

DSAM Product Family Series

Wavetek™ Series Field Meter

Quick-Start Guide

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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.

WEEE Directive Compliance JDSU has established processes in compliance with the Waste Electrical and Electronic Equipment (WEEE) Directive, 2002/96/EC.

This product should not be disposed of as unsorted municipal waste and should be collected separately and disposed of according to your national regulations. In the European Union, all equipment purchased from JDSU after 2005-08-13 can be returned for disposal at the end of its useful life. JDSU will ensure that all waste equipment returned is reused, recycled, or disposed of in an environmentally friendly manner, and in compliance with all applicable national and international waste legislation.

It is the responsibility of the equipment owner to return the equipment to JDSU for appropriate disposal. If the equipment was imported by a reseller whose name or logo is marked on the equipment, then the owner should return the equipment directly to the reseller.

Instructions for returning waste equipment to JDSU can be found in the Environmental section of JDSU's web site at www.jdsu.com. If you have questions concerning disposal of your equipment, contact JDSU's WEEE Program Management team at WEEE.EMEA@jdsu.com.

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About This Guide

This chapter describes how to use this guide. Topics discussed in this chapter include the following:

- “Purpose and Scope” on page viii
- “Assumptions” on page viii
- “Technical Assistance” on page viii
- “Conventions” on page ix

Purpose and Scope

The purpose of this guide is to help you successfully use the DSAM meter features and capabilities.

This guide includes task-based instructions that describe how to use and obtain support for the DSAM meter. Additionally, this guide provides a description of JDSU's warranty.

Assumptions

This guide is intended for novice, intermediate, and experienced users who want to use the DSAM meter effectively and efficiently. We are assuming that you have basic computer and mouse/track ball experience and are familiar with basic telecommunication concepts and terminology.

Technical Assistance

If you need assistance or have questions related to the use of this product, call or e-mail JDSU's Cable Technical Assistance Center for customer support.

Table 1 Technical Assistance Centers

Region	Phone Number	
Americas	+1 866 228 3762 (America)	tac@jdsu.com
	+1 301 353 1550 (World Wide)	
Cable TV/ Multimedia Products	+1 800 428 4424 Ext. 8350 (America)	catv.support@jdsu.com
	+1 317 788 9351 Ext. 8350 (World Wide)	

Table 1 Technical Assistance Centers (Continued)

Region	Phone Number	
Europe, Africa, and Mid-East	+49 (0) 7121 86 1345 (Europe)	hotline.europe@jdsu.com
	+800 882 85822 (European Freephone)	support.uk@jdsu.com
	+49 (0) 6172 59 11 00 (JDSU Germany)	hotline.germany@jdsu.com
	+33 (0) 1 39 30 24 24 (JDSU France)	hotline.germany@jdsu.com
Asia Pacific	+852 2892 0990 (Hong Kong)	
	+86 10 6655 5988 (Beijing-China)	
All others	+1 866 228 3762	tac@jdsu.com

During off-hours, you can request assistance by doing one of the following: leave a voice mail message at the Technical Assistance number in your region; e-mail North American Technical Assistance Center, tac@jdsu.com, or European Technical Assistance Center, support.uk@jdsu.com; or submit your question using our online Technical Assistance Request form at www.jdsu.com.

Conventions

This guide uses naming conventions and symbols, as described in the following tables.

Table 2 Typographical Conventions

Description	Example
User interface actions appear in this typeface .	On the Status bar, click Start .
Buttons or switches that you press on a unit appear in this Typeface .	Press the On switch.
Code and output messages appear in this <code>typeface</code> .	All results okay
Text you must type exactly as shown appears in this <code>typeface</code> .	Type: a: \set.exe in the dialog box
Variables appear in this <i>typeface</i> .	Type the new <i>hostname</i> .
Book references appear in this <i>typeface</i> .	Refer to <i>Newton's Telecom Dictionary</i>
A vertical bar means "or": only one option can appear in a single command.	platform [a b e]
Square brackets [] indicate an optional argument.	login [platform name]
Slanted brackets < > group required arguments.	<password>

Table 3 Keyboard and Menu Conventions

Description	Example
A plus sign + indicates simultaneous keystrokes.	Press Ctrl+s
A comma indicates consecutive key strokes.	Press Alt+f,s
A slanted bracket indicates choosing a submenu from menu.	On the menu bar, click Start > Program Files .

Table 4 Symbol Conventions



This symbol represents a general hazard.



This symbol represents a risk of electrical shock.



NOTE

This symbol represents a Note indicating related information or tip.

Table 5 Safety Definitions



WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Safety Instructions

1

This chapter describes DSAM meter Safety Instructions. The topics discussed in this chapter are as follows:

- [“Important Safety Instructions” on page 2](#)

Important Safety Instructions

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

- 1 Read all instructions in this section regarding the meter, battery and universal power supply.
- 2 Keep these instructions for future reference.
- 3 Pay attention to 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 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 JDSU.
- 2 When powering the meter, maintain the secure connection of each power component.
- 3 Use only JDSU-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

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.



WARNING

Do not disassemble the meter.

Do not attempt to service this product yourself. There are no user-serviceable parts inside. Contact the appropriate JDSU 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 battery:

These safety precautions apply to the use of the Li-Ion battery supporting the DSAM meter.

- 1 Power the meter only with battery types approved for use by JDSU.
- 2 Do not disassemble or attempt to service the battery.
- 3 Do not place the battery on a conductive surface.
- 4 Do not allow metal objects to touch the battery contacts.
- 5 Charge the battery only with the specified charger.
- 6 Keep the battery away from heat sources near or above 60° C (140° F).

7 Operate and store the battery only within the following ranges:

Li-Ion

- Charging
0 to +45° C
(+32° to +113° F)
- Discharge
-20° to +60° C
(-4° to +140° F)
- Short term storage (30 days or less)
-20° to +60° C
(-4° to +140° F)
- Long term storage (90 days or less)
-20° to +45° C
(-4 to +113° F)
- Long term storage (1 year +)
-20° to +20° C
(-4° to +68° F)



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.

**Battery 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 power supply module:

- 1 When powering the meter, maintain the secure connection of each power component.
- 2 Use only JDSU-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.

Chapter 1 Safety Instructions
Important Safety Instructions

DSAM Meter Operation

2

This chapter describes the functionality of the DSAM meter. Topics discussed in this chapter are as follows:

- “Product Overview” on page 8
- “Initial Set-Up” on page 9
- “Powering the Meter” on page 13
- “Using the Keypad” on page 16
- “Custom Shortcuts” on page 21
- “Configuring the Meter” on page 23
- “Using Measure Mode” on page 29
- “Using AutoTests Mode” on page 40
- “Using Access Mode” on page 47
- “DSAM Firmware Upgrade Instructions” on page 49
- “Cloning DSAM Meters” on page 52
- “Replacing the Lens” on page 53

Product Overview

The DSAM Product Family provides a combination of DOCSIS®/EuroDOCSIS® cable modem installation meters 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 meter 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.

JDSU has incorporated exclusive DSP, DOCSIS®, and analog technology to enhance your DSAM meter'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 TPP and FDM utility software.

Using This Quick-Start Guide

We know you want to get the most out of your DSAM meter 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 meter effectively.

We encourage you to read this guide completely and to take advantage of the extensive Help system on your DSAM meter (see ["Custom Shortcuts" on page 21](#)).

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

Typically your DSAM meter is shipped with the following accessories:

- One (1) Hi-Capacity Li-Ion rechargeable battery
- One (1) 12 volt DC universal power supply module
- One (1) power cord
- One (1) 12-volt DC in-vehicle power cable
- One (1) protective soft case
- One (1) shoulder strap
- One (1) installed replaceable lens
- One (1) quick-start guide

Many optional accessories are available to extend your DSAM meter's functionality, versatility, and ease of use. Learn more about optional DSAM accessories at this Internet address: www.jdsu.com/products/cable/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.

Removing the Battery

- 1 Ensure the power is off.



CAUTION INSTRUMENT DAMAGE

Failure to turn the power off before removing the batteries from the DSAM meter could damage internal components and/or corrupt the software. Always power down the unit before removing the batteries.

- 2 Hold the meter securely with the display screen facing away from you and the keypad in the palm of your hand.
- 3 Press the release button (Figure 1) located directly above the battery in the center of the back of the meter.



