TLA7000 Logic Analyzers

TLA7000 Series Data Sheet

The modular TLA7000 logic analyzer series provides the speed and flexibility you need to capture logic detail on today's fastest designs. Pinpoint the source of elusive errors and gain the visibility you want with large easy-to-read displays, fast data throughput, and time-correlated views of analog and digital signals through the same probe.

Key performance

- MagniVu™ acquisition technology provides up to 20 ps (50 GHz) timing resolution to find and measure elusive timing problems quickly
- Up to 156 ps (6.4 GHz)/512 Mb Record length timing analysis
- Up to 1.4 GHz Clock with up to 3.0 Gb/s Data with a Data Valid window of 180 ps for state acquisition analysis of high-performance synchronous buses
- D-Max® 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
- PCI Express Gen1 through Gen3 including Gen3 Protocol to physical layer analysis for link widths from x1 through x16 with up to 8.0 GT/s acquisition rates and up to 16 GB deep memory (for x16 link)

Key features

- 68/102/136 channel logic analyzers with up to 512 Mb record length
- Glitch and Setup/Hold triggering and display finds and displays elusive hardware problems
- Transitional storage extends the signal analysis capture time for signals that transition infrequently
- Simultaneous state, high-speed timing, and analog analysis through the same probe pinpoints elusive faults
- Trace problems from symptom back to root cause in real time across multiple modules by viewing time-correlated data in a wide variety of display formats
- Comprehensive PCI Express probing solutions, including midbus, slot interposer, and solder-down connectors
- Modular mainframes provide flexibility and expandability
- Broad processor and bus support

Applications

- MIPI protocol analysis
- DDR2 and DDR3 debug and verification
- Signal integrity
- PCI Express debug from Protocol layer to Physical layer
  - Silicon validation
  - Computer system validation
  - Embedded system debug and validation
- Processor/Bus debug and verification
- Embedded software integration, debug, and verification

Breakthrough solutions for real-time digital systems analysis

Tektronix provides breakthrough digital systems analysis tools that enable digital hardware and software designers to capture and analyze the source of elusive problems that threaten product development schedules. The TLA7000 Series provides the speed you need to capture the source of those elusive problems, plus the visibility you want with large displays and fast system data throughput, while protecting your investment with compatibility with all TLA modules.

TLA7012 and TLA7016 mainframes

The TLA7012 Portable and TLA7016 Benchtop mainframes are modular mainframes that accept TLA logic analyzer and pattern generator modules. The TLA7012 and TLA7016 can be configured as either master or expansion mainframes to provide solutions for large numbers of buses and high channel-count requirements.

The TLA7012 Portable Mainframe offers a familiar work environment for the TLA application software. It provides multiple display capability for extended desktop viewing, in addition to an internal DVD-RW, hard drive, and multiple USB ports for expansion. A replaceable hard drive is standard, ideal for security or enabling individual team members to store personal setups and data. Trigger in/out connections provide an interface to other external instrumentation, such as Tektronix oscilloscopes, for correlating measurement results.

TLA7ACx and TLA7BBx modules

Today's digital design engineers face daily pressures to speed new products to the marketplace. The TLA7ACx and TLA7BBx 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 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 TLA7ACx and TLA7BBx 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, nonintrusive software execution tracing that correlates to source code and to hardware events; and nonintrusive connectorless probing.

The TLA7BBx Series logic analyzer modules offer breakthrough MagniVu™ technology by Tektronix for providing high-speed sampling (up to 50 GHz) that dramatically changes the way logic analyzers work and enables new measurement capabilities. The TLA7BBx 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 20 ps timing on all channels, glitch and setup/hold triggering, and display and time stamp that is always on at up to 20 ps resolution.

To complement the high-performance logic analyzer modules, the TLA7ACx Series logic analyzer modules offer all the same debug and verification functionality, but with performance levels more suited to the embedded designer. The TLA7ACx modules offer high-speed state synchronous capture, high-speed timing capture, and analog capture through the same set of probes. MagniVu technology offering up to 125 ps timing on all channels, glitch and setup/hold triggering, and display and time stamp that is always on at 125 ps resolution is available as standard on all models.

Module	Timing resolution	State speed	Memory
TLA7ACx	125 ps (8 GHz)	Up to 800 MHz	Up to 128 Mb
TLA7BBx	20 ps (50 GHz)	Up to 1.4 GHz	Up to 64 Mb

P6800 and P6900 series probes

With the industry's lowest capacitance, the P6800 and P6900 Series logic analyzer probes protect the integrity of your signal - critical for connecting to fast buses like DDR2 and DDR3 where low intrusion is key to the proper operation of your design. Select from single-ended and differential probes and a variety of attachment mechanisms, including the "connectorless" compression connection that eliminates the need for onboard connectors.

