

CMA 5000

Multi-Layer Network Test Platform



research
& design



manufacturing



installation
& maintenance



network
monitoring



optical
components



The CMA 5000

Premier Solution for Current and Future Networks

Benefits and Applications

Benefits

Multi-Layer Network Test Platform to:

- Accelerate the deployment of services
- Optimize network performance and bandwidth
- Reduce the total cost of measurement

Applications

A true multi-layer network test solution to install, commission and document the:

- Physical layer
- Data link layer
- Network layer
- Transport layer

Today's telecommunication professionals are faced with unprecedented challenges ranging from accelerating the deployment of high-speed communications services to reducing costs, including capital expenditures. NetTest answers these challenges with the CMA 5000 Multi-Layer Network Test Platform.

The CMA 5000 is the industry's premier test and measurement solution designed with the high performance and scalability necessary to meet the stringent demands of telecommunication professionals while simultaneously accelerating the deployment of new services and reducing the total cost of measurement.

Reduce the Total Cost of Measurement

One platform providing complete testing solutions for multiple network layers saves time by minimizing training, increasing user efficiency, reducing equipment inventory, and decreasing test time via best-in-breed specifications - reducing the total cost of measurement.

Accelerate the Deployment of Services

Unparalleled performance for all applications allows networks to be characterized and commissioned faster than the competition, thereby providing accelerated time to revenue.

Optimize Performance and Bandwidth

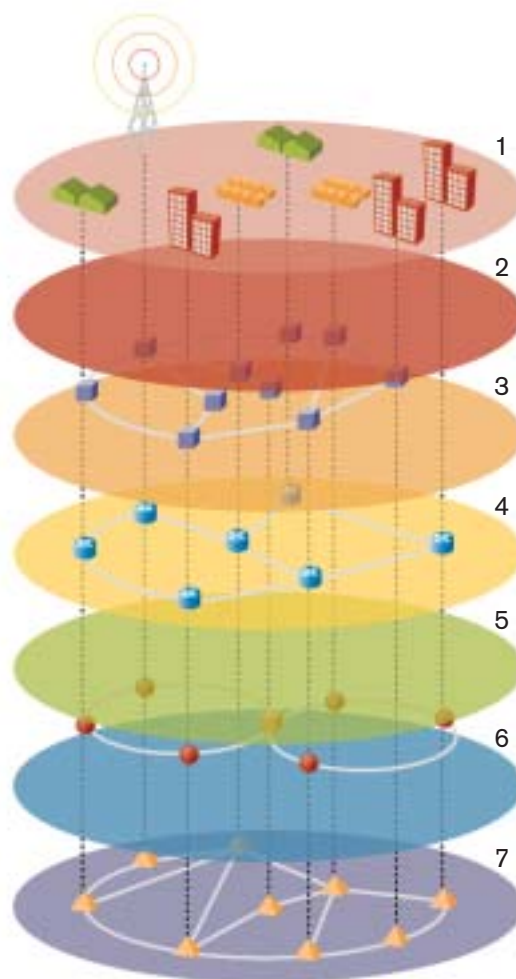
The CMA 5000 fully characterizes each fiber and network for maximum performance and revenue generation.



NetTest - Pioneering Multi-Layer Network Testing

The ability to adapt is key to success in a rapidly changing environment. In the highly competitive telecommunications industry, the ability to quickly deploy new services and respond to evolving customer requirements is paramount. NetTest is one of the few companies working in all major network technologies that has the experience and expertise in developing test and measurement solutions that can meet your current and future demands.

With applications ranging from DWDM, SONET/SDH, and Gigabit Ethernet test, to Dispersion, and OTDR measurements, the CMA 5000 is the ideal solution for any scenario. In addition to unsurpassed flexibility and scalability, the CMA 5000's high performance measurement applications enable networks to be installed, commissioned, and documented more efficiently, accelerating the deployment of new services. Spanning the Physical, Data Link, Network, and Transport layers, the CMA 5000 provides a true multi-layer network test solution.



