



Advanced Test Equipment Rentals
www.atecorp.com 800-404-ATEC (2832)

Acterna DSAM-2500

Digital Service Activation Meter

Quick-Start Guide



Acterna DSAM-2500

Digital Service Activation Meter

Quick-Start Guide

Notice Every effort was made to ensure that the information in this document was accurate at the time of printing. However, information is subject to change without notice, and Acterna reserves the right to provide an addendum to this document with information not available at the time that this document was created.

Copyright © Copyright 2002 Acterna, LLC. All rights reserved.
Acterna, The Keepers of Communications, and its logo are trademarks of Acterna, LLC.
No part of this guide may be reproduced or transmitted electronically or otherwise without written permission of the publisher.

Trademarks Acterna and DSAM-2500 are trademarks or registered trademarks of Acterna in the United States and/or other countries.
Specifications, terms, and conditions are subject to change without notice.

Ordering information This guide is a product of Acterna's Technical Information Development Department. To order additional copies, request document #6510-30-0384 Rev B.

EMC Directive Compliance This product was tested and conforms to the EMC Directive, 89/336/EEC as amended by 92/31/EEC and 93/68/EEC for electromagnetic compatibility.

Important Safety Instructions

Follow these safety precautions to reduce the risk of fire, shock, or personal injury and to avoid damage to the DSAM-2500 meter and its power components.

- 1 Read all instructions in this section regarding the meter, battery, charger module, and universal power supply.
- 2 Keep these instructions for future reference.
- 3 Heed all warnings and safety precautions.

Meter Safety

Follow these safety precautions to reduce the risk of fire, shock, or personal injury and to avoid damage to the DSAM-2500 meter:

- 1 Use the meter and its power components only as directed by the instructions in this guide or as directed by other resources provided by Acterna.
- 2 When powering the meter, maintain the secure connection of each power component.
- 3 Use only Acterna-specified components to power and conduct measurements with this meter.
- 4 Keep the meter cavity that holds the battery and its battery contacts clean.
- 5 Use only a dry cloth to clean the meter.
- 6 Avoid using the meter or its power components during an electrical storm.



WARNING:

Do not disassemble the meter.

Do not attempt to service this product yourself.

There are no user-serviceable parts inside.

Contact the appropriate Acterna representative for meter repair or calibration.

Battery Safety

Follow these safety precautions to reduce the risk of fire, shock, or personal injury and to avoid damage to the DSAM-2500 battery:

- 1 These safety precautions apply to the use of the NiMH battery and the optional Li-Ion battery supporting the DSAM-2500 meter.
- 2 Power the meter only with battery types approved for use by Acterna.
- 3 Do not disassemble or attempt to service the battery.
- 4 Do not place the battery on a conductive surface.
- 5 Do not allow metal objects to touch the battery contacts.
- 6 Charge the battery only with the specified charger.
- 7 Keep the battery away from heat sources near or above 60° C (140° F).
- 8 Operate and store the battery only within the following ranges:
 - **NiMH**
 - Charging 0 to +40° C
 - Discharge -20° C to +50° C
 - Short term storage -20° C to +55° C
(90 days or less)
 - Long term storage +10° C to +30° C
(1 year +)
 - **Li-Ion**
 - Charging 0 to +45° C
 - Discharge -20° C to +50° C
 - Short term storage -20° C to +60° C
(90 days or less)
 - Long term storage +10° C to +30° C
(1 year +)



WARNING:

Do not crush, penetrate, mutilate, or dismember the battery in any way.



WARNING:

Handle damaged or leaking batteries with extreme caution. Avoid contact with the electrolyte.



WARNING:

Do not dispose of the battery in fire or in water. Follow all local restrictions regarding the proper disposal or recycling of the battery.

Charger Module and Power Supply Module Safety

Follow these safety precautions to reduce the risk of fire, shock, or personal injury and to avoid damage to the DSAM-2500 charger module and power supply module:

- 1 When powering the meter, maintain the secure connection of each power component.
- 2 Use only Acterna-specified components to power and conduct measurements with this meter.
- 3 Do not damage the power cords.
- 4 Avoid using the meter or its power components during an electrical storm.
- 5 Follow all basic safety practices associated with the use of electrical equipment.



WARNING:

Do not use this product in the vicinity of a gas leak or in any other explosive environment.

Table of Contents

Product Overview	2
Initial Set-Up	3
Powering the Meter	6
Using the Keypad	8
Using the Help System	11
Configuring the Meter	13
Using Measure Mode	18
Using AutoTest Mode	23
Using Access Mode	27
Cloning DSAM Meters	28
Replacing the Protective Lens	29
Getting Technical Assistance	30
Warranty Information	30
Equipment Return Instructions	33
DSAM-2500 Specifications	34
Power Component Specifications	38

Product Overview

The DSAM-2500 Digital Service Activation Meter is a DOCSIS/EuroDOCSIS cable modem installation meter for the on-site installation and service of high-speed data and video services.

Using exclusive digital signal processing and integrated DOCSIS/EuroDOCSIS chipset technology, the meter communicates with the network CMTS to verify suitable conditions for cable modem installation from the subscriber's location. The DSAM is also equipped with signal level meter capabilities, including spectrum scanning for ingress assessment and mini-scan analysis of up to twelve analog and/or digital channels. The meter's AutoTest capability makes installations easier and more reliable than ever before.

Acterna has incorporated exclusive DSP, DOCSIS, and analog technology to enhance your DSAM's usability and provide significant flexibility as additional features become available. Upgrading the meter can be as simple as downloading a file from the Internet and installing it onto the device using optional DSAM PC utility software.

Using this Quick-Start Guide

We know you want to get the most out of your DSAM as soon as possible, so we've designed this Quick-Start Guide to provide the essential facts you need to know to use your DSAM effectively.

We encourage you to read this guide completely and to take advantage of the extensive Help system on your DSAM-2500 (see "Using the Help System" on page 11).

This guide provides safety information, initial set-up instructions, and important facts about powering, configuring, and executing the functions of the meter. The guide also provides information about cloning DSAM meters, sources for additional technical assistance, the product warranty, equipment return instructions, and specifications for the meter and its power components.

Initial Set-Up

Your DSAM-2500 Digital Service Activation Meter is shipped with the following accessories:

- One (1) NiMH rechargeable battery
- One (1) charger module
- One (1) universal power supply module
- One (1) power cord
- One (1) DC connector
- One (1) shoulder strap
- Two (2) hand-straps (installed on meter)
- Five (5) replacement lenses
- One (1) quick-start guide.

Many optional accessories are available to extend your DSAM's functionality, versatility, and ease of use. Learn more about optional DSAM accessories at this Internet address: www.acterna.com/products/network_types/cable_networks/index.html.

Installing the battery

To install the battery:

- 1** Hold the meter securely with the display screen facing away from you and the keypad in the palm of your hand.
- 2** Holding the battery in your other hand with its label facing away from you, rest the lower (contact) edge of the battery against the raised edge at the bottom of the meter.
- 3** Gently lower the battery into the cavity of the meter until the top edge of the battery latches into place.

To remove the battery, hold the meter in the manner described above and press the release button located directly above the battery in the center of the back of the meter. When released, gently pull the battery out of the cavity in the back of the meter.

Connecting the power components

In addition to the battery, three power components have been shipped with your DSAM -- a charger module, a universal power supply module, and a power cord.

IMPORTANT: Read all safety instructions in the front of this guide before attempting to power the meter or charge the battery (see page ii).

