

Tornado[®]

2.2

RELEASE NOTES



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Tornado Release Notes, 2.2

15 Aug 02
Part #: DOC-14291-ZD-01

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Tornado

Release Notes

2.2

1. Introduction

Tornado 2.2 is the standard Tornado II platform shipping for all major target architectures. This Tornado 2.2 release includes the Tornado 2.2 host development tools and the VxWorks 5.5 operating system.

Tornado 2.2 is a substantial update and re-release of the Tornado II platform. These release notes contain information about supported hosts and targets, new features, compatibility with previous releases, and known problems. Every effort is made to make them as complete as possible before they are printed. More current sources of information are described below.

Tornado 2.2 Features

Key features of Tornado 2.2 include:

- an updated version of VxWorks (VxWorks 5.5)
- updated GNU compiler support
- integrated Diab compiler support
- an updated run-time and BSP packaging model
- over 2000 enhancements and bug fixes throughout the product line
- support for the latest versions of Windows and Solaris
- support for many new target processors, including PowerPC 440
- FlexLM license management

Release Notes Conventions

These release notes use the following conventions:

- Pathnames are based in the Tornado installation directory. For example: *installDir/target/src*.
- For simplicity, forward slashes are used as pathname delimiters for both UNIX and Windows filenames.
- A series of items to be selected from the GUI is denoted by A>B>C. The elements A, B, and C may be menu items, buttons, or tabs.

Wind River Web Site

The online Tornado 2.2 support page contains additional information about this release at the following URL:

<http://www.windriver.com/corporate/support/prodbullet/T2.2/>

In addition to the most up-to-date information on the release, this web page provides links to the following:

- **Known Problems** describes known problems with released Wind River products. Access to this list requires WindSurf authentication.
- **Fixed Problems** describes problems in Tornado 2.0/VxWorks 5.4 that have been fixed in this release. Access to this list requires WindSurf authentication.
- *Tornado Release Notes, 2.2*
- *Tornado Getting Started Guide, 2.2*
- *Tornado Migration Guide, 2.2*

Ongoing information about Wind River products is available for all customers on the WindSurf Web page, which can be reached from the Support section of the Wind River Web site at **<http://www.windriver.com>**. For more information, see 7. *Customer Services*, p.20.

1.1 Host System Requirements

Tornado 2.2 runs on PCs and on Sun workstations.



NOTE: The following host operating systems are *no longer supported*: HP-UX, Windows 95/98, Solaris 2.5.1, and Solaris 2.6.



NOTE: The requirements described in this section are for Tornado 2.2; they do not take into consideration the requirements of other software you may be running simultaneously.

PC Windows Host

Requirements for installing Tornado 2.2 on a PC are:

- Windows NT 4.0 with service pack 5 or higher, Windows 2000 Professional, or Windows XP.
- Administrator rights.
- 128 MB RAM minimum. 256 MB *highly* recommended.
- 300 MB disk space for typical installation.
- A CD-ROM drive or networked CD-ROM for installation.
- Intel Pentium class processor; 400 MHz or faster.
- Netscape 4.5 or newer, or Internet Explorer 5.0 or newer.
- TCP/IP must be installed on the host system even if it is being used as a standalone PC with a serial connection to the target, because Tornado tools use the TCP/IP protocol to communicate with one another.
- A network interface card for debugging over a network is recommended.

Solaris Host

System requirements for installing Tornado 2.2 on a Sun workstation are:

- The Solaris 2.7 and Solaris 2.8 (32-bit mode only), or Solaris 2.9 (32-bit mode only) operating system.
- An Ultra5/360 or higher-performance workstation.
- 128 MB RAM minimum, 256 MB *highly* recommended.
- 300 MB disk space for a typical installation.
- A CD-ROM drive or networked CD-ROM for installation.
- Netscape Communicator 4.5 or newer, or Internet Explorer 5.0 or newer.
- CDE Window Manager is recommended (see *Window Managers*, p.5).



NOTE: Solaris on an x86 host is not supported.

Solaris Patches and Upgrades

Before installing Tornado, all Solaris hosts must have the latest Solaris Patch Cluster, which is available from <http://sunsolve.sun.com>.

Table 1 **Solaris Patches**

Patch Cluster	System	Patch
Solaris Patch Cluster 7	Solaris 7 (5.7)	107078-10 X Sun Patch. If you have a later patch, such as 108376-03, use it.
Solaris Patch Cluster 7	Solaris 7 (5.7)	VIS/XIL Patch 106147-03 or later is required for developers of imaging and video applications using the VIS/XIL graphics package or doing VIS/XIL graphics programming.