Figure 1 Back of DSAM Meter

- 4 When released, gently pull the battery out of the cavity in the back of the meter

Battery to External Power Connection



IMPORTANT

Read all safety instructions in the front of this guide before attempting to power the meter or charge the battery (see [“Important Safety Instructions” on page 2](#)).

Connect the external power components to the DSAM battery as follows: ([Figure 2 on page 12](#))

- 1 Align the 12 volt DC universal power supply module connector (or DC connector) with the DC connection port in the battery.
- 2 Insert the connector into the connection port.
- 3 Align the female connector of the power cord with the 12 volt DC universal power supply connection port.
- 4 Insert the connector into the connection port.



WARNING ELECTRICAL SHOCK

Electrical shock may result in serious injury or death. Be sure the AC cord is connected to the correct voltage mains. Do not use outdoors or in wet locations. Use only the universal power supply supplied with the test set.

- 5 Connect the male connection of the power cord to an AC power source when you are ready to power the meter or charge the battery.

NOTE

If you are using the DC connector, connect it to an appropriate 12-volt DC power source.

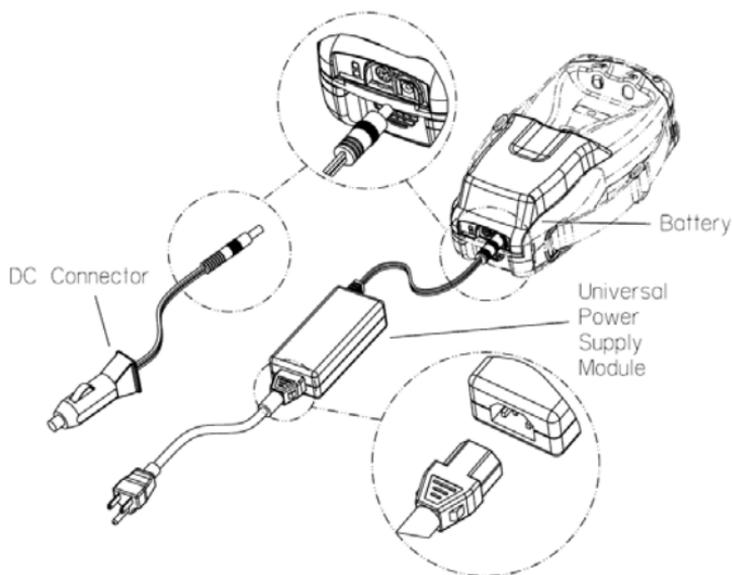


Figure 2 External Power Components

Connecting the RF Cable To conduct measurements with your DSAM meter, 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 52](#)) or to synchronize your data with optional FDM utility software (see [“Using Access Mode” on page 47](#)).

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

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 [“Important Safety Instructions” on page 2](#)).

Selecting a Power Option

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

- DC power from the universal power supply connected to an AC power source,
- DC power from the battery alone, or
- DC power using the 12-volt DC in-vehicle cable connected to 12-volt DC power source.

Battery Care

Battery life and instrument runtime will be maximized if best practices are followed.

- 1 Charge your new DSAM battery for a minimum of 12 hours prior to first use. The charge indicator on the DSAM charger will change from a steady red light to a steady green light.
- 2 Fully charge your DSAM battery every evening. A normal full charge cycle typically takes 12 hours. Removal of the battery from the instrument is not required, but is suggested periodically to allow the natural wiping action of the unit contact pins to clean the battery contacts.
- 3 In-vehicle charging as the primary method of charging the battery is **NOT** recommended. A typical in-vehicle charging scenario will have multiple power cycles as you turn on and off the vehicle or go to multiple service calls which does not allow the battery to fully charge.

Charging the Battery With the power components properly connected (see [“External Power Components” on page 12](#)) the DSAM battery can be charged when outside of the meter or when installed in the meter.

NOTE

You can power the DSAM meter and recharge the batteries at the same time.

- 1 For typical battery charging (fast charge or maximum capacity) and normal operational values, refer to [Table 5](#).

Table 5 Battery Charge and Operation Values

Item	Charge Time
Battery 11 AH (Amp Hour)	
Fast Charge Period	≥ 7.0 Hours
Normal Operation	5.0-8.0 Hours typical
Complete Charge	Approximately 10 to 12 Hours

- 2 For battery charge LED indications refer to [Table 6 on page 15](#).

The charging time will be the same whether the power is on or off.

When you power the meter directly with an AC or a DC power source, this source automatically charges the battery while providing power 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.

Interpreting the Battery LED’s There are two LED indicator lights located on the bottom of your DSAM battery (refer to [Figure 3 on page 15](#)) – the red “CHARGE” LED and the green “OK” LED.



Figure 3 DSAM Battery

The green “OK” LED illuminates to indicate that the battery is completely charged.

The red “CHARGE” LED illuminates to indicate the present charge condition. Under normal charging conditions, this LED should remain on constantly. A flashing LED is indicative of a fault condition. To interpret the “CHARGE” LED indications, review [Table 6](#).

Table 6 Charge LED indications

LED color	State	Battery and charge condition
Red (CHARGE)	Steady	Charging
	Flashing	Charge fault check: <ul style="list-style-type: none">– Temp too high/low or,– DC too high/low or,– Internal fault
Green (OK)	Steady	Charge Complete

For information about the charger module’s specifications, see [Table 9 on page 64](#).

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

Using the Keypad

Below the display screen on the front panel of your DSAM meter ([Figure 4 on page 17](#)) is a keypad used to perform all functions of the meter.



Figure 4 DSAM Meter 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 5](#)) 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 5](#)) to directly access the top level menu of features associated with each mode.



Figure 5 DSAM Meter Mode Keys

Press the **AutoTest** mode key to display the AutoTest mode menu (see [Figure 29 on page 42](#)).

Press the **Measure** mode key to display the Measure mode menu (see [Figure 15 on page 30](#)).

Press the **Access** mode key to display the Access mode menu (see [Figure 35 on page 48](#)).

Press the **Configure** mode key to display the Configure mode menu (see [Figure 11 on page 24](#)).

Using the Display Softkeys 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 6](#), the softkey below **Limits** was pressed to access the **Limits** pop-up menu in Level Mode.

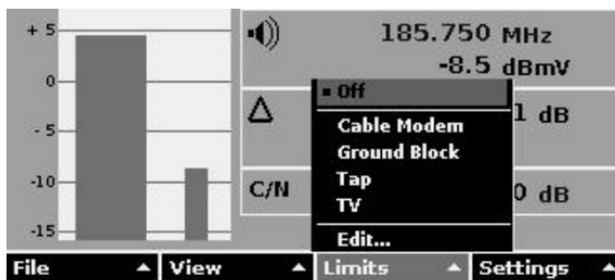


Figure 6 “Limits” Softkey Selected

In [Figure 7](#), 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.

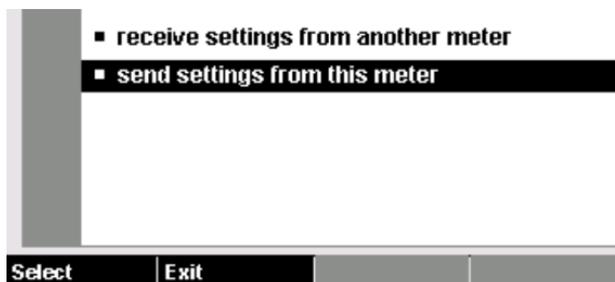


Figure 7 “Select” and “Exit” Softkey Options

Using Shift Key Shortcuts Use the **Shift** key ([Figure 4 on page 17](#)) 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. Also refer to [Table 7 on page 20](#).

A quick way to access the Level, Mini Scan, Spectrum, and DOCSIS® is to press the **Shift** key to display the options above each softkey and press the softkey directly under the option of your choice. Refer to [Figure 8](#).

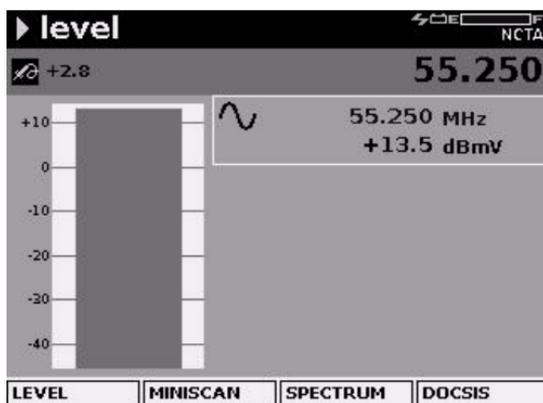


Figure 8 Shift Key - Softkey Options

Table 7 Shift Key Shortcuts

Key Sequence	Icon	Description
Shift, 3		Displays Configure Adjust Sounds screen.
Shift, 4		Displays Configure Test Point Compensation screen.
Shift, 5		Displays topic related help text.

