

CENTEST® 650 Family

DTU Module



The JDSU CENTEST 650 and 650-S are centralized test systems that remotely test DS3, DS1, DS0, and DDS circuits accessed from a digital cross connect system (DCS) or other network element. With the ability to test services and facilities throughout the entire network from the network control center, the CENTEST 650 and the CENTEST 650-S offer the ability to lower maintenance costs, improve responsiveness to customers, and enable more efficient network troubleshooting.

The CENTEST 650 and CENTEST 650-S systems combine test system controller (TSC) and remote test unit (RTU) functionality into a single, integrated system. The CENTEST 650 provides slots for up to 15 application test modules, and the CENTEST 650-S provides six slots.

The DTU module provides maximum testing flexibility by using a programmable DSP-based design. Configurable for DS1 facility access digroup (FAD) and fractional T1 (FT1) testing from a 3/1 or 1/0 DCS, the DTU module also provides DS0 test access digroup (TAD) testing from a 1/0 DCS, including voice frequency (VF) and DDS. Using a test port on an Alcatel® 1630 or DSC DEX CS 1/0 DCS, the DTU module nonconcurrently performs single, dual, or universal FAD testing on a DCS with a test port, reducing the need for two DTU modules. And with optional DS0 drop and insert software, the DTU module will perform all DS0 testing from a 3/1 DCS. As your mix of services changes over time, the DTU module adapts to meet your specific needs, maximizing your investment in CENTEST equipment.

The DTU module and the CENTEST 650/650-S platform enables you to monitor and maintain existing services and facilities as well as verify the quality of new VF, DDS, FT1, and DS1 circuit installations. When the DTU module is coupled with the DS3 capabilities of the CENTEST 650/650-S, the combination is your complete central office test solution.



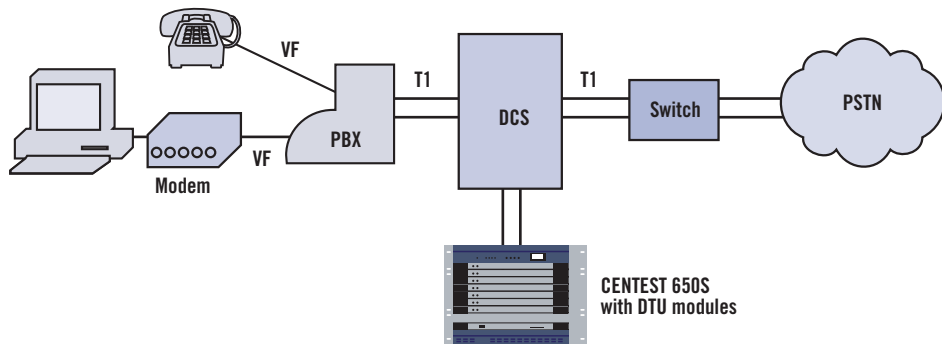
Applications

VF and Enhanced Signaling Capability

Analog lines are still very prominent for data and voice transmissions in today's combined digital/analog networks. Service providers, therefore, need enhanced VF and signaling test capabilities to supplement their fully redundant, highly tested fiber optic backbone networks.

VF circuit testing offers measurements for audio output, level, and frequency to ensure that problems such as attenuation, DC offset, and noise do not adversely affect the signal. VF line analysis may be performed from the digital T1 access points so that the specific VF channel in question may be isolated for analysis.

Users may also test the quality of signaling, which is the data used to establish, maintain, and terminate a call through a switched voice network. Technicians may automatically monitor the call origination and termination sequences for voice channels by analyzing digits sent as DP, DTMF, and MF and by reviewing received signaling activity for both directions of the circuit under test.

