860 DSP & 860 DSPi Multifunction Interactive Cable Analyzer

Section III: Service Functions

TRILITHIC

Service Functions Overview 1

Introduction

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

This section will provide you with instructions on how to utilize the functions available in the **Service** 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 **Service** 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
Hum	Displays the amplitude of the 50/60 Hz, 100/120 Hz, and low frequency interference present on the video carrier of a single selected channel.	Standard	PP-1
Carrier-to-Noise Ratio	Displays the ratio of the amplitudes of the visual carrier and the noise within a single selected channel.	Standard	PP-1

Mode	Description	860 DSP Option	860 DSPi Option
Depth of Modulation	Displays the percentage of video modulation for the visual carrier of a single, selected channel.	Standard	PP-1
CSO / CTB	Measures the amplitude of two common intermodulation products, Composite Second Order and Composite Triple Beat present within a selected analog video channel. This feature also allows a user to measure CSO/CTB on an Analog (NTSC) Cable TV Channel without removing the carrier and disrupting service.	Standard	PP-1
Channel Plan Scan	Displays the amplitudes of all visual and aural carriers in the selected channel plan as two simultaneous line graphs or as a bar graph; also displays total power measurement.	Standard	PP-1
FM Deviation	Displays the current and maximum FM deviation on the audio carrier of a single, selected channel.	Standard	PP-1
Sweepless Sweep® / Forward SpeedSweep	Used to test and set the tilt and gain of distribution amplifiers and detect faults in the system that affect these parameters. Note: The 8300 FST is no longer supported.	Standard	PP-1
Forward SpeedSweep	Performs all of the Sweepless Sweep features plus it provides compatibility with the 8300 FST. This will allow the Forward SpeedSweep Mode to test the tilt and gain of un-used frequency bands that are not in the users channel lineup.	FS-1	FS-1

Mode	Description	860 DSP Option	860 DSPi Option
SSR Return Test	This test allows you to maintain your reverse spectrum by performing reverse band frequency flatness sweeps and return band ingress analysis.	SR-1	PP-1 and SR-1
RSA Return Sweep	This test allows you to test your return path for micro-reflections and suck-outs.	SR-1	PP-1 and SR-1
RSVP Return Installation	This test allows you to test your return band for cable modem launch levels and return band carrier-to-ingress measurements.	VP-1	PP-1 and VP-1
VSB VSB	Analyzes and displays the signal qualities of Vestigial Sideband Modulation (VSB) signals displayed using constellation, equalizer tap diagram, and BER graph. This feature also displays the signal level and numeric values for MER and pre/post FEC BER.	VSB and IL-1 or IL-2	VSB and IL-1 or IL-2
VITS VITS	Analyzes the signal qualities of Vertical Interval Test Signals (VITS) to measure in-channel response, differential phase, differential gain, and chroma delay. This feature also displays the test signal itself.	VITS	VITS
QAM EVS QAM EVS	Allows the operator to tune the meter to a downstream QAM channel and display its Error Vector Spectrum (EVS), to reveal noise and ingress that may be present under the QAM channel.	QA-1	PP-1 and QA-2
Traffic TraffiControl	Provides a way to troubleshoot ingress and noise problems within active channel bands by seeing the ingress that is present "underneath" an upstream cable modem channel, or any bursty signal.	TC-1	PP-1 and TC-1

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 Service Functions you will need to connect your instrument to your cable system.

Introduction

In **Hum** Mode the instrument displays the amplitude of the 50/60 Hz, 100/120 Hz, and low frequency (<1KHz) interference present on the video carrier of a single selected channel. In **Hum** Mode the instrument displays the selected channel number and the amplitudes of hum and low frequency interference as individual percentages. **Hum** Mode requires a minimum signal level of -20 dBmV. The basic 860 DSP comes equipped with the **Hum** Mode as a standard feature. In order to use the **Hum** Mode on your 860 DSPi, the instrument must be equipped with Power Pack Option (PP-1).

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

- Required Setup

- Adjusting Channels

- Setting Channel Plan

- Using the Goto Function

- Function Menu Options

> **Note: Hum** Mode is an optional function of the 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 **Hum** 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 **Hum** 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.
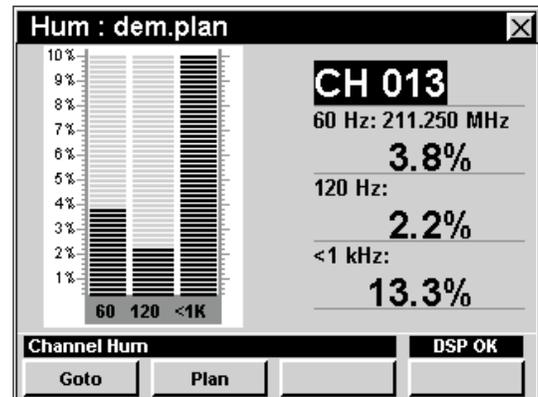
To use **Hum** Mode, you will need to setup the line frequency **Hum Type (50/60 Hz)**. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Level Mode Settings* before proceeding through this chapter.

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

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 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 analog in your plan or the channel is scrambled, the message **Hum Not Available** will be displayed in the status bar at the bottom of the screen and the instrument will beep.

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 the channels defined as analog 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.

TRILITHIC

Using the Goto Function

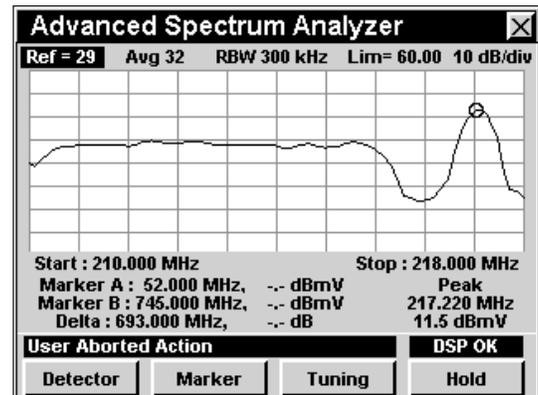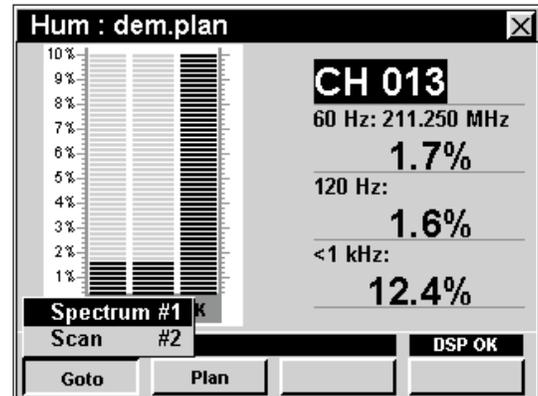The ⬚Goto⬚ softkey gives you rapid access to related measurement functions.

Goto Spectrum

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

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 **Section II: Installer Functions**, Chapter 4: Spectrum Mode. Pressing the (Bk) button will return you to **Hum** 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 **Hum** Mode tuned to the new channel.
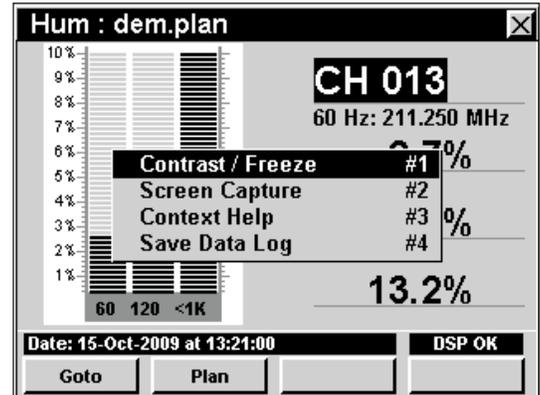
Function Menu Options

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

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

- Contrast / Freeze

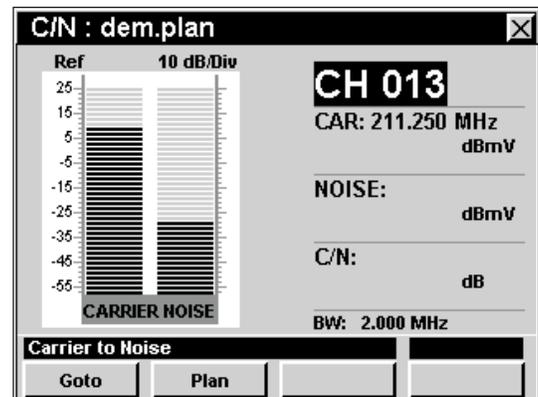- Screen Capture

- Context Help

- Save Data Log

Introduction

In **C/N** Mode the instrument displays the ratio of the amplitudes of the visual carrier and the noise within a single, selected channel. In **C/N** Mode the instrument displays the selected channel number, frequency, and the amplitudes of the visual carrier, the bandwidth-corrected noise and the ratio of the two measurements. **C/N** Mode requires a minimum signal level greater than 5 dBmV. The basic 860 DSP comes equipped with the **C/N** Mode as a standard feature. In order to use the **C/N** Mode on your 860 DSPi, the instrument must be equipped with Power Pack Option (PP-1).

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

- Required Setup

- Setting Reference Level

- Setting Vertical Resolution

- Adjusting Channels

- Setting Channel Plan

- Using the Goto Function

- Function Menu Options

Note: C/N Mode is an optional function of the 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 **C/N** 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 **C/N** 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 **C/N** Mode, you will need to set the **Analog Noise BW** used when computing the C/N for analog TV channels. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Measurement Settings* before proceeding through this chapter.
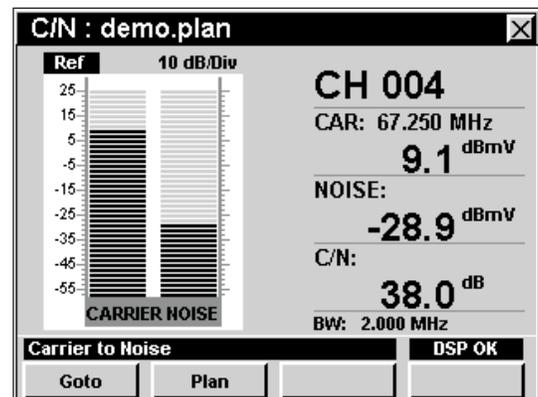
For SECAM L channels, you will need to set the **Optimal Modulation**. See **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Measurement Settings*.

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).
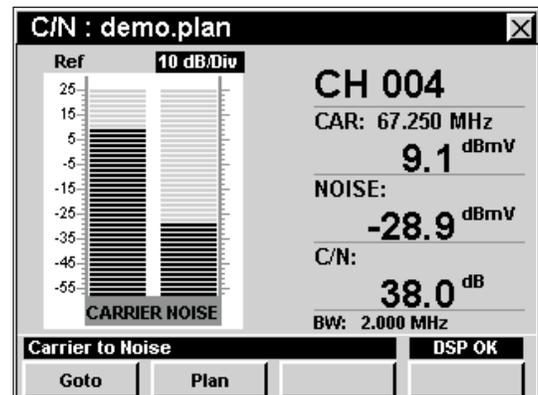

Setting Vertical Resolution

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).
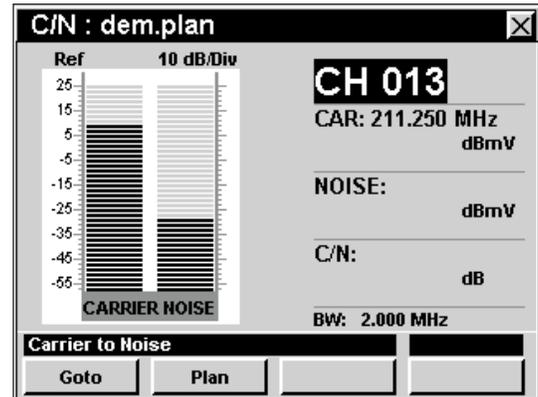
Adjusting Channels

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 using the alphanumeric keypad, and then press the (Ent) button.
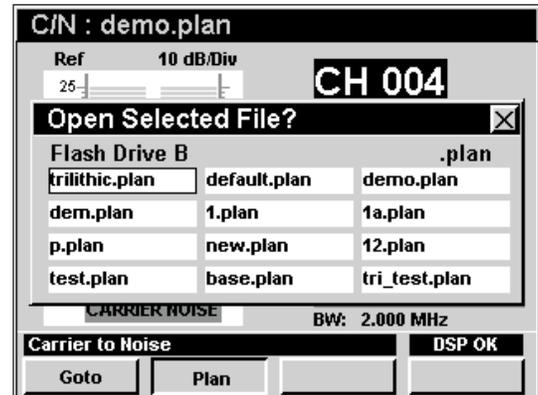
You may enter any channel number in your plan. If the channel is not designated as analog in your plan or the channel is scrambled, the message **C/N Not Available** will be displayed in the status bar at the bottom of the screen and the instrument will beep.

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.

Using the Goto Function

The ⎡ Goto ⎤ softkey gives you rapid access to related measurement functions.
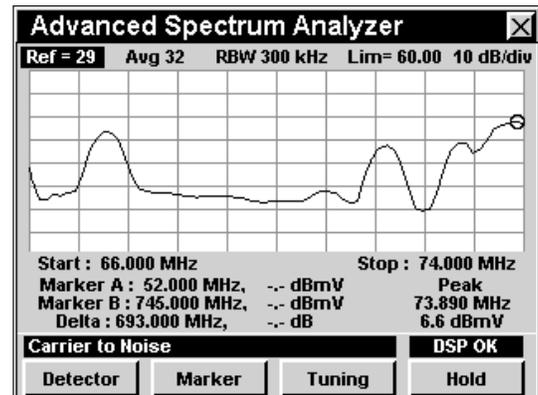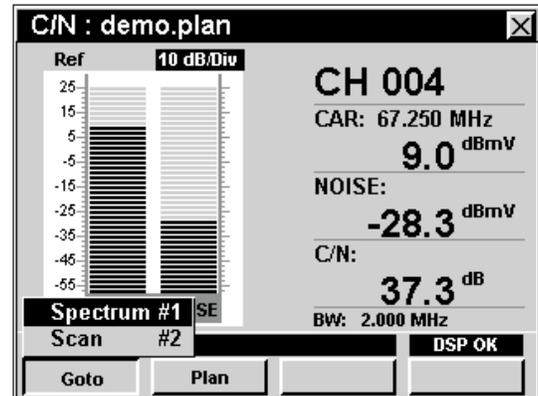
Goto Spectrum

From **C/N** Mode you can jump to **Spectrum** Mode with the spectrum analyzer settings automatically set to display the current channel.

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 **Section II: Installer Functions**, Chapter 4: Spectrum Mode. Pressing the (Bk) button will return you to **C/N** Mode at the originally selected channel.
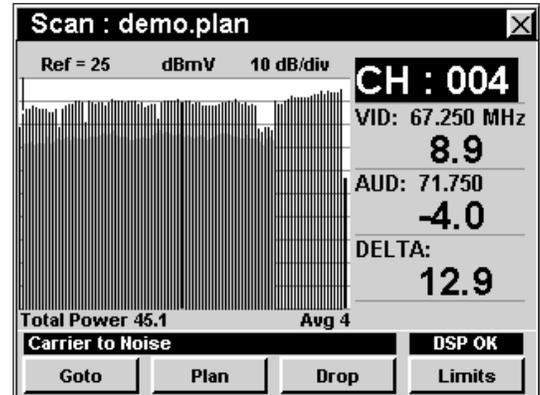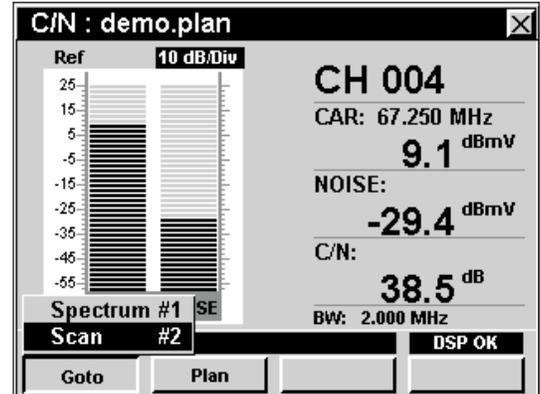
Goto Scan

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 **C/N** Mode tuned to the new channel.
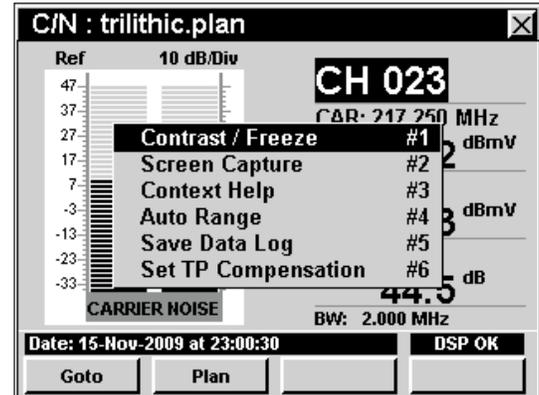
Function Menu Options

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

The following **Function** Menu options can be accessed
while in **C/N** Mode:

- Contrast / Freeze

- Screen Capture

- Context Help

- Auto Range

- Save Data Log

- Set Test Point Compensation

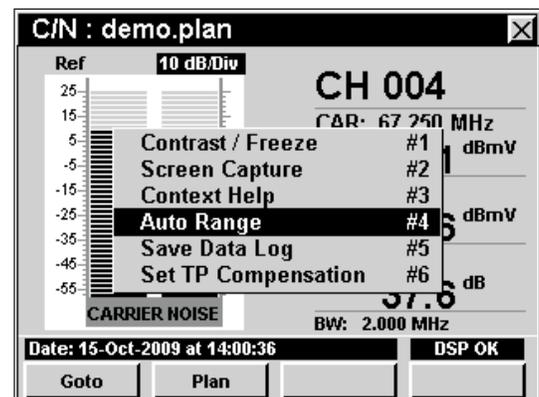## Basic Function Menu Options

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
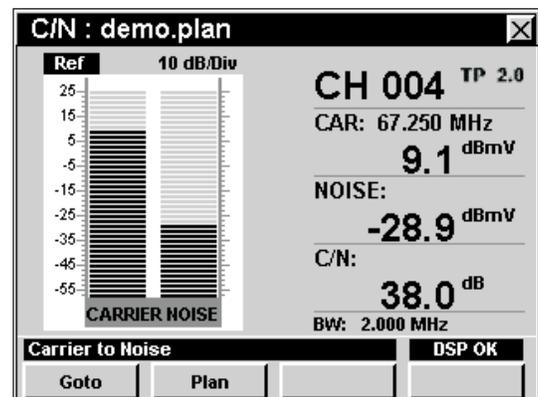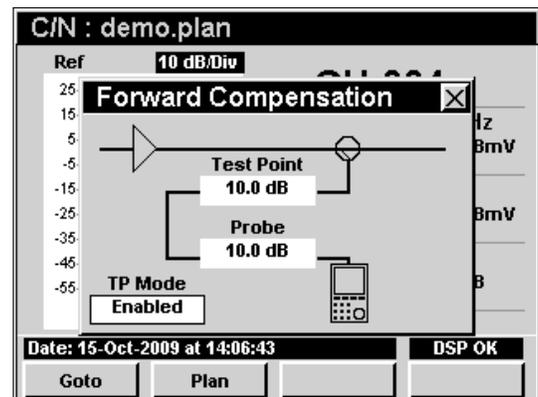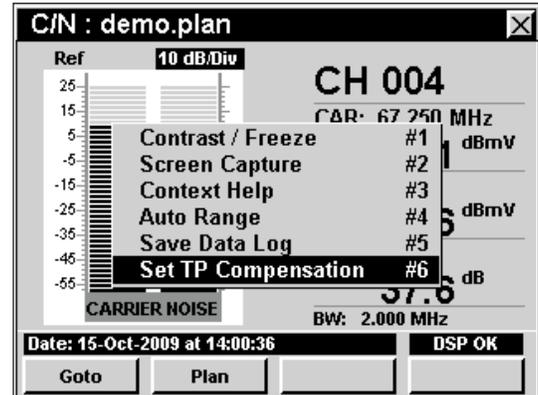Range** by pressing (4).

Set Test Point Compensation Option

This option is used to enter an offset that will be added to all measurements made in **C/N** 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 **C/N** Mode will display the combined (**Test Point** and **Probe**) test point compensation value next to the channel number.
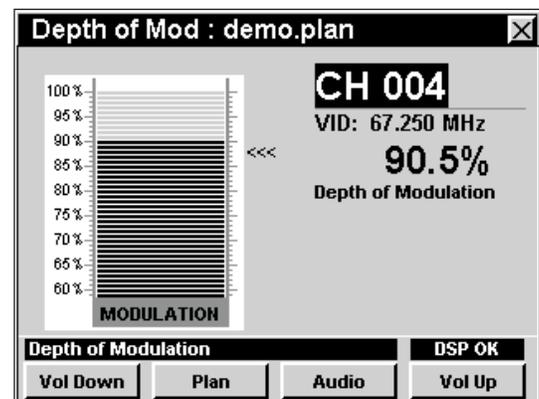
Introduction

In **Mod** Mode the instrument displays the percentage of video modulation for the visual carrier of a single, user-selected channel. In **Mod** Mode the instrument displays the selected channel number, frequency, and the video modulation depth as a percentage, both numerically and as a bar graph. This mode can also be toggled to a mode that allows the user to hear the demodulated aural content through the instrument's built-in speaker. The basic 860 DSP comes equipped with the **Mod** Mode as a standard feature. In order to use the **Mod** Mode on your 860 DSPi, the instrument must be equipped with Power Pack Option (PP-1).

