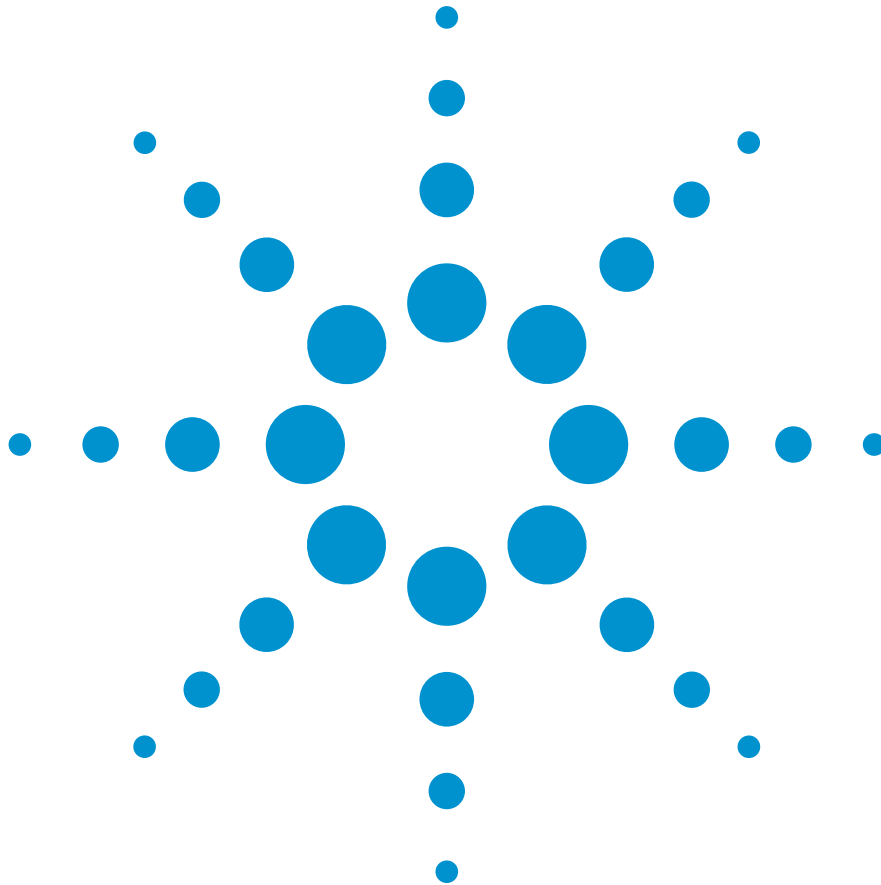


DDR3 DIMM Probing For Use With the 16900 Series Logic Analyzer

Data Sheet



Agilent offers a wide range of probing solution for DDR3 DIMM measurement. The Agilent N4835A DDR3 analysis slot interposer for use with the 16900 Series logic analyzers enables DDR3 memory debug and validation up to 1.6GT/s on target system with good signal integrity.

Features

- Quick, easy connection between the DIMM connector and Agilent logic analyzers with the interposer or midbus probe
- Compatible with all 240-pin DDR3 SDRAM DIMMs
- Supports both registered and non-registered DIMMs
- Interposer design allows probing a fully-loaded memory bus
- Up to 1600 MT/s protocol decode
- Simultaneous capture of read and write transactions
- Non-intrusive interposer design and works well on target system with good signal integrity
- DDR3 EyeFinder software enables accurate sampling of read and write data



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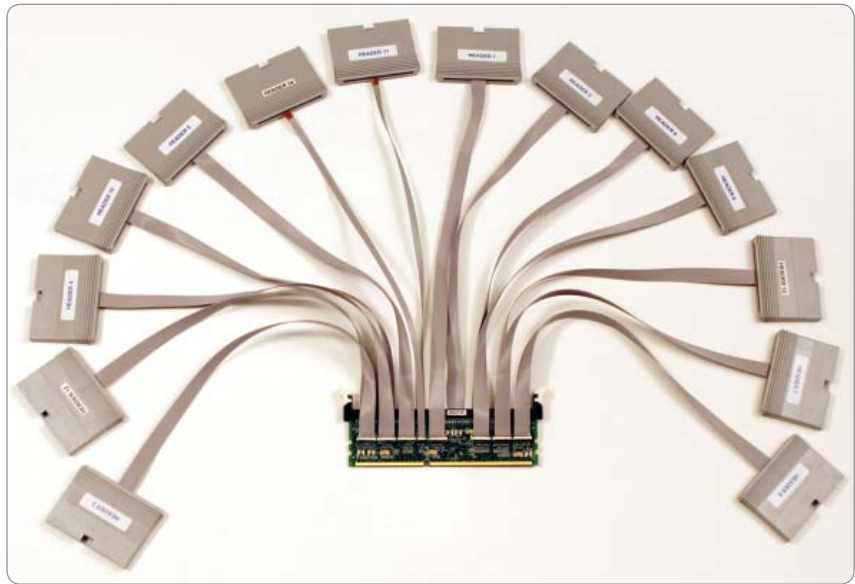


