Tektronix Logic Analyzers

▶ TLA7N4 Logic Analyzer Module

Breakthrough Solutions for Real-time Digital Systems Analysis

Today's digital design engineers face daily pressures to speed new products to the marketplace. The TLA7N4 logic analyzer module answers 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 TLA7N4 logic analyzer module. Its broad feature set includes capturing and correlating elusive hardware and software faults; providing simultaneous state and high-speed timing 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 probing.

The TLA7N4 logic analyzer module offers Tektronix' breakthrough MagniVu technology for providing high-speed sampling (up to 2 GHz) that dramatically changes the way logic analyzers work and enables them to provide startling new measurement capabilities.

The TLA7N4 module offers high-speed state synchronous capture and high-speed timing capture through the same set of probes. It capitalizes on MagniVu technology to offer 500 ps timing on all channels, glitch and setup/hold triggering and display, and timestamp that is always on at up to 500 ps resolution.

The TLA700 Series logic analyzer modules are ideal for timing analysis, multi-processor/bus applications and embedded software analysis.

▶ Features & Benefits

136 Channel Logic Analyzer with up to 8 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

500 MHz Deep Timing Analysis with Up to 8 Mb Per Channel

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

Transitional Storage Extends the Signal Analysis Capture Time

Broad Processor and Bus Support

Full Range of General-Purpose and High-density, Non-intrusive Probes

▶ Applications

Hardware Debug and Verification

Processor/Bus Debug and Verification

Embedded Software Integration, Debug and Verification

Tektronix

Enabling Innovation

▸ Characteristics

General

Number of Channels (all channels are acquired including clocks) – TLA7N4: 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" – Three modules can be "merged" to make up to a 408-Channel module. Merged modules exhibit the same depth as the lesser of the three individual modules. Word/range/setup-and-hold/glitch/transition recognizers span all three modules. Only one set of clock connections is required.
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.
Number of Mainframe Slots Required per TLA700 Module – 2.

Input Characteristics (with P6417, P6418, P6419 or P6434 probes)

Capacitive Loading –
<0.7 pF data and clock (P6419).
1.4 pF typical data; 2 pF typical clock (P6418).
2 pF typical data and clock (P6417 and 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 and P6419).
300 mV or 25% of signal swing (P6434).
Input Signal Minimum Slew Rate –
200 mV/ns typical.

State Acquisition Characteristics (with P6417, P6418, P6419 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, or 4 Mb per channel.
Setup-and-Hold Time Selection Range – From 8.5 ns before to 7.0 ns after clock edge.
Setup-and-Hold Window – 2 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 user interface with 8-Channel granularity.

Timing Acquisition Characteristics (with P6417, P6418, P6419 or P6434 probes)

MagniVu Timing – 500 ps.
MagniVu Timing Memory Depth – 2 Kb (2048) per channel.
Deep Timing Resolution (half/full channels) – 2/4 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, 8/4 Mb per channel.
Deep Timing Memory Depth with Glitch Storage Enabled – Half of default main memory depth.
Channel-to-Channel Skew – <1 ns typical.
Minimum Recognizable Pulse Width (single channel) – 2 ns.
Minimum Recognizable 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.
Safety – CSA C22.2 No. 1010.1, EN61010-1, IEC61010-1, UL 3111-1

Physical Characteristics

Dimensions	**mm**	**in.**
Height	262	10.3
Width	61	2.4
Depth	381	15
Weight	**kg**	**lb.**
Net (without probes)	3.1	6.7
Shipping (typical)	6.3	13.7

▸ Ordering Information

TLA7N4 Logic Analyzer Module

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

Probes must be ordered separately – Order any combination and quantity of probes by ordering the P6417, P6418, P6419 or P6434 individually.

TLA7N4 – 136-Channel Logic Analyzer module, 2 GHz timing, 100 MHz state, 64 Kb depth. Options for up to 4 Mb depth and/or 200 MHz state.