Table 7 Shift Key Shortcuts

Key Sequence	Icon	Description
Shift, 6		Displays Meter Info screen.
Shift, 7		Displays Configure Adjust Contrast screen.
Shift, 8		Pause (used in some measurement modes).
Shift, 9		Automatically adjust the analog meter to the best reference setting. Use the arrow keys to adjust the setting by one (1) dB per key.
Shift, .		Not Currently Used.
Shift, 0		Allows you to enter a + (positive) or - (negative) numeric value.
Shift, CLEAR		Not Currently Used.
Shift, Shift		Power the display backlight on or off.

Custom Shortcuts To increase efficiency between commonly accessed modes, shortcut links can be customized to point to any measurement mode in the instrument.



Figure 9 Custom Shortcut Configuration

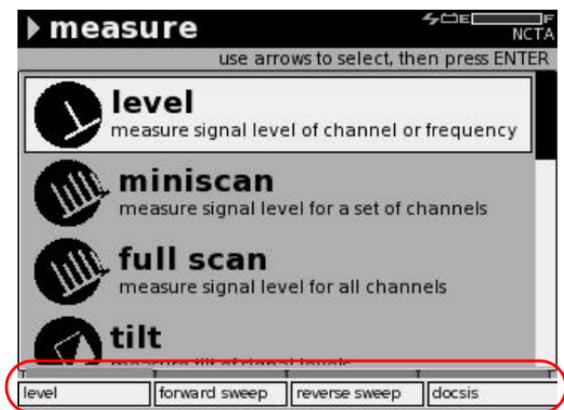


Figure 10 Custom Shortcuts Displayed After Pressing “Shift” Key

Using the Help System

Your DSAM meter 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.

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

Configuring the Meter

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

It is recommended to use the JDSU TechComplete Test Productivity Pack (TPP) software or the FDM-100 software to configure the DSAM meter.

Selecting a Configuration Mode To view the Configure General menu (see [Figure 11 on page 24](#)), press the **Configure** mode key ([Figure 5 on page 18](#)), then press the **General** softkey.



Figure 11 Configure Mode General Menu

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 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
- configure custom shortcuts

Language Selection and Local Preferences Select **Regional Preferences** 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 12 on page 26), press the **Configure** mode key (Figure 5 on page 18), then press the **Measure** softkey.

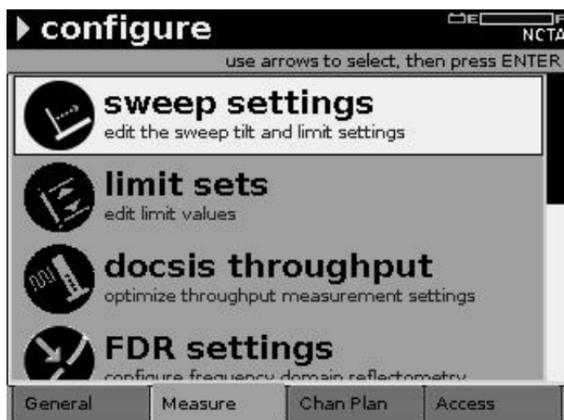


Figure 12 Configure Mode Measure Menu

Use measure configuration to specify:

- sweep settings
- limit sets
- DOCSIS® throughput
- FDR settings
- other (measurement) settings, such as the roving MAC address for cable modem tests
- VoIPCheck
- test point compensation
- loopback reference

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 menu (Figure 13), press the **Configure** mode key (Figure 5 on page 18), then press the **Channel Plan** softkey.



Figure 13 Configure Mode Channel Plan Menu

Your DSAM meter has a default (NCTA) channel plan. You can build, clone, or synchronize customized plans.

Use channel plan configuration to:

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

Access Configuration To view the Configure Access menu (Figure 14), press the **Configure** mode key (Figure 5 on page 18), then press the **Access** softkey.



Figure 14 Configure Mode Access Menu

Use pc connection to select your preferred PC connection (Ethernet or RF) to TPP or FDM and to define its IP address.

Use WFA browser settings to enter the preferred ethernet or RF connection, home URL, proxy server parameters (optional) and CM diagnostic web page information.

The pc connection is a critical setting for connecting to the TPP or FDM-100 for meter configuration.

Refer to [“DSAM Firmware Upgrade Instructions” on page 49](#).

Using Measure Mode

Measurement modes are indicated by softkey tabs at the bottom of the display screen – **Basic**, **Service**, **Spectrum** and **Sweep**. Each measurement mode has a menu of measurement items specific to that mode.

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

You are ready to perform tests in Measure mode only when:

- The meter is receiving power
- The RF cable is connected to the meter (on the back panel)
- Your DSAM meter has been configured to conduct measurements (see [“Configuring the Meter” on page 23](#))

Basic Menu To view the Measure Basic menu ([Figure 15 on page 30](#)), press the **Measure** mode key ([Figure 5 on page 18](#)), then press the **Basic** softkey. Use the arrow keys to highlight the type of measurement you wish to perform and press **Enter** to access that option.

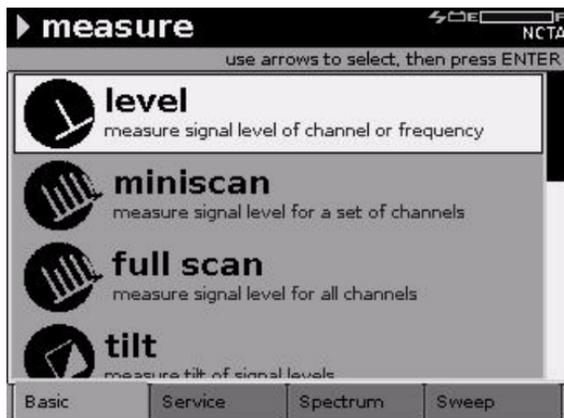


Figure 15 Measure Mode Basic Menu

Service Menu To view the Measure Service menu ([Figure 16 on page 30](#)), press the **Measure** mode key ([Figure 5 on page 18](#)), then press the **Service** softkey. Use the arrow keys to highlight the type of measurement you wish to perform and press **Enter** to access that option.

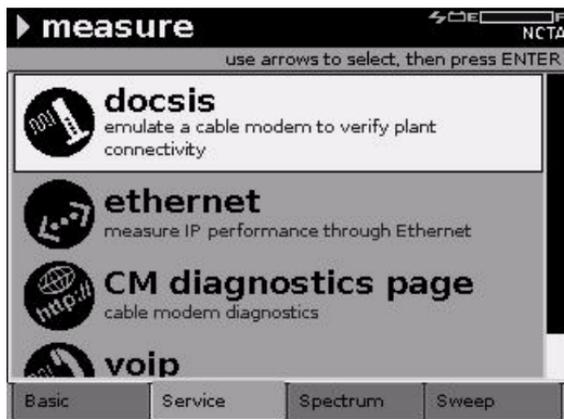


Figure 16 Measure Mode Service Menu

Spectrum Menu To view the Measure Spectrum menu (Figure 17), press the **Measure** mode key (Figure 5 on page 18), then press the **Spectrum** softkey. Use the arrow keys to highlight the type of measurement you wish to perform and press **Enter** to access that option.

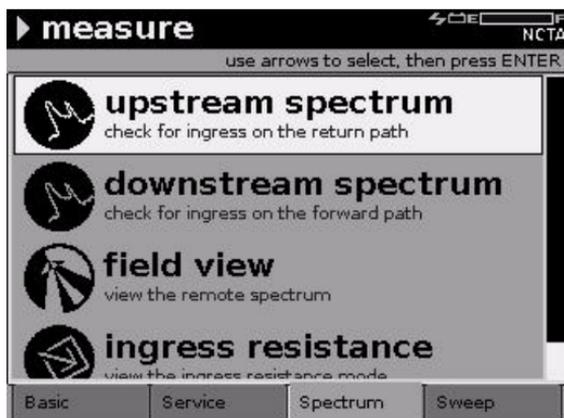


Figure 17 Measure Mode Spectrum Menu

Sweep Menu To view the Measure Sweep menu (Figure 18 on page 32), press the **Measure** mode key (Figure 5 on page 18), then press the **Sweep** softkey. Use the arrow keys to highlight the type of measurement you wish to perform and press **Enter** to access that option.