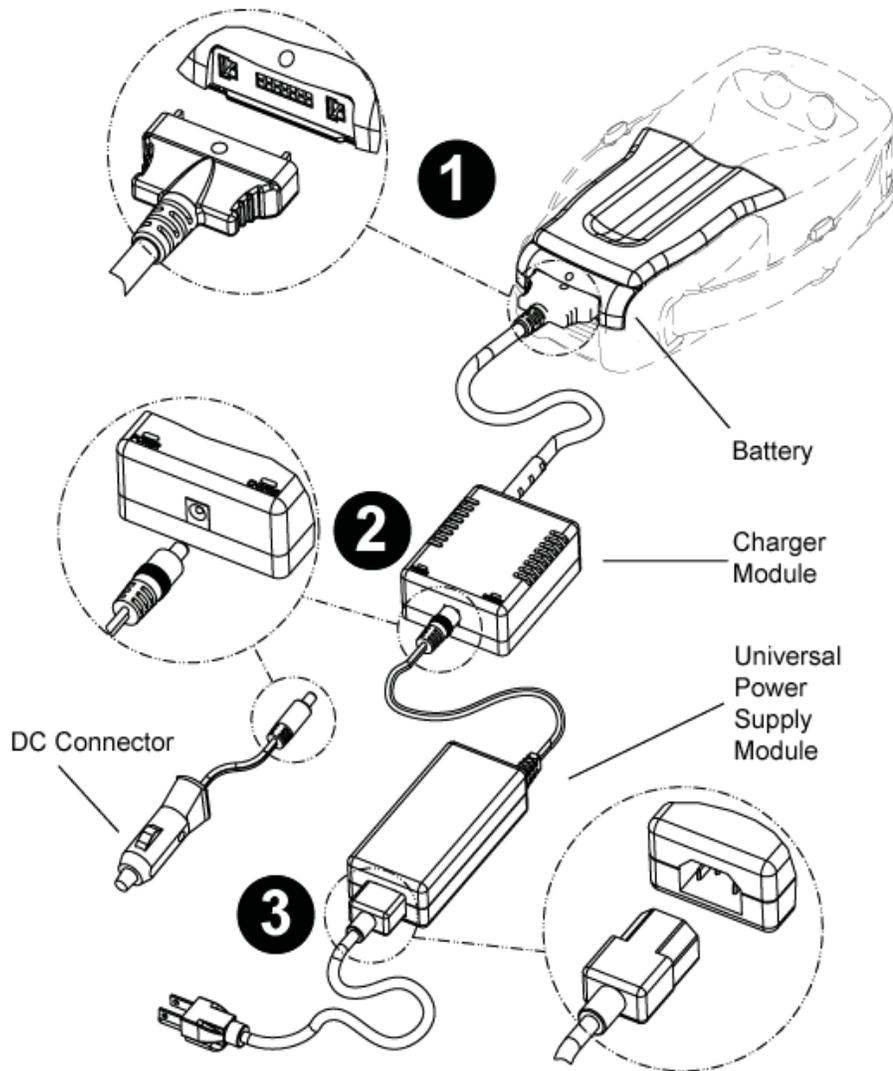


Figure 1 DSAM Power Components

Connect the power components in the manner shown in Figure 1 on page 4.

Follow these three steps to connect the power components to the DSAM battery (the battery can be in or out of the meter):

- 1 Align the tabs of the charger module connector to the slots in the battery and gently insert the connector tabs into the battery slots.
- 2 Align the universal power supply module connector (or DC connector) with the DC connection port in the charger module and gently insert the connector into the connection port.
- 3 Align the power cord connector with the universal power supply connection port and gently insert the connector into the connection port. Connect the power cord plug to an AC power source when you are ready to power the meter or charge the battery. (If you are using the DC connector, connect it to an appropriate 12-volt DC power source.)

Connecting the RF cable

To conduct measurements with your DSAM-2500, connect the RF cable of the system you are servicing to the RF connection port on the back panel of the meter.

Making additional connections

Use the Ethernet port located on the top of the meter to clone settings with other DSAM meters (see “Cloning DSAM Meters” on page 28) or to synchronize your data with optional DSAM PC utility software (see “Using Access Mode” on page 27).

(The headphone jack and USB ports located on the top of the meter will be used in future DSAM applications.)

Use the 9-pin, RS-232 connection port located on the charger module as another connection option to synchronize your data with optional DSAM PC utility software (see “Using Access Mode” on page 27).

Powering the Meter

IMPORTANT: Read all safety instructions in the front of this guide before attempting to power the meter or charge the battery (see page ii).

Selecting a power option

There are three ways to provide power to your DSAM-2500. Choose the method that best suits your working conditions:

- DC power from the charger module connected to an AC power source,
- DC power from the battery alone, or
- DC power using an (optional) DC power cord.

Charging the battery

With the power components properly connected (see “DSAM Power Components” on page 4), the DSAM battery can be charged when outside of the meter or when installed in the meter.

When you power the meter directly with an AC or a DC power source, this source automatically charges the battery as well on a separate path with no degradation to the meter’s direct power. When the battery is fully charged, the charger module provides a maintenance charge from the power source (see “Charge LED indications” on page 7).

The charger module automatically identifies the type of battery being charged; no battery selection configuration is required.

Fast charge temperature range

Your DSAM charger module will not allow fast charge mode to begin if the battery temperature is not within a safe range for charging. To begin and maintain fast charge mode, the battery temperature should be approximately between 32 °F (0 °C) and 122 °F (50 °C). Fast charge mode automatically resumes when the battery temperature returns within this range.

Interpreting the “Charge” LED

There are two LED indicator lights on your DSAM charger module -- the “Power” LED and the “Charge” LED.

The green “Power” LED illuminates to indicate that the charger module is receiving power.

The “Charge” LED illuminates in red, green, or orange to indicate the present battery and charge condition. It may remain on constantly, or it may begin to flash. To interpret the “Charge” LED indications, review Table 1.

Table 1 Charge LED indications

LED color	LED activity	Battery and charge condition
Red	On (constant)	Charger module is in fast charge mode; maximum charge is delivered to battery
Green	On (constant)	Fast charge cycle is complete; battery is ready for use and in maintenance charge mode while attached to the charger module
Red	Flashing	Battery-related error or defect detected; min/max cell voltage or battery temperature is out of range)
Orange	Flashing	DC input voltage is out of range.

For information about the charger module’s specifications, see Table 3 on page 38.

Using the Keypad

Below the display screen on the front panel of your DSAM-2500 (Figure 2) is a keypad used to perform all functions of the meter.



Figure 2 DSAM-2500 Front Panel

The keypad is comprised of:

- four **Display Softkeys** (directly below the display screen) used to select screen-specific options or to select pop-up menus associated with each key
- four directional **Arrow Keys** (located directly below the two center softkeys) used to navigate up, down, right, and left among the displayed menus and measurement features

- an **Enter Key** used to select highlighted menu items and input alphanumeric data
- an **Exit Key** used to depart from the currently viewed screen to a previously viewed option
- four **Mode Keys** (Figure 3) used to access the meter's four primary functional modes
- twelve **Alphanumeric Keys** used for data entry and for shortcut access to specific features (as a shift key function)
- a **Shift Key** used in conjunction with the alphanumeric keys or the display softkeys for shortcut access to specific features
- a **Power Key** used to turn the meter on and off.

Using the mode keys

Use the mode keys (Figure 3) to directly access the top level menu of features associated with each mode.



