

VxWorks 5.5/Tornado™ BSP Rel. 3.x for PPMC-280 Installation Guide

P/N 221087 Revision AC November 2003

Copyright

The information in this publication is subject to change without notice. Force Computers reserves the right to make changes without notice to this, or any of its products, to improve reliability, performance, or design.

Force Computers shall not be liable for technical or editorial errors or omissions contained herein, nor for indirect, special, incidental, or consequential damages resulting from the furnishing, performance, or use of this material. This information is provided "as is" and Force Computers expressly disclaims any and all warranties, express, implied, statutory, or otherwise, including without limitation, any express, statutory, or implied warranty of merchantability, fitness for a particular purpose, or non-infringement.

This publication contains information protected by copyright. This publication shall not be reproduced, transmitted, or stored in a retrieval system, nor its contents used for any purpose, without the prior written consent of Force Computers.

Force Computers assumes no responsibility for the use of any circuitry other than circuitry that is part of a product of Force Computers. Force Computers does not convey to the purchaser of the product described herein any license under the patent rights of Force Computers nor the rights of others.

Copyright© 2003 by Force Computers. All rights reserved.

The Force logo is a trademark of Force Computers.

IEEE is a registered trademark of the Institute for Electrical and Electronics Engineers, Inc.

PICMG, CompactPCI, and the CompactPCI logo are registered trademarks and the PICMG logo is a trademark of the PCI Industrial Computer Manufacturer's Group.

MS-DOS, Windows95, Windows98, Windows2000 and Windows NT are registered trademarks and the logos are a trademark of the Microsoft Corporation.

Intel and Pentium are registered trademarks and the Intel logo is a trademark of the Intel Corporation.

PowerPC is a registered trademark and the PowerPC logo is a trademark of International Business Machines Corporation. Solaris $^{\mathrm{TM}}$ is a registered trademark and the logo is a trademark of Sun Microsystems, Inc.

VxWorks, Wind River Systems, Tornado, and the Wind River Systems logo are registered trademarks of Wind River Systems, Inc.

Other product names mentioned herein may be trademarks and/or registered trademarks of their respective companies.



World Wide Web: www.forcecomputers.com

24-hour access to on-line manuals, driver updates, and application notes is provided via SMART, our SolutionsPLUS customer support program that provides current technical and services information.

Headquarters

The Americas

Corporate Headquarters/CA

Force Computers 4211 Starboard Drive Fremont, CA 94538

Tel.: +1 510 624-8274 Fax: +1 510 445-6007 Email: support@fci.com

Europe

Force Computers GmbH

Lilienthalstr. 15 D-85579 Neubiberg/München Germany

Tel.: +49 (89) 608 14-0 Fax: +49 (89) 609 77 93 Email: support-de@fci.com

Asia

Force Computers Japan KK

Shibadaimon MF Building 4F 2-1-16 Shiba Daimon Minato-ku, Tokyo 105-0012 Japan

Tel.: +81 (03) 3437 6221 Fax: +81 (03) 3437 6223 Email: support-de@fci.com

Contents

Using This Guide

Documentation

1 Installation

Introduction	1-3
Supported Features	. 1-3
Delivered BSP Configuration	. 1-4
Installing the BSP	1-5
Installation Procedure for Solaris and Windows NT	. 1-5
Building the Binary	1-7
Specifying Defines	. 1-7
Defines Common to Single and Dual CPU Builds	. 1-7
Additional Defines Specific to Dual CPU Build	. 1-9

Product Error Report

Using This Guide

This Installation Guide is intended for users qualified in software engineering. Users must also have a working understanding of electronics, VxWorks/Tornado, and of the board supported by the BSP.

This guide is to be referenced for VxWorks 5.5/Tornado™ 2.2 BSP Rel. 3.x for PMC-280.

Related Documents

For further information, refer to the VxWorks/TornadoTM BSP Rel. 3.x for PPMC-280 Programmer's Guide (Order Number 221088 410 000).

Style Conventions

Notation	Description
	All numbers are decimal numbers except when used with the following notations:
00000000 ₁₆	Typical notation for hexadecimal numbers (digits are 0 through F), e.g. used for addresses and offsets
Bold	Character format used to emphasize a word
Courier	Character format used for on-screen output
Courier+Bold	Character format used to characterize user input and to separate it from system output
<text></text>	Typical notation for words that represent a part of a command, a programming statement, or the like, and that will be replaced by an applicable value when actually applied.
Italics	Character format for references and for table and figure descriptions.
Note:	No danger encountered. Pay attention to important information marked using this layout
Caution	Possibly dangerous situation: slight injuries to people or damage to objects possible

Revision History

Order Number	Revision	Date	Description
221087 410 000	AA	May 2003	Release 1.0 Release for Tornado 1.0.1
221087 410 000	AB	July 2003	Release 2.0 Release for Tornado 2.2
221087 410 000	AC	November 2003	Rel. 3.x Release for Tornado 2.2

Documentation

Information on booting VxWorks, on BSP configuration, features supported by the BSP is provided by the VxWorks 5.5/Tornado™ 2.2 BSP Rel. 3.x for PMC-280 Programmer's Guide (Order Number 221088 410 000) delivered with the BSP.



