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PMC-700-X00
Graphics Controller
User's Manual

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Revision History

Rev	By	Date	Description
1	BJ	July 2000	First release
2	BJ	December 2000	Corrected Table 3.2 on page 3-8. Added P0 cable information. Added information on inserting PMC-700-X00 in PMC slot 1 of a basecard.

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Trademarks

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Preface

Purpose

This manual provides an overview of the PMC-700-X00 graphics controller. After explaining the capabilities of the PMC-700-X00, the manual provides the procedure for correctly installing it and checking its operation.

Audience

This document is aimed at readers with a technical understanding of hardware engineering fundamentals, as well as a basic understanding of the VMEbus and computer graphics hardware and software.

Scope

This manual contains the following chapters:

Chapter 1 - Product Overview. This chapter provides an overview of the features and functions of the PMC-700-X00.

Chapter 2 - Pre-Installation Tasks. This chapter discusses tasks that must be performed before installing the PMC-700-X00 in a system, including checking power requirements.

Chapter 3 - Hardware Installation on a PowerPC™ Single Board Computer. This chapter explains how to install the PMC-700-X00 and the PowerPC Single Board Computer (SBC) into a VME chassis and verify that it is operating correctly.

Chapter 4 - Hardware Installation on a Pentium™ Single Board Computer. This chapter explains how to install the PMC-700-X00 and the Intel-based Single Board Computer (SBC) into a VME chassis and verify that it is operating correctly.

Appendix A - Connector Pin Assignments. This appendix lists the interface connector pinouts for the PMC-700-X00 and for the SVME/DMV-179 with PMC-700-X00 attached and SVME/DMV-192 with PMC-700 attached.

Related Documents

For detailed information about the Single Board Computer on which your PMC-700-X00 is installed, refer to its Getting Started Manual and Hardware User's Manual.

Chapter 1 of the BSP Target Document for your basecard explains how to install the BSP on a PowerPC basecard.

For information on installing the PMC-700-X00 software, see Chapter 3 of the SeaWind X Window System User's Manual and Chapter 3 of the SeaWind X Window System Server User's Manual.

Conventions Used in this Manual

This document and the accompanying documents in the documentation package use various icon conventions and abbreviations to make the documents clearer and easier to read. These conventions cover typography for such elements as sample software code and keystrokes, signal meanings, and graphical elements for important information such as warnings or cautions.

Typographic Conventions

Table 1 lists the typographical conventions used in this documentation package.

Table 1: Typographical Conventions

Item	Convention	Example
Keystrokes	Keys are listed as they appear on most keyboards, surrounded by < > marks. Combinations of keystrokes appear within a single set of < > brackets.	Type < Ctrl-Alt-C > to return to the previous menu. Type < Esc > to exit.
File Names	File names are set in italics.	Open the file named *es.h*.
Directory Names	Directory names show the full directory path. The last directory in the path does not have a trailing slash following it.	Go to the *c:\windows\temp\backup* directory.
Monitor Displays	Prompts and other text appearing on monitors is set in bold monospace type.	**% mpp MC68040gnu >**
Firmware Code	Firmware code, and any informtion you need to type in response to a prompt, is set in monospace type.	`% make -f Makefile.MC68040gnu`

Signal Conventions

Table 2 lists symbols that can follow a signal name. For example, the asterisk (*) is used with a VMEbus signal name, such as BERR*.

Table 2: Signal Conventions

Symbol	Description
*	The signal is active LOW and is connected to the VMEbus.
/	The signal is active LOW and is connected to the local bus only, not directly to the VMEbus.
#	The signal is active LOW and is connected to the local bus only, not directly to the VMEbus.
[no symbol]	The signal is active HIGH, with no indication whether it is connected to the VMEbus or local bus.

Abbreviations

Table 3 lists the abbreviations used to describe the size of a memory device or a range of addresses.

Table 3: Abbreviations

Abbreviation	Convention
1 Kbyte	1,024 bytes
1 Mbyte	1,024 Kbytes
1 Gbyte	1,024 Mbytes

Memory Addresses

Unless otherwise stated, all memory addresses are shown in hexadecimal notation.

