

DDR3 DIMM Slot Interposer

DDR3-1867 Digital Validation

- High Speed DDR3 Digital Validation
- Passive 240-pin DIMM Slot Interposer
- Custom Designed for Agilent Logic Analyzers
- Compatible with Agilent Software Applications
- Supports all speeds of DDR3 up to DDR3-1867
- Supports JEDEC PC3-15000, PC3-12800, PC3-10600, PC3-8500, and PC3-6400 DDR3 modules



Passive Interposer Design

This interposer is an extender design, does not require a dedicated DIMM slot, and provides a quick & easy connection between your target DDR3 bus and an Agilent logic analyzer. This is a passive interposer with no added buffers to conceal system performance.

Software

This product comes with logic analyzer setup software, DDR3 protocol decode software and is fully compatible with Agilent's DDR3 Eye Finder software and Protocol Compliance & Analysis tool (B4622A).

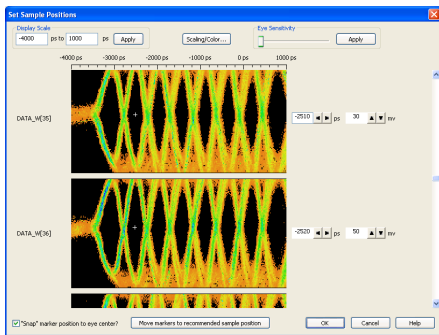


Figure 1 Full-sensitivity DDR3-1867 Eye Finder results of this interposer.

DDR3 Data Eye Finder Software

The Agilent DDR3 Eye Finder software (freely available from Agilent) can be used to set valid read and write data eyes for proper state acquisition of DDR3 read and write data. This tool can also be used to analyze the analog characteristics of the read and write data eyes as seen by the logic analyzer. This information can be useful when debugging physical layer issues on the DDR3 data bits (DQ data channels). All DDR3 Data Eye Finder results used in the figures of this datasheet are DDR3-1867 acquisitions using this interposer; highlighting the minimal impact this product has on the DDR3 bus and the data presented to the logic analyzer for storage & reliable analysis.

DDR3 Command & Address Eye Scan

The Agilent Logic Analyzers Eye Scan tool (fully integrated with the Agilent Logic Analyzer application) can be used to quickly analyze the analog characteristics of the DDR3 command and address bus. With a horizontal resolution of 5ps, EyeScan can be used to 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. All Eye Scan results in this datasheet are DDR3-1867 command/address acquisitions using this interposer.

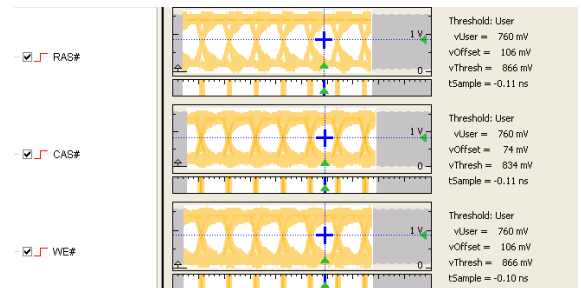


Figure 2 DDR3-1867 EyeScan results of this interposer.

DDR3 Protocol Compliance & Analysis

The Agilent DDR3 Protocol Compliance & Analysis tool (Agilent product B4622A, available for purchase separately) enables automated measurement of deep DDR3 bus traces to help identify protocol problem areas and presents an overview of the system performance.

- Automates DDR3 protocol compliance
- Quickly identifies protocol violations and timing errors
- Allow user defined timing parameters
- Provides test results in HTML format
- Provides quick overview of DDR3 bus performance
- Enables fast trigger setup

