



Once **mobile backhaul** has migrated to Ethernet/ IP / MPLS a bunch of synchronization alternatives are available including: a) **TDM** based signals such as E1/T1, b) satellite based **GPS** and c) packet based solutions such as **SyncE** and **PTP**. **Ether.Genius** is suitable for testing all this three environments and also those hybrid architectures on packet have not totally replaced legacy circuit switching.

## Market Analysis

Updated on 6/10/15

# ALBEDO Ether.Genius

Ether.Genius	VePAL TX130M+	NetProbe 2000
		

CONFIDENTIAL

PLATFORM			
<b>Size</b>	<ul style="list-style-type: none"> <li>• 210 x 110 x 60 mm</li> <li>• Volume: 1,386.0 cc</li> <li>• 1 kg</li> </ul>	<ul style="list-style-type: none"> <li>• 210 x 100 x 55 mm</li> <li>• Volume: 1,155.0 cc</li> <li>• 1 kg</li> </ul>	<ul style="list-style-type: none"> <li>• 210 x 100 x 42 mm</li> <li>• Volume: 900 cc</li> </ul>
<b>Architecture</b>	• No modules, all interfaces included	• No modules, all interfaces included	• No modules, all interfaces included
<b>Display</b>	<ul style="list-style-type: none"> <li>• 480 x 272 pixels (4.3 inch)</li> <li>• Touchscreen</li> <li>• Keyboard</li> <li>• Mouse</li> </ul>	<ul style="list-style-type: none"> <li>• 320 x 240 pixels (3.5 inch)</li> <li>• Touchscreen</li> <li>• Keyboard</li> </ul>	<ul style="list-style-type: none"> <li>• 320 x 240 pixels (3.5 inch)</li> <li>• Touchscreen</li> <li>• 5-way keypad</li> </ul>
<b>Ruggedness</b>	• 1,5 meters drop	• 1,0 meter drop	• (?)
<b>Remote Control</b>	<ul style="list-style-type: none"> <li>• Standard VNC</li> <li>• SNMP</li> </ul>	• Proprietary (ReVeal)	• Standard VNC
<b>Batteries</b>	<ul style="list-style-type: none"> <li>• 2 x Li-Po</li> <li>• 8h in GbE</li> <li>• 24h in E1</li> </ul>	<ul style="list-style-type: none"> <li>• Li-Po</li> <li>• 2-6 h. operation</li> </ul>	<ul style="list-style-type: none"> <li>• Li-Po</li> <li>• 4-8 h. operation</li> </ul>
<b>Auxiliar Ports</b>	<ul style="list-style-type: none"> <li>• SD card (configuration, results)</li> <li>• RJ45 (remote control)</li> <li>• 2 x USB (upgrades, configuration, results)</li> </ul>	• RJ45	<ul style="list-style-type: none"> <li>• RJ45 (remote control)</li> <li>• mini USB</li> </ul>
<b>GNSS receiver</b>	• Yes GPS / GLONASS	• No	• No
<b>Optical Interfaces</b>	<ul style="list-style-type: none"> <li>• 2 x SFP</li> <li>• C37.94</li> </ul>	• SFP (one)	<ul style="list-style-type: none"> <li>• SFP (one)</li> <li>• C37.94</li> </ul>
<b>Electrical Interfaces</b>	<ul style="list-style-type: none"> <li>• 2 x RJ-45</li> <li>• 2 x BNC</li> <li>• 2 x RJ45-balun</li> <li>• External Clock input</li> <li>• VF input</li> <li>• Datacom DTE</li> <li>• Datacom DCE</li> </ul>	<ul style="list-style-type: none"> <li>• 2 x Bantam (or RJ45)</li> <li>• 2 x BNC</li> <li>• External Clock input</li> <li>• VF input</li> </ul>	<ul style="list-style-type: none"> <li>• Bantam</li> <li>• BNC</li> <li>• 2 x RJ45</li> <li>• External Clock input</li> <li>• VF input</li> </ul>