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

- Required Setup

- Adjusting Channels

- Setting Channel Plan

- Using the Audio Function

- Function Menu Options

Note: Mod Mode is an optional function of the 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 **Mod** 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.
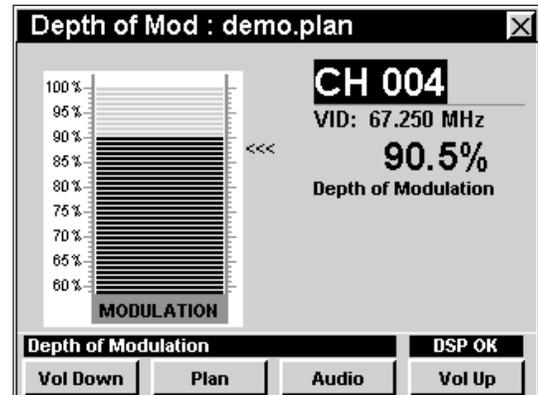
Required Setup

To use **Mod** 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.

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

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 using the alphanumeric keypad, and then press the (Ent) button.
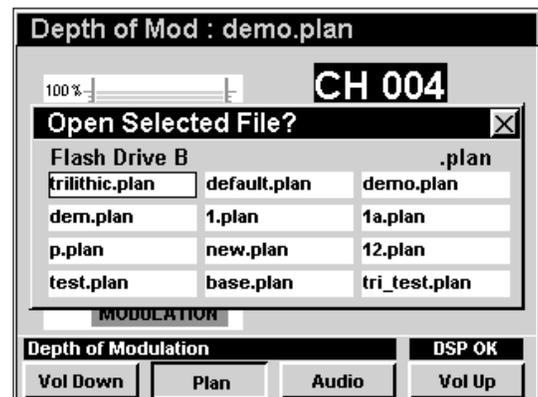
You may enter any channel number in your plan. If the channel is not designated as analog in your plan or the channel is scrambled, the message **Depth of Modulation Not Available** will be displayed in the status bar at the bottom of the screen and the instrument will beep.

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.
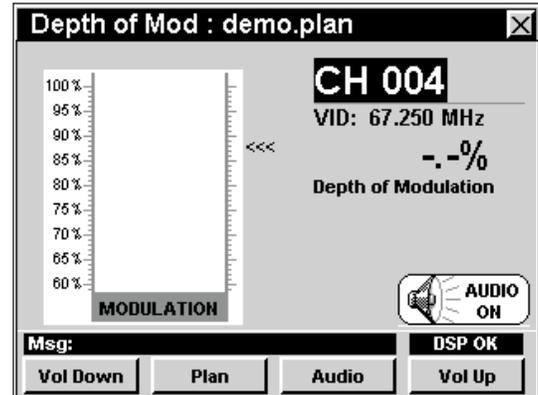
Using the Audio Function

The ⎣ Audio ⎦ softkey allows you hear the audio (AM or FM) on analog video channels. You can toggle the audio feature on and off by pressing the ⎣ Audio ⎦ softkey. When the audio feature is on, the **AUDIO ON** icon will be displayed in the lower right portion of the screen and the % depth of modulation measurement will be paused.

To adjust the volume use the ⎣ Vol Up ⎦ or ⎣ Vol Down ⎦ softkey. The current volume will be displayed in the status bar at the bottom of the screen.
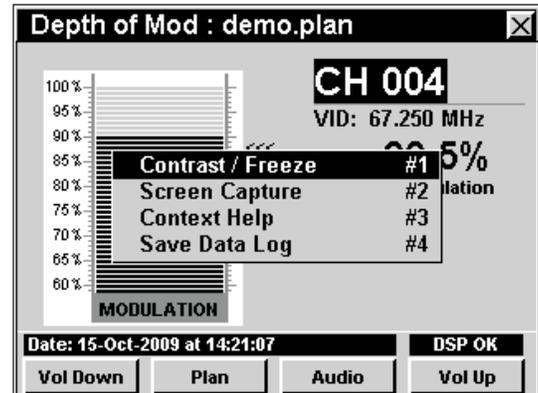

Function Menu Options

The **Function** Menu can be accessed by pressing the ⒻⓃ button while in the **Mod** Mode.

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

- Contrast / Freeze
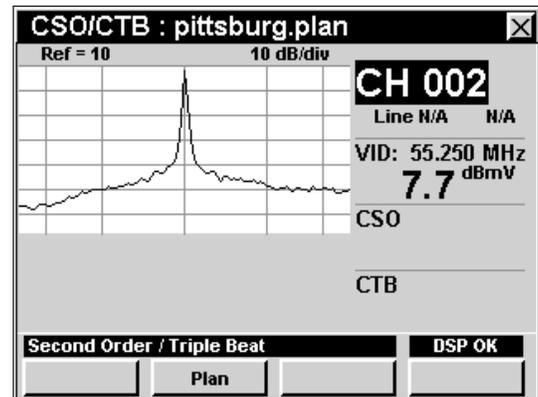
- Screen Capture

- Context Help

- Save Data Log

Introduction

In **CSO/CTB** Mode the instrument measures the amplitude of two common intermodulation products, composite second order and composite triple beat present within a selected analog video channel. This mode requires two measurements; the in-channel energy while the video carrier is present and the residual energy when the carrier is switched off. To ensure full measurement range, the CSO/CTB measurement should be performed with a carrier level greater than 0 dBmV. The basic 860 DSP comes equipped with the **CSO/CTB** Mode as a standard feature. In order to use the **CSO/CTB** Mode on your 860 DSPi, the instrument must be equipped with Power Pack Option (PP-1).

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

- Required Setup

- Adjusting Channels

- Setting Channel Plan

- Measuring CSO/CTB

- Function Menu Options

Note: CSO/CTB Mode is an optional function of the 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 **CSO/CTB** 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 **CSO/CTB** 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 **CSO/CTB** Mode, you will need to set up the **CSO/CTB** Mode. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *CSO/CTB 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*.
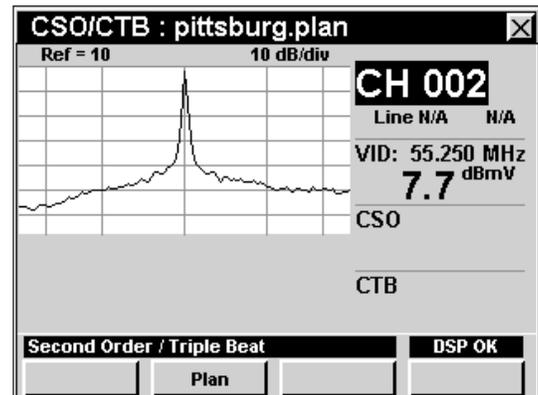
> **Note:** In order to properly measure CSO/CTB you will need signal levels of at least 0 dBmV. For best results you may need to add a channel filter in line with the instrument. When using a filter make certain the filter has sufficient bandwidth to include the carrier and CSO/CTB.

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 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 analog in your plan or the channel is scrambled, the message **CSO/CTB Not Available** will be displayed in the status bar at the bottom of the screen and the instrument will beep.
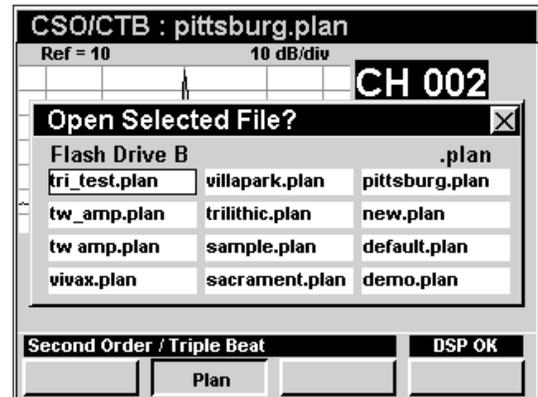
TRILITHIC

![CSO/CTB icon]

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 the channels defined as analog 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.

CSO/CTB : pittsburg.plan
Ref = 10   10 dB/div   **CH 002**
Open Selected File? ☒
Flash Drive B .plan
tri_test.plan	villapark.plan	pittsburg.plan
tw_amp.plan	trilithic.plan	new.plan
tw amp.plan	sample.plan	default.plan
vivax.plan	sacrament.plan	demo.plan
Second Order / Triple Beat   **DSP OK**
Plan

Measuring CSO/CTB

The instrument can perform CSO/CTB calculations using one of the following two methods:

- **Method #1** - This method involves taking a reference trace, removing the channel, and looking at the spectrum beneath the channel.

- **Method #2** - This method involves using a line blanker and looking at the spectrum beneath the channel during the blanked line.

> **Note:** In general, worst-case CSO products appear at the lowest and highest frequency channels while worst-case CTB products tend to appear at the mid-frequency channels.
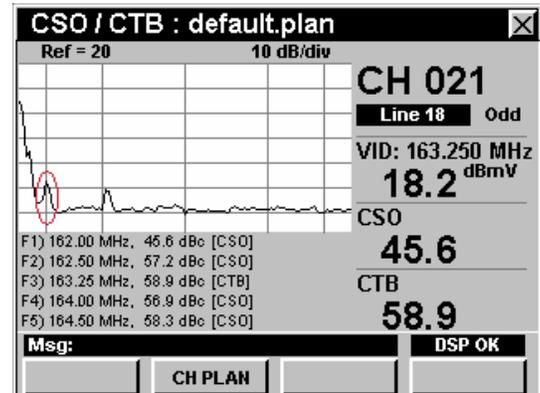
Method #1

Once you have selected the desired channel, the instrument will display the peak video carrier level.

To measure CSO/CTB you must remove the selected channel for a short period of time in order to see what signal lies underneath the chosen frequencies. This should be done under strict conditions as to not affect the cable subscribers.

When the carrier has been removed, it will measure and display CSO and CTB. The CSO/CTB values for the five selected frequencies from setup are displayed below the channel.

A detailed list of CSO/CTB components is displayed in tabular form at the lower left of the screen. The instrument will hold the CSO/CTB readings after you turn the carrier back on.

> **Note:** If your meter is equipped with the Advanced CSO/CTB option, you must set the Line number to zero (**Line N/A** will be displayed) in order to use **Method #1**.

> **Note:** For additional information about this measurement, refer to the *860 DSPi CSO/CTB* application note, available on Trilithic's website at *www.trilithic.com,* in the Broadband Instruments, Downloads, Application Notes section.
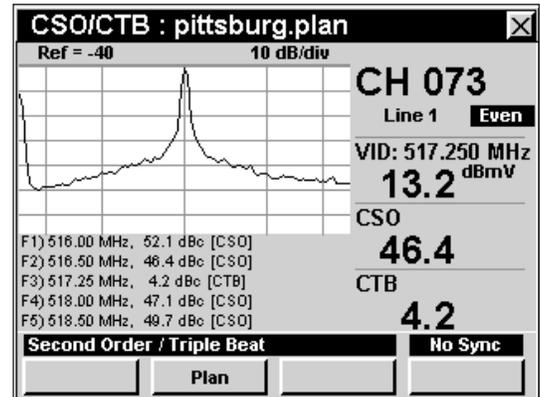
Method #2

Once you have selected the desired channel, the instrument will display the peak video carrier level.

To measure CSO/CTB this method requires the use of a line blanker. Once you have installed your line blanker and chosen a line number to blank perform the following steps;

- Use the ◄ ► buttons to highlight **Line**, and then use the ▲ ▼ buttons to choose your line number or use the alphanumeric keypad to enter the desired line number and then press the (Ent) button.

- Use the ◄ ► buttons to highlight **Even/Odd**, and then use the ▲ ▼ buttons to select either **Even** or **Odd**.

- The meter will automatically look at the selected channel during the blanked line for CSO and CTB carriers.

The CSO/CTB values for the five selected frequencies from setup are displayed below the channel.

A detailed list of CSO/CTB components is displayed in tabular form at the lower left of the screen. The instrument will hold the CSO/CTB readings after you turn the carrier back on.
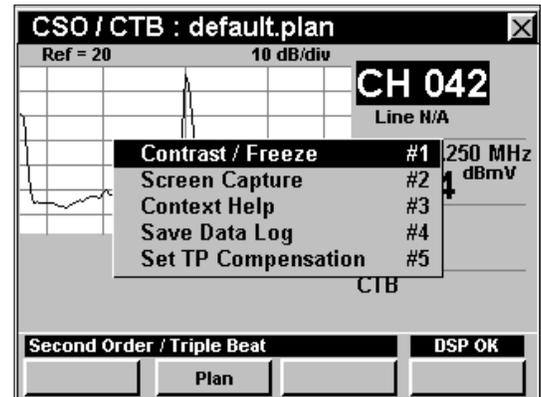
Function Menu Options

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

The following **Function** Menu options can be accessed while in **CSO/CTB** Mode:

- Contrast / Freeze

- Screen Capture

- Context Help

- 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
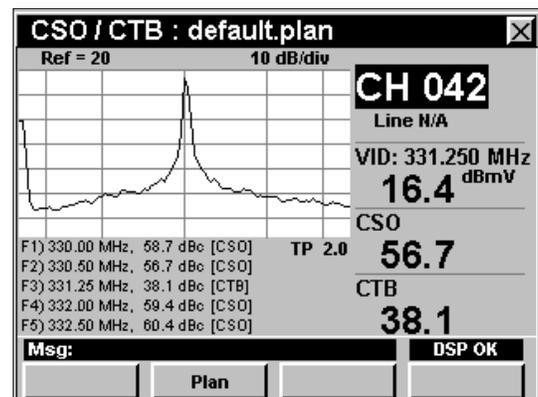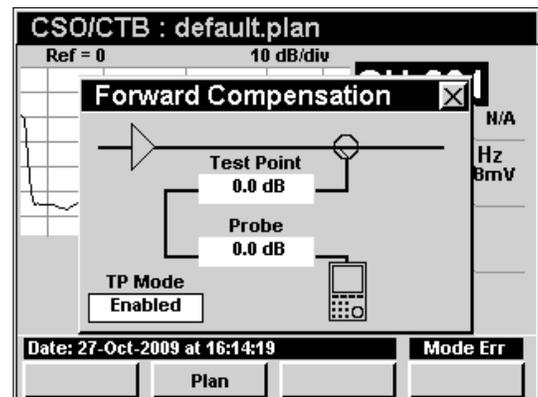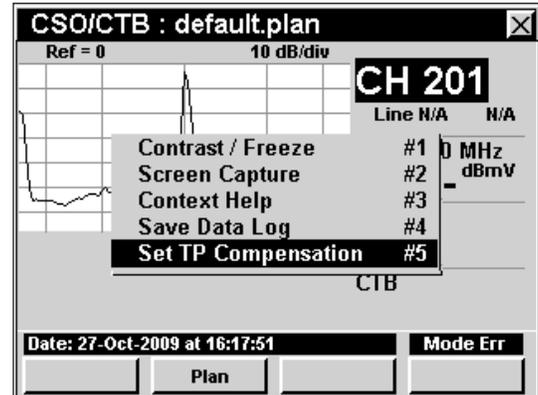
- Screen Capture

- Context Help

- Save Data Log

Set Test Point Compensation Option

This option is used to enter an offset that will be added to all measurements made in **CSO/CTB** 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 (5).

- 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 **CSO/CTB** Mode will display the combined (**Test Point** and **Probe**) test point compensation value below the graph.
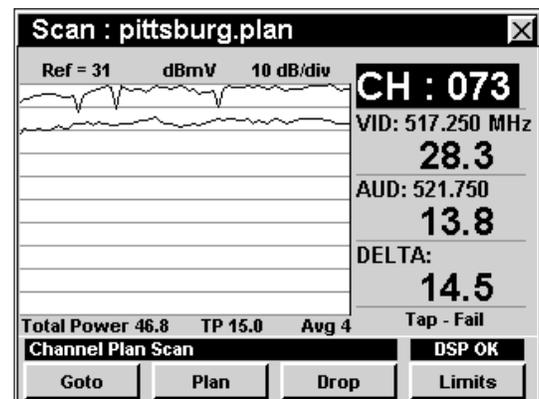
Introduction

In **Scan** Mode the instrument displays the amplitudes of all visual and aural carriers in the selected channel plan as two simultaneous line graphs or as a bar graph. The amplitudes of the visual and aural carriers, and their difference, are displayed for the channel currently selected by the variable marker. The basic 860 DSP comes equipped with the **Scan** Mode as a standard feature. In order to use the **Scan** Mode on your 860 DSPi, the instrument must be equipped with Power Pack Option (PP-1).

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

- Required Setup

- Setting Reference Level

- Setting Vertical Resolution

- Adjusting Channels

- Setting Channel Plan

- Setting Scan Limit Set and Viewing Limits

- Using the Goto Function

- Changing Display Mode

- Function Menu Options

Note: Scan Mode is an optional function of the 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 **Scan** 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 **Scan** 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 **Scan** Mode, you will need to set up the **Scan** Mode. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Scan Mode Settings* before proceeding through this chapter.
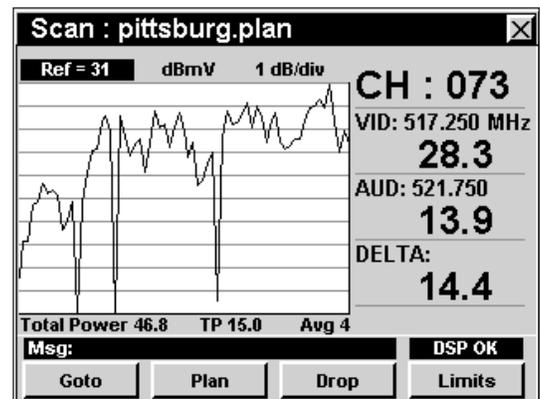
For SECAM L channels, you will need to set the **Optimal Modulation**. See **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Measurement Settings*.

Setting Reference Level

On the 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.
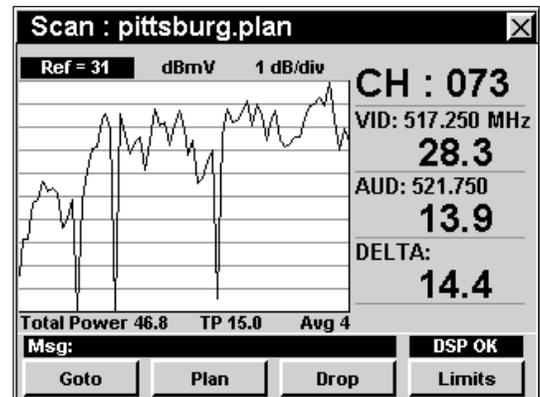
Setting Vertical Resolution

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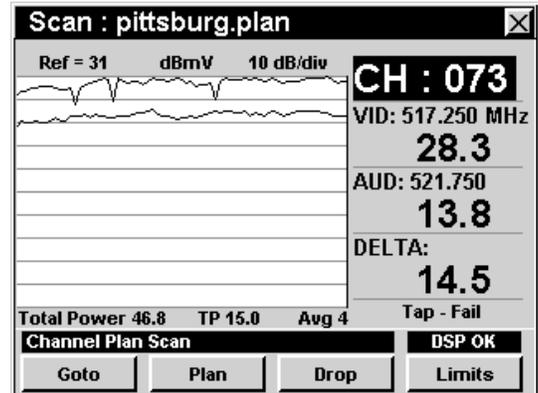
To quickly bring off scale signals on screen, press the **Fn** button, and then select **Auto Range** by pressing ④.
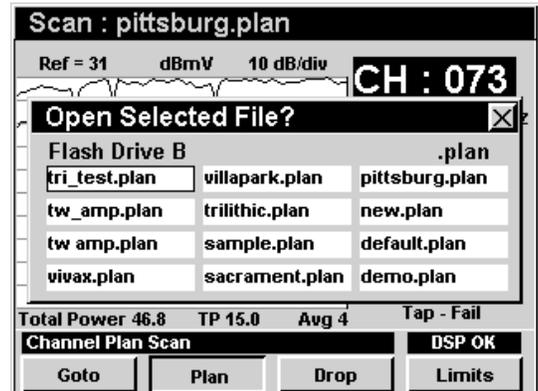
Adjusting Channels

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 using the alphanumeric keypad, and then press the (Ent) button.

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.
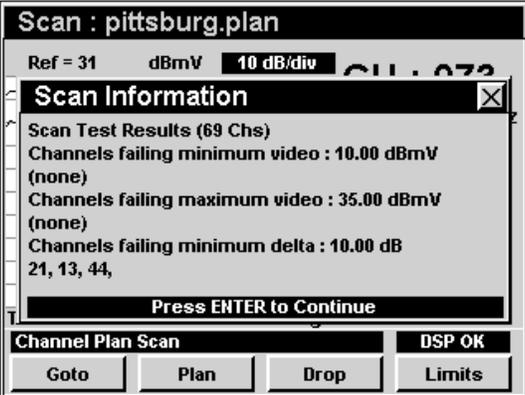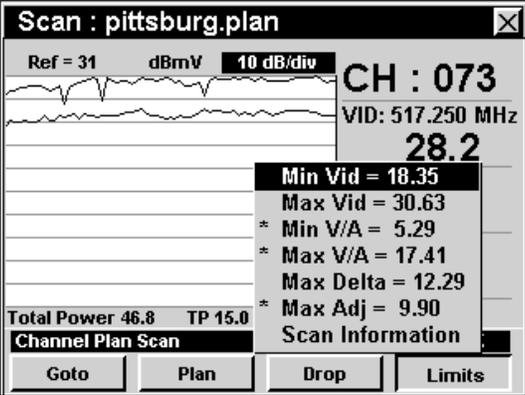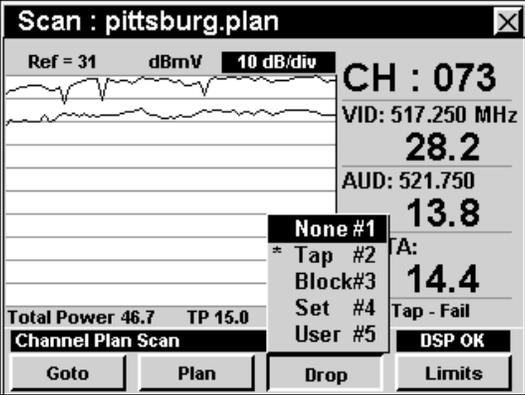
Setting Scan Limit Set and Viewing Limits

The instrument can analyze a channel scan according to one of four scan limit sets named **Tap**, **Block**, **Set**, and **User**. By selecting the appropriate scan limit set, the instrument will instantly inform you of out of tolerance readings.

