

# Tektronix Logic Analyzers

## ► TLA7Sxx Serial Analyzer Modules



## Breakthrough Solutions for PCI Express Analysis

PCI Express 2.0 introduces new challenges for validation engineers. Time to market pressures require a solution that can quickly pinpoint problems. The TLA7Sxx Series serial analyzer modules provide an innovative approach to PCI Express validation that spans all layers of the protocol from the physical layer to the transaction layer.

For the first time, parallel and serial acquisition modules can be utilized in both the TLA7012 portable mainframe and the TLA7016 benchtop mainframe offering the highest degree of flexibility. Additionally, the TLA7Sxx Series serial analyzer modules have unsurpassed ability to capture and trigger on PHY layer events, whether problems exist during link training or while the link is going into or out of power management states. Complete support for L0s and L1 power management is critical as power saving techniques become more

prevalent in system designs. The TLA7Sxx Series serial analyzer acquisition capability is complemented by analysis tools which provide protocol decode and error reporting capabilities.

Hardware developers, hardware/software integrators and embedded system designers will appreciate the tight integration with the Tektronix Logic Analyzer. Correlation with other system buses or general purpose debug signals uses the TLA common system timestamp. Elusive problems that may have been propagated from other system buses can be efficiently debugged in a single environment.

Coupled with the P67xx Series mid-bus probes engineers have flexible options for platform accessibility.

## ► Features & Benefits

8/16 Channel Serial Analyzer Modules with 32M 8b/10b Symbols Memory Depth per Channel

2.5 Gb/s and 5 Gb/s Acquisition Speed for PCI Express 1.0 and PCI Express 2.0

Frequency Margining at 2.5 Gb/s +/- 10% or 5.0 Gb/s +/- 10%

Supports x1, x2, x4, x8, and x16 PCI Express Links

Sync to L0s within 12 FTS Packets (Typical)

Track 2.5 Gb/s to 5.0 Gb/s Data Rate Change

Dynamically Track Changes in Link Width

Powerful Trigger State Machine Spans all Layers of the Protocol (Physical, Data Link, and Transaction)

Hardware Filtering Extends Link Capture Time

Compression Probing System Provides Minimal Intrusion on Circuits

Internal or External Reference Clock with or without Spread Spectrum Clocking (SSC)

Protocol Decode and Error Reporting in Listing and Waveform Views

Real Time Link Status Indicators

## ► Applications

- PCI Express Validation for:
- Silicon Validation
  - Computer System Validation
  - Embedded System Debug and Validation

## ▶ Characteristics

### ▶ General

#### Number of Channels

TLA7S08	8 channels
TLA7S16	16 channels
Memory Depth	32M 8b/10b symbols per channel
Timestamp Range	62 hours
Timestamp	54-Bits at 25 ps resolution
Clocking/Acquisition Modes	TLA Module without SSC (Spread Spectrum Clocking) , External Reference Clock (100 MHz +/-10% or 125 MHz) with or without SSC
External Reference Clock Frequency Tolerance	+/- 350 ppm
Number of Mainframe Slots Required per TLA Series Module	2

### ▶ Module Configuration Requirements

#### Bi-directional Link Width

	x1	x4	x8	x16
TLA7S08	1	1	0	0
TLA7S16	1	1	1	2

### ▶ Input Characteristics (with P67xx probes)

#### Signaling

Capacitive Loading	See P67xx Probe Manual
Minimum data eye	See P67xx Probe Manual

### ▶ Acquisition Characteristics (with P67xx probes)

#### General

Dynamic link width switch latency consumes up to 48 symbols (typical)
FTS support consumes up to 12 FTS packets (typical)

### ▶ Filter Characteristics

Logical Idle	
Ordered Sets	TS1, TS2, SKP, EIOS, FTS, EIEOS
DLLPs	Ack, Nak, PM, Vendor Specific, InitFC1, InitFC2, UpdateFC
TLPs	MRd, MRdL, MWr, IORd, IOWr, CfgRd0, CfgWr0, CfgRd1, CfgWr1, Msg, MsgD, Cpl, CplD, CPILk, CPIDLk

### ▶ Trigger Characteristics

Independent Trigger States	8
Maximum Independent If/then Clauses per State	8
Maximum Number of Events per If/Then Clause	8
Maximum Number of Actions per If/Then Clause	8
Maximum Number of Event Counters per State	2
Event Counter Range	16-Bits
Number of TLP Packet Recognizers per link direction	4
Number of DLLP Packet Recognizers per link direction	4
Number of Sequence Recognizers	4
Number of Symbols per Sequence Recognizer	16
Number of Link Event Recognizers	4
Number of Global Counter/Timers	4
Trigger Event Types	Anything, TLP, DLLP, Sequence, Link Event, Counter, Timer
Trigger Action Types	Trigger, Trigger All Modules, Wait for System Trigger, Go To, Increment Counter, Decrement Counter, Reset Counter, Start Timer, Reset Timer, Reset and Start Timer, Stop Timer, Reset and Stop Timer, Set Signal Out, Clear Signal Out, Arm Module, Start Storage, Stop Storage, Do Nothing
Counter/Timer Range	48-Bits (~5 days with 3.6 ns resolution)
Storage Control (data qualification)	by State (Start/Stop)

