Ether.Sync when timing matters

in Test we trust

ALBEDO Ether.Sync is a field tester for Synchronous Ethernet equipped with all the features to deploy and troubleshoot both SyncE infrastructures, and standard Gigabit Ethernet supporting legacy and new test standards such as Y.1564 & Y.1731 therefore it is capable to verify the QoS and SLA not only on SyncE but also standard Ethernet network supporting Multiplay services offering field technicians tools to quickly and easily validate and troubleshoot Ethernet services.

Ethernet offers opportunities to the industry as it is technology suitable for a massive deployment triggered by network convergence and growth in multiplay applications such as VoIP, IPTV, VoD, high-performance Computing, Virtualization Services, Data Centers and Storage that require significant levels of bandwidth.

Tic, tac... clocks again

The deployment of high speed circuits across access and metro networks requires better synchronization to minimize offsets and drift that increment errors and quality degradations. SyncE testers must adapt mobility and the most advanced technology to measure the performance and quality metrics of these services.

Ethernet: from GbE to SyncE

Ether.Sync adds new features for the installation and maintenance of new Synchronous Ethernet Standards while conserving absolutely everything required for the commissioning and troubleshooting of Gigabit Ethernet networks.

"Ether.Sync facilitates seamless migration to Synchronous networking"

This hand-set can also simulate those services that run on the network and qualify the key QoS and SLA parameters for each application. Moreover, it validates the mechanisms provisioned in the network to manage each service type, resulting in better operation.

Field and mobile networks

If you need to verify Synchronous Ethernet access services at the first mile between the central office and the mobile field we have the best possible solution because it has been deployed with all new features required to satisfy engineers commissioning or maintaining the new mobile networks.

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Be Synchronous

Synchronous Ethernet overcomes the inherent timing limitations of packet networks by providing the ability to distribute frequency at the PHY-layer via an Ethernet interface. Synchronous Ethernet nodes require a stable and accurate reference source that has to be verified to satisfy timing requirements.
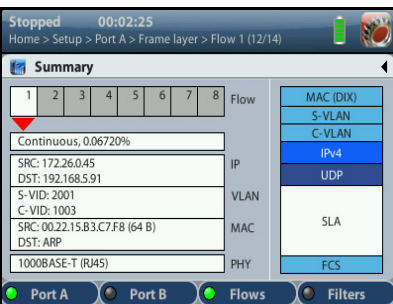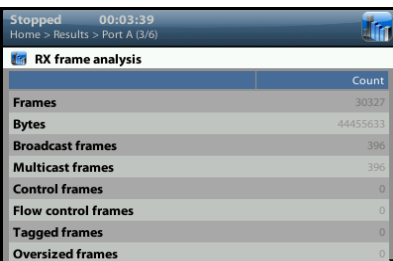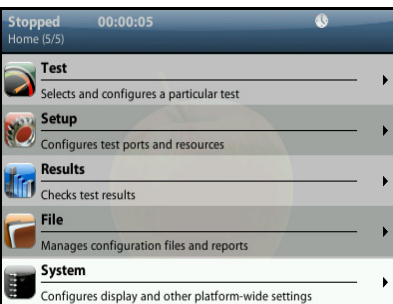
Innovation on SyncE

Ether.Sync tester can use several sources of timing, It can recover the clock from incoming data, it can use an external reference or it can use an internal clock to be used as master or in hold-over situations.

Jitter & Wander

Ether.Sync has two ports and they can be used simultaneously to simplify daily work while saves time and costs by conducting bench testing with only one instrument.

SyncE G.826x

Ether.Sync analyses and generates G.826x messages SSM to check the SyncE, this protocol can be captured and saved for more detailed analysis.

Analysis and Generation

Users of Ether.Sync can relay on the instantaneous traffic generation set up and modify parameters such as headers, bandwidth and frame size directly, without navigating away to a different page, giving experts reaction capacity depending to the on the scopes of the test. While analysis brings in a very well structured way, plenty of graphical measurements and results, ensuring that engineers can quickly and easily interpret the test conclusions.