Window Managers

Tornado is officially supported for Solaris CDE, fvwm2, KDE, and Exceed. Some early versions of KDE do not work with Tornado. If you have difficulties using an alternative window manager, return to a supported window manager.

If you use fvwm2, it may be necessary to make the following change in the `.fvwm2rc` file:

```
# set up the default style
Style "*" DecorateTransient
```

Exceed Tips and Information

Following are some useful tips for customers using Exceed with Tornado 2.2.

- **X Window Display**

If you run under Exceed, you must set Xconfig>Screen Definition Preferences>Window Manager to “Native.” Otherwise, X window borders disappear.

- **Multibyte Limitation**

The first line of a C/C++ source file cannot contain Japanese characters or any multibyte character. This restriction is limited only to the first line. The reason for this limitation is that, for some tools, such as the debugger and Tornado editor, the first line of a C/C++ source file is checked to determine the file type, such as text, binary, directory, or so on. If it is an unexpected file type, it is rejected; and the debugger (or editor) will display the following message.

```
-- Unable to load non text file Aborting --
```

- **Font Tips**

To reduce your font path, run:

```
% xset fp default
```

then, remove your MainWin font cache—for example, by removing the `~/.wind/mw/fonts` directory. If this does not work, you can use the Exceed font database and remove selected (unused) font directories, such as `japanese`, `hebrew`, `chinese`, depending upon your location.

1.2 Target System Requirements

Tornado target requirements include:

- Tornado boot media (ROM, flash, floppy disk)
- 512 KB ROM space recommended, 256 minimum

Tornado 2.2 is supported for the following target architectures:

- PowerPC
- Pentium
- ARM
- StrongARM/XScale
- MIPS
- SuperH
- ColdFire
- MC68K/CPU32
- VxSim

A complete, up-to-date list of all available supported processor families and BSPs is at <http://www.windriver.com/corporate/support/prodbullet/T2.2/>.



NOTE: Several processor families have been discontinued: i960 and SPARC. In addition, many older BSPs are discontinued and other boards are no longer supported in Tornado 2.2.

1.3 Documentation

This release of Tornado is shipped with the *Tornado Release Notes* (this document), the *Tornado Getting Started Guide* (Windows and UNIX versions), the *GNU Toolchain for Tornado 2.2 Release Notes*, and the *Diab Release Notes*, 5.0.1 (for Coldfire).

The core documentation set for this release is listed in Table 2. Printed versions of this documentation can be obtained with redeemable coupons from the Wind River bookstore. Additional copies of books and manuals for optional products can also be purchased through the bookstore. For more information, see *Accessing the Documentation*, p.8.

Table 2 **Core Documentation Set for Tornado 2.2/VxWorks 5.5**

Document	HTML	Print/PDF
<i>GDB User's Guide</i>	X	
<i>GNU Toolchain for Tornado 2.2 Release Notes</i>		X*
<i>GNU ToolKit User's Guides</i> (for ARM, MIPS, Pentium, PPC, simulators, MC68K, and SH)	X	
<i>GNU Make User's Guide</i>	X	
<i>GNU Binary Utilities User's Guide for ColdFire</i>	X	
<i>Diab C/C++ Compiler for Coldfire User's Guide</i>	X	X
<i>Diab Release Notes</i> (Coldfire and optional products)		X*
<i>Tornado Release Notes</i>		X*
<i>Tornado API Programmer's Guide</i>	X	X
<i>Tornado API Reference</i>	X	
<i>Tornado Getting Started Guide, Windows Version</i>	X	X
<i>Tornado Getting Started Guide, UNIX Version</i>	X	X
<i>Tornado Migration Guide</i>		X [†]
<i>Tornado Tools Reference</i>	X	
<i>Tornado User's Guide, Windows Version</i>	X	X
<i>Tornado User's Guide, UNIX Version</i>	X	X
<i>Tornado SETUP SDK Developer's Guide</i>		X [†]
<i>VxWorks OS Libraries API Reference</i> (formerly included in the <i>VxWorks API Reference</i>)	HTML and as man pages on UNIX hosts	X
<i>VxWorks Drivers API Reference</i> (formerly included in the <i>VxWorks API Reference</i>)	HTML and as man pages on UNIX hosts	X
<i>VxWorks Errno Code List</i>	X	
<i>VxWorks BSP Developer's Guide</i>		X
<i>VxWorks BSP Reference</i>	X	
<i>VxWorks for 68K/CPU32 Architecture Supplement</i>	X	X

