

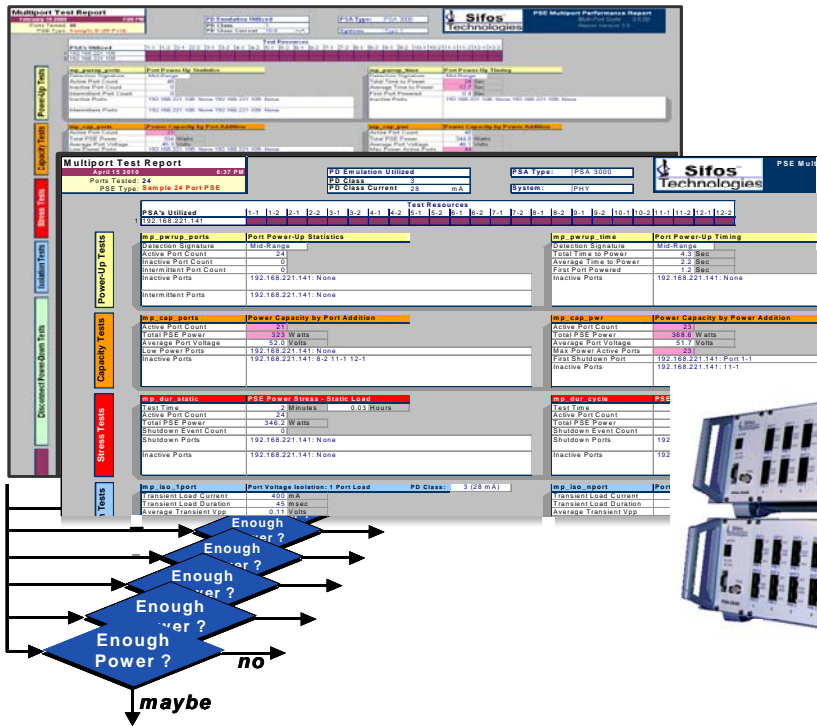


# Multi-Port System Test Suite

## PowerSync® Analyzer

IEEE 802.3 Power over Ethernet

### Product Overview



### Key Features

- ❑ Multi-Port PSE Capacity Analysis
- ❑ Multi-Port PSE Power Management Testing
- ❑ Full Load PSE Stress Testing
- ❑ PSE Port Independence Testing
- ❑ PSE Disconnect, Overload, Restart Timing
- ❑ Fully Automated Testing
- ❑ Flexible PD Emulation
- ❑ Selectively Test Up To 192 PSE Ports
- ❑ User Configurable Test Conditions
- ❑ PSA-3000 / PSL-3000 Growth Path to Type-2 (30W) PSE's Including LLDP Emulation

*real Power from Sifos*

## **Rapidly Analyze Multi-Port System Behaviors in 802.3 End-Point and Mid- Span PSE's....**

## **Assess PSE Power Delivery, Strength, Responsiveness, and Management Attributes....**

## **Fully Automated, Flexibly Configured ....**

## **Supported on All PowerSync Platforms Including the Low Cost PSA Programmable Loads.**

### **Overview**

The Multi-Port System Test Suite takes the PowerSync™ Analyzer (PSA) and its proven PSE Conformance Capabilities into the realm of fully automated PSE System Power Management and Multi-Port Behavior testing.

Whereas PSE Conformance Testing assesses compliance of each PSE port to 802.3 specifications, Multi-Port Testing assesses system-wide behaviors only observable when many PD's are powered by a PSE. The fully automated test suite will acquire and distill information regarding key behaviors of a PSE including network **power-up** and **power-down** behaviors, **total power capacity** and **power management** decisions, powered **port interactions**, port **interdependence** traits, and durability or **stress test** analyses.

Automated testing covering up to 192 PSE ports can be automatically sequenced over user-defined tests and PSE ports.

Users of the Multi-Port System Test Suite may specify characteristics of typical or "worst-case" Powered Device (PD) loads including **classification level**, **classification current**, power-up **inrush loads**, and **steady state loads**. These characteristics will automatically be applied as Multi-Port Tests sequence across all specified ports-under-test.

Reports generated by the Multi-Port System Test Suite provide highly distilled performance parameters including statistics covering failed power-ups, network power-up, shut-down, and re-start timing, power capacity measured with both incremental ports and incremental port power methods, full PSE power stressing and port power intermittency including identification of specific problem test ports.