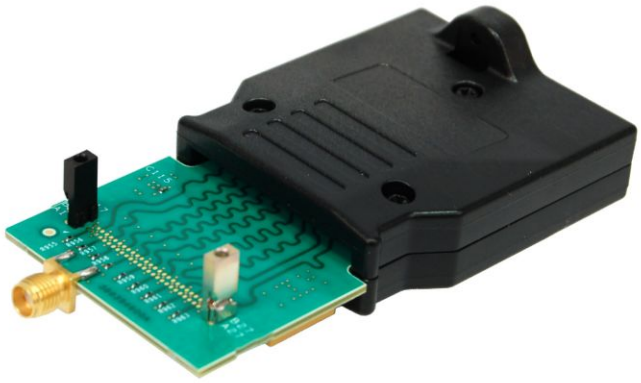
For applications where circuit board space is at a premium, the high-density P6900 Series with D-Max® Probing Technology offers the industry's smallest available footprint. For debugging the signal integrity glitches common on fast buses, the P6900 Series works with the TLA7BBx and TLA7ACx modules and their iLink™ Tool Set capability to provide iCapture™ simultaneous digital-analog acquisition. This allows you to clearly see the time-correlated digital and analog behavior of your design, without the extra capacitance and setup time of double-probing.

For differential signaling applications where signal integrity is critical, the high-fidelity P6980 and P6982 are perfect for those applications where noise performance is critical. In addition, the P6980 and P6982 can support the small voltage swings that differential signaling often requires. The P6962DBL, when used with a TLA7000 Series logic analyzer with the TLA7BBx module, supports digital validation and debug of DDR3 memory with data rates up to 1600 mega-transfers per second. For board designs that do not include high-density probe footprints, the P6960 with its companion flying leadset provides the flexibility required to meet many different debug needs.

AutoDeskew and Customer Deskew fixture

Tektronix recommends AutoDeskew, a standard feature available within the TLA application, for deskewing probe channels and setting the sample point for synchronous applications. However, for tight time alignment in both synchronous and asynchronous applications (including MagniVu), Tektronix recommends the Customer Deskew fixture. This is an optional accessory to the TLA7BBx modules that is used to perform a channel-to-channel deskew of the probes connected to the TLA7BBx module to ensure tight time alignment between all channels across all probes. Two different fixtures are available:

- Customer Deskew fixture for P6800 series probes
- Customer Deskew fixture for P6900 series probes



For ordering details, please see the *Ordering information* section.

TLA7SAxx PCI Express logic protocol analyzer modules

PCI Express 3.0 introduces new challenges for validation engineers. Time-to-market pressures require a solution that can quickly pinpoint problems. The TLA7SAxx Series logic protocol 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.

Reduce your time to information by viewing and searching up to 16 GB deep memory in just seconds with rapid display updates enabled by our industry-leading hardware acceleration. With improved information density you can then quickly ascertain the health of the system and identify patterns of interest (errors, specific transactions, ordered sets, etc.) with statistics using the Summary Profile window. Protocol behavior can be viewed at the packet and transaction level interspersed with physical layer activity in a single innovative Transaction window. Further insight into physical layer details can be gained with the unique Listing window showing packet details at the symbol level by lane and you can view individual lane activity correlated with analog waveforms from your high-bandwidth oscilloscope in the Waveform window.

Hardware developers, hardware/software integrators, and embedded system designers will appreciate the tight integration with the Tektronix Logic Analyzer. This provides visibility of complete system interactions with time-correlated, multibus analysis on a single display. Cross triggering and a common global time stamp enables accurate and efficient debugging by showing exactly what was happening on one bus relative to another at any given instant of time. Coupled with the P67SA00 Series probing solutions, engineers have flexible options for platform accessibility.

Refer to the *TLASA00 Series Datasheet* (52W-25691-xx) for additional information on the Tektronix PCI Express Logic Protocol Analyzer modules.

P67SA00 series probes for PCI Express

The P67SA00 series probes provide validation engineers with a comprehensive set of PCI Express probing solutions, including midbus, slot interposer, and solder-down connectors. With support for PCI Express Gen3 channel lengths up to 24 in. With two connectors, these probes offer minimal electrical loading with the highest signal fidelity and active equalization to ensure accurate data recovery of closed eyes. All P67SA00 series probes feature a graphical lane swizzling capability for maximum flexibility to accommodate unique circuit board layouts.

