Model Two and Model Two Lite Signal Level Meters

OPERATION MANUAL

TRILITHIC
INNOVATIVE ENGINEERING

Trilithic Company Profile

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

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

Trilithic is comprised of three major divisions:

- **Broadband Instruments & Systems**
  Offers test, analysis and quality management solutions for the major cable television systems worldwide.
- **RF Microwave Components**
  Provides components and custom subsystems for companies specializing in cellular, military and other wireless applications.
- **Emergency Alert Systems**
  Leading supplier of government-mandated emergency alert systems used by HFC service

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General Information 1

Helpful Website

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

http://www.trilithic.com

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

Where to Get Technical Support

Trilithic technical support is available Monday through Friday from 8:00AM to 5:00PM EST. Callers in North America can dial 1-317-895-3600 or 1-800-344-2412 (toll free). International callers should dial 1-317-895-3600 or fax questions to 1-317-895-3613. You can also e-mail technical support at *techsupport@trilithic.com*.

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

- Your name and your company name
- The technical point of contact (name, phone number, e-mail)
- The Model Two serial number, firmware and hardware version numbers
- A detailed description of the problem you are having, including any error or information messages

How this Manual is Organized

This manual is divided into the following chapters:

- Chapter 1, “General Information” provides Trilithic contact information and describes how this Operation Manual is structured.
- Chapter 2, “Introduction” introduces the equipment and features of the Model Two and Model Two Lite.
- Chapter 3, “Walkthrough” describes the components of the Model Two and Model Two Lite.
- Chapter 4, “Setup” describes the steps needed to perform the setup of the Model Two and Model Two Lite.
- Chapter 5, “Basic Operation” describes how to use the basic features of Model Two and Model Two Lite.
- Chapter 6, “Advanced Operation” describes how to use the advanced features of Model Two and Model Two Lite.
- Chapter 7, “Specifications” shows the technical specifications of the Model Two and Model Two Lite.

Conventions Used in this Manual

This manual has several standard conventions for presenting information.

- Connections, Menus, menu options, and user entered text and commands appear in **bold**.
- Section names, Web and email addresses appear in *italics*.

Note: Note: A note is information that will be of assistance to you related to the current step or procedure.

CAUTION: A caution alerts you to any condition that could cause a mechanical failure or potential loss of data.

WARNING: A warning alerts you to any condition that could cause personal injury.

Precautions

WARNING: The battery **MUST** be charged with the Trilithic charge cube provided with the Model Two. Using any other charge cube may damage the battery.

WARNING: The maximum input voltage to the meter is 100 V (AC or DC). A larger voltage will damage the meter.

CAUTION: The accuracy of the meter may be affected when in a strong electromagnetic field.

CAUTION: Do not use the Model Two in any manner not recommended by the manufacturer.

Introduction 2

Overview

Congratulations! You now own Trilithic's **Model Two Signal Level Meter**. This instrument is designed to provide you with optimal features for reduced cost.

Amplitude measurements are fast and efficient. Carrier amplitudes are displayed singly, as a group (up to 12 "favorites"), or as a full-span display. This product also features a single-channel Spectrum Mode, which displays the presence of interfering beats in addition to the carrier amplitudes. The unit lets you take the direct power measurement of QAM signals, carrier-to-noise measurements, data logging, and also supports a voltmeter function.

5 user-defined channel plans may be stored, and the Model Two can perform a complete test of all channels in the selected User Channel Plan to specified limits at the press of a single key. It can also be set to automatically perform Level, Spectrum, Tilt (Favorite), and Limit tests at programmed intervals unattended.

The Model Two can save files for Level, Tilt, Spectrum, Scan, Limit Test, and Auto Test measurements. These files can be recalled to display the recorded data, or Scan, Spectrum, and Limit files can be viewed graphically. The Model Two also makes it easy to obtain a hard copy of installation data or documentation of a problem via its printer function.

The unit is the ideal signal level meter for HFC installations. It is durable, has many features, and is simple to use in a wide range of conditions. Its tough, plastic shell and protective jacket make the Model Two highly resistant to damage from shock and impact. When not in use, the unit and its accessories are contained in a carrying case.

The Model Two is rugged and convenient to use. It weighs only 1.5 pounds and can be carried and operated with one hand. All measurement functions are accessible via a single keystroke, and, with the Fast Setup function, settings for each measurement mode can be accessed at the press of a single key without going through nested menus. Other functions are simplified though the combination of dedicated function keys and "softkeys".

Equipment

The Model Two comes with the following:

- Model Two Signal Level Meter
- Carrying Case
- Strap (for Carrying Case)
- Protective Bumper
- Built-in 3.6 V / 3.5 AH Ni-MH Battery
- Universal Charger
- Operation Manual

The following options are also available:

- Holster (P/N 2130854000)
- Leather Case - sleeve (P/N 2130856000)
- Software Kit - includes data cable (P/N 0930089000)
- Data Cable (P/N 2071351000)
- Serial Printer Cable (P/N 2071352000)
- Parallel Printer Adapter (P/N 0440214000)
- Cigarette Charger Adapter (P/N 2071483000)
- Replacement Battery (P/N 0090046000)
- Replacement Charger (P/N 0610165000)
- Replacement F-connector (0200579000)

For more information, please contact Trilithic at *www.trilithic.com* or 1-800-344-2412.

Model Two & Model Two Lite Feature Comparison

Some of the functions described in this manual are not available in the Model Two Lite. A comparison of the features included in the Model Two Lite vs. the Model Two, is shown in the following chart.

Feature:	Model Two Lite:	Model Two:
Tilt & Favorite Group Display	X	X
Single Chan. Display	X	X
Single Chan. Spectrum		X
Scan Display	X	X
Spectrum Display	5-65 MHz	5-870 MHz
Carrier/Noise (C/N)		X
Dig. Chan. Measurement	X	X
Data Logging		X
Limit Test		X
Auto Test Programs		X
Voltmeter Function	X	X
File Saving, Viewing		X
File Printing		X

Note: The Model Two Lite can be easily upgraded to a Model Two by contacting Trilithic Technical Support at 1-800-344-2412.

Tilt and Favorite Group Display

Press **TILT** to display a graph showing the amplitudes of up to twelve user-selected video carriers. This display also shows the calculated difference in amplitude (tilt) between the highest and lowest channels in the user-selected group. Press **TILT** again, and the Model Two displays a numeric list that shows the amplitudes of the carriers in the group.

Single Channel Display

When tuned to a single channel, the Model Two displays bar graphs for the video and audio carriers. It also shows numeric readouts of the carrier amplitudes and V/A difference.

Single Channel Spectrum

The Model Two can also provide a spectral display of the selected channel including intermodulation products or other undesired signals that may be present.

Scan Display

Press **SCAN** to display the full span of video and audio carriers in the selected User Channel Plan. This mode is useful to make a quick check of your system's overall flatness and amplitude. Up to 5 User Plans may be stored.

Amplitude limits can be imposed on the display. By using the Model Two's frequency marker, you can zoom in on any suspect channel that appears in the display.

Spectrum Display

Press **SPECT** to display the spectrum measurements with frequency spans from 2.5 MHz to 62.5 MHz or a full-spectrum scan.

Carrier-To-Noise (C/N)

Press **C/N** to measure the C/N ratio of the CATV transmission system.

Digital Channel Measurement

The Model Two includes a special single-channel mode you can use to measure the actual power of a QAM signal. The single-channel spectrum display shows the actual shape of the modulation "haystack". This feature provides you with a powerful tool for checking in-channel flatness or mismatches that might affect digital transmission quality.

Data Logging

The Model Two has the capability to store the amplitudes of all video and audio carriers (up to 150 channels). These data records can be captured in nonvolatile memory and later recalled or uploaded to your PC for record keeping.

Each record carries the time, date, and other Model Two information at the time the record is saved.

Limit Test

The Model Two can perform a complete test of all channels in the selected User Channel Plan to specified limits at the touch of a single key. All channels are listed with Pass or Fail results, and the user may select any channel to review its individual test results. In addition, results for the entire channel plan, such as Maximum Δ Video and Maximum Δ Adjacent Channel, are seen on the test-result display.

Auto Test Programs

The Model Two can be set to automatically perform Level, Spectrum, Tilt (Favorite), and Limit tests in user settable time increments. This makes the Model Two ideal for performing required 24-hour tests. The Model Two may be set to print the stored test results automatically after measurement, or the file can be viewed, printed, or uploaded to a PC later.

Voltmeter

The Model Two is equipped with a built-in voltmeter that can be used for troubleshooting power supplies or power drops. The Model Two displays the voltage with a bar graph and numeric readout. It can accommodate AC or DC voltages up to 100 Volts.

File Saving, Viewing

The Model Two can save records from Level, Tilt (Favorite Channels group), Spectrum, Scan, or Limit Test measurements either to individual files or all to one file. These files can be recalled to display the recorded data, and Scan, Spectrum, and Limit graphics can be viewed. All files may be uploaded to a PC with the Toolbox software for analysis and storage.

File Printing

The Model Two has a print function that makes it easy to connect to a printer for a hard copy of measurement data and reports. This is useful for obtaining an instant hard copy of your installation or to document a problem.

Walkthrough 3

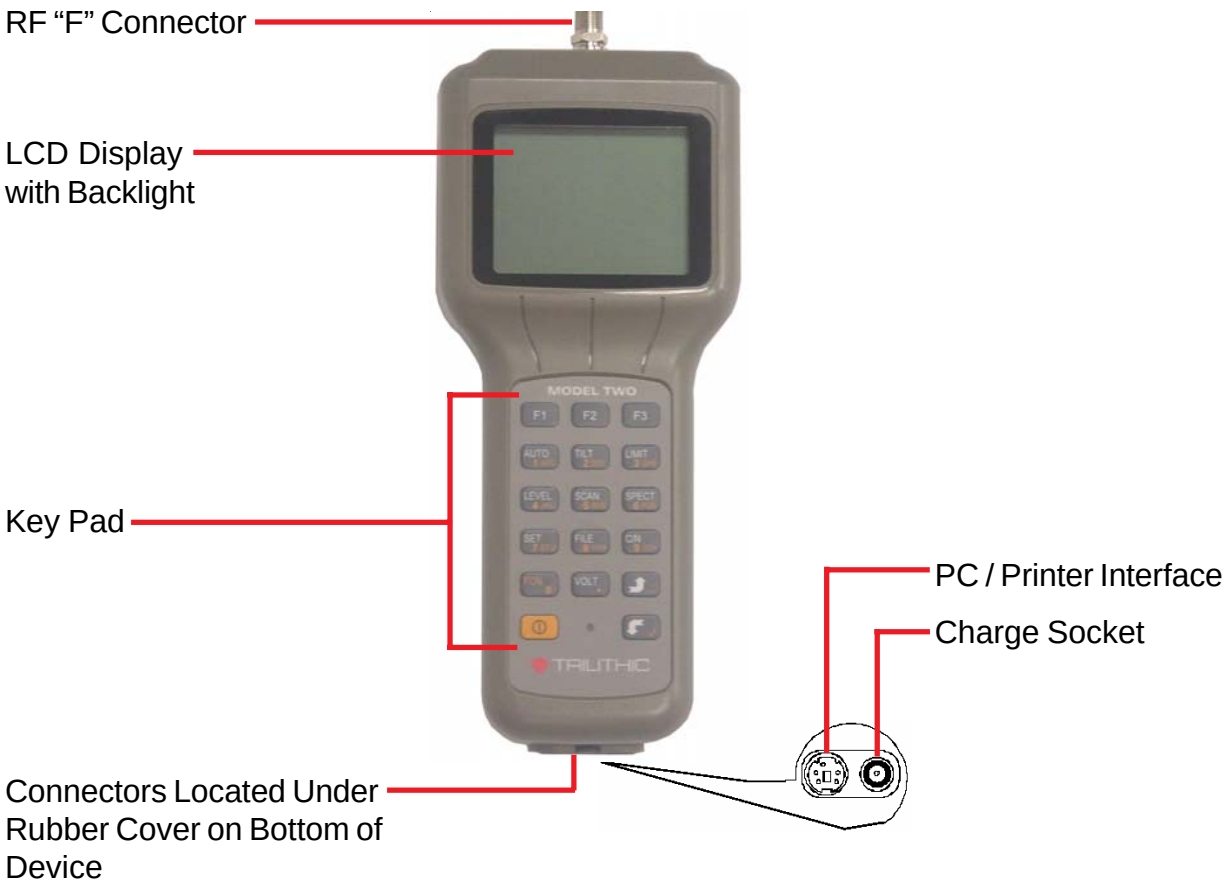
Now that you have your Model Two out of its box, take a few moments to look it over and become familiar with its controls.

Note: The thin protective film layer used to protect the display during shipping should be removed.

Note: Your Model Two's battery may need to be charged (see *Battery Charging* on Page 20).

