

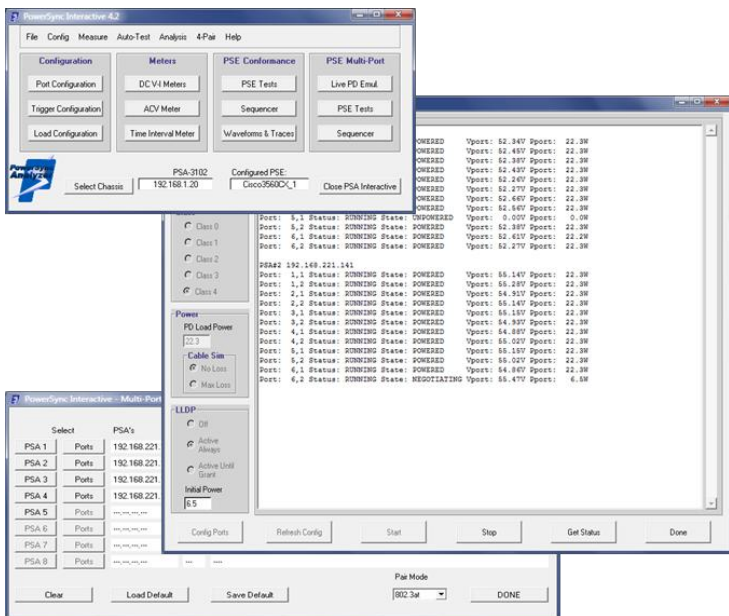


# Multi-Port Live PD Emulation

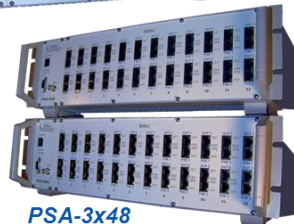
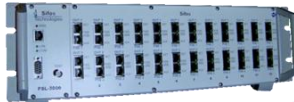
for PowerSync Analyzers & Programmable Loads

IEEE 802.3at Power over Ethernet

## Product Overview



PSL-3x24



PSA-3x48

## Key Features

- Fully Mimic 1 Powered Device Per Test Port
- Configure up to 192 Simultaneous IEEE 802.3at PD's
- Flexible Powered Device Modeling
- Emulate Type-1 (13W) and Type-2 (25.5W) Devices
- Emulate Up To 96 Pre-Standard 4-Pair PD's (PoH, UPoE, etc.)
- Emulate PoE-LLDP Negotiations and Power Adjustments
- Emulate Both Valid and Non-Valid PD Loads
- Monitor Multi-Port Live Emulation Status
- Concurrent 802.3at PD Loading to 34.5W on Every Port
- Concurrent Pre-Standard 4-Pair PD Loading to 95W on Every Slot
- Available on PSA-3000 and PSL-3000 Platforms under the Multi-Port Suite Feature

**Verification, Simplified.**

## Overview

### **IEEE 802.3at and Pre-802.3bt PSE's**

**End-Spans**

**Mid-Spans**

**PoE/PoE+ Connectors**

**Hybrid-Legacy PSE's**

### **No PD "Banks" Required**

**Emulate up to 24 PD's per  
Chassis, up to 802.3at 192  
PD's Total**

**Flexibly Emulate 802.3at  
Type-1 and Type-2 PD's,  
including LLDP!**

**Flexibly Emulate 4-Pair PD's  
Including 'PoH' and 'UPoE'  
Models**

### **Evaluate PoE Admin & Power Management Decisions**

**Verify PSE Management  
Functions and Interfaces**

**Verify PSE Management  
Reporting**

**Verify Power Capacity**

### **Multi-Platform Support**

**Configure ANY Combination  
of PSA-3xxx and PSL-3xxx**

Power Sourcing Equipment (PSE) system developers and system test personnel are routinely confronted with the challenge to connect many Powered Devices (PD's) to many PSE ports in order to evaluate PSE administrative and power management behaviors. With IEEE 802.3at extending power-per-port to 30 watts or more and adding the option of LLDP-managed power allocation between PSE's and PD's, the burdens on PSE power administration and power allocation processes are considerably larger. Type-2 PD's, under 802.3at, typically have at least two power operating states while drawing maximum continuous power loads up to 25.5 watts.

