Agilent 16962A 2 GHz State, 2/4/8 GHz Timing Logic Analyzer Module

Data Sheet

Features:

- State analysis up to 2 GHz addresses all DDR speeds

- Up to 125 ps (8 GHz) timing analysis captures up to 400 M of system activity at high resolution

- 68-channel cards combined in up to 5-card sets provide 340 channels on a single time base and trigger

- Selectable memory depths up to 100 M enables you to purchase the memory depth you need now and upgrade later as your needs evolve

Agilent Technologies

The Agilent 16962A logic analyzer module delivers the performance required for the latest high-speed standards like DDR3 and QuickPath Interconnect (QPI). In addition to covering emerging standards, the 16962A provides conventional state and timing measurements on single-ended or differential signals at rates up to 2 GHz. The 100 M samples of memory ensure you capture enough system activity to troubleshoot complex systems.

## Optimized for comprehensive DDR memory analysis

The 16962A logic analysis module with 2.0 GT/s state speed and 2 GHz trigger sequencer speed provides full capability to reliably trigger and capture all DDR activity, including DDR3 1600. When used with a full suite of DDR probing solutions (Interposer, BGA, SODIMM, mid-bus) and compliance/performance analysis software, you obtain full test capability for system integration in the memory industry.

Automate measurement setup and quickly gain diagnostic clues

Quickly get up and running by automating your measurement setup process. In addition, the logic analyzer's sampling position and threshold voltage settings are automatically determined so that data on high-speed buses is captured with the highest accuracy.

Identify problem signals over hundreds of channels simultaneously

As timing and voltage margins continue to shrink, confidence in signal integrity becomes an increasingly vital requirement in the design validation process. Eye scan lets you acquire signal integrity information on all the buses in your design, under a wide variety of operating conditions, in a matter of minutes. Identify problem signals quickly for further investigation with an oscilloscope. Results can be viewed for each individual signal or as a composite of multiple signals or buses.
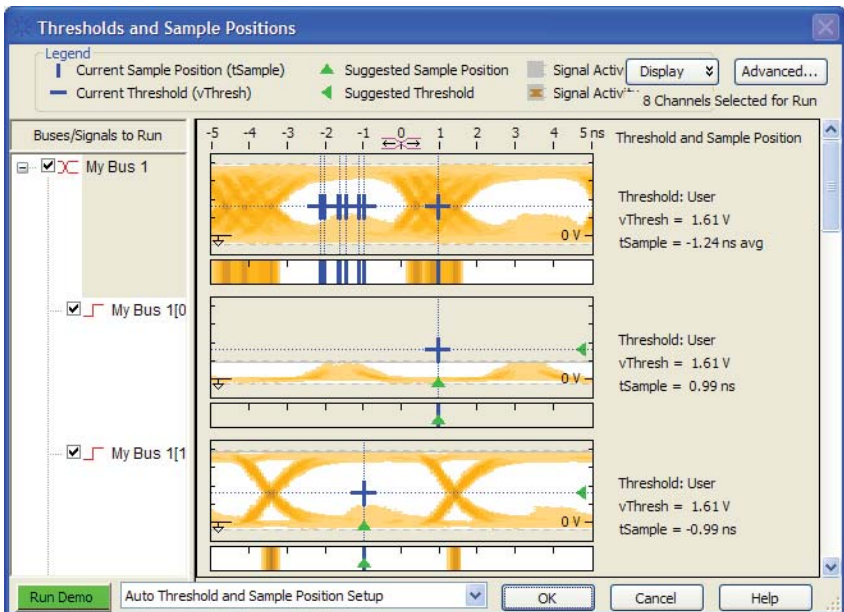
16962A Key Specifications and Characteristics

Agilent model number	16962A		
Channels per card (unused clock and clock ready bits can be used as data bits)	68 channels State: 64 data + 2 clock + 2 clock ready Timing: 68 data channels		
Maximum channels on single time base and trigger	340 channels		
Number of mainframe slots per card	1		
Number of independent analyzers per module set	1		

