



# Inside Nexus

Volume 1, Issue 2, Feb 2015

*Welcome to the 2nd issue of the Nexus 5001 Forum's quarterly newsletter "Inside Nexus." This newsletter provides forum members and interested parties from industry and academia updates to the forum's activities related to the Nexus 5001 standard (2012), advancing the tool set, and promoting its market acceptance.*

*Updates/revisions to the standard are being accepted and reviewed by the forum's Technical Committee. Additionally, Nexus is working on a Technical White paper that will be released later this year. If you have any suggestions/updates and you would like the committee to consider, please email [tech@nexus5001.org](mailto:tech@nexus5001.org). Thank you.*

## A Letter from the chairman, Randy Dees

I am honored to be selected as the new chairman of the Nexus Consortium. I began working with the original 1999 standard many years ago and as co-chairman or chairman of the technical subcommittee, have been active in all of the revised editions of the Nexus standard. As one of the only open standards for microcontroller that is supported on multiple core architectures from several different semiconductor companies, the Nexus standard continues to expand based on proposals from the member companies for additional debug capabilities. Mats Fredriksson (Ericsson) is taking over the reins of the hardware technical committee, but I will support him in future technical activities as well.

As part of 2014 activities, University of Washington Bothell completed their first phase of a project that will eventually generate example Nexus implementations. The first phase was to develop an FPGA-based microcontroller with an external DRAM interface. Discussions are underway for the next phase of the project.

In 2015, we hope to review more proposals for additions or changes to the next version of the standard.

## Nexus Annual Members Meeting

The Nexus 5001 Forum had its annual member's meeting on January 20th, 2015. This meeting brought members from all over the globe to review the last year's accomplishments and to start planning for 2015.

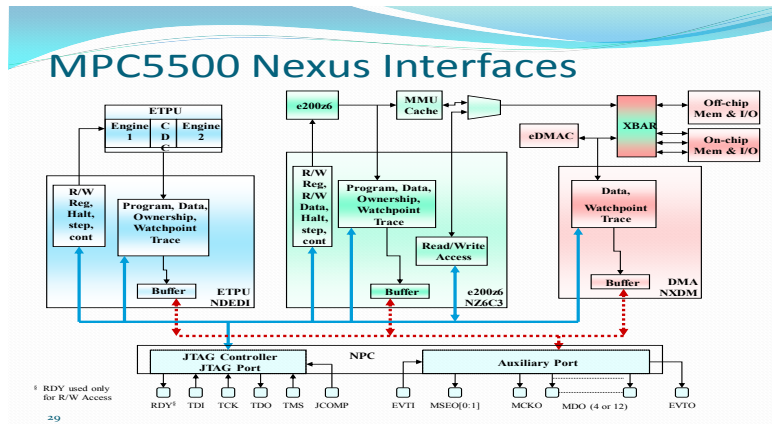
Some highlights from the meeting: include:

- ◆ Nexus 5001 Forum elected a new Chairman, Randy Dees, Freescale and Vice-Chairman, Todd Collins, ETAS for the consortia.
- ◆ Upcoming Technical Strategy planning meetings to plan the next release of the standard and soon to be released Nexus Whitepaper.
- ◆ New and improved website that will be showcasing different areas of the industry through member spotlights, upcoming webinars and technical documents.
- ◆ A review of the Nexus Capstone Project success in 2014 and future roadmap.

Nexus 5001 Forum will be reaching out to its members in the upcoming months to get more feedback from its members and industry at large.

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## Inside Look at a Nexus Interface



### Member Spotlight

**SYNOPSYS**<sup>®</sup>

*Synopsys provides a comprehensive portfolio of tools for digital and mixed-signal IC design, implementation, signoff, verification, test, and design for manufacturability (DFM). Based on industry standards, Synopsys tools are production-proven at established process nodes and emerging process nodes down to 16 nm and concurrently optimize trade-offs between speed, area, power, test, and yield. In addition, Synopsys offers the industry's "golden" signoff timing and extraction solutions, and has unmatched third-party support for technology libraries, services, and IP. In short, Synopsys offers the fastest path to accelerated innovation. To learn more about Synopsys, please visit, [www.synopsys.com](http://www.synopsys.com)*

### Real-Time Trace: A Better Way to Debug Embedded Applications White Paper

#### Abstract:

Firmware and application software development is often the critical path for many embedded designs. Problems that appear in the late phases of the development can be extremely difficult to track down and debug, thus putting project schedules at risk. Traditional debug techniques cannot always help to localize the issue. This white paper shows the benefits of debugging with 'real-time trace' hardware assistance, including how it can vastly reduce the amount of time needed to track down problems in the code. It also offers other benefits, such as hot-spot profiling and code coverage, offered by real-time trace systems.

