

Tektronix Logic Analyzers

▶ TLA7Axx Logic Analyzer Modules



▶ *The TLA700 Series offers the highest performance for today's demanding applications and consists of portable and benchtop modular mainframes with expansion mainframe capability.*

Breakthrough Solutions for Real-time Digital Systems Analysis

Today's digital design engineers face daily pressures to speed new products to the marketplace. The TLA7Axx Series logic analyzer modules answer the need with breakthrough solutions for the entire design team, providing the ability to quickly monitor, capture and analyze real-time digital system operation in order to debug, verify, optimize and validate digital systems.

Hardware developers, hardware/software integrators and embedded software developers will appreciate the range of capabilities of the TLA7Axx Series logic analyzer modules. Its broad feature set includes capturing and correlating elusive hardware

and software faults; providing simultaneous state, high-speed timing, and analog analysis through the same probe; using deep state acquisition to find the cause of complex problems; real-time, non-intrusive software execution tracing that correlates to source code and to hardware events; and non-intrusive connectorless probing.

The TLA7Axx Series logic analyzer modules offer Tektronix' breakthrough MagniVu™ technology for providing high-speed sampling (up to 8 GHz) that dramatically changes the way logic analyzers work and enables them to provide startling new measurement capabilities.

▶ Features & Benefits

34/68/102/136 Channel Logic Analyzers with up to 256 Mb Depth

500 ps (2 GHz)/32 Mb Deep Memory Timing Analysis

MagniVu™ Acquisition Technology Provides up to 125 ps (8 GHz) Timing Resolution to Find Difficult Problems Quickly

Up to 800 MHz State Acquisition Analysis of Synchronous Digital Circuits

Simultaneous State, High-speed Timing, and Analog Analysis Through the Same Probe Pinpoints Elusive Faults Without Double Probing

Glitch and Setup/Hold Triggering and Display Finds and Displays Elusive Hardware Problems

Transitional Storage Extends the Signal Analysis Capture Time

Simultaneous Analog and Digital Measurements Through the Same Probe

Compression Probing System With 0.5 pF Capacitive Loading Eliminates Need For On-board Connectors, Minimizes Intrusion on Circuits and is Ideal for Differential Signal Applications

Broad Processor and Bus Support

▶ Applications

Hardware Debug and Verification

Processor/Bus Debug and Verification Including Source Synchronous Clocking

Embedded Software Integration, Debug and Verification

COMPUTING

COMMUNICATIONS

VIDEO

Tektronix Logic Analyzers

► TLA7Axx Logic Analyzer Modules

The TLA7Axx modules offer high-speed state synchronous capture, high-speed timing capture and analog capture through the same set of probes. They capitalize on MagniVu™ technology to offer up to 125 ps timing on all channels, glitch and setup/hold triggering and display and timestamp that is always on at up to 125 ps resolution. The TLA7Axx also offers new capabilities to capture source synchronous applications.

► Characteristics

General

Number of Channels (all channels are acquired including clocks) –

TLA7AA1: 34 channels (2 are clock channels).

TLA7AA2, TLA7AB2: 68 channels

(4 are clock channels).

TLA7AA3: 102 channels (4 are clock and

2 are qualifier channels).

