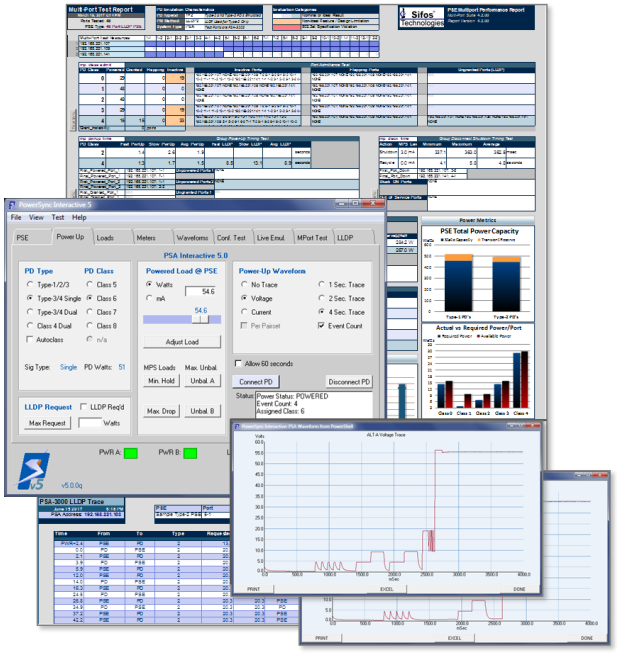
PSA-3248

RackPack PowerSync Analyzer

IEEE 802.3at & 802.3bt Power over Ethernet

Product Overview



Key Features

- ❑ **48 Port Bundled PowerSync Analyzer – Reduced Cost / Port**
- ❑ **Connect up to 48 802.3at and/or 802.3bt PSE Ports**
- ❑ **Continuous 2-Pair Loading > 47 Watts Per PSE Port x 48 Ports**
- ❑ **Continuous 4-Pair Loading > 99 Watts Per PSE Port x 24 Ports**
- ❑ **Flexible 802.3at / 802.3bt Powered Device Emulation Including PoE LLDP**
- ❑ **Industry Leading IEEE 802.3at PoE PSE Conformance Suite**
- ❑ **Unique, Fully Automated Multi-Port PSE System Analysis for 802.3at**
- ❑ **One-Click 2-Pair and 4-Pair PSE Waveform Analysis**
- ❑ **Automated PoE LLDP Protocol Analysis**
- ❑ **High Level Script Automation and Powerful Graphical User Interface**
- ❑ **Flexible and Accurate Measurements of Voltage, Current, & Noise**
- ❑ **Noise Immune Triggering and Flexible Load Transients**
- ❑ **Supports PSE Packet Transmission Testing with PoE Loads**
- ❑ **Smart Fan Control – Runs Cool and Quiet**

Verification, *Simplified.*

IEEE 802.3at and 8023.bt PSE's

End-Spans

Mid-Spans

PoE/PoE+ Connectors

Injectors

Fully Automated 802.3at PSE Conformance Test

Comprehensive Hardware / Firmware DV Testing

Device Qualification

LLDP Protocol Analysis

Interoperability Analysis

Quality Assurance

Fully Automated PSE System Power Management Test

PSE System and Power Management Verification

System Stability Analysis including PoE LLDP

PSE Administrative Responses up to 192* 802.3at PD's

High Throughput QA, Manufacturing

Multi-Port Automation

Ready-to-Use, High Throughput Test Scripts

High Defect Coverage

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 multiple 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 complete testing and analysis of Power Sourcing Equipment (PSE) behaviors including overall compliance to the **IEEE 802.3at** and emerging **802.3bt** specifications. Each test port inside a PowerSync Analyzer is an autonomous and fully isolated instrument offering a rich set of stimulus and measurement resources for 2-Pair PSE testing. Each pair of test ports can be configured as an autonomous and fully isolated instrument for testing **802.3bt** and pre-standard 4-Pair PSE's.

Automated PSE Conformance Testing

The PSA-3000 may be optioned via a license key to run the world's most advanced 802.3at **PSE Conformance Test Suite**. This fully automated application applies the PowerSync Analyzer's diverse resources to assess over 70 IEEE 802.3at specification parameters per port, presented in easily readable spreadsheet reports with multi-port statistics and clearly notated pass/fail limit analysis. The PowerSync Analyzer and the PSE Conformance Test Suite may be used to qualify PSE's for the Ethernet Alliance PoE Logo under the Ethernet Alliance PoE Certification Program.

Analyzing 802.3bt PSE's

The PSA-3248 offers capability to fully emulate emerging 802.3bt compliant PD's for the purpose of testing new Type-3 and Type-4 PSE's that can provide over 90W of power using four wire pairs. New **PSA 5.0** software opens the door to comprehensive 802.3bt PSE analysis and automated test development. With several mouse clicks, virtually any 802.3bt PD can be emulated and PSE responses to PD emulations can be evaluated. A rich set of standardized **one-click waveforms** and **one-button test loads** make swift work of exposing new 802.3bt PSE's to the vast array of PD's and connection environments described under the 802.3bt standard.

