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CMA5000

SPECIFICATIONS

5710 Gigabit Ethernet Module



General Description

The CMA5710 Gigabit Ethernet application is a single slot module that can be used in any CMA 5000. The Gigabit Ethernet test module enables testing of 10/100/1000 Mbps optical and electrical Ethernet networks. The module provides 2 optical (SFP) and 2 electrical (RJ45) ports. The module is specifically designed to facilitate installation and maintenance of Ethernet networks. For installation, the module provides RFC2544 test functions including: Throughput, Latency and Frame Loss tests. For maintenance and troubleshooting the module provides complete, non-intrusive monitoring capabilities and presents comprehensive statistics to give insight into the network's health and status.

Network Monitoring and troubleshooting

The CMA 5000 targeted application modes allow for quick and easy set up to ensure decreased downtime of the network under test. The auto-detect and auto negotiation capabilities takes the guess work out of connectivity and link status. User defined thresholds provide instant pass/fail notification of the network impairment. All test results can be displayed in both tabular and graphical forms which further expand the test results. In addition the pass through capabilities of the CMA5000 allow for non-intrusive network monitoring.

Installation and commissioning

In today's triple play networks proper installation testing and verification is essential to providing QoE to your customer. The industry standard RFC2544 is this method of ensuring proper network turn up and is required for deploying and commissioning high data rate networks. The CMA 5000 provides accurate results of throughput, frame loss, burst and latency to ensure the SLA performances that are demanded by the end user. The CMA 5000 not only performs these tests but automates the process through an Auto search function which decreases test time but still provides the accuracy that is needed. With the touch of a button all tests results can be generated into a comprehensive and professional report.

Key Features

- Small light weight single slot module
- Industry standard SFP optics
- Extended Battery operation
- Easy to use graphical user interface
- RFC 2544 Master/slave functionality to ensure ease of use
- IP jitter measurement for time sensitive applications such as IPTV and VOIP to ensure QoS
- Dual port provides non-intrusive monitoring of suspect link
- TCP and UDP encoding allows testing of the higher layer protocols
- Professional and comprehensive report generation at the touch of a button
- The channel statistics option allows you to identify all IP conversation pairs on the network with more than 40 statistics per channel
 - o Top Talkers identify which addresses are consuming the most bandwidth, helps identify, malicious users
 - o Top Error Generators identify which addresses are causing retransmissions
 - MAC / IP Addresses identify all users on the link
 - o VLAN tags / MPLS labels filter and segment traffic per customer via VLAN tags

TGen TGen Address Frame	APLS	Channels	Summary	Help		Port 1 Port 2	Test Results
nclude VLAN and 🗆 N	MPLS					Port 1 Ports2	Test Résults
							1
	IP Statistics	View		TC I I	:p Bytes Packet Count		
Errored Frames Errored Frame Rate Errored Throughput Errored Byte Count	Frames Press						
IP Datagram Bytes	IPv4	Packets	Rate		Packet Count Packet Rate Packet Throughput		LOCK
able		Dytes Throughp	put	TC	P/UDP Errored Packets		Write PDF
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Fig.1 Channel statistics setup screen

Fig.2 Channel statistics results screen

Standard Application Modes					
Monitor/ Traffic Generator	• BERT				
 Utilization (Constant Frame Rate and Frame Size) 	○ Framed and Unframed				
 ○ Throughput 	 Sequence Test 				
 Errored frames 					
 Frame size distribution 					
$_{\odot}~$ Total frames transmitted and received					
• RFC2544					
 o Throughput 					
• Frame Loss					
o Latency					
 Back to Back frames (Burst) 					
○ IP Jitter					
• Ping					
 o Trace route 					
Reflector					
 Reflect all 					
 Reflect specific MAC address 					
 Selective IP swap 					



Fig.3 Targeted application modes provide the required tests for each test application

CMA5000 Communications Media Analyzer	Monitor/T [*] Gen	Tuesday, January 9, 2007 11:32:54 AM
Ethernet Port Thresholds TGen Address TGen Frames	Summary Help	Start
Connection Diagram		
< 5 - Electric	al Port 1, Electrical Port 2	 Test
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	<u>† </u>	
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Service	0	LOCK
Port 1	Port 2	
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Clock: Auto Master	Clock:	Auto Master
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1A5000 Com	lyzer		Monitor/T*(Tuesday,	January 9, 20	07 11:33:53				
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Frame Cont	tent:	PRBS 2x10E9_1 -								
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Test Durati	on:			Con	tinuous			-		
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Frame Size										
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Fig.4 Intuitive graphical user interface provides unsurpassed ease of use Fig.5 User defined traffic mix provides emulation of real world traffic

07 3:40:20 PM hroughput & rame Loss Port Addres Star Size (Bytes) [N m Number of Frame Sizes: 10 UserDefined Frame Profile ፼ 64 ≥ 128 ≥ 256 ≥ 512 ≥ 768 ≥ 1024 Load Line Load (Mbps) [Maximum Number of Throughputs: 101] m Throughput: Ma 1000.0 Minimum Throughput: 10.0 Auto Search Resolution 0.01 Frame Step Duration (secs): 5 PRBS 2x10E9_1 -Write Content: PDF **}**? 5

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Fig. 6 Quick and automated RFC 2544 testing to ensure SLA performance Fig.7 Intuitive test results in both a tabular and graphical display

Specifications

General	
Ports	 2 electrical 10/100/1000M 2 optical (SFP) ports 1000M or 100M (SFP's sold as separate line item)
Connectivity	 Auto negotiation User defined On or selective service Auto detection User defined On or Off Pass through mode in Monitor/Tgen application
Additional Support	ARP Response PING Response