Pass Through / Terminal Mode

Through mode used to pass traffic through the two SFP ports or the two RJ45 ports for dull-duplex monitoring of live traffic without the need of splitters. While Terminal mode permit several configurations using the Tx and 2·Rx simultaneously

FCS Error insertion in pass mode

This unique feature permits the insertion of errors in live traffic to verify switches and routers procedures when high rate of FCS errors occur.
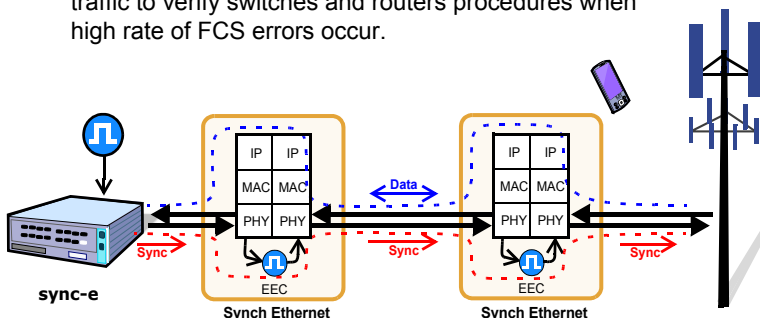
IP Services test

Often it is required to test IP features to verify end-to-end connectivity by means of Ping and Trace Route with ICMP echo request and analysis fully supported.

Q-in-Q

Ether.Sync has the ability to check QoS by means of the VLAN CoS bits which are used for VLAN stacking by Carrier Ethernet carriers and operators.

Multistream tester

Ether.Sync permits up to 8 traffic streams that are configured with proper CoS and QoS priorization. The flows facilitate the simulation of realistic traffic conditions such as Internet, VoIP, IPTV to test end-to-end performance.

m-Layer Loopback

This feature assists with four loopback modes from L1 to L4. Whether you need to pinpoint loopback wire traffic, or requires to select specific a UDP or TCP ports, or maybe you need just to swap the MAC or the IP addresses, then Ether.Sync always has the right configuration set up for each type of test.

Automatic SLA & QoS Test

Traffic Scan and Discovering

Ether.Sync can quickly scan the network traffic to select those flows to be tested and choose whether you want to monitor o execute any test. Consequently not anymore slow set up, or deep expertise.

Improved RFC 2544

Perform the RFC 2544 test option, testing throughput, frame loss, latency, jitter and burst is straightforward. Ether.Sync can execute it both in symmetric and asymmetric way and with the far-end device in loopback mode or peer-to-peer mode. In any case objectives can be configured and get PASS/FAIL results.

ITU-T Y.1564 e-SAM test

This new methodology for Ethernet executes multiple traffic streams completing the test in two phases:

- *Service Configuration,* confirms the end-to-end set-up while quickly checking the Information Rate (IR), Frame Delay Variation (FDV), Frame Loss Ratio (FLR), Frame Loss Ratio at the Service Acceptance Criteria (FLRSAC), Committed Burst Size (CBS) and Excess Burst Size (EBS) sequentially for all traffic streams.

- *Service Performance,* transmits all configured traffic streams at the CIR confirming all traffic is able to transverse the network under full load while checking IR, FDV, FLR and availability.
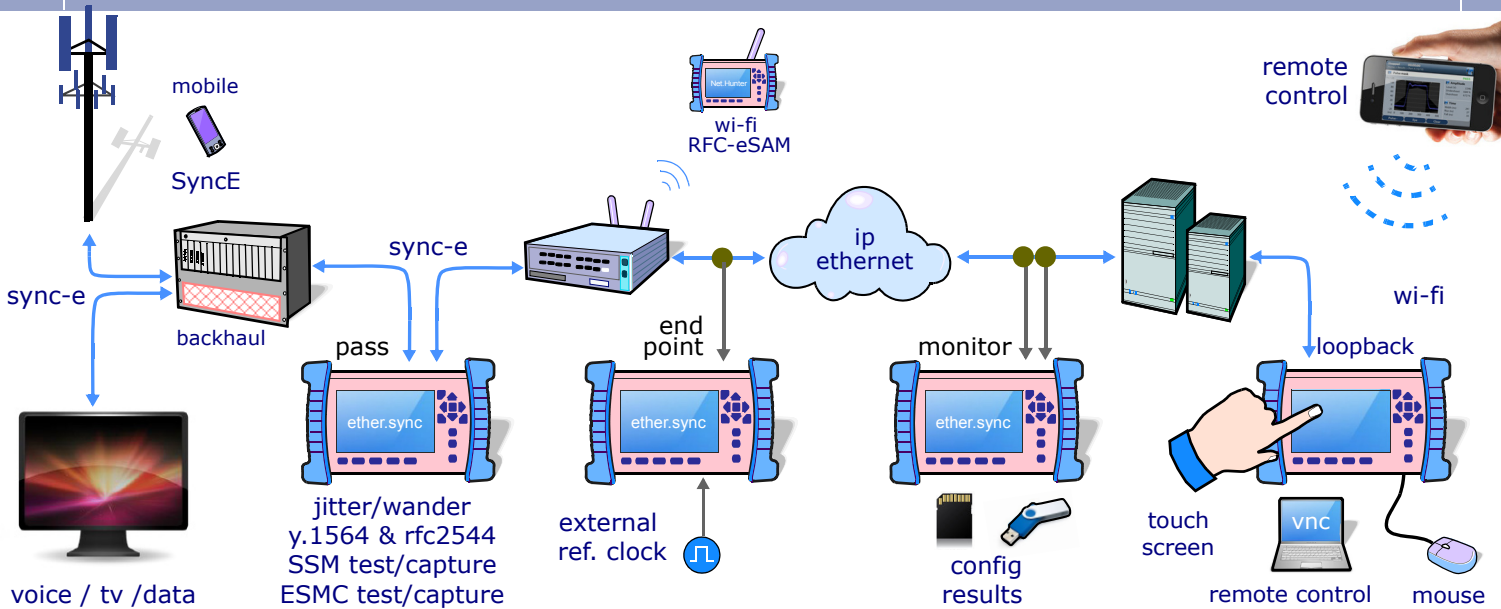
Smart Operation