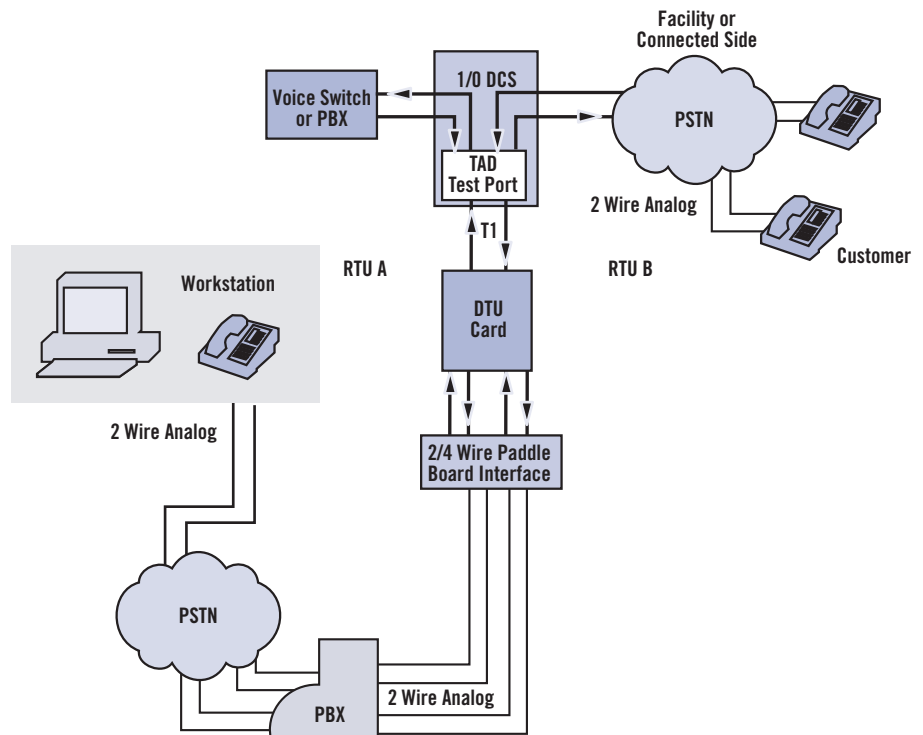


VF and enhanced signaling testing

Centralized Talk and Listen

VF impairments tests may show no trouble on the line even though the customer detects a problem or degradation in voice quality. The CENTEST 650/650-S now offers a powerful talk/listen feature that enables network operations center (NOC) technicians to nonintrusively listen to a VF circuit in monitor mode or talk and listen on the line in intrusive (split) mode. This provides the NOC technician with direct audio access to the line and, in talk/listen mode, enables the user to communicate interactively with the customer to solve line-quality impairments.

The testing of individual voice circuits with the talk/listen feature is performed by the CENTEST 650/650-S DTU module. The talk/listen feature supports voice circuit testing through a test access digroup (TAD) test port on a DS1/0 DCS as well as through a FAD on a 3/1 DCS using the drop/insert feature.

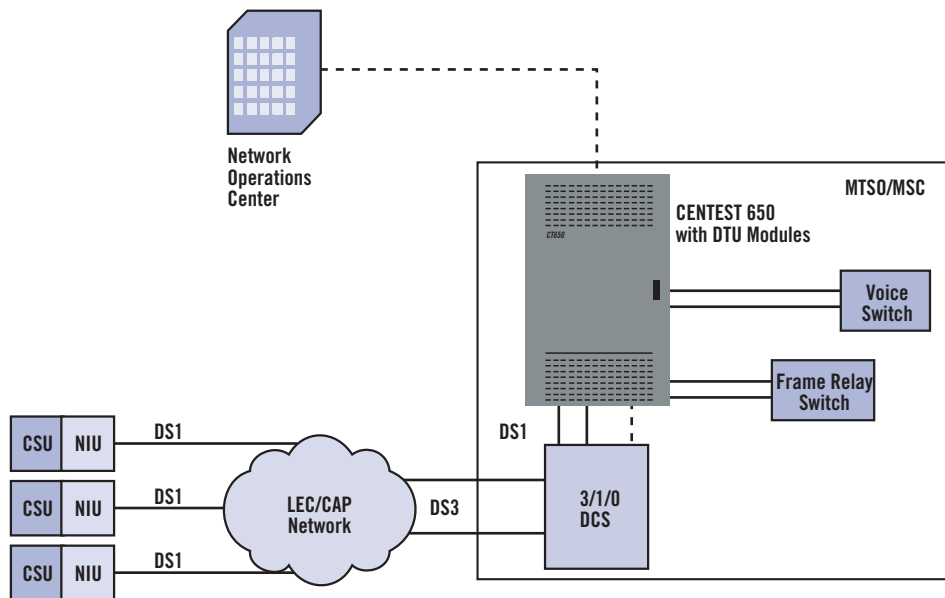


Centralized talk and listen

DS0 Drop and Insert from a DS1

The DS0 drop and insert capability enables the user to access a DS0 circuit from a dual DS1 FAD access point. This provides a valuable solution in wideband DCS (3/1) locations in which individual DS0s must be tested, and only dual DS1 FAD test access is available. Providers with 1/0 DCSs may also use this feature for intact DS1s if their DCS provides a dual DS1 FAD, if their 1/0 DCS does not have TAD access, or if all TAD resources are being used.