Figure 3 DSAM-2500 Mode Keys

Press the **AUTOTEST** mode key to display the AutoTest mode menu (see Figure 18 on page 24).

Press the **MEASURE** mode key to display the Measure mode menu (see Figure 13 on page 18).

Press the **ACCESS** mode key to display the Access mode menu (see Figure 20 on page 27).

Press the **CONFIGURE** mode key to display the Configure mode menu (see Figure 9 on page 13).

Using the display softkeys

Four Display Softkeys (directly below the display screen) are used to select screen-specific options or to select pop-up menus associated with each key.

In Figure 4, the softkey below **Limits** was pressed to access the **Limits** pop-up menu in Level Mode.

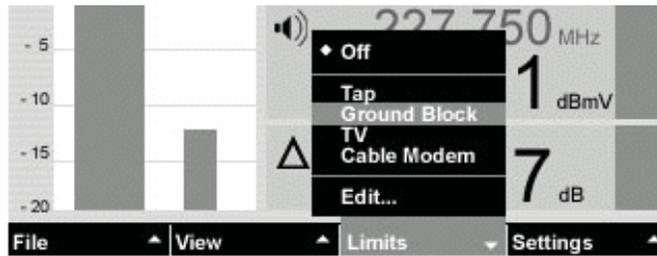


Figure 4 “Limits” Softkey Selected

In Figure 5, the softkey below **Select** may be pressed to select the highlighted option; the softkey below **Exit** may be pressed to exit to the previously viewed screen.

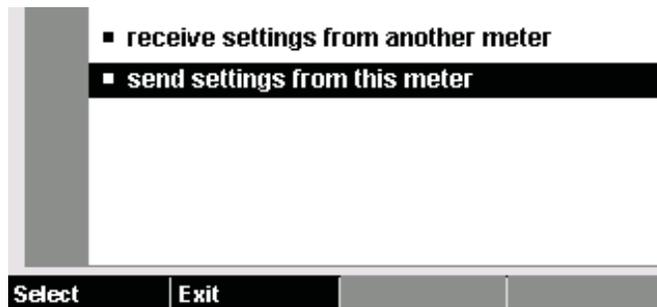


Figure 5 “Select” and “Exit” Softkey Options

Using Shift Key shortcuts

Use the **Shift Key** (Figure 2 on page 8) in conjunction with the alphanumeric keys or display softkeys for shortcut access to specific features. Shortcut functions are indicated by symbols at the bottom-right of each shortcut key. For example, press the **Shift Key** and then press the number **5** key to access the “?” shortcut -- which takes you directly to the Help system (“?” means “**Help**”). The Help system has more information about each shortcut feature.

Using the Help System

Your DSAM-2500 is equipped with an on-board Help system designed to answer many of the questions you may have about the proper configuration of the meter and the purpose and use of its measurement functions. You can access Help texts as questions occur or easily review all of the texts associated with a particular function as a short tutorial before attempting a particular task.

Access the Help system by pressing **SHIFT+?** (#5) on the alphanumeric keypad.

Two types of Help menus direct you to dozens of available Help text screens.

Accessing Help from a mode menu

When you access the Help system from one of the mode menus (such as AutoTest or Measure), the DSAM displays a mode-level Help menu that allows you to select the general topic you would like to learn about within that mode (see Figure 6). When you use the arrow keys to choose a topic and press **ENTER**, the Help submenu menu for that topic is displayed (see Figure 7 on page 12). Use the arrow keys again to specify the Help text you would like to review and press **ENTER** to make your selection.

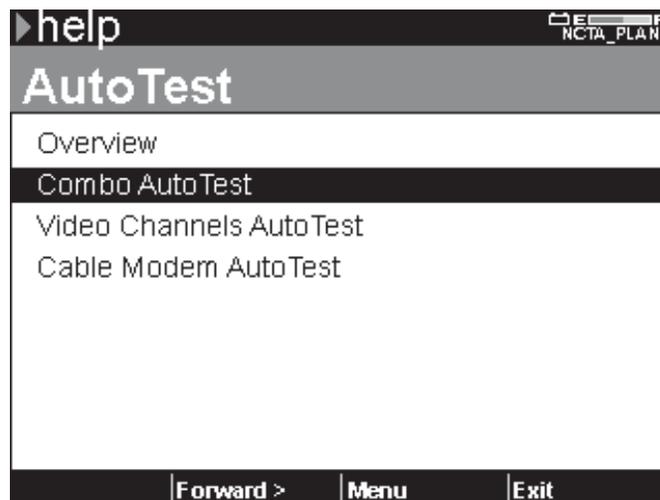


Figure 6 Help Menu for AutoTest Mode

Accessing Help from a submenu

When you access the Help system from any screen within one of the submodes (such as Combo AutoTest, DOCSIS, or Synchronize), the DSAM displays a submode-level menu of specific Help topics (Figure 7). Use the arrow keys to select a topic and press **ENTER** to make your selection.

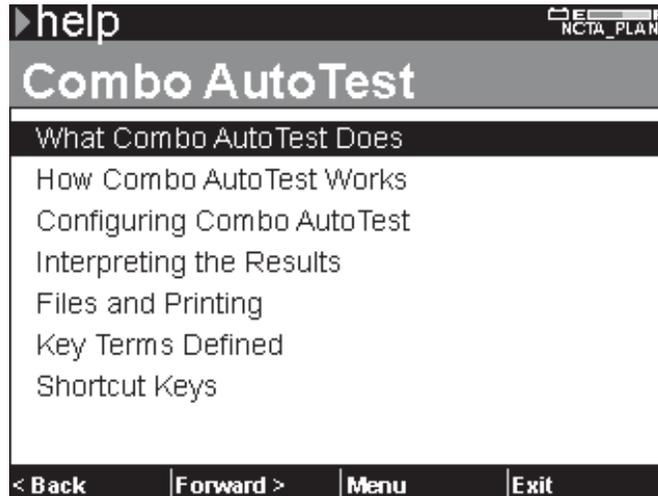


Figure 7 Help Menu for Combo AutoTest

Navigating within Help

Use the Help screen softkeys (Figure 7) to move **Forward** to the highlighted menu selection or **Back** to the last-viewed Help screen. The **Exit** softkey returns you to the beginning of the last active mode, and the **Menu** softkey displays the Help main menu (Figure 8).



Figure 8 Help System Main Menu

Configuring the Meter

Accurate and complete configuration of your DSAM-2500 assures reliable measurement performance and enhanced ease of use. To take full advantage of the many features your DSAM offers, be sure to properly configure the meter to respond effectively to your working conditions and to meet your data management needs.

Using Help when configuring the meter

The Help system on your DSAM-2500 contains Help texts addressing each configuration topic.

Press **SHIFT+?** (#5) to access the Help system.

In addition to the Help texts linked to each topic in the four configuration modes, you may want to review the Help texts addressing configuration in the AutoTest and Measure modes for more complete information (Help texts such as, “Configuring Video Channels AutoTest” and Configuring DOCSIS”).

Selecting a configuration mode

Press the **CONFIGURE** mode key (see Figure 3 on page 9) to display the four configuration mode menus. The CONFIGURE GENERAL mode menu is shown in Figure 9.