Quantity of Probes to Order Per Option

Probe	TLA7N4
P6418 Probes	8
P6434 Probes	4
P6417 Probes	8
P6419 Probes	8

Logic Analyzer Module Options

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

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

Opt. 2S – Increase to 1 M depth at 100 MHz state.

Opt. 3S – Increase to 4 M 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.

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

Opt. 7S – Increase to 4 M depth at 200 MHz state.

TLA7N4 Service Manual and Test Fixtures

TLA7N4 Logic Analyzer Performance Verification and Adjustment Fixture (includes AC adapter; requires local power cord) – Order 671-3599-00.

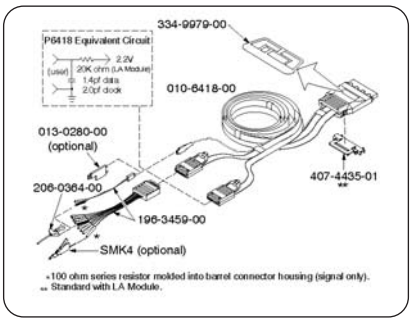
TLA7N4 Logic Analyzer Modules Service Manual (includes Performance Verification and Adjustment procedures) – Order 071-0864-01.

TLA700 Series Module Upgrades

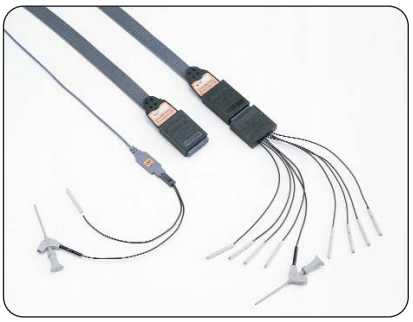
You can increase the memory depth and state speed of most existing TLA700 Series logic analyzer modules. You can also install a TLA7N4 logic analyzer module into an existing TLA714/715/720/721/7XM mainframe. Please refer to the TLA Family Upgrade Guide for further details.

Logic Analyzer Probe Selection Guidelines

For the TLA7N4 logic analyzer module, you have the choice of four probe options.



▶ P6418.



▶ P6418.

▸ P6418

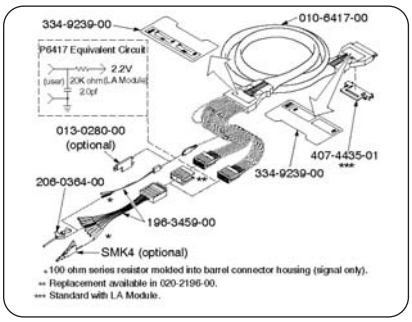
Part Number	Description
334-9979-00	1 sheet of probe labels (not installed)
196-3476-00	1 each – 8-Channel leadset (barrel connectors support 0.100" and 2 mm spacing) Black
196-3479-00	1 each – 1-Channel leadset (barrel connectors support 0.100" and 2 mm spacing) Black
196-3477-00	(Optional) 1 each – 8-Channel reduced bias voltage leadset (barrel connectors support 0.100" and 2 mm spacing) White
196-3478-00	(Optional) 1 each – 1-Channel reduced bias voltage leadset (barrel connectors support 0.100" and 2 mm spacing) White
SMG50	20 each – SMT KlipChip™ grabber tips
013-0280-00	(Optional) one-to-two adapter
SMK4	(Optional) micro KlipChip grabber tip adapter, 4 each
071-0567-00	P6417/P6418 Instruction Manual

Logic Analyzer Module Probes and Accessories

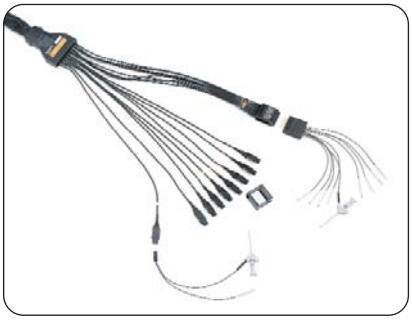
P6418 – The P6418 is a 17-Channel general-purpose probe with leadsets and grabber tips for use with: 1) probing individual test points within your target system, either directly or with a test clip, or 2) direct connection to legacy TLA family processor/bus support probe adapters with 8-Channel probe connectors. The P6418 works with a wide range of industry-standard probing accessories for flexible attachment to your target system. This probe is recommended for most general-purpose applications.

