the (Ent) button.

- Use the ◄ ► buttons to highlight **Stop**, and then use the alphanumeric keypad to enter the span frequency, and then press the (Ent) button.

- When **Start** or **Stop** are highlighted, use the ▲ ▼ buttons to increment the frequency up or down by the selected channel spacing. To set the frequency spacing between channels, you will need to set the **Channel Spacing**, see **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Level Mode Settings*.
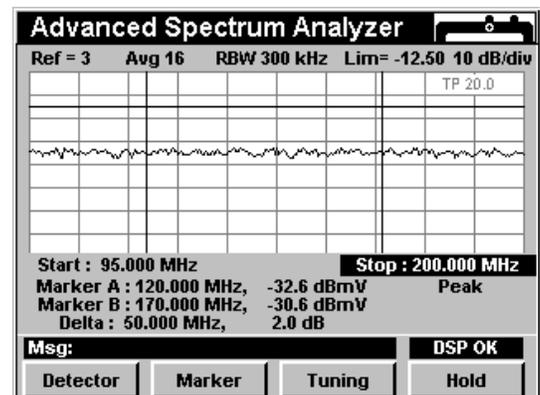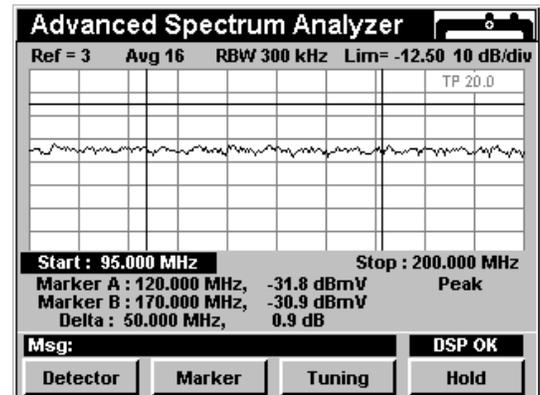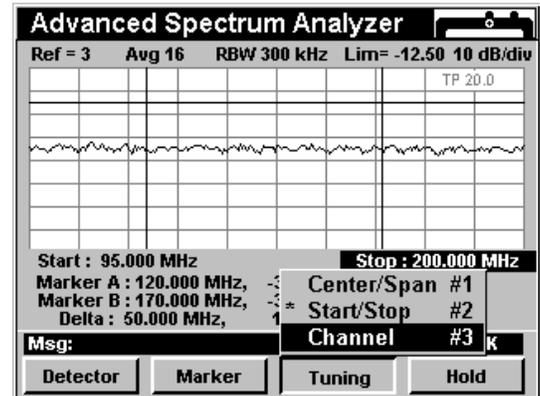
Zero Span Measurements

With the **Center/Span** setting selected and with **Span** set to 0 MHz, the zero span measurement mode is enabled. This allows "time domain" measurements to be performed on signals.

In the zero span measurement mode, you can measure timing relationships or measure the amplitude of a waveform at a settable time interval after a user-set amplitude trigger.

In effect, this mode converts the instrument into a tunable receiver connected to a digital oscilloscope, but displaying power in dBmV rather than +/- volts.

The zero span measurement mode is useful for detecting transient noise and bursts of data transmissions. It may also be used to compare the amplitudes of TDMA sources sharing the same frequency.

To use the zero span measurement mode, press the ⌷ Tuning ⌷ softkey, use the ▲ ▼ buttons to highlight

Center/Span, and then press the (Ent) button. You may also select **Center/Span** by pressing ①.

- Use the ◀ ▶ buttons to highlight **Span**, press the ⓪ button, and then press the (Ent) button.

- The detector settings status area in the upper left of the display window will change to **Trig**.

- Two small horizontal and vertical arrows will appear on the display to indicate the voltage and time triggers.

- The horizontal resolution settings will appear on the display between the **Center** and **Span**.

- The frequency settings of the variable markers will change to time settings. The units of the variable markers will match the units of the horizontal resolution settings.

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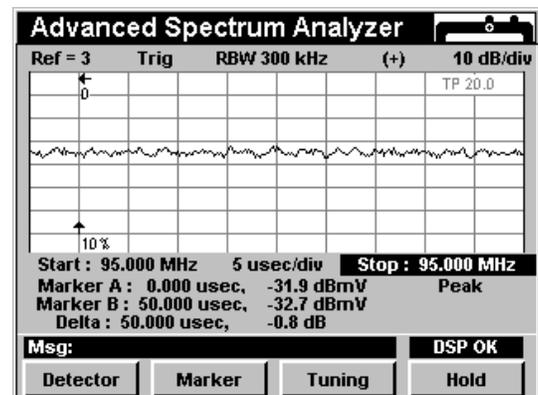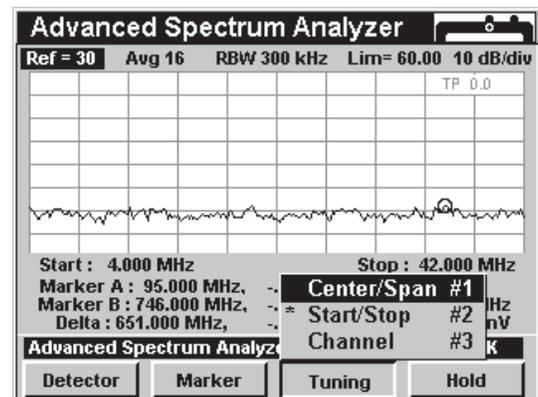
Setting Triggers

When the instrument is in zero span measurement mode, the small horizontal and vertical arrows that appear on the display are voltage and time triggers.

These control which point in a displayed waveform will be used as a reference for time interval measurements, and where that point will appear in the display window.

To set the voltage trigger, use the ◄ ► buttons to highlight **Trig**. Press ▲ ▼ buttons to set the voltage trigger to the point on the waveform that you wish measurements to be referenced from.
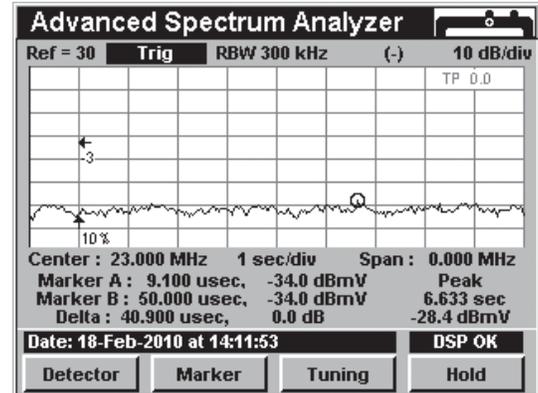
Trigger Modes

You can set the trigger point on the rising side of the waveform or the trailing side.

To set the trigger mode, use the ◄ ► buttons to highlight the second heading from the right, above the display window. (It may indicate **(+)**, **(-)**, or **Auto**, depending on how it was last set.)

- Press the ▲ ▼ buttons to select a rising trigger **(+)** or a falling trigger **(-)**. Being able to set this parameter enables you to for example, trigger on the lead or trailing side of a pulse, or to capture a trace when a burst of data starts, or when it ends.

- You can also select **Auto**, which automatically manages the trigger settings for you. This is a useful feature when you are setting up the instrument to display a waveform because **Auto** always provides a view of the waveform, even if some measurement parameters are not yet set.
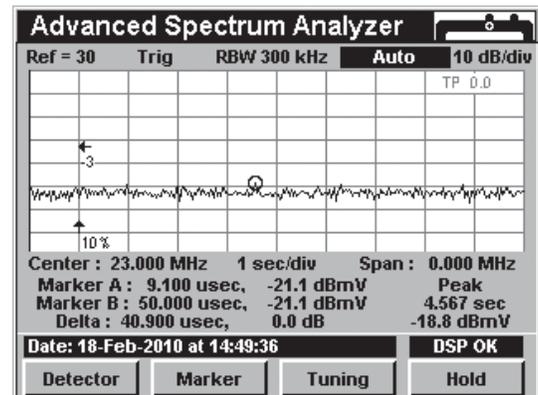
Setting Markers

While operating in zero span measurement mode, markers denote time intervals, rather than frequencies.

You can set one marker to measure the waveform amplitude at a settable delay after the trigger or you can set both markers and measure the amplitude difference between two points in the waveform.

To set a marker, use the ◀ ▶ buttons to highlight **Marker A** or **Marker B**, enter the desired interval before or after the time trigger at which you want the marker to appear by using the alphanumeric keypad,

and then press the (Ent) button. Also, you can increment the marker value by pressing the ▲ ▼ buttons. The display will now show the setting of each marker, the amplitudes of the displayed waveform at those points, and the time and amplitude differences between them.
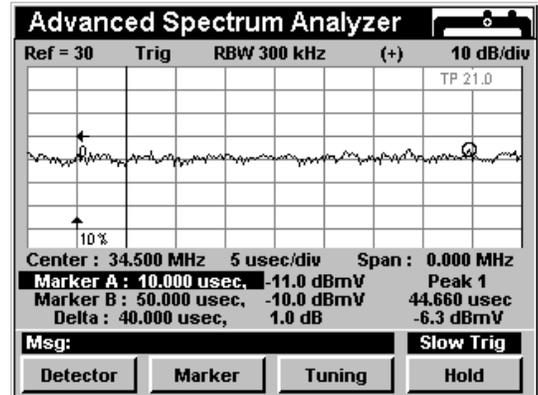
Hold Settings

The `Hold` softkey will allow the user to hold the minimum or maximum value of the spectrum being displayed on the instrument screen.

The user may choose, **None**, **Max**, or **Min** as the Hold setting value.

None

The **None** selection disables the Hold setting.

To use the **None** selection of the Hold setting, press the `Hold` softkey, use the ▲ ▼ buttons to highlight **None**, and then press the (Ent) button. You may also select **None** by pressing ①.
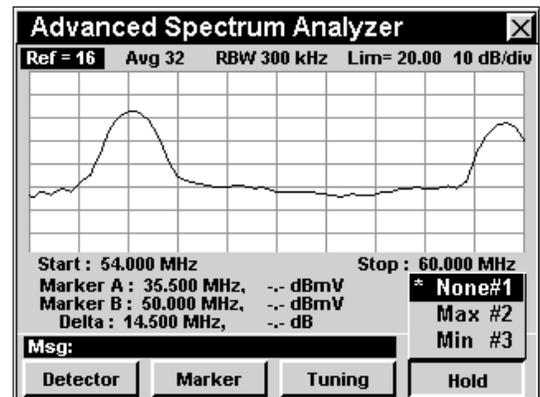
Max

The **Max** selection will hold the maximum value of the spectrum being displayed.

To use the **Max** selection of the Hold setting, press the `Hold` softkey, use the ▲ ▼ buttons to highlight **Max**, and then press the (Ent) button. You may also select **Max** by pressing ②.
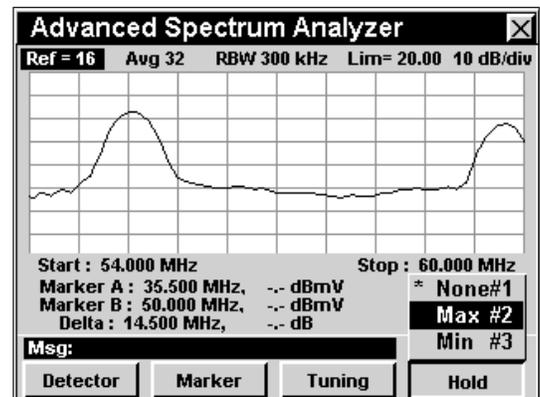
Min

The **Min** selection will hold the minimum value of the spectrum being displayed.

To use the **Min** selection of the Hold setting, press the `Hold` softkey, use the ▲ ▼ buttons to highlight **Min**, and then press the (Ent) button. You may also select **Min** by pressing ③.
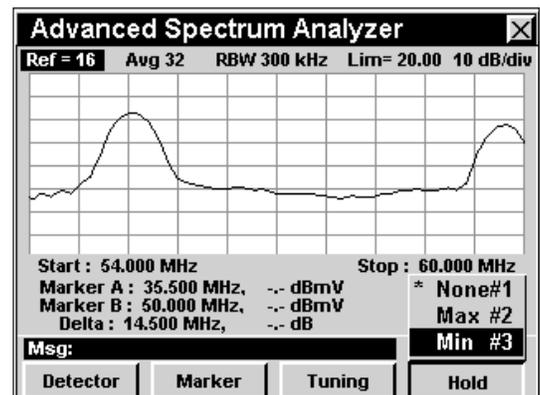
Function Menu Options

The **Function** Menu can be accessed by pressing the **Fn** button while in the **Spectrum** Mode.

The following **Function** Menu options can be accessed while in **Spectrum** Mode:

- Contrast / Freeze

- Screen Capture

- Context Help

- Auto Range

- Save Data Log

- Set Test Point Compensation

- Limit Beeps On/Off

- Toggle Peak Hold
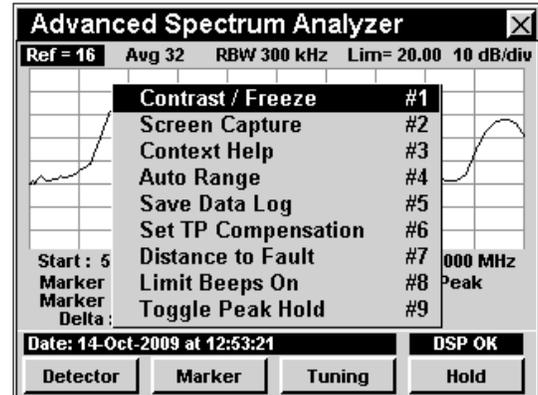
> **Note:** For more information on Limit Beeps On/Off, see _Setting Amplitude Limits_ in this chapter.

Basic Function Menu Options

The following functions are described in **Section I: The Basics**, Chapter 6: Basic Function Menu Options:

- Contrast / Freeze

- Screen Capture

- Context Help

- Save Data Log

Auto Range Option

This option is used to quickly bring off scale signals on screen.

To use this option, press the (Fn) button, use the (▲) (▼) buttons to highlight **Auto Range**, and then press the (Ent) button. You may also select **Auto Range** by pressing (4).

Set Test Point Compensation Option

This option is used to enter an offset that will be added to all measurements made in **Spectrum** Mode.

To use this option, press the (Fn) button, use the (▲) (▼) buttons to highlight **Set TP Compensation**, and then press the (Ent) button. You may also select **Set TP Compensation** by pressing (6).

- The **Function** Menu will close and the **Forward Compensation** window will open.

  - To enter an offset value for the test point or probe, use the (◄) (►) buttons to highlight **Test Point** or **Probe**, enter the value using the alphanumeric keypad, and then press the (Ent) button.

  - To enable test point compensation, use the (◄) (►) buttons to highlight **TP Mode**, and then use the (▲) (▼) buttons to change between **Enabled** and **Disabled**.

  - To resume measurement, press the (Bk) button.

- The **Forward Compensation** window will close and the **Spectrum** Mode will display the combined (**Test Point** and **Probe**) test point compensation value in the upper right portion of the spectrum analyzer display.
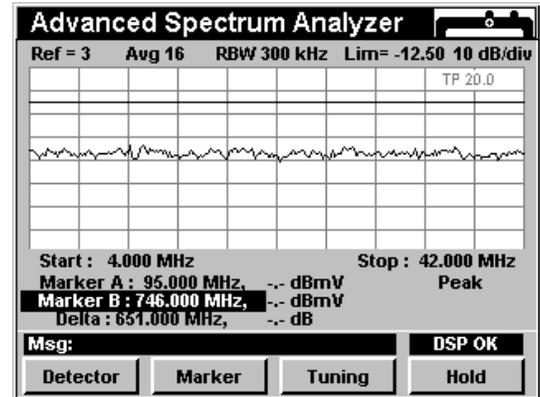
Toggle Peak Hold

This option is used to hold the maximum signal level at each frequency, scanned over time.

To use this option, press the (Fn) button, use the (▲) (▼) buttons to highlight **Toggle Peak Hold**, and then press the (Ent) button. You may also select **Toggle Peak Hold** by pressing (9).
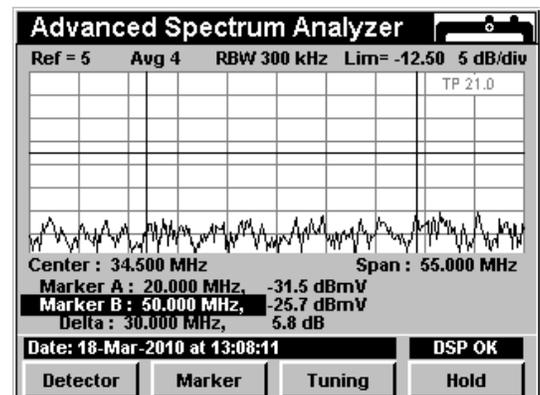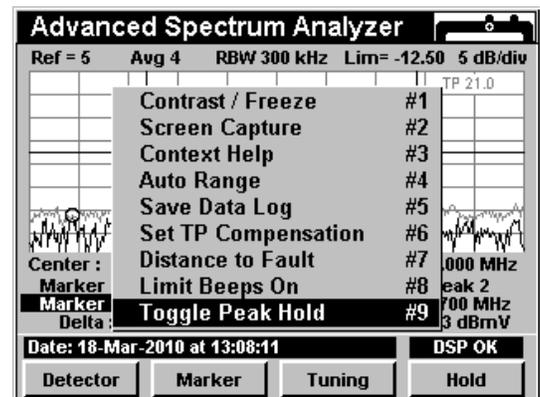
Introduction

In **Tilt** Mode the instrument measures the amplitudes of a pre-selected group of carriers, and also computes the difference in amplitude between two selectable channels in the group. This function may be used to quickly measure several especially important channels or to calculate distribution system unflatness.

In **Tilt** Mode the instrument displays the amplitudes of up to 10 pre-selected carriers in a bar graph.

> **Note:** Do not select more than 10 channels from your channel plan to be included in the Tilt measurement. When performing the Tilt measurement, the instrument will only use the first 10 channels from the active channel plan that are selected for Tilt measurement.

The amplitudes of the highest and lowest carriers, and their difference, are displayed numerically. You may also display the amplitudes of all **Tilt** plan carriers numerically.

The basic 860 DSP and 860 DSPi come equipped with the **Tilt** Mode as a standard feature.

This section will provide you with the basic understanding of how to use **Tilt** Mode including:

- Required Setup

- Setting Reference Level

- Setting Vertical Resolution

- Setting Channel Plan

- Setting Low and High Tilt Channels

- Changing Display Mode

- Function Menu Options
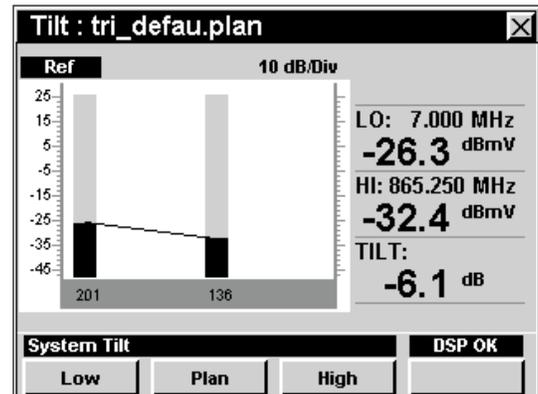
> **Note:** If your instrument does not include all of the features shown in this chapter, go on-line to *www.trilithic.com* to update your firmware for free. This will allow you to use all of the newest features that are included in this mode.

Tilt

Required Setup

To use **Tilt** Mode, you will need to set up some basic parameters. Be sure you have completed **Section I: The Basics**, Chapter 5: Initial Setup before proceeding through this chapter.

Setting Reference Level

On the bar graph, vertical displacement represents signal strength. The amplitude represented by the top horizontal line on the graph is the reference level.

To change the reference level, use the ◄ ► buttons to highlight **Ref** and then adjust the current value using the ▲ ▼ buttons.

To quickly bring off scale signals on screen, press the **Fn** button, and then select **Auto Range** by pressing ④.

Setting Vertical Resolution

The **XX dB/Div** sets the vertical resolution for the graph. To change the vertical resolution, use the ◄ ► buttons to highlight **XX dB/Div** and then use the ▲ ▼ buttons to set the vertical resolution to 1 dB, 2 dB, 5 dB, or 10 dB per division as desired.

Selecting a low value will magnify the differences in the amplitudes of the displayed signals, but will limit the range of amplitudes that will fit on the graph.

To quickly bring off scale signals on screen, press the **Fn** button, and then select **Auto Range** by pressing ④.

Setting Channel Plan

The instrument tunes channels according to a predefined channel plan. The currently selected plan is displayed in the title bar. To change the channel plan press the `Plan` softkey. The **Open File** window will open. Use the ◀ ▶ ▲ ▼ buttons to select the channel plan you want from the list of channel plans available, and then press the **Ent** button.

You must have a system channel plan that is up to date in order to view the channels in your system.

Setting the Low and High Tilt Channels

The **Low** and **High** channels used for computing tilt can be changed by pressing either the `Low` or `High` softkey. The **Low** and **High** channels selected will appear as solid bars in the graph.

TRILITHIC
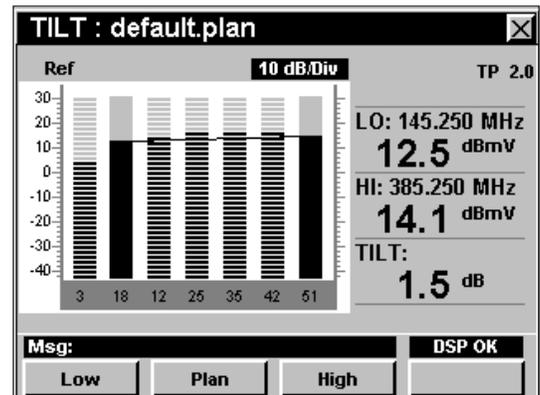
Changing Display Mode

You can toggle the display between a bar graph and a numeric display.