Leverage Insight from Every Network Layer

1 Application

Assess the impact applications have on your bandwidth consumption

2 Presentation

Monitor public and encrypted packets without jeopardizing data security

3 Session

Troubleshooting network slowdowns by analyzing conversation sessions in real time

4 Transport

Easily verify that packet delivery has occurred and to see vital source and destination information

5 Network

Increase efficiency and revenue by understanding how packets and cells are sent over your network

6 Data-Link

Solve bandwidth bottlenecks, component failure and dropped packets through frame analysis

7 Physical

Quickly isolate and resolve issues causing you downtime such as damaged cables, loss of connectivity and improper use of physical components

FROST & SULLIVAN

Market Engineering Award Recipient

Market Penetration

2001

"Research indicates that NetTest is the market share leader in the mini-OTDR market," said Bal Ganjoo, Senior Industry Analyst, Frost & Sullivan. "NetTest's mini-OTDRs offer all the features of a mainframe OTDR in rugged, economical, field-portable units, and their unique features are popular with end users."

Reducing the Cost of Measurement

The consistent operation offered by the CMA 5000 across all measurement applications ensures that technicians are spending more time testing rather than learning equipment operation. By basing the CMA 5000 on an open-architecture utilizing a common user interface, NetTest has ensured that your investment will be able to remain up-to-date with the latest applications necessary to install and

maintain current and evolving telecommunication infrastructures. NetTest has incorporated numerous test technologies into an expandable platform allowing a single unit to adapt and evolve to meet your testing needs and reduce inventory. The CMA 5000 provides best-in-class performance for every testing application to dramatically decrease testing time, further reducing the cost of measurement.

Benefits and Features

Benefits

The CMA 5000 provides many ways for reducing the cost of measurement:

- Reduces training time through a common intuitive user interface across all applications
- Increases user efficiency and decreases test time via the industry's best-in-class performance for every application
- Reduces equipment inventory and obsolescence with one multi-layer test platform

Features

- 1 Full range of I/O connections, including Ethernet, USB, IrDA, PS/2, VGA, Serial, Parallel, and PC-card slots
- 2 Large 26.7 cm (10.5") touch screen
- 3 Dedicated hard keys for one button operation, including Test, Stop, File, Setup, Print and Help
- 4 Cursor knob with integral push button for precise cursor location
- 5 Drives include a minimum 6GB hard disk, modular CD-ROM, CD-RW or floppy
- 6 LEDs to indicate external power, battery and drive activity



Small Bay
(2 Modules)

Medium Bay
(4 Modules)

Large Bay
(8 Modules)



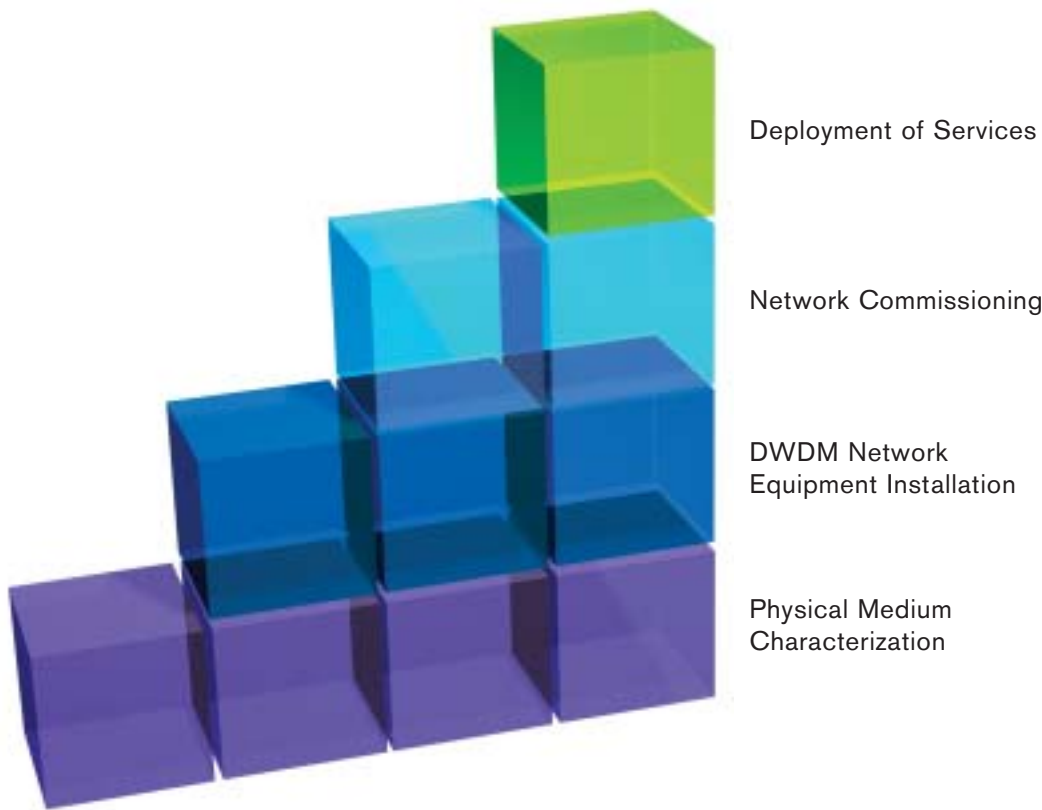
Expandable bay adapters hold a wide variety of application test modules, providing unsurpassed flexibility and scalability to reduce cost.

