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# Tektronix Logic Analyzers

## ▶ TLA600 Series



### Breakthrough Solutions for Real-time Digital Systems Analysis

Today's digital design engineers face daily pressures to speed new products to the marketplace. The TLA600 Series logic analyzers answer the need with breakthrough solutions for the hardware design team, providing the ability to quickly monitor, capture and analyze real-time digital system operation in order to debug, verify and optimize their systems. TLA600 Series logic analyzers are affordable, entry-level logic analyzers, which are ideal for general-purpose state/timing analysis.

The TLA61x/62x logic analyzers feature front-panel controls, an integral display and support an external display simultaneously. The TLA60x logic analyzers utilize an external display.

Hardware developers appreciate the TLA600 Series logic analyzers' range of capabilities. Their broad feature set includes capturing and correlating elusive hardware faults by triggering on glitches and setup/hold violations; providing simultaneous state and high-speed timing analysis; and using state acquisition to find the cause of complex problems. Productivity and connectivity features, such as the open Microsoft Windows 2000 Professional PC platform, make the TLA600 Series logic analyzers easy to use and easy to network into the design environment.

All Tektronix TLA logic analyzers share the same TLA application software so that if you learn one, you can use them all. You can also share setups and data between them as well as display data on Windows PCs with the free TLAVu Offline Data Viewer.

## ▶ Features & Benefits

34/68/102/136 Channel Logic Analyzers With Up to 2 Mb Depth

MagniVu™ Acquisition Technology Provides 2 GHz (500 ps) Timing Resolution to Find Difficult Problems Quickly

Up to 200 MHz State Acquisition Analysis of Synchronous Digital Circuits

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

500 MHz Deep Timing Analysis with Up to 2 Mb Per Channel

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

Transitional Storage Extends the Signal Analysis Capture Time

Processor and Bus Support

Universal Source Code Support for Correlating High-level Language Source with Real-time Trace

Integrated View (iView) Capability Works with Tektronix TDS Digital Storage Oscilloscopes for Analog/Digital Cross-domain Analysis

## ▶ Applications

Digital Hardware Verification and Debug

Monitor and Measure Digital Hardware Performance





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## ▶ Characteristics

### General

**Number of Channels (all channels are acquired including clocks) –**
TLA601/611/621, TLA7N1: 34 channels (2 are clock channels).
TLA602/612/622, TLA7N2, TLA7P2: 68 channels (4 are clock channels).
TLA603/613/623, TLA7N3: 102 channels (4 are clock and 2 are qualifier channels).
TLA604/614/624, TLA 7N4, TLA 7P4: 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).

**Time Stamp –** 50-Bit at 500 ps resolution (6.5 day range).

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

### Input Characteristics (with P6417, P6418 or P6434 probes)

**Capacitive Loading –** 1.4 pF typical data;
2 pF typical clock (P6418).
2 pF typical data and clock (P6417 & P6434).

**Threshold Selection Range –** From +5.0 V to –2.0 V in 50 mV increments.

**Threshold Selection Channel Granularity –** Separate selection for clock (1) and data (16) for each 17-Channel probe connector.

**Threshold Accuracy (including probe) –** ±100 mV.

**Input Voltage Range –** Operating: 6.5 $V_{p-p}$ centered around the programmed threshold.
Non-destructive: ±15 V.

**Minimum Input Signal Swing –** 250 mV or 25% of signal swing, whichever is greater (P6417 & P6418).
300 mV or 25% of signal swing (P6434).

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

### State Acquisition Characteristics (with P6417, P6418 or P6434 probes)

**State Clock Rate –** 100 MHz standard, 200 MHz optional.

**State Data Rate (half/full channels) –** 400/200 Mb/s, typical. Requires 200 MHz state option.

**State Memory Depth with Timestamps –** 64 Kb, 256 Kb, 1 Mb.

**Setup Time Selection Range –** From 8.5 ns before, to 7.0 ns after clock edge.

**Setup-and-hold Window –** 2.0 ns typical.

**Minimum Clock Pulse Width –** 2 ns.

**Active Clock Edge Separation –** 5 ns.

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

### Timing Acquisition Characteristics (with P6417, P6418 or P6434 probes)

**MagniVu™ Timing –** 500 ps (2 GHz).

**MagniVu Timing Memory Depth –** 2 Kb per channel.

**Deep Timing Resolution (half/full channels) –** 2 ns, 4 ns to 50 ms.

**Deep Timing Resolution with Glitch Storage Enabled –** 10 ns to 50 ms.

**Deep Timing Memory Depth (half/full channels with timestamps and with or without transitional storage) –** 128/64 Kb, 512/256 Kb, 2/1 Mb.