ALBEDO Ether.Sync is a field tool designed with rugged case and hardware that makes it a secure in harsh environments. It is controlled by a GUI very easy to navigate and learn. We have made a serious effort to make it suitable for any technical skill, and optimised for clarity.

SyncE Activation

This hand-held unit is ideal for installation and commissioning because it supports all new generation capabilities, and traffic analysis under various conditions. The instrument also provides facilities for BER testing of the lines, performance statistics and QoS statistics

Ethernet/IP maintenance

Carrier-Ethernet providers have to face the maintenance of unhappy customers that often do not differentiate between their internal issues and service provider problems. Now thanks to Ether.Sync is possible to measure at customer demarcation points that separate LAN/WAN, that is customers and operator networks. Test can be executed addressing both ca-

pacity and quality parameters simultaneously to prove where the issue is.

Field engineers can save setups and results for a given application and then, via a USB port or VNC, distribute or download files to other instruments.

Performance Test

Commissioning Ethernet bandwidth is required before delivering the service to the customer that want to see how their SLA is satisfied.

Triple Play test on Mobiles

Using ALBEDO test suite -built on Ether.Sync- operators of then IPTV and VoIP bundle will be able to:

- Minimize Churn while gaining customer loyalty by quality service.
- Reduce Costs, as faulty networks require experts visiting customers.

- Increase Profits, offering innovative applications to raise the ARPU
- Grow the brand name, cultivating the perception of the company capable to deliver any type of m-play application.

In other words you will improve Service provision using advanced management solutions for quick and easy provisioning and maintenance.

USERS

- Mobile operators
- Sync Installers
- G.826x Vendor
- Commission / Maintenance

BENEFITS

- SyncE deployment
- QoS and SLA certification
- Automatic RFC2544, Y1464
- pdf & csv reports on SD/USB
- IPTV, VoIP, Data assurance
- VNC, LAN or wi-fi control
- Spot sources of degradation
- Touchscreen, mouse, SNMP

KEY FEATURES

- ESMC / SSM generation, analysis and capture
- Y.1564 (e-SAM) FTD, 2-way FDV, FDV, 2-way FTD, FLR SES, PEU and PEA
- Y.1731 QoS statistics
- 2 x SFP + 2 x RJ45 ports
- Symmetrical & Asymmetrical RFC2544 test
- FCS error insertion in pass-thought mode
- L1/L2/L3/L4 loopback
- Multistreams for IPTV, VoIP, and Critical Data verification
- Q-in-Q for demarcation tests
- MPLS support
- Scan MAC/IP/VLAN/QinQ
- Advanced Counts: Up to 8 filters at MAC, IP, TCP/UDP, Arbitrary [mask + offset]