The Multi-Port System Test Suite is supported on Sifos PSA-3000 and PSA-1200 platforms and will evolve to include new 802.3at Type-2 Power Levels and LLDP Protocol when activated on PSA-3000 platforms.

### **PSE Multi-Port Tests**

#### **Powered Port Inventories**

#### **Group Power-Up Timing Test**

#### **Group Power-Up Independence Test**

#### **PSE Total Power Capacity Tests**

#### **Power-Duration Stress Tests**

#### **Load-Response Isolation Tests**

#### **Group Disconnect Shutdown Tests**

#### **Group Overload Shutdown Tests**

#### **Group Restart Timing Tests**

#### **Group Shutdown Independence Tests**

### **Multi-Port System Test Automation**

#### **Automated Analysis and Reporting on Up to 192 PSE Ports at a Time**

#### **Run Individual Tests from PSA Interactive or PowerShell**

#### **Sequence Selected Tests from PSA Interactive or PowerShell**

#### **Automated Microsoft Excel Report Generation with PD Class-Specific Test Limit Analysis**

### **PSE Multi-Port Test Suite Features**

#### **Configurable 802.3at Type-1\* PD Emulation (Detection Load, Class Load, Inrush Load, Steady-State Load)**

#### **Configurable Load Stimuli for Port Isolation, Disconnect Loads, and Overloads**

#### **Many Tests Run with low cost PSA Programmable Load platforms.**

#### **Higher Defect Coverage and Power Management Analysis using PowerSync Analyzer platforms.**

\* The Multi-Port Test Suite will be extended to 802.3at **Type-2** (25.5W) PD Emulation, including LLDP, on the PSA-3000 family in a future release.

## Multi-Port System Suite Tests

Network Power-On Tests		
<b>mp_pwrup_ports</b>	<p><b>Powered Port Inventories</b> Evaluate ability of PSE to power a fixed number of ports given PD's of specified classification, specified transient, and steady-state load characteristics. Recover statistics on successfully <b>powered ports</b>, <b>un-powered ports</b>, and <b>intermittently powered ports</b>.</p>	<p><b>User Setup Options:</b></p> <p><b>PD Load Traits:</b> (PD Class, I<sub>class</sub>, I<sub>inrush</sub>, I<sub>load</sub>)</p> <p><b>PD Detection Signature:</b> (Low, Mid, High)</p>
<b>mp_pwrup_time</b>	<p><b>System Power Up Timing Characteristics</b> Evaluate network startup timing characteristics of a PSE including <b>time to first port powered</b>, <b>time to last port powered</b>, <b>average port power-up time</b>, and <b>un-powered ports</b> discovered during a network power-up utilizing specified PD characteristics.</p>	
<b>mp_pwrup_idp</b>	<p><b>Port Power-Up Independence Testing</b> Determines that power-up of each individual port in a PSE has no impact to operational state of any other port in the PSE. Reports any <b>port-to-port couplings</b> that are discovered.</p>	
PSE Power Capacity Tests		
<b>mp_cap_ports</b>	<p><b>PSE Total Power Capacity by Port Addition</b> Determine the total PSE Power Capacity by successively adding PD's of user specified load or classification characteristics to the network load. Report <b>total PSE power output</b>, <b>average port voltage</b> at full capacity as well as <b>powered port count</b>, <b>under-powered ports</b>, and <b>un-powered ports</b>. Use PD emulation controls to assess PSE Power Management characteristics.</p>	<p><b>User Setup Options:</b></p> <p><b>PD Load Traits:</b> (PD Class, I<sub>class</sub>, I<sub>inrush</sub>, I<sub>load</sub>)</p>
<b>mp_cap_pwr</b>	<p><b>PSE Total Power Capacity by Load Growth</b> Determine the total PSE Power Capacity by starting all ports that will power in a low power mode and then successively stepping up power demand per port until peak total output capacity is reached. Report <b>total PSE power output</b>, <b>average port voltage at full capacity</b>, <b>powered port count at peak PSE output power</b>, <b>un-powered ports</b>, and <b>first port to drop power</b>. Use PD emulation controls to assess PSE Power Management characteristics.</p>	
PSE Power Stress Tests		
<b>mp_dur_static</b>	<p><b>Assess Port Power Reliability Under Constant Full Power Load</b> Evaluate the ability of a PSE to sustain full power with a steady state load for a user specified time duration without port dropouts. Test automatically determines, establishes, and reports <b>near-full power output</b> of the PSE and tallies counts of instantaneous or permanent <b>port shutdown events</b> and <b>associated shutdown test ports</b>. Testing may be specified to run from 1 minute until 100 hours. Optional control to re-cycle or disable ports that shut down.</p>	<p><b>User Setup Options:</b></p> <p><b>PD Load Traits:</b> (PD Class, I<sub>class</sub>, I<sub>inrush</sub>, I<sub>load</sub>)</p> <p><b>Test Duration</b> (up to 100 hours)</p> <p><b>Disable Down Ports</b></p>
<b>mp_dur_cycle</b>	<p><b>Assess Port Power Reliability Under Constant Full Power Load</b> Evaluate the ability of a PSE to sustain variable power for a user specified time duration without port drop-outs. Test automatically determines, establishes, and reports <b>near-full power output</b> of the PSE and tallies counts of instantaneous or permanent <b>port shutdown events</b> and <b>associated shutdown test ports</b>. All testing performed under cycling load capacity between 15% and 100% of full power randomly distributed across all tested ports. Testing may be specified to run from 1 minute until 100 hours. Optional control to re-cycle or disable ports that shut down.</p>	