Table 2 **Core Documentation Set for Tornado 2.2/VxWorks 5.5**

Document	HTML	Print/PDF
<i>VxWorks for ARM Architecture Supplement</i>	X	X
<i>VxWorks for ColdFire Architecture Supplement</i>	X	X
<i>VxWorks for Hitachi SuperH Architecture Supplement</i>	X	X
<i>VxWorks for Intel XScale/StrongARM Architecture Supplement</i>	X	X
<i>VxWorks for MIPS Architecture Supplement</i>	X	X
<i>VxWorks for Pentium Architecture Supplement</i>	X	X
<i>VxWorks for PowerPC Architecture Supplement</i>	X	X
<i>VxWorks Network Programmer's Guide</i>	X	X
<i>VxWorks Programmer's Guide</i>	X	X
<i>WindView User's Guide</i>	X	X
<i>WindView User's Reference</i>	X	X

* Available only in print and on WindSurf; not on product CD.

† Available only on WindSurf; not in print and not on product CD.

Accessing the Documentation

Please note the following about the documentation for this release:

- **HTML**

The HTML is available from Help>Help Topics. You can also view the help by opening *installDir/docs/books.html*.

- **Printed Books**

Printed documentation is available from the Wind River Bookstore Web site: <http://www.windriver.com/windsurf/bookstore>. The Wind River Bookstore is a web-based store which allows you to order extra copies of the Tornado documentation at any time. It is accessible to anyone with a WindSurf account. The bookstore also has a list of documentation for optional products.

- **PDF**

PDF versions of most books in the standard Tornado 2.2/VxWorks 5.5 documentation set, as well as the Diab compiler guides, are provided in *installDir/SETUP/DOCS*. They are also available in the **DOCS** directory at the root of the Tornado core product CD, accessible from your CD-ROM drive. PDF versions are also available from WindSurf at:

<http://www.windriver.com/corporate/support/prodbullet/T2.2/>

- **Support**

Support information is available from the Web at:

<http://www.windriver.com/corporate/support/prodbullet/T2.2/>

man Pages

In addition to HTML and print formats, the *VxWorks OS Libraries API Reference* and the *VxWorks Drivers API Reference* are also available in UNIX-style man pages for the Solaris host. The most convenient way to access these pages is to create an alias for **man -M**. The following C shell example uses **vxman** for the alias:

```
% alias vxman 'man -M installDir/man'
```

You can then display entries, such as the entry for **malloc()**, from a shell prompt as follows:

```
% vxman malloc
```

Documentation Errata

The *VxWorks for MIPS Architecture Supplement* refers to r3k targets, which have been removed from this release.

The *VxWorks OS Libraries API Reference* defines precisely when a resource becomes free. This information is not complete in the *VxWorks Programmer's Guide*, which only provides a definition of 'a resource being free.' For full details, see the reference manual.

2. Installation

The primary source for installation information is the *Tornado Getting Started Guide: Installing Tornado*. The Tornado 2.2 installation requires two CDs. The Tornado 2.2/VxWorks 5.5 CD contains mainly the host executables and target libraries for a specific architecture, as well as the simulator and the optional full simulator with networking support. The other BSPs/Drivers CD has BSPs, driver objects, headers, and associated source code.

Both CDs must be installed in order to use the product on a real target. The BSP CD is not required if you are using only the simulator or full simulator.

They must be installed in the correct order:

1. Tornado 2.2/VxWorks 5.5 CD first
2. BSPs/Drivers CD next - install this CD in the same tree as your Core CD



WARNING: Users whose LANG variable is not set to English must run:
unsetenv LANG
prior to running install (**SETUP**).

Installing Tornado

Before installing:

1. Ensure that you are installing Tornado 2.2 on a currently supported host, meeting all the requirements described in *1.1 Host System Requirements*, p.3.
2. For Windows NT users, ensure that you have administrative privileges.
3. If you participated in the Tornado 2.2 Beta program, uninstall any previous versions of Tornado 2.2/VxWorks 5.5. For details, see *Installing Tornado*, p.10. Tornado 2.2 must be installed in its own tree, not on top of an existing Tornado installation of any kind:
 - end all Tornado processes, the registry, and so forth.
 - run Tornado Uninstall (Windows) or execute **SETUP/UNINST** (UNIX)

To install Tornado 2.2, run **SETUP**. Your installation key(s) can be found on your Installation Keys sheet. Enter the installation key in the registration page of **SETUP**. Each CD requires its own key; keys are case-sensitive.