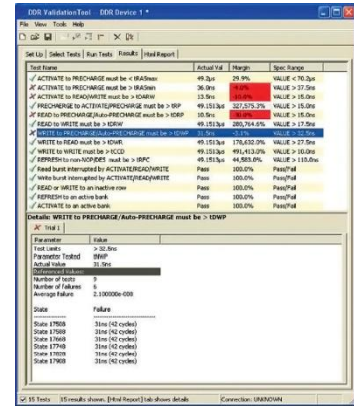


Figure 3 DDR3 Protocol Compliance & Analysis

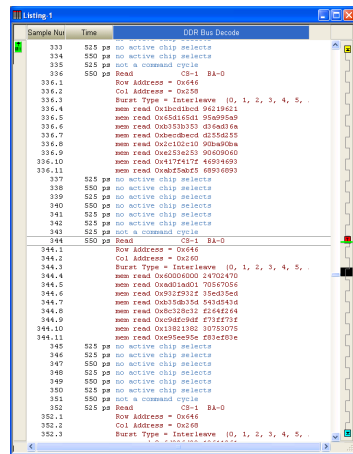


Figure 4 DDR3-1867 Bus Decode of this interposer.

DDR3 Protocol Decode

The NT-DDR3-DECODE memory bus decoder (included with this product) integrates with the Agilent Logic Analyzer software and sets up the logic analyzer and decodes the acquired data in a standard listing window. This allows for easy analysis of the DDR3 protocol, addressing, and read/write data from the DDR3 bus. This product also supports the Agilent memory bus decoder (B4621A, available for purchase from Agilent).

- Handles any read or write offsets (latencies)
- Burst lengths of 4, 8, or On-The-Fly
- Data Masking
- Read and Write data decoding

DDR3-1867 Command/Address Acquisition

This interposer provides excellent signal fidelity at all speeds of DDR3, including DDR3-1867, as seen in the Eye Capture of the command and address bus of a DDR3-1867 bus using this interposer. Note the large valid data eyes at DDR3-1867 in the figure below. Also, note that this data was acquired with a dual-rank DIMM and the acquisition results seen on the CS# bus represents an overlay of valid, active eyes for CS0# & CS1# and valid, tri-stated CS2#, & CS3#.

The BANK and ADDR bus are also overlays of multiple channels (three bank channels and 16 address channels).