TLA7012 and TLA7016 Mainframe specifications

General characteristics

Instrument slots	
TLA7012	Holds two TLA modules
TLA7016	Holds six TLA modules
Expansion capability	The TLA7000 Series mainframes can be used as either master or expansion mainframes (TL708EX 8-port Instrument Hub and Expander is required for 3-8 mainframes connected together using TekLink™ cable)
TLA7012	Up to eight TLA7012 mainframes can be used, providing support for up to 16 TLA modules (2,176 channels)
TLA7016	Up to eight TLA7016 mainframes can be used, providing support for up to 48 TLA modules (6,528 channels)

TLA7012 PC specifications

Operating system	Microsoft® Windows® XP Professional and Multilingual User Interface Pack
Processor	2 GHz Intel® Pentium® M-760
Chipset	Intel® 915GM
Memory	1 GB DDR PC 533 MHz (SODIMM), expandable to 2 GB DDR memory
Sound	Line In and Mic Out connectors
Removable hard drive	3.5 in., ≥80 GB Serial ATA, 7200 RPM
Optical drive	Internal 4.7 GB DVD±R/RW
External display port type	One (1) DVI-D (primary - digital only) and one (1) DVI-I (secondary - digital and analog) connectors
External display resolution	Up to 1600 × 1200 noninterlaced at 32-bit color, each for both primary and secondary displays
Network port	One (1) 10/100/1000 LAN with RJ-45 connector
USB port	Seven (7); three (3) in front and four (4) in rear

TLA7012 integral controls

Front panel display	Size: 15 in. (38.1 cm) diagonal Type: Active-matrix color TFT LCD with backlight ion: 1024×768
Simultaneous display capability	Both the front-panel and one external display can be used simultaneously at 1024 × 768 resolution
Front panel	General-purpose knob with dedicated hotkeys and knobs for horizontal and vertical scaling and scrolling
Touchscreen	Available with Option 18

Integrated View (iView™) capability

TLA mainframe configuration requirements	GPIB-iView™ (Opt. 1C) USB-iView™ (Opt. 2C)
Number of Tektronix oscilloscopes that can be connected to a TLA system	1
External oscilloscopes supported	More than 100. For a complete listing of current supported oscilloscopes, please visit our website http://www.tektronix.com/iview.
TLA connections	USB, Trigger In, Trigger Out, Clock Out
Oscilloscope connections	
GPIB-iView™ (Opt. 1C)	GPIB, Trigger In, Trigger Out, Clock In (when available)
USB-iView™ (Opt. 2C)	USB Device Port, Trigger In, Trigger Out
Setup	iView™ external oscilloscope wizard automates setup.
Data correlation	After oscilloscope acquisition is complete, the data is automatically transferred to the TLA and time correlated with the TLA acquisition data.
Deskew	The oscilloscope and TLA data is automatically deskewed and time correlated when using the iView™ external oscilloscope cable.
GPIB-iView™ (Opt. 1C) External oscilloscope cable length	2 m (6.6 ft.)
USB-iView™ (Opt. 2C) External oscilloscope cable length	2 m (6 ft.)

Symbolic support

Number of symbols/ranges	Unlimited (limited only by amount of virtual memory available on TLA)
Object file formats supported	IEEE695, OMF 51, OMF 86, OMF 166, OMF 286, OMF 386, COFF, Elf/Dwarf 1 and 2, Elf/Stabs, TSF (If your software development tools do not generate output in one of the above formats, TSF, or the Tektronix symbol file, a generic ASCII file format is supported. The generic ASCII file format is documented in the TLA online help). If a format is not listed, please contact your local Tektronix representative.

External instrumentation interface

System Trigger output	Asserted whenever a system trigger occurs (TTL-compatible output, back-terminated into 50 Ω)
System Trigger input	Forces a system trigger when asserted (adjustable threshold between 0.5 V and 1.5 V, edge sensitive, falling-edge latched)
External Signal output	Can be used to drive external circuitry from a module's trigger mechanism (TTL-compatible output, back-terminated into 50 Ω)
External Signal input	Can be used to provide an external signal to arm or trigger any or all modules (adjustable threshold between 0.5 V and 1.5 V, level sensitive)