- (1) If you are using more than one target architecture, each one must be installed in a separate tree. This restriction is new as of Tornado 2.2.
- (2) Do not attempt to install in directories with spaces in the names.
- (3) Be sure to install at least the minimum required set of products:
 - Tornado/VxWorks CD
 - Compiler (either GNU or Diab): *hostType archType*
 - Tornado Tools: *hostType archType*
 - BSP/Drivers CD (not necessary if using only a simulator)
 - Driver Objects/Headers: *archType*
 - at least one VxWorks BSP: *bspType*
- (4) Tornado 2.2 requires a license. If you have Internet access, obtaining a license is automated. If you are behind a firewall and cannot access the internet, you must manually obtain a license file. See 3. *License Management, p.13* and the *Tornado Getting Started Guide: Installing Tornado*.
- (5) Do NOT attempt to use Tornado 2.2 with pre-Tornado 2.2 Tornado registry. The new Tornado 2.2 registry will work for pre-Tornado 2.2 clients. If you are a command-line user, make sure that **WIND_REGISTRY** is *either*:
 - Not set (Tornado 2.2 will automatically launch a local registry).
 - or
 - Set to a Tornado 2.2 registry.
- (6) To use command-line operations, you must source **torVars.sh** or **torVars.csh** (UNIX) or execute **torVars.bat** (Windows) in the *installDir/host/hostType/bin* directory.
- (7) If you have another installation of Tornado, be certain that you do not have any environment variables pointing into that installation while trying to run the new installation.

Installation Notes for BSPs and Processor Families

VxWorks 5.5 and run-time products are sold on a per-processor-family basis. Therefore, it is important to install the correct variations of VxWorks run-time components that match the BSP(s) you will be using.

All users must use boot images or floppies from this release. You cannot use boot images from earlier VxWorks 5.x releases, or from pre-release or Beta versions of VxWorks 5.5, to boot VxWorks 5.5 systems.

Booting and BootApps

No boot media are shipped with Tornado 2.2.

Boot ROMS

For all targets, Tornado 2.2 boot ROMS must be used. Boot ROMs from earlier versions of Tornado 2.x will not work.

Boot Floppies for Pentium

Floppy disks are not distributed with Tornado 2.2. Customers can create target floppy disks using specific instructions in the **target.nr** for the appropriate Pentium BSP.

Tornado 2.2 boot images now use the ELF format and default to a new memory map. For these reasons, Tornado 2.2 VxWorks images are not compatible with previous Tornado boot floppies. The appropriate BSP's **target.nr** file provides instructions for building boot floppies, boot disks, or IACSFL boot ROMs.

Uninstalling Tornado 2.2

If you uninstall Tornado 2.2 from a Windows host, and you were previously using another version of Tornado 2.x with the registry running as a service, the old registry service will not be automatically restored.

3. License Management

Tornado 2.2 is license managed. You will need a valid license to use the host tools, thus you will encounter License Management screens when installing the core CD.

License management software for Tornado 2.2 is Flexlm 8.0 (0d) from Globetrotter. This package offers a full complement of tools for administering license management, including online documentation that is available on the Web at <http://www.globetrotter.com/>.

Automated License Process

Tornado 2.2 licenses are available using an automated, Web-based process. Details of this process for both system administrators and end users are available in the *Tornado Getting Started Guide: Installing Tornado*. Instructions for obtaining licenses for those who are behind a firewall that does not allow Web access are also there.

General Information

License management in Tornado 2.2 is configured at setup/installation time and can be purchased and set-up as either Floating or Node-locked:

- **Node-locked.** Means that you obtain a license file which is tied to your computer, usually by ethernet card MAC address; if you use a laptop with multiple Ethernet cards, you should specify that **Setup** use your laptop's **DiskId** instead.

Your use of the tools will depend upon a license file installed on your computer

- **Floating.** Means that you wish to obtain a license from a license server on an as-needed basis.

This requires that a license server be set up somewhere on your local network, to log when you are using Tornado 2.2; use the "License Management Server Installation" option in the Installation Options page of **Setup** to set up a FlexLM license server for your network. This step is usually done by your system administrator.

If you participated in the Tornado 2.2 Beta program, the license you used for that installation does not work for the release version. Contact your sales representative if you need to obtain new Tornado 2.2 licenses.

What Does License Management Control?

The license management controls access to:

- Tornado Target Server
- Windows IDE
- Diab compiler
- SNIFF+ and SNIFF+ Pro
- SingleStep for Tornado (PowerPC)
- all tools that connect through the WTX API, meaning the browser, Tornado debugger, windsh, WindView, and so on.