To use this feature, press the **Fn** button, use the **▲** **▼** buttons to highlight **Change Display Mode**, and then press the **Ent** button. You may also select **Change Display Mode** by pressing **6**.

In the numeric display the instrument lists the levels for all **Tilt** channels.
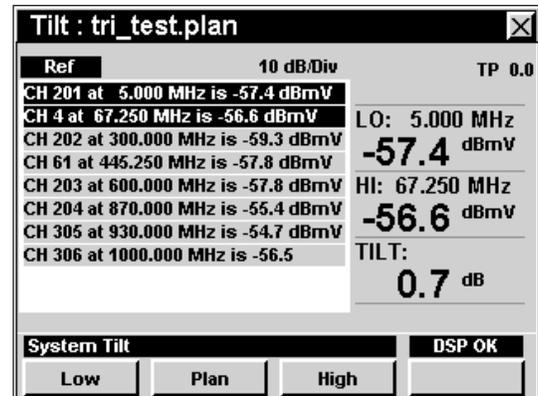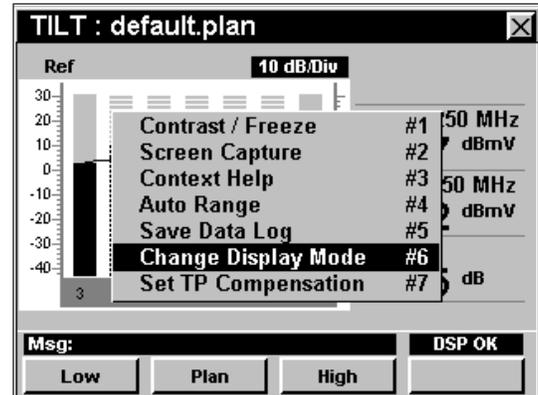
Function Menu Options

The **Function** Menu can be accessed by pressing the **Fn** button while in the **Tilt** Mode.

The following **Function** Menu options can be accessed while in **Tilt** Mode:

- Contrast / Freeze
- Screen Capture
- Context Help
- Auto Range
- Save Data Log
- Change Display Mode
- Set Test Point Compensation
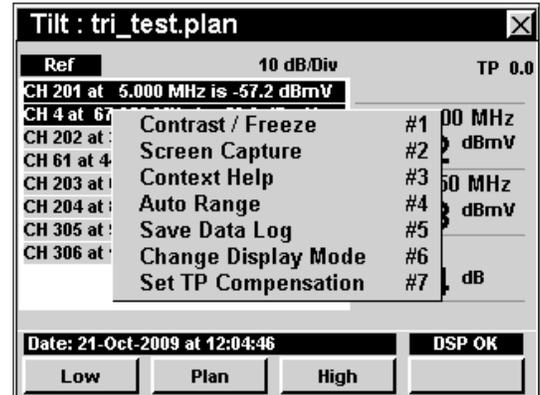
> **Note:** For more information on **Change Display Mode**, see _Changing Display Mode_ in this chapter.

Basic Function Menu Options

The following functions are described in **Section I: The Basics**, Chapter 6: Basic Function Menu Options:

- Contrast / Freeze
- Screen Capture
- Context Help
- Save Data Log

![Tilt icon]

Auto Range Option

This option is used to quickly bring off scale signals on screen, by automatically adjusting the reference level and vertical resolution.

To use this option, press the (Fn) button, use the
(▲) (▼) buttons to highlight **Auto Range**, and then press the (Ent) button. You may also select **Auto Range** by pressing (4).

Set Test Point Compensation Option

This option is used to enter an offset that will be added to all measurements made in **Tilt** Mode.

To use this option, press the (Fn) button, use the
(▲) (▼) buttons to highlight **Set TP Compensation**, and then press the (Ent) button. You may also select **Set TP Compensation** by pressing (7).

- The **Function** Menu will close and the **Forward Compensation** window will open.

  - To enter an offset value for the test point or probe, use the (◄) (►) buttons to highlight **Test Point** or **Probe**, enter the value using the alphanumeric keypad, and then press the (Ent) button.

  - To enable test point compensation, use the (◄) (►) buttons to highlight **TP Mode**, and then use the (▲) (▼) buttons to change between **Enabled** and **Disabled**.

  - To resume measurement, press the (Bk) button.

TRILITHIC

- The **Forward Compensation** window will close and the **Tilt** Mode will display the combined (**Test Point** and **Probe**) test point compensation value in the upper right portion of the screen.

CM Stat Mode (DOCSIS 2.0) 6

Introduction

In **CM Stat** Mode the instrument displays a quick view of the internal cable modem information. The basic 860 DSPi comes equipped with the **CM Stat** Mode as a standard feature. This mode is not available for the 860 DSP in any configuration.

This section will provide you with the basic understanding of how to use **CM Stat** Mode including:

- Required Setup

- Logging on to the Network

- Measurement Data

- Using the Goto Function

- Function Menu Options

Cable Modem Statistics

08-Mar-2010 Chrg 13.60V 34 C   IP   13:40:38

Downstream

Frequency	Rx Level	MER	preBER	postBER
819.00 MHz (256 QAM)	3.57 dBmv	38.98 dB	1.00E-09	1.00E-09
807.00 MHz (256 QAM)	4.23 dBmv	38.60 dB	1.00E-09	1.00E-09
813.00 MHz (256 QAM)	4.35 dBmv	38.60 dB	1.00E-09	1.00E-09
801.00 MHz (256 QAM)	5.10 dBmv	38.98 dB	1.00E-09	1.00E-09

Upstream

Frequency	Tx Level
24.00 MHz (64 QAM -2)	25.75 dBmv
16.90 MHz (64 QAM -1)	25.68 dBmv
31.10 MHz (64 QAM -3)	25.18 dBmv
38.20 MHz (64 QAM -4)	25.18 dBmv

Msg: DOCSIS 2.0

| Goto | IP Info | Config File | Change ID |

Note: If your instrument does not include all of the features shown in this chapter, go on-line to *www.trilithic.com* to update your firmware for free. This will allow you to use all of the newest features that are included in this mode.

Required Setup

To use **CM Stat** Mode, you will need to set up some basic parameters. Be sure you have completed **Section I: The Basics**, Chapter 5: Initial Setup before proceeding through this chapter.

To use **CM Stat** Mode, you will need to set up the internal cable modem. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *CM/CPE Settings* before proceeding through this chapter.

CM Stat

Logging on to the Network

Verify in the status bar that the field to the left of the time says **RDY**. This indicates that the instrument is ready to connect to the cable modem network.

> **Note:** If the instrument does not indicate **RDY** within 10 seconds (30 seconds if SSL is installed) after the instrument is turned on, power the unit off and back on. If the **RDY** message never shows up, you may not have Ethernet Option (CI-1, CI-2, CI-3, CI-4, or CI-5) installed on your 860 DSP.

Internal Cable Modem

Connect the cable drop to the instrument's

SLM/Forward input, then select the [PING] icon from

the **Installer** menu. The **Logging On To Network** window will show the progress of the logon process.

When logon is complete, the **PING** function will be displayed.

```
NAVIGATION
19-Mar-2007  Charge 14.32V    29 C    COM    00:43:04
   LOGGING ON TO NETWORK          ☒
   Enabled                            00:50
   Network Config    Internal Cable Modem
      IP Address         Requesting IP
      MAC Address     00:05:CA:28:E7:A6
      Search Freq        SEARCH ALL
          Status         Traffic Enable

   ☒ Power ☒ Cable ☒ Status ☒ E-Net
Cable Modem Statistics
  INSTALLER    SERVICE    SETUP    UTILITY
```

> **Note:** If you have not set the default downstream data carrier frequency or it is incorrect, it may take several minutes for the modem to find the downstream data carrier.

Measurement Data

The **CM Stat** Mode displays connections statistics for the internal cable modem. The instrument will display the downstream and upstream frequency, transfer rate, and power level as well as the downstream modulation type, signal-to-noise ratio, corrected bits, and uncorrected bits.

CM Stat

Using the Goto Function

The [Goto] softkey gives you rapid access to related measurement functions.

Goto Throughput

From **CM Stat** Mode you can jump to **Throughput** Mode.

To change to **Throughput** Mode, press the [Goto] softkey, use the (▲) (▼) buttons to select **Throughput**, and then press the (Ent) button. You may also select **Throughput** by pressing (1).

Once in **Throughput** Mode, you may test the internal cable modem as described in Chapter 11: Throughput Mode of this section of the manual. Pressing the (Bk) button will return you to **CM Stat** Mode.

TRILITHIC

Goto PING / LPR

From **CM Stat** Mode you can jump to **PING** Mode.

To change to **PING** Mode, press the ⬚Goto⬚ softkey, use the ⬆ ⬇ buttons to select **PING / LPR**, and then press the (Ent) button. You may also select **PING / LPR** by pressing ②.

Once in **PING** Mode, you may test the internal cable modem as described in Chapter 8: PING Mode of this section of the manual. Pressing the (Bk) button will return you to **CM Stat** Mode.

Cable Modem Statistics

08-Mar-2010 Chrg 13.66V   38 C   IP   14:24:20

Downstream

Frequency	Rx Level	MER	preBER	postBER
819.00 MHz (256 QAM)	2.61 dBmv	38.60 dB	1.00E-10	1.00E-10
807.00 MHz (256 QAM)	3.72 dBmv	38.60 dB	1.00E-10	1.00E-10
813.00 MHz (256 QAM)	3.71 dBmv	38.60 dB	1.00E-10	1.00E-10
801.00 MHz (256 QAM)	4.57 dBmv	38.98 dB	1.00E-10	1.00E-10

Upstream

Frequency	Tx Level
24.00 MHz (64 QAM -2)	25.75 dBmv
16.90 MHz (64 QAM -1)	25.68 dBmv
Throughput #1	25.18 dBmv
Ping / LPR #2	25.18 dBmv
	2.0.12

DOCSIS 2.0

Goto	IP Info	Config File	Change ID

Ping (Our IP = 192.168.5.51)   ✕

Host Name			
or Host IP	10.1.1.3		
Pkt Delay	10 msec	Pkt Size	0 bytes
Sent	0	Min Time	5000 msec
Received	0	Avg Time	0 msec
Lost	0	Max Time	0 msec
LPR	0	Vt Latency	65 msec
LPR (%)	0 %	Jitter	---

Cable Modem Statistics

FAVORITE	START	STOP	MODEM

![CM Stat icon]

Function Menu Options

The **Function** Menu can be accessed by pressing the **Fn** button while in the **CM Stat** Mode.

The following **Function** Menu options can be accessed while in **CM Stat** Mode:

- Contrast / Freeze
- Screen Capture
- Context Help
- Save Data Log
- Upstream Correction
- Downstream Correction

Basic Function Menu Options

The following functions are described in **Section I: The Basics**, Chapter 6: Basic Function Menu Options:

- Contrast / Freeze
- Screen Capture
- Context Help
- Save Data Log

Introduction

In **CM Stat** Mode the instrument displays a quick view of the internal cable modem information. The basic 860 DSPi comes equipped with the **CM Stat** Mode as a standard feature. This mode is not available for the 860 DSP in any configuration.

This section will provide you with the basic understanding of how to use **CM Stat** Mode including:

- Required Setup

- Logging on to the Network

- Measurement Data

- Using the Goto Function

- Function Menu Options

Cable Modem Statistics

08-Mar-2010 Chrg 13.60V   34 C   IP   13:40:38

Downstream

Frequency	Rx Level	MER	preBER	postBER
819.00 MHz (256 QAM)	3.57 dBmv	38.98 dB	1.00E-09	1.00E-09
807.00 MHz (256 QAM)	4.23 dBmv	38.60 dB	1.00E-09	1.00E-09
813.00 MHz (256 QAM)	4.35 dBmv	38.60 dB	1.00E-09	1.00E-09
801.00 MHz (256 QAM)	5.10 dBmv	38.98 dB	1.00E-09	1.00E-09

Upstream

Frequency	Tx Level
24.00 MHz (64 QAM -2)	25.75 dBmv
16.90 MHz (64 QAM -1)	25.68 dBmv
31.10 MHz (64 QAM -3)	25.18 dBmv
38.20 MHz (64 QAM -4)	25.18 dBmv

Msg:			DOCSIS 3.0
Goto	IP Info	Config File	Change ID

Note: If your instrument does not include all of the features shown in this chapter, go on-line to *www.trilithic.com* to update your firmware for free. This will allow you to use all of the newest features that are included in this mode.

Required Setup

To use **CM Stat** Mode, you will need to set up some basic parameters. Be sure you have completed **Section I: The Basics**, Chapter 5: Initial Setup before proceeding through this chapter.

To use **CM Stat** Mode, you will need to set up the internal cable modem. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *CM/CPE Settings* before proceeding through this chapter.

Logging on to the Network

Verify in the status bar that the field to the left of the time says **RDY**. This indicates that the instrument is ready to connect to the cable modem network.

> **Note:** If the instrument does not indicate **RDY** within 10 seconds (30 seconds if SSL is installed) after the instrument is turned on, power the unit off and back on. If the **RDY** message never shows up, you may not have Ethernet Option (CI-1, CI-2, CI-3, CI-4, or CI-5) installed on your 860 DSP.

Internal Cable Modem

Connect the cable drop to the instrument's

SLM/Forward input, then select the [icon] icon from the **Installer** Menu. The **Logging On To Network** window will show the progress of the logon process.

When logon is complete, the **PING** function will be displayed.

> **Note:** If you have not set the default downstream data carrier frequency or it is incorrect, it may take several minutes for the modem to find the downstream data carrier.

Measurement Data

The **CM STAT** Mode displays connections statistics for the internal cable modem. The instrument will display the downstream and upstream frequency, transfer rate, and power level as well as the downstream modulation type, signal-to-noise ratio, corrected bits, and uncorrected bits.

Using the Goto Function

The `Goto` softkey gives you rapid access to related measurement functions.

Goto Throughput

From **CM Stat** Mode you can jump to **Throughput** Mode.

To change to **Throughput** Mode, press the `Goto` softkey, use the ▲ ▼ buttons to select **Throughput**, and then press the (Ent) button. You may also select **Throughput** by pressing ①.

Once in **Throughput** Mode, you may test the internal cable modem as described in Chapter 11: Throughput Mode of this section of the manual. Pressing the (Bk) button will return you to **CM Stat** Mode.

Goto PING/ LPR

From **CM Stat** Mode you can jump to **PING** Mode.

To change to **PING** Mode, press the ⬚Goto⬚ softkey, use the ⬆⬇ buttons to select **PING / LPR**, and then press the ⓔⓝⓣ button. You may also select **PING / LPR** by pressing ②.

Once in **PING** Mode, you may test the internal cable modem as described in Chapter 8: PING Mode of this section of the manual. Pressing the Ⓑⓚ button will return you to **CM Stat** Mode.

Cable Modem Statistics

08-Mar-2010 Chrg 13.66V 38 C   IP   14:24:20

Downstream

Frequency	Rx Level	MER	preBER	postBER
819.00 MHz (256 QAM)	2.61 dBmv	38.60 dB	1.00E-10	1.00E-10
807.00 MHz (256 QAM)	3.72 dBmv	38.60 dB	1.00E-10	1.00E-10
813.00 MHz (256 QAM)	3.71 dBmv	38.60 dB	1.00E-10	1.00E-10
801.00 MHz (256 QAM)	4.57 dBmv	38.98 dB	1.00E-10	1.00E-10

Upstream

Frequency	Tx Level
24.00 MHz (64 QAM -2)	25.75 dBmv
16.90 MHz (64 QAM -1)	25.68 dBmv
	25.18 dBmv

Throughput #1   25.18 dBmv
Ping / LPR #2   2.0.12   DOCSIS 2.0

| Goto | IP Info | Config File | Change ID |

Network Ping (IP 10.2.8.124)   ☒

Host Name	Throughput Server
Host IP	207.250.51.174
Pkt Delay	100 msec	Pkt Size	256 bytes

Sent	9	Min Time	41 msec
Received	9	Avg Time	55 msec
Lost	0	Max Time	109 msec
LPR	0.00e+00	Latency	88 msec
LPR (%)	0.0 %	Jitter	31 msec

Msg:

| Favorites | Start | Stop | Modem |

Function Menu Options

The **Function** Menu can be accessed by pressing the **Fn** button while in the **CM Stat** Mode.

The following **Function** Menu options can be accessed while in **CM Stat** Mode:

- Contrast / Freeze

- Screen Capture

- Context Help

- Save Data Log

- Upstream Correction

- Downstream Correction

Basic Function Menu Options

The following functions are described in **Section I: The Basics**, Chapter 6: Basic Function Menu Options:

- Contrast / Freeze

- Screen Capture

- Context Help

- Save Data Log

Introduction

In **PING** Mode the instrument has the ability to ping a host on the network connection. This is extremely useful for checking network connectivity between network devices. The basic 860 DSPi comes equipped with the **PING** Mode as a standard feature. In order to use the **PING** Mode on your 860 DSP, the instrument must be equipped with Ethernet Option (CI-1, CI-2, CI-3, CI-4, or CI-5).

This section will provide you with a basic understanding of how to use **PING** Mode including:

- Required Setup

- Logging on to the Network

- Entering a Host Name or IP

- Editing Packet Delay

- Editing Packet Size

- Pinging the Network

- Viewing Modem Information

- Function Menu Options

Network Ping (IP 10.2.8.124)			☒
Host Name	www.my860.com		
Host IP	207.250.51.130		
Pkt Delay	100 msec	Pkt Size	256 bytes
Sent	12	Min Time	51 msec
Received	11	Avg Time	92 msec
Lost	0	Max Time	151 msec
LPR	0.00e+00	Latency	107 msec
LPR (%)	0.0 %	Jitter	19 msec
Network Ping			
Favorites	Start	Stop	Modem

Note: PING Mode is standard on the 860 DSPi, but is an optional function of the 860 DSP. To view the installed functions on your instrument, see **Section IV: Setup Functions**, Chapter 5: Instrument Information Mode. If you do not have **PING** Mode installed in your instrument, you may call Trilithic at (800) 344-2412 to order this option and start using it today.

Note: If your instrument does not include all of the features shown in this chapter, go on-line to *www.trilithic.com* to update your firmware for free. This will allow you to use all of the newest features that are included in this mode.

Required Setup

To use **PING** Mode, you will need to set up some basic parameters. Be sure you have completed **Section I: The Basics**, Chapter 5: Initial Setup before proceeding through this chapter.

To use **PING** Mode with an internal cable modem, you will need to setup the internal cable modem. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *CM/CPE Settings* before proceeding through this chapter.

To use **Wi-Fi** Mode with an internal Wi-Fi adapter, you will need to setup the internal Wi-Fi adapter. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Wi-Fi Settings* before proceeding through this chapter.

Logging on to the Network

Verify in the status bar that the field to the left of the time says **RDY**. This indicates that the instrument is ready to connect to the cable modem network.

> **Note:** If the instrument does not indicate **RDY** within 10 seconds (30 seconds if SSL is installed) after the instrument is turned on, power the unit off and back on. If the **RDY** message never shows up, you may not have Ethernet Option (CI-1, CI-2, CI-3, CI-4, or CI-5) installed on your 860 DSP.

Internal Cable Modem

Connect the cable drop to the instrument's

SLM/Forward Input, then select the icon from the **Installer** Menu. The **Logging On To Network** window will show the progress of the logon process.

When logon is complete, the **PING** Mode will be displayed.

> **Note:** If you have not set the default downstream data carrier frequency or it is incorrect, it may take several minutes for the modem to find the downstream data carrier.

External RJ45 Port

Connect the external network connection to the instrument's Ethernet Port, then select the icon from the **Installer** Menu.

The **Logging On To Network** window will show the progress of the logon process.

When logon is complete, the **PING** Mode will be displayed.

Wi-Fi

Select the icon from the **Utility** Menu.

The **Logging On To Network** window will show the progress of the logon process.

When logon is complete, the **PING** Mode will be displayed.

TRILITHIC
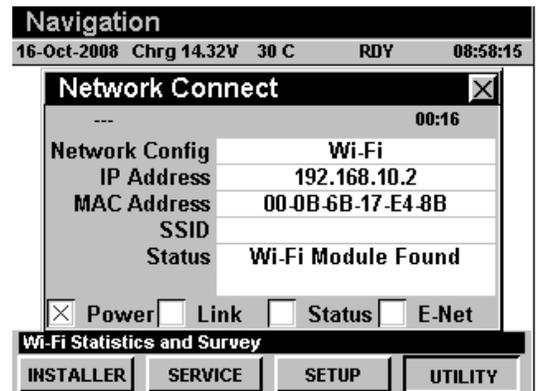
Entering a Host Name or IP

You will need to enter an address to ping. You can enter either the **Host Name** (i.e. *www.860dsp.com*) or the **Host IP** (i.e. 207.67.51.2).

- To enter the **Host Name**, use the ◀ ▶ buttons to highlight **Host Name**, press the (Ent) button, enter the name you want to ping using the alphanumeric keypad, and then press the (Ent) button.

- To enter the **Host IP**, use the ◀ ▶ buttons to highlight **Host IP**, enter the address you want to ping using the alphanumeric keypad, and then press the (Ent) button.

- To select from the pre-stored favorite web addresses, press the [Favorite] softkey, use the ▲ ▼ buttons to highlight desired web address, and then press the (Ent) button. You may also select the desired web address by pressing the corresponding alphanumeric button.

Note: Notice the IP address of your instrument is displayed in the title bar at the top of the screen.

