



SAS Test Solutions QPHY-SAS2



Key Features

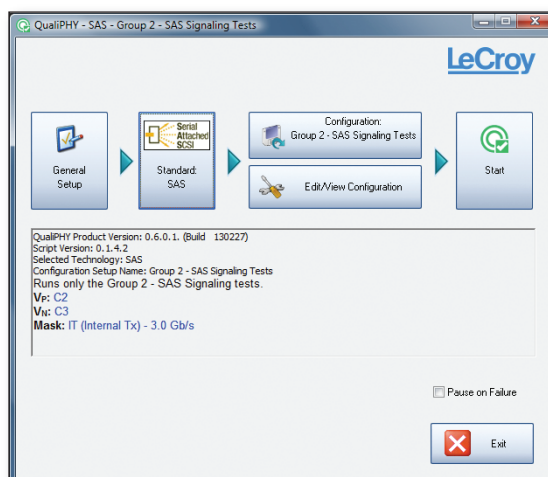
- QPHY-SAS2 provides a highly automated and easy-to-use solution for SAS-2 configurations from 1.5 Gb/s to 6 Gb/s
- Compliant with version 1.01 of the UNH IOL Serial Attached SCSI (SAS) Consortium SAS-2 6 Gb/s Physical Layer Test Suite
- Support for SAS-2 Targets and Initiators
- QualiPHY automated test framework provides connection diagrams, automated oscilloscope operation and report generation
- When used in conjunction with the Sierra SAS Protocol Verification System the device or host under test can be stimulated to generate the required test patterns

The LeCroy QPHY-SAS2 Test Solution provides automated control for the SDA 8 Zi Series of oscilloscopes for performing all of the transmitter physical layer tests as described by version 1.01 of the UNH IOL Serial Attached SCSI (SAS) Consortium SAS-2 6G b/s Physical Layer Test Suite. This specification covers targets and initiators running at 1.5 Gb/s, 3.0 Gb/s and 6.0 Gb/s.

SAS is the serialized version of the popular SCSI standard. SAS is primarily used for server class storage at speed of up to 6 Gb/s.

QPHY-SAS2 covers tests from "Group 1 (TX OOB Signaling and AC Coupling Requirements), Group 2 (TX Spread Spectrum Clocking (SSC) Requirements) and Group 3 (TX NRZ Data Signaling Requirements) of the test specification.

These capabilities make QPHY-SAS2 an all-inclusive automated test suite that meets the requirements for 1.5 Gb/s, 3.0 Gb/s and 6.0 Gb/s Serial Attached SCSI (SAS) transmitter compliance testing.



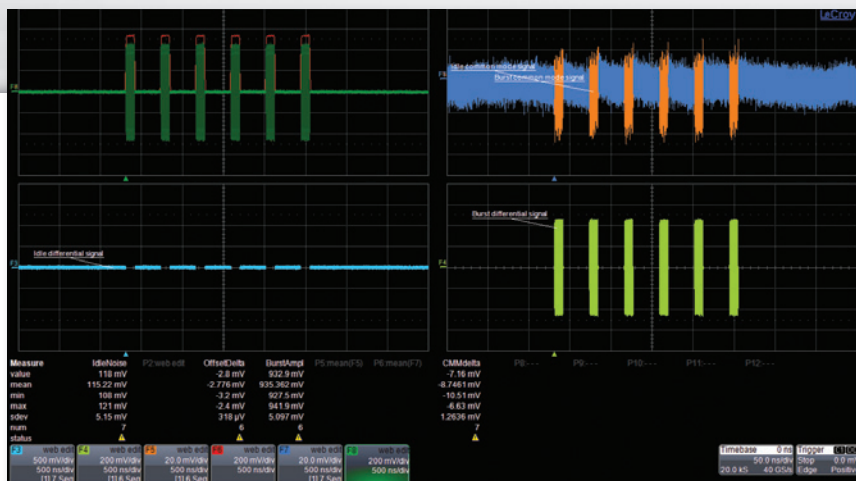
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Powerful Debugging Tools

