

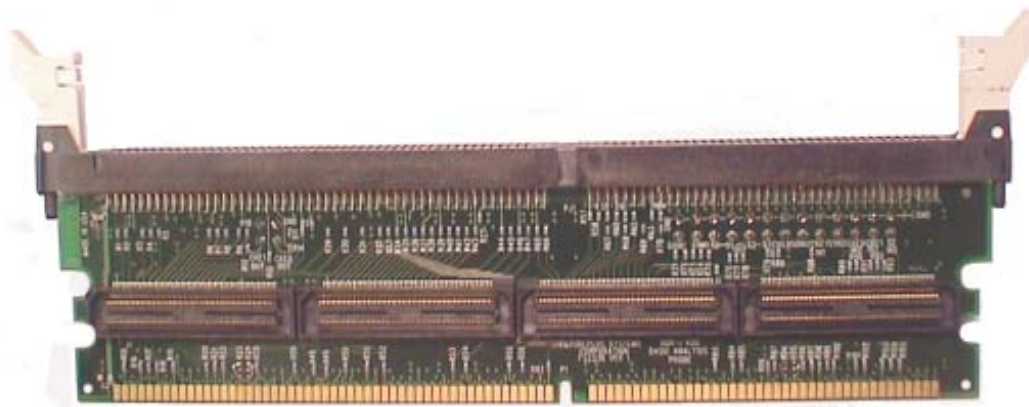


DDR Memory Protocol Analysis For Use with Agilent Logic Analyzers

The FuturePlus® FS2336 DDR400 Double Data Rate (DDR) SDRAM bus analysis probe provides complete protocol decode of memory transactions using an Agilent logic analyzer as the analysis execution engine. This combination provides powerful triggering, debug and compliance verification measurements. Data is decoded and displayed at any level of detail from the protocol level to binary.

FS2336 Key Features

- Quick and easy connection between the DDR400 bus connector and Agilent logic analyzers
- Complete and accurate 400 MT/s protocol decode
- Complete and accurate 2 or 4 GHz timing analysis (depending on analyzer modules).
- Uses High-speed Timing Zoom traces to locate tight DDR data valid windows for optimal state data capture.
- Supports both X4 and X8 SDRAMs
- Off Line analysis software allows PC-based analysis of data captured on a 16700 series logic analyzer.
- Requires only 750 ps data valid window for state data capture.
- Interposer design does not consume a DDR400 slot.
- Supports burst sizes of 2, 4, or 8
- Write only, reads only, or writes and reads visible in most circumstances.



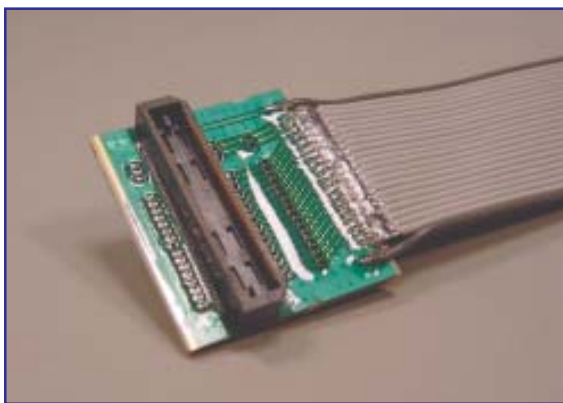
The FS2336 DDR400 Memory Bus Analysis Probe