Note: The first four web addresses entered in the Host Name or Host IP fields will be stored as favorites. To clear the list and save a new series of favorites, refer to the section *Function Menu Options, Clear Favorites* in this chapter.

TRILITHIC

Editing Packet Delay

The packet delay determines how often packets are transmitted. To change the packet delay use the ◄ ► buttons to highlight **Pkt Delay** and use the ▲ ▼ buttons to change the packet delay. The packet delay can be set between 10 msec and 1000 msec in 10 msec increments.

Network Ping (IP 10.2.8.124)			☒
Host Name	www.my860.com		
Host IP	207.250.51.130		
Pkt Delay	100 msec	Pkt Size	256 bytes
Sent	1024	Min Time	40 msec
Received	1003	Avg Time	74 msec
Lost	20	Max Time	247 msec
LPR	1.95e-02	Latency	98 msec
LPR (%)	2.0 %	Jitter	57 msec
Msg:			
Favorites	Start	Stop	Modem

Editing Packet Size

The packet size determines the size of the transmitted packet payload. To change the packet size use the ◄ ► buttons to highlight **Pkt Size** and use the ▲ ▼ buttons to change the packet size. The packet size can be set to 0, 32, 64, 256, 512, 768, or 1024 bytes.

Network Ping (IP 10.2.8.124)			☒
Host Name	www.my860.com		
Host IP	207.250.51.130		
Pkt Delay	100 msec	Pkt Size	256 bytes
Sent	1177	Min Time	40 msec
Received	1151	Avg Time	73 msec
Lost	26	Max Time	247 msec
LPR	2.21e-02	Latency	97 msec
LPR (%)	2.2 %	Jitter	86 msec
Msg:			
Favorites	Start	Stop	Modem

Pinging the Network Host

To ping the host, press the **Start** softkey.

The instrument will continue to ping the host and update the status of the test on the screen until you press the **Stop** softkey.

A successful ping will display zero **Lost** packets as the number of packets **Sent** and **Received** increases.

An unsuccessful ping will display an increasing **LPR** (Lost Packet Rate) as the number of packets **Sent** and **Received** increases.

Network Ping (IP 10.2.8.124)

Host Name	www.my860.com		
Host IP	207.250.51.130		
Pkt Delay	100 msec	Pkt Size	256 bytes
Sent	1177	Min Time	40 msec
Received	1151	Avg Time	73 msec
Lost	26	Max Time	247 msec
LPR	2.21e-02	Latency	97 msec
LPR (%)	2.2 %	Jitter	86 msec

Msg:

Favorites | Start | Stop | Modem

Viewing Modem Information

To view internal modem information, press the **Modem** softkey. Pressing the **Bk** button will return you to **PING** Mode.

Ping (Our IP = 192.168.5.89)

Host Name
or Host IP

Downstream
Frequency : 819.000 MHz
Data Rate : 5.360484 MSPS
Power : 2.61 dBmV
Modulation : 256 QAM
Signal to Noise : 37.00 dB
Upstream
Frequency : 19.000 MHz
Data Rate : 2560.000 KSPS
Power : 57.72 dBmV

FAVORITE | START | STOP | MODEM

Function Menu Options

The **Function** Menu can be accessed by pressing the (Fn) button while in the **PING** Mode.

The following **Function** Menu options can be accessed while in **PING** Mode:

- Contrast / Freeze
- Screen Capture
- Context Help
- Save Data Log
- Clear Favorites
- Display CPE IP or Display IP
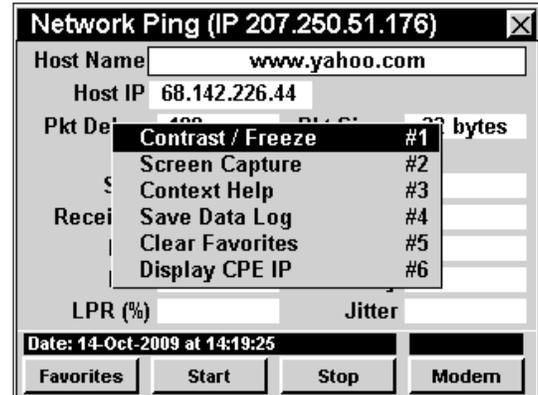
Basic Function Menu Options

The following functions are described in **Section I: The Basics**, Chapter 6: Basic Function Menu Options:

- Contrast / Freeze
- Screen Capture
- Context Help
- Save Data Log

Clear Favorites

This option is used to clear the list of pre-stored favorites that are shown when the [Favorite] softkey is selected.

To use this option, press the (Fn) button, use the (▲) (▼) buttons to highlight **Clear Favorites**, and then press the (Ent) button. You may also select **Clear Favorites** by pressing (5).

After you clear the favorites, the instrument will remember the next four addresses that are entered.
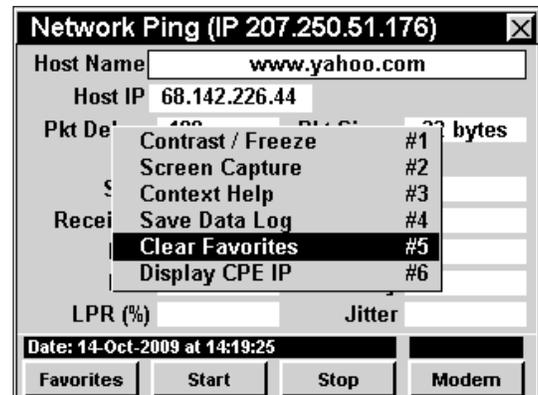
Display CPE IP

To use this feature, press the (Fn) button, use the (▲) (▼) buttons to highlight **Display CPE IP**, and then press the (Ent) button. You may also select **Display CPE IP** by pressing (6).

- The **Function** Menu will close and the **Display CPE IP** window will open.

- To exit the **Display CPE IP** window, press the (Ent) button.
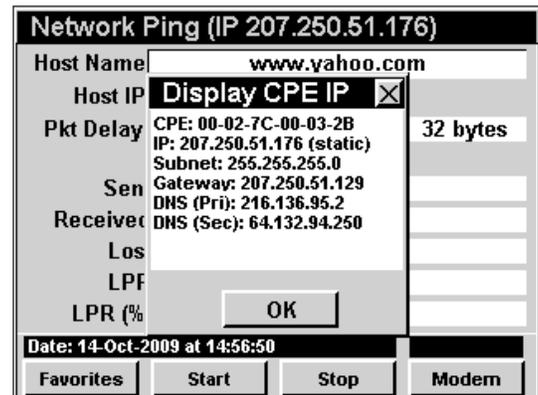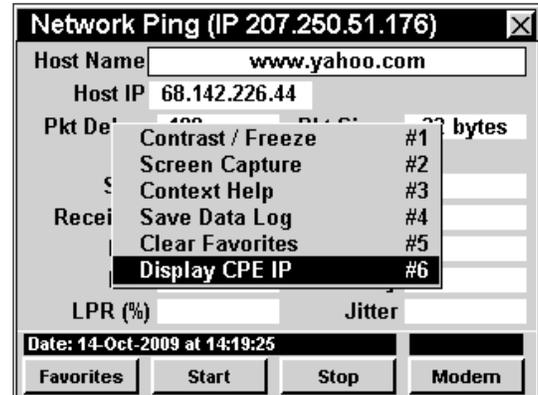
Note: Display CPE IP is only shown when using an internal cable modem connection.

Note: When connected to a cable modem in the field, the 860 DSP or 860 DSPi is considered as Customer Premise Equipment (CPE). The Display CEP IP function displays the IP address and connection settings for the 860 DSP or 860 DSPi when installed as CPE.

Introduction

The **Trace Route** Mode is a network utility which plots a route from the source to the destination while displaying all the routers along the way. It also displays the round trip route time from the source to the router.

It also attempts to do a reverse domain name look up to display the registered name of each router.

This section will provide you with a basic understanding of how to use **Trace Route** Mode including:

- Required Setup

- Trace Route Mode Support

- Entering a Host Name or IP

- Function Menu Options
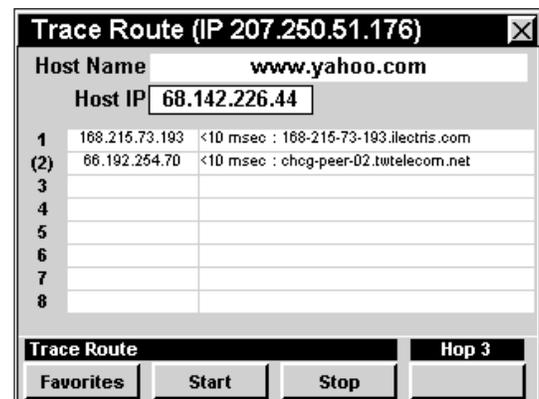
Required Setup

To use **Trace Route** Mode, you will need to set up some basic parameters. Be sure you have completed **Section I: The Basics**, Chapter 5: Initial Setup before proceeding through this chapter.

To use **Trace Setup** Mode with an internal cable modem, you will need to setup the internal cable modem. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *CM/CPE Settings* before proceeding through this chapter.

To use **Wi-Fi** Mode, you will need to set up some basic parameters. Be sure you have completed Chapter 5: Initial Setup before proceeding through this chapter.

To use **Wi-Fi** Mode with the internal Wi-Fi adapter, you will need to set up the internal Wi-Fi adapter. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Wi-Fi Settings* before proceeding through this chapter.

Trace Rt

> **Note: Trace Route** Mode is an optional function of the 860 DSP. To view the installed functions on your instrument, see **Section IV: Setup Functions**, Chapter 5: Instrument Information Mode. If you do not have **Trace Route** Mode installed in your instrument, you may call Trilithic at (800) 344-2412 to order this option and start using it today.

> **Note:** If your instrument does not include all of the features shown in this chapter, go on-line to _www.trilithic.com_ to update your firmware for free. This will allow you to use all of the newest features that are included in this mode.

Trace Route Mode Support

To determine if your instrument supports **Trace Route** Mode, perform the following:

- Select the [Setup] softkey.

- Select the [ⓘ Info] icon.

- Examine the version. If the firmware version is 8.1.1.1 or higher, your instrument supports **Trace Route** Mode.
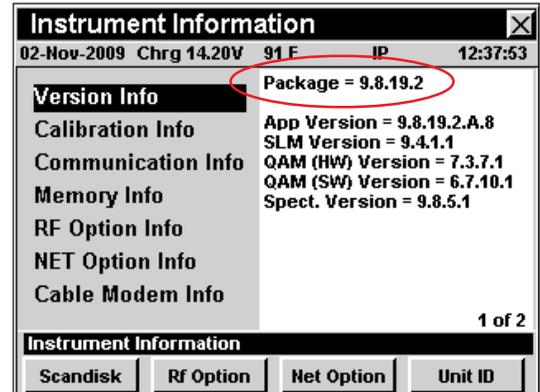
TRILITHIC

Entering a Host Name or IP

You will need to enter an address to ping. You can enter either the **Host Name** (i.e. *www.860dsp.com*) or the **Host IP** (i.e. 207.250.51.130).

To enter the **Host Name:**

- Use the ◄ ► buttons to highlight **Host Name**, and then press the (Ent) button.

- Use the alphanumeric keypad and enter the **Host Name** you want to trace, and then press the (Ent) button.

To enter the **Host IP** address:

- Use the ◄ ► buttons to highlight **Host IP,** and then press the (Ent) button.

- Use the alphanumeric keypad and enter the **Host IP** address you want to trace, and then press the (Ent) button.

- To select from a list of pre-stored favorite web addresses, press the Favorite softkey, use the ▲ ▼ buttons to highlight desired web address, and then press the (Ent) button. You may also select the desired web address by pressing the corresponding alphanumeric button.

- Select the Start softkey to begin the trace.

- Select the Stop softkey to stop the trace.

The display screen continuously displays the trace route in a loop. This allows the user to see if a particular router is intermittently passing ping packets and if different routes are being taken.

This feature can be disabled by removing the Continuous Run option, which is accessed by pressing the (Fn) key.

Note: There is no guarantee that every ping packet will follow the same route.

Function Menu Options

Standard Functions

- Contrast Freeze
- Screen Capture
- Context Help
- Save Data Log

Optional Functions

- Clear Favorites
- Display IP or Display CPE IP
- Run Test Continuous

Basic Function Menu Options

- Clear Favorites
- Display CPE IP
- Display IP
- Run Test Continuous

Introduction

In **VoIP** Mode the instrument can test a variety of call and connection quality parameters using either a built in modem or an external modem. The basic 860 DSPi comes equipped with the **VoIP** Mode as a standard feature. In order to use the **VoIP** Mode on your 860 DSP, the instrument must be equipped with Ethernet Option (CI-1, CI-2, CI-3, CI-4, or CI-5).

The instrument tests the various measurable parameters that impact call quality, and provides measurement results to test proximity to potential failure. This test utilizes a network protocol called RTP (Real Time Protocol). The instrument will establish a connection to the indicated server on port 24007. The instrument and the server negotiate the test parameters from the **Instrument Setup** Mode as well as synchronize their clocks. The server and the meter then communicate using RTP over UDP protocol on port 24007. Once all of the packets are transmitted and received by both the server and the meter, the results are calculated and compared to user-defined limits. An ACTS (Advanced Communication Test System) server is also required, and ideally will be installed in the cable network near the gateway.

This section will provide you with a basic understanding of how to use **VoIP** Mode including:

- Required Setup
- Logging on to the Network
- Entering the Server IP
- Running a VoIP Test
- Viewing VoIP Test Details
- Function Menu Options
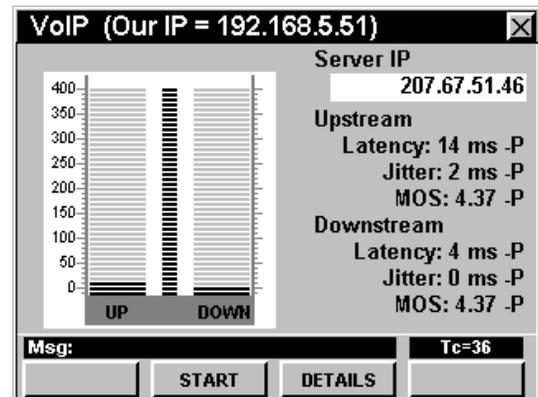
Note: VoIP Mode is an optional function of the 860 DSP. To view the installed functions on your instrument, see **Section IV: Setup Functions**, Chapter 5: Instrument Information Mode. If you do not have **VoIP** Mode installed in your instrument, you may call Trilithic at (800) 344-2412 to order this option and start using it today.

**Note:** If your instrument does not include all of the features shown in this chapter. Be sure to go on-line to *www.trilithic.com* to update your firmware for free. This will allow you to use all of the newest features that are included in this mode.

Required Setup

To use **VoIP** Mode, you will need to set up some basic parameters. Be sure you have completed **Section I: The Basics**, Chapter 5: Initial Setup before proceeding through this chapter.

To use **VoIP** Mode with an internal cable modem, you will need to setup the internal cable modem. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *CM/CPE Settings* before proceeding through this chapter.

To use **Wi-Fi** Mode, you will need to set up some basic parameters. Be sure you have completed Chapter 5: Initial Setup before proceeding through this chapter.

To use **Wi-Fi** Mode with the internal Wi-Fi adapter, you will need to set up the internal Wi-Fi adapter. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Wi-Fi Settings* before proceeding through this chapter.

To use **VoIP** Mode, you will need to setup **VoIP** Mode. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *VoIP Settings* before proceeding through this chapter.

In order for your instrument to test the upstream and downstream data rate it must send and receive a file from a server. This server will need to be setup by your IT department prior to using **VoIP** Mode. It is preferable to use a server located within your local system to prevent skewing of the throughput results due to extensive routing or Internet traffic. The server application must be either the Trilithic VoIP RTP test server or the Trilithic Advanced Communication Test Server.

Logging on to the Network

Verify in the status bar that the field to the left of the time says **RDY**. This indicates that the instrument is ready to connect to the cable modem network.

> **Note:** If the instrument does not indicate **RDY** within 10 seconds (30 seconds if SSL is installed) after the instrument is turned on, power the unit off and back on. If the **RDY** message never shows up, you may not have Ethernet Option (CI-1, CI-2, CI-3, CI-4, or CI-5) installed on your 860 DSP.

Internal Cable Modem

Connect the cable drop to the instrument's

SLM/Forward input, then select the ⬛ icon from the **Installer** menu. The **Logging On To Network** window will show the progress of the logon process.

When logon is complete, the **VoIP** Mode will be displayed.

> **Note:** If you have not set the default downstream data carrier frequency or it is incorrect, it may take several minutes for the modem to find the downstream data carrier.

External RJ45 Port

Connect the external network connection to the

instrument's Ethernet port, then select the ⬛ icon from the **Installer** Menu.

The **Logging On To Network** window will show the progress of the logon process.

When logon is complete, the **VoIP** Mode will be displayed.

Wi-Fi

Select the [icon] icon from the **Installer** Menu.

The **Logging On To Network** window will show the progress of the logon process.

When logon is complete, the **VoIP** Mode will be displayed.

Entering the Server IP

You will need to enter the address of the server to connect to.

To enter the **Server IP**, use the ◄ ► buttons to highlight **Server IP**, press the (Ent) button, enter the address of the server you want to connect to using the alphanumeric keypad, and then press the (Ent) button.
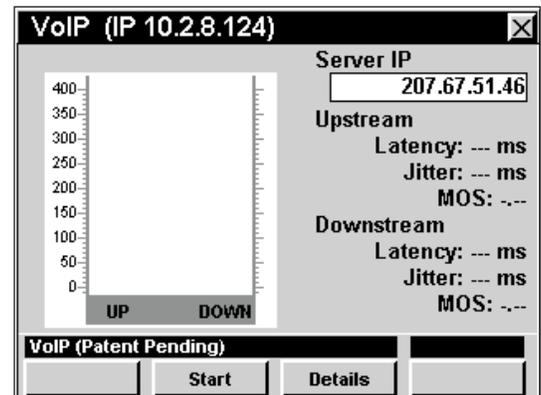
Running a VoIP Test

To run the **VoIP** Test, press the [Start] softkey.

The instrument will display the progress of the **VoIP** Test on the bar graph.

When the test is complete, the instrument will display upstream and downstream results for **Latency**, **Jitter**, and **MOS**. The "P" or "F" next to the upstream and downstream results indicates the pass or fail status of the test.
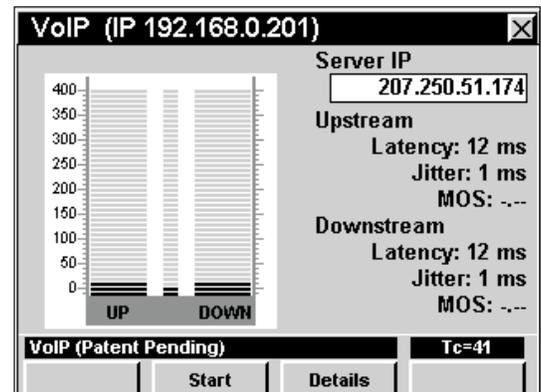
Viewing VoIP Test Details

To view detailed results of the **VoIP** Test, press the
 Details softkey.

The **Results** window will open. If the results occupy more than one screen, use the (Ent) button to scroll through the results.

Press the (Bk) button to return to the **VoIP** Mode.
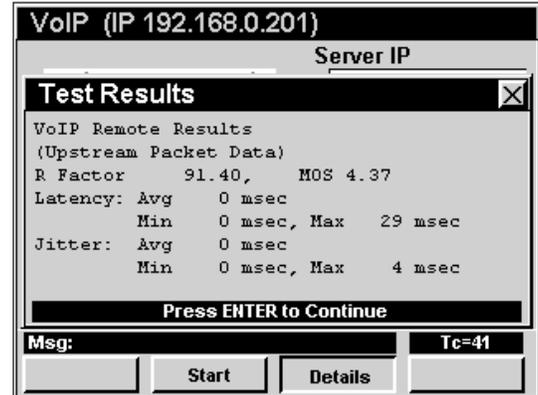
Function Menu Options

The **Function** Menu can be accessed by pressing the (Fn) button while in the **VoIP** Mode.

The following **Function** Menu options can be accessed while in **VoIP** Mode:

- Contrast / Freeze
- Screen Capture
- Context Help
- Save Data Log
- Display CPE IP
- High Priority Ping
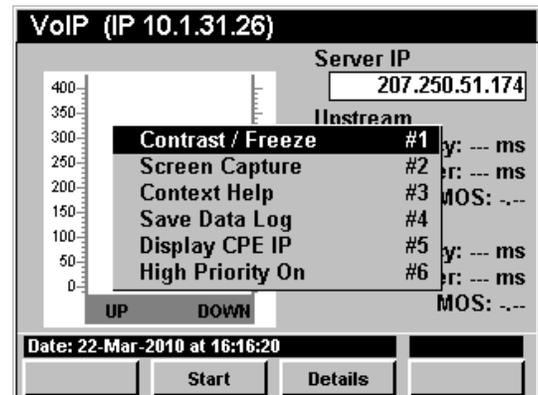
Basic Function Menu Options

The following functions are described in **Section I: The Basics**, Chapter 6: Basic Function Menu Options:

- Contrast / Freeze
- Screen Capture
- Context Help
- Save Data Log

Display CPE IP

To use this option, press the (Fn) button, use the (▲) (▼) buttons to highlight **Display CPE IP**, and then press the (Ent) button. You may also select **Display CPE IP** by pressing (5).

- The **Function** Menu will close and the **Display CPE IP** window will open.