Figure 1. N4835A DDR3 advanced analysis slot interposer

For embedded DDR3 design or validation board design with no constraints on board spaces, Agilent offers the N4834A double probed soft touch probe for midbus probing. The N4834A comes in sets of 4 double probed soft touch probes for connection to four footprints on the board.

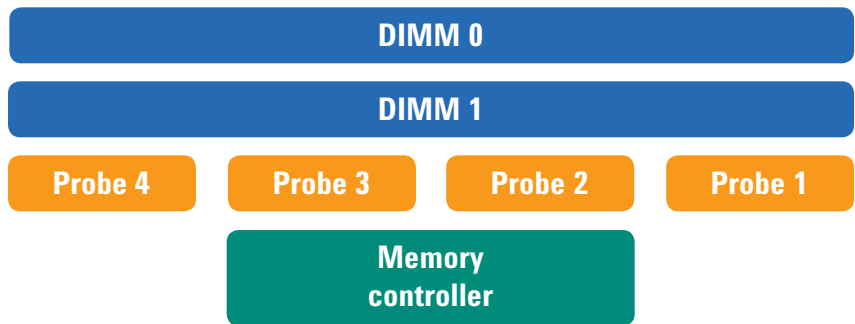


Figure 2. Four footprints enable probing of full DDR3 memory traffic

Table 1: N4834A pinout information

Probe 2				Probe 1			
DQS_P_12	A1	B1	GND	DQ_4	A1	B1	GND
DQS_P_3	A2	B2	DQ_30	DQ_0	A2	B2	DQ_5
GND	A3	B3	DQ_31	GND	A3	B3	DQ_1
DQ_26	A4	B4	GND	DQS_P_9	A4	B4	GND
DQ_27	A5	B5	CB_4	DQS_P_0	A5	B5	DQ_6
GND	A6	B6	CB_5	GND	A6	B6	DQ_7
	A7	B7	GND	DQ_2	A7	B7	GND
GND	A8	B8	CB_0	GND	A8	B8	DQ_3
GND	A9	B9	CB_1	GND	A9	B9	DQ_12
DQS_P_17	A10	B10	GND	DQ_13	A10	B10	GND
DQS_P_8	A11	B11	CB_6	DQ_9	A11	B11	DQ_8
GND	A12	B12	CB_7	GND	A12	B12	DQS_P_10
CB_2	A13	B13	GND	DQS_P_1	A13	B13	GND
CB_3	A14	B14	RST_L	DQ_15	A14	B14	DQ_14
GND	A15	B15	CKE_2	GND	A15	B15	DQ_10
CKE_3	A16	B16	GND	DQ_11	A16	B16	GND
CKE_0	A17	B17	CKE_1	DQ_20	A17	B17	DQ_21
GND	A18	B18	MA_15	GND	A18	B18	DQ_16
MA_14	A19	B19	GND	DQ_17	A19	B19	GND
ERR_L_1	A20	B20	GND	DQS_P_11	A20	B20	GND
GND	A21	B21		GND	A21	B21	DQS_P_2
ERR_L_0	A22	B22	GND	DQ_22	A22	B22	GND
BA_2	A23	B23	MA_11	DQ_23	A23	B23	DQ_18
GND	A24	B24	MA_12	GND	A24	B24	DQ_19
MA_9	A25	B25	GND	DQ_28	A25	B25	GND
MA_7	A26	B26	MA_8	DQ_29	A26	B26	DQ_24
GND	A27	B27	MA_6	GND	A27	B27	DQ_25