Automated 802.3at PSE System Testing

PSA-3248's may be optioned via a license key to run the one-of-a-kind 802.3at **PSE Multi-Port Suite**. This software offers flexible, programmable, simultaneous **Live PD Emulation** of up to 192 independent Powered Devices including 802.3at Type-2, LLDP capable devices. The fully automated **Multi-Port Test Suite** for 802.3at evaluates PSE power allocation decisions and power management behaviors in response to multi-port PD loads including Type-2 PD's that negotiate power using PoE LLDP. Results are presented in colorful graphical reports.

LLDP Emulation for 802.3at and 802.3bt

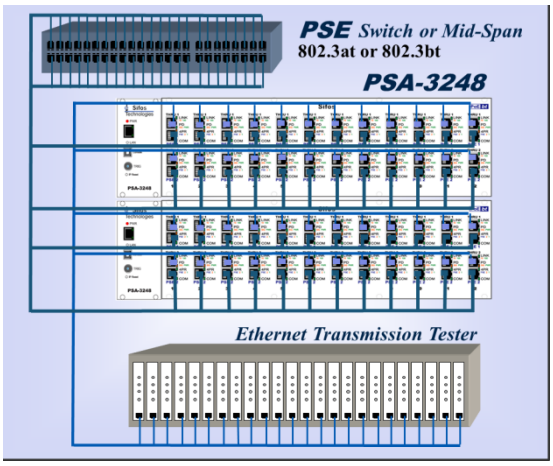
The IEEE 802.3at and 802.3bt specifications describe PSE's and Powered Devices (PD's) that communicate precise power demands and allocations using Ethernet layer 2 (LLDP) protocols. The PSA-3248 may be optioned via a license key to flexibly emulate PD's and to analyze the power negotiation protocols between PSE's and PD's.

* *Assumes up to 4 PSA-3248's combined into single Multi-Port Resource Configuration.*

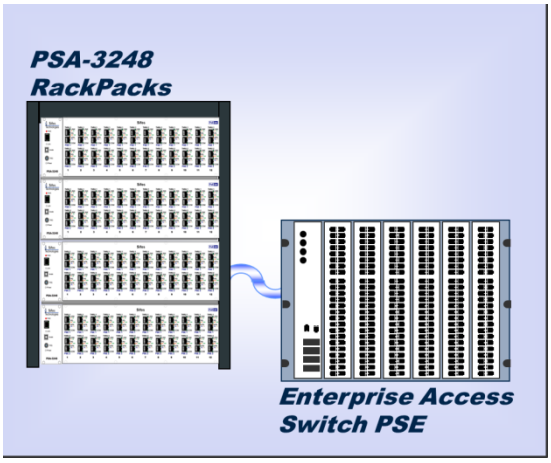
Verification, Simplified.

PowerSync Analyzer Test Equipment Setups

PSE DV, System, Mfg. Test



Large PSE System QA



* Available as an optional feature to the PSA-3248. See feature-specific data sheet.

Per-Port PSE Test Resources

Flexible 2-Pair and 4-Pair PD Detection & Class Emulation including all 802.3bt PD Types

Flexible Loads and Load Transients including 4-Pair PSE Loads to > 99 Watts on Either Test Port

Event or Edge Triggering of Load Transients & Measurements

Average, Peak (Min/Max), and Trace Measurements of Port Voltage and Load Current with Flexible Sampling Apertures

Standard One-Click Waveforms for Rapid PSE Analysis and Conformance Troubleshooting

Flexibly Triggered, Noise-Immune Time Intervals / Slews

One-Button Specialized Loads

LAN Termination, LLDP Protocol Emulation and Tracing

Concurrent Packet Transmission and PoE Load Testing

PSE System & Multi-Port Testing*

Fully Automated Multi-Port Test Suite for Type-1 and Type-2, including Type-2 LLDP PSE's up to 192 PSE Ports Covering:

- **Power Administration by PD Class and Port Group Subsets**
- **Group Power-Up, Power Negotiation, and Disconnect Timing**
- **Static Power Capacity by PD Type**
- **Transient Reserve Capacity by PD Type**
- **PD Power Budget Uncertainty by PD Class**
- **Group Overload Response and Timing**
- **Power Stress Tolerance**

Programmable Live PD Emulation Up to 192 Simultaneous 802.3at PD's (Type-1, Type-2, Type-2 LLDP), 34W per port

Programmable Live PD Emulation Up to 96 pre-standard 4-Pair PD's (with or without UPoE LLDP), 95W per test slot

