

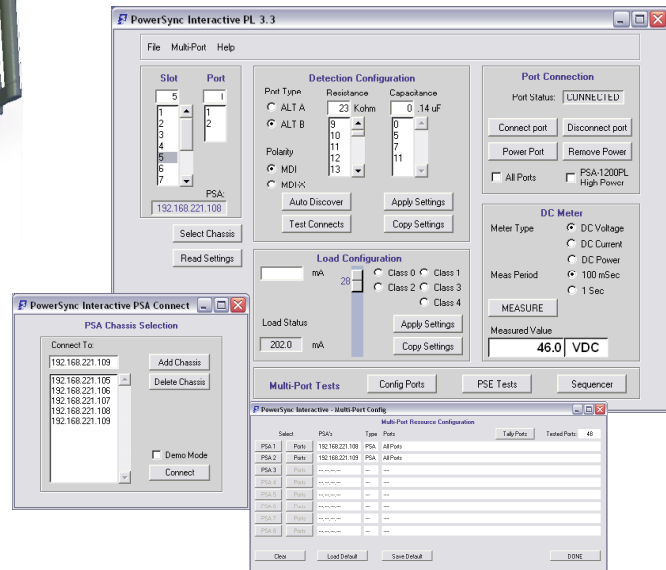


# PSL-3000

## PowerSync® Programmable Load

IEEE 802.3at Power over Ethernet

### Product Overview



## Key Features

- Multi-Port Precise PSE DC Loading
- Static PSE Loading > 42 Watts Per Port x 24 Ports
- Powered Device Flexible LLDP Emulation and Analysis\*
- DC Voltage, Current, and Power Metering
- Scaleable, Cost-Efficient Architecture
- PSA Interactive-PL Graphical User Interface
- PSE Multi-Port Automated Test Suite Option
- Enables PSE Packet Transmission Testing with PoE Loads
- Smart Fan Control – Runs Cool and Quiet
- Flexible Script Automation and Graphical User Interface for Microsoft Windows and Linux PC's.
- Backward Compatible to Sifos PSA-1200-PL Programmable Loads

*real POWER from Sifos*

**802.3at EndSpan  
and MidSpan PSE  
Testing with  
Commercial,  
Data-Sheeted  
Instrumentation**

**Easy Setup, Rapid  
PD Emulation,  
Testing in Minutes**

**PSE Functional  
and System  
Stressing and  
Verification....**

**Fully Automated  
Manufacturing  
Verification....**

## Overview

Power-over-Ethernet (PoE) challenges design and test engineers to evaluate multi-channel, “intelligent” DC power sources that are activated and deactivated through signaling protocols operating over several power delivery and polarity configurations. The application and management of DC power over many local area network connections must be completely transparent and non-disruptive to the traditional data transmission functions of those network connections.

### One Box Solution

Sifos Technologies provides a **one-box solution** to facilitate testing and analysis of **IEEE 802.3at** Power Sourcing Equipment (PSE) behaviors. Each test port inside a PowerSync 3000 Programmable Load is an autonomous and fully isolated instrument offering stimulus and measurement resources. Test ports are configured and controlled via a high level automation interface, **PowerShell PSA**, and may also be rapidly accessed and managed from an intuitive graphical user interface, **PSA Interactive PL**.

### LLDP Emulation

The IEEE 802.3at specification describes new types of PSE's and Powered Devices (PD's) that communicate power needs and power grants using Ethernet layer 2 (LLDP) link protocols. The PSL-3000 is designed with resources to flexibly emulate PD LLDP functions and to analyze LLDP interactions with the PSE. \*LLDP emulation may be activated using software keys and will be available via software update from Sifos in the mid-2009 time frame.

### High Power Ready

The PSL-3000 offers independent and concurrent capable static load currents up to 750 mA on each test port up to a maximum of 24 test ports per chassis. Current loading is accurate from 0 to 750 mA with independent metering to assess actual loading seen by the PSE. Built-in PD emulation modes enable power-on emulation of PD's ranging from Class 0 to Class 4.

