Memory Compliance Analyzer

Nexus Technology MCA3000/MCA4000 for DDR3/DDR3L/DDR4

The Memory Compliance Analyzer (MCA) is a new class of instrument that combines real-time visibility of the occurrence of the events on the bus with post processing capability of the memory bus protocol.

Key performance specifications

- Complete memory standard support for DDR3, DDR3L, and DDR4 memory standards up to 2400MT/s including custom speed grades not defined in the JEDEC specification.
- Unmatched test coverage with over 1400 real-time checks performed and reported for a typical dual rank system. Sets of timing parameters can be defined and customized with Boolean and arithmetic equations.
- Comprehensive trigger capability with the ability to create multi-state triggers (up to 8 states) to trigger and capture complex events using any combination of violations: 4 word recognizers, 2 counters, 1 global qualifier, 1 trigger in.
- Deep acquisition memory; 1 G samples of qualified deep acquisition storage allows capture of bus activity leading up to and/or following the events of interest.

Key features

- Automates protocol compliance and performance statistics.
- Perform debug/analysis across the self-refresh or power down cycles when clock signal is inactive.
- Operate as a real-time protocol analyzer or a triggered state analyzer or both simultaneously, enabling real-time analysis over long periods to identify the events of interest and capture data around the region of the occurrence.
- Visualize eye diagrams, assess bus signal integrity with iCiS™ (I see eyes) and programmable front-end enable DDR PHY level debug.
- DDR3 and DDR4, component, slot, and midbus probing solutions provide the ability to target the MCA for different form factors/ applications, preserving analog characteristics.
- Use a family of over 20 interposer probes to preserve analog signal characteristics; compatible with the Tektronix TLA7000 series logic analyzers.
- Reuse the probes/interposers between the MCA and the Tektronix logic analyzer.
- Drill down from violation listing to state or waveform views based on single timestamp.
- Perform concurrent analysis on multiple instruments with a single probe to get analog, high-speed timing, state and real-time protocol views on the same data through a single probe.
- Take snapshots of the contents of the real-time event storage and export post capture data in XML format for importing into other third party analysis tools.
- Scripting based real-time reporting and charting for on-system analysis
- Tektronix provides a broad range of tools for electrical validation, logic validation, and execution validation.
- Multi-acquisition control enables long analysis runs and capture of highly intermittent violations.
- Integrated PC controller enables Windows Remote Desktop access or stand-alone operation.