17-Channel general-purpose probe and accessories – Order P6418.

P6418 Probe Cable Length – 1.9 m (6.25 ft.).



▶ P6417.



▶ P6417.

P6417 – The P6417 is a 17-Channel general-purpose probe that is similar to the P6418 with the additional capability of allowing you to separate the 8-Channel podlet groups into individual channels for both maximum electrical performance and maximum distance between adjacent channels. This probe is recommended for those general-purpose applications that require maximum flexibility.

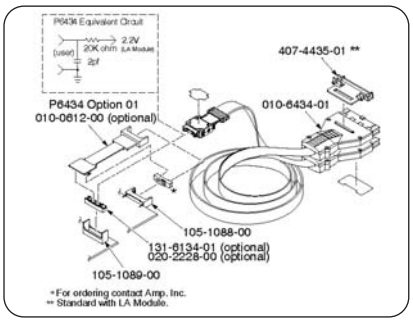
17-Channel general-purpose probe and accessories – Order P6417.

P6417 Probe Cable Length – 1.8 m (6 ft.).

▶ P6417

Part Number	Description
N/A	2 each – 8-Channel podlet holders (installed)
N/A	1 set of 17 podlet color coding bands (installed)
334-9239-00	1 sheet of probe labels (not installed)
196-3476-00	1 each – 8-Channel leadset (barrel connectors support 0.100" and 2 mm spacing) Black
196-3479-00	1 each – 1-Channel leadset (barrel connectors support 0.100" and 2 mm spacing) Black
196-3477-00	(Optional) 1 each – 8-Channel reduced bias voltage leadset (barrel connectors support 0.100" and 2 mm spacing) White
196-3478-00	(Optional) 1 each – 1-Channel reduced bias voltage leadset (barrel connectors support 0.100" and 2 mm spacing) White
SMG50	20 each – SMT KlipChip™ grabber tips
013-0280-00	(Optional) one-to-two adapter
SMK4	(Optional) micro KlipChip grabber tip adapter, 4 each
071-0567-00	P6417/P6418 Instruction Manual

▶ P6419.



▶ P6434.

▶ P6434.

P6419 – The P6419 is a 17-channel high-density compression probe, with single-ended clock and data. This probe utilizes a connector-less probe attach mechanism for quick and reliable connections to your system under test. This probe is recommended for those applications that require higher signal density or a connector-less probe attach.

17 channel High-density Compression Probe, with Single-ended Clock and Data – Order P6419.

P6419 Probe Cable Length – 1.8 m (6 ft.).

P6434 – The P6434 is a lightweight probe with quick connect/disconnect and a positive latching mechanism to ensure a secure, reliable connection. It is for use with: 1) applications where you have designed in the AMP Mictor high-density connectors into your target system or 2) direct connection to newer TLA family processor/bus support probe adapters with AMP Mictor 34-Channel probe connectors. An optional low-profile adapter for low-clearance applications is also available. This probe is recommended for all high-density applications.

34-Channel High-density Probe and Accessories – Order P6434.

P6434 Probe Cable Length – 1.5 m (5 ft.).