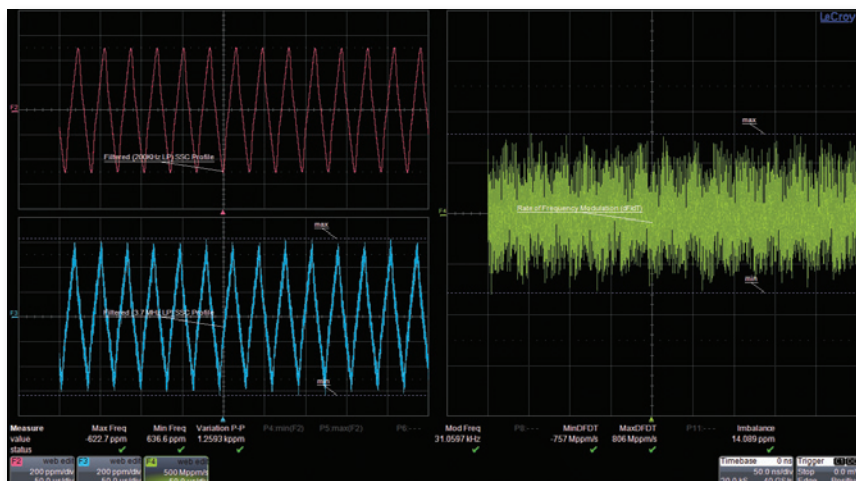
The use of Spread Spectrum Clocking (SSC) in transmitted signals is an optional feature of the SAS-2 specification. When SSC is enabled, measurements such as frequency modulation rate and deviation must also be verified per the specification. The QPHY-SAS2 software works in conjunction with the deep memory and powerful analysis library of LeCroy oscilloscopes to greatly simplify this verification process. Clock recovery circuitry and clock extraction via Phase-Locked Loops (PLLs) is another significant design consideration. Flexible clock recovery options allow for the replication of virtually any real receiver PLL configuration enabling the simulation of “what if” scenarios. Jitter results can be measured exactly as the receiver would see them.

Comprehensive and Easy-to-read Test Reports

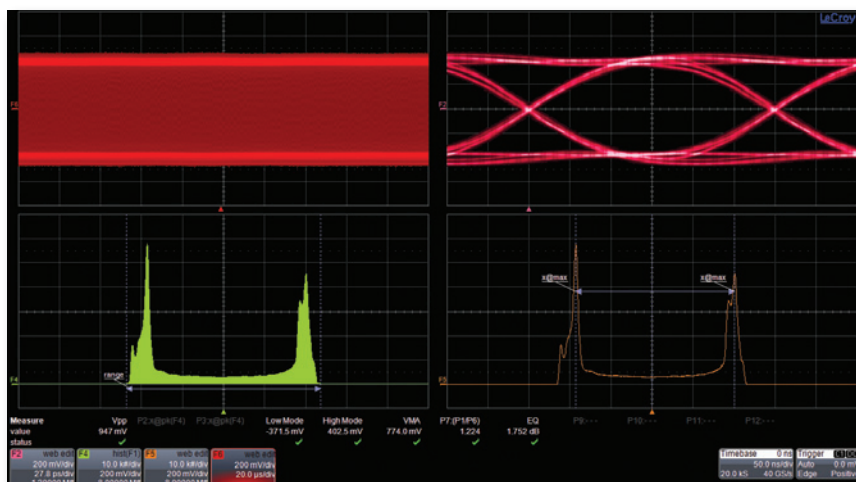
Measurement results often need to be summarized and tabulated to quickly verify specifications. This information, together with instrument and signal acquisition/test condition setups, results in a fully documented record. QPHY-SAS2 streamlines this process by incorporating an automatic HTML report generation engine. The created test reports contain tabulated numerical values for each individual test result, including PASS/FAIL and specification limit columns. Reports can also be saved as PDF, HTML or XML.