Power

Power	
Voltage range/frequency	90-250 V AC at 45-66 Hz
	100-132 V AC at 360-440 Hz
Input current	7 A maximum at 90 V AC (70 A surge)
Power consumption	750 W maximum
TLA7016 Voltage range/frequency	Ratings apply to mainframes with serial numbers B020000 and higher.
Configuration A, Maximum load 1000 W	100 V_{RMS} to 120 V_{RMS}, 50 Hz to 60 Hz and 115RMS, 400 Hz, 1450 W maximum
Configuration B, Maximum load 1000 W	120 V_{RMS} to 240 V_{RMS}, 50 Hz to 60 Hz, 1900 W maximum
TL708EX	
Voltage range/frequency	100-240 V AC at 50-60 Hz
Input current	2 A maximum at 100 V AC
Power consumption	200 W maximum

Environmental

Temperature	
Operating	+5 °C to +45 °C
Nonoperating	-20 °C to +60 °C
Humidity	20% to 80%
Operating	≤30 °C; 80% relative humidity (29 °C maximum wet-bulb temperature)
Nonoperating	8% to 80% (29 °C maximum wet-bulb temperature)
Altitude	Operating: -1,000 ft. to 10,000 ft. (-305 meters to 3,050 meters)
Safety	UL3111-1, CSA1010.1, EN61010-1, IEC61010-1

TLA7012 Portable Mainframe physical specifications

Dimensions	
Height	295 mm (11.6 in.)
Width	451 mm (17.75 in.)
Depth	460 mm (18.1 in.)
Weight	
Net (without modules)	14 kg (30 lb.)
Shipping (typical)	27 kg (59 lb.)

TLA7016 Benchtop Mainframe physical specifications

Dimensions	
Height	350 mm (13.7 in.)
Width	425 mm (16.7 in.)
Depth	673 mm (26.5 in.)
Weight	
Net (without modules)	25 kg (55 lb.)
Shipping (typical	51.8 kg (115 lb.)

TLA708EX 8-port instrument Hub and expander physical specifications

Dimensions	
Height	51 mm (2.0 in.)
Width	455 mm (17.5 in.)
Depth	305 mm (12.0 in.)
Weight	
Net	3 kg (6 lb.)
Shipping	5 kg (11 lb.)

TLA7ACx logic analyzer module specifications

Specifications apply to all TLA7ACx models unless noted otherwise.

General specifications

Number of channels	All channels are acquired including clocks
TLA7AC2	68 channels (4 are clock channels)
TLA7AC3	102 channels (4 are clock and 2 are qualifier channels)
TLA7AC4	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)
Module merging	Up to 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.
Time stamp	51 bits at 125 ps resolution (3.25 days duration)
Clocking/Acquisition modes	Asynchronous and synchronous 8 GHz MagniVu high-speed timing is available simultaneous with all modes.
Number of mainframe instrument slots required per TLA series module	2

Data input with P6800 or P6900 series probes

Capacitive loading

P6900 series	0.5 pF clock/data
P6800 series	<0.7 pF clock/data
P6810 (In group configuration)	1.0 pF

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), PECL (3.7 V), LVPECL (2.0 V), LVCMOS 1.5 V (0.75 V), LVCMOS 1.8 V (0.9 V), LVCMOS 2.5 V (1.25 V), LVCMOS 3.3 V (1.65 V), LVDS (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)

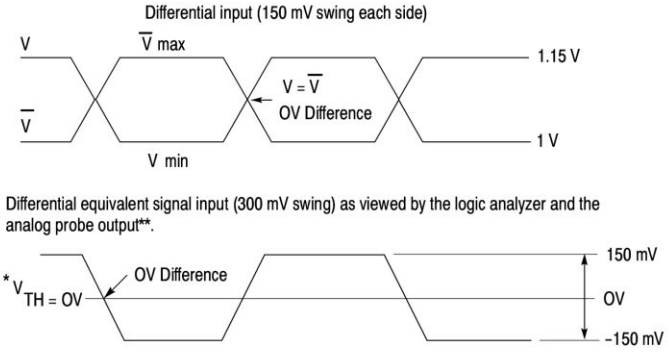
±(35 mV + 1%)

Input voltage range

Operating	2.5 V to 5.0 V
Nondestructive	±15 V

Minimum Input Signal Swing

Single-ended	300 mV
Differential	$V_{MAX} - V_{MIN} > 150$ mV



* Note: For differential inputs, the module threshold should be set to OV (assuming no common mode error).