	Ether.Genius	VePAL TX130M+	NetProbe 2000
<b>CLOCKS</b>			
<b>Internal Clock</b>	<ul style="list-style-type: none"> <li>- GPS built-in receiver</li> <li>- OCXO <math>\pm 0.1</math> ppm</li> <li>- Default better than <math>\pm 2.0</math> ppm</li> </ul>	<ul style="list-style-type: none"> <li>- Default <math>\pm 3.5</math>ppm</li> </ul>	<ul style="list-style-type: none"> <li>- (?)</li> </ul>
<b>External Clocks Input</b>	<ul style="list-style-type: none"> <li>- Antenna to GPS/GLONASS</li> <li>- 1.5, 2Mb/s,</li> <li>- 1.5, 2, 10 MHz</li> <li>- 1 pps</li> </ul>	<ul style="list-style-type: none"> <li>- 2Mb/s</li> <li>- 2, 25, 125 MHz</li> <li>- 2 and 10 MHz</li> <li>- 1 pps</li> <li>- SyncE, PPT</li> </ul>	<ul style="list-style-type: none"> <li>- No</li> </ul>
<b>Clock outputs</b>	<ul style="list-style-type: none"> <li>- 1 pps</li> <li>- 2Mb/s, 2.0 MHz</li> </ul>	<ul style="list-style-type: none"> <li>- 1.5, 2.048 Mb/s</li> <li>- 1.5, 2, 10, 25, 125 MHz</li> <li>- 1 pps</li> </ul>	<ul style="list-style-type: none"> <li>- No</li> </ul>
<b>ETHERNET - IP</b>			
<b>Frames</b>	<ul style="list-style-type: none"> <li>- IEEE 802.3 / DIX</li> <li>- VLAN</li> <li>- IEEE 802.1ad / Q-in-Q</li> <li>- FCS error insertion</li> </ul>	<ul style="list-style-type: none"> <li>- IEEE 802.3 / DIX</li> <li>- VLAN</li> <li>- IEEE 802.1ad / Q-in-Q</li> </ul>	<ul style="list-style-type: none"> <li>- IEEE 802.3 / DIX</li> <li>- VLAN</li> <li>- IEEE 802.1ad / Q-in-Q</li> </ul>
<b>Optical Power meter</b>	<ul style="list-style-type: none"> <li>- Yes</li> </ul>	<ul style="list-style-type: none"> <li>- No</li> </ul>	<ul style="list-style-type: none"> <li>- Yes</li> </ul>
<b>PoE</b>	<ul style="list-style-type: none"> <li>- Yes</li> </ul>	<ul style="list-style-type: none"> <li>- No</li> </ul>	<ul style="list-style-type: none"> <li>- No</li> </ul>
<b>Cable test</b>	<ul style="list-style-type: none"> <li>- TDR: Open, Short distance fault</li> <li>- Active links: MDI / MDIX status</li> <li>- Wiremap: Open, Short, Straight, Crossed, Polarity, Pair skew, Crosstalk</li> </ul>	<ul style="list-style-type: none"> <li>- TDR: Open/Short distance fault</li> </ul>	<ul style="list-style-type: none"> <li>- Wiremap: open, short, crosstalk, length impedance</li> </ul>
<b>Operation Modes</b>	<ul style="list-style-type: none"> <li>- Pass through</li> <li>- End point: IP, Ethernet, LI</li> <li>- Monitor</li> <li>- Loop-back</li> </ul>	<ul style="list-style-type: none"> <li>- End point</li> <li>- Monitor</li> <li>- Loop-back</li> </ul>	<ul style="list-style-type: none"> <li>- End point</li> <li>- Monitor</li> <li>- Loop-back</li> </ul>
<b>One-way Delay</b>	<ul style="list-style-type: none"> <li>- Yes</li> </ul>	<ul style="list-style-type: none"> <li>- No</li> </ul>	<ul style="list-style-type: none"> <li>- No</li> </ul>
<b>Packet Capture</b>	<ul style="list-style-type: none"> <li>- No</li> </ul>	<ul style="list-style-type: none"> <li>- Yes</li> </ul>	<ul style="list-style-type: none"> <li>- No</li> </ul>
<b>Streams</b>	<ul style="list-style-type: none"> <li>- 8 streams</li> </ul>	<ul style="list-style-type: none"> <li>- 8 streams</li> </ul>	<ul style="list-style-type: none"> <li>- 8 streams</li> </ul>
<b>MPLS</b>	<ul style="list-style-type: none"> <li>- Yes</li> </ul>	<ul style="list-style-type: none"> <li>- Yes</li> </ul>	<ul style="list-style-type: none"> <li>- Yes</li> </ul>
<b>Measurements</b>	<ul style="list-style-type: none"> <li>- BERT (Single Stream, Framed, Unframed)</li> <li>- Alarm Detection</li> <li>- Round Trip Delay</li> <li>- Service Disruption Time??</li> </ul>	<ul style="list-style-type: none"> <li>- BERT (Single Stream, Framed, Unframed)</li> <li>- Alarm Detection</li> <li>- Round Trip Delay</li> <li>- Service Disruption Time</li> </ul>	<ul style="list-style-type: none"> <li>- BERT</li> </ul>
<b>Protocols</b>	<ul style="list-style-type: none"> <li>- DHCP, ARP, DNS</li> <li>- Ping, Traceroute</li> </ul>	<ul style="list-style-type: none"> <li>- DHCP, ARP, DNS, FTP</li> <li>- Ping, Traceroute</li> </ul>	<ul style="list-style-type: none"> <li>- DHCP, ARP, DNS, FTP</li> <li>- Ping, Traceroute</li> </ul>
<b>IP</b>	<ul style="list-style-type: none"> <li>- IPv4 and IPv6</li> <li>- CoS / DSCP</li> </ul>	<ul style="list-style-type: none"> <li>- IPv4 and IPv6</li> <li>- CoS / DSCP</li> <li>- Browser</li> </ul>	<ul style="list-style-type: none"> <li>- IPv4</li> <li>- IPTV</li> </ul>
<b>BW Profiles</b>	<ul style="list-style-type: none"> <li>- Constant, burst, ramp, random</li> </ul>	<ul style="list-style-type: none"> <li>- Constant, burst, ramp</li> </ul>	<ul style="list-style-type: none"> <li>- Constant, burst, ramp</li> </ul>
<b>Network Search</b>	<ul style="list-style-type: none"> <li>- Yes</li> </ul>	<ul style="list-style-type: none"> <li>- No</li> </ul>	<ul style="list-style-type: none"> <li>- No</li> </ul>
<b>RFC-2544</b>	<ul style="list-style-type: none"> <li>- Symmetric / Asymmetric</li> <li>- Throughput, Back-to-back, Frame loss, Latency, System recovery</li> </ul>	<ul style="list-style-type: none"> <li>- Symmetric / Asymmetric</li> <li>- Throughput, Back-to-back, Frame Loss, Latency</li> </ul>	<ul style="list-style-type: none"> <li>- Symmetric / Asymmetric</li> <li>- Throughput, Back-to-back, Frame loss, Latency</li> </ul>
<b>eSAM (ITU-T Y.1564)</b>	<ul style="list-style-type: none"> <li>- Symmetric</li> <li>- Asymmetric</li> </ul>	<ul style="list-style-type: none"> <li>- Symmetric</li> </ul>	<ul style="list-style-type: none"> <li>- Symmetric</li> </ul>

