
HP 54620A/C Logic Analyzers

Product Overview

- **16 Channels**
 - **500 MSa/s**
 - **3.5 ns Glitch Capture**
 - **Simple Scope-Like Operation**
 - **Full Color Display With 54620C**
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Do you use your scope as your primary tool for troubleshooting digital circuits because you feel that your problems are not complex enough for a logic analyzer? Do you wish that your scope had the power of a logic analyzer without the complexity and cost of one?

If so, these are the logic analyzers for you. With familiar scope-like operation and high speed display, these are the logic analyzers that you can simply set on your bench and use like your scope. Because you are a scope user, these are the logic analyzers that you already know how to operate.

The HP 54620A/C are designed to be used with your scope to quickly troubleshoot and debug your mixed signal and digital circuits. The HP 54620A is the choice for tight budget situations. Its monochrome raster CRT display provides bright crisp displays of your logic waveforms. The HP 54620C adds a full color active matrix LCD display. With the addition of color, the logic analyzer's 16 channel display is easy to use. Colors can be used to group or highlight channels.

The HP 54620A/C offers:

- Scope-like control knobs
- Auto scale for one button set-up
- Trigger Input/outputs for use with your scope
- Automatic measurements of frequency, period, duty cycle, width, channel-to-channel delay, hold time and set-up time



- Cursor measurements and read-out of waveform values in Hex or Binary
- Edge, pattern and advanced triggering
- Store/recall of 16 front panel setups with channel labels
- Full color active matrix LCD display (HP 54620C)
- Monochrome raster CRT display (HP 54620A)
- Optional HP-IB or RS-232 remote control
- Optional hard copy to HP-IB, RS-232, or parallel printers
- Weight 6.8 kg/15 lb.
- 3 Year Warranty

Scope-like operation

The HP 54620A/C logic analyzers are designed for the person whose primary analysis tool is the oscilloscope, but often wishes for the additional power of a logic analyzer. This logic analyzer has a control panel that is very much like

that of your scope. Simply turn a knob, much like you would on your scope, to make a change in the time per division or reposition a channel in the display. Analyzer set-up is simplified with a powerful Autoscale operation. Autoscale will turn on and display all channels that have activity. The time base will be set to give an optimally scaled display of all active signals.

Flexible triggering

The simplest and most scope-like triggering is provided in the edge triggering mode. The pattern mode extends the triggering to be a pattern of high, low, and don't care levels across all 16 of the HP 54620A's input channels as well as the external trigger input port. This pattern can be qualified with an edge. For those applications where more triggering power is needed to isolate the event of interest, the Advanced trigger mode is available.

High speed display

An important consideration of a troubleshooting tool is its ability to clearly display changes in the circuit under test. The HP 54620A/C employs an advanced four processor architecture, giving you a logic analyzer that can display changing waveforms in your system that would be missed by more traditional analyzers. Another benefit of the high speed display system is that the HP 54620A/C will respond instantly to your front panel control inputs. This eliminates a source of confusion in your troubleshooting process.

See more with color

The display of 16 logic channels can be somewhat confusing. By the use of color, you can group channels that are displaying related information, or specific channels can be highlighted. For example, address lines can be in one color while control lines are displayed in other colors. Alternate palettes allow the display to be customized for most favorable viewing.

Upgrade to meet your changing needs

You can upgrade the HP 54620A logic analyzer to produce hard copies to either a printer or plotter. Or, you can interface it to a computer with either HP-IB or RS-232 interfaces.

Using HP 34810A BenchLink/Scope for Windows, you can easily upload the logic analyzer display to your personal computer for preparing a report, creating a presentation, or storing the analyzer's set-up for later use.

Performance Characteristics

Input Channels	
Number of Channels	16 numbered 0 - 15
Channel Input Cable	HP 54620-61601 with channels grouped in two sets of 8. Instrument is compatible with HP 01650-61607 cable and accessories.
Input R&C	~ 100 k Ω and 8 pF
Maximum Input	\pm 40 V
Dynamic Range	\pm 10 V about threshold
Minimum Input	500 mV peak to peak about threshold
Minimum Input Voltage Overdrive	To meet timing accuracy, the threshold value must be within 20% of the 50% value of the input signal
Threshold Setting	Threshold levels can be assigned to the input channels in groups of 8 channels (0 - 7 and 8 - 15) and external trigger
Threshold Range	\pm 6.0 v
Threshold Accuracy	\pm (3% of setting \pm 100 mv)
Preset Threshold Levels	TTL = 1.5 V CMOS = 2.5 V ECL = 1.3 V
Channel to Channel Skew	2.0 ns typical 3.0 ns maximum
Horizontal System	
Sweep Speeds	1 s/div to 5 ns/div Main & Delayed Sweep Extended to 5s/div with Autoglyph disabled
Accuracy	0.01% of reading Main, Delayed sweeps, and verniers
Horizontal Modes	Main, Main & Delayed and post acquisition pan and zoom
Cursor Accuracy	
Single Channel	\pm (Sample Period + 0.01% of reading + 0.2% of screen width)
Dual Channel	\pm (Sample Period + Ch to Ch skew + 0.01% of reading + 0.2% of screen width)
Delay Jitter	10 ppm
Delay Range	
Pre-trigger	(Negative time) Maximum delay is independent of time reference (left, center, right)
Sweep Speed (per division)	Maximum Delay divisions
5 ns	3,231
10 ns	1,615
20 ns	807
50 ns	323
100 ns	161
200 ns	80.7
500 ns	64.6
1 μ s	16
> 1 μ s	16