## PSE Port Isolation Tests

<p><b>mp_iso_1port</b></p>	<p><b>Single-Port Load Transient Impact</b> Evaluate impact of large load transients on a single PSE port across all other PSE ports. Reports <b>average</b> and <b>peak port voltage variation</b> across all PSE ports. Reports <b>peak coupling site</b> (stimulus and response ports). Accepts user defined load transient characteristics.</p>	<p><b>User Setup Options:</b></p> <p><b>PD Load Traits:</b> (PD Class, <math>I_{class}</math>, <math>I_{inrush}</math>, <math>I_{load}</math>)</p> <p><b>Transient Load</b> (Magnitude &amp; Duration)</p>
<p><b>mp_iso_nport</b></p>	<p><b>Multiple-Port Load Transient Impact</b> Evaluate impact of near-capacity load transients on multiple PSE ports across all other PSE ports. Reports <b>average</b> and <b>peak port voltage variation</b> across all PSE ports. Reports <b>peak coupling site</b> (peak response port). Accepts user defined load transient characteristics.</p>	

## Multi-Port Disconnect Shutdown Tests

<p><b>mp_discx_ports</b></p>	<p><b>Disconnect Shutdown Inventories</b> Verify that all powered PSE ports remove power given mass PD disconnect. Report <b>powered port count</b>, <b>intermittently powered port count</b>, and associated <b>powered ports</b> and <b>intermittent ports</b>. Report <b>inactive ports</b> that never power initially. Control <b>Imin1</b> disconnect current level to DC MPS PSE's.</p>	<p><b>User Setup Options:</b></p> <p><b>PD Load Traits:</b> (PD Class, <math>I_{class}</math>, <math>I_{inrush}</math>, <math>I_{load}</math>)</p> <p><b>Disconnect Load Current Level (<math>I_{min1}</math>)</b> (PSE MPS Method known via standard PSA1200 PSE Configuration File)</p>
<p><b>mp_discx_time</b></p>	<p><b>System Power Down Timing Characteristics</b> Evaluate power-down timing across all powered PSE ports given a mass PD disconnect event. Report <b>average time-to-remove-power</b>, <b>first power-down time</b>, <b>last power-down time</b>, as well as associated <b>first and last ports to remove power</b>. Report any <b>inactive ports</b> that never powered initially and any <b>powered ports</b> that fail to power down. Control <b>Imin1</b> disconnect current level to DC MPS PSE's.</p>	
<p><b>mp_discx_cycle</b></p>	<p><b>System Disconnect Power Recycle Timing</b> Evaluate power-down and power recycle timing following a mass PD disconnect event. Report <b>average time-to-recycle power</b>, <b>minimum recycle time</b>, and <b>maximum recycle time</b>, as well as associated <b>last port to recycle power</b>. Report any <b>inactive ports</b> that never powered initially and any <b>down ports</b> that fail to recycle power.</p>	
<p><b>mp_discx_idp</b></p>	<p><b>Port Disconnect Power-Down Independence Testing</b> Determines that a PD induced disconnect power-down of each individual port in a PSE has no impact to operational state of any other port in the PSE. Reports any <b>port-to-port couplings</b> that are discovered (both <b>count</b> and associated <b>coupled ports</b>).</p>	

