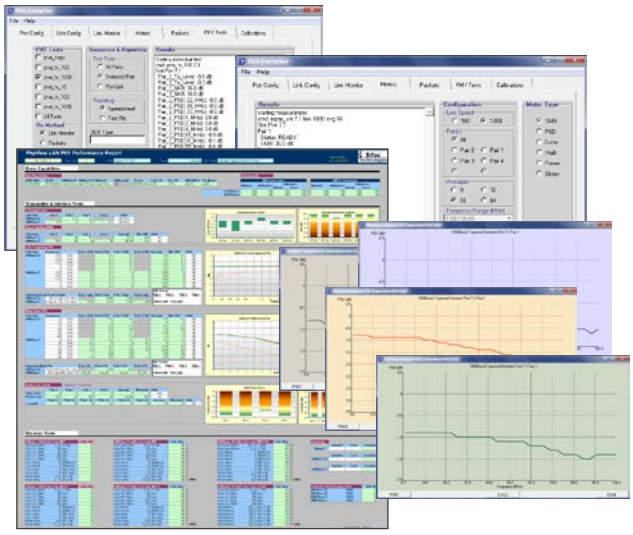
PVA-3000
PhyView™ Analyzer
Gigabit & Fast Ethernet Transceiver Analysis



Product Overview

Test & Measurement World BEST IN TEST 2012 AWARD WINNER

Key Features

- **Comprehensive 10/100/1000 PHY Testing Made Easy**
  Just *Plug…..Run…..Evaluate*
- **Faster and More Informative Alternative to Packet Testing**
  Answer *"What's Wrong, How Wrong, and Where?"*
- **Automatically Examine All PHY Performance Margins**
  Transmitted Signal Integrity
  Receiver Performance Under Stress
  Physical Interface Characteristics
- **Automatically Sequence Up To 24 DUT Ports per PVA-3000 Chassis**
  That's *96 Gigabit Pairs* ***and*** *48 10/100BaseT Pairs!*
- **No Scopes, Fixtures, Probes, Generators, Test Modes, or Cable Spools!**
  Test *Any LAN Interface, Anywhere*
- **Innovative New Measurements on Transmitted Signals**
- **Versatile Programmable Impairments for LAN Receiver Testing**
- **Single Connection Receiver Testing or Dual Connection Packet Loss**
- **Automated DC Unbalance Analysis When Combined with PSA-3102 Blades**
- **Externally Accessible Impairments – Combine with Packet Analyzers**
- **Sifos PSA-3000 and PSA-1200 Chassis Compatible**
- **Compact 2-Port PVA-3002 Also Available**

Verification, Simplified.

Anything 10/100/1000

Switches/Hubs
Routers/Gateways
NIC's/Ports
PSE's
Repeaters
Link Components
Service Outlets

True Physical Layer Integrity WITHOUT

Scopes & Probes
Fixtures & Test Modes
Packet Analyzers
Generators & Network Analyzers

Full Automation

Sequence Pairs/Ports with One Button
Transmitter, Interface, & Receiver Tests
Colorful, Graphical Spreadsheet Reporting & Analysis

Expose Hidden Defects!

Uncover Problems Invisible to Link & Packet Flow Tests

Overview

The PVA-3000 PhyView Analyzer is designed to bridge the wide coverage gap between comprehensive Ethernet twisted pair PHY compliance testing and rudimentary link verification testing. The PVA-3000 introduces an innovative multi-port capability *dedicated* to 10/100/1000BaseT physical layer characterization under controlled impairments including line loss, ingress noise, jittered or offset timing, and even Power-over-Ethernet. The PVA-3000 tests Ethernet switches and routers, discrete LAN interfaces, link transmission components, and network service integrity at any DTE interface.

Why Test Ethernet PHY's ?

Conformance to all IEEE 802.3 specifications at the physical layer assures that a LAN port will successfully interoperate with other specification compliant equipment under all possible link configurations and conditions of connection impairment. Exhaustive physical layer testing also exposes and identifies any "weak links" that can adversely affect link performance. Physical layer testing is essential for qualifying new components including PHY silicon, magnetics, connectors, and physical layouts.

PHY Testing versus Ethernet Packet Testing

Ethernet PHY testing, as typically specified by IEEE 802.3 specifications, is both expensive and time consuming. It requires expensive test equipment and a high degree of expertise to perform. Most measurements are done pair-by-pair with considerable manual intervention. The types of measurements specified often defy automation and test coverage typically favors transmitter testing over receiver testing despite the equal role both elements play in enabling successful link-ups.

Packet transmission testing is widely available and has evolved as the convenient substitute to physical layer evaluation. In fact, many consider it an "equivalent" to physical layer evaluation. As a substitute however, ordinary packet testing is highly challenged to resolve defect types, defect locations, and defect magnitudes. It is therefore a poor predictor of the interoperability of an Ethernet port under all possible link configurations and impairments.