TLA 7AA4, TLA 7AB4: 136 channels (4 are clock

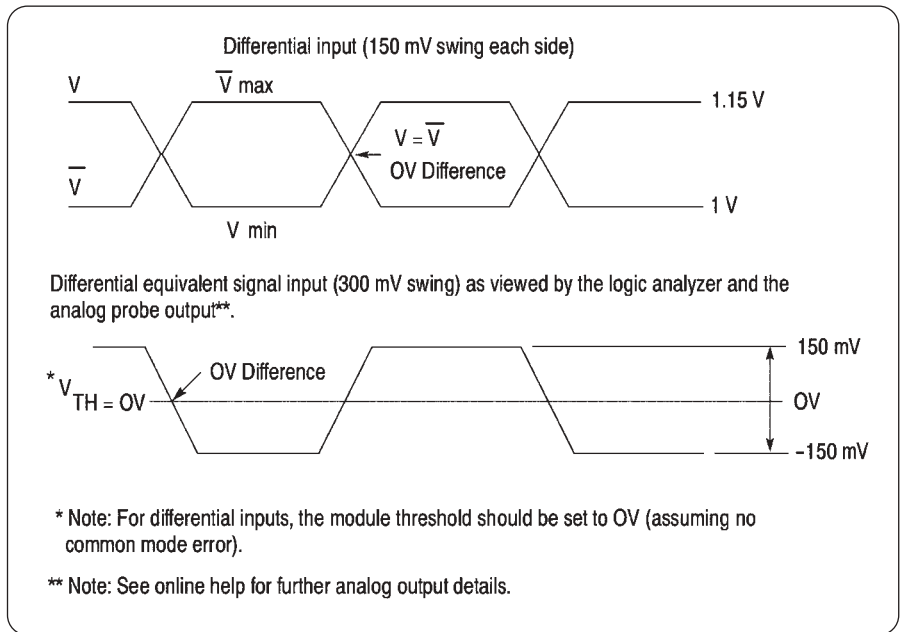
and 4 are qualifier channels).

Channel Grouping: No limit to number of groups or number of channels per group (all channels can be reused in multiple groups).

TLA700 Module “Merging” –

Five 102 channel or 136 channel modules can be “merged” to make up to a 680 channel module. Merged modules exhibit the same depth as the lesser of the five individual modules.

Word/setup-and-hold/glitch/transition recognizers span all five modules. Range recognizers limited to three module merge. Only one set of clock connections is required.



State Acquisition Characteristics (with P6810, P6860, P6864, P6880, P6960, or P6980 probes)

► State Acquisition

Full Channel	Half Channel	Quarter Channel
120 MHz Standard	235 MHz/235 Mb/s or 240 Mb/s (DDR)	235 MHz/470 Mb/s
235 MHz Optional	450 MHz/450 Mb/s or 470 Mb/s (DDR)	450 MHz/900 Mb/s
450 MHz Optional	800 MHz/800 Mb/s or 900 Mb/s (DDR)	625 MHz/1.25 Gb/s

Time Stamp – 51-Bits at 125 ps resolution (3.25 days duration).

Clocking/Acquisition Modes – Internal, internal 2X, internal 4X, external, external 2X, external 4X, source synchronous. 8 GHz MagniVu™ high-speed timing is available simultaneous with all modes.

Number of Mainframe Slots Required per TLA700 Module – 2.

Input Characteristics (with P6810, P6860, P6864, P6880, P6960, or P6980 probes)

Capacitive Loading –

0.5 pF typical clock/data (P6960, P6980).
0.7 pF typical clock/data (P6810, P6860, P6864, P6880).
(1.0 pF for P6810 in group configuration).

Threshold Selection Range –

From –2.0 V to +4.5 V in 5 mV increments. Threshold presets include TTL (1.5 V), CMOS (1.65 V), ECL (–1.3 V), Differential (0 V) and user defined.

Threshold Selection Channel Granularity –

Separate selection for each of the clock/qualifier channels and one per group of 16 data channels for each 34 channel probe.

Threshold Accuracy (including probe) – ±(35 mV + 1%).

Input Voltage Range –

Operating: –2.5 V to 5.0 V.
Nondestructive: ±15 V.

Minimum Input Signal Swing – 300 mV (single-ended).
 $V_{MAX} - V_{MIN} > 150$ mV (differential).

Input Signal Minimum Slew Rate – 200 mV/ns typical.

State Memory Depth with Timestamps – (quarter/half/full channels) 512/256/128 Kb, 2 Mb/1 Mb/512 Kb, 8/4/2 Mb, 32/16/8 Mb, 128/64/32 Mb, 256/128/64 Mb per channel.

Setup and Hold Time Selection Range – From 16 ns before, to 8 ns after clock edge in 125 ps increments. Range may be shifted towards the setup region by 0 ns [+8, –8] ns, 4 ns [+12, –4] ns, or 8 ns [+16, 0] ns.

Setup-and-hold Window –

All Channels: 625 ps typical.
Single Channel: 500 ps typical.