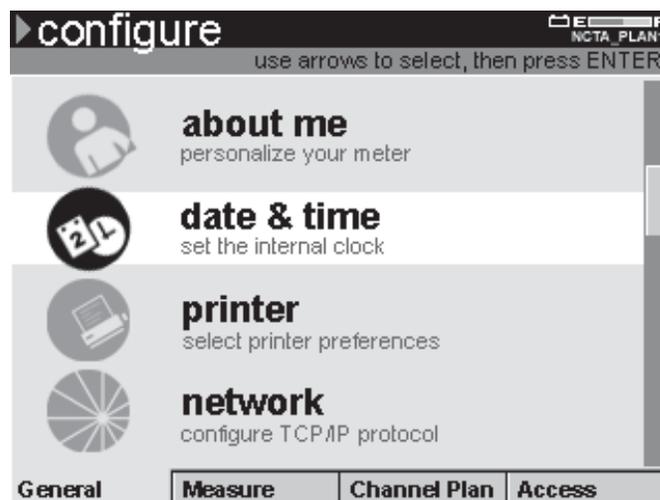


Figure 9 Configure General Mode Menu

Four configure modes are indicated by softkey tabs at the bottom of the display screen -- **General**, **Measure**, **Channel Plan**, and **Access**. Each configuration mode has a menu of configurable items specific to that mode.

To access a Configure Mode menu, press the softkey directly below the mode you wish to view. The **CONFIGURE GENERAL** menu is displayed when you press the **CONFIGURE** mode key for the first time. After that, the meter will display the most recently displayed Configure Mode each time you return to the configuration menus by pressing the **CONFIGURE** mode key.

When you have displayed the mode menu you prefer, use the arrow keys to highlight the item you intend to configure and press **ENTER**.

**General
Configuration**

To view the **CONFIGURE GENERAL** menu, press the **General** softkey when in Configure mode.

Use general configuration to:

- adjust contrast
- adjust sounds
- optimize battery life
- enter your personal information
- set date and time
- configure printer
- configure network
- configure ports
- set local preferences
- administer security
- choose a utility
- clone settings with other DSAM meters
- choose a diagnostic

Language selection and local preferences

Select **Country** on the CONFIGURE GENERAL menu to specify the type of language, date format, signal level units, temperature units, and digital performance units you prefer.

Press ENTER to open the LANGUAGE edit box and use the arrow keys to highlight the selection you prefer. Then press ENTER to complete the edit.

Each edit box may be edited individually. To save time, you can edit fewer boxes by first editing the PRESET TO edit box (which automatically selects default settings for date format, signal level units, temperature units, and digital performance units based upon the locale you choose).

Measurement Configuration

To view the CONFIGURE MEASURE menu (Figure 10), press the **Measure** softkey when in Configure mode.



Figure 10 Configure Measure Menu

Use measure configuration to specify:

- limit sets
- other (measurement) settings, such as the roving MAC address for cable modem tests.

Channel Plan Configuration

A CATV system is comprised of channels representing the channel plan for that system. Each channel is identified by its carrier type, frequency, and other parameters. The parameters (characteristics) of individual channels can be edited within a plan to meet a variety of measurement objectives.

To view the CONFIGURE CHANNEL PLAN menu (Figure 11), press the **Channel Plan** softkey when in Configure mode.

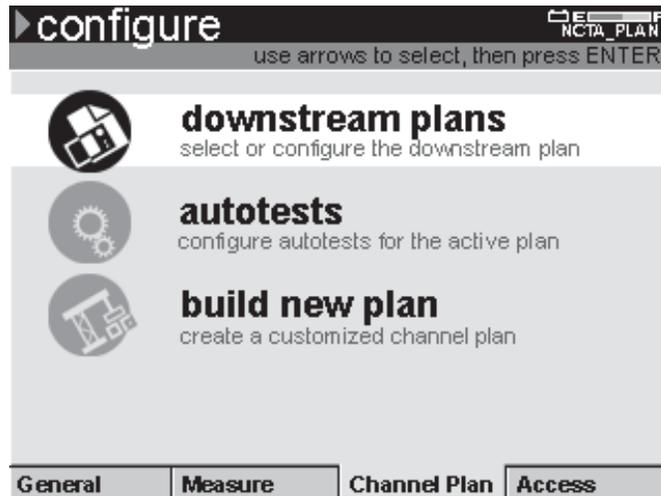


Figure 11 Configure Channel Plan Menu

Your DSAM-2500 has a default (NCTA) channel plan. You can build, clone, or synchronize customized plans. (Press **SHIFT+?** to access the Help system for more information about these options.)

Use channel plan configuration to:

- select a plan
- edit a plan
- enable/disable channels
- configure Miniscan channels
- configure AutoTests
- build a new plan

Access Mode Configuration To view the CONFIGURE ACCESS menu (Figure 12), press the **Access** softkey when in Configure mode.



Figure 12 Configure Access Mode Menu

Use access configuration to select your preferred PC connection (Ethernet or Serial) and to define its IP address.

Using Measure Mode

Use Measure Mode to perform signal level, miniscan, upstream spectrum, and DOCSIS measurements.

Press the **MEASURE** mode key (Figure 3 on page 9) to display the Measure mode menu (Figure 13). Use the arrow keys to highlight the type of measurement you wish to perform and press **ENTER** to access that option.

Here's another quick way to access Measure mode options: Press the **SHIFT** key to display the options above each softkey and press the softkey directly under the option of your choice.

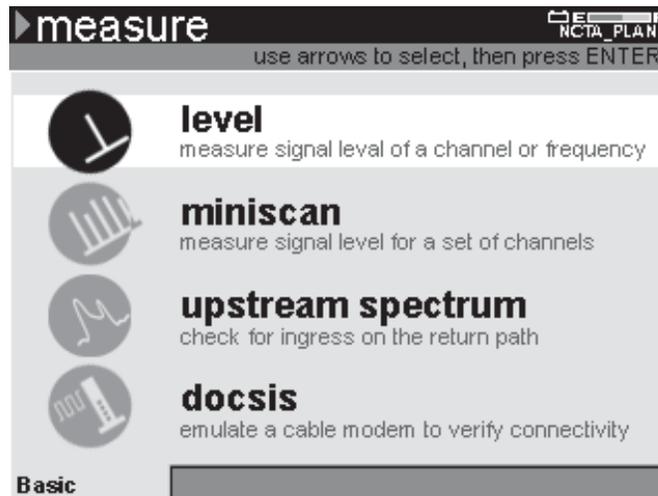


Figure 13 Measure Mode Menu

You are ready to perform tests in Measure mode only when

- 1 the meter is receiving power
- 2 the RF cable is connected to the meter (on the back panel) and
- 3 your DSAM has been configured to conduct measurements (see “Configuring the Meter” on page 13).

Use the Help system on your DSAM to learn more about each measurement mode. Press **SHIFT+?** to find out what each option does, how it works, how to configure it, how to interpret the results, and more.

Performing signal level measurements

Level measurement mode views and analyzes the signal level of each carrier within a channel (as defined by the active channel plan).

To access Level mode, use the arrow keys to highlight the Level option on the Measure mode menu (Figure 13), and press **ENTER**. (Or, press the **SHIFT** key and the **LEVEL** softkey.) The first Level mode screen you see will look similar to Figure 14.