### Automated PSE System Testing

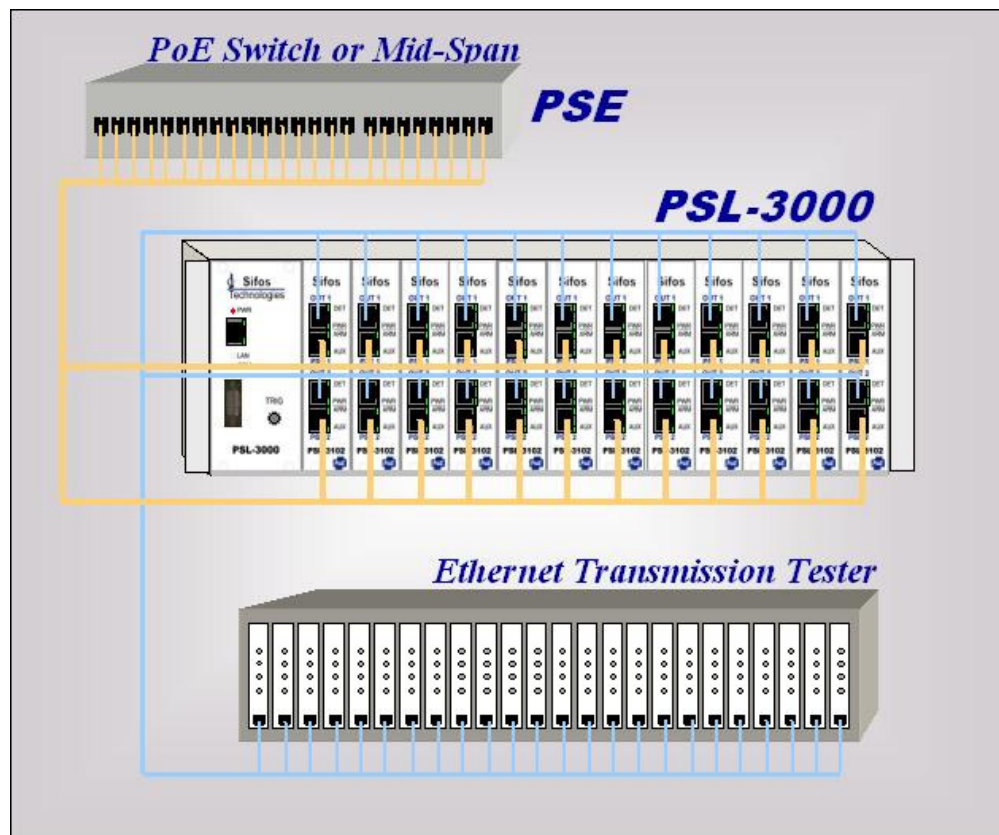
PSA-3000's may also be optioned via software keys to run the one-of-a-kind **PSE Multi-Port System Performance Suite**. PSE Multi-Port automatically evaluates systems of up to 192 PSE ports simultaneously to assess overall power capacities, PSE system power budgeting, port power prioritization, and port state behavior independence. Users may specify PD emulation test conditions with full control of PD class and static loading.

### Cost Effective, Scalable, and Backward Compatible

The PSL-3000 may be configured with 2 to 24 test ports, or with a fixed 24 test ports (**PSL-3024**) to further reduce per-port cost. Features such as LLDP and Multi-Port Test Suite can also be optioned into each PSL-3000 as needed. The PSL-3000 is Sifos' second generation Programmable Load and offers full programming backward compatibility to the PSA-1200-PL, the first generation Programmable Load from Sifos Technologies. PSL-3000 test software will also run transparently with the PSA-3000 family of PowerSync Analyzers from Sifos Technologies.

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## PowerSync Programmable Load Test Equipment Setup: PSE Testing



### Flexible PD Emulation with Measurements

- Alternative A/B Pair Configuration
- Polarity Configuration
- Configurable Detection Resistance
- Configurable Detection Capacitance
- Configurable PD Classification Emulation
- Static DC Load Current to 750mA
- Average DC Voltage Measurement
- Average DC Current Measurement
- Average DC Power Measurement

### LLDP & LAN Test Support

- Flexible, Programmable PD LLDP Emulation for PoE\* with control of LLDP payloads, timing, and message synchronicity
- LLDP Frame and Message Capture Per Port
- Test Port "Through" Channel for LAN Transmission
- Testing with or without PoE Port Power
- Negligible Through-Channel LAN Impairment

