120 DSP
Basic Signal Level Meter

Operation Manual

innovative technology to keep you a ***step ahead***

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Putting Innovation Within Reach

Product innovation at Trilithic has always been characterized by one thing: it's practical. It makes life easier for customers. It's the natural result of listening to them. That philosophy has been the driving force behind the company's growth from its beginnings as a two-man engineering team in 1986 to its current position as a global manufacturer with more than 130 employees.

A privately held company, Trilithic broadend its original RF and microwave component product line by acquiring Filters manufacturer Cir-Q-Tel and instruments manufacturer Texscan, adding broadband solutions to the product line. The company also expanded operations to Thailand in 2001, to meet increasing demand for its products in the growing markets of Asia.

As new communications applications continue to emerge, part of Trilithic's business has evolved into managing change—helping customers respond quickly to market opportunities with innovative technology and individualized solutions. But the core value of Trilithic's business approach—listening to customers—hasn't changed. Keeping that focus intact will help provide better products in the long run and ensure continued growth for decades to come.

Trilithic is comprised of two major divisions:

Broadband Instruments

The company is best known for innovations in signal level measurement, leakage detection and reverse path maintenance—like the use of Digital Signal Processing (DSP) technology, which lets field technicians upgrade their signal analyzers by simply downloading firmware.

Emergency Alert Systems

Trilithic's EAS division is a leading supplier of homeland security government-mandated emergency alert systems for broadband and other communication system providers. As the communications industry continues its rapid evolution, Trilithic has begun offering comprehensive systems and services to address a wide variety of emergency alert system needs, including the design and architectural layout of complex analog and digital EAS networks.

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120 DSP
Basic Signal Level Meter

Section I: The Basics

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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.

Trilithic technical support is available Monday through Friday from 8:00 AM to 5:00 PM 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 *support@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)
- A detailed description of the problem you are having, including any error or information messages
- The serial number of the 120 DSP that you are having problems with

How this Manual is Organized

Thank you for choosing the 120 DSP. This manual is provided with the 120 DSP to help the user become better acquainted with the device and to become productive faster. Each section is written as though the user is familiar with the basic operation of the instrument and is broken into chapters for each function.

This manual is divided into the following sections:

- Section I: The Basics - This section provides Trilithic contact information, describes how this operation manual is structured, and gives an overview of the instrument and its basic features. Before using the instrument, it is recommended that the user read this section for an overview of features, basic commands and other important details.
- Section II: Setup Menu - This section includes instructions on how to use the features shown in the Setup Menu of the instrument.
- Section III: Autotest Menu - This section includes instructions on how to use the features shown in the Autotest Menu of the instrument.
- Section IV: Troubleshoot Menu - This section includes instructions on how to use the features shown in the Troubleshoot Menu of the instrument.
- Section V: Appendix - provides instrument specifications and warranty information.

Conventions Used in this Manual

This manual has several standardized conventions for presenting information:

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

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

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

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

Precautions

The maximum "RF" input voltage to the meter is 90 Volts (AC or DC). A larger voltage will damage the meter.

Do not use the instrument in any manner not recommended by the manufacturer.

A strong electromagnetic field may affect the measurement accuracy of the 120 DSP.


CAUTION

Use only the battery charger supplied with the 120 DSP. Use of any other charger may damage the battery.


CAUTION

Damage caused by improper cleaning of the display screen will void the warranty of the 120 DSP.


CAUTION

Never use abrasive pads, paper towels, tissue paper, or clothing to wipe the screen. If you do, these non-ultrasoft materials can cause permanent damage by scratching the screen or stripping the anti-glare coating off the screen.


CAUTION

Never use any type of window cleaner, soap, scouring powder, or any cleanser with solvents such as alcohol, benzene, ammonia, or paint thinner. These chemicals can react with the materials used to construct the display which can lead to hazing, yellowing, brittleness, or other types of damage.


CAUTION

Never spray liquid directly on the display screen as it could run inside the unit and cause damage.

Recommended Software & Hardware

The following software is recommended for configuration and data management of the 120 DSP:

ViewPoint Express

ViewPoint Express is a Windows-based software application that supports basic 120 DSP configuration as follows:

- Software registration and activation
- Create channel configuration presets and test locations
- Create and organize channel plans, limits sets, and autotests
- Create configuration packages with channel plans, limit sets, and autotests
- Define meter settings
- Upload and download data to your 120 DSP via a USB flash drive
- Query, display, and delete test data (optional)

NOTE

For the most current version of ViewPoint Express, contact Trilithic Applications Engineering
1-800-344-2412 or 317-895-3600
support@trilithic.com or www.trilithic.com

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What is the 120 DSP?

Overview

The 120 DSP™ signal level meter is the most cost-effective and dependable tool available for all of your basic CATV installation needs. This device features a compact rugged design, easy-to-use color user interface and an unparalleled selection of digital and analog channel measurements.

- Tailored to Simplify Installation and Troubleshooting of RF Signals
- Intuitive Color Display with Simple Pass/Fail Indicators Reduce Installer Entry Errors and Improves Decision Making
- Autotest Apps Streamline Certification
- Convenient Multiple Standard Tests in a Single Auto Test App help to Standardize Tech Processes & Procedures
- Powerful Troubleshooting Tools Improve the Overall Health of the System
- Up to Six Hours of Operation from a Single Charge

Autotest Apps

The 120 DSP streamlines your testing procedures while making installation and troubleshooting more efficient with the use of Autotest apps. These apps allow users to perform a Return Spectrum and Channel Plan Scan of the channels included in the selected channel plan. The results are then compared to a specific set of measurement limits and displayed with familiar color-coded Pass/Fail results. All of this can easily be accomplished just by simply pressing a single button.

Job Management

With the included Job manager, technicians have the ability to enter job information that can be attached to any test results. Notes can also be added directly to each job so the technician can report any faults, anamolies or job codes related to the work being performed.

Level Measurements

When testing or troubleshooting within your analog, digital or mixed analog/digital transmission system, the 120 DSP makes the perfect tool for measuring the power levels of all of your analog and digital QAM carriers.

Additionally, for QAM carriers (including deep interleave) the 120 DSP provides Constellation, Equalizer Tap, MER and BER measurement displays. This allows users to quickly analyze 64 and 256 QAM downstream channels for quality verifications or to locate impairments with the meter, all right out of the box.

Channel Plan Scan

With it's channel plan scan feature, the 120 DSP can also display the frequency response of the entire channel lineup. This measurement displays a color-coded bar graph of each channel or your favorite channels in the active channel plan. The channel plan scan also includes on-screen markers that can be adjusted to perform a tilt measurement.

Spectrum Measurements

The 120 DSP comes standard with the ability to display the the full return spectrum from 4 to 110 MHz. The spectrum display provides peak measurements, color-coded markers, and delta measurements. This feature also includes adjustable detector modes which are useful for capturing bursty transient noise. Optionally, the 120 DSP can also be equipped to perform forward spectrum measurements from 50 MHz to 1000 MHz.

Simple Yet Powerful

Providing the widest range of functions for an installer available today (as standard options), the 120 DSP includes virtually all the testing options an installer or service technician needs to verify service quality and easily identify and fix problems in the field.

- User-Defined Tests
- Multi-language Support
- Create Work Orders Right on the Meter
- Interactive Basic RF Installation Process
- Flexible Data Storage & Setup

Standard Testing Features

- Return Spectrum Analysis (4 to 110 MHz)
- Level Measurement
- C/N Measurement
- QAM Measurement (MER/BER/Constellation/EQ)
- Complete Channel Plan Scan with Tilt Measurement
- Network Test Suite with Ping, Traceroute, & Throughput Measurements

Standard Interfaces

- RF Test Port (F-Type, Replaceable)
- RJ45 Management Port (10/100 Mbps)
- Mini-USB Type B Female Charge & Data Port

HUM Measurement

The HUM measurement function is used to troubleshoot interference that may result from a defective power supply or faulty or overloaded power inserters. This function enables the 120 DSP to measure the amplitude of the 50/60 Hz, 100/120 Hz, and low frequency interference (HUM) present on the video/QAM carrier of a single selected analog or digital channel.

User-Defined Autotests

A significant time and cost savings feature of the 120 DSP is the capability to group tests into automatic tests that can be executed with a single keystroke. Several Autotests can be stored in the meter and recalled as needed. These may include Level, Tilt, Spectrum, Hum, and Limit tests.

Limit Testing

Limit test data allows for test uniformity and flexible field storage, and may be automatically scored against specified limits and assembled into reports.

Flexible Data Storage

The user can easily customize their 120 DSP with a virtually unlimited number of channel plans, limit sets, and jobs. This feature makes life much easier for technicians that work in multiple systems or areas that have differing channel lineups and testing requirements.

With Trilithic's complimentary ViewPoint Express PC software, you can quickly create setup files for the 120 DSP. These files can be packaged for easy transfer to one or all of your 120 DSP units simply using a standard USB flash drive.

The 120 DSP can also save measurement results and screen captures for Level, Channel Plan Scan, Return Spectrum, and Autotest measurements and these files can then be transferred to a standard USB flash drive for upload into the ViewPoint Express software for reporting, analysis, and printing (optional).

Optional Features

The following optional features are available for the 120 DSP.

Forward Spectrum Analysis

This feature enables the 120 DSP to view raw forward spectrum traces from 50 to 1000 MHz with DSP spectrum snapshots to give the user your downstream channels.

Analog & Digital HUM Measurement

This feature enables the 120 DSP to measure the amplitude of the 50/60 Hz, 100/120 Hz, and low frequency interference (HUM) present on the video/QAM carrier of a single selected analog or digital channel.

Getting to Know Your 120 DSP

Overview

Before using your instrument take a few minutes to familiarize yourself with the instrument, its basic conventions and its navigational tools. This section provides a brief overview of the instrument's features, buttons, and controls.

Equipment Supplied with the 120 DSP

The 120 DSP comes with the following:

- 120 DSP Basic Signal Level Meter
- Two Built-In Li-Ion Batteries
- Protective Carrying Case with Shoulder Strap
- AC to DC Power Adapter & Battery Charger
- USB Charge & Data Cable (Mini-B to Standard-A Male)
- USB Flash Drive Adapter (Mini-B Male to Standard-A Female)

Replacement Parts

The following replacement parts are available for the 120 DSP:

Part Number	Description
0090048000	Li-ION Replacement Battery (Replacement Requires 2 Batteries)
2131593000	120 DSP Protective Carrying Case
0320052000	Shoulder Strap
0610169006	AC to DC Power Adapter & Battery Charger with USB Charge & Data Cable
0610169002	AC to DC Power Adapter & Battery Charger
2071585004	USB Charge & Data Cable
2071585050	USB Flash Drive Adapter

Field Accessories

The following accessories are available for the 120 DSP:

Part Number	Description
2071527048	Precision RF Coaxial Test Cable (I/O-15)
0610169007	CL-9 Vehicle Power Adapter with USB cable
0610169004	CL-9 Vehicle Power Adapter without USB cable
2071585004	Mini-USB Power/Data Cable (I/O-20)
0610169012	Euro Power Adapter
0610169013	UK Power Adapter
0610169014	Australian Power Adapter

Software

The following software is available for the 120 DSP:

Part Number	Description
0930208000	ViewPoint Express Configuration Software for the 120 DSP
0930144000	ACTS™ software for high speed network testing

A Guided Tour of the 120 DSP

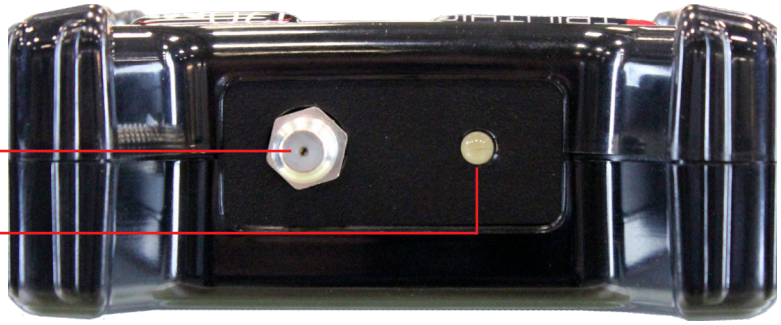
Front View

Rear View

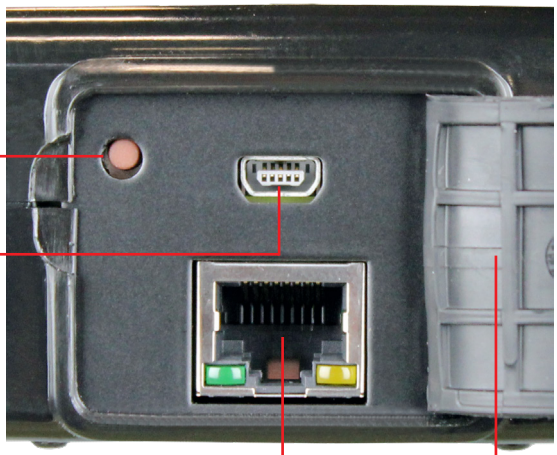
RF Input Connector

Identification Label
(S/N, FCC ID & Notice)

Top View



Bottom View



NOTE

In the image above, the protective rubber door is in the open position for illustrative purposes. This door should remain closed when not using any of these ports.

Protective Carrying Case

The 120 DSP includes a protective carrying case with the following features:

- Molded form-fit design that includes an impact resistant foam core with coated ballistic nylon finish to provide maximum protection
- High-strength zipper to ensure secure closure
- Adjustable Velcro hand strap
- Removable shoulder strap (not shown)
- Metal D-rings for shoulder strap or line hook with reinforced stitching throughout
- Front flap with magnetic closure provides full access to the screen, keypad, and bottom ports when open
- When the front flap is closed, it provides protection to the screen and keypad as well as the bottom ports
- Convenient belt clip for easy portability. To remove clip, turn it 90° and slide off.

Cleaning the Display Screen

The LCD display of the 120 DSP requires special care when cleaning. This display is sensitive and can be easily scratched or damaged while cleaning. To clean the display screen of the 120 DSP, use an ultrasoft, clean, lint free, microfiber cloth.

To clean fingerprints and greasy smudges off the display screen, use a bottle of screen cleaning solution designed for LCD displays. Put a small amount of screen cleaning solution on a cleaning cloth and then wipe the screen gently.

For correct cleaning of the display, follow these four simple steps:

1. Turn off the 120 DSP before you begin. If the screen is dark, it will be easier to see any areas that aren't clean.
2. Very gently, wipe the display with an ultrasoft, clean, lint free, dry cloth. If this does not completely clean the display, DO NOT press harder on the screen in an attempt to clean the screen as this may cause permanent damage.
3. If Step 2 does not work, spray screen cleaning solution onto the cloth. Never spray the screen cleaning solution directly onto the display screen.
4. Let the screen dry completely before turning on the 120 DSP.

Damage caused by improper cleaning of the display screen will void the warranty of the 120 DSP.

Battery Charging

Before you can use your instrument, you will need charge its batteries. Your instrument's Li-Ion batteries (two internal) provide approximately 6 hours of power during continuous operation.

The instrument comes with a AC to DC Power Adapter & Battery Charger which can be used to charge the batteries in approximately 6 hours or to trickle charge the batteries while the instrument is in use.

Plug the power adapter & battery charger into the DC charge port of the 120 DSP on the bottom of the instrument under a protective cover.

Your instrument is equipped with a "smart" battery charging circuit so that the charging method (fast or trickle) is an auto function. Fast Charge is used to charge the battery quickly. Trickle Charge is used to keep the battery fully charged.

Every time your instrument is plugged into the charging cube, it starts charging automatically via the Trickle Charge method. If the unit determines Fast Charge is necessary, it defaults to the Fast Charge method.

Charging Status

The Title Bar at the top of the 120 DSP screen displays the battery voltage and the following charging status icons:

Charging - This icon is displayed when the 120 DSP battery is charging. When charging, the battery voltage will be shown between 3 and 4 VDC (dependent on charging source).

100% Charge - This icon is displayed when the 120 DSP battery is charged from a minimum of 4.0 VDC or approximately 100% of battery capacity.

75% Charge - This icon is displayed when the 120 DSP battery is charged from a minimum of 3.75 VDC or approximately 75% of battery capacity.

50% Charge - This icon is displayed when the 120 DSP battery is charged from a minimum of 3.50 VDC or approximately 50% of battery capacity.

25% Charge - This icon is displayed when the 120 DSP battery is charged from a minimum of 3.40 VDC or approximately 25% of battery capacity. When the battery charge drops to this level, it is recommended that the battery is charged soon.

0% Charge - This icon is displayed when the 120 DSP battery is charged to less than 3.40 VDC or approximately 0% of battery capacity. When the battery charge drops to this level, it is recommended that the battery is charged immediately.

If the  ***icon is displayed, the unit is in calibration mode. See Section II: Setup, Chapter 3: Meter Configuration, Global Settings to change the operating level back to normal.***

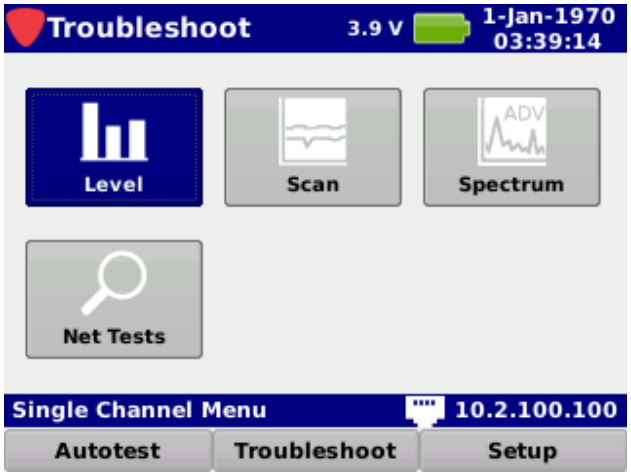
Basic Navigation & Control

Startup

Once the instrument's battery is charged, you may startup the 120 DSP by pressing the **Power** button at the bottom left of the keypad.

Upon startup one of the following will occur:

- If multiple user profiles are activated, the instrument will display the **Welcome to** the **120 DSP** screen as shown in the image above. Use the keypad to select the user profile that you wish to use. The **Troubleshoot** menu will be displayed as shown in the image to the right.
- If multiple user profiles are deactivated, the 120 DSP will automatically display the **Troubleshoot** menu as shown in the image to the right.



NOTE

For more information about configuring multiple user profiles, see Section II: Setup, Chapter 3: Meter Configuration, Global Settings.

NOTE

For more information on how to log off the current user or to switch to another user, see Section I: The Basics, Chapter 4: Function Menu, Log Off User.

Sleep Mode

The sleep mode is used to conserve power by putting the 120 DSP to sleep when not in use. This also allows the 120 DSP to be turned back on quickly when moving from one test location to another throughout the work day

Automatic Sleep Mode

The 120 DSP will automatically enable the sleep mode to conserve power after the 120 DSP has been idle for a specified period of time.

The default setting for the sleep mode delay is **5 Minutes**. The sleep mode delay can be set from a minimum of one (1) minute up to a maximum of 60 minutes.

NOTE ***For more information about setting the Sleep Mode Delay, see Section II: Setup, Chapter 3: Meter Configuration, Interface Settings.***

NOTE ***Whenever the 120 DSP is being powered by the AC to DC power adapter & battery charger, the sleep mode delay will be deactivated automatically.***

Manual Sleep Mode

To manually enter the sleep mode, quickly press the **Power** button.

Wake from Sleep Mode

Quickly Press the **Power** button to wake the 120 DSP from sleep mode. The sleep mode delay timer will automatically restart.

Shutdown

Shutdown allows the 120 DSP to be turned off at the end of the work day to conserve power.

Automatic Shutdown

The 120 DSP will automatically enable the automatic shutdown mode to conserve power after the 120 DSP has been idle for a specified period of time.

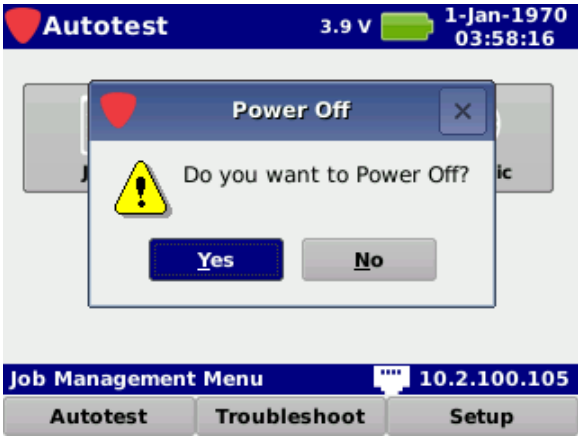
The default setting for the turn off delay is **1 Hour**. The turn off delay can be set from a minimum of one (1) hour up to a maximum of 24 hours.

NOTE ***For more information about setting the Turn Off Delay, see Section II: Setup, Chapter 3: Meter Configuration, Interface Settings.***

NOTE ***Whenever the 120 DSP is being powered by the AC to DC power adapter & battery charger, the turn off delay will be deactivated automatically.***

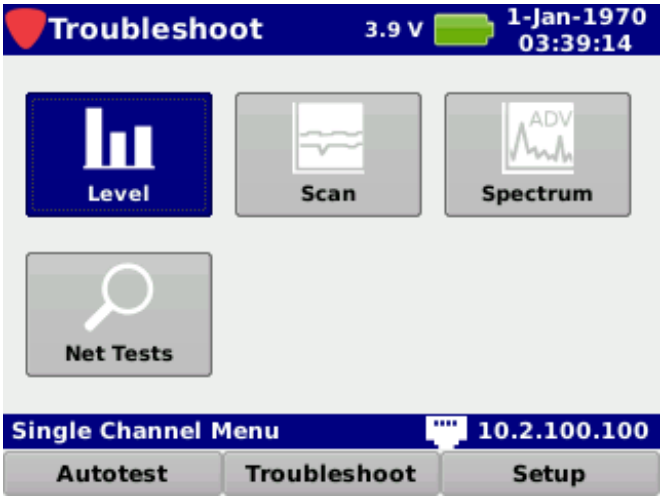
Manual Shutdown

Press and hold the **Power** button to shutdown the 120 DSP. A notification window will be displayed. Select the **OK** button to shutdown or select the **Cancel** button to exit without shutting down the device.



Display Screen

The instrument has been designed with simple, intuitive navigational tools. For your convenience, the display has a large, easy to read, menu style navigation. In some menus you will also notice on-screen cursors which enhance functions.



The display screen contains several tools which you should become familiar with before using the instrument. Take a moment to locate the basic features of the display screen.

Title Bar

The title bar is located at the top of the display screen, an example is shown in the image below. The left side of the title bar displays the name of the currently selected screen, such as the **Autotest**, **Troubleshoot**, and **Setup** menus, the right side of the Title Bar displays the battery voltage, charging status, date, and time.

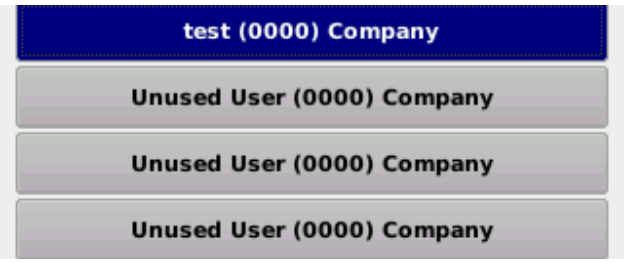
Message Bar

The message bar is located below the main display area, an example is shown in the image below. This area displays single line text entries to help you navigate the 120 DSP menus and show information when the instrument is performing tests. On the **Autotest**, **Troubleshoot**, and **Setup** menus, the right side of the message bar displays network connection icons to indicate which types of network connections are currently active.

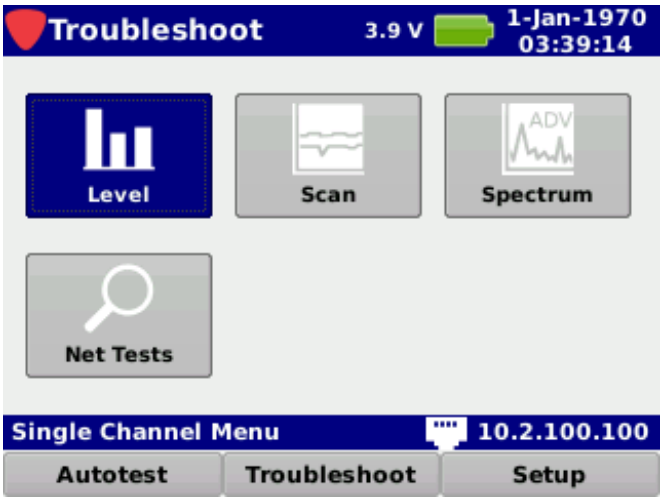
Main Display Area

The main display area, located below the Title Bar, displays text and graphic information such as function icons, measurement, graphs, and interactive pop-up boxes which vary depending on which screen has been accessed.

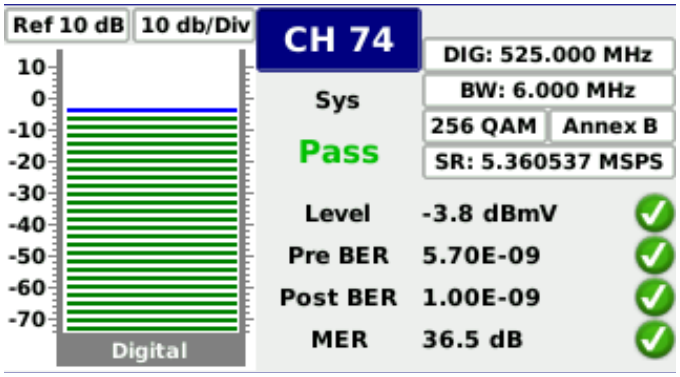
If multiple user profiles are enabled, the **Welcome to the 120 DSP** screen will always be displayed upon startup as shown in the image to the right.



After selecting a user profile, the **Troubleshoot** Menu will automatically be displayed by default with the **Level** icon highlighted.



After selecting a function icon from any navigation menu, the measurements and data will be displayed in this area. For example, the image shown to the right represents the type of information that would be displayed in a measurement mode.



Softkey Labels

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

Most screens utilize from one to three of the softkeys which are used to toggle between different menus and access various measurement functions.

Navigation Menus

All navigation menus will show the same softkeys. For example, the following image shows a navigation menu with the **Autotest**, **Troubleshoot**, and **Setup** softkeys.

Other Screens

On measurement screens the softkeys are used to access additional measurement functions such as:

SETUP FUNCTIONS

- File Management - New, Open, Save and Save As commands for Channel Plan, Limit Set,
- Channel Plan Management - Add, Remove and Preset commands.
- Limit Set Management - Remove command.

MEASUREMENT & UTILITY FUNCTIONS

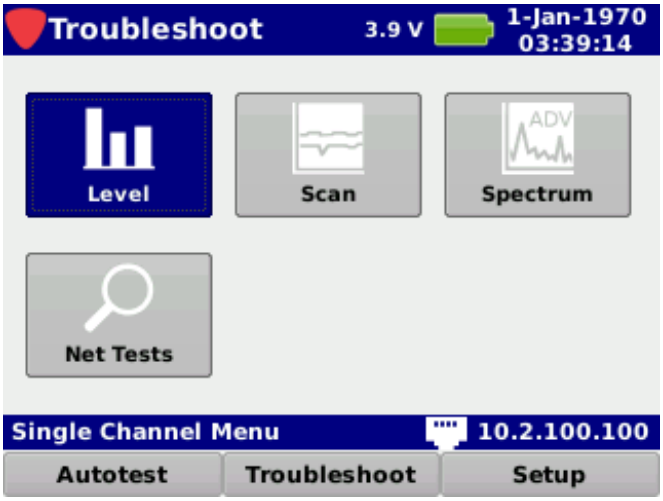
- Job Management - New, Open, Close and Delete commands.
- Level and Scan Measurements - Display, Channel Plan and Limit Set commands
- Spectrum Measurements - Peak Hold and Limit Set commands.
- File Explorer - Database Backup/Restore, File Delete/Export, Sort by Name/Type/Date-Time/Size and Save Logs commands.
- Web Browser - Back, Menu, Home and Refresh commands.

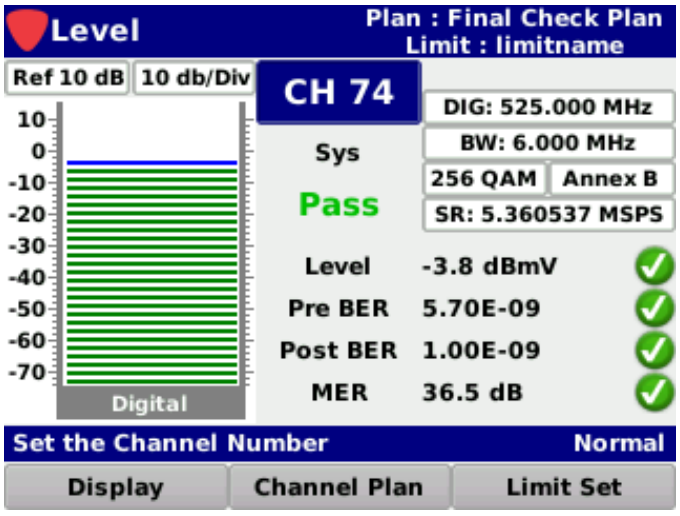
Selecting On-Screen Items

To select items on the display screen, use the arrow buttons on the keyboard to highlight the desired item and then press the **Enter** button.

In the example images shown to the right, notice how the currently selected item is highlighted blue and the other items remain gray.

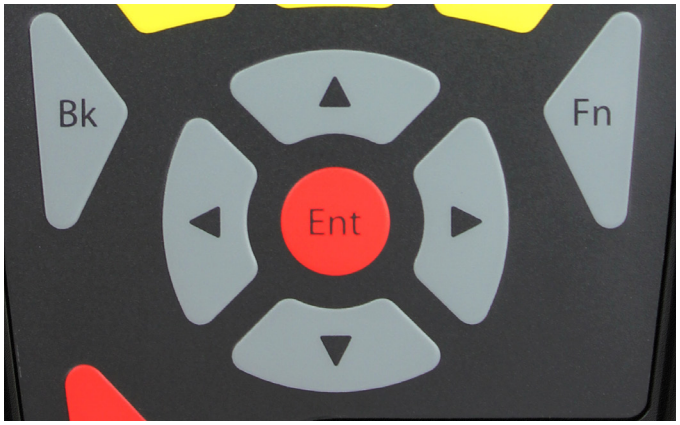
Once you select an item, you will either enter a new function or a window will appear.





Main Keypad

The main keypad is the set of buttons that are shown in the image to the right.



Enter Button

The **Enter** button is used to select the highlighted items in order to:

- Select icons from the navigation menus
- Select custom setting fields to open the **Virtual Keyboard** and enter custom values
- Select functions from the **Function** menu
- Select menu options from pop-up menus
- Select channel plans and limit sets from file lists

Arrow Buttons

The arrow buttons are used to navigate, highlight items, scroll lists, or change values on the display screen.

Back Button

The **Back** button is used to take you back to a previous screen or to close a menu. It can also be used to exit a pop-up entry window without accepting entry information. If you hold down the **Back** button, this will cause the instrument to go back multiple screens.

Function Button

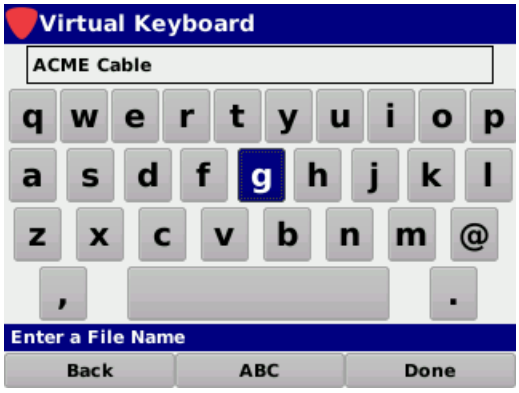
The **Function** button can be selected at any time to display a pop-up menu with additional functions. These functions vary from capturing screens for future reference to saving configuration files.

Using the Virtual Keyboard

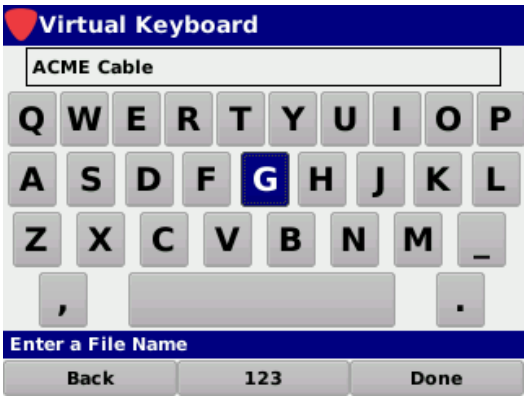
The instrument makes use of a **Virtual Keyboard** similar to that of a smart device for entering both numbers and letters.

The following **Virtual Keyboards** can be accessed by toggling the **abc/ABC/123/123+** combined softkey:

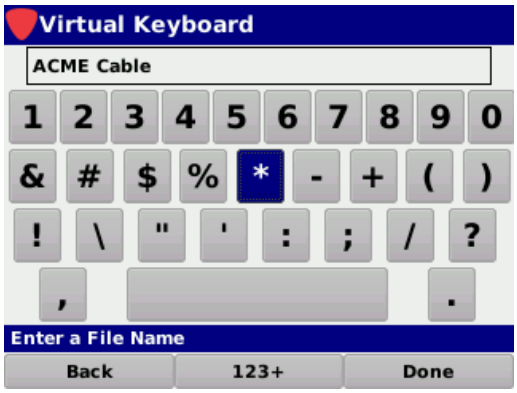
- Select the **abc** softkey to display a keyboard with lower case letters
- Select the **ABC** softkey to display a keyboard with upper case letters
- Select the **123** softkey to display a keyboard with numbers and symbols
- Select the **123+** softkey to display a keyboard with additional symbols



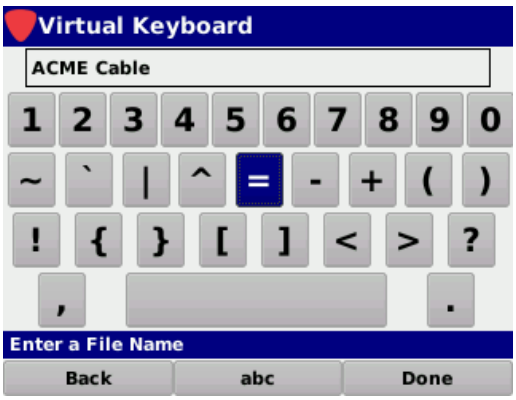
abc softkey selected



ABC softkey selected



123 softkey selected

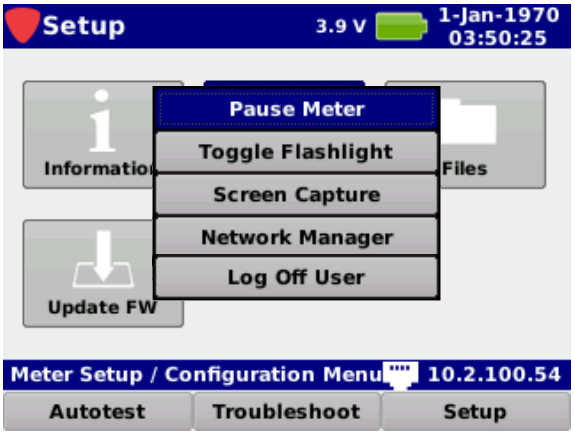


123+ softkey selected

To delete existing text, use the **Back** softkey. Once you have finished making changes, select the **Done** softkey to save your changes and exit, or select the **Back** button on the keyboard to exit without saving your changes.

Introduction

While in any of the navigation menus or from within many of the instrument functions, Press the **Function** button to display the **Function** menu as shown in the image to the right.



This chapter will provide you with an understanding of the most common **Function** menu options as follows:

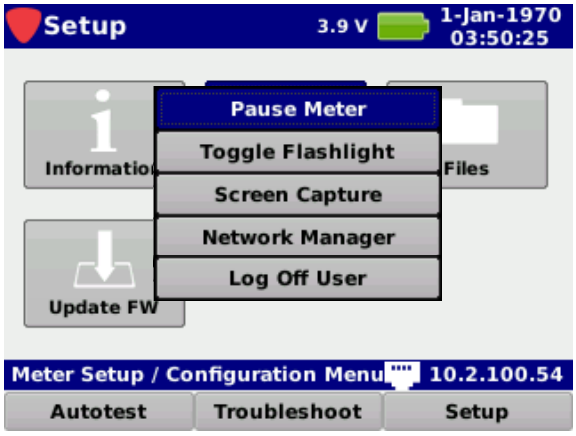
- Pause Meter
- Toggle Flashlight
- Screen Capture
- Network Manager
- Log Off User

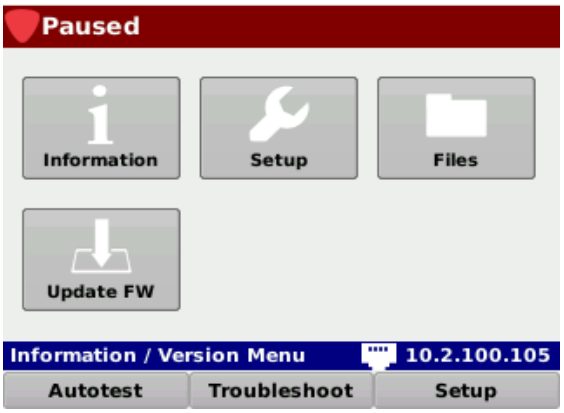
Pause Meter

This function is used to pause the meter during measurements. To pause meter measurements, select the **Pause Meter** button from the **Function** menu as shown in the image to the right.

The **Title Bar** will be highlighted in red and display **Paused** until the pause meter function is disabled.

To exit the pause meter function, Press the **Back** button.



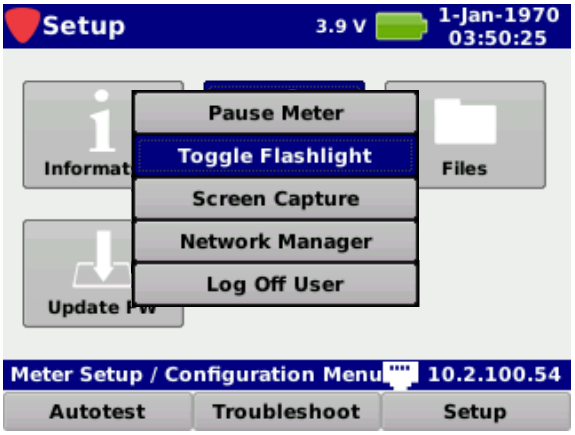


Toggle Flashlight

This function is used to toggle the flashlight on and off. To turn the LED flashlight on, select the **Toggle Flashlight** button from the **Function** menu as shown in the image to the right.

The LED flash light will illuminate until the flashlight delay has expired (between 30 and 180 seconds, user adjustable) or it has been manually toggled off.

To manually toggle the LED flash light off, Press the **Function** button and then select the **Toggle Flashlight** function again.

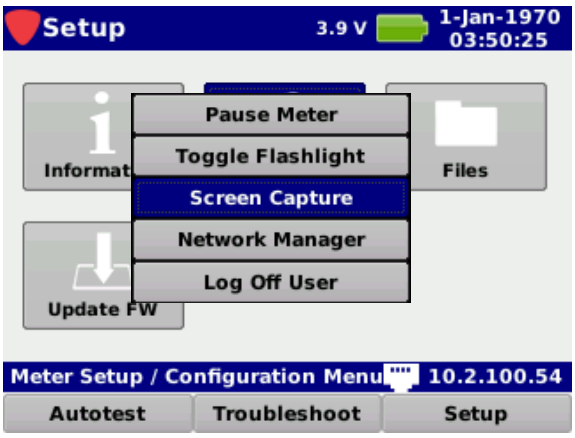


NOTE

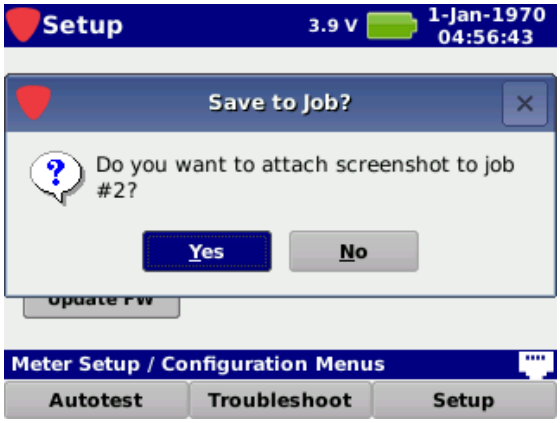
To adjust the Flashlight Delay, see Section II: Setup, Chapter 3: Meter Configuration, Interface Settings.

Screen Capture

This function is used to take a screen capture of the currently displayed screen. To take a screen capture, select the **Screen Capture** function from the **Function** menu as shown in the image to the right.



If you have an open job, you can also save the screen capture to the job by selecting **Yes** as shown in the image to the right.



If you don't want to save the test to the open job, select **No** and you will be prompted to enter a file name using the **Virtual Keyboard**. It will then be saved to the internal memory of the 120 DSP.

NOTE

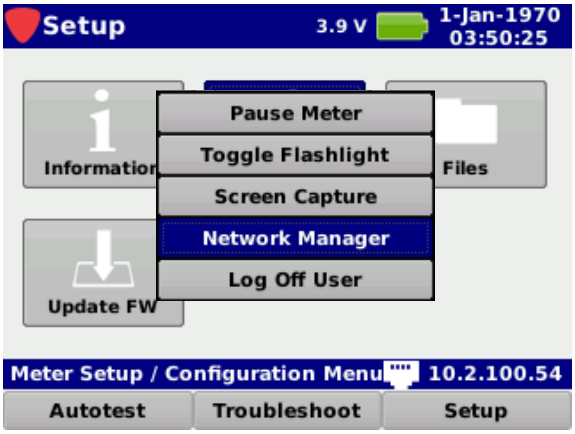
To view the files saved to the internal memory of the 120 DSP, see Section II: Setup, Chapter 4: File Management.

Network Manager

NOTE

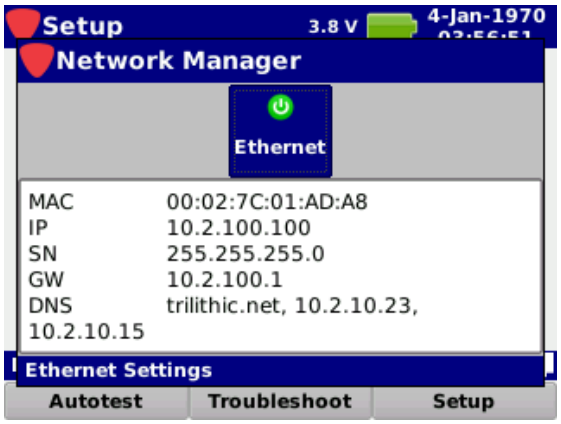
Before proceeding through this section, you should first setup the default network configuration as shown in Section II: Setup, Chapter 3: Meter Configuration.

This function is used to enable or disable network connections. To open the network manager, select the **Network Manager** button from the **Function** menu as shown in the image to the right.



The **Network Manager** window provides controls for the following type of network connection:

- **Ethernet** - This enables the built-in 10/100 Mbit/s Ethernet Port.



Connection Indicators

Once connected, the **Network Manager** window will automatically display the MAC, IP, Subnet, Gateway, and DNS of the active connection.

Within the **Network Manager** window, each connection button is labeled with the connection name and status as follows:

Active - This symbol indicates the connection is currently active.

Inactive - This symbol indicates the connection is currently inactive.

From any navigation menu, the active connection is shown in the right side of the Status Bar as follows:

Ethernet - This symbol indicates the Ethernet connection is currently active.

Disconnect a Network Connection

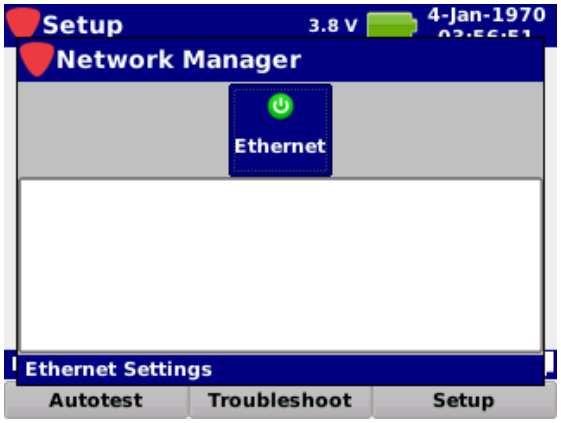
To disconnect an active network connection, select any connection button with an active status.

The **Continue** window will appear as shown in the image to the right. Select the **OK** button to disconnect or select the **Cancel** button to exit without disconnecting.

Ethernet Connection

Perform the following steps to connect using the Ethernet connection:

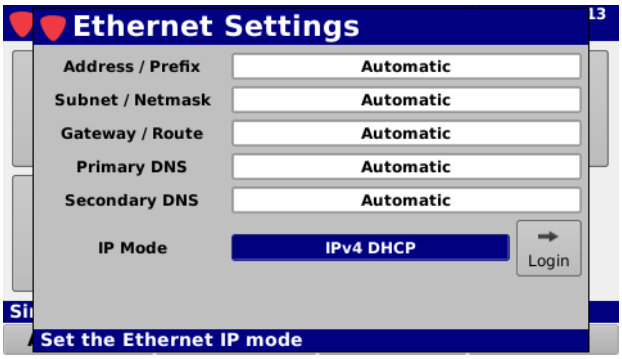
1. Connect an Ethernet cable to the Ethernet Port of the 120 DSP.
2. Select the **Ethernet** connection button from the **Network Manager** window as shown in the image to the right.



NOTE

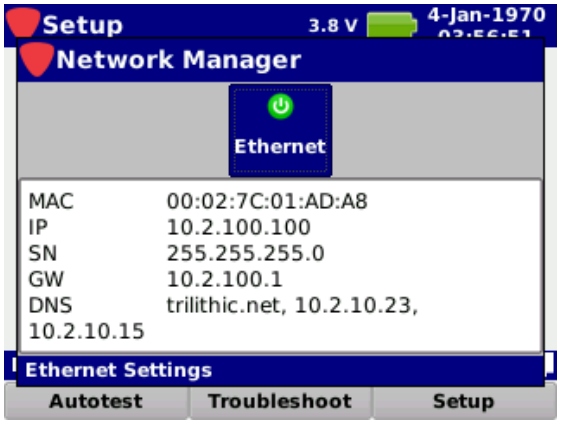
If the Prompt User option is set to No from within the Ethernet Settings option of the Setup Menu, the Ethernet Settings window will not appear. If so, proceed to Step 4.

3. If the **Prompt User** option is set to **Yes** from within the **Ethernet Settings** option of the **Setup** menu, the **Ethernet Settings** window will appear as shown in the image to the right. Adjust the Ethernet settings as desired and then select the **Login** button.



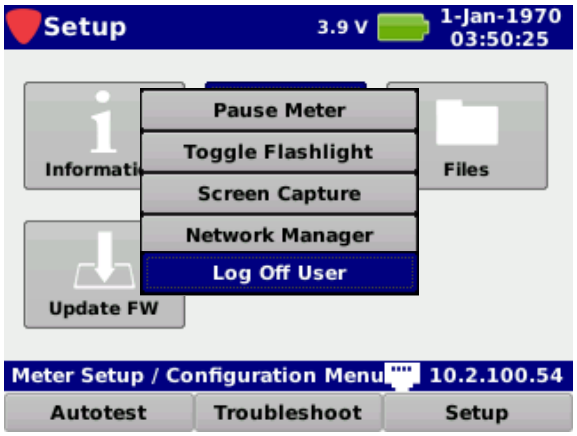
4. The **Ethernet Settings** window will display the network connection progress as shown in the image to the right.
5. The icon of the active connection will be displayed in the **Message Bar**.

6. Return to the **Network Manager** window to view the MAC, IP, Subnet, Gateway, and DNS of the Ethernet connection as shown in the image to the right.



Log Off User

This function is used to log off the current user. To log off, select the **Log Off User** button from the **Function** menu as shown in the image to the right.



The **Welcome to** the **120 DSP** screen will be displayed, from this screen you can now log in as a different user.

NOTE

If the Multiple Users option is set to No from within the Global Settings option of the Setup Menu, the Log Off User function and welcome screen will not be displayed.

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120 DSP
Basic Signal Level Meter

Section II: Setup Menu

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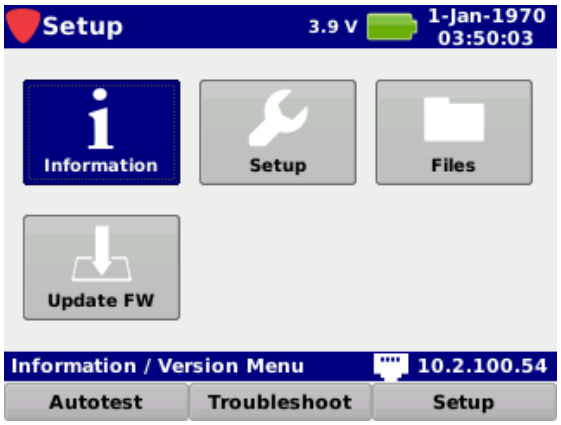
Introduction

Select the **Setup** softkey to display the **Setup** menu as shown in the image to the right. The 120 DSP enables you to select from numerous instrument setup functions. These functions allows you to view, edit, and adjust information and setup parameters for the meter.



This section will provide you with instructions on how to utilize the functions available in the Setup menu of the instrument including:

- Instrument information
- Meter configuration
- File management
- Firmware updates

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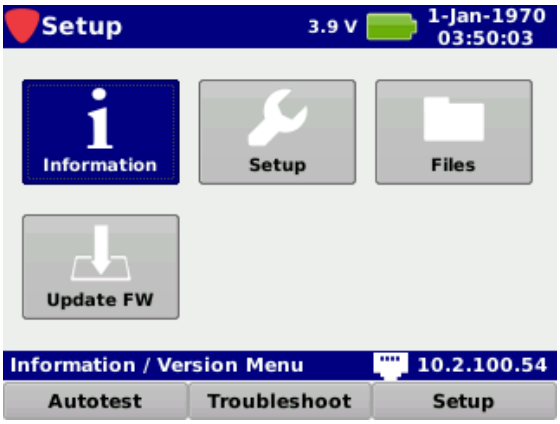
Chapter 2

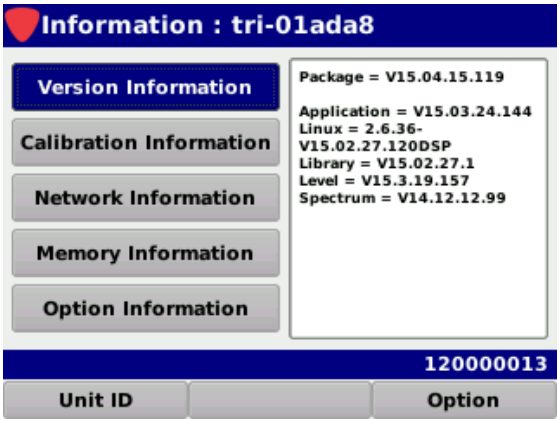
Instrument Information

Overview

Select the **Information** icon as shown in the image to the right to view information about the 120 DSP.



The **Information** screen will be displayed as shown in the image to the right. This screen allows you to view the following types of instrument information:



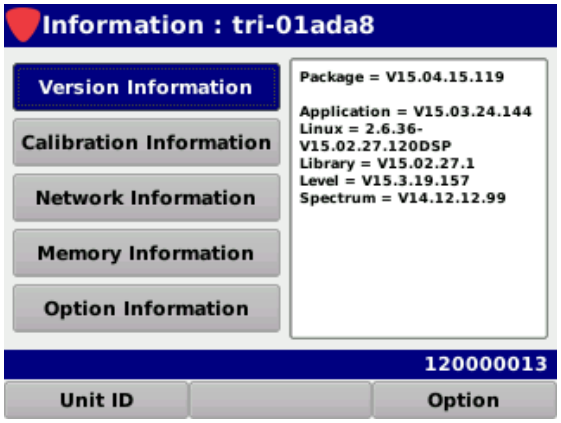
- Serial Number
- Version
- Calibration
- Network
- Memory
- Options
- Activate Options
- View Unit ID

NOTE ***All information displayed in the Instrument Information Mode is static and is to be used as a reference only. To edit any settings you will need to use the Instrument Setup Mode.***

The unit serial number is located on the right side of the **Message Bar**. This information is set at the Trilithic factory and cannot be changed by the user. The serial number also appears on a label on the back side of the 120 DSP. Please provide this number when requesting an RMA for troubleshooting, service, calibration, or repair.

Version Information

Select the **Version Information** button to display details on the version of software/firmware installed in the 120 DSP. This information will be helpful if you are updating your firmware or upgrading your instrument's option package.

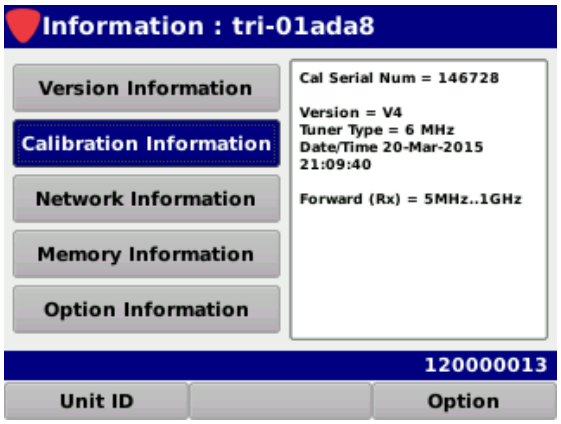


NOTE

When you perform a firmware update, this information will be automatically updated.

Calibration Information

Select the **Calibration Information** button to display recorded details of the last time the 120 DSP was calibrated. This information will be helpful if you are sending your instrument in to the factory for periodic maintenance.

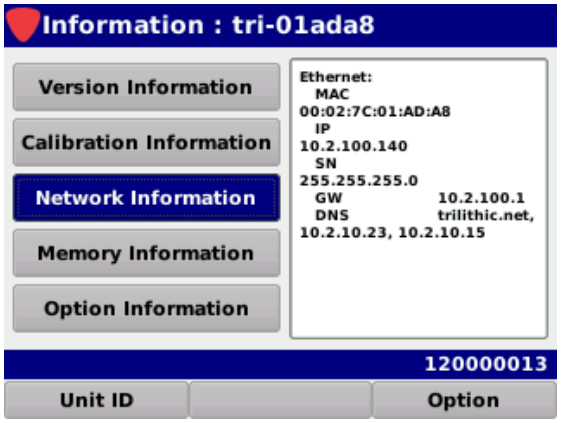


NOTE

When the 120 DSP is sent in for calibration, this information will be automatically updated. You should schedule the 120 DSP for calibration every two years.

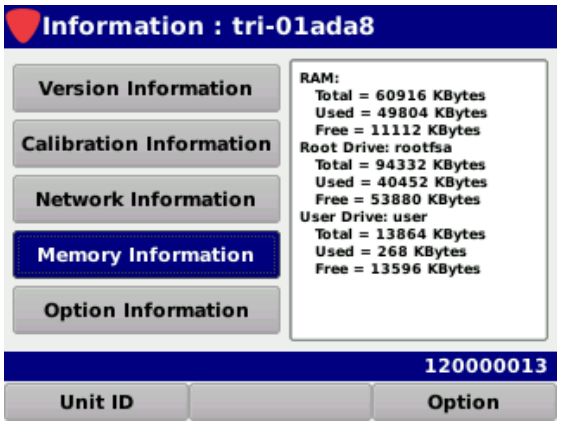
Network Information

Select the **Network Information** button to displays network details such as MAC, IP, SN, GW, and DNS. This information is helpful for quick reference of your current network status.



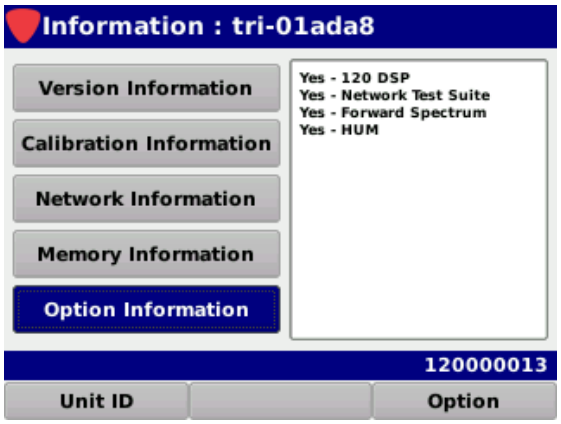
Memory Information

Select the **Memory Information** button to display details of the memory available and used on the 120 DSP. This information is automatically updated as files are saved and stored in the 120 DSP.



Option Information

Select the **Option Information** button to display which options that are available to use and those options that you can install on the 120 DSP.

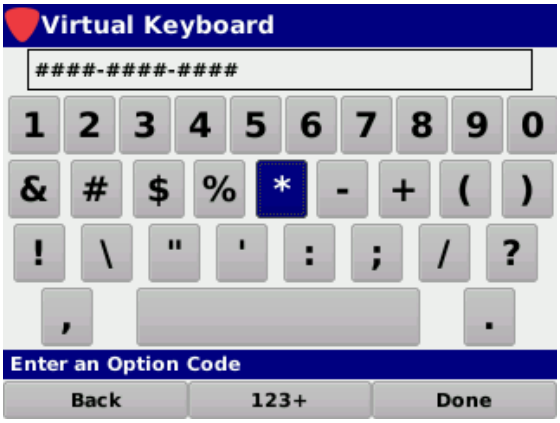


NOTE

This information is automatically updated as options are added to the 120 DSP. After initial sale, most options can be simply added with the purchase of an option activation code. For more information, call your sales representative or Trilithic at 800-344-2412.

Option Activation

Select the **Option** softkey and then enter the option activation key that you purchased from Trilithic. The dash between each four digits of the code as shown in the image to the right is not required when entering the option activation key.

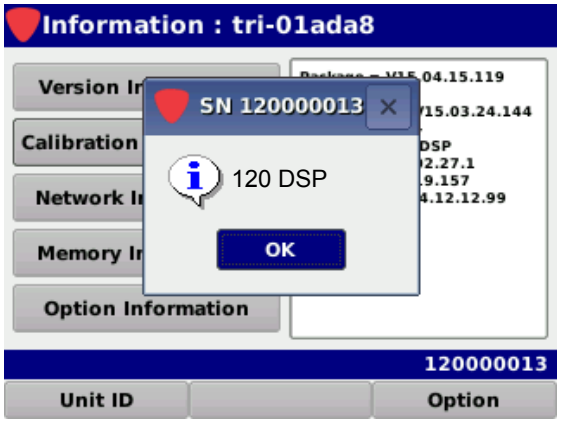


NOTE

The option code is a unique activation number that is specifically generated for your instrument. You should have received this code with your order for new options. If you are missing this code, contact Trilithic at 800-344-2412.

Unit ID

Select the **Unit ID** softkey to view the serial number associated with this meter. Select the **OK** button to exit this window.

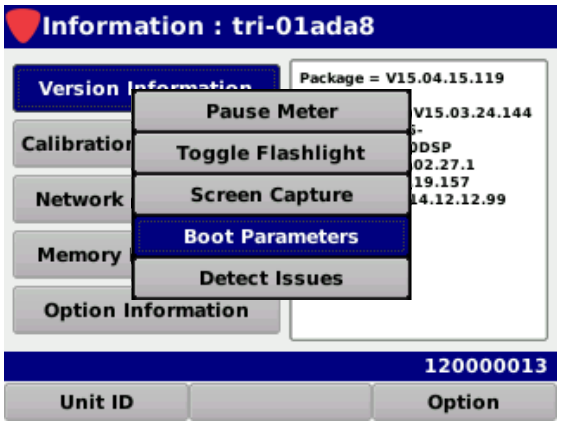


Function Menu Options

The Function menu can be accessed by pressing the **Function** button while in the Instrument Information Mode.

The following **Function** menu options can be accessed while in Instrument Information Mode:

- Pause Meter
- Toggle Flashlight
- Screen Capture
- Boot Parameters
- Detect Issues



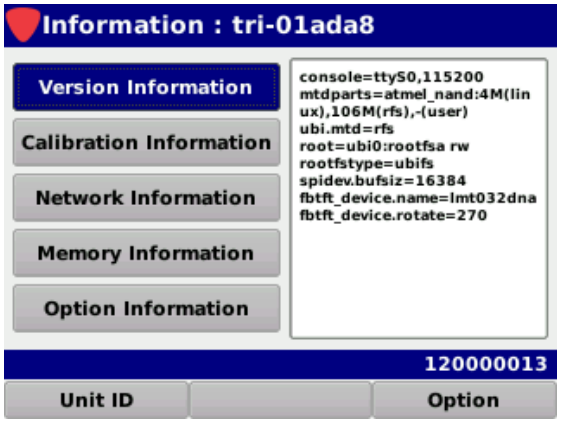
The following functions are described in Section I: The Basics, Chapter 4: Function Menu:

- Pause Meter
- Toggle Flashlight
- Screen Capture

Boot Parameters

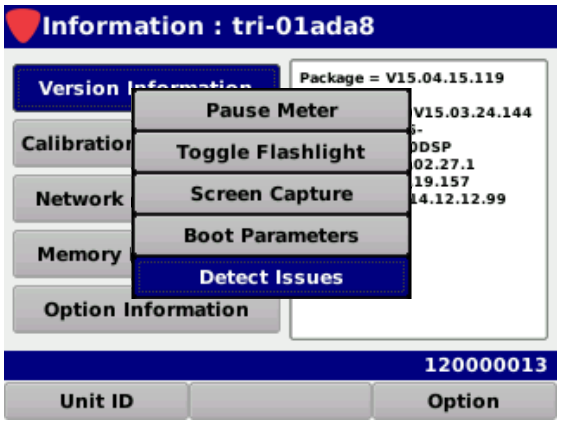
Select the **Boot Parameters** button to view the more information about the boot parameters of the 120 DSP.

The boot parameters will be displayed in the right side of the Information screen. This information is used for advanced troubleshooting by Trilithic technical support.

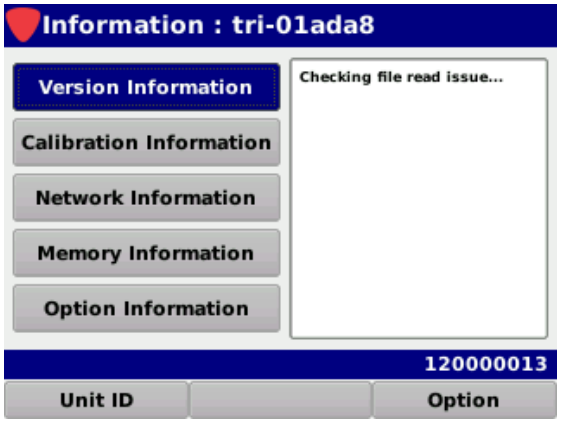


Detect Issues

Select the **Detect Issues** button to detect any file system issues of the 120 DSP.



Any detected file system issues will be displayed in the right side of the Information screen. This information is used for advanced troubleshooting by Trilithic technical support.