Timing mode – conventional			
Maximum sample rate (conventional timing)	125 ps (8 GHz): quarter channel mode	250 ps (4 GHz): half channel mode	500 ps (2 GHz): full channel mode
Maximum memory depth	(4x memory option)	(2x memory option)	
Option 100	400 M	200 M	100 M
Option 064	256 M	128 M	64 M
Option 032	128 M	64 M	32 M
Option 016	64 M	32 M	16 M
Option 004 (included standard)	16 M	8 M	4 M
Channels per multi-card module			
1-card module	17	34	68
2-card module	34	68	136
3-card module	51	102	204
4-card module	68	136	272
5-card module	85	170	340
Pod usage	1 pod from each pod pair, user selectable	1 pod from each pod pair, user selectable	All pods
Channel usage	Even bits of selected pods	All channels of selected pods	All channels
Probe connection	E5386A adapter recommended between probe and logic analyzer cable for selected pods	Direct to logic analyzer cable for selected pods	Direct to logic analyzer cable

Timing mode – transitional			
Transitional timing	2 GHz: full channel mode		

16962A Key Specifications and Characteristics

Agilent model number	16962A
State modes	
Maximum state speed[1]	2 GHz (single edge, 2 GHz clock)
Maximum state data rate[*,1]	2 Gb/s (DDR, 1 GHz clock)
Channels per multi-card module	State
1-card module	64 data + 2 clocks + 2 clock ready
2-card module	132 data + 2 clocks + 2 clock ready
3-card module	200 data + 2 clocks + 2 clock ready
4-card module	268 data + 2 clocks + 2 clock ready
5-card module	336 data + 2 clocks + 2 clock ready
Maximum memory depth	
Option 100	100 M
Option 064	64 M
Option 032	32 M
Option 016	16 M
Option 004 (included standard)	4 M
Minimum time between active clock edges	500 ps
Minimum state clock pulse width[2]	
Single edge	250 ps
Multiple edge	500 ps
Number of clocks	2 (on odd pods), 1 can be selected
Number of clock ready inputs	2 (on even pods), 1 can be selected
Time tag resolution	25 ps
Maximum time count between stored states	83.4 days
Automated threshold/sample position, Simultaneous eye diagrams, all channels	Yes

Maximum memory depth[3]

	State	Timing (full/half/quarter ch)
Option 100	100 M	100 M/200 M/400 M
Option 064	64 M	64 M/128 M/256 M
Option 032	32 M	32 M/64 M/128 M
Option 016	16 M	16 M/32 M/64 M
Option 004 (included standard)	4 M	4 M/8 M/ 16 M
Memory depth upgrade after purchase	Available via E5887A	

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* *Items marked with an asterisk (*) are specifications. All others are characteristics. "Typical" represents the average or median value of the parameter based on measurements from a significant number of units.*

1. *Requires continuous, periodic clock.*

2. *Tested with input signal Vih = 1.125 V, Vil = 0.875 V, threshold = 1.0 V, tr/tf = 180 ps ±30 ps (10%, 90%)*

3. *Store qualification consumes 1 sample per store qualified block.*

16962A Key Specifications and Characteristics

Agilent model number	16962A
Trigger characteristics	
Maximum trigger sequencer speed	2 GHz (500 ps)
Trigger resources – create a trigger from any 8 of the listed resources (7 in transitional timing)	16 pattern detectors evaluated as =, !=, >, ≥, <, ≤, in range, not in range 8 range detectors 4 to 8 burst detectors 4 edge detectors in timing, 3 in transitional timing 4 flags 1 timer in timing or transitional timing 1 arm in
Trigger resource combinations	Arbitrary Boolean combinations
Trigger actions	Goto Trigger and fill memory Trigger and Goto Trigger, send e-mail, and fill memory
Store qualification actions (available in state mode)	Store sample Don't store sample Turn on default storage Turn off default storage Store sample and turn on default storage Don't store sample and turn off default storage
Timer actions	Start from reset Stop and reset Pause Resume
Flag actions	Set Clear Pulse set Pulse clear
Trigger sequence level branching	Arbitrary 4-way if/then/else
Trigger position	Start, center, end, or user-defined
Maximum pattern width	128 bit – single label 340 bit – AND of multiple labels across multi-card set

