



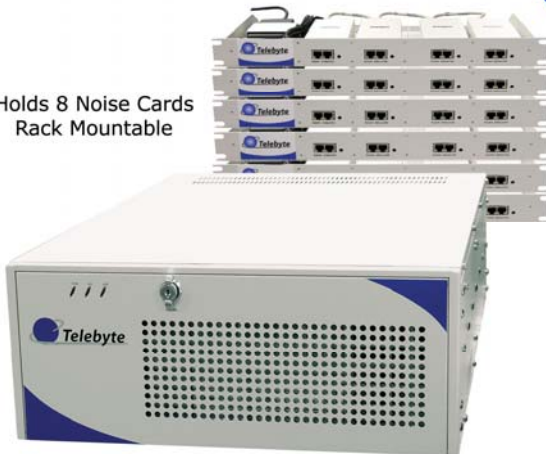
"Results You Can Count On"

Model 4901 Multi-Output Noise Simulator

4901-PC-HD

High-Density Version
2-32 Independent
Noise Channels

Holds 8 Noise Cards
Rack Mountable



Uses same software



4901-PC-Compact

Compact Version
2-8 Independent
Noise Channels



Holds 2 Noise Cards
Small, Lightweight

Uses same



Accessories

Monitor not included.

The 4901-PC-HD High-Density version provides **2 to 32 independent noise channels** in a 4U-high industrial PC. The modular system holds up to 8 (2 or 4-port) AWG cards and can be expanded by adding more AWG cards, noise injectors and other components as needed.

The 4901-PC-Compact version provides **2 to 8 independent noise channels** in a small form factor. The modular system holds up to 2 (2 or 4-port) AWG cards.

A user-friendly configuration software allows the user to select and build impairment models common to DSL network implementations. A wide variety of custom crosstalks (including ADSL2+ and VDSL2) as well as impulse noises (such as REIN, SHINE and PEIN) can be created. In addition, user-defined files in several formats (such as MATLAB and Excel) may be imported. Optional noise modules automatically setup standards-based testing for TR-114, TR-100, G.SHDSL and more.

Offering the only fully-compliant TR-114 solution in the industry.
Provides Micro-interruptions for WT-105/TR-115.



Model 4901 Multi-Output Noise Simulator Highlights

“Results You Can Count On”

- Bandwidth 20 kHz to 30 MHz
- Crest Factor greater than 5
- High degree of accuracy
- Noise Floor less than -145 dBm/Hz (as measured at the output of the noise injector)
- Expandable, modular design. High-density version holds up to 8 AWG cards (2-Port and/or 4-Port) for a maximum of 32 Ports. Compact version holds up to 2 AWG cards (2-Port and/or 4-Port).
- Split output from 1 AWGx port to 2 noise injectors, expanding ports to total of 64 Ports
- Patented technology produces totally random “real-life” noise
- Inject crosstalk and impulse combined
- Independent control of each port
- Select from common crosstalk types such as SHDSL, ADSL, and VDSL
- Impulse noises such as REIN, SHINE and PEIN
- Specify NEXT, FEXT and number of disturbers
- Add in RFI and AWGN (at variable levels)
- Specify impedance, sampling rate and DUT location
- Optional Noise Modules setup and run all tests in standard automatically
- Design custom loops with Loop Configuration Editor
- Integrate with Telebyte WLS to control loop simulator
- Save custom noise files or entire configurations to repeat tests with ease and accuracy
- Import MATLAB (.mat) or Excel (.xls) noise files
- Remote control via RS-232, multiple Telnet sessions over Ethernet
- Adjust Amplitude of Crosstalk and Impulse noise
- Micro-Interruptions
- Essential component in future Telebyte solution for DSM multi-pair testing per the Broadband Forum's WT-249