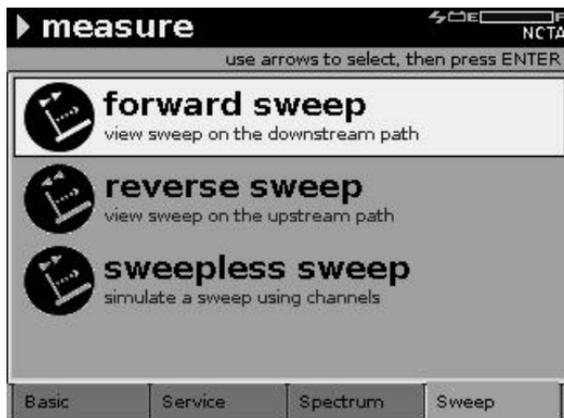


Figure 18 Measure Mode Sweep Menu

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 15 on page 30), and press **Enter**. (Or, press the **Shift** key and the **Level** softkey.) The first Level mode screen you see will look similar to Figure 19 on page 33.

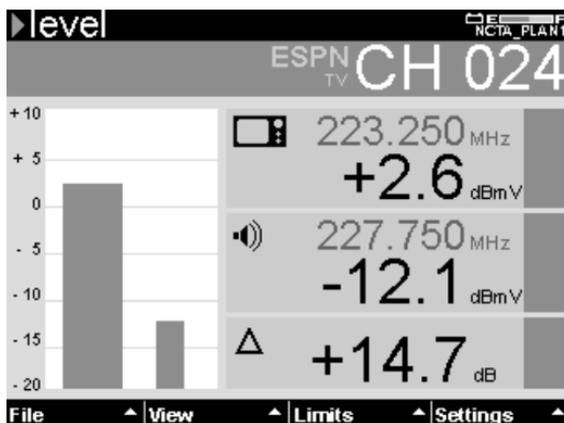


Figure 19 Level Mode Screen

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.

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 15 on page 30), and press **Enter**. Or, press the **Shift** key and the **MiniScan** softkey.) The first Miniscan Mode screen you see will look similar to Figure 20 on page 34.

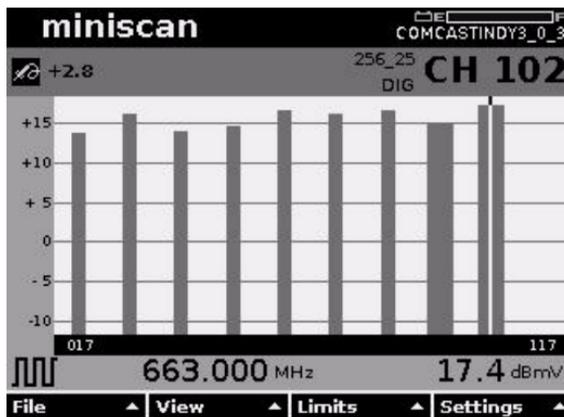


Figure 20 Miniscan Mode Screen

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.

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 17 on page 31), 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 21 on page 35.

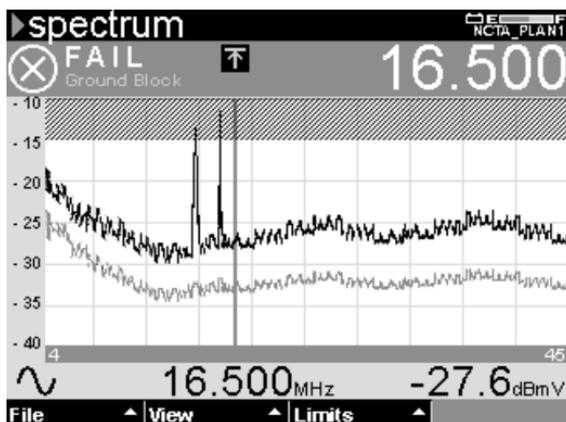


Figure 21 Upstream Spectrum Mode Screen

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.

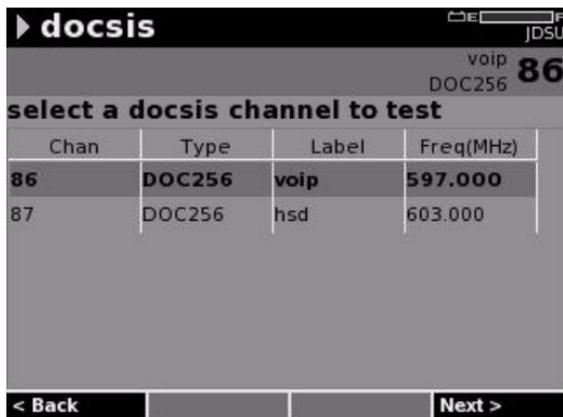
Prior to an installation, use upstream spectrum measurements to verify that the system does not exceed the maximum acceptable level for ingress. After an installation, check the level again to compare the previous reading and confirm that install procedures or components did not create new sources of ingress.

**Performing
DOCSIS®
Measurements**

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

primary DOCSIS® channels should be configured in the channel plan, but they will not show up in the list of DOCSIS® channels.

To access DOCSIS® Mode, use the arrow keys to highlight the DOCSIS® option on the Measure mode menu (Figure 16 on page 30), and press **Enter**. (Or, press the **Shift** key and the **DOCSIS®** softkey.) The first DOCSIS® mode screen you see will look similar to Figure 22.



The screenshot shows a handheld device screen with a black header bar containing the text 'docsis' and 'JDSU'. Below the header, the text 'voip' and 'DOC256' is displayed, followed by a large number '86'. The main content area is titled 'select a docsis channel to test' and contains a table with four columns: 'Chan', 'Type', 'Label', and 'Freq(MHz)'. The table has two rows: the first row is highlighted and shows '86', 'DOC256', 'voip', and '597.000'; the second row shows '87', 'DOC256', 'hsd', and '603.000'. At the bottom of the screen, there are two buttons: '< Back' on the left and 'Next >' on the right.

Chan	Type	Label	Freq(MHz)
86	DOC256	voip	597.000
87	DOC256	hsd	603.000

Figure 22 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.