Getting Help With License Management

If you encounter license management problems, they may be resolved by going to

<http://www.windriver.com/windsurf/LMSupport>

or the Tornado 2.2 Support Web page at:

<http://www.windriver.com/corporate/support/prodbullet/T2.2/>

4. Changes from Tornado 2.x to Tornado 2.2

This section gives an overview of changes from Tornado 2.x to Tornado 2.2. Details on many of these issues can be found in the *Tornado Migration Guide*.

Compiler Changes

Support for the Diab 5.x compiler has been added for many architectures. The GNU compiler has been updated for all architectures, except ColdFire, on which it is no longer supported.

In addition, all target architectures now use the ELF/DWARF2 object module format, with the exception of MC68K/CPU32 and the simulators. For more information, see 4.1 *Target Architectures and Compilers*, p.15.

Documentation Changes

The contents of all Tornado 2.2 manuals have been revised. Also, the makeup of the collection of books has changed as follows:

- Architecture-specific information is no longer included as an appendix in the *VxWorks Programmer's Guide*. For information on your target architecture, please see the appropriate *VxWorks Architecture Supplement*. For information on the VxWorks simulator, VxSim, see the *Tornado User's Guide: VxSim*.
- The *VxWorks BSP Developer's Guide* (formerly called the *Tornado BSP Developer's Kit for VxWorks User's Guide*) is now included as part of the standard documentation set. This manual is available in printed form from the Wind River bookstore.
- The new *Tornado Migration Guide* addresses the process of migrating from previous versions of Tornado and VxWorks to Tornado 2.2 and VxWorks 5.5.

Miscellaneous Changes

- Unified TCP/IP networking stack: all Tornado architectures in Tornado 2.2 share the identical networking stack from Wind River Networks.

4.1 Target Architectures and Compilers

In addition to upgrading the GNU compiler to gcc 2.96+, Tornado 2.2 will also support Wind Rivers Diab 5.x compiler on many architectures. A breakdown of compiler support and OMFs by architecture is provided in Table 3:

Table 3 **Compiler Support and OMFs by Architecture**

Architecture	OMF	GNU	Diab
PowerPC	ELF/DWARF2 (was ELF/Stabs)	2.96+	5.x
Pentium	ELF/DWARF2 (was a.out/Stabs)	2.96+	N/A
ARM	ELF/DWARF2 (was COFF/Stabs)	2.96+	5.x
XScale/StrongARM	ELF/DWARF2 (was COFF/Stabs)	2.96+	5.x
MIPS	ELF/DWARF2 (was ELF/Stabs)	2.96+	5.x
Hitachi SuperH	ELF/DWARF2 (unchanged)	2.96+	5.x
ColdFire	ELF/DWARF2 (unchanged)	N/A	5.x

Table 3 **Compiler Support and OMFs by Architecture**

Architecture	OMF	GNU	Diab
MC68K / CPU32	a.out/Stabs (unchanged)	2.96+	N/A
VxSim Solaris	ELF/Stabs (unchanged)	2.96+	N/A
VxSim Windows	pe-coff/Stabs (unchanged)	2.96+	N/A

C Code

Full object-code-level interoperability exists for C code built with either GNU or Diab. This means that GNU and Diab object files (binaries) in C are compatible and can be mixed freely. However, C code that includes GNU-style assembly macros may have to be modified to work with both compilers. See the *VxWorks BSP Developer's Guide: Writing Portable C Code*.

C Libraries and Documentation

When the Diab compiler is used with Tornado and VxWorks, the ANSI C library is provided by VxWorks components. The documentation is provided in the *VxWorks OS Libraries API Reference*. There is ANSI C library information in the Diab Compiler Manuals which does not apply in a Tornado/VxWorks environment.

C++ Support

Source code from earlier releases may not compile immediately with either GNU or Diab in Tornado 2.2, as these updated compilers support a more recent version of the ANSI C++ specification.

The C++ runtime support for each compiler is different and mutually exclusive. Cross-linking of Diab and GNU C++ modules is not supported. This means that only one C++ runtime support can be present in an image at a time; thus any application written in C++ must be built with a single compiler (GNU or Diab) for all C++ modules to be used together in a running image.

C++ Libraries and Documentation

The GNU C++ libraries are lightly documented; only the **IOstreams** are documented. This information is in HTML files installed in your Tornado 2.2 tree. The Diab C++ libraries are provided by Dinkumware, Ltd, and are documented at <http://www.dinkumware.com/refxcpp.html>.