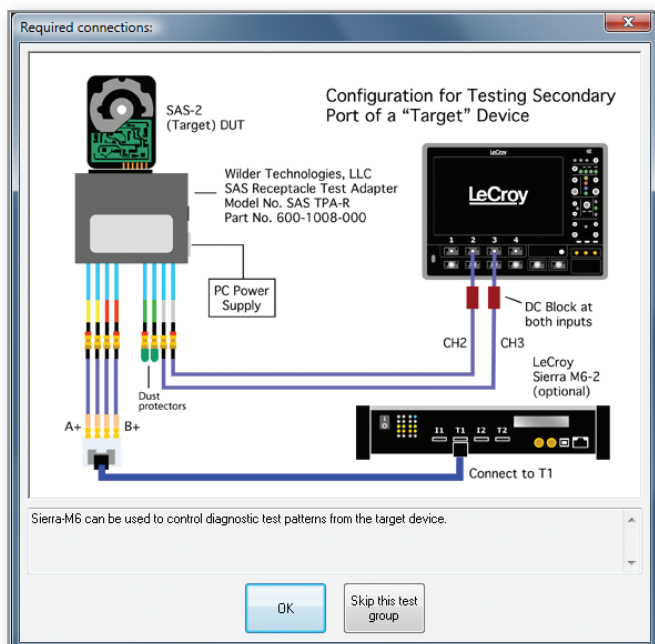
Out of Band (OOB) validation ensures that the maximum noise during OOB idle, OOB burst amplitude, OOB offset delta, and OOB common mode delta are all within the specification limits.



Spread Spectrum Clock (SSC) validation requires long memory and specialized analysis functions. LeCroy is the only manufacturer that can precisely track SSC profiles through multiple cycles in real time. SSC modulation frequency, deviation, balance and DFDT are all measured.



Peak-to-Peak Voltage, VMA and EQ measures the peak-to-peak amplitude, voltage modulation amplitude and transmitter equalization to ensure that these parameters are within the specification limits.



Connection diagrams prompt the user to set the DUT to output specific test patterns.

Advanced Debug Capability

If a compliance failure is found, LeCroy's SDA II serial data analysis package is available to help find the root cause quickly and easily. SDA II has the ability to perform Eye and Jitter measurements simultaneously and is fully integrated into the oscilloscope application software. In addition, SDA II provides insight into the measured Eye and Jitter parameters making it easier to identify the sources of problems.

LeCroy

QualiPHY

SAS Test Report

Overall result: **Fail**

DUT: DUT
 Comment: 03/04/2010 14:21:55
 Time of test: Chris
 Operator: 23° C
 Temperature:
 Configuration in use: Demo of 6.0 Gbps Tx tests using Saved Data
 Limits in use: SAS2-6G
 Standard in use: SAS
 Oscilloscope Name: CBUSO64-NB Model: SDA613Z
 Oscilloscope Serial #: CBUSO64-NB
 Computer: CBUSO64-NB
 Oscilloscope firmware version: 6.1.0.7 (Build 135572)
 QualiPHY core version: 6.1.0.1 (Build 134477)
 QualiPHY script version: 0.0.0.109
 Stylesheet version: 1.2.0.5
 Waveform path on oscilloscope: D:\LeCroy\Waveforms\SAS2DUT

Summary Table

Pass	Test	Measurement	Current Value	Test Criteria
✗	5.1.2	Tx - Max Noise During Idle	121.1 mV	x < 120.0 mV
✓	5.1.3	Tx - Min Burst Amplitude	927 mV	x > 240 mV
✓	5.1.3	Tx - Max Burst Amplitude	942 mV	x < 1.600 V
✓	5.1.4	Tx - OOB Offset Delta	-2.8 mV	-25.0 mV <= x <= 25.0 mV
✓	5.1.5	Tx - OOB Common Mode Delta	-8.7 mV	-50.0 mV <= x <= 50.0 mV
✓	5.2.2a	Tx - SSC Mod Freq	31.2 kHz	30.0 kHz <= x <= 33.0 kHz
✓	5.2.3a	Tx - SSC Down Mod Freq Min	-1.486 kppm	x > -2.400 kppm
?	5.2.3a	Tx - SSC Variation P-P	1.505 kPPM	Informational Only
✓	5.2.3a	Tx - SSC Down Mod Freq Max	19 ppm	x < 100 ppm
✓	5.2.4a	Tx - SSC DFDT Min	-354 Mppm/s	x > -850 Mppm/s
✓	5.2.4a	Tx - SSC DFDT Max	333 Mppm/s	x < 850 Mppm/s
✓	5.2.2b	Tx - SSC Mod Freq	31.1 kHz	30.0 kHz <= x <= 33.0 kHz
✓	5.2.3b	Tx - SSC Center Mod Freq Min	-623 ppm	x > -2.400 kppm
✓	5.2.3b	Tx - SSC Center Mod Freq Max	637 ppm	x < 2.400 kppm

Compliance reports contain all of the tested values, the specific test limits and screen captures. Compliance reports can be created as HTML, PDF or XML.