Icons

The following icons are used throughout the documentation package:

Warning

The warning icon indicates procedures in the manual that, if not carried out, or if carried out incorrectly, could cause physical injury, electrical damage to equipment, or a non-recoverable corruption of data. Warnings include instructions for preventing such damage. Please observe warning icons and read the accompanying text completely before carrying out the procedure.

Caution

The caution icon indicates non-catastrophic incidents, complex practices, or procedures which, if not observed, could result in damage to the hardware. Cautions include specific instructions for avoiding or minimizing these incidents.

Note

The note icon highlights exceptions and special information.

Tip

Tips provide extra information on the subject matter. This could include hints about how to use your current DY 4 card to its maximum potential.

Cross Reference

Cross references to other documents are used when a subject being discussed is addressed in depth by another, more authoritative document. Cross references are also used for document chapters and sections.

Reference Documentation

Please refer to the CD-ROM included in the documentation package for additional reference information, supplied in Portable Document Format (PDF) files readable by Adobe® Acrobat® Reader software. The Technical Documentation CD-ROM includes documents relating to the standard Foundation Firmware, a user's manual for the Universe PCI to VMEbus interface, and a helpful guide to the VMEbus, among other things.

You'll also find copies of the relevant schematics and cable assembly drawings there.

Note

The CD-ROM also provides a copy of the Adobe Acrobat Reader software, version 4.0, including the Acrobat Search plug-in, to enable you to get the most out of your CD-ROM by enabling full-text searches of the information.

Chapter 1
Product Overview

In this chapter...

This chapter provides you with a general overview of the PMC-700-X00 Graphics Controller, including the following:

- ❏ general description;
- ❏ summary of features;
- ❏ technical description;
- ❏ physical characteristics; and
- ❏ overview of available software.

General Description

The PMC-700-X00 Graphics Controller is based on the 3Dlabs Permedia3 graphics processor. The Permedia3 provides a virtual texture memory management unit, a 256 Mbyte virtual texture address space, a multi-texture unit (single-pass), an integrated 270 MHz RAMDAC, a high-speed 128-bit memory interface, seven DMA engines, a unified 2D/3D raster core, and an integrated SVGA controller.

The PMC-700-X00 has 64 Mbytes of SDRAM, giving 32 Mbytes of useable graphics memory. It is compatible with both the PowerPC/VxWorks and Pentium/WinNT platforms. Figure 1.1 illustrates the PMC-700-X00 architecture.

