WIND RIVER

Wind River Probe

Today's average device has a million lines of code. Within the next two years, that number will grow to 2 million. As applications get bigger and microprocessors become faster and more complex, developers must gain access to the core processor and its peripherals. They need to see what's going on inside.

Wind River Probe enables engineers to see what's happening in the system every step of the way, from board bring-up to production and test. Businesses can standardize on a common, smart, and powerful debugging tool throughout the development process, freeing engineering bandwidth for product innovation. Your entire organization will profit from shorter development cycles, higher product quality, reduced cost, and shorter time-to-market.

Wind River Probe is a USB connectivity solution for developers who want to reliably connect their host development environments to their target under development. Using the on-chip debugging capabilities available in most embedded microprocessors, Wind River Probe enables developers to connect to the target via the JTAG, EJTAG, or BDM interface and communicate information to and from the host PC through a USB 1.x- and 2.0-compliant interface.

Wind River Probe has the following features:

- USB 2.0 compliance
- No external power supply needed
- Simple plug-and-play host connection
- Extensible support of ARM, ColdFire, Intel, MIPS, and Power architectures
- Support for Linux and Windows hosts
- Adapts to custom hardware

Components

USB Connectivity

Combining USB 2.0 compliance with Wind River's JTAG Accelerator technology ensures a fast download speed to the target using Wind River Probe, as well as the improved ability to utilize the full JTAG scan chain. This provides developers with a more responsive debug interface compared with parallel port interface-based probes and products compliant only with USB 1.x. The improved download speed offers users more development iterations per day, in addition to a more responsive and generally improved debug experience. The USB connector provides a smaller, easy to plug and play connection method that is more reliable than parallel port connections. Wind River Probe also eliminates the need for an external power supply.

Figure 1: Wind River Probe

JTAG Connector

Wind River Probe provides industry-leading JTAG performance. Able to support up to 100MHz JTAG clock speeds, it far surpasses the requirements for any device software CPU products available today—so this product will support new silicon from major CPU vendors for years to come. Probe supports I/O voltage tracking from 1.2V to 3.3V, so it can automatically plug and play from one device to another. Hot insertion lets users plug and play on the target board without altering the target state: Developers no longer need to reset or power cycle the target board once a connection is made or removed. In addition, Wind River Probe is adaptable to the target board under development—it can provide slew rate control, JTAG clock skew control, and programmable target termination control.

Debug Connector

Wind River Probe supports a next-generation debug interface connector manufactured by Samtec. The Samtec connector provides better electrical and

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physical JTAG connections that support high-speed processors through a high-speed impedance-controlled connector. The connector also supports keying to prevent illegal insertion, support for EMI shielding if desired, and hot swap capability based on its integrated ground capability. This connector is provided in a footprint similar in size to that of the 16-pin JTAG connectors in common use.

Customers can deploy the new Samtec connector on their own hardware to take full advantage of this leading interconnect system. For designs that do not use the Samtec connector, Wind River Probe offers adapters to interface with traditional JTAG/EJTAG/BDM connectors.

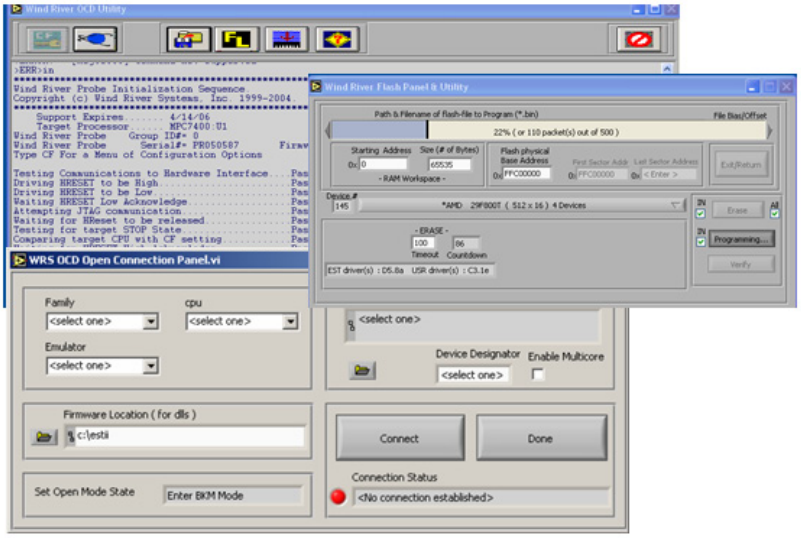

Figure 3: On-Chip Debugging API with On-Chip Debugging Utility

Host Software Support

Wind River Probe is supported by the following Wind River software debuggers and APIs.