Probe 4				Probe 3			
DQ_38	A1	B1	GND	MA_5	A1	B1	GND
DQ_34	A2	B2	DQ_39	MA_3	A2	B2	MA_4
GND	A3	B3	DQ_35	GND	A3	B3	MA_1
DQ_44	A4	B4	GND	MA_9	A4	B4	GND
DQ_40	A5	B5	DQ_45	MA_0	A5	B5	PAR
GND	A6	B6	DQ_41	GND	A6	B6	MA_10
DQS_P_14	A7	B7	GND	CLK_P_2	A7	B7	GND
GND	A8	B8	DQS_P_5	CLK_N_2	A8	B8	BA_1
GND	A9	B9	DQ_46	GND	A9	B9	BA_0
DQ_47	A10	B10	GND	RAS_L	A10	B10	GND
DQ_52	A11	B11	DQ_42	CS_L_0	A11	B11	CS_L_4
GND	A12	B12	DQ_43	GND	A12	B12	CAS_L
DQ_53	A13	B13	GND	WE_L	A13	B13	GND
DQ_49	A14	B14	DQ_48	ODT_0	A14	B14	CS_L_1
GND	A15	B15	DQS_P_15	GND	A15	B15	ODT_2
DQS_P_6	A16	B16	GND	MA_13	A16	B16	GND
DQ_55	A17	B17	DQ_54	ODT_1	A17	B17	CS_L_5
GND	A18	B18	DQ_50	GND	A18	B18	ODT_3
DQ_51	A19	B19	GND	CS_L_7	A19	B19	GND
DQ_60	A20	B20	GND	CS_L_3	A20	B20	GND
GND	A21	B21	DQ_61	GND	A21	B21	
DQ_56	A22	B22	GND	CL_L_6	A22	B22	GND
DQ_P_16	A23	B23	DQ_57	DQ_36	A23	B23	CS_L_2
GND	A24	B24	DQS_P_7	GND	A24	B24	DQ_37
DQ_62	A25	B25	GND	DQ_32	A25	B25	GND
DQ_58	A26	B26	DQ_63	DQS_P_13	A26	B26	DQ_33
GND	A27	B27	DQ_59	GND	A27	B27	DQS_P_4

DDR3 EyeFinder Software

The DDR3 EyeFinder software is a great tool to help you position the sampling points for accurate read and write data capture. The software triggers on valid read and write commands with your system executing any memory test suite or stimulus program. The software will then display read and write data valid window as a result of the scan.

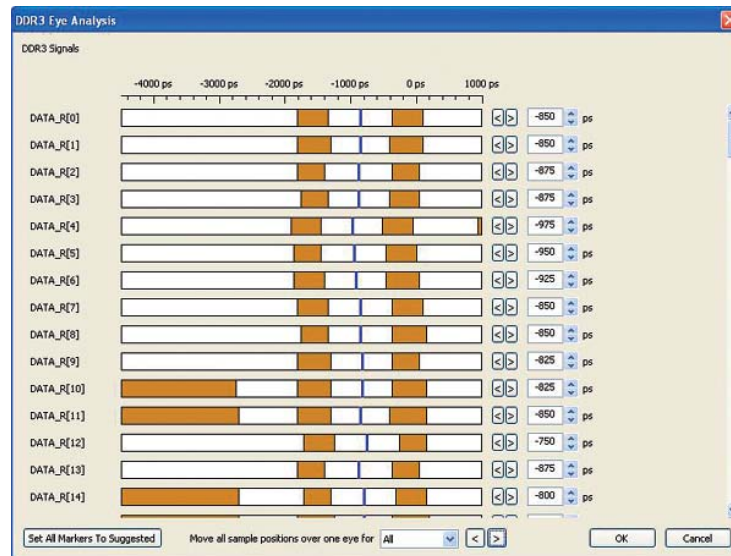


Figure 3. DDR3 EyeFinder software shows read and write data valid windows for accurate sampling position of data for protocol decode

Timing and State Analysis

The N4835A DDR3 analysis slot interposer probe and N4834A double probed soft touch probe bring bus signals to your Agilent logic analyzer via controlled impedance cables for an easy protocol-and-timing analysis connection while maintaining signal fidelity.

Timing analysis

The N4835A and N4834A lets you perform timing analysis measurements on a DDR3 DIMM bus at speeds up to 1600 MT/s. Choose timing mode provided by the Agilent logic analyzer. This allows for an accurate waveform analysis of all signals on the DDR3 DIMM bus.