External Trigger Input/Output

LLDP*, PHY, Transmission Test Support

Flexible, Per-Port, Programmable PD LLDP Emulation for PoE with Payload, Timing, & Synchronization Control

Fully Automated LLDP Protocol Traces and Analysis

Emulate 802.3at and 802.3bt LLDP Protocols

Test Port "THRU" Channel for 10/100/1000 PHY Testing (*using the Sifos PVA-3000*) and Packet Transmission Testing

Negligible Thru-Channel Impairment (10/100/1000/2.5GBase-T)

PSE Conformance Suite*

High Coverage, Fully Automated IEEE 802.3at PSE Compliance Testing and Analysis (including LLDP*)

23 PSE Tests Producing Over 70 802.3at Parameters / Port

Automated Test and Port Sequencing with Comprehensive, Colorful Spreadsheet Reporting

Automatically Adapts to PSE Device Technologies

> 95% 802.3at PSE PICS Coverage

Regularly Updated with Sifos Tracking Service

Approved for Ethernet Alliance 1st Party (self) Certification Testing of 802.3at PSE's

EA Certified™

Powerful Software

PowerShell PSA Script Automation

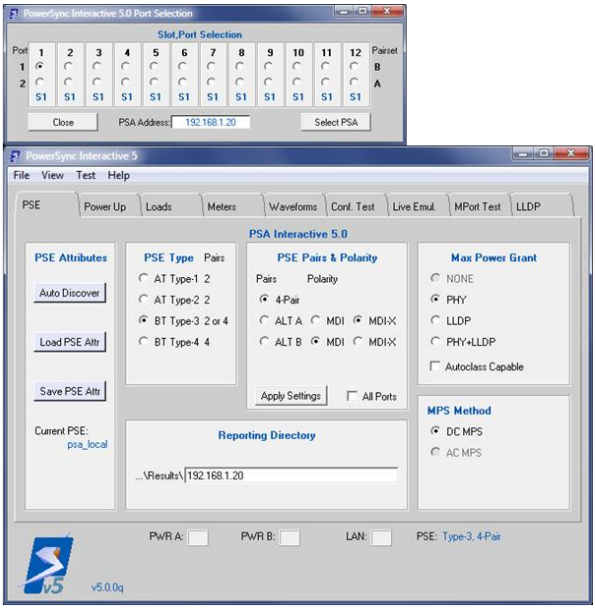
PSA Interactive Graphical User Interface*

Sample High Throughput, Multi-Port PSE Test Script

PSA Interactive Graphical User Interface

The Sifos **PSA Interactive** graphical user interface (GUI) is a flexible and powerful tool that enables users to access and manage many of the resources and testing functions available as an option for the PSA-3248 instrument. **PSA 5.0** software introduces a second generation of PSA Interactive offering the following key features:

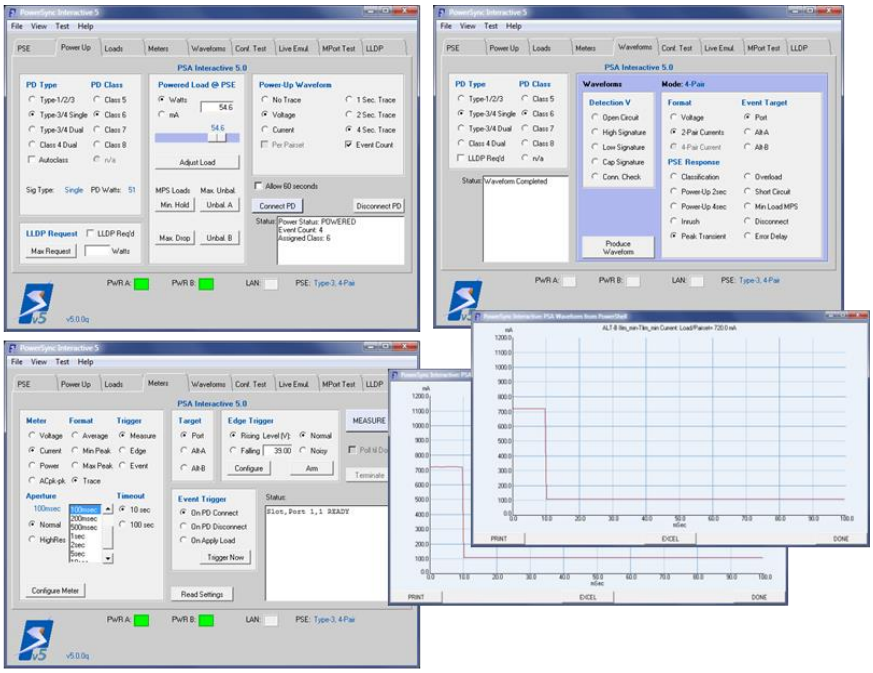
- Intelligent Management of 2-Pair and 4-Pair PSE Connections
- Seamless Integration Between 802.3at and 802.3bt PSE Testing Processes
- Seamless Integration of Newer PSA-3202 Test Blades and Older PSA-3102 Test Blades
- Ergonomic Tab Menu Scheme
- Highly Flexible PD Emulations and PSE Stimulus-Response Assessments
- Full Support for All 802.3at Automated Test Suites and Analyses Previously Supported Under PSA 4.x Software
- Floorplan for Future 802.3bt Automated Test Suites