## Multi-Port Overload Shutdown Tests

<p><b>mp_overld_time</b></p>	<p><b>System Overload Power Down Timing Characteristics</b> Evaluate power-down timing across all powered PSE ports given a mass PD overload event. Report <b>average time-to-remove-power</b>, <b>first power-down time</b>, <b>last power-down time</b>, as well as associated <b>first and last ports to remove power</b>. Report any <b>inactive ports</b> that never powered initially and any <b>powered ports</b> that fail to power down. Control <b>Icut</b> overload current level to assess PSE behaviors with different overloads and PD Classification levels.</p>	<p><b>User Setup Options:</b></p> <p><b>PD Load Traits:</b> (PD Class, <math>I_{class}</math>, <math>I_{inrush}</math>, <math>I_{load}</math>)</p> <p><b>Overload Cutoff Current Level (<math>I_{cut}</math>)</b></p>
<p><b>mp_overld_cycle</b></p>	<p><b>System Overload Power Recycle Timing</b> Evaluate power-down and power recycle timing following a mass PD overload event. Report <b>average time-to-recycle power</b>, <b>minimum recycle time</b>, and <b>maximum recycle time</b>, as well as associated <b>last port to recycle power</b>. Report any <b>inactive ports</b> that never powered initially and any <b>down ports</b> that fail to recycle power.</p>	
<p><b>mp_overld_idp</b></p>	<p><b>Port Overload Power-Down Independence Testing</b> Determines that a PD induced overload power-down of each individual port in a PSE has no impact to operational state of any other port in the PSE. Reports any <b>port-to-port couplings</b> that are discovered (both <b>count</b> and associated <b>coupled ports</b>).</p>	

## Standard Multi-Port System Test Report

In keeping with Sifos Technologies' innovative reporting for PSE Conformance Test Suite, the Multi-Port System Suite offers a standard Microsoft Excel spreadsheet report that is automatically produced upon the completion of any sequence of Multi-Port tests. This document distills all meaningful testing conditions and test results onto a single, easy-to-read page. The report documents PSA testing resources utilized and automatically applies test limits for certain system parameters. Test limits are derived from test conditions such as number of tested ports and PD classification level. Those parameters that exceed the derived test limits are annotated clearly in the standard report.