Accelerating the Deployment of Service

Is Your Network Ready to Handle High-Speed Communication?

From verifying your network's ability to handle high-speed data transmission to ensuring customer quality of service, the CMA 5000 is the one tool that can instill confidence that your network is operating at its full

potential, delivering the quality of service your customers expect and deserve. The CMA 5000 is designed to maximize network performance and accelerate schedules during each step of your network's deployment.



Each of the four major milestones of network deployment present differing test requirements, and the CMA 5000 is tailored to deliver optimal performance every step of the way.

Facilitating Network Deployment Every Step of the Way

Deployment of Services

- Critical network parameters must be characterized and network impairments diagnosed efficiently to reduce time to revenue

Network Commissioning

- Network performance and reliability must be achieved and documented quickly to facilitate accelerated deployment of services

DWDM Network Equipment Installation

- Proper DWDM system tuning eliminates non-linear effects, maximizing bandwidth and revenue

Physical Medium Characterization

- Efficient, accurate measurements and meticulous documentation ensure that your network is deployed on a solid foundation



Accelerating the Deployment of Service (continued)

Benefits

Physical Layer Characterization

- Efficient, accurate measurements and meticulous documentation ensure that your network is deployed on a solid foundation

DWDM Network Equipment Installation

- Proper DWDM system tuning eliminates non-linear effects maximizing bandwidth and revenue

Physical Layer Characterization

The CMA 5000 continues NetTest's long tradition of being the world's leader in optical fiber and network characterization. The CMA 5000 OTDR application offers over 50 dB of dynamic range to obtain all required OTDR test information on any link in seconds.

Offering world-class OTDR performance is just the beginning. The power and extended value of the CMA 5000 platform become evident during full physical layer medium characterization. Coupled with the best-in-class OTDR, the CMA 5000 offers all test applications required for comprehensive physical medium characterization including:

- Chromatic Dispersion
- Polarization Mode Dispersion
- Visual Fault Locator
- Talk Set
- Optical Return Loss
- Video Inspection Probe (for connector verification)
- Loss Test Set

In short, the CMA 5000 is the most complete solution for physical layer fiber characterization available.

DWDM Network Equipment Installation

With the network installation started and deadlines looming, time is of the essence. During equipment installation, the CMA 5000 again provides the required tools to accomplish the job correctly the first time, accelerating the network deployment. With the required information intuitively displayed, including channel wavelength (or frequency) and power, OSNR, and system gain tilt, the Optical Spectrum Analysis (OSA) application facilitates accurate and efficient channel management, power balancing and tuning throughout the network.

In addition to industry-leading OSA performance, the CMA 5000 offers a Video Inspection Probe (VIP) to verify connector quality and a Power Meter application for measuring individual channel power or aggregate system power. When working with high power amplifiers and pump lasers, safety is paramount. The VIP offers a safe, reliable method of checking, evaluating and recording connector end face condition to avoid potentially hazardous situations.

Whether you're testing transmitters, amplifiers, receivers, or other optical components, the CMA 5000 OSA, Video Inspection Probe and Power Meter, combine to offer the performance required to facilitate rapid network equipment installation.