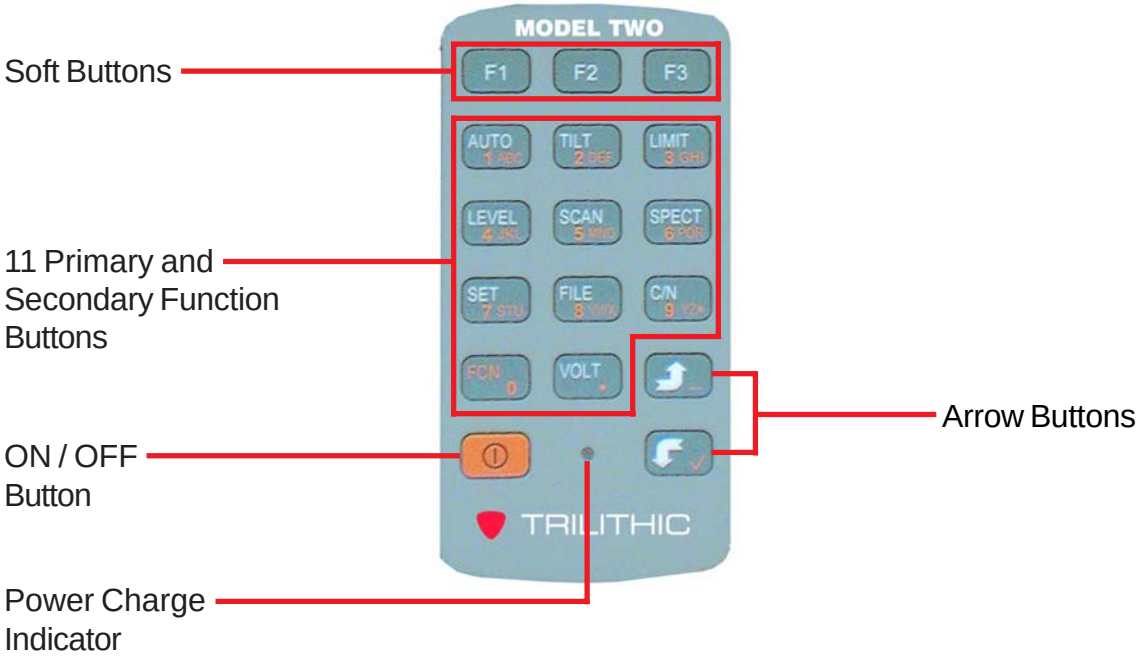
Identify Components

The Model Two's function buttons and backlit LCD display are on the front panel. The unit's charge socket and printer interface socket are on the bottom. The RF "F" connector is on the top of the unit. The belt clip is located on the back of the unit.



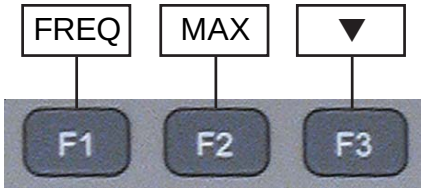
Key Pad

The key pad consists of the various buttons to access the Model Two's functions. There are eleven function buttons, two arrow buttons (up, down), the power on/off button and three "soft buttons" that enable you to perform functions in the display.



Soft Buttons

F1, **F2** and **F3** are used to access various functions within the display menus. On specific displays, three boxes appear at the bottom of the display. These boxes correspond to the three softkeys and provide additional commands such as ENTER, EXIT, SCALE, REF, movement arrows, etc. (See the individual function displays for more information.)



Function Buttons

The following is a list of the function buttons:

Key	Function	#	Purpose
	AUTO	1	Enter Auto Test Mode
	TILT	2	Enter Tilt Measurement Mode
	LIMIT	3	Enter Limit Test Mode
	LEVEL	4	Enter Single Channel / Frequency Measurement Mode
	SCAN	5	Enter Channel Spectrum Scanning Mode
	SPECT	6	Enter Frequency Spectrum Scanning Mode
	SET	7	Use for Fast Setup or Main Setup Menu
	FILE	8	Save or Recall Measurement Files
	C/N	9	Enter Carrier-to-Noise Ratio Measurement Mode
	FCN	0	Puts the key pad into alphanumeric mode for entering numbers or letters
	VOLT	.	Check Voltage (battery and power supply / drop)

Power ON / OFF

Use the **POWER ON / OFF**  button to turn the device on and off.

Arrow Buttons

Use the **UP**  and **DOWN**  buttons to change values within a function display.

Navigating Functions

Several methods are used to navigate the Model Two's functions. For some procedures, use **UP** and **DOWN** to make changes within a specific screen such as to increase or decrease values.

To scroll through a specific display's menu topics, you generally use the designated soft buttons (usually **F2** and **F3**).

Entering Numeric Values

Within several displays, you must enter numeric values. Press **FCN** to put the key pad in its secondary function mode, then press the number buttons to enter the desired value. For example, to enter the number 12:

Press 

Then press **F1**, the soft button for ENTER, to enter the value into the Model Two.

Entering Alphanumeric Characters

Similarly, you must enter alphanumeric data on several screens, such as File names, Channel labels, and Auto Test program names. As before, you press **FCN** to put the key pad into its secondary function mode, then press the buttons to enter the desired value. When you press a button in function mode, the first entry is the number associated with the button, after which you press the same button repeatedly to scroll through the letters associated with the button. To enter a second letter or number using a different button, you can go directly to the second button for entry. If you want to enter a second letter or number using the same button as the preceding character, you must press the **DOWN** arrow to shift the Model Two control to a new number or letter.

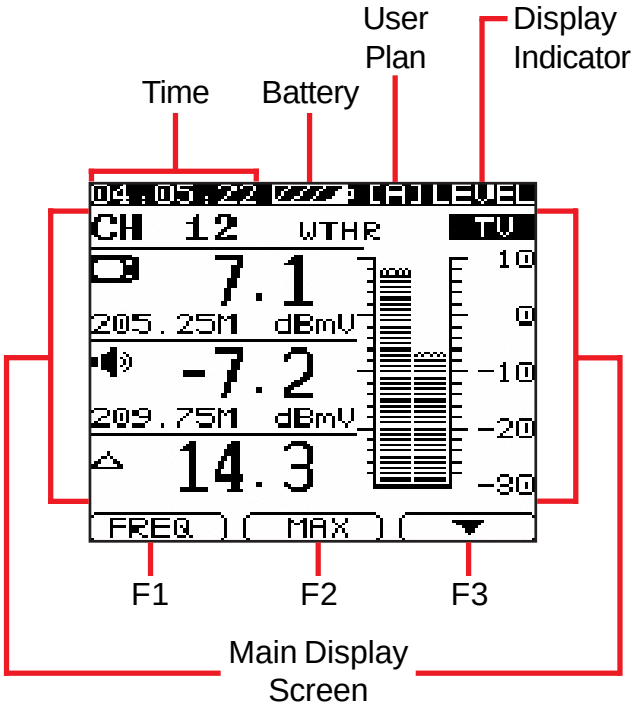
For example, to enter “TEST” in the Name field, do the following:

1. Press FCN 0 to switch to function mode.
2. Press SET 7 STU + SET 7 STU + SET 7 STU to enter “T” in the field.
3. Press TILT 2 DEF + TILT 2 DEF + TILT 2 DEF to enter “E” in the field.
4. Press SET 7 STU + SET 7 STU to enter “S” in the field
5. Press  to shift to a new entry with the same key.
6. Press SET 7 STU + SET 7 STU + SET 7 STU to enter “T” in the field.

Tip: If you make an error when entering a number or a name, you can press **F2** to go back and then re-enter it. Press **F3** to escape from the operation.

Display Screen Description

Each display contains the following sections or features.



Time - Displays unit's time based on time set up parameter (see *Date & Time* on Page 24).

Battery charge - Shows the approximate percentage of remaining battery charge. Flashes when the charge drops below 10%.

User Plan - Indicates the selected User Channel Plan.

Display Indicator - Indicates which function is being used.

Main Display Screen - Displays the parameters and graphs of the selected function.

F1, F2, F3 - Indicates the function of the soft buttons in the selected Model Two mode.

Note: The soft buttons vary from function to function on the meter (see *Soft Buttons* on Page 15).

Battery Charging

The Model Two has a built-in 3.6 V / 3.5 AH Ni-MH battery. When fully charged, it can be used for over six hours. When the battery charge drops below 10%, the battery symbol flashes in the information line at the top of the display screen. If the charge drops below 5%, the Model Two shuts off automatically to protect the battery. You cannot turn the Model Two on again until you recharge the battery.

To charge the Model Two's battery, connect the charge cube to the charge socket on the bottom of the Model Two (see *Identify Components* on Page 14) and plug the charger into an AC outlet.

WARNING: The battery **MUST** be charged with the Trilithic charge cube provided with the Model Two. Using any other charge cube may damage the battery.

While charging, the Model Two display indicates the charging mode with a charging curve and displays an approximate percentage of charge. The elapsed charging time is also displayed. A full charge will be achieved in less than 3 hours, after which the Model Two will shut off automatically.

When the battery charge is too low for the Model Two to turn on, but you need to use the unit immediately

1. Plug the charge cube into the Model Two.
2. When the charging screen appears, press softkey **F1** to permit Model Two operation.

CAUTION: The Model Two batteries will not charge during operation in this F1 mode. Also, any changes in the Model Two user settings, either manually or by connection to a PC, are not retained in this mode (with the charge cube connected).

When you first press **POWER ON/OFF**, the Model Two briefly displays the startup screen, then displays the Level screen.

CAUTION: The Model Two battery may need charging prior to first use (see *Battery Charging* on Page 20).

Before using the Model Two, you need to perform some setup procedures from the following areas:

- Information (general information about your Model Two and the status of user settings)
- General (backlight time, contrast, shutdown time, temperature units, date & time, and print setup)
- Measurement (signal level units, single frequency setup, limit setup, transmission)
- Channel Plan (select, learn, and edit the user plan, channel number display, tilt / favorite list)

Note: Model Two PC software may also be used to set up the Model Two. See the Model Two Toolbox II manual for more information.

To enter the setup display, do the following:

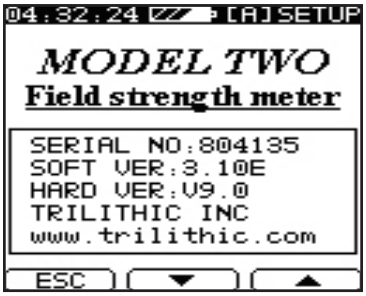
1. Press **SET** twice to display the main SETUP menu.

Note: Pressing **SET** once activates the Fast Setup mode to display setup parameters for the current mode. Pressing **SET** twice always displays the main Setup menu. (See *Fast Setup* on Page 38.)

2. Use **F2** and **F3** arrows to scroll through the main Setup menu.
3. When the desired command is highlighted, press **F1** (ENTER) to select the display.

Information

The Information display windows contain useful information regarding your Model Two.



The first screen of information shows the unit's serial number, firmware and hardware version, and the company's Web address. You can use the **F2** and **F3** keys to scroll through other information screens to see more information about the Model Two, including user settings. Press **F1** (ESCAPE) to return to the main Setup menu.

General

Use the General menu screen to set the operational parameters of your unit.

Use **F2** and **F3** to scroll through the command choices to the desired parameter.

Backlight

This selection determines the backlighting time on the Model Two display. Press **F1** (or use the **UP** and **DOWN** arrow keys) to change the backlighting time. The selected time is displayed in the window near the bottom of the display screen. You can select **ON** (backlighting is always on), **OFF** (backlighting is always off), or **3, 5, 10**, or **30** minutes (activates the backlight for the selected number of minutes, then turns it off to save power).

LCD Contrast

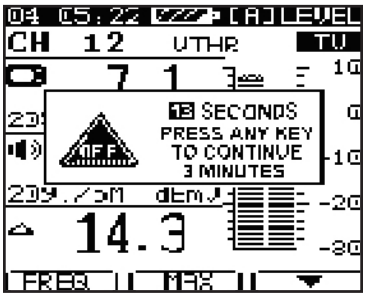
This selection determines the LCD contrast on the Model Two display. Press the **UP** arrow key to darken the contrast and the **DOWN** arrow key to brighten.

> **Note:** All signal levels below –30 dBmV (+30 dBµV) are displayed with lighter shade digits in all measurement modes to indicate they are low signal levels.

Shutdown Time

This selection sets the automatic shutdown timer. Press **F1** (or use the **UP** and **DOWN** arrow keys) to change the shutdown time. The selected time is displayed in the window near the bottom of the display screen. You can select **ON** (always on until manually turned off), or **3, 5, 10**, or **30** minutes (the Model Two shuts itself off when there has been no Model Two activity for the selected time interval).

A caution screen appears 20 seconds prior to automatic shutdown as shown below. This screen counts down the remaining time until shutdown and displays the shutdown time setting.



Press any key to reset the shutdown time to its current setting for continued operation, or press the **UP** and **DOWN** arrow keys to change the shutdown time setting.

Temperature Unit

This selection specifies the temperature units used by the Model Two. The selected temperature units are displayed in the window near the bottom of the display screen. Press **F1** or press the **UP** and **DOWN** arrow keys to select Fahrenheit or Centigrade.

Date & Time

This selection sets the date and time. Press **F1** to enter the date and time screen.

Do the following to enter the date and time:

1. Press **FCN** to perform alphanumeric entries. The current date disappears from the field. Enter the date in the date order displayed to the left of the field.
2. When you are satisfied with your entry, press **F1** again to log the date in the Model Two memory, then press **F2** to switch to the time field.
3. Press **FCN** to switch the Model Two to the numeric function. The current time disappears from the field. Enter the time (in 24-hour format). If you make a mistake while entering the time, you can press **F2** to back up.

Some tips for entering dates and times:

- The Model Two automatically assigns the first two digits of the year (20), so you only need to enter the last two digits of the year.
- You may change the order of the date between Y/M/D, D/M/Y, and M/D/Y by pressing the **UP** and **DOWN** arrow keys from within the date field.

CAUTION: The desired sequence for the Month, Day, and Year should be set before any files are saved in the Model Two. If the date sequence is changed after storing files, the date information for those files will not be correct.

- If you make a mistake while entering a date or time, you can press **F2** to back up or press **F3** to restore the date or time in the field.