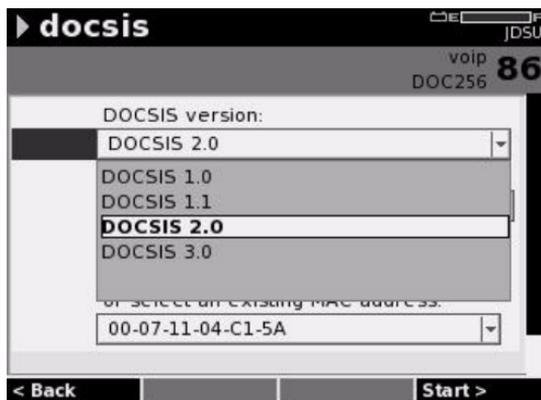


Figure 23 Select DOCSIS® Version that the Meter Should Emulate

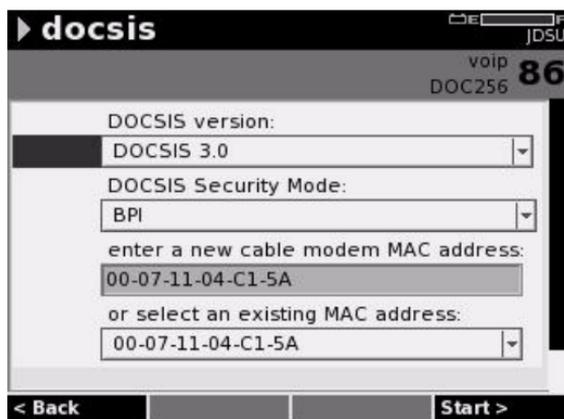


Figure 24 Select DOCSIS® Test Parameters

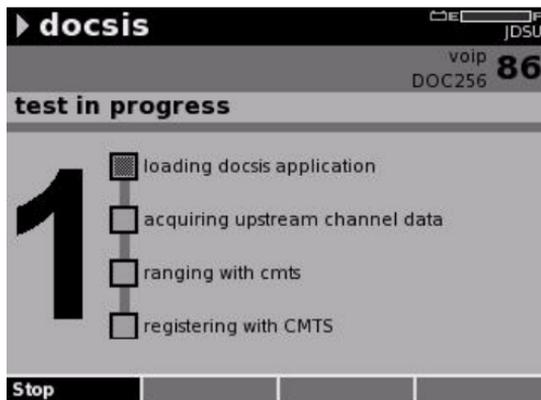


Figure 25 Test in Progress

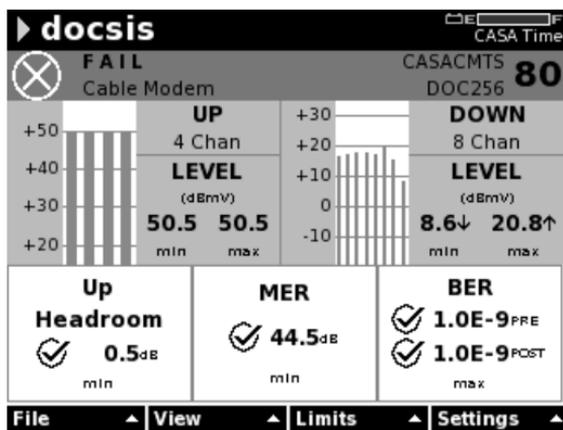


Figure 26 DOCSIS® 3.0 Summary Results

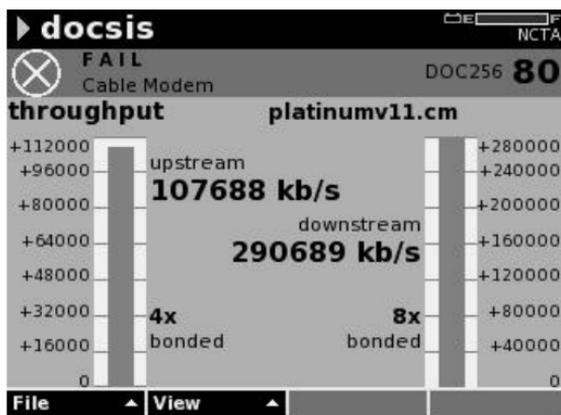


Figure 27 DOCSIS® 3.0 Throughput

Performing DQI Measurements

The measurement Digital Quality Index (DQI) is a real-time measurement that immediately detects intermittent issues and some sustained issues within a downstream QAM stream. In comparison, the typical measurement used to check for these issues on a digital QAM carrier is the pre and post forward error correction (FEC) bit error rate (BER). The BER measurement relies on actual errors and is slow to detect many issues. The DQI measurement uses error magnitude information from the output of the demodulator, including error magnitudes that do not result in errors. Measurement response is considerably faster than BER or MER and more sensitive to transient and intermittent issues that affect the stream.

To access DQI measurement mode, use the arrow keys to highlight the DQI feature on the Measure mode menu. (Figure 15 on page 30), and press **Enter**. Or, while in the Level mode, press View softkey and select DQI from the list of options. The DQI mode screen will look similar to Figure 28 on page 40.

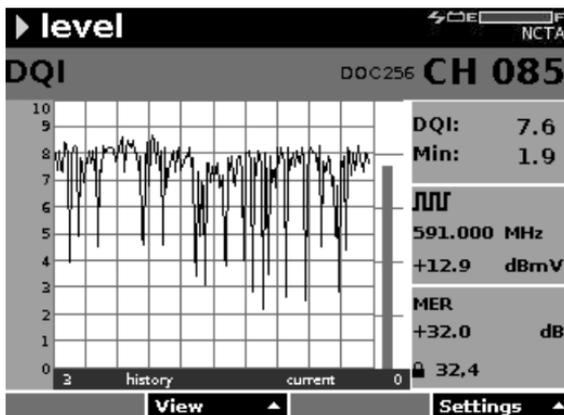


Figure 28 DQI Mode Screen

The DQI display shows three minutes of data. [Figure 28](#) displays a point where over a minute passed before DQI dropped to a point where BER might capture the issue.

Using AutoTests Mode

One AutoTest measurement mode is indicated by the softkey tab at the bottom of the display screen – **Autotests**. The AutoTests measurement mode has a menu of measurement items specific to that mode.

Menu To view the Autotests menu ([Figure 29 on page 42](#)), press the **Autotest** key. Use the arrow keys to highlight the type of AutoTests measurement you wish to perform and press **Enter** to access that option.

The AutoTests tests are automated test sequences. The following types of user-configurable AutoTest Install tests 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,
- **Home Certification** - (optional purchase required) is a user configured combination of tests. The tests can be any combination of testing on video channels and DOCSIS® tests such as ranging, registration, throughput, packet loss, and VoIPCheck. The configuration of the tests for the certification option are established in the JDSU Test Productivity Pack (TPP) client along with the appropriate limit plans. The closeout test option also provides an automated sequence of steps that guides the technician through the entire process. This is different also in that it combines the sync process with the test.
- **Proof of Performance** - a user configured scheduled test sequence designed to assess the signal performance of a user-configured series of analog and/or digital video channels.
- **Cable Modem AutoTest** - an automated test sequence that assesses the performance and verifies the DOCSIS® compliance of user-configured digital channels in the upstream and downstream plant.

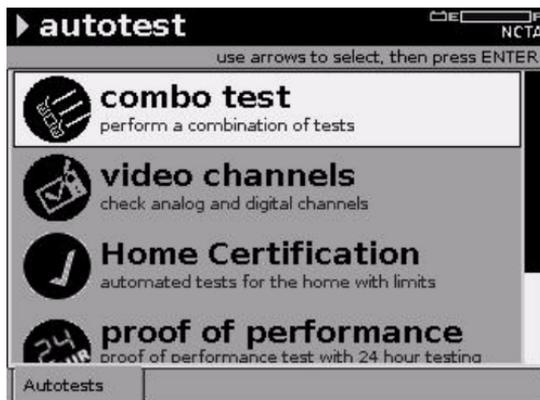


Figure 29 AutoTests Menu

You are ready to perform tests in AutoTest mode only when:

- The meter is receiving power
- The RF cable is connected to the meter (on the back panel)
- Your DSAM meter has been configured to conduct AutoTest measurements (see [“Configuring the Meter” on page 23](#))

Using Combo Autotest To access the Combo Autotest mode, use the arrow keys to highlight the Combo Test option on the AutoTests mode menu ([Figure 29](#)), and press **Enter**. The first Combo Test screen you see will look similar to [Figure 30 on page 43](#).

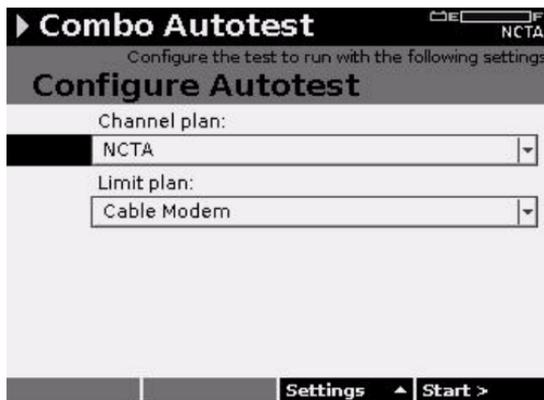


Figure 30 Combo Autotest Mode Screen

Each Combo AutoTest is based on two types of configuration:

- The parameters of the selected channel plan
- The parameters of the selected limit plan

After a channel plan and 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 the Video Autotest mode, use the arrow keys to highlight the Video Channels option on the AutoTests mode menu (Figure 29 on page 42), and press **Enter**. The first Video Channels screen you see will look similar to Figure 31 on page 44.

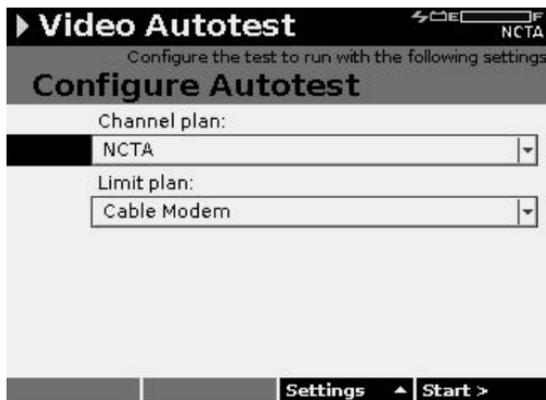


Figure 31 Video Autotest Mode Screen

Each Video AutoTest is based on two types of configuration:

- The parameters of the selected channel plan
- The parameters of the selected limit plan

After a channel plan and a limit set has been selected, press the **Start** softkey (Figure 31) and the AutoTest sequentially measures the signal performance of all assigned channels in the Video Channels AutoTest configuration.