To select the scan limit set, press the `Drop` softkey, use the ▲ ▼ buttons to select the scan limit set from the list of scan limit set options, and then press the (Ent) button. You may also select the desired scan limit set option by pressing the corresponding alphanumeric button.

To view the details of a current scan limit set, press the `Limits` softkey. To view details of a specific limit, use the ▲ ▼ buttons to highlight the desired limit, and then press the (Ent) button. The **Scan Information** window will appear. Pressing the (Ent) or (Bk) button will return you to **Scan** Mode. An asterisk (*) next to the limit indicates that the limit has failed.

To see a list of channels not meeting limits, press the `Limits` softkey, use the ▲ ▼ buttons to highlight **Scan Information**, and press the (Ent) button. To page through the scan results, press the (Ent) button. The **Scan Information** window will appear. Pressing the (Ent) or (Bk) button will return you to **Scan** Mode.

Note: To set the test limits of a scan limit set, see **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Scan Mode Settings*.
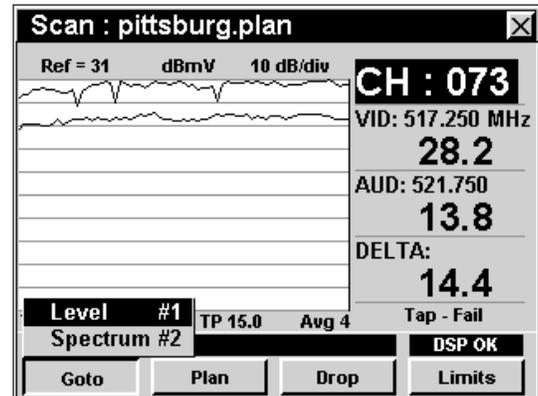
Scan

Using the Goto Function

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

Goto Level

From **Scan** Mode you can jump to **Level** Mode with the channel automatically set to display the current channel.

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

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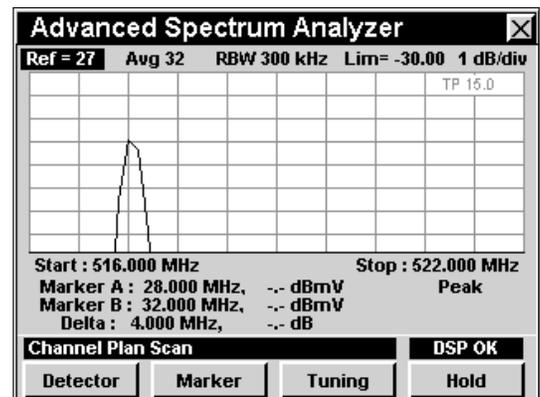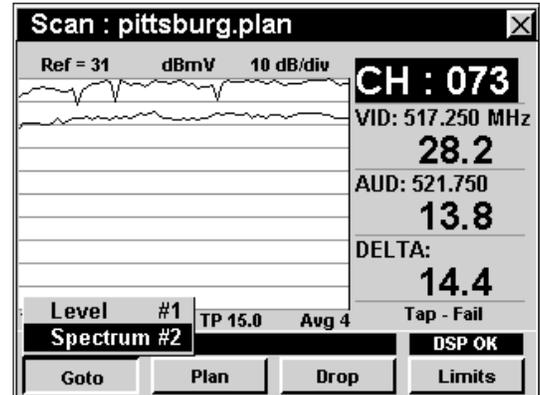
Goto Spectrum

From **Scan** 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 ②.

Once in **Spectrum** Mode, you may change any of the analyzer settings as described in **Section II: Installer Functions**, Chapter 4: Spectrum Mode.

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

TRILITHIC

Scan

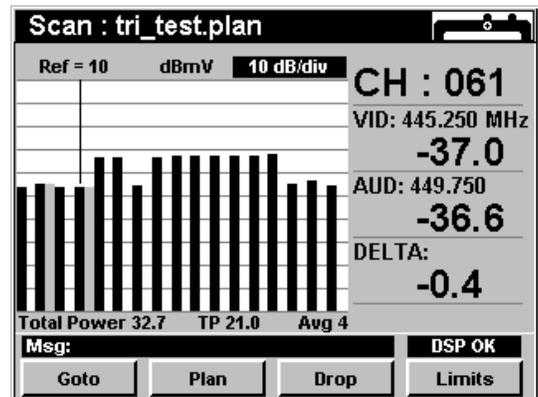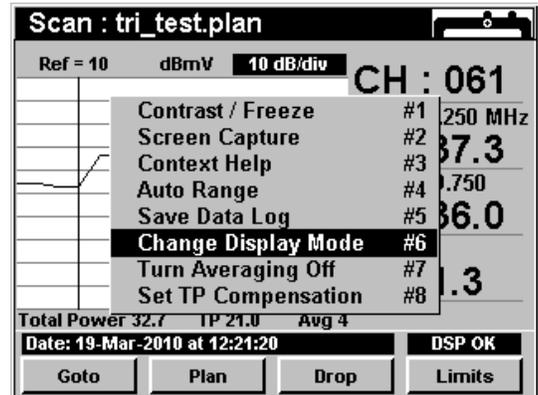# Changing Display Mode

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

To use this option, 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 bar graph display the instrument lists the levels for all **Scan** channels.

TRILITHIC

Function Menu Options

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

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

- Contrast / Freeze
- Screen Capture
- Context Help
- Auto Range
- Save Data Log
- Change Display Mode
- Turn Averaging On/Off
- 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

Auto Range Option

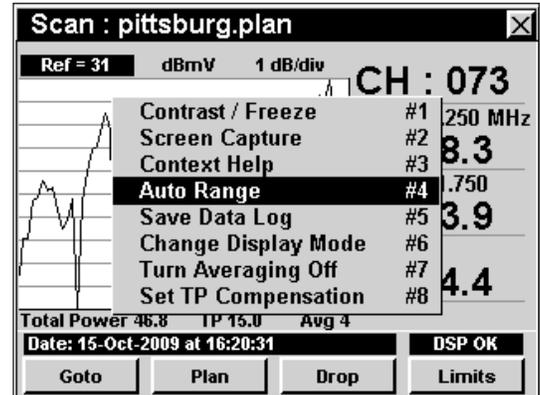This option is used to quickly bring off scale signals on screen, by automatically adjusting the reference level and vertical resolution.

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).

Turn Averaging On/Off

This option is used to enable and disable the sweep averaging function. When active, this function averages the values of several consecutive sweeps to reduce display jitter.

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

To adjust the number of scans in an average, see **Section IV: Setup Functions**, Chapter 2: INSTRUMENT SETUP Mode, *Forward Sweep Settings*.

Set Test Point Compensation Option

This option is used to enter an offset that will be added to all measurements made in **Scan** 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 (8).
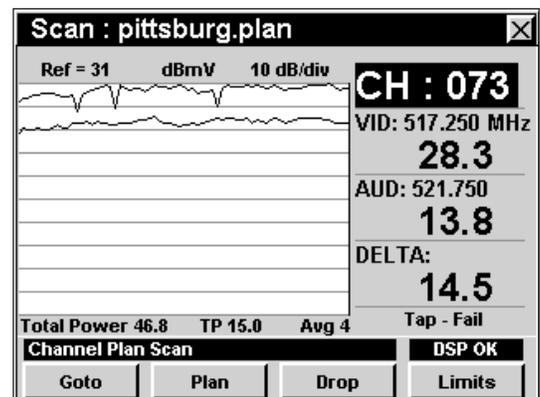
- The **Function** Menu will close and the **Forward Compensation** window will open.

    - 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 **Scan** Mode will display the combined (**Test Point** and **Probe**) test point compensation value below the graph.

Introduction

In **FM Dev** Mode the instrument displays the current and maximum FM deviation on the audio carrier of a single user-selected channel. In **FM Dev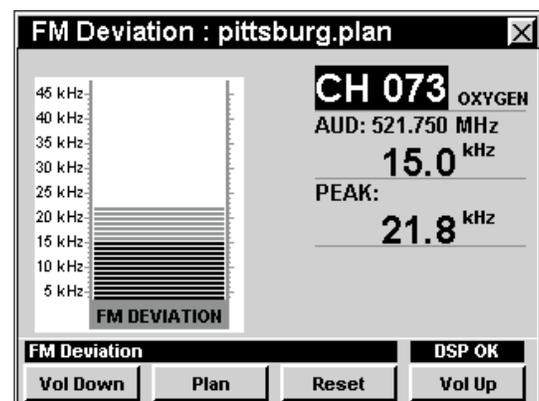** Mode the instrument displays the selected channel number, the current FM deviation, and the maximum detected FM deviation, both numerically and as a bar graph. The basic 860 DSP comes equipped with the **FM Dev** Mode as a standard feature. In order to use the **FM Dev** Mode on your 860 DSPi, the instrument must be equipped with Power Pack Option (PP-1).

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

- Required Setup

- Adjusting Channels

- Setting Channel Plan

- Using the Audio Function

- Function Menu Options

Note: FM Dev Mode is an optional function of the 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 **FM Dev** 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.
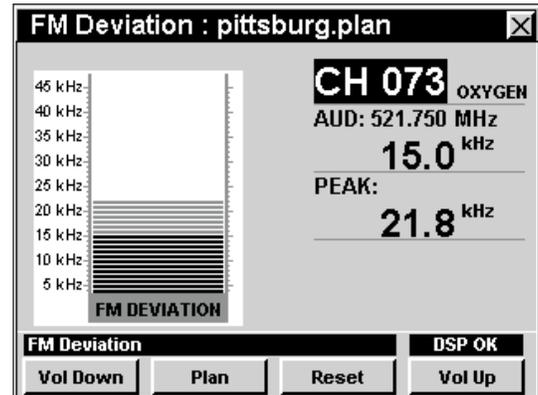
Required Setup

To use **FM Dev** 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 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 analog in your plan or the channel is scrambled, the message **FM Deviation Not Available** will be displayed in the status bar at the bottom of the screen and the instrument will beep.

> **Note:** Press the [Reset] softkey to reset the displayed **peak/max hold**.

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 Volume Level

To adjust the volume use the [Vol Up] or [Vol Down] softkey. The current volume will be displayed in the status bar at the bottom of the screen.

Function Menu Options

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

The following **Function** Menu options can be accessed while in **FM Dev** 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
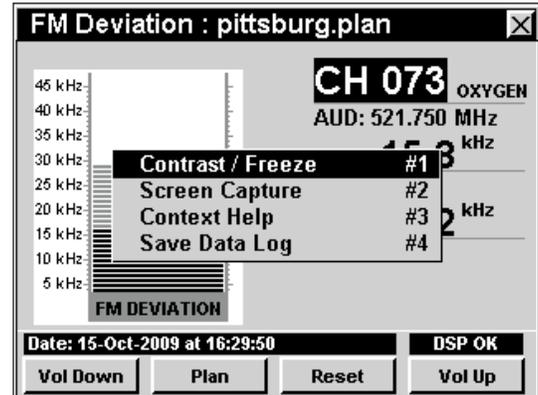
The **Sweep** Mode is used to test and set the tilt and gain of distribution amplifiers and detect faults in the system that affect these parameters.

The instrument uses the carriers already being carried by the HFC distribution system or a dedicated sweep transmitter in the head end. The instrument compensates for differences in the amplitudes of the carriers by comparing two sweeps, a reference and a test. You perform the reference sweep at some starting point in the coaxial plant, usually the node for the service area to be swept, and save the scan in the instrument.

The sweep process is based on the unity gain principle that applies to the coaxial design of the HFC network. This means that each amplifier output test point will ideally have the same output level characteristics. The sweep uses comparison to a stored reference (typically the node or first active component of the network). If the successive amplifiers are operating according to the designed unity gain principle, the response will be very close to that of the stored reference. When ther is damage, loose connections, or adjustment is required, the display response will deviate from the ideal "flat" response.

The 860 DSP and 860 DSPi come equipped with two different versions of the **Sweep** Mode as follows:

- **Carrier-Referenced Sweep** Mode - The basic 860 DSP comes equipped with this mode as the standard **Sweep** Mode. This mode is use to test and set the tilt and gain of distribution amplifiers and detect faults in the system that affect these parameters. The 860 DSPi can be upgraded to this mode by purchasing the Power Pack Option (PP-1).

- **Forward SpeedSweep** Mode - The 860 DSP and 860 DSPi can be upgraded to this mode by purchasing the Forward SpeedSweep Option (FS-1). This mode includes all of the **Carrier-Referenced Sweep** Mode features plus it provides compatibility with the 8300 FST, however the **Forward SpeedSweep** Mode does not require the 8300 FST. This will allow the **Forward SpeedSweep** Mode to test the tilt and gain including unused frequency bands that are not in the users channel lineup.
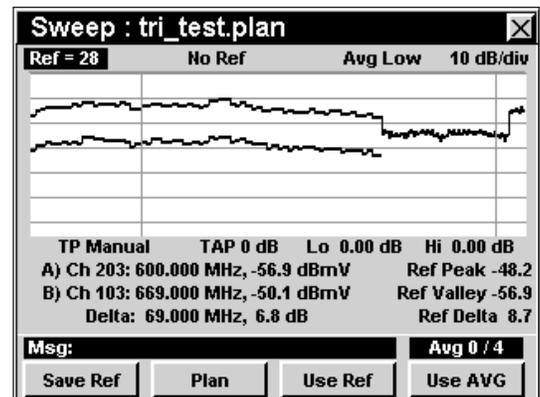
> **Note:** To view the installed functions on your instrument, see **Section IV: Setup Functions**, Chapter 5: Instrument Information Mode. If you do not have **Sweepless Sweep** Mode or **Forward SpeedSweep** Mode installed in your instrument, you may call Trilithic at (800) 344-2412 to order these options and start using them today.

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

- Required Setup

- Setting Reference Level

- Setting Averaging Type

- Setting Vertical Resolution

- Setting Channel Plan

- Setting Test Point Profile

- Setting TAP Offset Value

- Marker Settings

- Capturing a Reference Scan

- Sweeping an Amplifier

- Changing Display Mode

- Function Menu Options

```
Sweep : tri_test.plan                    ☒
Ref = 28        No Ref         Avg Low    10 dB/div

TP Manual       TAP 0 dB    Lo  0.00 dB   Hi 0.00 dB
A) Ch 203: 600.000 MHz, -56.9 dBmV       Ref Peak -48.2
B) Ch 103: 669.000 MHz, -50.1 dBmV       Ref Valley -56.9
    Delta: 69.000 MHz, 6.8 dB            Ref Delta 8.7
Msg:                                     Avg 0 / 4
Save Ref      Plan       Use Ref       Use AVG
```

Required Setup

To use **Sweep** 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 **Sweep** Mode, you will need to set up the **Sweep** Mode. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Fwd Sweep Settings* before proceeding through this chapter.
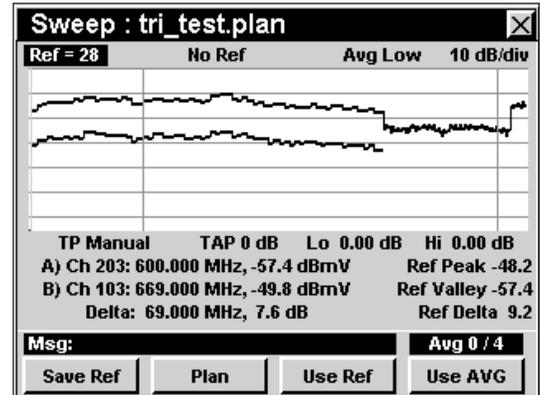
For SECAM L channels, you will need to set the **Optimal Modulation**. See **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Measurement Settings*.
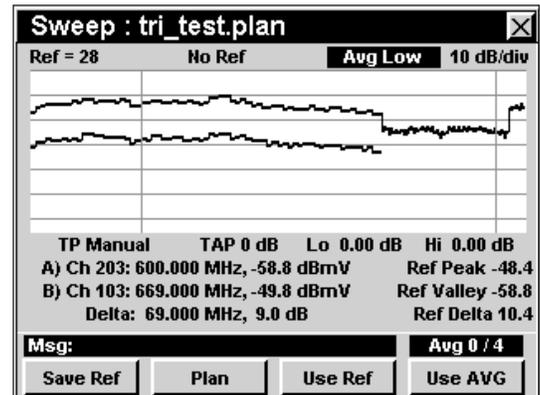
Sweep

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.

Sweep : tri_test.plan

| Ref = 28 | No Ref | Avg Low | 10 dB/div |

TP Manual   TAP 0 dB   Lo 0.00 dB   Hi 0.00 dB
A) Ch 203: 600.000 MHz, -57.4 dBmV   Ref Peak -48.2
B) Ch 103: 669.000 MHz, -49.8 dBmV   Ref Valley -57.4
        Delta: 69.000 MHz, 7.6 dB   Ref Delta 9.2

Msg: Avg 0 / 4

Save Ref   Plan   Use Ref   Use AVG

Setting Averaging Type

To set the averaging type, use the ◄ ► buttons to highlight **Avg** and then use the ▲ ▼ buttons to set the averaging type to Avg Off, Avg Low, Avg Med, and Avg High as desired.
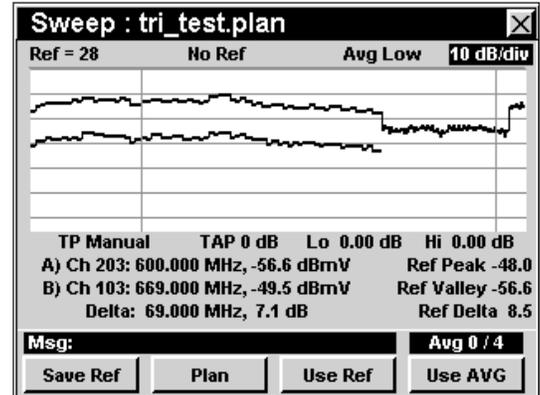
Sweep : tri_test.plan

| Ref = 28 | No Ref | Avg Low | 10 dB/div |

TP Manual   TAP 0 dB   Lo 0.00 dB   Hi 0.00 dB
A) Ch 203: 600.000 MHz, -58.8 dBmV   Ref Peak -48.4
B) Ch 103: 669.000 MHz, -49.8 dBmV   Ref Valley -58.8
        Delta: 69.000 MHz, 9.0 dB   Ref Delta 10.4

Msg: Avg 0 / 4

Save Ref   Plan   Use Ref   Use AVG

Note: Higher averaging is recommended when setting a reference to ensure optimal performance when sweeping.

Sweep

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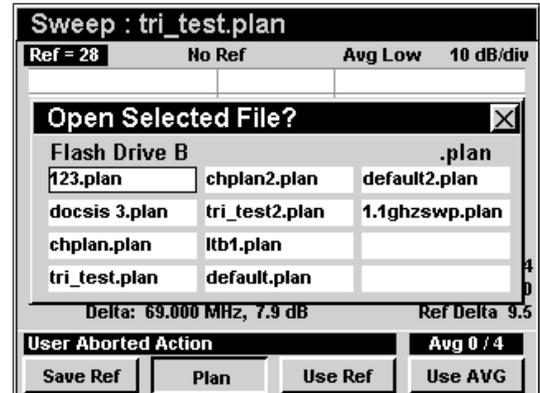
Selecting a low value will magnify the differences in the amplitudes of the displayed signals, but will limit the range of amplitudes that will fit on the graph.

Sweep : tri_test.plan ✕
Ref = 28   No Ref   Avg Low   10 dB/div

TP Manual   TAP 0 dB   Lo 0.00 dB   Hi 0.00 dB
A) Ch 203: 600.000 MHz, -56.6 dBmV   Ref Peak -48.0
B) Ch 103: 669.000 MHz, -49.5 dBmV   Ref Valley -56.6
Delta: 69.000 MHz, 7.1 dB   Ref Delta 8.5
Msg: Avg 0 / 4
Save Ref   Plan   Use Ref   Use AVG

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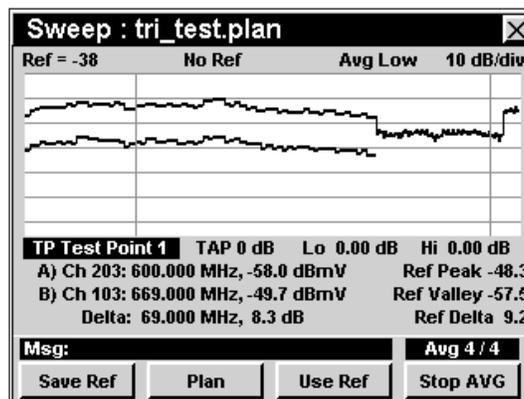
You must have a system channel plan that is up to date in order to view the channels in your system.

