



ALBEDO Ether.Giga is a Gigabit tester equipped with all the standard features of field testers, plus the new ones like FCS insertion, Y.1564, Y.1731 and SyncE capable to verify the QoS and SLA of brand new Multiplay and IP services.

## Datasheet

# ALBEDO Ether.Giga

Ether.Giga is a dual port tester, multistream and compatible with the new ITU-T standards. The equipment includes traffic generation and analysis features up to 1 Gbit/s, equivalent to 1.5 millions of frames, if frame size is set to 64 bytes. If the equipment is connected in through mode, it accepts and forwards frames at wirespeed.

## 1. ETHERNET PHYSICAL LAYER

### 1.1 Ports and Interfaces

- Dual RJ-45 port for electrical connection 10/100/1000BASE-T
- Dual optical and electrical SFPs ports supporting 10BASE-T, 100BASE-TX, 100BASE-FX, 1000BASE-T, 1000BASE-SX, 1000BASE-LX, 1000BASE-ZX and 1000BASE-BX
- Laser ON/OFF function

### 1.2 Autonegotiation

- Bit rate at 10, 100, and 1000 Mbit/s
- Disable autonegotiation and direct set up

## 2. MAC LAYER

- EtherType II (DIX v.2), IEEE 802.3, IEEE 802.1Q, IEEE 802.1ad
- IEEE 802.2-LLC1 and IEEE 802.3-SNAP

## 3. IP LAYER

- IP packet: IPv4 (IETF RFC 791)

## 4. OPERATION MODES

- Ethernet End-point and Loop-back mode
- IP endpoint and IP Loop-back mode
- Pass-through mode

## 5. TRAFFIC GENERATION

- Single or multistream (up to 8 independent streams)

### 5.1 Setting

#### MAC address

- Source / destination
- Default / user defined
- Single / range

#### VLAN

- Single VLAN support
- Q-in-Q stacking
- VID and Priority

#### Type / Length

- Generation/Analysis
- Jumbo frames with MTU up to 10 kB

### 5.2 Bandwidth Profile

- Constant, in bit/s and frames/s

- Periodic Burst, in high/low traffic, duration and step
- Ramp, in high/low traffic, duration and step
- Poisson as %, bit/s and frames/s

## 6. LOOPBACK FEATURES

- L1 or wire loopback, at the far-end Rx is forwarded to Tx
- L2 or frame loopback, MAC addresses are swapped
- L3 or packet loopback, IP addresses are swapped
- L4 or application loopback, Ports are swapped
- Filtered loopback, only MTU directed to Port / IP / MAC

## 7. ICMP PROCESSOR (RFC 792)

This suite is responsible of ICMP echo request and reply messages used by the embedded IP ping / Traceroute feature.

### 7.1 Generation of ICMP echo request

- Destination IP address
- Packet length
- Generation interval

### 7.2 Analysis of ICMP echo reply

- Round trip time
- Lost packets
- Time-To-Live Exceeded
- Port unreachable

## 8. TEST SUITE

### 8.1 Code Errors Insertion

- Single, burst, rate, random
- FCS error insertion in pass-through mode

### 8.2 Test Patterns

Insertion modes: single, rate and random

#### Unframed Layer 1 (IEEE 802.3-2008 Annex 36A)

- High Frequency Test Pattern
- Low Frequency Test Pattern
- Mixed Frequency Test Pattern
- Long and Short continuous random

#### Unframed Layer 1 (NCITS TR-25-1999)

- Random Data Pattern (RPAT)
- Jitter Tolerance Test Pattern (JTPAT)
- Supply Noise Test Sequence (SPAT)

#### Framed Layer 1-4 BERT

- PRB:  $2^{11}-1$ ,  $2^{15}-1$ ,  $2^{20}-1$ ,  $2^{23}-1$ ,  $2^{31}-1$  and inverted
- All 1, all 0, and user-defined (32 bits)

### 8.3 SLA Measurement Payload

- QoS statistics according to Y.1731



## 9. ETHERNET + TCP/IP TOOL KIT

- Address Resolution Protocol (ARP)
- Domain Name System (DNS)
- Dynamic Host Configuration Protocol (DHCP)
- Point-to-Point Protocol over Ethernet (PPPoE)
- Traceroute with increasingly higher TTL values
- Ping a single IP address

## 10. AUTOMATIC RFC 2544 TEST

Automatic and normalized tests defined in IETF RFC 2544 includes Throughput, Latency, Frame Loss, Back-to-back, Recovery

## 11. AUTOMATIC Y.1564 TEST & RESULTS

Automatic tests of up to 8 services simultaneously

### 11.1 Bandwidth Set up

- CIR, EIR and Throughput

### 11.2 Quality Objectives and Results

- Frame Delay (FTD), Frame delay variation (FDV) and Frame loss ratio (FLR)

### 11.3 Y.1564 procedure

- Network Configuration Test (Phase 1) Set step and duration up while CIR, EIR and Throughput rates are derived.
- Ethernet Service Test (Phase 2) Set phase duration and bandwidth profile (deterministic, poisson) then traffic is generated, at CIR rate, to all services simultaneously.