#### **Multi-Port Live PD Emulation**

Live PD Emulation represents a behavioral state where each Test Port in each PSA/PSL instrument autonomously behaves as a user-specified IEEE 802.3at PD regardless of the state of the PSE. If a PSE administratively disables PoE service and then restores it, the PSE will detect a PD and re-apply power. If a patch cord is disconnected and reconnected, the PSA/PSL Test Port will behave just as if an actual PD were at the end of the link. Users may describe PD Classification, PD Power Load, and Cable Loss Power when modeling PD's. PD Classifications range from 0 to 4 and PD Power Loads range from 0.5 to 25.5 watts. Cable Loss Power may be programmed to model or exceed worst case PoE power loss in a PSE to PD connection.

Multi-Port Live PD Emulation is a feature available under the **Multi-Port Suite** for the PSA-3000 and the PSL-3000. Using PSA Interactive software, users may configure up to 192 Test Ports across up to 8 PSA/PSL chassis' to simultaneously model a user-defined PD. Alternatively, using PowerShell PSA, users can program unique PD emulations *per Test Port* across any number of PSA/PSL instruments.

#### **Multi-Port Live PD Emulation with LLDP**

Live PD Emulation can be extended to model PoE LLDP messaging and protocol from a PD. All Type-2 (or Class 4) PD's are required to support PoE LLDP protocol while Type-1 PD's have the option to support this link layer protocol. PoE LLDP enables PSE's to manage power loads with 0.1 watt granularity per powered PD and also allows PSE's to "throttle" down Type-2 PD power levels (13 to 25.5 watts) to below Type-1 levels, that is less than 13 watts.

#### **Live Status Monitoring**

PD emulation status across all emulating test ports is readily captured and displayed with a single mouse click to PSA Interactive software. This status information can be compared to PSE status information to assess that PSE status reports are accurate and up-to-date.

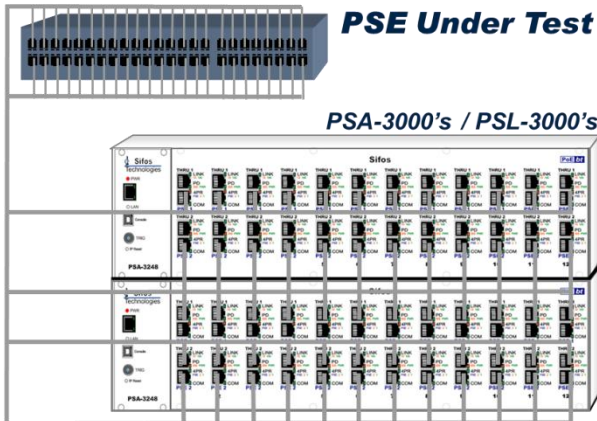
#### **Getting Ready for 4-Pair PoE (802.3bt)**

Live PD Emulation supports the emulation of *pre-standard* 4-Pair PD's connected to one test port\* in each test slot of a PSA/PSL-3000 chassis. Users can configure signature-per-pair and continuous static load power up to 95 watts per PD. Common 4-Pair PD models supported include PoH (coincident 4-pair signature detection) and Cisco UPoE (with extended PoE LLDP protocol.) Future 5.x PSA software releases will expand this to include 802.3bt PD emulations including one Type-3 or Type-4 PD per test slot in PSA-3202 and PSL-3202 test blades and in PSA-3248 instruments.

