Sifos® Technologies

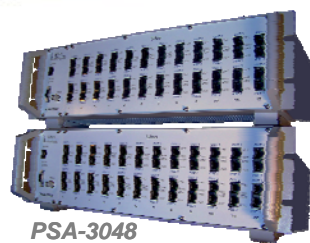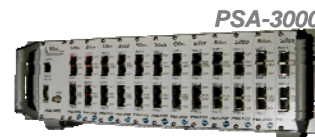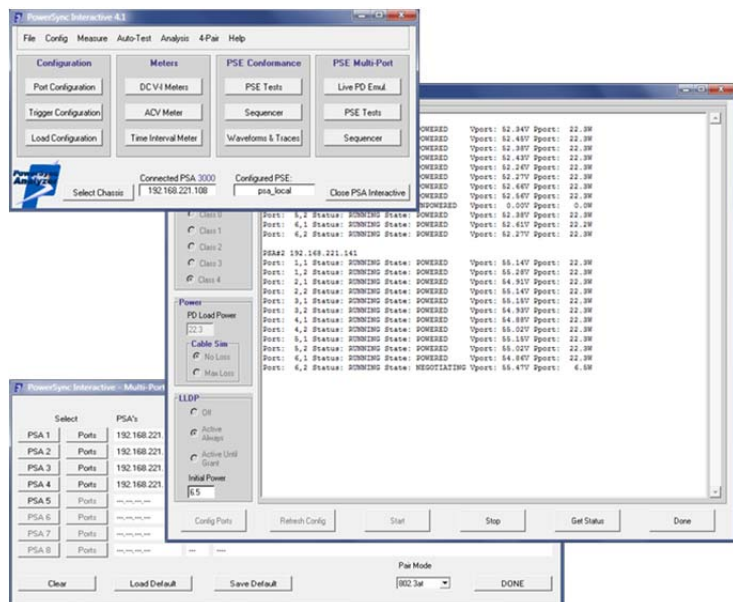# Multi-Port Live PD Emulation

for PowerSync Analyzers & Programmable Loads

IEEE 802.3at Power over Ethernet

Product Overview

PSA-3000

PSL-3024

PSA-3048

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 **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 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

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 Test 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.
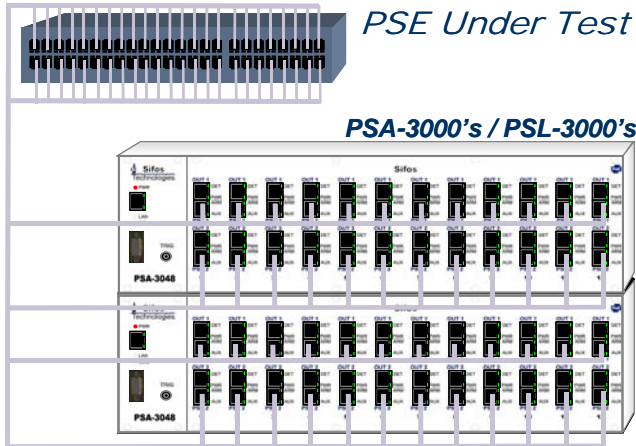
Live Status Monitoring

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 certain 4-Pair PD's connected to Port 2 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.)

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-30xx and PSL-30xx

Verification, Simplified.

Multi-Port Test Configuration (48 Port Example)

PSE Under Test

PSA-3000's / PSL-3000's

Traditional Rack of PD's vs PSA-3048
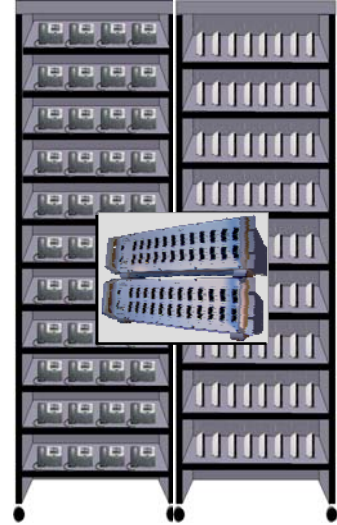
Flexible IEEE 802.3 PD Modeling on Every PSE Port

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.

