LOGIC ANALYZERS

State and Timing Analysis Modules

HP 16550A, 16554A, 16555A, 16556A, 16555D, 16556D

Key Specifications and Characteristics

	HP 16550A	HP 16554A[1]	HP 16555A/16555D[1]	HP 16556A/16556D[1]
Timing-analysis rate	Conventional: 250/500 MHz[2] Transitional: 125/250 MHz[2] Glitch: 125 MHz	Conventional: 125/250 MHz[2]	Conventional: 250/500 MHz[2]	Conventional: 200/400 MHz[2]
State-analysis rate	100 MHz	70 MHz	110 MHz[3]	100 MHz
Channels/card	102	68	68	68
Channels/timebase	204	204	204	340
Memory depth/channel	4 K/8 K[4]	512k/1024K[4]	1M/2M[4], 2M/4M[4]	1M/2M[4], 2M/4M[4]
Setup/hold time	3.5/0 ns to 0/3.5 ns adj. in 500 ps steps	3.5/0 ns to 0/3.5 ns adj. in 500 ps steps	3.5/0 ns to 0/3.5 ns adj. 500 ps steps	3.5/0 ns to 0/3.5 ns adj. in 500 ps steps
Minimum detectable glitch	3.5 ns	3.5 ns	3.5 ns	3.5 ns
Probe input R and C	100k Ω and ~ 8 pF	100k Ω and ~ 8 pF	100k Ω and ~ 8 pF	100k Ω and ~ 8 pF
Triggering terms	Patterns: 10; Ranges: 2; Edge and glitch: 2; Timers: 2	Patterns: 10[5]; Ranges: 2; Edge and glitch: 2; Timers: 2	Patterns: 10[5]; Ranges: 2; Edge and glitch: 2; Timers: 2	Patterns: 10; Ranges: 2; Edge and glitch: 2; Timers: 2
Trigger sequence levels	12 in state and 10 in timing	12 in state and 10 in timing	12 in state and 10 in timing	12 in state and 10 in timing
Symbols	Unlimited	Unlimited	Unlimited	Unlimited

[1] HP 16554A, 16555A, 16555D, 16556A, and 16556D can only be used with the HP 16500B or 16500C logic analysis mainframe.
[2] Half-channel mode doubles memory depth, doubles maximum conventional timing speed and doubles maximum transitional timing speed.
[3] For 110-MHz mode only–Single clock edge with qualifiers. 100-MHz mode and below is the same as the HP 16550A.
[4] Memory depth doubles in half-channel timing mode.
[5] Eight pattern recognizers are available in HP 16554A timing modes and HP 16555A/16555D timing and 110-MHz state analysis modes.

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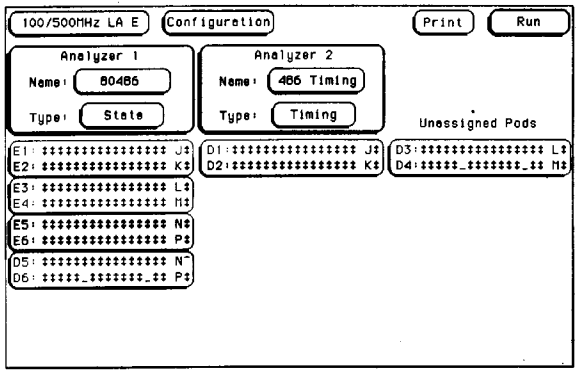
State and Timing Analysis with a Choice of Depth

The HP 16550 series of state and timing analyzers offers a range of memory depths and state analysis speeds to fit your application. The HP 16550A offers industry-standard state and timing analysis features at an affordable price. The HP 16554A, 16555A, 16556A, and the new HP 16555D and 16556D analyzers provide the same acquisition and triggering capabilities as the HP 16550A, but provide the deeper memory needed to capture elusive system crashes.

All HP 16550 series analyzers use the same probing scheme, which makes it possible for you to easily interchange probing interconnections whenever your probing needs change. All HP 16550 series analyzers also connect to Hewlett-Packard's broad and growing selection of preprocessor solutions because the probes are compatible with previous HP state and timing analyzer modules.