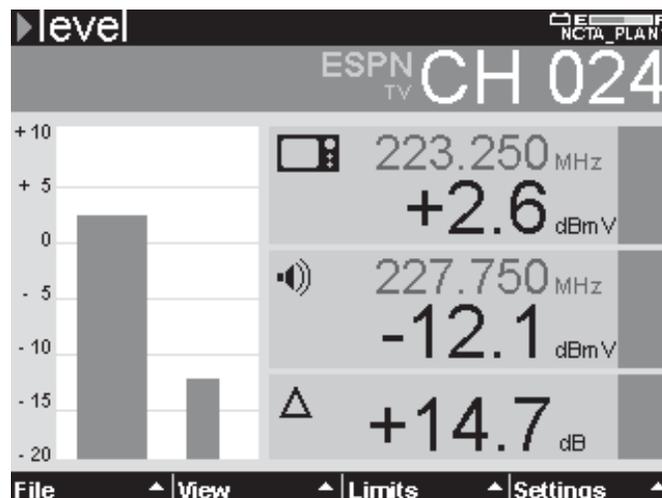


Figure 14 Level Mode Screen

To configure the Level measurement feature, select the channel plan to be tested and the tuning mode you prefer. If desired, you can select a set of measurement limits and the parameters of those limit sets.

Press **SHIFT+9** to automatically adjust the analog meter to the best reference setting. Use the arrow keys to adjust the setting by one (1) dB per key press.

The Help system offers additional instruction about these tasks.

Performing miniscan measurements

Miniscan Mode views and analyzes the carrier levels of up to twelve channels and displays the results on a single screen.

To access Miniscan Mode, use the arrow keys to highlight the Miniscan option on the Measure mode menu (Figure 13), and press **ENTER**. (Or, press the **SHIFT** key and the **MINISCAN** softkey.) The first Miniscan Mode screen you see will look similar to Figure 15.

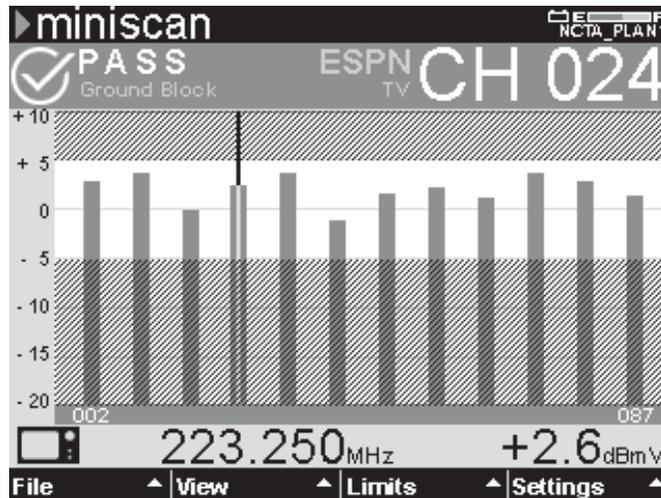


Figure 15 Miniscan Mode Screen

To configure the Miniscan measurement feature, select: the channel plan to be tested, up to twelve channels for Miniscan measurement, a set of measurement limits (based on test location), the parameters of those limit sets, and the resolution of the Miniscan graph for the best viewing.

Use the up and down arrow keys to adjust the reference setting of the graph by one (1) dB per key press. Use the right and left arrow keys to move the vertical marker to the next or previous channel.

The Help system offers additional instruction about these tasks.

Performing spectrum measurements

Upstream Spectrum Mode views and analyzes ingress and distortion on the upstream (return) path. Initial measurements typically occur at the ground block with the home disconnected from the network.

To access Upstream Spectrum Mode, use the arrow keys to highlight the Upstream Spectrum option on the Measure mode menu (Figure 13), and press **ENTER**. (Or, press the **SHIFT** key and the **SPECTRUM** softkey.) The first Upstream Spectrum mode screen you see will look similar to Figure 16.

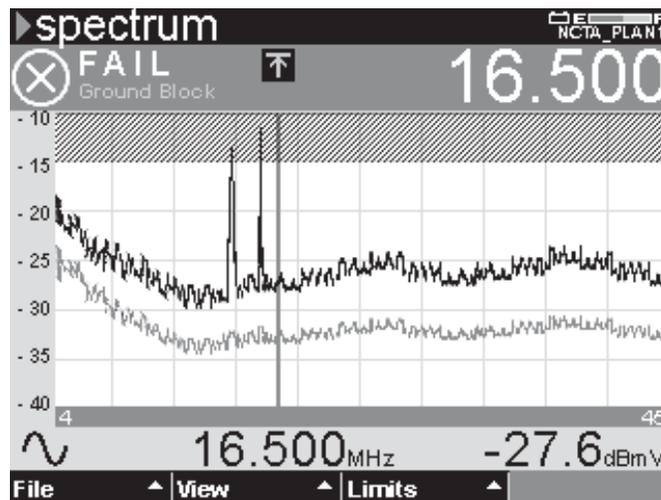


Figure 16 Upstream Spectrum Mode Screen

To configure Upstream Spectrum Mode, select the measurement limit option (or turn it off), and (if it is on) set an appropriate pass/fail limit value for your installation. Position the marker at each frequency to display the level value.

Use the up and down arrow keys to adjust the reference setting of the graph by one (1) dB per key press. Use the right and left arrow keys to move the vertical marker to the next or previous measurement data point.

The Help system offers additional instruction about these tasks.

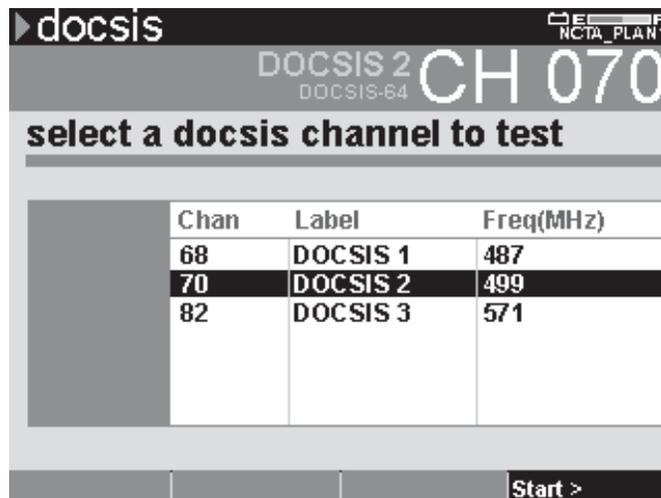
Prior to an installation, use upstream spectrum measurements to verify that the system does not exceed

the maximum acceptable level for ingress. After an installation, check the level again to compare the previous reading and confirm that install procedures or components did not create new sources of ingress.

Performing DOCSIS measurements

DOCSIS Mode analyzes the digital performance of user-selected DOCSIS channels to verify downstream/upstream connectivity. Only DOCSIS channels defined in the downstream (forward path) channel plan are available for DOCSIS measurement testing.

To access DOCSIS Mode, use the arrow keys to highlight the DOCSIS option on the Measure mode menu (Figure 13), and press **ENTER**. (Or, press the **SHIFT** key and the **DOCSIS** softkey.) The first DOCSIS mode screen you see will look similar to Figure 17.



The screenshot shows a terminal-style interface for DOCSIS mode. At the top, it says 'docsis' and 'NCTA_PLANT1'. Below that, it displays 'DOCSIS 2 CH 070' and 'DOCSIS-64'. The main heading is 'select a docsis channel to test'. A table lists three channels: Chan 68 (DOCSIS 1, 487 MHz), Chan 70 (DOCSIS 2, 499 MHz), and Chan 82 (DOCSIS 3, 571 MHz). The row for Chan 70 is highlighted. At the bottom right, there is a 'Start >' button.

