"Results You Can Count On"

G.fast Analyzer/Field Noise Capture

High-Performance • 212MHz • Portable
Digital Storage Oscilloscope/Spectrum Analyzer
Supports Broadband Forum's G.fast Certification Test Plan

- **Capture, analyze and monitor live noise/interference on a DSL line**
- **Includes Digital Storage Oscilloscope**
- **Includes FFT-based Spectrum Analyzer**
- **Up to 212 MHz**
- **Portable or rack-mountable high-performance system with 2 capture channels**
- **Nonintrusive differential mode probe**
- **Easy-to-use interface**
- **Troubleshoot real field conditions**
- **Export to wide range of file types**
    - **Noise Capturing**
    - **Concurrent visual feedback of capture data and free space remaining**
    - **Computation of impulse noise statistics**
    - **View capture in time/frequency domain**
    - **Up to 8 TB of storage**
    - **G.fast Lab Testing**
        - **Evaluate crosstalk on real cable for G.fast**
        - **Testing on both sides of network simultaneously**
        - **Performs G.fast PSD mask verification without separate measurements**
        - **Measures G.fast TDD inter-symbol gap**

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Now you can capture live field noise and export it to a wide variety of formats with a bandwidth of 106 MHz. The G.fast Analyzer is a Digital Storage Oscilloscope and Spectrum Analyzer in one portable, high-performance system. Perform G.fast PSD mask verification and measure the TDD inter-symbol gap with one instrument using the software's G.fast PSD and TDD analysis features.

Bring live noise from the field back to the lab for injection into test loops. Prepare crosstalk and impulse files for export to the Model 4902 Multi-Output Noise Generator with this 212 MHz system, capable of transparently capturing high frequency interference. The MATLAB-based interface provides convenient options for range selection, sampling rate, capture length and more. The solution operates in three capture modes for control of recording of time.

The Solution also acts as a real-time, general purpose, portable data acquisition system. This convenient feature can be used during installation and maintenance or for spectrum monitoring and analysis to support documentation and reports on the field environment.

ID-337 Test Automation

Using the 501-Portable (or 501-HD) with the 501-JIG and the 501-Probe-D's is an ideal solution for automating many tests in ID-337 (the Broadband Forum's G.fast Certification Test Plan). The 501-JIG provides two test tools for ID-337 testing (PSD Test Jig and TIGA Test Jig) while the 501-Probe-D can be used for the ID-337 Timing Tests. With these tools the following tests can be easily integrated into your Automated Test Environment - saving valuable time and money:

ID-337 Tests

PSD Test Jig (Use 501-JIG)

6.2.1 PSD Limit Mask Test
6.2.2 Sub-carrier Masking Test
6.2.3 PSD Shaping Test
6.2.4 RFI Notching Test
6.2.5 UPBO Test

TIGA Test Jig (Use 501-JIG)

6.2.6 TIGA Test

Timing Tests (Use 501-Probe-D)

6.3.1 TDD Inter-frame Gap Test
6.3.2 DS and US ratio configuration (MDS) Test
6.5 Discontinuous Operation Test

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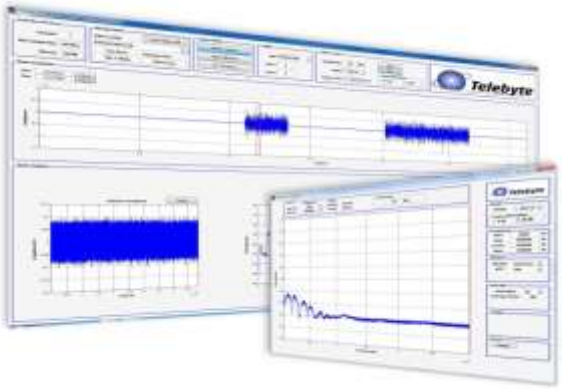
Ordering Options

Model 501-Portable	G.fast Analyzer/Field Noise Capture with built in monitor and keyboard*
Model 501-HD	G.fast Analyzer/Field Noise Capture, rack-mountable version**
Model 501-Probe-D	Single Channel Differential Probe
Model 501-JIG	G.fast Test Jig (for ID-337 PSD Mask test and TIGA Test)

* Includes software, high-performance PC, and soft travel case with wheels and telescoping handle.
** Includes software and high-performance PC.