Sweep : tri_test.plan
Ref = 28   No Ref   Avg Low   10 dB/div

Open Selected File? ✕
Flash Drive B   .plan
123.plan   chplan2.plan   default2.plan
docsis 3.plan   tri_test2.plan   1.1ghzswp.plan
chplan.plan   ltb1.plan
tri_test.plan   default.plan
Delta: 69.000 MHz, 7.9 dB   Ref Delta 9.5
User Aborted Action   Avg 0 / 4
Save Ref   Plan   Use Ref   Use AVG
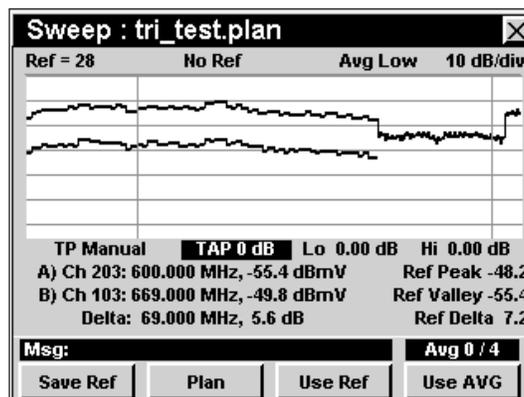
Setting Test Point Profile

The **TP** sets the name of the test point profile which is used for comparison of sweep signals. To change the test point profile, use the ◄ ► buttons to highlight **TP** and then use the ▲ ▼ buttons to set the test point profile to **Manual** or **Test Point 1** through **Test Point 9** as desired.

To use a Test Point Profile, the profile parameters will have to be entered as described in **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *FWD Sweep Settings*.
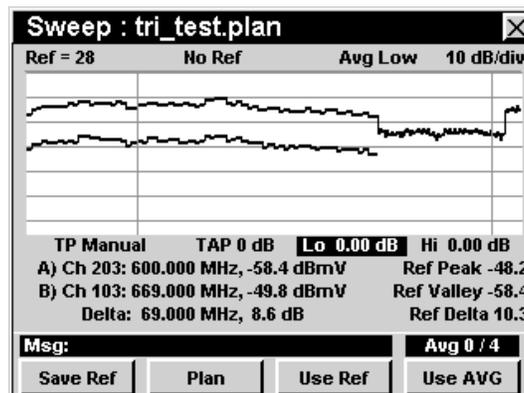

Setting TAP Offset Value

The **TAP** sets the offset value of the TAP. To change the offset, use the ◄ ► buttons to highlight **TAP** and then use the ▲ ▼ buttons to set the TAP value to the desired value.
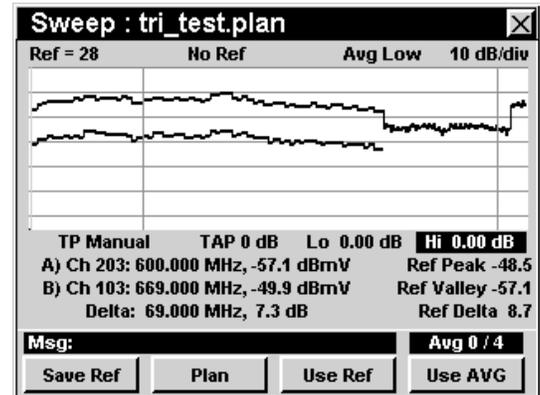

Setting Low Gain

The **Lo** sets the lower gain limit. To change the low gain, use the ◄ ► buttons to highlight **Lo** and then use the ▲ ▼ buttons to set the low gain to the desired value.
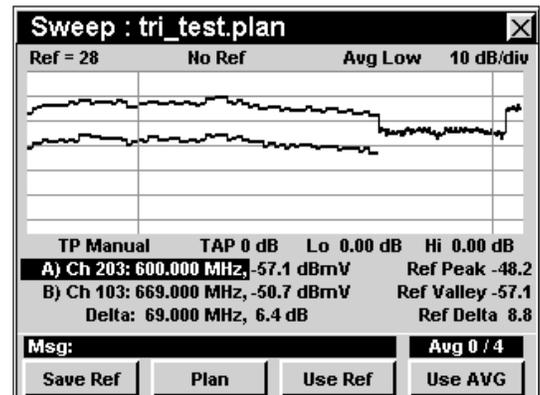
Setting High Gain

The **Hi** sets the upper gain limit. To change the high gain, use the ◀ ▶ buttons to highlight **Hi** and then use the ▲ ▼ buttons to set the high gain to the desired value.

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.

Capturing a Reference Scan

The reference scan will be used to remove measurement errors caused by variations in carrier amplitudes. In most cases, the reference scan will be taken at the node for the service area you will be sweeping. For convenience, the instrument can store up to 12 independent sweep references.

To capture a reference scan, connect the instrument to the node output test point, use the ◄ ► buttons to highlight **TP** and then use the ▲ ▼ buttons to set the test point profile.
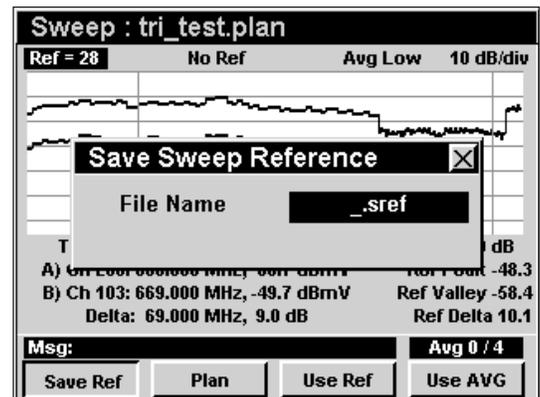
You should now see a scan of the carriers present at the test point, with a shaded line across the screen representing the desired carrier amplitudes.

> **Note:** If you do not see this display, adjust the reference level to bring the scan on-screen.

Use the markers to adjust the amplifier gain and tilt pads to bring the node to nominal performance.

To save the displayed scan as a reference scan, press the `Save Ref` softkey and use the alphanumeric keypad to enter the desired reference name, and press the (Ent) button. The current scan has now been saved with the selected reference scan name for use as a reference when sweeping amplifiers.
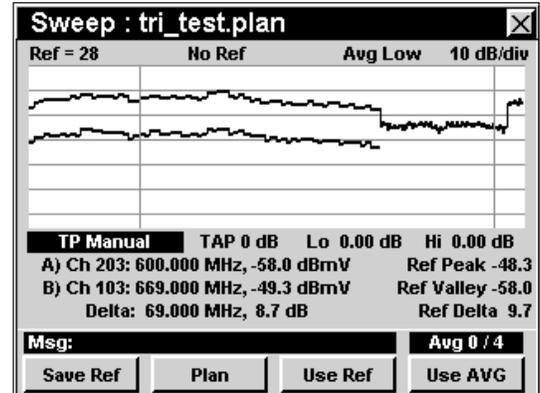
Sweeping an Amplifier

The process for sweeping an amplifier is very similar to that used to create a reference scan.

To sweep an amplifier, connect the instrument to the node output test point, use the ◄ ► buttons to highlight **TP Manual** and then use the ▲ ▼ buttons to set the **TP Test Point (1 thru 9)** profile for this type of amplifier installation.
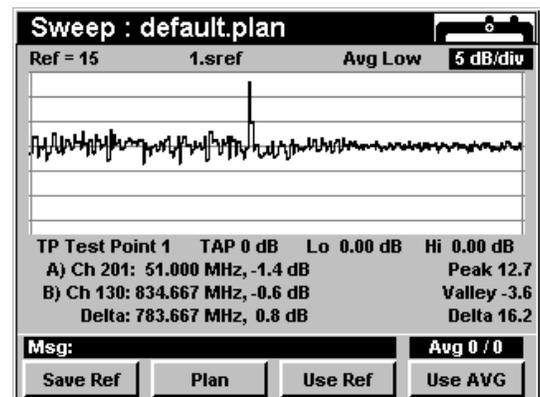
Note: If you do not see this display, adjust the reference level to bring the scan on-screen.

Press the Use Ref softkey, use the ▲ ▼ buttons to highlight the reference file for the node that serves this area, and press the **Ent** button.

The instrument now displays a line graph representing the gain and tilt performance of the amplifier. When the amplifier is properly aligned, the trace will coincide with the center (fourth from the bottom) horizontal line of the graph's grid.

While using a reference, the **Ref** and **TAP** settings are automatically adjusted to position the trace at the appropriate point in the graph, and are not manually adjustable.

To stop using the reference function, press the Use Ref softkey, use the ▲ ▼ buttons to highlight **No Ref**, and press the **Ent** button.
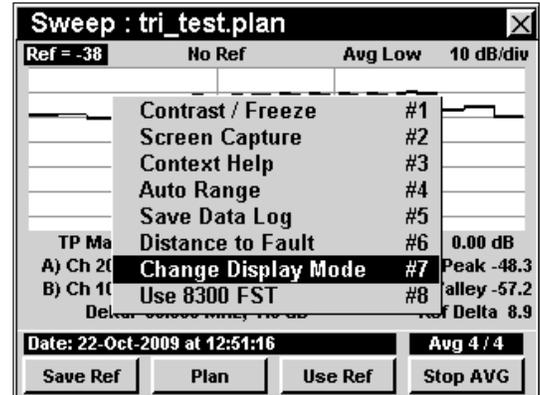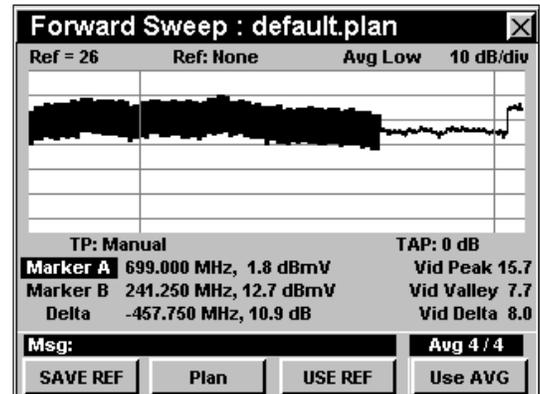
Changing Display Mode

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

To use this option, 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 (7).

```
Sweep : tri_test.plan                    ⊠
Ref = -38        No Ref        Avg Low   10 dB/div
        ┌──────────────────────────────┐
        │  Contrast / Freeze      #1    │
        │  Screen Capture         #2    │
        │  Context Help           #3    │
        │  Auto Range             #4    │
        │  Save Data Log          #5    │
   TP Ma│  Distance to Fault      #6    │ 0.00 dB
  A) Ch 2│ Change Display Mode    #7    │ Peak -48.3
  B) Ch 1│  Use 8300 FST          #8    │ alley -57.2
       De└──────────────────────────────┘ ef Delta 8.9
Date: 22-Oct-2009 at 12:51:16             Avg 4 / 4
  Save Ref      Plan       Use Ref      Stop AVG
```
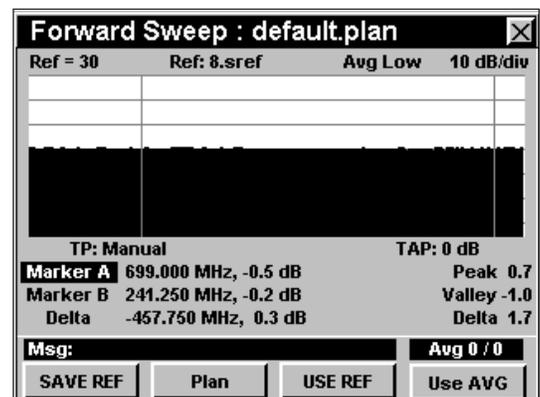
When Taking Reference

When taking a reference sweep, the instrument highlights the difference between the active video and audio signals.

```
Forward Sweep : default.plan              ⊠
Ref = 26       Ref: None       Avg Low   10 dB/div

     TP: Manual                     TAP: 0 dB
 Marker A  699.000 MHz,  1.8 dBmV        Vid Peak 15.7
 Marker B  241.250 MHz, 12.7 dBmV        Vid Valley 7.7
   Delta    -457.750 MHz, 10.9 dB        Vid Delta  8.0
 Msg:                                     Avg 4 / 4
  SAVE REF      Plan       USE REF      Use AVG
```

When Using Reference

When using a reference sweep, the instrument displays the sweep response with the area below the trace "filled-in."

```
Forward Sweep : default.plan              ⊠
Ref = 30       Ref: 8.sref     Avg Low   10 dB/div

     TP: Manual                     TAP: 0 dB
 Marker A  699.000 MHz, -0.5 dB          Peak  0.7
 Marker B  241.250 MHz, -0.2 dB          Valley -1.0
   Delta    -457.750 MHz,  0.3 dB        Delta  1.7
 Msg:                                     Avg 0 / 0
  SAVE REF      Plan       USE REF      Use AVG
```
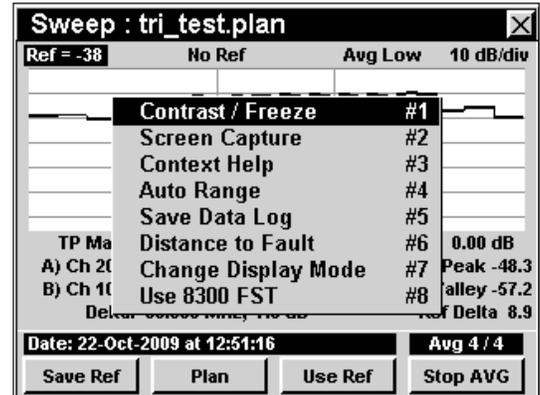
Sweep

Function Menu Options

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

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

- Contrast / Freeze

- Screen Capture

- Context Help

- Auto Range

- Save Data Log

- Distance to Fault

- Change Display Mode

- 8300 FST Channel On/Off

> **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

TRILITHIC

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).

Distance to Fault Option

This option is used to calculate the distance to a fault.

To use this option, press the (Fn) button, use the (▲) (▼) buttons to highlight **Distance to Fault**, and then press the (Ent) button. You may also select **Distance to Fault** by pressing (6). The distance to fault value will be displayed in the status bar.

To accurately use the Distance to Fault Option, you will need to setup the cable velocity factor in **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Forward Sweep Settings*.

Use 8300 FST

This option is used to enable and disable the use of 8300 FST channels.

To use this option, press the (Fn) button, use the (▲) (▼) buttons to highlight **Use 8300 FST**, and then press the (Ent) button. You may also select **Use 8300 FST** by pressing (8).

Sweep : tri_test.plan

| Ref = -38 | No Ref | Avg Low | 10 dB/div |

Contrast / Freeze	#1
Screen Capture	#2
Context Help	#3
Auto Range	#4
Save Data Log	#5
Distance to Fault	#6
Change Display Mode	#7
Use 8300 FST	#8

TP Ma
A) Ch 20
B) Ch 10
Del

0.00 dB
Peak -48.3
alley -57.2
Delta 8.9

Date: 22-Oct-2009 at 12:51:16   Avg 4 / 4

| Save Ref | Plan | Use Ref | Stop AVG |

TRILITHIC

Introduction

SSR Mode equips the instrument with the return maintenance functions of a Trilithic Guardian SSR reverse field unit including:

- Reverse path sweep graphing the response of 8 individually-settable reverse test carriers, as measured in the hub and transmitted to the 860 DSP or 860 DSPi.

- Reverse gain and tilt, calculated from the reverse test carriers used in the sweep display.

- Reverse spectrum view, showing a spectrum plot of the reverse band as scanned in the hub and transmitted to the 860 DSP or 860 DSPi.

SSR Mode also equips your instrument with some additional features not available in the Trilithic Guardian SSR field unit including:

- Simultaneous display of both the sweep trace and the reverse spectrum, as scanned in the hub.

- Variable markers that simplify the direct measurement of ingress and traffic amplitudes.

- A compare function that simultaneously displays the reverse spectrum as measured at the hub by the SST and the reverse spectrum measured locally by the 860 DSP or 860 DSPi. This function is especially useful for determining if the disrupting ingress detected by the SST is coming from the leg of the system to which the 860 DSP or 860 DSPi is currently connected.

In order to use the **SSR** Mode on your 860 DSP, the instrument must be equipped with Return Sweep Receiver Option (SR-1). In order to use the **SSR** Mode on your 860 DSPi, the instrument must be equipped with Power Pack Option (PP-1) and Return Sweep Receiver Option (SR-1).

> **Note: SSR** 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 **SSR** Mode installed in your instrument, you may call Trilithic at (800) 344-2412 to order this option and start using it today.
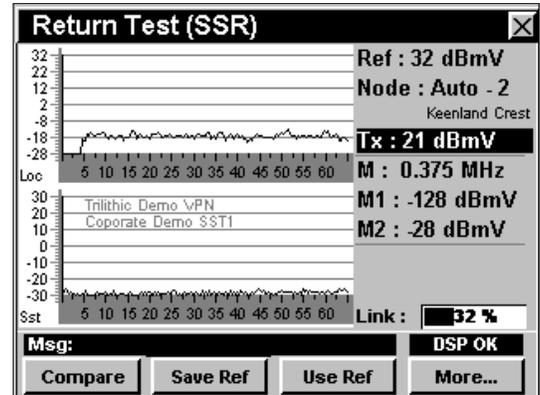
> **Note:** If your instrument does not include all of the features shown in this chapter, go on-line to *www.trilithic.com* to update your firmware for free. This will allow you to use all of the newest features that are included in this mode.

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

- Required Setup
- Using the SSR Mode
- Adjusting Node
- Adjusting Tx Level
- Using Variable Markers
- Using the Compare Function
- Saving a Reference Scan
- Using a Reference Scan
- Using the Goto Function
- Viewing the Tx Frequencies
- Adjusting Rx Link Level
- Function Menu Options

Required Setup

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

To use **SSR** Mode with Auto Link with a 9581 SST R4 in **Normal** Mode, you will need to set up the return link parameters. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Ret Link 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*.

> **Note:** To use **SSR** Mode, the 860 DSP or 860 DSPi must be in communication with a Trilithic Guardian 9580 SST (0.3 Mhz – 42 MHz) or 9581 SST (0.3 – 65 MHz) reverse analyzer located in the hub. SSTs are digitizers which analyze test signals from the 860 DSP or 860 DSPi and scan the reverse spectrum, measuring traffic and ingress. Data collected by the SST is transmitted on a downstream data carrier to instruments in the field for use in reverse path quality calculations.

Using the SSR Mode

The **SSR** Mode transmits a set of up to eight reverse test carriers to the SST in the hub for analysis. The frequencies for the carriers are set at the hub, but if you know that one of these carriers will interfere with return services in a particular part of your system you may selectively turn that carrier off.

Reverse sweeping is used to adjust the gain and tilt of reverse distribution amplifiers. When adjusted, test signals injected into any amplifier's reverse test point at a particular level will arrive in the hub at a desired level. To perform the adjustments you must know the injection level specified for the reverse amplifier modules and the insertion loss of the test point you will be connecting to.

> **Note:** For more information on SST/SSR setup and sweeping see the 9580 SST or 9581 SST operation manual.

> **Note:** The Guardian SST in the hub that will be receiving and evaluating the upstream test signals must also be set to the appropriate reference level before you begin your RSVP tests. If the SST is set to the wrong reference level inaccurate test results may occur.

Adjusting Node

If the **Node** setting is **Auto**, the 860 DSP or 860 DSPi will display the return spectrum, as scanned by the SST, for the node the 860 DSP or 860 DSPi is currently connected to.

If you move to another node's service area, the 860 DSP or 860 DSPi will automatically begin showing you the spectrum for the new node.

You can also manually select a different **Node :** for display, as long as the node is served by the same SST as the **Node** you are connected to.

To change the node, use the ◀ ▶ buttons to highlight **Node** and use the ▲ ▼ buttons to increment the value up and down.

Adjusting Tx Level

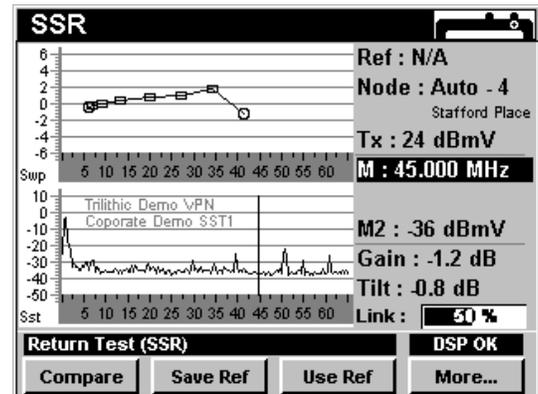The output transmit level (**Tx**) of the 860 DSP or 860 DSPi needs to be set to the sum of the specified input level of the return module, plus the test point coupler insertion loss, plus the losses of any other devices that may be connected between the test point and the 860 DSP or 860 DSPi.

Once you have calculated this value, you can adjust the output transmit level while in **SSR** Mode**.**

To change the output transmit level, use the ◄ ► buttons to highlight **Tx :** and use the ▲ ▼ buttons to increment the value up and down.

Using Variable Markers

The spectrum functions of the 860 DSP or 860 DSPi are equipped with variable markers, one for the graph transmitted by the SST, one for the spectrum scanned locally by the 860 DSP or 860 DSPi.

To set the frequency of the marker, use the ◄ ► buttons to highlight **M**, and then use the ▲ ▼ buttons to increase and decrease the marker frequency level.

- **M1** shows the amplitude of any signals at the marker frequency on the upper graph (local).

- **M2** shows the amplitude of any signals at the marker frequency on the lower graph (SST).