With DS0 drop and insert, the individual testing of DS0s from a dual DS1 FAD connection on a 3/1 DCS is performed on the CENTEST 650's DTU module. This feature supports drop and insert testing using a standard DS1 dual FAD access port. Drop and insert is available as a software option for CENTEST 650 systems running on release 5.4 or higher.



Centralized talk and listen

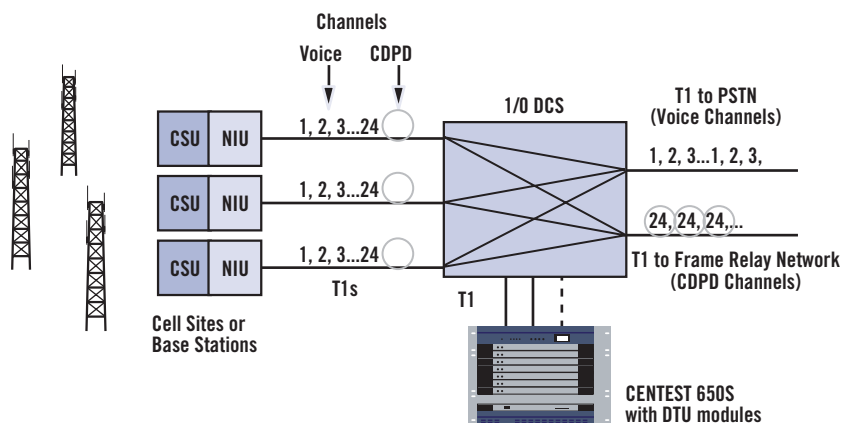
Universal FAD™ Testing

The CENTEST 650 family provides a unique feature—Universal FAD—that enables cell site facility turn-up and maintenance from a 1/0 DCS. Due to limitations in 1/0 DCSs, full T1 testing has historically only been available to users when all 24 channels of an inbound T1 are mapped to a single outbound T1. When an inbound T1 is mapped to multiple outbound T1s, automated full T1 testing has not been possible.

Most wireless networks have an architecture that utilizes the 1/0 DCS at MTSOs/MSCs to groom traffic from cell sites/base stations to several different networks. In cellular networks, T1 circuits from the cell sites carry a mix of voice and data traffic such as CDPD and GSM. The 1/0 DCS grooms and fills outbound T1s to their respective networks.

Wireless service providers must perform turn-up and maintenance tests of T1 circuits out to the cell sites. Since the T1s are not mapped intact through the DCS to a single outbound T1, full T1 testing to the cell site has been limited. The CENTEST's Universal FAD capability solves this problem by sending a combination of commands to the 1/0 DCS that establish a full T1 test access connection. This enables users to quickly and efficiently run a full T1 test to the cell sites—including sending NIU and CSU loop codes.

The CENTEST's Universal FAD feature eliminates the need for a separate test access switch external to the DCS for DS1 testing. Since many MTSOs/MSCs terminate DS3s into the 3/1/0 DCS, a DSX-1 or test access switch is not an option—the Universal FAD feature provides the only way to access these DS1s.



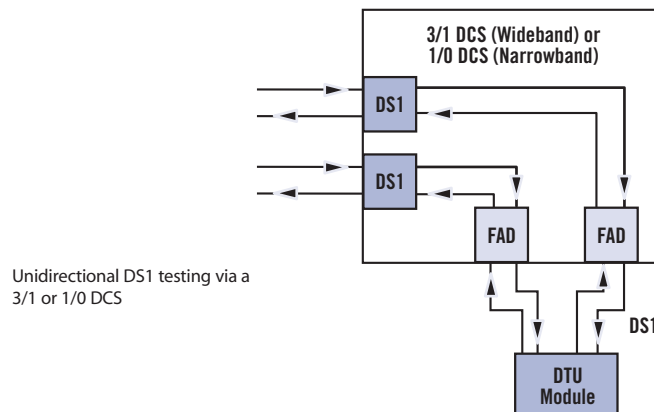
The CENTEST 650 family's Universal FAD capability provides the only centralized test solution for full T1 testing to cell sites and nonintact T1s passing through a 1/0 DCS

Configuration

The DTU module employs two DS1 interfaces to provide testing functionality for DS0 and DS1. The module's twin transmitters and receivers allow it to support two DS1 single FADs, one dual FAD, DS0 drop and insert from a dual DS1 FAD, two TADs, or one TAD and one single FAD. The DTU module may also be used to test TAPs from a TAD interface connected to a separate DTU. Each mode is described below.