Fully Automated Multi-Port LAN PHY Testing

The PVA-3000 introduces highly automated measurements and analyses while connected to any target 10/100/1000BaseT LAN interface. All measurements are "live link" measurements, that is, they are performed on an active link to directly assess link partner and/or link connection performance. Measurements such as transmission **power**, **power spectral distortion**, **sign-to-noise**, bulk **echo response**, and bulk **crosstalk** can run on all LAN pairs and link configurations across multiple test ports without any user intervention. Link partner receiver assessments with controlled impairments such as **100M line loss**, controlled **transmit jitter**, transmit **frequency offset**, and controlled **ingress noise** are facilitated on each test port independently with multi-port concurrent measurements of link stability and packet loss enabled. In combination with Sifos PSA-3102 test ports, **DC unbalance** testing from PoE is offered with full automation and reporting.

Breaking the Mold

The PVA-3000 presents an innovative, time-efficient, and highly cost-effective alternative for qualifying and characterizing 10/100/1000BaseT interfaces, providing wide-scale visibilities into performance that simply have not been available historically. Whether evaluating design components, assuring system quality, troubleshooting failures, or assessing link performance, the PVA-3000 introduces a unique new tool to enhance quality and productivity.

Verification, Simplified.

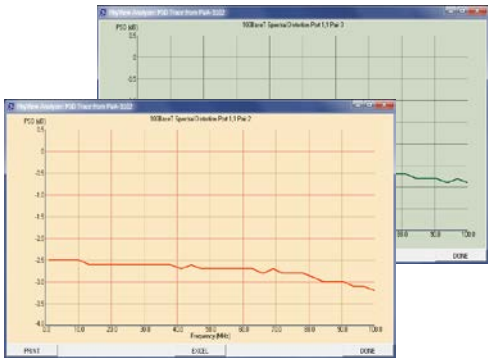
LAN PHY Transmission and Interface Metering with the PhyView Analyzer

The PVA-3000 introduces new techniques for assessing LAN PHY Transmitter & Interface performance. These techniques require just a simple RJ-45 interface to the device-under-test and are performed on a **live link** – that is, the test instrument acts as the link partner while performing physical layer assessments. **Transmitters** and **physical interfaces** are characterized by methods that are completely independent of their receiver characteristics.

Measurement	Description	Reported Units
Tx Power Level	Single Pair (100BaseTx) or 4-Pair (1000BaseT) **RF Power** at DUT Interface Tx Power Level reports aggregate transmitted power at the DUT interface. This factory calibrated meter reports power-per-transmitting-pair.	**dB(nominal)** Where "nominal" is the mid-level transmit amplitude specified for a 100BaseTx or 1000BaseT transmitter.
SNR	Single or Multi-Pair **Signal-to-Noise Ratio** SNR characterizes all forms of non-correctable signal distortion including noise or crosstalk ingress, signal compression, and severe ISI (inter-symbol interference). Meter configures desired link speed (100BaseTx or 1000BaseT) and measures specified pair.	**dB** (Ideal Signal Power / Distortion Components) The measurement ceiling for SNR is 36 dB.
PSD	Single or Multi-Pair **Power Spectral Distortion** PSD characterizes the spectral frequency response of a LAN transmitter. PSD returns 33 evenly spaced frequency-amplitude points over a user-specified frequency range between 20KHz and 100MHz. Meter configures desired link speed (100 or 1000BaseT) and measures specified pair(s).	**dB, Frequency** Each frequency-power point is referenced to a nominal mid-level amplitude, flat frequency response 100BaseTx or 1000BaseT transmitter. The measurement floor is below –30 dB.
Echo Response	Single or Multi-Pair **Bulk Echo Response** Bulk Echo Response is equivalent to Return Loss in a typical RF transmission system. It characterizes total reflected energy across the frequency spectrum and therefore assesses the degree of deviation from a nominal 100Ω transmission line. Meter measures any or all of the 4 pairs in a 1000BaseT link.	**dB** Ratio of total reflected to total transmitted power. Measurements are normalized to test port calibrations. The measurement floor is –26 dB.
Crosstalk	Single or Multi-Pair Group **Bulk Crosstalk** Bulk Crosstalk is equivalent to Isolation in a typical RF transmission system. It characterizes total power transmitted between any two specified pairs with the assumption that these transmissions are bi-directional on average. Meter measures any or all of the 6 pair groupings in a 1000BaseT link.	**dB** Ratio of total ingress (crosstalk) power to total transmitted power. Measurements are normalized to test port calibrations. The measurement floor is –39 dB.
Pair Skew	Relative Pair **Timing Offset** in 1000BaseT Pair Skew reports any symbol period timing differences between pairs in a 1000BaseT link. Each measurement reports 4 pairs, of which 3 pairs are each compared to a reference pair.	**nsec** Measurement granularity is one symbol period, or 8 nsec per pair.

PVA-3000 metering, while very different from the traditional time-domain measurements associated with LAN PHY compliance testing, is actually analogous to the types of testing typically seen in wired or wireless RF communications channels. In this regard, both measurements and calibrations are readily automated and are based upon similar conceptual constructs as seen with ordinary spectral analysis and vector network analysis. Calibrations required for **PSD**, **Echo Response**, and **Crosstalk** are fully automated and require no external fixturing.