JEDEC Protocol compliance analysis

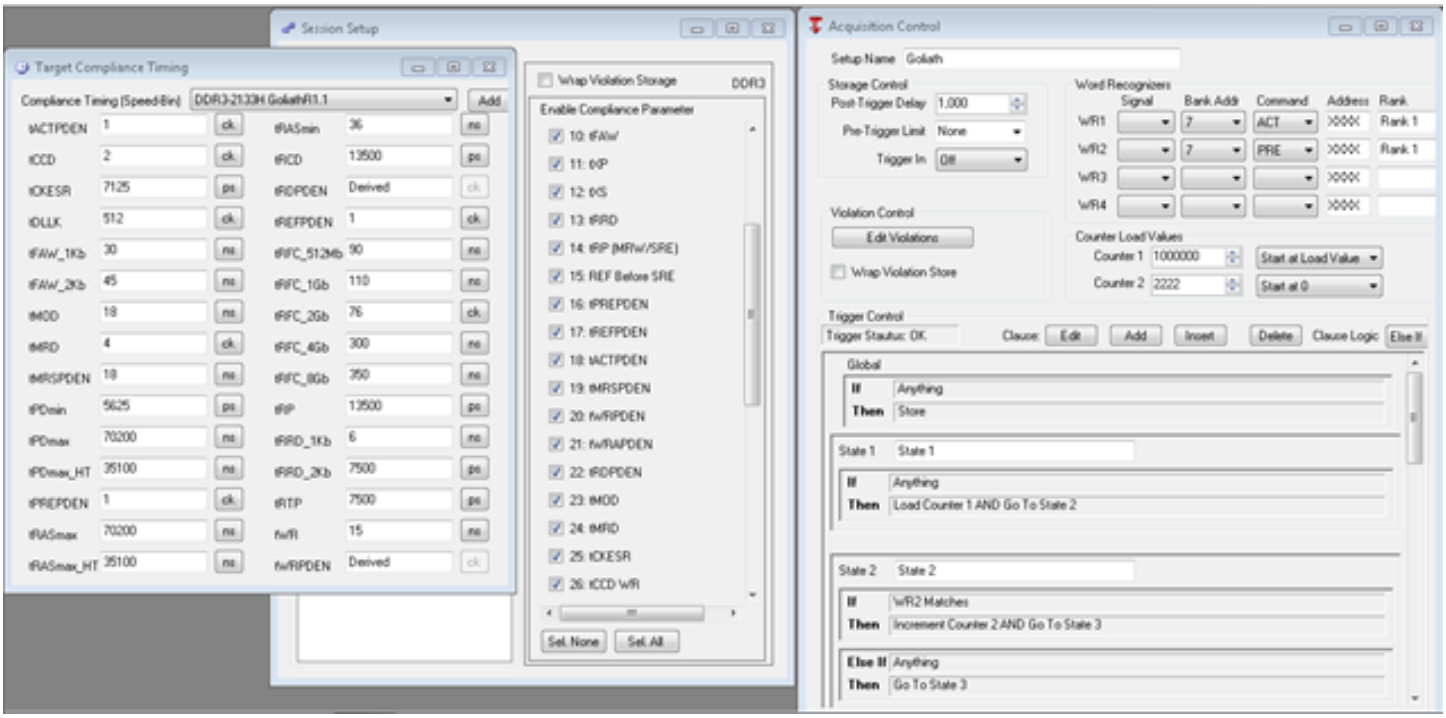
The MCA4000 and MCA3000 Memory Compliance Analyzer analyzes across 2 channels and 8 ranks for thousands of compliance violation checks. Analysis continues across self-refresh cycles and power down entry/exit. It includes auto-precharge analysis.