Wind River Workbench

Wind River Probe is fully compatible with Wind River Workbench, the industry-leading, open, extensible development suite. Wind River Workbench On-Chip Debugging is specifically configured to meet the needs of developers early in the device software development cycle—handling initial board bring-up and validation, developing device drivers, incorporating low-level software capabilities, and developing C/C++ applications. Workbench On-Chip Debugging offers a feature-rich development suite optimized for the capabilities of JTAG-based debugging using Wind River ICE 2 and Wind River Probe JTAG debug units.

Wind River Workbench contains the following components:

- Standards-based Eclipse framework
- Development environment: build system, project manager, editor, symbol browser, and static analysis
- Multicontext-aware debugger: multicore and monocore debugger, with target connection support via on-chip debugging and agent-based solutions (agent solutions provided by Wind River platform products)
- OS awareness for VxWorks and Wind River Linux, now supporting both kernel- and user-mode debugging for the Linux operating system
- On-chip debugging target connection plug-in (TCP) and on-chip debugging connection to Wind River Probe; includes on-chip debugging views and capabilities
- Instruction set simulator (for supported architectures)
- Compilers available from Wind River for use with Workbench:
  - Wind River Compiler (formerly known as Diab Compiler): best-in-class optimizing compiler
  - Wind River GCC Compiler for VxWorks
  - Wind River GCC Compiler for Linux

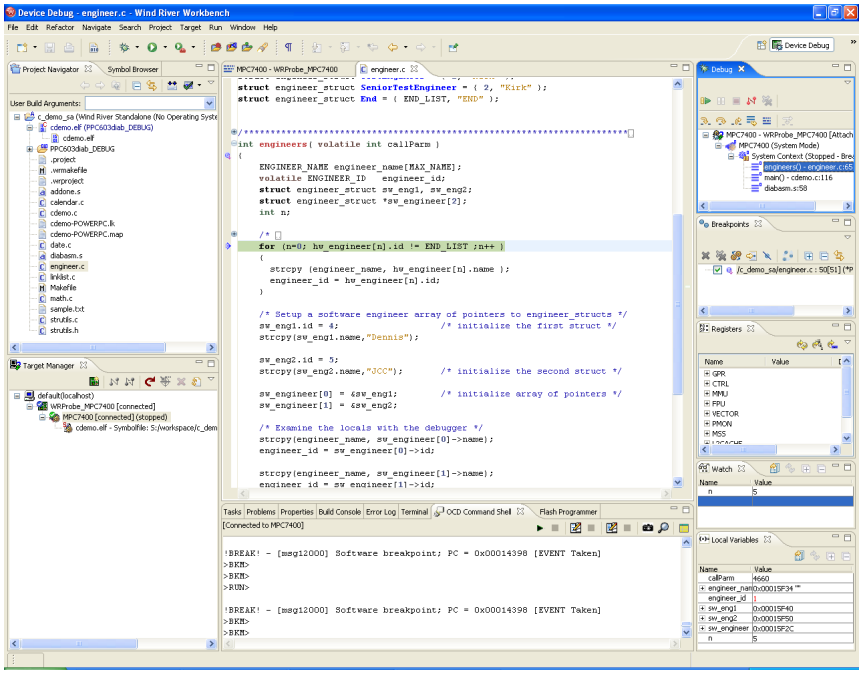

Figure 2: Wind River Workbench

On-Chip Debugging API

Wind River On-Chip Debugging API provides C/C++ and Visual Basic programmers with direct access to Wind River Probe or Wind River ICE 2 JTAG debug units. This access can be utilized by engineers in the manufacturing environment for flash programming and gaining access to the built-in diagnostic features available in Wind River Probe. Access can also be used as an interface to customize software GUIs.

Technical Specifications

- USB host connection
- Easy migration path to additional processor families and/or processor architectures through firmware updates to Wind River Probe
- High-speed JTAG run control and program download
- Built-in hardware diagnostics
- Flash memory programming
- Source-level debugging via Wind River's hardware-optimized software debuggers
- Support for the usage of Memory Management Units (MMUs) to create virtual memory or protected applications
- Support for VxWorks, Linux, and other third-party operating systems
- Internal register configuration
- Additional custom registers
- Open API

Supported Architectures

Support for specific processors varies by Workbench On-Chip Debugging version and the specific JTAG debug unit. Wind River Probe supports single-core and single-thread debug operations (even on multicore devices). For details on currently supported processors, refer to the processor support matrix at http://www.windriver.com/products/OCD/. Wind River is continually adding new processor support. If you do not see your processor listed, contact your Wind River sales representative.