Traffic Generation Application

- Variable line rate traffic generation, up to full line rate
- Configurable IP and Ethernet source and destination addresses (Support of IPv4 and IPv6 addressing)
- Configurable TCP and UDP source and destination ports
- 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 38 bytes to 10,000 bytes
- 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.
- Transmit Statistics

Monitor Application	
General Health/Line Statistics	Link status
	Signal present
	Frames present
	• Speed
	Full or half duplex
	Interface type
	TX and RX optical power levels
	Local clock
	Pause capable
	Asymmetric pause capable
	Link partner capabilities
Performance Statistics	Max., min., average utilization
	Max., min., average throughput
	Max., min., average frame rate

Monitor Application (cont'd)	
Frame Statistics	Total frames
	Unicast frames
	Multicast frames
	Broadcast frames
	Number of pause frames
	Number of VLAN tagged frames
	Total errored frames
	Number of fragment frames
	Number of oversize frames
	Number of undersized frames
	Number of FCS errored frames
	 Number of collisions (10/100 Mbps half duplex only)
	Preamble violations
	Alignment errors
	IFG violations
Frame Distribution Statistics	Total valid/good frames
	64 - 127 byte frames
	• 128 - 255 byte frames
	• 256 - 511 byte frames
	• 512 - 1023 byte frames
	• 1024 - 1518 byte frames
	Total number of jumbo frames
	Max., min., average frame size
Burst Statistics	Total frames in bursts
	Max., min., average burst size
Transmit Statistics	
	Compare transmitted and received Statistics
	Current and cumulative
Thresholds	Simplified Pass/Fail evaluation of the test results by the following user defined thresholds:
	Utilization
	Throughput
	Collision rate
	Unicast, Mulitcast, Broadcast frames
	Pause frames
	Errored frames
	Fragment frames
	Undersized, oversized frames
	FCS errored frames
	IFG violations
	Preamble violations
	Alignment errors

RFC-2544 Application	
General	Graphical display of "use cases" to choose from for ease of use
	Support for Half duplex
	Auto Search
	User selectable "stop on No frame loss"
	VLAN tag selectable
	Predefined test configurations
Throughput and Frame Loss	 Frame profile: constant, stepped and user defined frames sizes including Jumbo frames.
	User selectable step duration
	User selectable frame content
Back to back frames (Burst)	 Frame profile: constant, stepped and user defined frames sizes including Jumbo frames.
	Burst profile: constant, stepped
	Step duration
	User selectable number of repeats
Latency	 Frame profile: constant, stepped and user defined frames sizes including Jumbo frames.
	User selectable step duration
	User selectable number of repeats
	Selectable "measure latency only at throughputs"
	IP Jitter measurement
Report	Printable PDF report
	Results and settings
	Tabular and graphical results
	Custom logos can be generated on the PDF report.
	 A text version of the report may be generated, with CSV utilized for tabular results.

BERT Application	
BERT Patterns	• PRBS 2x10E9_1
	• PRBS 2x10E11_1
	• PRBS 2x10E15_1
	• PRBS 2x10E20_1
	• PRBS 2x10E20_2
	• PRBS 2x10E23_1
	• PRBS 2x10E29_1
	• PRBS 2x10E31_1
	• HF Test
	• CRPAT
	• JTPAT
	• SPAT
BERT Statistcs	Errored Seconds
	Severely errored seconds
	Alarm seconds
	Unavailable time
	Available time
	Error free seconds
Sequence Statistics	Sequence errors
	Sequence sync lost
	Frame loss
	Frame loss seconds

CMA5000 Communic	ations Media	a Analyzer		BERT and Seque	ence	т	uesday	, March 18, 2	008 3:27:32 PM
Ethernet Port Addre	ess Frame	Summary	Help						Start
BERT Configuratio	BERT Configuration Outframed								
Sequence	Pot 2								
Frame Content Encapsulation:				EtherType			•		
Vlan Tag:	Enable	Priority:		0	ID:	0			
Frame Content:	: PRBS 2x10E9_1 -								
Enable Response to Pause Frames									
Line Rate									
Test Duration:				Continuous	1		-		
Line Load: N	Mbps 1000.0 (Including preamble and IFG)								
Frame Size	Frame Size								
Start Frame Size	rame Size (Bytes): 64 End Frame Size (Bytes): 1518							LOCK	
									Write
P								PDF	
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Fig.8 BERT application generates test patterns, either unframed or framed with IP header, and also detects sequence errors and loss of sequence synchronization.

Channel Statistics Option	
Statistics Displayed	Frame count
	Frame rate
	Throughput
	Byte count
	MPLS frames
	Jumbo frames
	Errored frames
	Errored frame rate
	Errored throughput
	Errored byte count
	L2 header rate
	Frame/packet size distribution
	IP header bytes
	IP fragments
	IP length errors
	TTL threshold violations
	IP packets
	IP packet rate
	IP bytes
	IP throughput
	IP length errors
	IP header errors
	TCP/UDP bytes
	TCP/UDP packet counts
	TCP/UDP packet rate
	TCP/UDP packet throughput
	TCP/UDP errored packets
Filters	Filters available to be used in conjunction with the Channel Statistics Option to
	snow only the required type of traffic of interest
	IP or MAC source address
	IP or MAC destination address
	VLAN lag priority
	User defined pattern at a defined onset

Ordering Information	
5710-000-GIGE	Base Module
5710-085-GIGE	850 SFP
5710-013-GIGE	1310 SFP
5710-015-GIGE	1550 SFP
5710-CS-OPT	Channel statistics software option

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