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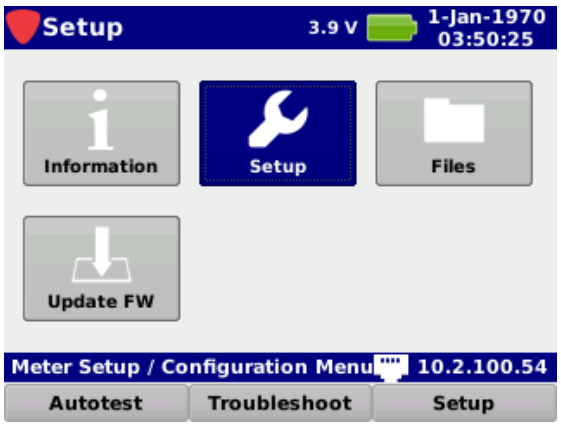
Meter Configuration

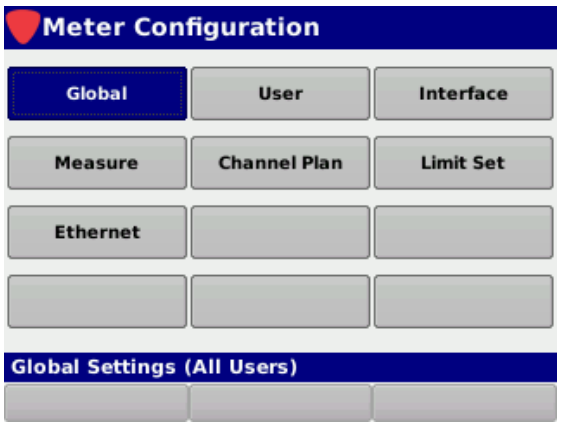
Overview

Select the **Setup** icon as shown in the image to the right to adjust the meter configuration of the 120 DSP.



The **Meter Configuration** screen will be displayed as shown in the image to the right. This screen allows you to modify the following types of settings:

- Global
- User
- Interface
- Measurement
- Channel Plan Management
- Limit Set Management
- Ethernet

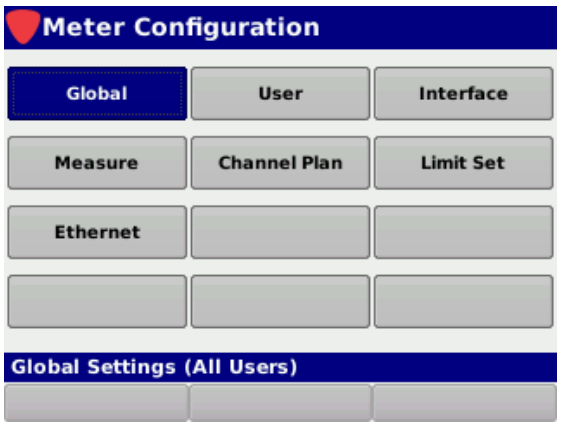


NOTE

All changes that are made in this mode are automatically saved.

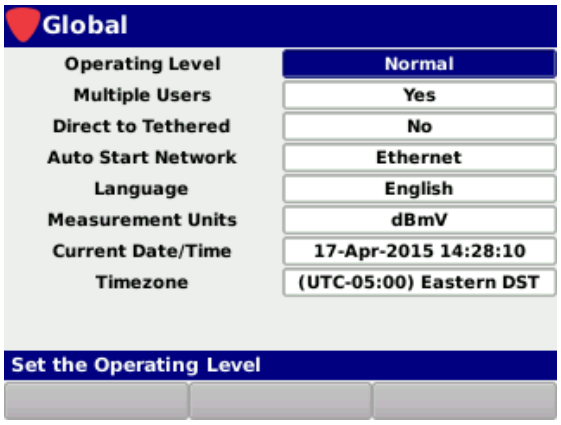
Global Settings

Select the **Global** button as shown in the image to the right to adjust the global settings for all users of the 120 DSP.



The **Global Settings** screen will be displayed as shown in the image to the right. This screen allows you to modify the global settings of the 120 DSP.

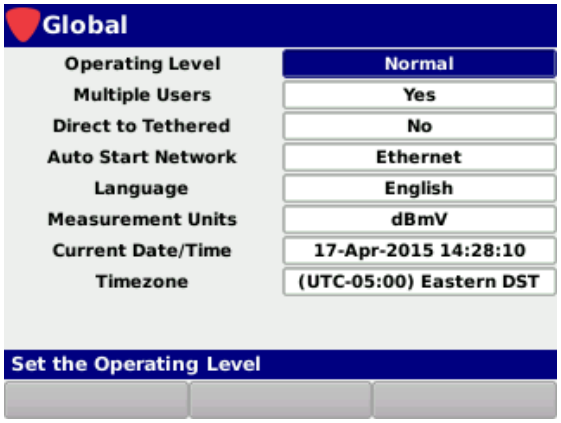
From within the **Global Settings** screen, use the left/ right arrow buttons on the keypad to navigate through the list of setup items.



NOTE ***These parameters can be set directly from your instrument or using ViewPoint Express. For instructions regarding setup using ViewPoint Express, please refer to the ViewPoint Express Operation Manual.***

Operating Level

The **Operator Level** setting is used to control whether the 120 DSP is operating in its normal mode or in an advanced logging mode. The logging mode is used for advanced troubleshooting by Trilithic technical support.



The default setting for **Operator Level** is **Normal**, use the up/down arrow buttons to select from the following preset values:

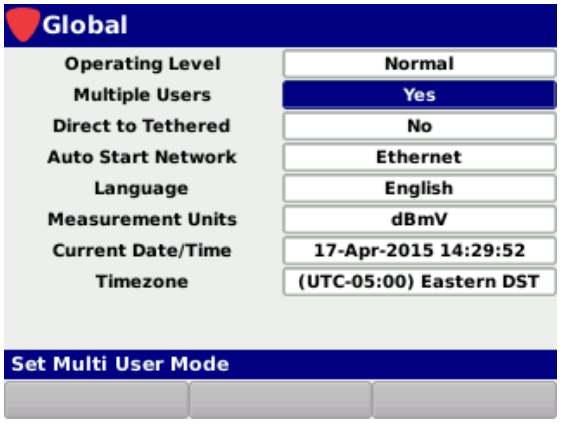
- Select **Normal** for the normal mode of operation.
- Select **Logging** for troubleshooting with Trilithic technical support.
- Select **Calibrate** to enter the calibration mode.

NOTE

When the Operating Level is set to Calibrate, you will see the  ***icon. Use the up/down arrow buttons to change the setting back to Normal to charge the battery.***

Multiple User Control

The **Multiple Users** setting is used to control whether multiple user profiles are displayed when the 120 DSP is powered on.



The default setting for **Multiple Users** is **Yes**, use the up/down arrow buttons to select from the following preset values:

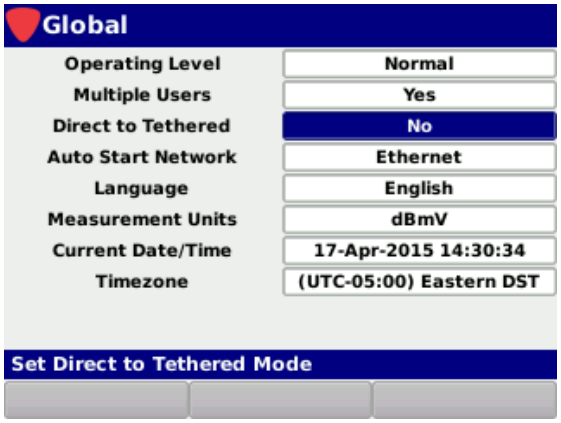
- Select **Yes** to allow multiple user profiles.
- Select **No** to use only one user profile.

Tethering Control

The **Direct to Tethered** setting is used to control whether the 120 DSP automatically enters its tethered mode upon startup/login.

The default setting for **Direct to Tethered** is **No**, use the up/down arrow buttons to select from the following preset values:

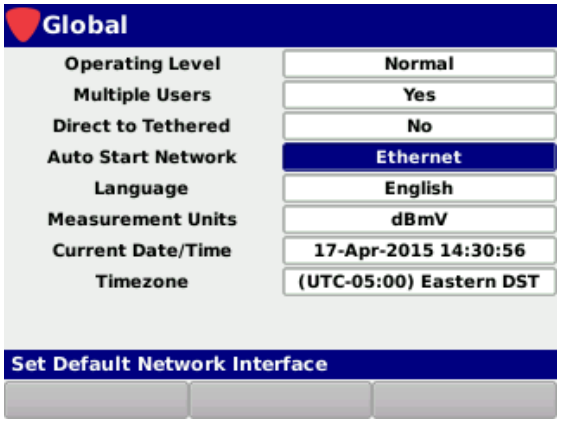
- Select **Yes** to allow automatic tethering upon startup/login.
- Select **No** to disable automatic tethering upon startup/login.



Auto-Start Network

The **Auto-Start Network** setting is used to control what network the 120 DSP automatically connects to when entering the tethered mode upon startup/login.

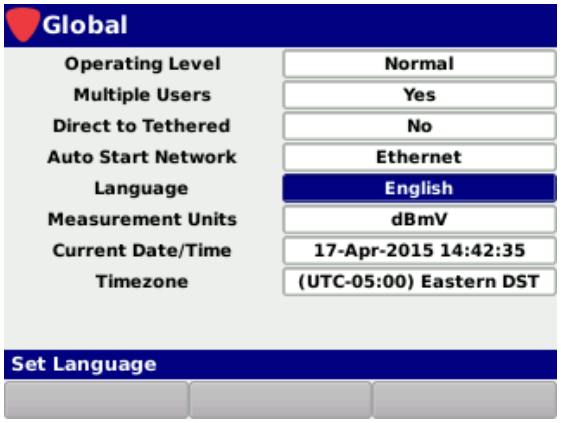
It is set to **Ethernet** and is fixed.



Language

The 120 DSP can be equipped to work in various languages.

The default language is **English**, use the up/down arrow buttons to select from the following languages.



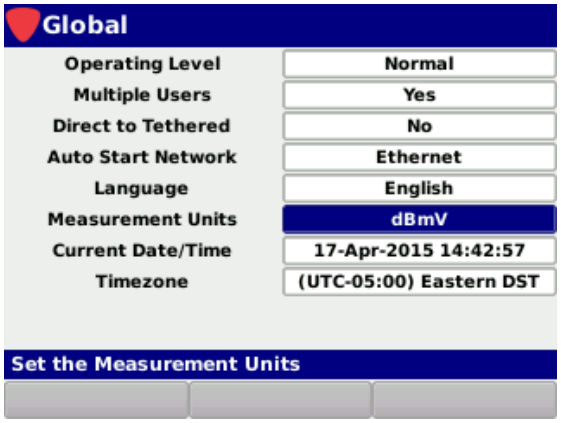
- **English**
- **Spanish**
- **Portuguese**
- **Chinese**
- **Chinese (Simplified)**
- **Japanese**

If you have other language options available on your instrument, you can change the default language. You must restart the device before language changes take affect.

Measurement Units

The **Measurement Units** settings is used to choose the default measurement units.

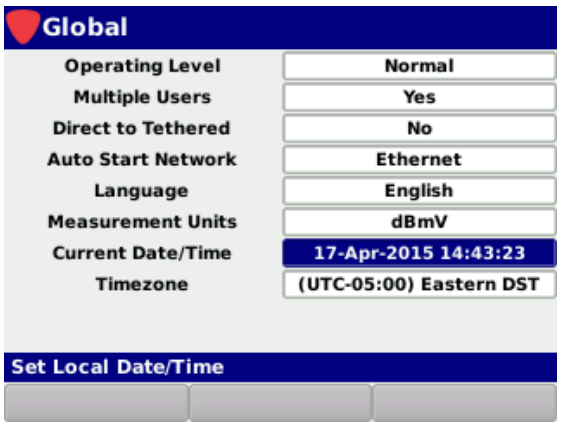
The default unit of measurement is **dBmV**, use the up/down arrow buttons to select from the following preset values:



- **dBuV**
- **dBmV**
- **dBm**

Current Date/Time

The **Current Date/Time** setting is used to set the current date and time for the 120 DSP. This information is displayed in the Title Bar of any navigation screen and is added to every data log, measurement, job, and autotest.



Press the **Enter** button and the **Virtual Keyboard** will be displayed as shown in the image to the right.

Use the **Virtual Keyboard** to enter the current date in the mm/dd/yyyy format.

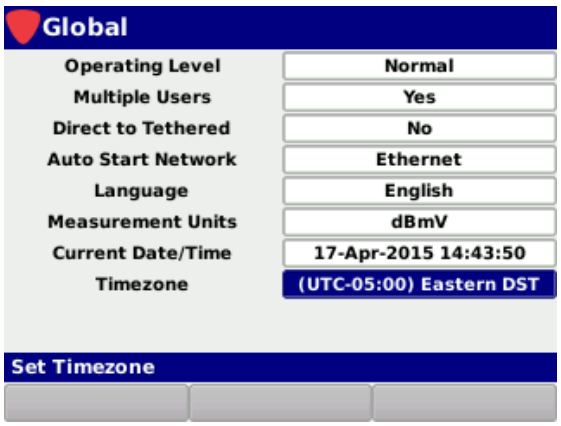
Select the **Done** softkey and the **Virtual Keyboard** will be displayed as shown in the image to the right.

Use the **Virtual Keyboard** to enter the current time in the hh:mm:ss format.

Select the **Done** softkey again to save the current date and time or Press the **Back** button at any time to exit without saving the changes.

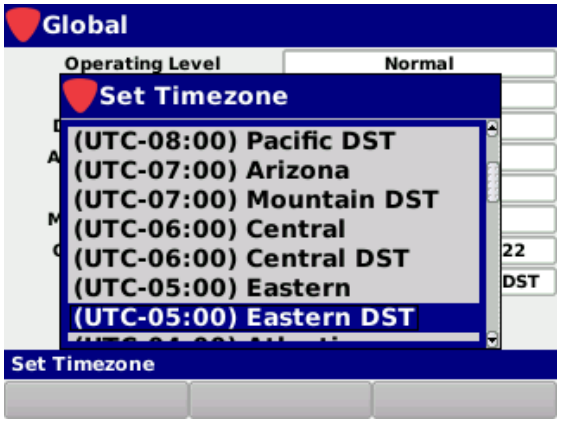
Timezone

The **Timezone** setting allows you to set the time zone of the 120 DSP. This is useful when using the instrument in areas that automatically adjust their local time based on Daylight Savings Time (DST).



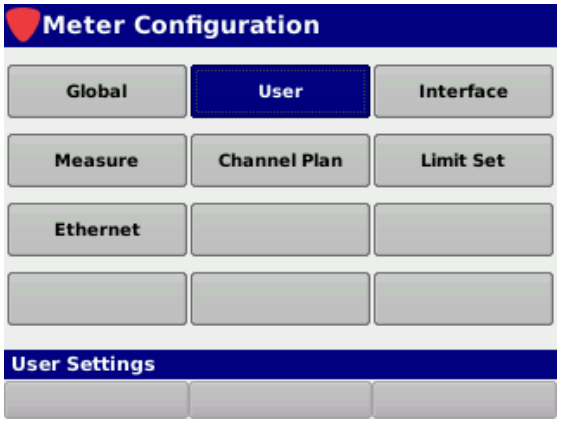
Press the **Enter** button and the **Set Timezone** window will be displayed as shown in the image to the right.

Use the up/down arrow buttons to choose the desired timezone and then press the **Enter** button to select the timezone.



User Settings

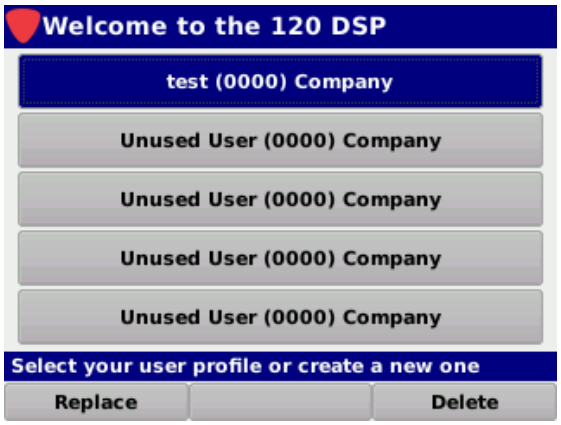
Select the **User** button as shown in the image to the right to adjust the user information that is associated with the currently logged in user of the 120 DSP.



The **User** screen will be displayed as shown in the image to the right. This screen allows you to modify the user settings of the currently logged in user of the 120 DSP.

From within the **User** screen, use the left/right arrow buttons on the keypad to navigate through the list of setup items.

This information is added to every data log and is displayed on the welcome screen of the 120 DSP as shown in the image to the right.

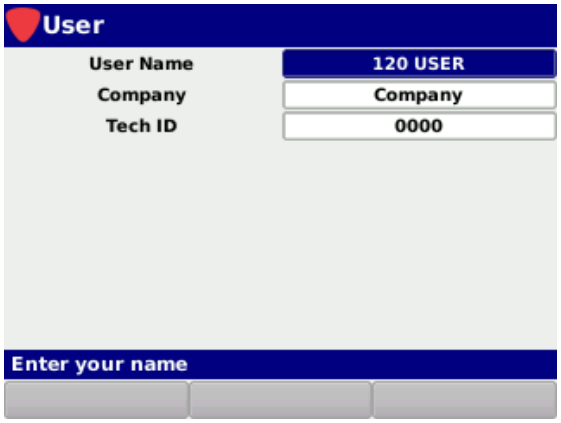


NOTE

These parameters can be set directly from your instrument or using ViewPoint Express. For instructions regarding setup using ViewPoint Express, please refer to the ViewPoint Express Operation Manual.

User Name

The **User Name** setting is used to set the user name for the user profile that is currently logged into the 120 DSP. This information is displayed on the welcome screen and is added to every data log, measurement, job, and autotest.

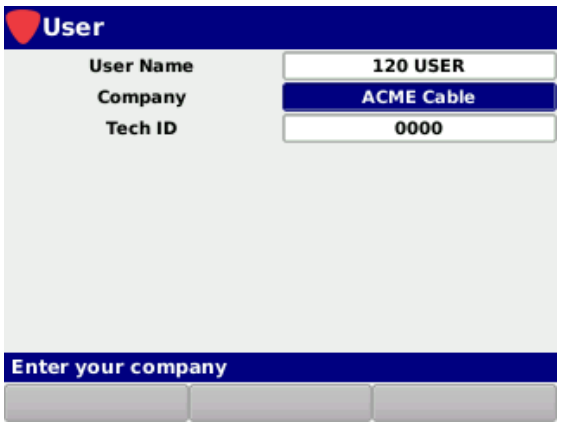


Press the **Enter** button and the **Virtual Keyboard** will be displayed as shown in the image to the right.

Use the **Virtual Keyboard** to enter the user name.

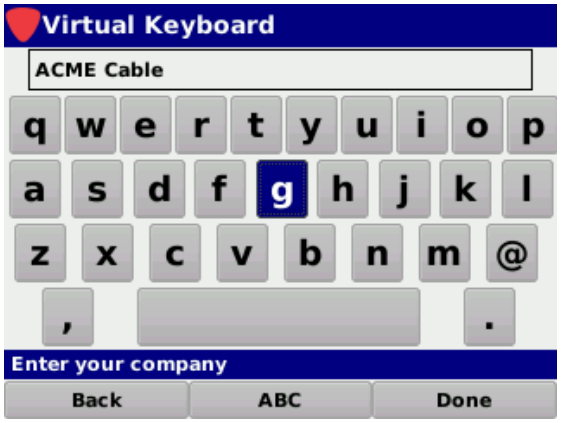
Company

The **Company** setting is used to set the company name for the user profile that is currently logged into the 120 DSP. This information is displayed on the welcome screen and is added to every data log, measurement, job, and autotest.



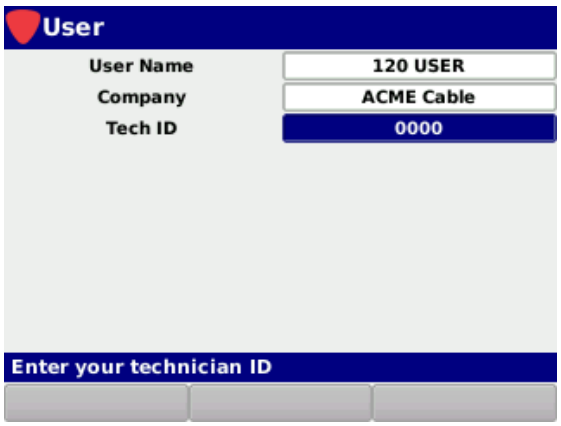
Press the **Enter** button and the **Virtual Keyboard** will be displayed as shown in the image to the right.

Use the **Virtual Keyboard** to enter the company name.



Tech ID

The **Tech ID** setting is used to set the technician ID for the user profile that is currently logged into the 120 DSP. This information is displayed on the welcome screen and is added to every data log, measurement, job, and autotest.

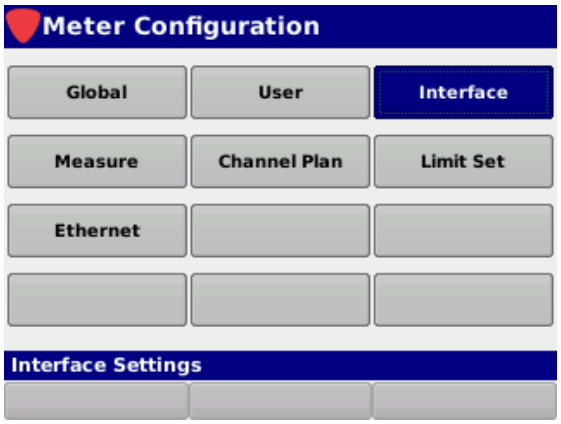


Press the **Enter** button and the **Virtual Keyboard** will be displayed as shown in the image to the right.

Use the **Virtual Keyboard** to enter the technician ID.

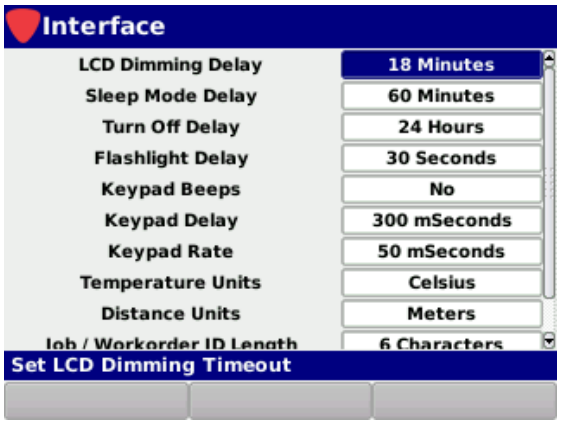
Interface Settings

Select the **Interface** button as shown in the image to the right to adjust the interface settings for the currently logged in user of the 120 DSP.



The **Interface** screen will be displayed as shown in the image to the right. This screen allows you to modify the user interface settings.

From within the **Interface** screen, use the left/right arrow buttons on the keypad to navigate through the list of setup items.



NOTE

These parameters can be set directly from your instrument or using ViewPoint Express. For instructions regarding setup using ViewPoint Express, please refer to the ViewPoint Express Operation Manual.

LCD Dimming Delay

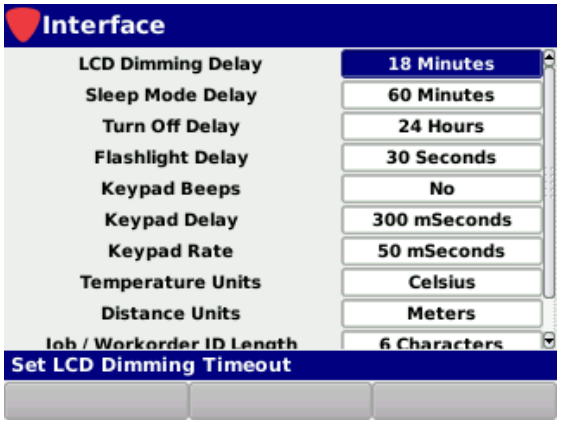
The **LCD Dimming Delay** setting is used to conserve power by automatically dimming the display screen backlight after the 120 DSP has been idle for a specified period of time.

The default setting for the LCD dimming delay is **1 Minute**. The LCD dimming delay can be set from a minimum of one (1) minute up to a maximum of five (5) minutes.

Use either of the following methods to change the LCD dimming delay:

- Use the up/down arrow buttons to change the value in one (1) minute increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the LCD dimming delay as shown in the image to the right.

Upon any button press, the LCD will automatically brighten and the delay timer will restart.



NOTE

Whenever the 120 DSP is being powered by the AC to DC power adapter & battery charger, the LCD dimming delay will be deactivated automatically.

Sleep Mode Delay

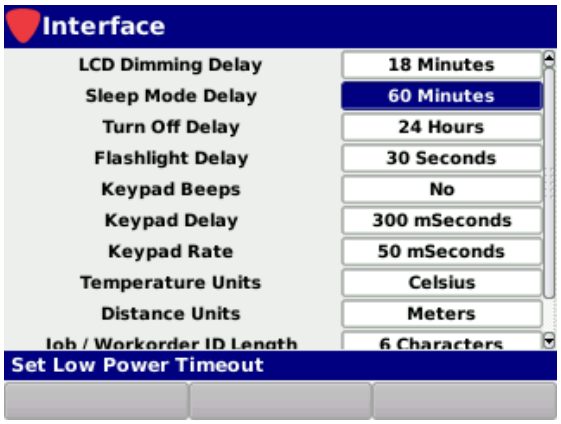
The **Sleep Mode Delay** setting is used to conserve power by automatically enabling the sleep mode after the 120 DSP has been idle for a specified period of time.

The default setting for the sleep mode delay is **5 Minutes**. The sleep mode delay can be set from a minimum of one (1) minute up to a maximum of 60 minutes.

Use either of the following methods to change the sleep mode delay:

- Use the up/down arrow buttons to change the value in one (1) minute increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the sleep mode delay as shown in the image to the right.

Quickly Press the **Power** button to awaken the 120 DSP from sleep mode. The sleep mode delay timer will automatically restart.



NOTE

Whenever the 120 DSP is being powered by the AC to DC power adapter & battery charger, the sleep mode delay will be deactivated automatically.

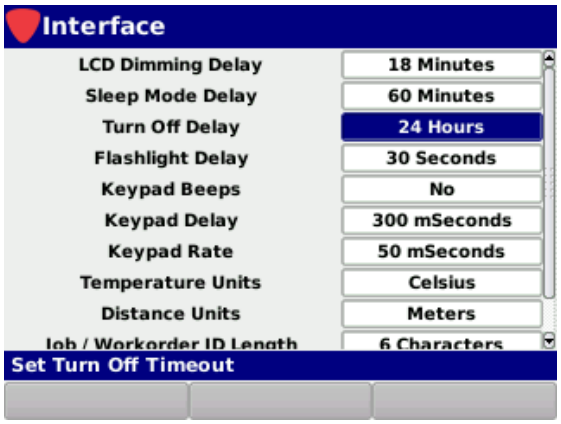
Turn Off Delay

The **Turn Off Delay** setting is used to conserve power by automatically turning off the device after the 120 DSP has been idle for a specified period of time.

The default setting for the turn off delay is **1 Hour**. The turn off delay can be set from a minimum of one (1) hour up to a maximum of 24 hours.

Use either of the following methods to change the turn off delay:

- Use the up/down arrow buttons to change the value in one (1) hour increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the turn off delay as shown in the image to the right.



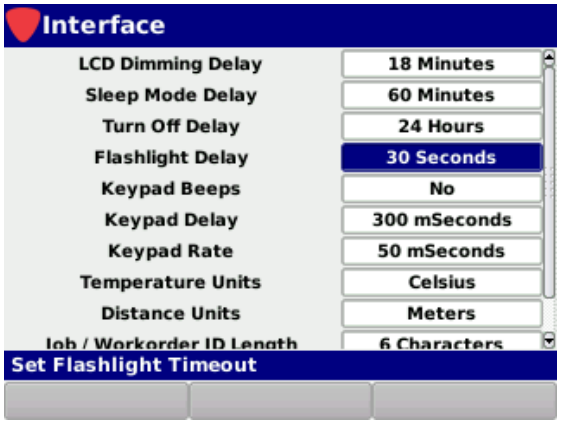
Flashlight Delay

The **Flashlight Delay** setting is used to conserve power by automatically turning off the LED flashlight after a specified period of time.

The default setting for the flashlight delay is **30 Seconds**. The flashlight delay can be set from a minimum of 30 seconds up to a maximum of 180 seconds.

Use either of the following methods to change the flashlight delay:

- Use the up/down arrow buttons to change the value in 30 second increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the flashlight delay as shown in the image to the right.

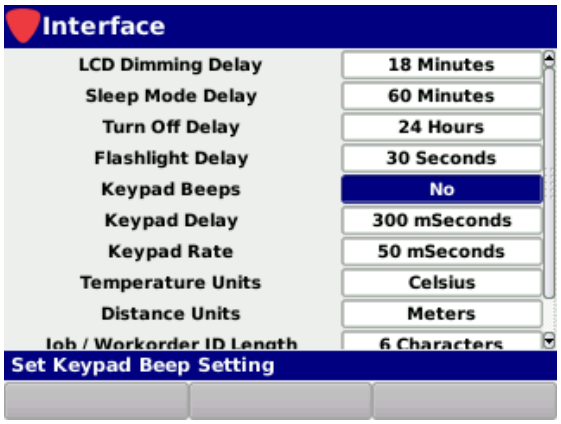


Keypad Beeps

The **Keypad Beeps** setting is used to enable or disable keypad beeps for the internal speaker.

The default setting for **Keypad Beeps** is **Yes**, use the up/down arrow buttons to select from the following preset values:

- Select **Yes** to hear the keypad beeps.
- Select **No** to mute the keypad beeps.



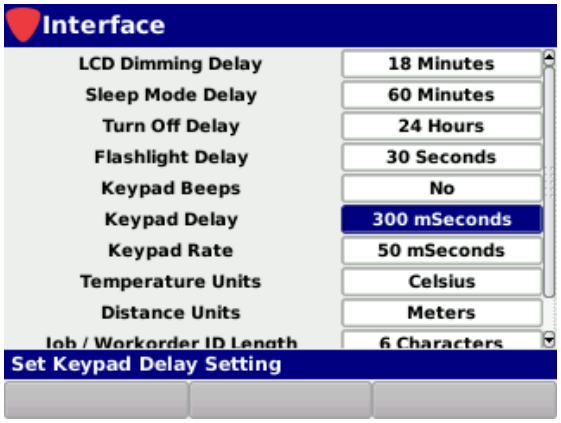
Keypad Delay

The **Keypad Delay** setting is used to adjust the keypad delay.

The default setting for the keypad delay is **300 mSeconds**. The keypad delay can be set from a minimum of 100 mSeconds up to a maximum of 1000 mSeconds.

Use either of the following methods to change the keypad delay:

- Use the up/down arrow buttons to change the value in 50 mSecond increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the keypad delay as shown in the image to the right.



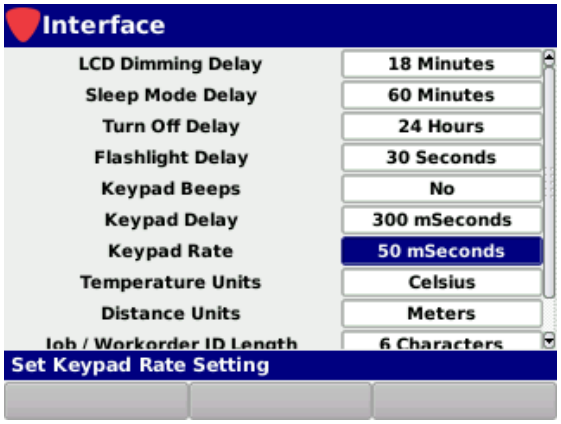
Keypad Rate

The **Keypad Rate** setting is used to adjust the keypad rate.

The default setting for the keypad rate is **50 mSeconds**. The keypad rate can be set from a minimum of 50 mSeconds up to a maximum of 1000 mSeconds.

Use either of the following methods to change the keypad rate:

- Use the up/down arrow buttons to change the value in 50 mSecond increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the keypad rate as shown in the image to the right.

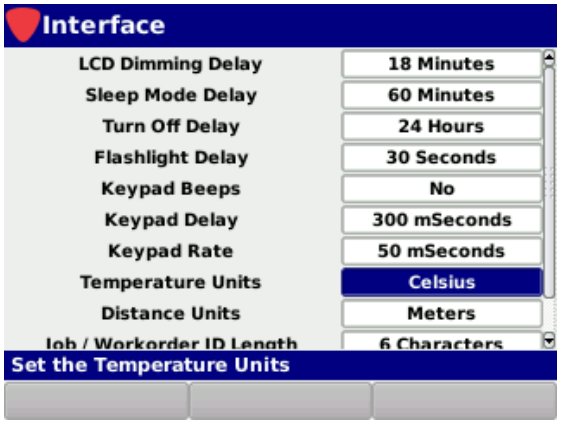


Temperature Units

The **Temperature Units** setting is used to set the default temperature units to display on the 120 DSP.

The default setting for **Temperature Units** is **Celsius**, use the up/down arrow buttons to select from the following preset values:

- **Fahrenheit** (°F)
- **Celsius** (°C)

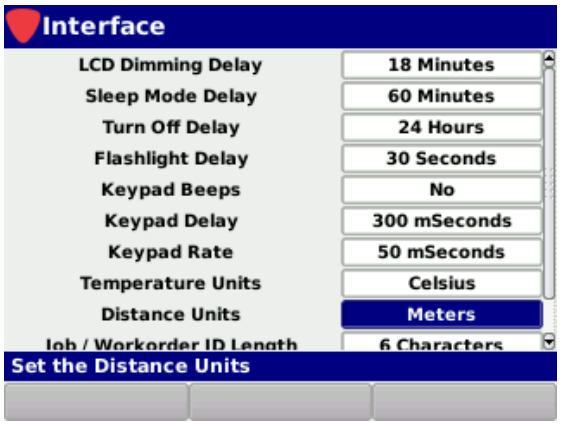


Distance Units

The **Distance Units** setting is used to set the default distance measurement units to display on the 120 DSP.

The default setting for **Distance Units** is **Meters**, use the up/down arrow buttons to select from the following preset values:

- **Feet**
- **Meters**



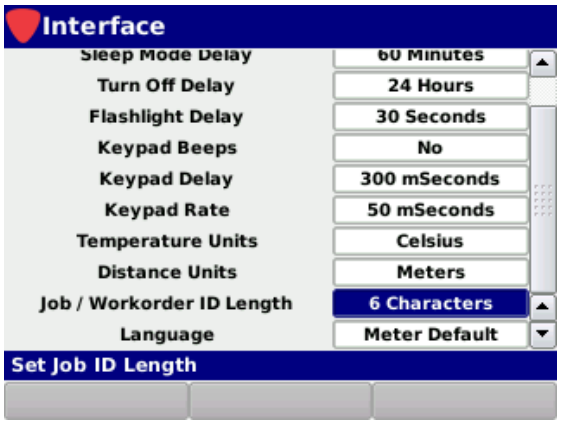
Job & Workorder ID Length

The **Job/Workorder ID Length** setting is used to set the maximum number of characters to display for jobs and workorders on the 120 DSP.

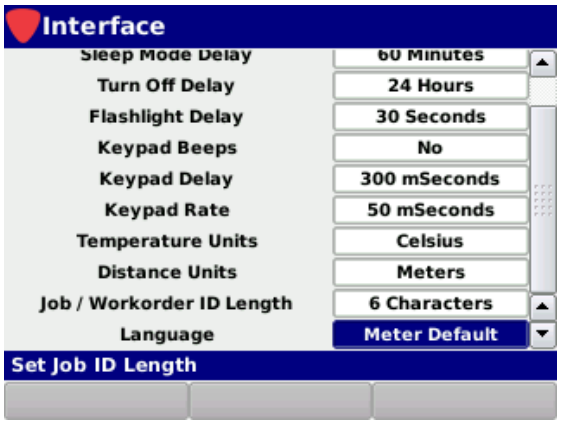
The default setting for the job and workorder ID length is **6 Characters**. The character length can be set from a minimum of 6 characters up to a maximum of 32 characters.

Use either of the following methods to change the maximum number of characters:

- Use the up/down arrow buttons to change the value in one (1) character increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the number of characters as shown in the image to the right.



Language



The 120 DSP can be equipped to work in various languages.

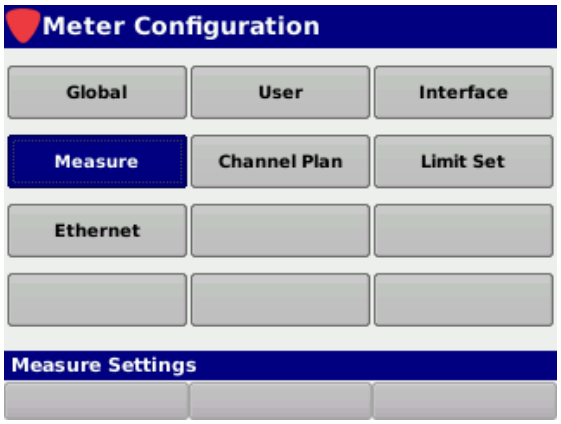
The default language is defined by the **Global** menu and shows here as **Meter Default**, but can be adjusted per user. Use the up/down arrow buttons to select from the following languages.

- **Meter Default**
- **English**
- **Spanish**
- **Portuguese**
- **Chinese**
- **Chinese (Simplified)**
- **Japanese**

If you have other language options available on your instrument, you can change the default language. You must restart the device before language changes take affect.

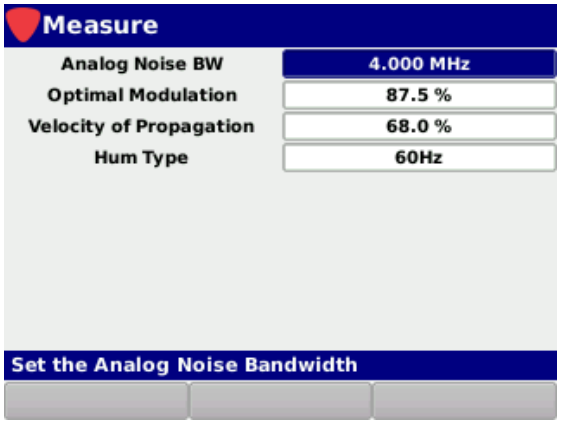
Measurement Settings

Select the **Measure** button as shown in the image to the right to adjust the measurement settings for the 120 DSP.



The **Measure** screen will be displayed as shown in the image to the right. This screen allows you to modify the measurement settings of the 120 DSP.

From within the **Measure** screen, use the left/right arrow buttons on the keypad to navigate through the list of setup items.



NOTE

These parameters can be set directly from your instrument or using ViewPoint Express. For instructions regarding setup using ViewPoint Express, please refer to the ViewPoint Express Operation Manual.

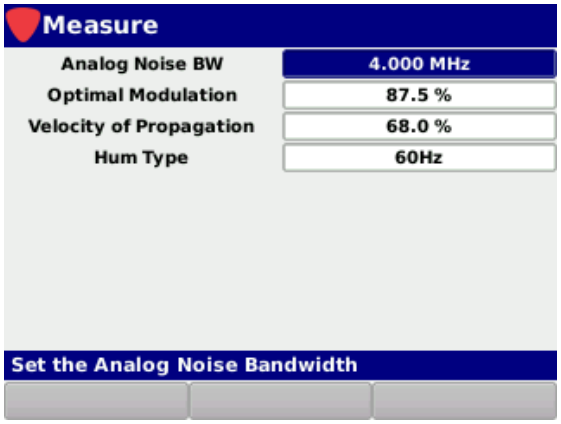
Analog Noise Bandwidth

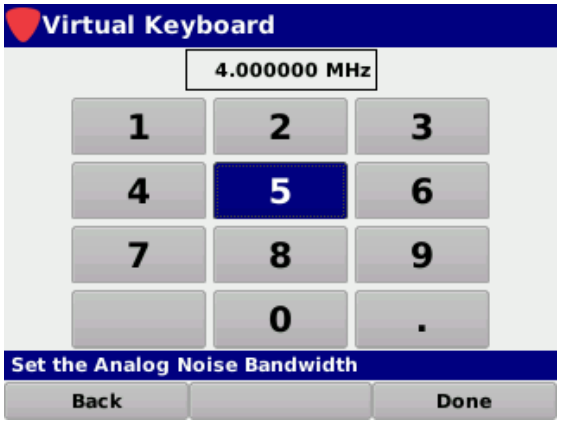
The **Analog Noise BW** setting is used to set the noise bandwidth that is used when computing C/N for analog TV channels.

The default setting for the analog noise bandwidth is **4.000 MHz**. The analog noise bandwidth can be set from a minimum of 0.100 MHz up to a maximum of 9.000 MHz.

Use either of the following methods to change the analog noise bandwidth:

- Use the up/down arrow buttons to change the value in 0.1 MHz increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the analog noise bandwidth as shown in the image to the right.





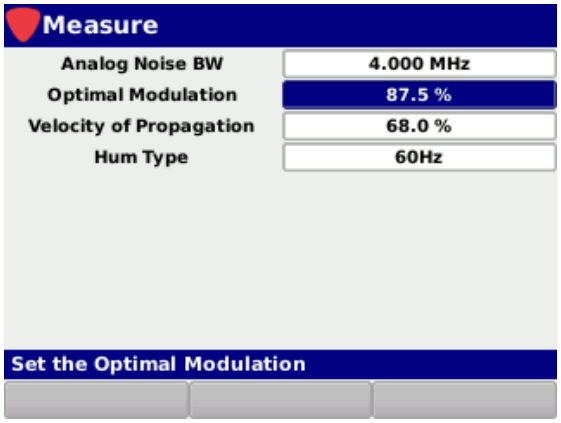
Optimal Modulation

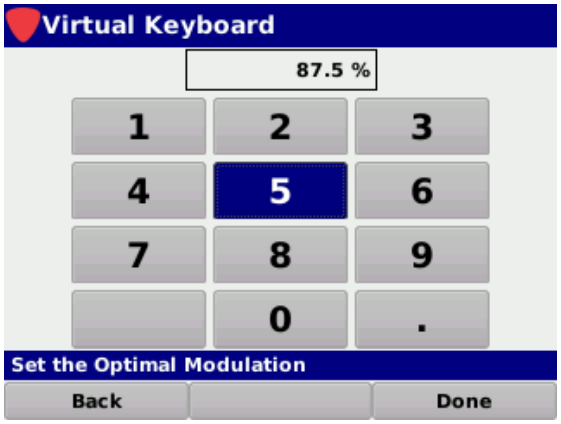
The **Optimal Modulation** setting is used to set the marker on the % modulation bar graph to compute signal level for analog channels with SECAM L modulation.

The default setting for the optimal modulation is **87.5%**. The optimal modulation can be set from a minimum of 70.0% up to a maximum of 99.0%.

Use either of the following methods to change the optimal modulation:

- Use the up/down arrow buttons to change the value in 0.1% increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the optimal modulation as shown in the image to the right.





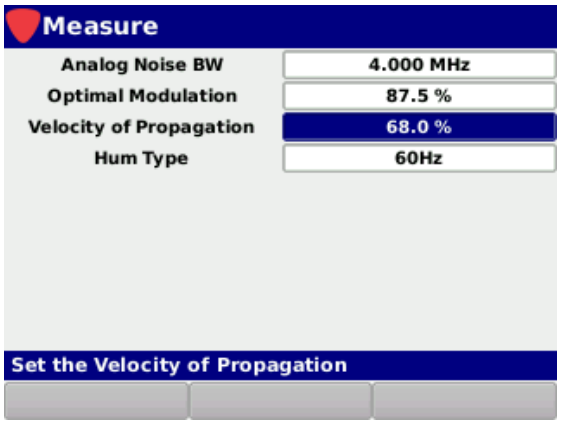
Velocity of Propagation

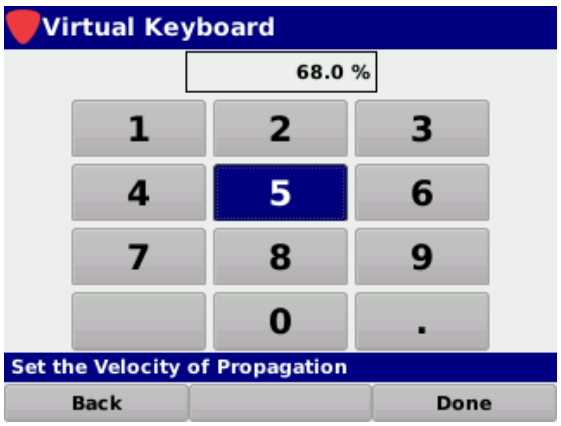
The **Velocity of Propagation** setting is used to set the propagation value for the cable under test.

The default setting for the velocity of propagation is **82.0%**. The velocity of propagation can be set from a minimum of 60.0% up to a maximum of 99.0%.

Use either of the following methods to change the velocity of propagation:

- Use the up/down arrow buttons to change the value in 0.1% increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the velocity of propagation as shown in the image to the right.



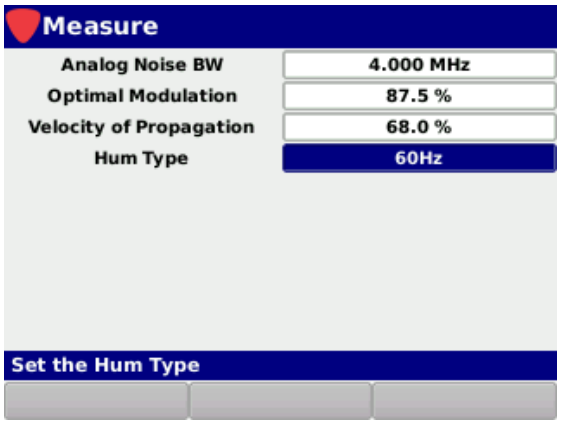


Hum Type (OPTIONAL)

The **Hum Type** setting is used to set the default hum type for testing.

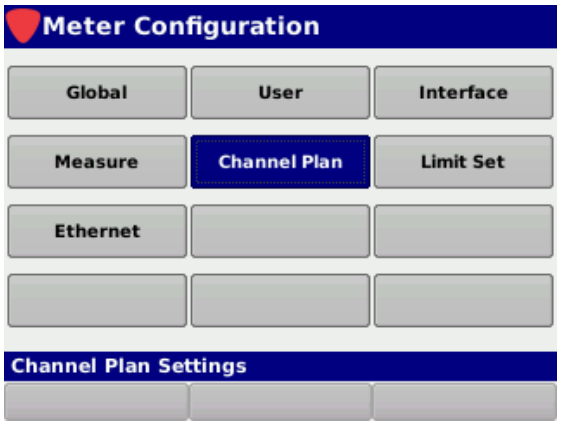
The default setting for **Hum Type** is **60 Hz**, use the up/down arrow buttons to select from the following preset values:

- **60 Hz**
- **50 Hz**



Channel Plan Management

Select the **Channel Plan** button as shown in the image to the right to manage channel plans on the 120 DSP.

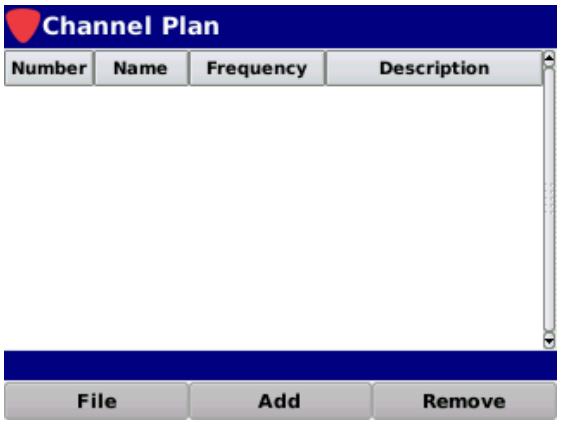


NOTE

Channel Plans and Limit Sets created/modified on the 120 DSP can only be used in the Troubleshooting menu. Autotests require ViewPoint Express Channel Plans and Limit Sets.

The **Channel Plan** screen will be displayed as shown in the image to the right. This screen allows you to:

- Open, create, save and delete channel plans
- Add and remove channels
- Edit channel details
- Save preset channel configurations



NOTE

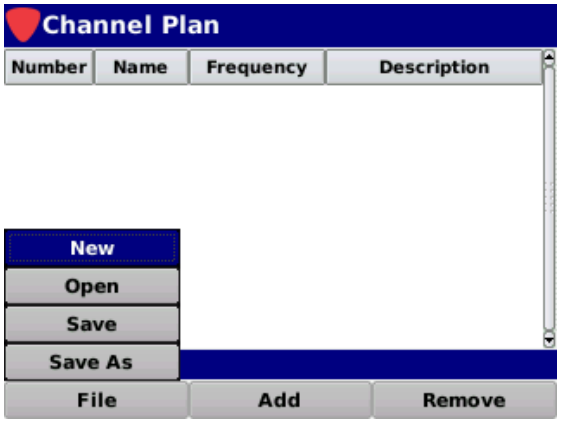
These parameters can be set directly from your instrument or using ViewPoint Express. For instructions regarding setup using ViewPoint Express, please refer to the ViewPoint Express Operation Manual.

From within the **Channel Plan** screen, use the arrow buttons on the keypad to navigate through the list of channels.

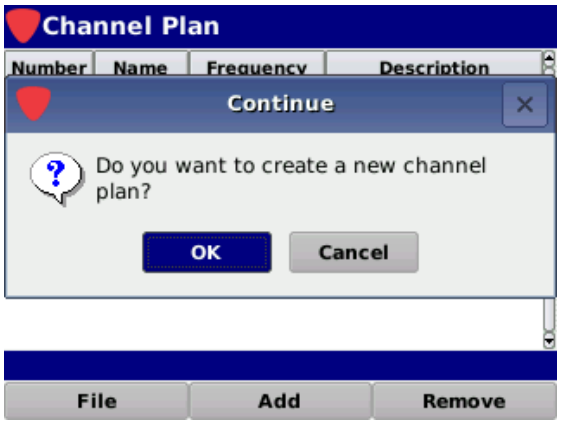
Create a New Channel Plan

Perform the following steps to create a new channel plan:

1. Select the **File** softkey.
2. From the **File** pop-up menu, select the **New** button as shown in the image to the right.

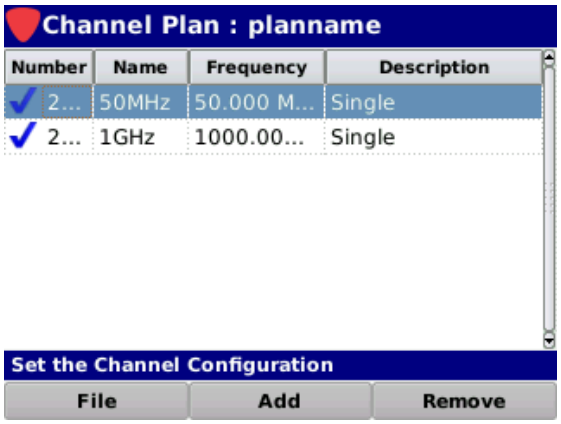


3. The **Continue** window will be displayed as shown in the image to the right.
4. Select the **OK** button to continue or select the **Cancel** button to exit without creating a new channel plan.



5. Use the **Virtual Keyboard** to enter the name of the new channel plan as shown in the image to the right.

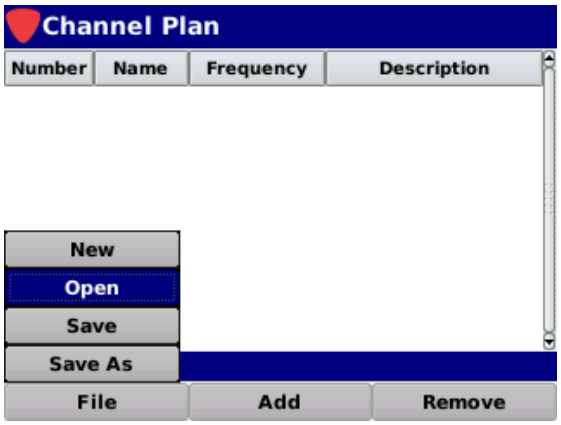
6. The new channel plan will be displayed as shown in the image to the right. Use the up/down arrow buttons to highlight specific channels for editing or removal.



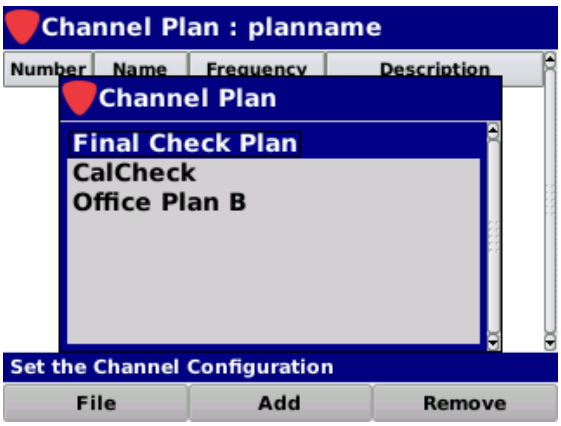
Open an Existing Channel Plan

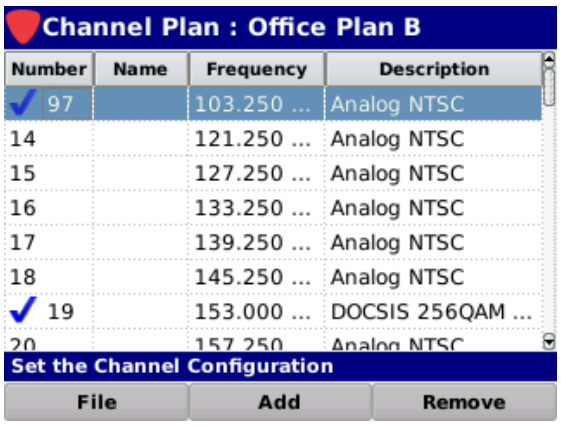
Perform the following steps to open an existing channel plan:

1. Select the **File** softkey.
2. From the **File** pop-up menu, select the **Open** button as shown in the image to the right.
3. The **Channel Plan** window will be displayed as shown below (left).
4. Select the name of the channel plan that you would like to open.



5. The selected channel plan and its channels are displayed as shown below (right). Use the up/down arrow buttons to highlight specific channels for editing or removal.

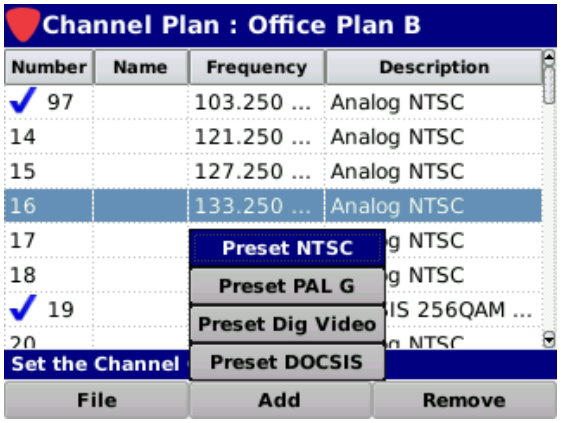


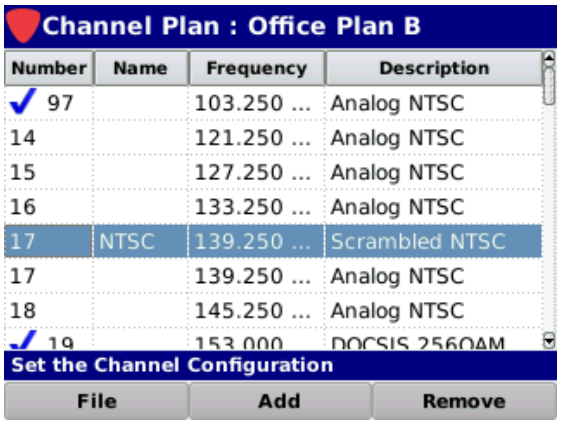


Adding Channels to a Channel Plan

The 120 DSP comes pre loaded with four different channel presets; **NTSC**, **PAL G**, **Dig Video**, and **DOCSIS**. Perform the following steps to add a channel to the channel plan:

1. Use the up/down arrow buttons to highlight the row above the location to add the new channel. Skip this step when adding the first channel to an empty channel plan.
2. Select the **Add** softkey.
3. From the **Add** pop-up menu, select from one of four preset channels as shown in the image to the right.
4. The new channel will be inserted below the previously highlighted row or as the first channel in the channel plan.



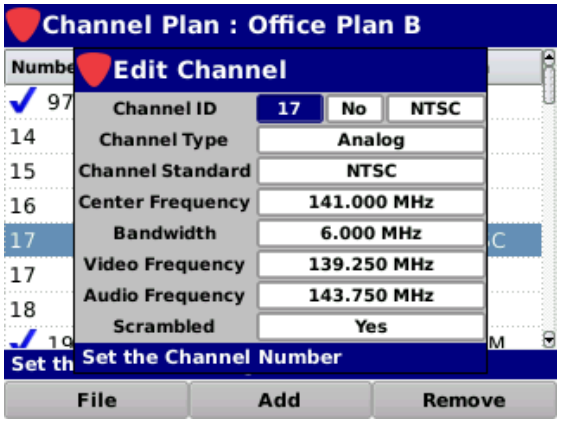


Removing Channels from a Channel Plan

To remove a channel from the channel plan, use the up/down arrow buttons to highlight the channel to be removed and select the **Remove** softkey.

Editing a Channel

To edit a channel from the channel plan, use the up/down arrow buttons to highlight the channel to be edited and then Press the **Enter** button. The **Edit Channel** screen will be displayed as shown to the right.

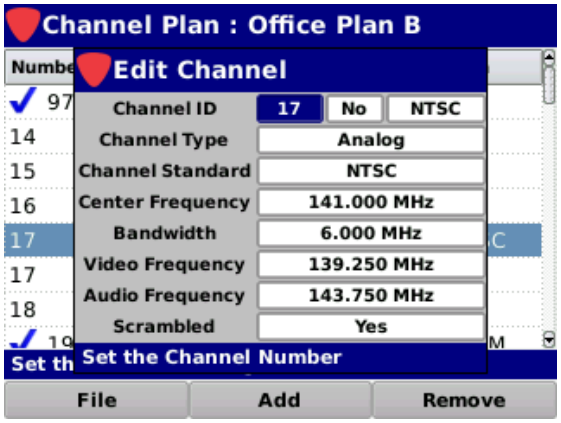


Basic Channel Settings

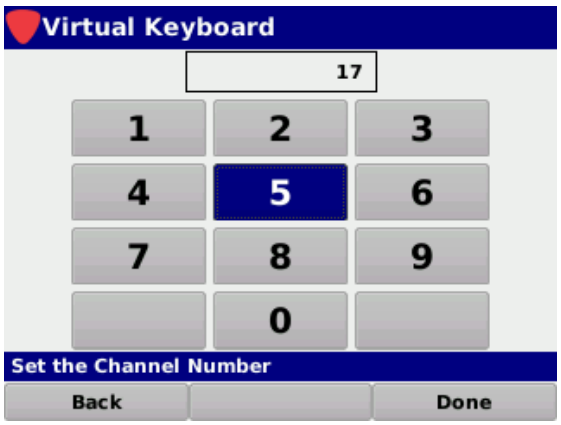
From within the **Edit Channel** screen, use the left/right arrow buttons on the keypad to navigate through the list of setup items.

Channel ID

The **Channel ID** setting is used to number the selected channel.



Press the **Enter** button and use the **Virtual Keyboard** to directly enter the channel number as shown in the image to the right.

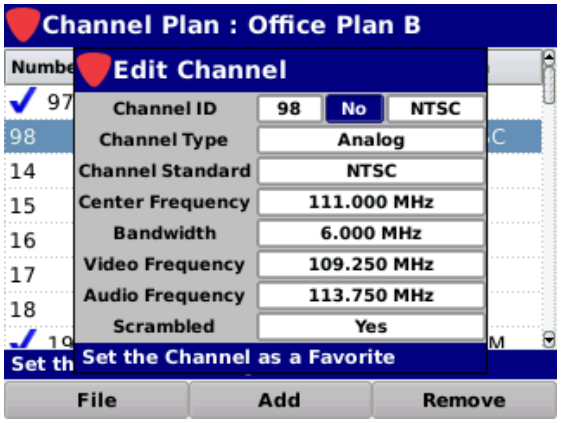


Favorites Selection

The **Favorites** setting is used to select favorite channels for quick access

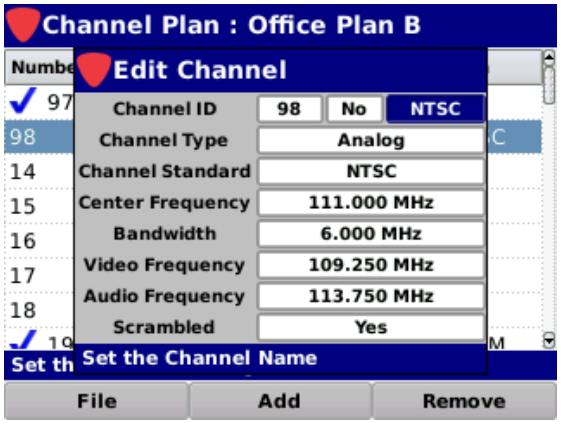
The default setting for **Favorites** is **No**, use the up/down arrow buttons to select from the following preset values:

- Select **Yes** to add the channel to the favorites list.
- Select **No** to remove the channel from the favorites list.



Channel Name

The **Channel Name** setting is used to name the selected channel.

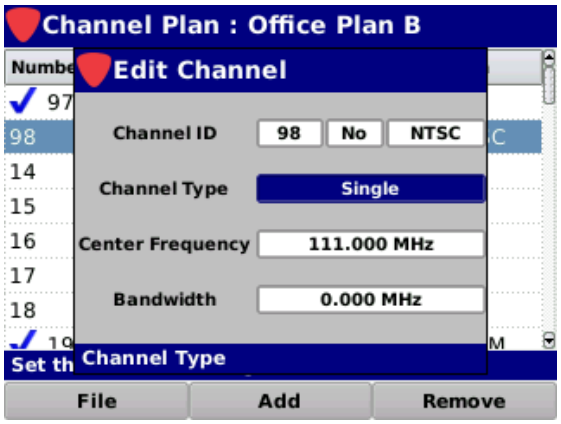


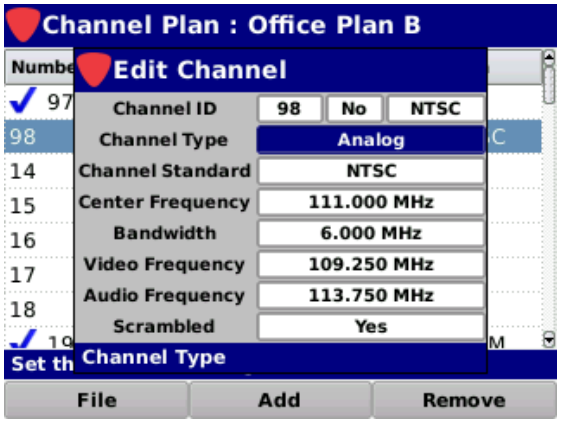
Press the **Ent**er button and use the **Virtual Keyboard** to directly enter the channel name as shown in the image to the right.