4.2 Archive Splitting

Tornado 2.2 uses a new archive arrangement that includes archives only, not individual **.o** files. Archives are grouped into a hierarchical directory structure to allow more precise updating and upgrading of selected pieces of runtime functionality. Backwards compatibility for the previous mechanism (shipping **.o** files) is still supported. For more information, see the *Tornado Migration Guide*.

4.3 BSP Changes

Tornado 2.2 introduces a large number of updated and new BSPs.

The structure of the supplied BSPs is changed. The typical BSP now includes a BSP directory and two project directories (one for each compiler, if available). Each project directory typically has four build rule subdirectories.

Also, BSPs are decoupled from the Tornado/VxWorks CDs. BSPs are available on a separate BSP CD and are downloadable from the Wind Surf site. Wind River intends to update the BSP CD regularly.

In some cases, custom BSPs from earlier 2.x releases may have to be modified to support both compilers. For instance, the Diab compiler performs tighter ANSI C/C++ type-checking. Also, BSP code that uses GNU-specific assembly macros may have to be modified so it can work with both Diab and GNU compilers. For more information, see the *Tornado Migration Guide: Migrating BSPs*.

4.4 Host Interfaces

- The WTX API is unchanged; functionally, it now checks for a valid license on the host.
- Tcl APIs to the IDE are unchanged.

4.5 API Changes

For details about API changes, see the *Tornado Migration Guide* mentioned in *1.3 Documentation*, p.6.

4.6 Products and Support NOT Included in Tornado 2.2

The following hosts are no longer supported:

- HP-UX
- Windows 95/98
- Solaris 2.5.1, 2.6

The following target architectures are no longer supported:

- SPARC
- i960

In addition, a number of BSPs and processor families have been discontinued.

Drivers and Routines

The following drivers are deprecated in this release:

- **pciLocalBus** and **pcilomapLib** (use **pciConfigLib**)
- **ideDrv** (use **ataDrv**)
- **dec21x4x** (use **dec21x40End**)
- **rt11FS**
- **taskInit()** (use **taskCreate()**)

The loader and module management API present in earlier 5.x releases is also deprecated.

Packaging

The following packaging changes have been made:

- Simulators-only CD is dropped - the full simulator is now directly available on all Arch CDs instead. It can be added to any installation at any time (as an optional product).
- BSPs are no longer included on the Tornado/VxWorks CDs; they are packed on a separate BSPs and Drivers CD and may also be downloaded from the Web and installed individually.
- CodeTEST Coverage and Memory, HTTP, OSPF, SNMP, and STREAMS are no longer delivered as part of the Core CD set
- WindNavigator and Look! have been discontinued.
- The RT-11 file system is included but is no longer being supported.
- Wind Foundation Classes (WFCs) are no longer an individually selectable part of the Core CD, but rather, is a subcomponent of Tornado Tools, accessible from the Details button. They are now considered unsupported. Rogue Wave **tools.h++** components are discontinued.

5. Migration

Please see the *Tornado Migration Guide* for information on migrating existing VxWorks code (custom projects, BSPs, and so on) from Tornado 2.0 and 2.1 to Tornado 2.2. The guide is available from:

<http://www.windriver.com/corporate/support/prodbullet/T2.2/>

Many pSOSystem customers migrating to Tornado/VxWorks want to continue using the Diab compiler. Thus, support of the Diab compiler on many major architectures is available to help pSOSystem users migrate their applications more easily to VxWorks 5.5. In addition, Tornado 2.2 includes a VxWorks events feature similar to pSOS-type events. A pSOS system migration kit, pSOSystem Conversion Kit (pCK), is also available. See your sales representative.

6. Known Problems

A full and up-to-date list of known problems, some with workarounds, is available via the Tornado 2.2 support Web site:

<http://www.windriver.com/corporate/support/prodbullet/T2.2/>

Patches will also be posted to, and downloadable from, WindSurf pages as they become available.

7. Customer Services

Wind River is committed to meeting the needs of its customers. As part of that commitment, Wind River provides a variety of services, including training courses and contact with customer support engineers, along with a Web site containing the latest advisories, FAQ lists, known problems lists, and other valuable information resources.

Customer Support

For customers holding a maintenance contract, Wind River offers direct contact with a staff of engineers experienced in Wind River products. A full description of the Customer Support program is available in the *Customer Support User's Guide* available at the following Web site:

<http://www.windriver.com/support>

The *Customer Support User's Guide* describes the services that Customer Support can provide, including assistance with installation problems, product software, documentation, and service errors.