Network Commissioning

Today's competitive environment demands that networks offer exceptional performance and reliability with minimal down time. When characterizing and documenting such stringent performance levels, the CMA 5000 once again excels. The Optical Transport Analysis (OTA) application provides efficient, reliable testing of a multitude of parameters, including Alarms and Errors analysis, APS with 125 μ s resolution, Round Trip Delay measurement with 100 ns resolution and network availability, and performance evaluation. The OTA application characterizes networks supplying PDH/T-carriers to SONET/SDH up to 10 Gb/s. In addition, the OTA's innovative Troublescan feature automatically detects problems, allowing network impairments to be identified and rectified quickly to ensure the network meets the expectations of both you and your customer.

Deployment of Services

With the network nearing completion and eager customers anxious to deploy services, time is critical. The CMA 5000 Gigabit Ethernet application rises to the challenge by providing assurance that critical parameters, including throughput, latency, frame rate and frame loss, (as detailed in RFC 2544,) are met to accelerate the deployment of services. In addition, the ability to measure BER at the frame level and provide general IP statistics allow the CMA 5000 to supply critical layer 2 QoS information. The Gigabit Ethernet test application contains the required performance to install, maintain and troubleshoot 10/100/1000 Mbps based Ethernet networks with unsurpassed ease-of-use for improved efficiency.

The CMA 5000 convergence test platform's flexible, scalable design combines best-in-class functionality for every test application to accelerate deployment of services while simultaneously reducing the cost of measurement and optimizing bandwidth.



Benefits

Network Commissioning

- Network performance and reliability must be achieved and documented quickly to facilitate accelerated deployment of services

Deployment of Services

- Critical network parameters must be characterized and network impairments diagnosed efficiently to reduce time to revenue

Optimizing Performance and Bandwidth

Features and Benefits

OTDR Application

Increased revenue through accurate fiber characterization:

- Extremely high resolution (0.5 meter resolution at 125 km, 1 meter resolution at 250 km)
- Superior event analysis software - accuracy and detection capability
- Unequaled reflectance and ORL accuracy - 1-2 dB accuracy, fully automatic

Added value through performance:

- Highest dynamic range - 50 dB, improved DR vs. pulsewidth/deadzone
- Shortest deadzones - <1 m event (reflective), 1-2 m attenuation (non-reflective)
- Complete attenuation spectrum - 1244, 1310, 1410, 1480, 1550 and 1625 nm

Reduced cost of measurement:

