

CMA 5000

Gigabit Ethernet Application



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The compact size of the Gigabit Ethernet application makes the CMA 5000 ideal for field installation and maintenance of Ethernet networks. In addition, when combined with the SONET/SDH analysis application, the CMA 5000 becomes the ultimate solution for metro network optimization.



Ideal Solution For Any Test Scenario

As a part of the CMA 5000 platform, the Gigabit Ethernet application is just one other way to accelerate the deployment of services while reducing the cost of measurement. With test and measurement options ranging from OTDR, connector inspection and dispersion to optical spectral analysis, bit error rate and SONET/SDH analysis the CMA 5000 is the ideal single-solution for all your testing needs.

To guarantee customer satisfaction, network providers must ensure rapid delivery of services, efficient response to service impairments and trouble-free network operation. The CMA 5000 Gigabit Ethernet application accelerates the deployment of 10/100/1000 Mbps Ethernet services and decreases trouble-shooting time and cost, while increasing network uptime. It is the ideal solution to satisfy even the most demanding customer.

Accelerate Deployment of 10/100/1000 Mbps Ethernet Networks

The CMA 5000 platform and Gigabit Ethernet application accelerates deployment via:

- Targeted applications to efficiently measure critical network parameters including throughput, latency, frame loss, connectivity and errored frame rate.
- Unsurpassed ease-of-use allowing users to perform all relevant tests, including RFC 2544 by loading automated, preconfigured settings or defining all parameters individually. All user defined settings may then be stored and recalled for future testing.
- Professional, comprehensive reporting of all settings and test results in standard .pdf format at the press of a button.

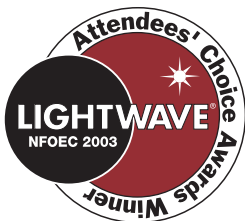
Decrease Troubleshooting Time and Cost and Increase Network Uptime

When your network is down, or service levels are compromised, delay is not an option. The CMA 5000 Gigabit Ethernet application quickly diagnoses service impairments and improves network up time.

- The Auto-negotiation and Auto-detect capabilities allow important network parameters such as connectivity, link activity, utilization, valid frame transmission and errored frames to be viewed immediately and automatically.
- To accelerate troubleshooting efforts, measurement results are displayed in both a detailed tabular (statistical) and intuitive graphical format.
- Thresholds may be set for all measurements to provide a quick, unmistakable, visual indication of pass/fail test status and the source of the failure.
- The Channel Statistics option quickly identifies the IP or Ethernet address, VLAN tag or MPLS label causing network impairment.

Easily and Efficiently Certify Links from End-to-End

When deploying 10, 100 or 1000 Mbps Ethernet service, it's critical to certify the link from end-to-end to ensure efficient turn-up and error free operation. The CMA 5000 provides targeted applications to facilitate fast, efficient link certification.



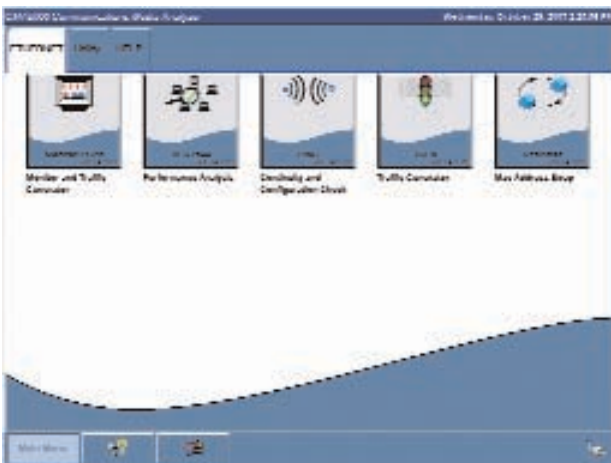
The Ping application quickly and easily verifies connectivity and configuration. The Traffic Generation application provides end-to-end testing by having one CMA 5000 generate Ethernet traffic, up to full line rate, while a receiving network station or second CMA 5000 monitors the traffic at the far end of the link under test. With the CMA 5000, you have complete control of the line load, frame size, frame rate, frame contents and VLAN tag. In addition to the ability to insert one or multiple errors, links can be easily characterized under real-world, full line rate conditions. By using the CMA 5000's Monitor with Traffic Generation application, one unit can be used to both generate and receive Ethernet traffic. In this manner, all traffic sent and received can be simultaneously viewed on one display. The network under test can either provide the logical loopback, or a remote CMA 5000 can be used to swap the Ethernet or IP source and destination addresses to provide the loopback.