Capture State or Timing Data on All Channels

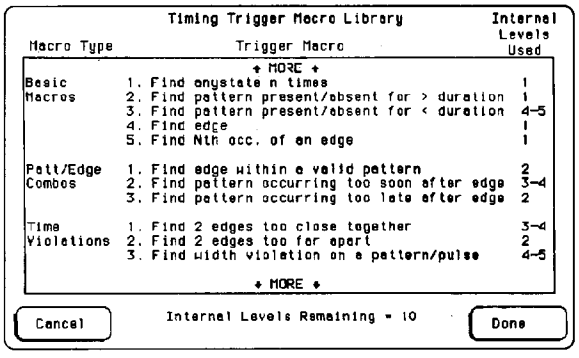
With the HP 16550 series of state and timing analyzers, there is no need to connect special probes to view timing activity. All channels on HP state and timing analysis modules perform either state or timing functions. Set up your HP 16550 series analyzer to perform simultaneous, fully time-correlated state analysis on some channels, and timing analysis on the rest.



Assign channels to capture state timing data without moving probes.

Advanced Trigger Macros Capture Elusive Problems

Both basic and complex state and timing macros are available in the trigger macro library. Macros can be combined to create custom trigger setups.

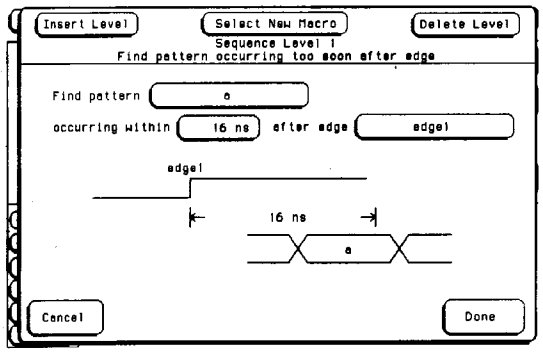


The HP 16550 series timing trigger macro library.

Each trigger macro has a graphic of the measurement and a sentence-like structure to make triggering easy. Set up your triggering in terms of the measurement you want to make, rather than in terms of the trigger functions in the logic analyzer.

Families of trigger macros make it easy to pick out just the trigger macro you need, and avoid the hassle of wading through a long list of triggers to find the one you want. Families of trigger macro measurements include:

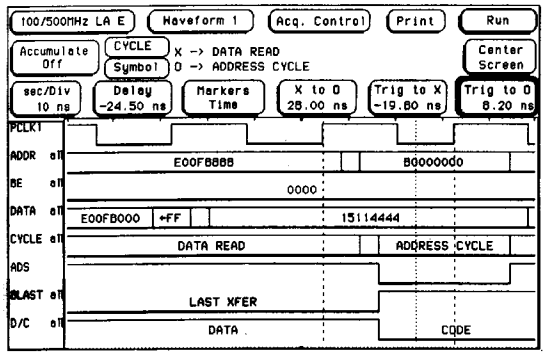
- Basic macros, including find anystate n times;
- Sequence-dependent macros, including find a n-bit serial pattern;
- Time-violation macros, including find an event 2 occurring too soon after event 1.



Typical timing trigger macro input screen.

Analyze Distant Timing Events with Transitional Timing

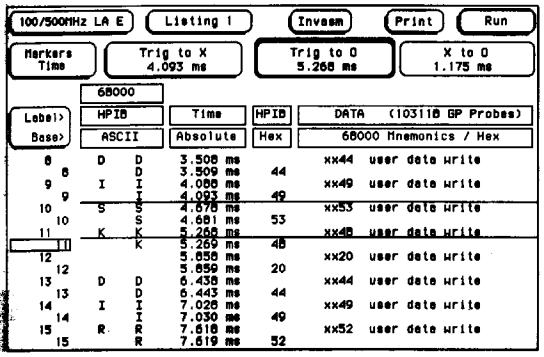
Capture events that are seconds apart while maintaining 4-ns resolution with the HP 16550A. Transitional timing samples at full speed but only stores data when a transition occurs. This technique effectively extends the total time captured by the acquisition memory while maintaining high time resolution.