You can reach Customer Support using either of the following methods:

- **E-mail.** You can contact Wind River Customer Support by sending e-mail to support@windriver.com.
- **1-800-872-4977 (1-800-USA-4WRS)** . Within North America, you can contact Customer Support with a toll-free voice telephone call. For telephone access outside North America, see the Support Web site shown above.

For Customer Support contact information specific to your products, please visit the Support Web site.

WindSurf

Wind River Customer Services also provides WindSurf, an online support service available under the Support Web site. WindSurf offers basic services to all Wind River customers, including advisories, publications such as the *Customer Support User's Guide*, and a list of training courses and schedules. For maintenance contract holders, WindSurf also provides access to additional services, including known problems lists, available patches, answers to frequently asked questions, and demo code.

8. Source Code CD

This section provides information about the source code CD for VxWorks 5.5. It describes where to find installation instructions, it lists the files that are not included on the source code CD, it describes the steps required for rebuilding VxWorks from the source code, and it provides notice of certain limitations of the VxWorks source code product.

8.1 Installing VxWorks Source

For information on installation, please see the *Tornado Getting Started Guide*.



NOTE: The VxWorks 5.5 source product should be installed on top of the Tornado tree.

8.2 File Information

The source code CD does not include all the files found in the standard VxWorks 5.5 delivery. Some source files have been acquired by Wind River and cannot be resold in source code format. Table 4 lists, for each architecture, the files not provided on the source code CD.

Table 4 Files Not Provided on Source Code CD

Platform	Files		
ARM	acos.o	mathSoftLib.o	_x_ads_dsqrt.o
StrongArm	acosh.o	modf.o	_x_ads_dunder.o
XScale	armFpLib.o	pow.o	_x_ads_except.o
	asin.o	rem_pio2.o	_x_ads_f2d.o
	asinh.o	scalbn.o	_x_ads_faddsub.o
	atan.o	sin.o	_x_ads_fcheck.o
	atan2.o	sinh.o	_x_ads_fcmp.o
	atanh.o	sqrt.o	_x_ads_fdiv.o
	ceil.o	tan.o	_x_ads_feqf.o
	copysign.o	tanh.o	_x_ads_ffix.o
	cos.o	_x_ads_basic.o	_x_ads_ffixll.o
	cosh.o	_x_ads_d2f.o	_x_ads_ffixu.o
	exp.o	_x_ads_daddsub.o	_x_ads_ffixull.o
	expm1.o	_x_ads_dcheck.o	_x_ads_fflt.o
	fabs.o	_x_ads_dcmp.o	_x_ads_ffltll.o
	finite.o	_x_ads_dcmpin.o	_x_ads_fgeqf.o
	floor.o	_x_ads_ddiv.o	_x_ads_fleqf.o
	fmod.o	_x_ads_deqf.o	_x_ads_fmull.o
	frexp.o	_x_ads_dfix.o	_x_ads_fnorm2.o
	ilogb.o	_x_ads_dfixll.o	_x_ads_fpconst.o
	k_cos.o	_x_ads_dfixu.o	_x_ads_fpinit.o
	k_poly.o	_x_ads_dfixull.o	_x_ads_frem.o
	k_rem_pio2.o	_x_ads_dflt.o	_x_ads_frnd.o
	k_sin.o	_x_ads_dfltll.o	_x_ads_fsqrt.o
	k_tan.o	_x_ads_dgeqf.o	_x_ads_funder.o
	log.o	_x_ads_dleqf.o	_x_ads_istatus.o
	log10.o	_x_ads_dmul_mull.o	_x_ads_retnan.o
	log1p.o	_x_ads_drem.o	_x_ads_status.o
	logb.o	_x_ads_drnd.o	_x_ads_trapv.o
ColdFire	None		
MC68K	None		
MIPS	None		
Pentium	None		
PPC60x	mathHardLib.o sqrt.o	pow.o	trig.o

Table 4 Files Not Provided on Source Code CD (Continued)

Platform	Files
PPC8xx	arc32.o ceil32.o dp32.o dpcmp.o exp32.o floor32.o fparc32.o fpceil32.o fp32.o fphyp32.o fpexp32.o fpcmp.o fpsqrt32.o fpmod32.o fpfloo32.o gccMathLib.o fptrig32.o fppow32.o mod32.o hyp32.o func32.o trig32.o pow32.o log32.o mathSoftLib.o sqrt32.o
SH	None



NOTE: `aic7880Lib.c` cannot be rebuilt for the Pentium architecture. The build of this file should be disabled in `installDir/target/src/drc/scsi/Makefile` by removing the following lines:

```

OBJJS_PENTIUM = aic7880Lib.o
OBJJS_PENTIUM2 = aic7880Lib.o
OBJJS_PENTIUM3 = aic7880Lib.o

```

8.3 Building VxWorks Source

The build of the VxWorks 5.5 source tree is performed in three steps, described in detail below. The first step is to back up the already-installed archives and object directories, which prevents overwriting the files installed from the original CD. The second step is to build the source tree. The final step is to restore the original library and object directory.