** Note: See online help for further analog output details.

Input signal minimum slew rate

200 mV/ns typical

State acquisition with P6800 or P6900 series probes

Channel configurations

Full channel	Half channel	Quarter channel
235 MHz	0 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

State record length with Time stamps	(Quarter/Half/Full channels) 8/4/2 Mb, 32/16/8 Mb, 128/64/32 Mb, 512/256/128 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 (P6960, P6962, P6964, P6980, P6982, P6860), 700 ps (P6910)
Active clock pulse 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 TLA7ACx 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 (with P6800 or P6900 probes)

MagniVu™ timing	125 ps max, adjustments to 250 ps, 500 ps, 1 ns, and 2 ns
MagniVu timing record length	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 record length	(Quarter/Half/Full channels with time stamps and with or without transitional storage) 8/4/2 Mb, 32/16/8 Mb,128/64/32 Mb, 512/256/128 Mb per channel
Deep timing record length 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 (P6960, P6962, P6964, P6980, P6982, P6860), 750 ps (P6910)
Minimum detectable Setup/Hold violation	250 ps
Minimum recognizable multichannel Trigger event	Sample period + channel-to-channel skew

Analog acquisition (with P6800 or P6900 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
iCapture™ Analog outputs	Compatible with any supported Tektronix oscilloscope
iCapture Analog output BNC cable	Low loss, 10X, 36 in. Basic Analog multiplexer functionality is offered standard on all TLA7ACx modules. This routes 4 fixed channels to the iCapture Analog output BNCs. The outputs cannot be switched to other logic analyzer channels. Option AM enables full analog multiplexer control and allows the routing of any 4 logic analyzer channels to the iCapture Analog output BNCs.

Trigger system

Independent Trigger states	16
Maximum idependent If/Then clauses per state	16
Maximum numger of events per If/ Then clause	8
Maximum number of actions per If/ Then clause	8
Maximum number of Trigger events	18 (2 counters/timers plus any 16 other resources)
Number of word recognizers	16
Number of transition recognizers	16
Number of range recognizers	4
Number of counters/timers	
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, Store Sample, 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)

Trigger system

Counter/timer latency	2 ns
Range recognizers	Double bounded (408 channel maximum). Can be as wide as any group, 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.
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 postion	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	
Height	262 mm (10.3 in.)
Width	61 mm (2.4 in.)
Depth	381 mm (15.0 in.)
Weight	
Net	3.1 kg (6.7 lb.)
Shipping	6.3 kg (13.7 lb.)

TLA7BBx logic analyzer module specifications

Specifications apply to all TLA7BBx models unless noted otherwise.

General specifications

Number of channels	All channels are acquired including clocks
TLA7BB2	68 channels (4 are clock channels)
TLA7BB3	102 channels (4 are clock and 2 are qualifier channels)
TLA7BB4	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)
Module merging	Up to five 68-channel, 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.
Time stamp	54 bits at 20 ps resolution (>4 days duration)
Clocking/Acquisition modes	Asynchronous and synchronous. 20 ps (50 GHz) MagniVu high-speed timing is available simultaneous with all modes
Number of mainframe instrument slots required per TLA series module	2

Data input with P6800 or P6900 series probes

Capacitive loading	
P6900 series	0.5 pF clock/data
P6800 series	<0.7 pF clock/data
P6810 (In group configuration)	1.0 pF
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), PECL (3.7 V), LVPECL (2.0 V), LVCMOS 1.5 V (0.75 V), LVCMOS 1.8 V (0.9 V), LVCMOS 2.5 V (1.25 V), LVCMOS 3.3 V (1.65 V), LVDS (0 V), and user defined.
Threshold selection channel granularity	Separate selection for each of the clock/qualifier and individual channels.
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	
Single-ended	200 mV
Differential	$V_{MAX} – V_{MIN} > 100$ mV
Input signal minimum slew rate	200 mV/ns typical

State acquisition with P6800 or P6900 series probes

Channel configurations

Configuration	Full channel	Half channel
750 MHz Standard	750 MHz / 750 Mb/s (1 sample/clock) 750 MHz / 1.5 Gb/s (2 samples/clock)	750 MHz / 3 Gb/s (4 samples/clock)
1.4 GHz Optional	1.4 GHz / 1.4 Gb/s (1 sample/clock)	1.4 GHz / 2.8 Gb/s (2 samples/clock)

State record length with Time stamps	(Quarter/Half/Full channels) 4/2 Mb, 8/4 Mb, 16/8 Mb, 32/16 Mb, 64/32 Mb, 128/64 Mb per channel
Setup and Hold time selection range	From 15 ns before, to 7.5 ns after clock edge in 20 ps increments. Range may be shifted towards the setup region by 0 ns [+7.5, -7.5] ns, 2.5 ns [+10, -5] ns, or 7.5 ns [+15, 0] ns.
Setup and Hold window, single channel	180 ps typical
Minimum clock pulse width	200 ps (P6960, P6962, P6964, P6980, P6982, P6860), 250 ps (P6910)
Demux channel selection	Channels can be demultiplexed to other channels through user interface with 8-channel granularity.