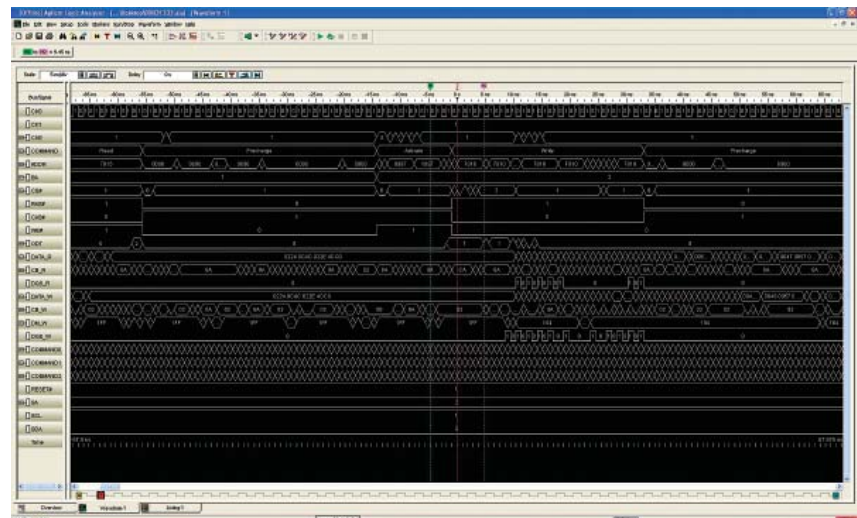


Figure 4. Timing analysis shows the timing relationships between the various bus signals as they are acquired.

Protocol Analysis

Both N4835A analysis slot interposer and N4834A double probed soft touch probe provides complete protocol decode of memory transactions using an Agilent logic analyzer as the analysis execution engine. This combination provides memory bus triggering, debug and compliance verification measurements. Data is decoded and displayed at any level of detail from the protocol to binary. The protocol-decode software translates acquired signals into easily understood bus transactions, at the full bus speed. The Agilent logic analyzer provides extensive triggering and store qualification features. The probe can be configured to perform state analysis of both reads and writes, at 1600 MT/s. The DDR protocol-decode software executes in the logic analyzer and takes user input on system attributes such as burst length, CAS and additive latency, as well as chip selects to decode the key DDR bus signals and present a display that lists the transaction type, address, data and command conditions. The software also supports user-defined symbols that can be easily added to the state listing display.

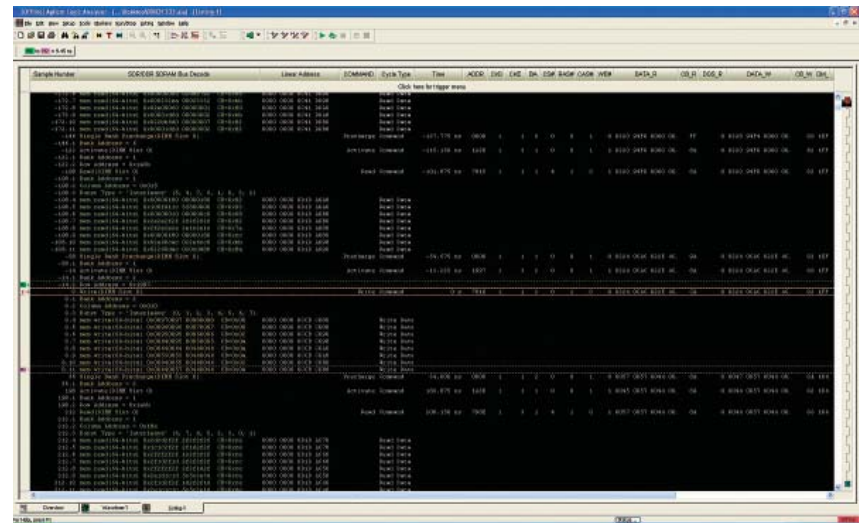


Figure 5. Reliable up to 1600 MT/s protocol decode

Signal Integrity Analysis

As timing and voltage margins continue to shrink, confidence in signal integrity becomes an increasingly vital requirement of the design verification process. Eye scan lets you quickly acquire comprehensive signal integrity information on all of the buses in your design, under a wide variety of operating conditions. The probe lets you use eye scan technology on signals being probed, but it does not contain clock-recovery.