Post-Trigger	(from trigger point to start of sweep) from 5 ns/div to 1 μ s/div - 8.839 ms From 2 ms/div to 1 s/d 1,048,575 times sampling period, not to exceed 100 s.
Delayed Sweep Operation	Delayed can be as fast as 5 ns/div but must be at least 2X main sweep.
Post Acquisition Pan & Zoom Operation	Acquired waveforms may be panned across the display and/or expanded for enhanced viewing by simply changing time/div or delay settings.
Acquisition System	
Maximum Sample Rate	500 MSA/s
Resolution	Single bit
Simultaneous Channels	16
Record Length	2 k samples at sampling periods of 8 ns and slower (sweep speeds of 1 μ s/div to 1 s/div) 8 k samples at sampling periods of 2 ns and 4 ns (sweep speeds of 5 ns/div to 500 ns/div), or all sweep speeds when Autoglyph mode is disabled
Maximum Update Rate	15 full screens per second independent of the number of channels being displayed.
Glitch Detect	Automatically activated at all sweep speeds where sampling period is slowed to be greater than 4 ns (1 μ s/div and slower). Will detect glitches as narrow as 3.5 ns at all activated sweep speeds.
Trigger System	
Sources	All Channels & External
Auto/Normal Operation	Auto will produce a free running display if the trigger is not found. Normal causes the analyzer to wait indefinitely for a trigger to start acquiring data.
Modes: Edge, Pattern and Advanced	
Edge	A single edge can be specified on channels 0-15 and External. Edge may be rising, falling or either.
Pattern	Analyzer will trigger upon entering a pattern of high, low and don't care levels on all of the channels and external trigger input. A single edge (rising, falling or either) can be ANDed with this pattern.
Advanced	Two unique pattern and edge terms can be combined with operators to create a very specific trigger event.

Advanced Operators	And, Or, Then, Entered, Exited, Duration > time, Duration < time, and Occurs N times. Maximum Occurrence: 2 ²⁰ -1
Edge Recovery Time	Sweep speeds of 5 ns/div to 1 µs/div: 28 ns Sweep speeds of 2 µs/div and slower: 20 ns + 1 sample period
Minimum Detectable Pattern Width	13 ns + Ch to Ch skew at sweep speeds of 5 ns/div to 1 µs/div. At sweep speeds of 2 µs/div and slower = (1 ns + 1 sample period + Ch to Ch skew + 0.01%)
Minimum Settable Duration	At all sweep speeds = 2 sample periods or 16 ns, whichever is greater.
External trigger	
Input R & C	~ 1 MΩ and 12 pF. Compatible with HP 1007X probes.
Maximum Input	± 40 V peak
Trigger Threshold Increments	± 6 V, settable in 50 mV
Threshold Accuracy	± 100 mV or 6% of setting whichever is greater
Minimum Input Change	200 mV pp
Minimum Pulse Width	20 ns
Trigger Output	Output is a rising edge at the trigger point.
Output Level	0 to >/= 2.0 V into 50 Ω 0 to >/= 4.8 V open circuit
Delay	Data in to trigger out ~ 85 ns
Jitter	± (Sample period + 10 ppm)
Maximum Output Rate	2 kHz with the analyzer stopped, 20/sec running.
Display System	
Display	HP 54620A: 7" Raster CRT HP 54620C: 5.8" active matrix color LCD
Resolution	256 Vertical by 500 Horizontal points
Controls Graticule	Front panel intensity control Selectable 8 x 10 grid frame, or none
Storage Scope	Autostore saves previous sweeps in half bright display and the most recent sweep full bright display. This allows easy differentiation of current and historic information.
Measurement Functions	
Automatic Measurements	The analyzer will perform measurements on the selected input channel(s). These measurements are continuously updated.

