



ALBEDO Ether.Sync is a field tester that supports absolutely all Ethernet standards and functionalities you need to install, commission and troubleshoot telecom services based on GbE, SyncE, PTP, Jitter and Wander.

Datasheet

ALBEDO Ether.Sync

Ether.Sync is a field instruments for testing the new LTE architectures, Synchronization planes, and Gigabit Ethernet networks the need of modules because everything is embedded in this modern hand-held units.

1. GENERAL

1.1. INTERFACES

- Port A - B: 2 x SFP, 2 x RJ45 connectors
- Port C - D: balanced, RJ45 120 Ω, unbalanced BNC 75 Ω
- Analogue voice frequency Port

1.2. OPERATION MODES

	TCP/IP	Ethernet
End-point	YES	YES
Monitor	YES	YES
Pass-through	YES	YES
Loop-back	YES	YES

2. ETHERNET PHY

2.1. INTERFACES

- SFP ports: 1000BASE-T, 1000BASE-SX, 1000BASE-LX, 1000BASE-ZX, 1000BASE-BX, 100BASE-FX, 100BASE-TX, 10BASE-T
- RJ-45 ports: 10BASE-T, 100BASE-TX, 1000BASE-T
- On / Off laser control
- Insertion of code errors

2.1.1 Auto-Negotiation

- Bit rate: 10 Mbit/s, 100 Mbit/s, 1 Gbit/s
- Master and Slave roles in the 1000BASE-T
- Disable auto-negotiation, force line settings

2.1.2 Power over Ethernet (PoE)

- Interfaces: 10BASE-T, 100BASE-T, 1000BASE-TX
- PoE pass-through in transparent mode

2.2. TIME REFERENCES

- Internal time ref $\pm 3.0 \text{ ppm}$ (Optionally <math>< \pm 0.1 \text{ ppm}</math>)
- Ethernet through Port A & B
- 2048 Mbit/s, 2048 MHz, 1544 Mbit/s, 1544 MHz Port C
- 10 MHz, 2 Mbit/s, 2 MHz, 1.5 Mbit/s, 1.5 MHz Datacom Port

- 1 PPS / TOD synchronization
- GNSS: GPS/GLONASS

2.3. SYNCHRONOUS ETHERNET

2.3.1 Interfaces

- SFP ports: 1000BASE-T, 1000BASE-SX, 1000BASE-LX, 1000BASE-ZX, 1000BASE-BX, 100BASE-TX
- RJ-45 ports: 100BASE-TX, 1000BASE-T

2.3.2 Timing

- Internal, external or recovered clock in Ethernet interfaces
- Freq offset generation up to $\pm 125 \text{ ppm}$ (res. 0.001 ppm)
- Line freq (MHz), offset (ppm), drift (ppm/s)

2.3.3 Synchronization

- Frequency offset generation of $\pm 120 \text{ ppm}$
- Sinusoidal wander generation
- ESMC, SSM, QL: generation, decoding, forwarding

3. ETHERNET MAC

- Formats: DIX, IEEE 802.3, IEEE 802.1Q, IEEE 802.1ad
- Jumbo frames up to 10 kB
- Sour / Dest MAC address setting
- Type / Length Setting
- Enable / Disable VLAN and Q-in-Q modes
- VLAN VID / User Priority setting
- S-VLAN VID, DEI, PCP, C-VLAN VID, User Priority
- FCS errors insertion

4. IP

4.1. IPV4

- Sour / Dest IPv4 address setting
- Dest. MAC address by hand or ARP
- DSCP CoS labels, TTL and transport protocol
- IP checksum errors insertion

4.2. PROTOCOLS

- ARP
- DHCP
- DNS
- Ping
- Trace route

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4.3. MPLS

- MPLS generation / analysis
- Double label stack support
- TTL exp, label fields

5. TRAFFIC GENERATOR

Generation over 8 independent streams

5.1. BANDWIDTH PROFILE

5.1.1 Operation Modes

- Continuous:
- Periodic:
- Ramp:
- Random

5.2. TEST PATTERNS AND PAYLOADS

- Layer 1 BER: HF, LF, MF, Long/Short continuous random
- Layer 2-4: PRBS $2^{11}-1$, PRBS $2^{15}-1$, PRBS $2^{20}-1$, PRBS $2^{23}-1$, PRBS $2^{31}-1$ along with their inverted versions, user (32 bits). These patterns apply to stream 1 only
- SLA payload
- All zeros
- Insertion of TSE: single, rate, random

6. FILTERS

- Up to 8 simultaneous filters to be applied to the traffic
- Selection by Ethernet, IP, TCP/UDP fields
- Generic filter by using 16 bit mask and arbitrary offset

6.1. ETHERNET SELECTION

- MAC Address: Source and Destination
- Type / Length value with selection mask
- C-VID and S-VID with selection mask
- Service and Customer priority codepoint