QualiPHY

QualiPHY is designed to reduce the time, effort and specialized knowledge needed to perform compliance testing on high-speed serial buses.

- Guides the user through each test setup
- Performs each measurement in accordance with the relevant test procedure
- Compares each measured value with the applicable specification limits
- Fully documents all results
- QualiPHY helps the user perform testing the right way—every time!

SPECIFICATIONS AND ORDERING INFORMATION

QPHY-SAS2 Test Coverage Specifications

TEST 5.1.2 – TX MAXIMUM NOISE DURING OOB IDLE

TEST 5.1.3 – TX OOB BURST AMPLITUDE

TEST 5.1.4 – TX OOB OFFSET DELTA

TEST 5.1.5 – TX OOB COMMON MODE DELTA

TEST 5.2.2 – TX SSC MODULATION FREQUENCY

TEST 5.2.3 – TX SSC MODULATION DEVIATION AND BALANCE

TEST 5.2.4 – TX SSC DFDT (INFORMATIVE)

TEST 5.3.1 – TX PHYSICAL LINK RATE LONG TERM STABILITY

TEST 5.3.2 – TX COMMON MODE RMS VOLTAGE LIMIT

TEST 5.3.4 – TX PEAK-TO-PEAK VOLTAGE

TEST 5.3.5 – TX VMA AND EQ (INFORMATIVE)

TEST 5.3.6 – TX RISE AND FALL TIMES

TEST 5.3.7 – TX RANDOM JITTER (RJ)

TEST 5.3.8 – TX TOTAL JITTER (TJ)

TEST 5.3.9 – TX WAVEFORM DISTORTION PENALTY (WDP)*

* WDP Test must be run manually using the SASWDP MATLAB script. This is not automated by QPHY-SAS2*

Ordering Information

Product Description

QualiPHY Enabled SAS-2 Software Option

Product Code

QPHY-SAS2*

* LeCroy recommends using the Wilder Tech SAS-TPA-P (SAS Gen3 Plug Adapter) or SAS-TPA-R (SAS Gen3 Receptacle Adapter).

Recommended Oscilloscopes (for 6 Gb/s Testing)

13–16 GHz, 40 GS/s, 4 Ch, 20 Mpts/Ch
Serial Data Analyzer with 15.3" WXGA
Color Display. 50 Ω and 1 M Ω Input
*SDA 813Zi, 816Zi

20, 25, 30 GHz, 80 GS/s, 2 Ch, 40 Mpts/Ch
Serial Data Analyzer with 15.3" WXGA
Color Display. 50 Ω and 1 M Ω Input
(16 GHz, 40 GS/s, 4 Ch, 20 Mpts/Ch)
*SDA 820Zi, 825Zi, 830Zi

16 GHz, 40 GS/s, 4 Ch, 20 Mpts/Ch DDA with
15.3" WXGA Color Display. 50 Ω and 1 M Ω Input
*DDA 816Zi

25 GHz, 80 GS/s, 2 Ch, 40 Mpts/Ch DDA with
15.3" WXGA Color Display. 50 Ω and 1 M Ω Input
(16 GHz, 40 GS/s, 4 Ch, 20 Mpts/Ch)
*DDA 825Zi

*WaveMaster 8 Zi oscilloscopes with the SDA II option are also supported.

Customer Service

LeCroy oscilloscopes and probes are designed, built, and tested to ensure high reliability. In the unlikely event you experience difficulties, our digital oscilloscopes are fully warranted for three years and our probes are warranted for one year.

This warranty includes:

- No charge for return shipping
- Long-term 7-year support
- Upgrade to latest software at no charge

Additional SAS-2 LeCroy Test Equipment



The Sierra Protocol Test System is the 6th generation of SAS/SATA protocol test solutions from LeCroy, the leading manufacturer of protocol test systems.



The PerT³ (Protocol-enabled Receiver and Transmitter Tolerance Tester) fills the space between physical layer test and protocol test, providing performance testing of receivers and transmitters.

For additional information please visit: www.lecroy.com



1-800-5-LeCroy
www.lecroy.com

Local sales offices are located throughout the world.
Visit our website to find the most convenient location.