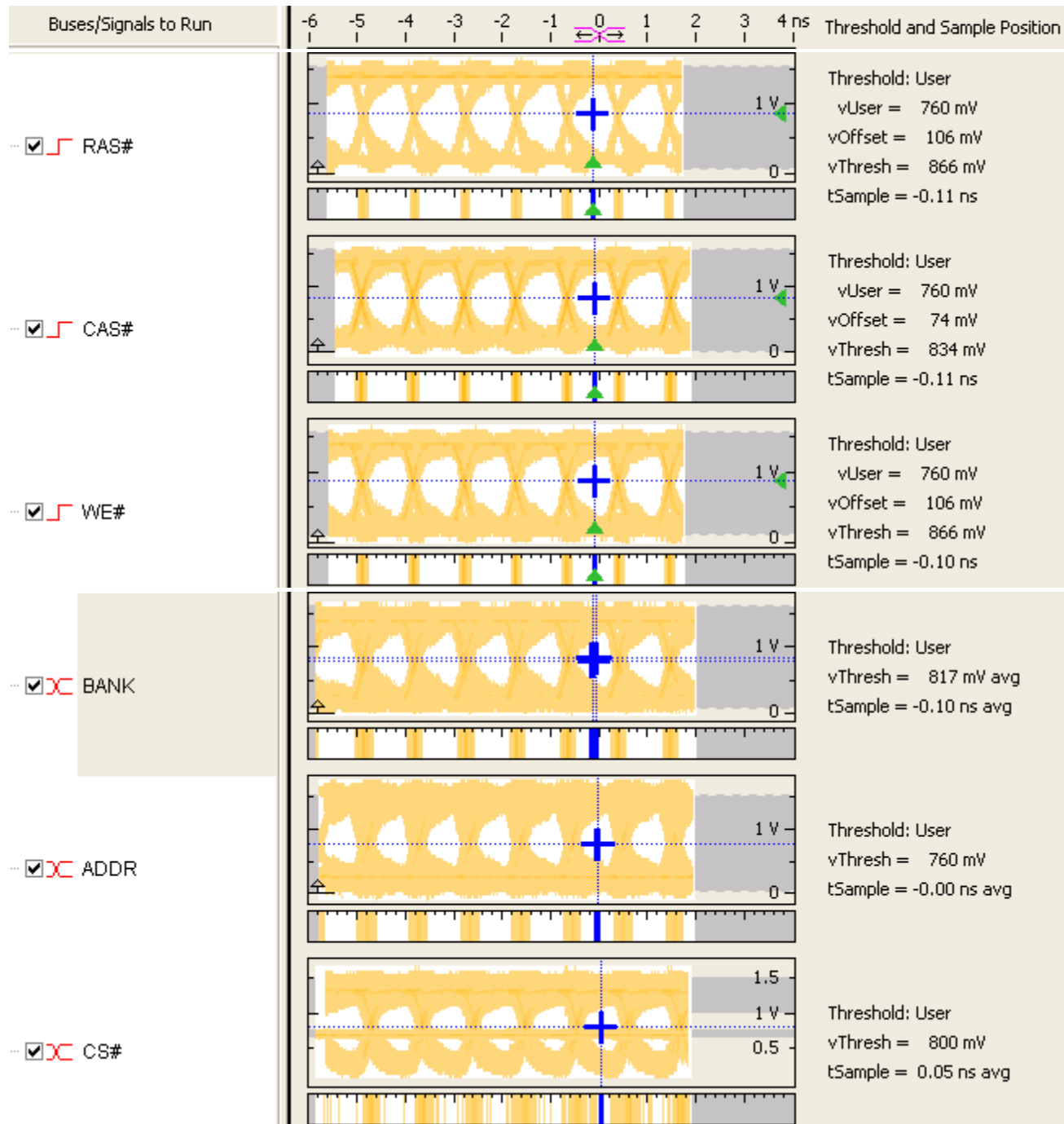


Figure 5 DDR3-1867 EyeScan results of the interposer.

DDR3-1867 Read & Write Data Eye Acquisition

This interposer provides excellent signal fidelity at all speeds of DDR3 - including DDR3-1867 as seen in the DDR3 Eye Finder results below. These results are from a DDR3-1867 bus using this interposer. Note the large valid data eyes for DDR3-1867 write bursts in the figure below.

The largest eye is 475 pS by 690 mV and the minimum eye is 285 pS by 595 mV.