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

**Channel-to-channel Skew –** ≤1 ns typical.

**Minimum Recognizable Pulse/Glitch Width (single channel) –** 2 ns.

**Minimum Recognizable Multi-channel Trigger Event –** Sample period +2 ns.

### 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 Range Recognizers –** 4.

**Number of Transition Recognizers –** 1.

**Number of Counter/Timers –** 2.

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

**Trigger Action Types –** Trigger module, trigger all, store, don't store, start store, stop store, increment counter, reset counter, start timer, stop timer, reset timer, goto state, set/clear signal, do nothing.

**Trigger Sequence Rate –** DC to 250 MHz (4 ns).

**Counter/Timer Range –** 51 Bits each (>100 days at 4 ns).

**Counter Rate –** DC to 250 MHz (4 ns).

**Timer Clock Rate –** 250 MHz (4 ns).

**Counter/Timer Latency –** None (can be tested or reset immediately after starting).

**Range Recognizers –** Double bounded (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 0.5 ns increments.

**Setup-and-hold Violation Recognizer Hold Time Range –** From 7 ns before to 8 ns after clock edge in 0.5 ns increments.

**Trigger Position –** Any data sample.

**MagniVu Trigger Position –** MagniVu data is centered around the module trigger.

**Storage Control (data qualification) –** Global (conditional), by state (start/stop), by trigger action, or transitional.

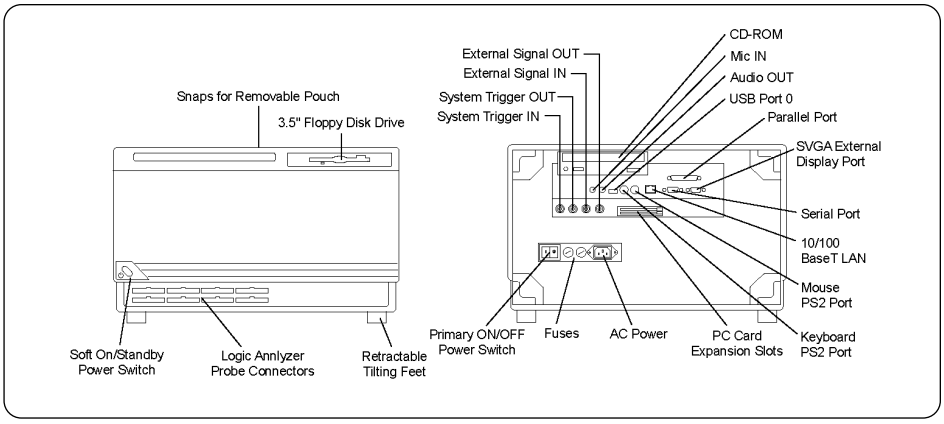
**Storage Window Granularity –** Single sample or block-of-31 samples before and after.



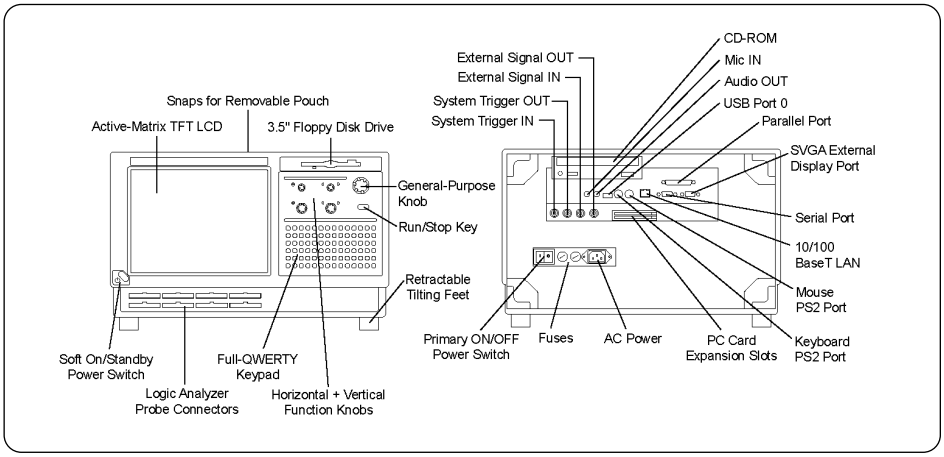
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▶ *TLA600 Series with TDS3000 Series oscilloscope.*