Display timing measurements with bus values overlaid in the waveforms.

Track Problems in Multiprocessor and Multiple Bus Systems

Configure your HP 16550 series logic analyzer as two independent state analyzers that sample data using separate clocks. Time tagging of states lets you time-correlate and view the state listing interleaved on the same screen.



View interactions between two separately clocked systems.

Capture Up to 340, 2M Deep Channels Simultaneously

Use the new HP 16555D and 16556D and the 16554A, 16555A and 16556A to debug ASICs, 8-bit, 16-bit, 32-bit and 64-bit microprocessors. Connect five HP 16556D cards for 340-channel wide measurements. The HP 16555D and HP 16556D provide 2M of acquisition memory across all channels. The HP 16555A and 16556A provide 1M of acquisition memory while the HP 16554A provides 512K.

The memory depth of all cards is doubled in timing analysis half-channel mode.

Find Intermittent Errors Using Postprocessing

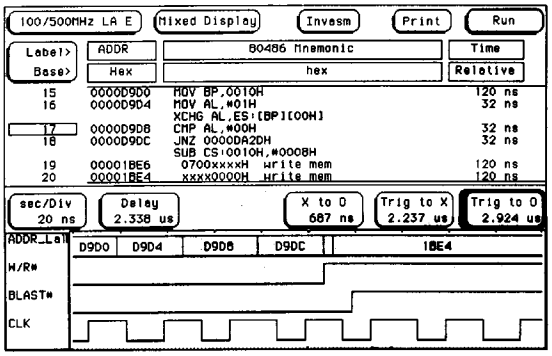
In state mode, set up compare mode to "run until compare not equal" to capture intermittent errors. Use compare for quick go/no-go testing of your product in manufacturing. State compare shows you the effects of system changes by comparing each sample in the current measurement to each sample in the previous measurement. In timing mode, capture intermittent setup and hold violations using the specify-stop-measurement feature to repetitively acquire data until the time interval between two patterns violates a specified condition.

Enhance Troubleshooting with Flexible Display Modes

State and timing analyzers let you display state measurements in listings, X-Y chart, or state waveforms. In addition to the waveform display, the HP 16550A, 16554A, 16555A/D, and 16556A/D allow you to display timing information as a listing. Markers placed on one display are automatically updated in the other display modes.

Find Whether the Problem is in Software or Hardware

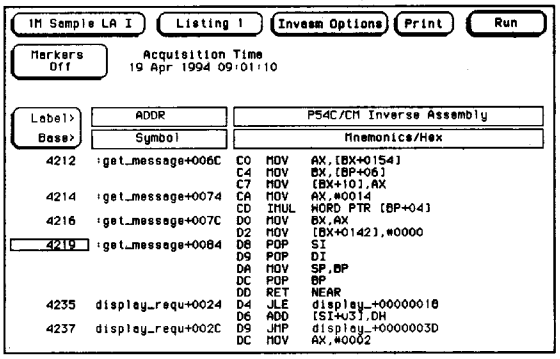
Arm the timing analyzer with the state analyzer to capture system behavior between states. Display both measurements on one screen and use time-correlated markers to identify the cause of problem states.



Display time-correlated state and timing measurements on the same screen.

Analyze Your Software with Informative Listings

New technology allows you to filter the disassembled trace, so it's easier to analyze. For example, suppress the display of instructions that were prefetched, but not executed. Display your high-level symbols in the state listing. If you program in a high-level language, the optional HP E2450A symbol utility lets you import symbols from source code. The utility reads industry-standard object module formats.



Disassembly filters let you analyze software from multiple viewpoints. The symbol utility lets you import and display symbols from your software.

Key Literature

A Family of State and Timing Analyzers for the HP 16500C Logic Analysis System, p/n 5962-7245E