- The frequency setting of **M2** automatically matches that of **M1**.

Using the Compare Function

Both the spectrum scanned by the SST in the hub and the spectrum of the field test point are presented simultaneously. This makes it easy for you to compare spectrum signatures to determine whether an ingress outbreak detected in the hub is caused by an ingress source on this branch of your system.

The **SSR** Mode displays the reverse spectrum graphs as follows:

- The upper part of the display can represent the reverse sweep graph or a graph of the reverse spectrum that is scanned locally by the 860 DSP or 860 DSPi. The graph that is displayed in the upper part of the display can be changed by using the Compare function.

- The lower part of the display always represents the reverse spectrum graph as scanned by the SST in the hub. The reverse spectrum graph information is transmitted to the field units through the SST's forward data carrier. A 9580 SST has eight reverse inputs; a 9581 SST has 16. In the most common installation configuration, Guardian SSTs are connected to scan the spectrum of each connected node separately.

Sweep Graph

The Sweep graph is arranged to display +/- 6 dB variation around a horizontal ("zero") line representing the correct settings for a return amplifier.

This value is set automatically by the data transmission from the SST in the hub.

To sweep a return path, begin at the node and work down to the last active location in each branch, selecting gain and tilt pad values that bring the sweep as close as possible to the "zero" line.

To change to the Sweep graph, press the Compare softkey, use the ▲ ▼ buttons to select **Sweep**, and then press the **Ent** button. You may also select **Sweep** by pressing ①.

Local + Headend Graph

The **Local + Headend** graph is arranged to display a continuously updated view of the reverse spectrum taken locally.

This graph will allow you to compare the spectrum at your location against what is being seen at the headend.

To change to the **Local + Headend** graph, press the Compare softkey, use the ▲ ▼ buttons to select **Local + Headend**, and then press the Ent button. You may also select **Local + Headend** by pressing ②.
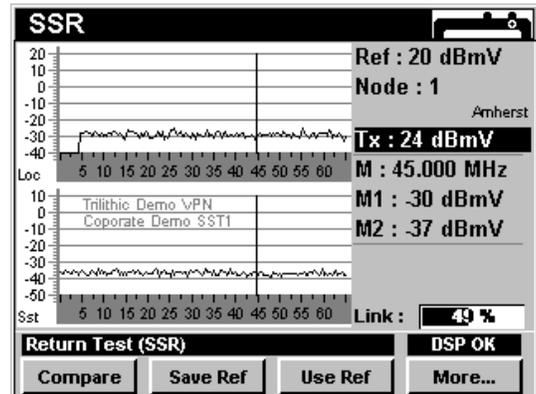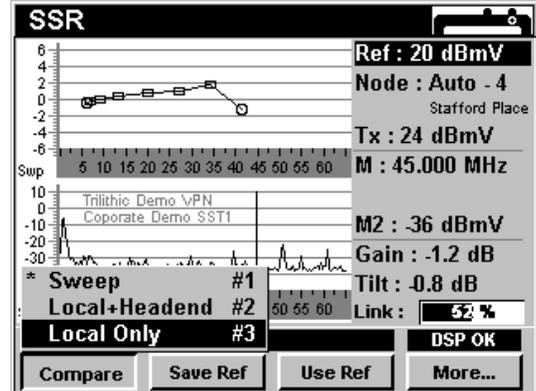
Local Only Graph

The **Local Only** graph is arranged to display a snapshot view of the reverse spectrum taken locally.

To change to the **Local Only** graph, press the `Compare` softkey, use the ▲ ▼ buttons to select **Local Only**, and then press the **Ent** button. You may also select **Local Only** by pressing ③.

In the **Local Only** Mode, only the top (local) spectrum will be updated.

Saving a Reference Scan

To save the displayed scan as a reference scan, press the `Save Ref` softkey. The Save Sweep Reference file will appear. Use the alphanumeric keypad to enter a file name then press the **Ent** button.

Using a Reference Scan

To use the displayed scan as a reference scan, press the Use Ref softkey, use the ▲ ▼ buttons to highlight the desired reference name, and press the Ent button. The selected reference scan can be used to reference when sweeping amplifiers.

Using the Goto Function

The Goto softkey gives you rapid access to several spectrum displays.

Goto Spectrum 42

From **SSR** Mode you can jump to **Spectrum 42** Mode which displays the reverse spectrum frequency range of 4 Mhz to 42 MHz.

To change to **Spectrum 42** Mode, press the Goto softkey, use the ▲ ▼ buttons to select **Spectrum 42**, and then press the Ent button. You may also select **Spectrum 42** by pressing ①.

Once in **Spectrum 42** Mode, you may change any of the analyzer settings as described in **Section II: Installer Functions**, Chapter 4: Spectrum Mode.

Pressing the Bk button will return you to **SSR** Mode.
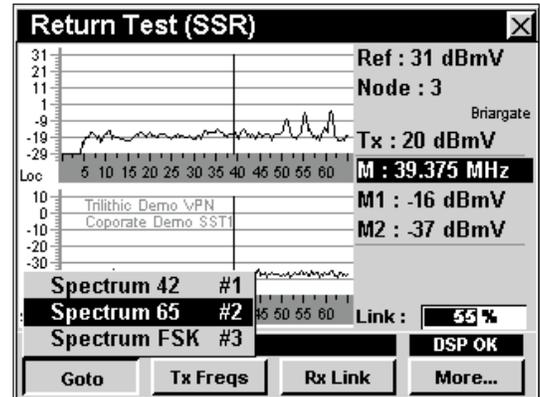
Goto Spectrum 65

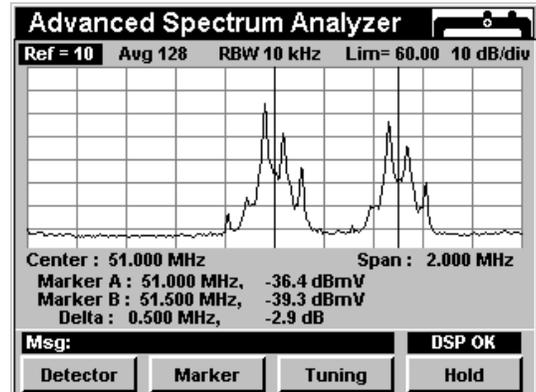From **SSR** Mode you can jump to **Spectrum 65** Mode which displays the reverse spectrum frequency range of 4 Mhz to 65 MHz.

To change to **Spectrum 65** Mode, press the `Goto` softkey, use the ▲ ▼ buttons to select **Spectrum 65**, and then press the (Ent) button. You may also select **Spectrum 65** by pressing ②.

Once in **Spectrum 65** Mode, you may change any of the analyzer settings as described in **Section II: Installer Functions**, Chapter 4: Spectrum Mode.

Pressing the (Bk) button will return you to **SSR** Mode.

Goto Spectrum FSK

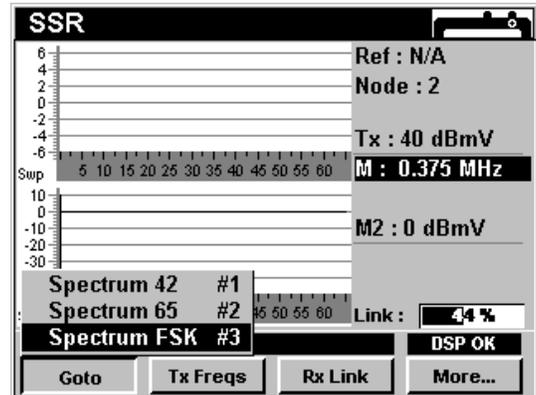From **SSR** Mode you can jump to **Spectrum FSK** Mode which displays the link frequency.

This should allow you to view the telemetry carrier of the 9581 SST.

To change to **Spectrum FSK** Mode, press the [Goto] softkey, use the ▲ ▼ buttons to select **Spectrum FSK**, and then press the (Ent) button. You may also select **Spectrum FSK** by pressing (3).

Once in **Spectrum FSK** Mode, you may change any of the analyzer settings as described in **Section II: Installer Functions**, Chapter 4: Spectrum Mode.

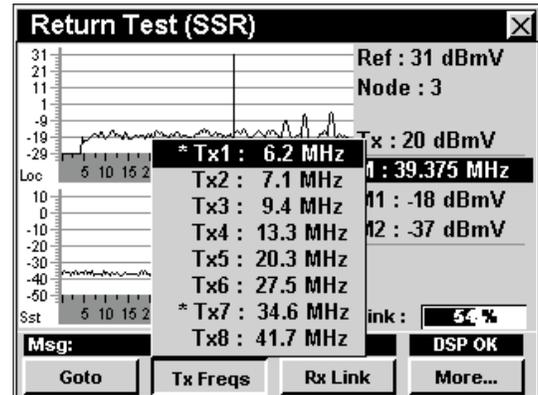Pressing the (Bk) button will return you to **SSR** Mode.

Viewing the Tx Frequencies

Pressing the `Tx Freqs` softkey will display a list of the test frequencies that your instrument is using to test the return path.

These frequencies are set by the headend SST base frequency plus an offset frequency determined by your **SSR ID** (A through F).
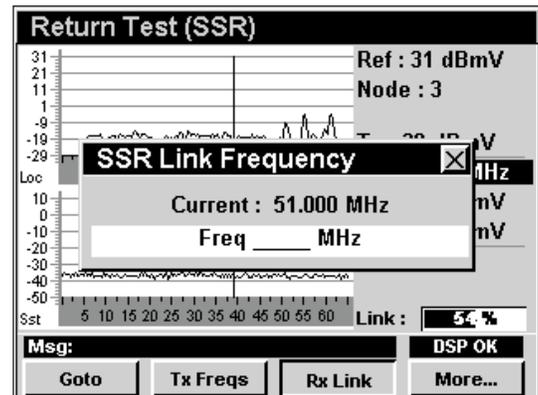
Active test frequencies will show a number in MHz. Inactive test frequencies will be blank. The two frequencies marked with (*) indicate they will be used for Gain/Tilt calculations.

Note: Your instrument must be communicating with an SST to display this frequency list.

Adjusting Rx Link Frequency

To change the actual link frequency, press the `Rx Link` softkey. The **SSR Link Frequency** window will appear. Use the alphanumeric keypad to enter a frequency value, and then press the `Ent` button.

Note: The Guardian SST in the hub that will be receiving and evaluating the upstream sweep signals must be set to the appropriate receive level before you begin your sweep. If the SST is set to the wrong level amplifier gains may be mis-adjusted.
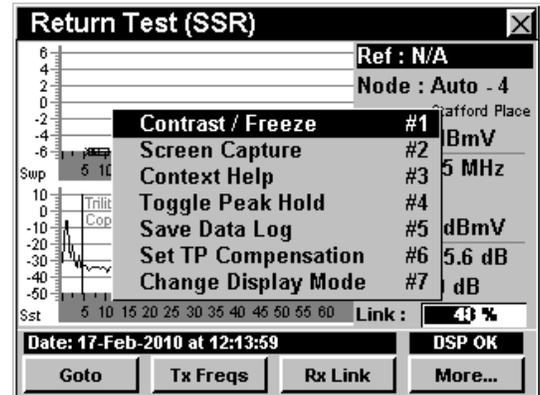
Function Menu Options

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

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

- Contrast / Freeze
- Screen Capture
- Context Help
- Toggle Peak Hold
- Save Data Log
- Set Test Point Compensation
- Change Display Mode

Basic Function Menu Options

The following functions are described in **Section I: The Basics**, Chapter 6: Basic Function Menu Options:
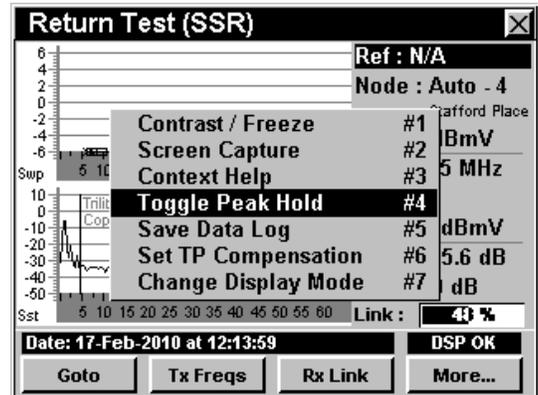
- Contrast / Freeze
- Screen Capture
- Context Help
- Save Data Log

TRILITHIC

Toggle Peak Hold

This option is used to hold the maximum signal level at each frequency, scanned over time. The two sweep displays will show a dark trace for the peak hold and a lighter trace for the live sweep.
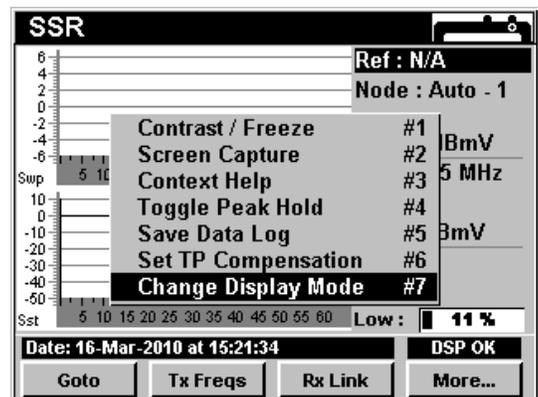
To use this option, press the (Fn) button, use the (▲) (▼) buttons to highlight **Toggle Peak Hold**, and then press the (Ent) button. You may also select **Toggle Peak Hold** by pressing (4).

Changing Display Mode

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

To use this option, 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 (7).

Introduction

RSA Mode configures the 860 DSP or 860 DSPi to function as an upstream sweep transmitter for troubleshooting micro-reflections and instances of narrow suck-outs between the test point and the headend. The upstream sweep is transmitted to the 8310 Return SpeedSweep Analyzer (RSA), installed in the headend. The 8310 RSA sends response information to the 860 DSP or 860 DSPi via a telemetry signal.

RSA Mode equips the instrument with return maintenance functions including:

- Reverse path sweep graphing the response at over 600 individually-settable reverse test frequencies, as measured in the hub and transmitted to the 860 DSP or 860 DSPi.

- Reverse gain and tilt, calculated from the reverse sweep display.

- Reverse spectrum view, showing a spectrum plot of the reverse band as scanned in the headend and transmitted to the 860 DSP or 860 DSPi.

- Simultaneous display of both the sweep trace and the reverse spectrum, as scanned in the headend.

- Variable markers that simplify the direct measurement of ingress and traffic amplitudes.

In order to use the **RSA** Mode on your 860 DSP, the instrument must be equipped with Return Sweep Option (SR-1). To use the **RSA** Mode on your 860 DSPi, the instrument must be equipped with Power Pack Option (PP-1) and Return Sweep Receiver Option (SR-1).

Note: RSA 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 **RSA** Mode installed in your instrument, you may call Trilithic at (800) 344-2412 to order this option and start using it today.
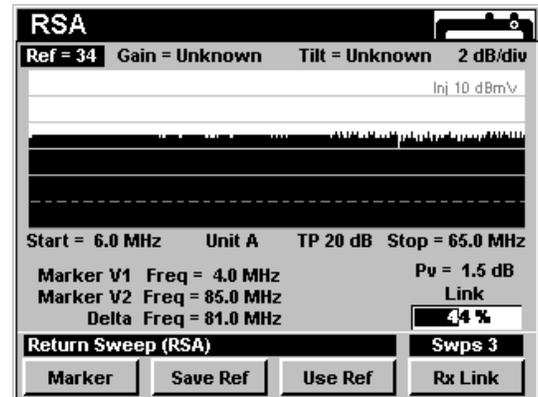
Note: If your instrument does not include all of the features shown in this chapter, go on-line to *www.trilithic.com* to update your firmware for free. This will allow you to use all of the newest features that are included in this mode.

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

- Required Setup

- Using RSA Mode

- Setting Reference Level

- Changing Display Resolution

- Setting Spectrum Limit Frequencies

- Instrument Unit Designation

- Setting Test Point Level

- Marker Settings

- Capturing a Reference Scan

- Sweeping an Amplifier

- Adjusting Rx Link Frequency

- Function Menu Options

Required Setup

To use **RSA** 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 **RSA** Mode, you will need to set up the **RSA** Mode. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *SSR Mode Settings* before proceeding through this chapter (**RSA** Mode Settings are contained within the **SSR** Mode Settings section).

To use **RSA** Mode, you will need to setup the 8310 RSA in the headend to communicate with the 860 DSP or 860 DSPi. Refer to the 8310 Reverse SpeedSweep Analyzer operation manual for setup instructions before proceeding through this chapter.

> **Note:** To use **RSA** Mode, the 860 DSP or 860 DSPi must be in communication with a Trilithic 8310 Return SpeedSweep Analyzer, located in the headend. The RSA analyzes sweep test signals from the 860 DSP or 860 DSPi and scan the reverse spectrum. Data collected by the RSA is transmitted on a frequency-agile downstream data carrier to the 860 DSP or 860 DSPi in the field for use in reverse path quality calculations.

TRILITHIC

Using RSA Mode

The **RSA** Mode transmits a sweep to the 8310 RSA in the headend for analysis. The sweep frequencies are set on the 8310 RSA in the headend, and the 860 DSP or 860 DSPi tracks the sweeping signal. The sweep steps around active channels to avoid interference with active channels.

Reverse sweeping is used to adjust the gain and tilt of reverse distribution amplifiers. When adjusted, test signals injected into any amplifier's reverse test point at a particular level will arrive in the headend at the desired level. To perform the adjustments you must know the injection level specified for the reverse amplifier modules and the insertion loss of the test point you will be connecting to.

Note: For more information on 8310 Reverse SpeedSweep Analyzer setup and sweeping, refer to the 8310 RSA's operation manual.

Note: The 8310 RSA in the headend that will receive and evaluate the upstream test signals must be set to the appropriate frequency before beginning reverse sweep tests. If the 8310 RSA and 860 DSP or 860 DSPi are not set to the same reference level, inaccurate test results may occur.

Setting Reference Level

On the graph, vertical displacement represents signal strength. The amplitude represented by the peak column 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.
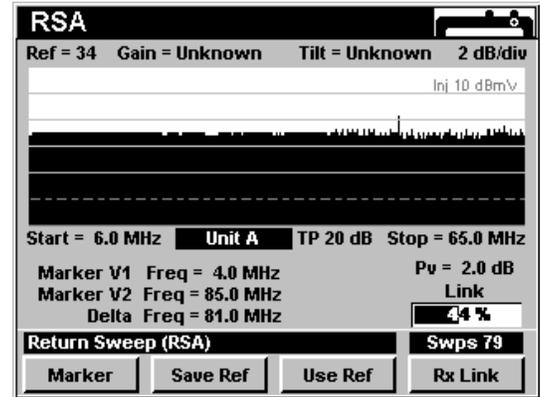
![RSA](RSA logo)

Changing Display 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.

Setting Spectrum Limit Frequencies

The **Start** and **Stop** spectrum limit frequencies are used to set the lower and upper spectrum display limits on the 860 DSP or 860 DSPi.

To change the **Start** (lower limit) and **Stop** (upper limit) frequencies, use the ◄ ► buttons to highlight the **Start** or **Stop** and use the ▲ ▼ buttons to increment each value up or down.

Instrument Unit Designation

The 8310 RSA installed in the headend can communicate with as many as (10) 860 DSP or 860 DSPi field analyzers. If multiple instruments are in communication with the 8310 RSA, each instrument must be configured with a different unit designation.

To assign a unique unit designation, use the ◀ ▶ buttons to highlight **Unit** and use the ▲ ▼ buttons to increment the value up or down.

Setting Test Point Level

The test point level (**TP**) of the 860 DSP or 860 DSPi needs to be set to the sum of the specified input level of the return module, plus the test point coupler insertion loss, plus the losses of any other devices that may be connected between the test point and the 860 DSP or 860 DSPi.

Once you have calculated this value, you can adjust the output transmit level while in **RSA** Mode**.**

To change the test point level, use the ◀ ▶ buttons to highlight **TP** and use the ▲ ▼ buttons to increment the value up and down.

TRILITHIC

Marker Settings

The spectrum functions of the 860 DSP or 860 DSPi are equipped with variable markers. These markers can be used to make amplitude measurements of the sweep at user-selected frequencies, or to determine the difference (Delta) in level or frequency between two selected sweep points.

Press the `Marker` softkey to toggle the display between vertical markers (frequency) and horizontal markers (level).

To set the level of the vertical marker, use the ◄ ► buttons to highlight **Freq** as it corresponds to **Marker V1** or **Marker V2**, and then use the ▲ ▼ buttons to increment the marker to higher or lower frequencies. You can also enter a frequency directly using the alphanumeric keypad and pressing the (Ent) button.

- **Marker V1** shows the frequency of the sweep at the marker frequency.

- **Marker V2** shows the frequency of the sweep at the marker frequency.

To set the level of the horizontal marker, use the ◄ ► buttons to highlight the amplitude level as it corresponds to **Marker H1** or **Marker H2**, and then use the ▲ ▼ buttons to increment the marker to higher or lower amplitude levels. You can also enter an amplitude level directly using the alphanumeric keypad and pressing the (Ent) button.

- **Marker H1** shows the amplitude level of the sweep at the marker level.

- **Marker H2** shows the amplitude level of the sweep at the marker level.

Capturing a Reference Scan

The reference scan will be used to remove measurement errors caused by variations in carrier amplitudes. In most cases, the reference scan will be taken at the node for the service area you will be sweeping.