▶ ***TLA60x*** *Logic Analyzer with external display.*




▶ ***TLA61x/62x*** *Logic Analyzer with internal display.*

## Integrated View (iView) Capability

**TLA mainframe configuration requirements –** TLA6XX instruments.
TLA App S/W V 4.1 or greater.
256 MB DRAM Minimum, 512 MB recommended.

**TDS configuration requirements –** TDS3GM GPIB/RS232 Interface Module required for iView capability on any TDS3000 Series. TDS3GV GPIB/RS232/VGA Interface Module required for iView capability on any TDS3000B Series. If using iView with a TDS6604, order a TCA-BNC connector to be compatible with BNC cable run from a TLA7Axx module.

**Number of TDS oscilloscopes that can be connected to a TLA system –** 1.

**External Oscilloscopes Supported –**
TDS3012, TDS3014, TDS3032, TDS3034,
TDS3052, TDS3054.
TDS3012B, TDS3014B, TDS3032B, TDS3034B,
TDS3052B, TDS3054B, TDS5052,
TDS5054, TDS5104.
TDS6604.
TDS7054, TDS7104, TDS7154, TDS7404.
TDS684C, TDS694C.
CSA7154, CSA7404.
TDS754C, TDS784C, TDS724D, TDS754D,
TDS784D, TDS794D.

**TLA Connections –** USB, Trigger In, Trigger Out, Clock Out.

**TDS Connections –** GPIB, Trigger In, Trigger Out, Clock In (when available).

**Setup –** iView external oscilloscope wizard automates setup.

**Data Correlation –** After TDS oscilloscope acquisition is complete, data is automatically transferred to the TLA and time correlated with the TLA acquisition data.

**Deskew –** TDS and TLA data is automatically deskewed and time correlated when using the iView external oscilloscope cable.

**iView External Oscilloscope Cable Length –** 2 m.

## TLA600 PC Characteristics

**Operating System –** Microsoft Windows 2000 Professional.

**Processor –** Intel Celeron.

**Chipset –** Intel 810.

**DRAM –** 256 MB SDRAM (512 MB with Opt. 1J).

**Sound –** Built-in PC speaker transducer; 16-Bit I/O and Mic In port.

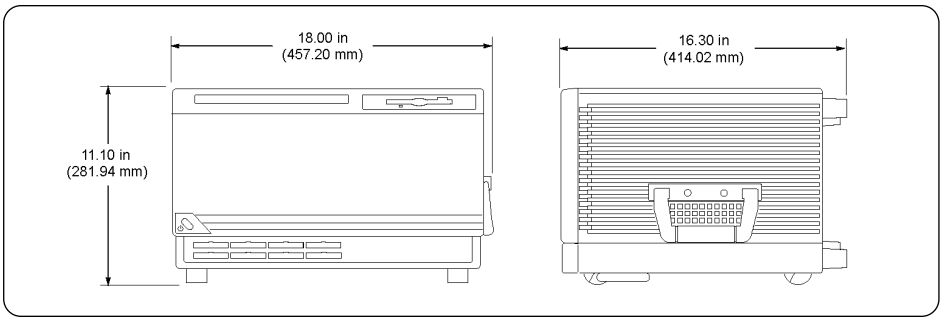
**Hard Disk Drive –** 10 GB (30 GB with Opt. 1J).