Single Channel	Frequency, Period, + Width, -Width, and Duty Cycle
Dual Channel	Channel to Channel delay, Hold-time, and Set-up time.
Cursor Measurements	Two cursors can be positioned on the display to make time measurements or read the value of the wave forms at the cursor. The cursors will track changes in time/div and delay controls. Readout in Time, 1/Time, Hex, and Binary.
Set-up Functions	
Autoscale	Selects all active channels and places them in the display. Channels not previously displayed will be added below those channels already being displayed with the lowest numbered channel at the top. Higher numbered channels will be displayed in order down the display. Sweep speed is set to give an optimally scaled display of all the active channels. Triggering and are not affected. Requires a signal with > 49 Hz frequency. Undo Autoscale function returns the instrument to the set-up prior to Autoscale being activated.
Save/Recall	16 front panel set-ups can be stored and recalled from nonvolatile memory.
Trace Memory	Two volatile pixel memories allow storage of trace display waveforms.
Channel Labels	Each channel may be identified with a six character label. Labels can be created from a front panel label generator and a library of up to 75 preset and user defined labels.
Probe Calibrator	Amplitude 5.0 V, Frequency 9.8 kHz
Power Requirements	
Voltage selection	Automatic
Line Voltage Range	90 to 250 Vac
Line Frequency	48 to 445 Hz
Max. Power Consumption	100 VA
General	
Environmental Characteristics	Meets the requirements of MIL-T-28800D for Type III, Class 3, Style D equipment as described below:
Ambient Temperature	
Operating:	-10° C to +55° C
Nonoperating:	-51° C to +71° C

Humidity*	
Operating:	95% RH at 40° C for 24 hours 90% RH at 65° C for 24 hours
Nonoperating:	
Attitude	
Operating:	To 4,500 m (15,000 ft)
Nonoperating:	To 15,000 m (50,000 ft)
Vibration Operating	15 min along each of the three major axes; 0.025-in peak to peak displacement, 10 Hz to 55 Hz in 1 minute cycles. Held at 10 min at 55 Hz (4 g at 55 Hz)
Shock Operating	30 g, 1/2 sine, 11-ms duration. 3 shocks/axis along major axis. Total of 18 shocks.
EMI	
Commercial:	Meets CISPR 11 Class A
MIL-T-28800D:	Meets the requirements in accordance with MIL-T28800 paragraph 3.8.3 table IX, and MIL-STD- 461C CE01: Part 2 CE03: Part 2 CS01: Part 2 CS02: Part 2 (limited to 100 MHz) CS06: Part 5 RE01: Part 5 measured at 6 inches, 15 dB excepted from 19 kHz to 50 kHz. RE02: Part 2 (limited to 1 GHz) 10 dB relaxation, 14 kHz to 100 kHz RS03: Part 2, limited to 3 V/meter from 14 kHz to 1 GHz.
This product meets the requirement of the European Communities (EC) EMC Directive 89/336/EEC.	
Emissions: EN55D 11/CISPR 11 (ISM, Group 1, Class A equipment)	
Immunity	
EN50082-1	Code ¹ Notes ²
IEC 801-2 (ESD) 4kV CD, 8kV AD	1 A
IEC 801-3 (Rad.) 3V/m	1 A
IEC 801-4 (EFT) 1 kV	1 B
¹ Performance Codes	
1 PASS – Normal operation, no effect.	
2 PASS – Temporary degradation, self-recoverable.	
3 PASS – Temporary degradation, operator intervention required.	
4 PASS – Not recoverable, component damage.	
² Notes:	
A TTL logic threshold with all cables disconnected.	
B TTL logic threshold with HP-IB cable connected.	
Size	
Height	172.7 mm (6.8 in),
Width	322.6 mm (12.7 in),
Depth	317.5 mm (12.5 in)
Weight	6.8 Kg (15 lb)
Safety	Self-certified to IEC 348/HD401, UL 1244, CSA-C22.2 No. 231 (series M-89)

*Tested to Hewlett-Packard environmental specification section 758 for class B- 1 products

Ordering Information

HP 54620A	16-channel 500 MSa Logic Analyzer, (supplied with 16-channel input cable assembly, User and Service Guide, as specified by language option) and line cord
HP 54620C	Color 16-Ch. 500 MSa Logic Analyzer, (supplied with 16-channel input cable assembly, User and Service Guide, as specified by language option) and line cord

Instrument Options

Option 101	Accessory Pouch & Front Panel Cover
Option 103	HP 54654A Operators Training Kit, Consists of a training signal board and lab workbook
Option 104	5041-9409 Carrying Case, (designed to protect the instrument for shipment or checking as airline baggage)
Option 106	HP 34810A BenchLink/Scope software. Windows software that interfaces the instrument (with any HP-IB or RS-232 module installed) to a PC for storage, analysis, or easy integration of trace images into popular desktop publishing software
Option 001	RS-03 Magnetic shielding (added to the CRT) (not compatible with HP 54620C)
Option 1 CM	Rackmount Kit, seven inch EIA standard rack mount HP P/N 5062-7345 compatible with fixed or pivoted slides

Optional Accessories

HP 54650A	HP-IB Interface Module
HP 54651A	RS-232 Interface Module
HP 54652A	Parallel Interface Module
HP 10070A	1.5 m 1X oscilloscope probe
HP 10071A	1.5 m 150 MHz 10X oscilloscope probe
HP 10072A	SMT probe adapter kit for HP 1007X Probes
HP 10079A	Trace Recording Camera
HP 01650-61607	16-Channel Woven Probe Cable, compatible with HP 1251-8106 20-pin header
HP 01650-61608	16-Channel Probe Lead Set for use with HP 01650-61607 cable
HP E2421A	SOIC Clip Adapter Kit
HP E2422A	J lead plastic lead clip carrier test kit