Host OS Support*

- Fedora Core 9, 64-bit x86-64
- Fedora Core 11, 32-bit x86 and 64-bit x86-64
- Red Hat Enterprise Linux Workstation 4 (Update 6), 32-bit x86
- Red Hat Enterprise Linux Workstation 4 (Update 8), 32-bit x86
- Red Hat Enterprise Linux 5 (Update 2), 32-bit x86 and 64-bit x86-64
- Red Hat Enterprise Linux 5 (Update 3), 32-bit x86 and 64-bit x86-64
- Ubuntu 8.04 LTS, 64-bit x86-64
- Ubuntu 9.04, 32-bit x86-32 and 64-bit x86-64
- SUSE Linux Enterprise Desktop 10 SP2, 32-bit x86-32 and 64-bit, x86-64
- SUSE Linux Enterprise Desktop 11 SP2, 32-bit x86-32 and 64-bit, x86-64
- openSUSE 11.1, 32-bit x86-32 and 64-bit x86-64

ARM
ARM9
ARM11
ARM Cortex-A8
ARM Cortex-M3

ATMEL AT9x*
Cavium Econa*
Freescale i.MX*
Marvell*
TI OMAP*

ColdFire
MCF52xx
MCF53xx
MCF54xx
MCF544xx

MIPS
MIPS 4Kc, 4Km, 4Kp, 4KEc
MIPS 5Kc, 5Kf
MIPS 20Kc
MIPS 24kc, 24kf
MIPS 25Kf

Altera MP32*
Broadcom BCM11xx*, BCM12xx*, BCM14xx*
Broadcom BCM33xx*, BCM35xx*

MIPS (continued)
Broadcom BCM47xx*
Broadcom BCM53xx*, BCM5621x*, BCM58xx*
Broadcom BCM63xx*, BCM65xx*
Broadcom BCM70xx*, BCM71xx*
Broadcom BCM73xx*, BCM74xx*
Cavium OCTEON Multicore MIPS 64 CN3xxx*
Cavium OCTEON Multicore MIPS 64 CN5xxx*
NEC VR41xx*, VR54xx*, VR55xx*, VR77xx*
Philips PR19xx*, PR39xx*, PR44xx*
Philips PNX30xx*, PNX73xx*,
Philips PNX83xx*, PNX85xx*
PMC-Sierra RM79xx*, RM9xxx*
RMI AU1x00* (AMD Alchemy)
Toshiba TX49xx*
Wintegra Winpath*

Intel Architecture
Intel Atom*
Intel Core 2* Duo
Intel Xeon*

XScale
Intel IXP4xx*
Intel IXP2xxx*
Intel IOP3xx*
Marvell PXA*

Power Architecture (PowerPC)
AMCC PPC403*
AMCC PPC405*
AMCC PPC440*
AMCC PPC460*
Freescale PPC5xx*
Freescale MPC512x*
Freescale MPC52xx*
Freescale MPC55xx*, MPC56xx*
Freescale/IBM PPC6xx*
Freescale/IBM PPC7xx*
Freescale MPC74xx*
Freescale MPC8xx*
Freescale MPC82xx*
Freescale MPC83xx*
Freescale MPC85xx*
Freescale MPC86xx*
Freescale QorIQ P2xxx*
Freescale QorIQ P4080*
P.A. Semi PA6T-1682M
ST Microelectronics SPC560xxx*
Xilinx Virtex-II Pro X2VP*
Xilinx Virtex-4 XC4V*

** Specific processors only; for details on currently supported processors, refer to the processor support matrix at http://www.windriver.com/products/OCD/*

Professional Services

Wind River Professional Services helps companies to reduce risk and improve competitiveness. Our team delivers device software expertise within structured engagements that directly address key development challenges and contribute to the success of our clients. Our track record of timely delivery and in-depth understanding of market and technology dynamics makes Wind River a valuable implementation partner for clients worldwide. Based on our commercial-grade project methodology, service offerings include device design, BSP and driver optimization, software system and middleware integration, and legacy application and infrastructure migration.

Workbench Services

Whether you select Wind River Probe with Wind River Workbench On-Chip Debugging as a standalone product or as part of our platform solutions, Wind River Professional Services knows how to jump-start your development efforts. Even if you opt for a non–Wind River platform, Linux distribution, host operating system, or target architecture, we can help.