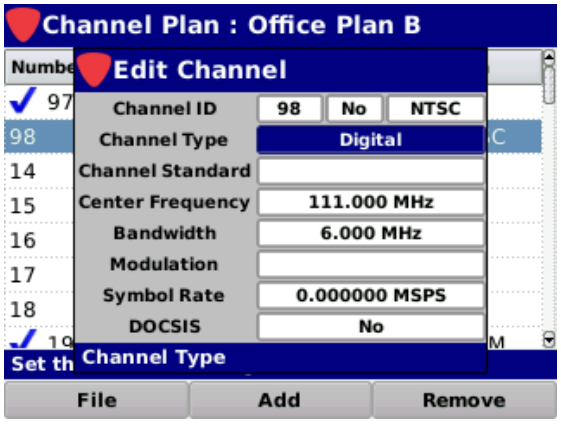
Channel Type

The **Channel Type** setting is used to select the type of channel and available channel settings. Use the up/down arrow buttons to select from the following types of channels as shown in the images below:

- **Single**
- **Analog**
- **Digital**

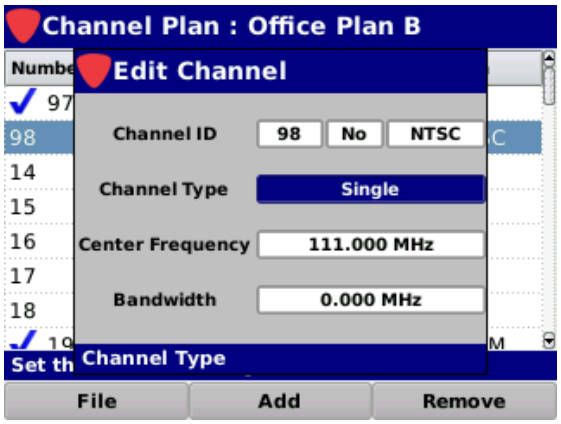






Single Channel Properties

When the **Channel Type** is set to **Single**, the following settings are available. From within the **Edit Channel** screen, use the left/right arrow buttons on the keypad to navigate through the list of setup items.

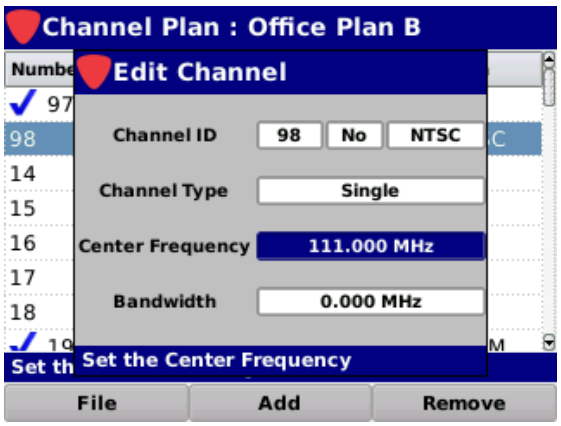


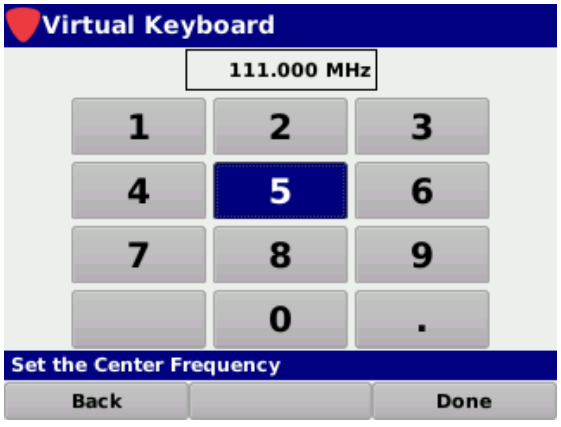
Center Frequency

The **Center Frequency** setting is used to adjust the center frequency of the channel. The center frequency can be set from a minimum of 50.000 MHz up to a maximum of 999.999 MHz.

Use either of the following methods to change the center frequency of the channel:

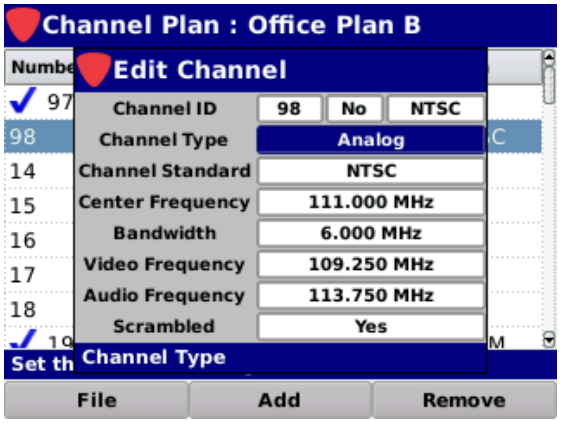
- Use the up/down arrow buttons to change the value in 0.050 MHz increments.
- Press the **Ent**er button and use the **Virtual Keyboard** to directly enter the center frequency as shown in the image to the right.





Analog Channel Properties

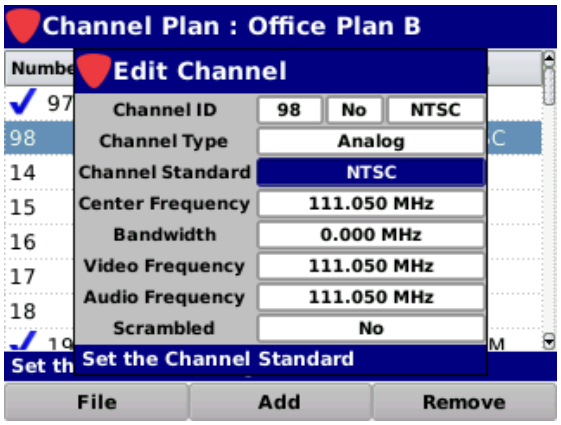
When the **Channel Type** is set to **Analog**, the following settings are available. From within the **Edit Channel** screen, use the left/right arrow buttons on the keypad to navigate through the list of setup items.



Channel Standard

The **Channel Standard** setting is used to select the analog encoding standard. Use the up/down arrow buttons to select from the following standards:

- **NTSC**
- **PAL B/I/D/N/M/G/H/K**
- **SECAM B/L/D/G/H/I/K**

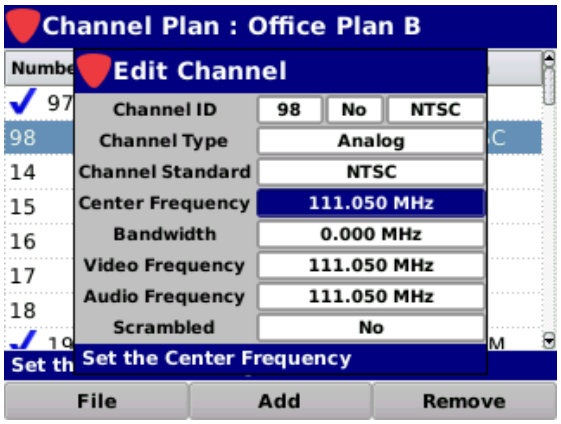


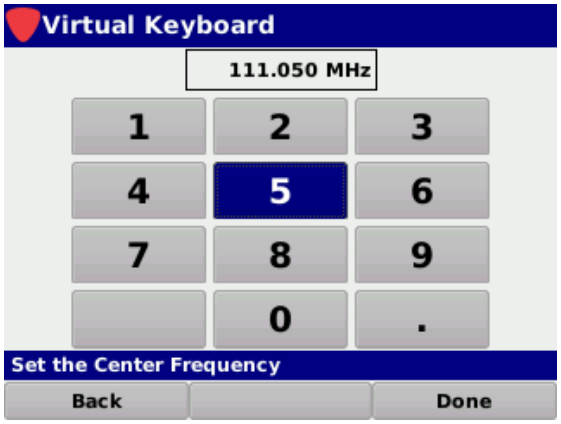
Center Frequency

The **Center Frequency** setting is used to adjust the center frequency of the channel. The center frequency can be set from a minimum of 50.000 MHz up to a maximum of 999.999 MHz.

Use either of the following methods to change the center frequency of the channel:

- Use the up/down arrow buttons to change the value in 0.050 MHz increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the center frequency as shown in the image to the right.



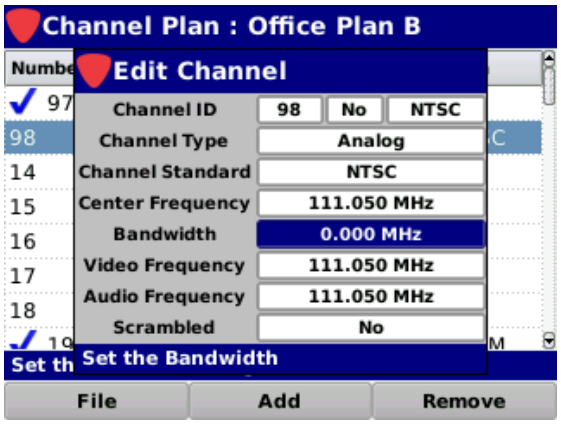


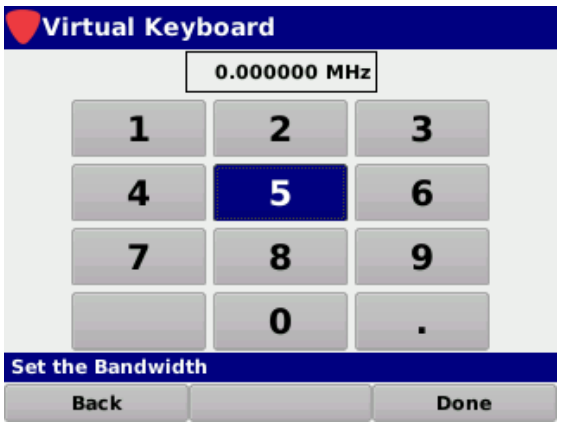
Bandwidth

The **Bandwidth** setting is used to adjust the bandwidth of the channel. The bandwidth can be set from a minimum of 0.000 MHz up to a maximum of 8.000 MHz.

Use either of the following methods to change the bandwidth of the channel:

- Use the up/down arrow buttons to change the value in 0.100 MHz increments.
- Press the **Ent**er button and use the **Virtual Keyboard** to directly enter the bandwidth as shown in the image to the right.



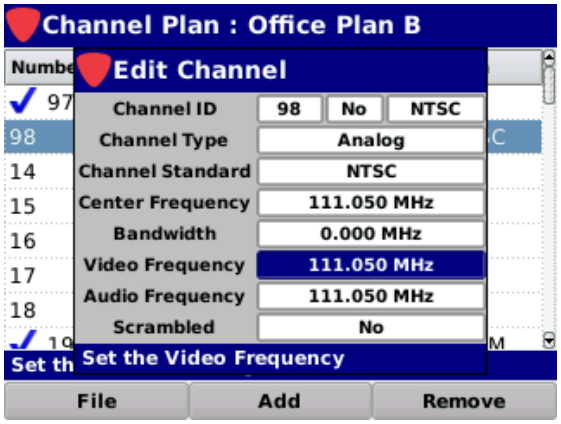


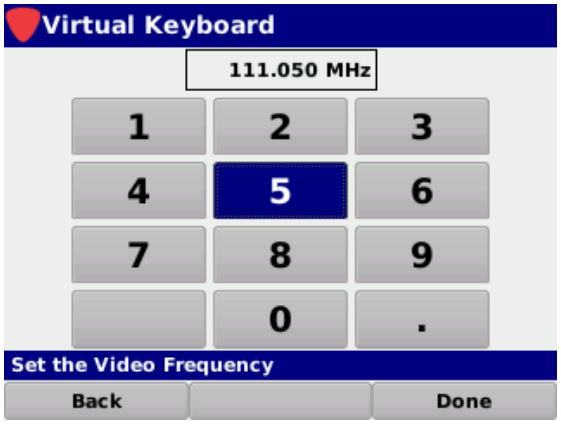
Video Frequency

The **Video Frequency** setting is used to adjust the video frequency of the channel. The video frequency can be set from a minimum of 50.000 MHz up to a maximum of 999.999 MHz.

Use either of the following methods to change the video frequency of the channel:

- Use the up/down arrow buttons to change the value in 0.050 MHz increments.
- Press the **Ent**er button and use the **Virtual Keyboard** to directly enter the center frequency as shown in the image to the right.



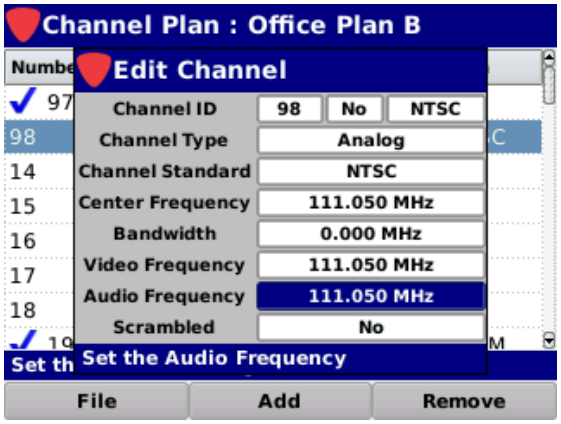


Audio Frequency

The **Audio Frequency** setting is used to adjust the audio frequency of the channel. The audio frequency can be set from a minimum of 50.000 MHz up to a maximum of 999.999 MHz.

Use either of the following methods to change the audio frequency of the channel:

- Use the up/down arrow buttons to change the value in 0.050 MHz increments.
- Press the **Ent**er button and use the **Virtual Keyboard** to directly enter the audio frequency as shown in the image to the right.

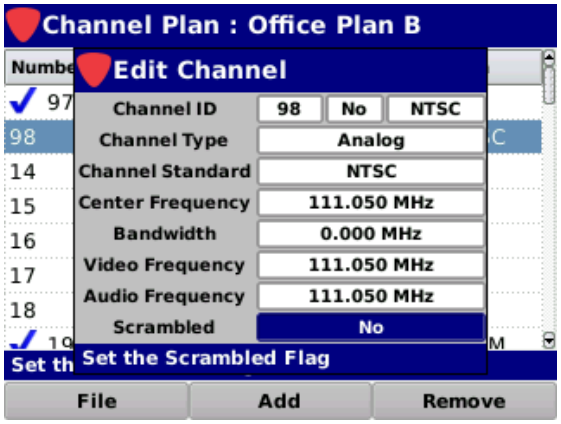


Scrambled

The **Scrambled** setting is used to set whether the channel is scrambled.

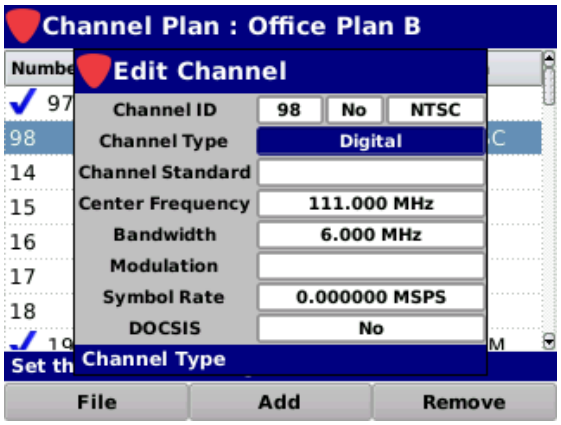
The default setting for **Scrambled** is **No**, use the up/down arrow buttons to select from the following preset values:

- Select **Yes** if the channel is scrambled.
- Select **No** if the channel is not scrambled.



Digital Channel Properties

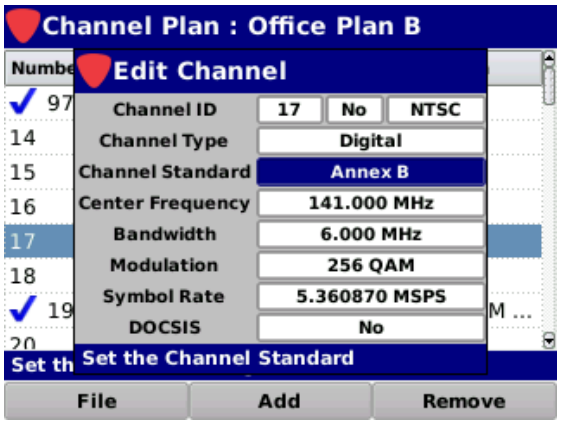
When the **Channel Type** is set to **Digital**, the following settings are available. From within the **Edit Channel** screen, use the left/right arrow buttons on the keypad to navigate through the list of setup items.



Channel Standard

The **Channel Standard** setting is used to select the digital encoding standard. Use the up/down arrow buttons to select from the following standards:

- **Arbitrary**
- **Annex A/B/C**

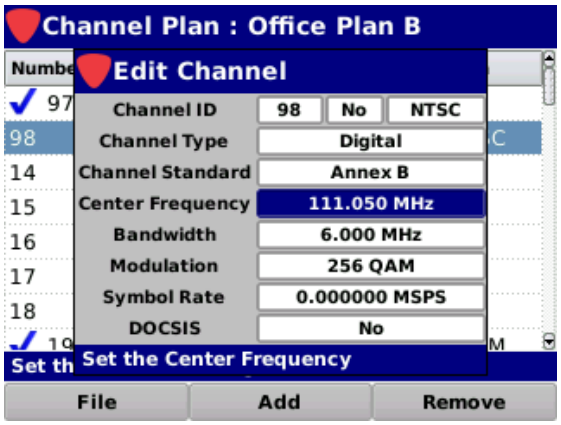


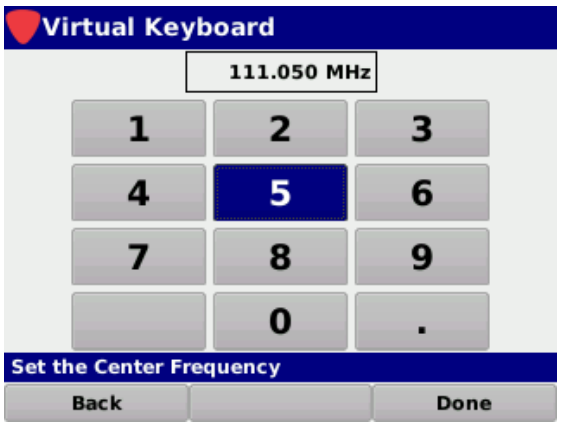
Center Frequency

The **Center Frequency** setting is used to adjust the center frequency of the channel. The center frequency can be set from a minimum of 50.000 MHz up to a maximum of 999.999 MHz.

Use either of the following methods to change the center frequency of the channel:

- Use the up/down arrow buttons to change the value in 0.050 MHz increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the center frequency as shown in the image to the right.



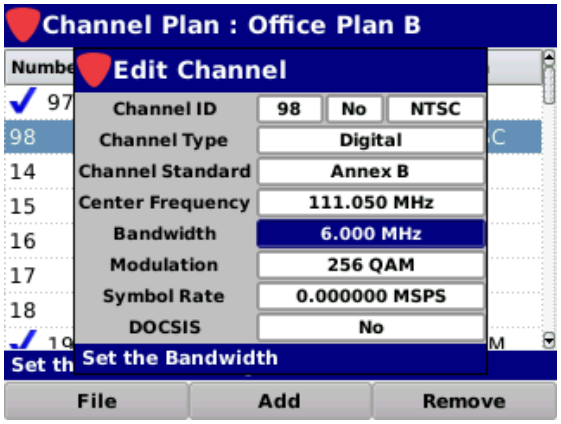


Bandwidth

The **Bandwidth** setting is used to adjust the bandwidth of the channel. The bandwidth can be set from a minimum of 0.000 MHz up to a maximum of 8.000 MHz.

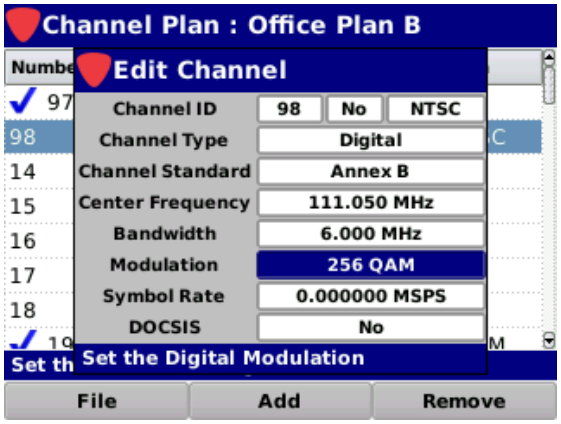
Use either of the following methods to change the bandwidth of the channel:

- Use the up/down arrow buttons to change the value in 0.100 MHz increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the bandwidth as shown in the image to the right.



Modulation

The **Modulation** setting is used to adjust the modulation type of the channel. Use the up/down arrow buttons to select from **16/32/64/128/256 QAM**.

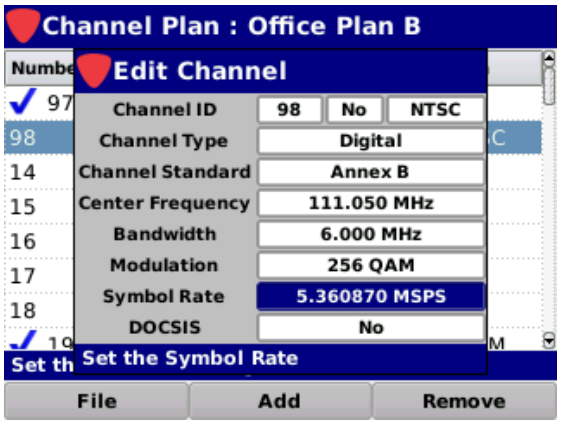


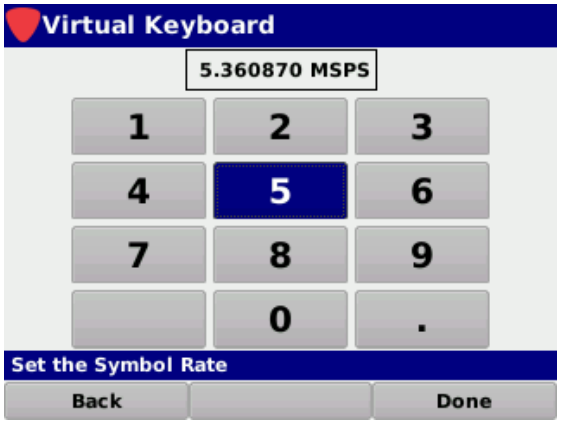
Symbol Rate

The **Symbol Rate** setting is used to adjust the symbol rate of the channel. The symbol rate can be set from a minimum of 0.000 MSPS up to a maximum of 6.952 MSPS.

Use either of the following methods to change the symbol rate of the channel:

- Use the up/down arrow buttons to change the value in 0.001 MSPS increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the symbol rate as shown in the image to the right.



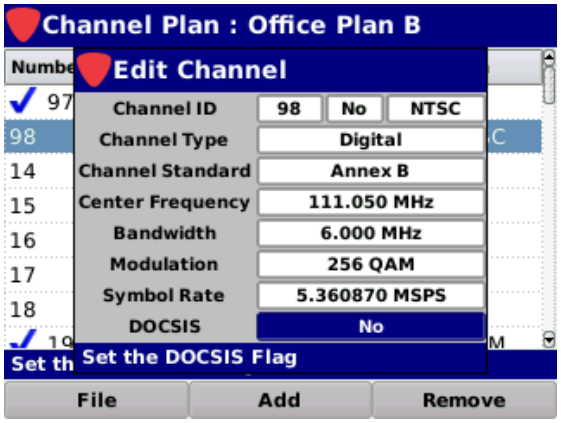


DOCSIS

The **DOCSIS** setting is used to set whether the selected channel is a DOCSIS cable modem communication channel.

The default setting for **DOCSIS** is **No**, use the up/down arrow buttons to select from the following preset values:

- Select **Yes** if the channel is a DOCSIS channel.
- Select **No** if the channel is not a DOCSIS channel.

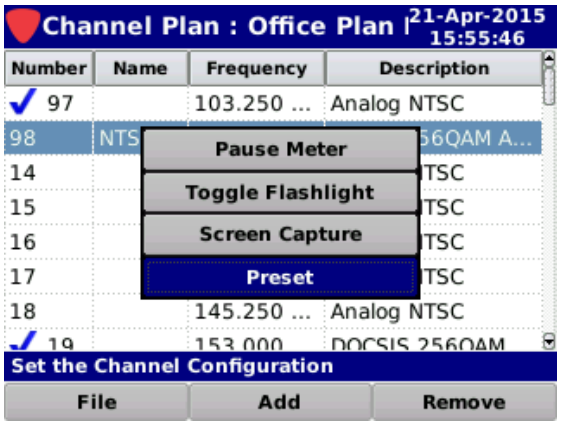


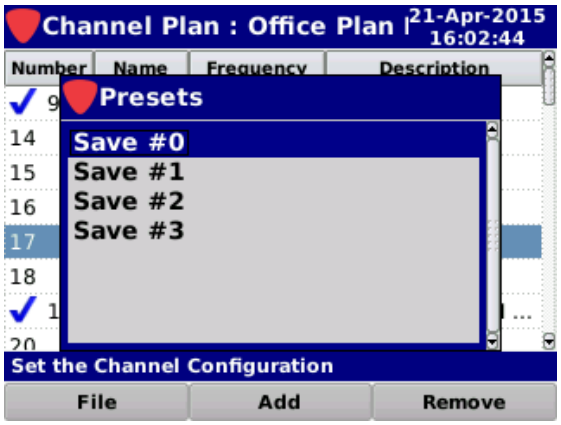
Channel Presets

The 120 DSP comes preloaded with four different channel presets. After editing custom channels, you may find it useful to save your own preset channels.

Perform the following steps to save new channel presets:

1. Use the up/down arrow buttons to highlight the channel that you would like to save as a preset.
2. Select the **Function** button and select **Preset**.
3. From the **Preset** pop-up menu, select the desired save position by selecting the **Save #X** button as shown in the image to the right.
4. The **Add** pop-up menu will now include the selected channel as a preset channel type.



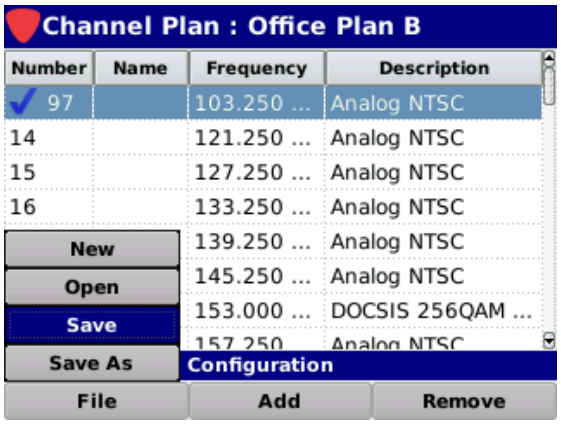


Save an Open Channel Plan

After editing an open channel plan, you must save your changes.

Perform the following steps to save the channel plan:

1. Select the **File** softkey.
2. From the **File** pop-up menu, select the **Save** button as shown in the image to the right.
3. The channel plan will be saved to the internal memory of the 120 DSP.

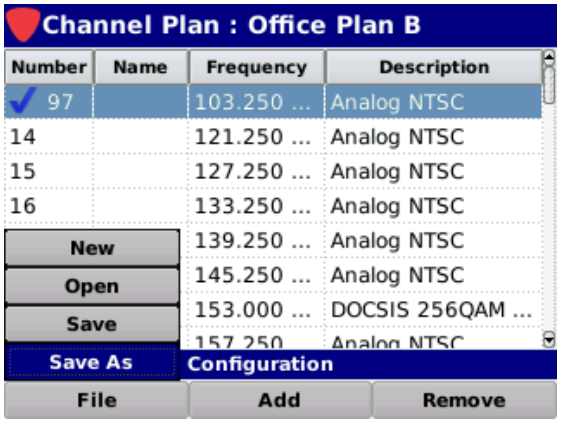


Save an Open Channel Plan with a New Name

After editing an open channel plan, you can save the channel plan with a new name. This function is useful for duplicating an existing channel plan

Perform the following steps to save the channel plan with a new name:

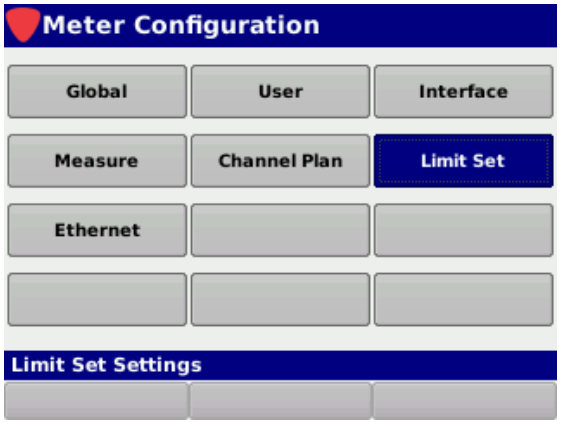
1. Select the **File** softkey.
2. From the **File** pop-up menu, select the **Save As** button as shown in the image to the right.



3. Use the **Virtual Keyboard** to enter the new name for the channel plan as shown in the image to the right.
4. The new channel plan will be saved to the internal memory of the 120 DSP.

Limit Set Management

Select the **Limit Set** button as shown in the image to the right to manage limit sets on the 120 DSP.

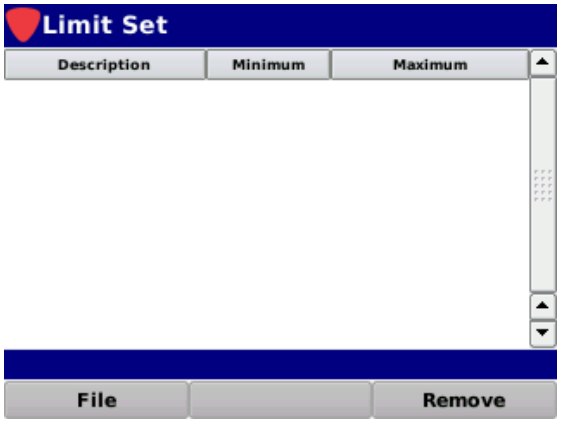


NOTE

Channel Plans and Limit Sets created/modified on the 120 DSP can only be used in the Troubleshooting menu. Autotests require ViewPoint Express Channel Plans and Limit Sets.

The **Limit Set** screen will be displayed as shown in the image to the right. This screen allows you to:

- Open, create, save and delete limit sets
- Edit measurement limits



NOTE

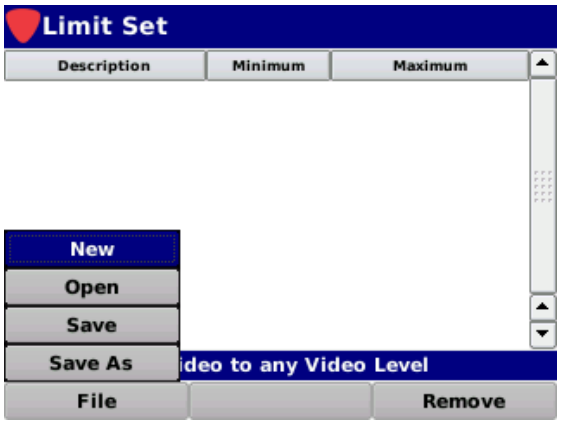
These parameters can be set directly from your instrument or using ViewPoint Express. For instructions regarding setup using ViewPoint Express, please refer to the ViewPoint Express Operation Manual.

From within the **Limit Set** screen, use the arrow buttons on the keypad to navigate through the list of channels.

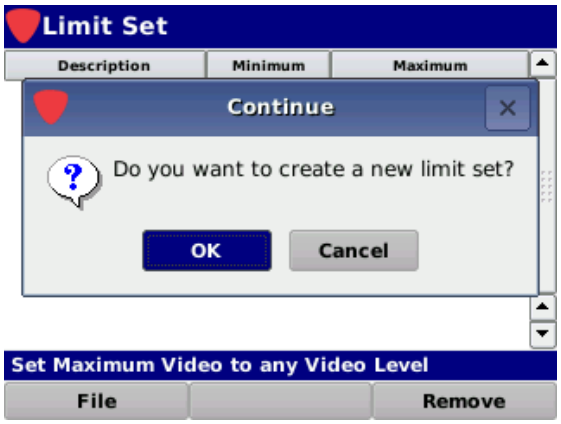
Create a New Limit Set

Perform the following steps to create a new limit set:

1. Select the **File** softkey.
2. From the **File** pop-up menu, select the **New** button as shown in the image to the right.

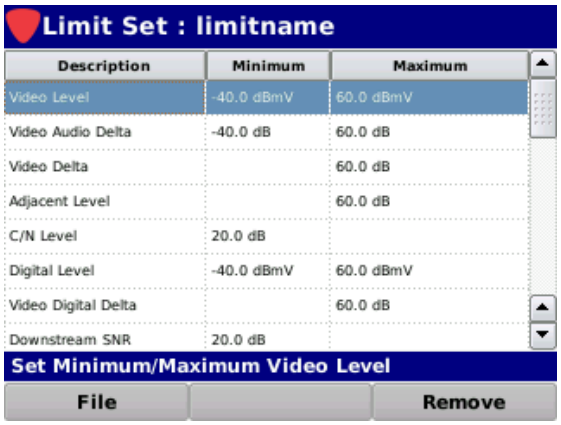


3. The **Continue** window will be displayed as shown in the image to the right.
4. Select the **OK** button to continue or select the **Cancel** button to exit without creating a new limit set.



5. Use the **Virtual Keyboard** to enter the name of the new limit set as shown in the image to the right.

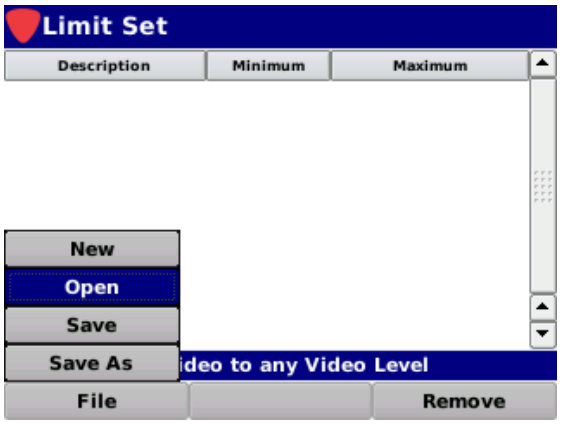
6. The new limit set will be displayed as shown in the image to the right. Use the up/down arrow buttons to highlight specific limits for editing or removal.

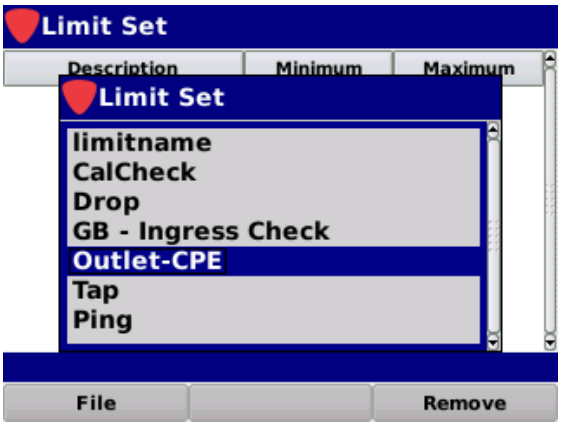


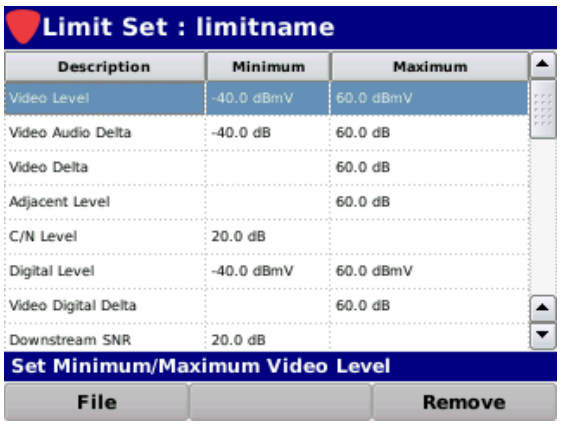
Open an Existing Limit Set

Perform the following steps to open an existing limit set:

1. Select the **File** softkey.
2. From the **File** pop-up menu, select the **Open** button as shown in the image to the right.
3. The **Limit Set** window will be displayed as shown below (left).
4. Select the name of the limit set that you would like to open.
5. The selected limit set and its thresholds are displayed as shown below (right). Use the up/down arrow buttons to highlight specific thresholds for editing or removal.







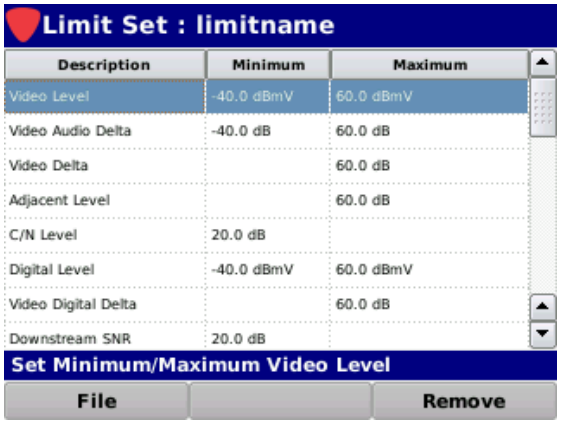
Removing Limits from a Limit Set

To remove a limit from the limit set, use the up/down arrow buttons to highlight the limit to be removed and select the **Remove** softkey.

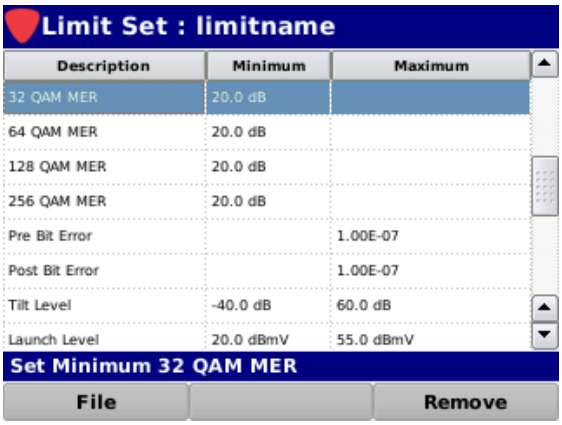
Knowing Your Limits

When the 120 DSP performs testing versus a limit set, it immediately display the pass/fail status for each measurement criteria that you have set.

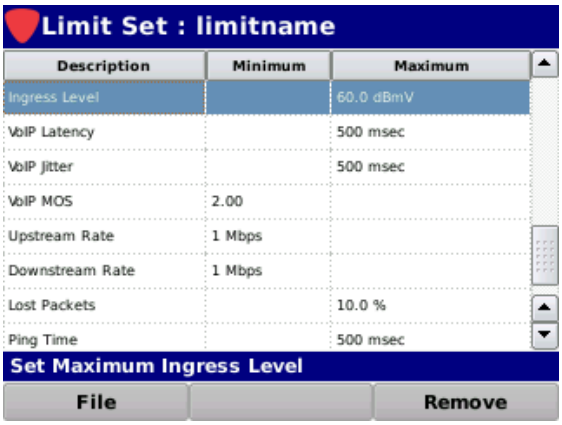
To meet a minimum limit, the measured values must be equal to or greater than the minimum limit. To meet a maximum limit, the measured values must be less than or equal to the maximum limit.



- **Video Level** - This sets the minimum and maximum analog video channel levels.
- **Video Audio Delta** - This sets the minimum and maximum allowable video to audio level difference.
- **Video Delta** - This sets the maximum difference allowed between the lowest and highest levels measured for the analog video channels.
- **Adjacent Level** - This sets the maximum level variation between any two adjacent video carriers.
- **C/N Level** - This sets minimum carrier to noise ratio.
- **Digital Level** - This sets the minimum and maximum digital video channel levels.
- **Video Digital Delta** - This sets the maximum difference allowed between the lowest and highest levels measured for the digital video channels.
- **Downstream SNR** - This sets the minimum cable modem downstream SNR.
- **16 QAM MER** - This sets the minimum MER for digital video channels with 16 QAM Modulation.



- **32 QAM MER** - This sets the minimum MER for digital video channels with 32 QAM Modulation.
- **64 QAM MER** - This sets the minimum MER for digital video channels with 64 QAM Modulation.
- **128 QAM MER** - This sets the minimum MER for digital video channels with 128 QAM Modulation.
- **256 QAM MER** - This sets the minimum MER for digital video channels with 256 QAM Modulation.
- **Pre Bit Error** - This sets the maximum pre error correction bit errors.
- **Post Bit Error** - This sets the maximum post error correction bit errors.
- **Tilt Level** - This sets the minimum and maximum Tilt level.
- **Launch Level** - This sets the minimum and maximum cable modem launch levels.



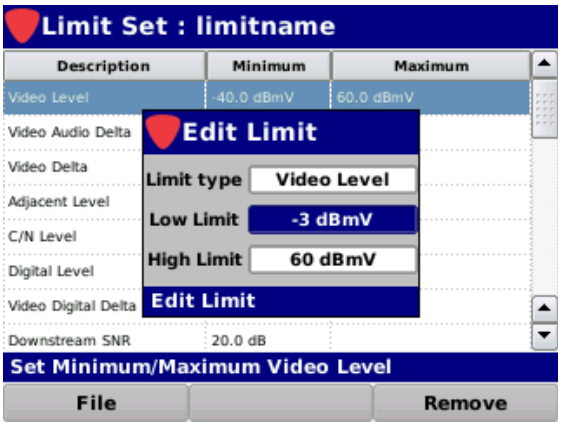
- **Ingress Level** - This sets the maximum ingress level while performing a Return Spectrum measurement.
- **VoIP Latency** - This sets the maximum upstream & downstream latency while performing a VoIP measurement.
- **VoIP Jitter** - This sets the maximum upstream & downstream jitter while performing a VoIP measurement.
- **VoIP MOS** - This sets the minimum upstream & downstream MOS (Mean Opinion Score) while performing a VoIP measurement.
- **Upstream Rate** - This sets the minimum upstream rate while performing a throughput measurement.
- **Downstream Rate** - This sets the minimum downstream transmission rate while performing a throughput measurement.
- **Lost Packets** - This sets the maximum lost packet rate while performing a ping measurement.
- **Ping Time** - This sets the maximum ping time while performing a ping measurement.

Editing Limit(s)

To edit limit(s) within the limit set, use the up/down arrow buttons to highlight the limit(s) to be edited and select the **Enter** button.

The **Edit Limit** screen will be displayed as shown to the right. Use the left/right arrow buttons to highlight the threshold that you would like to change.

Use the up/down arrow buttons or select the **Enter** button and use the **Virtual Keyboard** to enter the threshold.

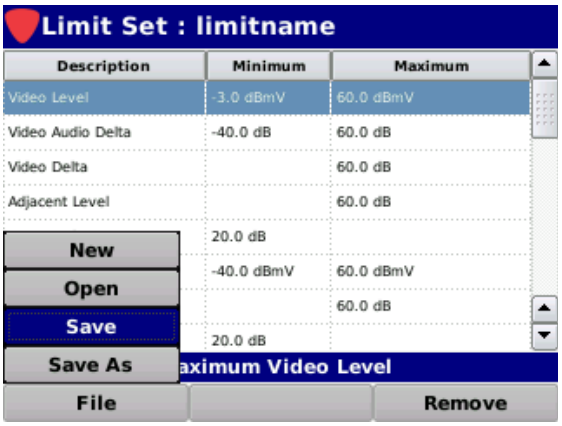


Save an Open Limit Set

After editing an open limit set, you must save your changes.

Perform the following steps to save the limit set:

1. Select the **File** softkey.
2. From the **File** pop-up menu, select the **Save** button as shown in the image to the right.
3. The limit set will be saved to the internal memory of the 120 DSP.

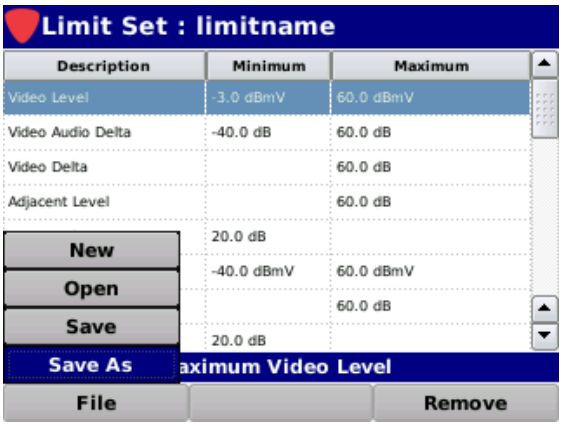


Save an Open Limit Set with a New Name

After editing an open limit set, you can save the limit set with a new name. This function is useful for duplicating an existing limit set.

Perform the following steps to save the limit set with a new name:

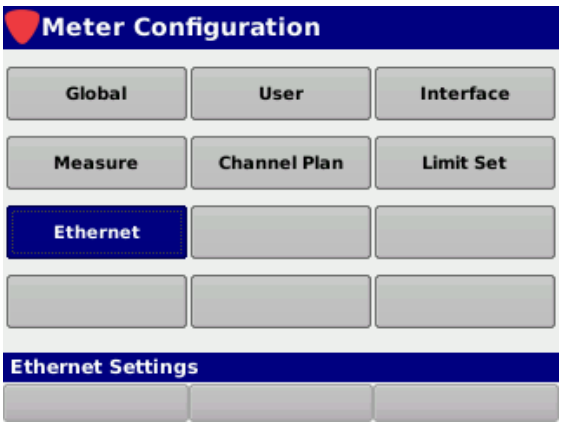
1. Select the **File** softkey.
2. From the **File** pop-up menu, select the **Save As** button as shown in the image to the right.



3. Use the **Virtual Keyboard** to enter the new name for the limit set as shown in the image to the right.
4. The new limit set will be saved to the internal memory of the 120 DSP.

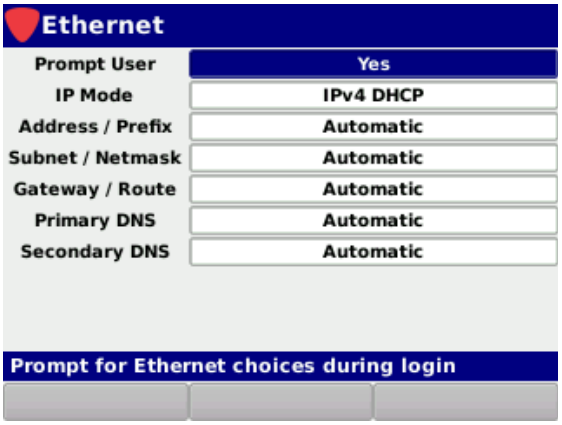
Ethernet Settings

Select the **Ethernet** button as shown in the image to the right to view/edit the Ethernet settings for the 120 DSP.



The **Ethernet** screen will be displayed as shown in the image to the right. This screen allows you to modify the Ethernet connection settings.

From within the **Ethernet** screen, use the left/right arrow buttons on the keypad to navigate through the list of setup items.



NOTE

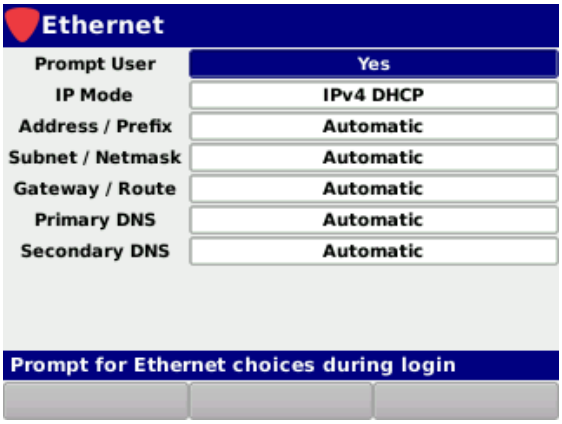
These parameters can be set directly from your instrument or using ViewPoint Express. For instructions regarding setup using ViewPoint Express, please refer to the ViewPoint Express Operation Manual.

Prompt User

The **Prompt User** setting is used to prompt a user with the **Network Settings** window before connecting to a network.

The default setting for **Prompt User** is **Yes**, use the left/right arrow buttons to select from the following preset values:

- Select **Yes** to prompt the user with the **Network Settings** window before connecting to a network.
- Select **No** to automatically connect using the default network settings.

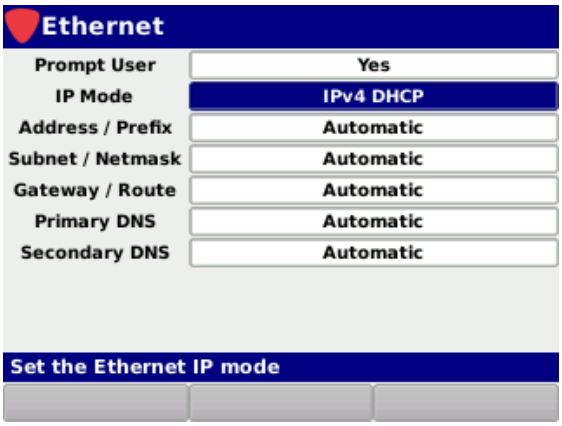


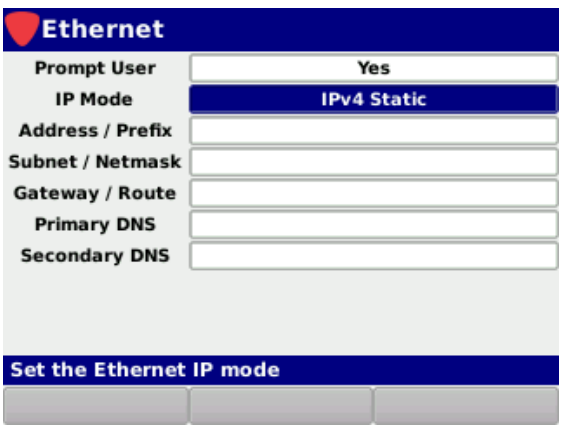
IP Mode

The **IP Mode** setting is used to set which type of network connection to establish when logging into a network.

The default setting for **IP mode** is **IPv4 DHCP**, use the left/right arrow buttons to select from the following preset values:

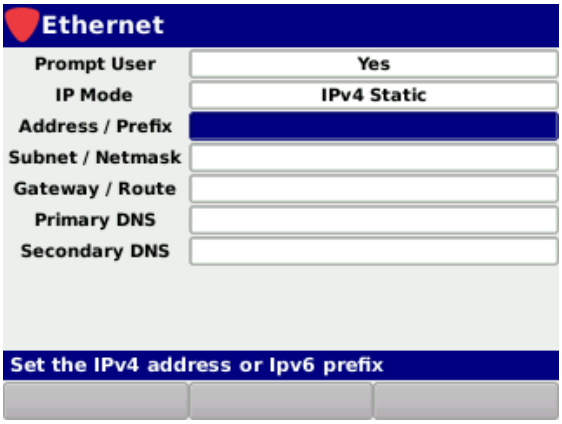
- Select **IPv4 DHCP** to automatically obtain an IP address from a DHCP server. In this mode, the network settings cannot be adjusted and are populated with the text **Automatic**.
- Select **IPv4 Static** to manually enter the network settings. In this mode, all of the network settings must be manually adjusted as shown in the following sections.



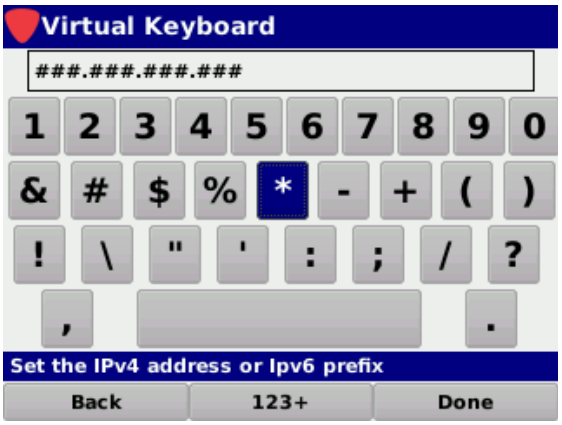


Address / Prefix

When **IP Mode** is set to **IPv4 Static**, the **Address / Prefix** setting is used to set the IP address of the network connection.

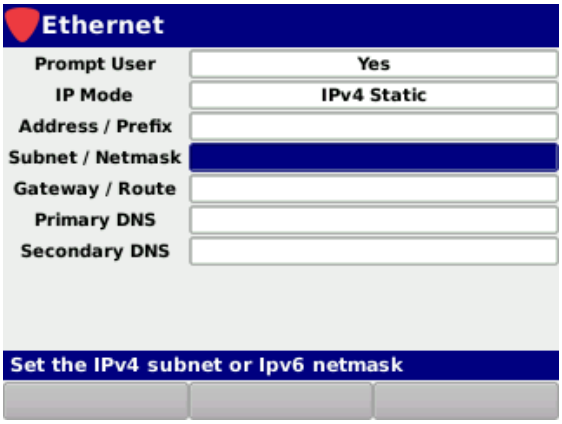


Press the **Enter** button and the **Virtual Keyboard** will be displayed as shown in the image to the right. Use the **Virtual Keyboard** to enter the IP Address in the ###.###.###.### format.

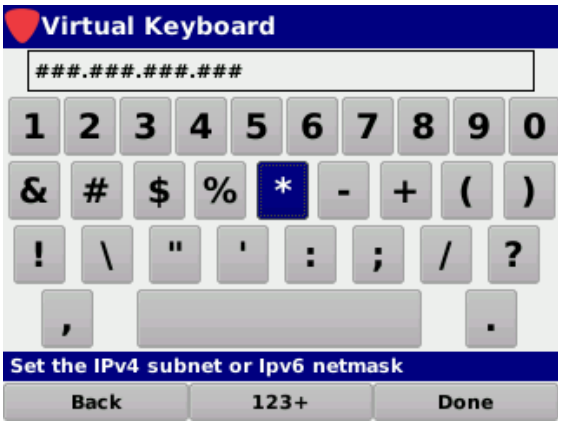


Subnet / Netmask

When **IP Mode** is set to **IPv4 Static**, the **Subnet / Netmask** setting is used to set the subnet address of the network connection.

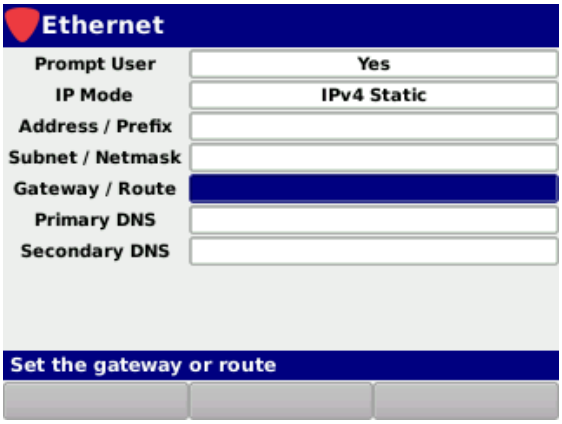


Press the **Enter** button and the **Virtual Keyboard** will be displayed as shown in the image to the right. Use the **Virtual Keyboard** to enter the subnet address in the ###.###.###.### format.

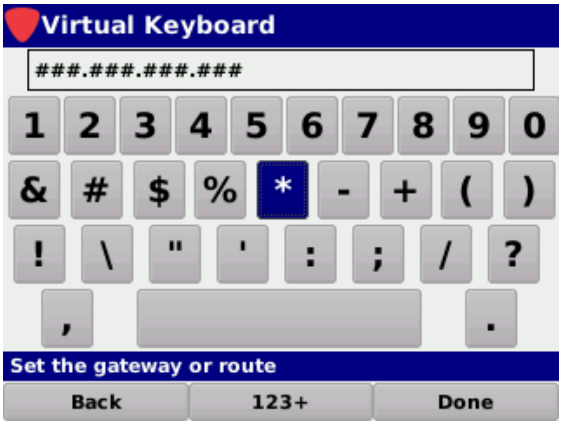


Gateway / Route

When **IP Mode** is set to **IPv4 Static**, the **Gateway / Route** setting is used to set the subnet address of the network connection.

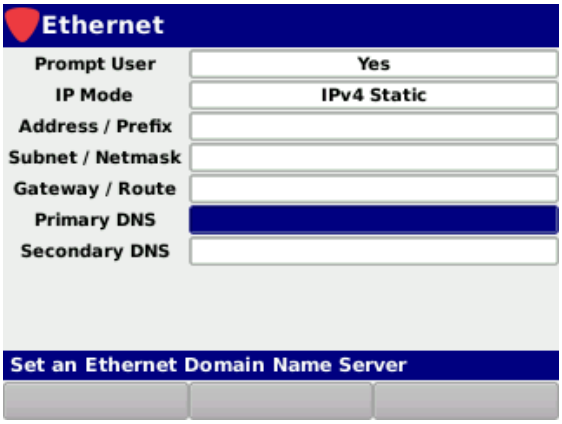


Press the **Enter** button and the **Virtual Keyboard** will be displayed as shown in the image to the right. Use the **Virtual Keyboard** to enter the gateway address in the ###.###.###.### format.

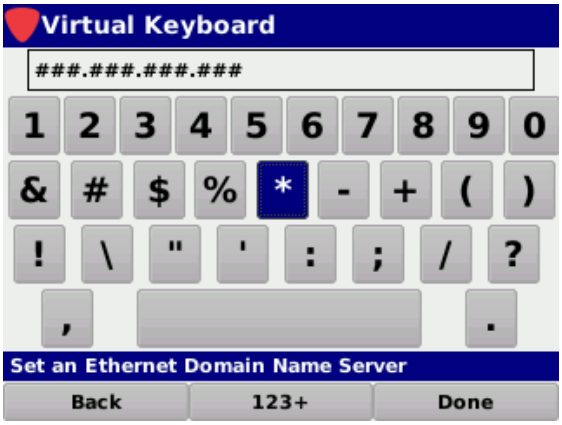


Primary DNS

When **IP Mode** is set to **IPv4 Static**, the **Primary DNS** setting is used to set the primary domain name server address of the network connection.

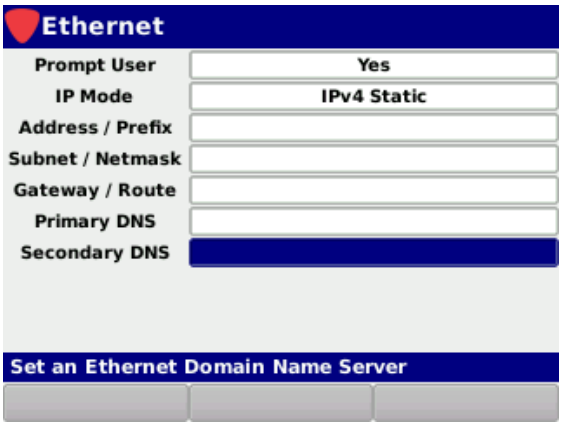


Press the **Enter** button and the **Virtual Keyboard** will be displayed as shown in the image to the right. Use the **Virtual Keyboard** to enter the primary DNS address in the ###.###.###.### format.

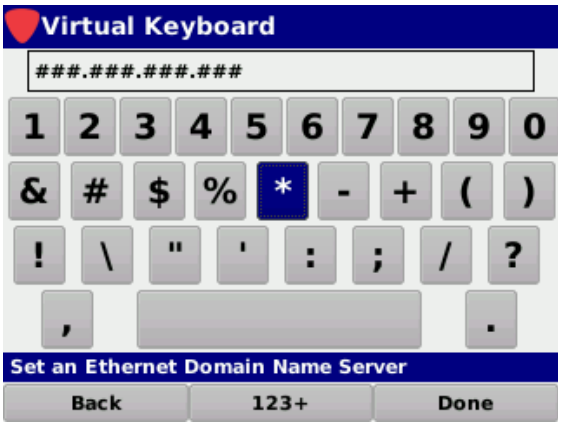


Secondary DNS

When **IP Mode** is set to **IPv4 Static**, the **Secondary DNS** setting is used to set the secondary domain name server address of the network connection.



Press the **Enter** button and the **Virtual Keyboard** will be displayed as shown in the image to the right. Use the **Virtual Keyboard** to enter the secondary DNS address in the ###.###.###.### format.



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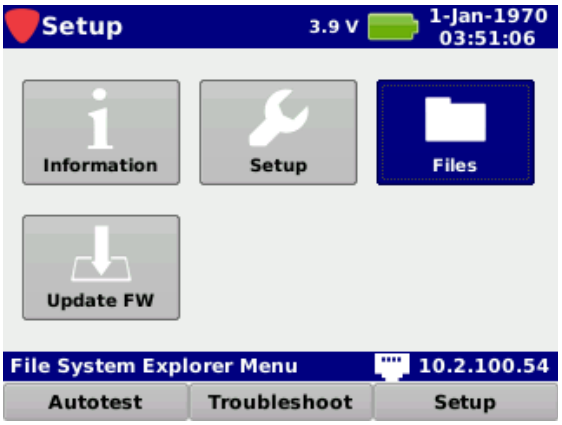
File Management

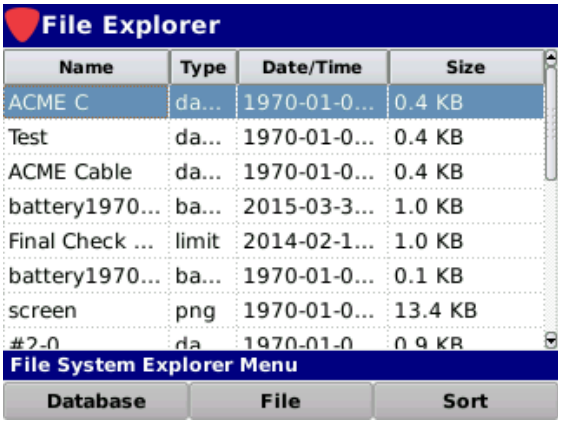
Overview

Select the **Files** icon as shown in the image to the right to view the files that are stored in the internal memory of the 120 DSP.



The **File Explorer** screen will be displayed as shown in the image to the right. This screen allows you to perform the following actions:

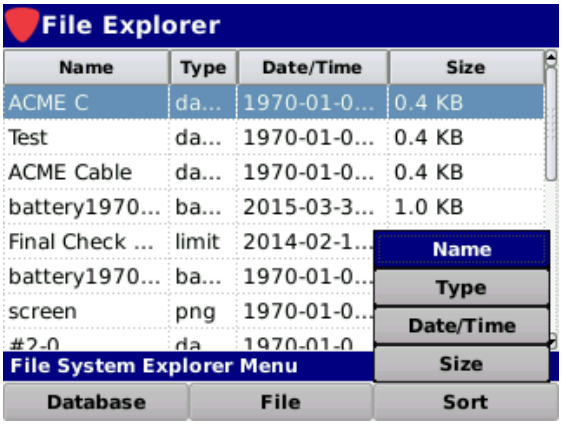
- View and sort files by; name, type, size and date/time saved
- Export files to USB
- Delete files
- Database backup & restore
- Save system logs



View & Sort

From within the **File Explorer** screen, use the arrow buttons on the keypad to navigate through the list of files.

Select the **Sort** softkey to sort the file list. Select from **Name**, **Type**, **Date/Time**, or **Size** sort types as shown in the image to the right.