- To exit the **Display CPE IP** window press the (Ent) button.
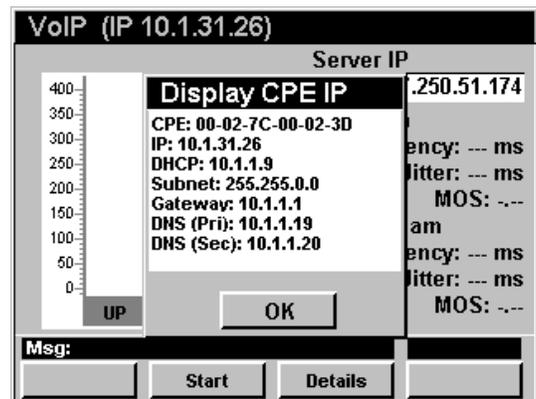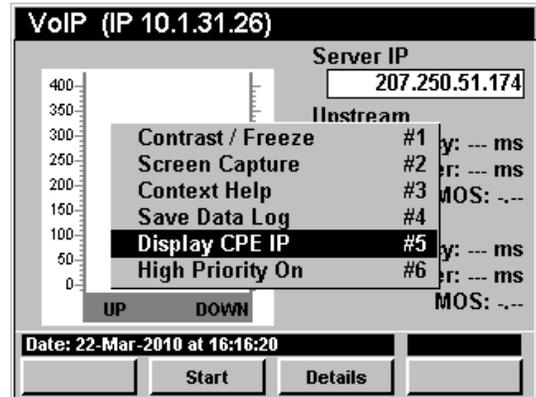
High Priority On/Off

The High Priority function allows the 860 DSP or 860 DSPi to instruct the CMTS to hold open time slots for the 860 DSP or 860 DSPi's cable modem to communicate over. To use this option, press the (Fn) button, use the (▲) (▼) buttons to highlight **High Priority On**, and then press the (Ent) button. You may also select **Display CPE IP** by pressing (6).

- The **Function** Menu will close and the screen will return to the **VoIP** window will open.

- To turn off **High Priority**, press the (Fn) button, use the (▲) (▼) buttons to highlight **High Priority Off**, and then press the (Ent) button. You may also select **High Priority Off** by pressing (6).
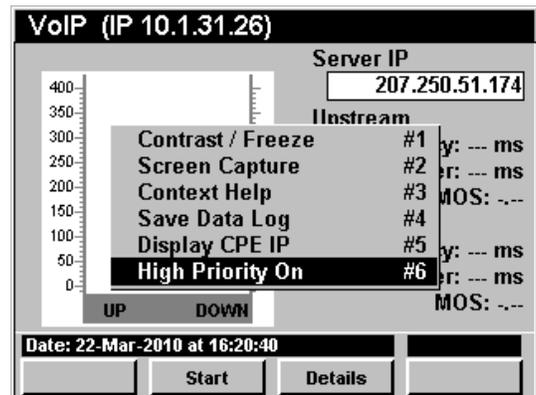
Introduction

In **Thru Put** Mode the instrument can test the effective data rate of both the upstream and downstream channels of a cable modem connection using either a built in modem or an external modem. The basic 860 DSPi comes equipped with the **Thru Put** Mode as a standard feature. In order to use the **Thru Put** Mode on your 860 DSP, the instrument must be equipped with Ethernet Option (CI-1, CI-2, CI-3, CI-4, or CI-5).

The instrument tests the data rate by sending and receiving a file from a Trilithic test server on the network. The instrument comes with a 1 MB upstream test file keyed to your instrument's MAC address.

This section will provide you with a basic understanding of how to use **Thru Put** Mode including:

- Required Setup

- Logging on to the Network

- Setting the Server IP

- Setting the Downstream file

- Running an Upstream Test

- Running a Downstream Test

- Using the Goto Function

- Viewing Modem Information

- Function Menu Options
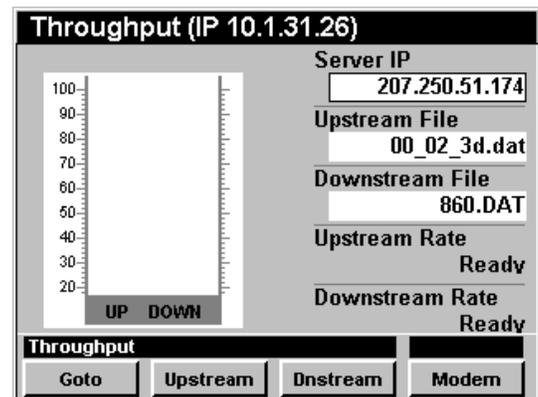
Note: Thru Put Mode is an optional function of the 860 DSP. To view the installed functions on your instrument, see **Section IV: Setup Functions**, Chapter 5: Instrument Information Mode. If you do not have **Thru Put** Mode installed in your instrument, you may call Trilithic at (800) 344-2412 to order this option and start using it today.

Note: If your instrument does not include all of the features shown in this chapter, go on-line to *www.trilithic.com* to update your firmware for free. This will allow you to use all of the newest features that are included in this mode.

Required Setup

To use **Thru Put** Mode, you will need to set up some basic parameters. Be sure you have completed **Section I: The Basics**, Chapter 5: Initial Setup before proceeding through this chapter.

To use **Thru Put** Mode with an internal cable modem, you will need to setup the internal cable modem. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *CM/CPE Settings* before proceeding through this chapter.

To use **Wi-Fi** Mode, you will need to set up some basic parameters. Be sure you have completed Chapter 5: Initial Setup before proceeding through this chapter.

To use **Wi-Fi** Mode with the internal Wi-Fi adapter, you will need to set up the internal Wi-Fi adapter. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Wi-Fi Settings* before proceeding through this chapter.

In order for your instrument to test the upstream and downstream data rate it must send and receive a file from a Trilithic ACTS server. This server will need to be setup by your IT department prior to using **Thru Put** Mode. It is preferable to use a server located within your local system to prevent skewing of the throughput results due to extensive routing or Internet traffic. The server must support the file transfer protocols used by the instrument.

Trilithic recommends using the Trilithic Advanced Communication Server application.

To see the file types supported by your instrument, follow the instructions for logging on to the network and then press the Upstream and Dnstream softkeys.

Logging on to the Network

Verify in the status bar, that the field to the left of the time says **RDY**. This indicates that the instrument is ready to connect to the cable modem network.

> **Note:** If the instrument does not indicate **RDY** within 10 seconds (30 seconds if SSL is installed) after the instrument is turned on, power the unit off and back on. If the **RDY** message never shows up, you may not have Ethernet Option (CI-1, CI-2, CI-3, CI-4, or CI-5) installed on your 860 DSP.

Internal Cable Modem

Connect the cable drop to the instrument's

SLM/Forward Input, then select the icon from the **Installer** menu. The **Logging On To Network** window will show the progress of the logon process.

When logon is complete, the **Thru Put** Mode will be displayed.

> **Note:** If you have not set the default downstream data carrier frequency or it is incorrect, it may take several minutes for the modem to find the downstream data carrier.

External RJ45 Port

Connect the external network connection to the

instrument's Ethernet Port, then select the icon from the **Installer** Menu.

The **Logging On To Network** window will show the progress of the logon process.

When logon is complete, the **Thru Put** Mode will be displayed.

Thru Put

Wi-Fi

Connect the external network connection to the instrument's Ethernet Port, then select the [((i)) Wi-Fi] icon from the **Installer** Menu. The Select Wi-Fi Zone window will appear. Select from the detected Wi-Fi connections.

The **Logging On To Network** window will show the progress of the logon process.

When logon is complete, the **Thru Put** Mode will be displayed.
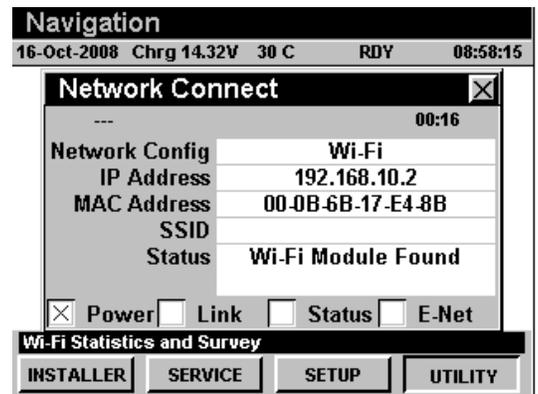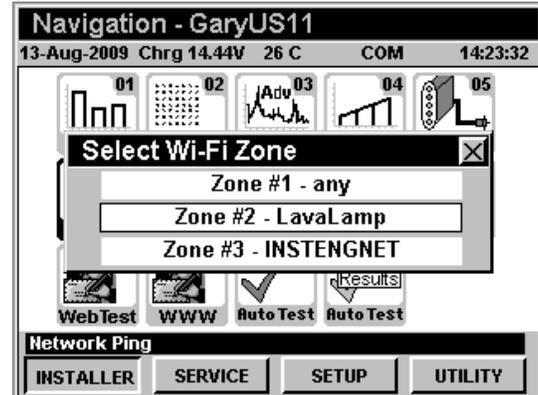
Setting the Server IP

To set the **Server IP** use the ◀ ▶ buttons to highlight **Server IP**, then enter the **Server IP** using the alphanumeric keypad, and then press the **Ent** button. Once set, the instrument will remember the IP.
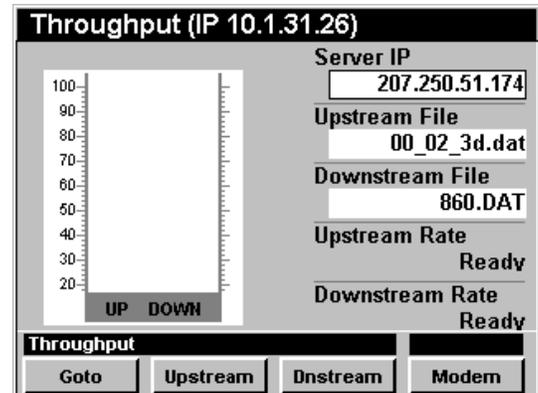
Setting the Downstream File

When performing a downstream throughput test, the instrument will download a file from the server. The downstream file size should be approximately 1 MB.

To set the **Downstream File** use the ◄ ► buttons to highlight **Downstream File**, then enter the file name using the alphanumeric keypad, and then press the Ent button.
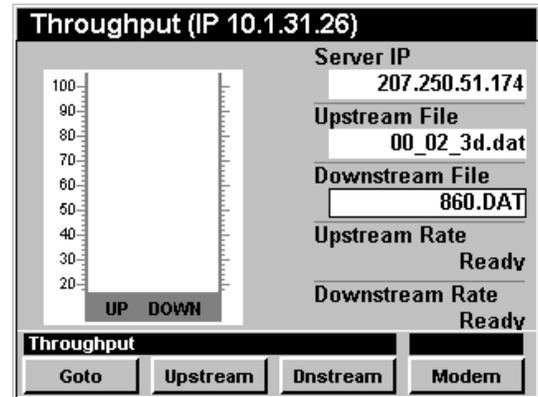
Running an Upstream Test

To run an upstream throughput test, press the Upstream softkey, use the ▲ ▼ buttons to highlight the desired test protocol, and then press the Ent button. You may also select the desired test protocol by pressing the corresponding alphanumeric button.

The instrument will display the progress of the upstream file transfer on the bar graph.

When the test is complete, the instrument will display the effective upstream data rate.

![Thru Put icon]
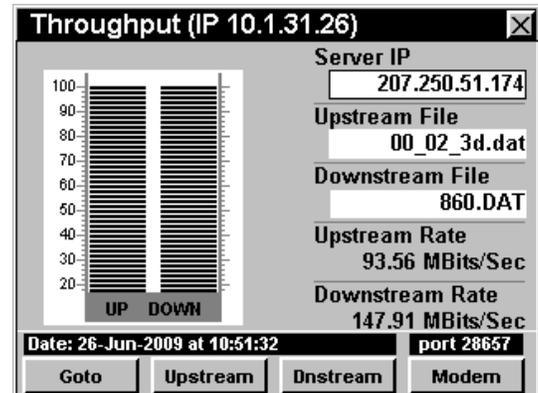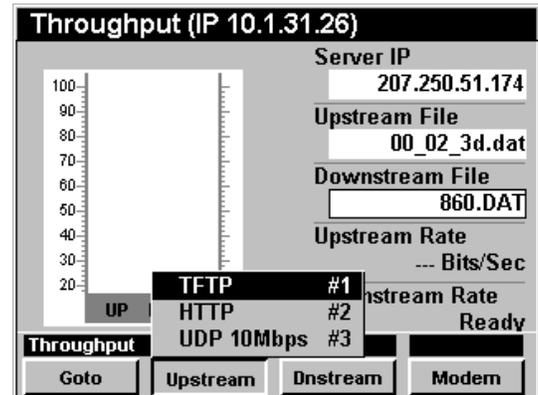
Running a Downstream Test

To run a downstream throughput test, press the `Dnstream` softkey, use the ▲ ▼ buttons to highlight the desired test protocol, and then press the Ent button. You may also select the desired test protocol by pressing the corresponding alphanumeric button.

The instrument will display the progress of the downstream file transfer on the bar graph.

When the test is complete, the instrument will display the effective downstream data rate.

Throughput (IP 10.2.8.124) ✕

	Server IP
	207.250.51.174
	Upstream File

TFTP	#1
HTTP	#2
UDP 5Mbps	#3
UDP 10Mbps	#4
UDP 15Mbps	#5
UDP 35Mbps	#6
UDP 40Mbps	#7
UDP 100Mbps	#8

UP DOWN

Throughput

| Goto | Upstream | Dnstream | Modem |

Throughput (IP 10.1.31.26)

Server IP
207.250.51.174
Upstream File
00_02_3d.dat
Downstream File
860.DAT
Upstream Rate
93.56 MBits/Sec
Downstream Rate
147.91 MBits/Sec

UP DOWN

Throughput

| Goto | Upstream | Dnstream | Modem |

> **Note:** The test protocols UDP 15 through UDP 100 Mbps are only available for DOCSIS 3.0 instruments that have the Ethernet Option (CI-4 or CI-5) installed. This option provides a 100 Mbps network connection. To view the installed functions on your instrument, see **Section IV: Setup Functions**, Chapter 5: Instrument Information Mode. If you do not have Ethernet Option (CI-4 or CI-5) mode installed in your instrument, you may call Trilithic at (800) 344-2412 to order this option and start using it today.

Thru Put

Using the Goto Function

The `Goto` softkey gives you rapid access to related measurement functions.

Goto Ping / LPR

From **Thru Put** Mode you can jump to **Ping** Mode.

To change to **Ping** Mode, press the `Goto` softkey, use the ⬆ ⬇ buttons to select **Ping / LPR**, and then press the (Ent) button. You may also select **Ping / LPR** by pressing ①.

Once in **Ping** Mode, you may test the internal cable modem as described in <u>Chapter 7: Ping Mode</u> of this section of the manual. Pressing the (Bk) button will return you to **Thru Put** Mode.

Viewing Modem Information

To view internal modem information, press the `Modem` softkey. Pressing the (Bk) button will return you to **Thru Put** Mode.

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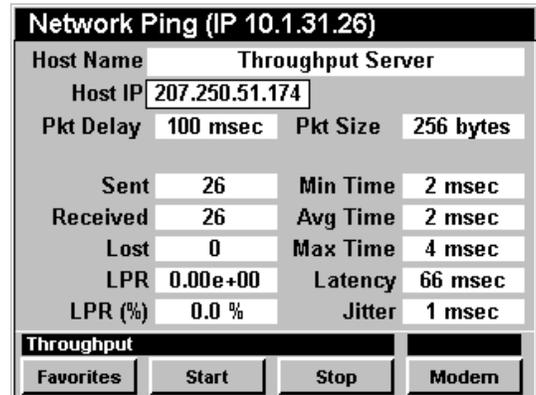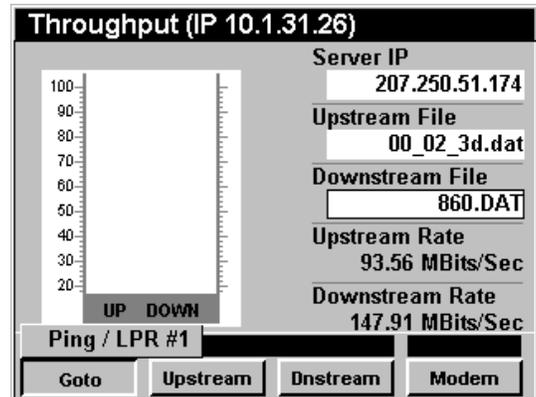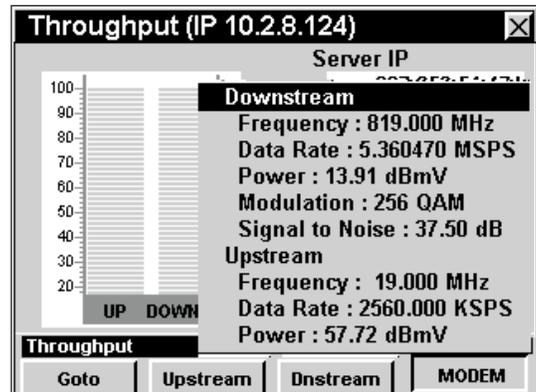
Thru Put

Function Menu Options

The **Function** Menu can be accessed by pressing the **Fn** button while in the **Thru Put** Mode.

The following **Function** Menu options can be accessed while in **Thru Put** Mode:

- Contrast / Freeze

- Screen Capture

- Context Help

- Save Data Log

- Change HTTP Port

- Change TFTP Port

- Change UDP Port

- Display CPE IP
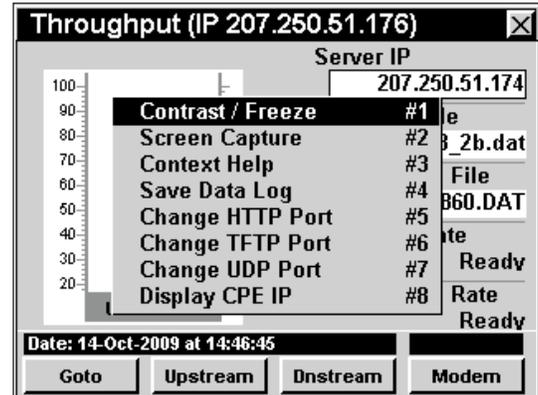
Basic Function Menu Options

The following functions are described in **Section I: The Basics**, Chapter 6: Basic Function Menu Options:

- Contrast / Freeze

- Screen Capture

- Context Help

- Save Data Log

Change HTTP Port

This option is used to set the HTTP port that the instrument uses to connect to the 860 DSPi High Speed Throughput Test Suite.

To use this option, press the (Fn) button, use the (▲) (▼) buttons to highlight **Change HTTP Port**, and then press the (Ent) button. You may also select **Change HTTP Port** by pressing (5).

- The **Function** Menu will close and the **Change HTTP Port** window will open.

- Enter the port number using the alphanumeric keypad, and then press the (Ent) button.

Throughput (IP 10.2.8.124)
Server IP
207.250.51.174
100
90
Upstream File
80
...d.dat
70
Change HTTP Port   ☒
60   Current=80 (Default=80)   .DAT
50
40   [____]
30
20   Test
UP   DOWN   Downstream Rate
Ready
Msg: port 80
Goto   Upstream   Dnstream   Modem

Throughput (IP 10.2.8.124)
Server IP
207.250.51.174
100
90   Upstream File
80   ...d.dat
70   **Change HTTP Port**   ☒   e
60   Current=80 (Default=80)   .DAT
50
40   [____]
30
20   Test
UP   DOWN   Downstream Rate
Ready
Msg: port 80
Goto   Upstream   Dnstream   Modem
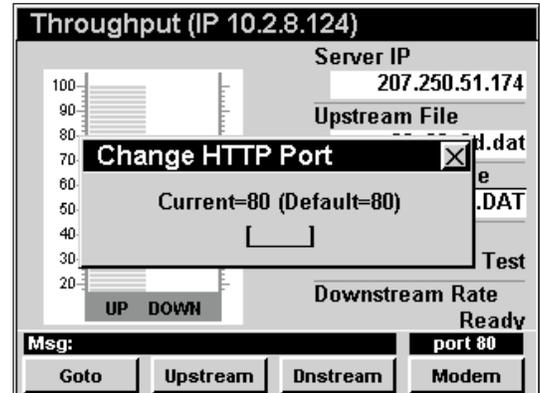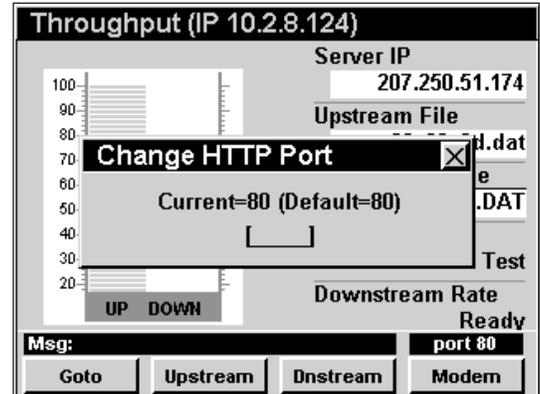
Note: If changing from the default port setting, a corresponding port setting change must be made to the ACTS server.

Change TFTP Port

This option is used to set the TFTP port that the instrument uses to connect to the 860 DSPi High Speed Throughput Test Suite.

To use this option, press the (Fn) button, use the (▲) (▼) buttons to highlight **Change TFTP Port**, and then press the (Ent) button. You may also select **Change TFTP Port** by pressing (6).

- The **Function** Menu will close and the **Change TFTP Port** window will open.