**CD-ROM –** Internal 16/8/32 CD-RW.

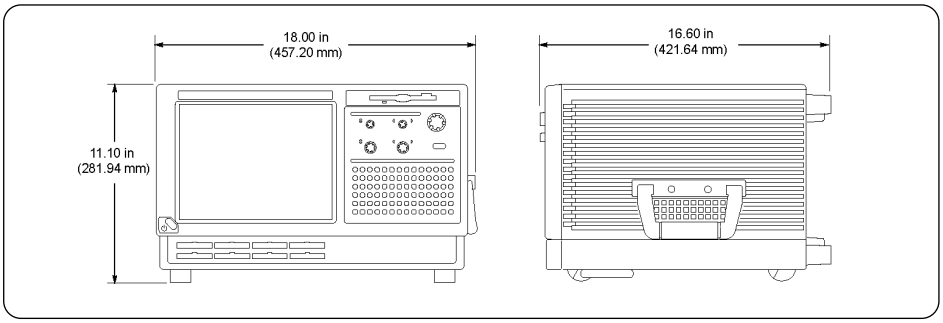
**Floppy Disk Drive –** Built-in 3.5 in. 1.44 MB drive.



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▶ ***TLA60x** Logic Analyzer with external display.*




▶ ***TLA61x/62x** Logic Analyzer with internal display.*

### TLA600 Integral Controls (TLA61x/62x only)

**Front-Panel Display –**
Size: 10.4 in. diagonal.
Type: Active-matrix color TFT LCD with backlight.
Resolution: 800x600.
Colors: 16.8 M (true color).

**Simultaneous Display Capability –** The front-panel and external displays can be used simultaneously, each with independent resolutions.

**Front-panel Knobs –** Special function knobs for instrument control.

**Front-panel QWERTY Keypad –** Mini-QWERTY keypad.

### TLA600 External Peripheral Interfaces

**External Display Port Type –** Female DB15 SVGA connector.

**External Display Resolution –** Up to 1280x1024 non-interlaced at 16 M colors.

**LAN Port Type –** 10/100Base-T, RJ-45.

**External Keyboard Port Type –** PS2 mini-DIN.

**External Mouse Port Type –** PS2 mini-DIN.

**Parallel Interface Port Type –** Female DB25.

**Parallel Interface Modes –** Centronics mode, EPP (Extended Parallel Port), ECP (Microsoft high-speed mode).

**Serial Interface Port Type –** Male DB9.

**Audio Out Port Type –** Stereo minijack.

**Mic In Port Type –** Minijack.

**PC Card (CardBus) Slot Types –** Two slots, two PC card type I/II or one PC card type III.

**USB Port –** One (1).

### 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 User Manual). If a format is not listed, please contact your local Tektronix representative.

### External Instrumentation Interfaces

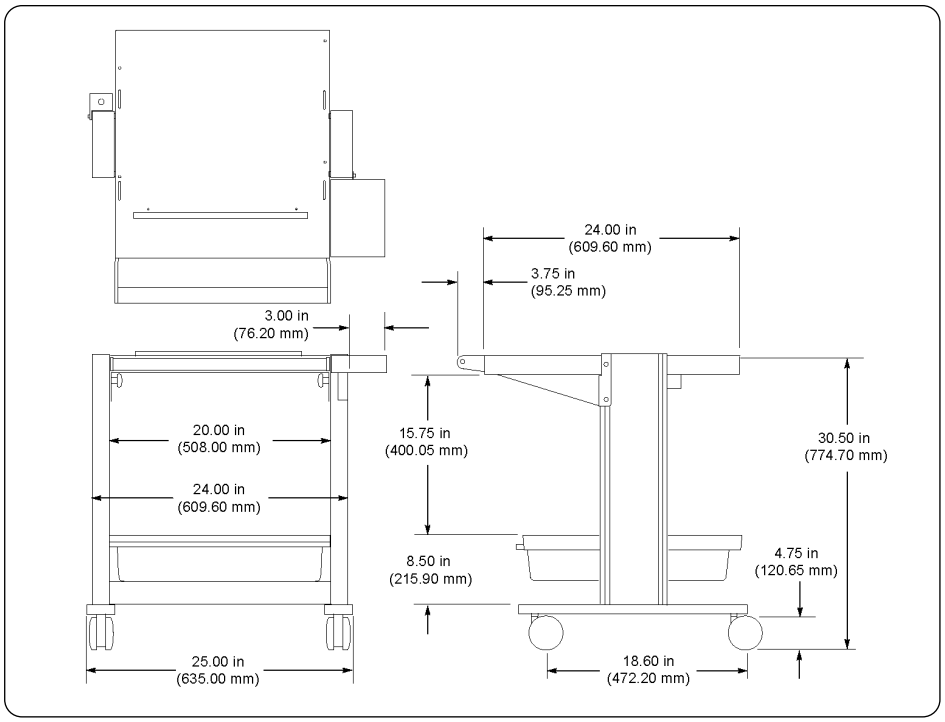
**System Trigger Output –** Asserted whenever a system trigger occurs (TTL-compatible output, back-terminated into 50 Ω).
**System Trigger Input –** Forces a system trigger (triggers all modules) when asserted (TTL-compatible, edge-sensitive, falling-edge latched).
**External Signal Output –** Can be 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 (TTL-compatible, level-sensitive).