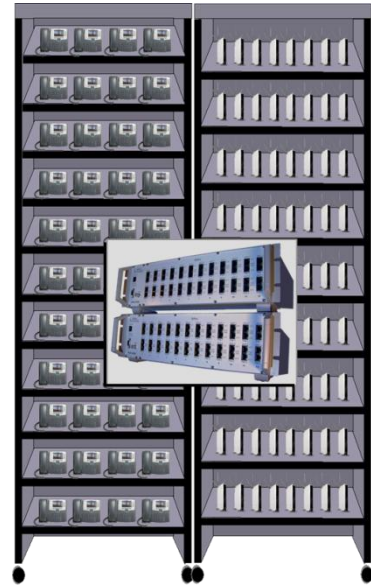
\* Port 1 or 2 in PSA-3202/PSL-3202 test blades, Port 2 in PSA-3102/PSL-3102 test blades.

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## Multi-Port Test Configuration (48 Port Example)



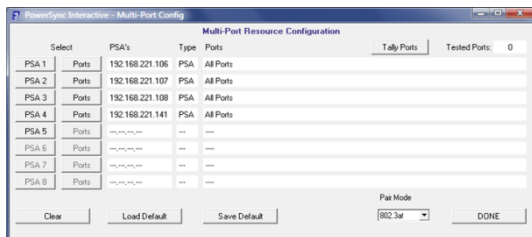
Traditional Rack of PD's vs PSA-3x48



## Flexible IEEE 802.3 PD Modeling on Every PSE Port

With the advent of IEEE 802.3at (PoE+), PSE system developers and system testers are ever more challenged by testing administrative and power management functions in multi-port PSE's. The traditional "rack of PD's" is becoming prohibitively expensive and space consuming given the range of Powered Devices that are now possible under 802.3at. Emerging 4-Pair PSE's that power both 802.3at and future 4-Pair PD's further complicate the system testing requirements and associated resource needs.

Using **Multi-Port Live PD Emulation**, each PSA/PSL-3000 test port can flexibly model any 802.3at Powered Device from Class 0 to Class 4 with static power loading from 0.5 watts to well over 25.5 watts. Maximum Type-1 and Type-2 line power drop can also be modeled.



PSA Interactive Resource Configurations

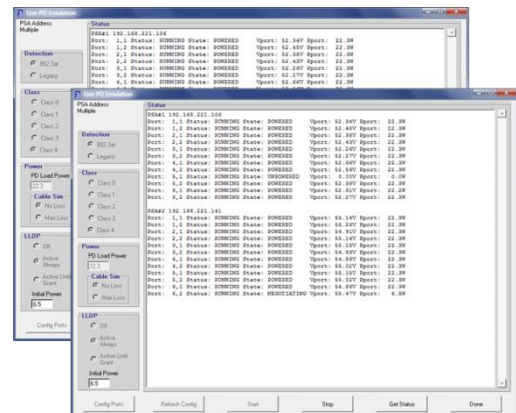
Furthermore, each PSA/PSL-3000 test slot can flexibly model proprietary (*pre-802.3bt*) **4-Pair PD types** including **PoH** and **UPoE** PD's with continuous power loading (including line power loss) up to 95 watts per slot.

Under control of **PSA Interactive** software, Multi-Port test resource fields of up to 192 test ports spanning up to 8 PSA chassis' may be configured. A single common PD emulation may then be activated on every test port in the resource configuration, thus allowing a PSE to experience up to 192 802.3at PD's or 96 4-Pair PD's.

Using **PowerShell PSA** scripting, either unique or common PD emulations may be defined across a limitless resource configuration of test ports.

Live PD Emulation will automatically emulate Powered Device **802.3at LLDP** messaging and power management actions given that the LLDP emulation feature is enabled on every PSA / PSL chassis in a given Multi-Port resource configuration. Each time a PD is disconnected and re-connected, or each time PSE PoE service is restored, the PD will carry-out a start-up power negotiation with the PSE. If a PSE elects to throttle back Type-2 power levels to a powered PD using LLDP, the PD will drop back to a pre-negotiated, Type-1 power level that the user may define.

Live PD Emulation runs indefinitely on each PSA / PSL test port until terminated by the user. While running, current power status, negotiation status, and actual power loading may be sampled for all utilized test ports with a single mouse click.