1

Installation

Installation Introduction

Introduction

This document describes the installation of TornadoTM (VxWorks) Board Support Package (BSP) Rel. 3.x for the Force Computers PPMC-280. The steps for setting up a project are also detailed in this chapter.

Note:

- This VxWorks 5.5/Tornado™ 2.2 BSP Rel. 3.x for PMC-280 must be used only with Tornado 2.2. Force Computers does not guarantee the compatibility of this BSP with any other Tornado versions.
- This VxWorks 5.5/Tornado™ 2.2 BSP Rel. 3.x for PMC-280 is not supported by Wind River Systems. Any problem should be directly reported to Force Computers technical support.

Supported Features

VxWorks 5.5/Tornado™ 2.2 BSP Rel. 3.x for PMC-280 supports the following features of PPMC-280:

- Dual Motorola PowerPC[™] 7447 processors
- Marvell MV64360 System Controller
- Support of up to 512 MB of total SDRAM.
- ATMEL and AT24C64A Serial EEPROM on I2C
- MAX6900 RTC support on the I²C bus
- PCI boot
- · PCI Bus access
- Two serial ports- one for each CPU
- Two Ethernet ports
- BIB
- RTC
- Intel strata flash 28F128J3 and 28F128K3.

Introduction Installation

Delivered BSP Configuration

The default BSP configuration is as stated below. It is possible to adapt most of these configuration items by changing the defines in the file config.h and pmc280.h in the BSP directory.

- Support for 128 MB, 256 MB, 512 MB and 1 GB of memory.
- The upper 16 MB range of the total available memory is reserved as User Reserved Memory in the Dual CPU BSP.
- Cache is configured in copy-back mode.
- Window to access PCI Bus Number 0 is opened.
- The sysclk is defined in pmc280.h (set by default to 133 Mhz)

For information on how to adapt the configuration, refer to the "VxWorks /TornadoTM BSP Rel. 3.x for PPMC-280 Programmer's Guide" (Order Number 221088 410 000).

Installation Installing the BSP

Installing the BSP

The default packaging of the BSP is a compressed tar file or zip file. You can download the zip file or tar file from the Force Computers SMARTTM page at *http://splus.forcecomputers.com/cgi-bin/user/account/services*.

The BSP Rel. 3.1 has been built under Tornado™ on Windows and Sun Solaris ™ host machines. The tar file has the following directory:

• **PMC280**: this is the main target BSP directory

Installation Procedure for Solaris and Windows NT

To install the BSP, use the compressed tar file.

The following procedure explains how to install a BSP contained in a file named, for example, bspFile.tar:

1. Uncompress the tar file to a temporary directory. For example, to uncompress the tar file to a temporary directory in a Solaris environment, use the following command.

```
tar -xvf <bspFile>.tar.
```

2. Copy the PMC280 directory to \$ (WIND_BASE) /target/config where WIND BASE is the directory where Tornado is installed.

Setup.log file

The Tornado configuration setup.log file which is automatically generated while installing the tools is shown below for reference.

```
07-Mar-03.13:53SETUP detected the following warning, and
installation was continued:
"WARNING: SETUP has detected that this machine is running on Solaris
2.5.x. Tornado does not officially support Solaris 2.5.x and Solaris
2.6."
07-Mar-03.14:00CD manufacturing time: Thu Oct 03 16:55:33 PDT 2002
07-Mar-03.14:00TDK-14620-ZC-01SETUP-2.2/home3/champ/tor2_2Ppc
07-Mar-03.14:00Tornado 2.2/VxWorks 5.5 for PowerPC
07-Mar-03.14:00SunOS surya 5.5.1 Generic_103640-20 sun4m sparc
SUNW, SPARCstation-5
07-Mar-03.14:00100-22651-30Back End Developer's Toolkit
07-Mar-03.14:00100-22700-30Compiler - GNU: solaris x ppc
07-Mar-03.14:01100-22566-30Tornado Setup SDK
07-Mar-03.14:02100-22531-30Tornado Tools: solaris x ppc
07-Mar-03.14:35100-23549-30VxWorks: ppc40x
07-Mar-03.14:37100-23550-30VxWorks: ppc44x
```

Installing the BSP Installation

```
07-Mar-03.14:37100-22535-30VxWorks: ppc6xx
07-Mar-03.14:38100-22537-30VxWorks: ppc74xx
07-Mar-03.14:39100-22536-30VxWorks: ppc7xx
07-Mar-03.14:40100-22539-30VxWorks: ppc82xx
07-Mar-03.14:40100-22538-30VxWorks: ppc8xx
07-Mar-03.14:41100-22533-30WindView: solaris x ppc
07-Mar-03.14:42
07-Mar-03.14:42licensed product: tornado 310
07-Mar-03.14:42licensed product: windview 320
07-Mar-03.14:42
```

Installation Building the Binary

Building the Binary

Follow the steps listed below to build the binary.