### Power

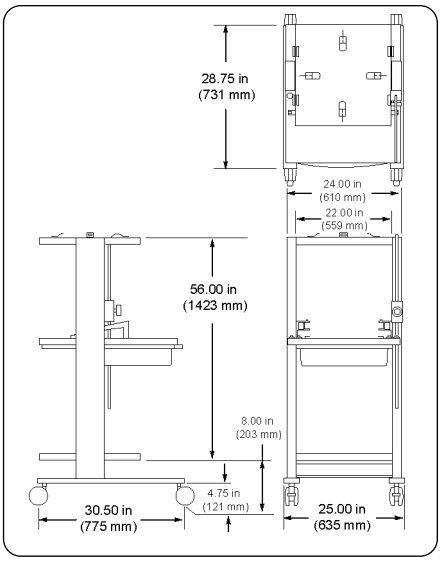
**TLA60x/61x/62x –**
Voltage range/frequency: 90-250 VAC at 45-66 Hz. 100-132 VAC at 360-440 Hz.
Input current: 6 A maximum at 90 VAC (70 A surge).
Power consumption: 400 W maximum.



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***LACART** Instrument Cart (adjustable probe skyhook not shown).*




***K4000** Instrument Cart.*

## Physical Characteristics

**TLA60x**

| **Dimensions** | **mm** | **in.** |
|---|---|---|
| Height | 281.94 | 11.1 |
| Width | 457.2 | 18 |
| Depth | 414.02 | 16.3 |
| **Weight** | **kg** | **lb.** |
| Net (w/o probes) | 16.8 | 37 |
| Shipping (typical) | 38.6 | 85 |

**TLA61x/62x**

| **Dimensions** | **mm** | **in.** |
|---|---|---|
| Height | 281.94 | 11.1 |
| Width | 457.2 | 18 |
| Depth | 414.02 | 16.3 |
| **Weight** | **kg** | **lb.** |
| Net (w/o probes) | 17.3 | 38 |
| Shipping (typical) | 39.1 | 86 |

## Environmental

**Temperature –**
Operating: +5°C to +50°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.



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## ▶ Ordering Information

### TLA60x

**Logic Analyzer with External Display.**

**Includes:** Wheel mouse, keyboard, front-panel cover, accessory pouch, probe retainer bracket, probe manual, power cord (North American 120 VAC, 60 Hz), software, user manual, certificate of calibration, and one-year warranty (return to Tektronix). Display is not included.

Probes must be ordered separately - Order Opt. 1P (P6418) or Opt. 2P (P6434) or Opt. 3P (P6417). You can also choose to order any combination and quantity of probes by ordering the P6418, P6434 or P6417 individually.

**TLA601 –** 34-Channel Logic Analyzer, 2 GHz timing, 100 MHz state, 64 K depth (must select one probe option below). Options for up to 256 K depth and/or 200 MHz state. Requires external display.

**TLA602 –** 68-Channel Logic Analyzer, 2 GHz timing, 100 MHz state, 64 K depth (must select one probe option below). Options for up to 256 K depth and/or 200 MHz state. Requires external display.

**TLA603 –** 102-Channel Logic Analyzer, 2 GHz timing, 100 MHz state, 64 K depth (must select one probe option below). Options for up to 256 K depth and/or 200 MHz state. Requires external display.

**TLA604 –** 136-Channel Logic Analyzer, 2 GHz timing, 100 MHz state, 64 K depth (must select one probe option below). Options for up to 256 K depth and/or 200 MHz state. Requires external display.

