



## Oszczędzaj czas i pieniądze ...



### Moduł High-Density Ethernet dla platformy NIC

Jednoczesne, wieloportowe testy Ethernet

Wykonywanie testów Ethernetowych na wielu portach jednocześnie może w znaczącym stopniu skrócić czas testowania sieci, co pozwala na zredukowanie kosztów. Przy użyciu modułu HD Ethernet użytkownik może testować jednocześnie do 8 portów 10/100/1000 plus 4 porty GigE. Dodatkowa opcja 10GigE LAN/WAN pozwala dodatkowo na kompleksowe testowanie nowoczesnych sieci Ethernet o wysokich przepustowościach.

*Popraw wydajność wykonywanych testów sieci Ethernet dzięki modułowi HD Ethernet dla platformy NIC .*

#### MODUŁ DOSTĘPNY W TRZECH KONFIGURACJACH:

##### **10G (1 port optyczny), 1G (4 porty optyczne), 10/100/1000BaseT (8 portów)**

*Moduł HD + 10G Ethernet oferuje największą liczbę portów i obsługuje największe przepustowości*

##### **1G (4 porty optyczne), 10/100/1000BaseT (8 portów)**

*Moduł HD Ethernet oferuje największą liczbę portów do testowania Gigabit Ethernetu*

##### **10/100/1000BaseT (8 portów)**

*Moduł HD BaseT oferuje największą liczbę portów do testowania elektrycznego Ethernetu*

#### PLATFORMS



NIC®



NIC Plus®



NIC EP™

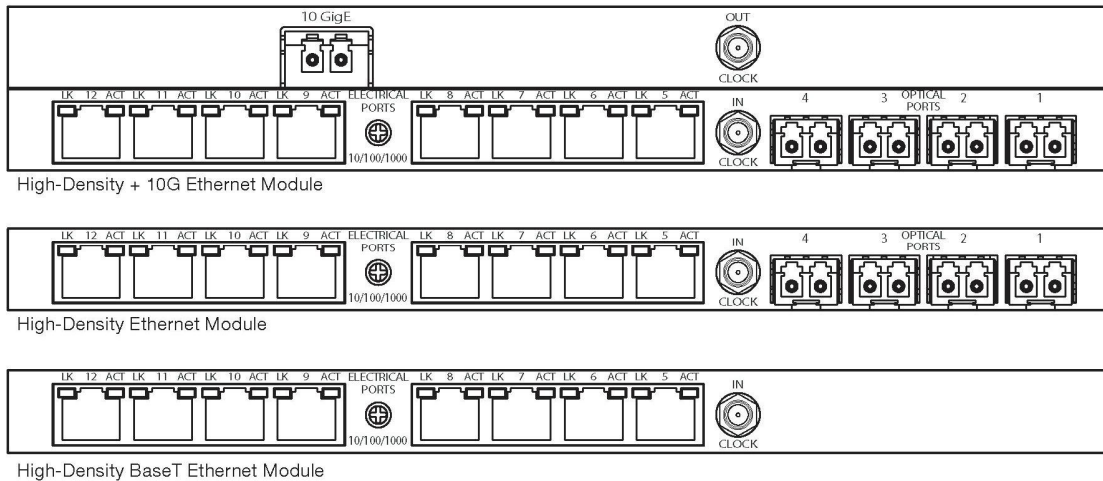
#### CECHY PRODUKTU:

- W parze z modułem NGMR, pozwala na wykonywanie testów telekomunikacyjnych i transmisyjnych przy użyciu jednego testera.
- Jednoczesne testy na WSZYSTKICH portach oraz na wielu strumieniach
- Dzięki możliwości zainstalowania wielu modułów HD Ethernet w jednej platformie NIC Plus lub NIC EP, użytkownik dostaje możliwość testowania do 60 portów Ethernetowych jednocześnie.
- Wsparcie dla wymiennych modułów optycznych SFP oraz XFP, 850 nm, 1310 nm, 1550 nm plus zwyczajna konfiguracja.
- Możliwość wykonywania testów Port-Port
- Intuicyjny interfejs graficzny pozwala ograniczyć do minimum czas potrzebny do nauki obsługi testera.
- Testy wg. rekomendacji RFC 2544 oraz RFC 1242
- Pomiary przepustowości, gubienia ramek, opóźnienia, maksymalnego obciążenia oraz czasu obrotu komunikatu
- Wsparcie dla 10 Gigabit Ethernet LAN/WAN
- Tryb pętli pozwalający na wykonywanie testów RFC w sieci routowanej.
- Ochrona inwestycji! Każda platforma NIC może zostać unowocześniona dzięki dodaniu nowych modułów.
- Standardowe, łatwe w użyciu GUI

# Moduł HD Ethernet dla platformy NIC

Jednoczesne, wieloportowe testy Ethernet

## WYGLĄD PANELI:



## Ethernet GUI CONFIG. SCREEN

The screenshot shows the configuration interface for a NIC GigE (TM) on IP: 10.1.3.117. The interface includes a navigation menu with tabs for HD Enet, WAN Enet, System, and Help. The main configuration area is divided into several sections:

- PP Name:** GoTo
- Tab 1 HD Enet:**
  - Laser is On:** Rx: -3.03 dBm, Tx: 1307.500 nm, E/A None/None
  - All Tests:** Test Paused
  - Error Alarm:** Set
  - Mode:** 9.953 Gbps WAN optical
  - Columns:** IP Reflect-Off, Flow Control, Tx Mode, Pause
- Test Results Table:**

Port	Tx State	MAC Src	MAC Dest	IP Src	IP Dest
1	On	00-02-02-01-09-01	02-05-08-02-03-01	192.168.0.1	29.1.10.5
2	On	06-03-50-20-00-08	04-02-00-30-20-01	192.168.0.2	29.1.10.10
3	On	01-00-80-3c-07-04	05-e0-20-04-0b-06	192.168.0.3	29.1.10.15
4	On	a0-50-0b-06-09-07	08-06-05-07-0d-05	192.168.0.4	29.1.10.20
- Performance Summary Table:**

Type	Packets	Pkts/sec	Bytes	Mbit/sec	%BW
TX	17438634796	13830430	1116072628435	9294.050	100.00
RX	17438634782	13830431	1116072627370	9294.050	100.00
- Control Buttons:** Error Insert, Stop, Restart, Print Report, Save, Restore, Clear History, Off/ Lock

# Moduł HD Ethernet dla platformy NIC

Jednoczesne, wieloportowe testy Ethernet

## INTERFACES

**10-Gigabit Ethernet** **Ports:** 1 XFP user-pluggable module with LC connector; **Data Rate:** 10 Gbps; **Line Rate:** 10.3125 Gbps (LAN), 9.95328 Gbps (WAN); **Duplex Mode:** Full duplex

Optional XFP modules available for 10GBaseLW, 10GBaseEW, 10GBaseLR, 10GBaseER in accordance with 802.3ae and custom configurations; Tx Level, Tx Wavelength, Rx Level, Rx Spectral Range, and Input Signal Measurement are dependant upon XFP module selected

**External Eye Clock:** SMA, AC coupled PECL (line rate/64)

**Gigabit Ethernet** **Ports:** 4 SFP user-pluggable modules with LC connector; **Duplex Mode:** Full duplex; **Data Rate:** 1 Gbps

Optional SFP modules available; Tx Level, Tx Wavelength, Rx Level, Rx Spectral Range, and Input Signal Measurement are dependant upon SFP module selected

**10/100/1000 BaseT** **Ports:** 8 ports, fully independent, RJ-45 connectors; **Data Rate:** 10 Mbps/100 Mbps/1 Gbps; **Duplex Mode:** Full or half duplex

## PACKET SPECIFICATIONS

**Frame Type** Statistics and generation of Ethernet frames with UDP/IP, IPv4

**Results/Statistics** Received optical power, LOS, link state, jabber, collision (10/100/1000 electrical only) code violation error counts, current rate, average rate, errored seconds; each port accumulates statistics in real time; event log result analysis with time stamp; user-defined test duration time

**All Ether Ports Results** Displays all activity, alarms and errors for all ports simultaneously in single screen for easier testing analysis with the option to rearrange rows and columns

**LED Indicators** LOS, link state and pattern sync alarms, FCS, code, and payload BIT errors, sequence errors, remote fault/link fault (10 Gig only)

**Traffic Stream Generation/Analysis** 4 independently configurable traffic generation and analysis streams, reply to link fault (10 Gig only)

**Configurable Stream Parameters** Destination port, transmitted bandwidth 0.01% to 100%; **Frame length:** 64 to 9600 bytes, acceptable bit-error rate, acceptable out-of-sequence rate, acceptable loss rate; **MAC source/IP source/destination addresses, UDP source/destination Addresses, VLAN tagging 802.1q,p, VLAN enabled/disabled, VLAN ID 0 to 4095, VLAN QoS levels 0 to 7, UDP payload pattern (all ones, all zeros, PRBS 31, user-defined 32-bit), IP TOS, IP TTL, and IP Fragment Flag**

**Flow Control** Generation of pause frames with a user specified time of 0 to 65535 Quantas; response to pause packets can be enabled or disabled

**Per-Port Tx Statistics** Transmitted packets, packets per second, transmitted bytes, Mbps, % bandwidth of transmitted packets/bytes

**Per-Port Receive Statistics** Received Mbps and bandwidth % rates, received packets/bytes count, received jumbo frames, received pause packets, pause end packets, pause

Quantas taken, count of received IP, ICMP, TCP,

UDP, and IGMP packets, count of received VLAN tagged frames and VLAN tagged frames per QoS levels 0 to 7, latency (minimum, maximum and average), broadcast, multicast and unicast packets, packet-size distribution

**Per-Stream Transmit Statistics** Transmitted bandwidth %, transmitted packet bytes count

**Per-Stream Receive Statistics** Received bandwidth %, Received packets/byte count, out-of-sequence packets, bit errors, latency (minimum, maximum, and average in ms)