PSA Interactive Tab Menu and Slot-Port Panel

Included in the second generation PSA Interactive GUI is an intelligent **Slot-Port Selection Panel** and a tab menu window with nine tab menus:

- **PSE**: Learn, Declare, Load, and Save **PSE Attributes** that are essential to test port configuration and to automated test functions and utilities
- **Power Up**: Flexibly emulate and then connect **802.3at**, **802.3bt**, and **proprietary 4-Pair PD's** while observing PSE behaviors and responses to those PD connections
- **Loads**: Select and apply elemental signatures, static DC loads, and flexible load transients to **2-Pair** and **4-Pair** PSE's.
- **Meters**: Configure and perform a wide variety of measurements on **2-Pair** and **4-Pair** PSE's with a variety of triggering options
- **Waveforms**: Configure and capture a wide variety of one-click waveforms that perform stimulus-response evaluations of **802.3at** and **802.3bt** PSE's. Flexibly emulate **802.3at**, **802.3bt**, and **proprietary 4-pair** PD's



PSA Interactive Menus for Power Up Emulation, Measurements & Triggering, and One-Click Waveforms

- **Conf. Test***: Configure and run the **802.3at** PSE Conformance Test Suite (*using traditional PSA 4.2 menu*)
- **Live Emul***: Configure and emulate between 1 and 192 **802.3at** PD's (*using traditional PSA 4.2 Multi-Port menus*)
- **MPort Test***: Configure and run the **802.3at** PSE Multi-Port Test Suite (*using traditional PSA 4.2 Multi-Port menus*)
- **LLDP***: Configure and run **802.3at** LLDP protocol traces (*using traditional PSA 4.2 menu*)

** The **Conf. Test**, **Live Emul**, **MPort Test**, and **LLDP** tab menus will evolve to add resources for **802.3bt** PSE testing as those resources become available.*

PowerShell PSA Tcl/Tk Interface

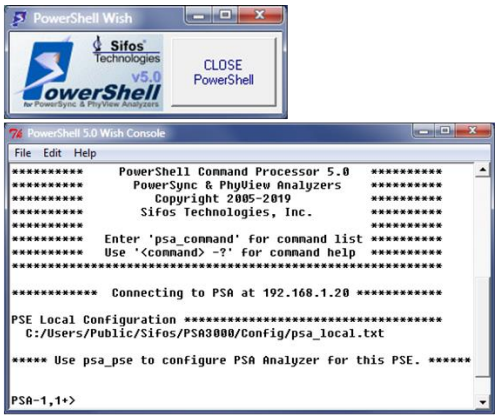
The PowerShell PSA Scripting Environment provides a high level, interactive means to control and program automated test sequences for the PSA-3248 PowerSync Analyzer. PowerShell enables fully automated testing suites that span multiple ports, blades, and instruments. Built upon the powerful and extensible Tool Command Language (Tcl), it offers an effective programming language well suited for automated testing.

PowerShell PSA provides a complete API for the PSA-3248 instrument including an extensive command set that ranges from elemental resource configurations to high level automated tests and test sequencers. Starting with PSA software version 5.0, PowerShell PSA seamlessly manages transitions between 802.3at (2-Pair) PSE testing and 802.3bt (4-Pair) PSE testing. Many PowerShell PSA commands and utilities automatically take on personalities governed by test port configurations (for example, **2-Pair** versus **4-Pair** and 4-Pair signature type).

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

Other features offered by the PowerShell PSA environment include:

- Interpretive command execution (no compilation, easy debug)
- Simple, intuitive PowerSync Analyzer commands (API)
- Integrated and extensive command “help” features
- Fast test execution speeds
- Smart prompt that tracks selected test port configuration
- Command-Knowledgeable Wish Console with PSA waveform viewer capability
- Notepad++ Editor Extension for PowerShell PSA script editing and debugging
- Flexible test suite sequencing including compound sequences
- Traditional Tcl Command Console
- Extensive PowerShell PSA command documentation



PowerShell PSA Wish Console

IEEE 802.3at PSE Conformance Test Suite

The IEEE **802.3at** PSE Conformance Test Suite is a library of **fully automated, flexibly sequenced,** and **self-adapting** tests that provide a high degree of specification compliance testing of PSE ports without the need for any external instrumentation. The PSE Conformance Test Suite may be used to fully assess interoperability of one or more PSE ports given a single button press or single command. Colorful Microsoft Excel spreadsheet reports analyze all test results relative to IEEE 802.3at specification parameters, flagging failures and compiling statistics.