RFC 2544

The data communications industry's RFC 2544 Benchmarking Methodology for Network Interconnect Devices, details the testing requirements for deploying and commissioning high data rate networks. The CMA 5000 Gigabit Ethernet application performs Throughput, Frame Loss, Latency and Back-to-Back frame tests (also called Burstability), in compliance with RFC 2544. The CMA 5000 not only performs these tests, but also automates the process by offering predefined, loadable configuration files to perform the tests in complete conformance to RFC 2544 standards. The CMA 5000 also allows the freedom to adjust all measurement parameters manually for ultimate flexibility and control. Once configured, these user defined setup parameters may be stored in a configuration file for future use. Regardless of the method, the CMA 5000's ease-of-use ensures the correct configuration, eliminating measurement errors and wasted time due to incorrect instrument setup.

Benefits and Features

- The Traffic Generation application provides fast, efficient end-to-end testing with traffic generation capabilities up to full line rate and per port user definable:
 - IP and Ethernet Source and Destination Addresses
 - Line Load
 - Frame Size
 - Frame Rate
 - Frame Contents
 - Error Insertion
 - VLAN Tag
 - Subnet Mask
 - Default Gateway
- In addition to the basic Traffic Generator, the CMA 5000 Gigabit Ethernet application also allows the transmit and receive statistics to be displayed simultaneously
- The CMA 5000's ability to swap the Ethernet and IP source and destination addresses provides a simple, logical loopback for single ended link certification
- Automated RFC 2544 testing provides simple acquisition of:
 - Throughput
 - Frame Loss
 - Latency
 - Burstability



Targeted applications to measure complete network statistics, RFC 2544, and connectivity provide unsurpassed ease-of-use to eliminate the learning curve.



RFC 2544 details the testing requirements for deploying and commissioning high data rate networks. The CMA 5000 allows either complete control of all setup parameters or enhanced ease-of-use through automated settings.

Benefits

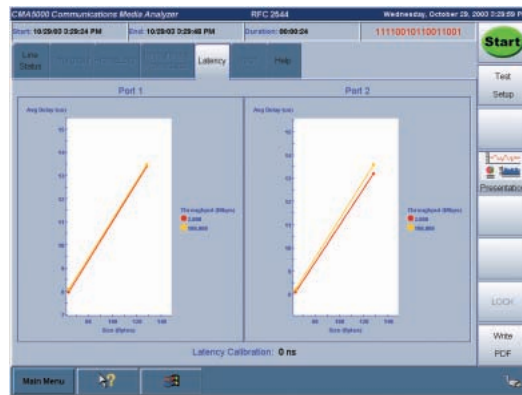
- The CMA 5000's intuitive GUI provides unsurpassed ease-of-use to accelerate testing
- Easily and accurately interpret test results presented in either tabular or graphical format



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



With the press of a single button, important network parameters such as link status and utilization may be obtained. In addition, unmistakable alarm notification will signal compromised network performance when service degrades below any one of 15 preset, user-defined thresholds.