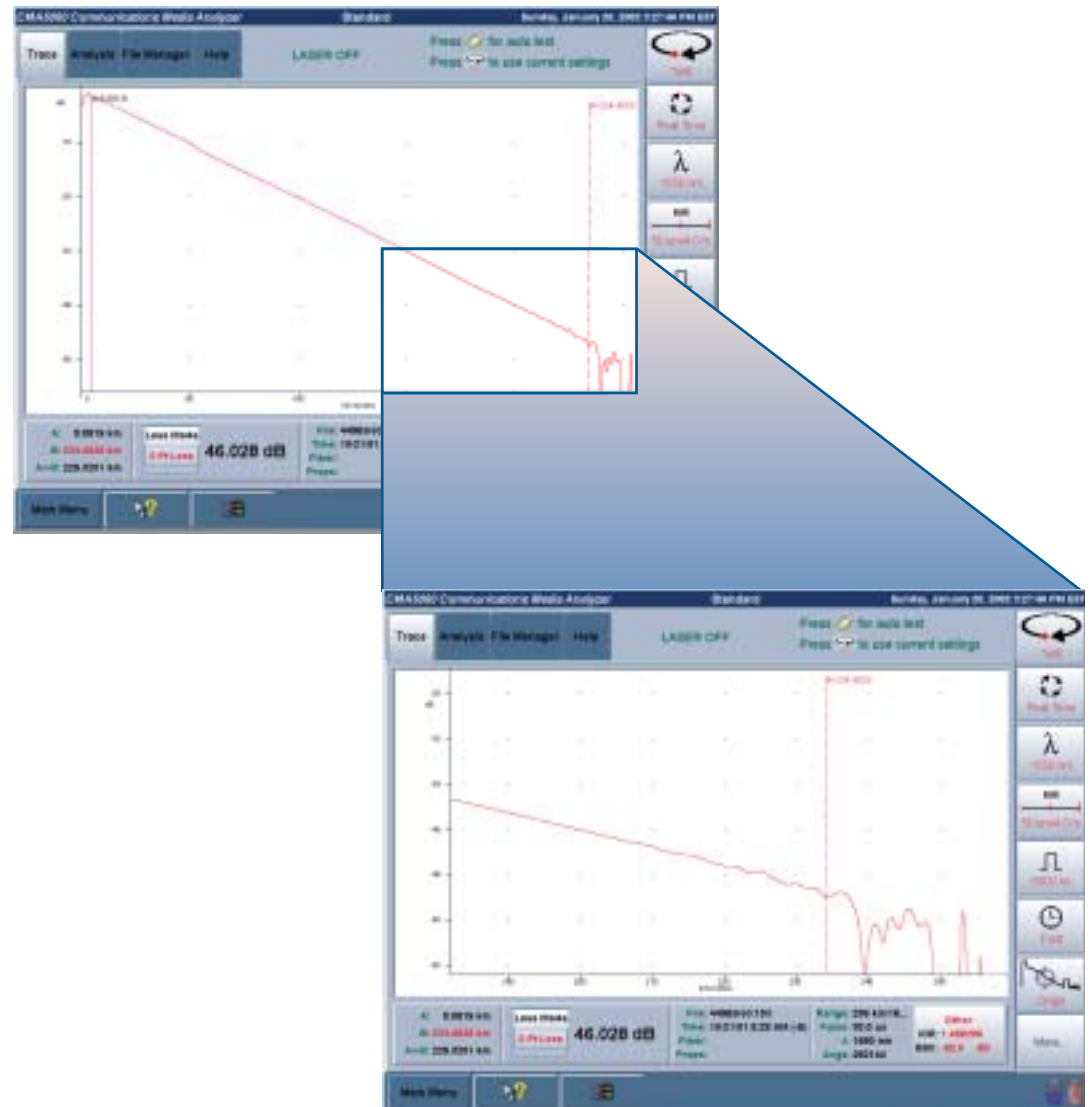
- Fastest OTDR in the industry, 60-80% of range in 15-30 seconds
- Automated reflectance and ORL measurements
- Automated reporting

CMA 5000 Optical Time Domain Reflectometer (OTDR) Application

The OTDR application reduces the time to install, commission and maintain fiber spans via high performance hardware and easy-to-use software.

With 50 dB of dynamic range and deadzones as small as 1.0 meter, the CMA 5000 OTDR application is the ideal solution for testing long-haul backbone networks, Metropolitan

Optical Networks (MONs) and Passive Optical Networks (PONs). The CMA 5000 can be easily equipped with a light source and power meter for complete end-to-end loss testing. In addition, the Visual Fault Locator (VFL) option enables you to locate breaks within the OTDR's deadzone or identify specific optical fibers within a cable.



Highest dynamic range - 50 dB, improved dynamic range vs. pulsewidth/deadzone



Superior OTDR event analysis software - accuracy and detection capability

Polarization Mode Dispersion (PMD) Application

The PMD application increases revenue, through complete PMD characterization, to optimize high data rate networks.

By utilizing the CMA 5000's PMD application to characterize the data rate capability of each fiber and transmitting at each fiber's maximum data rate, the negative effects of PMD may be minimized. As a result, installers, carriers and system providers can release the full potential of high data rate optical networks.

The power of the PMD application is easily accessed through an inherent, easy-to-use touch screen interface. Through an innovative parameter setup scheme, technician training is minimized and productivity is enhanced. In addition, the included emulation software allows the unit to remain in the field collecting data (where it belongs), while test results are reviewed and analyzed in the office on a desktop PC.

Chromatic Dispersion (CD) Application

The CD application increases revenue through accurate CD characterization to maximize bandwidth via optimal compensation.

The CMA 5000 Chromatic Dispersion application unlocks the true potential of your network by quickly and accurately measuring the chromatic dispersion, chromatic dispersion slope, and the zero-dispersion wavelength of any fiber type, to allow optimized compensation. By providing the valuable information required to precisely compensate for the negative effects of chromatic dispersion, the CMA 5000 CD application allows debilitating, non-linear effects to be eliminated and more channels (wavelengths) to be added to an individual fiber. In addition, each channel may be operated at the highest data rate possible for maximum bandwidth.