The PSE Conformance Test Suite serves as a virtual industry standard for PSE specification compliance. Testing can be completed without deep, internal knowledge of the 802.3at standard and without high expertise in PSA-3000 capabilities. Test coverage **exceeds 95%** of 802.3at PSE PICS.

See Sifos datasheet, **PSE Conformance Test Product Overview**, for further information about this test suite.

PSE Multi-Port Suite for 802.3at PSE’s

While IEEE 802.3at describes a PSE as a single port device, most PSE’s are multi-port systems such as Ethernet switches. This fact leads to the need for system test methods and tools to assess PSE behavior across a multitude of ports. The **PSE Multi-Port Suite** offers two fundamental testing capabilities that address this need.

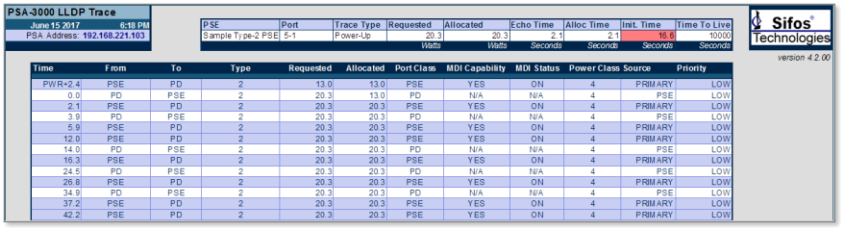
Multi-Port PD Emulation turns every PSA-3000 test port into an emulated Powered Device where behaviors such as static power load, PD classification, line power loss, and even PoE LLDP protocol characteristics are modeled simultaneously across as many as 192 PSA ports. Type-1 (≤ 13W) and Type-2 (≤ 25.5W) PD’s may be emulated. See Sifos datasheet, **Multi-Port Live PD Emulation Overview**, for further information on Live PD Emulation.

The **Multi-Port Test Suite** is a set of fully automated tests and reporting that takes the PSA-3000 into the realm of fully automated 802.3at PSE System Power Management and Multi-Port Stimulus-Response testing. The Multi-Port Test Suite assesses system-wide behaviors only observable when many IEEE 802.3at PD’s are powered by a PSE. The test suite will acquire and distill information regarding key behaviors of a PSE including **class-based power administration**, multi-port **LLDP granting**, power-up and LLDP grant timing, **static power** capacity, **transient reserve** capacity, power down timing, power-per-port **uniformity and uncertainty**, and power **stress test** analyses. Results are presented in colorful, graphical spreadsheet reports. See Sifos datasheet, **Multi-Port 2 Test Suite Overview**, for further information about this test suite.

PoE LLDP Emulation and Analysis

The PSA-3248 includes a subsystem designed to flexibly emulate 802.3at LLDP capable PD's on a per test port basis. Fully automated applications allow in depth capture and analysis of protocol between the PSE and the PD.

See Sifos datasheet**, LLDP Emulation and Analysis Overview**, for further information on this topic.



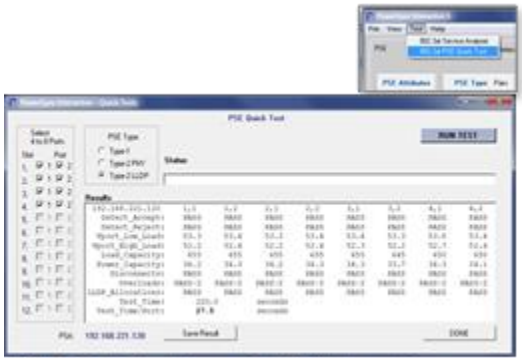
LLDP Protocol Trace

820.3at Multi-Port High Throughput PSE Verification

The PSA-3248 is provided with a sample PSE automated test script, **psa_quick_test**, that recovers several important 802.3at parameters from PSE ports with an effective test throughput of less than 15 seconds per tested port. This application can be used in both QA and manufacturing test to *rapidly* qualify PSE functional performance.