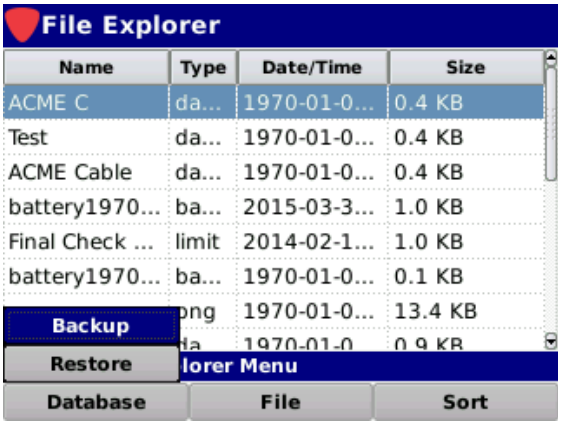


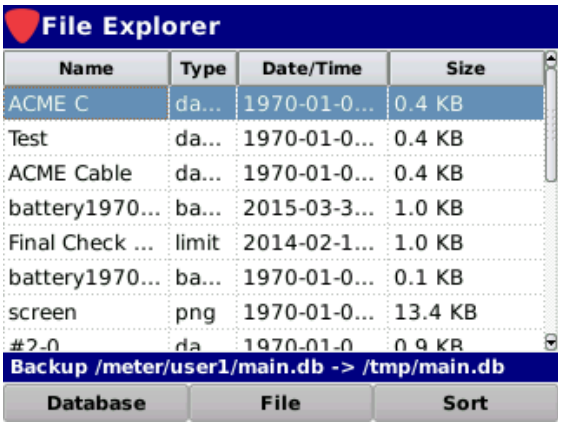
Database Backup

Backup to Internal Memory

Perform the following steps to backup the 120 DSP database file to the internal memory of the 120 DSP:

1. Select the **Database** softkey.
2. From the **Database** pop-up menu, select the **Backup** button as shown in the image to the right.
3. The Status Bar will indicate a successful backup to the internal memory by displaying the text **"-> /tmp/main.db"** as shown in the image below.





NOTE

This internal memory is lost on power down and is only used to clone users on the meter by backing up the database of one user and restoring the database to another user.

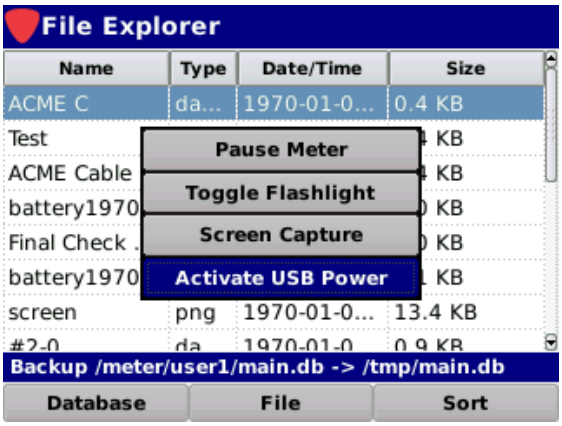
NOTE

This function is useful when cloning the device settings between users on the same meter. When importing the database file under another user, all device settings will be updated while retaining the existing user information.

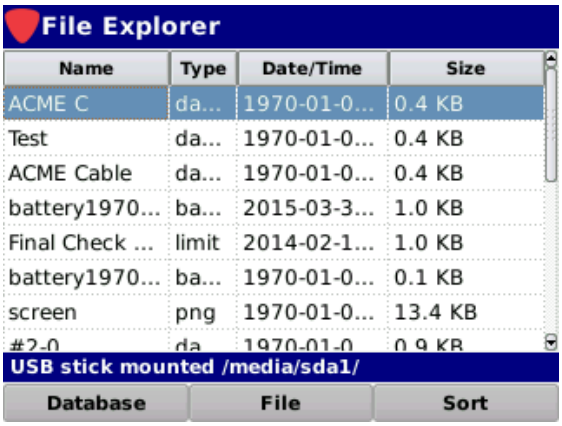
Backup to USB Flash Drive

Perform the following steps to backup the 120 DSP database file to a USB flash drive:

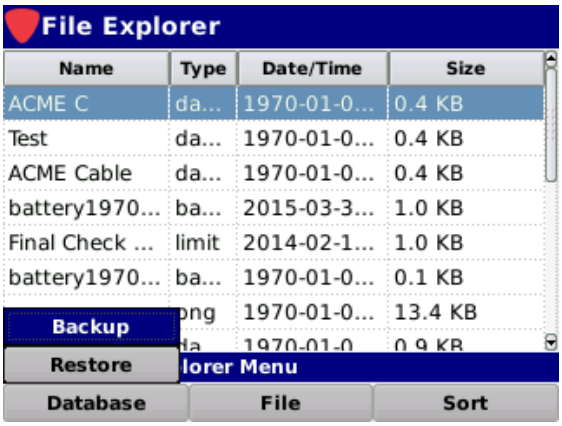
1. Insert the USB flash drive adapter into the USB port of the 120 DSP
2. Then insert a USB flash drive into the USB flash drive adapter.
3. Press the **Function** button and select the **Activate USB Power** function as shown in the image to the right.



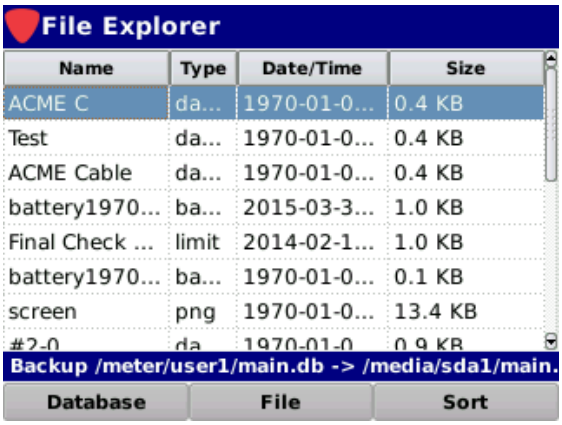
4. The power to the USB flash drive is activated and the drive is now mounted to the file system as shown in the image to the right. The 120 DSP is now capable of transferring files to and from the USB flash drive.



5. Select the **Database** softkey.
6. From the **Database** pop-up menu, select the **Backup** button as shown in the image to the right.



7. The **Message Bar** will indicate a successful backup to the flash drive by displaying the text **"-> /media/sda1/main.db"** as shown in the image below.



NOTE

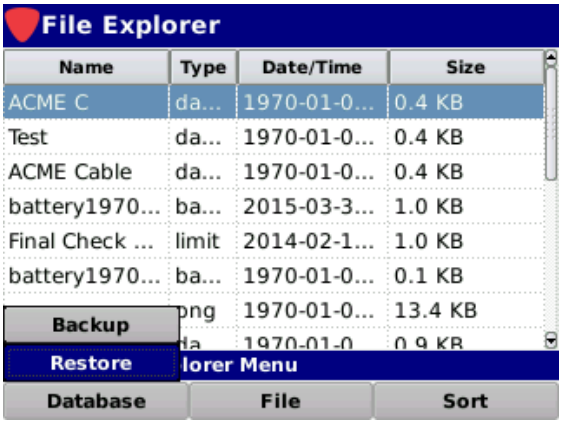
This function is useful when cloning the device settings between different meters. When importing the database file on another meter, all device settings will be updated while retaining the existing user information.

Database Restore

Restore from Internal Memory

Perform the following steps to restore the 120 DSP database file from the internal memory of the 120 DSP:

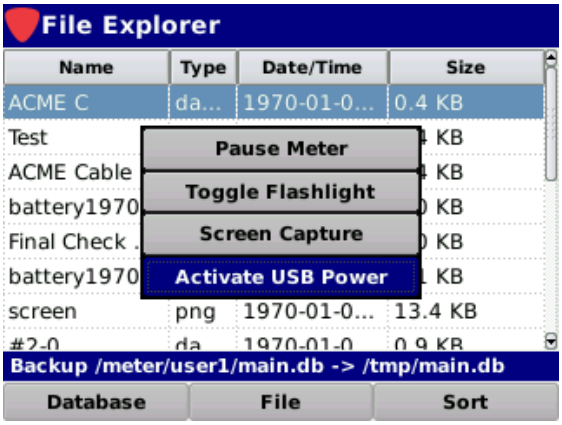
1. Select the **Database** softkey.
2. From the **Database** pop-up menu, select the **Restore** button as shown in the image to the right.
3. The entire database will be restored from the internal memory of the 120 DSP.



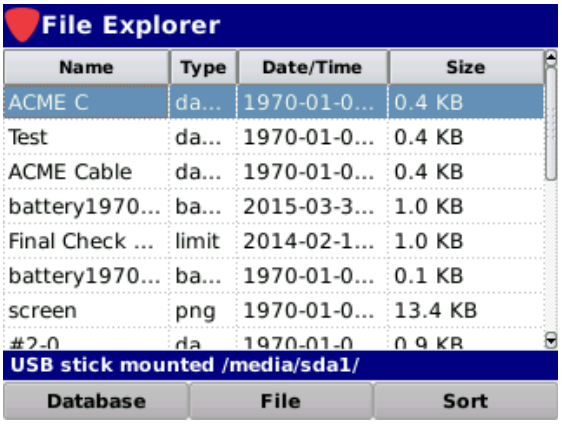
Restore from USB Flash Drive

Perform the following steps to restore the 120 DSP database file from a USB flash drive:

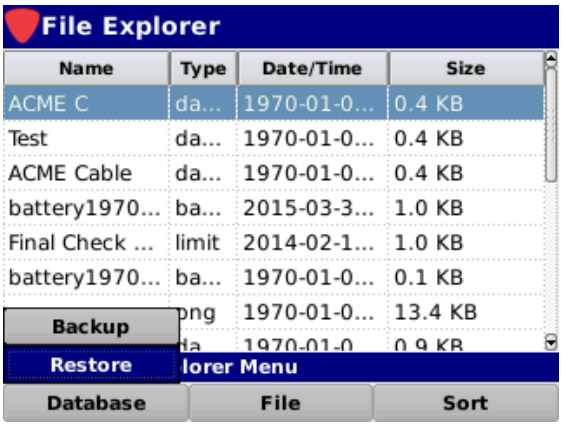
1. Insert the USB flash drive adapter into the USB port of the 120 DSP.
2. Insert a USB flash drive into the USB flash drive adapter.
3. Press the **Function** button and select the **Activate USB Power** function as shown in the image to the right.



4. The power to the USB flash drive is activated and the drive is now mounted to the file system as shown in the image to the right. The 120 DSP is now capable of transferring files to and from the USB flash drive.



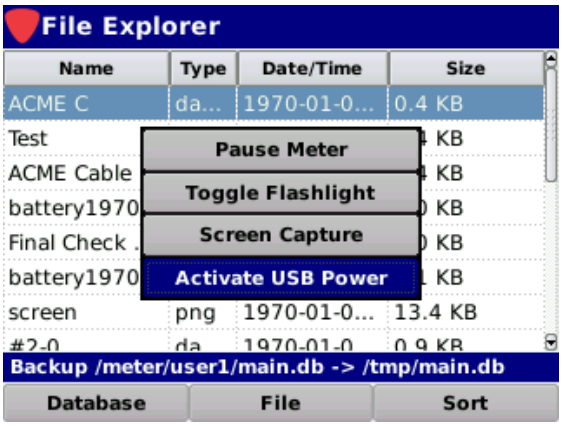
5. Select the **Database** softkey.
6. From the **Database** pop-up menu, select the **Restore** button as shown in the image to the right.
7. The entire database will be restored from the USB flash drive.



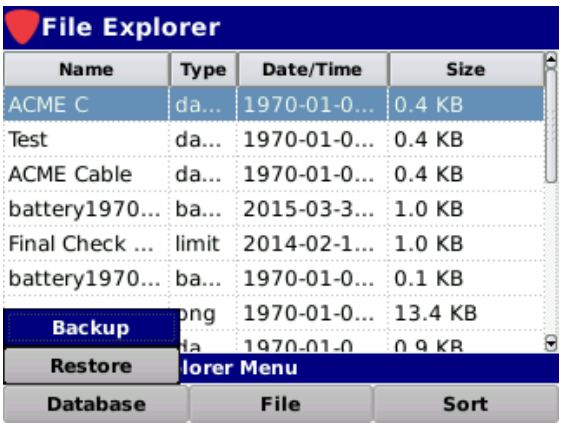
Cloning Meter Settings to a New Meter

Perform the following steps to clone all files from one 120 DSP to another:

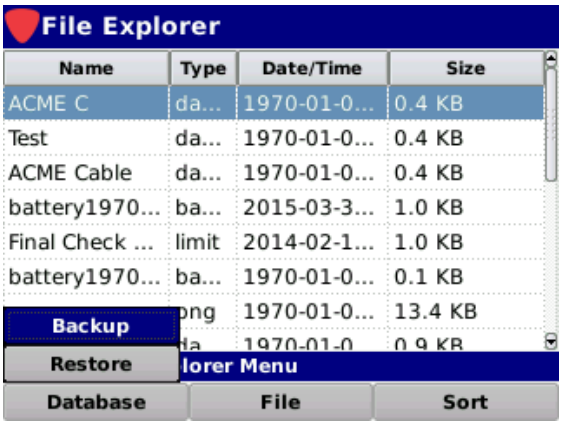
1. Insert the USB flash drive adapter into the USB port of the 120 DSP.
2. Insert a USB flash drive into the USB flash drive adapter.
3. Press the **Function** button and select the **Activate USB Power** function as shown in the image to the right.



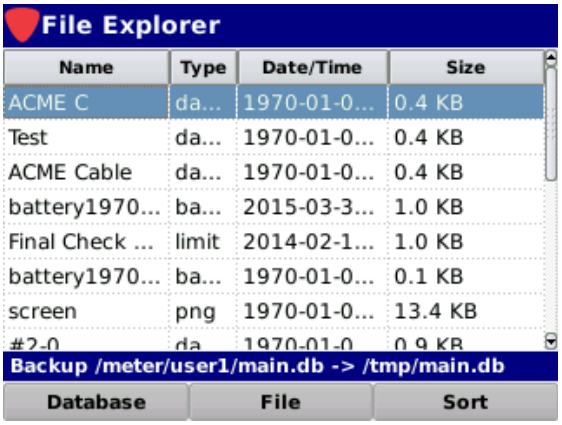
4. The power to the USB flash drive is activated and the drive is now mounted to the file system as shown in the image to the right. The 120 DSP is now capable of transferring files to and from the USB flash drive.



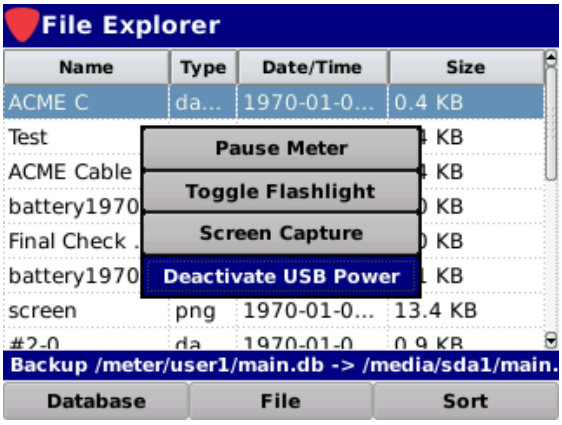
5. Select the **Database** softkey.
6. From the **Database** pop-up menu, select the **Backup** button as shown in the image to the right.



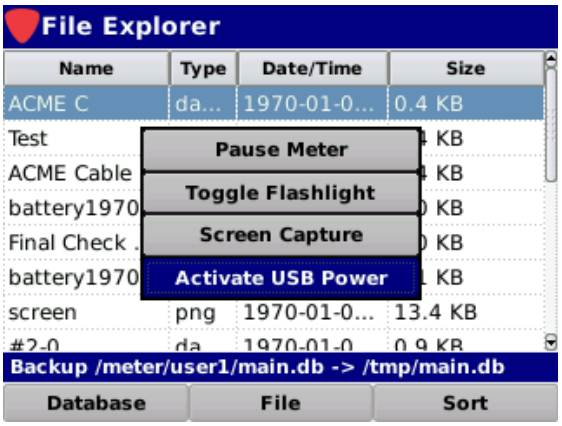
7. The **Message Bar** will indicate a successful backup to the flash drive by displaying the text **"-> /media/sda1/main.db"** as shown in the image to the right.



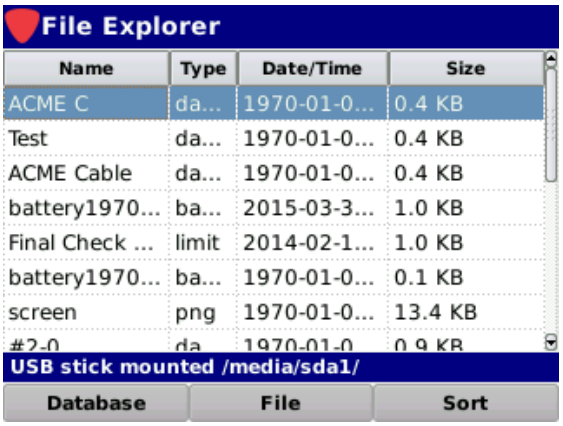
8. Press the **Function** button and select the **Deactivate USB Power** function as shown in the image to the right.
9. Remove the USB flash drive and adapter from the meter to clone.
10. Login to an existing user or create a new user on the new meter to clone to.
11. Insert the USB flash drive adapter and USB flash drive into the USB port of the new meter to clone to.



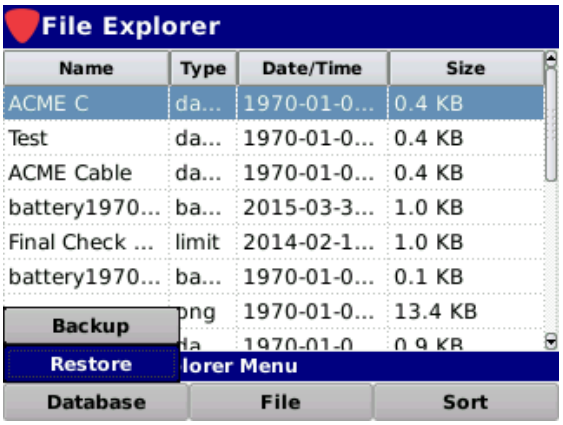
12. Press the **Function** button and select the **Activate USB Power** function as shown in the image to the right.



13. The power to the USB flash drive is activated and the drive is now mounted to the file system as shown in the image to the right. The 120 DSP is now capable of transferring files to and from the USB flash drive.



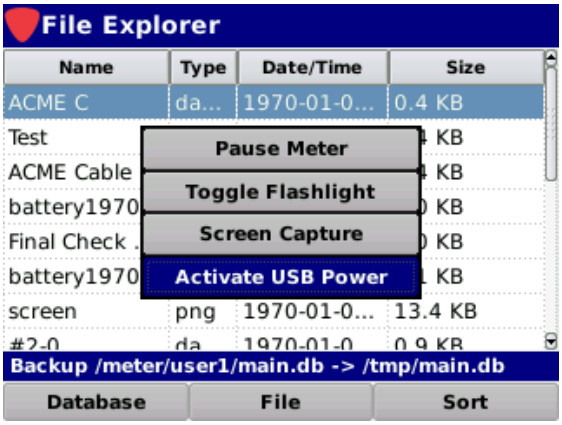
14. Select the **Database** softkey.
15. From the **Database** pop-up menu, select the **Restore** button.
16. The clone process is now complete. To continue with additional meters return to step 8 as the database file on your memory stick may be used for all your meters. You will not have to export another database file unless there is additional files you want to move.



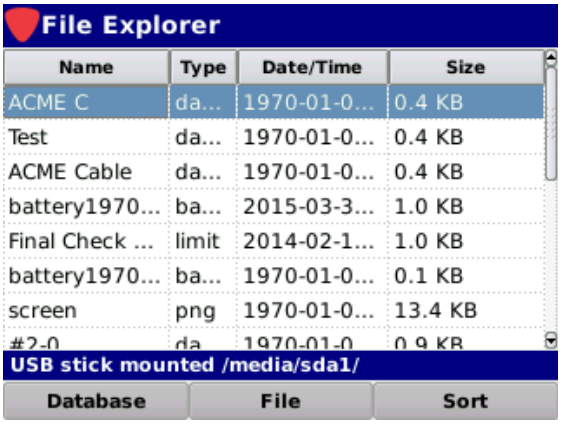
Import ViewPoint Files from a USB Flash Drive

Perform the following steps to import a ViewPoint package file from a USB flash drive:

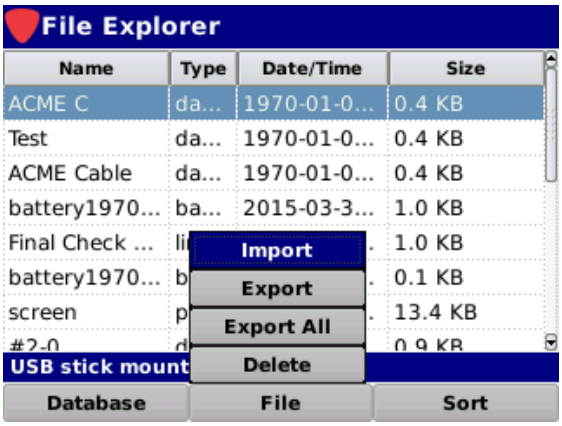
1. Insert the USB flash drive adapter into the USB port of the 120 DSP.
2. Then insert a USB flash drive into the USB flash drive adapter.
3. Press the **Function** button and select the **Activate USB Power** function as shown in the image to the right.



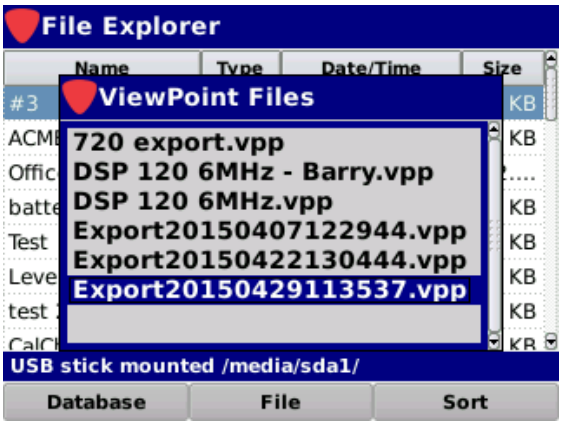
4. The power to the USB flash drive is activated and the drive is now mounted to the file system as shown in the image to the right. The 120 DSP is now capable of transferring files to and from the USB flash drive.



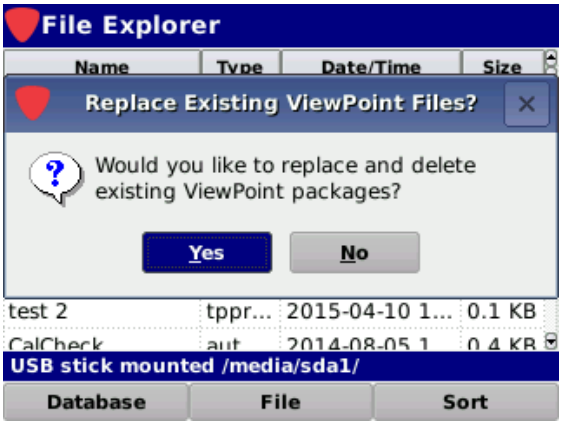
5. Select the **File** softkey.
6. From the **File** pop-up menu, select the **Import** button as shown in the image to the right.



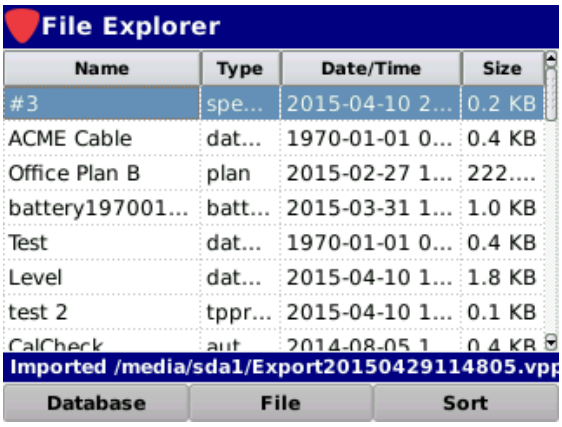
7. From the **ViewPoint Files** window, use the arrow buttons to highlight the file you would like to import.



8. A confirmation window will be displayed as shown in the image to the right. If you have existing ViewPoint files on the meter, it will ask if you want to replace them.
9. Select the **Yes** button to import the file and replace existing files or select **No** to keep the existing package files and import the new package.



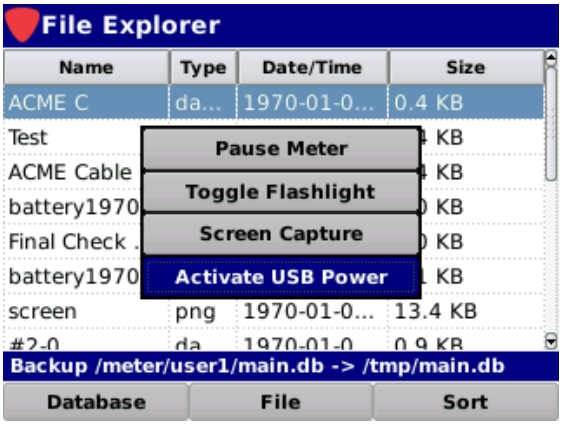
10. The **Message Bar** will indicate a successful import from the flash drive by displaying the text **"Imported /media/sda1/<file_name>"** as shown in the image to the right.



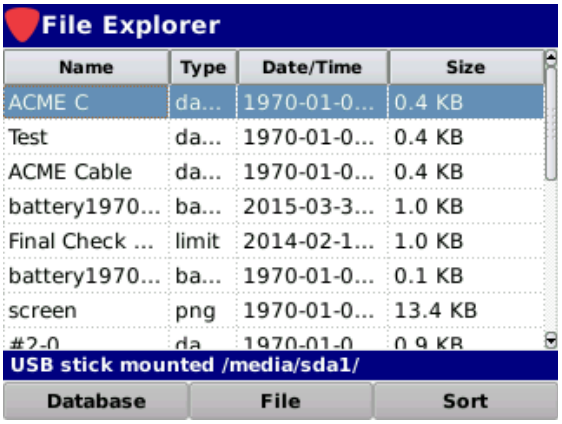
Export a File

Perform the following steps to export a single file to a USB flash drive:

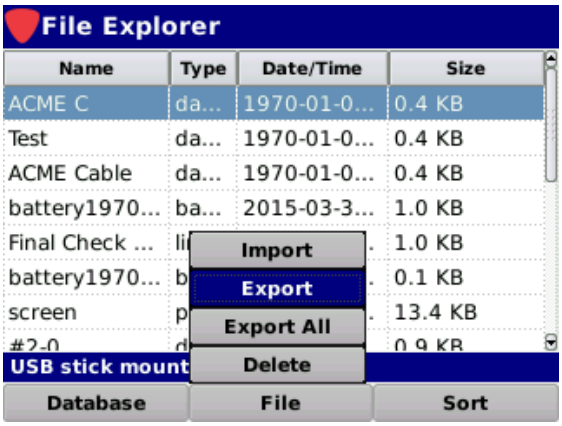
1. Insert the USB flash drive adapter into the USB port of the 120 DSP
2. Then insert a USB flash drive into the USB flash drive adapter.
3. Press the **Function** button and select the **Activate USB Power** function as shown in the image to the right.



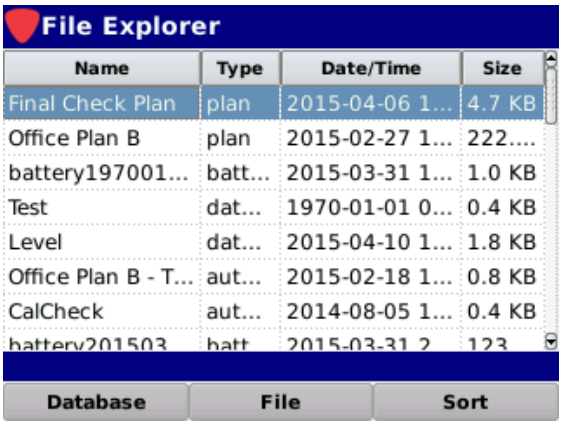
4. The power to the USB flash drive is activated and the drive is now mounted to the file system as shown in the image to the right. The 120 DSP is now capable of transferring files to and from the USB flash drive.



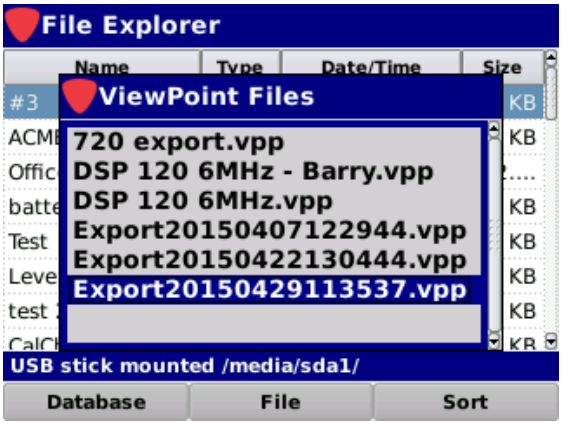
5. Use the arrow buttons to highlight the file that you would like to export.
6. Select the **File** softkey.
7. From the **File** pop-up menu, select the **Export** button as shown in the image to the right.



8. The **Message Bar** will indicate a successful export to the flash drive by displaying the text **"Export /media/sda1/<file_name>"** as shown in the image to the right.



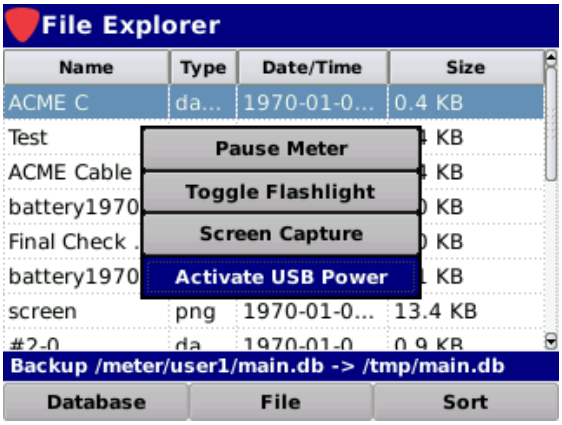
9. Later when you are ready to import, you will see the file listed in the ViewPoint files on the USB flash drive, as shown here.



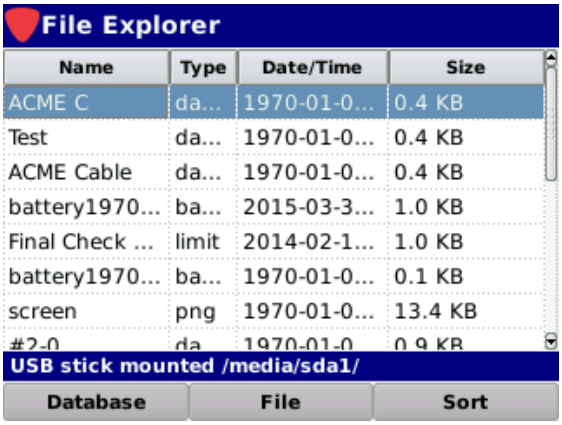
Export All Files

Perform the following steps to export all files to a USB flash drive:

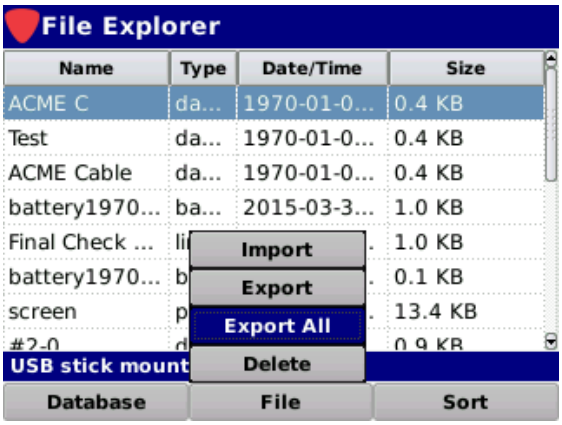
1. Insert the USB flash drive adapter into the USB port of the 120 DSP
2. Then insert a USB flash drive into the USB flash drive adapter.
3. Press the **Function** button and select the **Activate USB Power** function as shown in the image to the right.



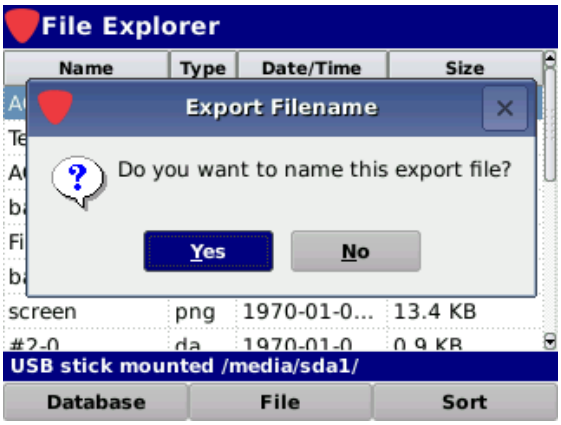
4. The power to the USB flash drive is activated and the drive is now mounted to the file system as shown in the image to the right. The 120 DSP is now capable of transferring files to and from the USB flash drive.



5. Select the **File** softkey.
6. From the **File** pop-up menu, select the **Export All** button as shown in the image to the right.

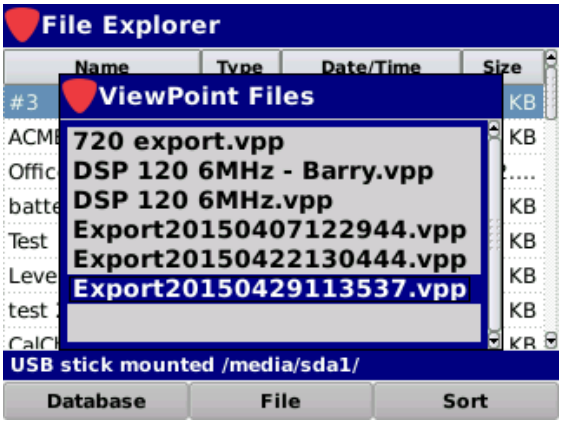


7. The **Export Filename** window will be displayed as shown in the image to the right.
8. Select the **Yes** button to name the export file or select **No** to use the date for the filename.



9. Use the **Virtual Keyboard** to enter the name of the new export file as shown in the image to the right.

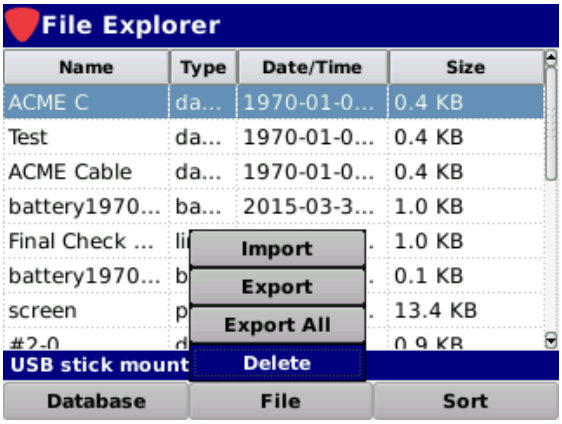
10. Later when you are ready to import, you will see the file listed in the ViewPoint files on the USB flash drive, as shown here.



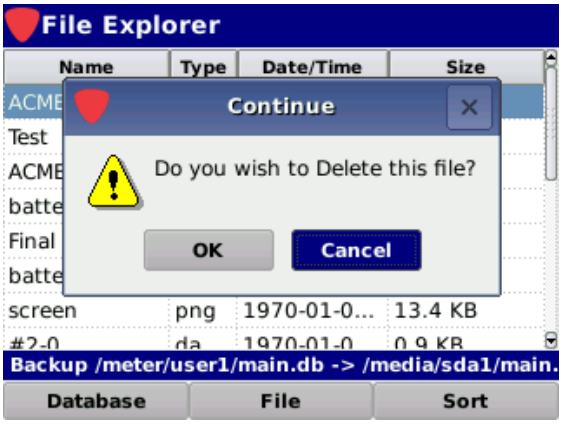
Delete Files

Perform the following steps to delete files from the internal memory of the 120 DSP:

1. Use the arrow buttons to highlight the file you want to delete.
2. Select the **File** softkey.
3. From the **File** pop-up menu, select the **Delete** button as shown in the image to the right.



4. The **Continue** window will be displayed as shown in the image to the right.
5. Select the **OK** button to delete the file or select the **Cancel** button to exit without deleting the file.



Save Log File

This function is used when experiencing unexpected operation of the 120 DSP.

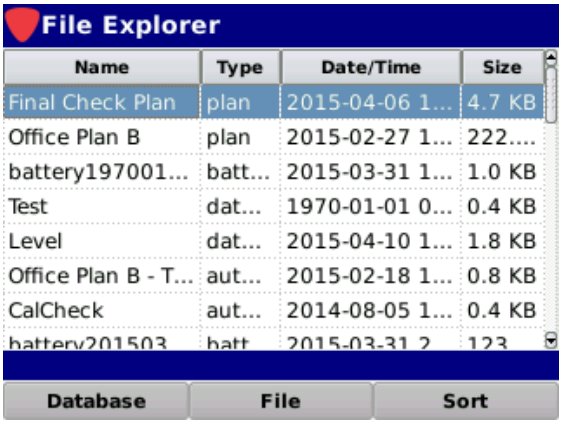
NOTE

To save a log file, the Operating Level setting must be set to Logging, see Section II: Setup, Chapter 3: Meter Configuration, Global Settings.

Save to Internal Memory

This function is used primarily for hands-on factory and repair center troubleshooting. Perform the following steps to save the 120 DSP log file to the internal memory of the 120 DSP:

1. Select the **Save Log** softkey.
2. The **Message Bar** will indicate a successful save to the internal memory of the 120 DSP by displaying the text **"-> /tmp/slm360log.txt"** as shown in the image to the right.

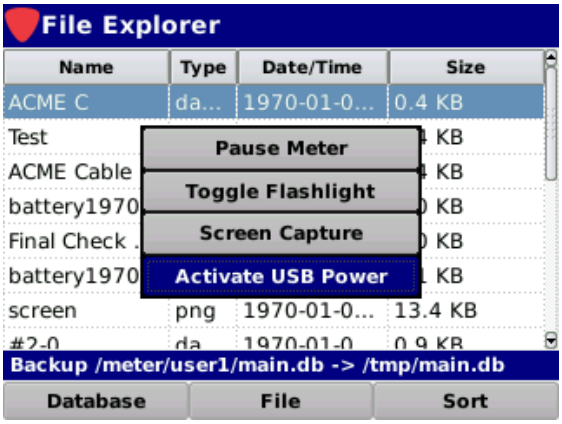


Save to a USB Flash Drive

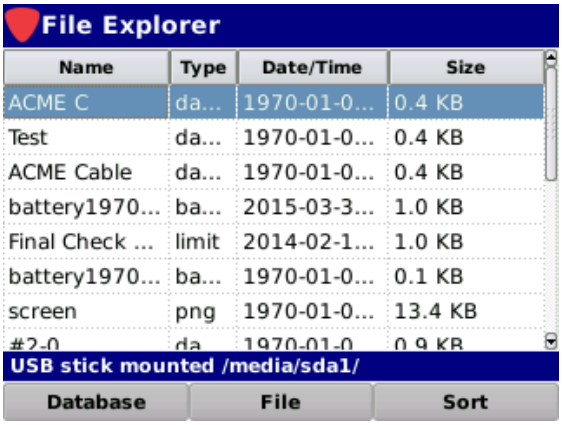
This function is used primarily for remote troubleshooting with the Trilithic Applications Support Department. This file can be emailed to Trilithic for advanced troubleshooting.

Perform the following steps to save the 120 DSP log file to a USB flash drive:

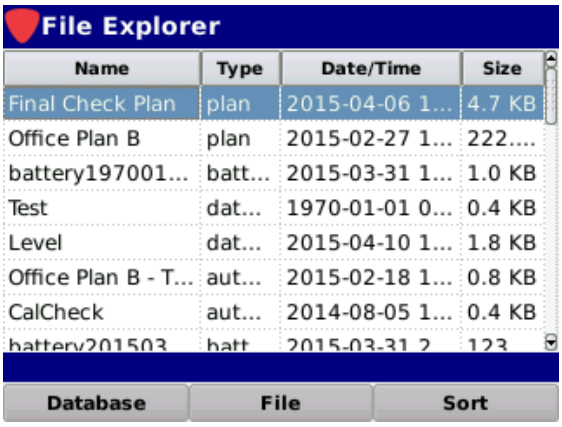
1. Insert the USB flash drive adapter into the USB port of the 120 DSP
2. Then insert a USB flash drive into the USB flash drive adapter.
3. Press the **Function** button and select the **Activate USB Power** function as shown in the image to the right.



4. The power to the USB flash drive is activated and the drive is now mounted to the file system as shown in the image to the right. The 120 DSP is now capable of transferring files to and from the USB flash drive.

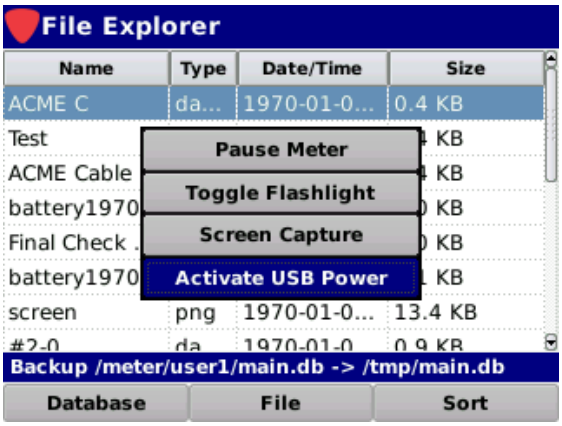


5. Select the **Save Log** softkey.
6. The **Message Bar** will indicate a successful save to the flash drive by displaying the text **"-> /media/sda1/slm360log.txt"** as shown in the image to the right.



Function Menu Options

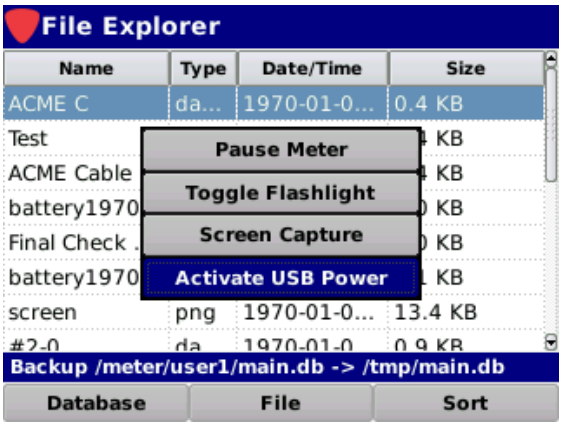
Additional functions can be accessed from within the **File Explorer** screen by pressing the **Function** button. The **Function** menu will be displayed as shown in the image to the right and includes the following functions specifically for the **File Explorer** screen.



Activate USB Power

This function is used to activate power to the USB flash drive inserted into the USB port of the 120 DSP. The USB flash drive must be enabled before being able to be used.

Select the **Activate USB Power** button from the **Function** menu. The USB flash drive will be mounted to the file system and is now capable of transferring files to/from the 120 DSP.

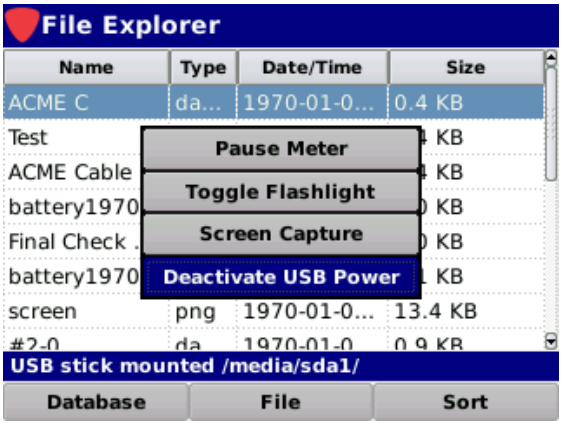


Deactivate USB Power

This function is used to deactivate power to the USB flash drive inserted into the USB port of the 120 DSP. The USB flash drive should be deactivated before removing.

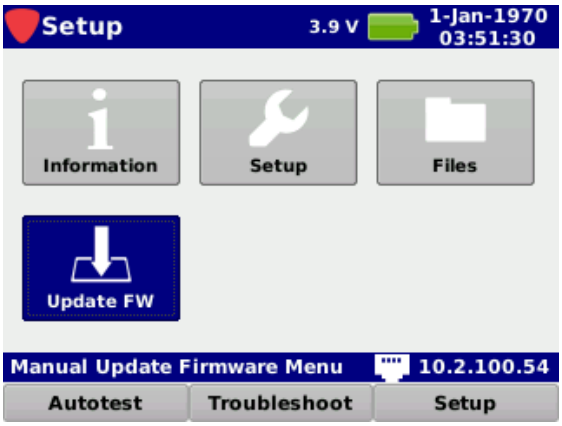
Select the **Deactivate USB Power** button from the **Function** menu. The USB flash drive can now be removed.

The 120 DSP automatically deactivates the power to the USB flash drive when you exit the **File Explorer** screen.

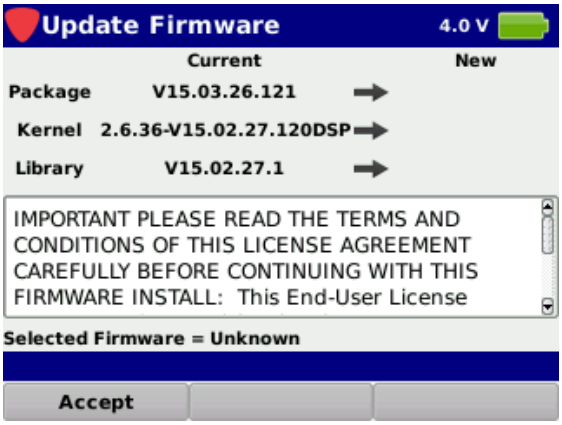


Overview

Select the **Update FW** icon as shown in the image to the right to update the firmware of the 120 DSP.



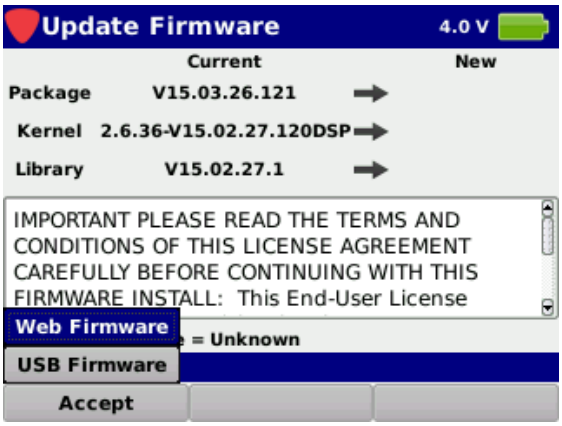
The **Update Firmware** screen will be displayed as shown in the image to the right. This screen allows you to perform a firmware update. Before performing a firmware update, you must accept the End User License Agreement (EULA) by selecting the **Accept** softkey.



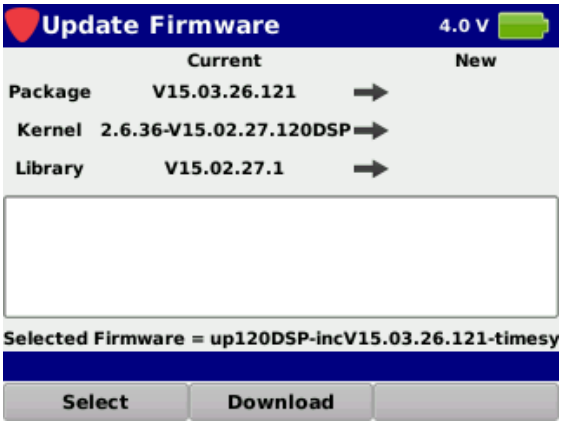
Update Firmware from Website

Perform the following steps to update the 120 DSP firmware from a website:

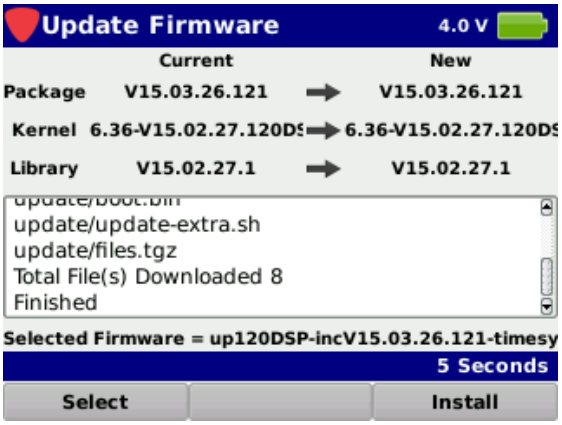
1. Make sure you are connected to the network via the Network Manager in the **Function** menu.
2. Select the **Accept** softkey.
3. From the **Accept** pop-up menu, select the **Web Firmware** button as shown in the image to the right.



4. Once you have selected the firmware file for download, select the **Download** softkey as shown in the image to the right to download the firmware file.



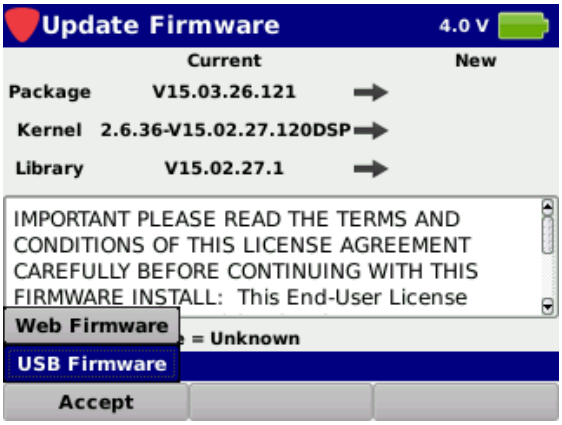
5. The download progress will be displayed in the activity area of the **Update Firmware** screen as shown in the image to the right.
6. Once the download has finished, the new firmware information will be displayed as shown in the image to the right. Select the **Install** softkey to install the firmware file.
7. Once the installation is finished, the 120 DSP will automatically restart with the new firmware.



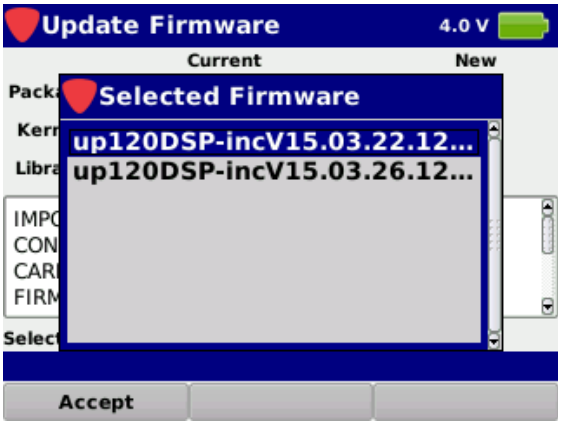
Update Firmware from a USB Flash Drive

Perform the following steps to update the 120 DSP firmware from a USB flash drive:

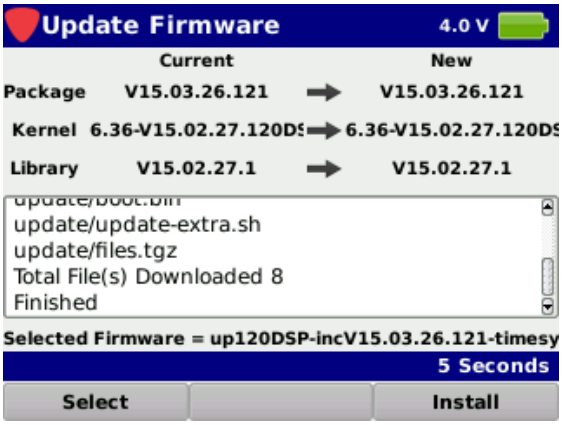
1. Insert the USB flash drive adapter into the USB port of the 120 DSP
2. Then insert a USB flash drive into the USB flash drive adapter.
3. Select the **Accept** softkey.
4. From the **Accept** pop-up menu, select the **USB Firmware** button as shown in the image to the right.



5. The **Selected Firmware** window will be displayed as shown to the right. Press the **Enter** button to select the firmware file that you would like to use.



6. Once the file has been transferred from the USB flash drive, the new firmware information will be displayed as shown in the image to the right. Select the **Install** softkey to install the firmware file.
7. Once the installation is finished, the 120 DSP will automatically restart with the new firmware.



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120 DSP
Basic Signal Level Meter

Section III: Autotest Menu

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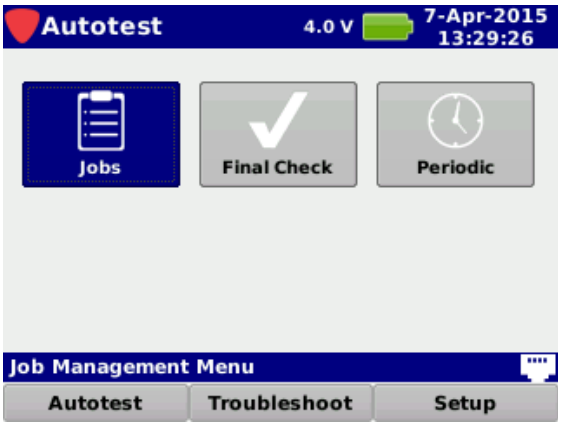
Introduction

Select the **Autotest** softkey to display the **Autotest** menu as shown in the image to the right. The 120 DSP enables you to view, create, and edit jobs as well as execute autotests on the meter.



This section will provide you with instructions on how to utilize the functions available in the **Autotest** menu of the instrument including:

- Manage Jobs
- Manage Autotests

NOTE

Autotests can only be created using the ViewPoint Express PC Configuration Software or ViewPoint Integrated Server Package with WFM Module.

NOTE

The CalCheck and Home Cert Autotests are included by default from the factory. When autotests are exported from ViewPoint, all of the Autotests in ViewPoint for this meter will be displayed on this screen.

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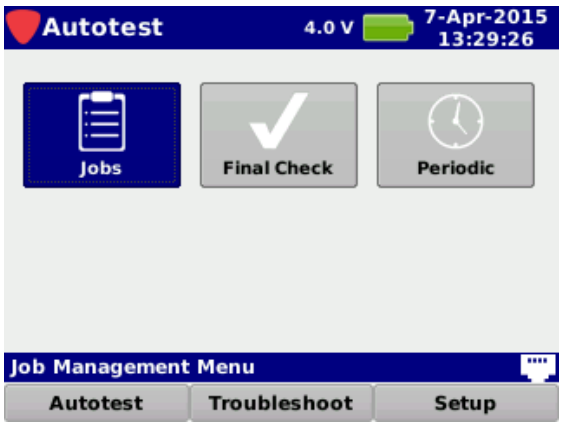
Job Management

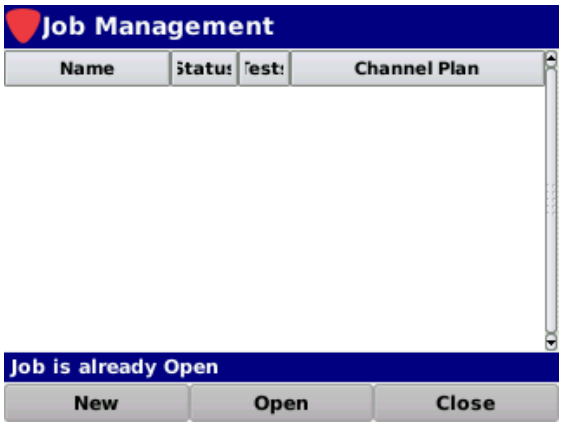
Overview

Select the **Jobs** icon as shown in the image to the right to manage jobs on the 120 DSP.



The **Job Management** screen will be displayed as shown in the image to the right. This screen allows you to perform the following actions:

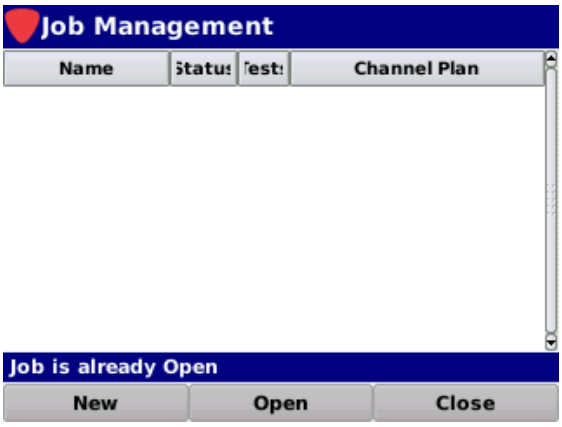
- Create new jobs
- Open existing jobs
- Close existing jobs
- Delete existing jobs



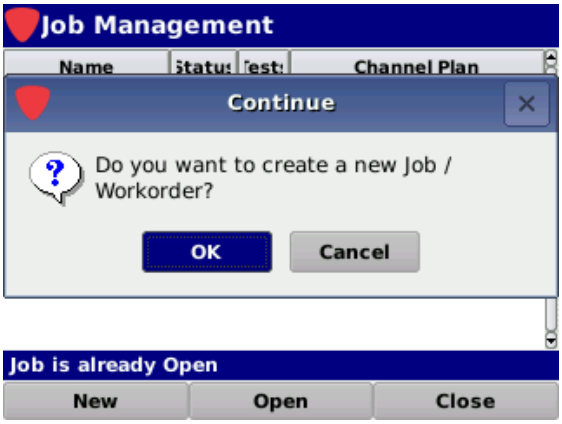
From within the **Job Management** screen, use the arrow buttons on the keypad to navigate through the list of jobs.

Create a New Job

From the **Job Management** screen, select the **New** softkey to create a new job.

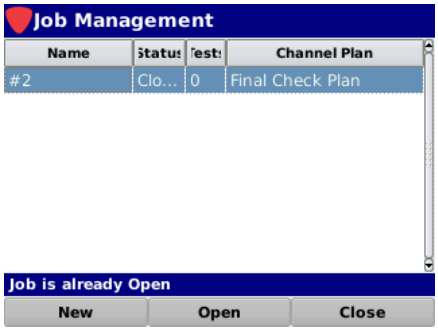


The **Continue** window will be displayed as shown in the image to the right. Select the **OK** button to create a new job or select the **Cancel** button to exit without creating a new job.



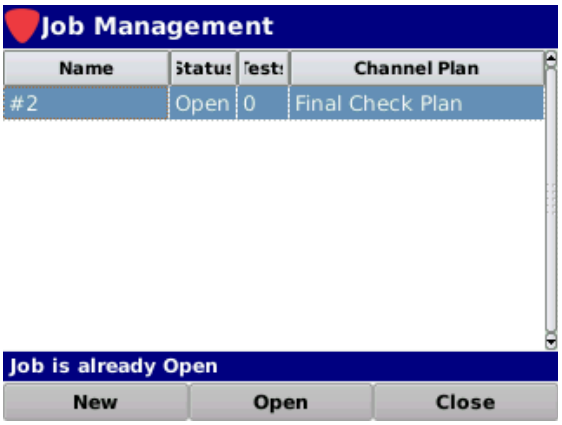
The **Virtual Keyboard** will be displayed as shown in the image below (left). Use the **Virtual Keyboard** to enter the name of the new job. The new job will be displayed in the **Job Management** screen as shown in the image below (right). If you don't enter a name for the job, the default job name will follow the format "wYYYYMMDDHHMMSS".

By default, the **Channel Plan** field will be populated with the last used channel plan provided that it still exists on the instrument.



Close an Open Job

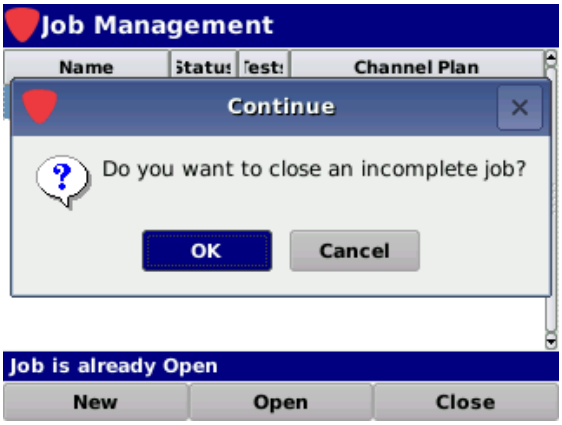
From the **Job Management** screen, select the **Close** softkey to close the highlighted job.

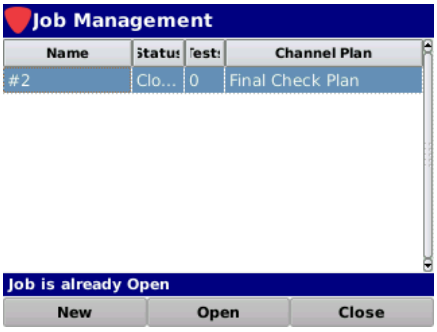


If the job hasn't been completed, the **Continue** window will be displayed as shown in the image to the right. Select the **OK** button to close the job or select the **Cancel** button to exit without closing the job.

After selecting the **OK** button or if the job has already been completed, the **Virtual Keyboard** will be displayed as shown in the image below (left). If the job is incomplete, use the **Virtual Keyboard**, enter any comments for the job.

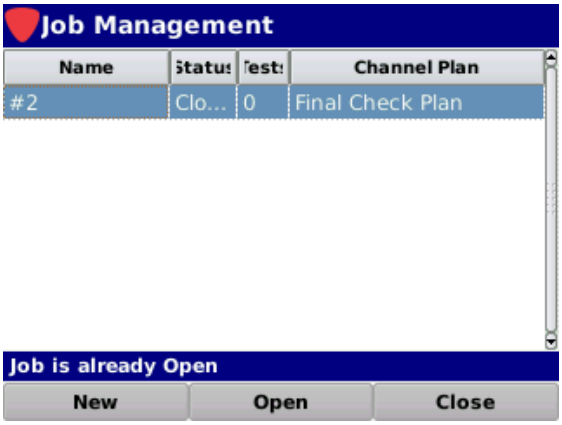
The **Job Management** screen will automatically refresh to display the closed status of the job as shown in the image below (right).





Open a Closed Job

From the **Job Management** screen, select the **Open** softkey to open the highlighted job.

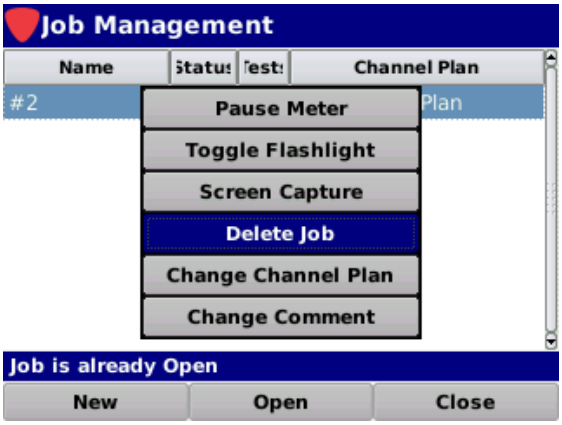


The **Job Management** screen will automatically refresh to display the open status of the job as shown in the image to the right.