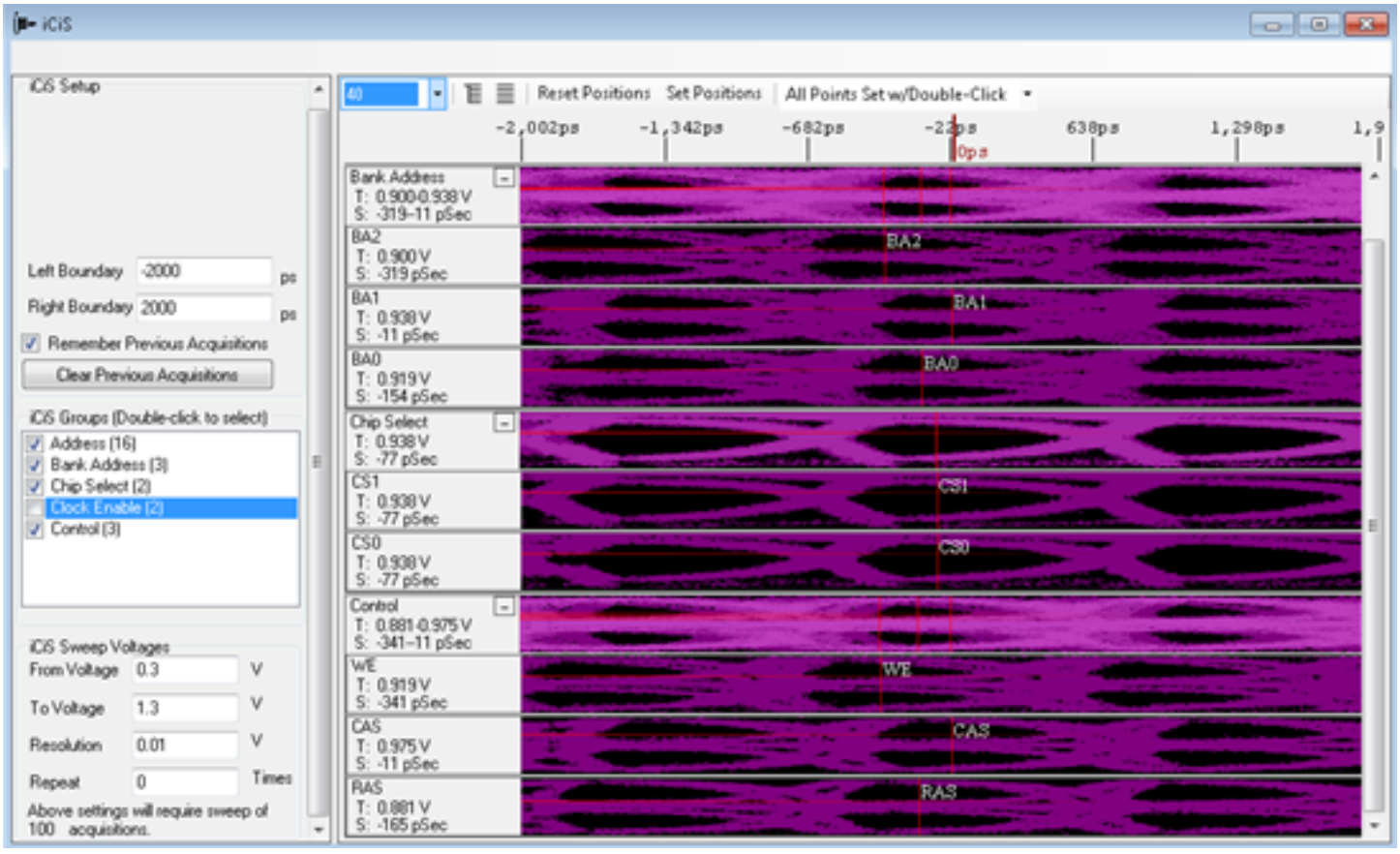
Multiple standard or custom timing parameter setups enable speed grading and quickly switch between standard or custom speed grades for margin analysis. It provides HTML reporting/XML exporting with customization support.

Automated analysis session features

The following automated analysis features are included:

- Selectable session types
  - Protocol analysis session - The protocol analyzer runs until stopped reporting violations and statistics.
  - Single acquisition session - The protocol analyzer runs until the state analyzer is triggered.
  - Multi-acquisition session - Results are stored, analysis is restarted; selectable iterations.
  - iCiS session - "Sampling Scope" illustration of signal characteristics and eye diagrams.
- JEDEC standard reference time sets that can be copied and modified.
- Ability to enable one, some, or all real-time parameter categories.
- Independent trigger state machine with 8 if/else/or logic states, 4 word recognizers, 2 counters and multi-condition global storage qualifier.





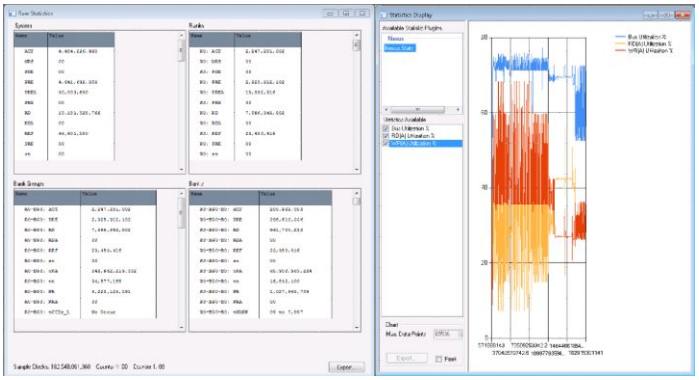
Fully programmable front-end enables high-speed iCiS eye diagramming.