Timing acquisition (with P6800 or P6900 probes)

MagniVu™ timing	20 ps max, adjustments to 40 ps, 80 ps, 160 ps, 320 ps, and 640 ps
MagniVu timing record length	128 Kb per channel, with adjustable trigger position
Deep timing resolution	(Quarter/Half/Full channels) 1.25 ps / 312.5 ps / 625 ps to 50 ms
Deep timing resolution with glitch storage enabled	1.25 ns to 50 ms
Deep timing record length	(Quarter/Half/Full channels) 8/4/2 Mb, 16/8/4 Mb, 32/16/8 Mb, 64/32/16 Mb, 128/64/32 Mb, 256/128/64 Mb per channel
Deep timing record length with glitch storage enabled	Half of default main memory depth
Channel-to-channel skew	(Module + probe)
Before customer deskew	±80 ps typical
After customer deskew	±20 ps typical
Minimum recognizable pulse/glitch width (single channel)	200 ps (P6960, P6962, P6964, P6980, P6982, P6860) 250 ps (P6910)
Minimum detectable Setup/Hold violation	40 ps
Minimum recognizable multichannel Trigger event	Sample period + channel-to-channel skew

Analog acquisition (with P6800 or P6900 probes)

Bandwidth	3 HGz 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
iCapture™ Analog outputs	Compatible with any supported Tektronix oscilloscope
iCapture Analog output BNC cables	Four (4) low loss, 10X, 36 in.

Trigger system

Independent Trigger states	16
Maximum idependent If/Then clauses per state	16
Maximum numger of events per If/ Then clause	8
Maximum number of actions per If/ Then clause	8
Maximum number of Trigger events	26 (2 counters/timers plus any 24 other resources)
Number of word recognizers	24
Number of transition recognizers	24
Number of range recognizers	8
Number of counters/timers	
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, Store Sample, 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	3.0 Gb/s
Trigger machine sequence rate	DC to 800 MHz (1.25 ns)
Counter/timer range	48 bits each (~4 days at 1.25 ns)
Counter rate	DC to 800 MHz (1.25 ns)
Timer clock rate	800 MHz (1.25 ns)

Trigger system

Counter/timer test latency	0 ns
Range recognizers	Double bounded (408 channel maximum). Can be as wide as any group, must be grouped according to specified order of significance.
Setup-and-hold violation recognizer setup time range	From 7.5 ns before, to 7.5 ns after clock edge in 20 ps increments. This range may be shifted toward the positive region by 0 ns, 2.5 ns, 5 ns, or 7.5 ns.
Setup-and-hold violation recognizer hold time range	From 7.5 ns before, to 7.5 ns after clock edge in 20 ps increments. This range may be shifted toward the positive region by 0 ns, 2.5 ns, 5 ns, or 7.5 ns.
Trigger position	Any data sample
MagniVu trigger postion	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	
Height	262 mm (10.3 in.)
Width	61 mm (2.4 in.)
Depth	381 mm (15.0 in.)
Weight	
Net	3.1 kg (6.7 lb.)
Shipping	6.3 kg (13.7 lb.)

Ordering information

TLA7012 standard accessories

TLA7012 Portable Logic Analyzer Mainframe, holds two TLA modules.

Part number	Description
119-7275-xx	Mini keyboard
119-7054-xx	Optical wheel mouse
200-4939-xx	Front-panel cover
333-4206-xx	One dual-wide panel filler for empty slots
063-3881-xx	TLA application software CD
-	Certificate of traceable calibration

Please specify power cord, language, and service options when ordering.

TLA7012 Options

Option	Description	Order number
Opt. 18	Add touch screen	N/A
Opt. 1C	Add GPIB-iView™ external oscilloscope interface kit (requires TLA Application SW V5.0 or greater)	012-1614-xx
Opt. 2C	Add USB-iView external oscilloscope interface kit (requires TLA Application SW V5.8 or greater)	N/A
Opt. PO	Add Accessory Pouch for TLA7012	016-1441-xx
Opt. TL	Add Teklink Cable	174-5019-xx
Opt. 1K	Add LACART logic analyzer cart	LACART
Opt. 88	Factory install of module	N/A

TLA7012 recommended accessories

Accessory	Description
650-4815-xx	Additional removable hard drive assembly (no SW)
020-2664-xx	Rackmount kit
016-1522-xx	Wheeled transport case

TLA7016 standard accessories

TLA7016 Benchtop Logic Analyzer Mainframe, holds six TLA modules.