There are a myriad of compensation schemes so selecting the proper technique can prove to be a daunting task. The CD application can ensure your network contains the required level of compensation without the undue cost of excess complexity or additional attenuation. This ability to streamline and optimize CD compensation designs, coupled with single button operation for superior ease-of-use and short test times, makes the CMA 5000's Chromatic Dispersion test application the CD measurement system of choice.

Features and Benefits

CD Application

Increased revenue through optimal CD compensation:

- Measurement accuracy of 1% facilitates optimal compensation of CD and slope for increased channel count and data rate

Added value through performance:

- Dispersion, dispersion slope, λ_0 and spectral attenuation for all fiber types

Reduced cost of measurement:

- Extremely short test time – seconds per fiber
- Easy-to-use, automated software with one button operation

PMD Application

Increased revenue through accurate PMD characterization:

- Comprehensive characterization ensures each fiber can be operated at its data rate limit

Added value through performance:

- Michelson Interferometric test method (FOTP-124) provides increased performance - Accuracy and repeatability, 1% +/- 0.06 ps

Reduced cost of measurement:

- Unique, patented design provides for increased speed to reduce the cost of measurement - 8 to 18 seconds maximum per fiber

Features and Benefits

Optical Spectrum Analysis

Increased revenue through accurate channel characterization:

- +20 pm wavelength accuracy over spectrum and temperature
- +0.3 dB power accuracy over spectrum and temperature

Added value through performance:

- High resolution, two-pass Diffraction Grating
- Channel Select option allows user to drop a wavelength

Reduced cost of measurement:

- Easy-to-use - one button complete spectral characterization
- User-defined configurations for custom DWDM testing

Connector Inspection Application

Increase revenue through detailed inspection:

- Connectors can be certified for lucrative data-rate upgrades
- Eliminate up to 75% of all network failures

Added value through performance:

- Compact, one cable design with USB interface

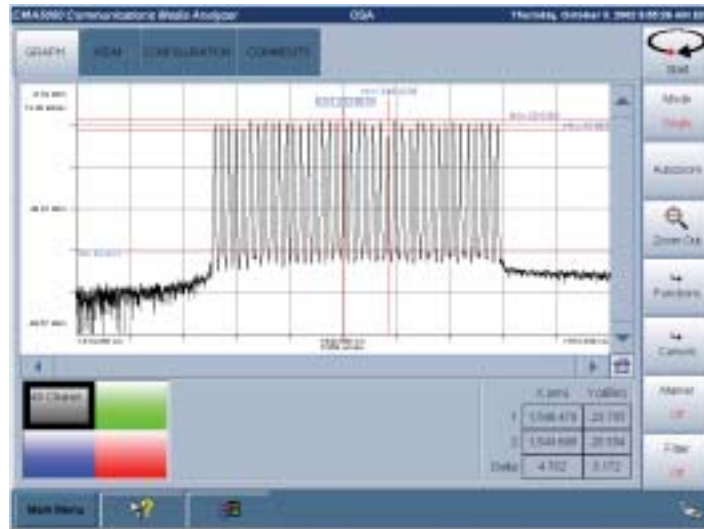
Reduced cost of measurement:

- View back panel fiber connectors through the bulk-head without removing them
- Software provides pass or fail results based on pre-defined criteria, reducing time and eliminating user subjectivity

Optical Spectrum Analysis (OSA) Application

The OSA application lowers DWDM installation and maintenance costs by providing industry-leading spectral analysis of system-critical parameters. It allows the testing of DWDM networks deployed both today and in the future. Operating from 1450-1650 nm

(S-, C- and L-band), the OSA module for the CMA 5000 maintains industry-leading accuracy performance over the entire temperature and spectral range. In addition 30 dB of OSNR at ± 25 GHz channel spacing is perfect for testing high-capacity DWDM systems.



+20 pm wavelength accuracy over spectrum and temperature range.