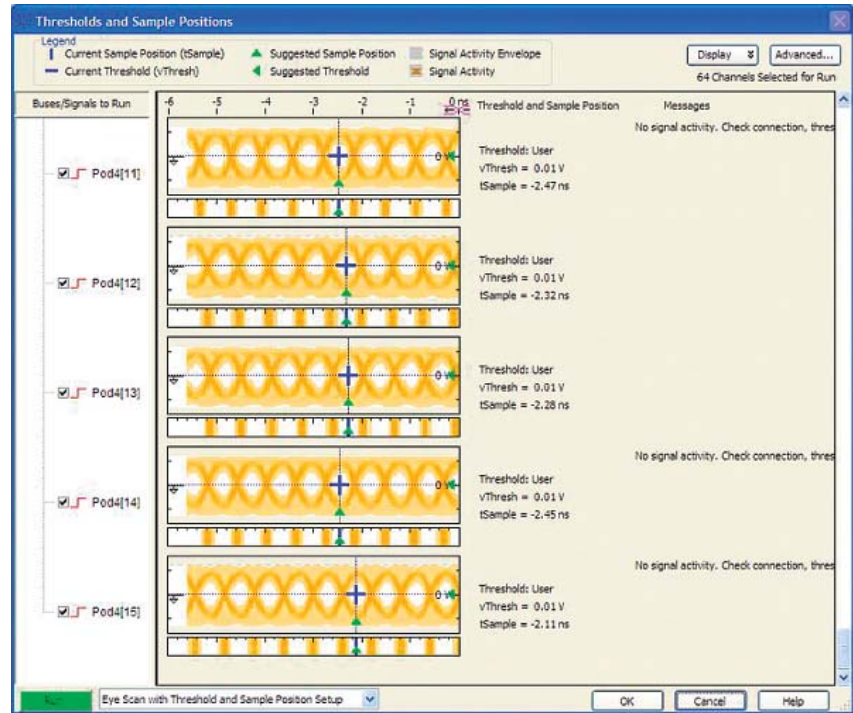


Figure 6. Quickly measure signal integrity with Agilent eye scan technology

Logic Analyzer Configuration

N4835A DDR3 advanced slot interposer configuration

Product number	Description	Quantity
16902B	6-slot mainframe with built-in touch display	1
16962A	68-ch, 2 GHz timing, 2 GT/s state, 4 M deep logic analysis module	4
N4835A	DDR3 advanced analysis interface slot interposer	1

Note:

Address, command and control signals cannot share the same module slot with data lines for DDR3 Eyefinder software to work.

N4834A DDR3 soft touch, double probe enhanced, SE, 90-pin cable configuration

Product number	Description	Quantity
16902B	6-slot mainframe with built-in touch display	1
16962A	68-ch, 2 GHz timing, 2 GT/s state, 4 M deep logic analysis module	4
N4834A	Soft touch, double probe enhanced, SE, 90-pin cable	1
N4834A-001	DOUBLE PROBE - FOOTPRINTS 1 AND 4	2
N4834A-002	DOUBLE PROBE - FOOTPRINT 2	1
N4834A-003	DOUBLE PROBE - FOOTPRINT 3	1

Note:

Address, command and control signals cannot share the same module slot with data lines for DDR3 Eyefinder software to work.

Logic analyzer ordering information

Product	Description
N4835A	6-slot mainframe with built-in touch display
N4834A	Soft touch, double probe enhanced, SE, 90-pin cable
N4834A-001	DOUBLE PROBE - FOOTPRINTS 1 AND 4
N4834A-002	DOUBLE PROBE - FOOTPRINT 2
N4834A-003	DOUBLE PROBE - FOOTPRINT 3
16900 Series logic analyzer	
16900A	6-slot mainframe requires external display
16902B	6-slot mainframe with built-in touch display
Measurement module	
16962A	68-ch, 2 GHz timing, 2 GT/s state, 4 M deep logic analysis module

Note:

DDR3 Eyefinder software only works with the 16962A logic analyzer module

Related Literature

Publication title	Publication type	Publication number
<i>Agilent Technologies 16900 Series Logic Analysis System</i>	Color brochure	5989-0420EN
<i>Agilent N4835A DDR3 DIMM Interposer Probe User's Guide</i>	Manual	N4835-97000
<i>B4622A DDR2/3 Protocol Compliance and Analysis Tool</i>	Data Sheet	5990-3300EN



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