Compliance navigator

The compliance navigator screen updates in real-time and displays current status of compliance parameters with min/max values, specification values, pass/fail results, and percentage margin indicators.

Stat	Index	Name	Status	Min.(ck)	Max.(ck)	Margin(%)	Spec.Value (ck)
	13	tRP (MRS/SRE)		9	9	800	1
	15	tPREPDEN		NA	NA	NA	1
	16	tREFPDEN		NA	NA	NA	1
	17	tACTPDEN		NA	NA	NA	1
	18	tMRSPDEN		NA	NA	NA	12
	19	tWRPDEN		NA	NA	NA	23
	20	tWRAPDEN		NA	NA	NA	18
	21	tRDPDEN		NA	NA	NA	14
	22	tMOD		NA	NA	NA	12
	23	tMRD		NA	NA	NA	4
	24	tCKESR		NA	NA	NA	5
	25	tCCDw		4	4	00	4
	26	tWRTW		10	10	25	8
	27	tXPDLL		NA	NA	NA	19
	28	tDLLK		NA	NA	NA	512
	29	tWWTR		17	17	00	17
	30	tCCDr		4	4	00	4
	31	tPDmin		NA	NA	NA	4
	32	tPDmax		NA	NA	NA	56160
	33	tRP		9	9	800	1
	34	tRFC		131	131	02	128
	35	tRASmin		27	1267	-04	28
	36	tRASmax		27	1267	4,333	56160
	37	tNARW		9	831	800	1
	38	tNRP		6	136	-25	8
	39	tNRA		NA	NA	NA	13
	40	tNWP		23	337	00	23
	41	tNWA		NA	NA	NA	13
	42	tDLLK		NA	NA	NA	512

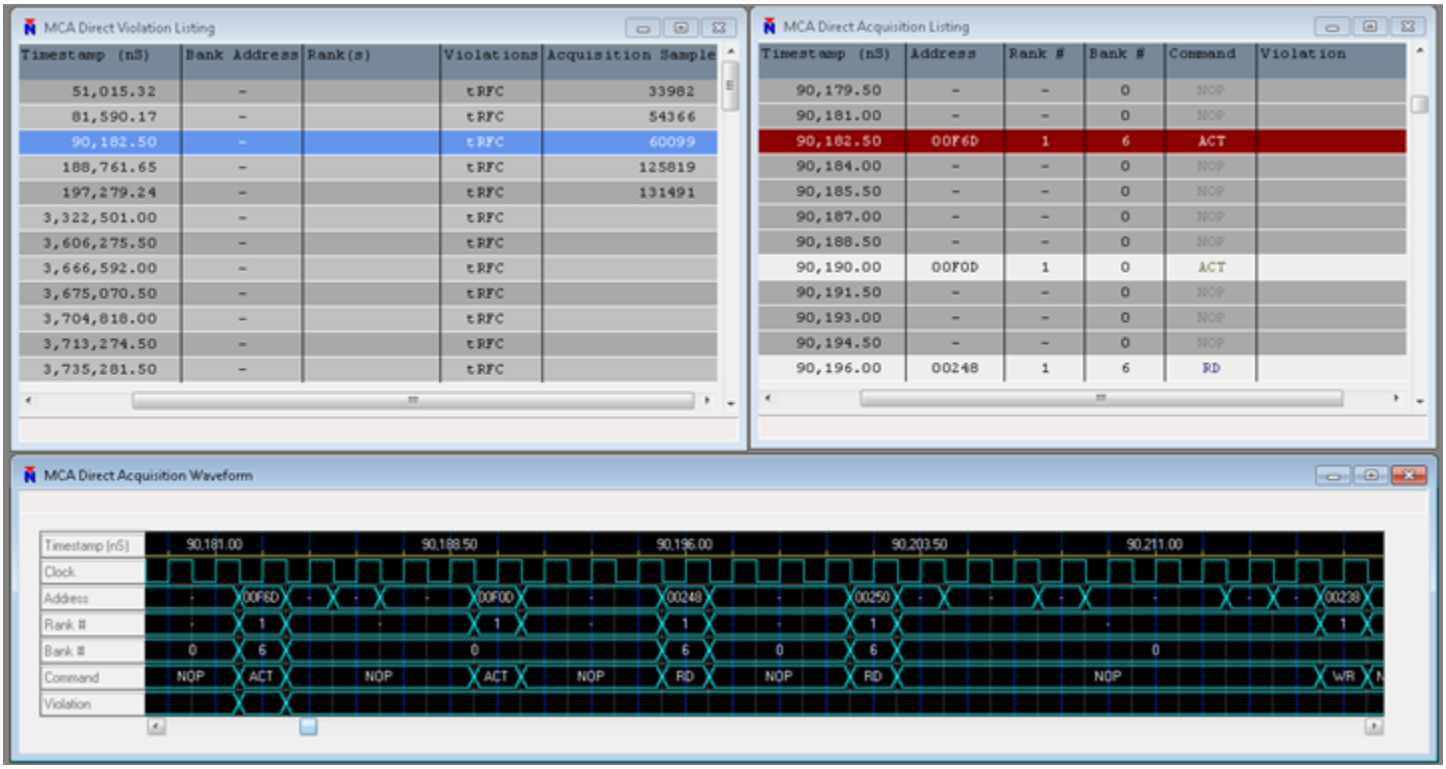
Statistics windows display parameters and counters at system, rank, bank group, and bank level. The statistics can be snap-shot exported without disturbing or disrupting real-time analysis.