Chan	Label	Freq(MHz)
68	DOCSIS 1	487
70	DOCSIS 2	499
82	DOCSIS 3	571

Figure 17 DOCSIS Mode Screen

To configure DOCSIS Mode:

- confirm that you are testing the correct channel plan (plan label is in upper right corner)
- confirm that you are testing the correct DOCSIS channel in that plan
- confirm (if required by the system administrator) that the roving MAC address on this meter is recognized by the CMTS

- select a set of measurement limits (based on test location), and
- if necessary, edit the parameters of the limit set you have selected.

The Help system offers additional instruction about these tasks.

Using AutoTest Mode

AutoTests are automated test sequences. Three types of user-configurable AutoTests are available on this meter:

- Combo AutoTest - a user-configured sequential combination of Video Channels AutoTest and Cable Modem AutoTest,
- Video Channels AutoTest - user-configured level measurements of a series of analog and/or digital video channels, and
- Cable Modem AutoTest - user-configured verification of upstream/downstream connectivity, ranging emulation, and quality parameter measurements of one or more DOCSIS channels.

Press the **AUTOTEST** mode key (Figure 3 on page 9) to display the AutoTest mode menu (Figure 18 on page 24). Use the arrow keys to highlight the type of AutoTest measurement you wish to perform and press **ENTER** to access that option.

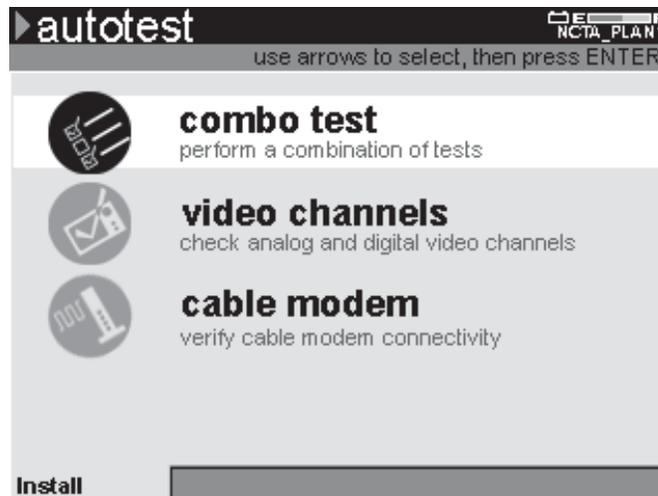


Figure 18 AutoTest Mode Menu

You are ready to perform tests in AutoTest mode only when

- 1 the meter is receiving power
- 2 the RF cable is connected to the meter (on the back panel) and
- 3 your DSAM has been configured to conduct AutoTest measurements (see “Configuring the Meter” on page 13).

Use the Help system on your DSAM to learn more about each AutoTest measurement mode. Press **SHIFT+?** to find out what each option does, how it works, how to configure it, how to interpret the results, and more.

Using Combo AutoTest

To access Combo AutoTest mode, use the arrow keys to highlight the ComboTest option on the AutoTest mode menu (Figure 18 on page 24), and press **ENTER**. The first Combo AutoTest mode screen you see will look similar to Figure 19 on page 25.

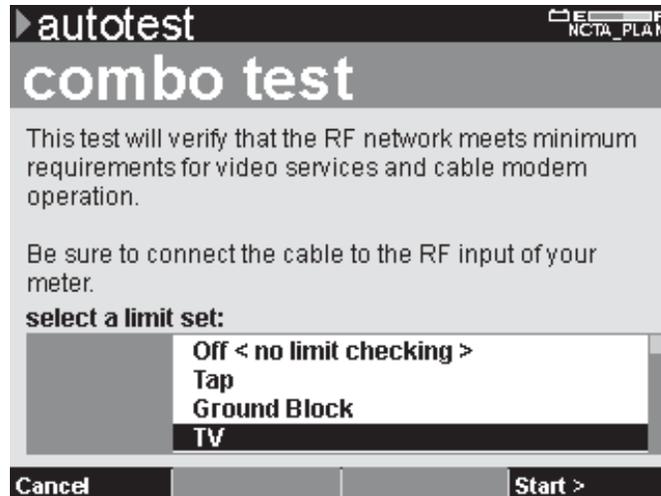


Figure 19 Combo AutoTest Mode Screen

Each Combo AutoTest is based on three types of configuration:

- 1 your configuration of one Video Channels AutoTest and one Cable Modem AutoTest,
- 2 the parameters of your limit sets, and
- 3 your selection of a set of measurement limits (based on test location).

The Help system offers additional instruction about these tasks.

After a limit set has been selected, press the **START** softkey and Combo AutoTest measures the signal performance of all assigned channels in the Combo Test configuration.

Using Video Channels AutoTest

To access Video Channels AutoTest mode, use the arrow keys to highlight the Video Channels option on the AutoTest mode menu (Figure 18 on page 24), and press **ENTER**. The first Video Channels AutoTest mode screen you see will look similar to the Combo AutoTest screen shown in Figure 19.

Each Video Channels AutoTest is based on three types of configuration:

- 1 the parameters of your limit sets,
- 2 your selection of channels to be tested, and
- 3 your selection of a set of measurement limits (based on test location).

The Help system offers additional instruction about these tasks.

After a limit set has been selected, press the **START** softkey (Figure 19 on page 25) and the AutoTest sequentially measures the signal performance of all assigned channels in the Video Channels AutoTest configuration.

Using Cable Modem AutoTest

To access Cable Modem AutoTest mode, use the arrow keys to highlight the Cable Modem option on the AutoTest mode menu (Figure 18 on page 24), and press **ENTER**. The first Cable Modem AutoTest mode screen you see will look similar to the Combo AutoTest screen shown in Figure 19 on page 25.

Cable Modem AutoTests are configured in the same manner as Video Channels AutoTests. To perform this test, first select

- 1 the parameters of your limit sets,
- 2 your selection of channels to be tested, and
- 3 your selection of a set of measurement limits (based on test location).

The Help system offers additional instruction about these tasks.

After a limit set has been selected, press the **START** softkey (Figure 19 on page 25) and the AutoTest sequentially measures the performance of all assigned channels in the Cable Modem AutoTest configuration.

Using Access Mode

Use Access mode to efficiently manage your measurement files and folders. You can also use Access to synchronize your data with optional DSAM PC utility software. The Help system offers additional instruction about these tasks.

Press the **ACCESS** mode key (Figure 3 on page 9) to display the Access mode menu (Figure 20). Use the arrow keys to highlight the task you wish to perform and press **ENTER**.



Figure 20 Access Mode Menu

Synchronizing your data

Use optional DSAM PC utility software to receive, transfer, manage, and archive the measurement data of this (and other) DSAM meters. You can also use synchronization with the software to receive firmware upgrades. Synchronize using the Ethernet port on the top of the meter or the RS-232 serial port on the battery charger module.

Managing files and folders

Use the Work Folders feature to create a new folder for your measurement files, rename or examine the properties of an existing folder, delete a folder that you no longer need, or delete (purge) all folders that have been synchronized with optional DSAM PC utility software.

Cloning DSAM Meters

Use the CLONE feature to transfer DSAM settings from or to this meter.

The Help system offers additional instruction about these tasks.

To access the CLONE configuration screen (Figure 21):

- 1 press the **CONFIGURE** mode key,
- 2 press the **GENERAL** softkey to display the Configure General mode menu (Figure 9 on page 13), and
- 3 use the arrow keys to highlight **Clone** and press **ENTER**.