Print Setup

This selection lets you set up and display printing options.

To select or deselect an option from the Print Setup menu, use **F2** or **F3** to scroll to the option, then press **F1**. A checkmark appears beside each selected option.

PRINT ALL - When this option is selected and multiple tests (Level, Scan, Spectrum, Tilt, or Limit) are stored in one file, all test reports in that file are printed. When this option is not selected, only the selected test in the file is printed, regardless of the number of tests stored in the file.

AUTO TEST PRINT - When this option is selected, the Model Two prints automatically after each Auto Test is performed. (Be sure to have a printer connected before starting the Auto Test.) When this option is not selected, automatic printing does not occur after each test. You can select and print the file at your discretion after testing.

PRINTER SETUP - Press **F1** to display the list of printers that may be used. (A checkmark appears beside the selected printer.) You can change the selected printer by using **F2** or **F3** to scroll through the list, then press **F1**. The Model Two returns to the Print Setup menu.

PRIOR MENU - Press **F1** to return to the previous menu.

LCD Test

This selection tests the LCD display. When you press **F1,** the Model Two display advances through four patterns to test the LCD, then returns to the menu. The patterns are all black, all white, vertical stripes, and checkerboard. Each pattern remains on the screen until you press **F1** to go to the next pattern.

Upgrade

Use this function to enter the authorization code to upgrade a Model Two Lite to full Model Two features.

Contact Trilithic to obtain an authorization code, then do the following:

1. Press **SET** (twice) to go to the MAIN SETUP menu.
2. Use the **F2** and **F3** to select GENERAL and press **F1**.
3. Use the **F2** and **F3** to select UPGRADE and press **F1**.
4. Press function for alpha/numeric entry and enter the 12 digit authorization code and press **F1**.

The Model Two will confirm correct entry of the code. Your Model Two Lite is now upgraded to Model Two.

Measurement

Use the Measurements menu screen to set the measurement parameters of your unit. Use **F2** and **F3** to scroll through the command choices.

Transmission

Use this selection to enable the transmission mode.

Press **F1** (ENTER), or press the **UP** and **DOWN** arrow keys to enable the Transmission mode. The selected transmission state (ON or OFF) is displayed in the window near the bottom of the display screen. Use this parameter to test for transmission characteristics and loss of in-between connections in your CATV system. (See *Transmission Characteristic Test* on Page 56.)

Level Units

Use this selection to set the signal level units for the Model Two. The selected signal level units are displayed in the window near the bottom of the display screen. Press **F1** or press the **UP** and **DOWN** arrow keys to switch between dBmV, dBµV, or dBmW.

Single Frequency Setup

Press **F1** to enter the Single Frequency Setup menu. Use this menu to set the parameters for the frequency display mode.

To select an item from the Single Frequency Setup menu, use **F2** or **F3** to scroll to the selection.

FREQ TUNING STEP - Select the meter's internal step values by pressing **F1,** or press the **UP** and **DOWN** arrow keys. The steps can be either 10 MHz, 1 MHz, 100 kHz, 10 kHz, or by Channel.

VOLUME - Use the **UP** and **DOWN** arrow keys to set the volume of the meter's internal speaker. The volume may be set to one of 4 levels or OFF. Audio is heard when in the Frequency mode.

SQUELCH - Press **F1** to select or deselect the squelch operation. When squelch is activated, the audio is muted when the Audio carrier level drops below –30 dBmV (+30 dBµV).

PRIOR MENU - Press **F1** to return to the previous menu.

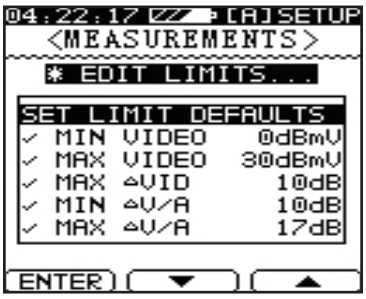
Limit Setup

Press **F1** to enter the Setup menu. Use this menu to set Scan parameters, including test limits.

To select an item from the Scan Setup menu, use **F2** or **F3** to scroll to the selection.

DISPLAY LIMITS - Press **F1,** or press the **UP** or **DOWN** arrow keys to select or deselect viewable Limits in Scan mode. When Display Limits is activated, the test limit settings for Minimum Video and Maximum Video can be seen on the display during channel scanning. (See *Channel Spectrum Scanning* on Page 46.)

EDIT LIMITS - Press **F1** to enter the Edit Limits menu. All parameters used in a Limit test may be set in this menu. (See *Limit Testing* on Page 48.)



Use **F2** or **F3** to scroll to each limit parameter.

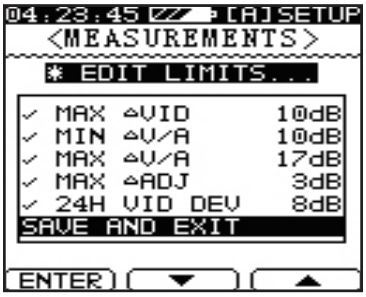
Select from the following:

Minimum Video Level	-20 to 59 dBmV (40 to 119 dBuV)
Maximum Video Level	-19 to 60 dBmV (41 to 120 dBuV)
Maximum Δ Video	2 to 30 dB
Minimum Video/Audio Difference	0 to 15 dB
Maximum Video/Audio Difference	5 to 30 dB
Maximum Δ Adjacent	0 to 20 dB
24 Hour Video Deviation	0 to 20 dB

A checkmark appears next to each enabled limit parameter. Press **F1** (ENTER) to enable or disable a limit parameter. Disabled limit parameters (indicated with an "X") are not tested during a Limit Test.

Press the **UP** and **DOWN** arrow keys to change each limit value. You may also press **FCN,** enter numeric data, and then press **F1** to change a limit.

You may scroll to SET LIMIT DEFAULTS and press **F1** to return all limits to their standard settings.



Once you have set the levels for each parameter, scroll to SAVE AND EXIT and press **F1** to return to the previous screen.

MARKER - Use this selection to switch between channel and frequency indicators for markers in the Scan mode. Use **F1** (ENTER), or press the **UP** or **DOWN** arrow keys to change the marker.

PRIOR MENU - Press **F1** to return to the previous menu.

Reset Max Hold

Use this selection to reset the maximum hold value when using Max hold in Spectrum mode. Press **F1** (ENTER) to reset the Spectrum mode data.

Prior Menu

Press **F1** to return to the main Setup menu.

Channel Plan

Use the Channel Plan menu screen to select, learn, and edit up to 5 channel plans for your unit. Use **F2** and **F3** to scroll through the command choices.

Select User Plan

Use this selection to set the active user plan. You can have up to five user-defined channel plans (A—E) on the Model Two. Use **F1** (ENTER), or press the **UP** and **DOWN** arrow keys to change the selected user plan.

Channel Numbers

Use this selection to choose the channel identifier in the Model Two. Use **F1** (ENTER), or press the **UP** and **DOWN** arrow keys to select between Standard or EIA channel numbering.

Learn User Plan

Use this selection to learn a channel plan (for the selected user plan) from your cable system.

CAUTION: Whenever you learn a new Channel Plan, the previously edited parameters are overwritten by the new plan, and all files and Auto Test programs that were saved with the previous plan are deleted.

Press **F1** to learn a channel plan. A prompt appears to instruct you to connect the CATV cable to the Model Two. A list of 8 base Channel Plans is displayed.

Use **F2** or **F3** to scroll through the list to the desired base plan. With the CATV cable connected, press **F1,** and the Model Two searches for all active channels in your system. A progress bar at the bottom of the screen indicates search progress.

Once the search is completed, the Model Two displays a prompt indicating the new Channel Plan is being saved. This learned Channel Plan (for the selected User Plan) has all active channels enabled . Those channels with levels less than -15 dBmV (45 dBµV) are not enabled.

Note: If a Channel Plan is learned with less than 3 active channels found (or the cable is not connected to the Model Two), all channels in the plan are enabled.

After learning a Channel Plan, the Model Two returns to the Level Measurement mode. You may then modify the various parameters in the plan.

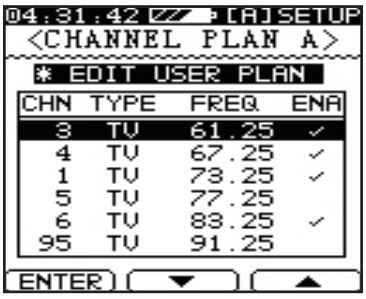
To return to the Channel Plan Setup menu to edit your User Plan, press **SET** twice to return to the main Setup menu, use **F2** or **F3** to scroll to the Channel Plan selection, press **F1** (ENTER) to display the Channel Plan menu and then use **F2** or **F3** to scroll to Edit User Plan.

Edit User Plan

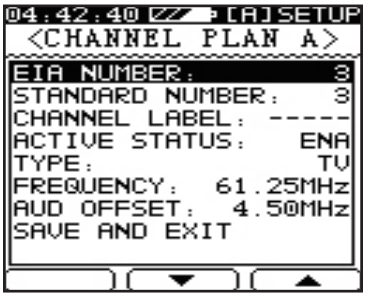
Once you have learned a Channel Plan, you can edit the plan.

CAUTION: Whenever you edit a Channel Plan, all files and Auto Test programs that were saved with the User Plan prior to editing are deleted.

Press **F1** to display the selected User plan for editing.



Within the Edit User Plan display, use **F2** or **F3** to scroll through the list of channels. All enabled channels have a checkmark under ENA. When the channel you wish to modify is highlighted, press **F1** (ENTER). The selected Channel Setup screen appears.



To select the channel's parameters, use **F2** and **F3** to scroll up and down the list. There are different methods for modifying each parameter.

Note: When using **FCN** to make an alphanumeric entry, remember to press **F1** (ENTER) once you have made an entry to store the new data. (See *Entering Alphanumeric Characters* on Page 17.)

EIA Number - Press **FCN** to switch to alphanumeric entry mode, then enter the desired EIA number for the channel. When you are satisfied with your entry, press **F1** (ENTER) to store the change.

Standard Number - Press **FCN** to switch to alphanumeric entry mode, then enter the desired standard number for the channel. Press **F1** (ENTER) to store the change.

Channel Label - Press **FCN** to switch to alphanumeric entry mode, then enter the desired label (up to 5 characters) for this channel. Press **F1** (ENTER) to store the channel label.

Active Status - Press **F1** to switch between ENA (enabled) and DIS (disabled). Enabling a channel adds it to the selected User Channel Plan. Disabling a channel removes it from the User Plan.

Type - Use **F1** to toggle between the channel types (TV, SIGL, DIGI, or DUAL).

Note: The rest of the parameters in the edit list are affected by which type of channel is selected.

TV - Audio and Video carriers (parameters: Frequency, Audio Offset)

SIGL - Single Frequency Channels (parameters: Frequency, Measure BW)

DIGI - Digital Channels (parameters: Frequency, Measure BW)

DUAL - Dual Audio Channels—(parameters: Frequency, Audio 1 Offset, Audio 2 Offset)

Frequency - Press **FCN** to switch to Numeric Entry mode and enter the desired frequency (Video Frequency for TV and DUAL type channels or Center Frequency for DIGI and SIGL type channels). Once the desired modification is made, press
F1 to store the change.

Note: The new frequency you enter should always be less than 870 MHz.

Aud Offset - Press **FCN** to switch to Numeric Entry mode and enter the positive offset of the audio frequency from the video carrier. Press **F1** (ENTER) to store the change. (This parameter appears for TV type only).

Note: The sum of this offset and the video carrier frequency should never be more that 870 MHz.

Measure BW–-Press **FCN** to switch to Numeric Entry mode and enter the measurement bandwidth for this channel. Press **F1** (ENTER) to store the change. (This parameter appears for DIGI and SIGL types only.)

Note: The sum of ½ of this bandwidth and the center frequency should never be more that 870 MHz.

Aud1 Offset—Press **FCN** to switch to Numeric Entry mode and enter the positive offset of the first audio frequency from the video carrier. Press **F1** (ENTER) to store the change. (This parameter appears for DUAL type only).

Aud2 Offset—Press **FCN** to switch to Numeric Entry mode and enter the positive offset of the second audio frequency from the video carrier. Press **F1** (ENTER) to store the change. (This parameter appears for DUAL type only).

Note: The sum of this second offset and the video carrier frequency should never be more that 870 MHz.

When you are satisfied with your entries, highlight SAVE AND EXIT and press **F1** (ENTER) to return to the Edit User Plan screen.

Adding a Channel: A channel may be added while in the Edit User Plan list of channels by pressing the **UP** arrow key. A Channel Edit screen appears for the new channel with the next available channel number assigned. This channel number may be changed, but an existing number in the plan (enabled or not) may not be used. Other parameters on the new Channel Edit screen should be set, including frequency, which has a default setting of 5 MHz. When finished, select SAVE AND EXIT and press **F1** (ENTER) to return to the Edit User Plan screen.

All channels, including a new channel, appear in the Channel Plan according to frequency—not channel number.

Deleting a Channel: A channel may be entirely deleted while in the Edit User Plan list of channels by pressing the **DOWN** arrow key. If a channel is deleted, it will not be available to enable later, and it will not be scanned in the full spectrum scan mode. It is recommended that a channel be disabled instead of deleted from the plan.

When you have completed your changes to all channels that require edit in the User Plan, press **SET** to save the modifications and return to the main Setup menu.