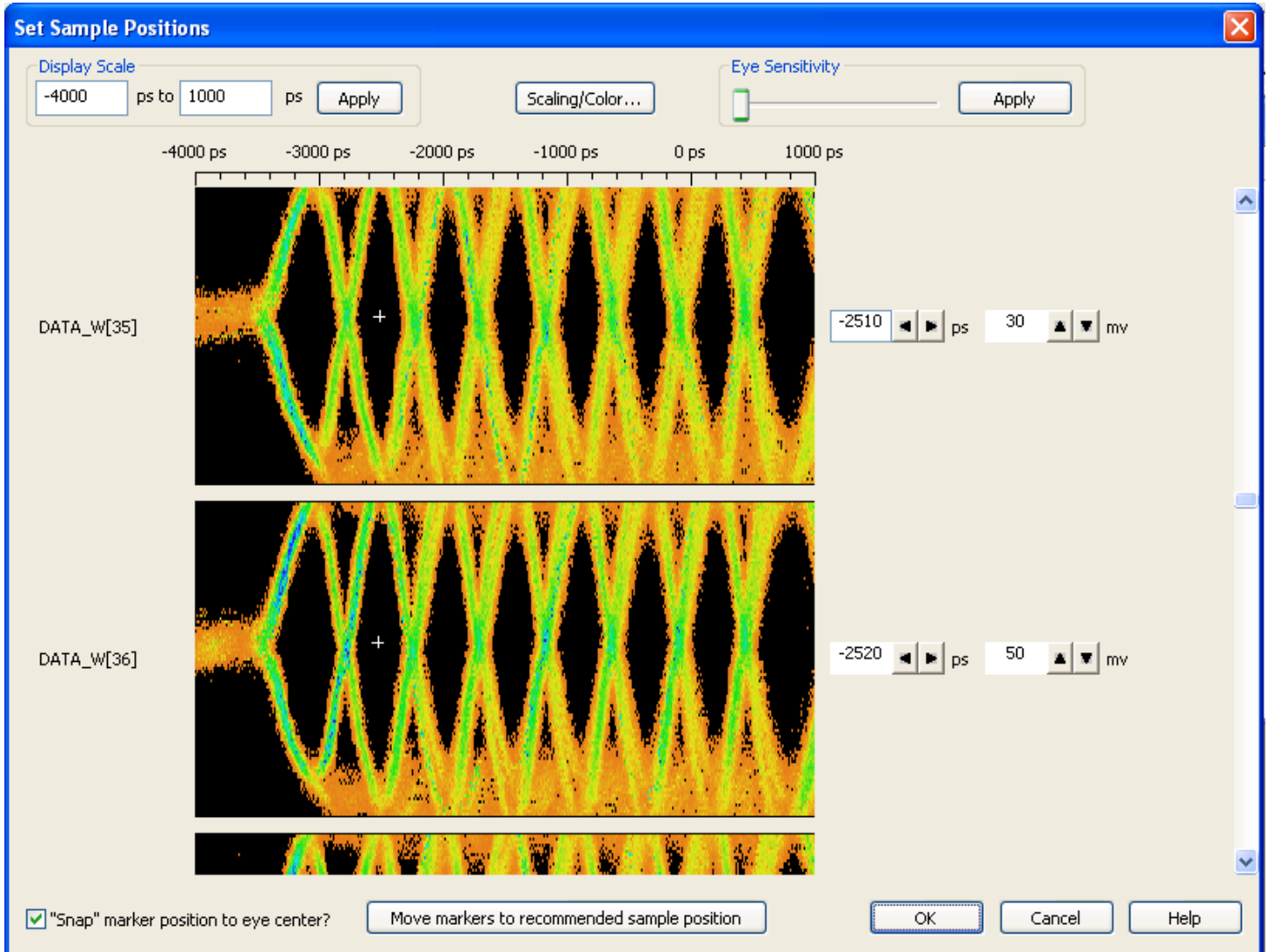


Figure 6 Full-sensitivity DDR3-1867 Write Data Eye Finder results of the interposer.

Similarly, note the large valid data eye results for DDR3-1867 read data bursts.

The largest eye is 525 pS by 600 mV and the minimum eye is 275pS by 360mV.