To save the displayed scan as a reference scan, press the Save Ref softkey, use the alphanumeric keypad to enter the desired reference name, and press the (Ent) button. The current scan has now been saved with the selected reference scan name for use as a reference when sweeping amplifiers.

Note: If you do not see this display, adjust the reference level to bring the scan on-screen.

Sweeping an Amplifier

The process for sweeping an amplifier is very similar to that used to capture a reference scan.

Press the Use Ref softkey, use the (▲) (▼) buttons to highlight the reference file for the node that serves this area, and press the (Ent) button.

The instrument now displays a graph representing the gain and tilt performance of the amplifier. When the amplifier is properly aligned, the trace will coincide with the center (fourth from the bottom) horizontal line of the graph's grid.

While using a reference, the **Ref** and **TAP** settings are automatically adjusted to position the trace at the appropriate point in the graph, and are not manually adjustable.

To stop using the reference function, press the `Use Ref` softkey, use the ▲ ▼ buttons to highlight **No Ref**, and press the (Ent) button.

Adjusting Rx Link Frequency

To change the actual link frequency, press the `Rx Link` softkey. The **RSA Link Frequency** window will appear. Use the alphanumeric keypad to enter a frequency value, and then press the (Ent) button.

Note: The 8310 RSA in the hub that will be receiving and evaluating the upstream sweep signals must be set to the appropriate receive level before you begin your sweep. If the 8310 RSA is set to the wrong level, amplifier gains may be mis-adjusted.

Function Menu Options

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

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

- Changing Display Mode
- Setting TP Compensation
- Toggling the Ingress View
- Toggling Peak Hold

Basic Function Menu Options

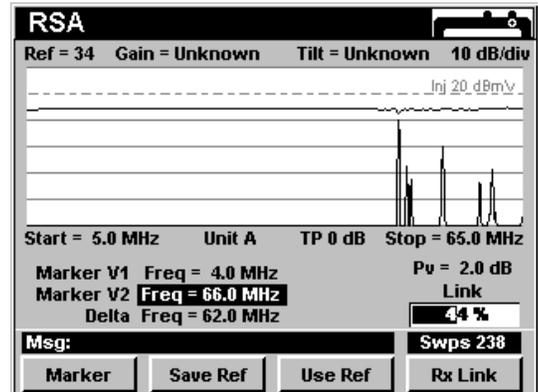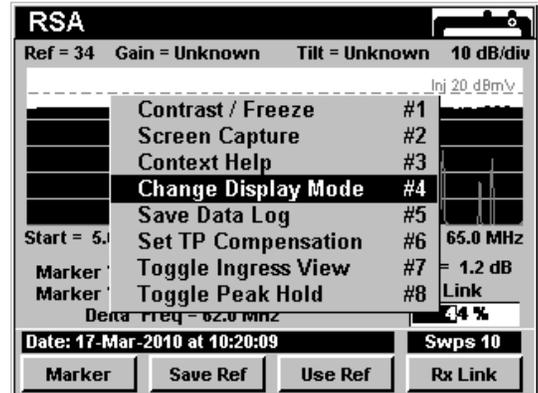The following functions are described in **Section I: The Basics**, Chapter 6: Basic Function Menu Options:

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

Changing Display Mode

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

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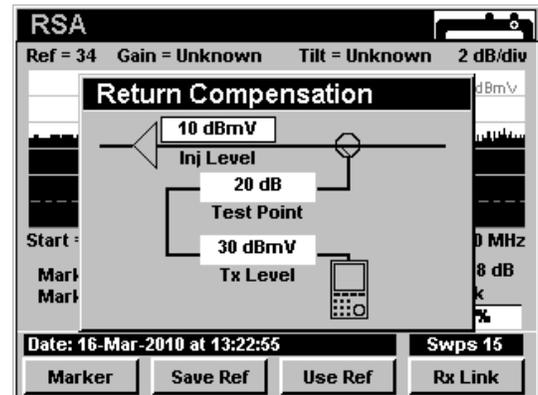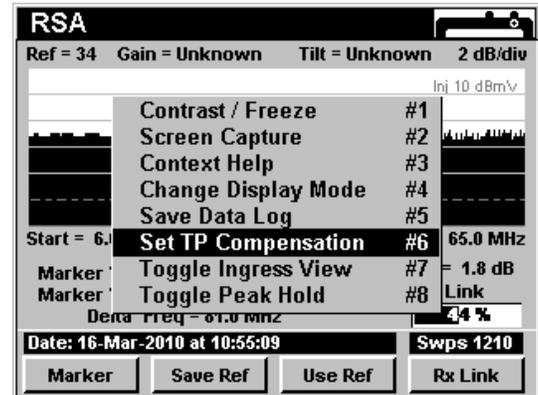**Change Display Mode** by pressing (4).

Setting TP Compensation

This option is used to enter an offset that will be added to all measurements made in **RSA** 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 **Return Compensation** window will open.

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

    - To resume measurement, press the (Bk) button or allow approximately five seconds for the **Return Compensation** window to close.

- The **Return Compensation** window will close and the **RSA** Mode will display the combined (**Injection Level**, **Test Point**, and **Probe**) test point compensation value below the graph.
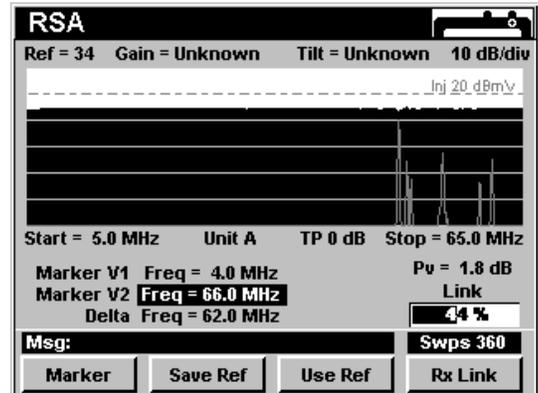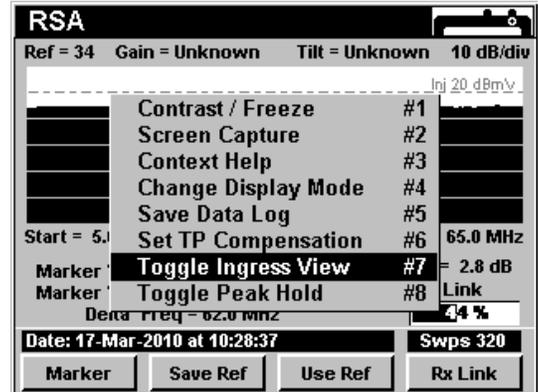
TRILITHIC

Toggle Ingress View

You can toggle a graphic overlay of system ingress on or off, which will affect the balancing of amplifiers over the spectrum graph.

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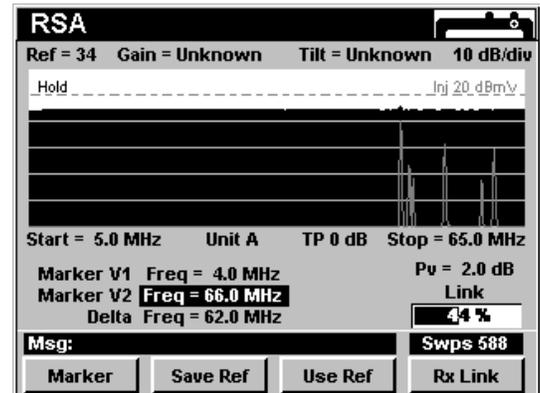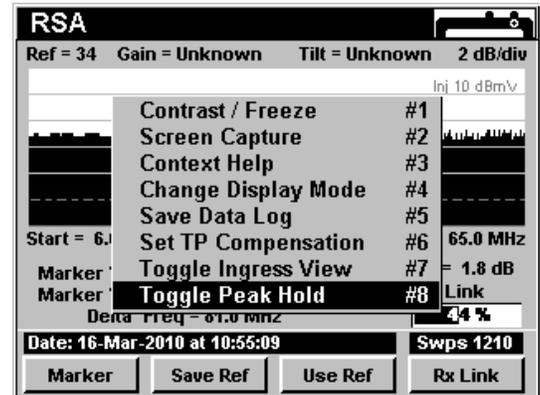
Toggle Peak Hold

You can toggle a hold function that will display the maximum recorded ingress over the spectrum graph.

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 (8).

Hold will appear in the upper-left corner of the spectrum display to indicate that Toggle Peak Hold has been selected.

Introduction

RSVP Mode equips the instrument with the return path testing functions of a Trilithic Guardian RSVP installer's reverse tester. This mode enables the 860 DSP or 860 DSPi to perform several key reverse path quality tests to insure trouble-free installations including:

- Determining the reverse signal "launch level" needed for a signal from the subscriber's terminal to arrive in the hub at the appropriate amplitude.

- Determining the bandwidth-corrected carrier / (noise + ingress) ratio for the path from the subscriber's terminal to the hub.

- Automatically comparing both measurements to user-set limits and displaying PASS or FAIL indications.

RSVP Mode also equips your instrument with some additional features not available in the Trilithic Guardian RSVP reverse tester including:

- Simultaneous testing of launch level and C/(N+I) on up to eight frequencies.

- Simultaneous display of markers for each test frequency, the reverse spectrum, and test results with PASS or FAIL messages, for all active test frequencies.

In order to use the **RSVP** Mode on your 860 DSP, the instrument must be equipped with Return Tester Option (VP-1). In order to use the **RSVP** Mode on your 860 DSPi, the instrument must be equipped with Power Pack Option (PP-1) and Return Tester Option (VP-1).

> **Note: RSVP** 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 **RSVP** Mode installed in your instrument, you may call Trilithic at (800) 344-2412 to order this option and start using it today.
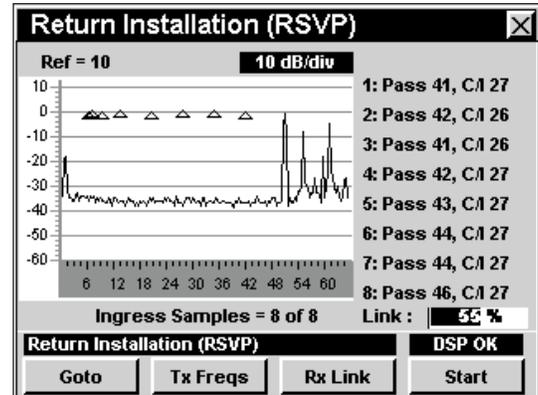
> **Note:** If your instrument does not include all of the features shown in this chapter, go on-line to *www.trilithic.com* to update your firmware for free. This will allow you to use all of the newest features that are included in this mode.

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

- Required Setup

- Using RSVP Mode

- Setting Vertical Resolution

- Using the Goto Function

- Viewing the Tx Frequencies

- Adjusting Rx Link Level

- Function Menu Options

Required Setup

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

To use **RSVP** Mode with a 9581 SST R4 in Normal Mode, you will need to set up the return link parameters. Be sure you have completed **Section IV: Setup Functions**, Chapter 2: Instrument Setup Mode, *Ret Link 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*.

Note: To use **RSVP** Mode, the 860 DSP or 860 DSPi must be in communication with a Trilithic Guardian 9580 SST (0.3 Mhz – 42 MHz) or 9581 SST (0.3 – 65 MHz) Reverse Analyzer located in the hub. SSTs are digitizers which analyze test signals from the 860 DSP or 860 DSPi and scan the reverse spectrum, measuring traffic and ingress. Data collected by the SST is transmitted on a downstream data carrier to instruments in the field for use in reverse path quality calculations.

Using RSVP Mode

The instrument displays several types of data at once in **RSVP** Mode:

- The reverse spectrum for the path you are connected to, showing noise, ingress and services traffic.

- Triangular markers showing the test frequencies that are active and the progress of the "launch level" test.

- A list showing PASS or FAIL for each active test carrier frequency, with the measured launch level and C/I ratio for each carrier.

When the **RSVP** Mode is started, the RSVP test sequence begins running.

When the test has finished, the results are displayed and the **RSVP** Mode is idle.

To begin another test sequence press the ▭ Start ▭ softkey.

The instrument then automatically runs the RSVP test sequence, evaluates the data and displays the results, then stops until you press the ▭ Start ▭ softkey again.

During the test sequence the marker triangles rise on the display as the instrument adjusts its launch levels. At the completion of the launch test the markers for all frequencies that passed the test are displayed stationary at the reference level of the SST in the hub.

During the tests, the reverse spectrum display is updated every 0.8 seconds until the selected number of samples is attained.
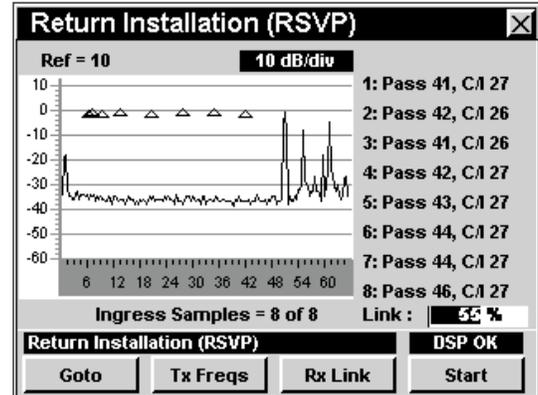
> **Note:** The Guardian SST in the hub that will be receiving and evaluating the upstream test signals must be set to the appropriate reference level before you begin your RSVP tests. If the SST is set to the wrong reference level inaccurate test results may occur.

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.

Using the Goto Function

The `Goto` softkey gives you rapid access to several spectrum displays.
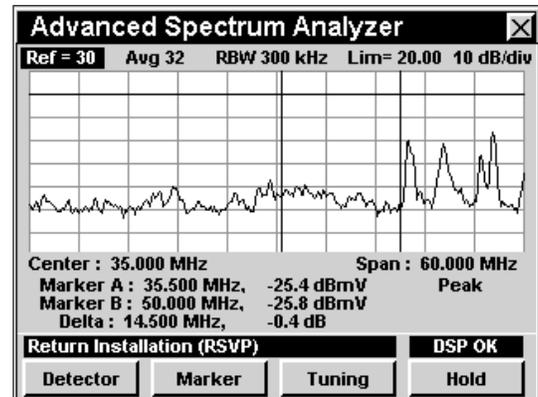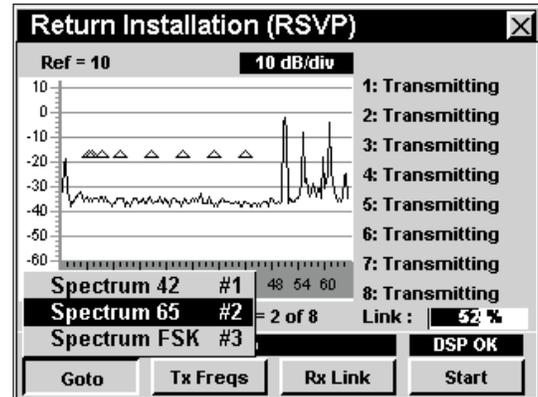
Goto Spectrum 42

From **RSVP** Mode you can jump to **Spectrum 42** Mode which displays the reverse spectrum frequency range of 4 Mhz to 42 MHz.

To change to **Spectrum 42** Mode, press the `Goto` softkey, use the ▲ ▼ buttons to select **Spectrum 42**, and then press the (Ent) button. You may also select **Spectrum 42** by pressing ①.

Once in **Spectrum 42** Mode, you may change any of the analyzer settings as described in **Section II: Installer Functions**, Chapter 4: Spectrum Mode.

Pressing the (Bk) button will return you to **RSVP** Mode.

Goto Spectrum 65

From **RSVP** Mode you can jump to **Spectrum 65** Mode which displays the reverse spectrum frequency range of 4 Mhz to 65 MHz.

To change to **Spectrum 65** Mode, press the Goto softkey, use the ▲ ▼ buttons to select **Spectrum 65**, and then press the (Ent) button. You may also select **Spectrum 65** by pressing ②.

Once in **Spectrum 65** Mode, you may change any of the analyzer settings as described in **Section II: Installer Functions**, Chapter 4: Spectrum Mode.

Pressing the (Bk) button will return you to **RSVP** Mode.
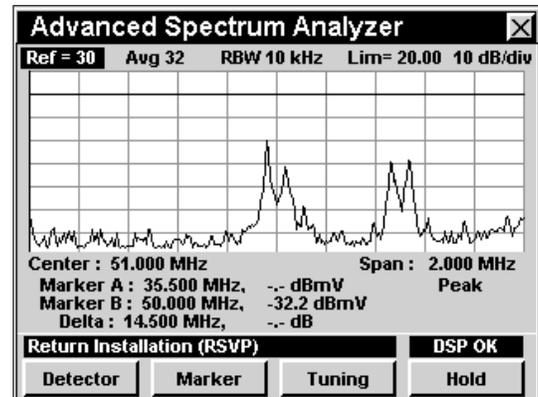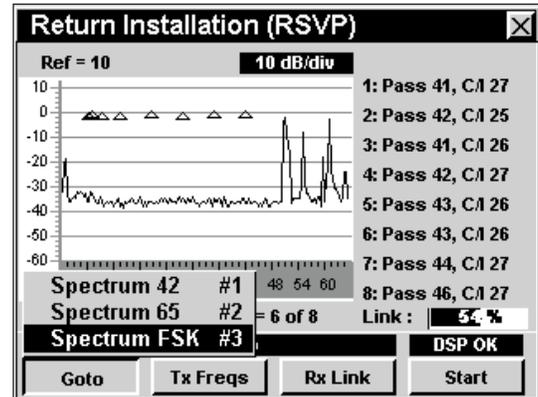
Goto Spectrum FSK

From **RSVP** Mode you can jump to **Spectrum FSK** Mode which displays the link frequency.

To change to **Spectrum FSK** Mode, press the

[Goto] softkey, use the ⏶ ⏷ buttons to select

Spectrum FSK, and then press the (Ent) button. You may also select **Spectrum FSK** by pressing ③.

Once in **Spectrum FSK** Mode, you may change any of the analyzer settings as described in **Section II: Installer Functions**, Chapter 4: Spectrum Mode.

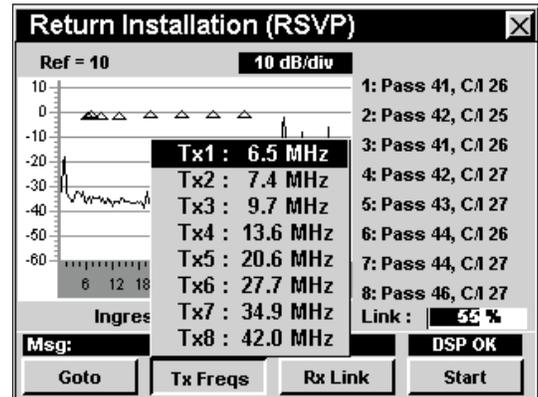Pressing the (Bk) button will return you to **RSVP** Mode.

Viewing the Tx Frequencies

Pressing the `Tx Freqs` softkey will display a list of the test frequencies that your instrument is using to test the return path.
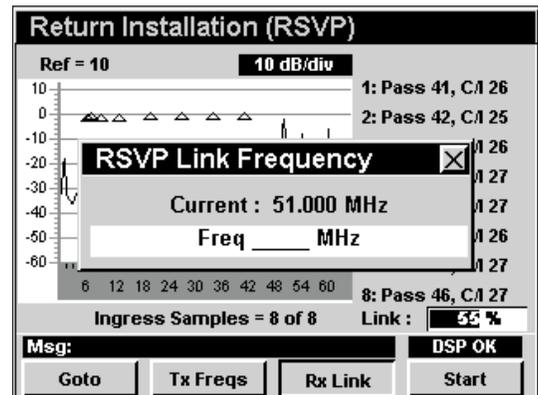
These frequencies are set by the headend SST base frequency plus an offset frequency determined by your **RSVP ID** (A through F).

> **Note:** Your instrument must be communicating with an SST to display this frequency list.

Adjusting Rx Link Frequency

To change the actual link frequency, press the `Rx Link` softkey. The **RSVP Link Frequency** window will appear. Use the alphanumeric keypad to enter a frequency value, and then press the (Ent) button.

> **Note:** The Guardian SST in the hub that will be receiving and evaluating the upstream sweep signals must be set to the appropriate receive level before you begin your sweep. If the SST is set to the wrong level amplifier gains may be mis-adjusted.
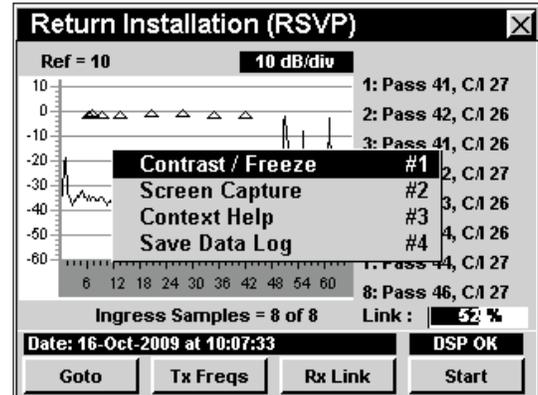
Function Menu Options

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

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

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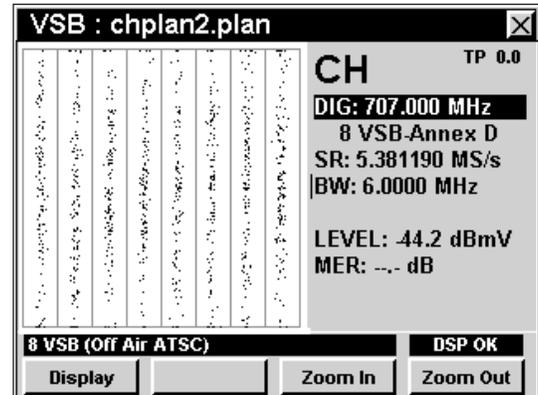- Context Help
- Save Data Log

Introduction

In **VSB** Mode the instrument operates similar to the **QAM** Mode without channel plan support. In order to use the **VSB** Mode on your 860 DSP or 860 DSPi, the instrument must be equipped with Vestigial Sideband Modulation Option (VSB).