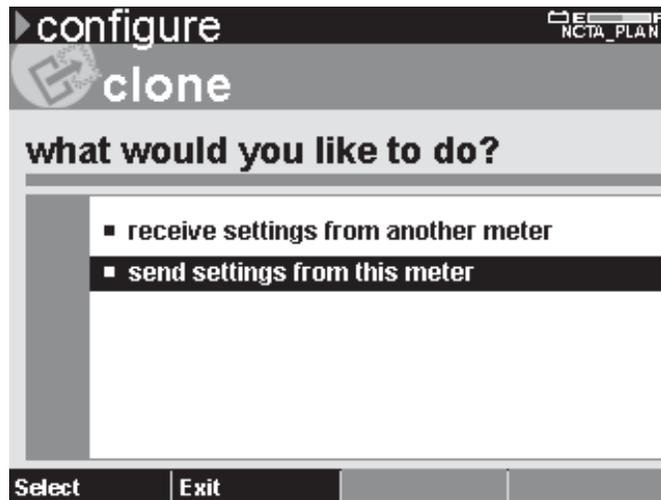


Figure 21 Configure General Clone Screen

Use an Ethernet crossover cable or a standard Ethernet cable with a crossover adapter to connect the DSAM meters. The Ethernet port is on the top of the meter.

Replacing the Protective Lens

Your DSAM-2500 is shipped with one protective lens covering the display screen and five additional protective lenses. These lenses are coated on both sides, so you need not worry about which side of the lens should face up or down. We recommend that you use only one lens at a time to protect the display screen. Replace the lens as it becomes damaged, smudged, or soiled.

To replace a lens, follow these steps:

- 1** Gently insert your fingernail or a small coin into the thin rectangular notch centered directly below the display screen and push forward (not down) until the installed lens begins to bend at the sides in the shape of a small arc. **Caution: To avoid display screen damage, do not use sharp objects (such as hand tools or writing implements) to perform this step.**
- 2** With the other hand, gently grab the sides of the lens and pull the lens tabs out of the holes in the meter
- 3** Insert the tabs of the replacement lens into the holes at the top of the display screen and gently bend the lens to insert the tabs at the bottom of the lens into the holes at the bottom of the screen.

Getting Technical Assistance

If you have questions related to the use of this product, call or email Acterna's Technical Assistance Center (TAC) for customer support.

Americas	1-866-ACTERNA	(1-866-228-3762)
	301-353-1550	tac@acterna.com
	941-752-9222	catv.support@acterna.com
Europe	+800 882 85822	support.uk@acterna.com
	+49 (0) 6172 59 11 00	(Germany)
	+33 (0) 1 39 30 24 24	(France)

Warranty Information

The warranties described herein shall apply to all commercially available Acterna products. Any additional or different warranties shall apply only if agreed to by Acterna in writing. These warranties are not transferable without the express written consent of Acterna.

Hardware Warranty — Acterna warrants that Hardware Product sold to customer shall, under normal use and service, be free from defects in materials and workmanship. The warranty period shall be one (1) year for mainframes and options (parts and labor), and (1) one year for accessories and field-replaceable batteries. If installation services have been ordered, the warranty period shall begin on the earlier of (1) completion of installation, or (2) thirty (30) days after shipment to Customer. If Installation Services have not been ordered, the warranty

period shall begin upon shipment to Customer. Hereafter these periods of time shall be collectively referred to as the “Initial Warranty Period.”

Acterna’s obligation and customer’s sole remedy under this Hardware Warranty is limited to the repair or replacement, at Acterna’s option, of the defective product. Acterna shall have no obligation to remedy any such defect if it can be shown: (a) that the Product was altered, repaired, or reworked by any party other than Acterna without Acterna’s written consent; (b) that such defects were the result of customer’s improper storage, mishandling, abuse, or misuse of Product; (c) that such defects were the result of customer’s use of Product in conjunction with equipment electronically or mechanically incompatible or of an inferior quality; or (d) that the defect was the result of damage by fire, explosion, power failure, or any act of nature.

Acterna warrants that Products returned to Acterna for repair shall be warranted from defective materials and workmanship for one (1) year for the same repair issue, and ninety (90) days for a different repair issue from date of shipment from Acterna to customer, or until the end of the Initial Warranty Period, whichever is longer. Risk of loss or damage to Product returned to Acterna for repair or replacement shall be borne by customer until delivery to Acterna. Upon delivery of such product, Acterna shall assume the risk of loss or damage until that time that the product being repaired or replaced is returned and delivered to customer. Customer shall pay all transportation costs for equipment or software shipped to Acterna for repair or replacement. Acterna shall pay all transportation costs associated with returning repaired or replaced product to customer.

Software Warranty — Acterna warrants that Software Products licensed to Customer shall, under normal use and service, and for a period of ninety (90) days from the date of shipment of the Software to Licensee (the “Warranty Period”), perform in all material respects in accordance with the published specifications for such Software as established by Acterna. However, Acterna does not warrant that the Software will operate uninterrupted or error free,

operate in the combination with other software, meet Customer's requirements, or that its use will be uninterrupted.

Acterna's obligation and Customer's sole and exclusive remedy under this Software Warranty is limited to, at Acterna's option, either (i) correcting the material errors reported to Acterna in writing by Customer during the Warranty Period and which Acterna is able to reproduce, (ii) replacing such defective Software, provided that Acterna received written notice of such defect within the Warranty Period, or (iii) provided that Acterna received written notice of such defect within the Warranty Period, terminating the License and, upon return to Acterna of the Software, Documentation and all other materials provided by Acterna under the applicable License, providing Customer with a refund of all charges paid with respect thereto. Acterna shall have no warranty obligations hereunder if (a) the Software is altered or modified or is merged with other software by Customer or any third party or (b) all or any part of the Software is installed on any computer equipment other than the Designated Server or used with any operating system for which the Software is not designed.

Services Warranty — Acterna warrants that the Services provided by Acterna, if any, shall be performed promptly, diligently and in a professional manner in accordance with the commercial standards of the industry. Acterna shall not, however, be responsible for any delays that are not due to Acterna's fault or negligence or that could not have reasonably been foreseen or provided against.

WARRANTY DISCLAIMER — FOR HARDWARE, SOFTWARE, AND/OR SERVICES FURNISHED BY ACTERNA, THE FOREGOING WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES AND CONDITIONS, EXPRESS OR IMPLIED. ACTERNA SPECIFICALLY DISCLAIMS ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, ON ANY HARDWARE, SOFTWARE, DOCUMENTATION OR SERVICES INCLUDING BUT NOT LIMITED TO WARRANTIES RELATING TO QUALITY, PERFORMANCE, NONINFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AS

WELL AS THOSE ARISING FROM ANY COURSE OF DEALING, USAGE OR TRADE PRACTICE. UNDER NO CIRCUMSTANCES WILL ACTERNA BE LIABLE FOR ANY INDIRECT OR CONSEQUENTIAL DAMAGES RELATED TO BREACH OF THIS WARRANTY.

Equipment Return Instructions

For each piece of equipment returned for repair, attach a tag that includes the following information:

- Owner's name, address, and telephone number.
- The serial number, product type, and model.
- Warranty status. (If you are unsure of the warranty status of your instrument, contact Acterna Customer Service.)
- A detailed description of the problem or service requested.
- The name and telephone number of the person to contact regarding questions about the repair.
- The return authorization (RA) number (US customers), or reference number (European Customers).

If possible, return the equipment using the original shipping container and material. If the original container is not available, the meter should be carefully packed so that it will not be damaged in transit; when needed, appropriate packing materials can be obtained by contacting Acterna Customer Services. Acterna is not liable for any damage that may occur during shipping. The customer should clearly mark the Acterna-issued RA or reference number on the outside of the package and ship it prepaid and insured to Acterna.