**Alarm Detection** LOS, link fault, pattern sync, jabber, link fault (10 Gig only), remote fault (10Gig only)

**Error Measurements** FCS, IP checksum, code errors, collisions, sequence, Bit, line code, runt, oversized/undersized frame error counts: current rates, average rates, and errored seconds

**Error Insertion** FCS, IP checksum, sequence: single, 1e-2 to 1e-7; bit: single, 1e-3 to 1e-10; line code: single

**APS Measurements** Maximum, minimum, average, and current protection switch times in ms; user-definable guard band thresholds for filtering receive traffic

**Advanced Ping Functionality** Selectable MAC source, IP source and IP destination, number of Ping attempts, Timeout (1-5 sec.), Packet size (64-9600 bytes), Time to live (1-255); Last 4 responses displayed in Ping response window; Full statistics of Ping operation displayed in the Ping Statistics section

**Rates and Negotiation** Supports autonegotiation at applicable rates with status display, including pending link, line rate, full-duplex or half duplex, and master/slave timing mode

**1G optical rates:** supports "1G full duplex mode" with negotiation enabled or disabled; **10/100/1000:** supports autonegotiation for all rates – configures to fastest data rate and duplex mode; **1000 Electrical Only:** Line control Auto, Master or Slave

**IP Reflection** User-selectable, can reflect all unicast packets or only packets created by Digital Lightwave test instrument

**Port-to-Port Testing** Ping, bi-directional bit-error-rate and stream testing; RFC 2544 testing for throughput, frame loss, and latency

**RFC 2544 Throughput Test** Measurements are provided for 64, 128, 256, 512, 1024, 1280, and 1518 byte frame standard lengths plus custom lengths, user-defined trial duration time (1 to 600 secs), acceptable loss rate (0 to 100%); resolution rate (1 to 100%) parameters; **Results:** passing rate %, number of transmitted/received packets, and min/max/average latency values in microseconds

**RFC 2544 Frame Loss Test** Measurements are provided for 64, 128, 256, 512, Test 1024, 1280, & 1518 byte frame standard lengths plus custom lengths, User-defined trial duration time (1 to 600 secs); **Results:** Tested frame rate %, number of transmitted/received frames, % loss

**RFC 2544 Back-to-Back Burst Test** Measurements are provided for 64, 128, 256, 512, Test 1024, 1280, & 1518 byte frame standard lengths plus custom lengths, User-defined trial duration time (1 to 600 secs); **Results:** Number of packets that can be forwarded in a burst per user-specified parameters and number of repetitions

# Moduł HD Ethernet dla platformy NIC

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## 10G WAN SPECIFICATIONS

Requirements	Meets the requirements of GR-253 (OC-192) and ITU-T G.707 (STM-64)
Mapping	<b>10G WAN PHY per IEEE 802.3</b>
Synchronization	Internal, received SONET or SDH signal
Error Measurement	<b>OC-192:</b> B1, B2, REI-L, B3, REI-P, NDF errors <b>STM-64:</b> B1, B2, MS-REI, B3, HP-REI, NDF errors (performance measurements per G.821, G.826, M.2101.1)
Alarm Detection	<b>OC-192:</b> LOF, LOS, SEF, AIS-L, RDI-L, LOP-P, AIS-P, RDI-P, UNEQ-P, concatenation: RS-TIM, HP-TIM, HP-PLM; <b>STM-64:</b> LOF, LOS, OOF, MS-AIS, MS-RDI, AU-AIS, AU-LOP, HP-RDI, HP-UNEQ, RS-TIM, HP-TIM, HP-PLM, concatenation
Alarm Generation	<b>OC-192:</b> LOF, LOS, AIS-L, RDI-L, LOP-P, AIS-P, RDI-P, UNEQ-P; <b>STM-64:</b> LOF, LOS, MS-AIS, MS-RDI, AU-AIS, AU-LOP, HP-RDI, HP-UNEQ
Pointer Control	New value, single adjustments (increment or decrement), burst (2-8) adjustments, NDF control

### Control and Monitoring

**OC-192:** Overhead: Transmit control over bytes: Transport OH: A1, A2, C1, Z0, D1-D12, E1, E2, F1, K1, K2, J0 (Trace), Z1, Z2; Path OH: C2, F2, G1, J1 (Trace), Z3, Z4, Z5; Receive monitor: Transport OH: All bytes; Path OH: All bytes

**STM-64:** Overhead: Transmit control over bytes: MSOH: A1, A2, Z0, D1-D12, E1, E2, F1, K1, K2, J0 (Trace), Z1, Z2; HP OH: C2, F2, G1, J1 (Trace), F3, K3, N1; Receive monitor: RSOH: All bytes HP OH: All bytes

### Error Injection

**OC-192:** B1, B2, REI-L, B3, REI-P  
**STM-64:** B1, B2, MS-REI, B3, HP-REI

### Error Injection Rate

Single

### Switch to Protect Measurement

Measure on B1, SEF, OOF, AIS-L, MS-AIS, AIS-P and AU-AIS; 125 microsecond resolution

### Round-Trip Delay (RTD) Measurement

Measurement ranges: 125 microseconds resolution

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