NOTE: The source code can only be compiled on a Solaris 2.7 system.

Step 1: Back Up ODL Archives and Object Directories

Go to the library subdirectory of the target directory. For example:

```
% cd installDir/target/lib
```

Make a copy of the VxWorks 5.5 archive directory for the architecture you want to rebuild by renaming it. For example:

```
% mv ppc ppcOrig
```

Step 2: Build the Source Tree

Set your environment to access the Tornado compiler by sourcing *installDir/host/sun4_solaris2/bin/torVars.sh* or *torVars.csh* (UNIX).

Go to the target source directory. For example:

```
% cd installDir/target/src
```

Start the build by invoking the **make** command with the following syntax:

```
% make CPU=cpuName TOOL=compilerName
```

For example:

```
% make CPU=PPC603 TOOL=gnu
```

The source tree build system has been set up and tested to compile the whole source tree with a primary compiler only. Table 5 lists the primary compiler used for each architecture supported by VxWorks 5.5. The secondary compiler is provided for the application level only, but some runtime support is required. Therefore, the source tree build system will build only the directory necessary to support the secondary compiler. Building the source tree with the secondary compiler will not compile the whole source tree, only a subset.

Table 5 lists both the primary and secondary compilers by architecture.

Table 5 Primary and Secondary Compilers by Architecture

CPU	Primary Compiler	Secondary Compiler
ARMARCH4_T	diab	gnu
ARMARCH4_T	diabbe	gnube
ARMARCH4	diab	gnu
ARMARCH4	diabbe	gnube
ARMARCH5_T	diab	gnu
ARMARCH5_T	diabbe	gnube
ARMARCH5	diab	gnu
ARMARCH5	diabbe	gnube
CPU32	gnu	N/A
MC68000	gnu	N/A

Table 5 **Primary and Secondary Compilers by Architecture**

CPU	Primary Compiler	Secondary Compiler
MC68010	gnu	N/A
MC68020	gnu	N/A
MC68040	gnu	N/A
MC68060	gnu	N/A
MC68LC040	gnu	N/A
MCF5200	diab	N/A
MCF5400	diab	N/A
MIPS32	sfdiab	sfgnu
MIPS32	sfdiable	sfgnule
MIPS64	diab	gnu
MIPS64	diable	gnule
PENTIUM	gnu	N/A
PENTIUM2	gnu	N/A
PENTIUM3	gnu	N/A
PENTIUM4	gnu	N/A
PPC403	gnu	diab
PPC405	gnu	diab
PPC440	gnu	diab
PPC603	gnu	diab
PPC604	gnu	diab
PPC860	gnu	diab
SH7600	gnu	diab
SH7700	gnu	diab
SH7700	gnule	diable

Table 5 **Primary and Secondary Compilers by Architecture**

CPU	Primary Compiler	Secondary Compiler
SH7750	gnu	diab
SH7750	gnule	diable
STRONGARM	diab	gnu
STRONGARM	diabbe	gnube
XSCALE	diab	gnu
XSCALE	diabbe	gnube

Step 3: Restore the Original Archives and Object Directories

Change directory to the library subdirectory of the target directory. For example:

```
% cd installDir/target/lib
```

Move the recompiled version of the VxWorks 5.5 archive directory by renaming it, and then restore the original archive directory. For example:

```
% mv ppc ppcRef  
% mv ppcOrig ppc
```

All the newly recompiled files are now located in *installDir*/**target**/**lib**/*archRef* directories.

8.4 Source Code Limitations

Please note the following limitations on the VxWorks source code product:

- The source code product, when compiled, may not match the VxWorks object code product.
- There may be certain portions of the VxWorks object code product for which source code has not been provided (see, for example, 8.2 *File Information*, p.21).
- The source code product may not compile on all host system platforms.
- Modifications to the source code product (when permitted) may not be covered by Wind River customer support.

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