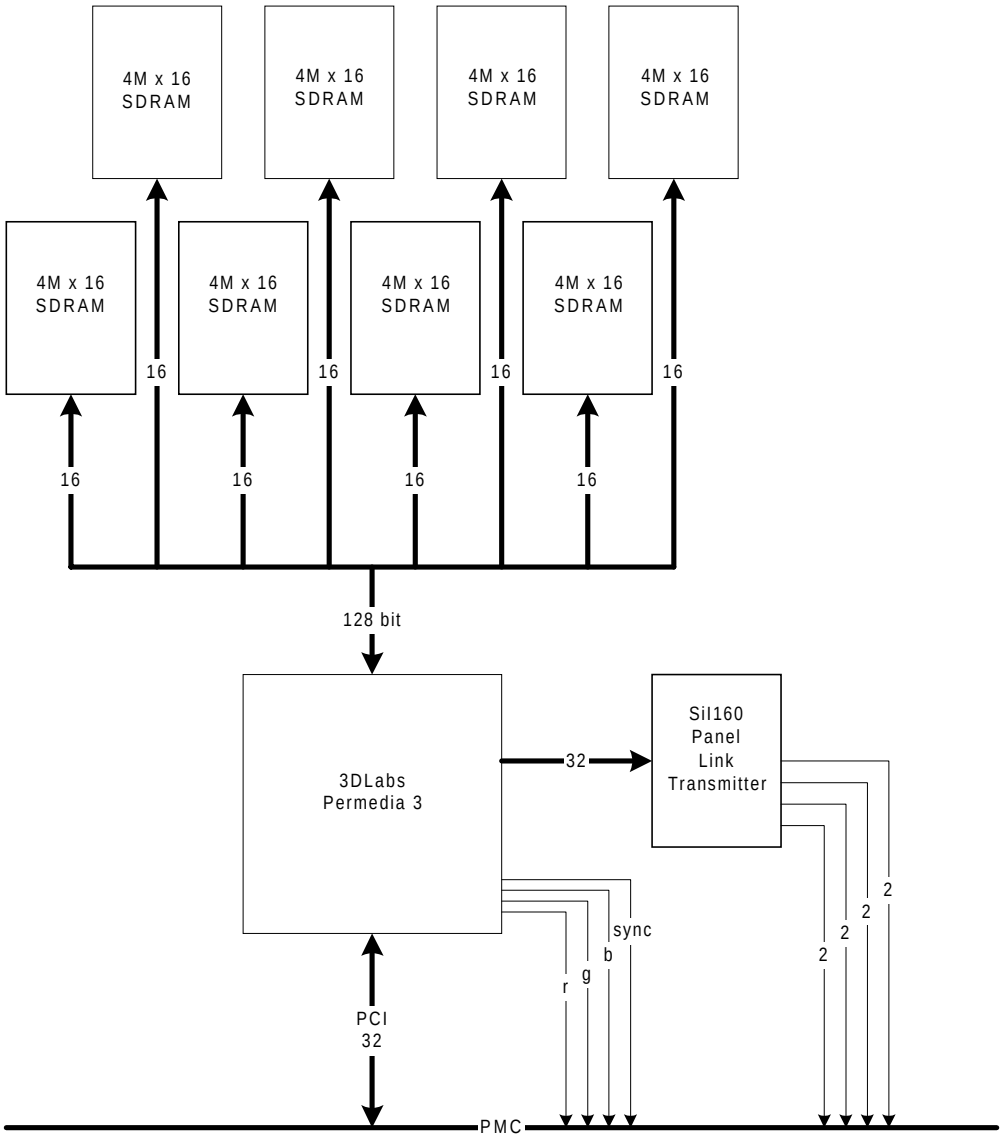


Figure 1.1 PMC-700-X00 Functional Block Diagram

Feature Summary

The PMC-700-X00 Graphics Controller supports the following features:

- ideal for harsh environment, military, and commercial applications;
- 33/66 MHz/32-bit standard PCI Mezzanine Card (PMC), compliant with IEEE P1386;
- TMDS (Transmission Minimized Differential Signalling) digital video interface, PanelLink-compatible output (four TMDS pairs, one clock signal, three data lines);
- maximum pixel clock rate of 270 MHz;
- 32 Mbytes useable SDRAM;
- one RGB output capable of providing non-interlaced signals up to 1600 x 1200 resolution at 24 bits;
- X11/OpenGL programming interface;
- hardware-accelerated X11 and OpenGL support;
- RGB pin-out compatibility with the SVME/DMV-783 when the PMC-700 is installed in PMC site 2 on a DY 4 PowerPC Single Board Computer; and
- digital video output bus utilizing PanelLink® transmitter, compatible with Digital Visual Interface (DVI) TMDS transmitter standard, supporting resolutions up to 1280 x 1024 at 60 Hz with 24-bit colour.

Technical Description

Clock Circuitry

Clock reference circuitry on the PMC-700-X00 generates a 14.318 MHz clock to drive the Permedia3.

Permedia3

The Permedia3 is a high performance graphics processor designed to accelerate 3D and 2D applications. It provides 3D polygon and textured graphics acceleration. It has a fast integrated SVGA core and integrated RAMDAC. It includes hardware support for OpenGL.

Reset

The Permedia3 resets when the basecard asserts the PCI_RST* signal. The reset status of the Permedia3 is controlled through the use of configuration resistors. After reset, the Permedia3 is in the following state:

- internal VGA subsystem is present;
- VGA Fixed address decoding is enabled;
- PCI Retry using “Disconnected Without Data” is disabled;
- the upper half of region Zero is write-combined;
- Base Address Registers 1 and 2 (representing relocatable address spaces Memory Aperture One and Two respectively) are marked as prefetchable.

PCI Bus Interface

The Permedia3 implements the PCI bus interface and is compliant with the PCI Local Bus standard Revision 2.1. Protection diodes protect the Permedia3 device from signal overshoot.

Data Path

The data path into and out of the PMC-700-X00 supports 8, 16, and 32-bit data transfers. That is, as a slave, the PMC-700-X00 provides D32, D16, and D8 interfaces.