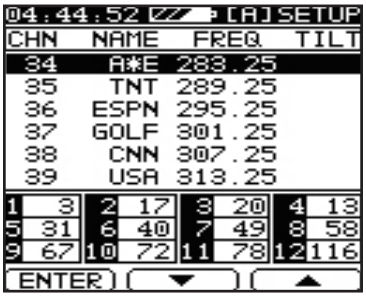
> **CAUTION:** All edits are temporarily stored until you exit the Edit User Plan screen. Do not turn off the Model Two before exiting the Edit User Plan screen, or the changes will not be saved.

Tilt/Level List

This feature lets you select up to twelve favorite channels. These channels are also used when making the Tilt measurement.

> **Note:** You must select at least four channels to make the Tilt Measurement. The Model Two uses the highest and lowest frequencies when making the measurement.

Press **F1** (ENTER) from the Tilt/Level List selection on the Channel Plan Setup menu to enter the Tilt Setup screen.



To add a channel to the Favorites list, use **F2** and **F3** to scroll the list of channels in the selected User Plan. When the desired channel is highlighted, press **F1**. A check mark appears next to the channel under the Tilt column, and the channel number is placed in the Favorites column at the bottom of the display. As you add channels, the Favorites list arranges them in order of their frequency. For example, even if you selected Channel 14 first, as you add Channels 4 and 6, these channels go to the top of the list.

> **TIP:** Use the **UP** and **DOWN** arrow keys to scroll through the User Plan list one page (6 channels) at a time.

To delete a Tilt/Favorite channel, scroll to the channel and press **F1**. The channel is removed from the list.

Once you have selected from four to twelve favorite channels, press **SET** to save the information and return to the main Setup menu.

Load Defaults

Press **F1** (ENTER) to load the factory default settings for the Model Two and then display the Level screen.

Prior Menu

Press **F1** (ENTER) to return to the main Setup menu.

Basic Operation 5

Once you have set up the Model Two's parameters, you are ready to operate the unit.

There are a number of tests you can perform with the Model Two:

- Single channel level tests
- Frequency mode
- Channel spectrum scans
- Limit tests
- Frequency spectrum scanning
- Carrier-to-noise
- Tilt and favorite channel levels
- Battery and trunk voltage

Note: The Model Two displays readings down to -50 dBmV (+10 dBµV). All signal levels that are below -30 dBmV (+30 dBµV) are displayed with lighter shade digits in all measurement modes to indicate they are low signal levels.

Fast Setup

The Model Two features a Fast Setup function for each measurement mode (except Carrier-to-noise and Voltage that do not require setup). The specific setup menu for each mode can be accessed directly by pressing the **SET** key once while in the Measurement mode. This makes it unnecessary to go back to the main Setup menu and look for nested submenus. This allows the operator to quickly make changes in the settings and return to Measurement mode with no wasted time.

Note: Pressing the **SET** key twice always displays the main Setup menu.

Single Channel Level Testing

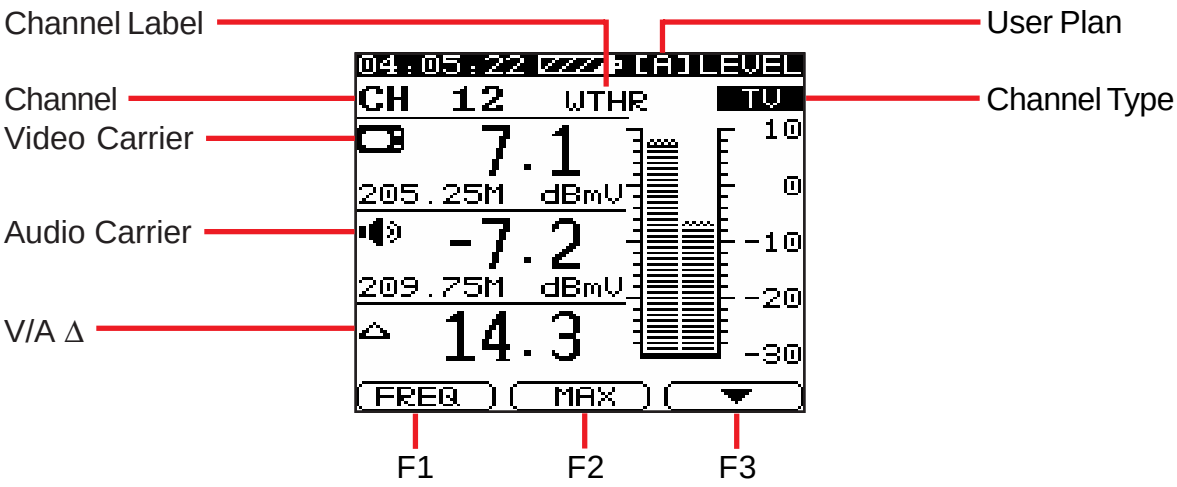
When set to the single channel level test, the Model Two displays bar graphs of the video and audio carriers as well as numeric readouts of the carrier amplitudes and V/A difference. The Model Two can also display a spectrum scan of the selected channel showing the amplitudes of the video and audio carriers and undesired signals that may be present, such as intermodulation.

To access the Level screen, press **LEVEL**.

The Model Two displays the Level screen for the last channel it was on before being turned off.

TV Channels

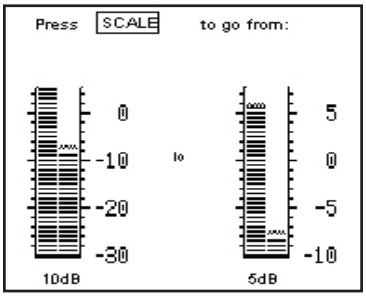
When measuring a TV type channel with audio and video carriers (see *Edit User Plan* on Page 33), the left column of the bar graph represents the video carrier while the right column displays the audio carrier. The V/A Δ is displayed below the video and audio carriers.



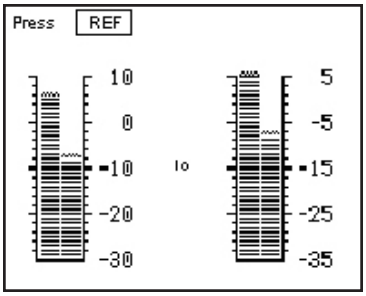
To change the channel, use the **UP** and **DOWN** arrow keys or press **FCN,** enter the desired channel number, and press **F1** (ENTER).

The Level screen displays a scale that you can adjust by pressing **F3** (DOWN) so that the functions of softkeys **F1** and **F2** become SCALE and REF. Press **F1** (SCALE) to vary the graduation of the scale according to a 1, 2, 5, and 10 dB per division scale.

For example, to change the display graph from a 10 dB scale to a 5 dB scale, press **F1** three times to cycle through the steps.



You may also change the reference level of the graph. Press **F2** (REF) and then press the **UP** and **DOWN** arrow keys to increase or decrease the reference by one digit at a time.



Note: The amplitude of the graph changes as you change the scale and reference so that it continues to indicate the correct level. You must press **F3** (UP) to return to the original Level screen for the **UP** and **DOWN** arrow keys to change channels (instead of reference) again.

Press **F3** (UP) to return to the original Level screen so that the functions of softkeys **F1** and **F2** become **FREQ** and **MAX**.

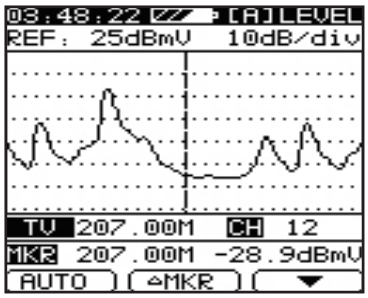
The Model Two digital readout can be set to display a LIVE, MAX, or Δ P-P signal level as an aid to troubleshooting. Press softkey **F2** to select the desired display mode as described below:

- **LIVE** is the normal operating mode whereby the digital display indicates the current value of the input signal.
- In the **MAX** mode, the digital display indicates the maximum level of the input signal. In this mode, an "**M**" is displayed after the digital reading.
- In the Δ **P-P** mode, the digital display indicates the variation in the input signal level. In this mode, a "Δ" is displayed after the digital reading.

The analog bar graphs for Audio and Video continue to indicate the LIVE level in all modes, while the wavy line at the top of each bar indicates the maximum level of the Audio and Video signals.

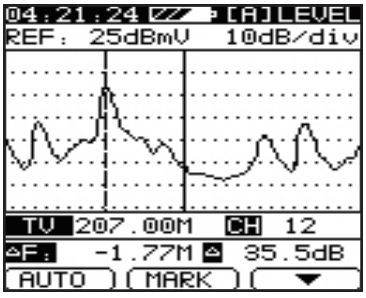
Single Channel Spectrum

The Model Two can scan the spectrum of the designated channel automatically. This function is particularly useful for CATV measurements. To scan the channel spectrum, press **LEVEL** again. The Model Two displays the spectrum screen and scans the channel for data, which it then graphs on the screen.



The Center Frequency and Channel Number are displayed, along with the Marker Frequency and Level. Use the **UP** and **DOWN** arrow keys to move the Marker Frequency to any position in the channel spectrum.

A **Δ Marker** function can also be used to check the distance (in MHz) and amplitude difference between any 2 points in the displayed spectrum. First, use the **UP** and **DOWN** arrow keys to move the marker to a reference position, then press **F2** (Δ MKR). The **UP** and **DOWN** arrow keys now move the second marker from the reference position, and the Δ Frequency and Δ Level are displayed. Press **F2** (MARK) to return to the normal single-marker spectrum display.



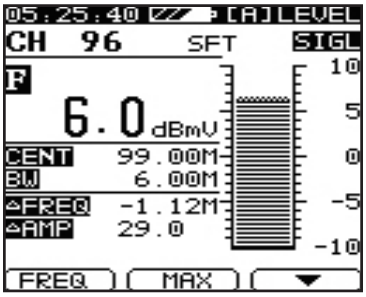
Use F1 (AUTO) to automatically set a scale and reference for the displayed spectrum graph. You may also set the Scale and Reference manually by pressing **F3** (DOWN) and using **F2** and **F3** for Scale and Reference as described for the preceding Level display mode.

Single Frequency Channels

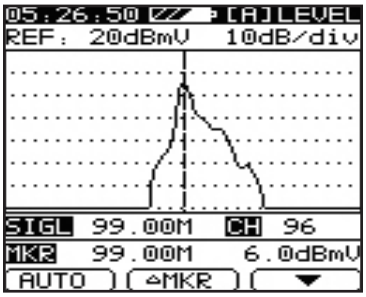
You can use the Model Two to measure a Single Frequency level over a specified bandwidth. To do this, first set the Model Two's channel type to SNGL or single frequency channel (see *Edit User Plan* on Page 33).

> **TIP:** While in Level mode, you can use Fast Setup to go directly to the setup parameters for the current channel.

The level for the signal is displayed along with an F to indicate Single Frequency mode. Also displayed are Δ FREQ and Δ AMP to indicate the distance and amplitude difference between the center frequency and the highest peak of the signal in the bandwidth.



To scan the channel spectrum, press **LEVEL** again.

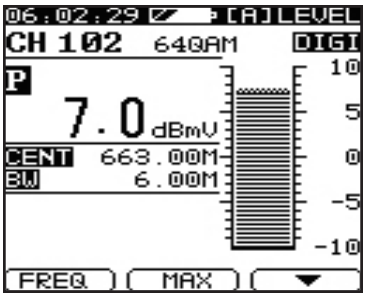


Note: With a Single Frequency Channel, the Level (Live, Max, Δ p-p), Scale, Reference, Auto, Marker, and Δ Marker may be used as described for TV Channels.

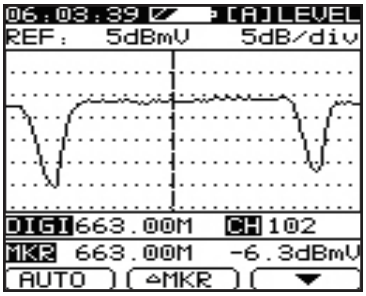
Digital Channels

You can use the Model Two to measure the average power of a digital channel according to the configured bandwidth. To do this, first set the Model Two's channel type to DIGI (see *Edit User Plan* on Page 33).

The level for the signal is displayed, along with a P to indicate the power level over the specified bandwidth for DIGI mode.



To scan the channel spectrum, press **LEVEL** again.



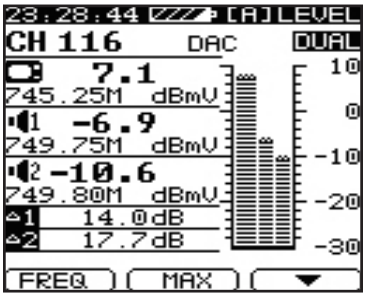
Note: With a Digital Channel, the Level (Live, Max, Δ p-p), Scale, Reference, Auto, Marker, and Δ Marker may be used as described for TV Channels.

The Marker level indicated for a DIGI signal in the channel spectrum mode is only the level at the marker frequency and not the total power for the channel bandwidth. You can return to the single-channel level mode (press **LEVEL** again) to read the total power of the set bandwidth.

Dual Audio Channels

You can use the Model Two to measure TV signals with dual Audio channels. To do this, first set the Model Two's channel type to DUAL, or dual audio channel (see *Edit User Plan* on Page 33).

The level for the Video and both Audio channels is displayed, along with V/A Δ for each audio level.



To scan the channel spectrum, press **LEVEL** again as described for other channel types.

Note: With a Dual Audio Channel, the Level (Live, Max, Δ p-p), Scale, Reference, Auto, Marker, and Δ Marker may be used as described for TV Channels.