Minimum Clock Pulse Width – 500 ps (P6860, P6880), 700 ps (P6810).

Active Clock Edge Separation – 400 ps.

Demux Channel Selection – Channels can be demultiplexed to other channels through user interface with 8 channel granularity.

Source Synchronous Clocking –

Up to four “Fast Latches” per module (20 max per 5-way merge) to strobe source-synchronous buses into TLA7Axx Modules.

Four sets of any predefined “Fast Latches” may be combined with qualification data and data pipelining to store four independent source-synchronous data buses.

Two “Fast Latches” may be combined to address DDR applications.

Timing Acquisition Characteristics (with P6810, P6860, P6864, P6880, P6960, or P6980 probes)

MagniVu™ Timing –

125 ps max, adjustments to 250 ps, 500 ps, 1 ns, and 2 ns.

MagniVu Timing Memory Depth – 16 Kb per channel, with adjustable trigger position.

Deep Timing Resolution (quarter/half/full channels) – 500 ps/1 ns/2 ns to 50 ms.

Deep Timing Resolution with Glitch Storage Enabled – 4 ns to 50 ms.

Deep Timing Memory Depth (quarter/half/full channels with timestamps and with or without transitional storage) – 512/256/128 Kb, 2 Mb/1 Mb/512 Kb, 8/4/2 Mb, 32/16/8 Mb, 128/64/32 Mb, 256/128/64 Mb per channel.

Deep Timing Memory Depth with Glitch Storage Enabled – Half of default main memory depth.

Channel-to-channel Skew – 300 ps typical.

Minimum Recognizable Pulse/Glitch Width (single channel) – 500 ps (P6860, P6880), 750 ps (P6810).

Minimum Detectable Setup/Hold Violation – 250 ps.

Minimum Recognizable Multi-channel Trigger Event – Sample period + channel-to-channel skew.

Analog Acquisition Characteristics (with P6810, P6860, P6864, P6880, P6960, or P6980 probes)

Bandwidth – 2 GHz typical.

Attenuation – 10x, ±1%.

Offset and Gain (Accuracy) – ±50 mV, ±2% of Signal Amplitude.

Channels Demultiplexed – 4.

Run/Stop Requirements – None, analog outputs are always active.

Tektronix Logic Analyzers

► TLA7Axx Logic Analyzer Modules

iView™ Analog Outputs – Compatible with any internal TLA7Dx/Ex DSO module or supported TDS external oscilloscope.

iView Analog Output BNC Cable – Low loss, 10x, 36 in.

Trigger Characteristics Independent Trigger States – 16.

Maximum Independent If/Then Clauses per State – 16.

Maximum Number of Events per If/Then Clause – 8.

Maximum Number of Actions per If/Then Clause – 8.

Maximum Number of Trigger Events – 18 (2 counter/timers plus any 16 other resources).

Number of Word Recognizers – 16.

Number of Transition Recognizers – 16.

Number of Range Recognizers – 4.

Number of Counter/Timers – 2.

Trigger Event Types – Word, group, channel, transition, range, anything, counter value, timer value, signal, glitch, setup-and-hold violation, snapshot.

Trigger Action Types – Trigger module, trigger all modules, trigger main, trigger MagniVu™, store, don't store, start store, stop store, increment counter, decrement counter, reset counter, start timer, stop timer, reset timer, snapshot current sample, goto state, set/clear signal, do nothing.

Maximum Triggerable Data Rate – 1250 Mb/s (4X clocking mode).

Trigger Sequence Rate – DC to 500 MHz (2 ns).

Counter/Timer Range – 51 Bits each (>50 days at 2 ns).

Counter Rate – DC to 500 MHz (2 ns).

Timer Clock Rate – 500 MHz (2 ns).

Counter/Timer Latency – 2 ns.

Range Recognizers – Double bounded (can be as wide as any group (408 channel max), must be grouped according to specified order of significance).

Setup-and-Hold Violation Recognizer Setup Time Range – From 8 ns before to 7 ns after clock edge in 125 ps increments. This range may be shifted towards the positive region by 0 ns, 4 ns, or 8 ns.