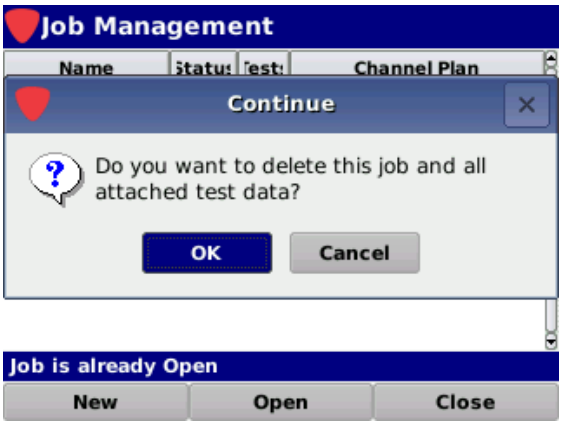
Delete an Existing Job

From the **Job Management** screen, press the **Function** button.

Select the **Delete Job** button from the **Function** menu as shown in the image to the right.



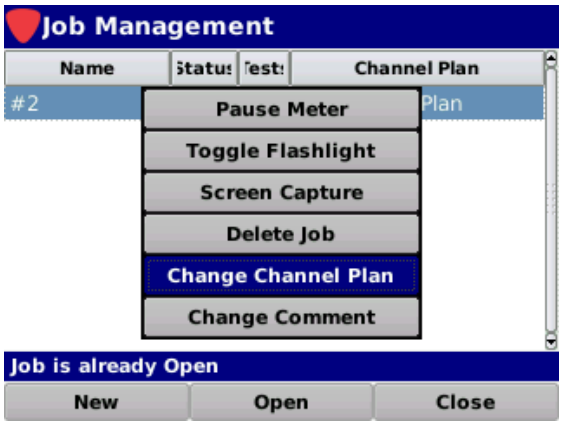
The **Continue** window will be displayed as shown in the image to the right. Select the **OK** button to delete the job or select the **Cancel** button to exit without deleting the job.



The **Job Management** screen will automatically refresh to remove the deleted job as shown in the image to the right.

Function Menu Options

Additional functions can be accessed from within the **Autotest** screen by pressing the **Function** button. The **Function** menu will be displayed as shown in the image to the right and includes the following functions specifically for the **Autotest** screen.

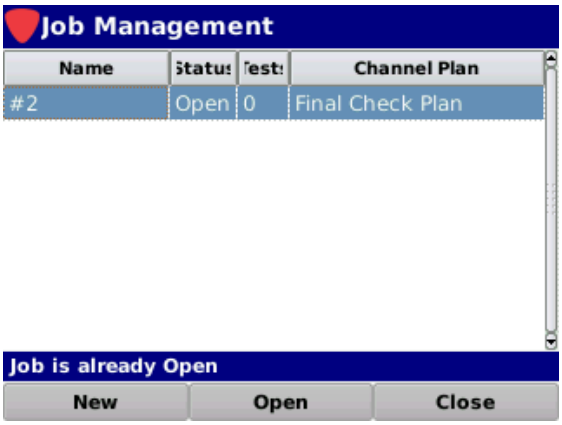


NOTE

For details on how to delete a job, see the Deleting An Existing Job section earlier in this chapter.

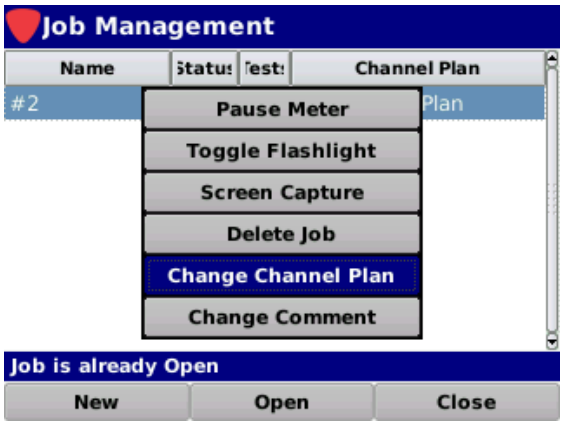
Changing Channel Plan of an Existing Job

This function is used to change the channel plan of the selected job. Highlight the name of the job that you would like to change the channel plan for as shown in the image to the right.



Press the **Function** button.

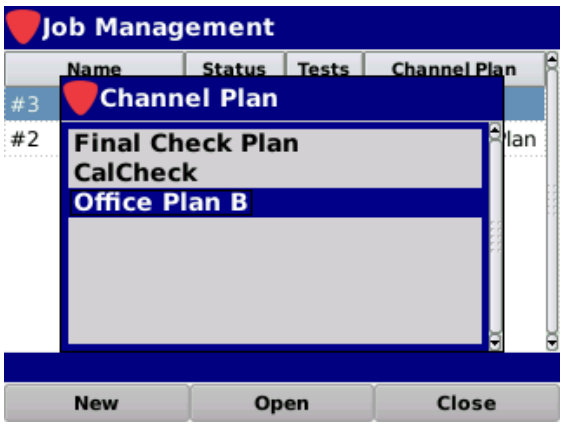
Select the **Change Channel Plan** button from the **Function** menu as shown in the image to the right.



If there is more than one channel plan on the 120 DSP, the **Channel Plan** window will be displayed as shown in the image below (left). Select the name of the channel plan that you would like to assign to the selected job.

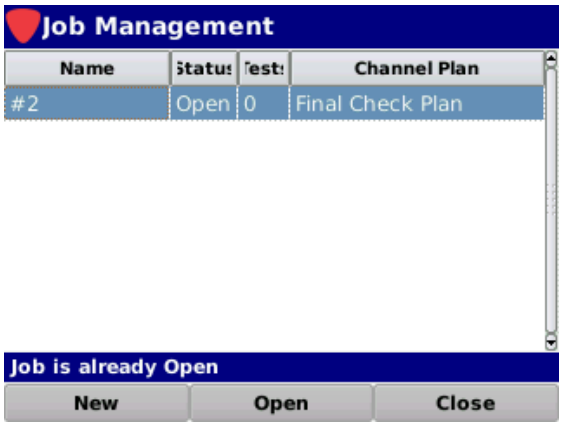
If there is only one channel plan on the 120 DSP, the **Channel Plan** window will be skipped and that channel plan will automatically be assigned to the channel plan.

Once you have selected the channel plan, the **Job Management** screen will automatically refresh to display the new channel plan assignment as shown in the image below (right).



Changing Comments of an Existing Job

This function is used to change the comments of the selected job. Highlight the job that you would like to change the comments for as shown in the image to the right.

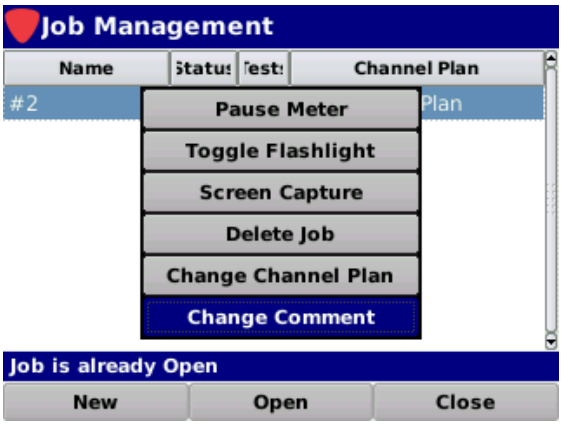


Changing Comments of an Existing Job

This function is used to change the comments of the selected job. Highlight the job that you would like to change the comments for as shown in the image to the right.

Press the **Function** button.

Select the **Change Comment** button from the **Function** menu as shown in the image to the right.

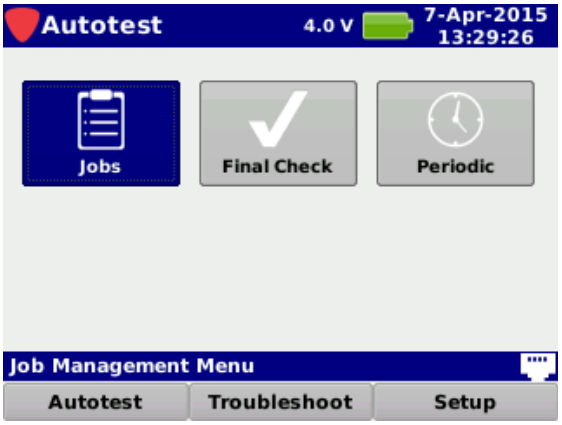


The **Virtual Keyboard** will be displayed as shown in the image to the right. Use the **Virtual Keyboard** to enter the comments for the selected job.

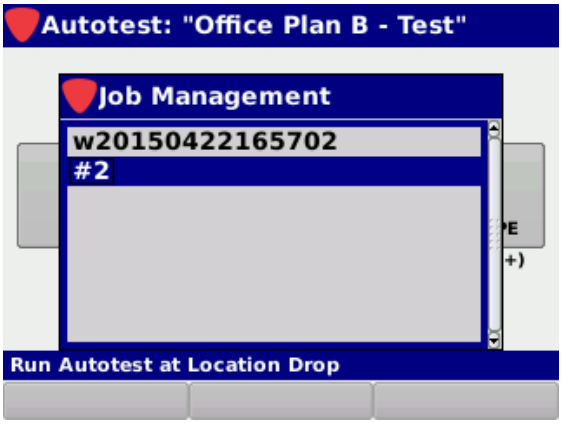
Overview

The **Autotest** menu can include up to 3 Autotest apps that are configured using ViewPoint. The image shown to the right displays three different Autotest apps: **Jobs**, **Final Check**, and **Periodic** that were configured using ViewPoint.

Select any of the Autotest apps as shown in the image to the right to execute an Autotest on the 120 DSP.

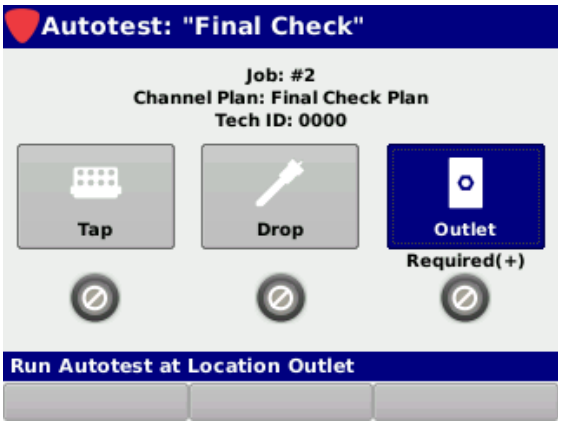


If a job hasn't been opened, the **Job Management** window will be displayed. Choose the job that you would like to perform that Autotest on.



The **Autotest** screen will be displayed as shown in the image to the right. This screen allows you execute autotests at multiple locations for each job on the 120 DSP.

The **Autotest** screen displays the Autotest Name, Job, Channel Plan, and Tech ID above the test locations.



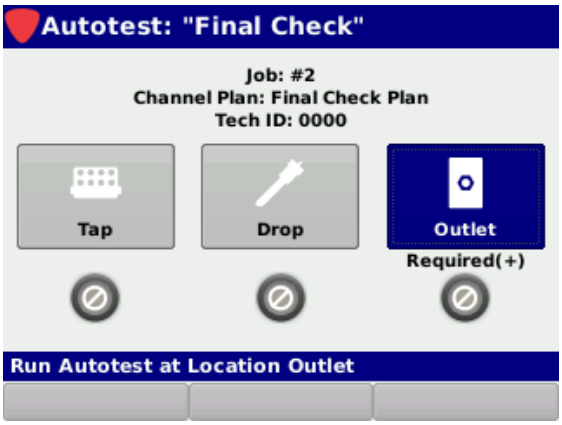
NOTE

See the ViewPoint Express or ViewPoint WFM Module Operation Manual for more information on how to create Autotest Apps and configure Locations, Channel Plans, and Limit Sets for Autotesting.

Each test location will be tested against a channel plan and limit set that is configured using the ViewPoint WFM Module.

The following information will be displayed below each location;

- **Required Status** - Each location will display its status with either of the following:
  - **Blank** - This is displayed when the location is not required and can be tested more than once.
  - **Required** - This is displayed when the location is required and can only be tested once.
  - **Required (+)** - This is displayed when the location is required and can be tested more than once.



- **Location Pass/Fail Indicators** - Each location will display a pass/fail indicator as shown in the following section:

NOTE

Channel Plans and Limit Sets created/modified on the 120 DSP can only be used in the Troubleshooting menu. Autotests require ViewPoint Express or ViewPoint WFM Module Channel Plans and Limit Sets.

NOTE

You can retest any location that fails as many times as you like but once a required location passes and only one test is required, you are done with that location.

Location Pass/Fail Indicators

When an Autotest App is created in ViewPoint, channel plans and limit sets will be assigned to each location for testing. The following standard locations can be added to an Autotest App (up to 3):

- Tap
- Drop
- Ground Block
- Outlet

Custom locations can also be created using ViewPoint. Any locations that aren't allowed for the selected autotest will not be displayed and cannot be executed.

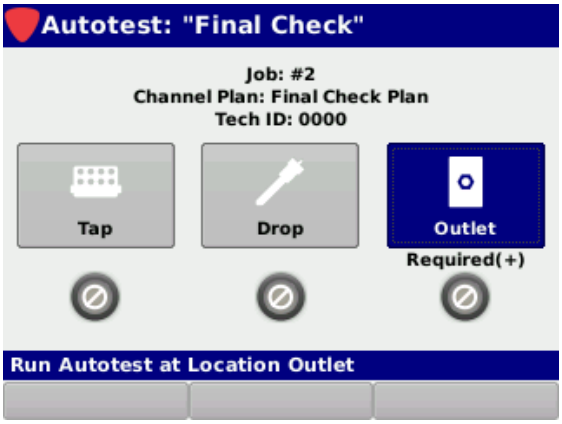
A Pass/Fail status will be displayed below each test location. When any of the individual measurement parameters of an autotest location fail, the location as a whole will indicate a Fail status.

Each individual location will indicate its status using the following icons:

This icon indicates that this autotest has not been executed at this location.

This icon indicates that all of the measurements for this test location have passed the measurement thresholds.

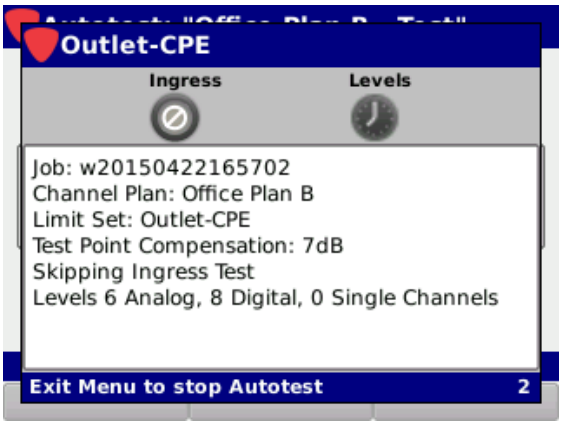
This icon indicates that one or more of the measurements for this test location have failed the measurement thresholds.



Executing an Autotest

To execute an Autotest, select the location for testing from the Autotest screen. The Autotest will automatically start testing according to the channel plan and limit set for each location as shown in the images below.

The names of the Job, Channel Plan, and Limit set will be displayed along with detailed measurement results for each test.

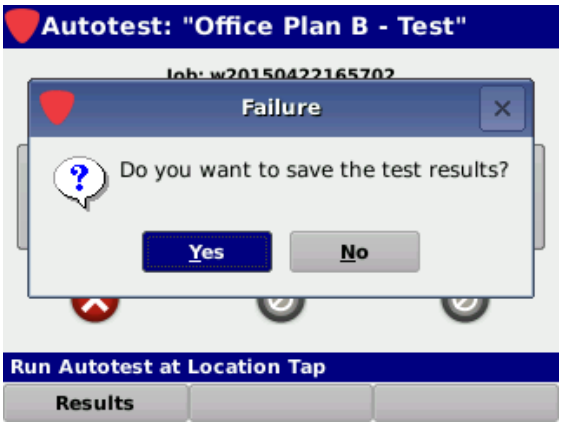


Any failed tests will be displayed with red text as shown in the image to the right.

When the Autotest is complete, press the Back button to exit. A notice screen will be displayed as shown in the image to the right. Select the **OK** button to save the test results or select the **Cancel** button to exit without saving the test results.

If you save the test passing results and the location is set to test only once, you will not be allowed to run this test again.

You can always re-run failed tests as the premises are repaired.



Pass/Fail Measurement Indicators

After completing an autotest, to view the measurement results from any location, select the corresponding **Results** softkey. The following tests can be executed at each location:

- **Channel Plan Scan** - This measurement scans each channel in the selected channel plan and compares the results to the selected limit set. This test includes: Level, Tilt, C/N, MER, and BER.
- **Modem Test** - This measurement performs a modem login and compares the results to the selected limit set. This test includes: Pre/Post Bit Error and Modem Launch Levels.
- **Spectrum Test** - This measurement performs a return spectrum test and compares the results to the selected limit set. This test includes: Maximum Ingress Level.

A Pass/Fail status will be displayed at the top of the results screen along with detailed test results for each test. When any of the individual measurement parameters of a test fail, the test as a whole will indicate a Fail status.

Each individual test will indicate its status using the following icons:

This icon indicates that this measurement was skipped. This only applies to measurements that are not enabled.

This icon indicates that all of the measurements for this test have passed the measurement thresholds.

This icon indicates that one or more of the measurements for this test have failed the measurement thresholds.

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120 DSP
Basic Signal Level Meter

Section IV: Troubleshoot Menu

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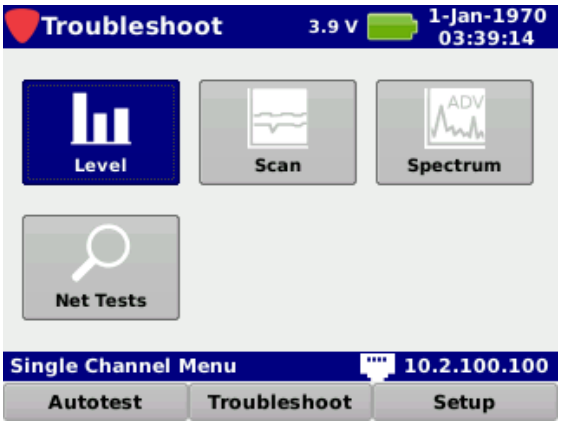
Introduction



Select the **Troubleshoot** softkey to display the **Troubleshoot** menu as shown in the image to the right. The 120 DSP enables you to troubleshoot installation issues using the functions within this menu.

This section will provide you with instructions on how to utilize the functions available in the **Troubleshoot** menu of the instrument including:

- Level Measurement
    - Analog & Digital Hum (OPTIONAL)
- Channel Plan Scan
- Spectrum Analysis
    - Return Spectrum Analysis - 4 to 110 MHz
    - Forward Spectrum Analysis - 50 to 1000 MHz (OPTIONAL)
- Network Testing Suite

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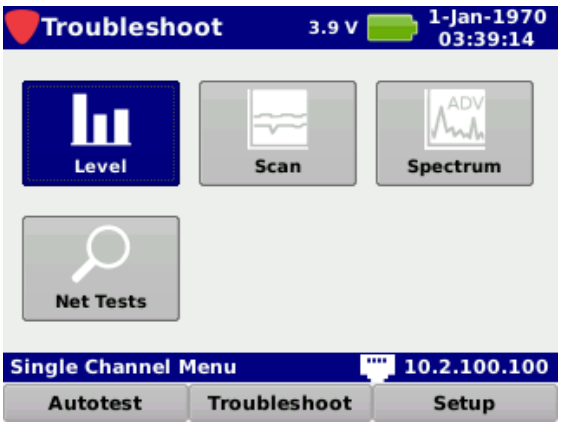
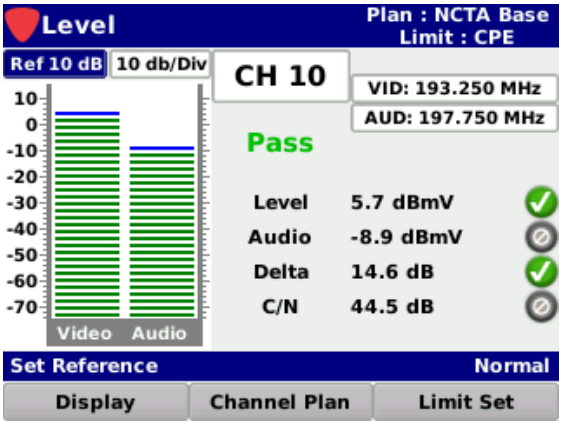
Overview

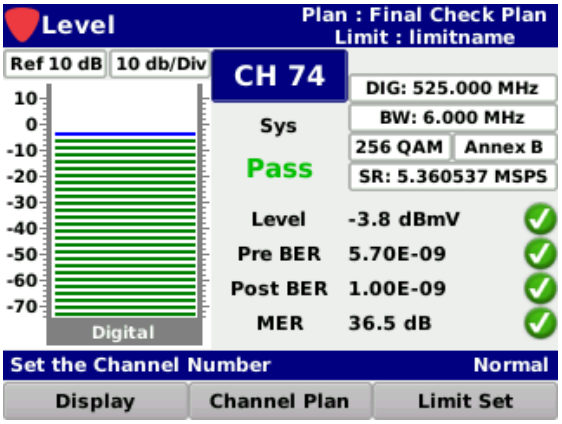
Select the **Level** icon as shown in the image to the right to perform channel measurements on the 120 DSP.

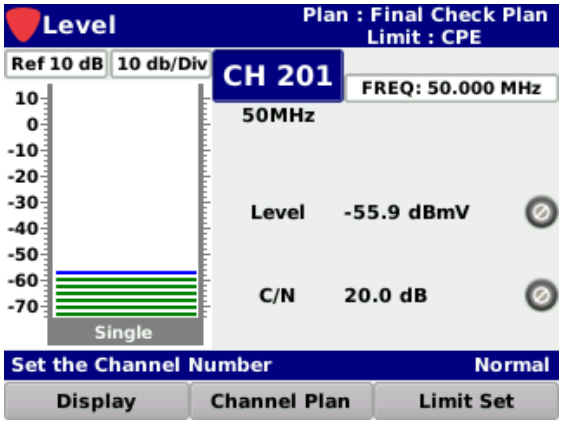


The **Level** screen will be displayed as shown in the image to the right. This screen allows you to perform measurements on the following types of channels:

- Analog (right)
  - **NTSC**
  - **PAL B/I/D/N/M/G/H/K**
  - **SECAM B/L/D/G/H/I/K**
- Digital (bottom left)
  - **Annex A/B/C**
  - **16/32/64/128/256 QAM**
- Single Carrier (bottom right)

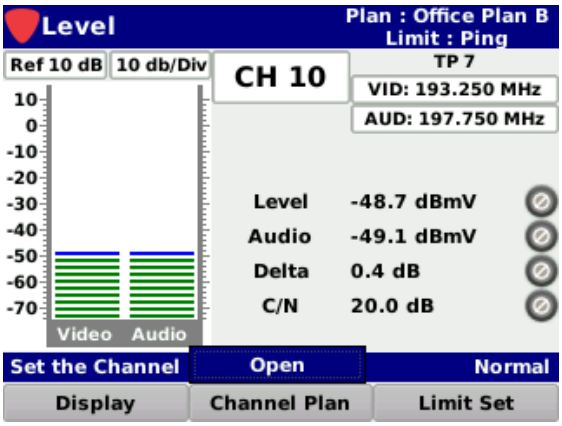






Opening a Channel Plan

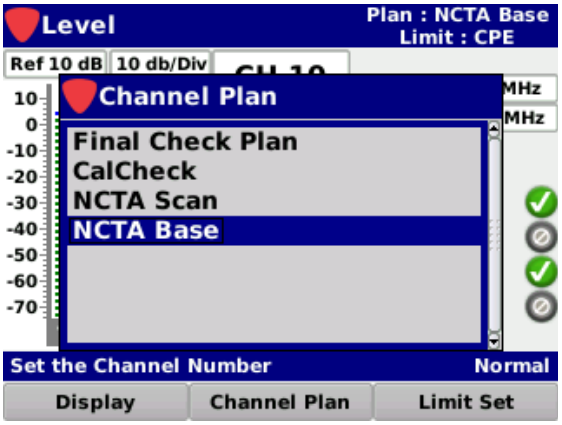
Select the **Channel Plan** softkey as shown in the image to the right to select the channel plan to use for the level measurement.



Select the **Open** button from the **Channel Plan** pop-up menu and the **Channel Plan** window will be displayed as shown in the image to the right.

From the **Channel Plan** window, select the name of the channel plan to use for the level measurement.

After selecting the channel plan, the **Level** screen will be displayed again.

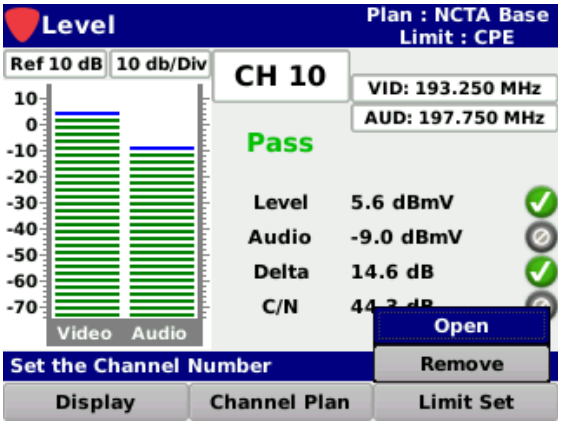


NOTE

The Channel Plan window will be bypassed if there is only one channel plan to choose from.

Opening a Limit Set

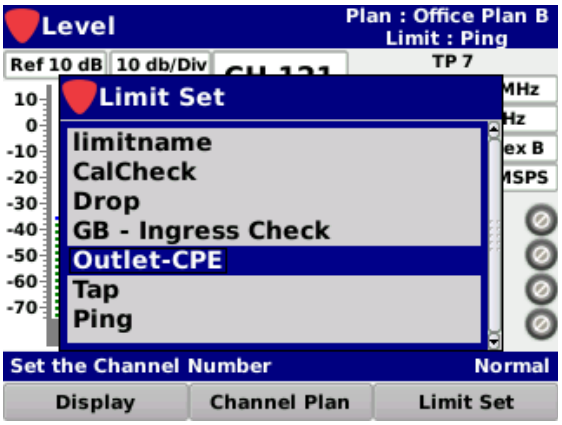
Select the **Limit Set** softkey as shown in the image to the right to select the limit set to use for the level measurement.



Select the **Open** button from the **Limit Set** pop-up menu and the **Limit Set** window will be displayed as shown in the image to the right.

From the **Limit Set** window, select the name of the limit set to use for the level measurement.

After selecting the limit set, the **Level** screen will be displayed again.

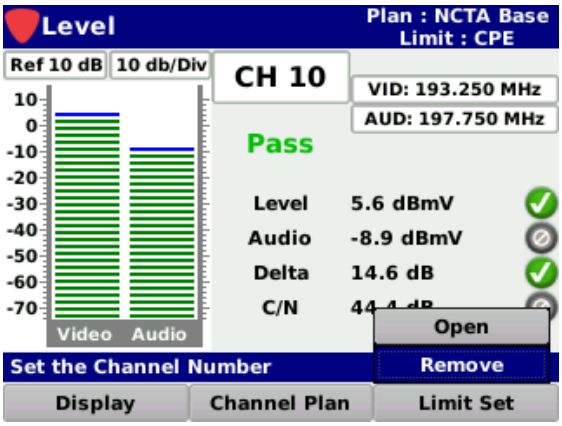


NOTE

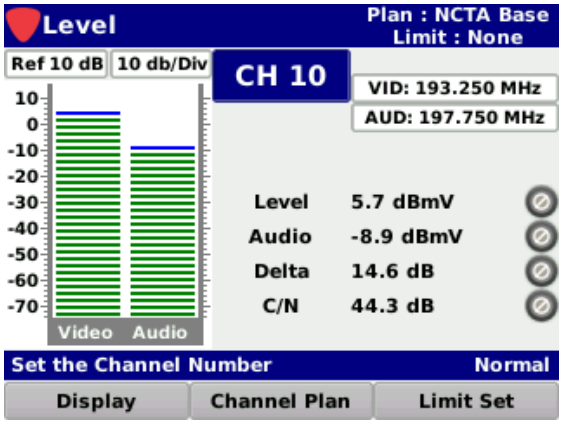
The Limit Set window will be bypassed if there is only one limit set to choose from.

Removing a Limit Set

Select the **Limit Set** softkey as shown in the image to the right to remove limits set for the level measurement.



Select the **Remove** button from the **Limit Set** pop-up menu and the pass/fail results will no longer be displayed as shown in the image to the right.



Pass/Fail Measurement Indicators

When a limit set has been opened, each channel that is included in the channel plan will be tested against the selected limit set thresholds.

A pass/fail status will be displayed below the channel number. When any of the individual measurement parameters of a channel fail, the channel as a whole will indicate a fail status.

Each individual measurement parameter will indicate its status using the following icons:

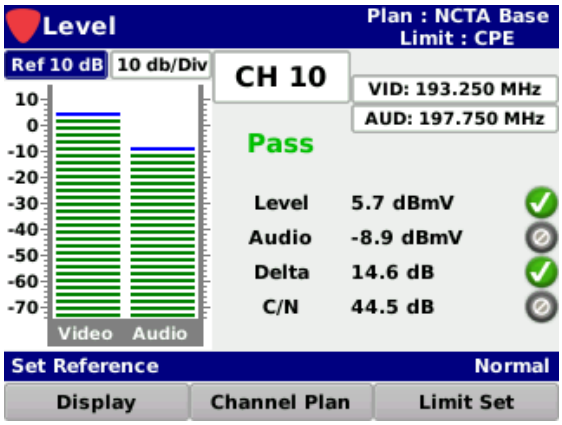
This icon indicates that this measurement is currently being performed and you must wait for it to be completed.

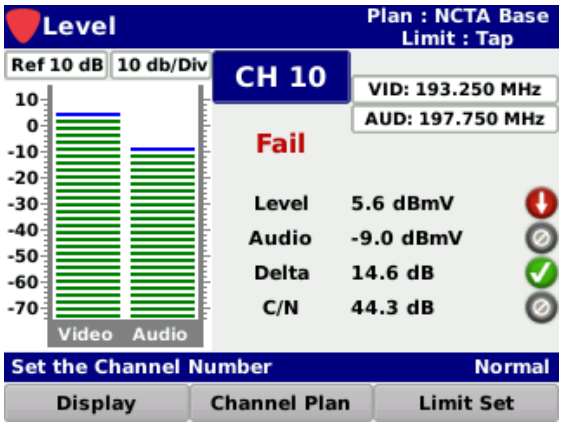
This icon indicates that this measurement was skipped. This only applies to measurements that have been removed from the currently selected limit set.

This icon indicates that this measurement is within the measurement thresholds of the currently selected limit set.

This icon indicates that the measurement has failed the high limit measurement threshold.

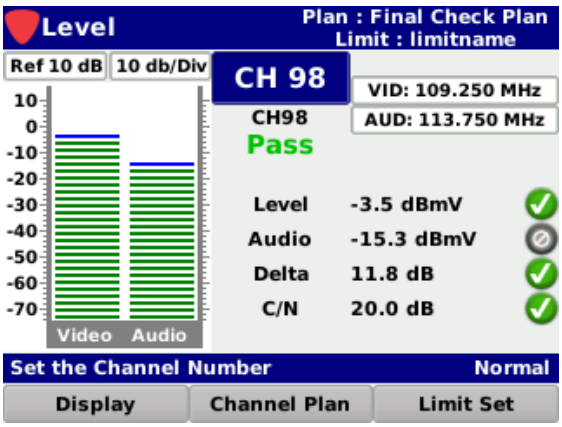
This icon indicates that the measurement has failed the low limit measurement threshold.





Analog Channel Measurement

When an analog channel is selected, the **Level** screen will display the following information:



- Reference Level (adjustable)
- Vertical Scale (adjustable)
- Channel Number (adjustable)
- Channel Name
- Video Center Frequency (adjustable)
- Audio Center Frequency (adjustable)
- Display Type (adjustable)

Measurement Results

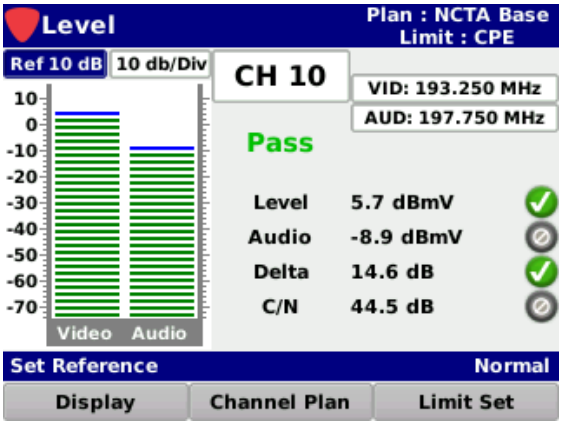
The following measurement results are displayed with a pass/fail status for each measurement that is included in the open limit set:

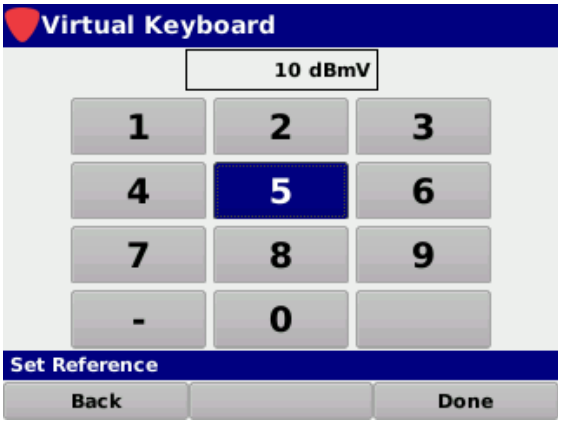
- Video level value with bar graph
- Audio level value with bar graph
- Video/Audio delta value
- C/N value

Reference Level Adjustment

The reference level can be adjusted from -40 to 60 dBmV and is the highest value displayed on the bar graph. Highlight the reference level field as shown in the image to the right and then use either of the following methods to change the reference level:

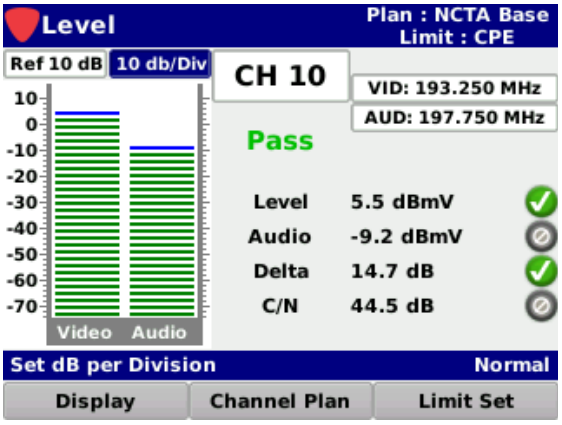
- Use the up/down arrow buttons to change the reference level in 1 dBmV increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the reference level as shown in the image to the right.





Vertical Scale Adjustment

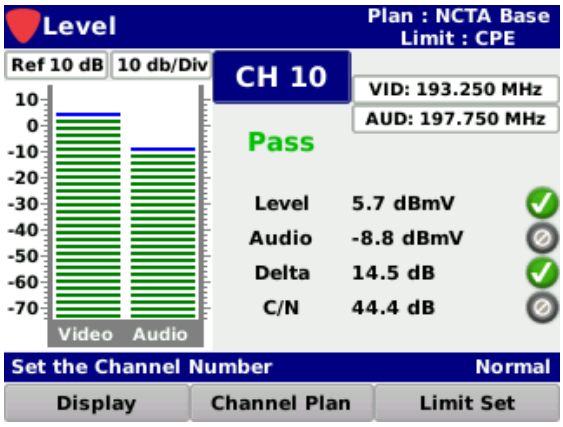
Highlight the vertical scale field as shown in the image to the right. Then, use the up/down arrow buttons to select from a vertical scale of **1**, **2**, **5** or **10 dB/div**.

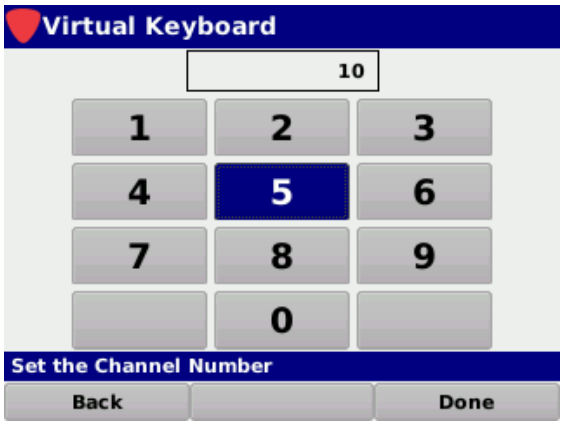


Channel Adjustment

Highlight the channel field as shown in the image to the right and then use either of the following methods to change the channel number:

- Use the up/down arrow buttons to change the channel number in 1 channel increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the channel number as shown in the image to the right.

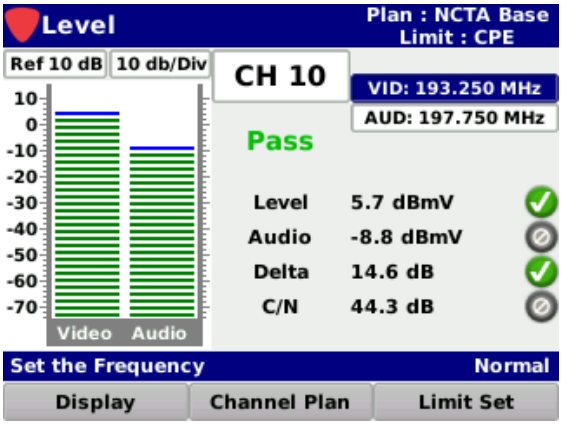




Video Frequency Adjustment

Highlight the video frequency field as shown in the image to the right and then use either of the following methods to change the video frequency:

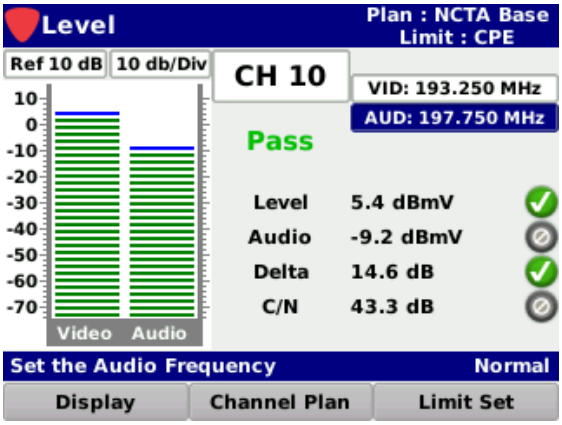
- Use the up/down arrow buttons to change the video frequency in 0.050 MHz increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the video frequency as shown in the image to the right.



Audio Frequency Adjustment

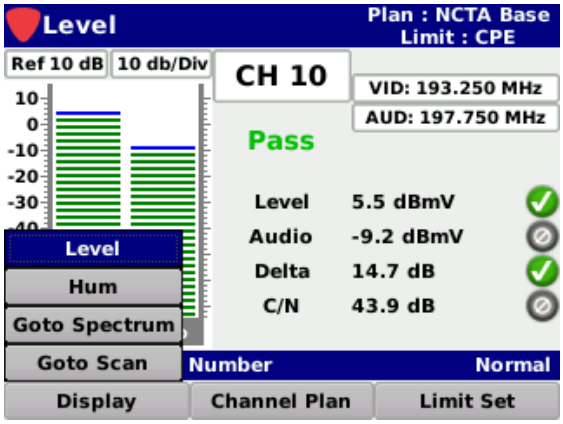
Highlight the audio frequency field as shown in the image to the right and then use either of the following methods to change the audio frequency:

- Use the up/down arrow buttons to change the audio frequency in 0.050 MHz increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the audio frequency as shown in the image to the right.



Display Type Adjustment

Select the **Display** softkey to scroll through the following types measurement displays:

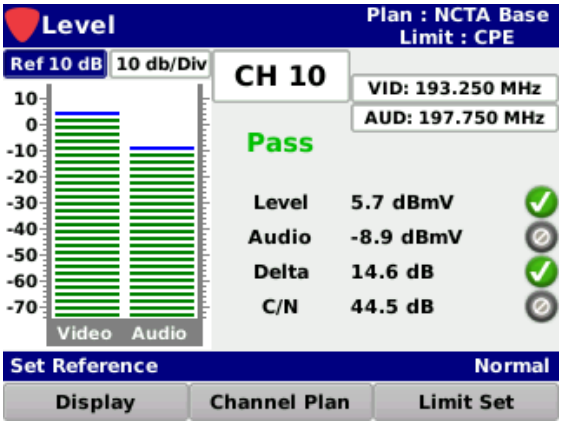


Bar Graph

Select the **Level** button from the **Display** pop-up menu to display a bar graph of the video and audio carrier levels of the analog video carrier.

The following measurement results are displayed with a pass/fail status for each measurement that is included in the open limit set:

- Video level value with bar graph
- Audio level value with bar graph
- Video/Audio delta value
- C/N value



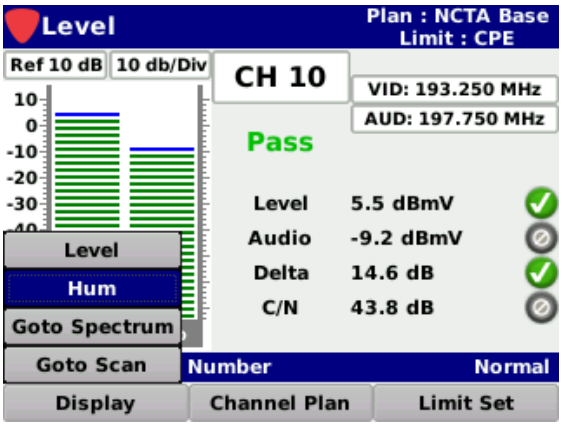
HUM (OPTIONAL)

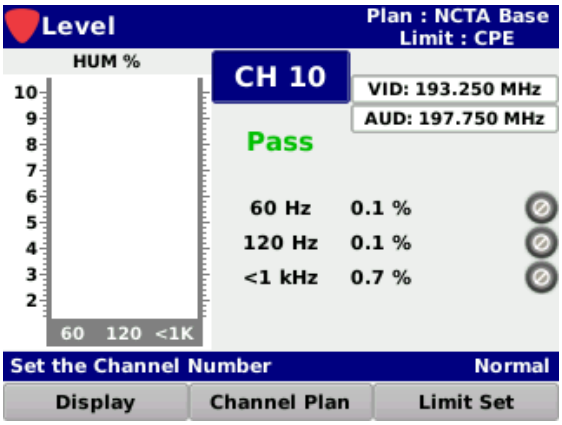
When activated in a 120 DSP, the HUM feature provides the ability to measure the amplitude of the 50/60 Hz, 100/120 Hz, and low frequency interference present on the video carrier of a single selected analog channel.

Select the **Hum** button from the **Display** pop-up menu to display a bar graph of the HUM levels of the analog channel.

The following measurement results are displayed with a pass/fail status for each measurement that is included in the open limit set:

- 60 Hz level value with bar graph
- 120 Hz level value with bar graph
- < 1 kHz (low frequency) level value with bar graph

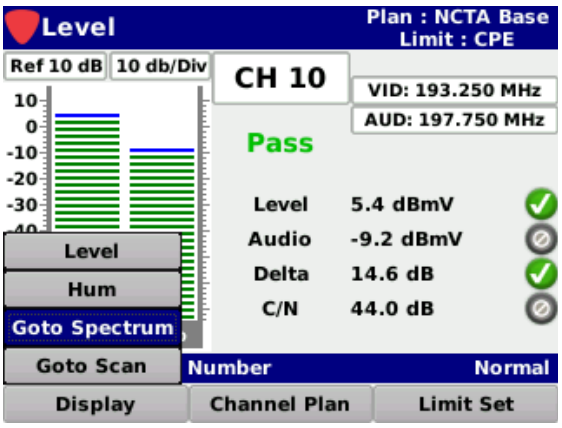




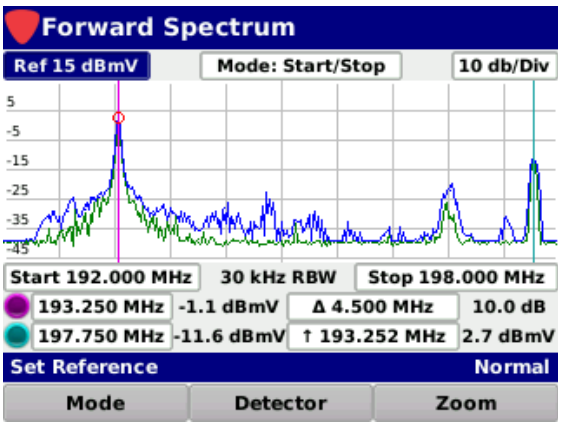
Go to Spectrum (OPTIONAL)

When the Forward Spectrum Analysis option is activated in a 120 DSP, the **Go to Spectrum** feature provides the ability to go to the Forward Spectrum display directly from the **Level** measurement screen.

Select the **Goto Spectrum** button from the **Display** pop-up menu to display the **Forward Spectrum** screen.



The **Forward Spectrum** screen provides the ability to view raw spectrum traces for the forward path from 50 to 1000 MHz with DSP spectrum snapshots to give a view of any downstream channels.



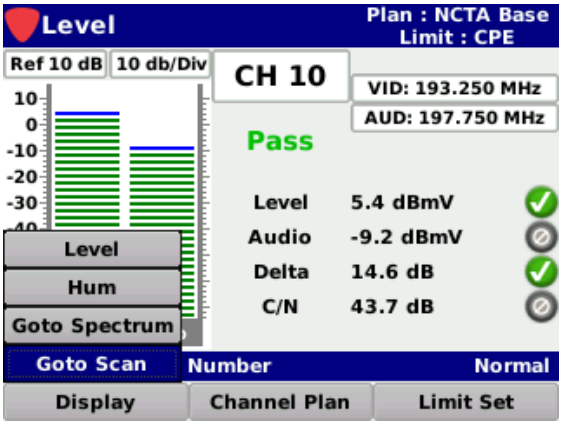
NOTE

For more information on Forward Spectrum, see Chapter 4: Spectrum Analysis, later in this section.

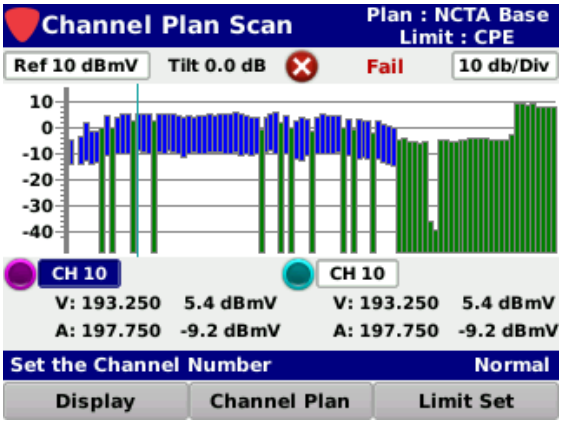
Go to Scan

The **Go to Scan** feature provides the ability to go to the Channel Plan Scan display directly from the **Level** measurement screen.

Select the **Goto Scan** button from the **Display** pop-up menu to display the **Channel Plan Scan** screen.



The **Channel Plan Scan** screen allows you to perform a scan of all of the channels in the current channel plan.



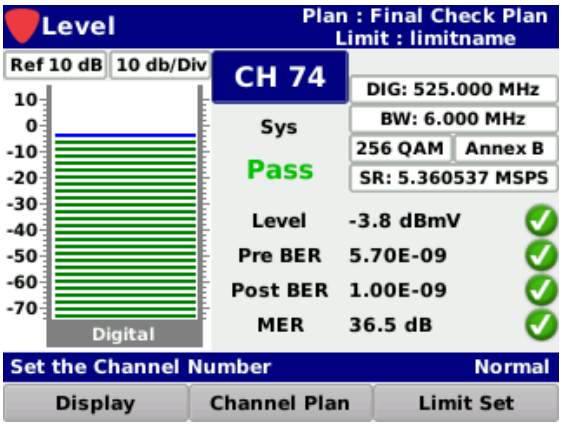
NOTE

For more information on Channel Plan Scan, see Chapter 3: Channel Plan Scan, later in this section.

Digital Channel Measurement

When a digital channel is selected, the **Level** screen will display the following information based on the settings of the current channel plan:

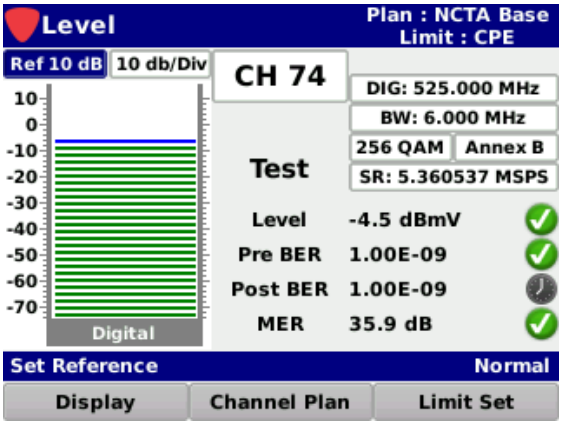
- Reference Level (adjustable)
- Vertical Scale (adjustable)
- Channel Number (adjustable)
- Channel Name
- Digital Video Frequency (adjustable)
- Channel Bandwidth (adjustable)
- Modulation Type (adjustable)
- Channel Standard (adjustable)
- Symbol Rate (adjustable)
- Display Type (adjustable)

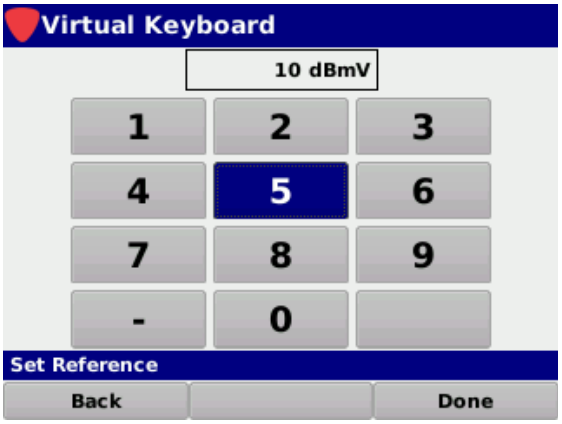


Reference Level Adjustment

The reference level can be adjusted from -40 to 60 dBmV and is the highest value displayed on the bar graph. Highlight the reference level field as shown in the image to the right and then use either of the following methods to change the reference level:

- Use the up/down arrow buttons to change the reference level in 1 dBmV increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the reference level as shown in the image to the right.



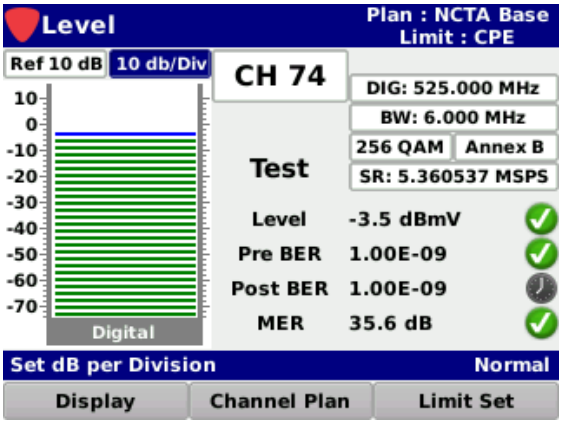


NOTE

The Reference Level adjustment is only available when the measurement display is set to the bar graph.

Vertical Scale Adjustment

Highlight the vertical scale field as shown in the image to the right. Then, use the up/down arrow buttons to select from a vertical scale of **1**, **2**, **5** or **10 dB/div**.



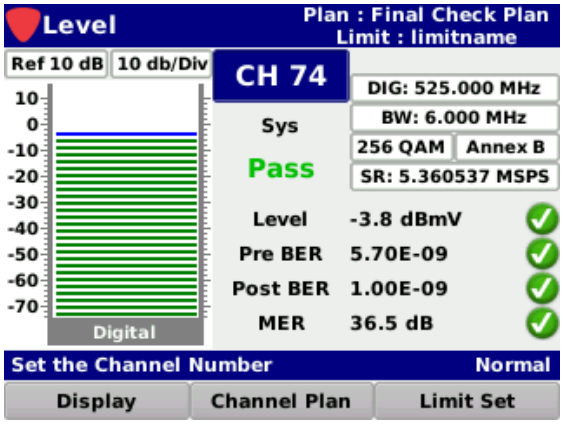
NOTE

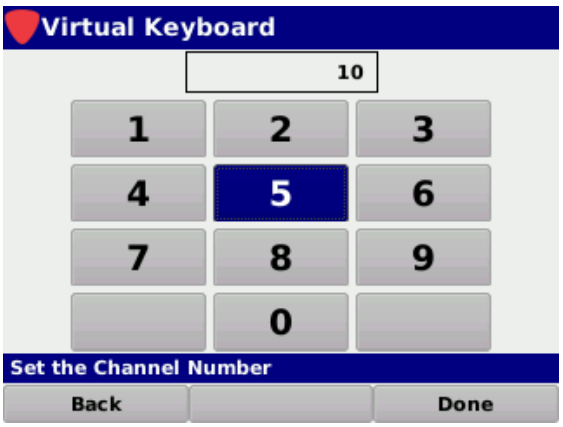
The Vertical Scale adjustment is only available when the measurement display is set to the bar graph.

Channel Adjustment

Highlight the channel field as shown in the image to the right and then use either of the following methods to change the channel number:

- Use the up/down arrow buttons to change the channel number in 1 channel increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the channel number as shown in the image to the right.

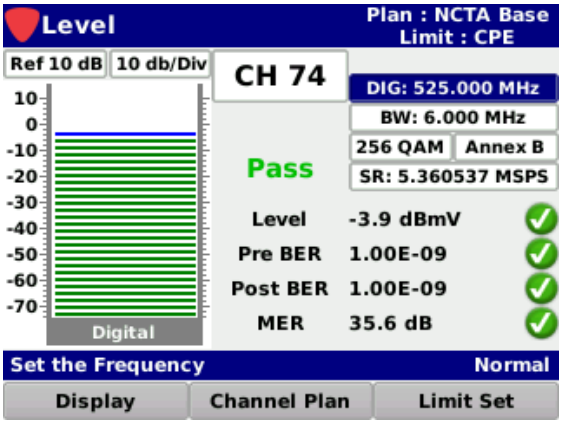


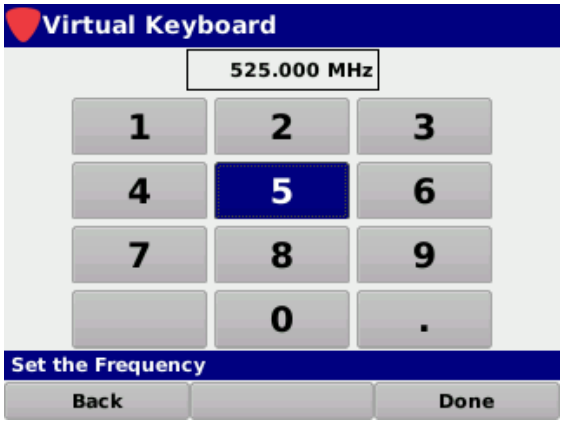


Digital Video Frequency Adjustment

Highlight the digital video frequency field as shown in the image to the right and then use either of the following methods to change the video frequency:

- Use the up/down arrow buttons to change the digital video frequency in 0.050 MHz increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the digital video frequency as shown in the image to the right.

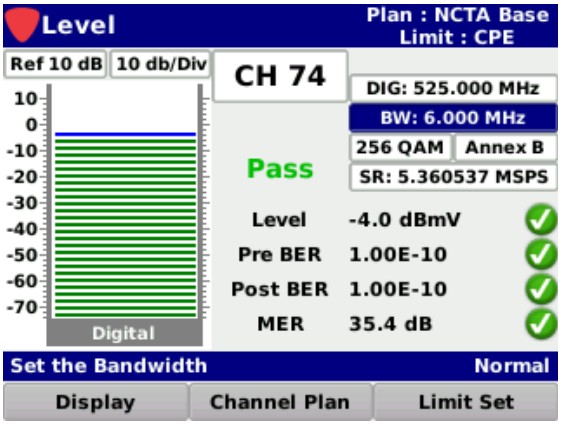


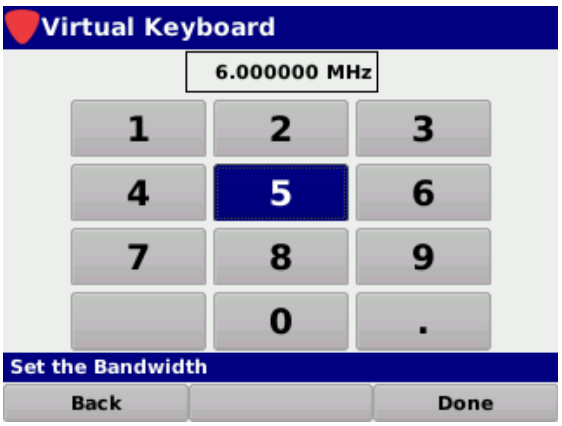


Channel Bandwidth Adjustment

Highlight the channel bandwidth field as shown in the image to the right and then use either of the following methods to change the frequency:

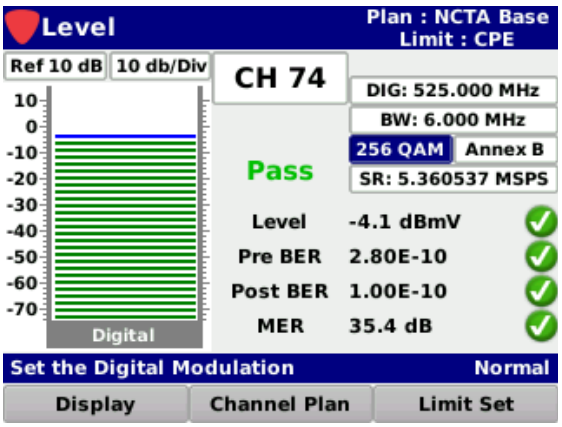
- Use the up/down arrow buttons to change the bandwidth in 0.1 MHz increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the bandwidth as shown in the image to the right.





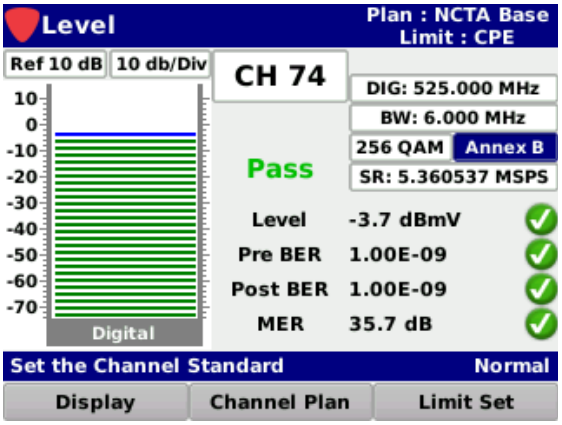
Modulation Type Adjustment

Highlight the modulation type field as shown in the image to the right. Then, use the up/down arrow buttons to select **QPSK, 16 QAM, 32 QAM, 64 QAM, 128 QAM,** or **256 QAM**.



Channel Standard Adjustment

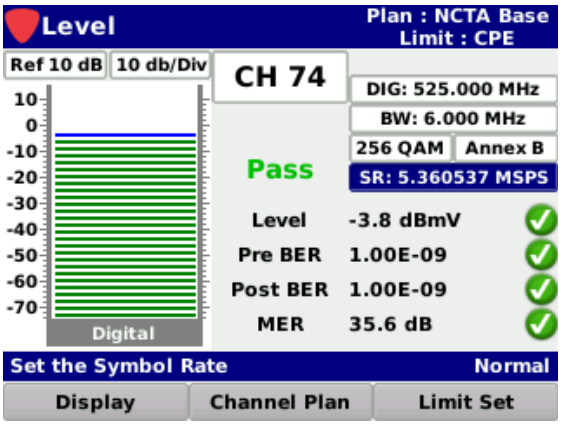
Highlight the channel standard field as shown in the image to the right. Then, use the up/down arrow buttons to select **Arbitrary, Annex A, Annex B,** or **Annex C**.

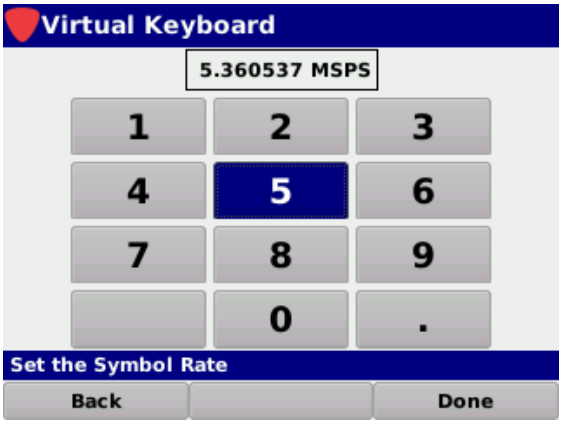


Symbol Rate Adjustment

Highlight the symbol rate field as shown in the image to the right and then use either of the following methods to change the symbol rate:

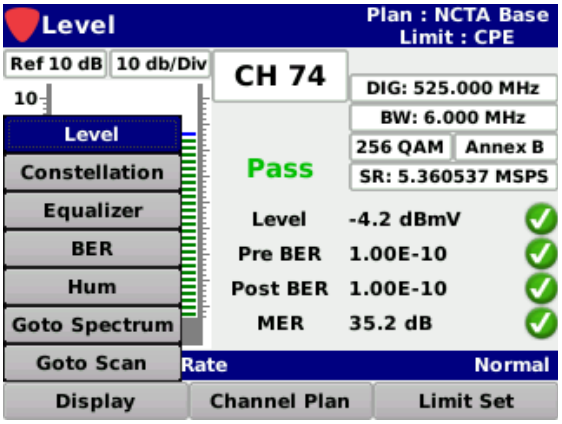
- Use the up/down arrow buttons to change the rate in 0.001 MSPS increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the bandwidth as shown in the image to the right.





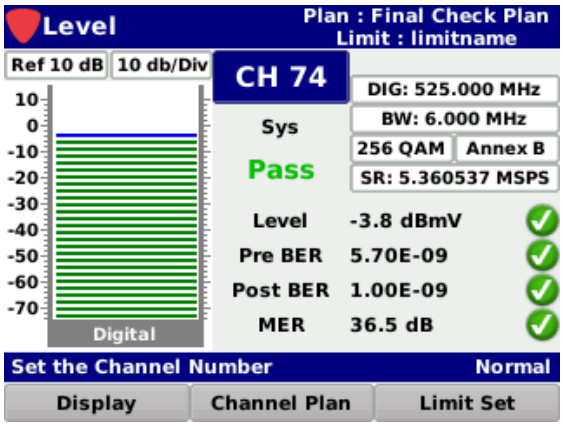
Display Type Adjustment

Select the **Display** softkey to scroll through the following types measurement displays:



Bar Graph

Select the **Level** button from the **Display** pop-up menu to display a bar graph of the digital video carrier

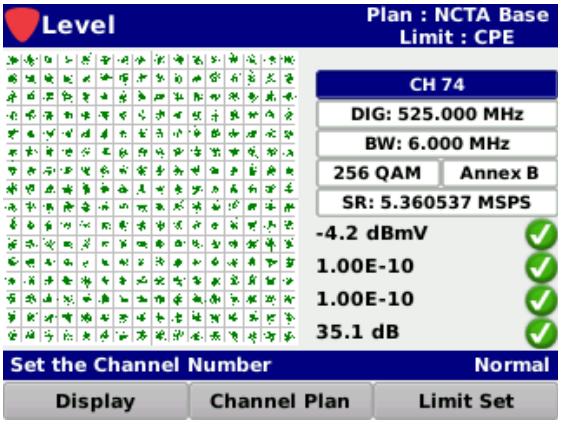


The following measurement results are displayed with a pass/fail status for each measurement that is included in the open limit set:

- Digital channel level value with bar graph
- Pre BER
- Post BER
- MER

QAM Constellation

Select the **Constellation** button from the **Display** pop-up menu to display the constellation diagram of the specified QAM channel.