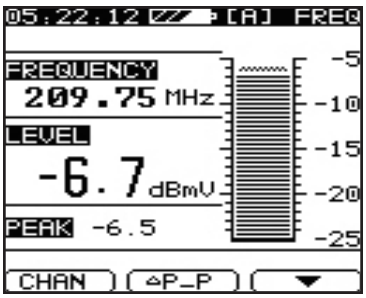
Frequency Mode

When set to the Frequency Mode, the Model Two displays the frequency and level for the desired channel. To access this screen, press **LEVEL**.

The Single Channel Level screen is displayed.

Now, press **F1** (FREQ).

This toggles the Model Two so that it displays the Frequency screen for the channel designated in the Single Channel Level screen.



If the channel is a TV or DUAL type channel with audio and video carriers, the Model Two is tuned to the audio frequency (Audio 1 if dual type). The signal level and peak level are displayed.

If the Volume has been set, you hear the channel's audio. If the Squelch function has been enabled, audio is heard only with signal levels above -30 dBmV (+30 dBµV).

> **TIP:** While in Frequency mode, you can use Fast Setup (press **SET** once) to go directly to the Single Frequency Setup parameters including volume, squelch, and frequency steps.

To change the frequency that is being measured, press the **UP** and **DOWN** arrow keys. The frequency moves in increments set in the Single Frequency Setup menu.

Note: By pressing **FCN**, you can enter the desired frequency. To finish, press **F1** (ENTER).

The level display can be set to display a LIVE or Δ P-P (variation) signal level by pressing the softkey **F2**.

The Scale and Reference shown on the Frequency screen can be adjusted by pressing **F3** (DOWN) so that the functions of softkeys **F1** and **F2** become SCALE and REF. Press **F1** (SCALE) to vary the graduation of the scale by 1, 2, 5, and 10 dB per division. Press **F2** (REF) and then press the **UP** and **DOWN** arrow keys to increase or decrease the reference.

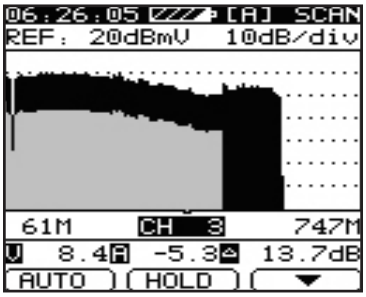
Press **F3** (UP) to return to the original softkey functions of CHAN and Δ P-P so the **UP** and **DOWN** arrow keys change frequency (instead of reference).

Channel Spectrum Scanning

The Model Two is designed to display the full span of video and audio carriers in your system. This function provides a quick check of your system's overall flatness and amplitude.

The Model Two can also be set to display the video and audio carriers at reduced frequency spans. Amplitude limits can be imposed on the display, while a convenient Frequency Marker enables you to *zoom* in on any suspect channels.

To enter the Channel Spectrum Scanning screen, press **SCAN**. The currently selected User Channel Plan measurement data is displayed in a graph with a viewing range of 126 channels. (This can be extended to 150 by adjusting the Scan Marker line).



The Audio levels are shown graphically with a light shade, while Video levels are shown darker. Digital channels (DIGI) and Single Frequency channels (SNGL) that do not have separate audio and video components are shown as all dark.

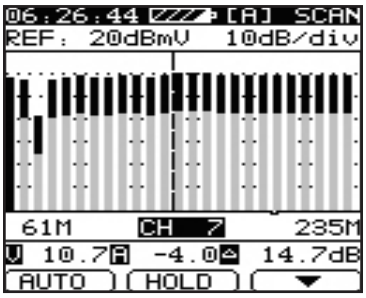
The Model Two also displays the marker (channel or frequency) and its video, audio, and V/A Δ levels along with the Low (starting) and High (ending) frequencies.

When entering Scan mode, the marker is positioned on the last channel used in Level mode. This makes it easy to quickly view a selected channel within the channel plan.

To change the marker channel, press the **UP** and **DOWN** arrow keys. You can also press **FCN** and enter the channel (or frequency if selected), then press **F1** to move the marker to the desired location.

Note: The marker may be changed from channel number to frequency: Press **SET** once for Fast Setup, select **Marker**, and press **F1** to change the marker indication.

You can zoom in on the marker position by pressing **SCAN**. The Model Two supports 5 levels of magnification (1x, 2x, 3x, 4x, and 5x).



The minimum span (5x) shows 25 channels of data.

To return to the original zoom level, keep pressing **SCAN** to cycle through the zoom magnifications.

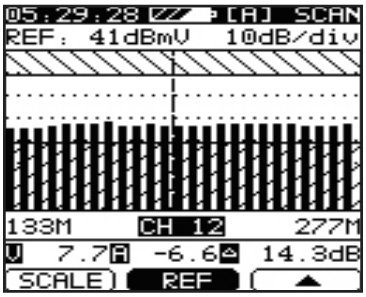
You can stop the scanning process so you can study the graph without losing the current data. In the Channel Scan screen, simply press **F2** (HOLD). The scanning marker stops moving. To resume scanning, press **F2** (TRIG).

To set the reference level and the scale automatically, press **F1** (AUTO). The Model Two selects the optimal scope for your system.

The Scale and Reference shown on the Channel Scan screen can also be adjusted manually by pressing **F3** (DOWN) so that the functions of softkeys **F1** and **F2** become Scale and Ref. Press **F1** (SCALE) to vary the graduation of the scale by 1, 2, 5, and 10dB per division. Press **F2** (REF), then press the **UP** and **DOWN** arrow keys to increase or decrease the reference. Press **F3** (UP) to return to the original softkey functions of Auto and Hold.

Display Limits

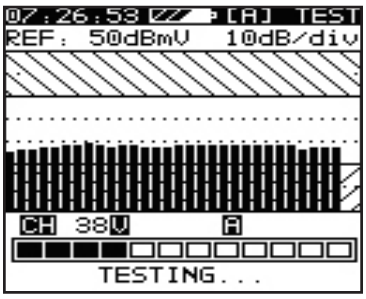
When Display Limits is set to Yes in the Scan Setup menu (see *Limit Setup* on Page 29), the Channel Scan display shows the limit lines for the specified Minimum Video level and Maximum Video level.



TIP: While in the Channel Scan mode, you can use Fast Setup (press **SET** once) to go directly to the Scan Setup parameters, including Marker type, Display Limits, and the Edit Limits screen.

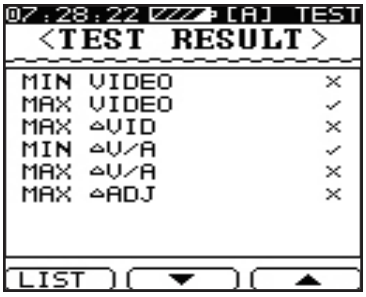
Limit Testing

The Model Two can quickly perform a test of the cable system to specified test limits with a single key press. The selected User Channel Plan is tested to all enabled limit parameters as set in the Edit Limits display from the Limit Setup menu. (See *Limit Setup* on Page 29.) To perform the Limit Test, press **LIMIT**.

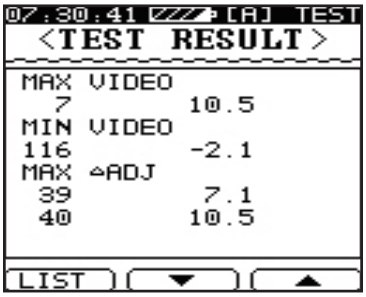


Channels are displayed momentarily as each channel is scanned. In addition, a progress bar indicates the scan status.

When the Limit Test is complete, a Test Result summary screen appears to indicate the Pass or Fail status for each test parameter. Each test that has passed has a checkmark next to that parameter. Each test that has failed has an X next to that parameter.



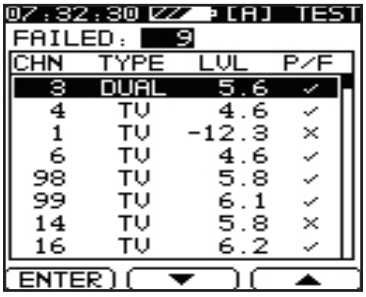
The Maximum Δ Video and Maximum Δ Adjacent channel status are determined by the results of the overall channel plan measurements. Press **F2** or **F3** to view the Minimum and Maximum Video channels and levels. Also, if a failure has occurred for the Maximum Δ Adjacent channel test, the adjacent channels with the greatest variation are listed.



Note: A digital (DIGI) type channel is measured during the Limit Test but is not used to determine Pass or Fail for any of the tests.

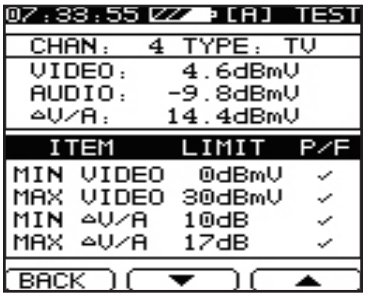
The Minimum Video, Maximum Video, Minimum Δ V/A, and Maximum Δ V/A are tested for all channels in the User Plan. If any channel fails one of these tests, the Test Result summary indicates a failure (X) for that test. If all channels pass one of these tests, the Test Result summary indicates a pass (checkmark) for that test.

The results for each channel from the individual channel tests can be viewed by pressing **F1** (LIST). The total number of failed channels is shown at the top of the display, and each channel is listed with the channel type, signal level (Video level if TV or Dual type), and a pass or fail indication. Each channel that has passed all four individual channel tests displays a checkmark. Each channel that has failed any of the 4 individual channel tests displays an X".



You can use **F2** and **F3** to scroll through the list of channels one at a time, or use the **UP** and **DOWN** arrow keys to scroll one page (8 channels) at a time.

Press **F1** to look at the Limit Test information for a specific channel.



The Video level, Audio level, and Δ V/A for the selected channel are shown at the top of the individual channel information screen. The Limit Test setup for the channel test parameters is displayed at the bottom of the screen with a Pass or Fail indication for each parameter.

Frequency Spectrum Scanning

The Model Two can be set to display spectrum measurements with spans ranging from 2.5 to 62.5 MHz. It can also be set for a full spectrum scan of the base channel plan with sampling at each video carrier frequency.

Note: The Model Two can show spectrum data with absolute measurements, or it can store data for comparative tests using the TRANSMISSION feature.

Note: TRANSMISSION mode is set up in the Measurement menu. Since the following data is for normal (absolute) spectrum scanning, TRANSMISSION should be set to OFF in the MEASUREMENT menu (see *Measurement* on Page 27).

TIP: While in the Spectrum mode, you can use Fast Setup (Press **SET** once) to go directly to the Measurement Setup parameters including Transmission.

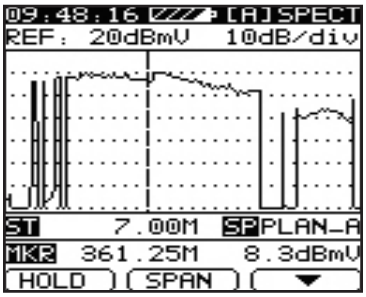
For further information on Transmission operation, see *Transmission Characteristic Test* on Page 56.

The following information is for normal (absolute) spectrum scanning.

To enter the Frequency Spectrum Scanning screen, press **SPECT**.

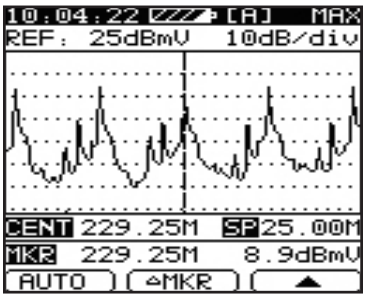
When the Full Spectrum scan is displayed, the Span indicator (SP) is displayed as PLAN_A-E (full span of selected user base plan). The starting frequency (ST) is shown along with the marker frequency and level.

Note: With Full Spectrum scan, all video carrier frequencies in the selected Base Channel Plan (including those disabled for Channel Scan) are scanned.



To move the marker frequency, press the **UP** and **DOWN** arrow keys.

To change the scanning bandwidth, press **F2** (SPAN). The span cycles through 2.50M, 6.25M, 12.50M, 25.00M, 62.50M and PLAN_A-E (full span).



When a span other than full span (PLAN_A-E) is selected, the display shows the center frequency.

To change the center frequency, press **FCN** to place the keypad in its numeric function. Enter the desired new center frequency and press **F1** (ENTER). If you enter an incorrect digit, do not press **F1**. Instead, press **F2** (BACK). You can exit the procedure by pressing **F3** (ESC) to return to the original center frequency.

The Spectrum mode can be set to hold the maximum (peak) spectrum data for display. Each time **SPECT** is pressed, the Model Two switches between Live and Max modes. **MAX** appears in the upper-right corner of the display when this mode is used. The Max hold data is retained as long as the Model Two is on. To reset the Max hold data in Spectrum Mode, you must select **RESET MAX HOLD** in the Measurements Setup menu.

> **TIP:** While in the Spectrum mode, you can use Fast Setup (press **SET** once) to go directly to the Measurement Setup parameters, including Reset Max Hold.

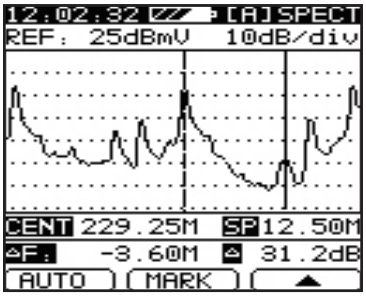
You may wish to stop the scanning process so you can study the graph. In the Spectrum screen, simply press **F1** (HOLD). The scan marker stops moving. To resume scanning, press **F1** (TRIG).

Other functions are available by using the **F3** key to change the function of softkeys **F1** and **F2**.