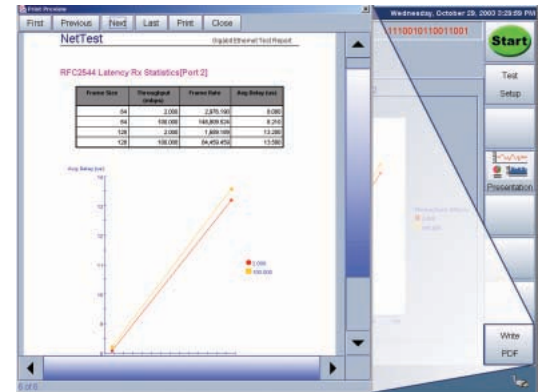
Intuitive, graphical displays provide an efficient, easy to understand overview of measurements.



For increased detail, view all test results in tabular format with the press of a button.



Complete control over IP and Ethernet addressing parameters, in addition to the traffic encapsulation type, allow the CMA 5000 Gigabit Ethernet application to emulate network elements for comprehensive testing and troubleshooting.



Generate professional reports detailing all critical results with the press of a button.

Interface Specifications

Ethernet Test Ports (2) Gigabit optical and (2) 10/100/1000 Mbps electrical

Optical Line Interfaces Simultaneously hold any two, field swappable, industry standard 850 nm (SX), 1310 nm (LX) and 1550 nm (LD, EX) GBICs

Electrical Line Interfaces 10/100/1000 Mbps RJ45 (unshielded and shielded twisted pair cables, category 3, 4, 5, 5E, and 6) FDX and HDX operation

Traffic Generation

The CMA 5000 Gigabit Ethernet application traffic generation capabilities include:

- Variable line rate traffic generation, up to full line rate
- Configurable IP and Ethernet source and destination addresses (Support of IPv4 and IPv6 addressing)
- Unicast and broadcast frames
- EtherType II (DIX V.2), IEEE 802.3 with 802.2 (LLC1) and IEEE 802.3 with SNAP encapsulation
- Adjustable frame size from 44 bytes to 10,000 bytes provides testing of undersize, oversize, and jumbo frames
- User definable VLAN ID and VLAN priority
- Configurable data field (payload) supporting PRBS or user defined payload
- User definable traffic mix (Broadcast and Unicast)
- Frame sizes may be set to constant, stepped, or random length to emulate real world traffic profiles.
- In addition, when used with Ethernet or IP address swapping, all measurements may be performed in loopback or point-to-point networks allowing the CMA 5000 to measure any network topology for unsurpassed versatility

Benefits

- Targeted applications provide efficient acquisition of all critical measurements
- The CMA 5000 provides all required functionality to install and maintain 10/100/1000 Mbps Ethernet networks

Ethernet Measurements (per port)

The CMA 5000's comprehensive active (RFC 2544) and passive (monitoring and statistics) testing capability accelerate Ethernet service deployment and facilitate faster troubleshooting and maintenance.

Installation/Commissioning (RFC 2544)

- Throughput
- Latency (timestamps or Pings)
- Frame loss
- Back-to-Back frames

Ping Test

- For efficient connection/configuration check and round trip time (RTT). Supports both IPv4 and IPv6 addressing.

General Health/Line Statistics

- Link status
- Speed
- Pause capable
- Remote fault
- Full or half duplex
- Asymmetric pause capable
- Signal present
- Interface type
- Link partner capabilities
- Frames present
- Local clock

Performance Statistics

- Max., min., average utilization
- Max., min., average throughput
- Max., min., average frame rate

Frame Statistics

- Total frames
- Total errored frames
- Number of collisions (10/100 Mbps half duplex only)
- Total good frames
- Number of fragments
- Preamble violations
- Unicast frames
- Number of undersized frames
- Alignment errors
- Multicast frames
- Number of jabbers/oversize frames
- IFG violations
- Broadcast frames
- Number of FCS errored frames
- Number of pause frames