G.fast Analyzer Software.

Nonintrusive differential probe for connection to the DSL line.

Portable, high-performance PC (semi-rugged for use in the field). Includes built-in monitor and dropdown keyboard.

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Solution Specifications - Software

Software (G.fast Analyzer GUI)		
File Size	Continuous file capture until hard drive full or capture length reached, whichever occurs first.	
Selections	• Capture Mode or FFT Spectrum Analyzer • Voltage Range • Sample Rate • Capture Time • Portion for Analysis	• Storage location • Manual Capture Start/Stop • Trigger Voltage Level • Trigger Sample Quantity and Length • Pre-trigger Sample Quantity
Displays	• Remaining capture time and free space available • Captured sequence • Noise Statistics • Noise in Time Domain • Noise in Frequency Domain • FFT-based Spectrum Analyzer	

Analysis	• Computations accelerated using NVIDIA CUDA parallel computing architecture
	• Plot of waveform in time domain
	• Plot of power spectral density (PSD)
	• G.fast PSD mask verification
	• G.fast TDD analysis
	• Spectrogram
	• Probability density of:
	  ○ Noise Amplitude
	  ○ Impulse Burst Duration
	  ○ Inter-Burst Intervals	

File Export	Wide variety including formats suitable for import into the Model 4902 Multi-Output Noise Generator	

Solution Specifications – Hardware

High Performance PC	
Processor	Intel Core i7-5930K 3.5GHz
Capture Modes	• Noise Capture Mode • Noise Monitor Mode • Spectrum Analyzer Mode
Memory	16 GB DDR4 RAM
Storage	• OS: 128 GB SSD • Noise Capture: 8 x 1 TB SSD in RAID0 Example of Storage Available Based on Sample Rate (using Noise Capture Mode):

No. of Channels	Storage (TB)	Sample Rate (MS/s)	Bandwidth (MHz)	Recording Time
1	8	500	212	~ 136 minutes
2	8	500	212	~ 68 minutes

Operating System	Windows 7 Professional 64-bit`
Power	88 to 264 VAC, 50 or 60 Hz
Noise Floor	-150 dBm/Hz
Bandwidth	212 MHz
Capture Channels	2x 14-bit, 500 MS/s, 4 GB memory

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Solution Specifications – Hardware (continued)

501-Probe-D Differential Mode Line Probe	
Max. Signal Level (In Band)	5 V p-p 0 dB attenuation, 50 V p-p 20 dB attenuation
Max. Input Voltage	200 V p-p AC Ringing, 400 V DC
Input Impedance	> 4K-ohms Balanced
Attenuation	0 dB or 20 dB switchable with overload indicator
Output Noise Floor	Below -145 dBm/Hz over Band
Bandwidth	5 kHz to 212 MHz
Connectors	Input: 2, RJ-45's for inserting into line Output: 50 ohms SMB connector
Power	+12V provided from external modular supply

G.fast Test Jig	
Channels	4 for TIGA test and 1 for PSD Mask Test
Input Impedance for PSD Mask test Channel and TIGA test channels	100 ohms
Voltage Transfer function for PSD Mask Channel	Between 826 VTF_MIN = -20dB and VTF_MAX = -17dB
Voltage Transfer function for TIGA test channels	

f [kHz]	VTF_MIN [dB]	VTF_MAX [dB]
25	-20	-17
1000	-20	-17
10000	-23	-17
30000	-36	-17
60000	-36	-23
120000	-36	-23

ELFEXT for TIGA test channels

f [kHz]	ELFEXT_MIN [dB] Line#2 -> Line#1	ELFEXT_MAX [dB] Line#2 -> Line#1	ELFEXT_MIN [dB] Line#3 -> Line#1 Line#4 -> Line#1	ELFEXT_MAX [dB] Line#3 -> Line#1 Line#4 -> Line#1
138	N/A	-49	N/A	-49
1000	N/A	-32	N/A	-35
10000	-38	-12	-41	-15
30000	-9	-3	-12	-6
60000	-3	0	-6	-3
120000	0	3	-3	0

Bandwidth	138 kHz to 106 MHz
Connectors	10 (2 RJ-45's each channel) 4 SMA connectors for output to G.fast Analyzer
Power	88 to 264 VAC, 50 or 60 Hz