Important features of the **psa_quick_test** include:

- **Source Code Provided**: May be used as is, may be modified, or may be used as template script
- Scans 4 to 8 PSE ports per test cycle
- Tests **Type-1**, **Type-2** (**2-event**), and **Type-2** (**LLDP***) PSE's
- Validates PoE **Detection Acceptance** and **Rejection** Ranges
- Measures PSE **Port Voltage** at min. and max. load conditions
- Determines **Power Capacity** in Watts and mA
- Assesses **Disconnect Power Removal** response and timing
- Assesses **Overload Power Removal** and **Power-Type** Threshold
- Assesses **LLDP Power Allocations*** and associated timing



PSA Quick Test Menu in PSA Interactive

Typical test times will range from 8 to 14 seconds per port tested including tests of Type-2 LLDP capable PSE's.

```
PSA-1,1>psa_quick_test 1,1 1,2 2,1 2,2 3,1 3,2 4,1 4,2  type-2 lldp
TESTING WITH 192.168.221.106 ON PORTS 1,1 1,2 2,1 2,2 3,1 3,2 4,1 4,2
EVALUATING DETECTION REJECT SIGNATURES...
EVALUATING DETECTION ACCEPT, LOW LOAD Vport, AND DISCONNECTS...
EVALUATING DETECTION ACCEPT, HIGH LOAD Vport, CAPACITY, & OVERLOADS...
ASSESSING LLDP POWER-UPS...
REQUESTING FULL TYPE-2 POWER...
ASSESSING LLDP ALLOCATIONS...

     192.168.221.106     1,1      1,2      2,1      2,2      3,1      3,2      4,1      4,2
      Detect_Accept:    PASS     PASS     PASS     PASS     PASS     PASS     PASS     PASS
      Detect_Reject:    PASS     PASS     PASS     PASS     PASS     PASS     PASS     PASS
     Vport_Low_Load:    55.7     55.8     55.8     55.8     55.7     55.7     56.0     55.9
    Vport_High_Load:    54.9     54.9     54.9     55.0     54.8     54.8     55.2     55.1
      Load_Capacity:     645      650      650      650      655      645      645      640
     Power_Capacity:    35.4     35.7     35.7     35.7     35.9     35.3     35.6     35.3
        Disconnects:    PASS     PASS     PASS     PASS     PASS     PASS     PASS     PASS
          Overloads:  PASS-2   PASS-2   PASS-2   PASS-2   PASS-2   PASS-2   PASS-2   PASS-2
   LLDP_Allocations:    PASS     PASS     PASS     PASS     PASS     PASS     PASS     PASS
          Test_Time:       101.0          seconds
     Test_Time/Port:       12.6          seconds
```

Automated Manufacturing/QA PowerShell Test Script, **psa_quick_test**

.

***** *LLDP testing requires PoE LLDP Emulation and Analysis feature*.

Technical Data: PSA-3248

LAN Interface Specifications

Operating Mode	Signal Path	Parameter	Specification
Data Through Mode	PSE # to THRU #	Connections	RJ45
		Data Rates and Signaling	10/100/1000BaseT/2.5GBaseT *5GBase-T, 10GBase-T with minor impairment*
		Latency	None - 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 (THRU port terminated into 100Ω)	≤ -24dB, 1MHz to 100MHz
Data Connect (LLDP Emulation) Mode	PSE-# to Blade Transceiver	Connection	RJ45
		Data Rate and Signaling	10/100Base-T
		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 1 (Port 2 disabled) or Connect to Port 2 (Port 1 disabled)	ALT-A Polarity (Port 2)	MDI or MDI-X
		ALT-B Polarity (Port 1)	MDI or MDI-X
		Detection Signature Type (*PSA-3202 Test Blades*)	Single (shared) or Dual (independent)
All	Any Conductor referenced to Any Other Conductor	Maximum Input Voltage	±60 VDC
	Any Conductor referenced to RJ-45 Shield	Maximum Input Voltage	±60 VDC

Detection and AC MPS Specifications

Description	Conditions	Parameter	Specification
Detection Resistance	Vport = 2.5VDC - 12VDC, Port Connected, Transition Current Load = 0	Range	9 KΩ to 39 KΩ
		Resolution	1 KW
		Accuracy vs Setting ΔV / ΔI at 4.5 Volt Spacing	±1.75% + 300Ω
Detection Capacitance	Vport = 2.5VDC - 12VDC, Port Connected, Transition Current Load = 0	Range	0.14, 5, 7, 11μF
		Accuracy	±15%
Detection Signature Cut-Off Threshold	Port Connected	Vport	12V ± 2%
AC MPS Signature	Vport = 12VDC - 60VDC, Port Connected	AC Impedance	24KΩ || (0.1μF + 330Ω)
		Resistance Accuracy ΔV / ΔI at 2 Volt Spacing	22.8KΩ ± 250Ω
	Port Isolated	AC Impedance (< 500 Hz) AC Impedance (< 120 Hz)	> 1.1 MΩ > 3.0 MΩ