PCI Bus Interrupts

A single PCI bus interrupt is generated as part of the Permedia3 PCI bus implementation. The interrupt level and vector are programmable by the basecard CPU. The interrupt is initialized and serviced by the X Server software.

PCI Bus Arbitration

The Permedia3 acts as a PCI Local Bus Target, a PCI Local Bus Read Master, and a PCI Local Bus Write Master. All PCI bus arbitration is resolved as per 3DLabs’ implementation of the PCI specification.

PCI Address Decoding

The PMC-700's PCI interface has seven base address regions as shown in Table 1.1. For a complete address map refer to the Permedia3 Reference Guide.

Table 1.1: PCI Address Regions

Region	Address Space	Description	Size
Config	Configuration	PCI Configuration	256 bytes
Zero	Memory	Control Registers	128 Kbytes
One	Memory	Memory Aperture One	64 Mbytes
Two	Memory	Memory Aperture Two	64 Mbytes
Three	I/O	Indirect Access I/O	16 bytes
ROM	Memory	Expansion ROM	64 Kbytes
VGA	Memory & I/O	VGA Access	---

Note

When the address range allocated for memory exceeds the memory size, the contents of memory are imaged throughout the allocated address range.

Local Registers

All registers on the PMC-700-X00 are part of the Permedia3 device and are described in the 3DLabs Permedia3 Reference Guide available from 3DLabs.

Memory

SDRAM

The PMC-700-X00 is equipped with 64 Mbytes (eight 64 Mbit devices) of SDRAM. 32 Mbytes of this is accessible through the Permedia3 to support 3D operations. The SDRAM is byte, word, and long word accessible. The SDRAM supports single and burst cycles from the basecard CPU.

The SDRAM is used to store colour, depth, stencil, and texture data.

Input/Output

DVI Output

The PMC-700-X00 provides one DVI-compatible output (four TMDS pairs, one clock, and three data) to be used to interface to a DVI-compliant display device.

VGA Output

The PMC-700-X00 provides one VGA output to be used to interface to a VGA-compliant display device.

Physical Characteristics

Figures 1.2 and 1.3 show the location of the major components and the mating connectors on the PMC-700-X00.

