



Test Solutions for the Power Utility Communications Market

Introduction

Power Utilities communications networks often need to support older technologies as well as newer, and next generation technologies, presenting a challenge for those operators having to install new circuits and maintain existing ones when both legacy and next-generation technologies co-exist.

Large numbers of older Teleprotection devices remain in service within Power Utilities, often equipped with interface technology such as V.24, X21/V.11 and V.F. With no real need to replace these older devices, Power Utilities rely on their communications network infrastructure to be able to support these interfaces, regardless of if the Wide Areas Network are TDM or Packet based.

Continued advances and changes in the Grid are driving the utilities to implement newer communications technologies in order to increase the intelligence, and manage the complexity required in today's Power Grid environments.

These challenges require new types of test tools, ones that are not only be able to support legacy interfaces but that also provide support for new and next generation communications technologies that are now being deployed. Tools not only need

to be able to support legacy and next generation interfaces, but they need certain test capabilities required for the Power Utility environment.

Some key capabilities required in the Power Utility Communications environment include:

- Asymmetrical Delay measurement capabilities on all interfaces.
- Capture and decode of protocols used in grid environments such as IEC61850 GOOSE and SV.
- Network Synchronisation and timing testing capabilities specific to the power environment.

The Albedo Telecom range of Multifunction communications testers have been developed especially for the Power Utility Communications market. With interface support for both legacy and next generation technologies, all products have advanced features and capabilities specially developed for testing critical communications infrastructure.

Both the Ether.Genius And xGenius products are ideal for the testing of WAN communications infrastructure within Power Utilities, whereas Zeus has been developed especially for the testing of Sub-station communications and automation.

The main features and differences of Albedo Telecoms Power Utility Communications testers are shown below. For users who may have purchased an Ether.Genius Product but would like to upgrade to xGenius or Zeus, we can offer a very attractive trade-in option allowing users to benefit from the advanced capabilities that these two products offer.

Ether.Genius



xGenius



Zeus



Feature

Screen Size	4.3 inch, TFT colour	8 inch, TFT colour	8 inch, TFT colour
Size	223x144x65mm	260x160x63mm.	260x160x63mm.
Weight	1.2 kg (with one battery pack)	1.9 kg (two battery packs).	1.9 kg (two battery packs).
Storage	Internal, USB	Internal, USB, SD Card	Internal, USB, SD Card
Modularity	Yes, through plug in adapters	Yes, through hot-swappable plug in modules	Yes, through hot-swappable plug in modules
Maximum Speed	1Gb/s Optical & Electrical	1Gb/s, upgradeable to 10Gb/s Optical and Electrical	1Gb/s Optical & Electrical
Traffic Generation	Multiple streams over one port	Multiple streams over two ports	Multiple streams over two ports
Ethernet automatic tests	RFC 254, Y.1564	RFC 2544, Y.1564, RFC 6349	RFC 2544, Y.1564
100 Mb/s optical Ethernet	Dual port through special SGMII SFPs	Yes (dual port)	Yes (dual port)
IEC 61850 GOOSE and SV analysis	No	Yes	Yes (Standard on Zeus)
Traffic capture in PCAP format	No	Yes, with hardware time-stamps	Yes, with hardware time-stamps (Standard on Zeus)
IEEE C37.94	Yes (two ports, one-way and two-way delay, pass-through mode)	Yes (two ports, one-way and two-way delay, pass-through mode, jitter and wander, delay generation in loopback and pass-through modes)	Yes (two ports, one-way and two-way delay, pass-through mode, jitter and wander, delay generation in loopback and pass-through modes)
G.703 E0	co-directional	co-directional and contra-directional	co-directional and contra-directional

E1 / T1	Yes (dual port, BERT and performance, pulse mask, jitter and wander, add and drop, channel map, one-way and two-way tests)	Yes (dual port, BERT and performance, pulse mask, jitter and wander, add and drop, channel map, one-way and two-way tests, delay generation in loopback and pass-through modes)	Yes (dual port, BERT and performance, pulse mask, jitter and wander, add and drop, channel map, one-way and two-way tests, delay generation in loopback and pass-through modes)
Voice Frequency	Yes (tone generation, noise and level measurements, frequency sweep, one-way and two-way delay)	Yes (tone generation, noise and level measurements, frequency sweep, one-way and two-way delay). One-way-delay and tone and level measurements built into a single plug-in module	Yes (tone generation, noise and level measurements, frequency sweep, one-way and two-way delay). One-way-delay and tone and level measurements built into a single plug-in module
Datacom	Yes (DTE / DCE emulation, BERT and performance, control circuit custom settings, one-way and two-way delay)	Yes (DTE / DCE emulation, BERT and performance, control circuit custom settings, one-way and two-way delay) Operation up to 10M bit/s on balanced interfaces	Yes (DTE / DCE emulation, BERT and performance, control circuit custom settings, one-way and two-way delay) Operation up to 10M bit/s on balanced interfaces
Plots and traces	Yes (displays only stored data)	Yes (displays results in real time)	Yes (displays results in real time)
Oscillator Options	TCXO, OCXO, Rubidium	TCXO, OCXO, Rubidium	TCXO, OCXO, Rubidium
GNSS clock reference input	Yes (GPS, GLONASS, Beidou, Galileo)	Yes (GPS, GLONASS, Beidou, Galileo)	Yes (GPS, GLONASS, Beidou, Galileo) (Standard on Zeus)
ToD clock references	Yes (available through the AT-96 module)	Yes (built in the mainframe)	Yes (built in the mainframe)
IRIG-B clock references	No	Yes (balanced / unbalanced reference input /output)	Yes (balanced / unbalanced reference input /output)
Built in screen-shot function	No	Yes	Yes