### PSE Multi-Port Testing

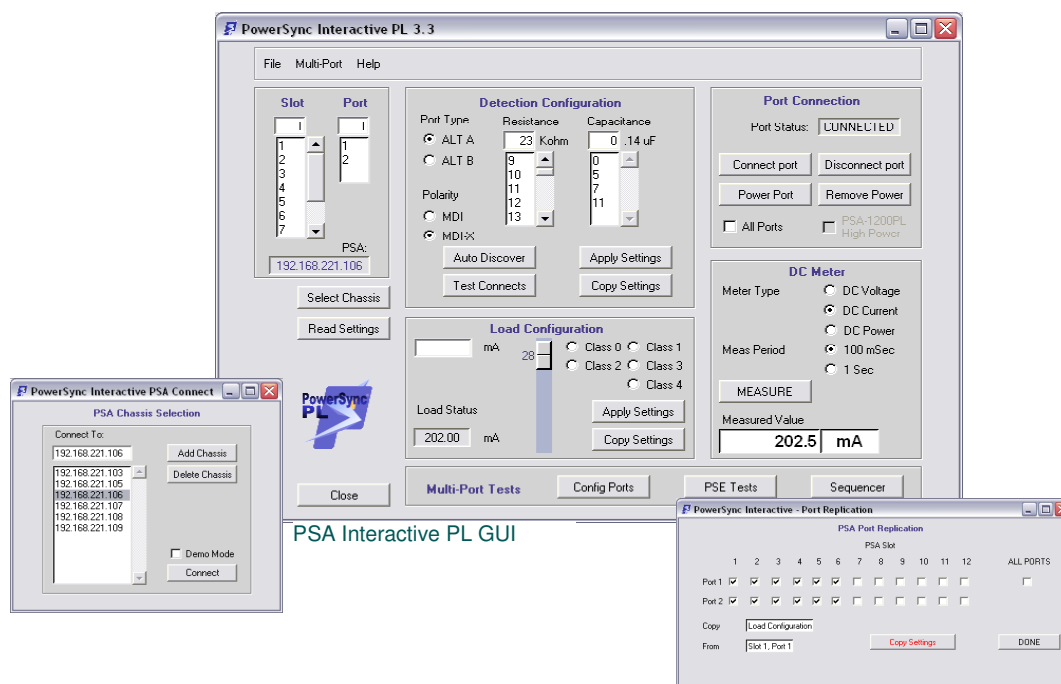
- Fully Automated PSE System Testing and Analysis Up to 192 PSE Ports
- Power Decisions & Management
- Power Capacity & Load Stressing
- Port Independence
- Flexible PD Emulation
- Automated Sequencing
- Colorful Spreadsheet Reporting
- New **IEEE 802.3at** PSE Multi-Port Test Suite (including LLDP Emulation Options) (Future Software Release)

### Powerful Software

- PSA Interactive GUI for Rapid Setup and Intuitive Manual Testing
- PowerShell Script Automation for Interactive Automated Test Development and Fast Test Execution

## PSA Interactive Graphical User Interface

The Sifos PSA Interactive Programmable Load Graphical User Interface (GUI) is an intuitive tool designed to allow user quickly to setup load configurations and perform measurements on IEEE 802.3at compliant power sourcing equipment (PSE). PSA Interactive Programmable Load GUI provides an intuitive view of the full range of testing resources available within the PowerSync Programmable Load. Users can quickly harness the flexibility and power of these resources to set up load configurations and perform measurements and to prototype sequences that will eventually be automated in PowerShell PL scripts.



The Sifos PSA Interactive Programmable Load GUI offers intuitive controls for\*:

- Chassis & Port Selection
- Replication of Settings Across Multiple Ports
- Port Configuration
  - Alternative A/B Pair and MDI/MDI-X Polarity
  - Automated ALT/Polarity Discovery
  - Detection Resistance
  - Detection Capacitance
- Single or Multi-Port PD Connect, Disconnect, Power-Up, and Power-Down
- Static Load Control
- PD Classification Emulation
- One Button Single Multi-Port PD Emulation
- Average DC Voltage, DC Current, and DC Power Measurements

**\*Note:** A new subsystem will be added for LLDP Emulation support when it is available from Sifos.

## PSE Multi-Port (PL) System Test Suite

The unique and innovative PSE Multi-Port (PL) Test Suite is a library of fully automated and sequence-able tests that characterize system behaviors of PSE's as they deliver power to groups of many Powered Devices (PD). It enables flexible configuration of PD emulation characteristics and reports numerous system characteristics including power capacities, power management decisions, port independence, and system stress or burn-in performance.

See **Sifos Technologies, Multi-Port Test Suite Product Overview** for further information regarding the Multi-Port Test Suite.