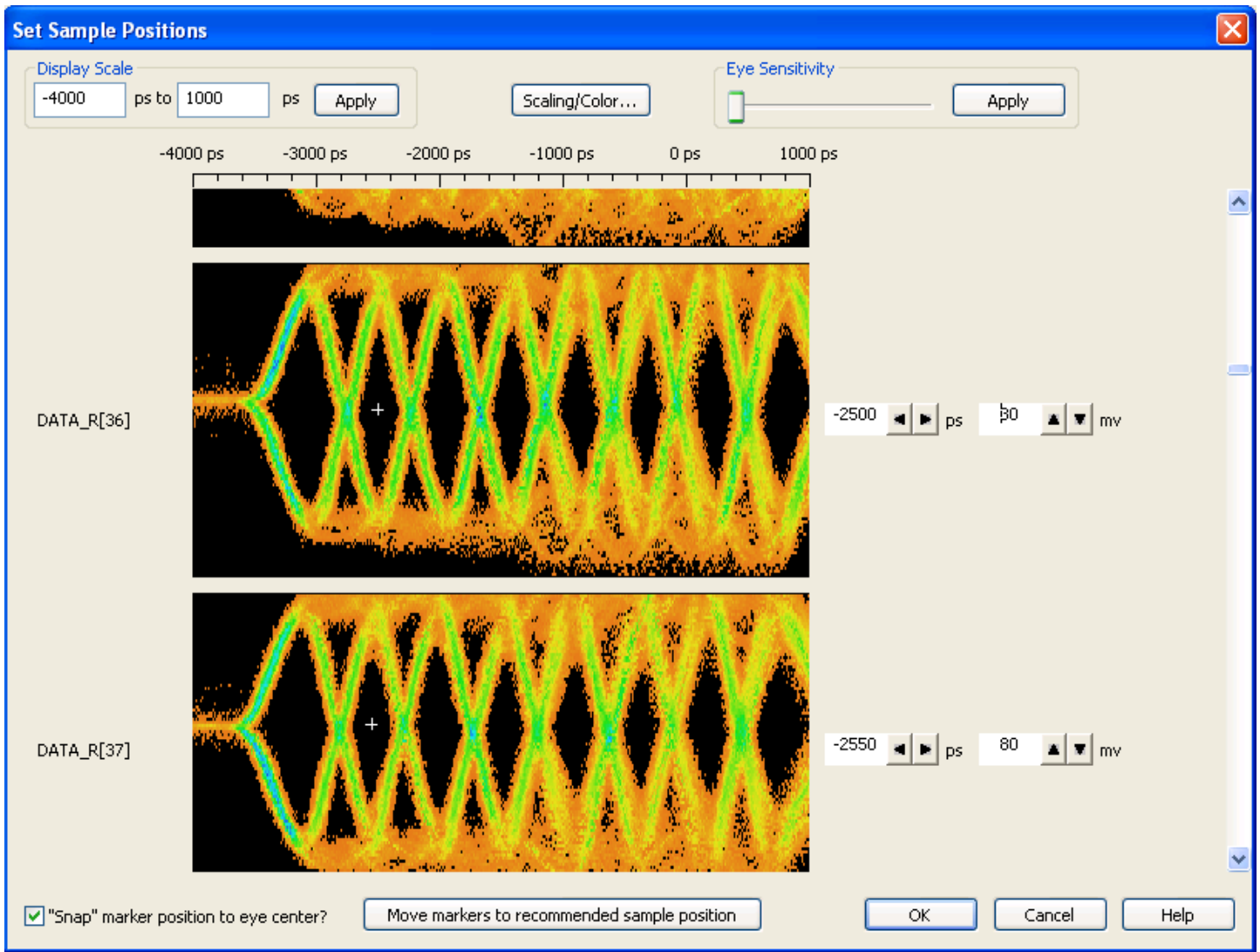


Figure 7 Full-sensitivity DDR3-1867 Read Data Eye Finder results of the interposer.