Part number	Description
333-4206-xx	Five (5) dual-wide panel fillers for empty slots
174-5225-xx	LAN cable, straight-through, RJ-45
063-3671-xx	TLA application software CD
-	Certificate of traceable calibration

Please specify power cord, language, and service options when ordering.

TLA7016 Options

Option	Description	Order number
Opt. 1C	Add GPIB-iView™ external oscilloscope interface kit (requires TLA Application SW V5.0 or greater)	012-1614-xx
Opt. 2C	Add USB-iView external oscilloscope interface kit (requires TLA Application SW V5.8 or greater)	N/A
Opt. TL	Add Teklink Cable	174-5019-xx
Opt. BTB	Add benchtop system mounting brackets	407-5127-xx (Left) 407-5132-xx (Right)
Opt. 1K	Add K4000 logic analyzer cart	K4000
Opt. 88	Factory install of module	N/A

TLA7016 recommended accessories

Accessory	Description
020-2369-xx	Rackmount kit
016-1651-xx	Wheeled transport case

TL708EX TekLink™ 8-port Instrument Hub and Expander (Used for connecting 3-to-8 TLA7012 or TLA7016 mainframes).
Includes: Instruction sheet (071-1765-xx, English only).
Please specify power cord and service options when ordering.

TLA 7000 series options

TLA7000 series power cord options

Opt. A0 North America power plug (115 V, 60 Hz)

Opt. A1 Universal Euro power plug (220 V, 50 Hz)

Opt. A2 United Kingdom power plug (240 V, 50 Hz)

Opt. A3 Australia power plug (240 V, 50 Hz)

Opt. A4 North America power plug (240 V, 50 Hz)

Opt. A5 Switzerland power plug (220 V, 50 Hz)

Opt. A6 Japan power plug (100 V, 110/120 V, 60 Hz)

Opt. A10 China power plug (50 Hz)

Opt. A11 India power plug (50 Hz)

Opt. A12 Brazil power plug (60 Hz)

Opt. A99 No power cord

Language options

Opt. L0 English manual

Opt. L5 Japanese manual

Opt. L10 Russian manual

Opt. L99 No manual

Installation options

LAINSTAL-SM Installation of single mainframe and up to 3 modules or 1 to 3 modules in existing mainframe.

LAINSTAL-LG Installation of single mainframe and 4 to 6 modules.

Gigabit LAN (GbE) switch

020-2666-xx	16-port Gigabit LAN (GbE) switch with U.S. standard (120 V, 60 Hz) power cord

Power cords for Gigabit (GbE) switch

161-0066-00	Power cord, IEC320 C13, North American, straight
161-0066-09	Power cord, IEC320 C13, Universal Euro, straight
161-0066-10	Power cord, IEC320 C13, Universal Euro, straight
161-0066-11	Power cord, IEC320 C13, Australian, straight
161-0066-12	Power cord, IEC320 C13, North American, straight
161-0154-00	Power cord, IEC320 C13, Switzerland, straight
161-0298-00	Power cord, IEC320 C13, Japan, straight
161-0304-00	Power cord, IEC320 C13, China, straight
TLA7000 series upgrades	Add new capabilities to your existing TLA mainframe or increase the state speed, memory depth, or add full analog multiplexer capability (TLA7ACx only) to existing TLA modules by ordering the appropriate upgrade kit. Please refer to the TLA Family Upgrade Guide for further details.

TLA7ACx logic analyzer modules

TLA7ACx modules	Includes: Certificate of calibration, and one-year warranty (return to Tektronix).
	Probes must be ordered separately.
TLA7AC2	68-channel Logic Analyzer module, 8 GHz timing, 235 MHz state, 2 Mb record length. Options for up to 128 Mb record length and/or up to 450 MHz state.
TLA7AC3	102-channel Logic Analyzer module, 8 GHz timing, 235 MHz state, 2 Mb record length. Options for up to 128 Mb record length and/or up to 450 MHz state.
TLA7AC4	136-channel Logic Analyzer module, 8 GHz timing, 235 MHz state, 2 Mb record length. Options for up to 128 Mb record length and/or up to 450 MHz state.

TLA7ACx module options

Base configuration is 2 Mb record length at 235 MHz state with basic Analog Multiplexer capability.