PVA-3000 transmission measurements can also readily be used to assess passive link components including cabling and patch panels or to assess LAN signal integrity at any point in a LAN link.



PSD on Pairs 2 & 3 at 100BaseT

LAN PHY Receiver Testing with the PhyView Analyzer

PhyView Analyzer test ports provide configurable line impairments and metering resources to enable rapid assessment of LAN PHY receivers under **controlled stresses** either at or beyond the margins specified in the respective IEEE 802.3 specifications for 10/100/1000BaseT. Some of these impairments are also accessible to external Ethernet packet testers so that accelerated receiver assessment can be performed using traditional packet counting methods. Device-Under-Test (DUT) receiver performance is tested **fully independent** of DUT transmitter performance.

Impairment	Description	External Access
Line Emulation	Emulate IEEE 802.3 worst case line loss (attenuation over frequency). May be applied to 2 or 4 pairs such that 100BaseTx transmit can be separated from 100BaseTx receive pair. This impairment models 90M Cat5e + 10M Cat5e patch cable and connector losses. Maintains 100Ω line impedance and approximately linear phase characteristics.	YES
Noise (Alien Crosstalk)	Apply random noise per pair that is spectrally similar to 100BaseTx. Noise source is isolated by 2.7dB from Test PHY so that DUT experiences greater noise levels. Amplitude is programmable from –6 dB to +21.5 dB in 0.5 dB steps where 0 dB corresponds to 100BaseTx limit of 40mVpp amplitude.	YES
Line Mismatch	Insert –12 dB (Return Loss) Mismatch on either 2 or 4 pairs such that 100BaseTx transmit can be separated from 100BaseTx receive pair.	YES
Transmitter Offset	Applies a fixed frequency offset to transmitted 100BaseTx and 1000BaseT signals. Frequency offset may be programmed to –115ppm, –100ppm, -50ppm, +50ppm, +100ppm, and +115ppm.	NO
Transmitter Jitter	Applies random jitter to transmitted 100BaseTx and 1000BaseT signals. Jitter level may be programmed to –6 dB to +24 dB in 0.5 dB steps where 0 dB corresponds to IEEE 802.3 specified 1.4 nsec peak-peak jitter. Transmit jitter is structured to meet 1000BaseT phase noise versus frequency profile such that jitter power above 5KHz is attenuated by ~13.5 dB relative to total jitter power.	NO
Transmitter Power	Transmitter power may be controlled on 100BaseT and 1000BaseT signals over a range of ~2.1 dB (or ~25%). This range is then summed with a nominal 2.7dB fixed loss on all Test Ports. Ten power level steps are provided.	NO
Transmitter Slew	Transmitter slew rate may be controlled on 100BaseT and 1000BaseT signals over a range of 0.17V/nsec (or ~75%). Eight slew rate steps are provided.	NO

PVA-3000 metering associated with PHY receiver testing includes a configurable Link Stability meter and an MAC frame generator / counter. Link Stability measurements require just a single port connection to the DUT.

Measurement	Description	Reported Units
Link Stability	Link Statistics and Sampled Link Stability Samples live link status (10/100BaseT) and/or gigabit remote receiver status (1000BaseT) to assess link stability. Counts from 1 to 100 samples with sampling interval configurable as 20, 50, or 100msec.	Type: **Link Status** or **Gigabit Remote Rx Status** Count: **Count of Link "Up"** or **Remote Rx "OK"** Indications
Packet Count	Count of Received MAC frames Each PVA-3000 port can transmit user-configured MAC frames with programmable duration, packet gap, and repeating 4-byte payload pattern. Each PVA-3000 port will count incoming MAC frames either independent of or coincident with MAC frame transmission.	**Packet Count** Burst transmissions of 32K, 128K, 512K, and 1024K packets are supported. Continuous transmission is also supported with counts into billions of packets.

Each PVA-3000 Test Port includes a **THRU** interface to enable LAN PHY receiver testing with external packet analyzers. This feature enables testing in situations where IP layer or higher protocols are required and/or where packet filtering must be performed as part of the packet counting process.

The PhyView Analyzer Performance Test Suite for 10/100/1000BaseT

Ethernet interface testing has never been easier than the PhyView Test Suite for the PVA-3000. This group of **fully automated tests** can be automatically sequenced across up to 24 10/100/1000BaseT ports to produce colorful and graphical reports of DUT PHY performance. Sequencing and reporting is accomplished with just a few mouse clicks in PVA Interactive software or with a single command in PowerShell PSA. Unlike rudimentary link testing, PhyView Performance Tests clearly and independently characterize **transmitter**, **receiver**, and **physical interface** performance in **quantitative terms** that predict link performance over the full range of possible applications.