## PowerShell PSA Tcl/Tk Interface

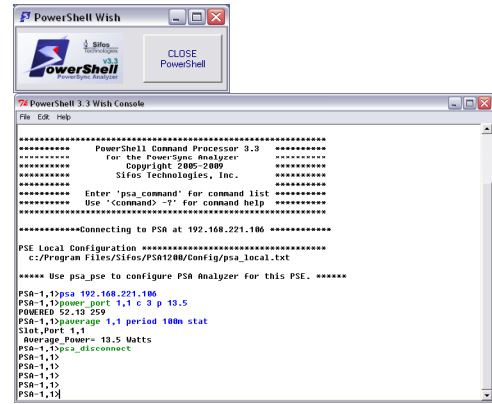
The PowerShell PSA Scripting Environment provides a high level, live-keyboard means to control and program automated test sequences for the PSA-3000 PowerSync Analyzer. PowerShell enables fully automated testing suites that span multiple ports, blades, and frames. Built upon the popular Tool Command Language (Tcl), it offers an extensive and extensible programming language.

PowerShell PSA provides a complete API for the PSA-3000 including high level commands that execute and sequence standard **802.3 PSE Conformance** and **Multi-Port System** test suites. PowerShell commands access all of the resources of the PSA-3000 and enable the rapid development of highly customized test scripts. PowerShell fully supports off-line script development and debug through its robust built-in emulation mode.

PowerShell PSA libraries can be integrated into broader Tcl environments that interlace traditional network transmission tests with Power-over-Ethernet tests. This enables seamless integration of custom or standard PSE tests with existing Tcl-based test suites.

Other features offered by the PowerShell Tcl environment include:

- Interpretive command execution (no compilation, simple debug)
- Simple, intuitive PowerSync PL commands (API)
- Integrated command “help” tools
- Upward compatible to PSA-3000 platforms
- Fast test execution speeds
- Script-configured test report files
- AnyEdit Smart Editor for PowerShell PSA
- Traditional Tcl Console or Command-Knowledgeable Wish Console with PSA waveform viewer capability



PowerShell Wish Console

## Technical Data: PSL-3000 & PSL-3024

LAN Interface Specifications			
Operating Mode	Signal Path	Parameter	Specification
Data Through Mode	PSE-# to OUT-#	Connections	RJ45
		Data Rates and Signaling	10/100/1000BaseT
		Latency	0 ( Passively Coupled)
		Impedance	100Ω, Balanced
		Pair-Pair Isolation	≥ 36dB @ 100MHz
		Insertion Loss	≤ 2dB, 0.1MHz to 100 MHz
		Insertion Loss Variation	≤ 0.75dB, 0.1MHz to 100 MHz
		Return Loss (OUT pairs terminated into 100Ω)	≤ -24dB, 1MHz to 100MHz
Data Connect (LLDP Emulation) Mode	PSE-# to Blade Transceiver	Connection	RJ45
		Data Rate and Signaling	10BaseT
		Orientation	MDI End Point
		Protocol	802.1ab, 802.3bc, 802.3at
		Impedance	100Ω, Balanced
		Return Loss	≤ -20dB, 1MHz to 100MHz

PoE Port Connections			
Operating Mode	Dependency	Parameter	Selections
2-Pair Power	Port 1 and Port 2 operate independently	Powered Pair	ALT-A or ALT-B
		Polarity	MDI or MDI-X
4-Pair Power	Connect to Port 2 (Port 1 bypassed)	Powered Pair	ALT-A (Port 2) and ALT-B (Port 1)
		Polarity	MDI or MDI-X for each pair

Detection and AC MPS Specifications			
Description	Conditions	Parameter	Specification
Detection Resistance	Vport = 2.5VDC - 12VDC, Port Connected	Range	9 K $\Omega$ to 39 K $\Omega$
		Resolution	1 K $\Omega$
		Accuracy	$\leq 24K\Omega, \pm 250\Omega$
		$\Delta V / \Delta I$ at 1 Volt Spacings	$> 24K\Omega, \pm 400\Omega$
Detection Capacitance	Vport = 2.5VDC - 12VDC, Port Connected	Range	0.14, 5, 7, 11 $\mu$ F
		Accuracy	15%
Detection Signature Cut-Off Threshold	Port Connected	Vport	12V $\pm$ 2%
AC MPS Signature	Vport = 12VDC - 60VDC, Port Connected	AC Impedance	24K $\Omega \parallel (0.1\mu F + 330\Omega)$
		Resistance Accuracy	22.8K $\Omega, \pm 250\Omega$
		$\Delta V / \Delta I$ at 2 Volt Spacings	
	Port Isolated	AC Impedance ( $\leq 500$ Hz)	$\geq 1.1$ M $\Omega$
		AC Impedance ( $\leq 120$ Hz)	$\geq 3.0$ M $\Omega$