Opt 1S	Increase to 8 Mb record length at 235 MHz state
Opt 2S	Increase to 32 Mb record length at 235 MHz state
Opt 3S	Increase to 128 Mb record length at 235 MHz state
Opt 4S	Increase to 2 Mb record length at 450 MHz state
Opt 5S	Increase to 8 Mb record length at 450 MHz state
Opt 6S	Increase to 32 Mb record length at 450 MHz state
Opt 7S	Increase to 128 Mb record length at 450 MHz state
Opt AM	Enable full analog multiplexer
Opt. 88	Factory install

TLA7ACx language options

Opt. LG1	Global manual
Opt. L99	No manual

TLA7BBx logic analyzer modules

TLA7BBx modules	Includes: Certificate of calibration, and one-year warranty (return to Tektronix).
	Probes must be ordered separately.
TLA7BB2	68-channel Logic Analyzer module, 50 GHz MagniVu timing, 750 MHz state clock, 2 Mb record length. Options for up to 64 Mb record length and/or up to 1.4 GHz state clock.
TLA7BB3	102-channel Logic Analyzer module, 50 GHz MagniVu timing, 750 MHz state clock, 2 Mb record length. Options for up to 64 Mb record length and/or up to 1.4 GHz state clock.
TLA7BB4	136-channel Logic Analyzer module, 50 GHz MagniVu timing, 750 MHz state clock, 2 Mb record length. Options for up to 64 Mb record length and/or up to 1.4 GHz state clock.

TLA7BBx module options

Base configuration is 2 Mb record length at 750 MHz state clock with full Analog Multiplexer capability.

Opt. 1S	Increase to 4 Mb record length at 750 MHz state clock
Opt. 2S	Increase to 8 Mb record length at 750 MHz state clock
Opt. 3S	Increase to 16 Mb record length at 750 MHz state clock
Opt. 4S	Increase to 32 Mb record length at 750 MHz state clock
Opt. 5S	Increase to 64 Mb record length at 750 MHz state clock
Opt. 6S	Increase to 2 Mb record length at 1.4 GHz state clock
Opt. 7S	Increase to 4 Mb record length at 1.4 GHz state clock
Opt. 8S	Increase to 8 Mb record length at 1.4 GHz state clock
Opt. 9S	Increase to 16 Mb record length at 1.4 GHz state clock
Opt. AS	Increase to 32 Mb record length at 1.4 GHz state clock
Opt. BS	Increase to 64 Mb record length at 1.4 GHz state clock
Opt. 88	Factory install

TLA7BBx Customer Deskew fixture

020-2942-xx	TLA7BBx Customer Deskew fixture for P6800 series probes
020-2940-xx	TLA7BBx Customer Deskew fixture for P6900 series probes

TLA7BBx language options

Opt. L0	English manual
Opt. L5	Japanese manual
Opt. L10	Russian manual
Opt. L99	No manual

Service options

The following service options are offered for the TLA logic analyzer products.

Option	TLA7000 mainframes	TLA7ACx modules	TLA7BBx modules	TLA7SAxx modules
Opt. C3 Calibration service 3 years	X	X	X	X
Opt. C5 Calibration service 5 years	X	X	X	X
Opt. D1 Calibration data report	X	X	X	
Opt. D3 Calibration data report 3 years (with Opt. C3)	X	X	X	
Opt. D5 Calibration data report 5 years (with Opt. C5)	X	X	X	
Opt. G3 Complete care 3 years (includes loaner, scheduled calibration and more). TLA7012, TLA7BB2, TLA7BB3, TLA7BB4, TLA7SA08, TLA7SA16 only			X	X
Opt. G5 Complete care 5 years (includes loaner, scheduled calibration and more). TLA7012, TLA7BB2, TLA7BB3, TLA7BB4, TLA7SA08, TLA7SA16 only			X	X
Opt. R3 Repair service 3 years	X	X	X	X
Opt. R5 Repair service 5 years	X	X	X	X
Opt. S1 On-site service 1 year	X			
Opt. S3 On-site service 3 years (with R or C options)	X			
Opt. R3DW Repair service coverage 3 years (includes product warranty period). 3-year period starts at time of instrument purchase.	X	X	X	X
Opt. R5DW Repair service coverage 5 years (includes product warranty period). 5-year period starts at time of instrument purchase.	X	X	X	X

Warranty

Enter the actual information in this section.

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Tektronix is registered to ISO 9001 and ISO 14001 by SRI Quality System Registrar.

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For Further Information. Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology. Please visit www.tektronix.com.

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