The LAN PHY Performance Test Suite consists of the following tests:

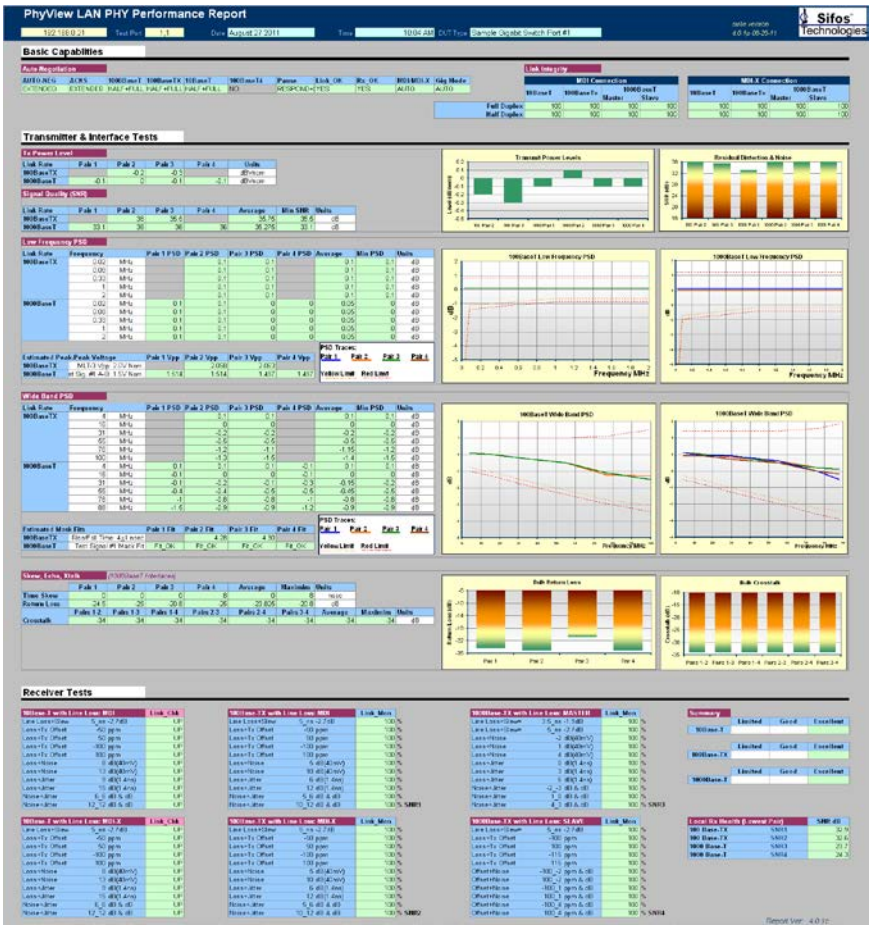
PHY Test	Description	Reported Parameters
PHY Capabilities	Assesses PHY advertised capabilities for 100BaseT and 1000BaseT. Also assess auto-MDI and then verifies each of these capabilities with a link verification.	**Auto-Negotiation Parameters** (10BaseT, 100BaseTx & 1000BaseT) **Link Stability Count** (10BaseT, 100BaseTx, 1000BaseT, Full vs Half Duplex, MDI vs MDI-X, Master vs Slave).
100BaseTx Transmission Analysis	Evaluates Transmitted Signal Characteristics of a 100BaseTx transmitter both in MDI and MDI-X configurations. Standard spreadsheet report utilizes PSD measurements to estimate per-pair values for **Vpk-pk** and **Rise/Fall Time**.	**Rx Power** (Rx Pair 2 or 3) **SNR (Pair 2 & 3)** **Low Frequency PSD** (20KHz-2MHz, Pair 2 & 3) **Wide Band PSD** (4MHz – 100MHz, Pair 2 & 3)
1000BaseT Transmission & Interface Analysis	Evaluates Transmitted Signal and Interface Characteristics of a 1000BaseT transmitter. . Standard spreadsheet report utilizes PSD measurements to estimate per-pair values for **Vpk-pk** (Test Signal #1 Pt A to Pt B) and **Pulse Template Fit**.	**Rx Power** (Aggregate 4-Pair) **SNR** (Pairs 1-4) **Low Frequency PSD** (20KHz-2MHz, Pairs 1-4) **Wide Band PSD** (4MHz – 100MHz, Pairs 1-4) **Time Skew** (Pairs 1-4) **Return Loss** (Pairs 1-4) **Crosstalk** (Pairs 1-2, 1-3, 1-4, 2-3, 2-4, 3-4)
10BaseT Receiver Analysis	Subjects DUT Receiver to IEEE worst case Line Loss impairment combined with low Tx level and slew, transmit frequency offsets, additive random noise, transmit frequency jitter, and combinations of random noise and jitter. Measures **Link Viability** or **Packet Transmission** (switches and hubs). Packet transmission requires 2 test port connections.	**Link Viability: "UP" or "DOWN"** (Based on 400 link samples and 3 re-links over 20 seconds per impairment) or **Packet Transmission %** (Based on line rate transmission of 128,000 (*default*) packets to a switch or hub DUT)
100BaseTx Receiver Analysis	Subjects DUT Receiver to IEEE worst case Line Loss impairment combined with low Tx level and slew, transmit frequency offsets, additive random noise, transmit frequency jitter, and combinations of random noise and jitter. Measures **Link Viability**, **Link Stability**, or **Packet Transmission** (switches and hubs). Packet Transmission requires 2 test port connections. If not using Packet Transmission, Link Stability is reported only if DUT drops link and/or falls back to 10BaseT given >100% packet loss. Otherwise Link Viability is reported.	**Link Viability: "UP" or "DOWN"** (Based on 400 link samples and 3 re-links over 20 seconds per impairment) or **Link Stability: Link "UP" %** (Based on 400 link samples and 3 re-links over 20 seconds per impairment) or **Packet Transmission %** (Based on line rate transmission of (default) 1,024,000 (*default*) packets to a switch or hub DUT)
1000BaseT Receiver Analysis	Subjects DUT Receiver to IEEE worst case Line Loss impairment combined with low Tx level and slew, transmit frequency offsets (slave), additive random noise (master), transmit frequency jitter (master), combinations of random noise and jitter (master), and combinations of frequency offset and random noise (slave). Measures **Link Stability** or **Packet Transmission** (switches and hubs). Packet Transmission requires 2 test port connections.	**Link Stability: Remote Rx "OK" %** (Based on 1000 link samples 20 seconds per impairment. If DUT remote_rx_status is defective, will report **Link Viability** - see 100BaseTx test.) or **Packet Transmission %** (Based on line rate transmission of 10,240,000 (*default*) packets to a switch or hub DUT)