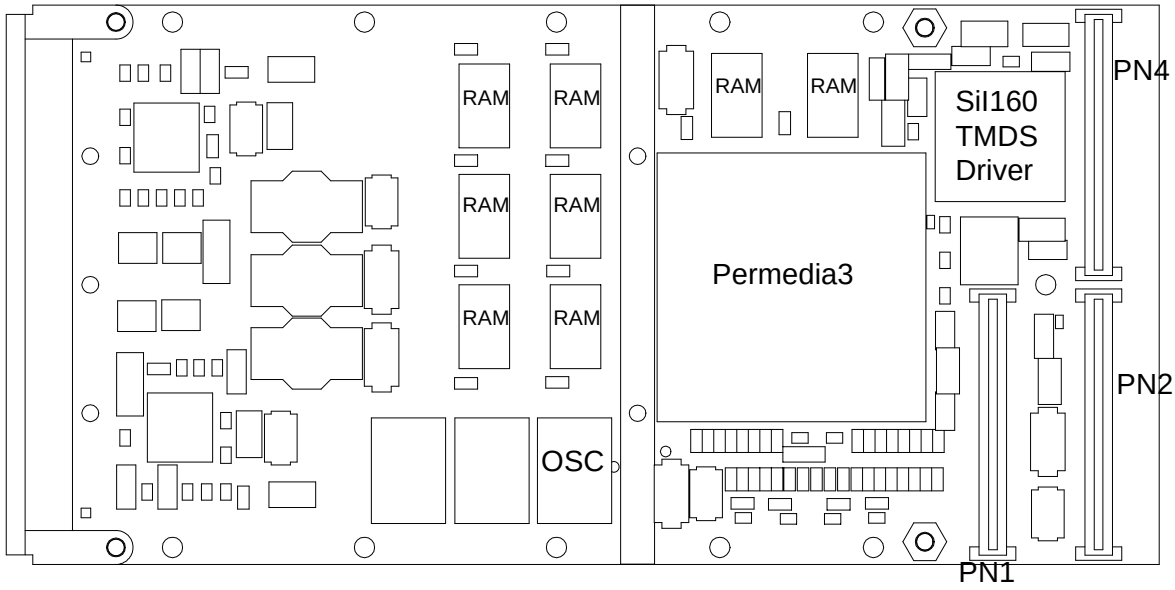


Figure 1.2 PMC-700-X00 Component Side Layout

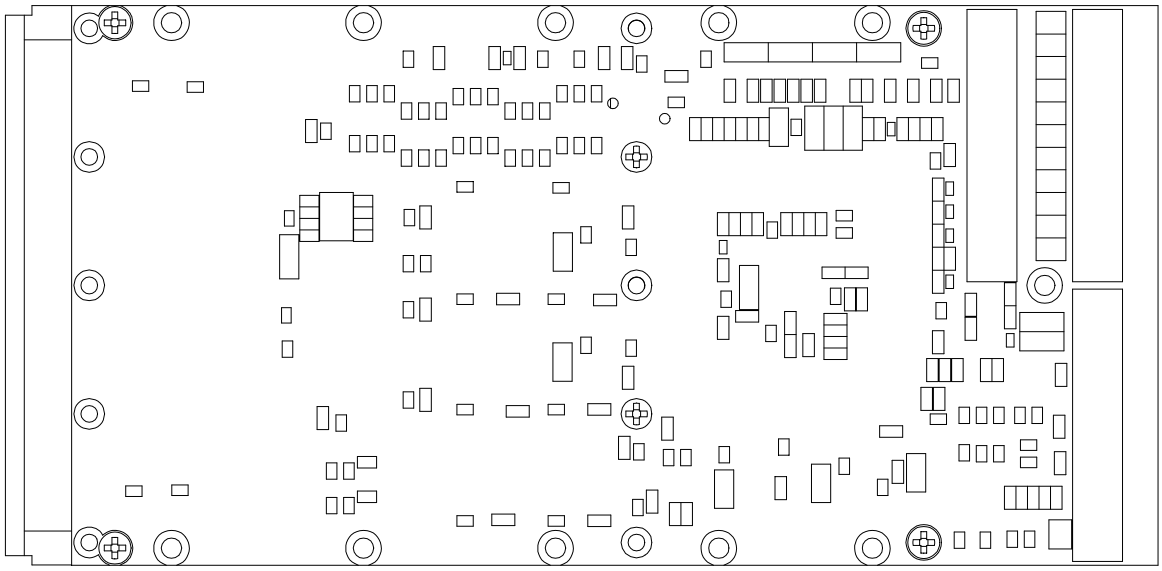


Figure 1.3 Solder Side Layout

Dimensions

The SPMC-700-X00 is compliant with IEEE P1386. The DPMC-700-X00 measures 144 mm (5.63 inches) x 74 mm (2.88 inches).

Weight

Table 1.2 lists the weight of the PMC-700-X00.

Table 1.2: PMC-700-X00 Weight

Card Type	Weight
PMC-700-X00	100 g

Mating Connectors

The PMC-700-X00 has three PMC connectors (PN1, PN2, PN4), compliant with IEEE P1386. These connectors interface the PMC-700-X00 to the basecard.

Overview of Available Software

If you do not have in-depth knowledge of the Permedia3, you should purchase an OpenGL/X Server package from DY 4. This package permits implementation of X, OpenGL and OSF/Motif-based clients in a VxWorks/Tornado/PowerPC environment. Such clients can then easily display graphical and image data.

SeaWind

The SeaWind X Window system is a full-featured implementation of the X11R6 Xlib, Xt, Xmu, Xaw, ICE, SM, and Xext libraries. It optionally includes the Motif 2.0 Motif library (Xm) and ancillary libraries used by Motif, Mrm and Xpm. It includes support for OpenGL including the GL and GLU libraries. In addition, SeaWind includes various useful client programs and a utility library, Xvxw. All libraries run efficiently on VxWorks and all libraries (except GLU) are fully reentrant. All libraries and clients adhere to all relevant X Consortium and OSF standards.

The basis for SeaWind is the publicly available X11R6 distribution from the Consortium and the Motif 2.0 distribution from the The Open Group.