Multiport Test Report		February 24 2009 3:50 PM		PD Emulation Utilized		PSA Type: PSA 3000		Sifos Technologies		PSE Multiport Performance Report																																																																																													
Ports Tested: 48		PSE Type: Sample D (48 Port)		PD Class: 3		System: Type-1		Multi-Port Suite 3.3.00		Report Version 3.3																																																																																													
				PD Class Current: 28 mA																																																																																																			
		<table border="1"> <thead> <tr> <th colspan="2">PSA's Utilized</th> <th colspan="12">Test Resources</th> </tr> <tr> <th>1</th> <th>2</th> <th>1-1</th> <th>1-2</th> <th>2-1</th> <th>2-2</th> <th>3-1</th> <th>3-2</th> <th>4-1</th> <th>4-2</th> <th>5-1</th> <th>5-2</th> <th>6-1</th> <th>6-2</th> <th>7-1</th> <th>7-2</th> <th>8-1</th> <th>8-2</th> <th>9-1</th> <th>9-2</th> <th>10-1</th> <th>10-2</th> <th>11-1</th> <th>11-2</th> <th>12-1</th> <th>12-2</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>192.168.221.108</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td>2</td> <td>192.168.221.109</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </tbody> </table>										PSA's Utilized		Test Resources												1	2	1-1	1-2	2-1	2-2	3-1	3-2	4-1	4-2	5-1	5-2	6-1	6-2	7-1	7-2	8-1	8-2	9-1	9-2	10-1	10-2	11-1	11-2	12-1	12-2	1	192.168.221.108																									2	192.168.221.109																								
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Power-Up Tests	<b>mp_pwrup_ports</b> Port Power-Up Statistics		<b>mp_pwrup_time</b> Port Power-Up Timing																																																																																																				
	Detection Signature: Mid-Range Active Port Count: 36 Inactive Port Count: 12 Intermittent Port Count: 0 Inactive Ports: 192.168.221.108: None 192.168.221.109: 7-1 7-2 8-1 8-2 9-1 9-2 10-1 10-2 11-1 11-2 12-1 12-2 Intermittent Ports: 192.168.221.108: None 192.168.221.109: None		Detection Signature: Mid-Range Total Time to Power: 18 Sec Average Time to Power: 9.9 Sec First Port Powered: 0.4 Sec Inactive Ports: 192.168.221.108: None 192.168.221.109: 7-1 7-2 8-1 8-2 9-1 9-2 10-1 10-2 11-1 11-2 12-1 12-2																																																																																																				
Capacity Tests	<b>mp_cap_ports</b> Power Capacity by Port Addition		<b>mp_cap_pwr</b> Power Capacity by Power Addition																																																																																																				
	Active Port Count: 21 Total PSE Power: 339 Watts Average Port Voltage: 45.4 Volts Low Power Ports: 192.168.221.108: None 192.168.221.109: None Inactive Ports: 192.168.221.108: 11-2 12-1 12-2 192.168.221.109: 1-1 1-2 2-1 2-2 3-1 3-2 4-1 4-2 5-1 5-2 6-1 6-2 7-1 7-2 8-1 8-2 9-1 9-2 10-1 10-2 11-1 11-2 12-1 12-2		Active Port Count: 47 Total PSE Power: 344.8 Watts Average Port Voltage: 46.1 Volts Max Power Active Ports: 44 First Shutdown Port: 192.168.221.109: Port 12-2 Inactive Ports: 192.168.221.108: None 192.168.221.109: 7-1																																																																																																				
Stress Tests	<b>mp_dur_static</b> PSE Power Stress - Static Load		<b>mp_dur_cycle</b> PSE Power Stress - Variable Load																																																																																																				
	Test Time: 2 Minutes 0.03 Hours Active Port Count: 47 Total PSE Power: 331.5 Watts Shutdown Event Count: 0 Shutdown Ports: 192.168.221.108: None 192.168.221.109: None Inactive Ports: 192.168.221.108: None 192.168.221.109: 7-1		Test Time: 2 Minutes 0.03 Hours Active Port Count: 47 Total PSE Power: 331.5 Watts Shutdown Event Count: 0 Shutdown Ports: 192.168.221.108: None 192.168.221.109: None Inactive Ports: 192.168.221.108: None 192.168.221.109: 7-1																																																																																																				
Isolation Tests	<b>mp_iso_1port</b> Port Voltage Isolation: 1 Port Load PD Class: 3 (28 mA)		<b>mp_iso_nport</b> Port Voltage Isolation: N:1 Port Load PD Class: 3 (28 mA)																																																																																																				
	Transient Load Current: 400 mA Transient Load Duration: 45 msec Average Transient Vpp: 0.23 Volts Max Transient Vpp: 0.3 Volts Max Coupling Sites: 192.168.221.108: 1-1 TO 192.168.221.108: 2-2 Inactive Ports: 192.168.221.108: None 192.168.221.109: 7-1 7-2 8-1 8-2 9-1 9-2 10-1 10-2 11-1 11-2 12-1 12-2		Transient Load Current: 150 mA Transient Load Duration: 45 msec Average Transient Vpp: 0.45 Volts Max Transient Vpp: 0.6 Volts Max Coupling Site: 192.168.221.108: 4-2 Inactive Ports: 192.168.221.108: None 192.168.221.109: 7-1 7-2 8-1 8-2 9-1 9-2 10-1 10-2 11-1 11-2 12-1 12-2																																																																																																				
Disconnect Power-Down Tests	<b>mp_disc_ports</b> Port Power-Down Statistics PD Class: 3 (28 mA)		<b>mp_disc_time</b> Disconnect Power-Down Timing PD Class: 3 (28 mA)																																																																																																				
	Disconnect Current Level: 0 mA Stuck Powered Count: 0 Intermittent Powered Count: 0 Powered Ports: 192.168.221.108: None 192.168.221.109: None Intermittent Ports: 192.168.221.108: None 192.168.221.109: None Inactive Ports: 192.168.221.108: None 192.168.221.109: 7-1 7-2 8-1 8-2 9-1 9-2 10-1 10-2 11-1 11-2 12-1 12-2		Disconnect Current Level: 0 mA Total Power-Down Time: 357 msec Avg. Power-Down Time: 340 msec First Power-Down Time: 324 msec Powered Ports: 192.168.221.108: None 192.168.221.109: None Last Port Down: 192.168.221.109: 6-2 First Port Down: 192.168.221.108: 3-2 Inactive Ports: 192.168.221.108: None 192.168.221.109: 7-1 7-2 8-1 8-2 9-1 9-2 10-1 10-2 11-1 11-2 12-1 12-2																																																																																																				
Overload Power-Down Tests	<b>mp_disc_cycle</b> Disconnect & Re-Power Timing PD Class: 3 (28 mA)		<b>mp_disc_idp</b> Disconnect Power-Down Independence PD Class: 3 (28 mA)																																																																																																				
	Disconnect Current Level: 0 mA Total Re-Power Time: 27 Sec Avg. Re-Power Time: 19.8 Sec Min. Re-Power Time: 3.7 Sec Last Port Powered: 192.168.221.108: 12-1 Never Recycled Ports: 192.168.221.108: None 192.168.221.109: None Inactive Ports: 192.168.221.108: None 192.168.221.109: 7-1 7-2 8-1 8-2 9-1 9-2 10-1 10-2 11-1 11-2 12-1 12-2		Disconnect Current Level: 0 mA Coupled Port Count: 0 Inactive Ports: 192.168.221.108: None 192.168.221.109: 7-1 7-2 8-1 8-2 9-1 9-2 10-1 10-2 11-1 Coupled Ports: None																																																																																																				
	<b>mp_overld_time</b> Overload Power Down Timing		<b>mp_overld_cycle</b> Port Overload and Re-Power Timing																																																																																																				
	Overload Current Level: 399 mA Total Power-Down Time: 102 msec Avg. Power-Down Time: 58 msec First Power-Down Time: 5 msec Powered Ports: 192.168.221.108: None 192.168.221.109: None Last Port Down: 192.168.221.108: 7-1 First Port Down: 192.168.221.109: 6-2 Inactive Ports: 192.168.221.108: None 192.168.221.109: 7-1 7-2 8-1 8-2 9-1 9-2 10-1 10-2 11-1 11-2 12-1 12-2		Overload Current Level: 399 mA Total Re-Power Time: 31 Sec Avg. Re-Power Time: 22.7 Sec Min. Re-Power Time: 10 Sec Last Port Powered: 192.168.221.109: 3-2 Never Recycled Ports: 192.168.221.108: None 192.168.221.109: None Inactive Ports: 192.168.221.108: None 192.168.221.109: 7-1 7-2 8-1 8-2 9-1 9-2 10-1 10-2 11-1 11-2 12-1 12-2																																																																																																				
	<b>mp_overld_idp</b> Overload Power Down Independence		<b>mp_pwrup_idp</b> PSE Port Power-Up Independence																																																																																																				
	Overload Current Level: 399 mA Coupled Port Count: 0 Inactive Ports: 192.168.221.108: None 192.168.221.109: 7-1 7-2 8-1 8-2 9-1 9-2 10-1 10-2 Coupled Ports: None		Detection Signature: Mid-Range Coupled Port Count: 0 Inactive Ports: 192.168.221.108: None 192.168.221.109: 7-1 Coupled Ports: None																																																																																																				