## ▶ Quantity of Probes per Option

| Option | TLA601/611/621 | TLA602/612/622 | TLA603/613/623 | TLA604/614/624 |
|---|---|---|---|---|
| 1P Add P6418 Probes | 2 | 4 | 6 | 8 |
| 2P Add P6434 Probes | 1 | 2 | 3 | 4 |
| 3P Add P6417 Probes | 2 | 4 | 6 | 8 |

Please refer to the "Logic Analyzer Probe Selection Guidelines" for further details on the probe which is best for your application.

### TLA61x

**Logic Analyzer with Internal Display.**

**Includes:** Wheel mouse, keyboard, front-panel cover, accessory pouch, probe retainer bracket, probe manual, power cord (North American 120 VAC, 60 Hz), software, user manual, certificate of calibration, and one-year warranty (return to Tektronix).

Probes must be ordered separately - Order Opt. 1P (P6418) or Opt. 2P (P6434) or Opt. 3P (P6417). You can also choose to order any combination and quantity of probes by ordering the P6418, P6434 or P6417 individually.

**TLA611 –** 34-Channel Logic Analyzer, 2 GHz timing, 100 MHz state, 64 K depth (must select one probe option below). Options for up to 256 K depth and/or 200 MHz state.

**TLA612 –** 68-Channel Logic Analyzer, 2 GHz timing, 100 MHz state, 64 K depth (must select one probe option below). Options for up to 256 K depth and/or 200 MHz state.

**TLA613 –** 102-Channel Logic Analyzer, 2 GHz timing, 100 MHz state, 64 K depth (must select one probe option below). Options for up to 256 K depth and/or 200 MHz state.

**TLA614 –** 136-Channel Logic Analyzer, 2 GHz timing, 100 MHz state, 64 K depth (must select one probe option below). Options for up to 256 K depth and/or 200 MHz state.

### TLA62x

**Logic Analyzer with Internal Display.**

**Includes:** Wheel mouse, keyboard, front-panel cover, accessory pouch, probe retainer bracket, probe manual, power cord (North American 120 VAC, 60 Hz), software, user manual, certificate of calibration, one-year warranty (return to Tektronix).

Probes must be ordered separately - Order Opt. 1P (P6418) or Opt. 2P (P6434) or Opt. 3P (P6417). You can also choose to order any combination and quantity of probes by ordering the P6418, P6434 or P6417 individually.

**TLA621 –** 34-Channel Logic Analyzer, 2 GHz timing, 100 MHz state, 1 M depth (must select one probe option below). Option for up to 200 MHz state.

**TLA622 –** 68-Channel Logic Analyzer, 2 GHz timing, 100 MHz state, 1 M depth (must select one probe option below). Option for up to 200 MHz state.

**TLA623 –** 102-Channel Logic Analyzer, 2 GHz timing, 100 MHz state, 1 M depth (must select one probe option below). Option for up to 200 MHz state.

**TLA624 –** 136-Channel Logic Analyzer, 2 GHz timing, 100 MHz state, 1 M depth (must select one probe option below). Option for up to 200 MHz state.

### Logic Analyzer Probe Options

**Opt. 1P –** Add full complement of P6418 17-Channel general-purpose probes (each includes two 8-Channel leadsets, one 1-Channel leadset, 20 SMT KlipChip™ grabber tips).

**Opt. 2P –** Add full complement of P6434 34-Channel high-density probe(s).

**Opt. 3P –** Add full complement of P6417 17-Channel general-purpose probes that allow you to separate the 8-channel podlet groups into individual channels (each includes two 8-Channel leadsets, one 1-Channel leadset, 20 SMT KlipChip grabber tips).



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## ▶ TLA Family Service Options

| | TLA6XX | TLA715/721 | TLA7XM | TLA7Axx | TLA7NX/PX/QX | TLA7PG2 | TLA7DX/EX |
|---|---|---|---|---|---|---|---|
| Opt. IN | | X | X | X | X | X | X |
| Opt. R3 | X | X | X | X | X | X | X |
| Opt. R5 | X | X | X | X | X | X | X |
| Opt. S1 | | X | X | | | | |
| Opt. S3 | | X | X | | | | |
| Opt. C3 | X | X | | X | X | X | X |
| Opt. C5 | X | X | | X | X | X | X |
| Opt. D1 | X | X | | X | X | X | X |
| Opt. D3 | X | X | | X | X | X | X |
| Opt. D5 | X | X | | X | X | X | X |

### TLA60X/61X Logic Analyzer Options

(Base configuration is 64 K depth at 100 MHz state).