Clients based on SeaWind may talk to X servers using VxWorks' loopback interface, Ethernet, FDDI, the VxWorks backplane protocol, or any other TCP-capable network interface.

If properly compiled, clients based on SeaWind have memory and file descriptor garbage collection performed on their behalf upon task exit.

The clients provided in SeaWind include twm (the Tab Window Manager), xterm (terminal emulator), xlsfonts, xdpyinfo, xclock, x11perf (a performance analysis client), and xlogo. Optionally, mwm (the Motif Window Manager) and uil are provided as well.

For distributions with Motif, the documentation is on the software CD-ROM in the directory /602186.000/doc. For distributions without Motif, the documentation is on the software CD-ROM in the directory /602085.000/doc.

Chapter 2

Pre-Installation Tasks

In this chapter...

This chapter discusses tasks that must be performed before installing the PMC-700-X00 in a system:

- ❏ unpacking the card;
- ❏ checking chassis, power, and cable requirements.

Unpacking the Card

Warning

To avoid personal injury or damage to this Circuit Card Assembly, disconnect the chassis from its power source before removing or installing any cards.

This Circuit Card Assembly uses components that are sensitive to electrostatic discharges. It must be kept in its conductive package until just before you install it. Remove the card from its protective package only at a grounded workstation while wearing an approved grounding wrist strap. Avoid touching any metal contacts on the card. Static discharges can damage integrated circuits.

To unpack the card from its protective package, follow these steps:

1. Unpack the Circuit Card Assembly from the shipping carton in a suitable work area. If the shipping carton appears to be damaged, request that an agent of the shipper or carrier be present during unpacking and inspection.
2. Find the packing list. Make sure all the items on the list are present.
3. Save the packing material for storing or reshipping the card.
4. Make sure the PMC-700-X00 module is firmly attached to the basecard.

Checking Hardware Requirements

Make sure the following hardware requirements have been met before you install the PMC-700-X00.

Chassis Requirements

The SPMC-700-X00 is designed to be installed on a basecard that operates in a free-air or forced-air cooled chassis.

The DPMC-700-X00 is a conduction-cooled card, and is designed to be installed on a basecard which uses DY 4-specific thermal management techniques operating in a conduction-cooled chassis.

Cross Reference

Input/output from the PMC-700-X00 is mapped through the standard PMC I/O signals through the basecard to the backplane. See Table 3.2 on page 3-8 and Table 3.3 on page 3-9 for the backplane signal definitions.

Power Requirements

Table 2.1 shows the power requirements for the PMC-700-X00.

Table 2.1: Power Requirements

Voltage	Maximum Current	Typical Current
+5 VDC	2.4 A	1.6 A

5 V is supplied to the PMC-700-X00 from the basecard. The PMC-700 includes voltage regulators to derive 3.3 V and 2.5 V.

Cable Requirements

There are two cables designed for use with the PMC-700-X00 when it is installed on a DY 4 PowerPC basecard. These cables provide connections for VGA and DVI interfaces and standard basecard I/O interfaces.

CBL-700-000 (901433-003) is a cable that mates with the backplane P2 connector of the basecard. It can be used when the PMC-700-X00 is installed in PMC slot 2. See Figure 3.1 on page 3-5.

CBL-700-001 (901434-001) is a cable that mates with the backplane P0 connector of the basecard. It can be used when the PMC-700-X00 is installed in PMC slot 1. See Figure 3.2 on page 3-6.

When using these cables, the maximum resolution is 1024 x 768. At higher resolutions, the image quality may be reduced because of signal degradation.