Supported Memory Modules

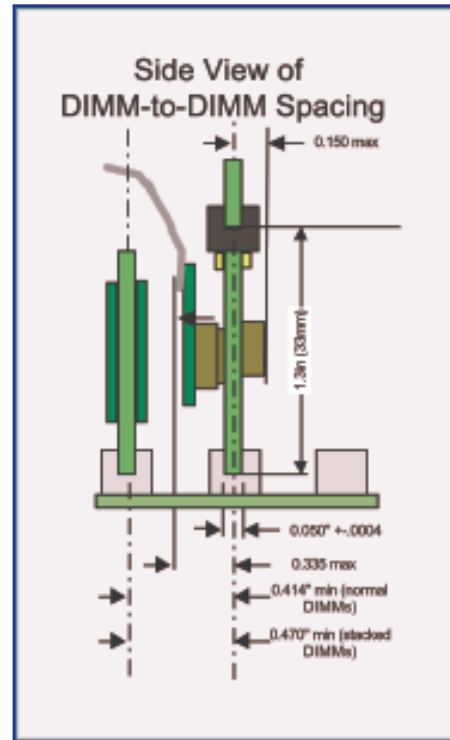
The FS2336 supports the PC3200 module, a 184-pin, 200 MHz clock (400 MT/s data rate), 64-bit, Unbuffered Synchronous Double Date Rate (DDR) DRAM Dual In-Line Memory Module (DDR SDRAM DIMM). It also supports slower versions that uses a 100 MHz (200 MT/s data rate) or a 133 MHz clock (266 MT/s data rate) DDR SDRAM DIMM. Registered and non-registered DIMM's are supported.

Connecting to the Logic Analyzer

The FS2336 attaches to the logic analyzer with termination adapters. Two are available. The FS1014 (Agilent E5378A) attaches to a 16753A through 16756A or 16760A. For situations where the probe must be used in a slot adjacent to other DIMM modules, the FS1026 (Agilent FSI-60090) attaches via a right angle egress to a 16753A through 16756A or 16760A. The necessary impedance matching networks are included in the Termination Adapters.



The FS1026 Right-angle Termination Adapter



The FS1026 termination adapter enables easy connection of the probe in the tight space between two adjacent memory slots.

Power Requirements

Power for the FS2336 is supplied by the logic analyzer. The analysis probe does not require any power from the DDR bus.

62	Active	0	1
	Bank = 0		
	Row Address = FF7		
63		1	1
64		1	1
65		1	1
66		1	1
67		0	1
68	Write	0	1
	Bank = 0		
	Address = FF7 38		
	Data = 80808080	80808080	
	Data = 80808080	80808080	
	Data = 80808080	80808080	
	Data = 80808080	80808080	
69		1	1

This display capture shows the typical output of the protocol decoder. The protocol decoder contains a filter that allows post filtering of any states including the *Not Selected* state, which is defined as a state that has no command or data associated with it.

Ordering Information

FS2336 DDR400 DIMM Bus Analysis Probe and Interposer

Termination Adapters (4 required)

FS1026 - Right angle egress, connects the 16753A-756A, 16760A, 16950A modules to FS2336

Agilent E5378A - 90 degree egress, connects the 16753A-756A, 16760A, 16950A modules to FS2336

Agilent E5385A - 90 degree egress, connects the 16717A-719A, 16750A-752A modules to FS2336

Software included with the FS2336:

Configuration files for the Agilent logic analyzer

Protocol Decoder software, runs on the Agilent logic analyzer

Logic Analyzer Requirements

See the table below for FS2336 protocol or timing analysis requirements.

The FS2336 requires up to four logic analyzer cards depending on whether protocol (double probed) or timing measurement are being used, and the type of logic analyzer card being used.

A logic analyzer pod has 17 channels

DDR Memory Bus Speed	Logic Analyzer Type	Timing Analysis	Protocol Analysis with Double Probing
200 MT/s (PC1600)	16750/751/752 16753/754/755/756 16910/911 16950	Two Cards Configured as One Timing Machine	Four Cards Configured as One State-Analysis Machine
400 MT/s (PC3200)	16753/754/755/756 16950	Two Cards Configured as One Timing Machine	Four Cards Configured as One State-Analysis Machine

Please note: for the most up-to-date information about Agilent logic analyzer compatibility, please check the FuturePlus Systems website at:

http://www.futureplus.com/products/fs2336/fs2336_sysreq9.shtml

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