Real-time snapshot

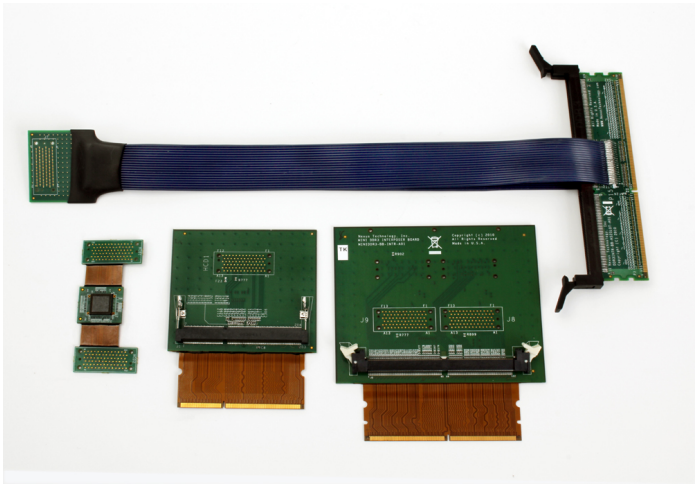
Single timescale for violations and state acquisitions

Violations are highlighted in the state display. Scroll the acquisition buffer to see what led up to the violation. Timing and state windows stay in sync.



Probing solutions

Large family of 20+ Ultra-fidelity slot and component interposers preserve analog waveform characteristics and are compatible with the MCA and the TLA; single probe loading enables concurrent usage.



Probes available for use with the MCA and TLA

The NEX-PRB1XL HCD probe, if used with the interposers, provides one copy of signals allowing the interposer to be used either with the MCA or with the TLA. Alternately use of the P6960HCD probe provides two copies of the signals with only a single load on the target allowing both the MCA and the TLA to be used at the same time as shown. The MCA can also be used with the standard P6900 series of probes making it suitable for mid-bus applications.