The PhyView Test Report

The PhyView Performance Suite produces a Microsoft Excel spreadsheet report that adds graphical presentations of test results and colorized annotations of test limit excursions. Unlike a strict compliance test, many of the parameters captured by the PhyView Performance Suite are evaluated to "soft limits" that assess performance to generally fall into one of three bands: **Green** (or "Excellent"), **Yellow** (or "Acceptible"), and **Red** (or "Marginal").

The report is structured such that each port tested creates a specific workbook tab dedicated to that particular port. Testing a 24 port switch would therefore cause a 24 tab workbook to automatically pop up upon completion of testing.

For those who must perform formal IEEE 802.3 physical compliance testing, PhyView Performance Reports provide an extremely efficient means to select worst-case (or best-case) performing ports to submit to intense testing.

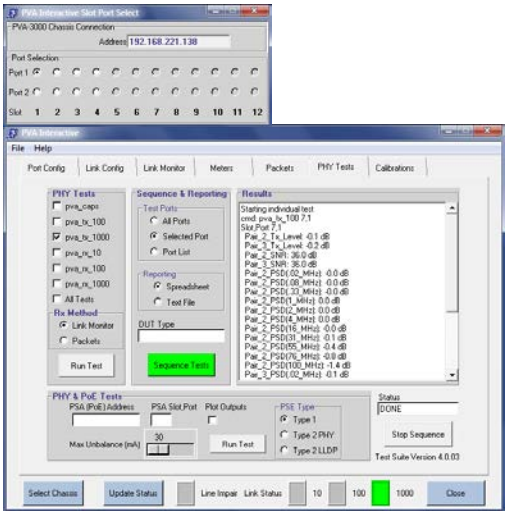


The Standard PhyView Spreadsheet Report

PhyView Analyzer Software

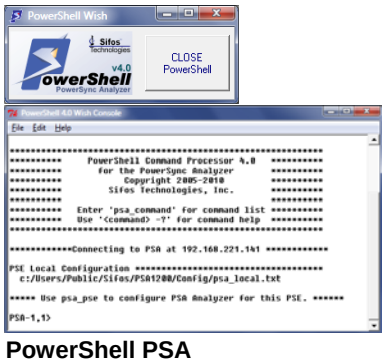
PhyView Analyzer software is hosted on a Microsoft Windows (or Linux) PC and consists of two primary components that manage the instrument over a LAN interface.

PVA Interactive is an intuitive graphical user interface that provides access to most of the features of each PhyView Analyzer test port. Using PVA Interactive, test port switching and impairments are readily configured to one or more test ports. Metering including Link Monitor, Rx Power, SNR, PSD, Echo, Crosstalk, and Skew are all configured and queried interactively. MAC frames are configured and activated as is the MAC frame receive counter. The PhyView Test Suite is fully accessible for running individual tests or sequencing groups of tests to reports. Automated meter calibration (PSD, Echo, Crosstalk) is also readily performed from PVA Interactive.



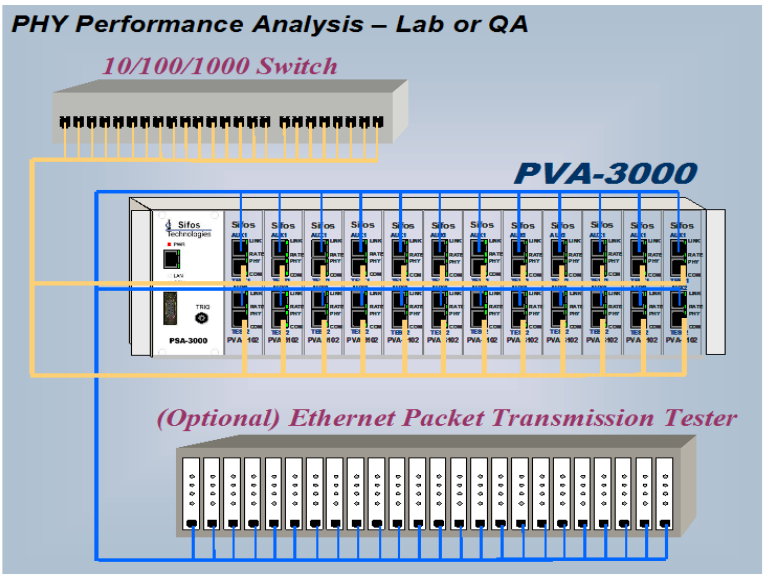
PVA Interactive Graphical User Interface