- 1. Follow installation procedure for the corresponding host OS.
- 2. Specify the defines in the makefile as per the details given.
- 3. Compile source code to obtain the binary.

Specifying Defines

The Source code can be built for a single or a dual CPU board. To build the source code for a single or a dual CPU board, change the defines in the makefile which correspond to the build required. The defines may be any one of the following:

- · Common to single and dual CPU builds
- · Specific to dual CPU build

Caution



- Do not turn off a define unless you are certain.
- To build for a Single CPU, refer to details in "Defines Common to Single and Dual CPU Builds" only.
- To build for a Dual CPU, refer to details in Defines Common to Single and Dual CPU Builds as well as "Additional Defines Specific to Dual CPU Build" page 1-9

Defines Common to Single and Dual CPU Builds

Defines common to Single and Dual CPU builds are mandatory and optional.

Mandatory Defines for Single and Dual CPU Builds

Enable or disable the following as detailed.

Mandatory Defines to be Enabled for Dual CPU Builds Enable the following defines:

• CONFIG_PMC280

CONFIG_PMC280

To include all the 280 specific source.

Building the Binary Installation

Mandatory Defines
to be Disabled for
Single and Dual
CPŬ Builds

Disable the following:

PMC280_ECC_TEST

PMC280_ECC TEST

This is for internal use.

Optional/debug Defines for Single and Dual CPU Builds

PMC280_DEBUG _UART This will enable initialization of MPSC[0] for debug prints as well as print debug info (only bootrom prints). Use this to find out all modules being initialized when debugging. These are debug prints from romInit.s and bootInit.c

PMC280_DEBUG _UART_VX This will print messages during the initialization in VxWorks. These are debug prints from sysALib.s, sysLib.c, usrConfig.c, etc. These are prints from VxWorks image and not boot ROM.

PMC280_DEBUG DRAM Print SDRAM controller registers for debugging.

PMC280_PCI_BOOT

This is necessary if the VxWorks image built has to boot-up across the PCI.

PMC280_USERFLA SH BOOT This is necessary if the VxWorks image built has to be userflash bootable.

PMC280_BOOTRO M_BOOT_WORKAR OUND

This is necessary if the VxWorks image built has to be bootflash bootable.

Note: When PMC280_PCI_BOOT is enabled,

PMC280_DUAL_CPU_AUTOBOOT should be enabled if you want to

boot both CPUs.

Installation Building the Binary

Additional Defines Specific to Dual CPU Build

This section details the defines that are specific to Dual CPU build. There are mandatory and optional/debug defines.

Mandatory Defines for Dual CPU Build

Enable following as detailed.

- PMC280 DUAL CPU
- PMC280_DUAL_CPU_MMU_SETUP
- PMC280_DUAL_CPU_PTE_SETUP

PMC280_DUAL _CPU Enable support for dual CPUs (MPC7447) in this BSP.

PMC280_DUAL _CPU_MMU_SETUP Compiles in the support for MMU outside of the VxWorks library. Used in usrConfig.c as well as src/arch/ppc/mmuPpcLib.c.

PMC280_DUAL _CPU_PTE_SETUP Compile in support for Page Table entries into Dual CPU BSP. Make sure you use this only when PMC280_DUAL_CPU is enabled.

PMC280_DUAL _CPU_AUTOBOOT Enabling this define will compile in support to boot the CPU1 (along with boot of CPU0) automatically. If this macro is turned off then the CPU1 will not boot. Thereafter, by no means the CPU1 can be booted.

Optional/Debug Defines for Dual CPU Build

PMC280_DUAL _CPU_DBG Enable prints of Block Address Translation (BAT) registers during boot-up on the dual CPU BSP.

Building the Binary Installation

Product Error Report

Product:	Serial No.:		
Date Of Purchase:	Originator:		
Company:	Point Of Contact:		
Tel.:	Ext.:		
Address:			
Present Date:			
Affected Product:	Affected Documentation:		
☐ Hardware ☐ Software ☐ Systems	☐ Hardware ☐ Software ☐ Systems		
Error Description:			
This Area to Be Completed by Force Computers:			
Date:			
PR#:			
Responsible Dept.: Marketing	□ Production		
Engineering	- □ Board □ Systems		

Send this report to the nearest Force Computers headquarter listed on the address page.