	Ether.Genius	VePAL TX130M+	NetProbe 2000
<b>SYNCHRONOUS ETHERNET</b>			
<b>SyncE modes</b>	- Master, Slave, Passthru	- Master, Slave	- No
<b>SyncE Frequenc</b>	- Offset / Drift Analysis & Generation	- Slave frequency offset analysis	- No
<b>SyncE</b>	- ESMC, SSM monitor, decoding, generation - QL: generation, decoding, forward	- ESMC, SSM monitor, decoding, generation - QL: generation, decoding, forward	- No
<b>SyncE Wander</b>	- Built-in and real-time mesurement - TIE, MTIE, TDEV	- No (requires external PC)	- No
<b>Wander Generation</b>	- Sinusoidal wander generation	- No	- No
<b>PTP - 1588v2</b>			
<b>PTP(IEEE1588)</b>	- Master, Slave, Transparnt - Protocol Analysis/Generat - Freq. offset, drift	- No	- Yes (?)
<b>PTP Profiles</b>	- Telecom - Electrical	- (?)	- No
<b>PTP Wander Analysis</b>	- Built-in and real-time mesurement - TIE, MTIE, TDEV	- No (requires external PC)	- No
<b>Wander Generation</b>	- Real-time MTIE & TDEV	- External software !!	- No
<b>PDV Floor metrics</b>	- FPR, FPP, FPC - Pass / Fail threshold	- No	- No
<b>E1 - T1</b>			
<b>TDM Frames</b>	- E1 (PCM-30/C, PCM-31/C) - DS1 (Q4-2015)	- E1 (PCM-30/C, PCM-31/C), E2, E3 - DS1, DS3	- E1 - DS1, DS3
<b>Measurements</b>	- Attenuation - Frequency, Freq. deviation	- Attenuation - Frequency	- Frequency
<b>Analysis</b>	- G821, G826, M2100 - CAS, G711	- G821, G826, M2100 - CAS, G711	- G.821, G.826, M.2100 - CAS, G711
<b>Latency</b>	- Round Trip Delay (RTD) - One-Way Delay (OWD) with GPS	- Round Trip Delay (RTD)	- Round Trip Delay (RTD)
<b>Pulse Mask</b>	- Yes	- Yes	- Yes
<b>Voice Freq.</b>	- Add/drop	- Add/drop	- Yes
<b>E1/T1 Jitter</b>	- Analysis - Jitter Generation	- Analysis	- No
<b>E1/T1 Wander</b>	- Built-in TIE, MTIE, TDEV analysis - Built-in Wander Generation	- Yes (but requires requires and external PC)	- No
<b>ITU-T G.703 / E0 (codirectional)</b>			
<b>Functions</b>	- BER - Anomalies insertion and analysis - Defects insertion and analysis - G.821 performance	- BER - Anomalies insertion and analysis - Defects insertion and analysis - G.821 performance	- Yes
<b>Latency</b>	- Rount Trip Delay (RTD) - One-Way Delay (OWD) with GPS	- Rount Trip Delay (RTD)	- Rount Trip Delay (RTD)