Connector Inspection Application

The Video Inspection Probe (VIP) gives technicians a safe, efficient way to analyze and document the condition of optical connectors. It uses a 1/3" CCD to convert connector images to a digital signal that are displayed on the CMA 5000 screen. Connector images can then be viewed or saved as a variety of popular

graphics files for later analysis or documentation of connector quality. The Video Inspection Probe has various adapters available to allow direct viewing of patch cord end faces, as well as for viewing of end faces already installed in patch panels.

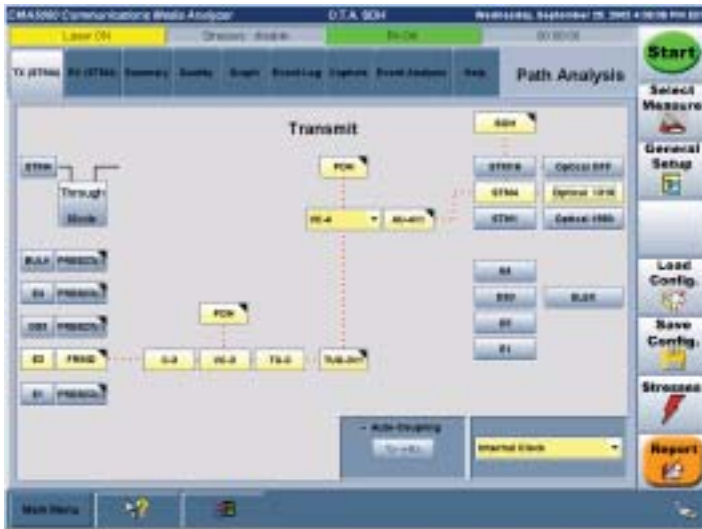


VIP provides a safe and efficient means to analyze and document connectors.

Optical Transport Analysis (OTA) Application

The innovative, comprehensive OTA application decreases time to revenue and mean time to repair high-speed SONET, SDH and DWDM transmission systems. It offers one of the most complete sets of electrical and optical

interfaces available in any portable platform. The OTA application allows installation and maintenance professionals to rely on one compact solution for all physical layer testing from DS1/E1 through OC-192/STM64.



Intuitive GUI reduces user errors and presents test data in an easy-to-interpret format. Verify QoS with objective performance tests in compliance with ITU-T M2100 & G826.

Gigabit Ethernet Application

The CMA 5000 Gigabit Ethernet application accelerates deployment of services via efficient verification of critical parameters, including physical connectivity, traffic throughput, latency, frame loss, and BER. In addition, with VLAN support and optical and electrical interfaces for 10/100/1000 Mbps, the versatility of the CMA 5000's Gigabit Ethernet application is unsurpassed.

To accelerate service deployment, the same CMA 5000 that was utilized to qualify and characterize the physical layer is now equipped with the Gigabit Ethernet application to test the physical interface at the data-link layer. Full line-rate traffic generation and shaping for 10/100/1000 BASE-T, 1000 BASE-SX, 1000 BASE-LX and 1000 BASE-EX networks, allow for accurate performance measurements under real-world conditions.

In addition, with unique features such as layered alarm and error analysis, and single button operation, the CMA 5000 Gigabit Ethernet application provides remarkable ease-of-use to accelerate the deployment of Gigabit Ethernet networks and services.



Coupling the CMA 5000's touchscreen interface with intuitive configuration controls ensure efficient, accurate setup to minimize test time and accelerate service deployment.

Features and Benefits

Optical Transport Analysis

Increased revenue through maximized network efficiency and QoS:

- Minimize network downtime via graphical event correlation
- Verify QoS with objective performance tests in compliance with ITU-T M2100 & G826

Added value through performance:

- All-in-one module, from PDH/T-carriers to SONET/SDH up to 10 Gbps
- Round Trip Delay measurement with 100 ns of resolution

Reduced cost of measurement:

- Reduced field force training and test time through targeted applications
- Best price/performance SONET/SDH tester on the market

Gigabit Ethernet Application

Increased revenue through:

- Targeted applications to efficiently measure critical network parameters including, utilization, throughput, latency, frame loss and burstability

Added value through performance:

- The Auto-negotiation capability allows the most important network parameters to be viewed immediately and automatically

Reduced cost of measurement:

- Unsurpassed ease-of-use allowing users to capture all relevant network statistics with the press of a single-button



