A SOLECTRON COMPANY

VxWorks 5.5/Tornado™

BSP Rel. 3.x

for PPMC-280

Installation Guide

P / N 221087 Revision AC
November 2003

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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.

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221087 410 000 AC

Contents

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 / Tornado™ 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>	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

Introduction

This document describes the installation of Tornado™ (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 I^2C bus
- PCI boot
- PCI Bus access
- Two serial ports- one for each CPU
- Two Ethernet ports
- BIB
- RTC
- Intel strata flash 28F128J3 and 28F128K3.

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 /Tornado™ BSP Rel. 3.x for PPMC-280 Programmer’s Guide” (Order Number 221088 410 000).

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 SMART™ 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
```

```
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
```

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.

Mandatory Defines to be Disabled for Single and Dual CPU 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_USERFLASH_BOOT	This is necessary if the VxWorks image built has to be userflash bootable.
PMC280_BOOTROM_BOOT_WORKAROUND	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.

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.

Product Error Report

Product:	Serial No.:
Date Of Purchase:	Originator:
Company:	Point Of Contact:
Tel.:	Ext.:
Address:	
Present Date:	
Affected Product: ❑ Hardware ❑ Software ❑ Systems	Affected Documentation: ❑ 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.