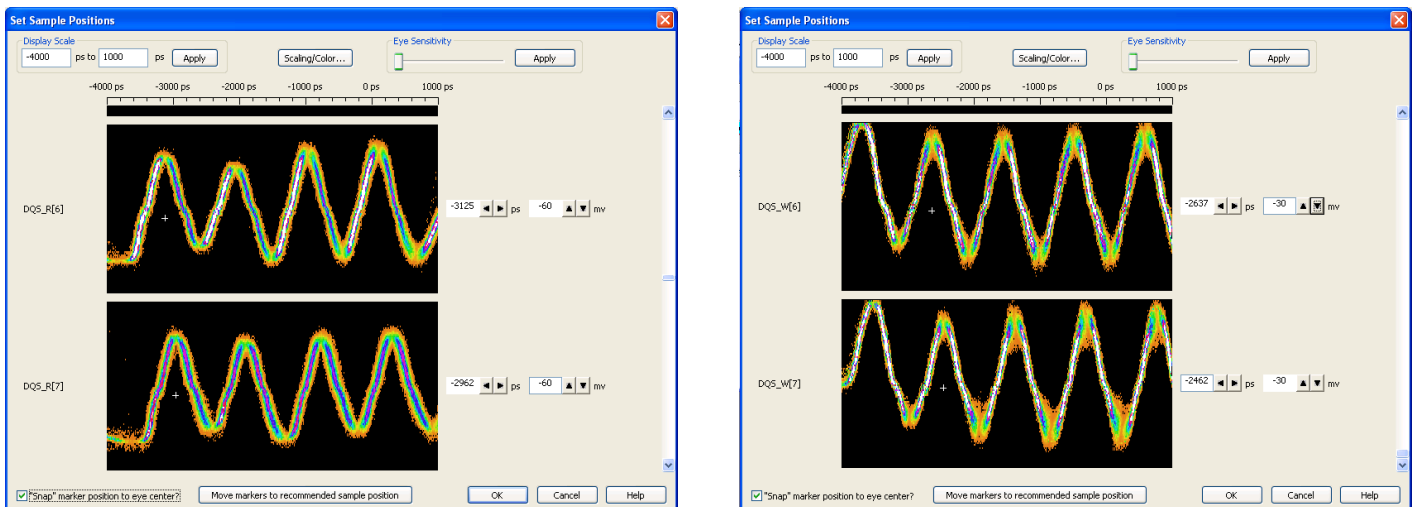


Figure 8 Full-sensitivity DDR3-1867 Read & Write Data Strobe Eye Finder results of the interposer.

DDR3-1867 Bus Decode

The high fidelity of the signals, as seen in the previous sections, allows for very accurate state acquisition. This accuracy is critical for digital validation of DDR3, minimizing the time spent validating the connection and setup, and maximizing the time spent validating the target DDR3 bus.

The state acquisition and bus decode below are from a DDR3-1867 bus using this interposer. Note the timestamp values, indicating DDR3-1867 acquisition. Also note the repeating data patterns in the burst data.

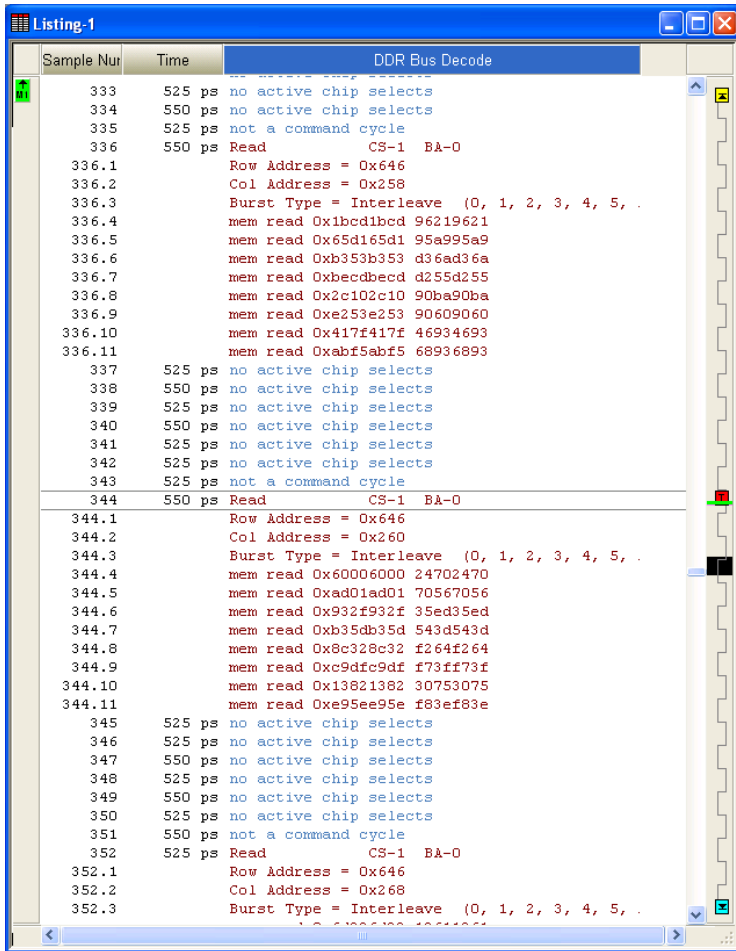


Figure 9 DDR3-1867 Bus Decode of the interposer.