DSAM-2500 Specifications

Table 2 DSAM-2500 Specifications

Item	Description
Frequency	
Range	4 to 1,000 MHz
Accuracy	±10 ppm at 25° C (77° F)
Tuning Resolution	Analog 10 KHz Digital 50 KHz
Channel Bandwidth	DSAM-2500A - 8 MHz DSAM-2500B - 6 MHz
Analog Level Measurement	
Signal Types	CW, video and audio (NTSC, PAL, and SECAM)
Range (1)	-40 to +60 dBmV
Resolution	0.1 dB
Resolution Bandwidth	330 KHz
Accuracy (2)	± 1.5 dB typical at 25° C (77° F)
Digital Level Measurement	
Modulation Types	QPR, QPSK, QAM (DVB/ACTS)
Range (1)	-40 to +60 dBmV
Resolution	0.1 dB
Resolution Bandwidth	330 kHz
Accuracy (2)	± 2.0 dB typical at 25° C (77° F)
Upstream Spectrum (Ingress Scan)	
Spans	DSAM-2500A - 4 to 65 MHz DSAM-2500B - 4 to 45 MHz
Sweep Rate	1.8 seconds or faster
Display Scaling and Range	5 and 10 dB/division; 6 vertical divisions
Resolution Bandwidth	330 kHz
Sensitivity (1)	-35 to +60 dBmV

Table 2 DSAM-2500 Specifications (Continued)

Item	Description
DOCSIS/EuroDOCSIS Compatibility	
Version	DOCSIS 1.0 and 1.1
Upstream Transmit Range and Diplexer Crossover (DOCSIS modes only)	DSAM-2500A - 5 to 65 MHz 65/96MHz (min. downstream DOCSIS center freq. 100 MHz) DSAM-2500B - 5 to 42 MHz 42/88 MHz (min. downstream DOCSIS center freq. 91 MHz)
Upstream Modulation	QPSK and 16 QAM as instructed by CMTS
Transmitter Output	At 25°C maximum 55 dBmV with 16 QAM and 58 dBmV with QPSK, (typical)
Downstream QAM Demodulation	
Modulation Type	64 and 256 QAM, ITU-T J.83 Annex A, B, or C (selectable)
Input Range (Lock Range) (3)	-15 to +50 dBmV total integrated power from 55 to 1000 MHz
BER (Bit Error Rate) (4)	Pre and Post FEC: 10^{-4} to 10^{-9}
MER (Modulation Error Ratio) (4)	Range 64 QAM: 21 to 35 dB Accuracy: ± 2 dB (typical) Range 256 QAM: 28 to 35 dB Accuracy: ± 2 dB (typical)
EVM (Error Vector Magnitude) (4)	Range 64 QAM: 1.2%-5.8% Accuracy: $\pm 0.5\%$ (1.2% to 2.0%) $\pm 1.0\%$ (2.1% to 4.0%) $\pm 1.4\%$ (4.1% to 5.8%) Range 256 QAM: 1.1% to 2.4% Accuracy: $\pm 0.6\%$

Table 2 DSAM-2500 Specifications (Continued)

Item	Description
Symbol Rate	Annex A, 5.057 to 6.952 Msps for 64 and 256 QAM Annex B, 5.057 Msps for 64 QAM and 5.361 Msps for 256 QAM Annex C, 5.274 Msps for 64 QAM, and 5.361 Msps for 256 QAM
Interfaces	
RF	75 ohm, F81 or BNC option
Maximum Sustained Voltage	100V AC 140V DC
RS232	Standard via DB9 on charger module or optional direct cable
Printer Compatibility	Epson and Citizen
Ethernet	RJ45, 10 base T, TCP/IP, and UDP supported
USB	v1.1 host mode, 150 mA maximum slave (future firmware release)
General	
Language Support (User interface and Help System)	English in all models. No-charge second language option of Spanish, French, or German
Display	320x240 pixels, gray scale, selectable backlight
Dimensions	12 cm (W) 25 cm (H) 7 cm (D) 4.75" (W) 9.75" (H) 2.75" (D)
Weight	2 pounds, 12 ounces (1.3kg)
Storage and Operating Temperature Range	-20 to +50°C; 0 to 120°F

Specification (1) Typical, detectable range.

Notes:

(2) Accuracy for levels between -20 to +60 dBmV (typical); Additional uncertainty of ± 1.0 dB from 4MHz to 15 MHz; Additional uncertainty of ± 0.5 dB across -20°C to +50°C.

(3) At 64 QAM.

(4) Accuracy and behavior from 100-1000 MHz for levels between -5 to +50 dBmV (typical).

Power Component Specifications

Table 3 Power Component Specifications

Item	Description
Charger Module	
Input	
Operational voltage range	11 to 14VDC (nominal = 12V DC)
Input protection	Reverse polarity; ESD
Connector	2.5 mm coaxial
Environmental	
Operational temperature range	0 to +120 °F / -20 to +50 °C
Storage temperature range	0 to +176 °F / -20 to +80 °C
High fast-charge inhibit range	140 °F / 60 °C (± 5 °C)
Low fast charge inhibit range	32 °F / 0 °C (± 5 °C)
Humidity range	0 to 95% RH (non condensing)
Output - NiMH Battery	
Battery life	3 hours (typical)
Fast charge rate	1000mA ± 10% @ 7.2V
Maximum charge time	Up to 5 hours
Output - Li-Ion Battery	
Battery life	4.5 Hours (typical)
Fast charge rate	1000mA ± 10% @ 7.4V
Maximum charge time	Up to 6.5 hours
Power Supply Module	
Input	
AC Input Voltage Range	90 - 264 VAC
AC Input Frequency	47 - 63 Hz
Output	
Output Voltage	+12VDC
Maximum Load Current	2A

**Worldwide
Headquarters**

20400 Observation Drive
Germantown, Maryland
20876-4023
USA

Acterna is present in more than 80 countries. To find your local sales office go to:
www.acterna.com

**Regional Sales
Headquarters**

North America

20400 Observation Drive
Germantown, Maryland
20876-4023
USA

Toll Free: +1 866 228 3762
Tel: +1 301 353 1550
Fax: +1 301 444 8468

Latin America

Av. Eng. Luis Carlos Berrini
936/8^a e 9^a andares
04571-000 São Paulo
SP-Brasil
Tel: +55 11 5503 3800
Fax: +55 11 5505 1598

Asia Pacific

42 Clarendon Street
PO Box 141
South Melbourne
Victoria 3205
Australia
Tel: +61 3 9690 6700
Fax: +61 3 9690 6750

Western Europe

Arbachtalstrasse 6
72800 Eningen u.A.
Germany
Tel: +49 7121 86 2222
Fax: +49 7121 86 1222

**Eastern Europe,
Middle East & Africa**

Elisabethstrasse 36
2500 Baden
Austria
Tel: +43 2252 85 5210
Fax: +43 2252 80 727

1st Neopalmovskiy Per.
15/7 (4th floor)
RF 119121 Moscow
Russia
Tel: +7 095 248 2508
Fax: +7 095 248 4189

© Copyright 2002
Acterna, LLC.
All rights reserved.

Acterna and its logo are trademarks of Acterna, LLC. All other trademarks and registered trademarks are the property of their respective owners. Major Acterna operations sites are ISO 9001 registered.

Note: Specifications, terms and conditions are subject to change without notice.



6510-30-0384
Rev. B, 06/02
English