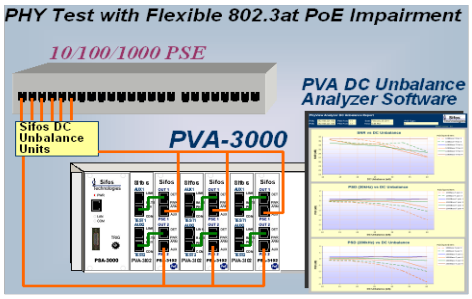
PowerShell PSA is the Tcl/Tk-based scripting environment that has historically been available for the PowerSync Analyzer from Sifos Technologies. All testing resources and applications associated with the PhyView Analyzer are accessible via high level commands to PowerShell PSA. Customized test scripts are readily created and debugged in this interactive "live" programming environment.

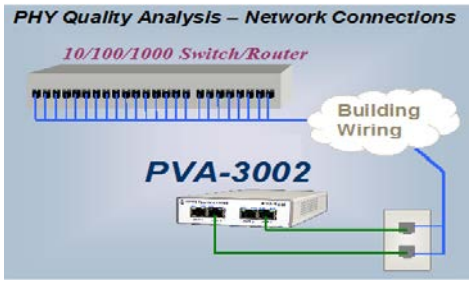


PowerShell PSA

PVA-3000 Test Configurations







Technical Data: PVA-3000

Test Port Configurations and Measurements

Test Category	Port Configuration	Measurements	Link Types	Calibrations
Link Partner (DUT) Transmitter / Interface Measurements or Link Outlet Signal Quality Analyses	Test PHY	Power Spectral Distortion	1000 & 100BaseT	YES
		Signal-To-Noise Ratio (SNR)	1000 & 100BaseT	NO
		Bulk Echo Response	1000BaseT	YES
		Bulk Crosstalk Response	1000BaseT	YES
		Pair Timing Skew	1000BaseT	NO
		Tx Signal Power Level	1000 & 100BaseT	(Factory)
Link Partner (DUT) Receiver or Remote Receiver Analyses	Test PHY or Thru Port + Line Loss Emulator	Link Stability, 100M Cat5	10/100/1000BaseT	(Noise, Tx Offset, and Jitter are Factory Calibrated)
		Packet Loss, 100M Cat5		
	Test PHY or Thru Port + Alien Crosstalk	Link Stability, Ingress Noise		
		Packet Loss, Ingress Noise		
	Test PHY or Thru Port + Passive Mismatch	Link Stability, 12dB Mismatch		
		Packet Loss, 12dB Mismatch		
	Test PHY or Thru Port + Line Emulator + Alien Crosstalk OR Passive Mismatch	Link Stability (Multi-Impairment)		
		Packet Loss (Multi-Impairment)		
	Test PHY + Jitter/Offset Synthesis	Link Stability, Jittered or Offset Xmit Signal		
		Packet Loss, Jittered or Offset Xmit Signal		
	Test PHY + Jitter/Offset Synthesis + Line Emulator &/or (Alien Crosstalk OR Passive Mismatch)	Link Stability (Multi-Impairment)		
		Packet Loss (Multi-Impairment)		
Transmit / Receive Tests with PoE Impairments	PVA-3102 Test Port to PSA-3102 OUT Port Connection(s)	(All Above Transmitter Tests)	1000 & 100BaseT	(see above)
		(All Above Receiver Tests and Impairments)	10/100/1000BaseT	NO
Link Partner Capabilities	Test PHY	Link Partner Advertisement	10/100/1000BaseT	NO
		Link Partner Static Responses		
		Link Partner Fallback Response		

LAN Interface Specifications

Port	Connection Mode	Parameter	Specification
Test Port	Terminated to Test PHY	Connection	RJ45
		Data Rate and Signaling	10/100/1000BaseT
		Impedance	100Ω, Balanced
		Insertion Loss to Test PHY (1 – 100 MHz)	2.7 +0.3/-0.2 dB (All Pairs)
		Maximum Return Loss (All Pairs)	≤-15 dB (1 - 100MHz) ≤-21 dB (1 - 62.5MHz)
		Pair-Pair Isolation (1 - 100MHz)	≤ -33 dB (All Pair Combo's)
	Terminated to Test PHY with Bulk 12dB Mismatch Connected	Return Loss (100 KHz – 100 MHz)	- 11.7 dB ± .5 dB (All Pairs)
	Bypass Mode TEST Port to THRU Port (*terminated 100Ω / pair*)	Insertion Loss (1 – 100 MHz)	2.7 +0.3/-0.2 dB (All Pairs)
		Return Loss	≤ -15 dB, 1MHz to 100MHz (All Pairs)
		Pair-Pair Isolation	≤ -33 dB, 1 MHz to 100MHz (All Pair Combo's)
Auxiliary Port for Packet Analyzers	Bypass Mode THRU Port to TEST Port (*terminated 100Ω / pair*)	Connection	RJ45
		Data Rate and Signaling	10/100/1000BaseT
		Impedance	100Ω, Balanced
		Insertion Loss (1 – 100 MHz)	2.7 +0.3/-0.2 dB (All Pairs)
		Return Loss (All Pairs)	≤ -15 dB, 1MHz to 100MHz
		Pair-Pair Isolation (All Pair Combinations)	≤ -33 dB, 1 MHz to 100MHz