Press the **F3** key to change the function of softkeys **F1** and **F2** to Scale and Ref. Change the display scale by pressing softkey **F1** (SCALE). Change the reference level by pressing softkey **F2** (REF) and using the **UP** and **DOWN** arrow keys to change the reference.

Press the **F3** key to change the function of softkeys **F1** and **F2** to Auto and ΔMkr. To set the reference level and the scale automatically, press **F1** (AUTO). The Model Two selects the optimal scope for your system.

A Δ Marker function can be used to check the distance (in MHz) and amplitude difference between any 2 points in the displayed spectrum. First, use the **UP** and **DOWN** arrow keys to move the marker to a reference position, then press **F2** (ΔMKR). The **UP** and **DOWN** arrow keys now move the second marker from the reference position, and the Δ Frequency and Δ Level are displayed.

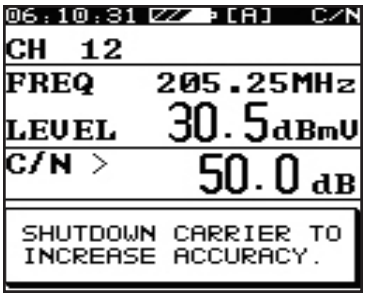


Press **F2** (MARK) to return to the normal single-marker Spectrum display.

Carrier-To-Noise Measurement

The Model Two measures C/N on the last channel selected in Level mode.

To enter the C/N screen, press **C/N**.



The Model Two measures the C/N difference of the selected channel. First, it measures the Video Carrier Level of the selected channel. The Video Carrier Level MUST be greater than 25 dBmV (85 dBμV) for the C/N function to operate.

If the measured Video Carrier is greater than 25 dBmV (85 dBμV), the Model Two displays a *please wait...* message prompt. Then, the Model Two measures the noise level away from the Video Carrier and calculates the C/N ratio of the selected channel. The value of the C/N difference is displayed on the screen.

If the Video Carrier is shut down as prompted on the display, the Model Two reads the noise in the measured channel bandwidth and uses this to calculate the C/N ratio for improved accuracy.

The measured channel may be changed by using the **UP** and **DOWN** arrow keys.

Tilt and Favorite Channel

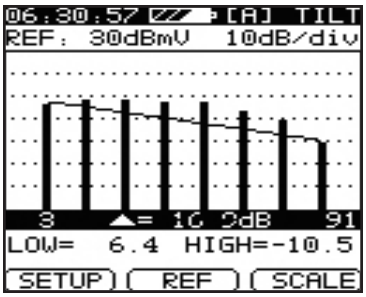
When installing and maintaining your CATV system, you may want to concentrate on the level of only a few channels and the gain distribution of the transmission line.

You can use the Tilt and Favorite Channel function to display and adjust the level and work status of your system. You may have up to 12 favorite channels for each User Plan. To enter the Tilt and Favorite Channel screen, press **TILT**.

Note: You must have at least four channels selected for the Tilt/Favorite display to operate.

The Tilt Setup display can be accessed directly by pressing **F1** (SETUP). See the Tilt/Level List Setup section of the Channel Plan Setup menu (see *Tilt/Level List* on Page 36).

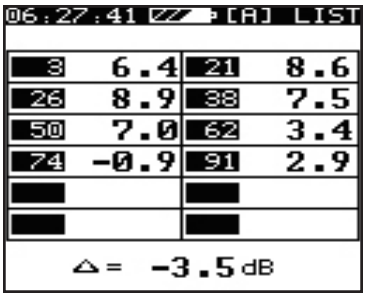
When 4 to 12 channels have been selected for Tilt/Favorite channels, the Tilt screen can be displayed with a graph of the Video levels for each channel.



The measured levels of the LOWEST and HIGHEST frequencies listed in the Tilt/Favorite list are used to calculate tilt. These levels and the tilt calculation (Δ) are displayed.

To adjust the reference level, press **F2** (REF), then press the **UP** and **DOWN** arrow keys. To change the scale, press **F3** (SCALE).

To bring up the list of favorite channels, press **TILT** again.



The Model Two displays the list of favorite channels with their Video Carrier Levels and the tilt calculation.

Battery and Trunk Voltage Measurement

The Model Two is equipped with a built-in voltmeter that can be used to troubleshoot problems with power supplies or power drops. The Model Two accommodates AC or DC voltages up to 100 Volts. To enter the Voltage screen, press **VOLT**.

The Voltage screen displays two bar graphs.

The top bar graph indicates the battery charge of your Model Two. This approximate charge level and the battery voltage are also displayed numerically. As you use your unit, you can access this screen to check the remaining battery power.

When the battery charge drops below 10%, the battery symbol *flashes* in the information line at the top of the display screen. If the charge drops below 5%, the Model Two shuts off automatically to protect the battery. (See *Battery Charging* on Page 20.)

The lower bar graph indicates the AC or DC voltage of the system's trunk.

The Model Two automatically detects the presence of an AC or DC voltage and displays the measurement graphically and numerically.

The voltmeter specifications are:

Input Range	1.0 - 100 VDC, 1.2 - 100 VAC
Resolution	0.1 V
Accuracy	+/- 1.0 V

Advanced Operation 6

Once you have a general understanding of the Model Two's basic features, you can try the advanced features, such as testing for transmission characteristics, auto-testing, saving data, and printing reports.

Transmission Characteristic Test

The Model Two enables you to test the transmission characteristics (gain and tilt) of your CATV distribution system. Maintaining proper gain and tilt is a necessary step in ensuring the quality of signals delivered to your customers.

The Model Two enables you to do this by setting a reference at a known good test point such as the headend's output test point or a node's output test point. This reference can then be compared to the transmission response at other places in the distribution system to allow proper gain and tilt adjustments of the distribution system.

To test the transmission characteristics, you first need to enable the Transmission option.

From Spectrum mode, the Measurements Setup menu, including Transmission, can be accessed quickly with Fast Setup by pressing **SET** once. With Transmission selected, press **F1** to switch from OFF to ON.

The Model Two asks if you want to replace the zero reference data.

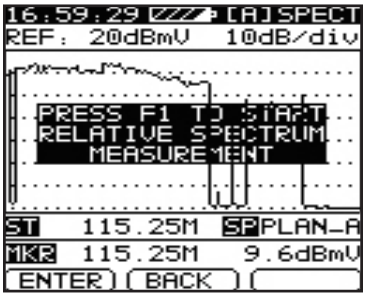
To replace the zero reference data, press **F1** (YES). To use the existing Zero Reference level, press **F2** (NO). You can exit this screen by pressing **F3** (ESCAPE).

Note: The first time you use the Model Two, you should press **F1** to replace the initial Zero Reference data.

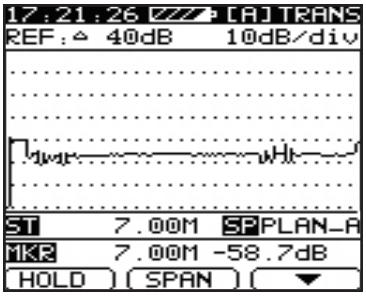
When you press **F1** to replace the Zero Reference data, the Model Two prompts you to connect the unit to the cable system.

After you have connected the CATV source to the Model Two, press **F1** (ENTER). The Model Two scans all video carrier frequencies in the selected Base Channel Plan, including those disabled for channel scan. (See *Channel Plan* on Page 31.)

When the Model Two has completed the new Zero Reference scan, a prompt appears to press **F1** to start a Relative Spectrum measurement.



Press **F1** (ENTER) to start the Relative Spectrum measurement.



The Model Two displays the transmission measurement. The reference level indicates Δ dB to show the difference between the current Scan Level and the Zero Reference scan. In the example above, a 6 dB loss is seen with the transmission measurement.

Note: Channels in the Base Channel Plan that are not active on your system have a transmission indication near 0 dB, because there was no signal to be changed. A User Plan can be configured with only active channels by deleting the unused channels (See *Edit User Plan* on Page 33.) This provides a transmission scan with all active data.

The new Zero Reference remains in the Model Two's nonvolatile memory even when the Model Two is turned off. This enables you to measure the level's relative change at a later time. To perform a new Transmission Test at any time, confirm that TRANSMISSION is set to ON in the Measurement Setup menu and then press **SPECT**. The Model Two performs a Spectrum Scan and compares it to the reference data.

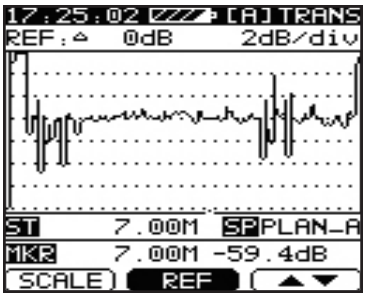
Press **UP** or **DOWN** to move the marker frequency.

Note: The Span function does **NOT** operate when the Model Two is in the TRANSMISSION mode. For normal (absolute value) Spectrum Measurements, set the TRANSMISSION selection to OFF.

You may wish to stop the scanning process so you can study the transmission graph. Simply press **F1** (HOLD). The scan marker stops moving. To resume scanning, press **F1** (TRIG).

As in Spectrum mode (absolute), other functions are available by using the **F3** key to change the function of softkeys **F1** and **F2**.

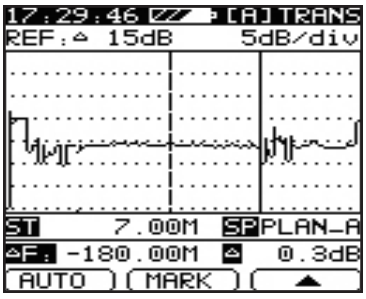
Press **F3** to change the function of softkeys **F1** and **F2** to Scale and Ref.



Change the display scale by pressing softkey **F1** (SCALE). Change the reference level by pressing softkey **F2** (REF) and using the **UP** and **DOWN** arrow keys to change the reference.

Press the **F3** key to change the function of softkeys **F1** and **F2** to Auto and ΔMkr. To set the reference level and the scale automatically, press **F1** (AUTO).

A Δ MARKER function can be used to check the distance (in MHz) and amplitude difference between any 2 points in the displayed transmission spectrum. First, use the **UP** and **DOWN** arrow keys to move the marker to a reference position, then press **F2** (ΔMKR). The **UP** and **DOWN** arrow keys now move the second marker from the reference position, and the Δ Frequency and Δ Level are displayed.



Press **F2** (MARK) to return to the normal single-marker Transmission display.

The new Zero Reference Scan remains in the Model Two so you can measure the relative change at a later time. To perform another Transmission Test at any time, confirm that Transmission is set to ON and press **SPECT**. The Model Two performs a Spectrum Scan and compares it to the reference data.

If Transmission has been turned off for absolute Spectrum Measurements, you can turn it on and press **F2** (NO) when asked to replace the Zero Reference data.

The Model Two then prompts you to select **F1** to start a relative Spectrum Measurement with the old Zero Reference data.

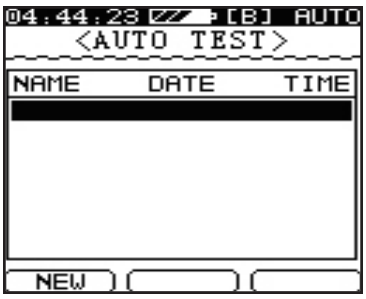
Auto Test

The Model Two can accept user-defined testing programs to automatically perform Level, Spectrum, Tilt (Favorite), and Limit tests in specified time increments. The Model Two can store up to 7 user programs for recall when needed. The test results are stored to a file automatically and may be printed automatically after measurement or they can be viewed, printed, or uploaded to a PC later.

If you wish to have Auto Test measurements printed automatically after each test time sequence, you must have the AUTO TEST PRINT feature enabled in the Print Setup menu. Also, you must have the printer connected and the correct printer selected in Printer Setup.

> **TIP:** With Fast Setup, you can access the Print Setup menu directly from Auto Test by pressing **SET** once.

To set up an Auto Test, press **AUTO**. The Auto Test program directory appears.



If existing programs are listed, press the Down arrow key until a blank selection is highlighted.

If the directory has no programs, the blank selection appears automatically.

Press the **F1** (NEW) key.

The Auto Test screen for STEP 1 appears.

Press **F1** (NAME) for the alphanumeric entry window to appear.

Enter up to 5 alphanumeric characters for the program name and press **F1** (ENTER). (See *Navigating Functions* on Page 17 if you need help with alphanumeric entry.)

The new program name appears on the screen for Step 1.

Press **F2** (NEXT) to continue.

The Auto Test screen for STEP 2 appears.

Four types of tests may be performed in a program: Level, Spectrum, Limit, and Tilt. Each enabled test has a checkmark next to it.

Use the **UP** and **DOWN** arrow keys to highlight any test, then press **F1** (ENTER) to enable or disable the test.

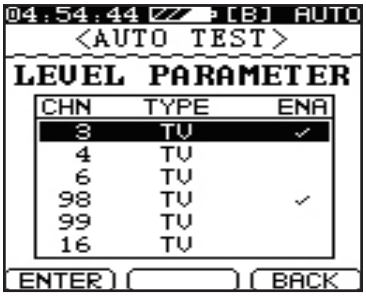
When only the desired tests are enabled with a checkmark, press **F2** (NEXT) to continue.

The Auto Test screen for STEP 3 appears.

You can change the parameters for each of the selected tests by using the **UP** and **DOWN** arrow keys to highlight the test, then press **F1** (ENTER).