| Ordering Information | |
|--|---|
| Minimum Required for Base System: | |
| 4901-PC-HD or 4901-PC-Compact | Telebyte 4U-High Industrial Computer or Telebyte Compact Industrial Computer |
| 4901-NS | Universal Noise Generation Software |
| At Least One of: 4901-AWG2* OR 4901-AWG4* | 2-Port AWG Card (128 MSamples) 4-Port AWG Card (128 MSamples) |
| 4901-D1 | Differential Mode Noise Injector |
| 4901-D1-PS | Power Supply for 4901-D1 (supports a combination of up to 4, 4901-D1's and/or 4901-D1-Micro's) |
| Optional Add-On's (The 4901-PC-Compact holds 2 cards, the 4901-PC holds 8): | |
| 4901-AWG2 | 2-Port AWG Card (128 MSamples) |
| 4901-AWG4 | 4-Port AWG Card (128 MSamples) |
| 4901-D1 | Differential Mode Noise Injector |
| 4901-D1-Micro | Differential Mode Noise Injector With Micro Interruption Function |
| 4901-RM-D1 | Rack Mount Kit for 4901-D1 and/or 4901-D1-Micro and/or 4901-ISDN2 (max 4) |
| 4901-PC-SC-6-1 | 6-to-1 Signal Combiner for 4901-PC |
| 4901-ISDN2 | Dual Channel ISDN Splitter & 50-to-150-ohm Matching Impedance Transformer |
| 4901-RM-PC | Rack Mount Kit for 4901-PC |
| 4901-N6 | Noise Module for TR-067 |
| 4901-N10 | Noise Module for TR-100 |
| 4901-N11 | Noise Module for TR-114 |
| 4901-N12 | Japanese Noise Library – Including TCM-ISDN Noise Files, SHDSL NTT Noise Files; Half, Single & Double ADSL Disturbers NTT Noise Files; 3-Band, 4-Band & 6-Band VDSL NTT Noise Files |
| 4901-N16 | Noise Module for WT-105 |
| 4901-N17 | Noise Module for TR-115 |
| 4901-N18 | Noise Module for G.SHDSL |
| 4901-YC** | Split 1 AWGx Port to 2 Noise Injectors |

* Impulse and crosstalk noises must be carried out on two different AWG cards. ** Splitting the noise on one port provides correlated noise on 2 ports. In this case, up to 12 independent noises may be injected simultaneously if all ports are utilized for this purpose.



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Model 4901 Multi-Output Noise Simulator Specifications

| 4901-PC-HD & 4901-PC-Compact Specifications | |
|---|---|
| Bandwidth | AWGN: 20 kHz to 30 MHz |
| Interference Profile Accuracy | ≤ 0.5 dB mean absolute error (MAE) for all Power Spectral Densities of Crosstalks |
| AWGN Crest Factor | ≥ 5 |
| AWGN Gap | < 10% |
| Output Impedance | 50Ω unbalanced |
| Dynamic Range | 95dB (-90 dBm to +5 dBm) |
| Remote Commands | RS-232, TelNet |
| Included Software | Telebyte Multi-Output Noise Simulator Software |
| Power supply | AC 90 V to 264 V, 47 to 63 Hz |
| Operating Temperature Range | 0 to 50 ° C |

| 4901-PC-HD Only Specifications | |
|--------------------------------|---|
| Operating Relative Humidity | Maximum 80% for up to 31° C, decreasing linearly to 50% at 40°C |
| Mechanical Dimensions | 4U-High Rack-Mountable Chassis |
| Weight | 60 lbs (27.22 kg) |
| Connectors | Rear: 2 Serial, 2 USB, 2 Ethernet |

| 4901-PC-Compact Only Specifications | |
|-------------------------------------|---|
| Operating Relative Humidity | 10% - 90% |
| Mechanical Dimensions | DxWxH:15.75 in X 6.54 in X 6.91 in (400 mm x 166 mm x 175.5 mm) |
| Weight | 17.5 lbs (7.94 kg) with 2, 4901-AWGx cards installed |
| Connectors | Front: 2 USB Rear: 1 Serial, 1 Ethernet |