Encapsulations (Frame Formats) Supported

- EtherType II (DIX v.2)
- IEEE 802.3 - LLC1
- IEEE 802.3 - SNAP

Benefits

- Adjustable thresholds enable unmistakable pass/fail test interpretation

Ethernet Measurements Continued (per port)																	
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<p>Adjustable Thresholds</p> <p>When any threshold is exceeded, the user receives a visual indication and the time and date are recorded in the events tag.</p> <table border="0"> <tr> <td>• Utilization</td> <td>• Broadcast frames</td> <td>• Oversize frames</td> </tr> <tr> <td>• Throughput</td> <td>• Pause frames</td> <td>• FCS errored frames</td> </tr> <tr> <td>• Collision rate</td> <td>• Errored frames</td> <td>• IFG violations</td> </tr> <tr> <td>• Unicast frames</td> <td>• Fragment frames</td> <td>• Preamble violations</td> </tr> <tr> <td>• Multicast frames</td> <td>• Undersized frames</td> <td>• Alignment errors</td> </tr> </table>			• Utilization	• Broadcast frames	• Oversize frames	• Throughput	• Pause frames	• FCS errored frames	• Collision rate	• Errored frames	• IFG violations	• Unicast frames	• Fragment frames	• Preamble violations	• Multicast frames	• Undersized frames	• Alignment errors
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Channel Statistics Option																																															
<p>90% of a networks life is spent installed, so troubleshooting and maintenance capabilities are critical. The Channel Statistics software upgrade for the CMA 5000 allows the user to quickly identify the root cause of network impairments, not just the symptoms. The Channel Statistics option presents detailed statistics on all traffic received for up to 8,000 individual Ethernet or IP addresses, VLAN tags or MPLS labels. These statistics allow immediate identification of the top talkers, top error generators or the most inefficient VLANs or users, in addition to many other parameters. The Channel Statistics option also includes a filtering capability that allows, problematic equipment, network links or VLANs to be targeted and isolated for analysis. Any or all of the following statistics may be presented on a per channel basis.</p>																																															
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Channel Statistics Option (continued)

Available Filters

The following filters are included with the Channel Statistics option.

- IP or MAC source address
- IP or MAC destination address
- Broadcast address
- IEEE OUI value
- Encapsulation type
- VLAN ID
- VLAN tag priority
- User defined pattern at a defined offset
- MPLS label
- TCP/UDP source and destination port

Global IP Statistics

The following IPv4 and IPv6 statistics are included with the Channel Statistics option.

- IPv4 and IPv6 Throughput
- TCP and UDP Throughput
- IPv4 and IPv6 Packet Rate
- TCP and UDP Packet Rate
- Total Packets
- Pv4 and IPv6 Packets
- TCP and UDP Packets
- IP Fragment Errors
- IP Header Errors
- TCP and UDP Packet Errors
- IP Packet Size Distribution
- Average IP Packet Size

Benefits

- Quickly troubleshoot network congestion using the CMA 5000's Channel Statistics option
- The Channel Statistics option allows the CMA 5000 to break down the traffic observed for up to 8,000 individual IP or MAC addresses, VLAN ID's or MPLS labels
- Identifies the IP and MAC address pairs of the various connections observed to relate test results to actual users in the network
- Having the test results linked to the MAC addresses carrying the IP traffic facilitates and simplifies layered troubleshooting
- Quickly identify the root problem instead of just the symptoms
- Powerful filtering features present only pertinent data

The screenshot displays the CMA 5000 Channel Statistics software interface. The main window shows a table with columns for MAC Src, MAC Dst, VLAN, L2 Protocol, IP Src, and IP Dst. The table contains multiple rows of data, including source and destination MAC addresses, VLAN IDs, and IP addresses. The interface also features a 'Stop' button in the top right corner and various navigation controls on the left and bottom.

The Channel Statistics option provides detailed troubleshooting information to quickly identify the root cause of a problem, not just the symptoms. This software option presents a number of statistics on a per channel basis (IP or MAC address, VLAN tag or MPLS label) to efficiently identify devices causing network congestion or impairment.



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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.