Setup-and-Hold Violation Recognizer Hold Time Range – From 7 ns before to 8 ns after clock edge in 125 ps increments. This range may be shifted towards the positive region by 0 ns [+8, -8] ns, 4 ns [+12, -4] ns, or 8 ns [+16, 0] ns.

Trigger Position – Any data sample.

MagniVu™ Trigger Position – MagniVu position can be set from 0% to 60% centered around the MagniVu trigger.

Storage Control (data qualification) – Global (conditional), by state (start/stop), block, by trigger action, or transitional. Also force main prefill selection available.

Physical Characteristics

Dimensions	mm	in.
Height	262	10.3
Width	61	2.4
Depth	381	15
Weight	kg	lb.
Net	3.1	6.7
Shipping	6.3	13.7

P6810 Probe Cable Length – 1.8 m (6 ft.).

P6860 Probe Cable Length – 1.8 m (6 ft.).

P6864 Probe Cable Length – 1.8 m (6 ft.).

P6880 Probe Cable Length – 1.8 m (6 ft.).

All four probes have the same electrical length and are delay matched.

► Ordering Information

TLA7Axx Logic Analyzer Modules

Includes: Probe retainer bracket, probe manual, certificate of calibration, one-year warranty (return to Tektronix), and user manual.

Probes must be ordered separately – Order Opt. 2P (P6810) or Opt. 3P (P6860) or Opt. 4P (P6880). You can also choose to order any combination and quantity of probes by ordering the P6810, P6860 or P6880 individually.

TLA7AA1 – 34 channel Logic Analyzer module, 8 GHz timing, 120 MHz state, 128 Kb depth (must select one probe option below). Options for up to 32 Mb depth and/or up to 450 MHz state.

TLA7AA2 – 68 channel Logic Analyzer module, 8 GHz timing, 120 MHz state, 128 Kb depth (must select one probe option below). Options for up to 32 Mb depth and/or up to 450 MHz state.

TLA7AA3 – 102 channel Logic Analyzer module, 8 GHz timing, 120 MHz state, 128 Kb depth (must select one probe option below). Options for up to 32 Mb depth and/or up to 450 MHz state.

TLA7AA4 – 136 channel Logic Analyzer module, 8 GHz timing, 120 MHz state, 128 Kb depth (must select one probe option below). Options for up to 32 Mb depth and/or up to 450 MHz state.

TLA7AB2 – 68 channel Logic Analyzer module, 8 GHz timing, 120 MHz state, 64 Mb depth (must select one probe option below). Option for up to 450 MHz state.

TLA7AB4 – 136 channel Logic Analyzer module, 8 GHz timing, 120 MHz state, 64 Mb depth (must select one probe option below). Option for up to 450 MHz state.

Logic Analyzer TLA7AAx Module Options

(Base configuration is 128 Kb depth at 120 MHz state).

Opt 1S – Increase to 512 Kb Depth at 120 MHz State.

Opt 2S – Increase to 2 Mb Depth at 120 MHz State.

Opt 3S – Increase to 8 Mb Depth at 120 MHz State.

Opt 4S – Increase to 32 Mb Depth at 120 MHz State.

Opt 5S – Increase to 128 Kb Depth at 235 MHz State.

Opt 6S – Increase to 512 Kb Depth at 235 MHz State.

Opt 7S – Increase to 2 Mb Depth at 235 MHz State.

Opt 8S – Increase to 8 Mb Depth at 235 MHz State.

Opt 9S – Increase to 32 Mb Depth at 235 MHz State.

Opt AS – Increase to 128 Kb Depth at 450 MHz State.

Opt BS – Increase to 512 Kb Depth at 450 MHz State.

Opt CS – Increase to 2 Mb Depth at 450 MHz State.

Opt DS – Increase to 8 Mb Depth at 450 MHz State.

Opt ES – Increase to 32 Mb Depth at 450 MHz State.

Logic Analyzer TLA7ABx Module Options

(Base configuration is 64 Mb depth at 120 MHz state).

Opt 1S – Increase to 64 Mb Depth at 235 MHz State.