Test limits may be user specified with simple edits to the standard spreadsheet report. For example, if a 48 port PSE offers less than 48 port X 15.4 watts of maximum port power to Class 0 PSE's, the power capacity limits may be manually set to the rated power capacity of the PSE.

Limit checking within the standard report is performed on the following parameters.

Multi-Port Test	Parameter	Default Limit Criteria
mp_pwrup_ports	Inactive Port Count	< 1 Port
	Intermittent Port Count	< 1 Port
mp_pwrup_time	Total Time to Power	< 10 Seconds
	Average Time to Power	< 5 Seconds
mp_pwrup_idp	Coupled Port Count	< 1 Port
mp_cap_ports	Active Port Count - Ports	= Total Ports
	Total PSE Power - Ports	≥ Total Ports x Max_Power/Port(PD Class)
	Average Port Voltage - Ports	≥ 45 Volts
mp_cap_pwr	Active Port Count - Pwr	= Total Ports
	Total PSE Power - Pwr	≥ Total Ports x Max_Power/Port(PD Class)
	Average Port Voltage - Pwr	≥ 45 Volts
	Max Power Powered Ports	= Total Ports
mp_dur_static	Active Port Count - Static	= Total Ports
	Total PSE Power - Static	≥ Ports x Max_Power/Port(PD Class) x 90%
	Shutdown Event Count - Static	< 1
mp_dur_cycle	Active Port Count - Cycle	= Total Ports
	Total PSE Power - Cycle	≥ Ports x Max_Power/Port(PD Class) x 90%
	Shutdown Event Count - Cycle	< 1
mp_iso_1port	Average Transient Vpp - 1port	≤ 0.5 V
	Max Transient Vpp - 1port	≤ 0.75 V
mp_iso_nport	Average Transient Vpp - nport	≤ 4.0 V
	Max Transient Vpp - nport	≤ 6.0 V
mp_discx_ports	Stuck Powered Count	< 1 Port
	Intermittent Powered Count	< 1 Port
mp_discx_time	Total Power-Down Time	≤ 500 msec
	Avg. Power-Down Time	≤ 400 msec
	First Power-Down Time	≥ 300 msec
mp_discx_cycle	Total Re-Power Time	≤ 11 seconds
	Avg. Re-Power Time	< 6 seconds
	Min. Re-Power Time	≥ 0.5 seconds
mp_discx_idp	Coupled Port Count	< 1 Port
mp_overld_time	Total Power-Down Time	≤ 90 msec
	Avg. Power-Down Time	≤ 75 msec
	First Power-Down Time	≥ 50 msec
mp_overld_cycle	Total Re-Power Time	≤ 12 seconds
	Avg. Re-Power Time	≤ 7 seconds
	Min. Re-Power Time	≥ 0.85 seconds
mp_overld_idp	Coupled Port Count	< 1 Port