| Noise Injector Specifications | |
|-------------------------------|--|
| Bandwidth | 20 kHz to 30 MHz |
| Output Impedance | 4kΩ Minimum (20 kHz to 30 MHz) |
| Input Impedance | 50Ω unbalanced (100Ω unbalanced*) |
| Output Mode | Differential, balanced |
| Noise Floor | Below -145 dBm/Hz as measured at the output of the noise injector |
| Insertion Loss | 13.0/35 dB ± 0.5 dB |
| Connectors | SMB Female Connector for 4901 Multi-Output Noise Simulator, RJ45 (2) Female Connectors for Loop Simulator (external cable provided) and for the modem. |
| Operating Temperature Range | 0 to 50 ° C |
| Operating Relative Humidity | Maximum 80% for up to 31° C, decreasing linearly to 50% at 40°C |
| Mechanical Dimensions | 2.6" W x 1.4" H x 4.7" D |
| Power supply | AC 90 V to 264 V, 47 to 63 Hz, 10 W (supports 1-4 Noise Injectors) |

| Micro-Interruptions Specifications | |
|------------------------------------|---|
| Micro Interruption Switches | Inclusion at either ATU-R/VTU-R or ATU-O/VTU-O ends |
| Duration | Programmable |
| Minimum Duration | 1 msec |
| Duration Increments | 1 msec |
| Duration Accuracy | +/- 0.5 msec |
| Periodicity | Programmable in increments of multiples of the Duration |

*100Ω input used when the output from one port is split to two noise injectors. 100Ω and 50Ω are used when the output from two ports are combined in one noise injector.



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Model 4901 Multi-Output Noise Simulator Noises Included in Base System

Crosstalks Included in Base System

| Standard | Bandplans/Protocols |
|---------------------|---|
| ADSL, ADSL2, ADSL2+ | G.992.3 Annex A, B, I, J, L, M G.992.4 Annex A, I G.992.5 Annex A, B, I, J, M |
| SHDSL | G.991.2 Annex A, B, F |
| HDSL | |
| ISDN | |
| T1 | |
| VDSL2 | G.993.2 Annex A (POTS) G.993.2 Annex A (ADL) G.993.2 Annex B7 (1-10), B8 (1-16) |

Alien Crosstalks Included in Base System

| Reference | Test System | Models |
|----------------------------|---------------------|---------------------------|
| ETSI TS 101 388 §5.3.4.1.1 | EC ADSL (POTS) | FA, FB, FC, FD |
| ETSI TS 101 388 §5.3.4.1.2 | EC ADSL (ISDN) | FA, FB, FC, FD |
| ETSI TS 101 388 §5.3.4.1.3 | FDD ADSL (POTS) | FA, FB, FC, FD |
| ETSI TS 101 388 §5.3.4.1.4 | FDD ADSL (ISDN) | FA, FB, FC, FD |
| TR-100 Annex D.1 | ADSL2 (TR-100 A.2) | FA, FB, FC, FD |
| TR-100 Annex D.1 | ADSL2+ (TR-100 A.2) | FA, FB, FD, FD19 |
| TR-100 Annex D.2 | ADSL2+ (TR-100 A.3) | CAL=12, CAL=36, CAL=52 |
| TR-100 Annex D.3 | ADSL2+ (TR-100 B.3) | FA, FB, FD |
| G.991.2 §B.3.5.4.1.2 | SHDSL | XA.#.A, XA.#.B, XA.#.C |
| WT-114 Appendix A | VDSL2 | MD_EX, MD_CAB27, MD_CAB72 |



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Model 4901 Multi-Output Noise Simulator Noises Included in Base System (continued)

Other Crosstalk Features

- Fluctuating Crosstalk
- VDSL Power Back-Off
- Dynamic Noise Levels
- Variable AWGN
- RFI Tones
- Pre-Defined Spectra
 - ETSI A
 - ETSI B
 - EURO-K
- Batch conversion of user-defined Crosstalk files for easy import

Impulse Noise

- High Frequency
- Low Frequency
- Single Shot
- Burst Pattern

Other

- Loop Editor
- Preconfigured Loops