



"Results You Can Count On"

Digital Analyzer/Field Noise Capture



High-Performance • 250 MHz • Portable Spectrum Analyzer Supports Broadband Forum's Gfast Certification Test Plan

- **Capture, analyze and monitor live noise/interference on twisted pairs or coaxial lines**
- **Includes Time Division Duplex (TDD) and Frequency Division Multiplexing (FDM) Signal Capture and Analysis**
- **Includes FFT-based Spectrum Analyzer**
- **Up to 250 MHz**
- **Portable or rack-mountable high-performance system with 2 capture channels**
- **Nonintrusive differential mode or COAX probe**
- **Easy-to-use interface**
- **Troubleshoot real field conditions**
- **Export to wide range of file types**
- **Noise Capturing for DSL, Gfast, and G.hn**
- **Concurrent visual feedback of capture data and free space remaining**
- **Up to 4 TB of storage**
- **View capture in time/frequency domain**
- **ITU G.9701 and IR-337 automated testing**
- **Gfast Lab Testing**
 - **Evaluate crosstalk on real cable for Gfast**
 - **Testing on both sides of network simultaneously**
 - **Performs Gfast PSD mask verification without separate measurements**
 - **Measures Gfast 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 250 MHz. The Digital Analyzer is a Digital Storage Oscilloscope and Spectrum Analyzer in one portable, high-performance system. Perform Gfast PSD mask verification and measure the TDD inter-symbol gap with one instrument using the software's Gfast PSD and TDD analysis features. Capture the noise on a Single Pair Ethernet (SPE) link.

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 250 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.

IR-337 Test Automation

Using the 501-Portable (or 501-HD) with the 501-JIG and the 501-Probe-D250 is an ideal solution for automating many tests in IR-337 (the Broadband Forum's Gfast Certification Test Plan). The 501-JIG provides two test tools for IR-337 testing (PSD Test Jig and TIGA Test Jig) while the 501-Probe-D can be used for the IR-337 Timing Tests. With these tools the following tests can be easily integrated into your Automated Test Environment - saving valuable time and money:

IR-337 Issue 1 & 2 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-D250)

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

MODEL 501-JIG
FOR IR-337 TESTING



MODEL 501-PROBE-D



MODEL 501-PROBE-COAX



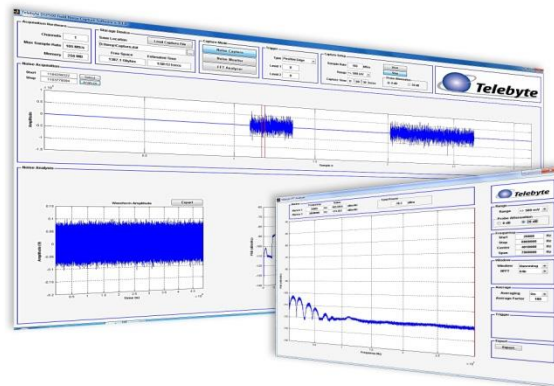
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Ordering Options

Model 501-Portable-4T	Digital Analyzer/Field Noise Capture with built in monitor and keyboard*
Model 501-HD-4T	Digital Analyzer/Field Noise Capture, rack-mountable version**
Model 501-Probe-D250	Single-Channel Differential Probe 250 MHz
Model 501-Probe-COAX	Single-Channel COAX Probe
Model 501-JIG	Gfast 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.



Digital Analyzer Software.



Probes for twisted pair and COAX.



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 (Digital Analyzer GUI)	
File Size	Continuous file capture until hard drive full or capture length reached, whichever occurs first.
Selections	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Remaining capture time and free space available • Captured sequence • Noise Statistics • Noise in Time Domain • Noise in Frequency Domain • FFT-based Spectrum Analyzer
Analysis	<ul style="list-style-type: none"> • Computations accelerated using NVIDIA CUDA parallel computing architecture • Plot of waveform in time domain • Plot of power spectral density (PSD) • Gfast PSD mask verification • Gfast TDD analysis • Spectrogram • Probability density of: <ul style="list-style-type: none"> ○ 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 i9															
Capture Modes	<ul style="list-style-type: none"> • Noise Capture Mode • Spectrum Analyzer Mode 															
Memory	16 GB DDR4 RAM															
Storage	<ul style="list-style-type: none"> • OS: 1 TB SSD • Noise Capture: 4 TB SSD <p>Example of Storage Available Based on Sample Rate (using Noise Capture Mode):</p> <table border="1"> <thead> <tr> <th>No. of Channels</th> <th>Storage (TB)</th> <th>Sample Rate (MS/s)</th> <th>Bandwidth (MHz)</th> <th>Recording Time</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>4</td> <td>500</td> <td>250</td> <td>~ 68 minutes</td> </tr> <tr> <td>2</td> <td>4</td> <td>500</td> <td>250</td> <td>~ 34 minutes</td> </tr> </tbody> </table>	No. of Channels	Storage (TB)	Sample Rate (MS/s)	Bandwidth (MHz)	Recording Time	1	4	500	250	~ 68 minutes	2	4	500	250	~ 34 minutes
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1	4	500	250	~ 68 minutes												
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Operating System	Windows 10 Professional 64-bit															
Power	100 to 240 VAC, 50 or 60 Hz															
Noise Floor	-150 dBm/Hz															
Bandwidth	250 MHz															
Capture Channels	2x 14-bit, 500 MS/s, 4 GB memory															



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Solution Specifications – Hardware (continued)

501-Probe-D250 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	20 kHz to 250 MHz
Connectors	Input: 2, RJ-45's for inserting into line Output: 50 ohms SMB connector
Power	+12V provided from external modular supply

501-Probe-COAX Single-Channel COAX 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	Thevenin Impedance >3K Ω for non-intrusive monitoring
Attenuation	0 dB or 20 dB switchable with overload indicator
Output Noise Floor	Below -145 dBm/Hz over Band
Bandwidth	20 kHz to 250 MHz
Connectors	Input: 75 Ohm Coax F-Type Output: 50 ohms SMB connector
Power	+12V provided from external modular supply



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Solution Specifications – Hardware (continued)

Gfast 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	<table border="1"> <thead> <tr> <th>f [kHz]</th> <th>VTF_MIN [dB]</th> <th>VTF_MAX [dB]</th> </tr> </thead> <tbody> <tr> <td>25</td> <td>-20</td> <td>-17</td> </tr> <tr> <td>1000</td> <td>-20</td> <td>-17</td> </tr> <tr> <td>10000</td> <td>-23</td> <td>-17</td> </tr> <tr> <td>30000</td> <td>-36</td> <td>-17</td> </tr> <tr> <td>60000</td> <td>-36</td> <td>-23</td> </tr> <tr> <td>120000</td> <td>-36</td> <td>-23</td> </tr> </tbody> </table>	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														
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Bandwidth	138 kHz to 212 MHz																																			
Total Measurement Uncertainty	+/- 1 dB (when used with the 501 PC).																																			
Connectors	10 (2 RJ-45's each channel) 4 SMA connectors for output to Gfast Analyzer																																			
Power	88 to 264 VAC, 50 or 60 Hz																																			

Specifications are subject to change without notice. Made in USA