Current Load Specifications			
Description	Conditions	Parameter	Specification
Load Current	Per Powered Pair	Range	0 to 750 mA
		Resolution	1.00 mA
		Accuracy	$\pm 0.5\% \pm 0.25$ mA
		Slew Rates	$> 4$ mA / $\mu$ sec
		Activation Voltage	15V, Rising Vport
		De-Activation Voltage	14V, Falling Vport

DC Metering Specifications			
Description	Conditions	Parameter	Specification
Voltage Meter	Average	Voltage Range	0 - 60V
		Sample Averaging	256 Samples
		Sample Rate (100 msec Period)	390 msec
		Sample Rate (1 sec Period)	3.9 msec
		Resolution	.0625 V
		Accuracy <sup>1</sup>	$\pm 2\% \pm 0.625$ mV
Current Meter	Average	Current Range	0 – 1000 mA
		Sample Averaging	256 Samples
		Sample Rate (100 msec Period)	390 msec
		Sample Rate (1 sec Period)	3.9 msec
		Resolution	1.00 mA
		Accuracy <sup>2</sup>	$\pm 2\% \pm 1.0$ mA

1. Does not include Voltage drop due to cable losses and 0.45 $\Omega$  maximum test port input resistance.

2. Does not include Port-Connected MPS current, which is approximately (Vport - 12V)/24k $\Omega$ .

LED Indicators		
LED Label	Parameter	Description
DET	Detection Enabled	<b>ON:</b> Valid Detection Signature Connected (R= 19 to 26 K $\Omega$ , C= 0 $\mu$ F) AND Port Switch Connected <b>BLINKING:</b> Receiving or Transmitting a Layer 2 LLDP message. <b>OFF:</b> Port Switch Open OR Invalid PD Signature
PWR	PSE Power On	<b>ON:</b> Indicates Power-Up with Vport > 36 <b>OFF:</b> Vport < 36 VDC
ARM	(LED Not Utilized on PSL-3000)	<b>OFF:</b> (LED Not Utilized)
AUX	Communications	<b>ON</b> or <b>BLINKING:</b> Indicates Communications to PSA Test Port

Programming and Control	
Description	Specification
Interface	Ethernet 10/100BaseT
Host Requirements	PC running Microsoft Windows NT, 2000, XP, Vista, or Linux PC (Fedora, SUSE)
Control Environment	Sifos PowerShell PSA or PSA Interactive-PL
Recommended Network Latency:	< 5 msec

Physical and Environmental	
Description	Specification
Dimensions	19"W x 5.25"H x 12"L (3U Rack Mount)
Weight	20.4 lbs. (Fully Populated with PSA-3102 Cards)
Power	100VAC-240VAC, 50-60 Hz, 2A Max.
Ambient Operating Temperature	0°C to 50°C ( $\leq$ 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 Meets EN55022 VCCI, AS/NZS 3548
Safety	CSA Listed (CSA22.2 No. 61010) Meets EN61010-1 CB Scheme IEC 61010-1
European Commission	Low Voltage Directive (73/23/EEC) Electromagnetic Compatibility Directive (89/336/EEC) CE Marking Directive (93/68/EEC)
FCC Statement:  This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense.	



## Ordering Information

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**PSL-3000**, PowerSync Programmable Load 3000 Chassis and Controller including PowerShell PSA and PSA Interactive-PL Software

**PSL-3102**, Dual Port PoE+ PSE Load Card for PSL-3000

**PSL-3024**, PowerSync Programmable Load 3000 Chassis and Controller including 12 PSL-3102 Load Cards, PowerShell PSA, and PSA Interactive-PL Software

**PSL-MPT**, PSE Multi-Port Test Suite for One PSA Controller (Up to 24 Test Ports)

**PSL-3000U**, PSA-1200-PL to PSL-3000 Chassis and Controller Upgrade

**PSAEF-2L-PL-CREDIT**, Credit for PSA-1200-PL Dual Port Test Card Trade-Up to PSL-3102

**PSA-LLPD**, LLDP Emulation and Analysis Feature for One PSA-3000 Controller (*future activation key availability*)

**Accessories Included:**

- Installation Guide & Configuration Chart
- PowerSync Analyzer Reference Manual (Binder and CD)
- Power Cord
- Cross-Over Ethernet Cable
- RS-232 Cable

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