	Ether.Genius	VePAL TX130M+	NetProbe 2000
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<b>Tests</b>	<ul style="list-style-type: none"> <li>- Unframed or framed operation</li> <li>- Bit-rate from 64 kb/s to 768 kb/s</li> <li>- BER and ITU-T G.821</li> <li>- Pass / fail indications</li> <li>- Alarms Detection / Insertion</li> </ul>	- No	<ul style="list-style-type: none"> <li>- BER and ITU-T G.821</li> <li>- Alarms</li> </ul>
<b>Measurements</b>	<ul style="list-style-type: none"> <li>- Optical Power meter</li> <li>- Frequency, Deviation, Data rate</li> </ul>	- No	<ul style="list-style-type: none"> <li>- Optical Power meter</li> </ul>
<b>Latency</b>	<ul style="list-style-type: none"> <li>- Round Trip Delay (RTD)</li> <li>- One-Way Delay (OWD) with GPS</li> </ul>	- No	- No
<b>D A T A C O M</b>			
<b>Operation Modes</b>	<ul style="list-style-type: none"> <li>- Terminal</li> <li>- Monitor</li> </ul>	- No	- Terminal
<b>Datacom</b>	<ul style="list-style-type: none"> <li>- Standard cables (CISCO)</li> <li>- From 50 b/s to 2048 kb/s</li> <li>- V.24/V.28 (RS-232)</li> <li>- X.21/V.11</li> <li>- V.35</li> <li>- V.36 (RS-449)</li> <li>- EIA-530 / EIA-530A</li> </ul>	- No	<ul style="list-style-type: none"> <li>- Cables NP2000-DCOM</li> <li>- V.24/V.28 (RS-232)</li> <li>- X.21/V.11</li> <li>- V.35</li> <li>- EIA-530</li> </ul>
<b>Analysis</b>	<ul style="list-style-type: none"> <li>- BER and ITU-T G.821 performance</li> <li>- Logic analyser capability</li> <li>- Defects LOC, AIS, LSS, All 0, All 1</li> <li>- Anomalies: TSE, Slip</li> <li>- Line attenuation, frequency, deviation</li> </ul>	- No	- No
<b>Latency</b>	<ul style="list-style-type: none"> <li>- Round Trip Delay (RTD)</li> <li>- One-Way Delay (OWD) with GPS</li> </ul>	- No	- No
<b>V o I P</b>			
<b>PBX emulation</b>	- Yes (with external PC)	- No	- No
<b>SIP Network emulation</b>	- Yes	- No	- No
<b>T.38 Fax emulation</b>	- Yes	- No	- No
<b>Simultaneous Calls</b>	- 5 simultaneous calls	- 1 call	- 1 call
<b>Codec</b>	- G.729	- G711, G723, G729	- (?)
<b>MOS</b>	- Yes	- Yes	- No
<b>Calls to PSTN</b>	- Yes	- No	- No
<b>RTP statistic:</b>	- Jitter, Delay, Loss	- No	- No
<b>DTMF tone</b>	- Yes	- Yes	- No
<b>SIP registration</b>	- Yes	- Yes	- Yes
<b>TOS/COS</b>	- Yes	- No	- No
<b>PDF reports</b>	- Yes	- Yes	- Yes
<b>ARP and Trace Route</b>	- Yes	- No	- No
<b>Call Modes</b>	- Single, Sequential, Mass	- No	- No