Using Home Certification Autotest

To access the Home Certification Autotest mode, use the arrow keys to highlight the Home Certification option on the AutoTests mode menu (Figure 29 on page 42), and press **Enter**. The first Home Certification test screen you see will look similar to Figure 30 on page 43.

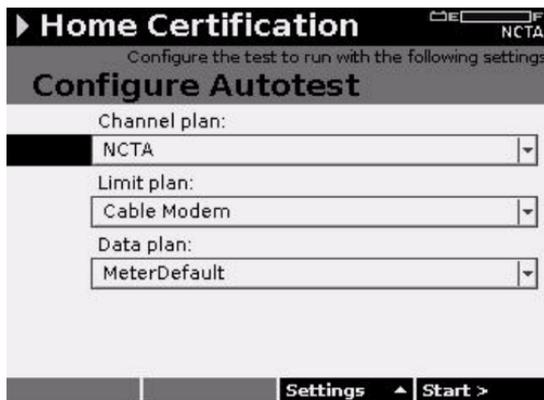


Figure 32 Home Certification Autotest Mode Screen

Each Home Certification AutoTest is based on three types of configuration:

- The parameters or the selected channel plan
- The parameters of the selected limit plan
- The parameters of the selected data plan

After a channel plan and a limit set has been selected, press the **Start** softkey and Home Certification Autotest measures the signal performance of all assigned channels in the Home Certification Autotest configuration.

Using Proof of Performance

To access Proof of Performance, use the arrow keys to highlight the Proof of Performance option on the AutoTests mode menu (Figure 29 on page 42), and press **Enter**. The first Proof of Performance AutoTest mode screen you see will look similar to the Combo AutoTest screen shown in Figure 33 on page 46.

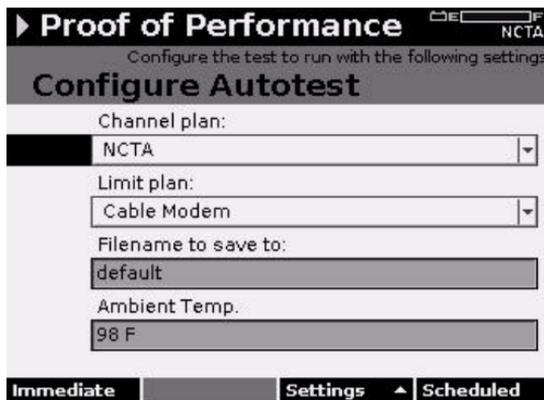


Figure 33 Proof of Performance Autotest Mode Screen

Each Proof of Performance AutoTest is based on four types of configuration:

- The selection of channels to be tested
- The parameters of your limit sets
- Your selection of a set measurement limits based on test location information (Location Type, Amp ID, Area, etc.)
- As an option the selection of a configured schedule

Press the **Immediate** softkey to begin a test that does not require a specified time period. Press the **Scheduled** softkey to schedule a test for a specified time period. (Figure 33).

Using Cable Modem Autotest

To access the Cable Modem Autotest mode, use the arrow keys to highlight the Cable Modem option on the AutoTests mode menu (Figure 29 on page 42), and press **Enter**. The first Combo Test screen you see will look similar to Figure 34 on page 47.

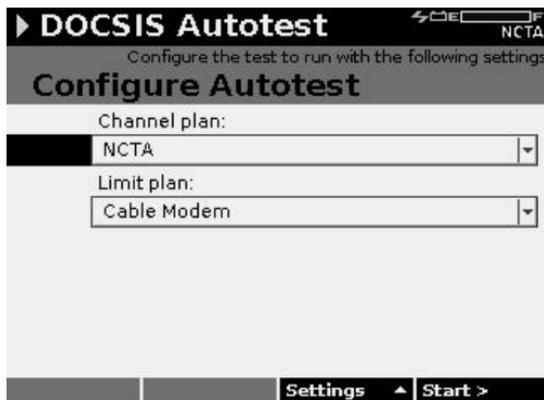


Figure 34 Cable Modem Autotest Mode Screen

Each Cable Modem AutoTest is based on two types of configuration:

- The parameters of the selected channel plan
- The parameters of the selected limit plan

After a channel plan and a limit set has been selected, press the **Start** softkey and Cable Modem AutoTest measures the signal performance of all assigned channels in the Cable Modem Test 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 FDM utility software. The Help system offers additional instruction about these tasks.

Displaying the Access Files Menu To display the Access Files menu (Figure 35 on page 48), press the **Access** mode key (Figure 5 on page 18), then press the **Files** softkey. Use the arrow keys to highlight the task you wish to perform and press **Enter**.



Figure 35 Access Files Menu

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 TPP and FDM utility software.

Synchronizing Your Data Use optional FDM 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. If only measurement files or channel plans are being synchronized you may also synchronize over RF.

Displaying the Access Browser Menu To display the Access Browser menu (Figure 36 on page 49), press the **Access** mode key (Figure 5 on page 18), then press the **Browser** softkey. Use the arrow keys to highlight the task you wish to perform and press **Enter**.



Figure 36 Access Browser Menu

Use Access Browser menu to select:

- WFA Browser - used to save, send, and receive various applications and system information
- Local Browser - used to open a saved Browser page
- Web Access Test - The Web Access Test connects to an JDSU test page on the internet to ensure internet connectivity. It accesses a single screen for view only.

DSAM Firmware Upgrade Instructions

DSAM users and Test Productivity Pack (TPP) administrators: You must use TPP 4.1 or later and FDM-100 4.1 or later to upgrade your DSAM with this firmware release.

If you are using the Test Productivity Pack please visit the TechComplete™ Test Productivity Pack (TPP) Software Upgrade Website or contact your sales representative or the Technical Assistance Center (TAC) for upgrade information.

If you are using FDM-100, visit the FDM-100 Upgrade page [here](#).

To maximize upgrade reliability, please upgrade your DSAM on networks that have reliable connections, minimal network congestion, and no restricting firewalls. In the case where you feel you may have such IP or RF networks or have experienced upgrade failures, we recommend that a direct laptop connection or Ethernet connection be used.

Connect your DSAM to the charger to provide a consistent power supply during the upgrade.

Synchronize each DSAM to be upgraded to the FDM-100 or Test Productivity Pack via the Ethernet port to verify proper configuration and communications. Firmware upgrades require the DSAM to be connected through the Ethernet port.

Avoid upgrading more than 10 meters at a time per FDM/TPP server. If your server is connected via a connection less than 10 Mbps, for example to a cable modem with a 384k upstream, you should limit your DSAM upgrades/synchronizations to 4 at a time.

Download these 2 necessary files. Save these files by right clicking on them and Select "Save Target as..." or "Save Link as..."

Example:

- Firmware file: v3_5.zip
- License file: v3_5.xml

Ensure that both the upgrade firmware .zip file and the upgrade .xml file are in the same folder (directory) on the FDM or TPP server.

Launch the FDM or TPP client and go to "manage meter assets" page.

Ensure that the DSAM(s) you are upgrading appear in the Meter Assets list, specified by serial number. If they are not on the list, you must add the DSAM(s) and synchronize them before you proceed to the next step.

In the "meter management tasks" sidebar on the left of the manage meter assets page, click on "upgrade meters".

On the upgrade meters page, click "browse" in step one and select the downloaded **.xml** file from the location you saved it to, in step 5 of this list. Then click "open".

The list of meter(s) that can be upgraded should now be displayed on this page. If there is no list, please review the previous steps or contact Technical Assistance Center (TAC) at the number below for further assistance. Ensure that only the meter(s) that you wish to upgrade are checked. De-select those meters you do not wish to upgrade.

Click the "done" button in the bottom right corner.

Synchronize the DSAM(s) with FDM or TPP.

After the meter has rebooted, verify the upgrade is successful. Check the "manage meter assets" page, sync "Status" column, and ensure the most recent sync is OK, and check the "FW Version" to see that it matches the latest version you deployed (eg. v3.5).

If the meter reboots to a screen that says "Upgrade was not completed, press soft key 1 to retry the upgrade" you should repeat steps 9 and 10 and re-deploy the upgrade BEFORE pressing the key to re-synchronize.

Congratulations! The latest DSAM firmware has now been installed!

If you have any issues after re-trying to synchronize, please contact TAC at the number below.