Chapter 3

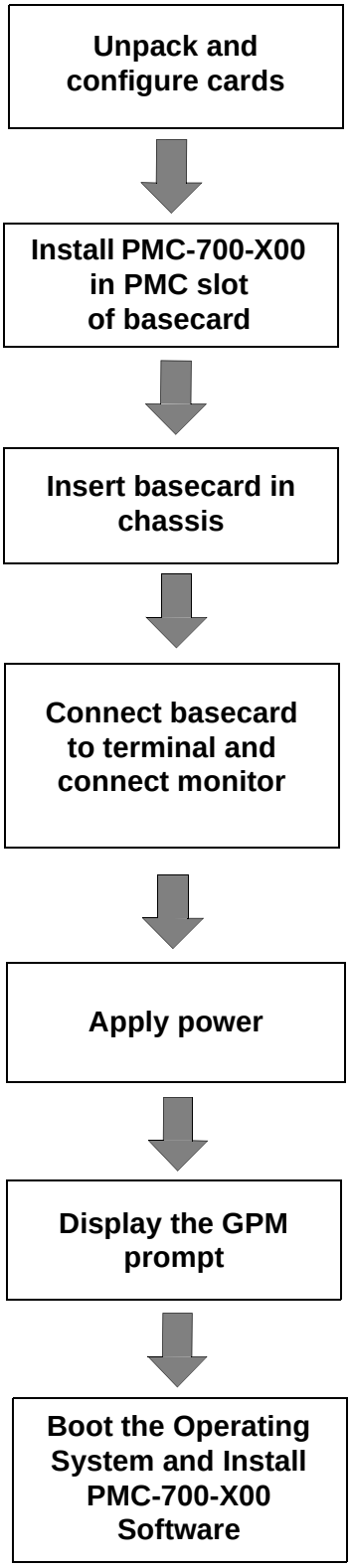
Hardware Installation on a DY 4 PowerPC™ Basecard

In this chapter...

This chapter explains how to install the PMC-700-X00 on a DY 4 PowerPC Single Board Computer (SBC) (for example, the SVME/DMV-179) and verify that it is operating correctly.

Installation Procedure Summary - PowerPC Basecard

Below is a summary of the installation procedure described in this chapter. Experienced users may wish to use it as a quick installation procedure.



Installation Procedure - PowerPC Basecard

Before You Begin...

Warning

This card uses components that are sensitive to electrostatic discharges. It must be kept in its conductive package until just before the installation begins. Remove the card from its protective package only at a grounded workstation while wearing an approved grounding wrist strap. Avoid touching any metal contacts on the card; static discharge can damage integrated circuits.

Turn the power off before inserting or removing cards from the VME chassis. Failure to do so could damage the card circuitry or cause personal injury.

Unpack and Configure the Cards

Before installing the card into a chassis, ensure that you complete the pre-installation tasks described in Chapter 2 of the *Getting Started Manual* for the basecard and in Chapter 2 of this manual.

Install the PMC-700-X00 on the Basecard

If you received your PMC-700-X00 as a stand-alone product, install it in a PMC slot of your basecard using the DY 4 mounting kit (901354-037 for SVME products and 901354-131 for DMV products).

When the PMC-700-X00 is mounted in slot 1 (at the centre of the basecard), its I/O signals are available on the backplane P0 connector. When the PMC-700-X00 is mounted in slot 2 (near the P2 connector), its I/O signals are available on the backplane P2 connector.

Choosing a VME Slot Location

Select Slot 1, the left-most slot in the VME chassis, if you want the basecard to be the System Controller (SYSCON). If you intend to use another card as the SYSCON, select the left-most unoccupied slot. All VME cards should be installed in adjacent slots; leaving empty slots may cause problems with interrupts and Bus Grant signals.

Insert the Basecard in the Chassis

Ensure that the chassis power is turned off before inserting the card.

An SVME basecard is equipped with a faceplate compliant with IEEE 1101.10. The large ejectors on this faceplate facilitate insertion of the basecard into the 160-contact, 5-row connectors for P1 and P2.

If the faceplate is not compatible with your chassis, you can purchase an alternate faceplate from DY 4. Use the basecard generic drawing to determine how to mount the faceplate on the card.

With SVME basecards with the alternate faceplate and with DMV cards, proper mating of these connectors with the VME backplane requires a significant amount of insertion force. Use extra care when aligning and

inserting your basecard into your chassis, to ensure that a secure mechanical and electrical connection is made between the card and the backplane mating connectors.

Insert the basecard in the selected slot in the chassis.

Connect the Basecard to a Terminal

Connect the basecard to a terminal via either the front panel connector (SVME version only) or the P2/P0 connector (both SVME and DMV versions). Use the following settings for your terminal emulation software: 9600 baud, 8 data bits, no parity, 1 stop bit.

Using a P2 Cable

If the PMC-700-X00 is installed in slot 2 of the basecard (near the P2 connector), you may use CBL-700-000 P2 I/O cable assembly (901433-003) to connect to a terminal.