The Auto Test parameter displays are described in the following section:

Level Parameters

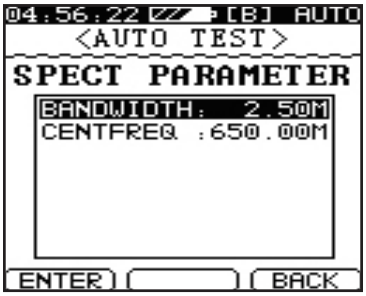


Use the **UP** and **DOWN** arrow keys to highlight any channel in the selected user plan, then press **F1** (ENTER) to enable or disable the channel for the Level Test. An enabled channel displays a checkmark next to it.

Note: There are no default channels enabled for the Level Test parameter. If Level Test is selected for the Auto Test program, you must enable one or more channels.

When all desired channels are enabled, press **F3** (BACK) to return to the Auto Test screen for STEP 3.

Spectrum Parameters

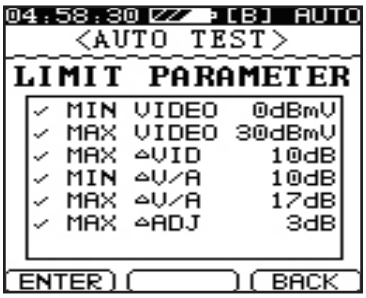


Press **F1** (ENTER) to change the highlighted Spectrum test bandwidth to 2.50 MHz, 6.25 MHz, 12.50 MHz, 25.00 MHz, 62.50 MHz, or a full-spectrum scan of the User Plan Base Channel Plan.

Use the **UP** and **DOWN** arrow keys to highlight the center frequency selection for the Spectrum test. Press the **FCN** key, enter the center frequency numerically in MHz, and press **F1** (ENTER). This parameter is not used if the full-span bandwidth is selected.

When the desired frequency and bandwidth have been set, press **F3** (BACK) to return to the Auto Test screen for STEP 3.

Limit Parameters

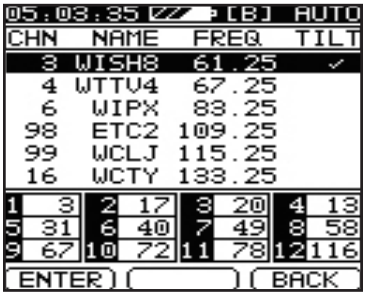


The status of all Limit Test parameters are displayed (except the 24 HR Deviation limit parameter for 24 HR tests). The enabled limits for testing are also indicated by a checkmark. If the current settings are acceptable, you can press **F3** (BACK) to return to the Auto Test screen for STEP 3.

If you wish to change or (disable) any Limit parameter, you can press **F1** (ENTER) to display the Edit Limits screen. All Limit parameters may be changed as described in Model Two Setup for the Edit Limits display. (See *Limit Setup* on Page 29.) When the desired changes have been made in the Edit Limits screen, select SAVE AND EXIT to return to the Auto Test Limit Parameter screen.

If the settings displayed on the Limit Parameter screen are correct, press **F3** (BACK) to return to the Auto Test screen for STEP 3.

Tilt Parameters



The Tilt Parameter screen for Auto Test is the same as the standard Tilt Setup screen. All Tilt channels already selected for the User Plan are enabled here.

You can use the **UP** and **DOWN** arrow keys to highlight any channel in the selected User Plan, then press **F1** (ENTER) to enable or disable the channel for the Tilt test. An enabled channel displays a checkmark next to it and will be listed in the Tilt Channel boxes at the bottom of the display. At least 4 of the 12 maximum number of Tilt channels must be selected for Tilt to operate.

When the desired TILT channels have been selected, press **F3** (BACK) to return to the Auto Test screen for STEP 3.

When the parameters for all selected tests have been verified or changed, press **F2** (NEXT) to continue. The Auto Test screen for STEP 4 appears.

If you wish this Auto Test program to perform its test sequence only once each time it is started, you can press **F1** (START) to immediately begin execution of the testing program. If **F1** is selected to start the program, the Model Two performs the selected tests and then shuts off.

A file containing all test records is created and automatically saved. The filename is the Auto Test program name followed by an asterisk (*) to indicate that it is a single Auto Test file. This is displayed in the Model Two file directory along with the date and time. (See *File Saving, Viewing, and Printing* later in this chapter.)

If you wish to save the Auto Test program for later use without running the entire program now, you can start the test and then press **F1** to exit.

Note: A new Auto Test program that is started as a single test sequence (no 24 HR test) has default settings for 24 HR operation (6 Hours, 5 Tests) stored with the program. When this program is executed again, it can run as a single test sequence or as a 24 HR test with the default settings.

If you wish the Auto Test program to perform its test sequence in programmed time intervals, press **F2** to setup the 24 HR Measurement routine.

The Auto Test screen for STEP 5 appears.

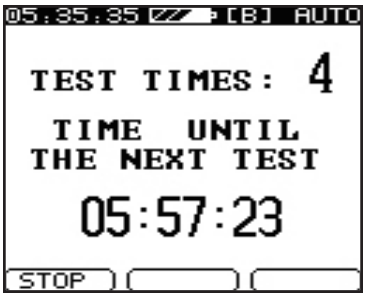
A default time interval of 6 hours between test times is displayed. To change the time interval, press **FCN**, enter a new number from 1 to 23 (hours), and press **F1** to enter.

Press **F2** (NEXT) to continue. The Auto Test screen for STEP 6 appears.

A default number of 5 test times is displayed. To change the number of test times, press **FCN**, enter a new number from 1 to 10 (times), and press **F1** to enter.

Note: Since the first Auto Test time is always performed immediately upon starting the program, the 5 default test times provides a 24 Hour span from first test to last test, with a 6-hour default time interval between test sequences.

Press **F1** (START) to begin execution of the testing program. The Model Two immediately performs the first sequence of tests. After each test time sequence is complete, an Auto Test program status screen appears for a short time, then the Model Two shuts off.



If the Model Two is turned on during an Auto Test program, the program status screen appears to indicate the Auto Test status. The program may be stopped by pressing **F1** (STOP).

A file containing all test records is created for each test time and automatically saved. The filename is the Auto Test program name followed by an alphabetical assignment (beginning with A) for each test time file to indicate they are 24HR Auto Test files. This is displayed in the Model Two file directory along with the date and time. (See *File Saving, Viewing, and Printing* later in this chapter.)

Note: If a Limit Test is part of a 24 HR Auto Test program, a 24 Hour Video Deviation report (Rep_24) is also created and saved after the last test sequence. This data record lists the maximum video deviation over all time tests for each channel along with a Pass (P) or Fail (F) indication for the channel based on the Limit Test parameter setup at the time the Auto Test was performed.

If you wish to save the Auto Test program for later use without running the entire program now, you can start the test and then press **F1** to exit.

The new Auto Test program is added to the Auto Test directory with the program name entered in Step 1.

Up to 7 Auto Test programs may be created and saved. From the Auto Test directory, a program may be deleted by using the **UP** and **DOWN** arrow keys to highlight the program name and pressing **F2** (DEL).

Also, information about an existing file may be obtained by using the **UP** and **DOWN** arrow keys to highlight the program name and pressing **F3** (INFO).

Parameters for each test may be viewed by using the **UP** and **DOWN** arrow keys to highlight the test and pressing **F1** (ENTER) to view the setup parameters. Also, the status of the 24 HR setup can be seen by pressing **F2** to view the Test Times and Time Intervals.

File Saving, Viewing, and Printing

The Model Two can save records from Level, Tilt (Favorite Channels group), Spectrum, Scan, or Limit Test measurements either to individual files or all to one file. Auto Test files are automatically saved. These files can be recalled to display the recorded data and Scan, Spectrum, and Limit graphics can be viewed. All files may also be printed from the Model two or uploaded to a PC.

Saving a Test Record to a File

Before saving a record, be sure the time, date, and date sequence (M/D/Y) has been set. (See *Date & Time* on Page 24.) If the date sequence is changed after storing files, the date information for those files will not be correct.

To save a test record, press **FILE**. The Model Two File directory appears with the filename, date, and time of all existing files.

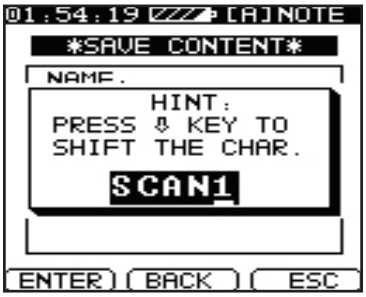
Press **F1** (NEW) to create a new file. A SAVE CONTENT screen appears with a list of test records that are available to be saved.

If a test has not been performed by the Model Two, it is not displayed on the SAVE CONTENT screen.

Use **F2** or **F3** to scroll to any listed test selection, then use the **UP** and **DOWN** arrow keys to turn ON or OFF the records that will be saved to the file. Any or all of the listed records may be saved to one file.

When only the desired test records are enabled (ON), press **F1** (OK) to continue.

The alphanumeric entry window appears to enter the desired filename.



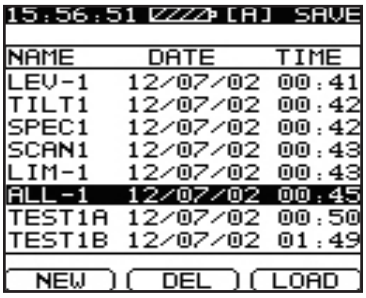
Enter up to 5 alphanumeric characters for the filename and press **F1** (ENTER).
(See *Entering Alphanumeric Characters* on Page 17.)

The File directory is displayed with the new filename at the end of the file list.

Viewing and Printing File Records

To recall (load) a test record file, press **FILE**.

The Model Two File directory appears with the filename, date, and time of all existing files.



Use the **UP** and **DOWN** arrow keys to scroll to the filename of the file you wish to view or print, then press **F3** (LOAD).

The FILE CONTENT screen appears with the filename, User Plan, and a list of all test records in the file.

Use the **UP** and **DOWN** arrow keys to scroll to the test record that you wish to list the data record, view graphically (Limit, Spectrum, and Scan records only), or to print.

To **LIST** the data for a test record, press **F1** (LIST):

Limit Test - This data record is listed with the number of channels failed for individual Channel Test parameters displayed at the top of the screen. Use **F2** or **F3** to scroll to any channel to see the Video level and Pass (checkmark) or Fail (X) indication.

Note: The Pass or Fail indication for the Limit Test is based on the Limit Test parameter setup at the time the Limit Test was performed. A digital (DIGI) type Channel Measurement during the Limit Test is shown but is not used to determine Pass or Fail for any of the tests.

Tilt Test - This data record is listed with the Tilt Level displayed at the top of the screen. Use **F2** or **F3** to scroll to any Tilt/Favorite channel to see the Video level.

Spectrum Test - This data record lists the frequency and signal level for each data point in the Spectrum test. Use **F2** or **F3** to scroll to any listed frequency in the Spectrum scan.

Scan test - This data record lists all Video and (first) Audio levels for each channel in the Scan test. Use **F2** or **F3** to scroll to any channel.

Level Test - This data record lists all Video and (first) Audio levels for each channel in the Level test. Use **F2** or **F3** to scroll to any channel.

TIP: On any listed record, you can use the **UP** and **DOWN** arrow keys to scroll through the channel list (data points for Spectrum test) by one page (8 channels) at a time.

Note: If DUAL Audio channels are used, only the first Audio level is listed for Scan and Level Tests. Both Audio levels are displayed on printouts or uploads to a PC.

While displaying a list of any data record, you can press **F1** (BACK) to return to the FILE CONTENT screen.

To **VIEW** the Limit, Spectrum, or Scan test record graphically from the FILE CONTENT screen, press **F2** (VIEW):

Limit Test - A view of the Limit test scan is displayed. The display may be controlled like a Live Channel Scan. The **UP** and **DOWN** arrow keys move the marker. **F1** (AUTO) automatically sets the Scale and Reference. **F2** (TRIG) changes the display to a Live Channel scan instead of the file record display. You can also press **F3** to change the softkey functions of **F1** and **F2** to set the Scale and Reference manually.

Spectrum Test - A view of the Spectrum scan is displayed. The display may be controlled like a Live Spectrum Scan. The **UP** and **DOWN** arrow keys move the marker. **F1** (TRIG) changes the display to a Live Spectrum scan instead of the file record display. **F2** (SPAN) does not operate with the Spectrum record file. If **F1** is used to trigger a Live Spectrum scan, then **F2** (SPAN) may be used. You can also press **F3** to change the softkey functions of **F1** and **F2** to set the Scale and Reference manually or use the Auto scale and Reference or the Δ Marker function.

Scan Test - A view of the Channel Scan test is displayed. The display may be controlled like a Live Channel Scan. The **UP** and **DOWN** arrow keys move the marker. **F1** (AUTO) automatically sets the Scale and Reference. **F2** (TRIG) changes the display to a Live Channel scan instead of the file record display. You can also press **F3** to change the softkey functions of **F1** and **F2** to set the Scale and Reference manually.

Note: The view of file records (**F2**) operates with Limit, Spectrum, and Scan records only. The View function does not operate with Level and Tilt records.

While viewing a data record, you can press **FILE** to return to the FILE CONTENT screen. Pressing **FILE** again will return you to the File Directory.

To **PRINT** a test record from the FILE CONTENT screen:

CAUTION: Before printing a test record, you must first have the correct printer selected in the setup menu. (See *Print Setup* on Page 25.)

TIP: With Fast Setup, you can access the Print Setup menu directly from the FILE CONTENT screen by pressing **SET** once.

Also, refer to Printer Connection in the next section for instructions on connecting your printer to the Model Two.

When the Printer has been connected and the proper printer selected in *Printer Setup*, you can print a selected test record from the FILE CONTENT screen by pressing **F3** (PRINT).