6.2. MPLS SELECTION

- Top and Bottom MPLS headers
- Label value
- Exp field

6.3. IPV4 SELECTION

- IPv4 Source and Destination address
- IPv4 Protocol
- DSCP fields

6.4. IPV6 SELECTION

- IPv6 Source and Destination address
- IPv6 flow label
- DSCP
- Next Header

6.5. UDP SELECTION

- Port: single value or or ranges of values

7. PHY RESULTS

7.1. CABLE TESTS

- Optical power (over compatible SFP/SFP+)
- Inactive links: Open/short, distance to fault
- 10/100 Mbit/s links: current local port MDI/MDI-X status
- 1000 Mbit/s links: current, polarities, skew

7.2. AUTO-NEGOTIATION

- Bit rate and duplex mode
- Master / Slave role indication (1000BASE-T)

7.3. SYNCHRONOUS ETHERNET

- Frequency (MHz), offset (ppm), drift (ppm/s)
- TIE / MTIE / TDEV
- Decoding of the QL transported in SSM

8. FRAME ANALYSIS

- Modes: One-way (port A - A), two-way (port A - B)
- Separate statistics for Port A / B, Tx / Rx, Filter

8.1. ETHERNET STATISTICS

- Counts: Ethernet, VLAN, IEEE 802.1ad frames, Q-in-Q, Control, Pause, IEEE 1588-2008
- Frames: unicast, multicast, broadcast
- FCS errors, Undersized, Oversized, Fragments, Jabbers
- Size: < 64, 65-127, 128-255, 256-511, 512-1023, 1024-1518, 1519-1522, 1523-1526 and 1527-MTU bytes

8.2. MPLS STATISTICS

- MPLS stack size: max, min

8.3. IP STATISTICS

- Packet counts: IPv4 packets, IPv6 packets
- Packet counts: unicast, multicast and broadcast
- UDP packets, ICMP packets
- IPv4 checksum errors, IPv6 checksum errors
- IEEE 1588-2008 packets

8.4. BANDWIDTH STATISTICS

- Current, max, min, avrg (Tx / Rx, Port A / B)
- Unicast, multicast and broadcast counts
- IP and UDP statistics

8.5. SLA STATISTICS

- Delay (FTD): current, min, max, mean
- Delay variation (FDV or jitter): current, min, max, mean
- Reordering: Out-of-order, Duplicated count and ratio
- Loss (FLR): count, ratio
- Availability: SES count, PEU, PEA

8.6. BER

- Count, seconds, ratio and pattern loss secs at layer 1-4

8.7. NETWORK EXPLORATION

- Top talkers: 25 most popular MAC / IPv4 / IPv6 addr
- Top C-VID and S-VID: 25+25 most popular tags
- Automatic setup of 8 filtering blocks

9. PTP (IEEE 1588)

9.1. OPERATION

- Generation / Decoding of PTP - IEEE 1588-2008
- Operation as Ordinary Clock
- Master / Slave operations, ability to force Slave role
- Transparent operation in pass-through mode with Packet delay equalization
- Encapsulations: PTP over UDP / IPv4, PTP over Ethernet

9.2. PROTOCOL STATE

- Port state, best master clock, master identity
- Grandmaster: identity, BMC priorities, clock class, accuracy, clock variance, time source

9.3. COUNTS & STATISTICS

- Sync, Delay request, Delay response, Peer delay request, Peer delay response, Follow up, Peer delay response follow up, Announce, Signaling, Management
- Sync delay: current, max, min, avg, st-dev, range
- Sync delay variation: current, max, avg
- Sync inter arrival time: min, max, avg, current
- Delay request: current, max, min, avg, st-dev, range
- Round trip delay: current, mean
- Correction field: current, max, avg
- Sync floor delay population: Count (FPC), Rate (FPR), Percent (FPP). Configurable Pass / Fail threshold
- Wander: TIE, MTIE, TDEV

10. AUTOMATIC TESTS

Automatic RFC 2544 / Y.1564 tests in one/two ways mode

10.1. PORT LOOPBACK

- Layer 1-4 loopback with Filtering conditions
- MPLS loop control
- Loop controls for broadcast and ICMP

10.2. RFC 2544

- Throughput, Frame-loss, Latency, Back-to-back, Recovery
- Asymmetric RFC based on Ethernet and IP RMP

10.3. Y.1564

- Ethernet service activation
- Eight / four services (colour / not) CIR, EIR, max, throughput
- FTD, FDV, FLR, availability objectives

10.3.1 Test Phases

- Phase 1: steps, step duration
- Phase 2: duration, bandwidth profile (deterministic, random)

11. PLATFORM

11.1. GUI

- Touch-screen, keyboard and mouse
- Full remote control with VNC
- SNMP and MIB support

11.2. BATTERIES

- Operation time with batteries (LiPO): 8 - 24 hours
- Battery recharge time (LiPO): 4 hours

11.3. OPERATION

- Operational range: -10°C to +50°C
- Operation humidity: 10% - 90%
- IP rating: 54
- Configuration, report storage and export through USB

11.4. ERGONOMICS

- TFT colour touch screen (480 x 272 pixels)
- Dimensions: 223 x 144 x 65 mm (8.8 x 5.6 x 2.5 inches)
- Weight: 1 kg