- Enter the port number using the alphanumeric keypad, and then press the (Ent) button.
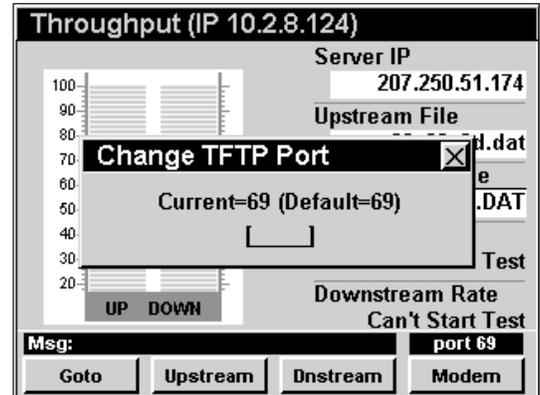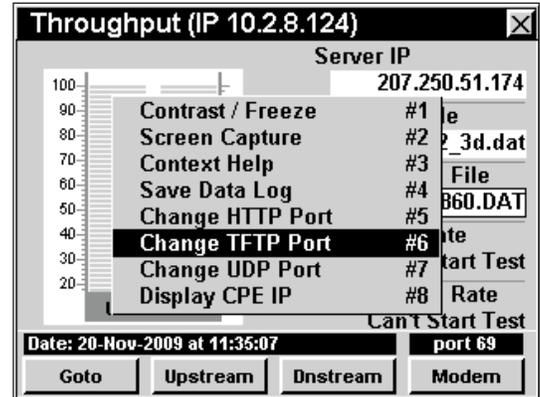
Note: If changing from the default port setting, a corresponding port setting change must be made to the ACTS server.

Change UDP Port

This option is used to set the UDP port that the instrument uses to connect to the 860 DSPi High Speed Throughput Test Suite.

To use this option, press the (Fn) button, use the (▲) (▼) buttons to highlight **Change UDP Port**, and then press the (Ent) button. You may also select **Change UDP Port** by pressing (7).

- The **Function** Menu will close and the **Change UDP Port** window will open.

- Enter the port number using the alphanumeric keypad, and then press the (Ent) button.
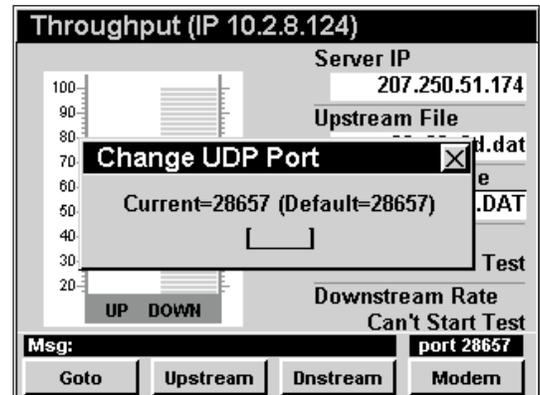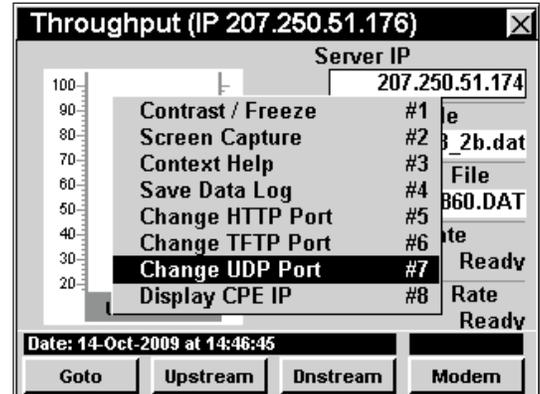
Note: If changing from the default port setting, a corresponding port setting change must be made to the ACTS server.

Display CPE IP

To use this option, press the (Fn) button, use the (▲)(▼) buttons to highlight **Display CPE IP**, and then press the (Ent) button. You may also select **Display CPE IP** by pressing (8).

- The **Function** Menu will close and the **Display CPE IP** window will open.

- To exit the **Display CPE IP** window press the (Ent) button.
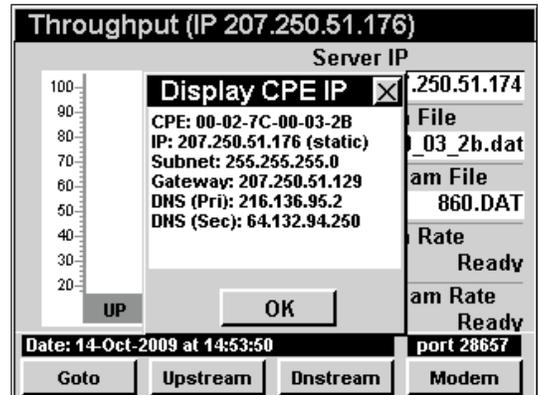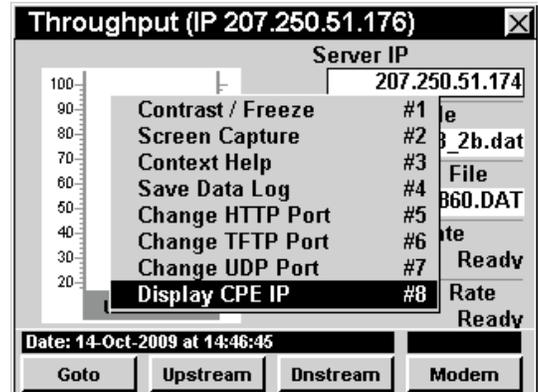
Display IP

To use this option, press the (Fn) button, use the (▲) (▼) buttons to highlight **Display IP**, and then press the (Ent) button. You may also select **Display IP** by pressing (7).

- The **Function** Menu will close and the **Display IP** window will open.

- To exit the **Display IP** window, press the (Ent) button.

Network Ping (IP 10.1.31.89)
Host Name
Host IP | 192.168.0.1
Pkt De... | Contrast / Freeze | 41 | 256 bytes
Screen Capture | 42
Context Help | 43
S... | Save Data Log | 44
Recei... | Clear Favorites | 45
Display CPE IP | 46
Display IP | 47
LPR...
Date: 18-Feb-2010 at 12:45:48
Favorites | Start | Stop | Modem

Network Ping (IP 10.1.31.89)
Host Name
Host IP | **Display IP**
Pkt Delay | IP: 10.1.31.89 | 256 bytes
DHCP: 10.1.1.9
Subnet: 255.255.0.0
Sen | Gateway: 10.1.1.1
Received | DNS (Pri): 10.1.1.19
DNS (Sec): 10.1.1.20
Los
LPR
LPR (% | OK
Msg:
Favorites | Start | Stop | Modem

Note: Display IP is only shown when using an internal cable modem connection.

Introduction

In **BER** Mode the instrument can test the ratio of corrupted bits versus the total bits of data for a selected channel. The basic 860 DSPi comes equipped with the **BER** Mode as a standard feature. In order to use the **BER** Mode on your 860 DSP, the instrument must be equipped with QAM Option (QA-1).

You can also upgrade the **BER** Mode with the addition of the Enhanced Digital Video Retrofit Option (IL-1 or IL-2). This option will provide deep interleave support for **BER** Mode on both the 860 DSP and 860 DSPi. This retrofit option is for instruments that were built before March 2005. Any instruments built since this date are equipped with the IL-1 or IL-2 Retrofit Option as a standard feature.

In **BER** Mode the instrument dwells on a particular channel, counting good bits and watching for individual corrupted bits. The ratio of corrupted bits/total bits is the impulse BER.

This section will provide you with a basic understanding of how to use **BER** Mode including:

- Required Setup

- Adjusting Channels

- Adjusting Time Scale

- Setting Channel Plan

- Resetting BER Test

- Viewing Test Results

- Function Menu Options
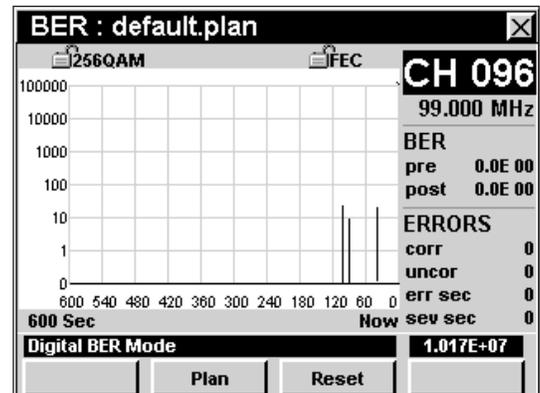
Note: BER Mode is an optional function of the 860 DSP. To view the installed functions on your instrument, see **Section IV: Setup Functions**, Chapter 5: Instrument Information Mode. If you do not have **BER** Mode installed in your instrument, you may call Trilithic at (800) 344-2412 to order this option and start using it today.

Note: If your instrument does not include all of the features shown in this chapter, go on-line to *www.trilithic.com* to update your firmware for free. This will allow you to use all of the newest features that are included in this mode. The QA-1 option is a paid upgrade to the 860 DSPi.

Required Setup

To use **BER** Mode, you will need to set up some basic parameters. Be sure you have completed **Section I: The Basics**, Chapter 5: Initial Setup before proceeding through this chapter.

Adjusting Channels

To change the channel, use the ◄ ► buttons to highlight the channel number, use the ▲ ▼ buttons to increment the value up and down or enter the desired channel number or frequency using the alphanumeric keypad, and then press the **Ent** button.
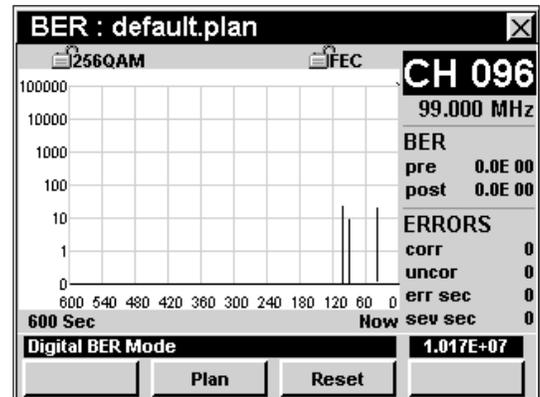
Adjusting Time Scale

To change the time scale of the time graph, use the ◄ ► buttons to highlight the time scale, use the ▲ ▼ buttons to increment the value up and down.
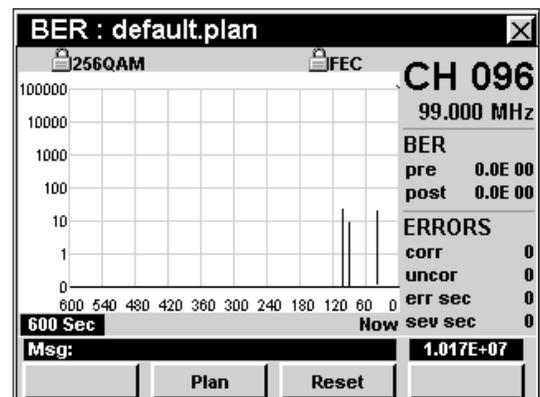
Setting Channel Plan

The instrument tunes channels according to a predefined channel plan. The currently selected plan is displayed in the Title Bar. To change the channel plan press the Plan softkey. The **Open File** window will open. Use the ◄ ► ▲ ▼ buttons to select the channel plan you want from the list of channel plans available, and then press the Ent button. You may also select the desired channel plan by pressing the corresponding alphanumeric button.

You must have a system channel plan that is up to date in order to view the channels in your system.
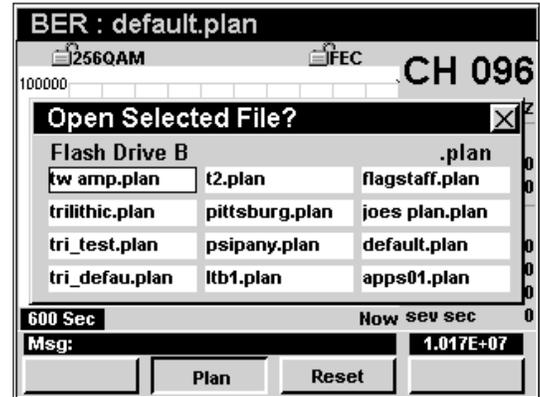
Resetting BER Test

To reset the **BER** Test press the Reset softkey. The **BER** Test will reset the time measurement to zero seconds and restart the **BER** Test.
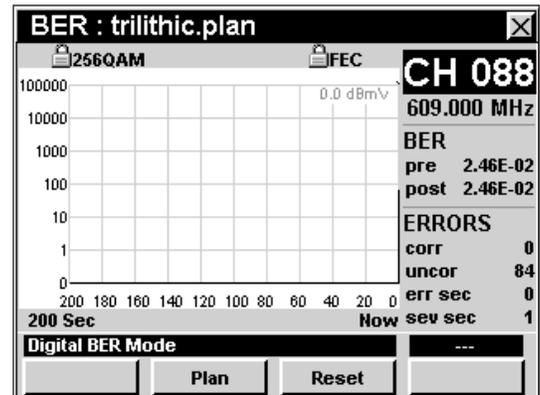
Viewing Test Results

The **BER** Mode presents bit error statistics as follows:

- The BER is expressed as the ratio of errored bits to total bits. This ratio is presented as a single number in the form "3E-7" or "7E-6". At the beginning of the test the BER is shown as 0E-0 then changes to show the BER as errored bits are accumulated in the course of the test.

    - Test results are given both as **pre-FEC** (before forward error correction) and **post-FEC** (after forward error correction) values.

- Total errored and corrected, and errored and uncorrectable code words, expressed as running totals.

    - The running total of code words that were corrected using the FEC are displayed as **corr**.

    - The number of code words that were not capable of being corrected by the FEC are displayed as **uncor**.

- Errored seconds and severely errored seconds, expressed as running totals.

    - In this convention, BER is expressed as the number of seconds of data that contained one or more bits that needed FEC correction.

    - The successfully-repaired seconds are displayed as **err sec**.

    - The seconds in which a bit was too damaged to repair are displayed as **sev sec**.

- Time graph

    - Errored code words are displayed as marks on a horizontal line that expands across the display, representing advancing time. The most recent events are shown on the right side of the graph, the earliest events are on the left. The advantage of this convention is that the displayed information is always meaningful regardless of the duration of the test and the graphical display makes patterns of reoccurrence easy to detect. Corrected code words per unit time are shown as light gray lines and uncorrectable code words per unit time are shown as black lines.

    - The X scale represents the number of seconds in the test.

    - The Y scale represents the number of errors in each interval of the time represented by the full X scale.

Function Menu Options

The **Function** Menu can be accessed by pressing the **Fn** button while in the **BER** Mode.

The following **Function** Menu options can be accessed while in **BER** Mode and are described in **Section I: The Basics**, Chapter 6: Basic Function Menu Options:

- Contrast / Freeze

- Screen Capture

- Context Help

- Save Data Log
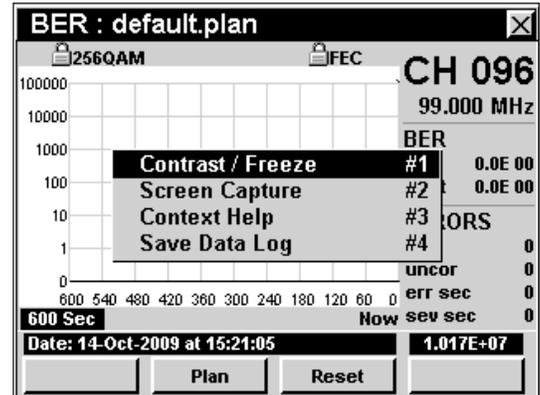
Introduction

The **Web Test** Mode is used to test whether the instrument has an active internet connection. In order to use the **Web Test** Mode on your 860 DSPi, the instrument must be equipped with Power Pack Option (PP-1). In order to use the **Web Test** Mode on your 860 DSP, the instrument must be equipped with Ethernet Option (CI-1, CI-2, CI-3, CI-4, or CI-5).

This section will provide you with a basic understanding of how to use **Web Test** Mode including:

- Required Setup

- Performing Web Test

- Function Menu Options

> **Note: Web Test** Mode is an optional function of the 860 DSP and 860 DSPi. To view the installed functions on your instrument, see **Section IV: Setup Functions**, Chapter 5: Instrument Information Mode. If you do not have **Web Test** Mode installed in your instrument, you may call Trilithic at (800) 344-2412 to order this option and start using it today.

> **Note:** If your instrument does not include all of the features shown in this chapter, go on-line to *www.trilithic.com* to update your firmware for free. This will allow you to use all of the newest features that are included in this mode.

Required Setup

To use **Web Test** Mode, you will need to set up some basic parameters. Be sure you have completed **Section I: The Basics**, Chapter 5: Initial Setup before proceeding through this chapter.

To use **Web Test** Mode with an internal cable modem, you will need to setup the internal cable modem. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *CM/CPE Settings* before proceeding through this chapter.

To use **Wi-Fi** Mode, you will need to set up some basic parameters. Be sure you have completed Chapter 5: Initial Setup before proceeding through this chapter.

To use **Wi-Fi** Mode with the internal Wi-Fi adapter, you will need to set up the internal Wi-Fi adapter. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Wi-Fi Settings* before proceeding through this chapter.

For more information on how to use the **Web Browser** Mode, see Chapter 14: Web Browser Mode in this section of the manual.

Performing Web Test

When the **Web Test** Mode is activated, the instrument will try to connect to the web page *http://my860dsp.com/confirm*.

When the **Web Test** Mode successfully connects to this web page, the web page will display **Web Connectivity...Pass**.

When the **Web Test** Mode cannot successfully connect to this web page, the web page will display a web page error. If this occurs, check your connections settings and try again.

Web Test

Function Menu Options

The **Function** Menu can be accessed by pressing the (Fn) button while in the **Web Test** Mode.

The following **Function** Menu options can be accessed while in **Web Test** Mode:

- Contrast / Freeze
- Screen Capture
- Context Help
- Browser Refresh
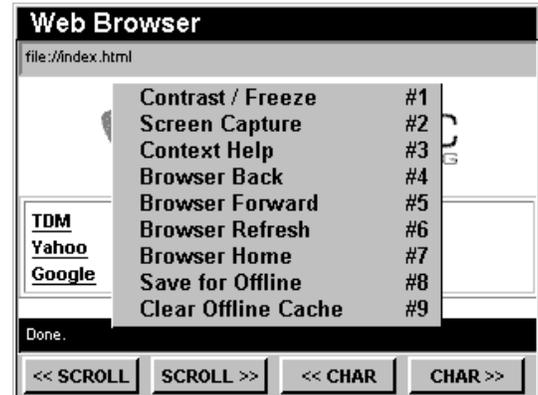
Basic Function Menu Options

The following functions are described in **Section I: The Basics**, Chapter 6: Basic Function Menu Options:

- Contrast / Freeze
- Screen Capture
- Context Help

Browser Refresh

This option is used to refresh the current web page.

To use this option, press the (Fn) button, use the (▲) (▼) buttons to highlight **Browser Refresh**, and then press the (Ent) button. You may also select **Browser Refresh** by pressing (6).
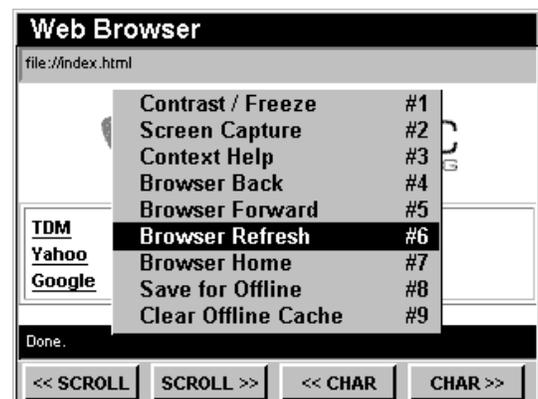
Introduction

In **Web Browser** Mode the instrument can access information from the Internet and connect with web based applications such as work force management and status monitoring or to retrieve information from technical databases. The **Web Browser** Mode can be used with a built in modem or via an ethernet connection to an external modem or network.

In order to use the **Web Browser** Mode on your 860 DSPi, the instrument must be equipped with Power Pack Option (PP-1). In order to use the **Web Browser** Mode on your 860 DSP, the instrument must be equipped with Ethernet Option (CI-1, CI-2, CI-3, CI-4, or CI-5).

This section will provide you with a basic understanding of using the **Web Browser** Mode including:

- Required Setup

- Browser Overview

- Browser Navigation

- Function Menu Options

Note: Web Browser Mode is an optional function of the 860 DSP and 860 DSPi. To view the installed functions on your instrument, see **Section IV: Setup Functions**, Chapter 5: Instrument Information Mode. If you do not have **Web Browser** Mode installed in your instrument, you may call Trilithic at (800) 344-2412 to order this option and start using it today.

Note: If your instrument does not include all of the features shown in this chapter, go on-line to *www.trilithic.com* to update your firmware for free. This will allow you to use all of the newest features that are included in this mode.

Note: Since the web browser can be configured to point to any website, in any country, it is possible to seize (lockup) the **Web Browser** Mode. Trilithic has taken every precaution to prevent browser problems, but there are still many features that a desktop web browser can perform that an embedded browser will have difficulties attempting to display. Please report any issues to Trilithic Technical Support.

CAUTION: Should you have any difficulties or get locked-up while in **Web Browser** Mode, hold down the ⏻ and ⒡ buttons at the same time, for five seconds to force a reboot of your instrument.

Required Setup

To use **Web Browser** Mode, you will need to set up some basic parameters. Be sure you have completed **Section I: The Basics**, Chapter 5: Initial Setup before proceeding through this chapter.

To use **Web Browser** Mode with an internal cable modem, you will need to setup the internal cable modem. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *CM/CPE Settings* before proceeding through this chapter.

To use **Wi-Fi** Mode, you will need to set up some basic parameters. Be sure you have completed Chapter 5: Initial Setup before proceeding through this chapter.

To use **Wi-Fi** Mode with the internal Wi-Fi adapter, you will need to set up the internal Wi-Fi adapter. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Wi-Fi Settings* before proceeding through this chapter.