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

- Required Setup

- Setting Frequency

- Selecting Modulation Type

- Changing Symbol Rate

- Changing Bandwidth

- Setting the Display Mode

- Function Menu Options

> **Note: VSB** 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 **VSB** 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.
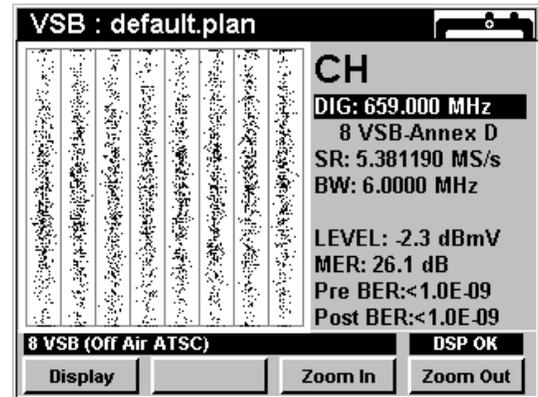
Required Setup

To use **VSB** 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 Frequency

To change the frequency, use the ◄ ► buttons to highlight the frequency, use the ▲ ▼ buttons to increment the value up and down or enter the desired frequency using the alphanumeric keypad, and then press the (Ent) button.
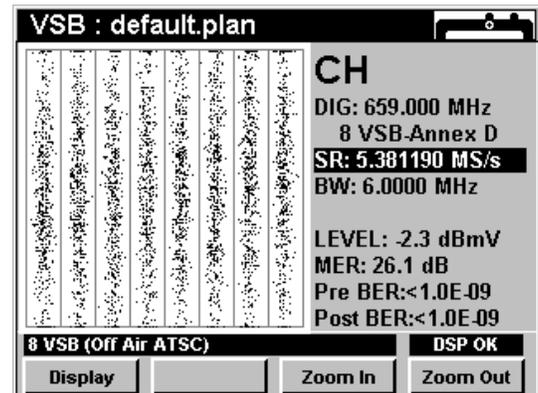
Note: This mode does not make use of the current channel plan; you must manually select your channel frequency.

Selecting Modulation Type

To change the modulation type, use the ◄ ► buttons to highlight the modulation type, use the ▲ ▼ buttons to increment the value up and down, and then press the (Ent) button.
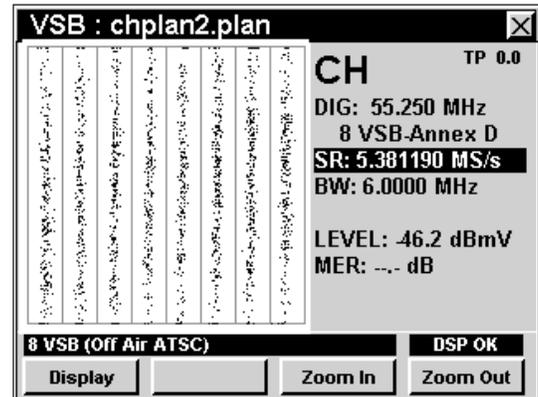
You can select from the modulation types as follows:

- **8 VSB:** This represents eight amplitude levels that support up to 19.28 Mbps of data in a single 6 MHz channel.

- **16 VSB:** This represents eight amplitude levels that support up to 38.57 Mbps of data in a single 6 MHz channel.
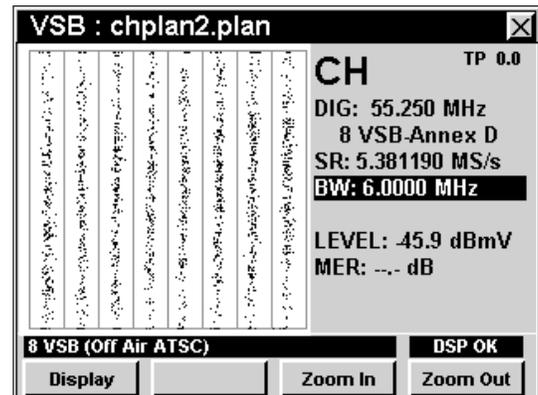
Changing Symbol Rate

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

```
VSB : chplan2.plan                    ⊠
                              CH      TP 0.0
                              DIG: 55.250 MHz
                                 8 VSB-Annex D
                              SR: 5.381190 MS/s
                              BW: 6.0000 MHz

                              LEVEL: -46.2 dBmV
                              MER: --.- dB

8 VSB (Off Air ATSC)                 DSP OK
Display  |         | Zoom In | Zoom Out
```

Changing Bandwidth

To change the bandwidth, use the ◄ ► buttons to highlight the bandwidth, use the ▲ ▼ buttons to increment the value up and down or enter the desired bandwidth using the alphanumeric keypad, and then press the (Ent) button.
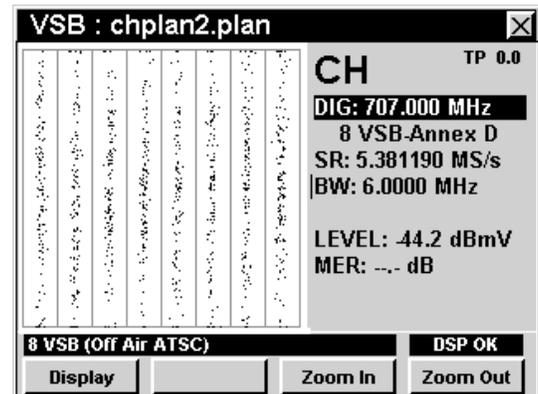
```
VSB : chplan2.plan                    ⊠
                              CH      TP 0.0
                              DIG: 55.250 MHz
                                 8 VSB-Annex D
                              SR: 5.381190 MS/s
                              BW: 6.0000 MHz

                              LEVEL: -45.9 dBmV
                              MER: --.- dB

8 VSB (Off Air ATSC)                 DSP OK
Display  |         | Zoom In | Zoom Out
```

Setting the Display Mode

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

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.

In 8 VSB, the digital information is transmitted exclusively in the amplitude of the RF envelope and not in the phase. This is unlike other digital modulation formats, such as QAM, where each point in the signal constellation is a certain vector combination of carrier amplitude and phase. A QAM-like arrangement is not possible in 8 VSB since the carrier phase is no longer an independent variable under our control, but is rather "consumed" in suppressing the lower sideband.

The eight levels are recovered by sampling an in-phase (I channel) synchronous detector. Nothing would be gained by sampling a quadrature (Q) channel detector since no useful information is contained in this channel. The signal constellation diagram is therefore a series eight vertical lines that correspond to the eight transmitted amplitude levels.

When the 8 VSB signal is corrupted, the eight vertical lines become blurred and errors are received.

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.
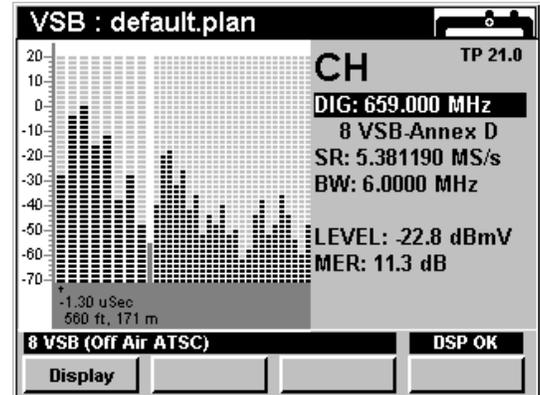
To zoom out from a constellation display press the [Zoom Out] softkey. Press the [Zoom Out] softkey repeatedly to zoom out further.
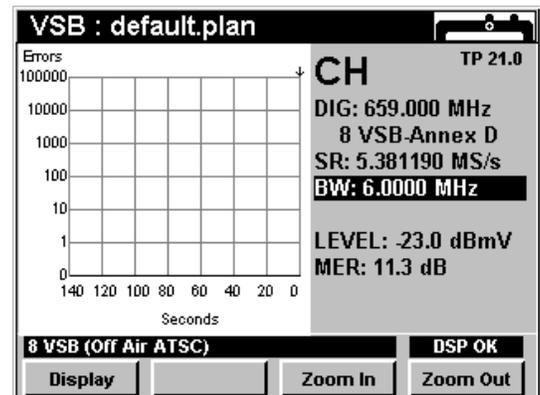
Using the Equalizer Tap Diagram

The equalizer tap diagram shows the relative amplitude of the equalizer taps needed to correct phase and amplitude distortions in the VSB 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 VSB 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.
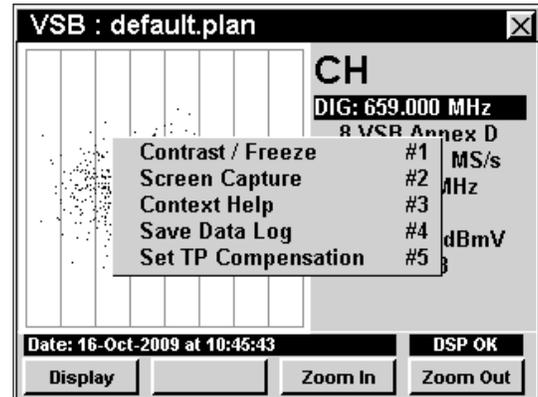
Function Menu Options

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

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

- Contrast / Freeze

- Screen Capture

- Context Help
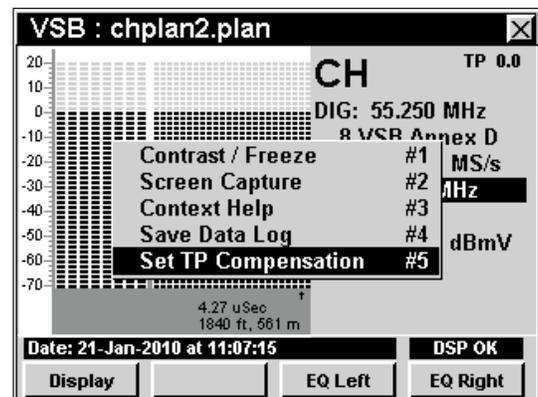
- Save Data Log

- Set TP 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

Set TP Compensation

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 (5).
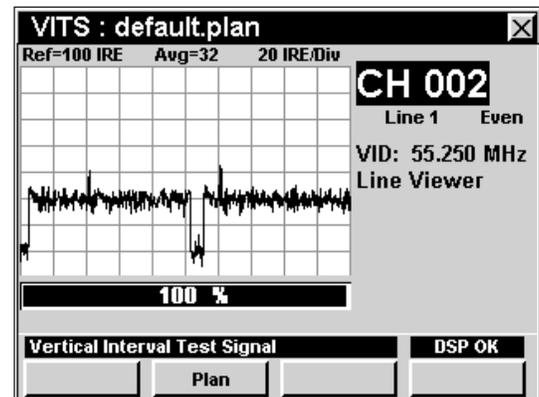
TRILITHIC

Introduction

In **VITS** Mode the instrument analyzes the signal characteristics of VITS (Vertical Interval Test Signals) signals to measure in-channel response, differential phase, differential gain, and chroma-delay. This mode also displays the test signal itself. In order to use the **VITS** Mode on your 860 DSP or 860 DSPi, the instrument must be equipped with the VITS Option (VITS).

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

- • Required Setup

- • Setting Averaging Type

- • Adjusting Channels

- • Setting Line Number

- • Setting Even/Odd Fields

- • Setting Test Type

- • Setting Channel Plan

- • Function Menu Options

> **Note: VITS** 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 **VITS** 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.
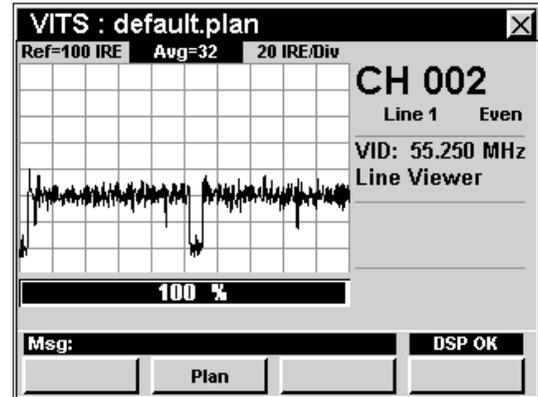
Required Setup

To use **VITS** 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 Averaging Type

To set the averaging type, use the ◄ ► buttons to highlight **Avg=** and then use the ▲ ▼ buttons to set the averaging type to Avg 16, 32, 64, 128, or 256 as desired.
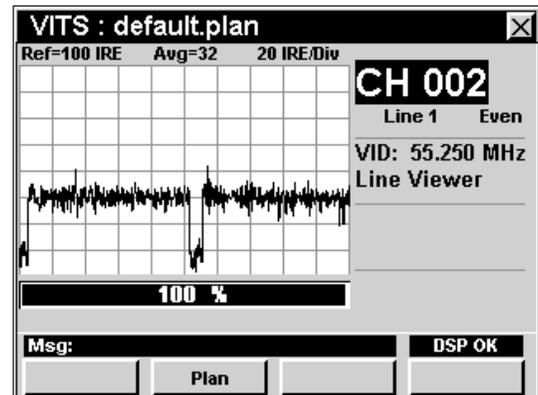
Increasing **Avg** will slow down test times but results in more accurate results. For improved results, set **Avg** to at least 64.
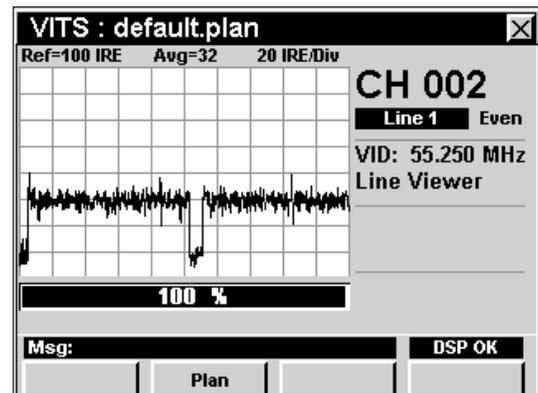
Adjusting Channels

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 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 analog in your plan or the channel is scrambled, the message **VITS Not Available** will be displayed in the status bar at the bottom of the screen and the instrument will beep.
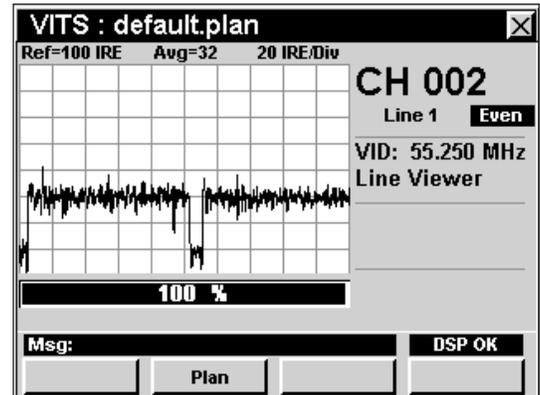
Setting Line Number

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

Setting Even/Odd Fields

To change between even and odd fields, use the
⬅ ➡ buttons to highlight the **Even/Odd** field, use the 🔼
🔽 buttons to change the value between **Even** and **Odd**.
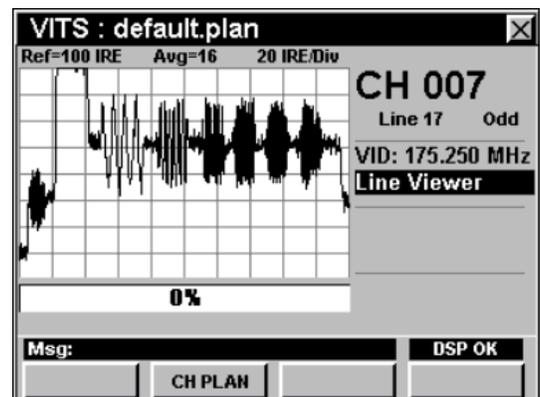

Setting Test Type

To set the type of test to perform, use the ⬅ ➡ buttons to highlight the test type field, use the
🔼 🔽 buttons to increment change the value between **Line Viewer**, **Diff Gain/Phase**, **Chroma Delay**, or **In Channel Response**.

Line Viewer

When the test type is set to **Line Viewer** the instrument simply displays the VITS signal using a line viewer. No measurements are made when this test type is selected and the progress bar will always show **0%**.
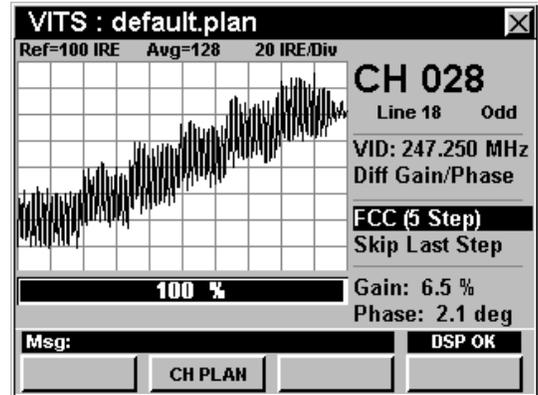
Differential Gain and Phase

When the test type is set to **Diff Gain/Phase** the instrument will measure and display the differential gain and phase.

- **Differential Gain** - This is the change in amplitude of the chrominance signal as a function of the amplitude of the associated luminance signal.

- **Differential Phase** - This is the change in phase of the chrominance signal as a function of the amplitude of the associated luminance signal.
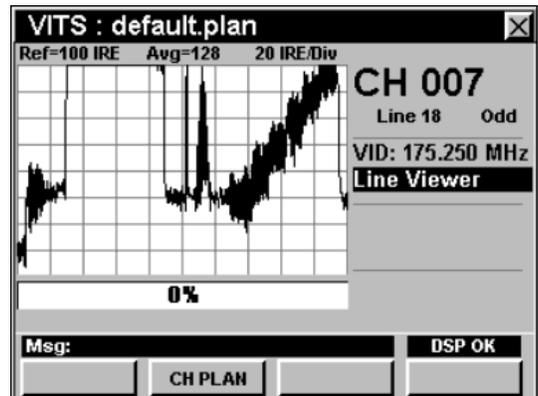
The progress bar will show the status of the test.

> **Note:** The test will not start until the appropriate line, field, and signal type have been selected.

Changing Test Signal Type

To change the test signal type, use the ◀ ▶ buttons to highlight the test signal type field, use the ▲ ▼ buttons to change the value between **FCC (5 Step)**, **FCC (10 Step)**, **NTC7 (5 Step)**, or **NTC7 (10 Step)**.
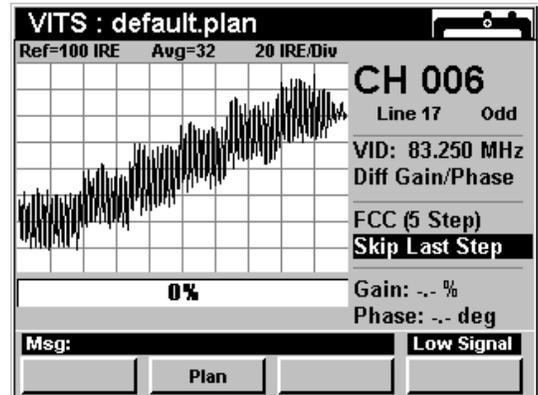
Including / Skipping Last Step

To include or skip the last step of the chrominance staircase when measuring the differential gain and phase, use the ◄ ► buttons to highlight the last step field, use the ▲ ▼ buttons to change the value between **Include Last** and **Skip Last Step**.
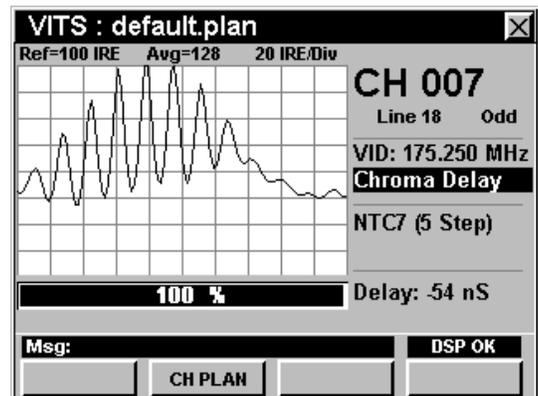
Typically the last step is skipped due to clipping circuitry contained in modulators.

Chrominance-Luminance Delay

When the test type is set to **Chroma Delay** the instrument will measure and display the chrominance-luminance delay. This is the change in delay time of the chrominance component of the signal relative to the luminance component after passing through the system.

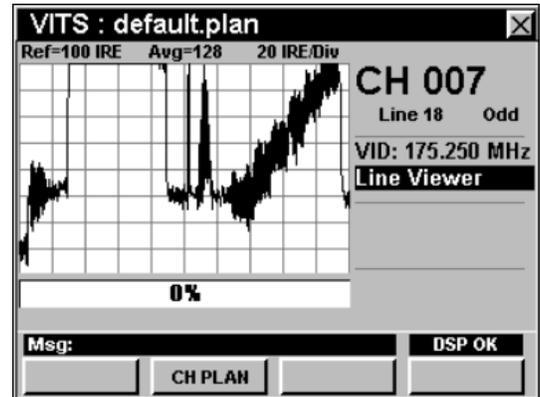The progress bar will show the status of the test.