Other	
Supported signal types	Single-ended and differential
Probe compatibility	90-pin cable connector
Voltage threshold	–3 V to 5 V in 10 mv increments
Threshold accuracy	±(30 mV + 1% of setting)
Threshold setting granularity	By channel

16962A Key Specifications and Characteristics

16962A

Logic analyzer mainframe compatibility

16902B 6-slot modular logic analysis system with software revision 3.82 or greater

Power requirements

All necessary power is supplied by the backplane connector of the logic analyzer mainframe.

Environmental characteristics

Indoor use only

Operating environment	
Temperature	0 °C to 40 °C (+32 °F to 104 °F). Reliability is enhanced when operating within the range +20 °C to +35 °C (+68 °F to +95 °F)
Humidity	0 to 80% relative humidity at 40 °C (+104 °F). Reliability is enhanced when operating within the range 20% to 80% non-condensing
Altitude	0 to 3,000 m (10,000 ft)
Vibration	Random vibration 5 to 500 Hz, 10 minutes per axis, approximately 0.2 g rms
Non-operating environment	
Temperature	−40 to +75 °C (−40 to +167 °F). Protect the instrument from temperature extremes which cause condensation on the instrument.
Humidity	0 to 90% at 65 °C (149 °F)
Altitude	0 to 15,300 m (50,000 ft)
Vibration (in shipping carton)	Random vibration 5 to 500 Hz, 10 minutes per axis, approximately 2.41 g rms; and swept sine resonant search, 5 to 500 Hz, 0.50 g (0-peak), 5 minute resonant dwell at 4 resonances per axis.

Ordering Information

16962A 2/4/8 GHz timing, 2 GHz state logic analyzer

Base configuration: 4 M acquisition memory included standard
    Option 016 – increase acquisition memory to 16 M
    Option 032 – increase acquisition memory to 32 M
    Option 064 – increase acquisition memory to 64 M
    Option 100 – increase acquisition memory to 100 M

E5887A after-purchase, memory upgrade for 16962A logic analyzer modules

Upgrade your 16962A logic analyzer module by "turning on" additional memory depth when you need more. Purchase the capability you need now, then upgrade as your needs evolve.
    Option 016 – increase acquisition memory to 16 M
    Option 032 – increase acquisition memory to 32 M
    Option 064 – increase acquisition memory to 64 M
    Option 100 – increase acquisition memory to 100 M

DDR memory probes and analysis software

Product	Description
DDR2 BGA probes	
W2631A	DDR2 x16 BGA command and data probe for logic analyzer and oscilloscope – kit of 4 probes
W2632A	DDR2 x16 BGA data probe for logic analyzer and oscilloscope – kit of 4 probes
W2633A	DDR2 x8 BGA command and data probe for logic analyzer and oscilloscope – kit of 4 probes
W2634A	DDR2 x8 BGA data probe for logic analyzer and oscilloscope – kit of 4 probes
ZIF probes (used to connect W2630A Series DD2 BGA probes to 90-pin logic analyzer cables)	
E5384A	46-ch single-ended ZIF probe for x8/x16 DRAM BGA probe connection to 90-pin logic analyzer cable
E5876A	46-ch single-ended ZIF probe for x16 DRAM data only BGA probe connection to 90-pin logic analyzer cable
E5877A	46-ch single-ended ZIF probe for 2 x8 DRAMs data only BGA probe connection to 90-pin logic analyzer cable
DDR3 BGA probes	
W3631A-001	Quantity of 1 – DDR3 x16 BGA command and data probe for logic analyzers and oscilloscopes
W3631A-002	Quantity of 2 – DDR3 x16 BGA command and data probe for logic analyzers and oscilloscopes
W3631A-004	Quantity of 4 – DDR3 x16 BGA command and data probe for logic analyzers and oscilloscopes
W3633A-001	Quantity of 1 – DDR3 x4/x8 BGA command and data probe for logic analyzers and oscilloscopes
W3633A-002	Quantity of 2 – DDR3 x4/x8 BGA command and data probe for logic analyzers and oscilloscopes
W3633A-004	Quantity of 4 – DDR3 x4/x8 BGA command and data probe for logic analyzers and oscilloscopes
ZIF probes (used to connect W3630A Series DD3 BGA probes to 90-pin logic analyzer cables)	
E5845A	46-ch SE ZIF probe for DDR3 x16 DRAM BGA probe connection to 90-pin logic analyzer cable
E5847A	46-ch SE ZIF probe for DDR3 x4/x8 DRAM BGA probe connection to 90-pin logic analyzer cable
DDR3 DIMM interposer	
N4835A	DDR3 advanced slot interposer probe - enhanced
DDR2/3 analysis software	
B4621A	DDR2/3 bus decoder
B4622A	DDR2/3 protocol compliance and analysis tool