PSA Interactive Live PD Emulation Status

## Technical Specifications

Live PD Emulation: General Configuration Requirements	
Supported Instruments	PSA-3000, PSA-3x48, PSL-3000, PSL-3x24
Required Instrument Feature	PSE Multi-Port Suite
Required Test Port Firmware Version	Version <b>3.13</b> and higher

Live PD Emulation: 802.3at PD's						
Maximum PD's Emulated	192					
Maximum PSA Instruments / Resource Configuration	8					
Emulated Detection Signature Resistance / PD	9 – 39 K $\Omega$ , 1 K $\Omega$ steps					
Emulated Detection Signature Capacitance / PD	0.1, 5.1, 7.1, or 11.1 $\mu$ F					
Emulated PD Class	0, 1, 2, 3, or 4					
Emulated Minimum Power / PD	0.5 W					
Emulated Maximum Power / PD	PD Class	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
	Maximum Watts	13.0	3.8	6.5	13.0	25.5
Maximum PSE Load Power / PD ( <i>Includes emulated line power loss</i> )	Maximum Watts	17.7	4.6	8.0	17.7	34.3

Live PD Emulation: 802.3at PD's with LLDP	
Required Instrument Feature	LLDP Emulation*
Pre-Negotiated (Quiescent) Power Load	0.5 W to 15.5 W
Connection Mode: Active Always	LLDP runs indefinitely while PD is powered up with capability to throttle back power given PSE request.
Connection Mode: Active Until Grant	LLDP runs until initial power negotiation is completed and PD is at requested power. PSA <b>OUT</b> port is then connected to PSE.

Live PD Emulation: 4-Pair PD's				
Recommended Instrument Controller Firmware Version	<b>3.0f</b> and higher (PSA-1200: <b>1.72</b> )			
Required Test Port Firmware Version ( <i>to exceed 68W</i> )	Version <b>3.1d</b> and higher			
Maximum PD's Emulated	96 (Maximum 8 PSA Instruments, 1 Port per Blade)			
Pair Set Polarity Configuration	Alt-A: MDI or MDI-X, Alt-B: MDI or MDI-X			
Supported 4-Pair PD Models	PSE1, PSE2 (PoH), and (Cisco) UPoE			
Detection Signature Placement	4-Pair PD Model	<b>PSE1</b>	<b>PSE2</b>	<b>UPoE</b>
	Signature Pair Set (Alt)	A or B	A and B	A, B optional
Class Signature Placement	Signature Pair Set (Alt)	A or B	A and B	A
Emulated Detection Signature Resistance / PD	9 – 39 K $\Omega$ , 1 K $\Omega$ steps			
Emulated Detection Signature Capacitance / PD	0.1, 5.1, 7.1, or 11.1 $\mu$ F			
Minimum PSE Load Power / PD	0.5 W			
Maximum PSE Load Power / PD	95 W			

Live PD Emulation: UPoE PD's with Cisco Extended LLDP	
Required Instrument Feature	LLDP Emulation*
Maximum UPoE Power Request Transmitted to PSE	50.8 W

### Ordering Information

**PSA-MPT** PSE Multi-Port Suite including Multi-Port Live PD Emulation and the Multi-Port Test Suite, for one **PSA-3000** Controller\*\* (*up to 24 test ports*)

**PSL-MPT** PSE Multi-Port Suite including Multi-Port Live PD Emulation and the Multi-Port Test Suite, for one **PSL-3000** Controller\*\* (*up to 24 test ports*)

**PSA-QTD** PowerSync Analyzer Test Suite RackPack (e.g. PSA-3248) Discount

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\* See Sifos Datasheet **LLDP Emulation & Analysis for the PowerSync Analyzer** for further information regarding LLDP.

\*\* The Multi-Port Suite requires a PSA-3000 or PSL-3000 with one or more PSx-3x02 test blades, PSA-3x48, or PSL-3x24. It may be added to previously installed PSA-3xxx and PSL-3xxx systems using a license key purchased from Sifos Technologies.

**Verification, Simplified.**