Current Load Specifications

Description	Conditions	Parameter	Specification
Load Current	Per Powered (or classifying) Pairset	Range	0 to 950 mA
		Resolution	0.25 mA
		Accuracy	± (0.5% setting + 0.25mA)
		Slew Rates	> 4mA / µsec
		Activation Voltage	15V, Rising Vport
		De-Activation Voltage	14V, Falling Vport
Transition (Mark Region) Current	Load Current Activated, Per Powered (or classifying) Pairset	Range	0 to 400 mA
		Resolution	0.25 mA
		Accuracy	± (1.0% setting + 0.5mA)
		Slew Rates	> 4mA / µsec
		Activation Voltage	14V, Falling Vport
		De-Activation Voltage	PSA-3202: 4.5V, Falling Vport PSA-3102: 6V, Falling Vport
Multi-Event Classification	Multi-Event Activated, Vport > 15VDC	802.3bt Signatures Emulated	Single Signature Class 5 - 8
			Dual Signature Class 1 - 5
		Non-Standard Signatures	Class Current per Event
		802.3bt Auto-Class	2mA @ 80msec of LCE1
		Multi-Event Activation	**psa_connect** or **mclass**
	Multi-Event Activated, Vport > 15VDC	Multi-Event Deactivation	**psa_disconnect** or **mclass**
		Multi-Event Timeout	100 msec @ > 15V
		Event Start Glitch De-bounce	150µsec
		Mark and Idle Transition Glitch De-bounce	500µsec
		Event Count Reset Condition	< 4.5V for > 500µsec
		Power-On Expiration (default)	115 msec
Configurable Load Transient	Vport > 15VDC, Per Powered Pairset	Sequential Load Steps	2
		Transient Sequence Repeats	1 to 6 cycles
		Load Step 1 Range	0 to 1800 mA
		Load Step 2 Range	0 to 950 mA
		Resolution (0 – 950 mA) Resolution (> 950 mA)	0.25 mA 0.50 mA
		Accuracy (0 – 25 mA) Accuracy (> 25 mA)	± (2% setting + 0.5mA) ± (1% setting + 1mA)
		Slew Rate	< 10mA / µsec
		Step 1 Duration ≤ 950 mA	200 µsec to 1 sec
		Step 1 Duration > 950 mA	200 µsec to 80 msec
		Step 2 Duration Load Step 1 ≤ 950 mA Load Step 1 > 950 mA	 200 µsec to 1 sec (or persist) 1 sec
		Step Resolution	100 µs
		Trigger Modes: ≤ 950 mA > 950 mA	Immediate, Edge, Event Immediate
		Active Load Resistance	37 Ω
		Foldback Suppression Min. Port Voltage (@ 400mA)	30 VDC
		Foldback Suppression Duration	Step 1 + Step 2 Duration

DC Metering Specifications

Description	Conditions	Parameter	Specification
Voltage Meter	Average, Max-Peak, Min-Peak, Scope Trace	Voltage Range	0 - 60V
		Aperture or Trace Length	256 Samples (10ms, 20ms, 0ms…10s)
		Extended Trace Length[3]	1024 Samples (200ms, 2s, 4s, 8s, 20s)
		Sample Rates	39.1 µsec - 39.1 msec (1,2,5 steps)
		Resolution	16 mV

DC Metering Specifications

Description	Conditions	Parameter	Specification
Voltage Meter (con'd)		Displayed Resolution	Avg & Peak: 2 decimal places O-scope Traces: 25 mV
		Accuracy[1]	> 30VDC: ± (1.5% reading + 16mV) < 30VDC: ± (2.0% reading + 16 mV)
		Measurement Triggers	Immediate, Edge, Event, Power-Up (*traces only*)
Current Meter	Average, Max-Peak, Min-Peak, Scope Trace	Current Range	0 – 2000 mA
		Aperture or Trace Length	256 Samples (10ms, 20ms, 50ms…10s)
		Extended Trace Length[3]	1024 Samples (200ms, 2s, 4s, 8s, 20s)
		Sample Rates	39.1 µsec - 39.1 msec (1,2,5 steps)
		Resolution (0– 1023 mA)	0.25mA
		Resolution (1024–2000 mA)	0.5mA
		Accuracy[2]	± (0.5% reading + 0.5mA)
		Triggers	Immediate, Edge, Event, Power-Up (*traces only*)

1. Does not include Voltage drop due to cable losses and 0.45Ω maximum test port input resistance.
2. Does not include Port-Connected MPS current, which is approximately (Vport - 12V)/24kΩ.
3. Scope Traces only - requires PSA controller firmware 3.10 or newer.

AC Metering Specifications

Description	Conditions	Parameter	Specification
AC Peak-Peak Meter	Low Band, VDC= 40-57V	Accuracy, 25Hz – 325Hz Accuracy, 50Hz – 300Hz	-15%, +11% -7.5%, +11%
	High Band, VDC= 40-57V	Accuracy, 2.5KHz – 250KHz Accuracy, 20KHz – 250KHz	-15%, +7% -6%, +7%
	Full Band, VDC= 40-57V	Accuracy, 50Hz – 250KHz	-7.5%, +8.5%
	All Bands, VDC= 40-57V	Resolution	1mV
		Range	1Vp-p
		Input Impedance	0.05µF[1]

1. Input impedance models the lowest possible PD input capacitance – measurements are therefore affected by the effective source impedance of the PSE, including any frequency specific variations in that source impedance.