No matter which development environment you use, Wind River Professional Services can extend Workbench to adapt to your needs with the following offerings:

- Extend Workbench processor support
- Extend Workbench target OS support
- Validate Workbench on Linux host environment
- Validate Eclipse plug-ins
- Integrate agents

Installation and Orientation

Proper installation and orientation of Wind River Workbench On-Chip Debugging means you won't waste time solving easily avoidable problems before you can begin your next development project. Wind River offers an Installation and Orientation Service to ensure that your project starts on time and without hassle by delivering the following:

- **Onsite installation:** Guided install on your hardware and host platform, along with a sample build process, demonstrations, and examples of customizations
- **Hands-on orientation:** Architecture, development file system, adding open source packages, porting drivers, addressing design issues
- **Advice:** Introduction to Wind River support channels and processes, additional services, project review, and consultation

The Wind River Installation and Orientation Service will expedite your path to productivity, allow you to rest assured that we have eliminated a common source of user error, and help you realize all of the platform's potential.

Education Services

Education is fundamentally connected not only to individual performance, but also to the success of a project or entire company. Lack of product knowledge can translate into longer development schedules, poor quality, and higher costs. The ability to learn—and to convert that learning into improved performance—creates extraordinary value for individuals, teams, and organizations. To help your team achieve that result, Wind River offers flexible approaches to delivering product education that best fits your time, budget, and skills development requirements.

Personalized Learning Program

Wind River offers a unique solution to minimize the short-term productivity drop associated with the process of adopting new device software technology, and optimize the long-term return on investment in a new device software platform. The Wind River Personalized Learning Program delivers the right education required by individual learners to accomplish their jobs. The program identifies work-related skill gaps, generates development plans, materials, and learning events to address these skill gaps, and quantifies the impact of the development activities for each individual user.

This programmatic, focused, and project-friendly approach to skills development results in a significant increase in the personal productivity of your teams, improved efficiency in the processes they employ, and faster adoption of the technology you have purchased. Personalized Learning Programs deliver improved business performance—customers have reported a return on investment ranging from 18% to 30% over a traditional training approach.

Please consult your local Wind River sales representative for more information on Personalized Learning Programs.

Public Courses

Wind River's public courses are scheduled for your geographical convenience. They are conducted over one to five days, using a mixed lecture and interactive lab classroom format that leverages the experience of Wind River instructors and other course participants. Courses provide a fast, cost-effective way for students to become more productive with Wind River technology.

Benefits of public courses include:

- A conceptual introduction that orients students to the subject matter
- A selective examination of the details, focusing on the most commonly used areas, or on areas with which users tend to be least familiar
- Personal guidance and hands-on application of individual tools and course concepts
- The chance to grasp device software concepts, as well as the fundamental issues involved in real-time design
- The knowledge needed to develop device drivers, perform hardware porting, or develop applications
- Answers to specific questions about topics addressed in the course

Courses of interest to Wind River Probe customers may include Workbench for On-Chip Debugging; Wind River General Purpose Platform, VxWorks Edition; Wind River General Purpose Platform, Linux Edition; and Workbench for Linux. Please consult your local Wind River sales representative or visit education.windriver.com for course schedules and fees.

In addition to these Wind River–sponsored courses, we also offer half-day seminars on a regional basis for processor architecture and OS development training. Please refer to education.windriver.com or contact your local Wind River sales representative for information on courses in your area.

Onsite Education

If you have a large project team or a number of new users, you may benefit from custom onsite education. Instructors will consult with you and, based on the workshop series curriculum, determine which topics should be included and emphasized. This type of education offers an opportunity for one-on-one discussions with our instructors about your specific project needs, technical requirements, and challenges—all in the comfort of your own office.

Advantages of onsite education:

- The entire team gains a common knowledge base.
- Onsite education helps ensure that knowledge and skills will transfer from the classroom to the workplace.
- The location saves employees both travel expenses and time away from the office.

Support Services

Wind River provides full technical support for our development solutions, including Wind River ICE, Wind River Probe, Wind River Trace, Wind River Workbench, VxWorks 6.x, and Wind River VxWorks and Linux platforms. Our products are backed by the most comprehensive customer support network in the industry.

Wind River's global support organization is staffed with experienced engineers who have extensive knowledge of Wind River products and device software development. With 10 major support centers and 15 additional support hubs worldwide, our local experts can help diagnose problems, provide guidance, and answer basic "How do I...?" questions.

Support is available 24/7 at our Online Support website or by email at support@windriver.com. The website provides patches, manuals, the latest errata, tech tips, and application notes. Visit Online Support at www.windriver.com/support or consult our Customer Support User's Guide at www.windriver.com/support/resources/csug.pdf.

Wind River experts are also available for telephone support during standard business hours. If you cannot find the information you need through Online Support, please contact our global support team:

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Fax: 510-749-2164
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Middle East Region fax: +972 9746 0867
Nordic tel.: +46 8 594 611 20
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How to Purchase Wind River Solutions

Please visit www.windriver.com/company/contact-us/index.html to find your local Wind River sales contact. To have a sales representative contact you, please call 800-545-9463 or write to inquiries@windriver.com.

WIND RIVER

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