NEXUS TECHNOLOGY

Memory Analyzers

MA5100 Series Memory Analyzer Datasheet

Key Performance Specifications

- LPDDR5-6400
- LPDDR4-4267
- LPDDR4x-4267
- ClockSafe™
- 20 input channels
- 1G-sample acquisition depth
- Programmable probe termination
- 11ps x 10mV x 20-channel analog characterization (iCiS™)
- Real-time smart single frequency or 16 frequency analysis
- Real-time memory performance metrics
- Real-time memory compliance margins and validationTrigger in and trigger out

Key Features

- Integrated Windows 10 Controller
- Application software ready for bench, remote-to-lab or offline operation
- Application includes advanced listing, waveform, tables and charting

- Turnkey setup, including automated MRW capture and analysis
- Analyze thousands of real-time memory parameters
- Full featured, industry standard trigger system
- Automated analysis runs for everything from detailed setup information, to quick summary runs, to in-depth extended data logging or margin testing run
- ClockSafe™: Continuous analysis across clock stops and clock frequency changes
- Analog eye characterization on 20-channels simultaneously at 11ps x 10mV
- Correlate with an oscilloscope for memory DQ data capture
- Patented interposer/probe designs

Applications

- LPDDR5, LPDDR4, LPDDR4x and/or LPDDR3
- Memory validation and debug
- Monitoring bus traffic
- Bus traffic measurement
- Optimization of memory performance
- Analog insight
- LPDDR5 rates to LPDDR5-6400
- LPDDR4 rates to LPDDR4-4267
- LPDDR4x rates to LPDDR4x-4267
- LPDDR3 rates to LPDDR3-2133

Results Overview

Real-time Continuous Analysis

Real-time analysis provides data results during and after analysis runs which may be extremely long (days) or very short (nano-seconds). During the run, analysis is continuous and in real-time. Any event that occurs during the run is captured and analyzed.

Performance

Memory performance metrics include real-time margin metrics and margin violations. For each margin test, results indicate test coverage, observed margin values, as well as flags indicating margin violations. All data is continuously acquired in real-time with results updates continuously while the analyzer is still running.
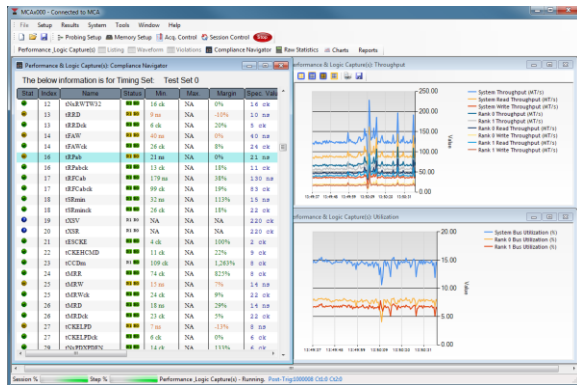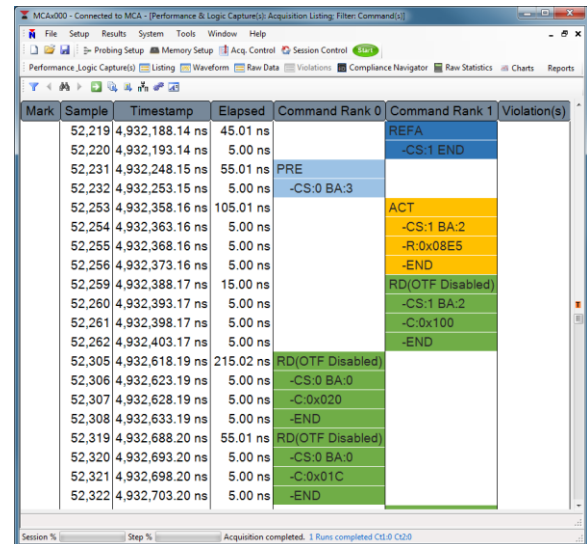

1 - MA5100 LPDDR4 Performance Metrics

Memory performance metrics also include continuous real-time charting of bus performance characteristics such as throughput, utilization, power management, and more.

Simultaneous State Capture

State capture results include continuous traffic around one or more events of interest. The traffic - consisting of time, bus commands, bus addressing, margin violations, and trigger events - is presented

in listing or waveform displays. State capture depths from one hundred samples to one billion samples is available. Advanced acquisition controls monitor and respond to the continuous traffic in real-time to best utilize the state capture memory. Advanced post-capture search and filter can quickly parse the acquisition store.