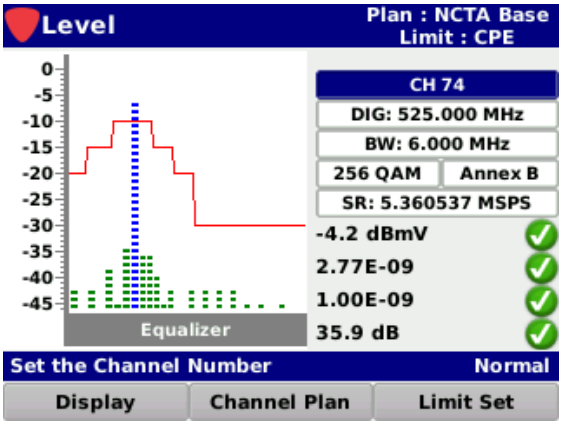


The following measurement results are displayed with a pass/fail status for each measurement that is included in the open limit set:

- Digital channel level value with constellation diagram
- Pre BER
- Post BER
- MER

Equalizer Tap

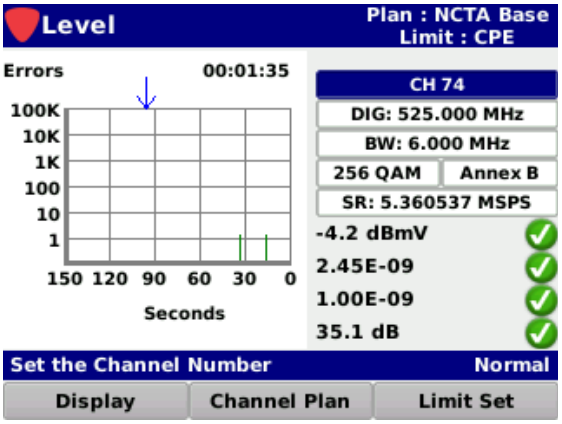
Select the **Equalizer** button from the **Display** pop-up menu to display the equalizer stress and whether the DOCSIS specification is being broken.



The following measurement results are displayed with a pass/fail status for each measurement that is included in the open limit set:

- Digital channel level value with bar graph
- Pre BER
- Post BER
- MER

Bit-Error Rate

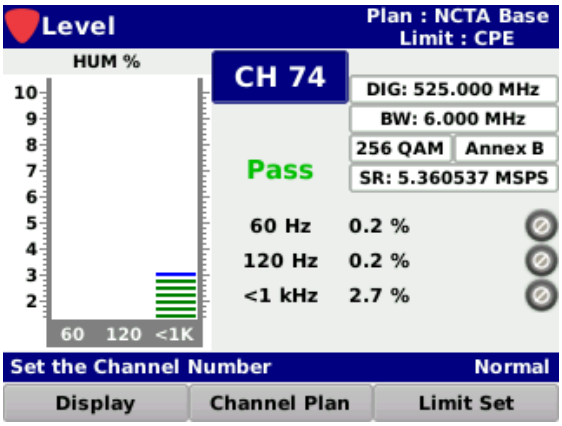


Select the **Equalizer** button from the **Display** pop-up menu to display the BER on a graph with a 150 second measurement period with solid green lines for Pre BER and solid red lines for Post BER.

The following measurement results are displayed with a pass/fail status for each measurement that is included in the open limit set:

- Digital channel level value with bar graph
- Pre BER
- Post BER
- MER

HUM (OPTIONAL)



When activated in a 120 DSP, the HUM feature provides users with the ability to measure the amplitude of the 50/60 Hz, 100/120 Hz, and low frequency interference present on the QAM carrier of a single selected digital channel.

Select the **Hum** button from the **Display** pop-up menu to display a bar graph of the HUM levels of the QAM channel.

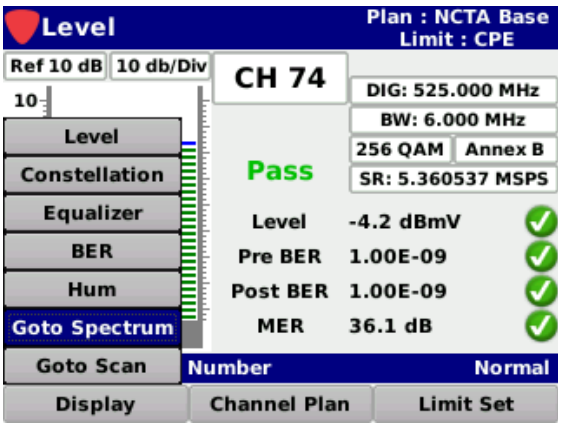
The following measurement results are displayed with a pass/fail status for each measurement that is included in the open limit set:

- 60 Hz level value with bar graph
- 120 Hz level value with bar graph
- < 1 kHz (low frequency) level value with bar graph

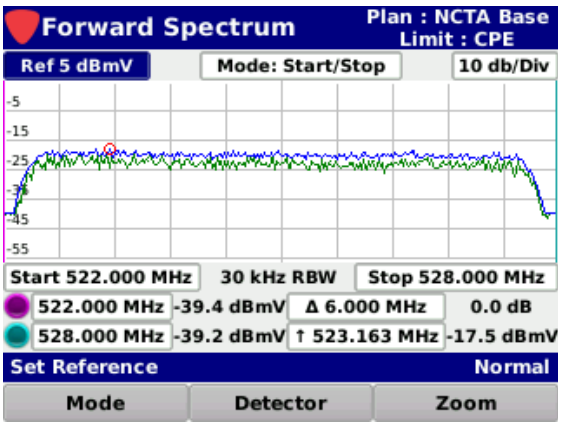
Go to Spectrum (OPTIONAL)

When the Forward Spectrum Analysis option is activated in a 120 DSP, the **Go to Spectrum** feature provides the ability to go to the Forward Spectrum display directly from the **Level** measurement screen.

Select the **Goto Spectrum** button from the **Display** pop-up menu to display the **Forward Spectrum** screen.



The **Forward Spectrum** screen provides the ability to view raw spectrum traces for the forward path from 50 to 1000 MHz with DSP spectrum snapshots to give a view of any downstream channels.



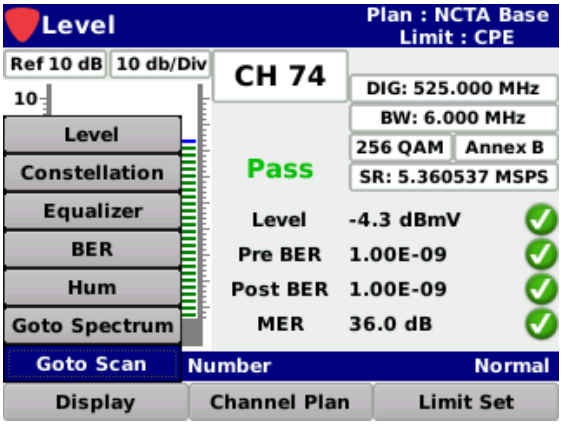
NOTE

For more information on Forward Spectrum, see Chapter 4: Spectrum Analysis, later in this section.

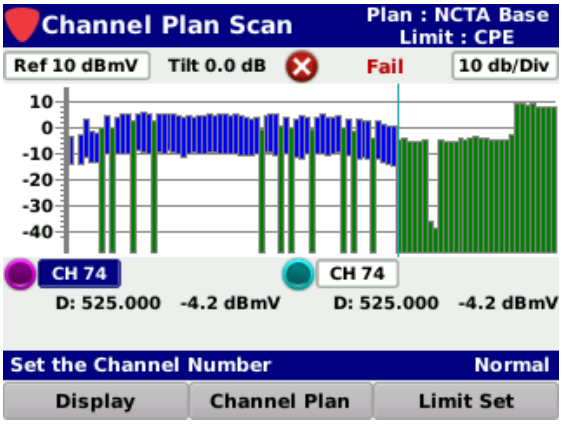
Go to Scan

The **Go to Scan** feature provides the ability to go to the Channel Plan Scan display directly from the **Level** measurement screen.

Select the **Goto Scan** button from the **Display** pop-up menu to display the **Channel Plan Scan** screen.



The **Channel Plan Scan** screen allows you to perform a scan of all of the channels in the current channel plan.



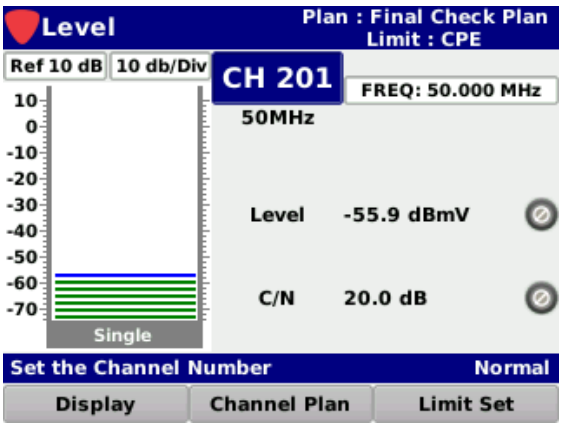
NOTE

For more information on Channel Plan Scan, see Chapter 3: Channel Plan Scan, later in this section.

Single Carrier Channel Measurement

When a single carrier channel is selected, the **Level** screen will display the following information based on the settings of the current channel plan:

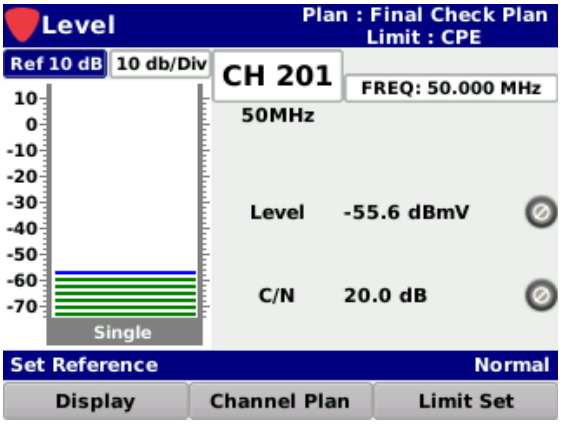
- Reference Level (adjustable)
- Vertical Scale (adjustable)
- Channel Number (adjustable)
- Channel Name
- Center Frequency (adjustable)

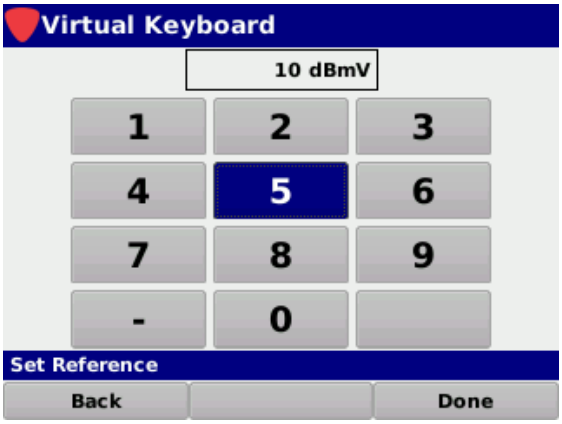


Reference Level Adjustment

The reference level can be adjusted from -40 to 60 dBmV and is the highest value displayed on the bar graph. Highlight the reference level field as shown in the image to the right and then use either of the following methods to change the reference level:

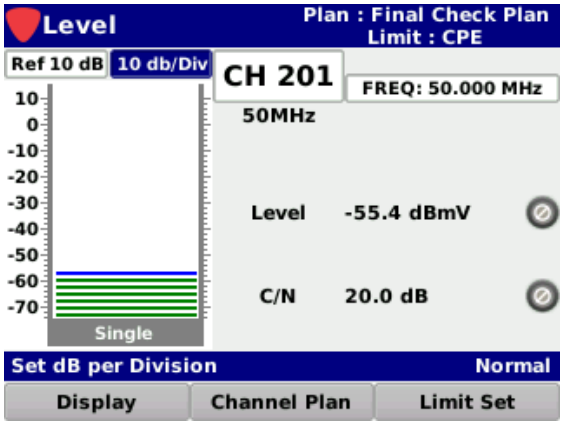
- Use the up/down arrow buttons to change the reference level in 1 dBmV increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the reference level as shown in the image to the right.





Vertical Scale Adjustment

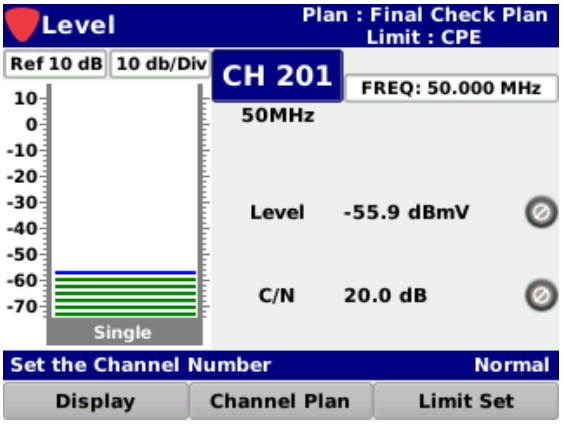
Highlight the vertical scale field as shown in the image to the right. Then, use the up/down arrow buttons to select from a vertical scale of **1**, **2**, **5** or **10 dB/div**.

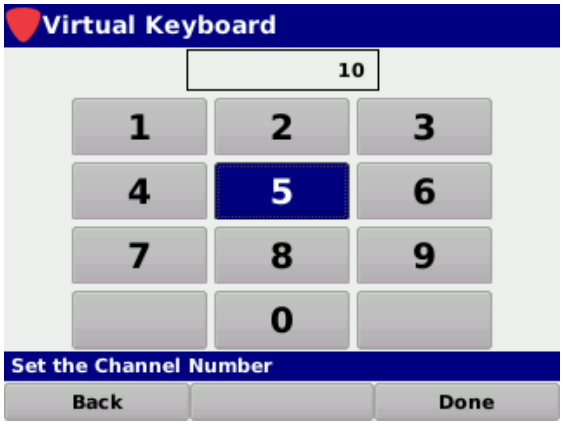


Channel Adjustment

Highlight the channel field as shown in the image to the right and then use either of the following methods to change the channel number:

- Use the up/down arrow buttons to change the channel number in 1 channel increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the channel number as shown in the image to the right.

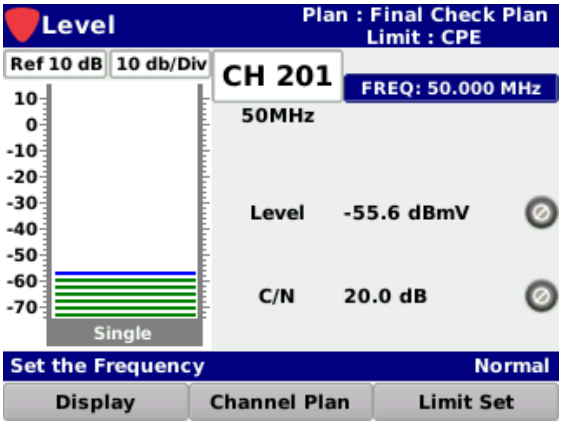


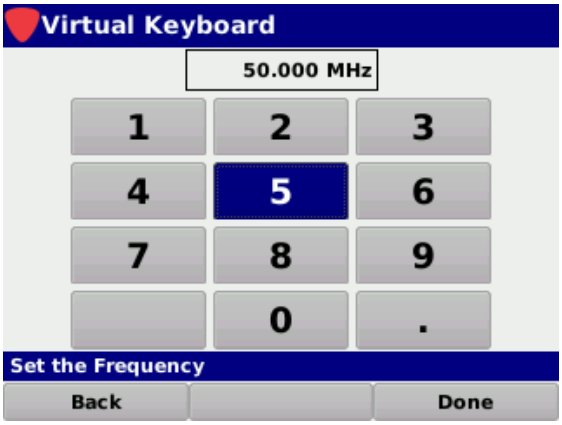


Center Frequency Adjustment

Highlight the center frequency field as shown in the image to the right and then use either of the following methods to change the center frequency:

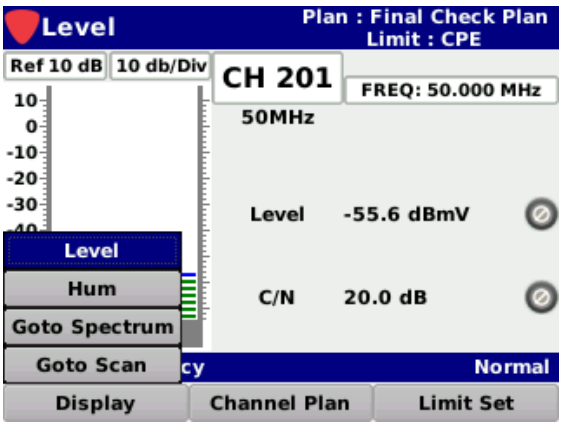
- Use the up/down arrow buttons to change the center frequency in 0.050 MHz increments.
- Press the **Ente**r button and use the **Virtual Keyboard** to directly enter the center frequency as shown in the image to the right.





Display Type Adjustment

Select the **Display** softkey to scroll through the following types measurement displays:

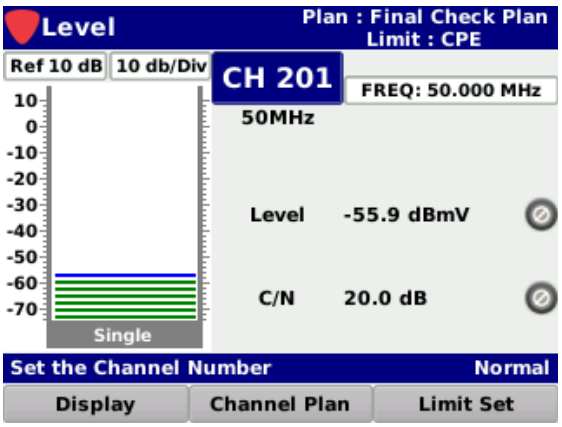


Bar Graph

Select the **Level** button from the **Display** pop-up menu to display a bar graph of the video and audio carrier levels of the analog video carrier.

The following measurement results are displayed with a pass/fail status for each measurement that is included in the open limit set:

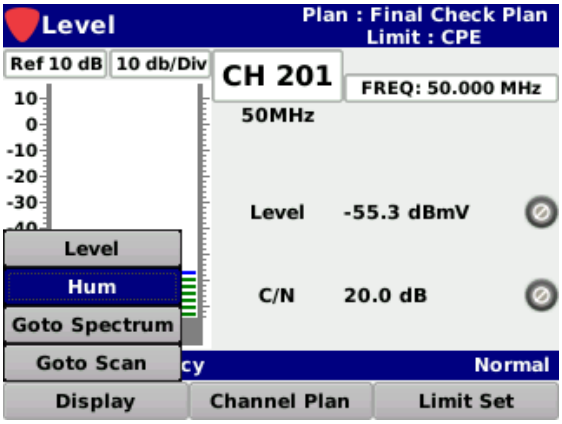
- Video level value with bar graph
- Audio level value with bar graph
- Video/Audio delta value
- C/N value



HUM (OPTIONAL)

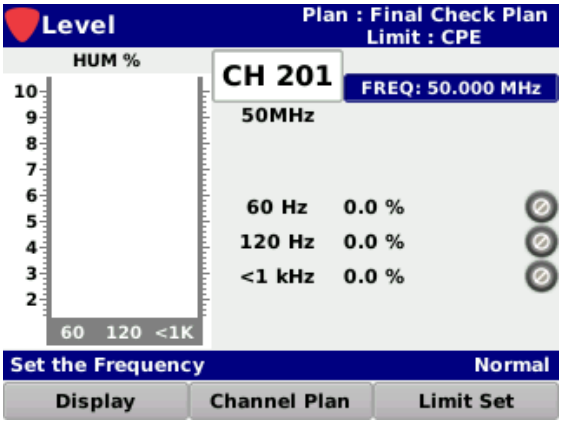
When activated in a 120 DSP, the HUM feature provides users with the ability to measure the amplitude of the 50/60 Hz, 100/120 Hz, and low frequency interference present on the video carrier of a single selected analog channel.

Select the **Hum** button from the **Display** pop-up menu to display a bar graph of the HUM levels of the analog channel.



The following measurement results are displayed with a pass/fail status for each measurement that is included in the open limit set:

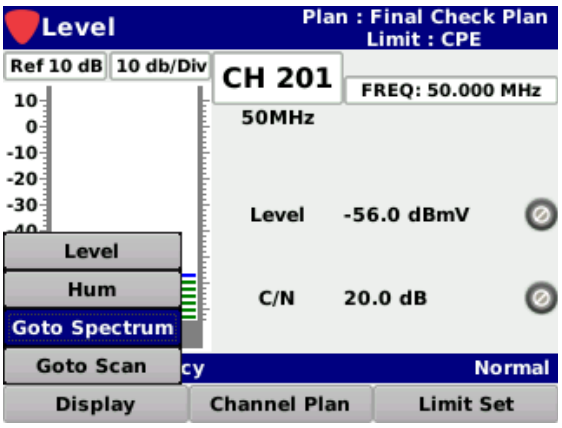
- 60 Hz level value with bar graph
- 120 Hz level value with bar graph
- < 1 kHz (low frequency) level value with bar graph



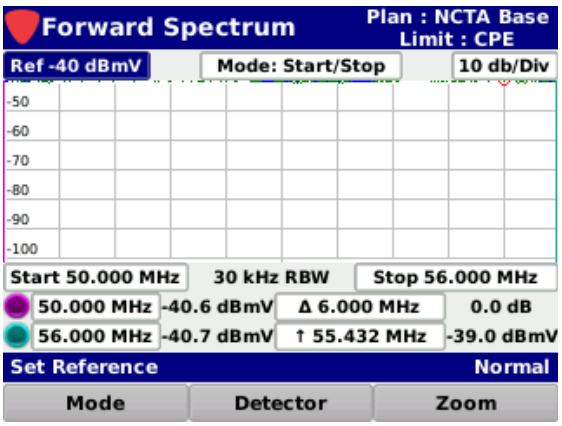
Go to Spectrum (OPTIONAL)

When the Forward Spectrum Analysis option is activated in a 120 DSP, the **Go to Spectrum** feature provides the ability to go to the Forward Spectrum display directly from the **Level** measurement screen.

Select the **Goto Spectrum** button from the **Display** pop-up menu to display the **Forward Spectrum** screen.



The **Forward Spectrum** screen provides the ability to view raw spectrum traces for the forward path from 50 to 1000 MHz with DSP spectrum snapshots to give a view of any downstream channels.



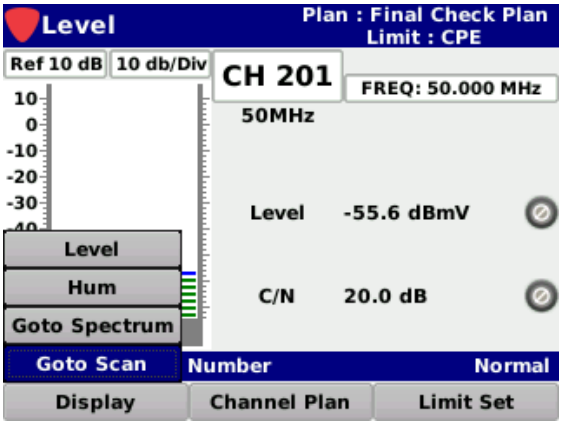
NOTE

For more information on Forward Spectrum, see Chapter 4: Spectrum Analysis, later in this section.

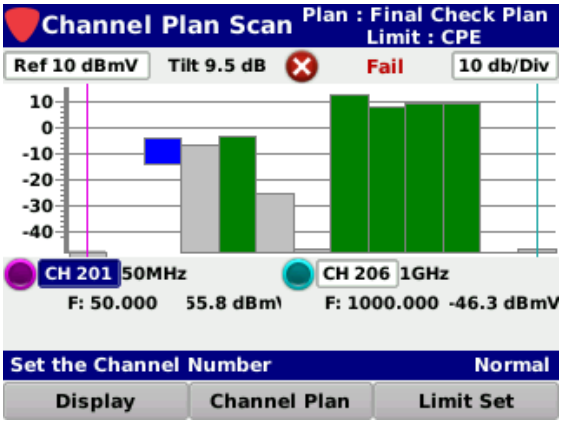
Go to Scan

The **Go to Scan** feature provides the ability to go to the Channel Plan Scan display directly from the **Level** measurement screen.

Select the **Goto Scan** button from the **Display** pop-up menu to display the **Channel Plan Scan** screen.



The **Channel Plan Scan** screen allows you to perform a scan of all of the channels in the current channel plan.

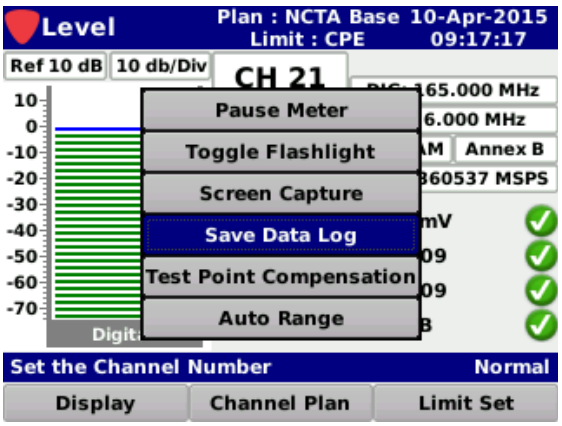


NOTE

For more information on Channel Plan Scan, see Chapter 3: Channel Plan Scan, later in this section.

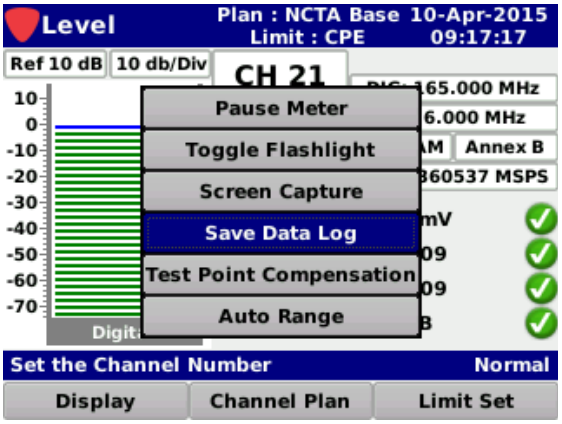
Function Menu Options

Additional functions can be accessed from within the **Level** screen by pressing the **Function** button. The **Function** menu will be displayed as shown in the image to the right and includes the following functions specifically for the **Level** screen.

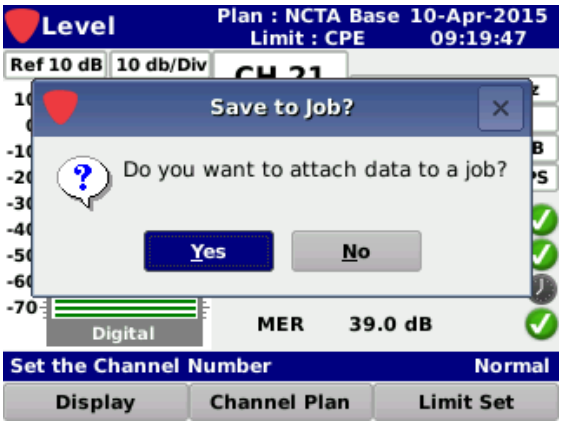


Save Data Log

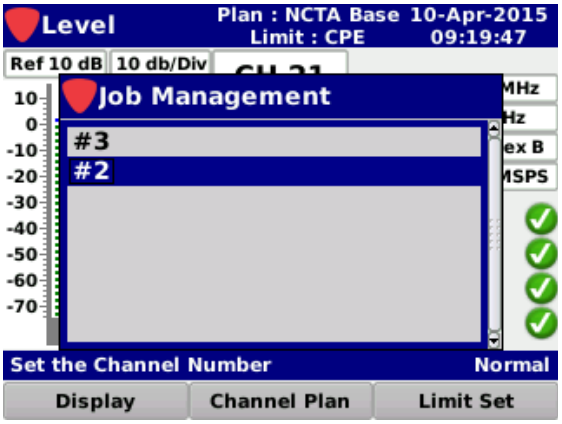
Select the **Save Data Log** button from the **Function** menu to save a copy of the measurement result data log.



If you have an open job, you can also save the test to the job by selecting **Yes.**



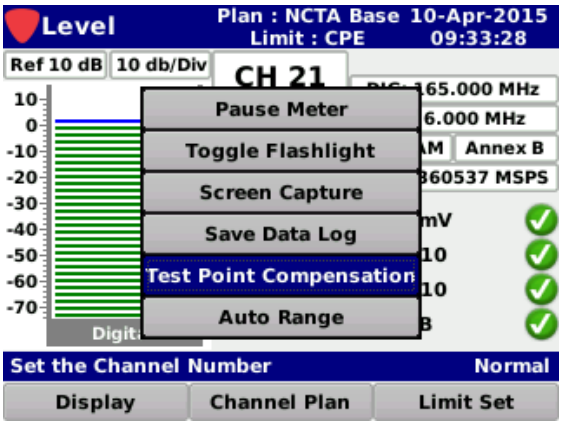
If you have multiple open jobs, the **Job Management** window will be displayed. Choose the job you would like to save the log to.



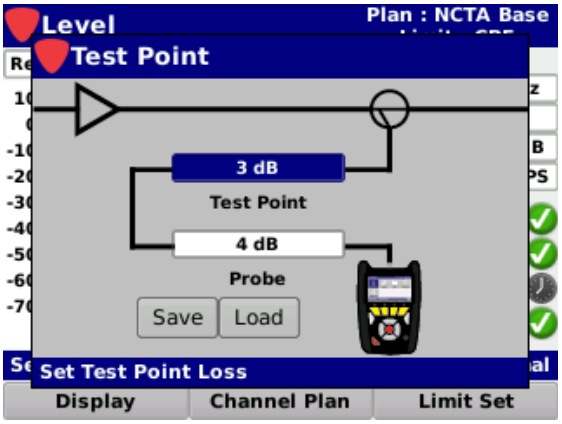
If you don't want to save the test to the open job, select **No** and you will be prompted to enter a file name using the **Virtual Keyboard**. It will then be saved to the internal memory of the 120 DSP.

Test Point Compensation

Select the **Test Point Compensation** button from the **Function** menu to enter test point loss measurements for both test point and probe loss.



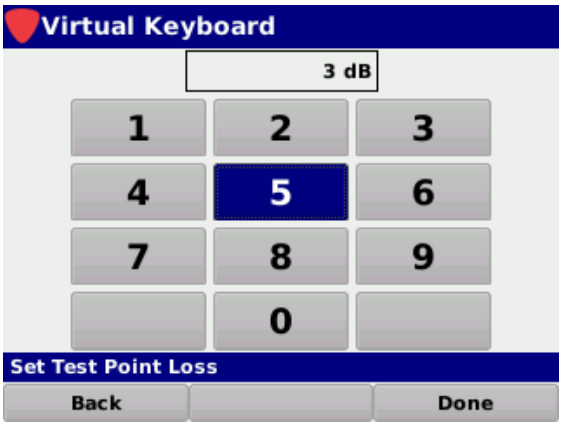
The **Test Point** screen will be displayed as shown in the image to the right.



Test Point Loss

Highlight the **Test Point** field and then use either of the following methods to change the loss value:

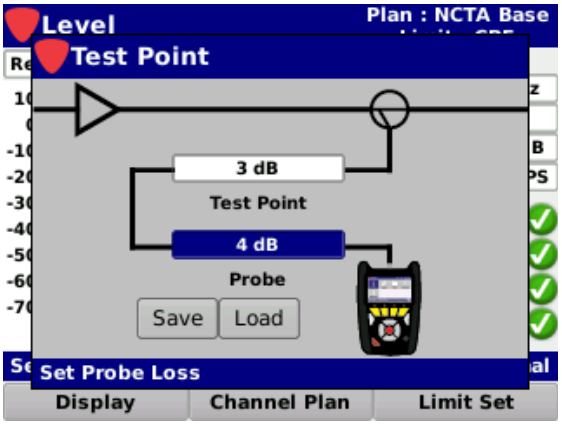
- Use the up/down arrow buttons to change the test point loss level in 1 dB increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the loss value as shown in the image to the right.



Probe Loss

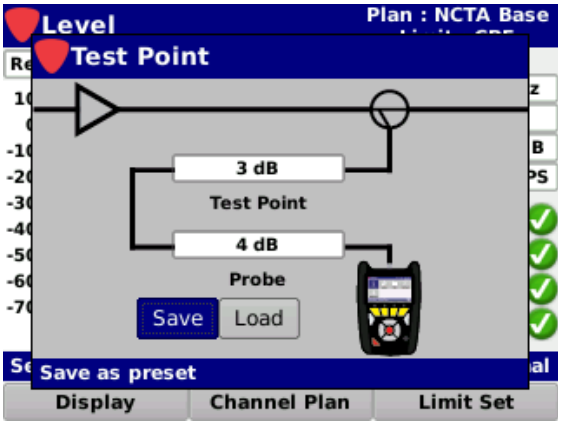
Highlight the **Probe** field and then use either of the following methods to change the loss value:

- Use the up/down arrow buttons to change the probe loss level in 1 dB increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the loss value as shown in the image to the right.



Save Preset

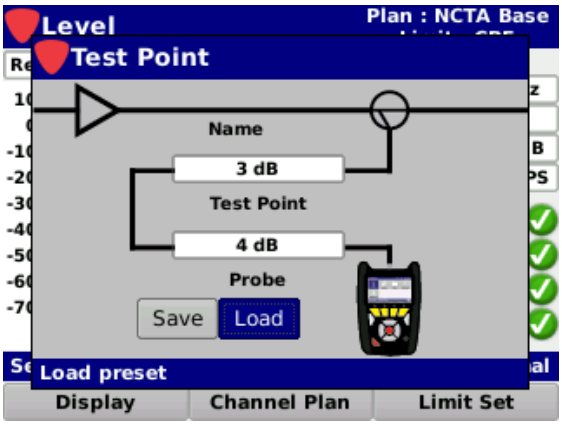
Select the **Save** button to save the test point values as a preset.



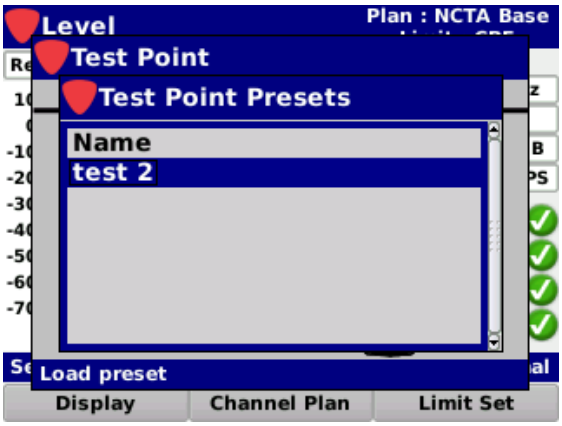
The **Virtual Keyboard** will be displayed as shown in the image to the right. Use the **Virtual Keyboard** to enter a name for the preset.

Load Preset

Select the **Load** button to load the test point values preset.

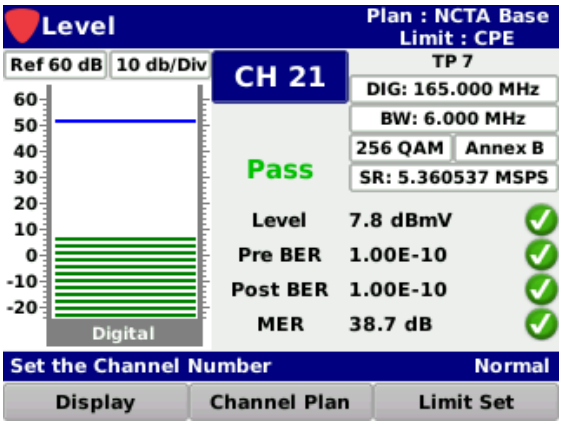


If you have multiple presets, the **Test Point Presets** window will be displayed. Choose the preset you would like to load.



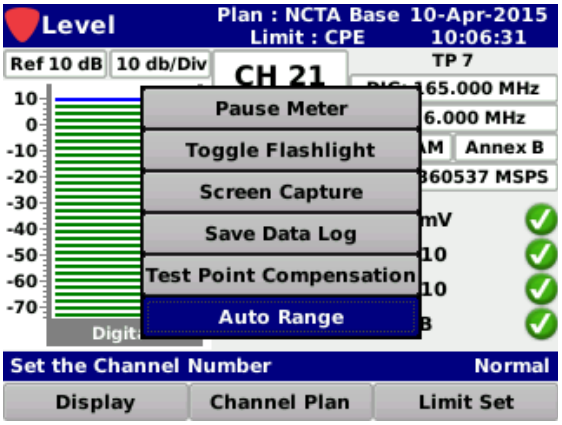
When finished entering the test point loss information, press the **Back** button to return to the **Level** screen.

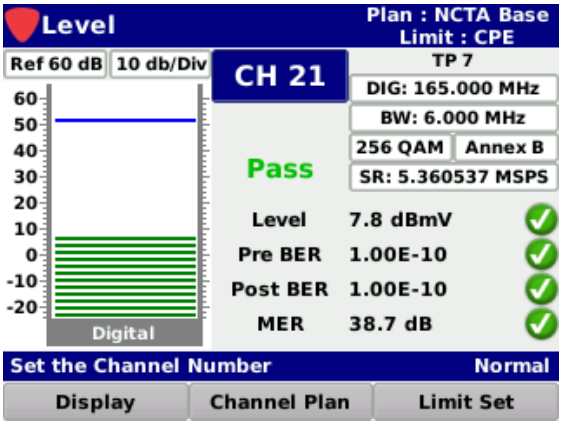
The total test point compensation value will be displayed to the right of the channel number, as shown in the image to the right.



Auto Range

Select the **Auto Range** button from the **Function** menu to quickly bring off-scale signals onscreen by automatically adjusting the reference level and vertical resolution.





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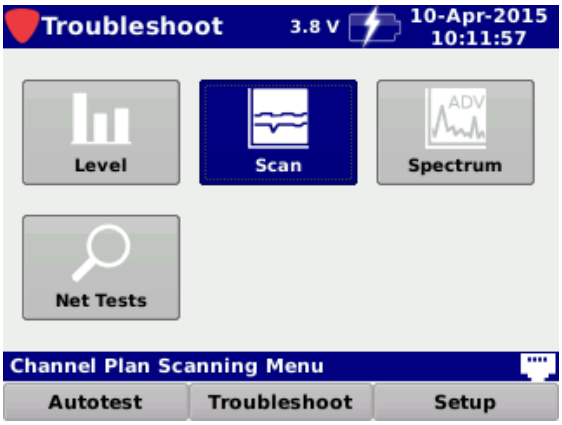
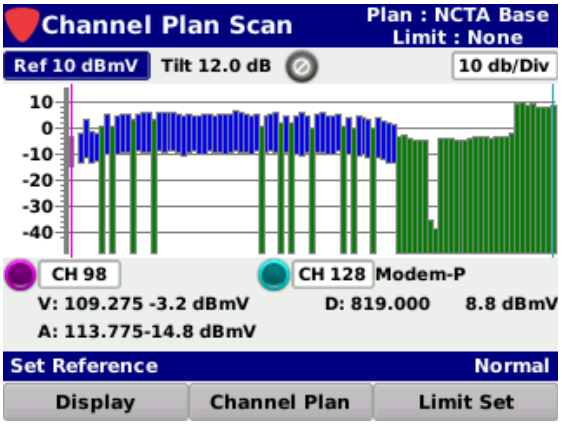
Channel Plan Scan

Overview

Select the **Scan** icon as shown in the image to the right to perform a channel plan scan on the 120 DSP.

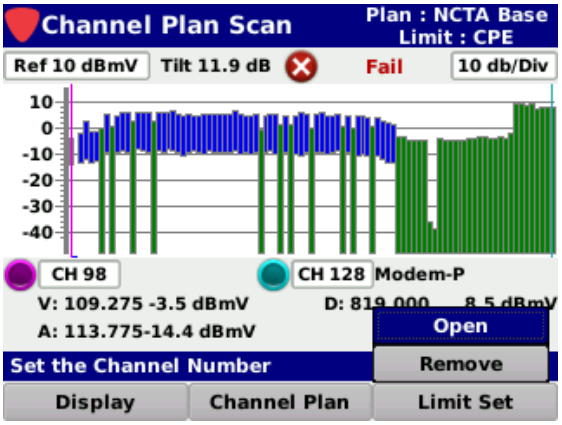


The **Channel Plan Scan** screen will be displayed as shown in the images to the right. This screen allows you to perform a scan of all of the channels in the current channel plan.



Opening a Channel Plan

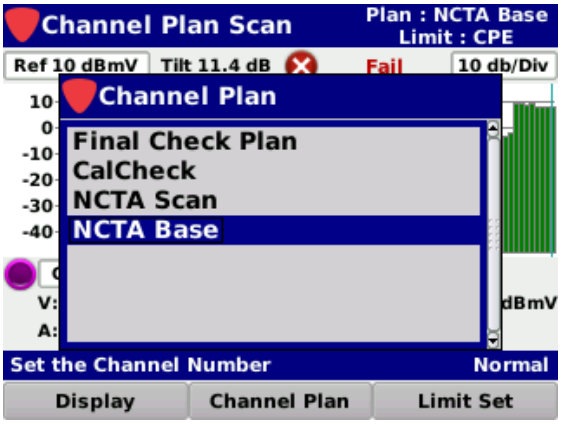
Select the **Channel Plan** softkey as shown in the image to the right to select the channel plan to use for the channel plan scan.



Select the **Open** button from the **Channel Plan** pop-up menu and the **Channel Plan** window will be displayed as shown in the image to the right.

From the **Channel Plan** window, select the name of the channel plan to use for the channel plan scan.

After selecting the channel plan, the **Channel Plan Scan** screen will be displayed again.

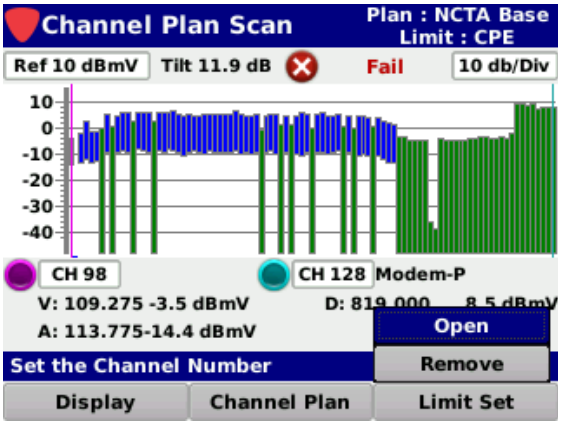


NOTE

The Channel Plan window will be bypassed if there is only one channel plan to choose from.

Opening a Limit Set

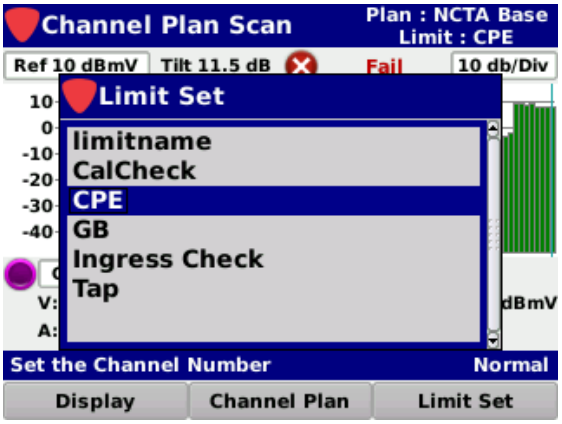
Select the **Limit Set** softkey as shown in the image to the right to select the limit set to use for the channel plan scan.



Select the **Open** button from the **Limit Set** pop-up menu and the **Limit Set** window will be displayed as shown in the image to the right.

From the **Limit Set** window, select the name of the limit set to use for the channel plan scan.

After selecting the limit set, the **Channel Plan Scan** screen will be displayed again.

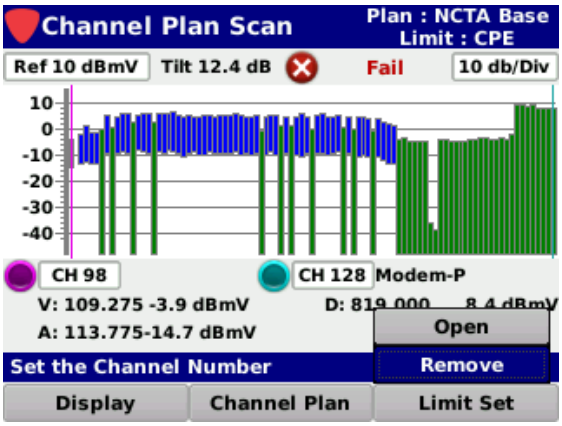


NOTE

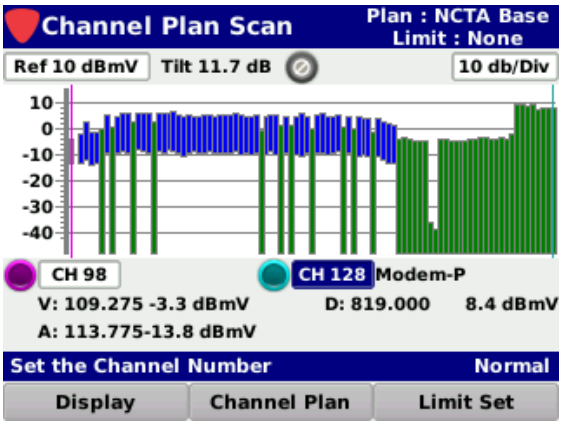
The Limit Set window will be bypassed if there is only one limit set to choose from.

Removing a Limit Set

Select the **Limit Set** softkey as shown in the image to the right to remove the limits set for the channel plan scan.



Select the **Remove** button from the **Limit Set** pop-up menu and the pass/fail results will no longer be displayed as shown in the image to the right.



Pass/Fail Measurement Indicators

When a limit set has been opened, each channel that is included in the channel plan will be tested against the selected limit set thresholds.

The Tilt measurement between the two user adjustable markers will be displayed along with the Pass/Fail status of the channel plan scan. When any of the individual measurement parameters of a channel plan scan fail, the channel plan scan as a whole will indicate a Fail status.

When the **Results** button is selected from the **Function** menu, the following results are displayed, each individual measurement parameter will indicate its status and uses the following icons:

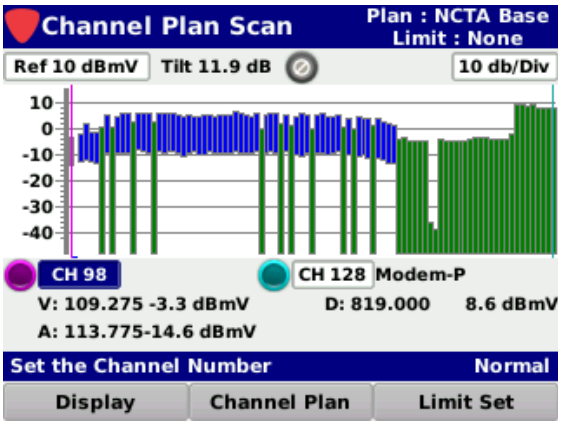
This icon indicates that this measurement was skipped. This only applies to measurements that have been removed from the currently selected limit set.

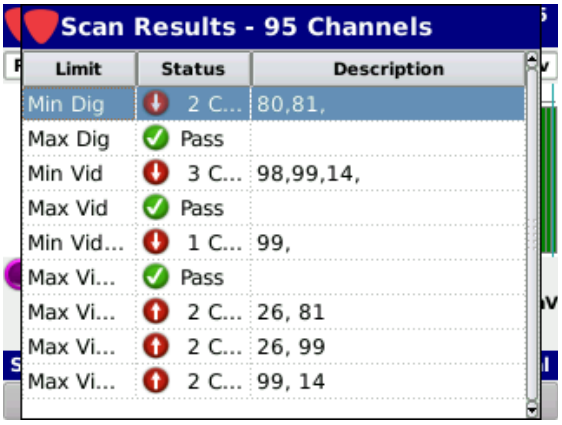
This icon indicates that this measurement is within the measurement thresholds of the currently selected limit set.

This icon indicates that the measurement limit set has failed.

This icon indicates that the measurement has failed the high limit measurement threshold.

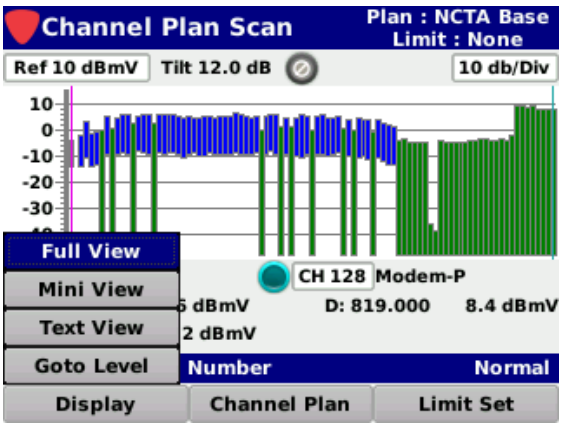
This icon indicates that the measurement has failed the low limit measurement threshold.





Display Type Adjustment

Select the **Display** softkey to scroll through the following types measurement displays:

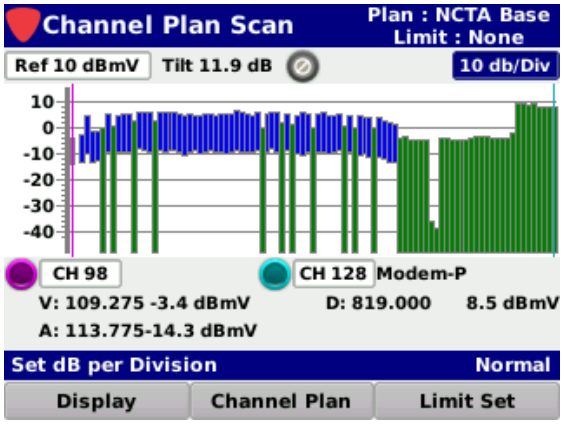


Measurement Results

The Tilt measurement results are displayed with a pass/fail status when Tilt limits are included in the open limit set.

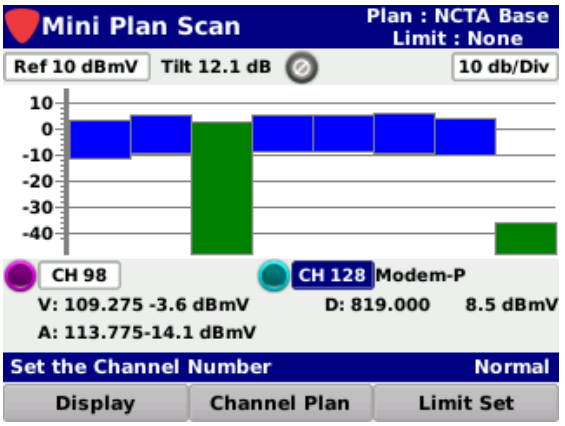
Full View

Select the **Full View** button from the **Display** pop-up menu to display the level of each channel in the channel plan scan. Analog channels are represented by a solid green bar, digital channels by a solid blue bar, and single carrier channel by a solid gray bar.



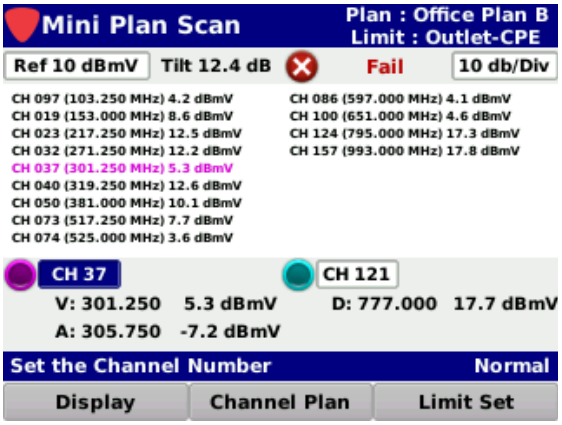
Mini View

Select the **Mini View** button from the **Display** pop-up menu to display the level of your favorites channels in the channel plan scan. Analog channels are represented by a solid blue bar, digital channels by a solid green bar, and single carrier channel by a solid gray bar.



Text View

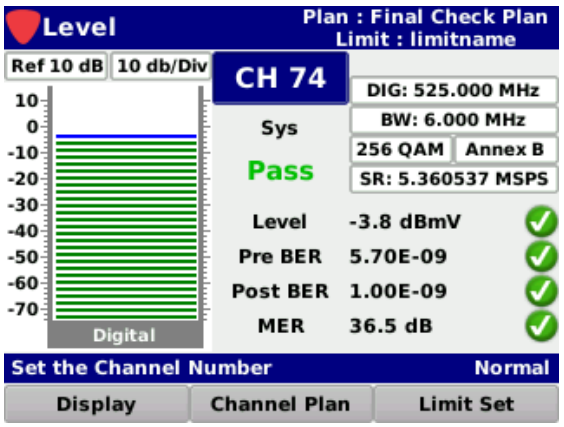
Select the **Text View** button from the **Display** pop-up menu to display a text list of your favorites channels in the channel plan scan.



Go to Level

The **Go to Level** feature provides the ability to go to the Level measurement display directly from the **Channel Plan Scan** screen.

Select the **Goto Level** button from the **Display** pop-up menu to display the **Level** screen. The **Level** screen allows you to perform various types of channel measurements.



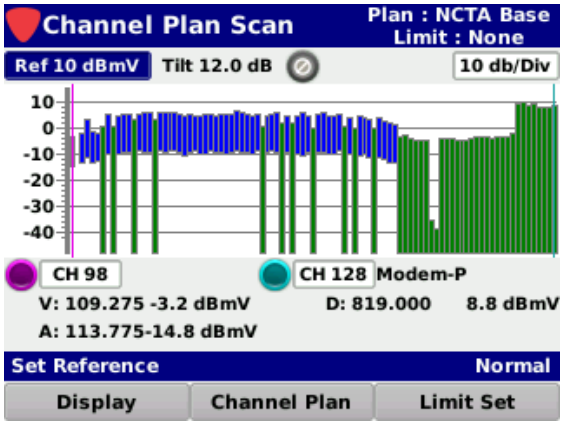
NOTE

For more information on Level measurement, see Chapter 2: Level Measurement, earlier in this section.

Reference Level Adjustment

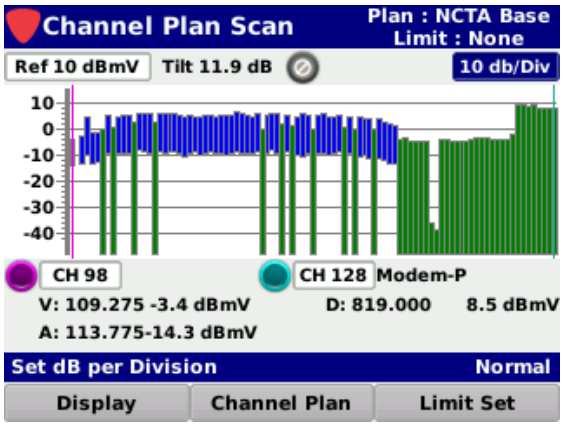
The reference level can be adjusted from -40 to 60 dBmV and is the highest value displayed on the bar graph. Highlight the reference level field as shown in the image to the right and then use either of the following methods to change the reference level:

- Use the up/down arrow buttons to change the reference level in 1 dBmV increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the reference level as shown in the image to the right.



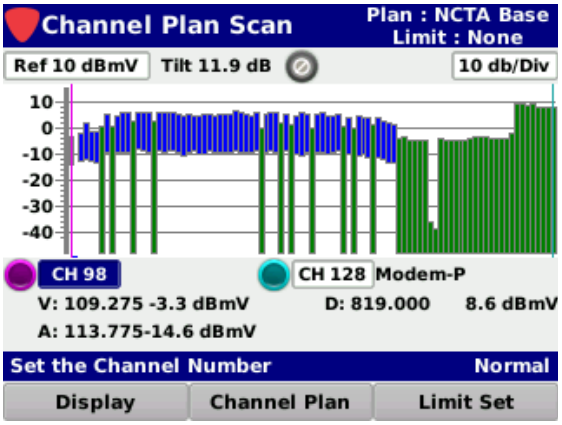
Vertical Scale Adjustment

Highlight the vertical scale field as shown in the image to the right. Then, use the up/down arrow buttons to select from a vertical scale of **1**, **2**, **5** or **10 dB/div**.



Tilt Measurement & Marker Adjustment

The **Channel Plan Scan** screen includes two on-screen markers that are used for measurement of Tilt in the channel plan. The Tilt between the two markers is displayed at the top middle of the screen as shown in the image to the right.

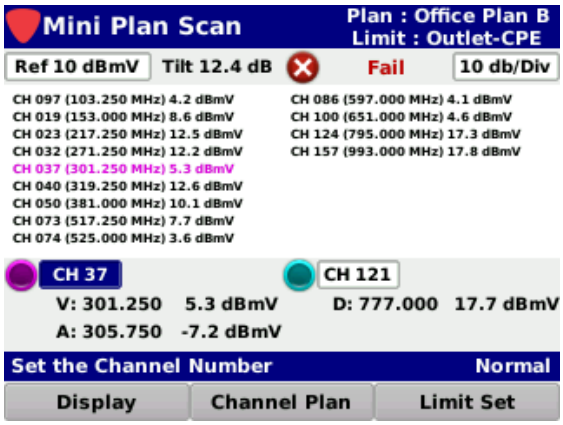


The markers are represented by the following color bullets, vertical lines, and text:

- **Marker 1** - Purple
- **Marker 2** - Light Blue

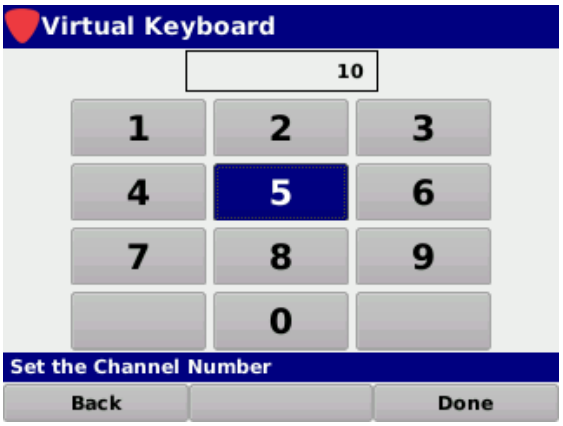
Highlight the desired marker and use either of the following methods to change the marker location:

- Use the up/down arrow buttons to change the marker in 1 channel increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the channel number as shown in the image below.



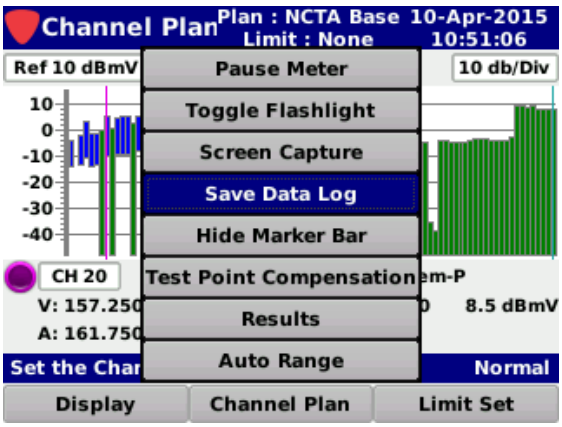
The following information is displayed for each channel type:

- **Analog** - Channel number/name, video/audio frequencies, and video/audio levels.
- **Digital** - Channel number/name, digital video frequency, and level.
- **Single Carrier** - Channel number/name, center frequency, and level.



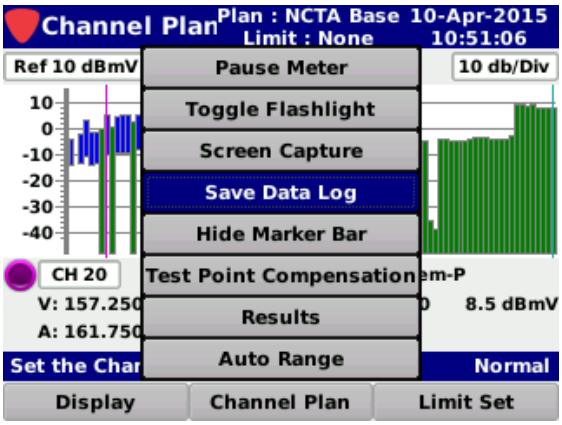
Function Menu Options

Additional functions can be accessed from within the **Channel Plan Scan** screen by pressing the **Function** button. The **Function** menu will be displayed as shown in the image to the right and includes the following functions specifically for the **Channel Plan Scan** screen.

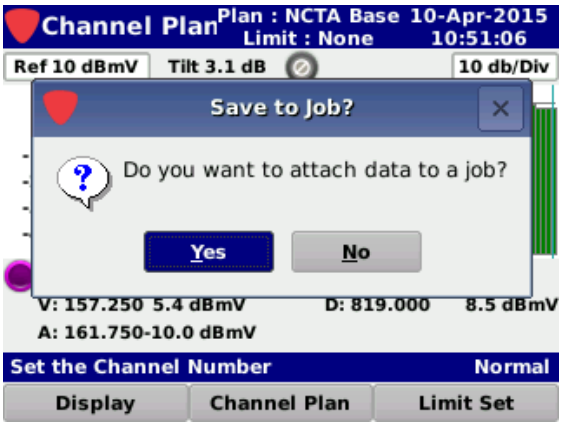


Save Data Log

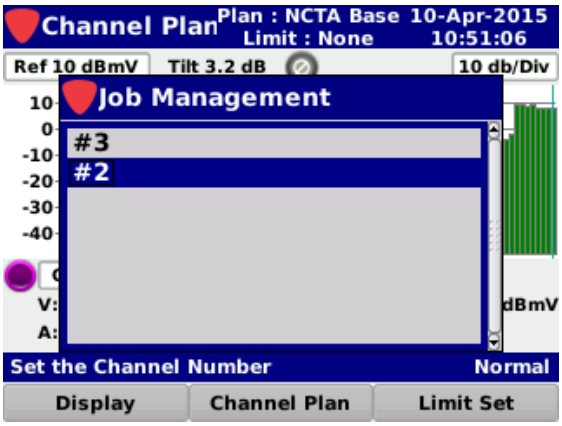
Select the **Save Data Log** button from the **Function** menu to save a copy of the measurement result data log.



If you have an open job, you can also save the test to the job by selecting **Yes.**



If you have multiple open jobs, the **Job Management** window will be displayed. Choose the job you would like to save the log to.