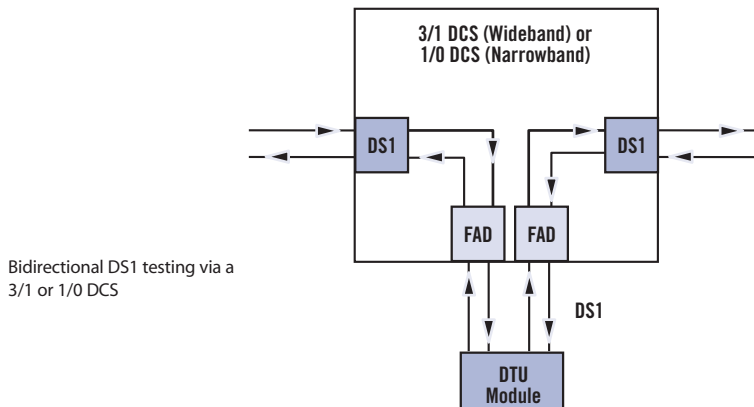
Two Single DS1 FADs

The DTU module may be configured to perform unidirectional DS1 testing via either a 3/1 or 1/0 DCS. The two single FADs supported by the DTU card allow technicians to perform two independent unidirectional DS1 tests through the DCS.



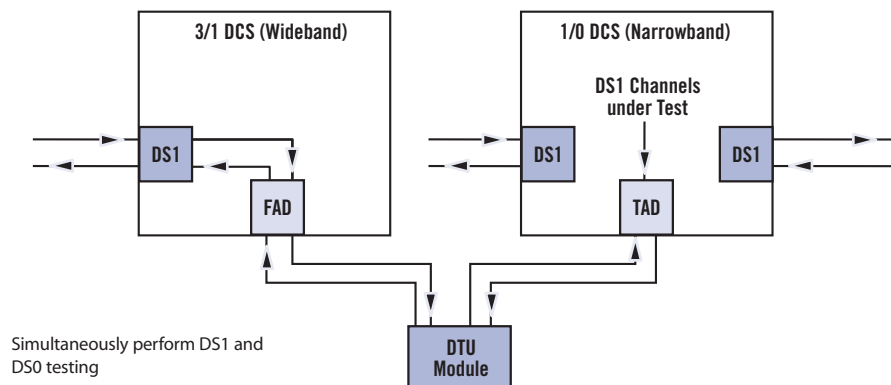
One Dual DS1 FAD

The DTU module may be configured to perform bidirectional DS1 testing via either a 3/1 or 1/0 DCS. A dual FAD allows technicians to perform one bidirectional DS1 test through the DCS. This mode is normally used when the DCS is in the middle of the network, and troubleshooting requires testing of both the equipment and facility sides.



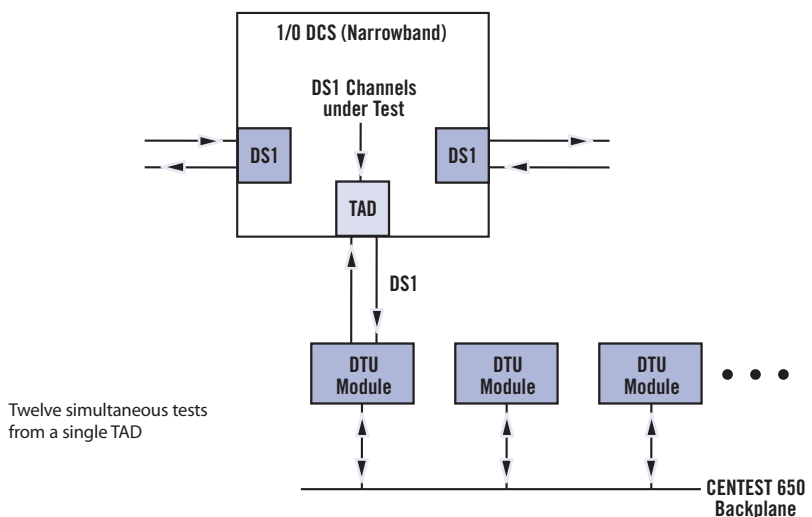
One TAD and One Single DS1 FAD

The DTU module may be configured to perform both DS0 and DS1 testing. One DS1 interface terminates a TAD on a 1/0 DCS and the other DS1 interface terminates a single FAD on a 3/1 or 1/0 DCS. The DTU module performs one bidirectional DS0 TAP test and one unidirectional DS1 test.