NetTest Sales Offices

Australia

NetTest Pty. Ltd
 Ground Floor
 9 Prospect Street
 Box Hill
 Victoria 3128
 Australia
 Tel: +61 3 9890 6677
 Fax: +61 3 9899 5553
 E-mail: marketing-apac@nettest.com

Brazil

NetTest (Brazil) Ltda.
 Av. Luis Carlos Berrini, 1297
 7th Floor - Brooklin
 Sao Paulo - SP 04571-010
 Brazil
 Tel: +55 11 5505-6688
 Fax: +55 11 5505-1090
 E-mail: vendas@nettest.com

Canada

NetTest (Canada) Inc.
 55 Renfrew Drive
 Markham, ON L3R 8H3
 Canada
 Toll Free: 1 800 465-9400
 Tel: +1 905 479-8090
 Fax: +1 905 475-6524
 E-mail: info@nettest.com

China

NetTest (China) Ltd.
 Room 1561, Jingan Center
 No. 8 East Beisanhuan Road
 100028 Beijing
 P.R. of China
 Tel: +86 10 6467 9888
 Fax: +86 10 6464 4711
 E-mail: helpdesk@nettest.com

Denmark

NetTest A/S
 Kirkebjerg Allé 90
 DK-2605 Brøndby
 Denmark
 Tel: +45 72 11 23 00
 Fax: +45 72 11 23 50
 E-mail: nordic@nettest.com

France

NetTest
 45 Avenue Jean Jaures
 78340 Les Clayes Sous Bois
 France
 Tel: +33 1 61 34 34 61
 Fax: +33 1 61 34 34 01
 E-Mail: sales.france@nettest.com

Germany

NetTest GmbH
 Martin-Kollar-Str. 13
 D-81829 München
 Germany
 Tel: +49 89 99 89 01-0
 Fax: +49 89 99 89 01 40
 E-mail: info-germany@nettest.com

Italy

NetTest S.p.A.
 c/o Centro Dir. Lombardo
 Palazzo G - Via Roma 108
 20060 Cassina de' Pecchi (MI)
 Italy
 Tel: +39 02 95 12 621
 Fax: +39 02 95 300 320
 E-mail: sales_italy@nettest.com

Mexico

NetTest de Mexico
 Homero 1933-10
 Mexico D.F. 11560
 Mexico
 Tel: +52 5557 8249
 Fax: +52 5557 9843
 E-mail: victor.monsivais@nettest.com

Singapore

NetTest Pte Ltd
 371 Beach Road
 Keypoint, #06-01/03
 Singapore 199597
 Tel: +65 6220 9575
 Fax: +65 6225 7612
 E-mail: marketing-apac@nettest.com

Spain

NetTest (España) S.A.
 Centro Empresarial El Plantio
 Ochandiano, 8-EI Plantio
 E-28023 Madrid
 Spain
 Tel: +34 91 372 92 27
 Fax: +34 91 372 97 21
 E-mail: ventas@gnettest.es

Sweden

NetTest A/S
 Infracity, Kanalvägen 10C
 SE-194 61 Upplands Väsby
 Sweden
 Tel: +46 8 555 410 65
 Fax: +46 8 590 717 81

United Kingdom

NetTest Limited
 204 Godstone Road
 Caterham,
 Surrey CR3 6RD
 UK
 Tel: +44 (0) 1883 349 110
 Fax: +44 (0) 1883 349 160
 E-mail: info.uk@nettest.com

USA

NetTest North America Inc.
 Center Green, Building 4
 6 Rhoads Drive
 Utica, NY 13502
 USA
 Toll Free: 1 800 443 6154
 Tel: +1 315 266 5000
 Fax: +1 315 798 4038
 E-mail: info@nettest.com



NetTest North America Inc.

Center Green, Building 4
 6 Rhoads Drive
 Utica, NY 13502 USA
 Toll Free: 1 800 443 6154
 Tel: +1 315 266 5000
 Fax: +1 315 798 4038
 E-mail: info@nettest.com
 web: www.nettest.com

NetTest, the pioneer in multi-layer network testing, is a global provider of test and measurement systems, instruments and components for all types of networks and all stages of network development and operation. Our solutions offer leaders in optical, wireless and fixed networking vital insights into network performance, enabling informed business decisions that drive profitability.