To change the appearance of your browser screen by hiding or displaying status bars, you will need to set up the browser settings; see **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Browser Settings*.

The 860 DSP web browser is limited to accessing the web pages listed on its internal home page (index.html) located on drive B.

You will need to use the WorkBench software to edit the index.html file. This will allow you to add or change the web pages accessible from the home page. See your WorkBench operation manual for further instructions.

Browser Overview

The web browser screen contains several tools which you should become familiar with before using the web browser. Take a moment to locate the basic features of the web browser screen.
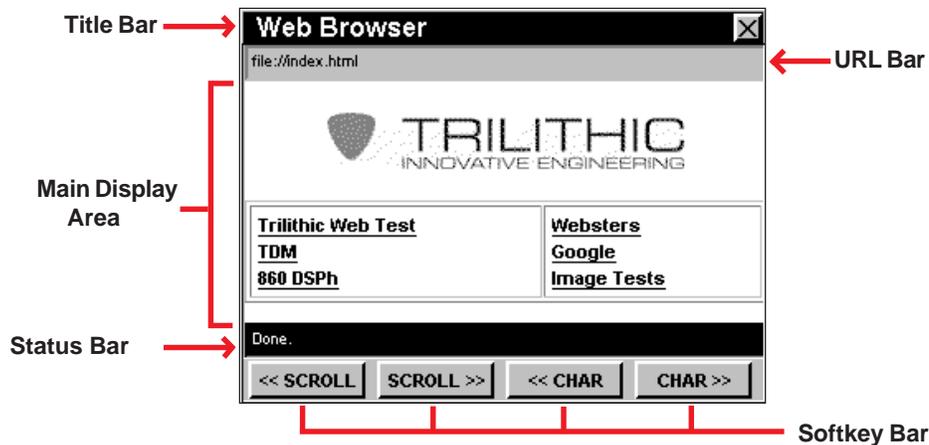
Title Bar

The title bar along the top of the screen indicates which screen is displayed, such as **Web Browser** shown above.

URL Bar

The URL bar shows the URL of the current web page.

Main Display Area

The main display area, located below the URL bar, displays the web page being accessed.

Status Bar

Below the main display area is a black status bar. Single line text entries are displayed to inform the user about the status of a web page.

Softkey Bar

Below the status bar, are four softkeys which correspond and identify the actions assigned to the four yellow buttons on the keypad.

The softkeys are used to access various web browsing functions.

Browser Navigation

Selecting Links

Use the ◄ ► buttons to move between selectable fields on a web page.

Pressing the (Ent) button will select a highlighted field.

Scrolling Web Pages

Use the ‹‹Scroll and Scroll›› softkeys to scroll left and right on the web page.

Use the ▲ ▼ buttons to scroll up and down on the web page.

Entering Data

To enter numbers and text use the alphanumeric keypad.

Use the ‹‹Char and Char›› softkeys to move the cursor left and right when entering or editing text.

Use the (Ent) button when finished entering text or the ◄ ► buttons to move to a new field.

Function Menu Options

The **Function** Menu can be accessed by pressing the **Fn** button while in the **Web Browser** Mode.

The following **Function** Menu options can be accessed while in **Web Browser** Mode:

- Contrast / Freeze
- Screen Capture
- Context Help
- Browser Back
- Browser Forward
- Browser Refresh
- Browser Home
- Offline Browsing
- Clear Offline Cache
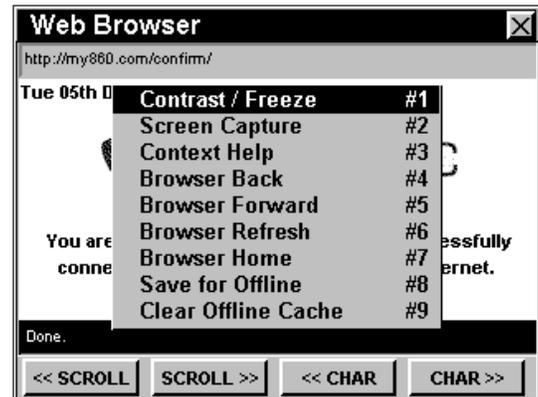
Basic Function Menu Options

The following functions are described in **Section I: The Basics**, Chapter 6: Basic Function Menu Options:

- Contrast / Freeze
- Screen Capture
- Context Help

Browser Back

This option is used to move back one web page.

To use this option, press the (Fn) button, use the (▲) (▼) buttons to highlight **Browser Back**, and then press the (Ent) button. You may also select **Browser Back** by pressing (4).
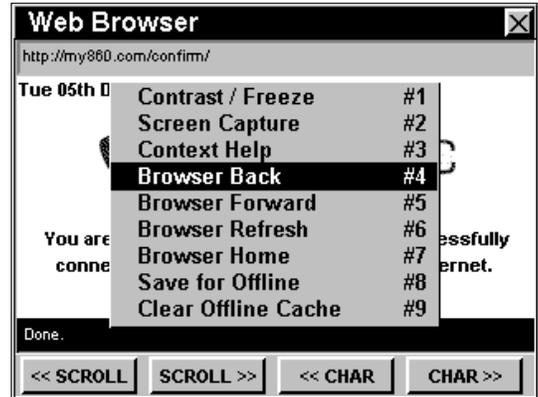
Browser Forward

This option is used to move forward one web page.

To use this option, press the (Fn) button, use the (▲) (▼) buttons to highlight **Browser Forward**, and then press the (Ent) button. You may also select **Browser Forward** by pressing (5).
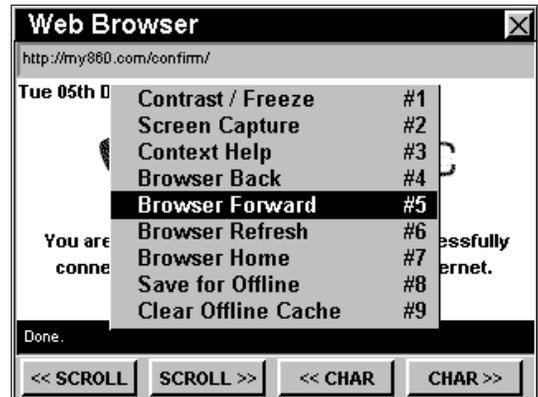
Browser Refresh

This option is used to refresh the current web page.

To use this option, press the (Fn) button, use the (▲) (▼) buttons to highlight **Browser Refresh**, and then press the (Ent) button. You may also select **Browser Refresh** by pressing (6).
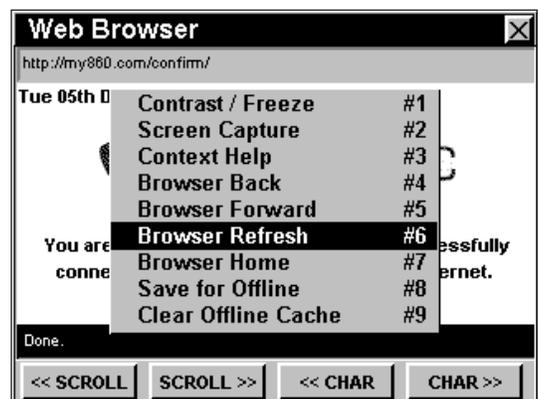
Browser Home

This option is used to go to the home web page.

To use this option, press the (Fn) button, use the (▲) (▼) buttons to highlight **Browser Home**, and then press the (Ent) button. You may also select **Browser Home** by pressing (7).
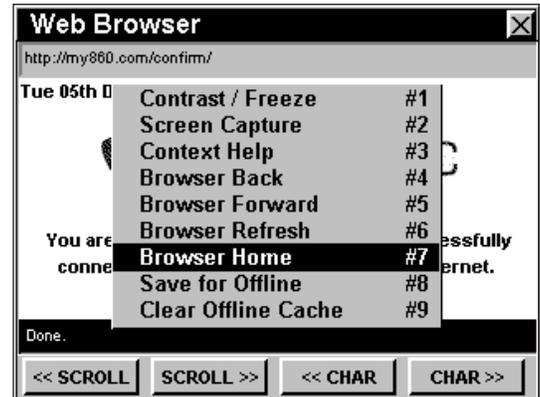
Offline Browsing

You can save web pages for off-line browsing when an internet connection is not available.

To use this option to save a web page for offline browsing, press the (Fn) button, use the (▲) (▼) buttons to highlight **Save for Offline**, and then press the (Ent) button. You may also select **Save for Offline** by pressing (8). The instrument will store the web page and associated graphics on flash drive B.
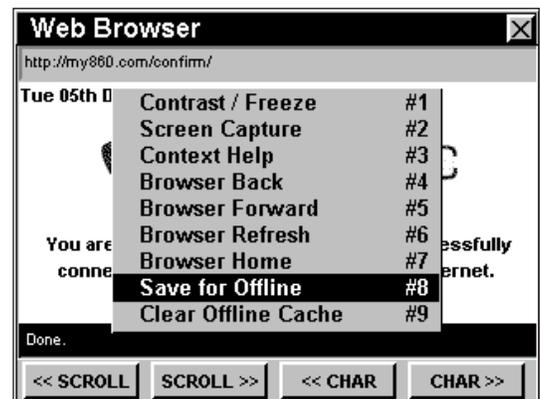
To use this option to recall pages or graphics when off-line, press the (Fn) button, use the (▲) (▼) buttons to highlight **Recall Offline**, and then press the (Ent) button. You may also select **Recall Offline** by pressing (8).

- The instrument will display a list of the cached web pages.

- Use the (◄) (►) buttons to highlight a website in the cache.

- To view a highlighted selection, press the (Ent) button.

> **Note:** In order for links from one web page to another to work offline, you must store the linked pages for offline browsing. If you try to navigate to an uncached page, the instrument will display an error message. Use the **Browser Back** function to return to the previous page.

Clear Offline Cache

This option is used to the clear the offline cache of web pages.

To use this option, press the (Fn) button, use the (▲) (▼) buttons to highlight **Clear Offline Cache**, and then press the (Ent) button. You may also select **Clear Offline Cache** by pressing (9).
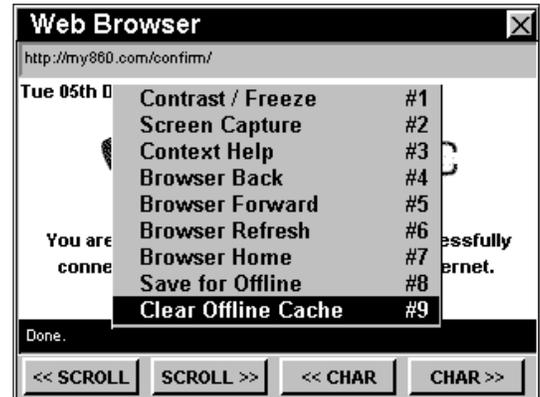
Introduction

The **Auto Test** Mode performs a sequence of operations specified by a "macro". You can assemble **Auto Test** macros either manually or load them into the instrument using WorkBench software. Each macro is a "script" that the instrument can follow. It may contain most of the functions that the instrument is capable of performing, including channel selection, level setting, measurements, comparisons to limits and data recording. A list of macros can be stored in your instrument and you can select a macro for performing tests and generating reports at any time.

The basic 860 DSP and 860 DSPi come equipped with the **Auto Test** Mode as a standard feature.

In **Auto Test** Mode, the instrument displays the results of a test sequence which you can store in the unit's memory. Stored reports may be recalled using the **Automatic Test Results** Mode.

This section will provide you with the basic understanding of how to use **Auto Test** Mode including:

- Required Setup
- Creating Auto Test Macros
- Running Auto Test Macros
- Function Menu Options

Note: If your instrument does not include all of the features shown in this chapter, go on-line to *www.trilithic.com* to update your firmware for free. This will allow you to use all of the newest features that are included in this mode.

Required Setup

To use **Auto Test** Mode, you will need to set up some basic parameters. Be sure you have completed **Section I: The Basics**, Chapter 5: Initial Setup before proceeding through this chapter.

Creating Auto Test Macros

Auto Test macros can include up to 16 automated tests which the instrument can perform immediately, at specific dates and times, or periodically starting at a specified date and time.

Create New Macro

To create a new **Auto Test** macro, press the [New] softkey.

- The **Create a New Macro** window will open.

- Enter the name of the new macro using the alphanumeric keypad, and then press the (Ent) button.

- The **Edit Macro** window will appear with **Step #1 of 16** selected. If **Step #1 of 16** is not selected, use the [Prev] or [Next] softkeys to select **Step #1 of 16**.

Automatic Test
20-Nov-2009 Chrg 14.20V 93 F   IP   11:58:51

File Name	LOG SIZE	Schedule
860serv1.mac	3088 bytes	Specified Times
at tap.mac	11068 bytes	Immediate
cpe.mac	10268 bytes	Immediate
eol.mac	13220 bytes	Immediate
grnd blk.mac	12424 bytes	Immediate
set top.mac	11448 bytes	Immediate
tap.mac	11708 bytes	Immediate
---	---	---
---	---	---

Automatic Test

| New | Edit | Start | Delete |

Automatic Test
20-Nov-2009 Chrg 14.20V 93 F   IP   12:00:36

File Name	LOG SIZE	Schedule
860serv1.mac	3088 bytes	Specified Times

Create a New Macro

Enter a Macro Name

_.mac

Automatic Test

| New | Edit | Start | Delete |

Edit Macro
20-Nov-2009 Chrg 14.20V 93 F   IP   12:01:33

Step #1 of 16   Unused Step

Information

Schedule   Immediate

Automatic Test

| Prev | Params | Limits | Next |

Selecting Type of Test

The default type of test **Unused Step** is displayed when creating a new macro.

To select the type of test desired, use the ◄ ► buttons to highlight the **Step #X** of **16** Field, use the ▲ ▼ buttons to select the type of test desired as follows;

Test Type	Mode	Channel Plan	IP Address	Schedule Type	Test Parameters	Test Limits
Unused Step	N/A					
Check All Levels	SCAN	X		X		X
Check Tilt (dB)	TILT	X		X		X
Check HUM (%)	HUM	X		X	X	X
Check C/N (dB)	C/N	X		X		X
Check Depth of Mod (%)	MOD	X		X		X
Check QAM w/o Constellation	QAM	X		X		X
Check QAM plus Constellation	QAM	X		X		X
Check Ping	PING		X	X	X	X
Check Throughput	THRU PUT		X	X	X	X
Check Spectrum	SPECTRUM			X	X	X
Check VoIP RTP	VoIP		X	X	X	X
Check Cable Modem	CM STAT			X	X	X
Check Leakage	N/A					X

If you wish to add another macro step, use the ⬚Next⬚ softkey to advance to the next step in the auto test sequence. You can then define the step as described above. You may define up to 16 steps in this manner.

Note: Macro test steps must be continuous. The instrument ends execution of a macro on the first unused step.

Note: Leakage measurement requires the use of an external leakage meter such as the Seeker Lite² or Seeker.

Auto Test

Selecting a Channel Plan

To select the channel plan, use the ◀ ▶ buttons to highlight the **Channel Plan** field, and then use the ▲ ▼ buttons to cycle through the channel plans available on your instrument.

A brief summary of the selected **Channel Plan** will be displayed in the **Information** field.

Edit Macro   ✕
20-Nov-2009 Chrg 14.20V   91 F   IP   12:08:32
Step #1 of 16   Check All Levels
Channel Plan   Prompt User

Information
                              9 Channels in Plan
                           3 Analog Channels to Test
                           6 Digital Channels to Test

Schedule   Immediate
Msg:
Prev   Params   Limits   Next
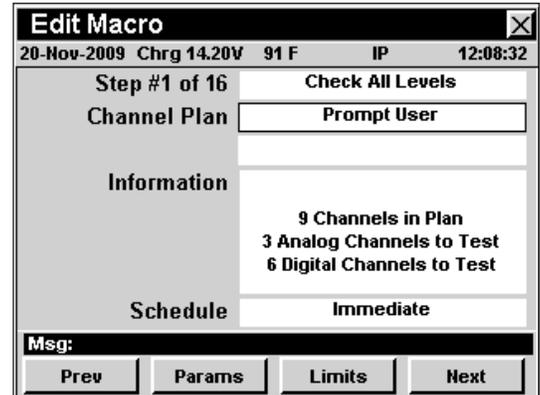
Note: Be sure to check that the channel plan you select has channels designated for the type of test you are defining for this step. For example, if you are defining a step as a **Hum** test, there must be at least one channel designated for **Hum**.

Select an IP Address

To enter an IP address, use the ◀ ▶ buttons to highlight the **IP Address** field, and then use the alphanumeric keypad to enter the IP address, and press the **Ent** button.

Edit Macro   ✕
20-Nov-2009 Chrg 14.20V   91 F   IP   12:21:26
Step #1 of 16   Check Ping

IP Address   10.1.33.23
Information

Schedule   Specified Times
Msg:
Prev   Params   Limits   Next

TRILITHIC
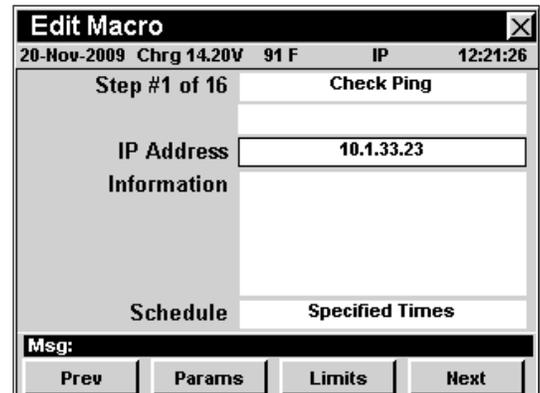
Selecting a Schedule Type

The schedule type is used to control how and when the instrument runs the macro. To select the schedule type, use the ◀ ▶ buttons to highlight the **Schedule** field, and then use the ▲ ▼ buttons to cycle through the schedule types available.

- **Immediate** - Run the macro immediately.

- **Interval / Count** - Run the macro at a selected date and time and repeating the macro at regular time intervals.

- **Specified Times** - Run the macro at up to four selected dates and times.
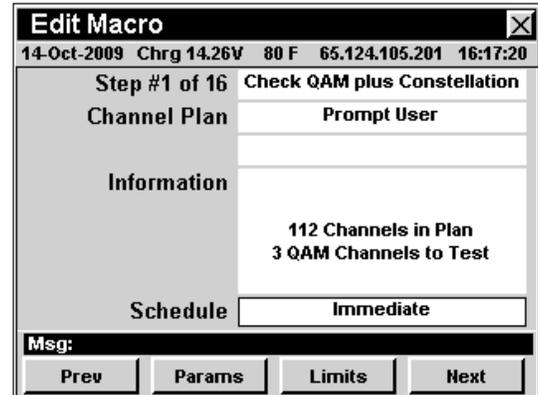
> **Note:** You can change the schedule type at run time; however, setting the default to the method you most commonly use will save time when running the macro.

Setting Test Parameters

To set test parameters, use the **Prv** or **Next** softkey to highlight the desired test step and then press the **Params** softkey.

After setting the test parameters, press the **Bk** button to save the new parameters and return to the **Edit Macro** window.

Check Hum (%) Test Parameters

When the test type is set to **Check Hum (%)**, use the ◀ ▶ buttons to highlight the following test parameters, and then use the ▲ ▼ buttons to cycle through the available options:

Hum Type - This sets the AC power frequency used to measure power line related HUM. You can select from **60 kHz**, **120 kHz**, or **< 1 kHz Value**.

TRILITHIC
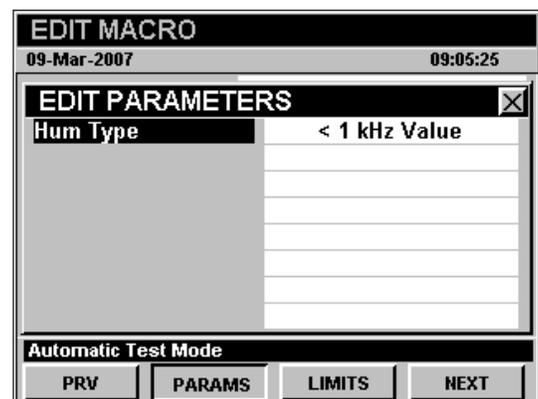
Check PING Test Parameters

When the test type is set to **Check PING**, use the
◀ ▶ buttons to highlight the following test
parameters, and then use the ▲ ▼ buttons to
cycle through the available options:

Packet Rate- This sets the time delay for the
signal to be converted into an IP packet. You can
select from **10 msec** to **1000 msec**, in 10 msec
increments.

Packet Size - This sets the size of the packet to
send for the test. You can select from **0**, **32**, **64**,
256, **512**, **768**, or **1024 Bytes**.

Edit Macro
14-Oct-2009 Chrg 14.26V   82 F   IP   16:20:58

Edit Parameters   ✕
Packet Rate   10 msec
Packet Size   0 Bytes
Packets to Send   100 Pkts
CODEC Delay   0 msec
Jitter Buffer Delay   0 msec

Msg:
Prev   Params   Limits   Next

Packets to Send - This sets the number of packets to send for the test. You can select
from **100 Pkts** to **100000 Pkts**, in 100 Pkt increments.

Codec Delay - This sets the time delay for the codec compression. You can select from
0 msec to **300 msec**, in 1 msec increments.

Jitter Buffer Delay - This sets the time delay for buffering packets. You can select from
0 msec to **300 msec**, in 1 msec increments.