Link Partner Transmitter / Incoming Link Integrity Measurements

Measurement	Link Types & Pairs	Parameter	Value
Power Spectral Distortion	100Base-Tx: Pair 2 or 3 1000Base-Tx: Pairs 1 to 4	Minimum Frequency	20 KHz
		Maximum Frequency	100 MHz
		Selectable Range	0.18 MHz – 99.98 MHz
		Frequency Resolution	Selected Range / 33 Points
		Amplitude Range	≤ -30 dB to ≥ +3 dB
		Amplitude Accuracy *normalized to calibration*	± .5 dB (.02 – 75 MHz) ± 1.5 dB (75 – 100 MHz)
Signal-To-Noise	100Base-Tx: Pair 2 or 3 1000Base-Tx: Pairs 1 to 4	Measurement Range	18.5 dB – 36 dB
		Measurement Accuracy*	± 1.5 dB (SNR > 30 dB) ± 0.75 dB (SNR ≤ 30 dB)
Power Level	100Base-Tx: Pair 2 or 3 1000Base-Tx: Pairs 1 – 4	Measurement Range	≤ -15 dB to ≥ +3 dB
		Accuracy / Repeatability	± 0.25 dB
Bulk Echo Response (~ 4 – 75 MHz)	1000Base-T: Pairs 1 to 4	Measurement Floor	-26 dB
		Accuracy / Repeatability *normalized to calibration*	± 1.0 dB @ > -20 dB ± 1.5 dB @ ≤ -20 dB
Bulk Crosstalk Response (~ 4 – 75 MHz)	1000Base-T: Pair Combo's 1-2, 1-3, 1-4, 2-3, 2-4, 3-4	Measurement Floor	-39 dB
		Accuracy / Repeatability *normalized to calibration*	± 1.0 dB @ < 32 dB ± 1.5 dB @ ≥ 32 dB
Pair Timing Skew	1000Base-T: Pairs 1 to 4	Range & Resolution	0 – 80 nsec, 8 nsec

* *100BaseT and 1000BaseT SNR measurements are not referenced to any metric standards for SNR. SNR is a bulk measure of signal deviation from "ideal" following compensations for linear distortion and other correctable impairments.*

Link Partner Reciever / Link Integrity Measurements

Measurement	Link Types & Pairs	Parameter	Value
Link State and Link Integrity	10/100/1000BaseT	Link Status	LINKED | DOWN
	1000BaseT	Remote Rx Status | Local Rx Status	Rx_ OK | Rx_Error
	10/100/1000BaseT	Status Samples	1 to 100
		Status State Sampling Periodicity	20, 50, or 100 msec

Link Partner Reciever / Link Integrity Measurements

Measurement	Link Types & Pairs	Parameter	Value
Internal Test Port Packet Counting	10/100/1000BaseT	Packet Frame	Ethernet MAC
		Packet Size & Resolution (*excluding 4 FCS bytes*)	60 to 1512 Bytes, 4 Bytes
		Packet Payload	Repeating 4-Byte Patterns
		Packet Address	6-Byte Arbitrary Address
		Transmitted Inter-Packet Gap Time	96, 576, or 11006 bit periods
		Transmitted Packet Count	0 = Continuous 32K, 128K, 5120K, or 1024K
		Received Packet Count	0 to > 1e9
		Receive Packet Filtering	NONE
Link Partner Capabilities	10/100/1000BaseT	Link Partner Advertisement	Recovers 100/1000BaseT Auto-Neg Parameters
		Link Partner Advertisement Integrity	(Link State Measurements)
		Link Partner Fallback Responses	(Link State & Impairments)

