

Wind River Workbench, On-Chip Debugging Edition

As processors grow more complex, it becomes increasingly difficult to develop hardware and software that can take advantage of new chip technology innovations. The increasing complexity of System on Chip (SoC) designs is driving the need for a more creative approach to debugging and analysis that expedites the hardware development process and provides collaboration between hardware, firmware, and software developers.

Wind River offers the industry's leading Eclipse-based development environment for on-chip debugging. Wind River Workbench, On-Chip Debugging Edition takes you through early hardware bring-up to test and manufacturing with a centralized development solution.

Product Highlights

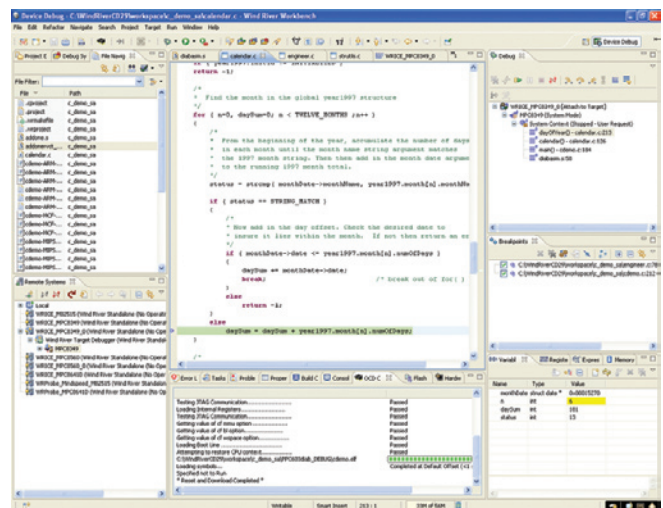
Wind River's standards-based on-chip debugging solutions expedite the development process and support life cycle debug and analysis. With Workbench On-Chip Debugging, you can:

- Bring up new hardware quickly—even before an operating system is available.
- Ensure that the operating system and middleware run effectively on the hardware early in the development cycle.
- Enhance product quality and speed time-to-market.
- Improve overall development productivity by using a common Eclipse-based debug platform for all development, debugging, and test phases.
- Debug even the most complex 32-bit, 64-bit, and multicore processors using patent-pending technology.

Centralized Debugging and Analysis

Today's hardware and software environments present unique challenges, such as how to effectively implement a life cycle development process in a centralized organization, then extend that process to remote development sites and outsourced partners. Traditional methods of debugging and analysis—from homegrown debug tools to off-the-shelf open source products—were not designed to deal with the complexity of today's 32-bit and 64-bit processors in an integrated development environment.

Workbench On-Chip Debugging provides a centralized, standards-based development environment that automates the debugging and analysis process. Its project-oriented methodology simplifies the handoff between different phases of development, from initial hardware bring-up to firmware design, OS implementations, and platform and application development. In addition, its hardware diagnostics, flash



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programming, and scripting capabilities expedite the initial development phases. The Wind River On-Chip Debugging API enables manufacturing and test engineers to employ the same Wind River emulator hardware used in hardware development, as well as leverage existing tools throughout the design and implementation process.

Workbench On-Chip Debugging is the only JTAG solution to support a robust, end-to-end, standard Eclipse debug environment that allows:

- Hardware developers to begin debugging without an operating system to expedite initial board bring-up
- Firmware and Board Support Package (BSP) developers to debug operating systems early in the development cycle when agent-based debugging is not an option, enabling them to spot hardware/software integration issues quickly
- Operating system and application engineers to use the same debugging tools, improving communication and troubleshooting with hardware and firmware/BSP developers
- Test and manufacturing engineers to use the same JTAG tools, extending the debug solution into the final product test, manufacturing, and repair phases

Powerful Eclipse-Based Environment

Workbench On-Chip Debugging software is based on the Eclipse framework, providing the Device Software Optimization (DSO) industry's first integrated JTAG debugging environment that can be easily extended through in-house, third-party, open source, or commercially available Eclipse plug-ins. For example, you can integrate software version control and change management solutions like CVS and ClearCase. You can also integrate UML-based software visualization and code generation tools, enhanced static analysis solutions, and simulation/virtualization software. Wind River on-chip debugging solutions enable you to take advantage of the growing Eclipse ecosystem to improve collaboration between hardware, firmware, and software developers, ensuring a smooth handoff in the debug process.

Advanced Hardware Diagnostics

The traditional hardware diagnostics process can be time-consuming and requires detailed knowledge of processor technology and multiple debug tools. As you move from debugging single core 8-bit and 16-bit processors to multi-core 32-bit or 64-bit processors, you need a more innovative hardware diagnostic toolset that supports a wide range of advanced processors. Workbench On-Chip Debugging was designed for these complex SoC microprocessors, and you don't need to rely on the availability of target firmware—all hardware initialization is performed by the emulator through the processor's JTAG interface.

The advanced debugging capabilities of Workbench On-Chip Debugging enable you to perform all the basic hardware diagnostic tasks, such as validating address and data bus activity, and also offer the following features:

- Advanced symbolic debugging
- Comprehensive diagnostics (RAM tests, address bus test, data bus test, cyclic redundancy checks (CRC) , and scope loops) for bus routing issues on densely populated boards using a single JTAG debug tool
- Register analysis and access to bit-level detail and user documentation with a simple mouse-click
- Complete run control solution, including start, stop, and stepping capabilities that support data- and expression-based hardware/software breakpoints
- Profile analysis tools that report the time your code spends executing a function
- Multicore debugging in a wide variety of configurations, including multiple cores within a system running different operating systems
- Support for multiple operating systems, including Wind River Linux, VxWorks, kernel.org Linux, and ThreadX
- Support for Linux kernel and user-mode debugging

- Support for Wind River Real-Time Core for Linux module
- Support for VxWorks 653 single and multiple memory partition debugging
- Extensive scripting capabilities
- Internal and external trace capabilities that dramatically reduce debug time by providing the underlying cause of specific defects

Scalable, Robust Multicore On-Chip Debugging

Multicore processors create new challenges, such as establishment of the initialization sequence for multicore devices, control of multiple cores from a single emulator, organization of debug information for easy visualization, and simultaneous synchronous debugging of multiple cores. The methodology developed for 8-bit/16-bit single-core tools does not always scale to support the multicore environment. Workbench On-Chip Debugging introduces patent-pending technology that solves one of the hardest problems in embedded software development in a multicore environment: diagnosing and analyzing embedded application behavior across multiple processors in a single board, or across multiple boards within a system.

This sophisticated debugging software supports up to eight separate cores, enabling you to synchronize the start and stop of multiple cores from a central location. In addition, you can easily visualize each core and its debug information to quickly locate and isolate problems. Additional breakpoint management enables cross-correlation of breakpoints to stop a specific processor—or even the entire system—when the breakpoint is hit. Combined with error tracking and cache management, this provides the most advanced on-chip debugging solution for multicore environments.

Supported Processors and Operating Systems

Wind River Workbench, On-Chip Debugging Edition supports a wide range of processors and operating systems. Please visit <http://www.windriver.com/products/product-notes/workbench-on-chip-debugging-product-note.pdf> for a current list. Supported operating systems include Wind River's industry-leading VxWorks and Linux, in addition to kernel.org Linux and Express Logic's ThreadX. Other commercial operating systems and in-house proprietary operating systems can be integrated by Wind River Professional Services.



Wind River is the global leader in Device Software Optimization (DSO). We enable companies to develop, run, and manage device software faster, better, at lower cost, and more reliably. www.windriver.com

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