Check Throughput Test Parameters

When the test type is set to **Check Throughput**,
use the ◀ ▶ buttons to highlight the following
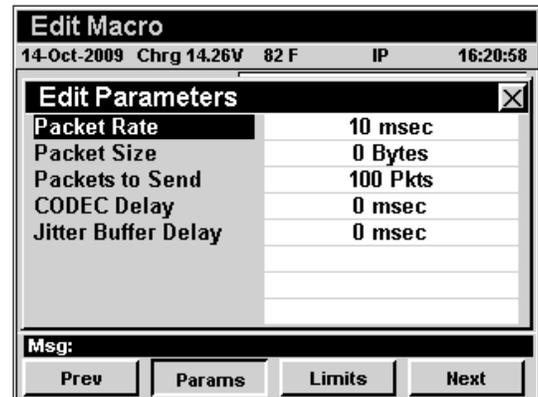test parameters, and then use the ▲ ▼ buttons to
cycle through the available options:

File Transfer - This sets the throughput file
transfer protocol. You can select from **UDP**, **TFTP**,
and **HTTP Upstream Test** and **UDP**, **TFTP**, and
HTTP Downstream Test.

Transfer Rate - This sets the data transfer rate
for the **UDP Downstream Test**. You can select
from **100 kBit/Sec** to **40 MBit/Sec**, in
100 kBit/Sec increments.

Edit Macro
20-Nov-2009 Chrg 14.20V   91 F   IP   12:23:24

Edit Parameters   ✕
Packet Rate   100 msec
Packet Size   1024 Bytes
Packets to Send   100 Pkts
CODEC Delay   21 msec
Jitter Buffer Delay   20 msec

Msg:
Prev   Params   Limits   Next

Check Spectrum Test Parameters

When the test type is set to **Check Spectrum**, use the ◄ ► buttons to highlight the following test parameters, and then use the ▲ ▼ buttons to cycle through the available options:

Start Frequency - This sets the start frequency for the spectrum scan. This value cannot be higher than the **Stop Frequency**.

Stop Frequency - This sets the stop frequency for the spectrum scan. This value cannot be lower than the **Start Frequency**.

Resolution Bandwidth - This sets the resolution bandwidth for the spectrum scan.

Detector Mode - This sets the type of detector mode to use. You can select from **Avg Detector**, **Dwell Wide Detector**, or **Dwell Narrow Detector**.

Sampling Level - This sets the number of samples to use for the detector mode averaging. You can select from **Single Sample**, **2** , **4**, **8**, **16**, **32**, **64**, **128**, or **256 Samples**.

Reference Level - This sets the reference level of the spectrum scan.

Hold Setting - This sets the time delay for buffering packets. You can select from **None**, **Max**, or **Min**.
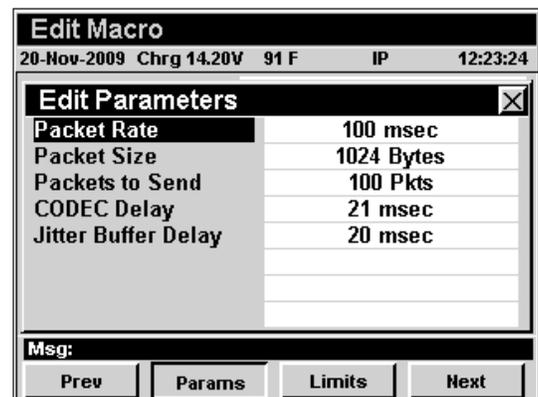
Auto Test
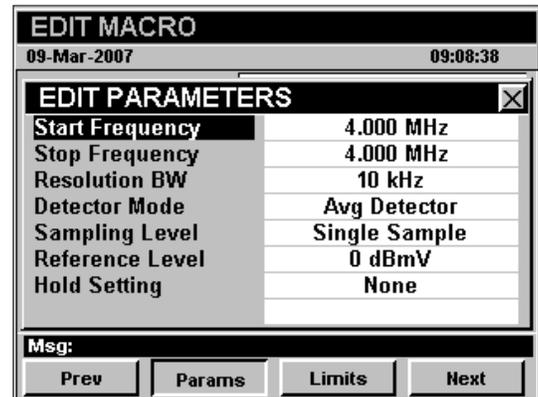
Check VoIP RTP Test Parameters

When the test type is set to **Check VoIP RTP**, use the ◄ ► buttons to highlight the following test parameters, and then use the ▲ ▼ buttons to cycle through the available options:

CODEC Type - This sets the type of CODEC. This is set to **G.711 64000 bps** and cannot be changed manually.

CODEC Delay - This sets CODEC delay. This is tied to the **CODEC Type** and cannot be changed manually.

Packet Rate - This sets the rate that packets are sent. You can choose from **20 msec** to **250 msec**, in 10 msec increments.

Packet Size - This sets set the size of packet. You can choose from **20 Bytes** to **1000 Bytes**.

Jitter Buffer Delay - This sets the jitter buffer to be used by voice receivers. You can choose from **20 msec** to **300 msec**, in 10 msec increments.

Call Length - This sets the length of the call. The values to choose from are variable based on the **Packet Rate** and **Packet Size**.
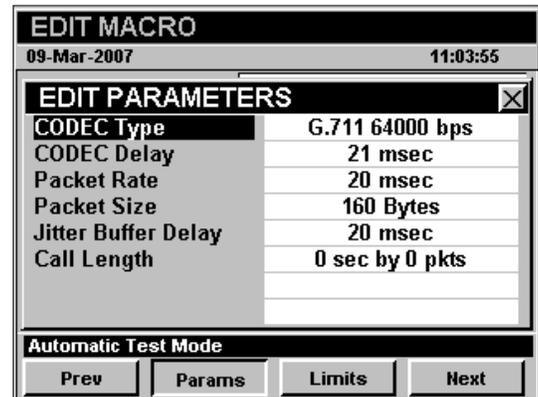
> ⚠ **CAUTION:** The instrument is set to perform the VoIP RTP test using the G.711 64000 bps CODEC. The default values provided, should be sufficient to perform any VoIP RTP test. If you choose to change the default values, it may adversely affect your test results. When your selected test settings do not conform to the CODEC, an asterisk will appear in the **CODEC Type** field. Change VoIP RTP test settings at your own risk.

Setting Test Limits

Setting test limits allows you to define the testing criteria that your system must satisfy. When the instrument performs an **Auto Test** macro it will compare the measurement data to the test limits that you have set.

> **Note:** To meet a minimum limit the measured values must be equal to or greater than the minimum limit. To meet a maximum limit the measured values must be less than or equal to the maximum limit.

To set test parameters, use the [Prv] or [Next] softkey to highlight the desired test step and then press the [Limits] softkey.

After setting the test limits, press the (Bk) button to save the new limits and return to the **Edit Macro** window.

Check All Levels Test Limits

When the test type is set to **Check All Levels**, use the ◀ ▶ buttons to highlight the following test settings, and then use the ▲ ▼ buttons to change the value of the test settings:

Min Video - Sets the minimum limit for analog video channel levels.

Max Video - Sets the maximum limit for analog video channel levels.

Min V/A Delta - Sets the minimum allowable video to audio level difference.

Max V/A Delta - Sets the maximum allowable video to audio level difference.

Min Digital Level - Sets the minimum limit for digital channel levels.

Max Digital Level - Sets the maximum limit for digital channel levels.

Max Delta Video - Sets the maximum difference allowed between the lowest and highest levels measured for the analog video channels.

Max Delta Adj Video - Sets the maximum level variation between any two adjacent video carriers.

Auto Test

Check Tilt (dB) Test Limits

When the test type is set to **Check Tilt (dB)**, use the ◄ ► buttons to highlight the following test settings, and then use the ▲ ▼ buttons to change the value of the test settings:

Min Tilt - Sets minimum amplitude versus frequency tilt your system must meet.

Max Tilt - Sets maximum amplitude versus frequency tilt your system must not exceed.

Check Hum (%) Test Limits

When the test type is set to **Check Hum (%)**, use the ◄ ► buttons to highlight the following test settings, and then use the ▲ ▼ buttons to change the value of the test settings:

Max Hum Percent - Sets the maximum hum level your system must not exceed.
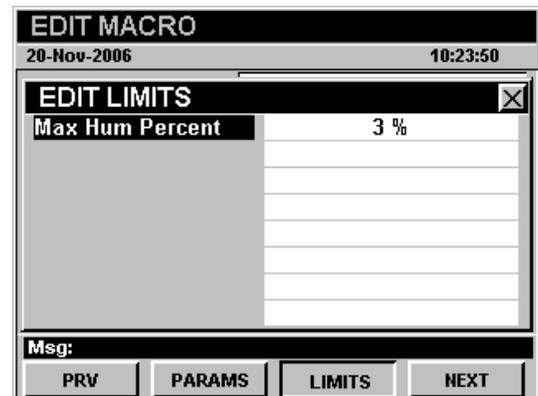
Check CN (dB) Test Limits

When the test type is set to **Check CN (dB)**, use the ◄ ► buttons to highlight the following test settings, and then use the ▲ ▼ buttons to change the value of the test settings:

Min Carrier to Noise - Sets minimum carrier to noise level your system must meet.

Check Depth of Mod (%) Test Limits
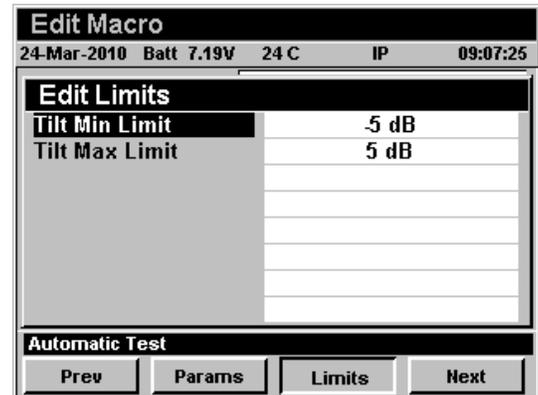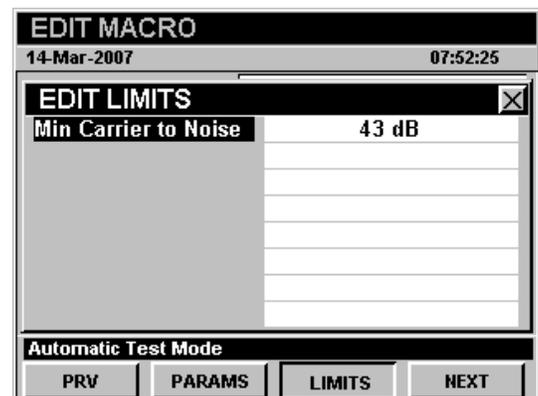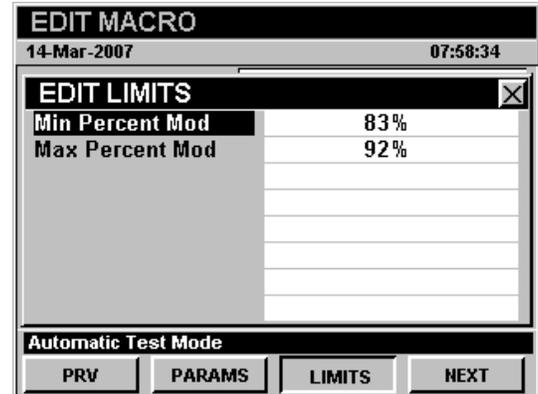
When the test type is set to **Check Depth of Mod (%)**, use the ◀ ▶ buttons to highlight the following test settings, and then use the ▲ ▼ buttons to change the value of the test settings:

Min Percent Mod - Sets minimum depth of modulation percentage your system must meet.

Max Percent Mod - Sets maximum depth of modulation percentage your system must not exceed.

```
EDIT MACRO
14-Mar-2007                        07:58:34
┌─ EDIT LIMITS ─────────────── ⊠ ┐
│ Min Percent Mod            83% │
│ Max Percent Mod            92% │
│                                │
│                                │
│                                │
│                                │
│ Automatic Test Mode            │
│  PRV    PARAMS   LIMITS   NEXT │
└────────────────────────────────┘
```

Check QAM w/o Constellation Test Limits

When the test type is set to **Check QAM w/o Constellation**, use the ◀ ▶ buttons to highlight the following test settings, and then use the ▲ ▼ buttons to change the value of the test settings:

Min Digital Level - Sets the minimum limit for digital channel levels.

Max Digital Level - Sets the maximum limit for digital channel levels.

Min Digital MER - Sets the minimum digital MER your system must meet.

```
EDIT MACRO
14-Mar-2007                        08:00:58
┌─ EDIT LIMITS ─────────────── ⊠ ┐
│ Min Digital Level      10 dBmV │
│ Max Digital Level       0 dBmV │
│ Min Digital MER    Don't Test MER │
│ Max Digital EVM    Don't Test EVM │
│ Max Digital Pre BER  Don't Test Pre BER │
│ Max Digital Post BER Don't Test Post BER │
│ Automatic Test Mode            │
│  PRV    PARAMS   LIMITS   NEXT │
└────────────────────────────────┘
```

Max Digital EVM - Sets the maximum digital EVM your system must not exceed.

Max Digital Pre BER - Sets the maximum digital pre BER your system must meet.

Max Digital Post BER - Sets the maximum digital post BER your system must not exceed.

> **Note:** Setting **Min Digital MER**, **Max Digital EVM**, **Max Digital Pre BER**, or **Max Digital Post BER** to zero disables the limit test.

> **Note:** The higher that you set the MER / BER limits, the more time the MER / BER test will take.

Auto Test

Check QAM plus Constellation Test Limits

When the test type is set to **Check QAM plus Constellation**, use the ◄ ► buttons to highlight the following test settings, and then use the ▲ ▼ buttons to change the value of the test settings:

Min Digital Level - Sets the minimum limit for digital channel levels.
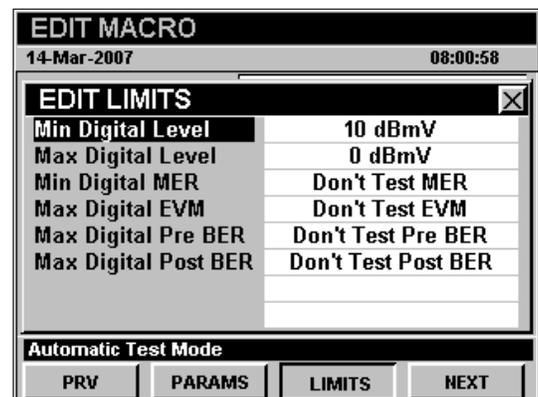
Max Digital Level - Sets the maximum limit for digital channel levels.

Min Digital MER - Sets the minimum digital MER your system must meet.

Max Digital EVM - Sets the maximum digital EVM your system must not exceed.

Max Digital Pre BER - Sets the maximum digital pre BER your system must meet.

Max Digital Post BER - Sets the maximum digital post BER your system must not exceed.

Check PING Test Limits

When the test type is set to **Check PING**, use the ◄ ► buttons to highlight the following test settings, and then use the ▲ ▼ buttons to change the value of the test settings:

Min Launch Level - Sets the minimum launch level that your cable modem must meet.

Max Launch Level - Sets the maximum launch level that your cable modem must not exceed.

Max Lost Packets - Sets the maximum number of lost packets that your system must not exceed.

Max Percent Lost - Sets the maximum percent of lost packets your system must not exceed.

Max Transit Time - Sets the maximum transit time your system must not exceed.

Max Latency - Sets the maximum latency your system must not exceed.

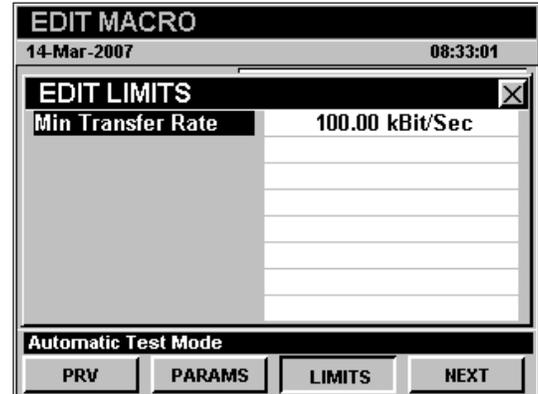**Max Jitter** - Sets the maximum jitter your system must not exceed.

Check Throughput Test Limits

When the test type is set to **Check Throughput**, use the ◀ ▶ buttons to highlight the following test settings, and then use the ▲ ▼ buttons to change the value of the test settings:

Min Transfer Rate - Sets the minimum throughput transfer rate that your system must meet.

```
EDIT MACRO
14-Mar-2007                          08:33:01
  EDIT LIMITS                              ☒
  Min Transfer Rate        100.00 kBit/Sec



  Automatic Test Mode
   PRV      PARAMS      LIMITS      NEXT
```
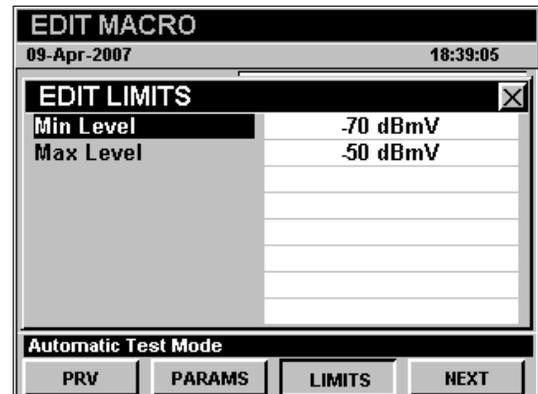
Check Spectrum Test Limits

When the test type is set to **Check Spectrum**, use the ◀ ▶ buttons to highlight the following test settings, and then use the ▲ ▼ buttons to change the value of the test settings:

Min Level - Sets the minimum level that your system must meet. This measurement is useful for checking for a dead laser.

Max Level - Sets the maximum level that your system must not exceed.

```
EDIT MACRO
09-Apr-2007                          18:39:05
  EDIT LIMITS                              ☒
  Min Level                     -70 dBmV
  Max Level                     -50 dBmV



  Automatic Test Mode
   PRV      PARAMS      LIMITS      NEXT
```
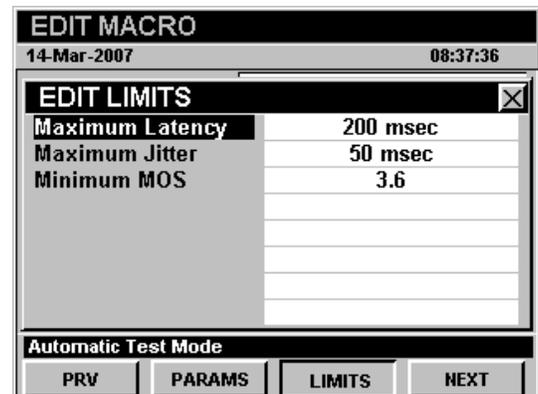
Check VoIP RTP Test Limits

When the test type is set to **Check VoIP RTP**, use the ◀ ▶ buttons to highlight the following test settings, and then use the ▲ ▼ buttons to change the value of the test settings:

Maximum Latency - Sets the maximum latency that your system must not exceed.

Maximum Jitter - Sets the maximum jitter that your system must not exceed.

Minimum MOS - Sets the minimum MOS that your system must meet.

```
EDIT MACRO
14-Mar-2007                          08:37:36
  EDIT LIMITS                              ☒
  Maximum Latency            200 msec
  Maximum Jitter              50 msec
  Minimum MOS                   3.6



  Automatic Test Mode
   PRV      PARAMS      LIMITS      NEXT
```
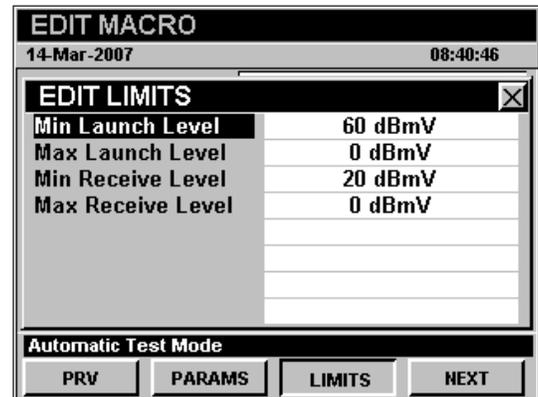
Check Cable Modem Test Limits

When the test type is set to **Check Cable Modem**, use the ◀ ▶ buttons to highlight the following test settings, and then use the ▲ ▼ buttons to change the value of the test settings:

Min Launch Level - Sets the minimum launch level that your cable modem must meet.

Max Launch Level - Sets the maximum launch level that your cable modem must not exceed.

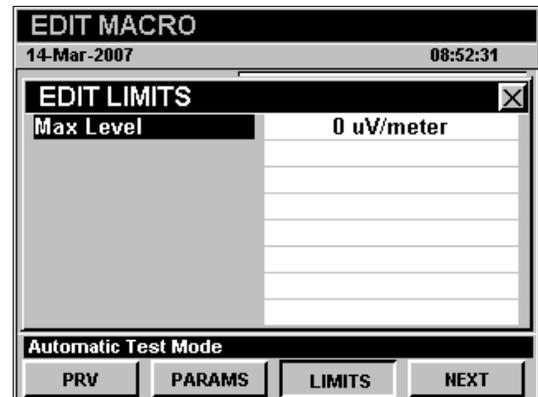**Min Receive Level** - Sets the minimum receive level that your cable modem must meet.

```
EDIT MACRO
14-Mar-2007                    08:40:46
  EDIT LIMITS                          ✕
 Min Launch Level          60 dBmV
 Max Launch Level           0 dBmV
 Min Receive Level         20 dBmV
 Max Receive Level          0 dBmV


 Automatic Test Mode
   PRV      PARAMS     LIMITS     NEXT
```

Max Receive Level - Sets the maximum receive level that your cable modem must not exceed.