- 1-866-228-3762- United States
- +1 317-614-8051 - Worldwide

E-mail CATV TAC at catvsupport@jdsu.com

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 37 on page 53](#)),

- 1 Press the **Configure** mode key.
- 2 To display the Configure General mode menu ([Figure 11 on page 24](#)), press **General** softkey.
- 3 Use the arrow keys to highlight **Clone**.
- 4 Press **Enter**.

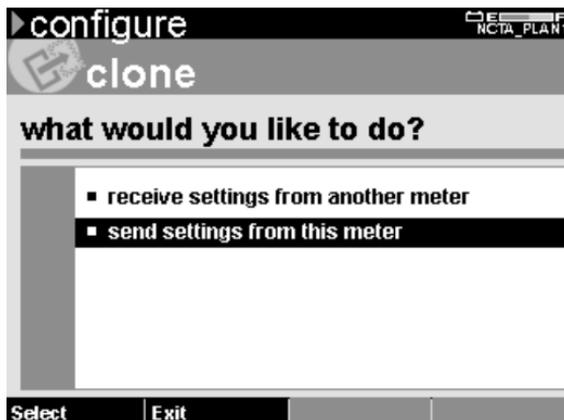


Figure 37 Configure General Clone Screen

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 Lens

Your DSAM meter is shipped with one replaceable lens (optional lens can be purchased) covering the display screen. Replace the lens as it becomes damaged, smudged, or soiled.

To replace a lens

- 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.

Specifications

A

This appendix describes the DSAM meter requirements. Topics discussed in this appendix are as follows:

- [“DSAM Product Family Specifications” on page 56](#)
- [“Power Component Specifications” on page 64](#)

DSAM Product Family Specifications

Table 8 Product 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	Supports 6 or 8 MHz depending on channel type
Analog Level Measurement	
Signal Types	CW, video and audio (NTSC, PAL, and SECAM)
Range ^a	-40 to +60 dBmV (typical)
Resolution	0.1 dB
Resolution Bandwidth	280 kHz
Accuracy ^b	± 1.5 dB typical at 25° C (77° F)
Carrier-to-Noise	30 to 45 dB ±2 dB 45 to 48 dB ±3 dB Input @ >0 dBmV (up to 750MHz) Input @ >6 dBmV (750 - 1000MHz)
Hum	For up to 5% hum: +/- 0.8% Above 5% (up to 10%) +/- 1.0%

Table 8 Product Specifications (Continued)

Item	Description
Digital Level Measurement	
Modulation Types	QPR, QPSK, QAM (DVB/ACTS)
Range ^a	-40 to +50 dBmV (typical)
Resolution	0.1 dB
Accuracy ^b	± 2.0 dB typical at 25° C (77° F)
Two-way Ranging Test	
DOCSIS® Based	DOCSIS® 1.0, 1.1, 2.0, and 3.0
Upstream Transmit Range and Diplexer Crossover (DOCSIS® modes only)	5 to 42 MHz 42/88 MHz (min. downstream DOCSIS® center freq. 91 MHz) 5 to 65 MHz 65/96 MHz (min. downstream DOCSIS® center freq. 100 MHz) 5 to 85 MHz 85/111 MHz (min. downstream DOCSIS® center freq. 111 MHz)
Upstream Modulation	QPSK, 16 QAM, 32 QAM, and 64 QAM as instructed by CMTS
Transmitter Output	At 25° C (77° F) maximum, +52 dBmV with 64 QAM, +55 dBmV with 16 QAM, and +58 dBmV with QPSK (typical for a single transmit channel)

Table 8 Product Specifications (Continued)

Item	Description
Downstream QAM Demodulation	
Modulation Type	64, 128 ^c , and 256 QAM, ITU-T J.83 Annex A, B, or C (selectable)
Input Range (Lock Range) ^d	-15 to +50 dBmV total integrated power from: 57-1000 MHz (42 MHz Diplexer 6 MHz Channel spacing) 83-1000 MHz (65 MHz Diplexer 6 MHz Channel spacing) 108-1000 MHz (85 MHz Diplexer 6 MHz Channel spacing) 58-1000 MHz (42 MHz Diplexer 8 MHz Channel spacing) 84-1000 MHz (65 MHz Diplexer 8 MHz Channel spacing) 109-1000 MHz (85 MHz Diplexer 8 MHz Channel spacing)
BER (Bit Error Rate) ^e	Pre and Post FEC: 10 ⁻⁴ to 10 ⁻⁹
MER (Modulation Error Ratio) ^h	Range 64 QAM: 21 to 45 dB ⁱ Accuracy: ± 2 dB (Up to 40 dB typical) ^h Range 128 QAM: 25 to 45 dB ⁱ Accuracy: ± 2 dB (Up to 40 dB typical) ^h Range 256 QAM: 28 to 45 dB ⁱ Accuracy: ± 2 dB (Up to 40 dB typical) ^h

Table 8 Product Specifications (Continued)

Item	Description
EVM (Error Vector Magnitude)	Range 64 QAM: 0.4% to 5.8% magnitude Accuracy: $\pm 0.5\%$ (0.9% to 2.0%) $\pm 1.0\%$ (2.1% to 4.0%) $\pm 1.4\%$ (4.1% to 5.8%) Range 128/256 QAM: 0.4% to 2.4% Accuracy: $\pm 0.6\%$
Symbol Rate	Annex A, 5.057 to 6.952 MSPS for 64, 128, 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
Upstream Spectrum (Ingress Scan)	
Spans	4 to 42 MHz, 4 to 65 MHz, 4 to 85 MHz
Sweep Rate	Less than 2 seconds
Display Scaling and Range	1, 2, 5 and 10 dB/division; 6 vertical divisions
Resolution Bandwidth	280 kHz
Sensitivity ^a	-45 to +60 dBmV (typical)

Table 8 Product Specifications (Continued)

Item	Description
Downstream Spectrum (forward scan) (optional)	
Frequency range	4 to 1000 MHz
Sweep rate	Less than 2.5 seconds (display)
Display scaling and range	1, 2, 5 and 10 dB/division; 6 vertical divisions
Resolution bandwidth	30 or 280 kHz
Span	10 MHz or 50 MHz
Sensitivity ^a	-35 to 60 dBmV (typical)
Constellation (optional)	
Modulation type	64, 128, and 256 QAM
Constellation points	2000, 4000, 8000, 16000, 32000, or 64000
Zoom	up to 4 levels
Cable Modem Diagnostic Page	
IP address ^f	192.168.100.1
Return QAM Generator	
Signal Modulations	CW, 16 QAM, 64 QAM
Symbol Rates (MSPS)	1.28, 2.56, 5.12
Frequency Range	5-42 MHz, 5-65 MHz, 5-85 MHz
Supported Levels	8.0 - 58.0 dBmV

Table 8 Product Specifications (Continued)

Item	Description
DSAM Sweep Specifications (optional)	
Forward Sweep	Requires SDA-5500 (SDA compatible mode)
Reverse Sweep and Reverse Alignment	Requires SDA-5500 (Single Reverse) or SDA-5510 (Multiple Reverse) (SDA compatible mode)
Sweep Modes	
Frequency Range	5 to 1000 MHz Forward 5 to 65 MHz Reverse
Display Span	User definable
Display Scale/Range	6 vertical divisions 1, 2, 5, or 10 dB/division
Sweep Pulse Occupied Bandwidth	30 kHz
Stability	± 0.5 dB, normalized (dependent on stability of referenced carriers)
Sweep Rate	~1 second (78 channels, including scrambled and digital signal types)
Channel Plan Templates (user editable on SDA Head-end gear)	China-1; China-2; France; HDTP-NL; Ireland; Japan; Jerold; Jerold-HRC; Jerold-IRC; NCTA; NCTA-HRC; NCTA-SUB; NCTA-IRC; NTSC-Broadcast; OIRT-D/K; PL-B/G; PAL-UK
Return Loopback	
Frequency Range	5-55 MHz (Annex B), 5-65 MHz (Annex A)
Transmit Level	8-58 dBmV

Table 8 Product Specifications (Continued)

Item	Description
Interfaces	
RF	75 ohm, F81 or BNC option
Maximum Sustained Voltage	100V AC and 140V DC
RS232	via optional direct cable
Ethernet	RJ45, 10/100/1000 base T, TCP/IP, and UDP supported
USB	v1.1 host mode, 150 mA maximum slave
Standards Compliance	
Shock and vibration	5Gs at 2Hz to 5KHz
Transportation Packaging	I.S.T.A. - Procedures 1C and 1G
Drop	IEC 61010
Handle Stress	IEC 61010
Water Resistance	MIL-STD-810F
Safety - emissions	EN 55022, CE, FCC
Safety - immunity	EN 61000, CE, FCC
General	
Display	320 x 240 pixels, TFT color display
Language Support (User interface and Help System)	English in all models. No-charge second language option of Chinese, French, German, Hungarian, Japanese, Korean, Polish, or Spanish.