Ethernet Testing	
Interfaces	• Dual RJ-45 port for electrical connection 10/100/1000BASE-T; PoE detection and PoE transparency • 2 x SFPs ports: 10BASE-T, 100BASE-TX, 100BASE-FX, 1000BASE-T, 1000BASE-SX, 1000BASE-LX, 1000BASE-ZX and 1000BASE-BX • Autonegotiation: Bit rate at 10, 100, and 1000 Mbit/s, Disable autonegotiation and direct set up • EtherType II (DIX v.2), IEEE 802.3, IEEE 802.1Q, and IEEE 802.1ad • IEEE 802.2—LLC1 and IEEE 802.3—SNAP • IIPv4 (RFC791), IPv6 RFC2460)
Generation	• Single or multistream traffic generation (up to 8 independent streams) • MAC address: Source / Destination, Default / User defined, Single / Range • VLAN: Single VLAN support, Q-in-Q stacking, VID, DEI, S-VLAN, C-VLAN, and Priority codepoint • Type / Length: Generation/Analysis, Jumbo frames with MTU up to 10 kB • Bandwidth Profile: Constant, in bit/s and frames/s, Periodic Burst, in high/low traffic, Ramp, in high/low traffic, Poisson
Loopback	• L1 (wire loopback) at the far end Rx is forwarded to Tx • L2 (frame), MAC addresses are swapped; L3 (packet) IP addresses are swapped; L4 (application) ports are swapped • Loop controls for broadcast and ICMP frames
Test Suite	Code Errors Insertion • Single, burst, rate, random, FCS error insertion in pass-through mode Test Patterns: Insertion modes: single, rate and random • Unframed Layer 1 (IEEE 802.3-2008 Annex 36A): High, Low, Mixed Frequency Test Pattern, Long and Short continuous random • Unframed Layer 1 (NCITS TR-25-1999): RPAT, JITPAT, SPAT • Framed Layer 1-4 BERT; PRB: 211-1, 215-1, 220-1, 223-1, 231-1 and inverted, All 1, all 0, and user-defined (32 bits) SLA Measurement Payload: QoS statistics according to Y.1731
RFC 2544	• RFC 2544: Throughput, Latency, Frame Loss, Back-to-back, Recovery • Symmetrical and Asymmetrical RFC 2544
Y.1564 (eSAM)	• Testing of up to eight services (non-color aware mode) or up to four services (color aware mode) • Configuration of the CIR, and EIR and maximum throughput for each service • Configuration tests (CIR, EIR and policing) with FTD, FDV, FLR and availability results for each service • Performance test with FTD, FDV, FLR and availability results for all services
Results	• SFP: Presence current interface, Vendor, Part number • Optical power (over compatible SFP) • PoE (IEEE 802.3af), PoE+ (IEEE 802.3at), none; PoE voltage between pairs in endpoint; Voltage and current in through mode • Twisted Cable: MDI/MDI-X status, Open (fault distance), Cable Length Test, Short (distance), Polarities, Pair Skew, Crosstalk • Autonegotiation: Current bit rate, Duplex mode • Frame Delay (FTD) Y.1563: Min/Max/Med/Mean • Frame Delay Variation (FDV) RFC1889: Peak; Jitter Curr/Max/Min/Mean • Frame Loss (FLR) Y.1563, Duplicated: Out-of-Order packets (RFC 5236) • Availability: SES and Y.1563 PEU • BER: Count, seconds with errors, Pattern losses, pattern loss second

SyncE and PTP testing	
Synchronous Ethernet	• Interfaces: 100/1000BASE-T by RJ45; 1000BASE-SX, 1000BASE-LX, 1000BASE-ZX and 1000BASE-BX by SFP both for all operation modes • Clock Ref.: recovered; internal (better than ±2.0 ppm or ±0.2 ppm); external (10 MHz, 2048/1544 Mb/s, 2048/1544 MHz, 1 pps) • Line Analysis: frequency (MHz), offset (ppm), drift (ppm/s) [clause 10]; Offset Generation: ±125 ppm (0.001 ppm) as per ITU-T O.174 • Wander generation [ITU-T O.174 section 8.4] and MTIE / TDEV measurement [ITU-T O.172 clause 10] • SyncE Generation / Decoding ESMC and SSM [ITU-T G.8264]
PTP / IEEE 1588(v2)	• Precision Time Protocol (PTP): Master & Grandmaster id., Priority 1-2, Class, Accuracy, Variance, Time source • PTP over UDP encapsulation, PTP Generation / Analysis / Emulation; hardware-assisted Decoding; End-point and Through modes • Counts: Sync Inter Arrival Delay (IAD) Avg/Curr; Packet Total Delay (PTD): Std Dev/Range; Packet Delay Variation (PDV): Cur/Max/Avg • Frequency offset between the master and the local clock (ppm)

Operation and Management	
Performance	• Full Duplex operation at 1 Gbit/s or 1,5 Mframes/s, Accuracy better than 10^{-6} secs. at 1 Gbit/s • Performance and accuracy 100% independent of the line bit rate
GUI	• Configuration and management on web browser • Configuration and management on CLI thought SSH and Telnet

Platform	
Hand-held Instrument	• Touchscreen 480 x 272 TFT, Mouse, USB & Ethernet ports; 1.0 kg, 223 x 144 x 65mm; IP-54 • Soft LEDS All events at a glance • Rechargeable Batteries continuous working up to 12 hours continuous operation. Fast recharging time • AC Power Adapter Input: 100 ~ 240 V AC, 50/60 Hz • Operating Temperature 0°C ~ 50° C, Storage Temperature -20°C ~ 70°C, Humidity 5% ~ 95%; IP rating 54 • SNMP, MIB and VNC remote control

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