## 12. RESULTS - PHYSICAL LAYER

### 12.1 Cable Test

*Fiber Optics*

- Optical power (over compatible SFP)

*Twisted Cable*

- MDI/MDI-X status
- Open (fault distance)
- Cable Length Test
- Short (fault distance)
- Polarities (normal / inverted)
- Pair Skew

### 12.2 Autonegotiation

- Current bit rate
- Duplex mode

### 12.3 SFP

- Presence current interface
- Vendor
- Part number

## 13. RESULTS - BERT

- Bit error count, errored seconds (ES)
- Bit error ratio (BER)
- Pattern losses
- Pattern loss seconds

## 14. RESULTS - TWO-WAY SLA (Y.1563)

*Point-to-point Frame Transfer Delay (FTD)*

- Histogram, Min, Max, Median, Mean

*Frame Delay Variation (FDV)*

- 2-way 0-99% interquantile FTD values
- 2-way Ethernet Frame Delay Variation (2-way FDV)

*Frame Loss (FL)*

- Lost Frames count
- 2-way Ethernet Frame Loss Ratio (FLR).

*Availability statistics*

- Severe Errored Seconds (SES)
- Percent Ethernet service Unavailability (PEU)
- Percent Ethernet service Availability (PEA)

## 15. FILTERS FOR COUNTS AND STATISTICS

Up to 8 filters at MAC, IP, TCP/UDP, Arbitrary [mask + offset]

### 15.1 Ethernet Selection

- MAC address: source, destination, or masks
- Type / Length value with selection mask
- VID with selection mask
- By CoS value with selection mask

### 15.2 IP Selection

- IP address: source, destination, or masks
- IP protocol field
- DSCP field: single value or range

### 15.3 TCP/UDP Selection

- TCP/UDP port: single value or range

## 16. TRAFFIC COUNTS AND STATISTICS

Separate reports per:

- Port A & B
- Tx/Rx (transmit & receive)
- Active filter
- Automatic filtering blocks for top talkers

### 16.1 Most common talkers:

- Source / Destination MAC addresses
- Source / Destination IP addresses
- VID (VLAN)
- C-VID (Q\_in\_Q)
- S-VID (MPLS)

### 16.2 Ethernet Frame Counts (RFC 2819)

- IEEE 802.1Q (VLAN), IEEE 802.1ad (Q-in-Q), Priority, Control, Pause frames, BPDUs
- Tx/Rx Unicast, Multicast, Broadcast
- Tx/Rx FCS errors, Undersized, Oversized, Fragments, Jabbers, Runts, Collisions, Late Collisions
- Tx/Rx size: <65, 65-127, 128-255, 256-511, 512-1023, 1024-1518, >1518
- Rx min/max length
- Tx/Rx total frames

### 16.3 IP Packet Counts

- TCP packets, UDP packets, ICMP packets
- IPv4 checksum errors
- Unicast, Multicast, Broadcast

### 16.4 Bandwidth Statistics

- Bit Current Rate, Max, Min, and Average (bit/s)
- Bits/sec, Frames/sec, Channel occupancy (%)
- Unicast, Multicast, Broadcast (%)
- IP statistics (bits/sec and packs/sec)
- User traffic (bits/sec)

## 17. GENERAL

### 17.1 User Interface

- Display true Color 4.3" LCD, 480 x 272px
- Touch Screen + Keyboard
- Languages: English, Spanish, French, Polish, Chinese, etc.
- VNC remote control

### 17.2 Operation

- AD/DC adapter
- NiMH battery providing more than 4h. of operation

### 17.3 LEDs

- External LEDs executing logical AND
- SoftLEDs 8 x 2 (Tx and Rx) labeled for Link, 10/F/G, FDX, OPT, Tx, Rx, PoE, Error

### 17.4 Environmental conditions

- Operational range: -10°C to +50°C
- Operation humidity: 10%-90%

### 17.5 Ergonomics

- Size 210 x 110 x 60mm
- Weight 1kg.
- Interfaces 2 x USB and RJ45
- Data storage in SD card

## 18. RF/EMI, ESD AND SAFETY

- Radiated EMI: UNE-EN 55022
- Immunity to EMI: UNE-EN 55024
- ESD: UNE-EN 61000-4-2
- Electrical safety: UNE-EN 60950
- RoHS compliant