Check Leakage Test Limits

When the test type is set to **Check Leakage**, use the ◀ ▶ buttons to highlight the following test settings, and then use the ▲ ▼ buttons to change the value of the test settings:

**Max Level** - Sets the maximum leakage level that your system must not exceed.

```
EDIT MACRO
14-Mar-2007                    08:52:31
  EDIT LIMITS                          ✕
 Max Level                0 uV/meter






 Automatic Test Mode
   PRV      PARAMS     LIMITS     NEXT
```

Saving Macros

After completing the setup of an **Auto Test** macro, press the **Bk** button, use the ◄ ► buttons to select **Yes** to save the macro or **No** to exit without saving, and select the **Ent** button. The instrument will return to the **Auto Test Macros** window.
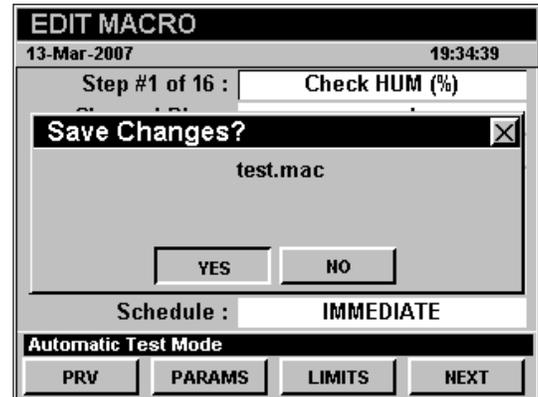

Copying Macros

To copy or create a macro similar to an existing macro, use the ◄ ► buttons to highlight the macro that you wish to copy, and select the ⎡ Copy ⎤ softkey. The **Copy a Macro** window will appear; enter a new file name using the alphanumeric keypad, and select the **Ent** button.
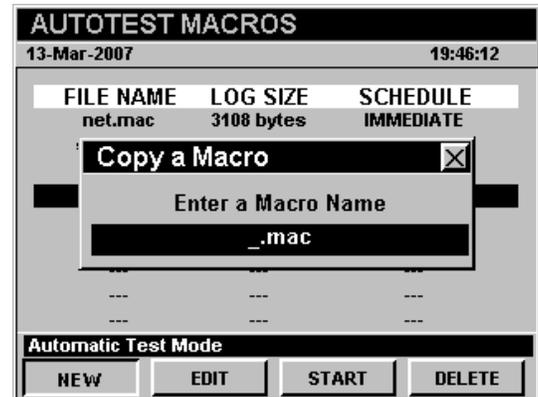
Deleting Macros

To delete an existing macro, use the ◄ ► buttons to highlight the macro that you wish to delete, and select the ⎡ Delete ⎤ softkey. The **Delete Selected File?** window will appear; use the ◄ ► buttons to select **Yes** to delete the macro or **No** to exit without deleting, and select the **Ent** button.

TRILITHIC
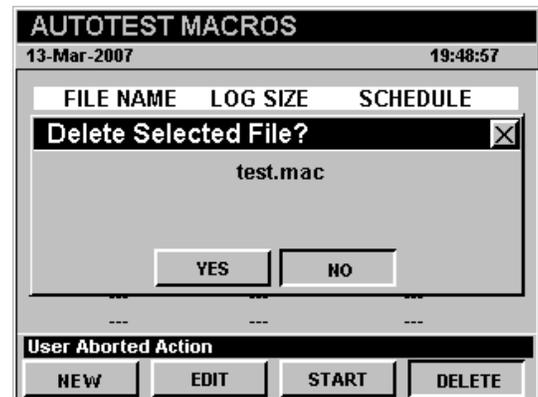
Auto Test

Running Auto Test Macros

To run an **Auto Test** macro, highlight the macro name on the **Auto Test Macros** window, and then start the selected macro by pressing the [Start] softkey.

Immediate Execution

If the **Schedule** field is set to **Immediate** the macro will execute immediately.

The instrument will display the progress of the macro along with the **Pass** or **Fail** status for each step.
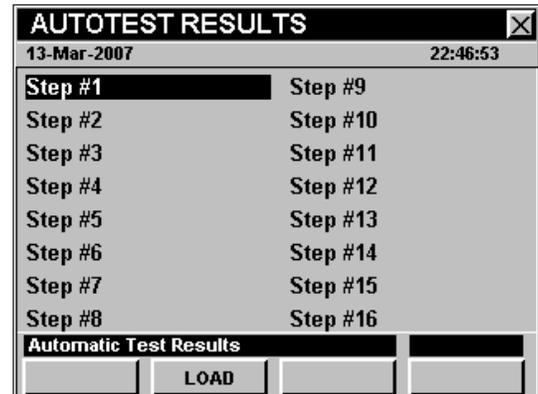
Note: You can abort a macro in progress by pressing the (Bk) button when the **Auto Test Results** window is shown.

When the macro finishes execution, the **Save Data As** window will appear; use the alphanumeric keypad to enter the file name, and then press the (Ent) button.
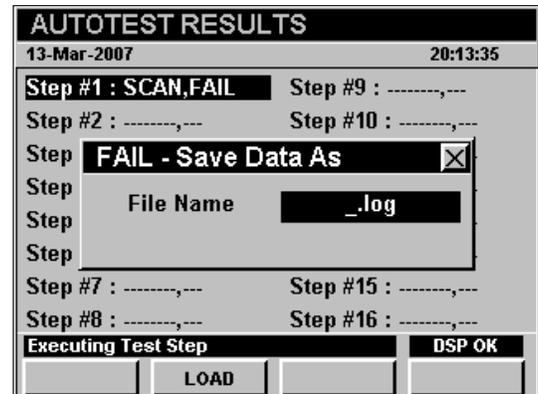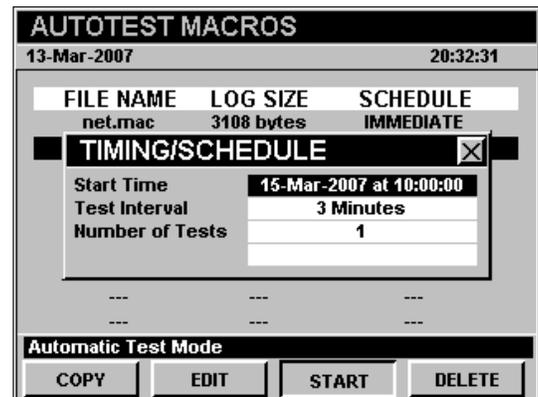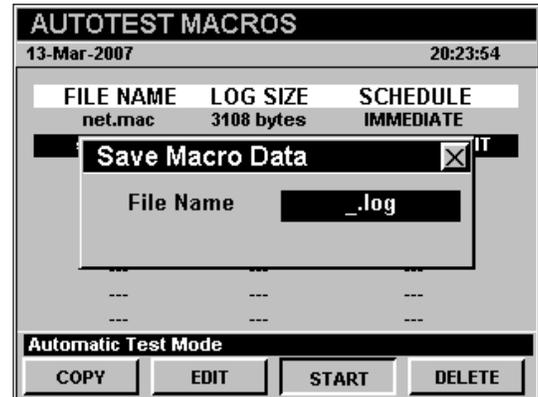

Note: When the macro is complete, the instrument will save a data log that includes all of the data collected during the test.

Interval / Count Execution

If the **Schedule** Field is set to **Interval / Count** the **Save Macro Data** window will appear; use the alphanumeric keypad to enter the file name, and then press the (Ent) button.
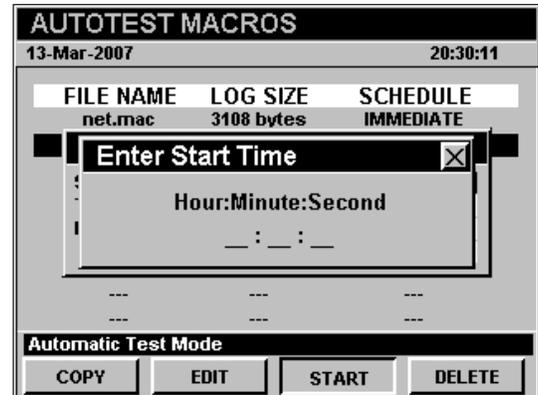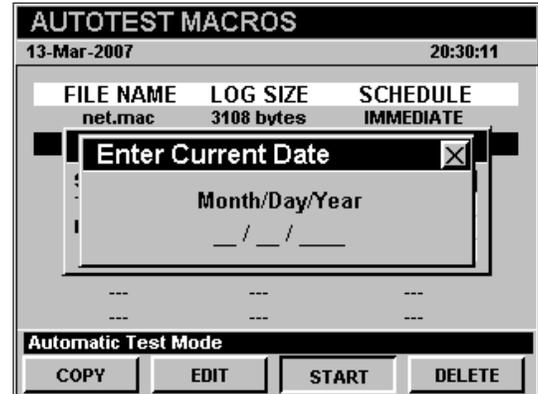
The **Timing/Schedule** window will appear.

Start Date and Time

To set the macro start date and time from the **Timing/Schedule** window, use the ◀ ▶ buttons to highlight the **Start Time** Field, and press the (Ent) button.

- The **Enter Current Date** window will appear. Use the alphanumeric keypad to enter the current date, and press the (Ent) button.

- The **Enter Start Time** window will appear. Use the alphanumeric keypad to enter the current date, and press the (Ent) button.
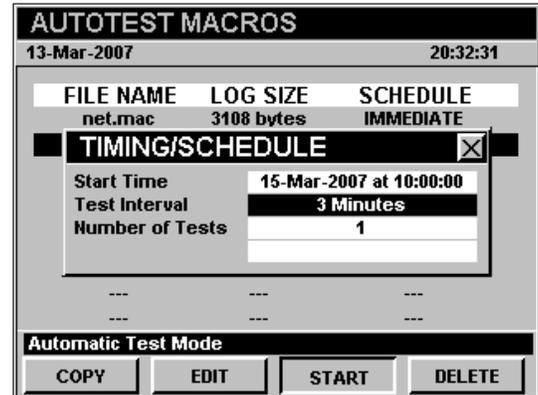

Note: The clock display on the instrument stops when the **Enter Current Date** and **Enter Start Time** windows are open.
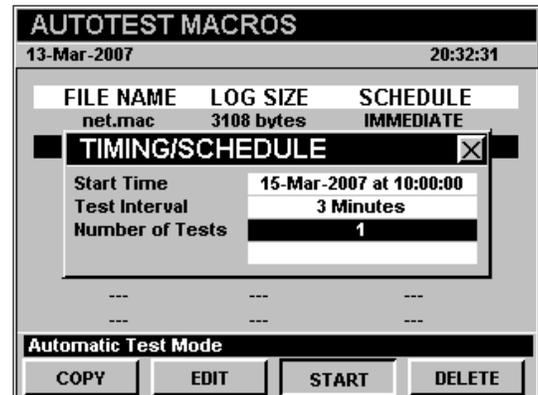
Auto Test

Test Interval

To set the macro test interval, use the ◄ ► buttons to highlight the **Test Interval** Field, and use the ▲ ▼ buttons to change the test interval value.

AUTOTEST MACROS
13-Mar-2007   20:32:31

FILE NAME	LOG SIZE	SCHEDULE
net.mac	3108 bytes	IMMEDIATE

TIMING/SCHEDULE   ⊠

Start Time	15-Mar-2007 at 10:00:00
Test Interval	3 Minutes
Number of Tests	1

Automatic Test Mode

| COPY | EDIT | START | DELETE |

Number of Tests

To set the number of test, use the ◄ ► buttons to highlight the **Number of Tests** Field, and use the ▲ ▼ buttons to change the number of tests.

AUTOTEST MACROS
13-Mar-2007   20:32:31

FILE NAME	LOG SIZE	SCHEDULE
net.mac	3108 bytes	IMMEDIATE

TIMING/SCHEDULE   ⊠

Start Time	15-Mar-2007 at 10:00:00
Test Interval	3 Minutes
Number of Tests	1

Automatic Test Mode

| COPY | EDIT | START | DELETE |

Test Execution

When you have completed setting up the macro schedule, press the **Bk** button. The instrument will begin running the macro. The instrument will display the **Auto Test Results** window briefly, and then the instrument will go into low power mode.

Forty-five seconds before a timed event is scheduled to occur, the instrument will exit low power mode and the instrument will display the **Auto Test Results** window.

The instrument will display the progress of the macro along with the **Pass** or **Fail** status for each step.

> **Note:** You can abort a macro in progress by pressing the **Bk** button when the **Auto Test Results** window is shown.

You can power up the instrument while it is in low power mode by pressing the ⏻ button. The instrument will display **Auto Test In Progress** in the title bar.

The instrument will display the next macro start time in the message bar at the bottom of the screen.

> ⚠ **CAUTION:** You may leave the instrument on or turn it off and the **Auto Test Macro** will continue. Pressing any other key will abort the macro in progress.
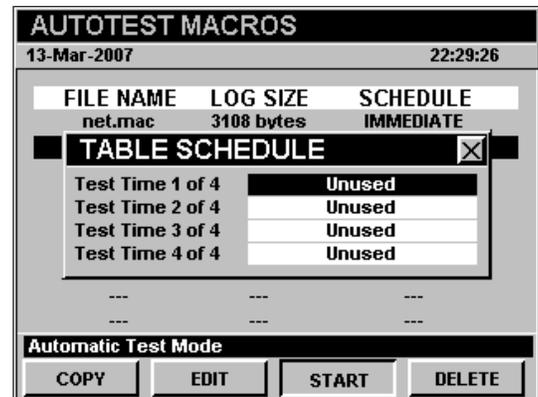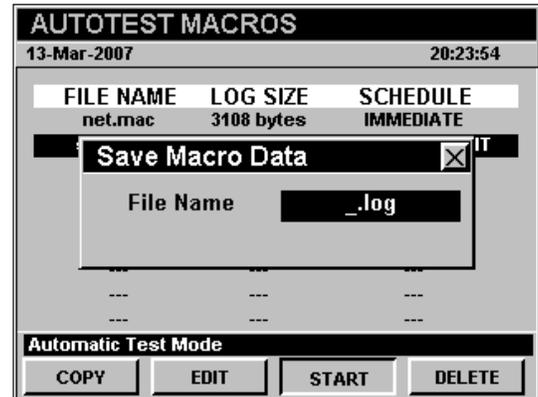
> **Note:** When the macro is complete, the instrument will save a data log that includes all of the data collected during the test.

Specified Times Execution

If the **Schedule** Field is set to **Specified Times** the **Save Macro Data** window will appear; use the alphanumeric keypad to enter the file name, and then press the (Ent) button.

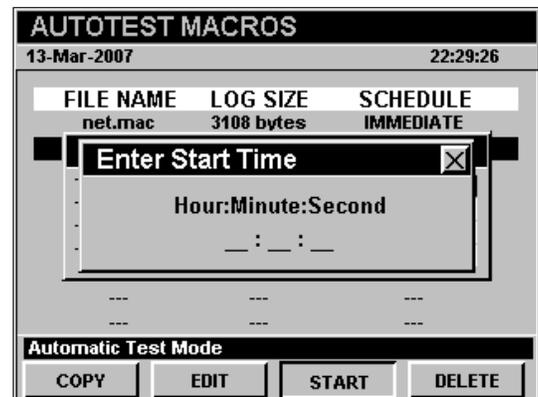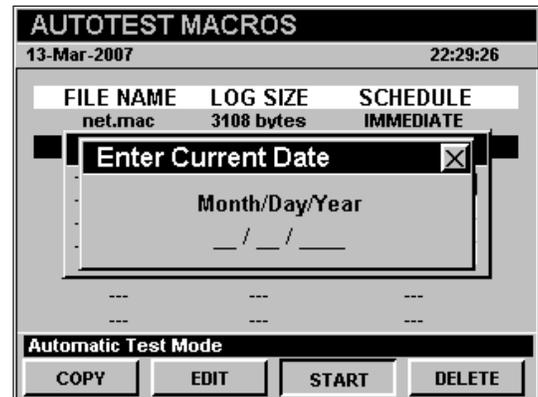The **Table Schedule** window will appear.

Start Date and Time

To set the macro start date and time from the **Table Schedule** window, use the ◀ ▶ buttons to highlight the unused test time, and press the (Ent) button.

- The **Enter Current Date** window will appear. Use the alphanumeric keypad to enter the current date, and press the (Ent) button.

- The **Enter Start Time** window will appear. Use the alphanumeric keypad to enter the start time, and press the (Ent) button.

AUTOTEST MACROS
13-Mar-2007   22:29:26

FILE NAME	LOG SIZE	SCHEDULE
net.mac	3108 bytes	IMMEDIATE

Enter Current Date ☒

Month/Day/Year
__ / __ / ___

Automatic Test Mode

| COPY | EDIT | START | DELETE |

AUTOTEST MACROS
13-Mar-2007   22:29:26

FILE NAME	LOG SIZE	SCHEDULE
net.mac	3108 bytes	IMMEDIATE

Enter Start Time ☒

Hour:Minute:Second
__ : __ : __

Automatic Test Mode

| COPY | EDIT | START | DELETE |

Note: The clock display on the instrument stops when the **Enter Current Date** and **Enter Start Time** windows are open.

Test Execution

When you have completed setting up the macro schedule, press the **Bk** button. The instrument will begin running the macro. The instrument will display the **Auto Test Results** window briefly, and then the instrument will go into low power mode.

Forty-five seconds before a timed event is scheduled to occur, the instrument will exit low power mode and the instrument will display the **Auto Test Results** window.

The instrument will display the progress of the macro along with the **Pass** or **Fail** status for each step.

Note: You can abort a macro in progress by pressing the **Bk** button when the **Auto Test Results** window is shown.

You can power up the instrument while it is in low power mode by pressing the ⏻ button. The instrument will display **Auto Test In Progress** in the title bar.

The instrument will display the next macro start time in the message bar at the bottom of the screen.

CAUTION: You may leave the instrument on or turn it off and the **Auto Test Macro** will continue. Pressing any other key will abort the macro in progress.

Note: When the macro is complete, the instrument will save a data log that includes all of the data collected during the test.
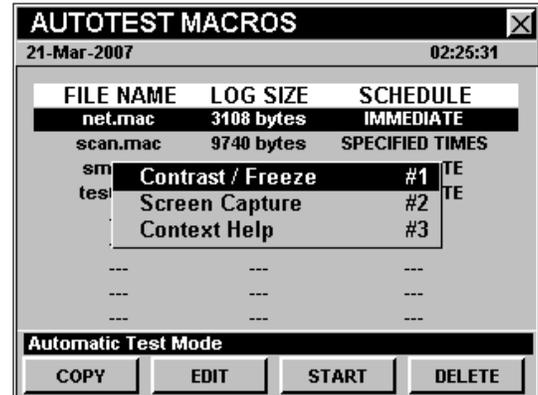
Function Menu Options

The **Function** Menu can be accessed by pressing the **Fn** button while in the **Auto Test** Mode.

The following **Function** Menu options can be accessed while in **Auto Test** Mode:

- Contrast / Freeze
- Screen Capture
- Context Help

Basic Function Menu Options

The following functions are described in **Section I: The Basics**, Chapter 6: Basic Function Menu Options:

- Contrast / Freeze
- Screen Capture
- Context Help

Introduction

The instrument can store the results of an **Auto Test** macro in its memory. Stored reports may be recalled using the **Auto Test Results** Mode. If you have just completed an **Immediate Auto Test** macro, the **Auto Test Results** Mode will appear and the test results will be displayed.

The basic 860 DSP and 860 DSPi come equipped with the **Auto Test Results** Mode as a standard feature.

This section will provide you with the basic understanding of how to use **Auto Test** Mode including:

- Required Setup

- Viewing Auto Test Results

Note: If your instrument does not include all of the features shown in this chapter, go on-line to *www.trilithic.com* to update your firmware for free. This will allow you to use all of the newest features that are included in this mode.
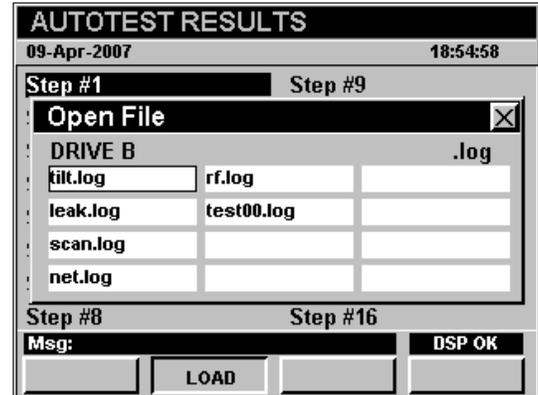
Required Setup

To use **Auto Test Results** Mode, you are not required to perform any setup procedures.
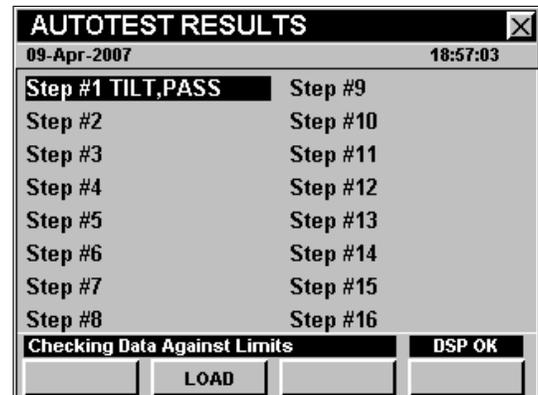
Viewing Auto Test Results

To review the results of an **Interval / Count** or **Specified Times Auto Test** macro press the [Load] softkey. The **Open File** window will appear.

Use the ◄ ► ▲ ▼ buttons to highlight the desired file and press the (Ent) button.

The instrument will display a list of each **Auto Test** macro step plus the results of the corresponding step.

To view the details of an **Auto Test** macro step, use the ▲ ▼ buttons to highlight the desired test step and press (Ent) button.

If the results occupy more than one screen, use the (Ent) button to scroll through the results.

Press the (Bk) button to return to the **Auto Test Results** window.