**Opt. 1S –** Increase to 256 K depth at 100 MHz state.

**Opt. 4S –** Increase to 64 K depth at 200 MHz state.

**Opt. 5S –** Increase to 256 K depth at 200 MHz state.

### TLA62X Logic Analyzer Option

(Base configuration is 1 M depth at 100 MHz state).

**Opt. 6S –** Increase to 1 M depth at 200 MHz state.

### TLA600 Series Upgrades

You can upgrade the operating system, TLA application software, increase DRAM and hard disk of your existing TLA600 logic analyzer. You can also increase the memory depth and state speed of most existing TLA600 Series logic analyzers.

Please refer to TLA Family Upgrade Guide for further details.

### TLA60X/61X/62X Options

**Opt. 1C –** Add iView external oscilloscope cable kit (012-1614-00).

### TLA60X/61X/62X International Power Plugs

**Opt. A1 –** Universal Euro 220 VAC; 50 Hz.

**Opt. A2 –** UK 240 VAC; 50 Hz.

**Opt. A3 –** Australian 240 VAC; 50 Hz.

**Opt. A4 –** North American 240 VAC; 60 Hz.

**Opt. A5 –** Switzerland 220 VAC; 50 Hz.

**Opt. A99 –** No Power Cord.

### TLA60X/61X/62X Optional Accessories

**Logic Analyzer Cart –** LACART, K4000.

**TLA60X/61X/62X Rackmount Kit –** Order 016-1790-00.

**TLA60X/61X/62X Wheeled Transport Case –** Order 016-1522-00.

**17 in. Monitor Transport Case –** Order 016-1653-00.

**21 in. Monitor Transport Case –** Order 016-1652-00.

**83 Key Notebook Keyboard, PS2-Compatible –** Order 118-9402-00.

**TLA7QS –** TLA Family training package. (TLA configuration required: 102 channels).

**Opt. A1 –** Universal Euro.

**Opt. A2 –** United Kingdom.

**Opt. A6 –** Japan.

**TLA7QS Technical Reference Support Kit –** Order 020-2211-02.

### TLA600 Series Manuals

**TLA Family User Manual –** Order 071-0863-02 (for Version 4.2 TLA application software).

**TLA7QS Quickstart Training Manual –** Order 070-9717-05.

### TLA600 Series Service Manuals and Test Fixtures

**TLA60x/61x/62x Service Manual (includes performance verification and adjustment procedures) –** Order 071-0728-02.

**TLA Logic Analyzer Adjustment Fixture (includes AC adapter; requires local power cord) –** Order 671-3599-00.

### TLA Family Service Options

**Opt. IN –** Product installation service (on-site configuration and user familiarization; excluding network integration).

**Opt. R3 –** Extends depot repair warranty service period to three years.

**Opt. R5 –** Extends depot repair warranty service period to five years.

**Opt. S1 –** Uplifts standard one-year warranty service of mainframe and installed modules to on-site service.

**Opt. S3 –** Uplifts Opt. C3 and/or R3 of mainframe and installed modules to on-site service (must be ordered with Opt. C3 and/or R3).

**Opt. C3 –** Three years of calibration service (includes initial calibration and two annual calibrations).

**Opt. C5 –** Five years of calibration service (includes inital calibration and four annual calibrations).

**Opt. D1 –** Add calibration test data report.

**Opt. D3 –** Provides test data for each calibration (must be ordered with Opt. C3).

**Opt. D5 –** Provides test data for each calibration (must be ordered with Opt. C5).



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## Contact Tektronix:

**ASEAN Countries & Pakistan** (65) 6356 3900

**Australia & New Zealand** (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) 80-2275577

**Italy** +39 (02) 25086 1

**Japan** (Sony/Tektronix Corporation) 81 (3) 3448-3111

**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

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