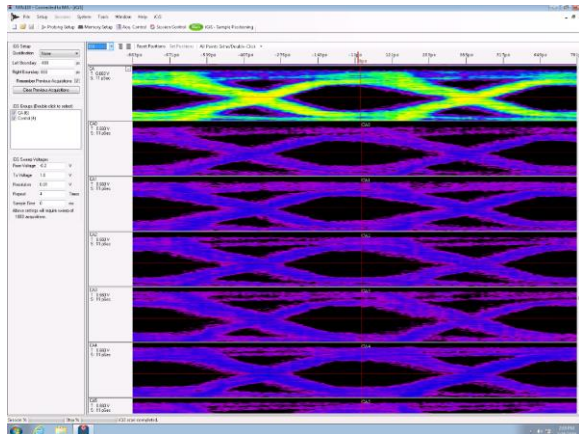

2 - MA5100 LPDDR4 State Listing Window Example
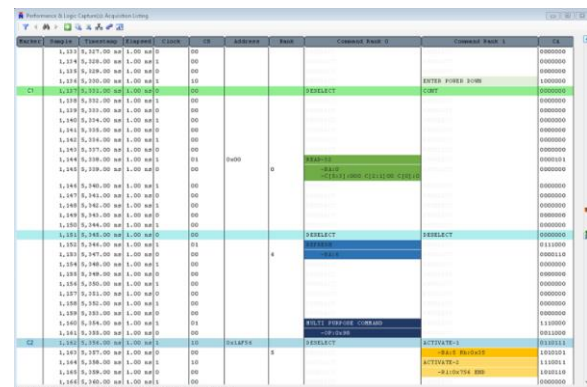
3 - MA5100 LPDDR5 Command Listing Example

Detailed Analog Visibility

iCiS™ provides detailed and invaluable insight of signal quality and expected

performance for data acquisition you can trust.

4 - MA5100 LPDDR4 iCiS Analog Characterization

Automated Analysis

Analysis is automated and continuous from the time the user clicks the Start button until the analysis session completes. While running, the session updates the application with real-time results. In the following image you can see real-time margins for all compliance parameters as well as a chart of read/write bus throughput. In this example, the analyzer is configured to continuously monitor acquire data until the first occurrence of a compliance violation occurs. That's three simultaneous measurements, each collecting/monitoring real-time data! Quickly find, analyze and share intermittent problems.
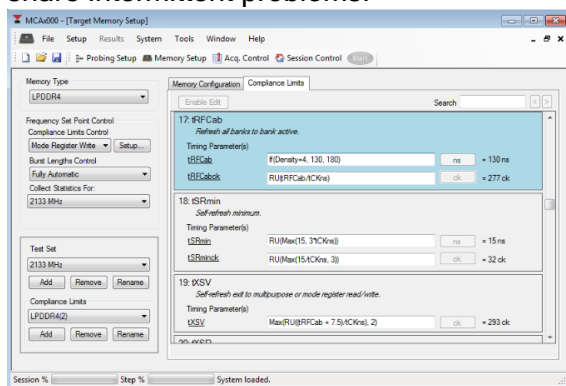
5 - MA5100 LPDDR4 ClockSafe™ Continuous Analysis Setup

Reliable Connection

Industry standard LPDDR4 component interposers/probes provide connection between the analyzer and the target while preserving analog signal characteristics.

6 - MA5100 Connection to Phone

Interposers/probes available for LPDDR5, LPDDR4/4x and LPDDR3 standard BGA and package-on-package (PoP) components.

Attachment Services

LPDDR4 and LPDDR3 memory components are available in a variety of packages. Most packages are very fine pitch BGA PoP (package-on-package) which typically live on densely populated targets. This presents a challenging probing environment and an opportunity to provide our expert services. We provide attachment services for all of our component/package interposers so that our customers are up and running quickly and reliably.

7 - Attachment Service

ClockSafe™

- Continuous Analysis Across Clock Stops and Frequency Changes
- Clock Protected Measurements in Nanoseconds

LPDDR4 memory clocks stop and change frequencies aggressively. A memory analyzer that can support continuous acquisition *and* continuous analysis through these aggressive changes is critical! The MA5100 memory analyzers for LPDDR4 support this through ClockSafe™.

Continuous Acquisition

ClockSafe™ provides continuous acquisition across clock stops and frequency changes through a robust acquisition interface that can handle any clock frequency from 0MHz to 2.4GHz.
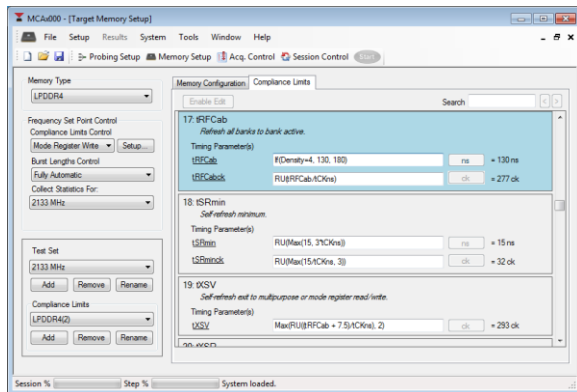

8 - MA5100 LPDDR4 ClockSafe™ Continuous Acquisition

Continuous Analysis

ClockSafe™ also provides continuous analysis by performing real-time measurements in nanoseconds (ns). This is critical for accurate measurements which would otherwise be corrupted when the clock stopped or changed frequencies.