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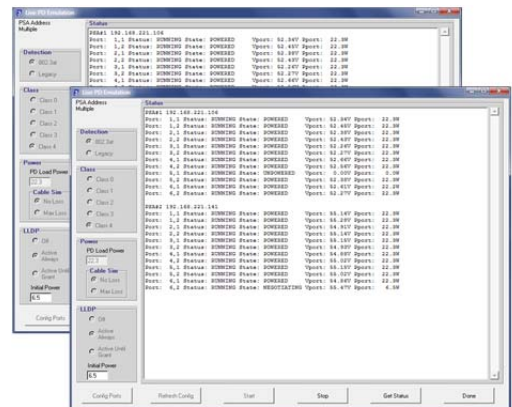

PSA Interactive Resource Configurations
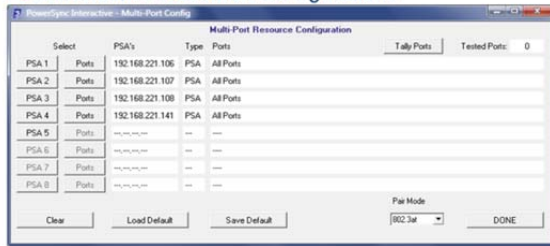
Under control of **PSA Interactive** software, Multi-Port test resource fields of up to 192 test ports spanning up to 8 PSA chassis' may be configured.   A single common PD emulation may then be activated on every test port in the resource configuration, thus allowing a PSE to experience up to 192 802.3at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

Technical Specifications

Live PD Emulation: General Configuration Requirements	
Supported Instruments	PSA-3000, PSA-3048, PSL-3000, PSL-3024
Required Instrument Feature	PSE Multi-Port Suite
Required Test Port Firmware Version	Version **3.13** 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 KΩ, 1 KΩ steps				
Emulated Detection Signature Capacitance / PD	0.1, 5.1, 7.1, or 11.1 μF				
Emulated PD Class	0, 1, 2, 3, or 4				
Emulated Minimum Power / PD	0.5 W				
Emulated Maximum Power / PD	**PD Class**	**0**	**1**	**2**	**3**	**4**
	Maximum Watts	13.0	3.8	6.5	13.0	25.5
Maximum PSE Load Power / PD (*Includes emulated line power loss*)	**PD Class**	**0**	**1**	**2**	**3**	**4**
	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 OUT port is then connected to PSE.

Live PD Emulation: 4-Pair PD's				
Recommended Instrument Controller Firmware Version	**3.0f** and higher (PSA-1200: **1.72**)			
Required Test Port Firmware Version (*to exceed 68W*)	Version **3.1d** and higher			
Maximum PD's Emulated	96 (Maximum 8 PSA Instruments. Port 2 only)			
Pair Set Polarity Configuration	Alt-A: MDI or MDI-X, Alt-B: MDI or MDI-X			
Supported 4-Pair PD Models	PSE1, PSE2, and UPoE			
Detection Signature Placement	**4-Pair PD Model**	**PSE1**	**PSE2**	**UPoE**
	Signature Pair Set (Alt)	A or B	A and B	A, B optional
Class Signature Placement	**4-Pair PD Model**	**PSE1**	**PSE2**	**UPoE**
	Signature Pair Set (Alt)	A or B	A and B	A
Emulated Detection Signature Resistance / PD	9 – 39 KΩ, 1 KΩ steps			
Emulated Detection Signature Capacitance / PD	0.1, 5.1, 7.1, or 11.1 μF			
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   PowerSync Analyzer Multi-Port Test Suite, per PSA Controller
PSL-MPT   PowerSync Programmable Load Multi-Port Test Suite, per PSL Controller
PSA-QTD   PowerSync Analyzer Test Suite Multi-Chassis Discount (Single P.O.)

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

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