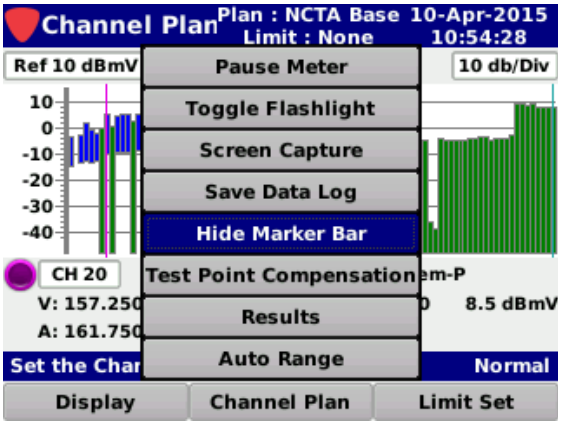


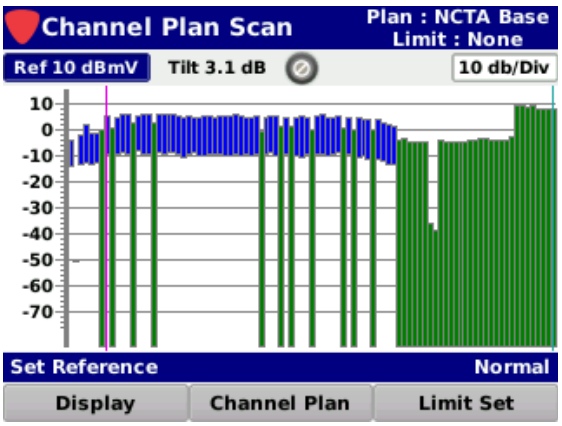
If you don't want to save the test to the open job, select **No** and you will be prompted to enter a file name using the **Virtual Keyboard**. It will then be saved to the internal memory of the 120 DSP.

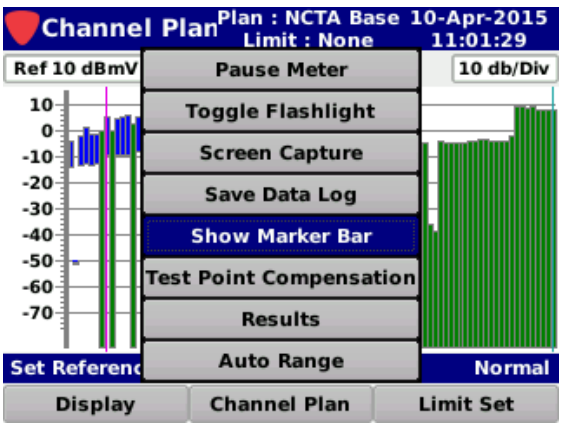
Hide Marker Bar

Select the **Hide Marker Bar** button from the **Function** menu to hide the marker bar at the bottom of the screen and expand the measurement viewing area.

When the marker bar is hidden, select the **Show Marker Bar** button from the **Function** menu to show the marker bar.

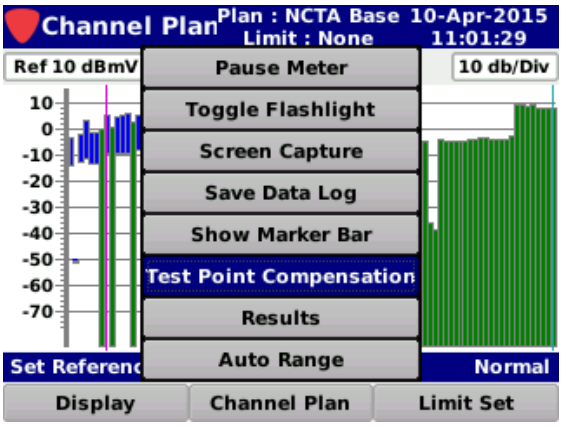




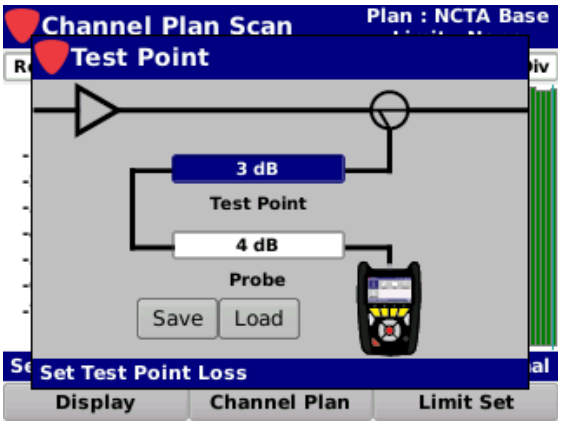


Test Point Compensation

Select the **Test Point Compensation** button from the **Function** menu to enter test point loss measurements for both test point and probe loss.



The **Test Point** screen will be displayed as shown in the image to the right.



Test Point Loss

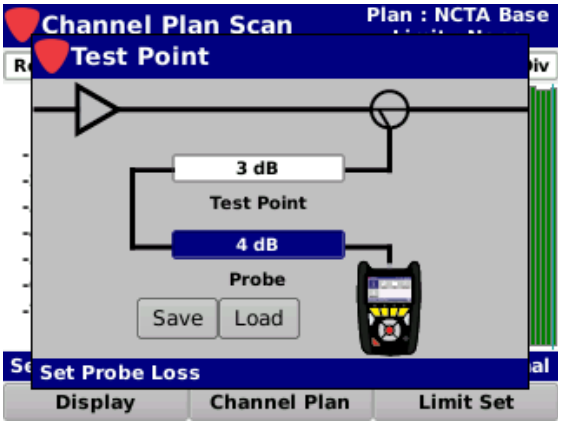
Highlight the **Test Point** field and then use either of the following methods to change the loss value:

- Use the up/down arrow buttons to change the test point loss level in 1 dB increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the loss value as shown in the image to the right.

Probe Loss

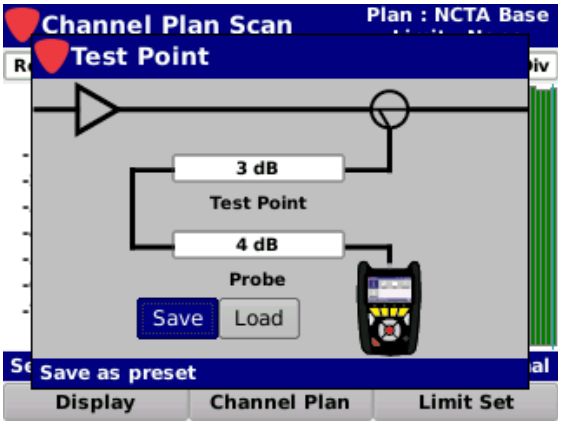
Highlight the **Probe** field and then use either of the following methods to change the loss value:

- Use the up/down arrow buttons to change the probe loss level in 1 dB increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the loss value as shown in the image to the right.



Save Preset

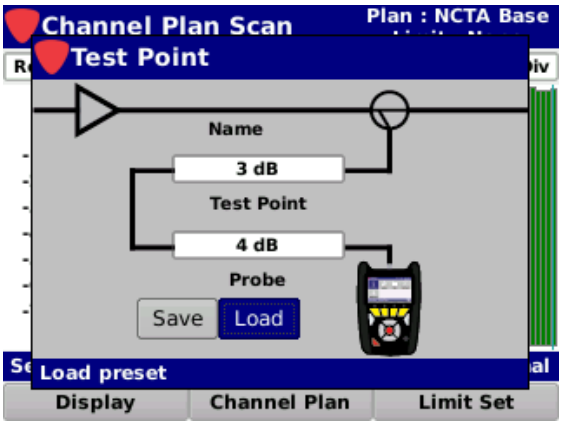
Select the **Save** button to save the test point values as a preset.



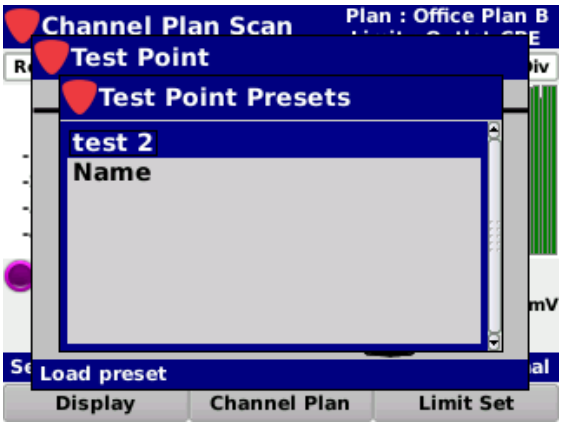
The **Virtual Keyboard** will be displayed as shown in the image to the right. Use the **Virtual Keyboard** to enter a name for the preset.

Load Preset

Select the **Load** button to load the test point values preset.

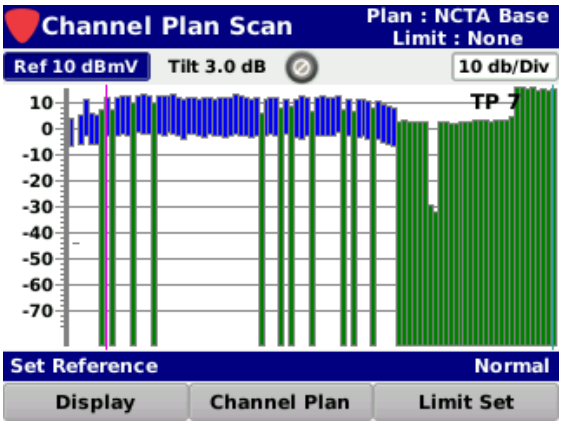


If you have multiple presets, the **Test Point Presets** window will be displayed. Choose the preset you would like to load.



When finished entering the test point loss information, press the **Back** button to return to the **Channel Plan Scan** screen.

The total test point compensation value will be displayed, as shown in the image to the right.

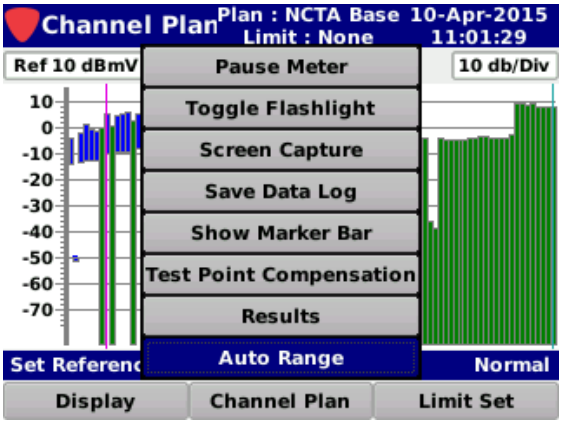


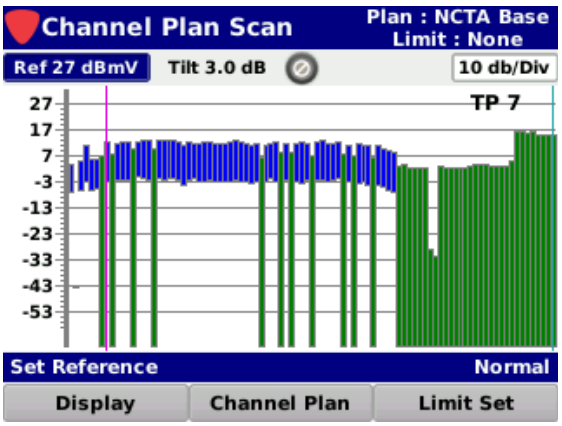
NOTE

The Results button in the Function menu was covered previously. For more information, see the Pass/Fail Measurement Indications section earlier in this chapter.

Auto Range

Select the **Auto Range** button from the **Function** menu to quickly bring off-scale signals onscreen by automatically adjusting the reference level and vertical resolution.





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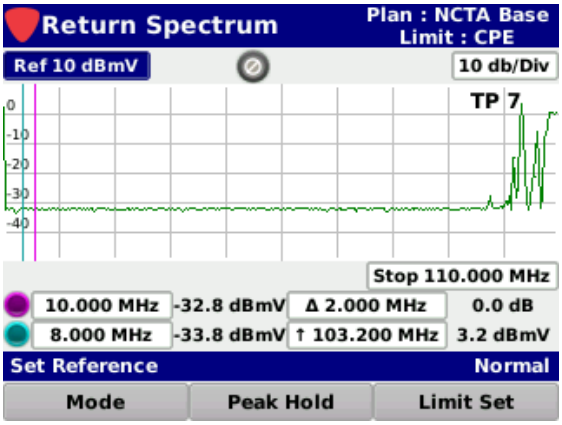
Available Options

The spectrum analysis options that are available for the 120 DSP are shown in the following sections. To view the installed functions on your instrument, see **Section II: Setup Menu, Chapter 2: Instrument Information**.

Return Spectrum Analysis

When the Icon shown to the left is displayed on the **Troubleshoot** menu, your 120 DSP is equipped for Return Spectrum Analysis.

The standard configuration for spectrum analysis on the 120 DSP provides users with the ability to view raw return spectrum traces from 4 to 110 MHz with DSP spectrum snapshots to give the user a view of any upstream channels.

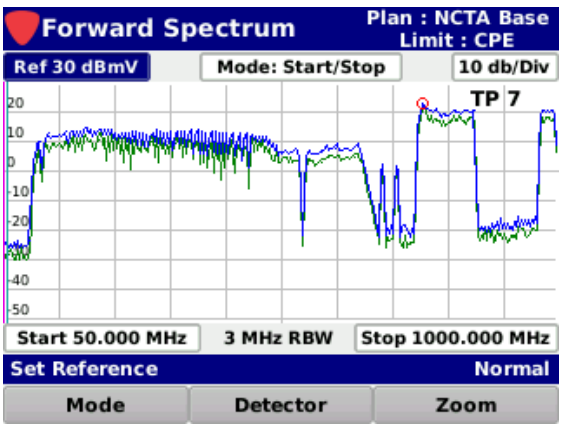


Advanced Spectrum Analysis (OPTIONAL)

Forward Spectrum Analysis is an optional advanced feature on the 120 DSP. When the Icon shown to the left is displayed on the **Troubleshoot** menu, your 120 DSP is equipped for both Forward and Return Spectrum Analysis.

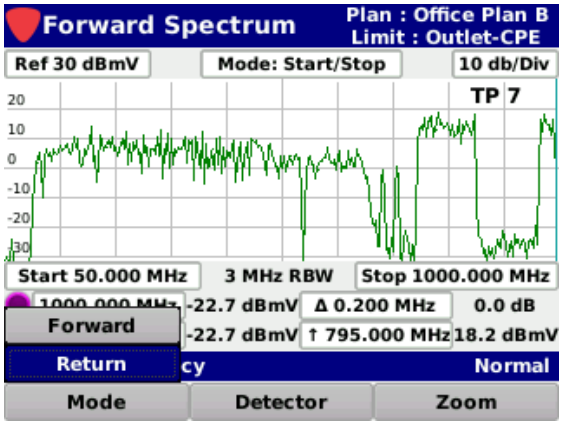
When activated in a 120 DSP, this feature provides users with the added ability to view raw spectrum traces for the forward (50 to 1000 MHz) path with DSP spectrum snapshots to give the user a view of any upstream or downstream channels.

If you do not have the Forward Spectrum Analysis (FSA) option, call Trilithic at (800) 344-2412 in order to purchase an option activation code and start using this option today.

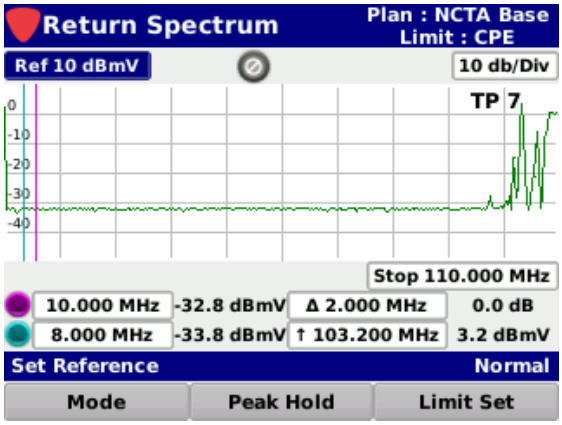


Return Spectrum Measurement

Select the **Mode** softkey and choose **Return** as shown in the image to the right.

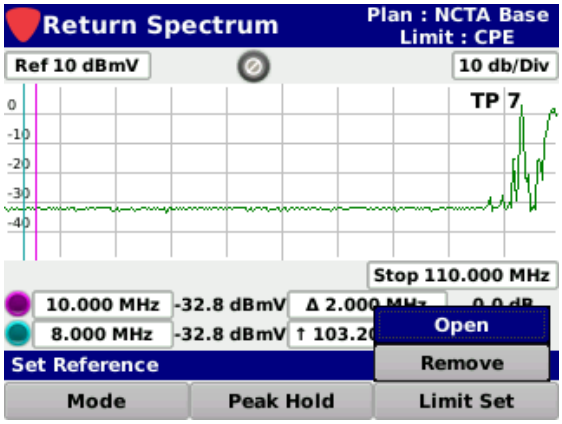


The **Return Spectrum** screen provide users with the ability to view raw spectrum traces for the forward path from 4 to 110 MHz with DSP spectrum snapshots to give the user a view of any upstream channels.



Opening a Limit Set

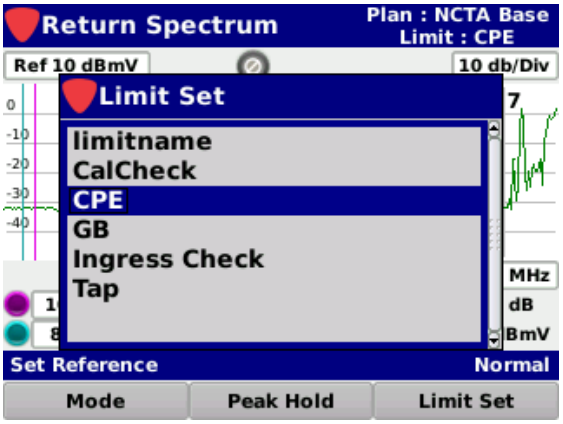
Select the **Limit Set** softkey as shown in the image to the right to select the limit set to use for the return spectrum measurement.



Select the **Open** button from the **Limit Set** pop-up menu and the **Limit Set** window will be displayed as shown in the image to the right.

From the **Limit Set** window, select the name of the limit set to use for the return spectrum measurement.

After selecting the limit set, the **Return Spectrum** screen will be displayed again.

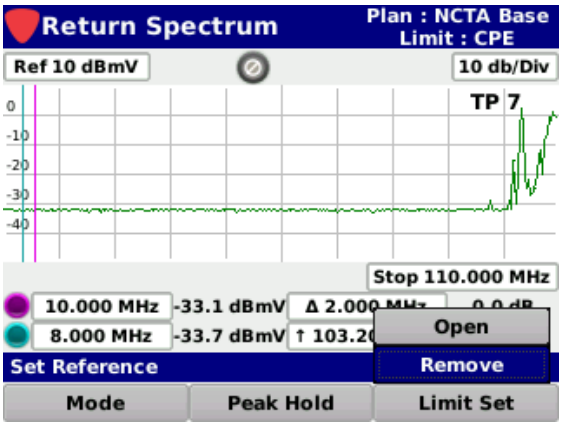


NOTE

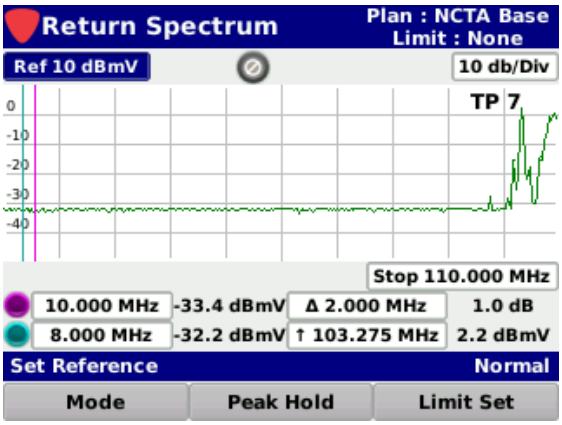
The Limit Set window will be bypassed if there is only one limit set to choose from.

Removing a Limit Set

Select the **Limit Set** softkey as shown in the image to the right to remove limits sets for the return spectrum measurement.



Select the **Remove** button from the **Limit Set** pop-up menu and the pass/fail results will no longer be displayed as shown in the image to the right.



Pass/Fail Measurement Indicators

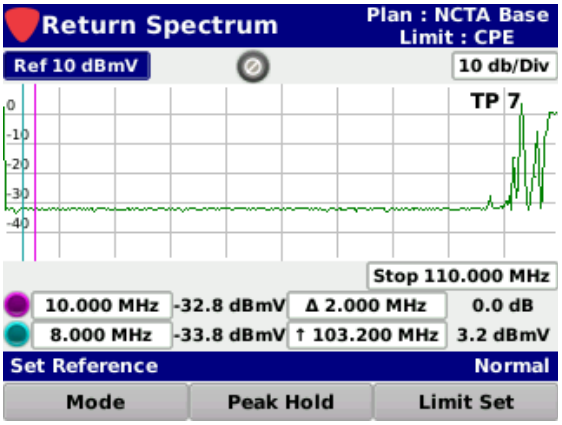
When a limit set has been opened, the return spectrum will be tested against the high limit measurement threshold for the return spectrum ingress.

A Pass/Fail status will be displayed at the top of the screen. The pass/fail status of the return spectrum ingress will be indicated using the following icons:

This icon indicates that this measurement was skipped. This only applies to measurements that have been removed from the currently selected limit set.

This icon indicates that this measurement is within the high limit measurement thresholds for the return spectrum **Ingress** measurement.

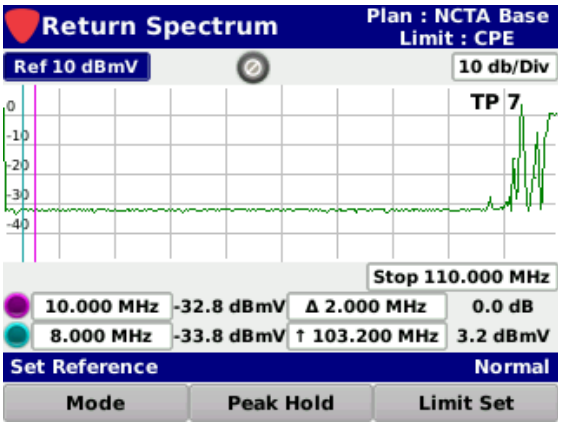
This icon indicates that the measurement has failed the high limit measurement threshold for the return spectrum **Ingress** measurement.

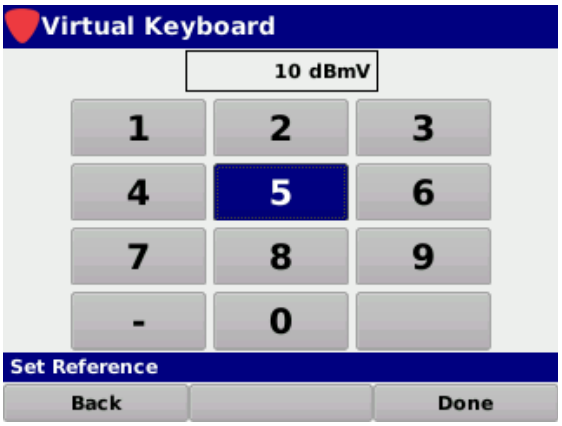


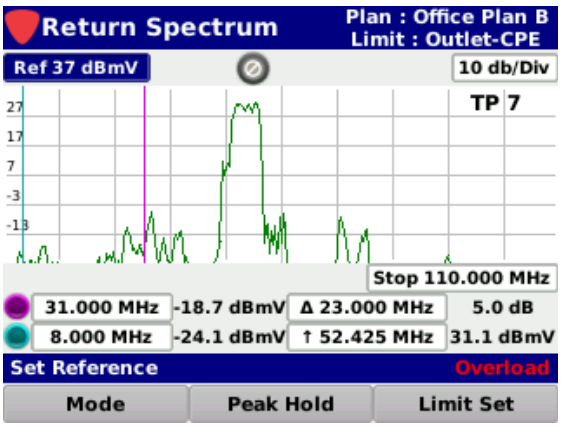
Reference Level Adjustment

The reference level can be adjusted from -40 to 60 dBmV and is the highest value displayed on the spectrum display. Highlight the reference level field as shown in the image to the right and then use either of the following methods to change the reference level:

- Use the up/down arrow buttons to change the reference level in 1 dBmV increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the reference level as shown in the image to the right.





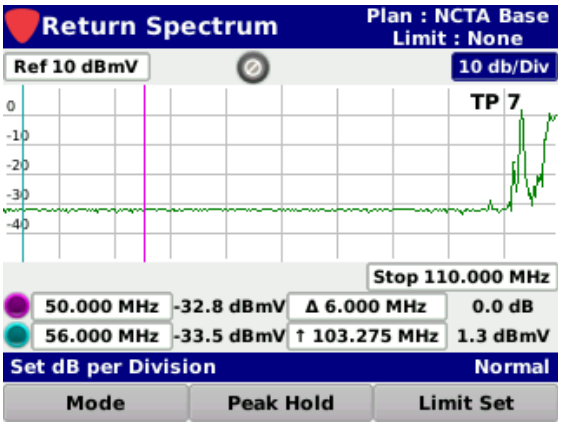


NOTE

If the red "Overload" message appears as shown in the image above, set your reference level higher. It's too low.

Vertical Scale Adjustment

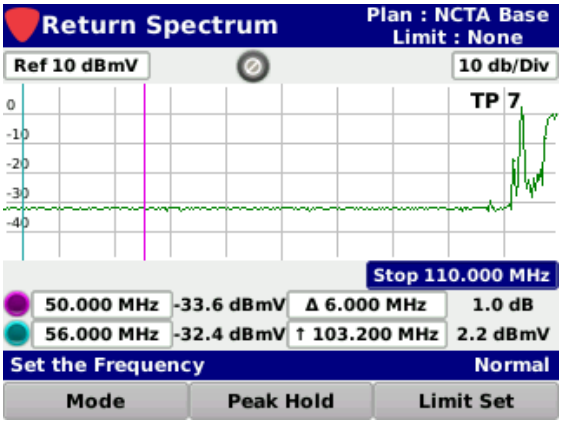
Highlight the vertical scale field as shown in the image to the right. Then, use the up/down arrow buttons to select from a vertical scale of **1**, **2**, **5** or **10 dB/div**.



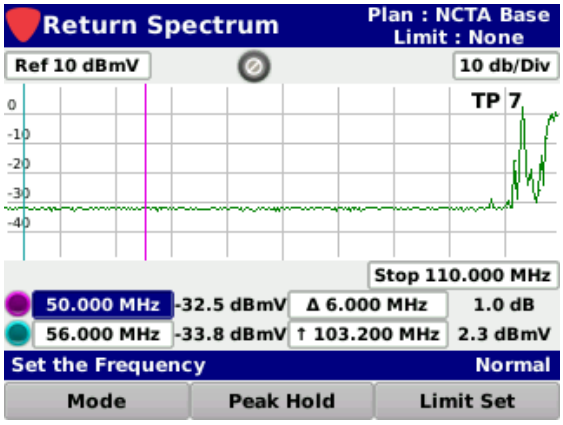
Stop Frequency Adjustment

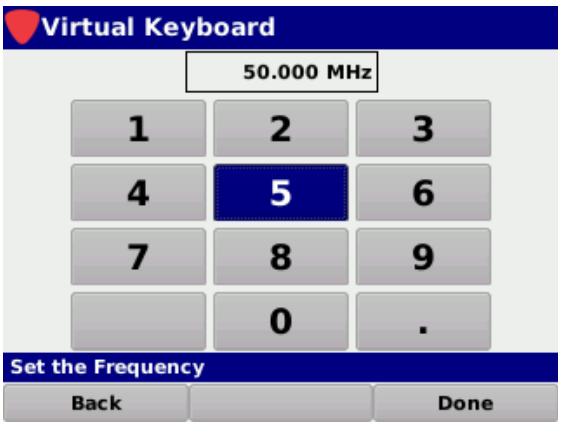
Highlight the stop frequency field as shown in the image to the right and then use either of the following methods to change the stop frequency:

- Use the up/down arrow buttons to select from a stop frequency of **42**, **65**, **85** or **110 MHz**.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the stop frequency as shown in the image to the right.



Marker Adjustment





The Return Spectrum measurement includes two on-screen markers that are used for measurement of specific frequencies within the return spectrum.

The markers are represented by the following color bullets and vertical lines:

- **Marker 1** - Purple
- **Marker 2** - Light Blue

Highlight the desired marker and use either of the following methods to change the marker location:

- Use the up/down arrow buttons to change the marker in 0.200 MHz increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the frequency as shown in the image below.

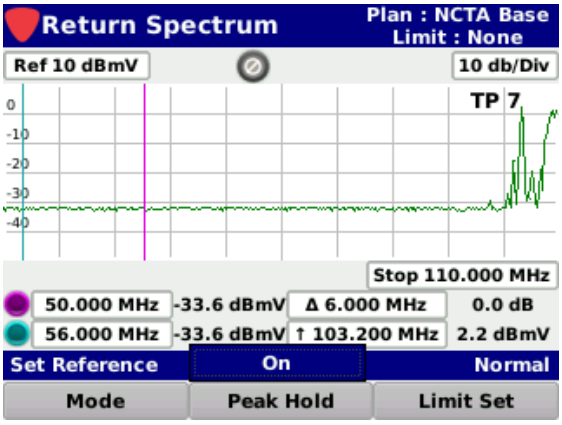
The following information is displayed for the markers:

- **Level** - Displays the signal level at the specified frequency for each marker.
- **Frequency Delta** - Displays the frequency delta between the two markers.
- **Frequency Peak** - Displays the frequency of the peak signal level in the return spectrum.
- **Level Peak** - Displays the peak signal level in the return spectrum.
- **Level Delta** - Displays the signal level difference between the minimum and maximum level values in the return spectrum.

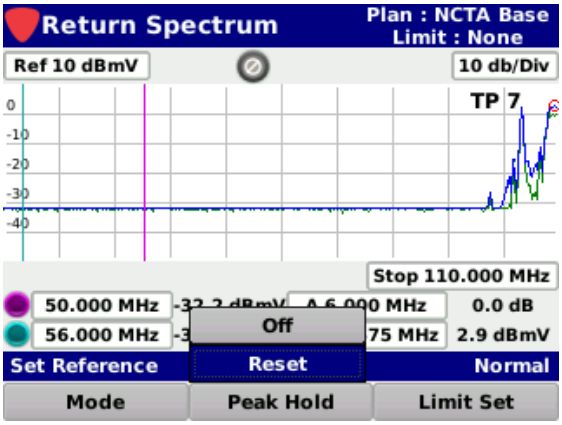
Peak Hold

Select the **Peak Hold** softkey as shown in the image to the right to enable peak hold for the return spectrum measurement.

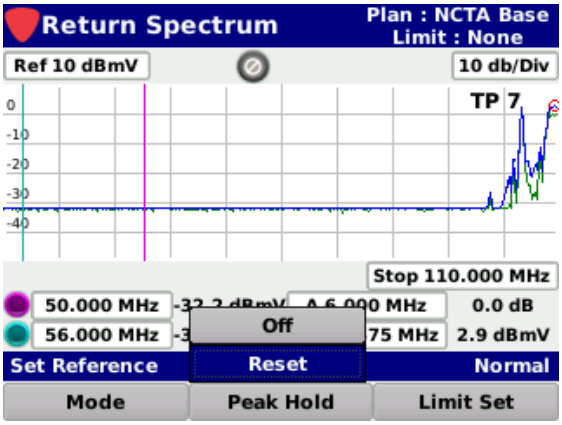
Select the **On** button from the **Peak Hold** pop-up menu and the blue peak hold trace will start to appear on the screen over the green live trace.



To reset the peak hold trace, select the **Peak Hold** softkey again and then select the **Reset** button from the **Peak Hold** pop-up menu. The blue peak hold trace will momentarily disappear and then start again.

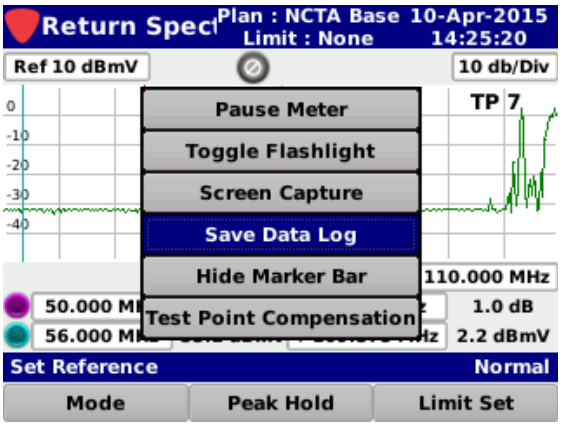


To turn of the peak hold trace, select the **Peak Hold** softkey again and then select the **Off** button from the **Peak Hold** pop-up menu. The blue peak hold trace will no longer be displayed.



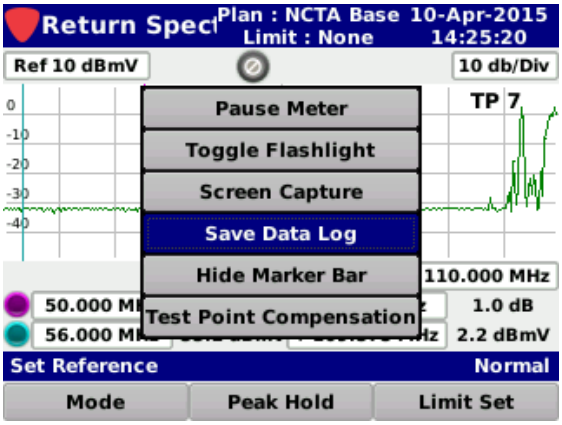
Function Menu Options

Additional functions can be accessed from within the **Return Spectrum** screen by pressing the **Function** button. The **Function** menu will be displayed as shown in the image to the right and includes the following functions specifically for the **Return Spectrum** screen.

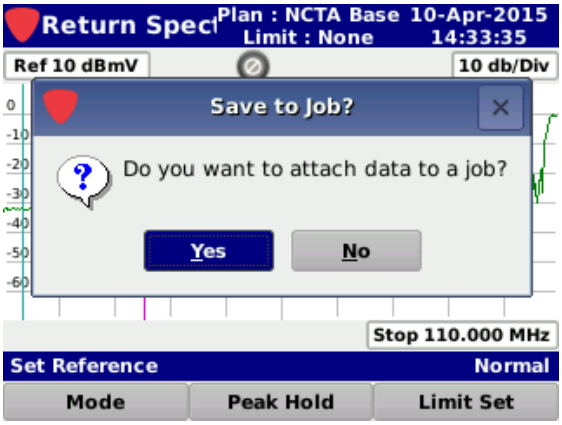


Save Data Log

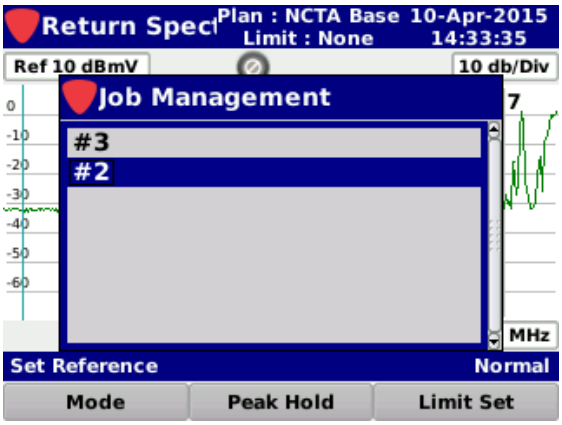
Select the **Save Data Log** button from the **Function** menu to save a copy of the measurement result data log.



If you have an open job, you can also save the test to the job by selecting **Yes.**



If you have multiple open jobs, the **Job Management** window will be displayed. Choose the job you would like to save the log to.

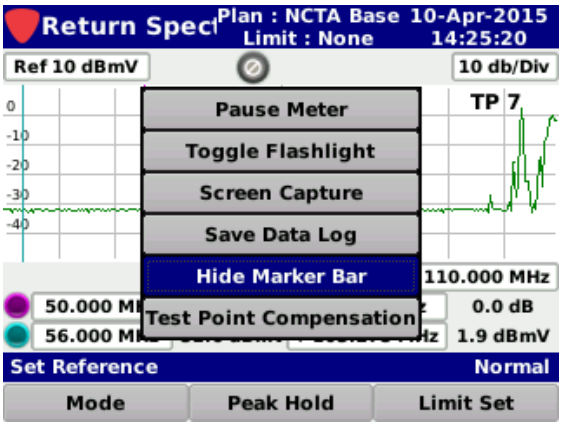


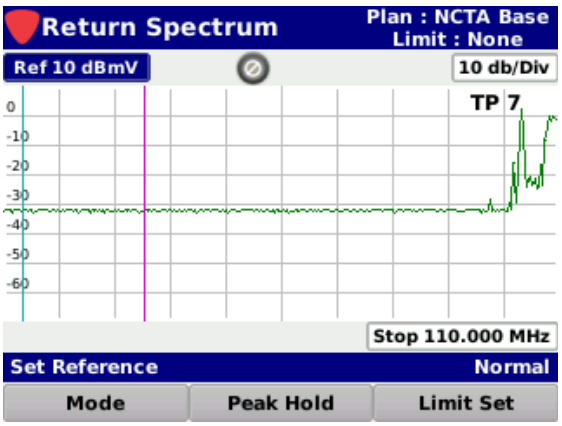
If you don't want to save the test to the open job, select **No** and you will be prompted to enter a file name using the **Virtual Keyboard**. It will then be saved to the internal memory of the 120 DSP.

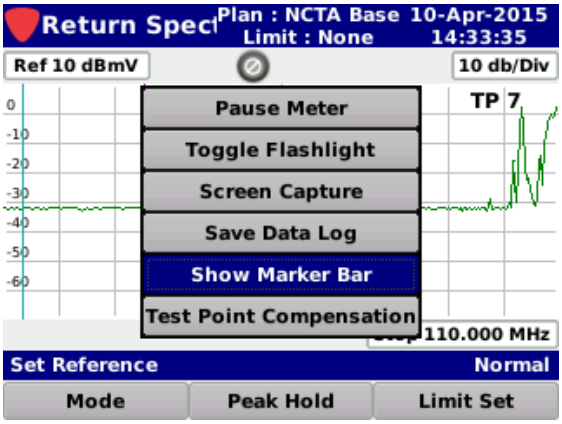
Hide Marker Bar

Select the **Hide Marker Bar** button from the **Function** menu to hide the marker bar at the bottom of the screen and expand the measurement viewing area.

When the marker bar is hidden, select the **Show Marker Bar** button from the **Function** menu to show the marker bar.

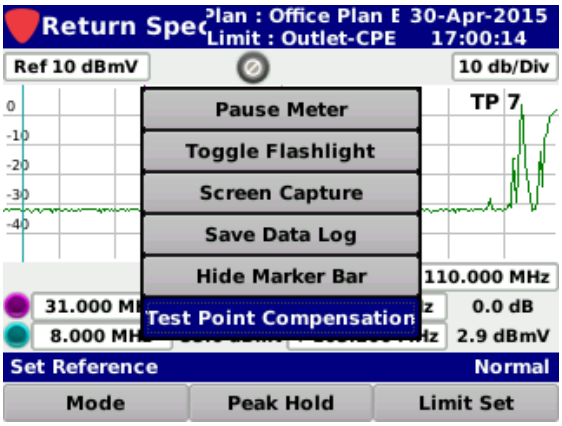




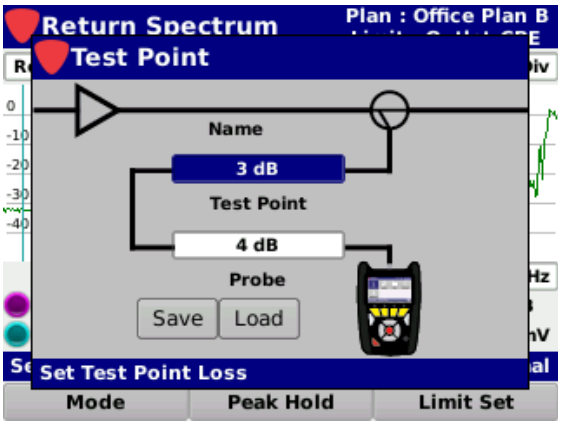


Test Point Compensation

Select the **Test Point Compensation** button from the **Function** menu to enter test point loss measurements for both test point and probe loss.



The **Test Point** screen will be displayed as shown in the image to the right.



Test Point Loss

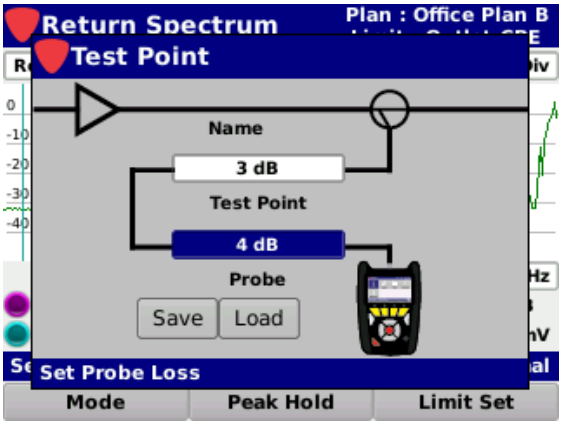
Highlight the **Test Point** field and then use either of the following methods to change the loss value:

- Use the up/down arrow buttons to change the test point loss level in 1 dB increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the loss value as shown in the image to the right.

Probe Loss

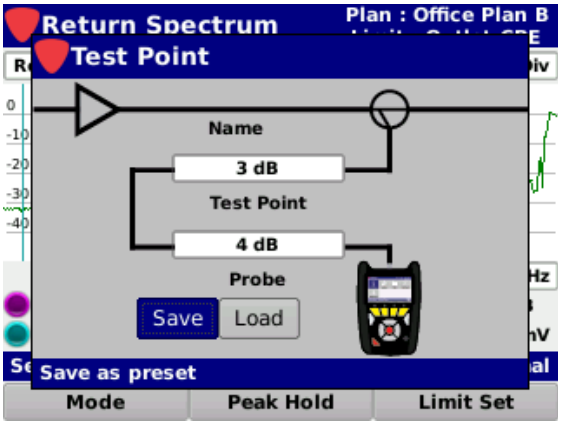
Highlight the **Probe** field and then use either of the following methods to change the loss value:

- Use the up/down arrow buttons to change the probe loss level in 1 dB increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the loss value as shown in the image to the right.



Save Preset

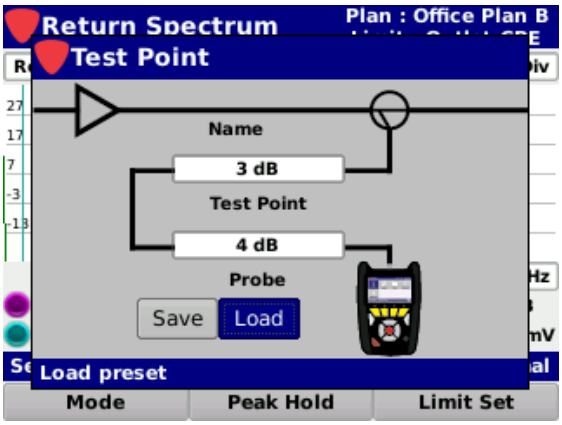
Select the **Save** button to save the test point values as a preset.



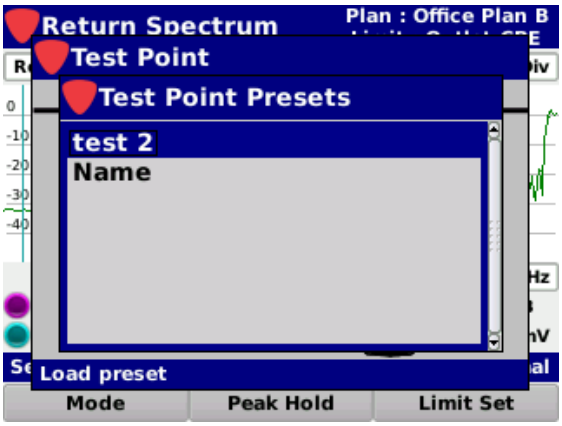
The **Virtual Keyboard** will be displayed as shown in the image to the right. Use the **Virtual Keyboard** to enter a name for the preset.

Load Preset

Select the **Load** button to load the test point values preset.

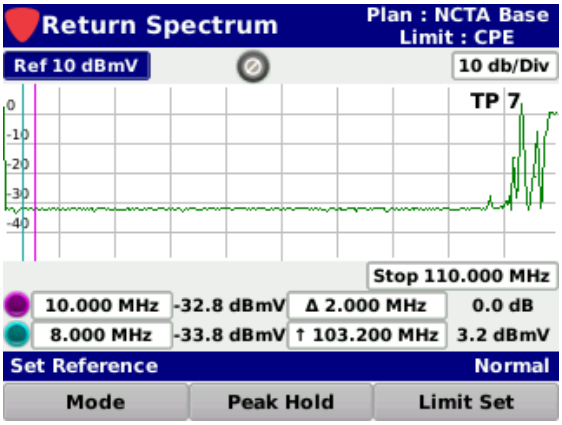


If you have multiple presets, the **Test Point Presets** window will be displayed. Choose the preset you would like to load.



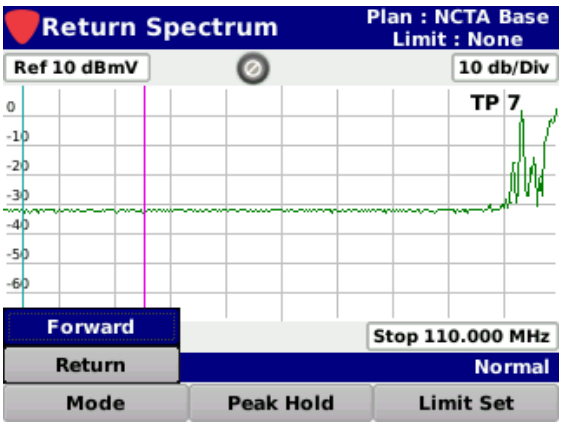
When finished entering the test point loss information, press the **Back** button to return to the **Return Spectrum** screen.

The total test point compensation value will be displayed, as shown in the image to the right.

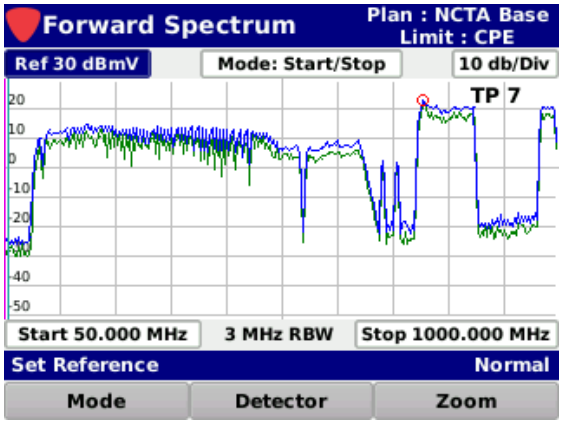


Forward Spectrum Measurement (OPTIONAL)

Select the **Mode** softkey and choose **Forward** as shown in the image to the right.



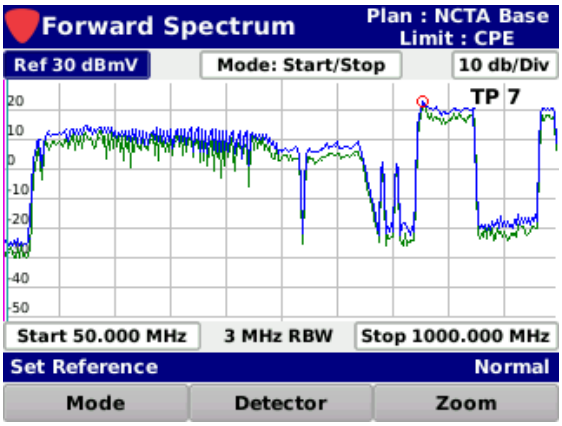
The **Forward Spectrum** screen provides users with the ability to view raw spectrum traces for the forward path from 50 to 1000 MHz with DSP spectrum snapshots to give the user a view of any downstream channels.

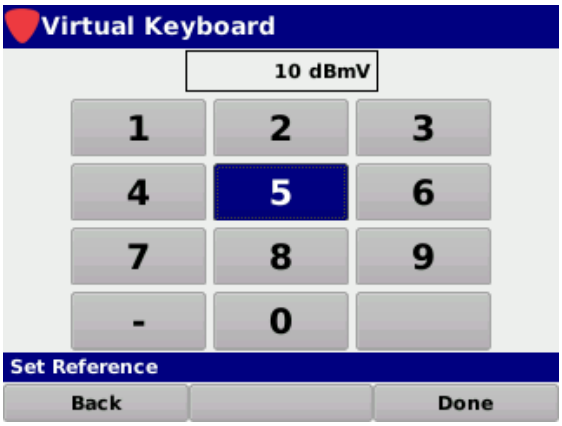


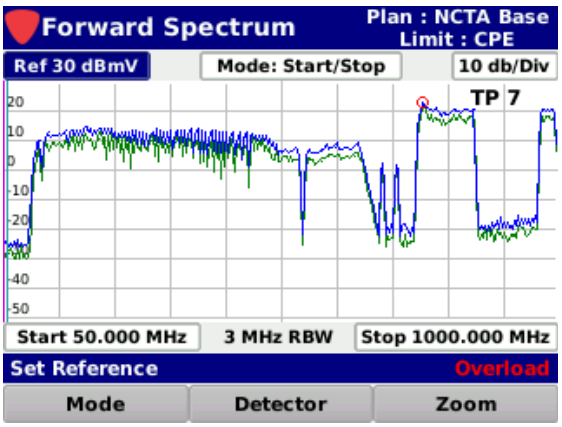
Reference Level Adjustment

The reference level can be adjusted from -40 to 60 dBmV and is the highest value displayed on the spectrum display. Highlight the reference level field as shown in the image to the right and then use either of the following methods to change the reference level:

- Use the up/down arrow buttons to change the reference level in 1 dBmV increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the reference level as shown in the image to the right.





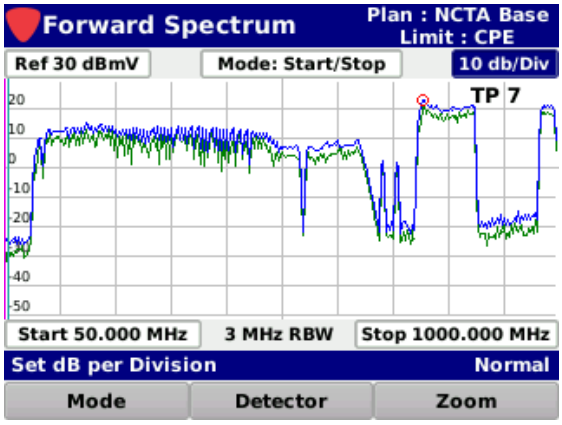


NOTE

If the red "Overload" message appears as shown in the image above, set your reference level higher. It's too low.

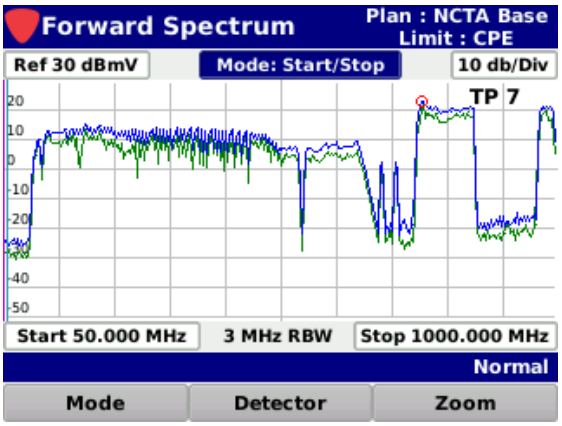
Vertical Scale Adjustment

Highlight the vertical scale field as shown in the image to the right. Then, use the up/down arrow buttons to select from a vertical scale of **1**, **2**, **5** or **10 dB/div**.



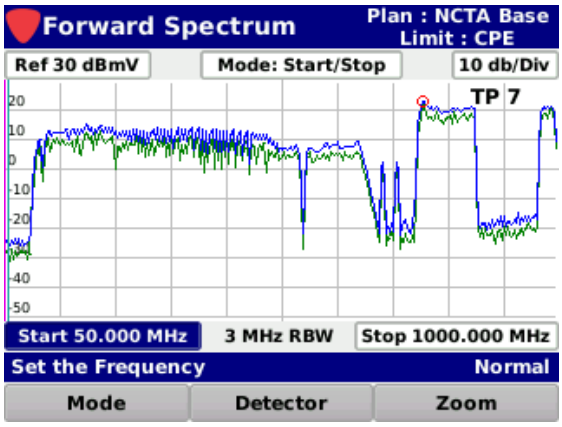
Start Frequency Adjustment

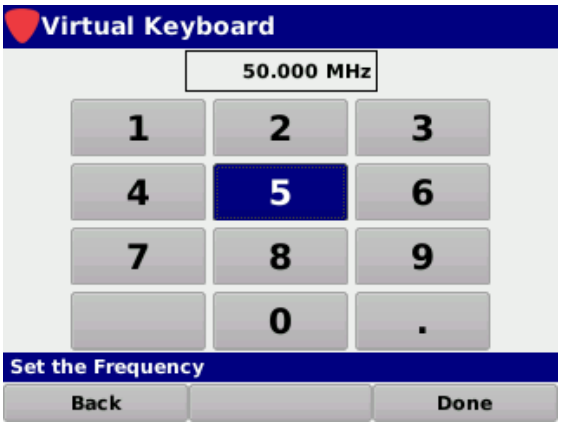
Highlight the **Mode: Start/Stop** field as shown in the image to the right. Use the up/down arrow buttons to set it to **Start/Stop.**



Highlight the **Start** frequency field as shown in the image below (left) and then use either of the following methods to change the start frequency:

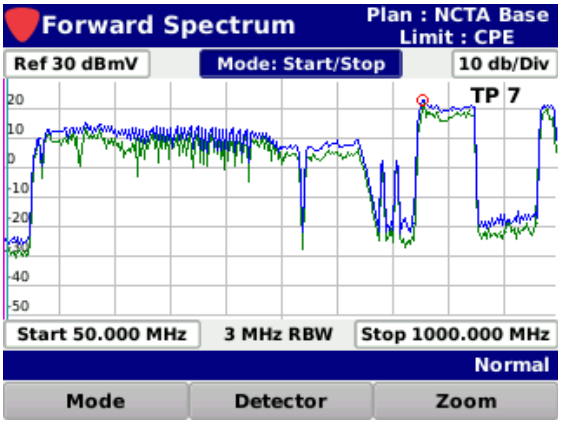
- Use the up/down arrow buttons to adjust the frequency in 0.1 MHz increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the start frequency as shown in the image below (right).





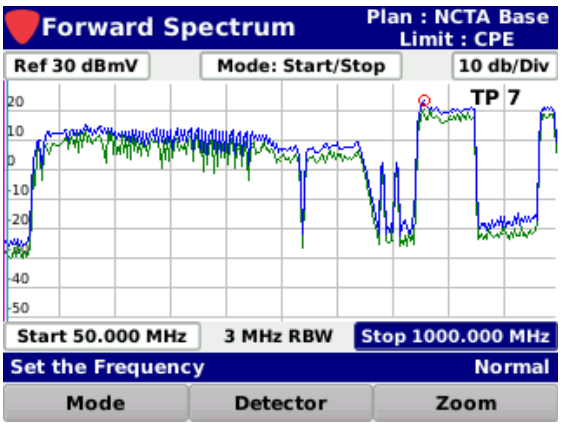
Stop Frequency Adjustment

Highlight the **Mode: Start/Stop** field as shown in the image to the right. Use the up/down arrow buttons to set it to **Start/Stop.**



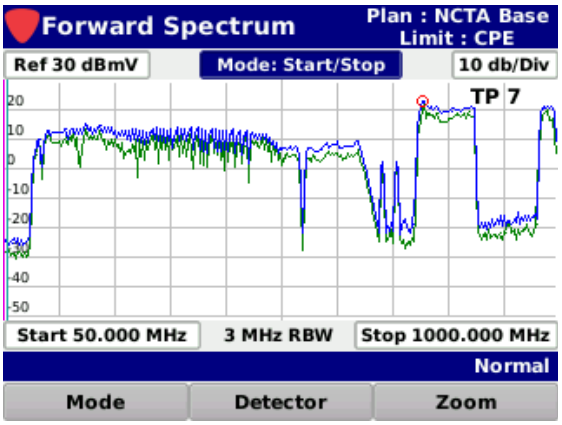
Highlight the **Stop** frequency field as shown in the image to the right and then use either of the following methods to change the stop frequency:

- Use the up/down arrow buttons to adjust the frequency in 0.1 MHz increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the stop frequency as shown in the image to the right.



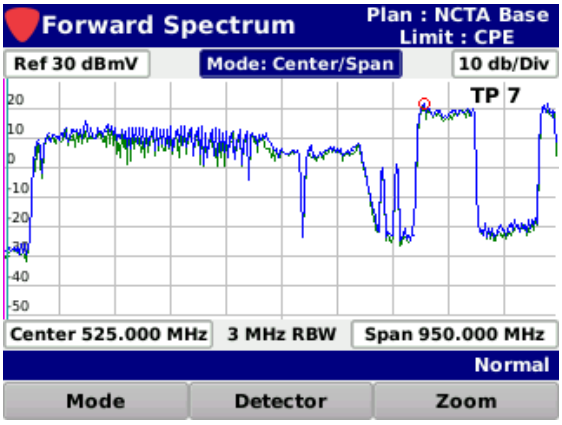
Center Frequency Adjustment

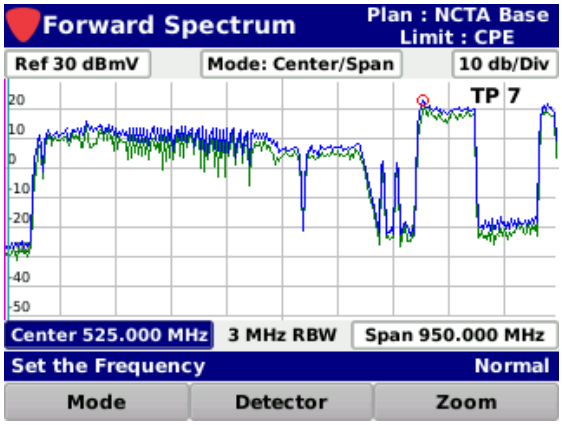
Highlight the **Mode: Start/Stop** field as shown in the image to the right. Use the up/down arrow buttons to set it to **Center/Span.**



Highlight the **Center** frequency field as shown in the image below (left) and then use either of the following methods to change the frequency:

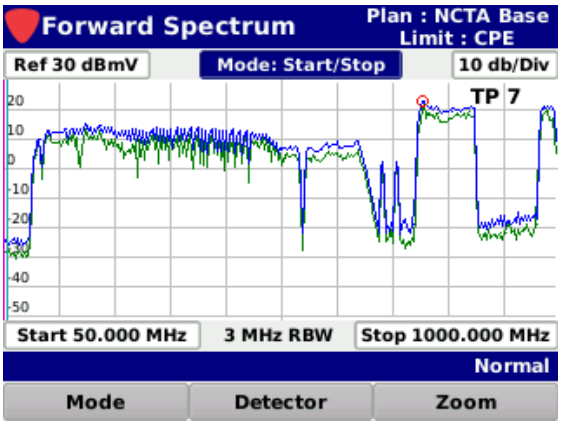
- Use the up/down arrow buttons to adjust the frequency in 0.1 MHz increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the frequency as shown in the image below (right).





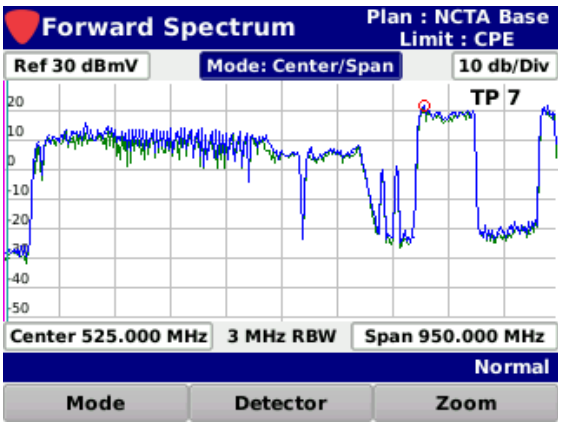
Span Frequency Adjustment

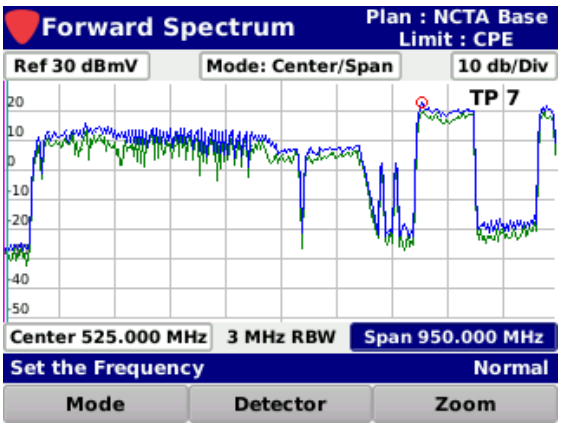
Highlight the **Mode: Start/Stop** field as shown in the image to the right. Use the up/down arrow buttons to set it to **Center/Span.**

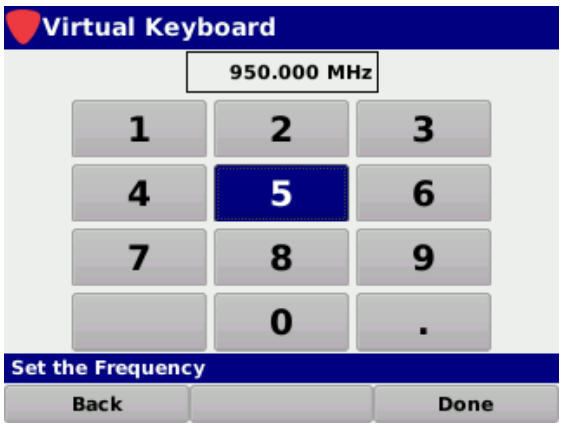


Highlight the **Center** frequency field as shown in the image below (left) and then use either of the following methods to change the frequency:

- Use the up/down arrow buttons to adjust the frequency in 0.1 MHz increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the frequency as shown in the image below (right).

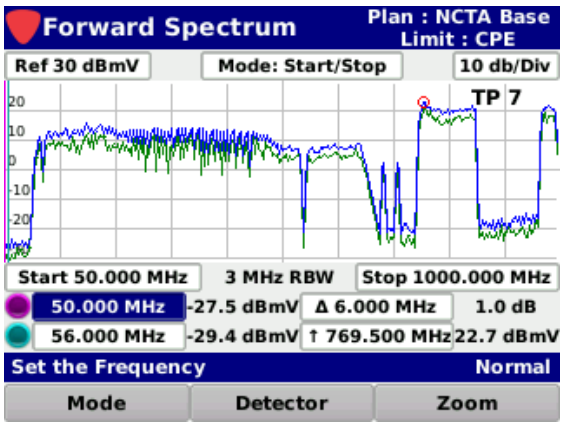






Marker Adjustment

The Forward Spectrum measurement includes two on-screen markers that are used for measurement of specific frequencies within the forward spectrum.