▸ P6419

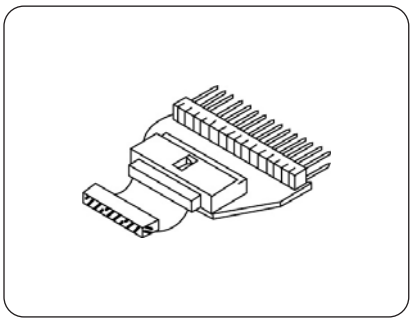
Part Number	Description
020-2453-00	Nut bar (used on <0.093 in. thick PCB) Bag of 2
020-2451-00	Elastomer Holder Assembly, Thin [black] (used on <0.093 in. thick PCB) Bag of 2
020-2452-00	Elastomer Holder Assembly, Thick [gray] (used on >0.093 in. thick PCB) Bag of 2
335-1007-00	Sheet of probe labels
020-2457-00	(Optional) Mictor-on-PCB to Compression Adapter
020-2455-00	(Optional) Compression-on-PCB to Mictor Adapter, 17-Channel

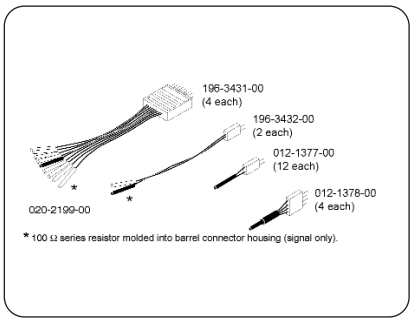
▸ P6434

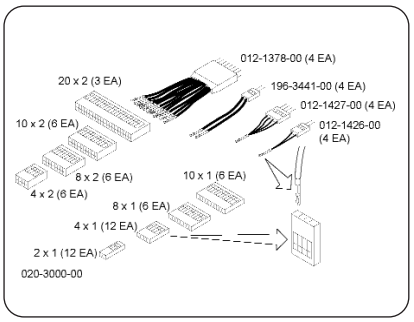
Part Number	Description
N/A	1 sheet of probe labels (not installed)
105-1088-00	1 latch housing assembly, edge-mount
105-1089-00	1 latch housing assembly, vertical
070-9793-02	P6434 Instruction Manual
131-6134-01	(Optional) 1 each – AMP mictor connector, surface-mount
020-2228-00	(Optional) 21 each – AMP mictor connector, surface-mount

34-Channel Low-profile Adapter for P6434 – Order P6434 Opt. 01.

Part Number	Description
010-0612-00	(Optional) low-profile leadset for P6434







▶ UPIK3M.

P6417 to 3M Type 3592, 2x10, 0.1 in. Adapter – Order UPIK3M (5 each).
Order 671-2508-00 (1 each).

34-Channel Probe Interface Kit with Barrel Connectors – Order 020-2199-00.

34-Channel Probe Interface Kit with mini-PV Connectors – Order 020-3000-00.

Differential-to-single-Ended Converters

Each podlet converts 8 input differential pairs to a single-ended output for use with the TLA Logic Analyzer. They draw their power from separate wires connected to the system under test. The units are shipped without any input termination connected and a supply of 100 Ω termination resistors for use and installation by the user, if desired. The units are shipped without input leadsets. Leadsets are also available.

Differential ECL/PECL to Single-ended ECL Converter Pod

Each channel is converted via an ON Semiconductor MC10E416 buffer which will support speeds as high as 800 MHz. The inputs have provisions for differential and/or parallel termination. The input power is provided via two leads that are connected to a lower voltage and a higher voltage, each DC-isolated from the output, allowing operation in both ECL and PECL systems.

Differential LVDS/TTL to Single-ended TTL Converter Pod

Each channel is converted via a National Semiconductor DS90LV032A receiver supporting data rates in excess of 400 Mbps (200 MHz). The inputs have provisions for differential terminations and have resistor-diode input protection from over voltage.

For information or ordering, please contact:
Dragonfly Software Development
4905 SW Griffith Drive, Suite 100
Beaverton, OR 97005-8724
(503) 643-3800 phone
(503) 626-9653 fax
sales@dfsw.com

TLA7N4 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 Opt. C3).

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

Opt. R3 – Repair Service 3 Years.

Opt. R5 – Repair Service 5 Years.

Opt. IN – Product Installation Service.

▶ Differential-to-single-ended converter pods.

Tektronix Logic Analyzers

► TLA7N4 Logic Analyzer Module

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Our most up-to-date product information is available at:
www.tektronix.com

Product(s) are manufactured in ISO registered facilities.

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