Note: The test will not start until the appropriate line, field, and signal type have been selected.

Changing Test Signal Type

To change the test signal type, use the ◀ ▶
buttons to highlight the test signal type field, use
the ▲ ▼ buttons to change the value between
FCC (5 Step), **FCC (10 Step)**, **NTC7 (5 Step)**,
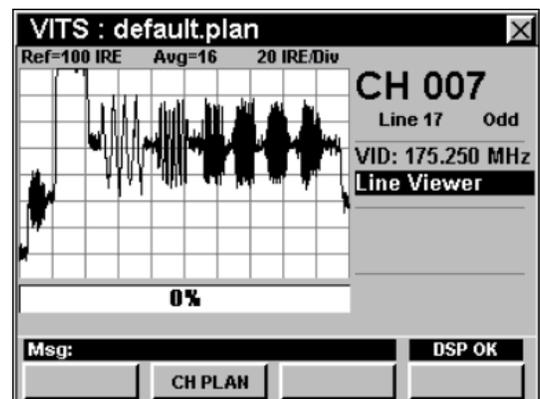or **NTC7 (10 Step)**.

In-Channel Response

When the test type is set to **In Channel Resp** the
instrument will measure and display the in-channel
flatness of the TV passband frequency response.

The FCC requires that the in-channel response be
within +/- 2 dB for a range of 0.75 MHz to 5 MHz
above the lower boundary frequency of the channel
(0.5 MHz to 3.58 MHz above the visual carrier may
be used instead).

Typically a multiburst signal is used for this
measurement. This signal usually includes six bursts
of discrete frequencies that range from 0.5 MHz to
4.1 MHz.

By looking at the spectrum of the multiburst signal, it is possible to measure in-channel
response by comparing the maximum variation in the magnitudes of each discrete burst
frequency to the FCC limit.

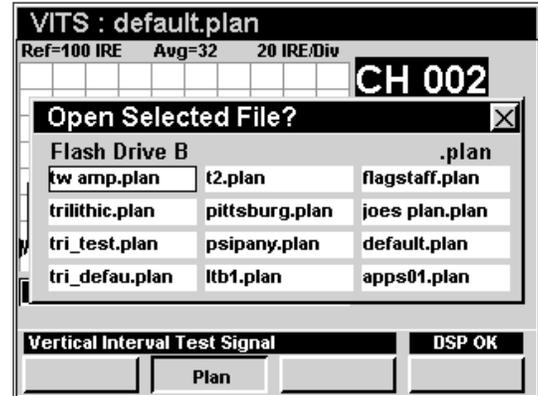The progress bar will show the status of the test.

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 the channels defined as analog 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.
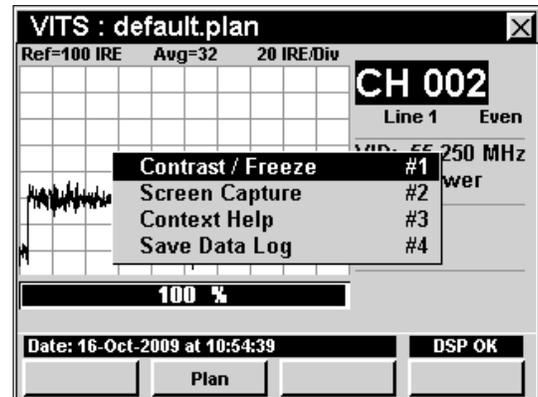
Function Menu Options

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

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

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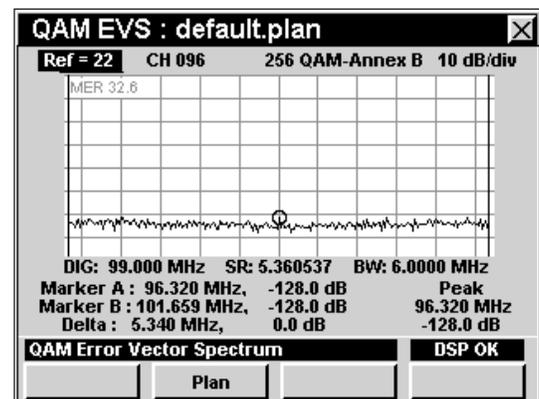- Context Help
- Save Data Log

Introduction

The Error Vector Spectrum Menu (**QAM EVS**) allows the operator to tune the meter to a downstream QAM channel and display its error vector spectrum to reveal noise and ingress that may be present under the QAM channel. This feature is a component of the QA-1 option for the 860 DSP and QA-2 option for the 860 DSPi, and will present itself when the unit is updated with the January 2008 firmware. 860 DSPi owners may activate the QA-2 option and 860 DSP owners may activate the QA-1 option in the field by purchasing a key code.

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

- Required Setup
- QAM EVS Support
- Using QAM EVS Mode
- Adjusting Marker
- Setting Vertical Resolution
- Setting Reference Level
- Adjusting Channels
- Adjusting Digital Frequencies
- Setting Channel Plan
- Function Menu Options

Required Setup

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

Using QAM EVS Mode

The QAM EVS test can be performed on a channel from a specified channel plan or custom user entered QAM channel. The mode of operation is a cross between the **QAM** Mode and the **Spectrum Analyzer** mode.

As soon as the operator enters the **QAM EVS** Mode, it is tuned to the last tuned channel in the **QAM** Mode. The operator can then adjust the reference (top line of spectrum display), the digital channel, the modulation, the frequency, the symbol rate, the bandwidth, and the dB per division.
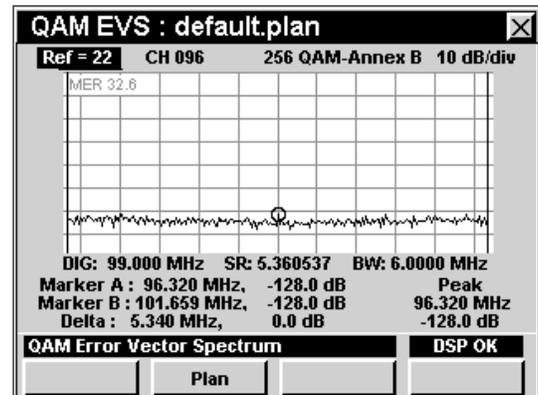
The center frequency of the display is the center frequency of the channel. The span of the display is the channel's symbol rate.

When the unit locks onto the QAM signal, the error vector spectrum is plotted. The user can also see the current MER in the upper left of the graph. The markers and peak can be used to help determine the frequency of unwanted signals present in the QAM channel.

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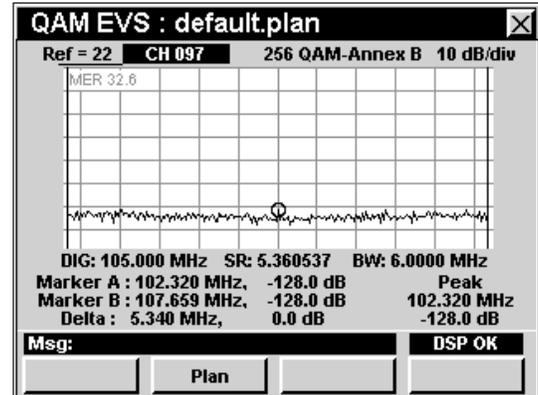
To change the reference level, use the ◄ ► buttons to highlight **Ref=** and then adjust the current value using the ▲ ▼ buttons.
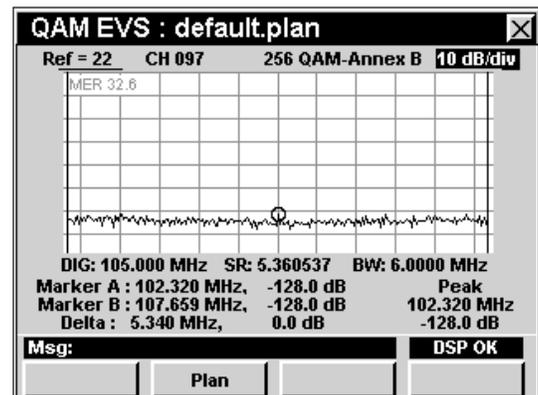
Adjusting Channels

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 using the alphanumeric keypad, and then press the (Ent) button.

```
QAM EVS : default.plan                      ☒
Ref = 22   CH 097        256 QAM-Annex B  10 dB/div
  MER 32.6

  DIG: 105.000 MHz   SR: 5.360537   BW: 6.0000 MHz
  Marker A : 102.320 MHz,    -128.0 dB         Peak
  Marker B : 107.659 MHz,    -128.0 dB      102.320 MHz
    Delta :   5.340 MHz,       0.0 dB        -128.0 dB
Msg:                                      DSP OK
                    Plan
```
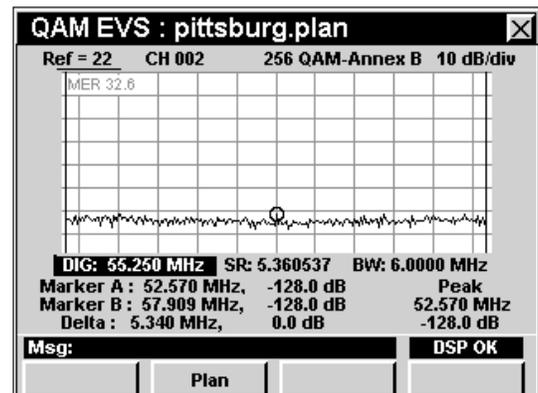
Setting Vertical Resolution

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.

```
QAM EVS : default.plan                      ☒
Ref = 22    CH 097        256 QAM-Annex B  10 dB/div
  MER 32.6

  DIG: 105.000 MHz   SR: 5.360537   BW: 6.0000 MHz
  Marker A : 102.320 MHz,    -128.0 dB         Peak
  Marker B : 107.659 MHz,    -128.0 dB      102.320 MHz
    Delta :   5.340 MHz,       0.0 dB        -128.0 dB
Msg:                                      DSP OK
                    Plan
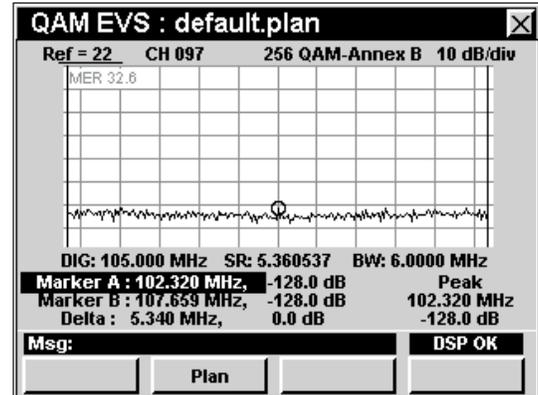```

## Adjusting Digital Frequency

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

```
QAM EVS : pittsburg.plan                    ☒
Ref = 22    CH 002        256 QAM-Annex B  10 dB/div
  MER 32.6

  DIG: 55.250 MHz   SR: 5.360537   BW: 6.0000 MHz
  Marker A : 52.570 MHz,    -128.0 dB          Peak
  Marker B : 57.909 MHz,    -128.0 dB       52.570 MHz
    Delta :  5.340 MHz,       0.0 dB         -128.0 dB
Msg:                                      DSP OK
                    Plan
```

Adjusting Marker

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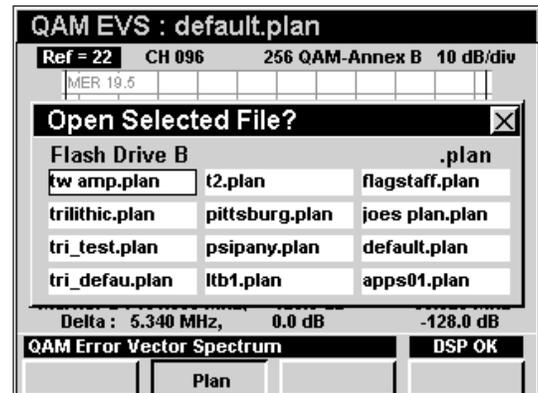

Setting Channel Plan

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 the channels defined as analog in your channel plan.

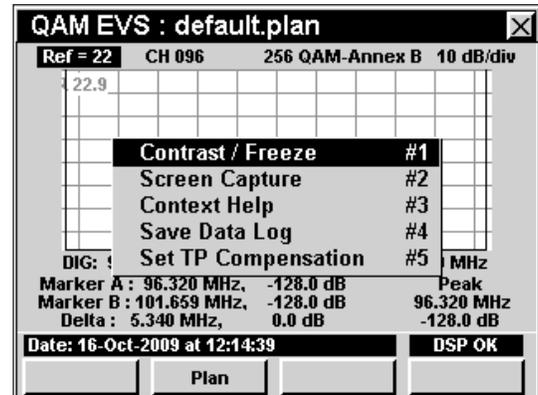You must have a system channel plan that is up to date in order to view the channels in your system.

Function Menu Options

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

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

- Contrast / Freeze
- Screen Capture
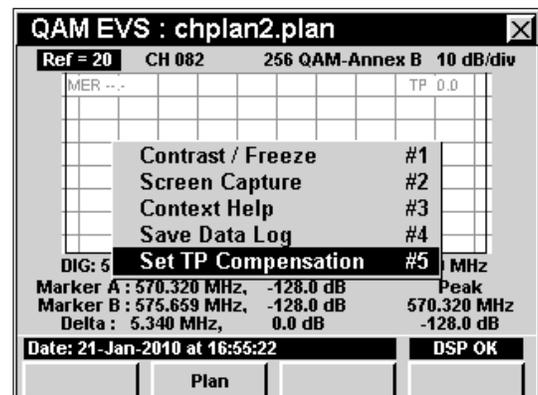- Context Help
- Save Data Log
- Set TP Compensation

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

Set TP Compensation

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 (5).
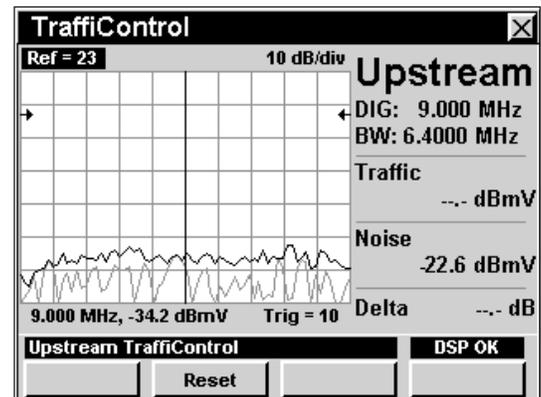
Introduction

The 860 DSPi TraffiControl option can be used to display the ingress that is present "underneath" an upstream cable modem channel, or any bursty signal.

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

- Required Setup
- Using TraffiControl Mode
- Setting Reference Level
- Setting Vertical Resolution
- Adjusting Digital Frequency
- Adjusting Bandwidth
- Adjusting Marker
- Adjusting Trigger
- Function Menu Options

Required Setup

To use **TraffiControl** 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.
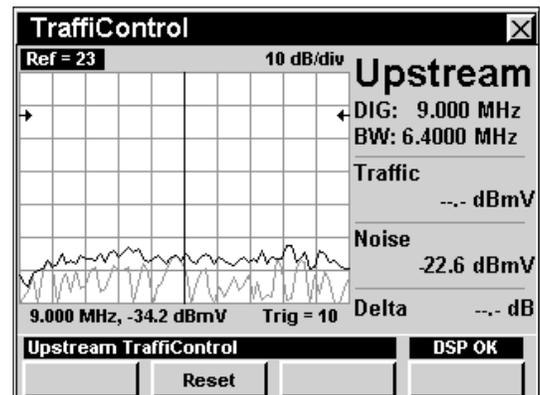
![Traffic icon]

Using TraffiControl Mode

The **TraffiControl** Mode provides a fixed frequency span of 8 MHz. The user enters the center frequency of the upstream cable modem signal (DIG:), and the bandwidth (BW:). (DOCSIS and Euro DOCSIS upstream bandwidths are 200 kHz, 400 kHz, 800 kHz, 1600 kHz, 3200 kHz, or 6400 kHz).

The TraffiControl display shows three traces: a Traffic trace, a Live Noise trace, and a Peak Noise trace. The Traffic trace (gray) shows the last captured signal containing traffic. The Live Noise trace (gray) shows the last captured signal without traffic. The Peak Noise trace (black) shows a persistent peak hold of the noise trace. This simple and comprehensive display enables a user to see what is currently happening, as well as capture peak interference levels of transient signals during the time that the measurement is being made.

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 value using the ▲ ▼ buttons.
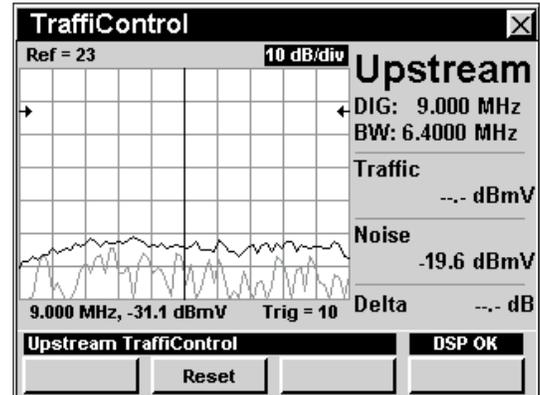
Setting Vertical Resolution

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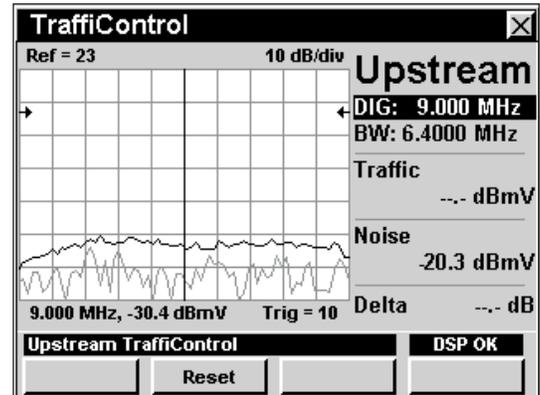
Selecting a low value will magnify the differences in the amplitudes of the displayed signals, but will limit the range of amplitudes that will fit on the graph.

Adjusting Digital Frequency

The center frequency of the display can be changed by adjusting the digital frequency (**DIG**).

To change the **DIG** frequency, use the ◄ ► buttons to highlight **DIG:**, use the ▲ ▼ buttons to increment the value up and down or enter the desired frequency using the alphanumeric keypad, and then press the **Ent** button.
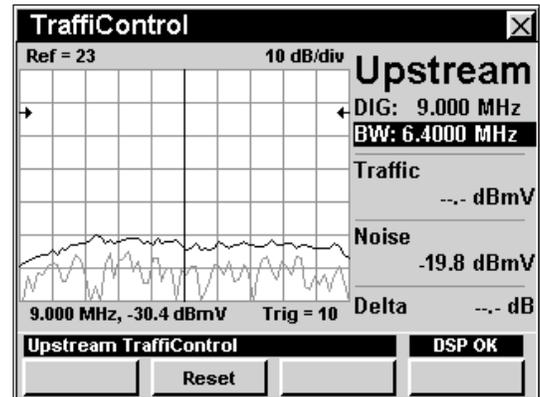
Adjusting Bandwidth Frequency

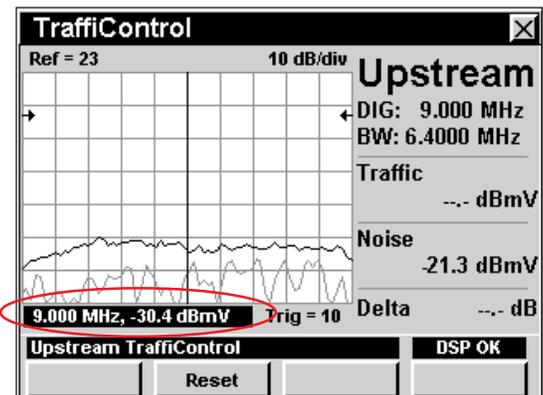The bandwidth frequency of the display can be changed by adjusting the bandwidth frequency (**BW**).

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

Adjusting Marker

To adjust the position of the marker on the display, use the ◄ ► buttons to highlight the marker and amplitude readout. Use the ▲ ▼ buttons to position the marker along the display.

The frequency and amplitude of the signal beneath the marker will be displayed in the readout.
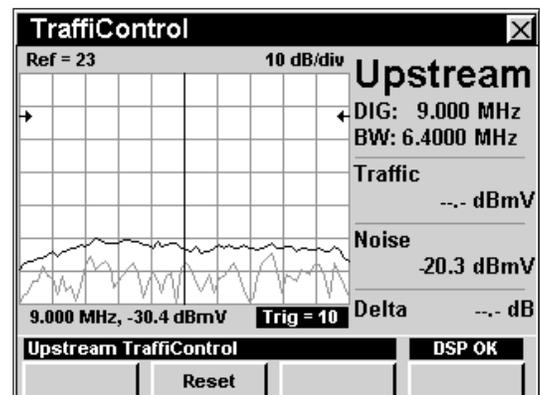
Adjusting Trigger

The trigger of the display can be changed by adjusting the trigger level (**Trig**). The recommended level is approximately 10 dB below the level of the traffic signal.

To change the trigger level, use the ◄ ► buttons to highlight **Trig =**. Use the ▲ ▼ buttons to increment the value up and down in one dB increments.

The Reset soft key will re-trigger the signal and refresh the screen with the data captured during the reset cycle.

Function Menu Options

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

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

- Contrast / Freeze

- Screen Capture

- Context Help

- Save Data Log