Table 8 Product Specifications (Continued)

Item	Description
Dimensions (without QAM Ingress option)	12 cm (W) 25 cm (H) 10.8 cm (D) 4.75" (W) 9.75" (H) 4.25" (D) (with battery)
Dimensions (with QAM Ingress option)	12 cm (W) 25 cm (H) 12.1 cm (D) 4.75" (W) 9.75" (H) 4.75" (D) (with battery)
Weight (without QAM Ingress option)	2 pounds, 10 ounces (1.2kg) (without battery)
Weight (with QAM Ingress option)	3 pounds, 0 ounces (1.4kg) (without battery)
Battery Weight	1 pound, 6 ounces (0.6 kg)
Storage and Operating Temperature Range	-20° to +50°C (-4° to +122°F)

- a. Total integrated power, detectable range.
- b. Accuracy for analog levels between -20 to +55 dBmV.
Accuracy for digital levels between -20 to +50 dBmV.
Additional uncertainty of ± 1.0 dB from 4 MHz to 15 MHz.
Additional uncertainty of ± 0.5 dB across -20°C to +50°C.
- c. 128 QAM not defined for Annex B ITU-T J83.
- d. Total integrated power, At 64 QAM.
- e. DSAM can support up to (I,J) = (128,5) interleave for ITU-T J.83.
- f. IP address is specified in the DOCSIS® 1.1, 2.0 and 3.0 operations support system interface (OSSI) specifications.
- h. MER Typical defined as identical QAM carriers at +5 dBmV with no adjacent analog carrier.
- i. MER Range declines as input levels decrease. Expected MER Range at MIN LOCK Level of -15 dBmV is >30 dB MER.

Power Component Specifications

Table 9 Power Component Specifications

Item	Description
Environmental	
Operational temperature range	-20° to +50° C (-4° to +122° F)
Storage temperature range Short Term (30 days or less)	-20° to +60° C (-4° to +140° F)
High fast-charge inhibit range	55° C ($\pm 5^\circ$ C) (140° F)
Low fast charge inhibit range	0° C ($\pm 5^\circ$ C) (+32° F)
Humidity range	0 to 95% RH (non-condensing)
Output - Li-Ion Battery	
Battery life	5-8 Hours typical* * actual life may vary with usage
Fast charge rate	1250mA $\pm 10\%$ > or = 7.0 hours
Maximum charge time	10 to 12 hours
Power Supply Module	
Input	
AC Input Voltage Range	90 - 264 VAC
AC Input Frequency	47 - 63 Hz
Output	
Output Power	36 Watt
Output Voltage	+12VDC
Maximum Load Current	3.0A

NOTE

These specifications also apply to other models.

Customer Services

B

This chapter describes the customer services available through JDSU. Topics discussed in this chapter include the following:

- [“About Our Services” on page 66](#)
- [“Customer Care” on page 66](#)

About Our Services

JDSU offers an unmatched portfolio of services to deploy, support and innovate purchased equipment through its Customer Care and Global Services and Solutions organizations. Customer Care is standard with every product sale and consists of business hour technical assistance, in-warranty repair, calibration, and upgrade services. Global Services and Solutions provides professional services to optimize product capabilities and maximize efficiencies, including field engineering and deployment, technical training, product support, consulting and custom software development. Together these organizations supply the services necessary successfully utilize purchased equipment.

Customer Care

Customer Care is accompanied with the sale of every JDSU product. Customer Care services include:

- Needs Analysis on Products and Services
- Comprehensive Product and Service Literature
- Pre-Sales Consulting
- Technical Assistance (Business Hour)
- Instrument Repair (Under Warranty Repair and Calibration Services)
- Immediate Return Authorizations

Contact a Customer Care representative through your local distributor or by accessing www.jdsu.com for information on upgrades, calibration, warranty policies or any of Global Services and Solutions offerings. Representatives also provide assistance with product repairs and returns.

Equipment Return Instructions Please contact your local Customer Care location via telephone or web site for Return or Reference Authorization to accompany your equipment. 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 JDSU Customer Care.)
- 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 unit should be carefully packed so that it will not be damaged in transit; when needed, appropriate packing materials can be obtained by contacting JDSU Customer Care. JDSU is not liable for any damage that may occur during shipping. The customer should clearly mark the JDSU-issued RA or reference number on the outside of the package and ship it prepaid and insured to JDSU.

Warranty information **Limited Product Warranty.** Notwithstanding any provision to the contrary (but subject to the operation of any law to the extent it cannot be excluded), JDSU's sole and exclusive obligations to Customer for any Product made by JDSU and sold here under are solely as described in this Section and the next Section below. For any Product which has been returned to JDSU under the RMA procedure (as defined herein) and which in the reasonable opinion of JDSU is determined to be defective in workman-

ship, material or not in compliance with the JDSU specification applicable to the Product and has in fact failed under normal use on or before: (i) for Software, ninety (90) days from the Delivery Date of the Software; and (ii) for all other Products one (1) year from the Delivery Date of the Product, unless otherwise stated in writing by JDSU. All third party products (including Software or Firmware) provided by JDSU carry only the original manufacturer's warranty applicable to Customer. JDSU will only accept for repair, replacement or credit under warranty Products made by third parties if expressly authorized to do so by the relevant third party. Any Product repaired or replaced under warranty is only warranted for the period of time remaining in the original warranty for the Product. Customer shall have no warranty claims, unless JDSU receives from Customer, before the end of the warranty period and within thirty (30) days of the date on which Customer first came to know, or should have known, about the warranty claim, (A) a written notice describing the warranty breach in reasonable detail (a "Warranty Claim"); and (B) information in sufficient detail to enable JDSU to reproduce and analyze the failure.

Excluded Causes. Customer has no warranty rights with respect to defects or non-conformities caused by (i) use of the Product with hardware or software that was not expressly specified in writing by JDSU as suited for use with the Product; (ii) Customer's failure to follow JDSU's operating instructions; (iii) failure to implement updates; (iv) changes to the Customer environment in which Product was installed; (v) acts or omissions of persons other than JDSU or its authorized representatives; (vi) installation or maintenance of Product by someone other than JDSU or persons certified by JDSU; (vii) being accidentally damaged, disassembled, modified, misused, repaired or reworked (by any party other than JDSU or its authorized agents), improperly stored or handled, used in conjunction with another product that is incompatible or of an inferior quality, or used in applications which exceed the Product's specifications or ratings, neglected, improv-

erly installed or otherwise abused or is used in hazardous activities; or (viii) acts of God or other Force Majeure conditions.

Excluded Product and Components. Customer has no warranty rights with regard to any (i) consumable Product or parts thereof (e.g., parts with an expected useful life of less than ninety (90) days, such as certain batteries); (ii) Product that has been modified by someone other than JDSU, unless such modifications were directed or approved by JDSU in writing and made in conformance with all specifications and instructions provided in such writing; (iii) prototypes, experimental, alpha, beta, field trial or unqualified Product; (iv) any patches, updates, or revisions that JDSU makes, at its sole discretion, available on its website or otherwise (for the avoidance of doubt, JDSU is not obligated to make any patches, updates, or revisions available outside the scope of specific maintenance agreements); (v) build to print Product and any other Product that JDSU provides in accordance with Customer's request, specifications, or instructions, unless JDSU agrees in a duly signed writing that the provided Product shall be covered by this limited warranty; and (vi) Product not returned in accordance with JDSU's RMA procedure.

Refurbished Parts and Prior Testing. Product may incorporate reconditioned or refurbished parts or subassemblies and may have been used in testing prior to sale.

Exclusive Remedies. If any Product materially fails to conform to the limited warranty set forth in this Section (Limited Warranty) and actually fails during the applicable warranty period and under normal use, JDSU shall, at its sole discretion (i) repair or replace the non-conforming Product to remedy the non-conformity identified by Customer in accordance with this Section (Limited Product Warranty); or (ii) issue a credit to Customer for the amounts paid for the Product in exchange for return of the non-conforming Product, in which case Customer's

licenses to any Firmware shall be automatically revoked. Customer hereby transfers to JDSU title and ownership of any parts that JDSU replaces.

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