Analysis in nanoseconds (ns) is specified for a number of measurements in the JEDEC specifications. ClockSafe™ ensures these measurements are performed, not only correctly, but also accurately.

9 - MA5100 LPDDR4 ClockSafe Continuous Analysis Setup

Smart Sixteen Frequency Analysis

Why analyze one frequency at a time when you can analyze all of them at once?

With aggressively changes frequencies, LPDDR4 presents a challenging analysis environment for most other analyzers but not for the MA5100 with Smart Sixteen Frequency Analysis and ClockSafe™.

With the push of a button the MA5100 starts acquiring and analyzing the memory bus in real-time. When a frequency change occurs, the analyzer responds, in real-time, collecting statistics for any one or all frequencies as well as margin testing (looking for violations) specific to each, of up to sixteen, independent frequencies and sixteen sets of margin limits. What does this mean for our users? It means they can run the analyzer once and verify the protocol and margins for every command – missing nothing – in real-time for every frequency.

Check Online for More Information

Check online at www.nexustechnology.com for more information including video tutorials and whitepapers. Topics include:

- Oscilloscope Correlation
- TLA/Scope Correlation

- JEDEC Protocol Compliance Analysis
- Dual Instrument Architecture
- Detailed Interposer/Probe Information
- iCiS
- Triggering and State
- Violations and Margins
- And more

Partial Configurations

LPDDR5 Configurations

MA5150 LPDDR5

Memory analyzer with LPDDR5 performance, margins and capture up to LPDDR5-6400 with 1G-Sample acquisition depth, ClockSafe™ and Sixteen Smart Frequency Analysis. Additional support for LPDDR4 and/or LPDDR3 available as an option.

NEX-MA5120-LPDDR5

Logic analyzer capture only up to LPDDR5-6400, 512M-Sample acquisition depth, and ClockSafe™. Options available for 1G-Sample. Planned options for performance, margins, and Sixteen Smart Frequency Analysis. Options also available to add LPDDR4/LPDDR4x and/or LPDDR3 support.

LPDDR4 Configurations

NEX-MA5150-LPDDR4
Real-Time Memory Analyzer and Logic Analyzer with LPDDR4 Real-Time compliance, performance, margins and capture exceeding LPDDR4-4267 (2.4GHz clock) with 1G-sample acquisition depth, ClockSafe™ and Sixteen Smart Frequency Analysis. Additional support for LPDDR5 and/or LPDDR3 available as an option.

NEX-MA5120-LPDDR4
Logic analyzer capture only up to LPDDR4/LPDDR4x-4267, 512M-Sample acquisition depth, and ClockSafe™. Options

available for 1G-Sample, performance, margins, and Single/Sixteen Smart Frequency Analysis. Options also available to add LPDDR5 and/or LPDDR3 support.

NEX-MA5100-LPDDR4

Entry level memory analyzer with LPDDR4/LPDDR4x performance, margins and capture up to LPDDR4/LPDDR4x-3200 with 512M-Sample acquisition depth, ClockSafe™, and Smart Single Frequency Analysis. Options include 1G-Sample, Sixteen Smart Frequency Analysis, and LPDDR4/LPDDR4x-4267 support. Options also available to add LPDDR5 and/or LPDDR3 support.

LPDDR3 Configurations

NEX-MA5150-LPDDR3

Memory analyzer with LPDDR3 performance, margins and capture up to LPDDR3-2133 with 1G-Sample. Options also available to add LPDDR4 support.

NEX-MA5120-LPDDR3

Logic analyzer capture only up to LPDDR3-2133, 512M-Sample and acquisition depth. Options available for 1G-Sample, performance, and margins. Options also available to add LPDDR5 and/or LPDDR4/LPDDR4x support.

NEX-MA5100-LPDDR3

Memory analyzer with LPDDR3 performance, margins and capture up to LPDDR3-1600 with 512G-Sample. Option available for 1G-Sample. Options also available to add LPDDR5 and/or LPDDR4/LPDDR4x support.

Recommended Interconnects

The following interconnects are available as of the printing of this datasheet. Please see our website or contact us for the most up to date information.

Technology (TECH)	Pin Count (PIN)	Data Bus (DQ)	Package (PACK)	Notes
LP4	366	4x16	PoP	
LP4	272	4x16	PoP	
LP4	200	2x16	Std	

Contact Information

For more information, please contact us by telephone, email or mail as listed below. Normal business hours are 9:00 – 5:00 EDT/EST.

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