## Textual Multi-Port System Test Reports

Prior to sequencing Multi-Port tests, users may elect to have all test results stored into an ASCII text file that is amended as test results are developed. This text file will be automatically titled with a Time-Date stamp. Users may override that default file name with a name and directory location of their choice.

This type of report is preferable in cases where Microsoft Excel is not available or in cases where processing scripts might be used to form customized reports over many test sequences. The text format report presents test conditions, parameters, and test results on a test-by-test basis and does not perform any limit checking.

Multi-Port test results may also be displayed in PowerShell as tests are run, either stand-alone or from the Multi-Port test sequencer.

## Multi-Port Data Logging

Under the Multi-Port automated test sequencer, detailed test data collected from all PSE ports may at the user's request be stored in test-specific logs formatted as text files. This enables a more detailed analysis of many of the results produced by the Multi-Port System Test Suite. For example, those tests reporting minimum or maximum and average values will store all individual port measurement data inside the data logging files. This information can be used by designers and QA personnel to get very detailed insights into PSE behaviors.

## PowerSync Analyzer Product Family Support

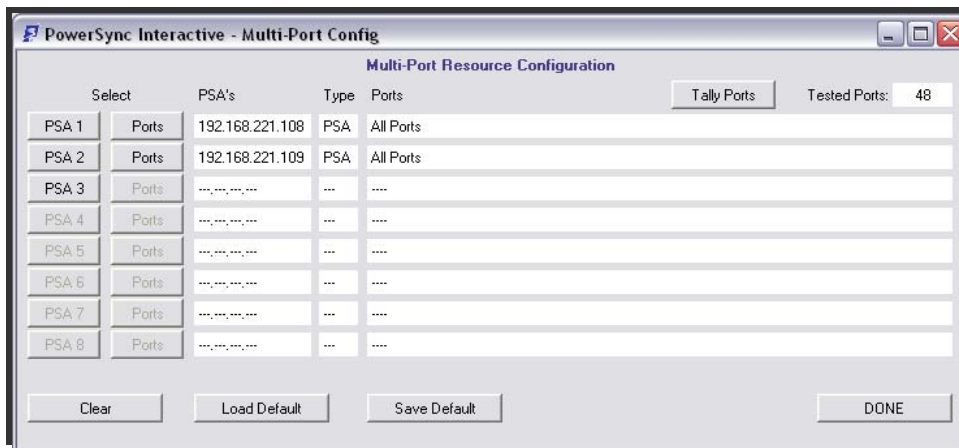
The Multi-Port System Test Suite may be activated on any PowerSync Analyzer or PowerSync Programmable Load using chassis-specific license codes.

The test suite is fully supported by the **PowerSync Analyzer** family of instruments. A subset of Multi-Port System Test Suite is supported on the PowerSync Programmable Load as indicated in the table below. Defect coverage will not be as robust with the Programmable Load as it would be with the PowerSync Analyzer.