Triggering Specifications

Description	Conditions	Parameter	Specification
Edge & Event Triggers	All Modes	Range	0.25V - 59.5V
		Resolution	0.125 mV
		Accuracy (relative to DC Meter)	± 0.0625 mV
		Trig1 to Meter or Transient Latency	~ 50 µsecs
		Event Trigger Latency	< 500 µsecs
	Trigger Noise Immunity	Pre-Trigger Qualification Time (Voltage below Rising threshold or above Falling threshold)	1.5 msec
		Normal Mode Edge Noise Rejection	125 mV
		Noisy Mode Edge Noise Rejection	500 mV

Time Interval Metering Specifications

Description	Conditions	Parameter	Specification
Time Interval Meter	Microsecond scale	Time Range	4 – 26200 µs
		Time Resolution	1 µsec
		Time Accuracy	± 2 µsecs
		Min. Resolvable Time Interval	~ 4 µsecs
	Millisecond scale	Time Range	2-6550 msec
		Time Resolution	0.1 msec
		Time Accuracy	± 1 msec
		Min. Resolvable Time Interval	2 msec

Time Interval Metering Specifications

Description	Conditions	Parameter	Specification
Time Interval Meter (con'd)	Second Scale	Time Range	0.1 – 16.1 sec
		Time Resolution	0.1 sec
		Time Accuracy	± 50 msec
		Min. Resolvable Time Interval	0.1 sec
	Triggering & Noise Immunity	Start Trigger	Edge or Event
		Stop Trigger	Edge
		Normal Mode Edge Noise Rejection	125 mV
		Noisy Mode Edge Noise Rejection	500 mV

LED Indicators

LED Label	Parameter	Description
LINK	LLDP Link Status & Activity	**GREEN:** Linked at 100Base-Tx for LLDP, Blink with Activity **AMBER**: Linked at 10Base-T for LLDP, Blink with Activity **OFF**: Unlinked (or Disconnected)
PD	PoE Power Status	**GREEN**: PSE powered with Vport > 36 VDC **AMBER**: Valid 802.3 Detection Signature Connected (No PSE Power) **OFF**: PSE not powered & PD signature not connected
4PR	Test Port Mode	**GREEN:** Test port configured for 4-Pair powering **AMBER**: Opposite test port configured for 4-Pair powering **OFF:** Test port configured for 2-Pair powering
COM	Communications	**ON**: Indicates active communications with test port

Programming and Control

Description	Specification
Interface	Ethernet 10/100BaseT (*Telnet Port 23 protocols*) **NOTE**: The **Console** interface is for IP Address config only.
Host Requirements	PC running Microsoft Windows XP, Vista, 7, 8, 10, or Linux PC (Fedora, SUSE, Debian)
Control Environment	Sifos PowerShell PSA or PSA-Interactive
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. per Chassis
Power	100VAC-240VAC, 50-60 Hz, 1.35A Max.
Ambient Operating Temperature	0°C to 40°C (≤ 100W combined PoE loading per test blade or 50W per test port)
Storage Temperature	-20°C to 85°C
Operating Humidity	5% to 95% RH, Non-Condensing.

Certifications

Description	North America	Europe & International
Emissions	FCC Part 15, Class A	Meets EN55011 VCCI, AS/NZS 3548, ICES-001
Safety	**CSA Listed** (CSA22.2 No. 61010)	Meets EN61010-1
European Commission		Low Voltage Directive (2014/35/EU) Electromagnetic Compatibility Directive (2014/30/EU) **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

PSA-3248, PowerSync Analyzer RackPack PSA including (24) PSA-3202 test blades and PowerShell PSA
PSA-3248-GUI, PSA Interactive Graphical User Interface Software for PSA-3248
PSA-LLDP, IEEE 802.3at LLDP Emulation and Analysis Feature for One PSA Controller (*Up to 24 Test Ports*)*
PSA-CT, IEEE 802.3at PSE Conformance Test Suite for One PSA Controller (*Up to 24 Test Ports*)*
PSA-TS1, IEEE 802.3at PSE Conformance Suite Tracking Service for One Year
PSA-TS2, IEEE 802.3at PSE Conformance Suite Tracking Service for Two Years
PSA-MPT, IEEE 802.3at PSE Multi-Port Test Suite for One PSA Controller (*Up to 24 Test Ports*)*

Accessories Included:

- Installation Guide & Configuration Chart
- PowerSync Analyzer Reference Manual (Binder and CD)
- Power Cords (2)
- Cross-Over Ethernet Cables
- RS-232 or USB Cable

*** Note**: *There are 2 PSA Controllers per PSA-3248 RackPack PSA*

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Verification, Simplified.