Testing TAPs from a TAD Interface Connected to a Separate DTU

A TAD allows up to 12 TAP tests to be run simultaneously. If a TAD is terminated on a DTU module, in addition to performing up to two TAP tests on that DTU itself, the DTU transfers the remaining TAPs onto the CENTEST 650/650-S backplane for testing by other DTUs. Therefore, DTUs that do not have TAD or FAD interfaces, but are used strictly for TAP testing, may be installed in the chassis. Each DTU in this configuration is capable of performing two independent TAP tests.



Specifications

DS1/FT1 Testing

Test Features

DS1 Framing¹

D4/SF, ESF, Unframed, Auto

DS1 Line Coding¹

AMI, B8ZS

Test Patterns

PRBS 63, 511, 2407, 2¹⁵-1, 2²⁰-1, 2²³-1, QRSS 511, QRSS 2047, QRSS (220-1), All Zeros, All Ones, Alternating Ones and Zeros, 1-and-7, 3-in-24, MULTIPAT[®]1, BRIDGTAP¹. Long User Patterns (Optional)- T1-2, T1-3, T1-4, T1-5, T1-6, T1-DALY, MIN_MAX, Programmable, 24-bit Programmable User Patterns

Error Injection

Logic Errors (single or continuous, 10⁻² to 10⁻⁹), BPV Errors (single or continuous, 10⁻³ to 10⁻⁹), Frame Errors (1-6 or continuous)¹

Loopbacks

CSU, FAC1¹, FAC2¹, FAC3¹, ESF Line¹, ESF Payload1, ESF Facility¹, 8-bit Programmable¹, HTU-R, HTU-C, DOUBLER-1, DOUBLER-2 (HDSL in-band codes)

Test Access

Single FAD and Dual FAD access, Universal FAD access, DSX-1 access including DSX-1 MON capability, Two uni-directional tests or one bidirectional test per card

Test Results

Logic Measurements

Bit Errors, Bit Error Rate, Bit Errored Seconds, Pattern Slips, Pattern Losses, Pattern Loss Seconds

BPV Measurements¹

BPV Errors, BPV Error Rate, BPV Errored Seconds

Frame Measurements¹

Frame Errors, Frame Error Rate, Frame Slips, Frame Errored Seconds, Frame Severely Errored Seconds, Frame Losses, Frame Loss Seconds, CRC Errors, CRC Errored Seconds, CRC Error Rate, CRC Severely Errored Seconds

G.821 Measurements

Error Free Seconds, Percent Errored Free Seconds, Severely Errored Seconds, Percent Severely Errored Seconds, Degraded Minutes, Percent Degraded Minutes, Available Seconds, Percent Available Seconds, Unavailable Seconds, Consecutive Severely Errored Seconds

Signal Measurements¹

Rx Frequency, Rx Level, Signal Losses, Signal Loss Seconds, Timing Slips

Line Status and History

Signal Present, Frame Sync1, Pattern Sync, AIS, Yellow Alarm1, Ones Density1, Excess Zeros1, Rx Line Coding Detection1

Note:

- 1Applicable to DS1 testing only
2Applicable to FT1 testing only

DDS Testing

Test Features

Data Rates

64 kbps Clear Channel, 56 kbps, DSOA- 2.4, 4.8, 9.6, 19.2 kbps

Test Patterns

DDS #1-6, Reverse DDS#3, PRBS 63, 511, 2047, 215-1, 220-1, 223-1, QRSS 511, 2047, 220-1, All Ones, Alternating Ones and Zeros, 24-bit Programmable User Patterns

Error Injection

Logic Errors (single or continuous, 10⁻² to 10⁻⁹)

Error Correction

User Selectable DSOA Majority Vote

Latching Loopbacks

CSU, DSU, OCU, DSO-DP (locations 1-8), NEL, LSI, 56 kbps Repeater, CSU Through Multiple Repeaters, V.54 (2.4, 4.8, 9.6, 19.2, 56, 64 kbps), 8-bit Programmable

Non-Latching (Alternating) Loopbacks

CSU, DSU, OCU, CSU Through Multiple Repeaters (up to 8)

Automated Error Logging

Bit Errored Seconds, Bit Severely Errored Seconds

Test Results

Logic Measurements

Bit Errors, Bit Error Rate, Bit Errored Seconds, Pattern Slips, Pattern Losses, Pattern Loss Seconds