Simultaneous probing with the MCA and TLA using a single probe

Ordering information

Product configurations

Product	Nomenclature	Description
MCA-3000 Memory Compliance Analyzer	NEX-MCA3-DDR3	Includes chassis, PC controller, and MCA-3000 instrument Supports up to DDR3-2133
MCA-3000 Memory Compliance Analyzer with second slot	NEX-MCA3-DDR3-2S	Includes chassis, PC controller, and MCA-3000 instrument Supports up to DDR3-2133 with second slot support
MCA-4000 Memory Compliance Analyzer	NEX-MCA4-DDR3	Includes chassis, PC controller, and MCA-4000 instrument Supports up to DDR3-2400
MCA-4000 Memory Compliance Analyzer with second slot	NEX-MCA4-DDR3-2S	Includes chassis, PC controller, and MCA-4000 instrument Supports up to DDR3-2400 with second slot support
MCA-4000 Memory Compliance Analyzer	NEX-MCA4-DDR4	Includes chassis, PC controller, and MCA-4000 instrument Supports up to DDR4-2400
MCA-4000 Memory Compliance Analyzer with second slot	NEX-MCA4-DDR4-2S	Includes chassis, PC controller, and MCA-4000 instrument Supports up to DDR4-2400 with second slot support
Second Slot Add on	NEX-MCA-2S-U	Add Second Slot Analysis to a non-2S unit
Memory Bus Add ons	NEX-MCADDR3-SWL	Factory add on for support for DDR3 up to instrument maximum bus rate
	NEX-MCADDR4-SWL	Factory add on for support for DDR4 up to instrument maximum bus rate
	NEX-MCADDR3-SWL-U	Upgrade for support for DDR3 up to instrument maximum bus rate
	NEX-MCADDR4-SWL-U	Upgrade for support for DDR4 up to instrument maximum bus rate

DDR3/DDR3L probing solutions

NEX-DDR3INTR-XL	DDR3 DIMM Slot Interposer probing Address/Command/Control/Data up to 1867MT/s
NEX-DDR3INTR-HS3	DDR3 DIMM Slot Interposer probing Address/Command/Control/Data up to 2400MT/s
NEX-SODDR3INTR-XL	DDR3 SODIMM Slot Interposer probing Address/Command/Control/Data up to 1867MT/s
NEX-SODDR3INTR-HS3	DDR3 SODIMM Slot Interposer probing Address/Command/Control/Data up to 2400MT/s
NEX-DDR3INTR-P	DDR3 DIMM Slot Interposer probing Address/Command/Control
NEX-SODDR3INTR-P	DDR3 SODIMM Slot Interposer probing Address/Command/Control
NEX-DDR3MP78BLASK	DDR3 x4/x8 Memory component Interposer
NEX-DDR3MP96BLASK	DDR3 x16 Memory component Interposer

DDR4 probing solutions

NEX-DDR4INTR-XL	DDR4 DIMM Slot Interposer probing Address/Command/Control/Data up to 2400MT/s
NEX-SODDR4INTR-HS	DDR4 SODIMM Slot Interposer probing Address/Command/Control/Data up to 1867MT/s
NEX-DDR4INTR-CMPL	DDR4 DIMM Slot Interposer probing Address/Command/Control
NEX-SODDR4INTR-CMPL	DDR4 SODIMM Slot Interposer probing Address/Command/Control
NEX-DDR4MP78BLASK	DDR4 x4/x8 Memory component
NEX-DDR4MP96BLASK	DDR4 x16 Memory component

Warranty information

As a distributed product the warranty is provided by Nexus Technology. Customers are to contact Nexus Technology for warranty support.

Nexus Technology products have a warranty against defects in material and workmanship for a period of 1 year from the date of shipment. During the warranty period, Nexus Technology will, at its option, either replace or repair products proven to be defective. For warranty service or repair, this product must be returned to Nexus Technology.

More details about Nexus Technology Warranty information please visit http://www.nexustechnology.com/support/Nexus%20Terms%20and%20Conditions%20of%20Sale.pdf

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Updated 10 April 2013

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16 Oct 2013

52W-29653-0

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