Limit Test - This data record is printed with Video and Audio levels for each channel along with a Pass (P) or Fail (F) indication for the channel. This report also shows which Individual channel test parameters have failed. The listed data is followed by a graphic printout of the Limit test scan. The total number of channels scanned and the number of channels that have failed are shown at the bottom of the report.

Note: The Pass or Fail indication for the Limit Test is based on the Limit Test parameter setup at the time the Limit Test was performed. A digital (DIGI) type channel measurement during the Limit Test is shown but is not used to determine Pass or Fail for any of the tests.

Tilt Test - This data record is printed with the Video levels for each Tilt/Favorite channel. The listed data is followed by a graphic printout of the Tilt levels. The lowest and highest frequency levels and the Tilt calculation are shown at the bottom of the report.

Spectrum Test - This data record is printed with the frequency and signal level for each data point in the Spectrum test. The listed data is followed by a graphic printout of the Spectrum scan. The minimum and maximum levels in the Spectrum scan are shown at the bottom of the report.

Scan test - This data record is printed with Video and Audio levels for each channel. The listed data is followed by a graphic printout of the Channel scan. The channels with minimum and maximum Video levels are shown at the bottom of the report.

Level Test - This data record lists all Video and Audio levels for each channel in the Level record.

All printed records contain information about the Model Two (serial number, memory space, battery voltage, and internal temperature) along with information about the record itself (User Plan, Base Plan, Filename, Save Date, and Save Time) as well as Print Date and Print Time.

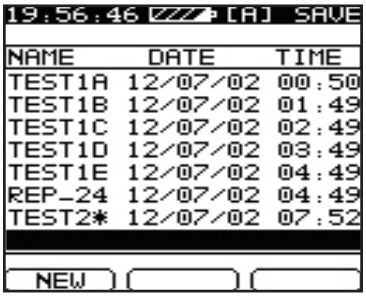
You may print all records in a file with one print command by selecting PRINT ALL in the Print Setup menu. (See *Print Setup* on Page 25.) Remember, with Fast Setup, you can access the Print Setup menu directly from the FILE CONTENT screen by pressing **SET** once. With PRINT ALL selected, all records in a file are printed regardless of which record is highlighted.

Note: When PRINT ALL is selected, the printout has a single title called *Report* followed by all printed records in the file. When PRINT ALL is not selected, each printed record has a specific title (*Level Report*, *Tilt Report*, etc).

When using a parallel printer with the Model Two printer adapter, you must wait a few minutes between pages for the data to be loaded into the printer before the page is printed.

Auto Test Records

Auto Test records are stored automatically. (See *Auto Test* on Page 60.) These records also appear in the File directory:



A file for 24 HR Auto Test records is created for each Auto Test time. The filename is the Auto Test program name followed by an alphabetical assignment (beginning with A) for each test time file to indicate they are 24 HR Auto Test files. This is shown in the directory above for an Auto Test program named *TEST1*. The suffix A-E for each test time file was added automatically.

A file containing all test records for an immediate Auto Test (not 24 HR test) is created and automatically saved. The filename is the Auto Test program name followed by an asterisk (*) to indicate that it is a single Auto Test file. This is shown in the directory above for an Auto Test program named *TEST2*. The suffix (*) for this file was added automatically.

Auto Test files may contain Level, Tilt, Spectrum, or Limit test records. These files may be listed, viewed, or printed in the same manner as described above for manually saved files.

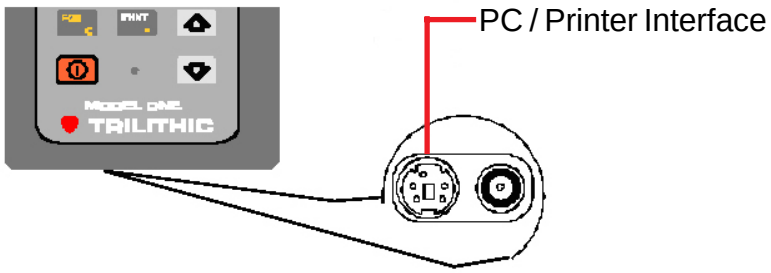
Note: If a Limit Test is part of a 24HR Auto Test program, a 24 Hour Video Deviation report (Rep_24) is also created and saved after the last test sequence. This data record lists the maximum Video deviation over all time tests for each channel along with a Pass (P) or Fail (F) indication for the channel based on the Limit Test parameter setup at the time the Auto Test was performed.

Printer Connection

The Model Two can print file records to a serial or parallel printer. (See *File Saving, Viewing, and Printing* on Page 70.)

For connecting the Model Two to a serial printer, you need a special cable. For connection to a parallel printer, you need a data cable and adapter. The required cable or adapter is listed in the following connection procedures for each type of printer.

For all printer connections, the required printer cable is connected to the **PC/Printer Interface** on the bottom of your Model Two. The other end is connected per the following instructions for serial and parallel printers.

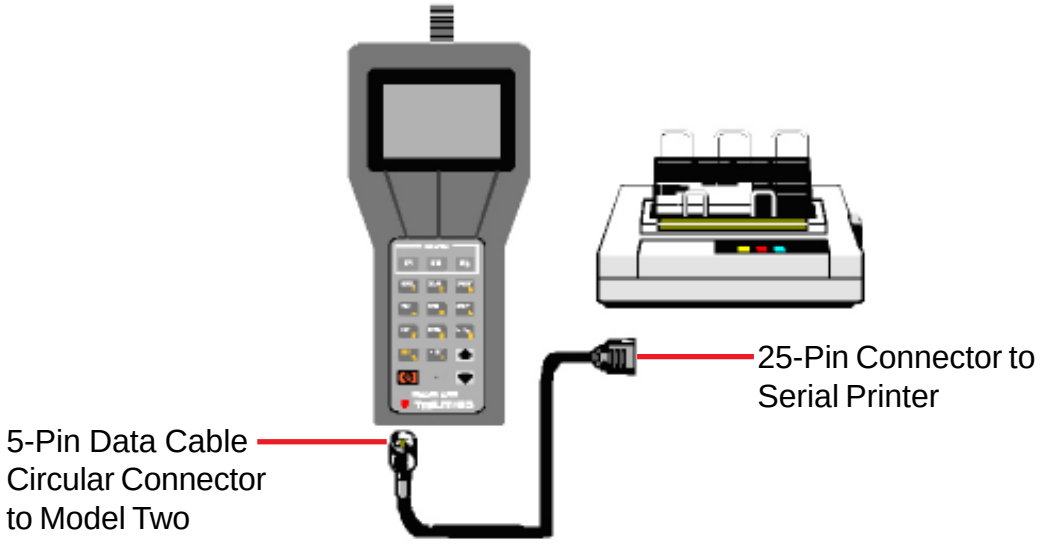


Serial Printer

To connect to a serial printer (such as an Epson LX-300), you need the following:

- Model Two Serial Printer Cable, P/N 2071352000
  (5-pin circular connector to 25-pin D-sub-male connector cable)

Connect the 5-pin circular end to the Model Two and the 25-pin connector to the serial printer.



Parallel Printer

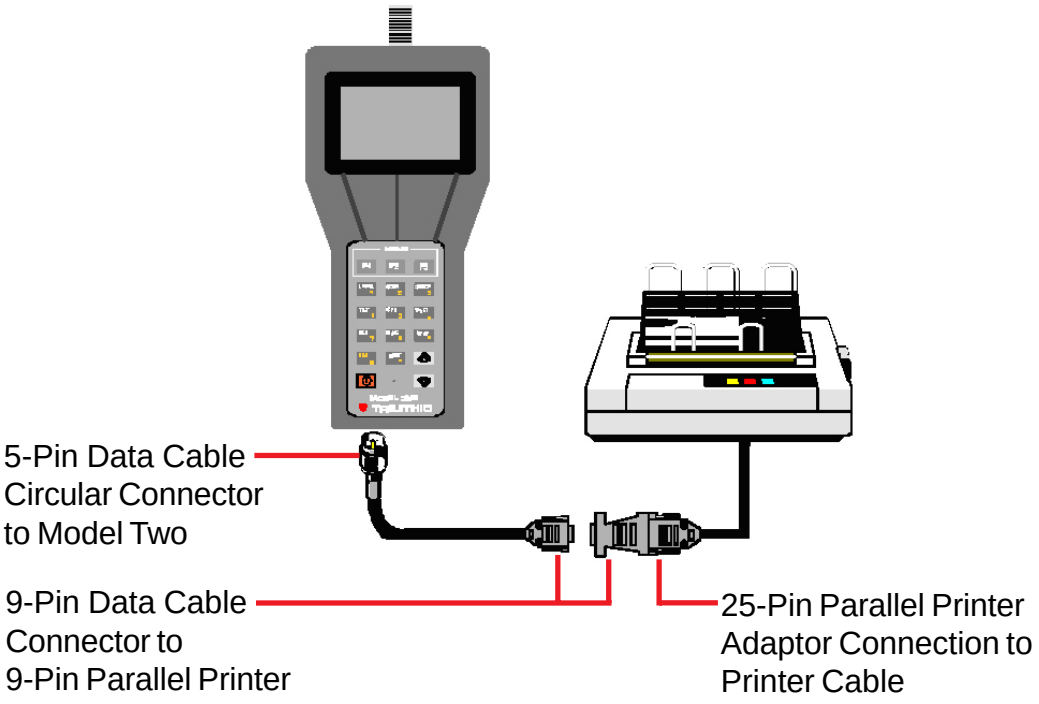
To connect to a parallel printer (such as an HP LaserJet), you need the following:

- Model Two Data Cable, P/N 2071351000 (5-pin circular connector to 9-pin D-sub-female connector cable)

> **Note:** The 2071351000 Data Cable is included with Toolbox II PC Software.

- Model Two Parallel Printer Adapter, P/N 0440214000
  (9-pin D-sub-male to 25-pin D-sub-female adapter)

Connect the data cable's 5-pin circular end to the Model Two and the 9-pin connector to the 9-pin connection of the parallel printer adapter. Then connect the 25-pin connection of the parallel printer adapter to the 25-pin connector on your standard parallel printer cable connected to your printer.



Specifications 7

Frequency:

Range:	5 MHz - 870 MHz
Accuracy:	+/- 50 ppm (20 °C +/-5 °C)
Resolution:	10 kHz

Channel Type:

Analog TV:	TV
Digital TV:	QAM, QPSK
FM channel:	Single Frequency
Dual Audio Channels	

Level Measurement:

Range:	30 dBµV - 120 dBµV (-30 dBmV to 60 dBmV)
Accuracy:	
	LEVEL: (> 35 dBµV or -25 dBmV) +/-1.5 dB (10°C to 30°C) +/-3 dB (-10°C to 40°C)
	SCAN: +/-2 dB (10°C to 30°C)
Resolution:	0.1 dB
Input Impedance:	75 Ohms (unbalanced, BNC or F type connector)

Channel Scan:

Number of Channels:	150 channels max.
Scanning speed:	2.75 channels / sec
Scale:	1,2,5,10 dB/div
Zoom:	1X, 2X, 3X, 4X, 5X five levels of magnification or full Channel Plan scan.

Frequency spectrum:

Bandwidth:	2.5 MHz, 6.25 MHz, 12.5 MHz, 25 MHz, 62.5 MHz, and full span
Scale:	1,2,5,10 dB/div

Carrier-noise ratio (C/N):

Input range:	Over 85 dBµV (25 dBmV)
Range:	20 - 50 dB max.(depending on input level)
Accuracy:	+/-2 dB
Resolution:	0.1 dB

Digital Channel (Average) Power:

Bandwidth:	0.28~9.99 MHz
Center Frequency:	5 MHz (plus ½ channel bandwidth) to 870 MHz (minus ½ channel bandwidth)
Digital modulation:	QAM, QPSK

Tilt measurement:

Number of channels:	4 - 12
Resolution:	0.1 dB

Limit Test Parameters:

Any of the following may be enabled:

Min video:	40 - 119 dBµV (-20 to 59 dBmV)
Max video:	41 - 120 dBµV (-19 to 60 dBmV)
Max Δ video:	2 - 30 dB
Min Δ V/A:	0 - 15 dB
Max Δ V/A:	5 - 30 dB
Max Δ ADJ:	0 - 20 dB
24HR Video Dev.:	0 - 20 dB

Auto Test:

Number Of Programs:	7 (Max)
Tests:	Level, Tilt, Spectrum, Limit, and 24HR Video Dev. (any or all tests may be used in an Auto Test program)
Time Intervals:	1 to 23 hours
Test Times:	1 to 10 times

Trunk Voltage measurement:

Input range:	1.2 - 100 VAC, 1.0 - 100 VDC
Accuracy:	+/-1 V
Resolution	0.1 V

Others:

Storage:	32 Kilobytes memory Up to 35 complete Scan files (150 channels max.) or 25 complete Limit Test files (150 channels max.). Less if other files (Level, Tilt, Spectrum) are saved.
Communication Port:	RS 232C
Printer:	Canon, Epson, and HP
Audio Output:	Built-in speaker
Dimensions:	218 mm x 95 mm x 49 mm (excluding belt clip and RF connector)
Weight:	1.45 lbs (658 gm)
Display:	128 x 128 LCD with backlight

Power Supply:

Battery:	3.6 V / 3.5 AH Ni-MH battery
Charger:	* AC 100 - 240 V, 50/60 Hz, 1.8 A 7 VDC (max) * Only the Trilithic Charger (P/N 0610165000) with internal charging circuitry may be used.
Work Time:	Average 6-8 hours (fully charged battery)
Charge Time:	Less than 3 hours

Warranty Information

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

Batteries are not included or covered by this Warranty.

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

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

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