G.821 Measurements

Error Free Seconds, Percent Error Free Seconds, Severely Errored Seconds, Available Seconds, Unavailable Seconds

VF/Signaling

Test Features

Monitor Frequency and Level

Single-tone Tests, Attenuation Distortion, Insertion Loss, Send/ Receive Tone

Multi-tone tests

Intermodulation Distortion, Peak to Average Ratio (P/AR), Three Tone Slope

C-message Weighted Tests

C-message Noise, C-notch Noise

Signal Quality Tests

Echo Return Loss, Impulse Noise, Line Transients

Other VF Testing Features

Phase Jitter, 2713 Hz VF Loopback (up/down), DTMF Loopback (up to 54 digits), Echo Canceller Disable (G.164), Digital Multipoint Bridge (DMB) Talk/Listen, 3 kHz Flat Noise, 3 kHz Notch Noise, VF Quiet Termination

Signaling and Supervision

Loop Start (FXS, FXO, SLC), E&M (Wink, Delay, Immediate Dial), Ground Start (FXS, FXO, SLC Office, SLC station) Monitor Signaling Bits, Monitor Dialed Digits, Dial Out

Enhanced Signaling Option

Digit Analysis in full text display

Display digit duration and delay, configurable digit and wink duration and delay, ground-on-ring detection

Additional Trunk Types

Ground start and loop start for SLC, immediate start for E&M, user defined trunk types

Full Dial/Receive Sequence Control

Signaling Scan

Scans for active cells and displays signaling events, displays signaling bits for all 24 DSO channels

Signaling Bit Control

Toggle signaling bits via easy-to-use buttons within NetAnalyst Test Management Software

GSM Testing

Test Results

Voice Results

TRAU Frame Bits, TRAU Frame Loss, TRAU Errors, TRAU BER, BFI (Bad Frame Indicator), BFI Rate, BFI Bit Set, Control Bits, DTX Mode

LAP-D Signaling Results

SAPI, Good Frames, RR Frames, I Frames, U Frames, UI Frames, CRC ERR Frames, Aborted Frames, Nonoctet Frames,

RF Measurements

Full RX Level, Sub RX Level, Full RX Qual, Sub RX, Timing Advance, Interference, Island Detection, Network Balance

Test Access/Configuration

1/0 DCS Test Access Digroup (TAD)

1/0 or 3/1 DCS Facility Access Digroup (FAD)

DSO test access from a 3/1 or 1/0 FAD with drop & insert option

Each DTU supports two TAD interfaces, one dual FAD interface, two single FAD interfaces, or one TAD and one single FAD interface

Two unidirectional DS1/DS0 tests or one bidirectional DS1 test per DTU module

Up to 15 DTU modules per CENTEST 650 shelf, supporting 30 simultaneous tests

Up to 6 DTU modules per CENTEST 650-S shelf, supporting 12 simultaneous tests

DS1 Input

Rate 1.544 Mbps
Code B8ZS or AMI
Connector Type Wirewrap
Input Level Range Automatically adapts to DSX or HIGH

DS1 Output

Rate 1.544 Mbps
Code B8ZS or AMI
Connector Type Wirewrap
Output Level Range DSX or HIGH



All statements, technical information and recommendations related to the products herein are based upon information believed to be reliable or accurate. However, the accuracy or completeness thereof is not guaranteed, and no responsibility is assumed for any inaccuracies. The user assumes all risks and liability whatsoever in connection with the use of a product or its application. JDSU reserves the right to change at any time without notice the design, specifications, function, fit or form of its products described herein, including withdrawal at any time of a product offered for sale herein. JDSU makes no representations that the products herein are free from any intellectual property claims of others. Please contact JDSU for more information. JDSU and the JDSU logo are trademarks of JDS Uniphase Corporation. Other trademarks are the property of their respective holders. ©2007 JDS Uniphase Corporation. All rights reserved. 30137185 501 0707 CT650.DS.SAS.TM.AE

Test & Measurement Regional Sales

NORTH AMERICA TEL: 1 866 228 3762 FAX: +1 301 353 9216	LATIN AMERICA TEL: +55 11 5503 3800 FAX: +55 11 5505 1598	ASIA PACIFIC TEL: +852 2892 0990 FAX: +852 2892 0770	EMEA TEL: +49 7121 86 2222 FAX: +49 7121 86 1222	WEBSITE: www.jdsu.com
---	--	---	---	--