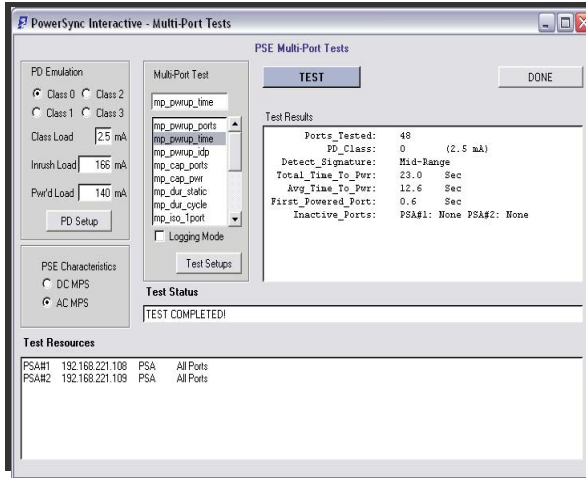
Multi-Port Test	Programmable Load Support	Programmable Load Test Limitations
mp_pwrup_ports	YES	<i>No Intermittent Testing with Programmable Load</i>
mp_pwrup_time	NO	
mp_pwrup_idp	YES	<i>Sampled Time vs. Continuous Time on all ports</i>
mp_cap_ports	YES	
mp_cap_pwr	YES	
mp_dur_static	YES	<i>Sampled Time vs. Continuous Time on all ports</i>
mp_dur_cycle	YES	<i>(PowerSync Analyzer Monitors Continuously)</i>
mp_iso_1port	NO	
mp_iso_nport	NO	
mp_discx_ports	YES	<i>No Intermittent Testing with Programmable Load</i>
mp_discx_time	NO	
mp_discx_cycle	NO	
mp_discx_idp	YES	<i>Sampled Time vs. Continuous Time on all ports</i>
mp_overld_time	NO	
mp_overld_cycle	NO	
mp_overld_idp	YES	<i>Sampled Time vs. Continuous Time on all ports</i>

## PSA Interactive and the Multi-Port System Test Suite

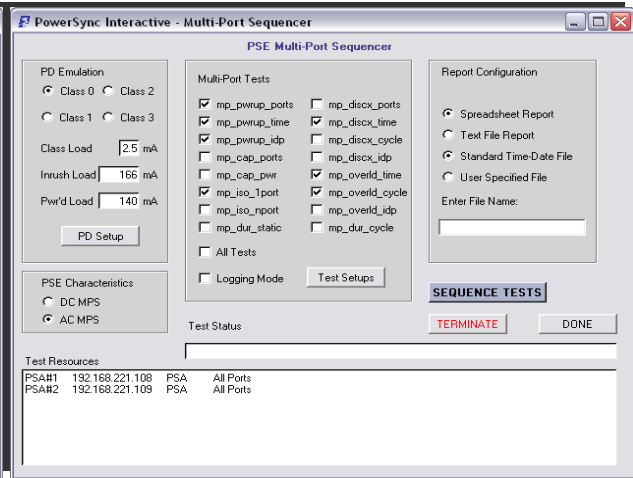
The Multi-Port Test Suite can be accessed from PSA Interactive, the interactive graphical user interface provided for the PowerSync Analyzer family. PSA Interactive and PSA Interactive PL software provide three menus in support of the Multi-Port System Test Suite: Multi-Port Test **resource configuration**, Multi-Port **individual test configuration and execution**, and automated Multi-Port **test sequencing** and reporting.



*Multi-Port Resource Configuration*

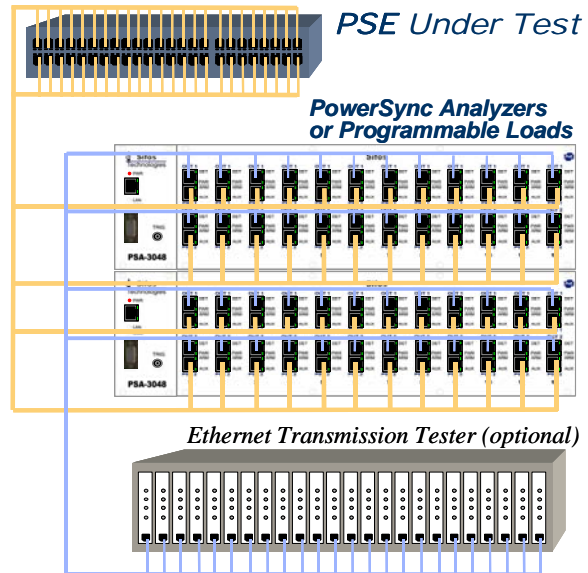


Multi-Port Selected Test Menu



Multi-Port Test Sequencer Menu

## Multi-Port Test Configuration (48 Ports)



## ORDERING INFORMATION

**PSA-MPT** PowerSync Analyzer Multi-Port Test Suite, Type 1 PD Emulation, per PSA Controller

**PSL-MPT** PowerSync Programmable Load Multi-Port Test Suite, Type 1 PD Emulation, per PSL Controller

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