#### Authors:

James Campbell - CAE, Synopsys Inc.

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Hugh O'Keeffe - Engineering Director, Ashling Microsystems

To read the complete whitepaper, please click on the link, below which will redirect you to the Synopsys page:

[https://www.synopsys.com/dw/doc.php/wp/real-time trace a better way to debug embedded applications.pdf](https://www.synopsys.com/dw/doc.php/wp/real-time%20trace%20a%20better%20way%20to%20debug%20embedded%20applications.pdf)

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## Nexus 5001 Forum Webinar Program



Nexus 5001 Forum partners with its members to deliver industry webinars. These webinars are free to attend. To see prior webinars, please [click here](#) or visit [www.nexus5001.org](http://www.nexus5001.org).

The Marketing Committee is looking for additional topics for future webinars. If you have an idea for a topic, please contact [marketing@nexus5001.org](mailto:marketing@nexus5001.org).

Our next scheduled webinar is currently in development 2015. Stay tuned for further details.

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## System Level Instrumentation using the Nexus 5001-2012 Specification

By Neal Stollon, Ph.D, P.E.

### Abstract

The paper addresses issues and challenges of integrating chip-level instrument resources, and their use at the board or rack levels of system integration and will discuss IEEE-ISTO Nexus 5001 as a solution in this context. This level of instrument integration is relevant to a variety of automotive, aerospace, and telecommunications systems. The presentation/paper will provide a summary overview of the Nexus 5001 instrumentation architecture, and discuss interfaces defined in the Nexus 5001-2012 specification, released in 2012, that simplify the integration of Nexus 5001 and other instrumentation subsystems, along with some example systems level architectures for debug and other analysis instrumentation and interfaces for access at the systems level.

### Introduction

Chip level embedded Instrumentation systems have been well established over the last decade as a required feature in all but the most trivial of ICs. Adding instrumentation to a design enables better functional observability and controllability of the systems to address more subtle issues related to integration and environment [1]. Systems integrators at the board and rack level in mission critical applications such as automotive, networking, and military systems have started to adopt and leverage chip level instruments to address the calibration and debug requirements of complex systems. In turn, instrumentation interfaces developed for the individual chip level analysis need to comprehend the larger scale debug challenges of boards and systems. Nexus 5001, an IEEE ISTO standard, along with other proprietary debug and instrumentation subsystems, has provided a comprehensive and effective means for in-silicon analysis of individual processors and SoC subsystems. Nexus 5001 was developed to address the limitations and concerns on instrumentation in complex (multi-core) systems, and has been used extensively in the automotive domain for over a decade. With the introduction of Nexus 5001-2012, the Nexus instrumentation and debug architecture introduces new features that also support the access to and integration of multi-chip systems found in distributed or heterogeneous board environments typical to automotive, aerospace, and telecommunications systems.

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## A Nexus 5001 Overview

The Nexus 5001 instrumentation standard was originally developed as a set of guidelines, based on best debug tools practices in the semiconductor and test tools industries. The initial 5001 specification was released as an IEEE-ISTO industry standard in 1999. In particular, Nexus 5001 sought to address the bottleneck of instrumentation solutions that were proprietary to a single processor family, and provide a common instrumentation framework that supported diverse processors or cores. Nexus 5001 specification defines a modular framework and guidelines for a message protocol, baseline command set, a register infrastructure, and IO interfaces.

To read more on this whitepaper, please [click here](#).

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## Nexus 5001 Forum Members



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## Nexus 5001 Forum's University Partners:

University of Washington Bothell

McMaster University

University of Alabama Huntsville

Technische Uniersitat Dresden

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Interested in Nexus 5001 Forum membership, please send an email to [admin@nexus5001.org](mailto:admin@nexus5001.org).

To remove your name from our mailing list, please [click here](#).

Questions or comments? E-mail us at [admin@nexus5001.org](mailto:admin@nexus5001.org) or call us at 732-465-5895

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