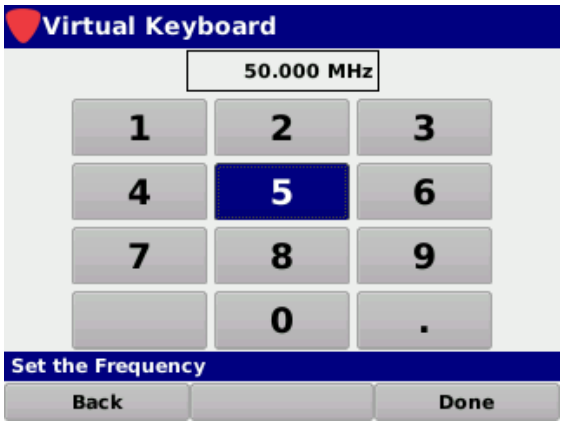


The markers are represented by the following color bullets and vertical lines:

- **Marker 1** – Purple
- **Marker 2** – Light Blue

Highlight the desired marker and use either of the following methods to change the marker location:

- Use the up/down arrow buttons to change the marker in 0.200 MHz increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the frequency as shown in the image to the right.

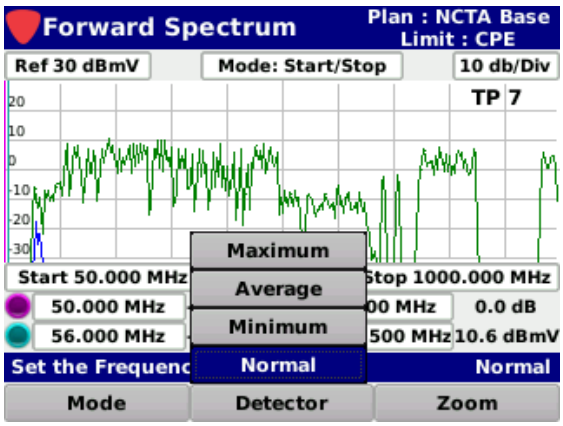


The following information is displayed for the markers:

- **Level** – Displays the signal level at the specified frequency for each marker.
- **Frequency Delta** – Displays the frequency delta between the two markers.
- **Frequency Peak** – Displays the frequency of the peak signal level in the return spectrum.
- **Level Peak** – Displays the peak signal level in the return spectrum.
- **Level Delta** – Displays the signal level difference between the minimum and maximum level values in the return spectrum.

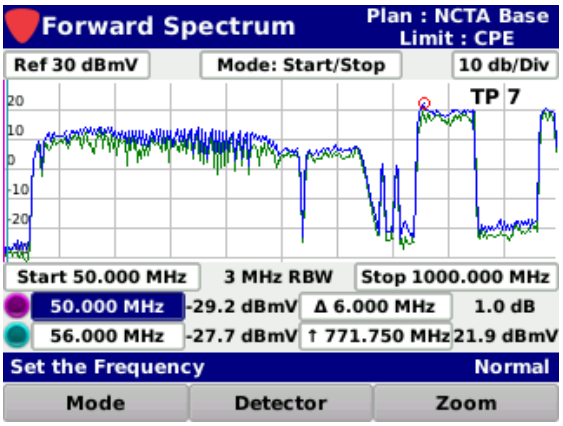
Detector Type

Select the **Detector** softkey to scroll through the following detector types for the forward spectrum measurement:



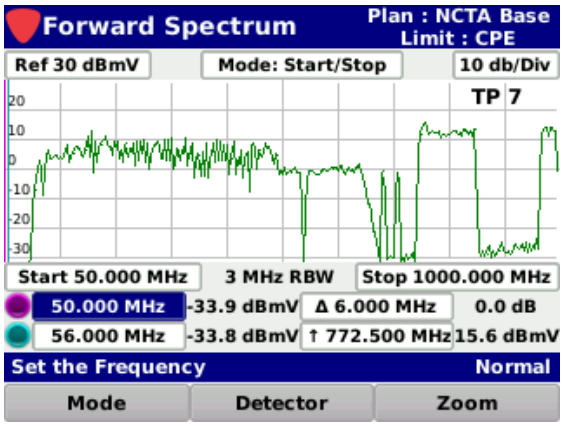
Maximum

Select the **Maximum** button from the **Detector** pop-up menu to display the maximum level of the forward spectrum as a blue trace that appears on the screen over the green live trace.



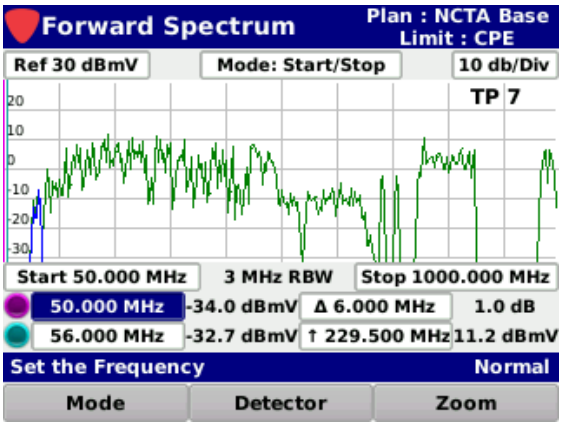
Average

Select the **Average** button from the **Detector** pop-up menu to display the average level of the forward spectrum as a green trace.



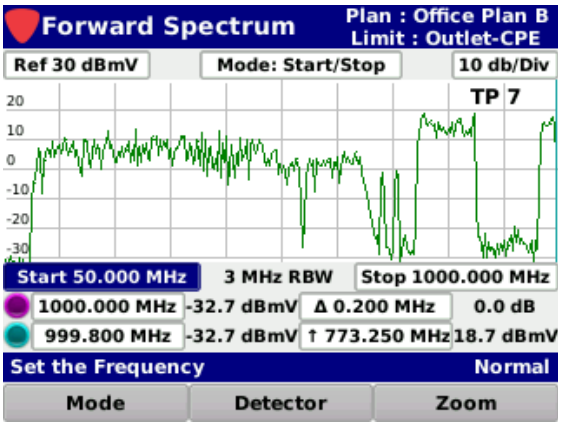
Minimum

Select the **Minimum** button from the **Detector** pop-up menu to display the minimum level of the forward spectrum as a blue trace that appears on the screen over the green live trace.



Normal

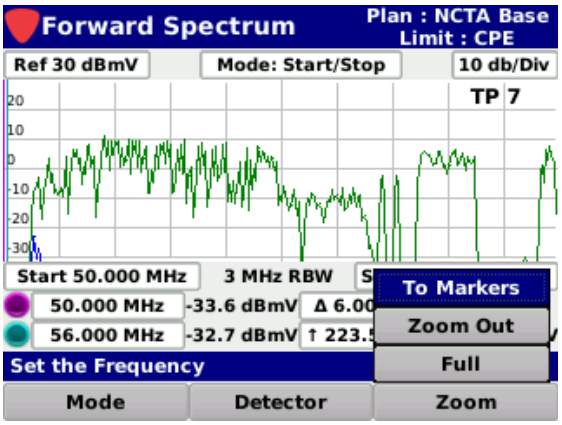
Select the **Normal** button from the **Detector** pop-up menu to display the normal live level of the forward spectrum as a green trace.



Display Zoom

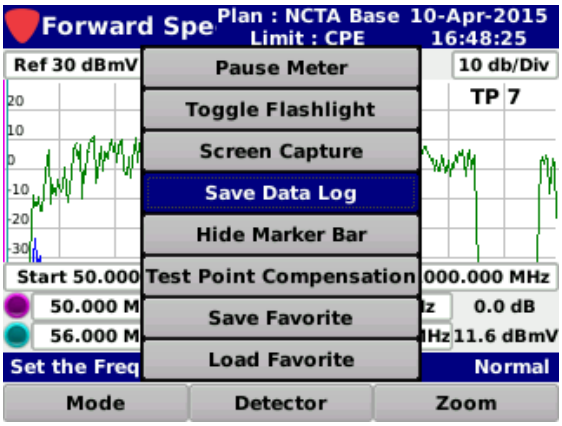
Select the **Zoom** softkey to choose from the following zoom options:

- **To Markers** – Changes the start and stop frequency values to match the currently displayed marker frequency values.
- **Zoom Out** – This is used after zooming to markers and returns the start and stop frequencies to their previously set values.
- **Full** – This is used to zoom out to the full forward spectrum view of 50 to 1000 MHz.



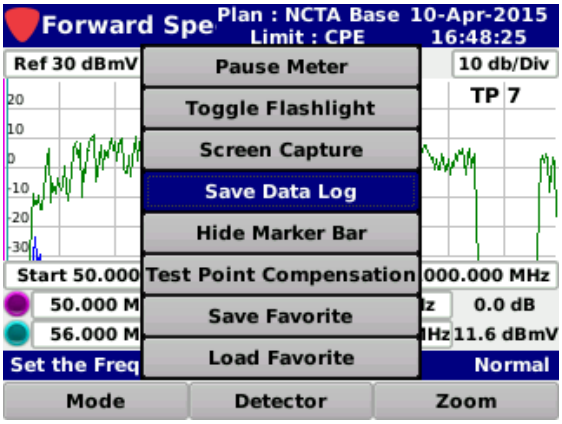
Function Menu Options

Additional functions can be accessed from within the **Forward Spectrum** screen by pressing the **Function** button. The **Function** menu will be displayed as shown in the image to the right and includes the following functions specifically for the **Forward Spectrum** screen.

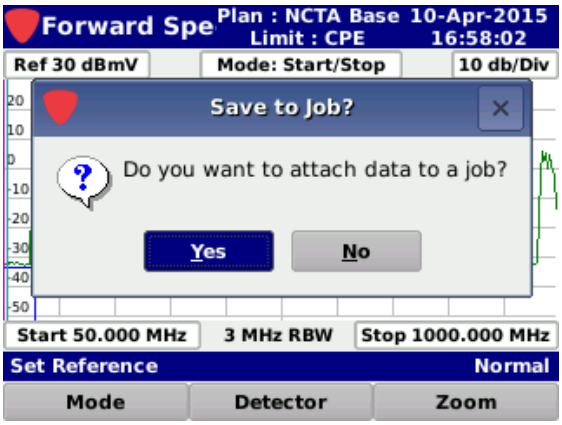


Save Data Log

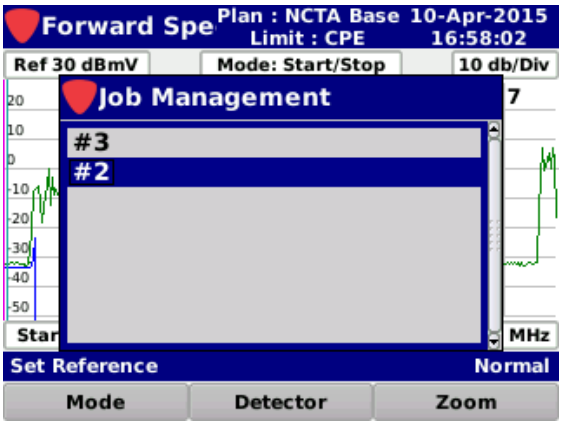
Select the **Save Data Log** button from the **Function** menu to save a copy of the measurement result data log.



If you have an open job, you can also save the test to the job by selecting **Yes**.



If you have multiple open jobs, the **Job Management** window will be displayed. Choose the job you would like to save the log to.

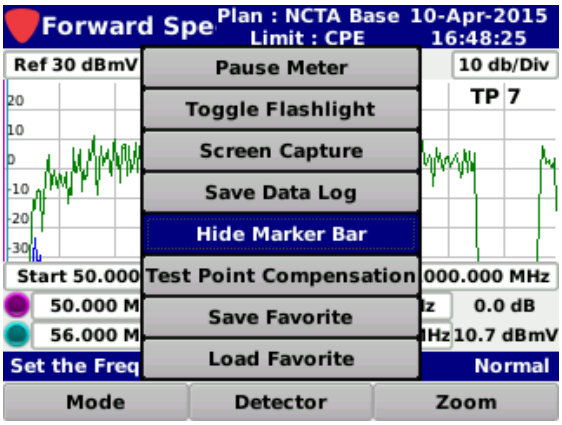


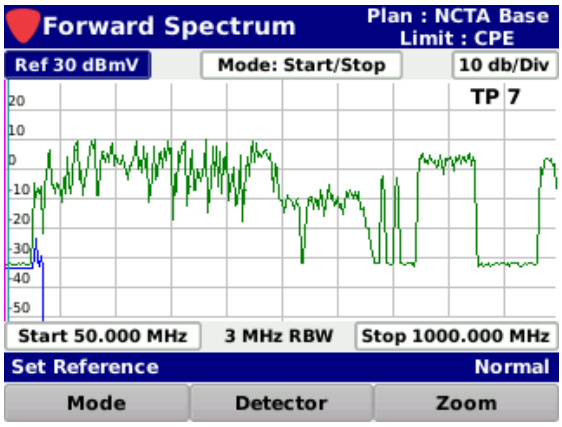
If you don't want to save the test to the open job, select **No** and you will be prompted to enter a file name using the **Virtual Keyboard**. It will then be saved to the internal memory of the 120 DSP.

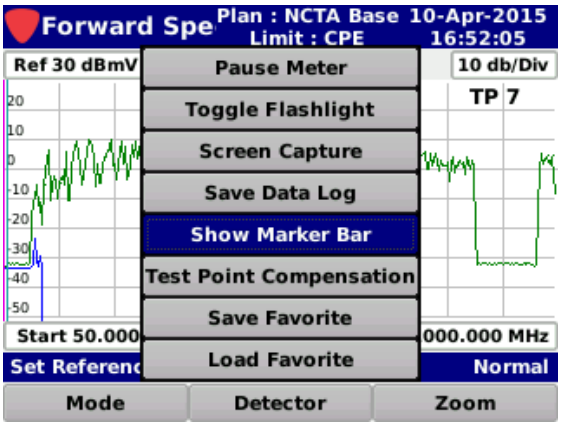
Hide Marker Bar

Select the **Hide Marker Bar** button from the **Function** menu to hide the marker bar at the bottom of the screen and expand the measurement viewing area.

When the marker bar is hidden, select the **Show Marker Bar** button from the **Function** menu to show the marker bar.



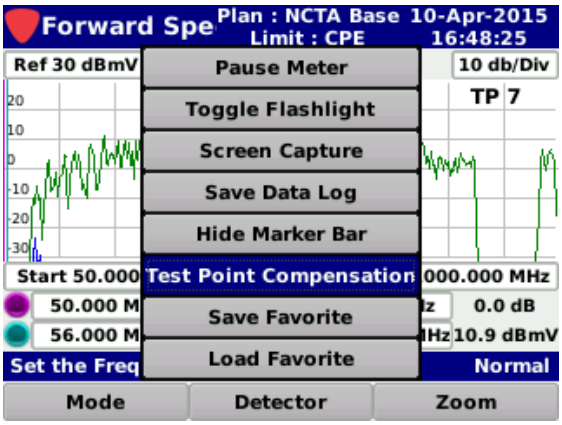




Test Point Compensation

Select the **Test Point Compensation** button from the **Function** menu to enter test point loss measurements for both test point and probe loss.

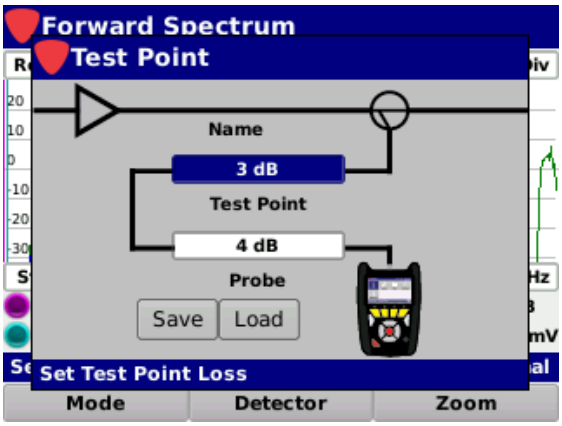
The **Test Point** screen will be displayed as shown in the image to the right.



Test Point Loss

Highlight the **Test Point** field and then use either of the following methods to change the loss value:

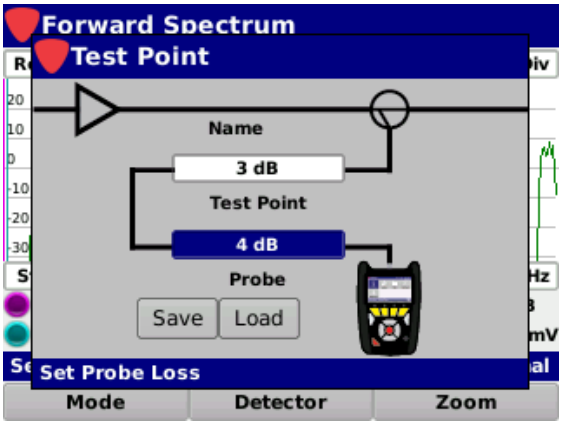
- Use the up/down arrow buttons to change the test point loss level in 1 dB increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the loss value as shown in the image to the right.



Probe Loss

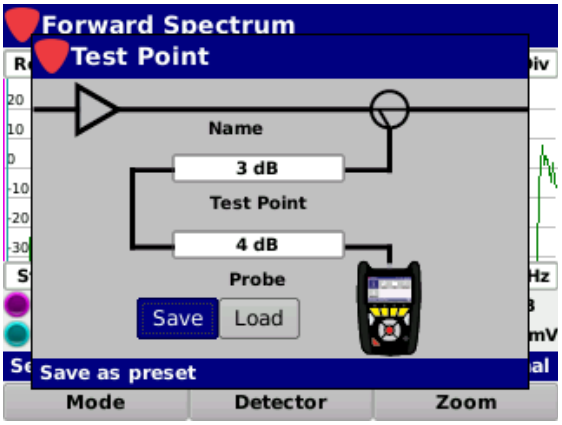
Highlight the **Probe** field and then use either of the following methods to change the loss value:

- Use the up/down arrow buttons to change the probe loss level in 1 dB increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the loss value as shown in the image to the right.



Save Preset

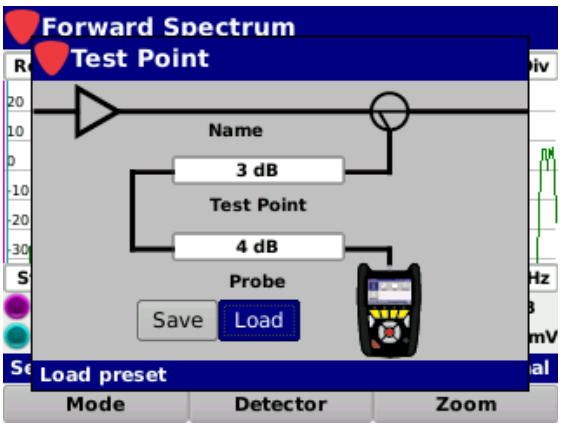
Select the **Save** button to save the test point values as a preset.



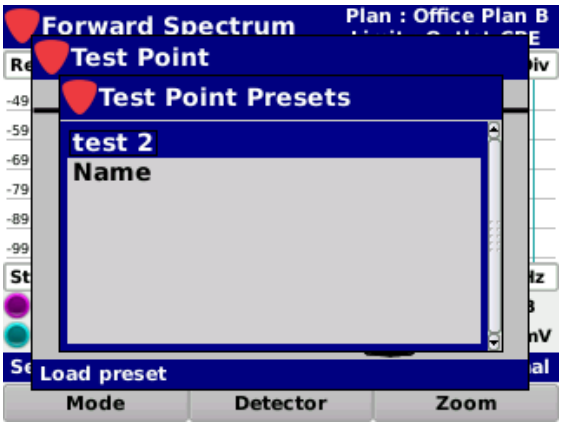
The **Virtual Keyboard** will be displayed as shown in the image to the right. Use the **Virtual Keyboard** to enter a name for the preset.

Load Preset

Select the **Load** button to load the test point values preset.

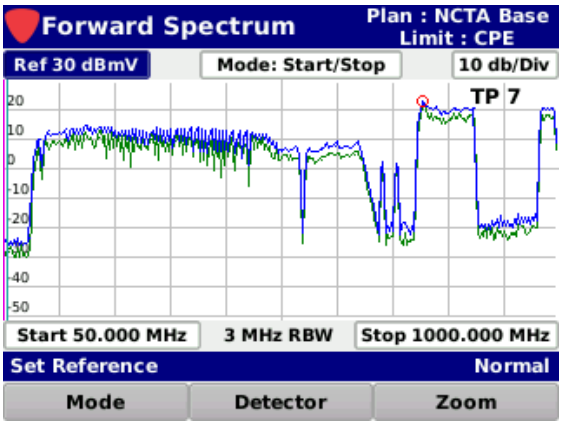


If you have multiple presets, the **Test Point Presets** window will be displayed. Choose the preset you would like to load.



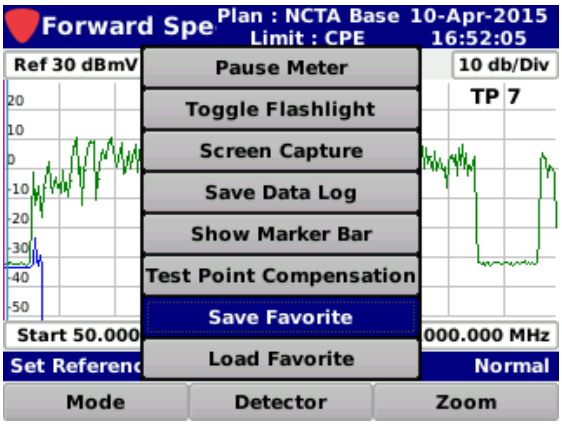
When finished entering the test point loss information, press the **Back** button to return to the **Forward Spectrum** screen.

The total test point compensation value will be displayed, as shown in the image to the right.

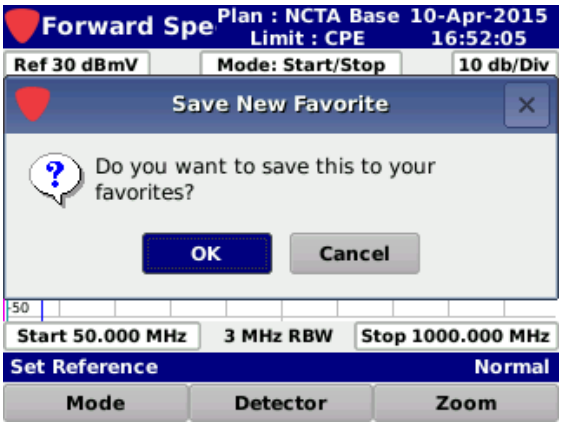


Save Favorite

Select the **Save Favorite** button from the **Function** menu to save a forward spectrum favorite.



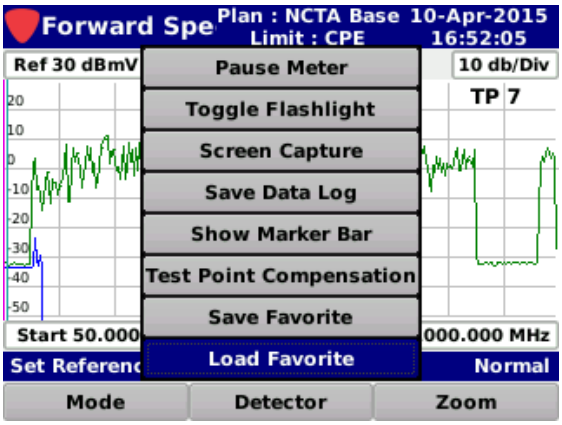
The **Save New Favorite** window will be displayed as shown in the image to the right. Select the **OK** button to save the favorite or select the **Cancel** button to exit without saving.



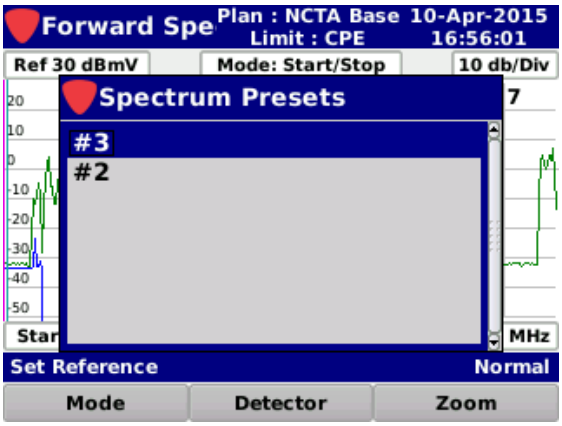
The **Virtual Keyboard** will be displayed. Use the **Virtual Keyboard** to enter the name of the new favorite.

Load Favorite

Select the **Load Favorite** button from the **Function** menu to load a forward spectrum favorite.

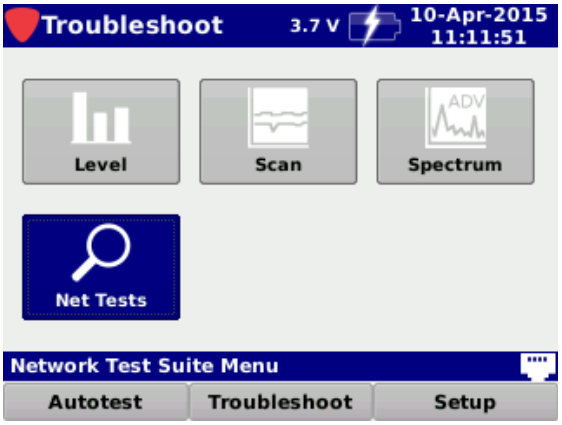


The **Sprectrum Presets** window will be displayed as shown in the image to the right. Choose the preset you want to load.

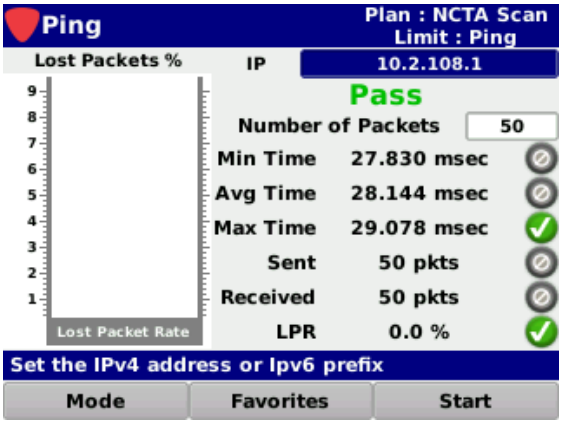


Overview

The Network Test Suite is a standard feature of the 120 DSP that is used to perform network tests and includes Ping, Trouceroute, and Throughput tests. Select the **Net Tests** icon as shown in the image to the right to perform network tests using the 120 DSP.



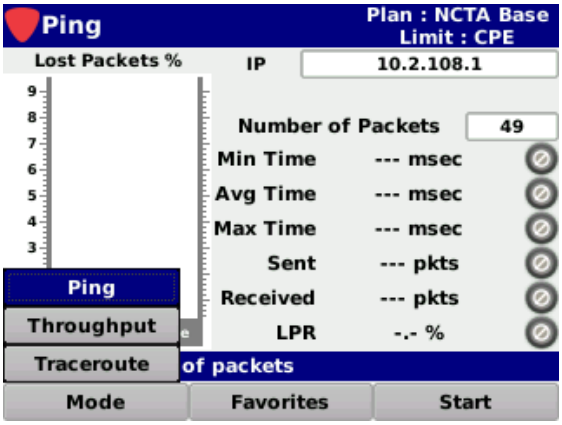
The **Network Tests** screen will be displayed as shown in the image to the right. This screen displays a measurement bar graph specific to the type of measurement along with relevant measurement values.

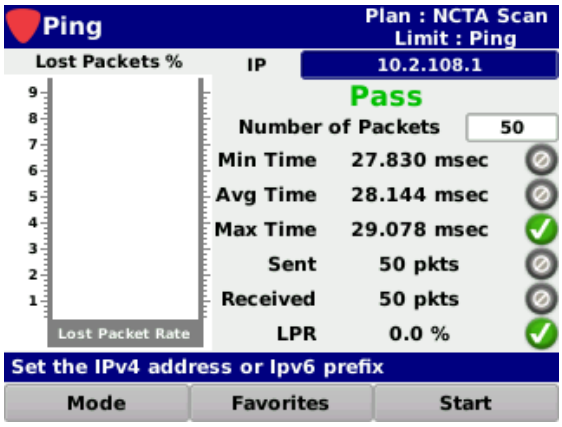


Selecting the Test Mode

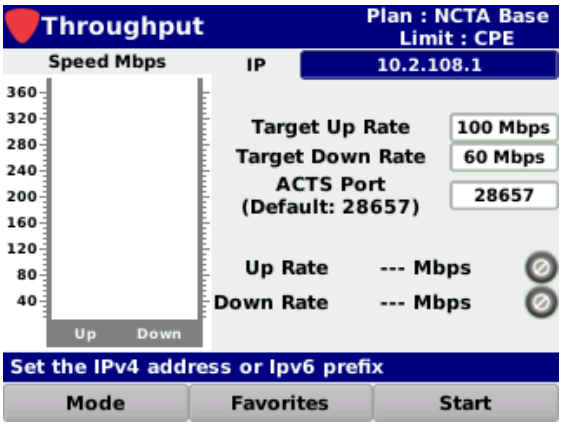
Select the **Mode** softkey to choose from the following network tests:

- Ping
- Throughput
- Traceroute

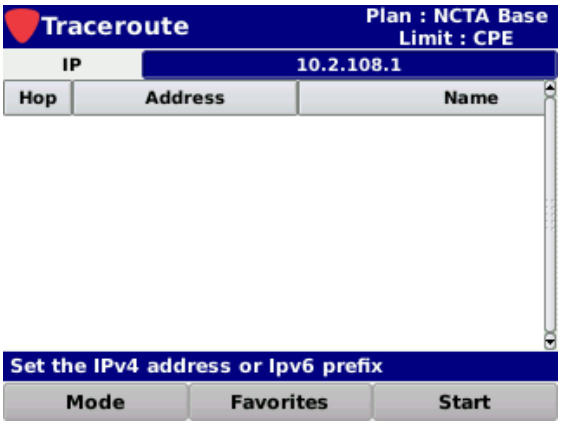




Ping



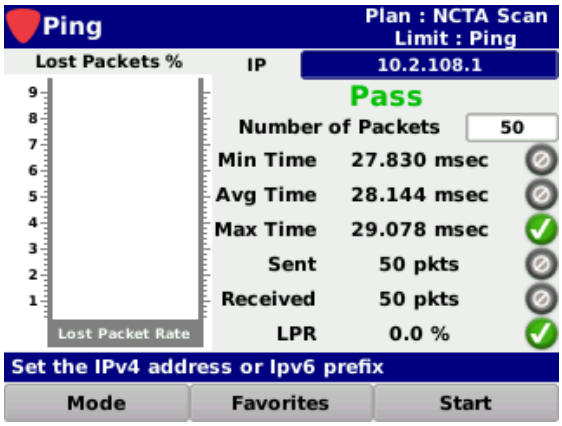
Throughput



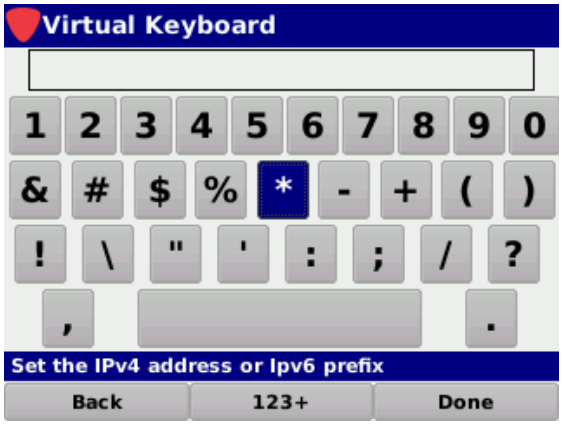
Traceroute

Setting the Destination IP Address

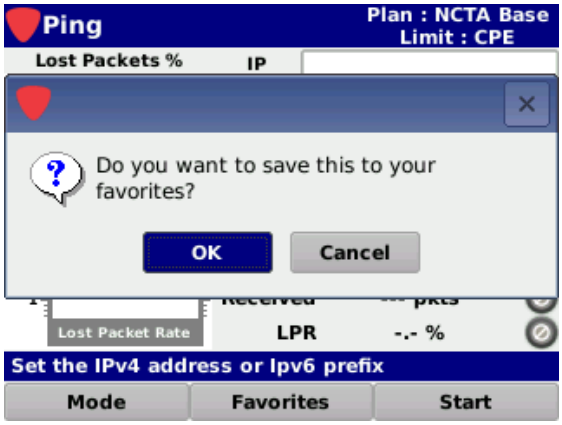
To manually enter the destination IP address for the network testing, highlight the **IP** field as shown in the image to the right.



Then, press the **Enter** button and use the **Virtual Keyboard** to directly enter the IP address as shown in the image to the right.



After selecting the **Done** softkey, a confirmation window will be displayed as shown in the image to the right. Select the **OK** button to save the location to your favorites or select the **Cancel** button to accept the changes without saving to your favorites.

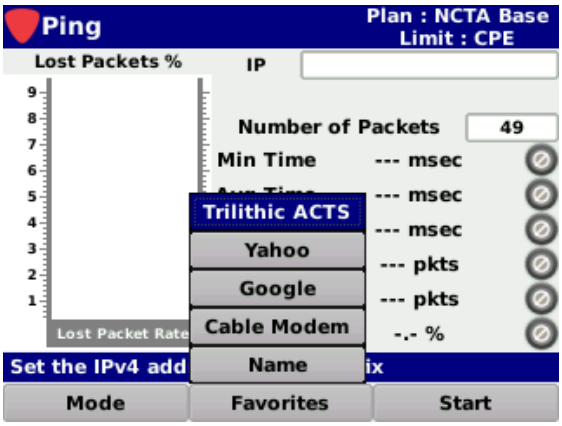


Selecting a Favorite

After entering a destination IP address as shown in the previous section, the 120 DSP allows you to save the entered IP address as a favorite location for quick and easy access.

Select the **Favorites** softkey to view a list of up to six (6) favorite destination IP addresses.

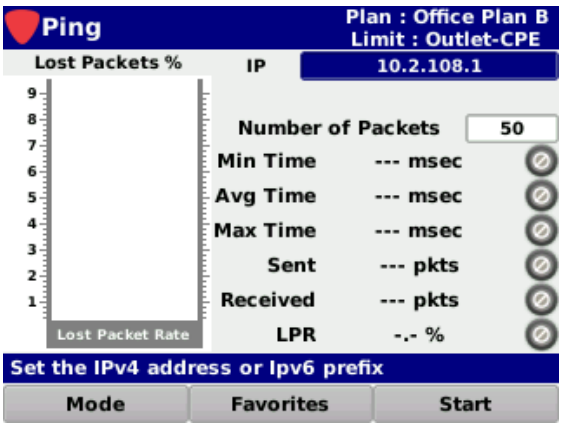
From the **Favorites** pop-up menu, select the name of the favorite to use for testing. The IP address or URL of the selected location will be entered automatically in the **IP** field.

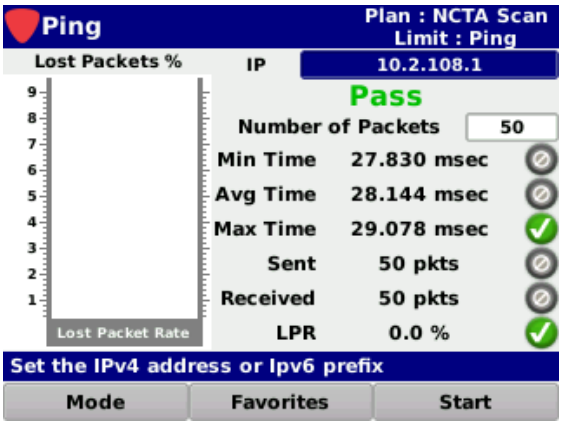


Executing Network Tests

After entering a destination IP address or selecting a favorite, select the **Start** key to execute the selected test.

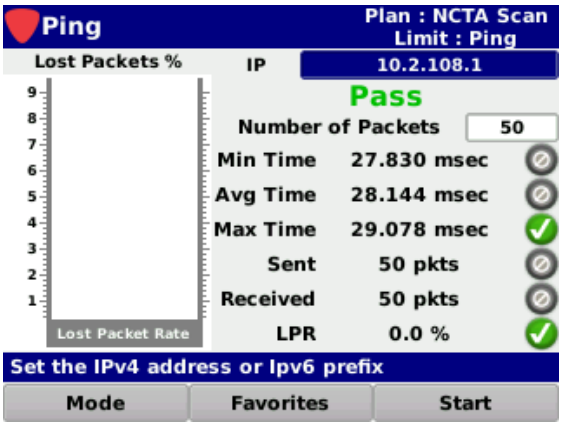
The 120 DSP will display the measurement results for each test mode as shown in the following sections.





Ping Mode

When the **Ping** mode is selected, the following measurement results are displayed as shown in the image to the right:

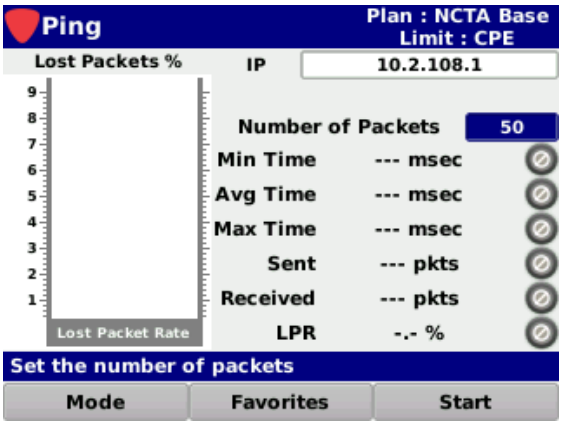


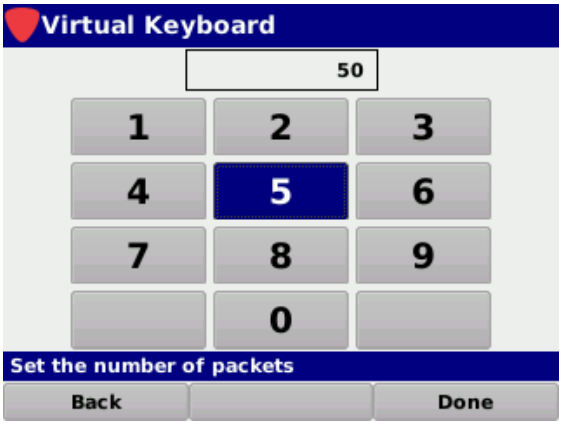
- **Minimum Time** - This is the minimum time required to send/receive a single test packet.
- **Average Time** - This is the average time required to send/receive all test packets.
- **Maximum Time** - This is the maximum time required to send/receive a single test packet.
- **Sent** - This is the number of packets sent by the 120 DSP to the destination IP address.
- **Received** - This is the number of packets received by the 120 DSP from the destination IP address.
- **LPR** - This is the lost packet ratio. This measurement is displayed in the bar graph and as a numeric value. The LPR is calculated as the percentage of packets received to those which were sent (LPR = {Received Packets / Sent Packets} * 100%), for example:
    - 50 sent packets
    - 25 received packets
    - LPR = {25 / 50} * 100%
      {0.50} * 100%
      50%

Setting the Number of Packets

To manually enter the number of packets for the ping test, highlight the **Number of Packets** field as shown in the image to the right and then use either of the following methods to change the packet number:

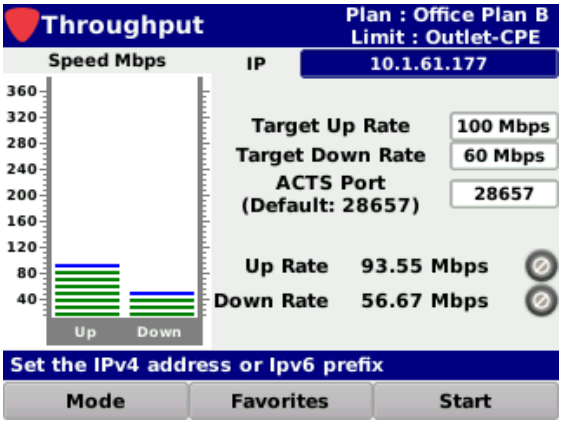
- Use the up/down arrow buttons to adjust the number in 1 packet increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the number of packets as shown in the image to the right.





Throughput Mode

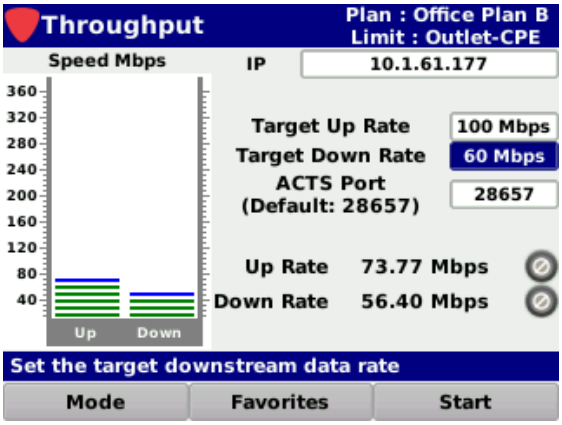
When the **Throughput** mode is selected, the following measurement results are displayed as shown in the image to the right:



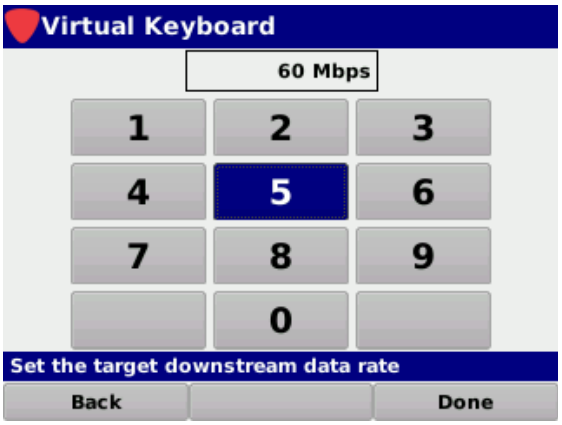
- **Target Up Rate** - This is the up stream data rate. This measurement is displayed in the bar graph and as a numeric value. This value is fixed.
- **Target Down Rate** - This is the down stream data rate. This measurement is displayed in the bar graph and as a numeric value.

Setting the Target Downstream Rate

To manually enter the target downstream rate for the throughput test, highlight the **Target Down Rate** field as shown in the image to the right and then use either of the following methods to change the target downstream rate:



- Use the up/down arrow buttons to adjust the rate in 1 Mbps increments.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the target downstream rate as shown in the image to the right.

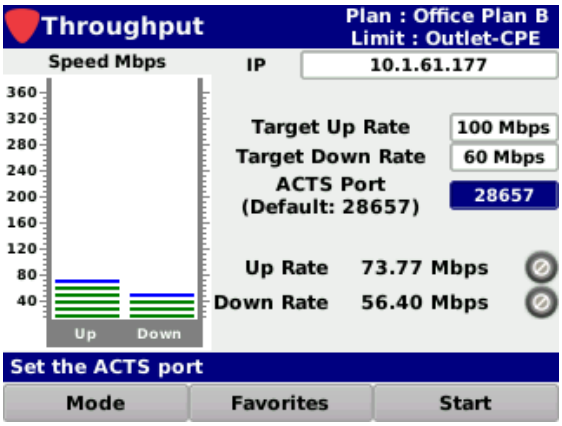


Setting the ACTS Port

To manually enter the ACTS server port for the throughput test, highlight the **ACTS Port** field as shown in the image to the right and then use either of the following methods to change the port:

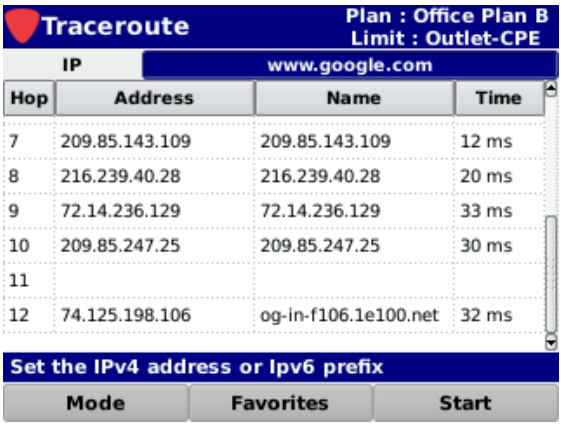
- Use the up/down arrow buttons to adjust the port number.
- Press the **Enter** button and use the **Virtual Keyboard** to directly enter the ACTS port as shown in the image to the right.

The default ACTS port is set to **28657**.



Traceroute

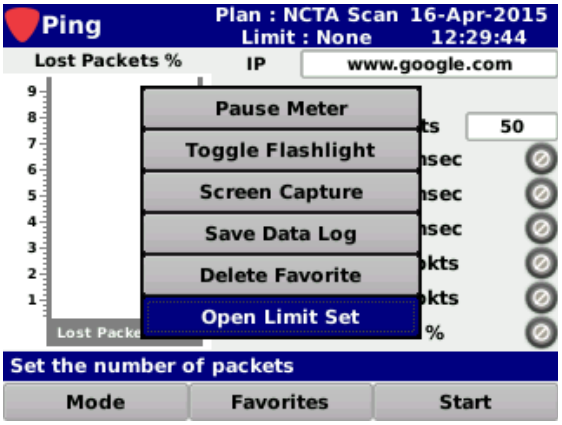
When the **Traceroute** mode is selected, the following measurement results are displayed as shown in the image to the right:



- **Hop** - This is the number of the intermediary point (hop) in the route between the meter and the destination address.
- **Address** - This is the IP address of the corresponding intermediary point (hop).
- **Name** - This is the name of the corresponding intermediary point (hop).
- **Time** - This is the time to each intermediary point (hop).

Opening a Limit Set

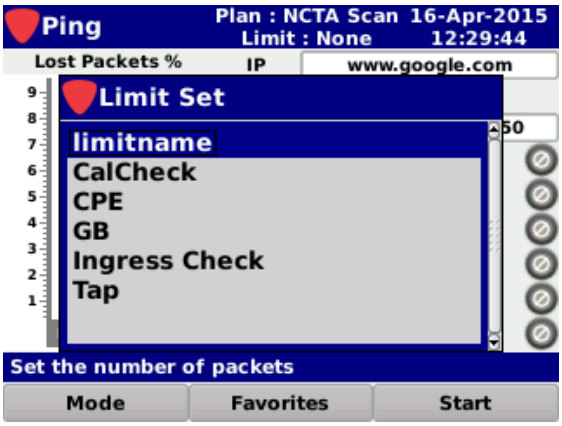
Select the **Open Limit Set** button in the **Function** menu as shown in the image to the right to select the limit set to use for the network testing.



The **Limit Set** window will be displayed as shown in the image to the right.

From the **Limit Set** window, select the name of the limit set to use for the network testing.

After selecting the limit set, the **Network Tests** screen will be displayed again.

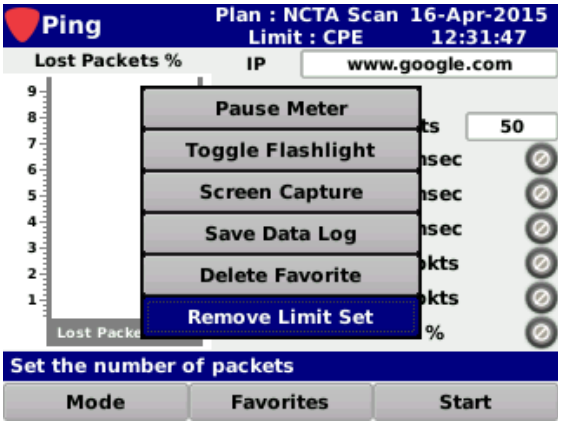


NOTE

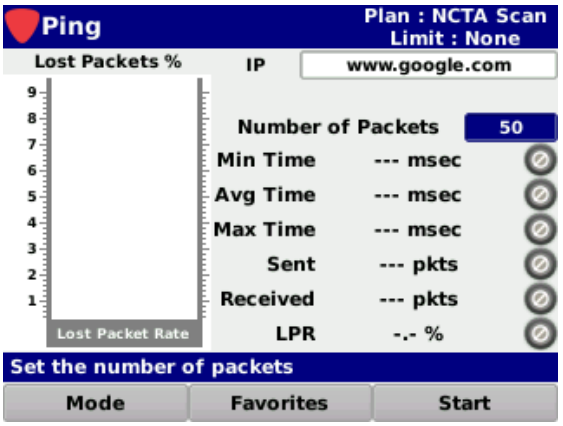
The Limit Set window will be bypassed if there is only one limit set to choose from.

Removing a Limit Set

Select the **Remove Limit Set** button in the **Function** menu as shown in the image to the right to remove the limit set for the network testing.



The pass/fail results will no longer be displayed as shown in the image to the right.



Pass/Fail Measurement Indicators

When a limit set has been opened, the network tests will be tested against the current limit set. When any of the individual measurement parameters of a network tests fail, the network tests as a whole will indicate a Fail status.

A Pass/Fail status will be displayed next to each measurement parameter. The pass/fail status of the network tests will be indicated using the following icons:

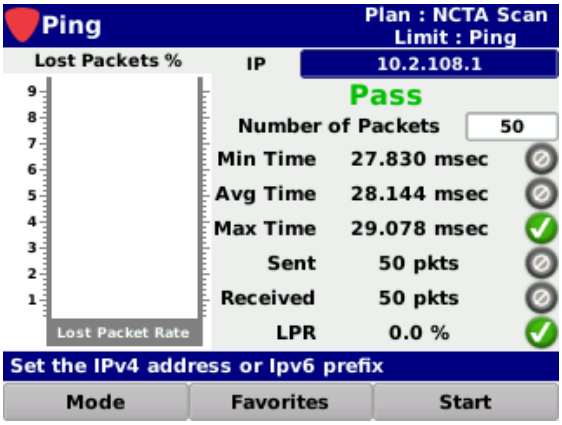
This icon indicates that this measurement was skipped. This only applies to measurements that have been removed from the currently selected limit set.

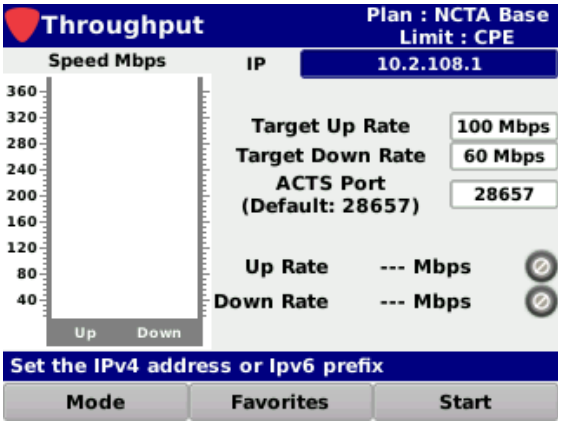
This icon indicates that this measurement is within the measurement thresholds of the currently selected limit set.

This icon indicates that the measurement limit set has failed.

This icon indicates that the measurement has failed the high limit measurement threshold.

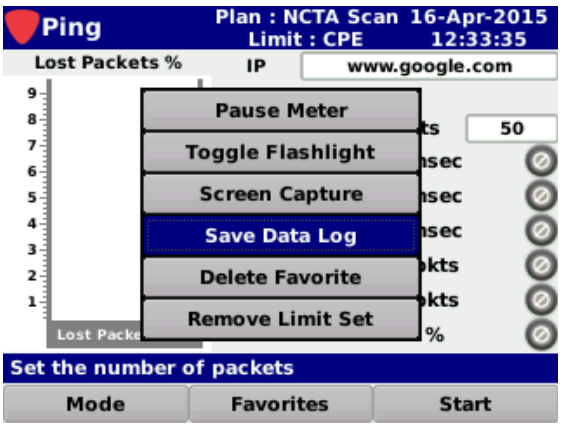
This icon indicates that the measurement has failed the low limit measurement threshold.





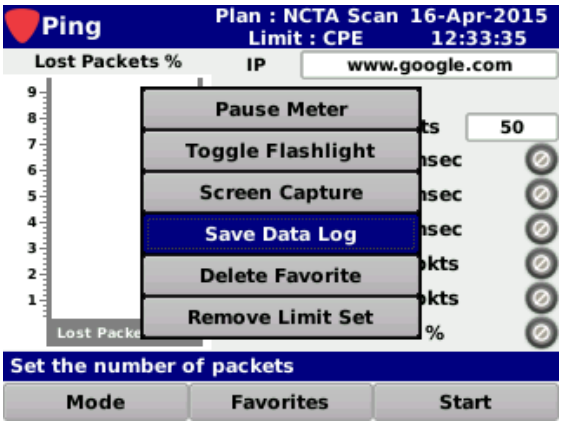
Function Menu Options

Additional functions can be accessed from within the **Network Tests** screen by pressing the **Function** button. The **Function** menu will be displayed as shown in the image to the right and includes the following functions specifically for the **Network Tests** screen.

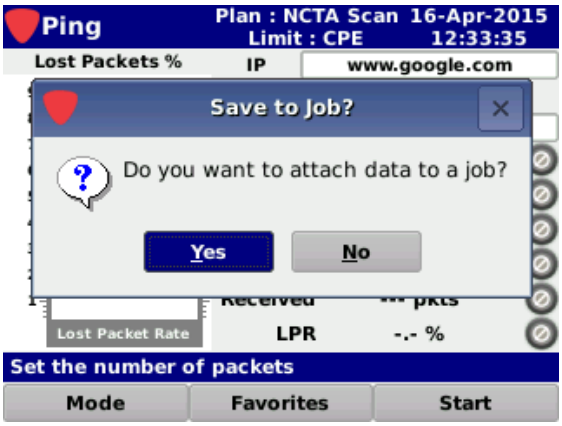


Save Data Log

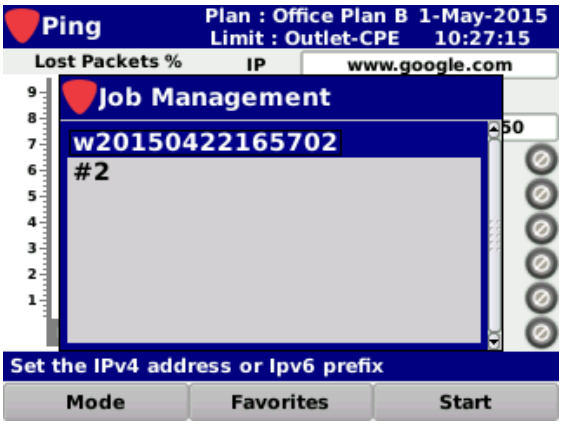
Select the **Save Data Log** button from the **Function** menu to save a copy of the measurement result data log.



If you have an open job, you can also save the test to the job by selecting **Yes**.



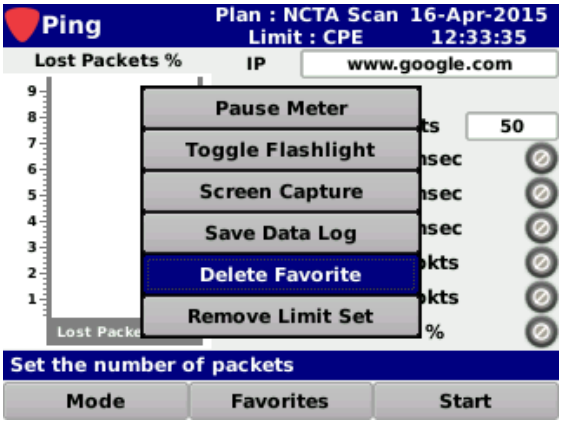
If you have multiple open jobs, the **Job Management** window will be displayed. Choose the job you would like to save the log to.



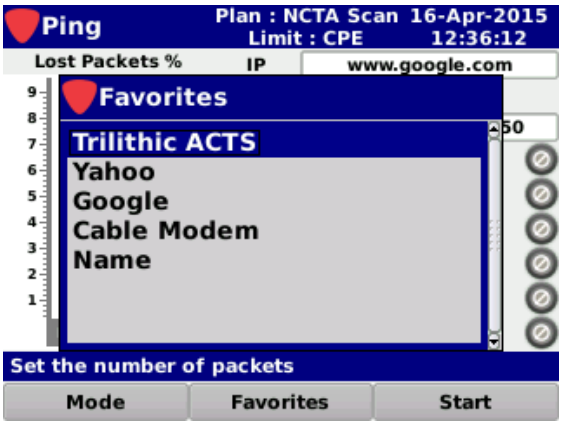
If you don't want to save the test to the open job, select **No** and you will be prompted to enter a file name using the **Virtual Keyboard**. It will then be saved to the internal memory of the 120 DSP.

Delete Favorites

Select the **Delete Favorite** button from the **Function** menu to delete any one of the six available favorites.



The **Favorites** window will be displayed as shown in the image to the right. Select the name of the favorite you want to delete.



NOTE

The Open Limit Set and Remove Limit Set buttons in the Function menu were covered previously. For more information, see these sections earlier in this chapter.

120 DSP
Basic Signal Level Meter

Section V: Appendix

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Specifications

Level Measurement

Channel Bandwidth	**Standard:** 6 MHz **Optional:** 8 MHz
Amplitude Range	-40 dBmV to +50 dBmV (20 to 120 dBµV)
Modulation Types	Analog: NTSC, PAL B/D/G/H/I/K/N & SECAM B/D/G/H/I/K/L Digital: 16/32/64/128/256 QAM Annex A, 64/256 QAM Annex B, QAM Annex C
Analog Measurement Accuracy	±0.75 dB @ 77° F (25° C) Input Frequency > 12.5 MHz
Digital Measurement Accuracy	±0.75 dB @ 77° F (25° C) Input Frequency > 12.5 MHz
Resolution	0.1 dB

Return Spectrum Measurement

Frequency Range	4 to 110 MHz
Resolution Bandwidth	300 kHz
Display Spans	4 to 42 MHz, 4 to 65 MHz, 4 to 85 MHz or 4 to 110 MHz
Display Scale	1, 2, 5, or 10 dB/division
Display Range	8 vertical divisions (when marker bar is hidden)
Spurious Free Dynamic Range	60 dB @ 25º C (77º F) (+50 dBmV)
Sensitivity	-30 dBmV (4 MHz to 110 MHz)

Digital Channel Measurement

Deep Interleave Compatibility	Yes
Downstream MER	40 ±2 dB @ +6 dBmV RF Input Level 34 ±2 dB @ -6 dBmV RF Input Level
Downstream BER	**Method:** True BER, derived from code words not from MER **Standard:** ITU J.83 annex A, B, C **Range:** 1 E-7 to 1 E-9 @ -6 dBmV RF Input Level
Symbol Rates	≥ 0.64 msps; ≤ 7 msps

Carrier-to-Noise Measurement

*In-service, non-scrambled standard channels only

Minimum Optimal Input Level for Full Range	+10 dBmV (although not optimal, signals below this level can be measured)
Dynamic Range	50 dB
Resolution	< 0.5 dB

Tilt Measurement

Max Number of Carriers	10
High/Low Delta Resolution	0.1 dB
Scan	Video, audio, pilot, and digital carriers

Forward Spectrum Measurement (OPTIONAL)

Frequency Range	50 to 1000 MHz
Resolution Bandwidth	10, 30, 100 and 300 kHz 1 and 3 MHz
Display Spans	User-selectable in 1 MHz steps
Display Scale	1, 2, 5, or 10 dB/division
Display Range	8 vertical divisions (when marker bar is hidden)
Spurious Free Dynamic Range	60 dB @ 25° C (77° F) (+50 dBmV)
Sensitivity	-40 dBmV (50 MHz to 1 GHz)

Hum Measurement (OPTIONAL)

*In-service, non-scrambled standard channels only

Minimum Input Level	0 dBmV
Range	0% to 5%
Resolution	0.1%
Accuracy	±0.5%

Physical Specifications

Construction	Rugged plastic housing
Control	Water resistant front panel solid membrane keypad
Display	Color LCD touch screen 320 x 240 pixels (approx 3.5” x 2.67”)
Annunciators	Audible annunciator for key strokes
Flashlight	High intensity LED (0.25W)
Dimensions w/o Case (H x W x D)	7.00 x 4.50 x 1.75 in (20.32 x 13.97 x 5.08 cm)
Dimensions w/ Case (H x W x D)	8.0 x 5.50 x 2.75 in (22.86 x 16.51 x 7.62 cm)
Weight w/o Case	1.0 lbs (0.45 Kg)
Weight w/ Case	1.5 lbs (1.09 Kg)

Available Interface Types

RF Test Port	Replaceable F-Type connector
USB	Mini-USB 2.0 Type-B female receptacle
Ethernet	RJ45 Ethernet Port (10/100 Mbps)

Battery & Power Specifications

Operating Time	6 hours, dependent on use
Charge Time	6 hours
Battery	Two 2600 mAh @ 3.7V Li-Ion internal battery, factory replaceable
Power Adapter Input	**Type:** 2-prong un-grounded male plug (NEMA 1-15p) **Voltage:** 100 to 240 VAC ~ 50 to 60 Hz **Current:** 0.3 A Max
International Power Adapters (Optional)	**Type**: Interchangeable clip-on, US adapter (included) **Euro:** CEE 7/16 Europlug, Type C **UK:** BS 546, Type D **AUS:** AS/NZS 3112
Power Adapter Output	**Type**: USB Type A female receptacle **Voltage**: 5 VDC **Current:** 1.0A
Data & Charge Cable	USB Type A male plug to Mini-USB Type B male plug

Environmental Specifications

Storage & Operating Temperature	-18º to +50º C (0º to 122º F)

Warranty Information

Trilithic Broadband Instruments 1-Year Limited Warranty

Trilithic, Inc. (“Trilithic”) warrants to the buyer that the product will be free from defects in materials and workmanship, under normal use, operating conditions and service for a period of one (1) year from date of delivery. Trilithic reserves the right, before having any obligation under this limited warranty, to inspect the damaged product, and all costs of shipping the product to Trilithic for inspection shall be borne solely by the buyer. Trilithic’s obligation under this limited warranty shall be limited, at Trilithic’s sole option, to replacing or repairing the product, or to replacing or repairing any defective part, F.O.B. Indianapolis, Indiana. If neither of the two options is reasonably available, then Trilithic, in its sole discretion, may provide a prorated refund to the buyer of the purchase price of the product, as evidenced by the proof of purchase, less any applicable service fees in accordance with the following schedule: months 0–1 = 100%; months 2–6 = 50%; and months 7–12 = 25%. Batteries and fans are not included or covered by this limited warranty. Any product or part that is repaired or replaced under this limited warranty shall be covered only for the remainder of the original warranty period which applied to the original product or part, or for ninety (90) days, whichever is longer. All products or parts that are exchanged for replacement shall become the property of Trilithic.

In order to recover under this limited warranty, buyer must make a written claim to Trilithic within sixty (60) days of the occurrence and must present acceptable proof of original ownership of the product (such as an original receipt, purchase order or similar documentation). In order for this limited warranty to be effective, the product must have been handled and used as set forth in the documentation accompanying the product and/or its packaging. This limited warranty shall not apply to any damage due to accident, misuse, abuse, neglect, fire or other casualty. Further, this limited warranty shall not apply to any product which has been altered or where the damage was caused by a part not supplied by Trilithic. Trilithic retains the final decision whether a product is within warranty conditions.

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