Ordering Information

General purpose logic analyzer probes

Probes are ordered separately. Please specify probes when ordering to ensure the correct connection between your logic analyzer and device under test.

When operating in 8 GHz quarter channel timing mode, the E5386A adapter enables easy signal connection and reduces the number of probes and connectors used in quarter channel timing mode. The adapter maps the appropriate logic analyzer channels to all pins of the probe to which it is connected.

The following probes are compatible with the 90-pin cable of the 16962A logic analyzer module.

Probe type	Model number	Channels	Maximum data rate	Supported signal types
Soft touch connectorless probes	E5406A (Pro series)	34 (32 data, 2 clock)	> 2.5 Gb/s	Single-ended data, differential or single-ended clock
	E5402A (Low profile)	34 (32 data, 2 clock)	> 2.5 Gb/s	Single-ended data, differential or single-ended clock
	E5390A (Classic)	34 (32 data, 2 clock)	> 2.5 Gb/s	Single-ended data, differential or single-ended clock
	E5398A (Half-size)	17 (16 data, 1 clock)	> 2.5 Gb/s	Single-ended data, differential or single-ended clock
	E5405A (Pro series)	17 (16 data, 1 clock)	> 2.5 Gb/s	Differential or single-ended data, differential or single-ended clock
	E5387A (Classic)	17 (16 data, 1 clock)	> 2.5 Gb/s	Differential or single-ended data, differential or single-ended clock
Samtec connector probes	E5378A	34 (32 data, 2 clock)	1.5 Gb/s	Single-ended data, Differential or single-ended clock
	E5379A	17 (16 data, 1 clock)	1.5 Gb/s	Differential or single-ended data, Differential or single-ended clock
Mictor connector probe	E5380A	34 (32 data, 2 clock)	600 Mb/s	Single-ended data, Differential or single-ended clock
General purpose flying lead probes	E5382A	17 (16 data, 1 clock)	1.5 Gb/s	Single-ended data, Differential or single-ended clock
	E5381A	17 (16 data, 1 clock)	1.5 Gb/s	Differential or single-ended data, Differential or single-ended clock

E5386A adapter and 16962A module quantity requirements

Probe models	Number of channels	Quantity of E5386A	Quantity of 16962A
E5379A, E5387A, E5398A, E5405A	17	1	1
E5378A, E5380A, E5390A, E5402A, E5406A	34	2	2
E5384A, E5826A, E5827A, E5845A, E5847A	46	3	3

Related Agilent Literature

Publication title	Type	Publication #
Agilent 16900 Series Logic Analysis System Mainframes	Data Sheet	5989-0421EN
W2630A Series DDR2 BGA Probes for Logic Analyzers and Oscilloscopes	Data Sheet	5989-5964EN
W3630A Series DDR3 BGA Probes for Logic Analyzers and Oscilloscopes	Data Sheet	5990-3179EN
N4835A DDR3 DIMM Probing for use with the 16900 Series Logic Analyzer	Data Sheet	5990-3577EN
B4622A DDR2/3 Protocol Compliance and Analysis Tool	Data Sheet	5990-3300EN

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