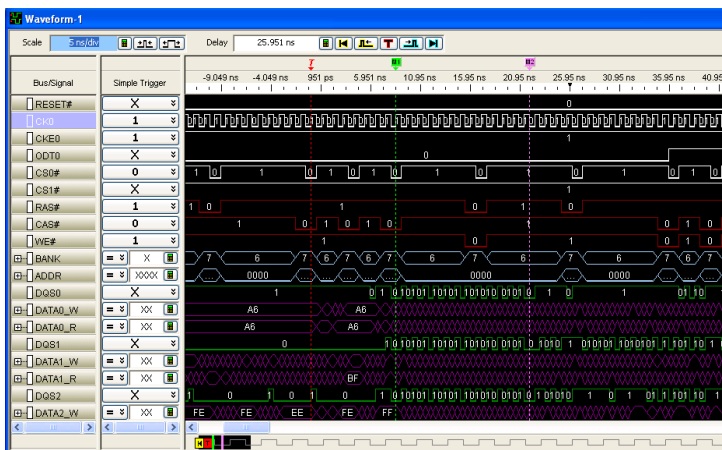


Figure 10 DDR3-1867 State Waveform Display of this interposer

DDR3 DIMM Slot Interposer

NT-DDR3DIHS Technical Specification

General

Specification	Detail
Interface Type	Passive Interposer
LA Interface	Direct attach or passive leash (-LSH) to Agilent modules.
JEDEC Module Types	DDR3 SDRAM Unbuffered DIMM or DDR3 SDRAM Registered DIMM
JEDEC Modules Supported	PC3-15000, PC3-12800, PC3-10600, PC3-8500, PC3-6400
Unbuffered Data Rates Supported (MT/s)	1867, 1600, 1333, 1067, 800
Registered Data Rates Supported (MT/s) ¹	1333, 1067, 800
Min. Clock Edge-to-Edge	500ps
Min. Voltage Swing	200mV
Min. Eye Width	200ps

Agilent Hardware Requirements

Specification	Detail	Quantity
Logic Analyzer Mainframe	16902B	1
Logic Analyzer Module(s)	16962A	4 ²
Logic Analyzer Probes	None needed.	

Supported Software

Specification	Detail	Supported
Agilent Logic Analyzer S/W	03.82.1024 or newer	Yes
Agilent DDR3 Eye Finder	Free from Agilent	Yes
Agilent B4622A	Agilent Protocol Compliance & Analysis	Yes ³
Agilent B4621A	Agilent Memory Bus Decoder	Yes ³
Nexus NT-DDR3-DECODE	Nexus Memory Bus Decoder (included)	Yes

DDR3 Signals Probed

Specification	Detail
Command	RAS#, CAS#, WE#, CKE0, CKE1, RESET#, ODT0, ODT1
Addressing	CS0#, CS1#, CS2#, CS3# A0-A15, BA0-BA2
Data Strokes	DQS0-DQS7
Data Bits	DQ0-DQ63
Data Masks	DM0-DM7
ECC ⁴ (Check Bits)	CB0-CB7

Product Configurations

Nomenclature	Detail
NT-DDR3DIHS(-LSH)	1- DDR3-1867 DIMM Slot Interposer 1- NT-DDR3-DECODE DDR3 Memory Bus Decoder SW License

Notes

- 1:** Please contact us for the most up to date information on registered DDR3 support at speeds above DDR3-1333.
- 2:** Only one 16962A module is needed for DDR3 protocol analysis (DDR3 command & address acquisition). Four modules are needed for DDR3 command, address, read, and write data acquisition.
- 3:** This product is fully supported and is available for purchase separately from Agilent.
- 4:** Acquisition of ECC channels does **not** change the hardware requirements. Only four Agilent 16962A modules are required for full DDR channel acquisition which includes all command, address, strobcs, data, masks, and ECC channel acquisition.

About Nexus Technology, Inc.

Nexus Technology is the industry's premier supplier of DDR3 digital and analog validation products for use with logic analyzers. Nexus Technology has provided memory bus analysis tools to the memory industry since 1991.

Please contact us by telephone, email or mail as listed below. Normal business hours are 9:00 – 5:00 EST.

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