Impairment Synthesis Specifications

Impairment	Access	Parameter	Value
IEEE 802.3 Line Loss Emulation	TEST Port & THRU Port	Frequency Response Target (5 MHz – 62.5 MHz)	-2.1 & $F^{0.529}$ + 0.4/F dB $\pm$ 0.5 dB (F in MHz)
		Frequency Response Target (62.5 MHz – 100 MHz)	-2.1 & $F^{0.529}$ + 0.4/F dB $\pm$ 1.5 dB (F in MHz)
		Return Loss (1 – 100 MHz)	$\leq$ -14 dB
		Isolation (1 – 100 MHz)	(*not yet specified)*
		Phase Linearity (4 – 100 MHz)	$\pm$ 12° from Linear (typical)
Passive Mismatch	TEST Port connected to Test PHY or THRU Port	Fixed Return Loss (TEST Port, 1 – 100MHz)	- 11.7 dB $\pm$ .5 dB
		Impairment Application	Pairs 1+3, 2+4, or 1+2+3+4
Alien Crosstalk	TEST Port connected to Test PHY or THRU Port	Amplitude Range relative to 40mVpp (= 0dB)	-6 dB - +21.5 dB
		Amplitude Steps (Resolution)	0.5 dB
		Frequency Shaping	100BaseTx Spectrum
		Impairment Application	Pairs 1+3, 2+4, or 1+2+3+4
Transmit Frequency Offset	Test Port with Test PHY Connected	Nominal Transmit Frequency	125 MHz $\pm$ 10 ppm
		Nominal Transmit Duty Cycle	50% $\pm$ 12.5 %
		Fixed Frequency Offsets	$\pm$115, $\pm$100, $\pm$50, & 0 ppm
Transmit Frequency Jitter	Test Port with Test PHY Connected	Jitter Magnitude Range relative to 1.4 nsec pk-pk (=0dB)	-6 dB to +24 dB
		Jitter Level Steps (Resolution)	0.5 dB
		Jitter Power @ greater than $\pm$ 5 KHz w.r.t. Total Jitter Power	-13.5 dB $\pm$ 1 dB
Transmit Power	Test Port with Test PHY Connected	Mid-Range Output Power 10/100/1000BaseT Peak Ampl.	-2.7dB (IEEE Spec.) at Tx Level = ~6 out of 10
		Transmit Power Range	-4 dB to –1.9 dB (IEEE Spec)
Transmit Slew	Test Port with Test PHY Connected	Mid-Range Slew Rate	~0.2V/nsec at setting = 5 out of 8
		Slew Rate Range	~0.1V/nsec to ~0.27 V/nsec

LED Indicators

LED Label	Parameter	Description
Rate	Link Indication	**ON**: 1000BaseT, **BLINKING**: 100BaseT, **OFF**: 10BaseT
Link	Link Status	**ON**: Link Up, **OFF**: Link Down
Impr	Line Impairment Connection	**ON**: 100M Cat5e Line Impairment Connected **OFF**: Line Impairment Removed
Com	Communications	**ON** or **BLINKING**: Indicates Host Communications to PVA-3102 Test Port

Programming and Control

Description	Specification
Interface	Ethernet 10/100BaseT
Host Requirements	PC running Microsoft Win7, Vista, Windows XP, Windows 2000, or Linux PC (Fedora, SUSE)
Control Environment	Sifos PowerShell or PSA-Interactive
Recommended Network Latency:	< 10 msec

Physical and Environmental

Description	Specification
Dimensions	PSA-3000, PSA-1200 Chassis: 19"W x 5.25"H x 12"L (3U Rack Mount) PVA-3002: 4"W x 1. 5"H x 8.5"D
Weight	20 lbs. (Fully Populated with PVA-3102 Cards)
Power	100VAC-240VAC, 50-60 Hz, 1350mA Max.
Test Port Configurations	PSA-3000 Chassis: 2 to 24 PhyView Test Ports PVA-3002 Compact PVA: 2 PhyView Test Ports PSA-1200 Chassis: 2 to 12 PhyView Test Ports
Ambient Operating Temperature	0°C to 50°C (≤ 42.75 Watt loading per port)
Storage Temperature	-20°C to 85°C
Operating Humidity	5% to 95% RH, Non-Condensing.

Certifications

Description	Certifications
Emissions	FCC Part 15, Class A; EN55022; VCCI, AS/NZS 3548
Safety	CSA Listed, EN61010-1, CB Scheme IEC 61010-1
European Commission	73/23/EEC, 89/336/EEC, CE Marking Directive 93/68/EEC

Ordering Information

PSA-3000	PowerSync Analyzer 3000 Chassis & Controller, PowerShell PSA, and PSA Interactive Software
PVA-3102	Dual Port PhyView Analyzer Test Card for PSA-3000 (Maximum 12 per PSA-3000 Chassis)
PVA-3000-PTS	PhyView Performance Test Suite for a PSA-3000 / PSA-1200 Chassis
PVA-3002	Compact 2-Port PhyView Analyzer
PVA-3002-PTS	PhyView Performance Test Suite for PVA-3002 Compact PhyView Analyzer
PVA-PL4	In-Line Quad Passive Loss Module (1, 2, 4, & 8 dB)
PVA-LI4	In-Line Quad Line Impairment Module (3 Mismatches, 1 Crosstalk)
PVA-DCU	In-Line DC Unbalance Generator Unit (ALT A/B, Forward and Reverse Channels)

Accessories Included:

- Installation Guide & Configuration Chart
- PhyView Analyzer Reference Manual (Binder and CD)
- High Performance Test Cables (1 cable per Test Port)
- Power Cord
- Cross-Over Ethernet Cable
- RS-232 Cable

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Verification, Simplified.