▶ Physical Characteristics

Dimensions	TLA7S16		TLA7S08	
	mm	in.	mm	in.
Height	262	10.3	262	10.3
Width	61	2.4	61	2.4
Depth	381	15	381	15
Weight	kg	lb.	kg	lb.
Net	2.45	5.40	2.345	5.17
Shipping	6.505	14.34	6.445	14.21

▶ Ordering Information

**TLA7Sxx Logic Analyzer Modules**

TLA7Sxx Logic Analyzer Modules

**Includes:** Statement of Compliance, one-year warranty (return to Tektronix), and installation manual. Reference clock cable, reference clock jumper cable. Probes must be ordered separately.

Module	
TLA7S16	16 channel Serial Analyzer module, 2.5 Gb/s and 5.0 Gb/s acquisition, 32M symbols depth per channel
TLA7S08	8 channel Serial Analyzer module, 2.5 Gb/s and 5.0 Gb/s acquisition, 32M symbols depth per channel

▶ Logic Analyzer TLA7Sxx Module Options

Opt. 88	Factory Install
Opt. L0	English Manual
Opt. L5	Japanese Manual
Opt. L10	Russian Manual
Opt. L99	No Manual

**Logic Analyzer Probe Selection Guidelines**

A flexible choice of logic analyzer probes is available for use with TLA7Sxx modules. Please see the logic analyzer probe data sheets for further information.

▶ TLA7Sxx Optional Accessories

Reference Clock Cable	672-6285-00
Reference Clock Jumper Cable	174-5392-00

▶ TLA7Sxx Service Options

Opt. C3	Calibration Service 3 Years
Opt. C5	Calibration Service 5 Years
Opt. CA1	Single Calibration
Opt. R3	Repair Service 3 Years
Opt. R5	Repair Service 5 Years
Opt. IN	Product Installation Service

▶ TLA7Sxx Service Products

TLA7Sxx Service Products	Repair Service Coverage
TLA7S08-R1PW	1 Year Post Warranty
TLA7S08-R2PW	2 Years Post Warranty
TLA7S08-R3DW	3 Years (includes Product Warranty Period). 3 Year period starts at time of instrument purchase
TLA7S08-R5DW	5 Years (includes Product Warranty Period). 5 Year period starts at time of instrument purchase
TLA7S16-R1PW	1 Year Post Warranty
TLA7S16-R2PW	2 Years Post Warranty
TLA7S16-R3DW	3 Years (includes Product Warranty Period). 3 Year period starts at time of instrument purchase
TLA7S16-R5DW	5 Years (includes Product Warranty Period). 5 Year period starts at time of instrument purchase

## Tektronix Logic Analyzers

### ► TLA7Sxx Serial Analyzer Modules

## Contact Tektronix:

ASEAN / Australasia (65) 6356 3900

Austria +41 52 675 3777

Balkan, Israel, South Africa and other ISE Countries +41 52 675 3777

Belgium 07 81 60166

Brazil & South America (11) 40669400

Canada 1 (800) 661-5625

Central East Europe, Ukraine and the Baltics +41 52 675 3777

Central Europe & Greece +41 52 675 3777

Denmark +45 80 88 1401

Finland +41 52 675 3777

France +33 (0) 1 69 86 81 81

Germany +49 (221) 94 77 400

Hong Kong (852) 2585-6688

India (91) 80-22275577

Italy +39 (02) 25086 1

Japan 81 (3) 6714-3010

Luxembourg +44 (0) 1344 392400

Mexico, Central America & Caribbean 52 (55) 5424700

Middle East, Asia and North Africa +41 52 675 3777

The Netherlands 090 02 021797

Norway 800 16098

People's Republic of China 86 (10) 6235 1230

Poland +41 52 675 3777

Portugal 80 08 12370

Republic of Korea 82 (2) 6917-5000

Russia & CIS +7 (495) 7484900

South Africa +27 11 206 8360

Spain (+34) 901 988 054

Sweden 020 08 80371

Switzerland +41 52 675 3777

Taiwan 886 (2) 2722-9622

United Kingdom & Eire +44 (0) 1344 392400

USA 1 (800) 426-2200

For other areas contact Tektronix, Inc. at: 1 (503) 627-7111

Updated 01 June 2007

Our most up-to-date product information is available at:  
[www.tektronix.com](http://www.tektronix.com)

Product(s) are manufactured  
in ISO registered facilities.



Copyright © 2007, Tektronix. All rights reserved. Tektronix products are covered by U.S. and foreign patents, issued and pending. Information in this publication supersedes that in all previously published material. Specification and price change privileges reserved. TEKTRONIX and TEK are registered trademarks of Tektronix, Inc. All other trade names referenced are the service marks, trademarks or registered trademarks of their respective companies.

8/07 HB/WOW

52W-21060-0

**Tektronix**  
Enabling Innovation