Opt 2S – Increase to 64 Mb Depth at 450 MHz State.

Tektronix Logic Analyzers

▶ TLA7Axx Logic Analyzer Modules

Logic Analyzer Probe Selection Guidelines

A flexible choice of logic analyzer probes is available for use with TLA7Axx modules.

▶ Logic Analyzer Probes

Category	P6810	P6960	P6860	P6980	P6880	P6864
Logic Analyzer Used	TLA7Axx Logic Analyzer Modules TLA7Nax Logic Analyzer Modules					
Recommended Use	For most general-purpose applications where signal integrity is critical.	For applications requiring the best signal density and a quick reliable attachment or for general-purpose probing with flying leads.	For applications requiring good signal density and a quick reliable attachment.	For applications requiring full differential probing with the best signal density and a quick reliable attachment.	For applications requiring full differential probing with good signal density and a quick reliable attachment.	For high data rate (>450 MHz) applications that require internal 4X demux and a connectorless probe attachment.
Attachment to Target System	Fits both 0.100 in. and 2 mm square pin configurations	D-Max™ Probing Technology compression cLGA with optional flying lead set.	Connectorless compression elastomer	D-Max Probing Technology compression cLGA	Connectorless compression elastomer	Connectorless compression elastomer
Probe Type	34-ch General Purpose	34-ch High-density	34-ch High-density	34-ch Differential High-density	34-ch Differential High-density	17 channel probe, signals demuxed to 68 channels
Logic Signals Supported	Differential Clock Differential Data	Differential Data Single-ended Data	Differential Clock Single-ended Data	Differential Clock Differential Data	Differential Clock Differential Data	Differential Clock Single-ended Data
Probe Load AC/DC	0.7 pF/20 kΩ to ground	0.5 pF/20 kΩ to ground	0.7 pF/20 kΩ to ground	0.5 pF/20 kΩ to ground	0.7 pF/20 kΩ to ground	0.7 pF/20 kΩ to ground

TLA700 Series Module Upgrades

You can increase the memory depth and state speed of most existing TLA700 Series logic analyzer modules. You can also install a TLA7Axx logic analyzer module into an existing TLA714/715/720/721/7XM mainframe. Please refer to the TLA Family Upgrade Guide for further details.

TLA7Axx Service Options

Opt. C3 – Calibration Service 3 Years.

Opt. C5 – Calibration Service 5 Years.

Opt. D1 – Calibration Data Report.

Opt. D3 – Calibration Data Report 3 Years (with Option C3).

Opt. D5 – Calibration Data Report 5 Years (with Option C5).

Opt. R3 – Repair Service 3 Years.

Opt. R5 – Repair Service 5 Years.

Opt. IN – Product Installation Service.

Tektronix Logic Analyzers

▶ TLA7Axx Logic Analyzer Modules

Contact Tektronix:

ASEAN / Australasia / Pakistan (65) 6356 3900

Austria +43 2236 8092 262

Belgium +32 (2) 715 89 70

Brazil & South America 55 (11) 3741-8360

Canada 1 (800) 661-5625

Central Europe & Greece +43 2236 8092 301

Denmark +45 44 850 700

Finland +358 (9) 4783 400

France & North Africa +33 (0) 1 69 86 80 34

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

Mexico, Central America & Caribbean 52 (55) 56666-333

The Netherlands +31 (0) 23 569 5555

Norway +47 22 07 07 00

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

Poland +48 (0) 22 521 53 40

Republic of Korea 82 (2) 528-5299

Russia, CIS & The Baltics +358 (9) 4783 400

South Africa +27 11 254 8360

Spain +34 (91) 372 6055

Sweden +46 8 477 6503/4

Taiwan 886 (2) 2722-9622

United Kingdom & Eire +44 (0) 1344 392400

USA 1 (800) 426-2200

USA (Export Sales) 1 (503) 627-1916

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

Last Update March 01, 2004

Our most up-to-date product information is available at:

www.tektronix.com

Product(s) are manufactured
in ISO registered facilities.



Copyright © 2004, Tektronix, Inc. 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.

05/04 HB/WOW

52W-15055-3