Install the CBL-700-000 P2 I/O cable assembly (901433-003) by carefully pressing the cable P1 connector onto the P2 backplane connector stakes. Attach a terminal to the cable Serial Channel 1 connector. Other basecard-related functions are available via this cable, as shown in Figure 3.1.

Note

The P2 cable does not provide an Ethernet interface. Use a front panel cable (for SVME basecards), or a standard P0 cable for your basecard to connect to Ethernet.

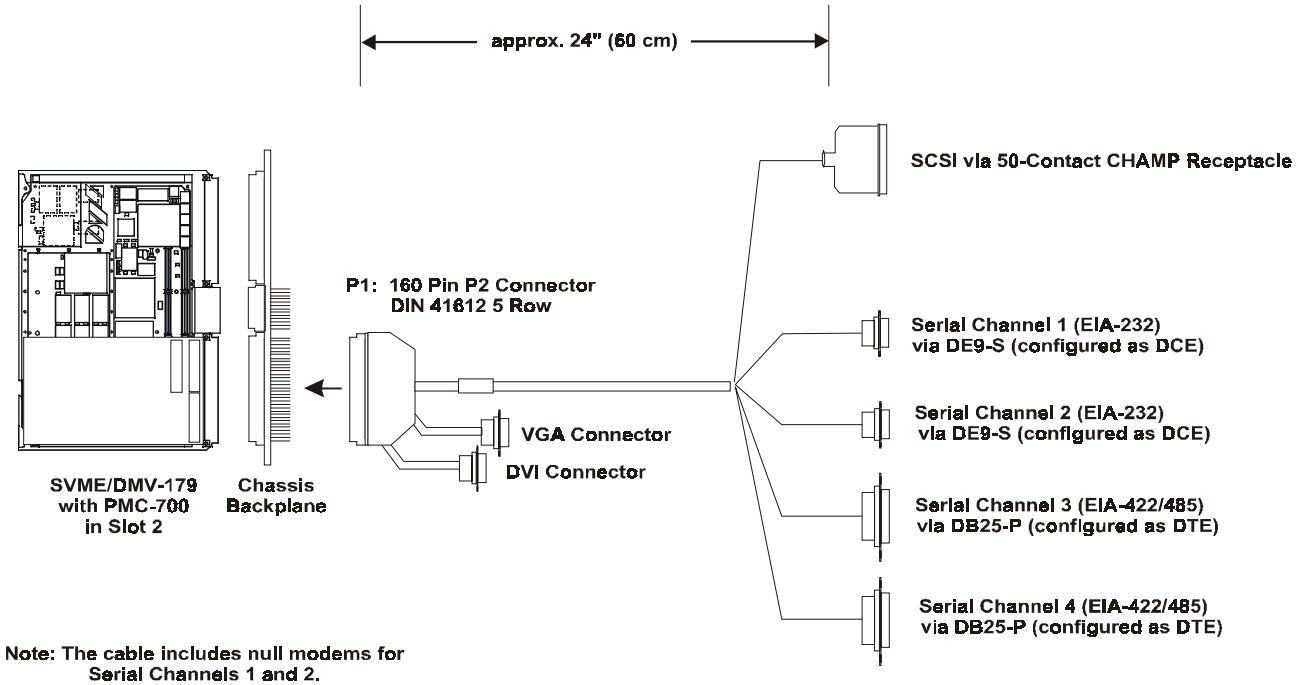


Figure 3.1 CBL-700-000 P2 Cable (901433-003)

Using a P0 Cable

If the PMC-700-X00 is installed in slot 1 of the basecard (near the centre of the basecard), you may use a P0 cable (CBL-700-001, DY 4 part number 901434-001) to connect to a terminal and an Ethernet network.

Install the cable assembly by carefully pressing the cable P1 connector onto the P0 backplane connector stakes. Attach a terminal to the cable J3 connector. Other basecard-related functions are available via this cable, as shown in Figure 3.2. Table 3.1 provides the pinout for the discrete digital I/O connector.

Exercise care when inserting and extracting the P0 I/O cable as the P0 backplane pins can be easily bent if the cable connector is not properly aligned.

Warning

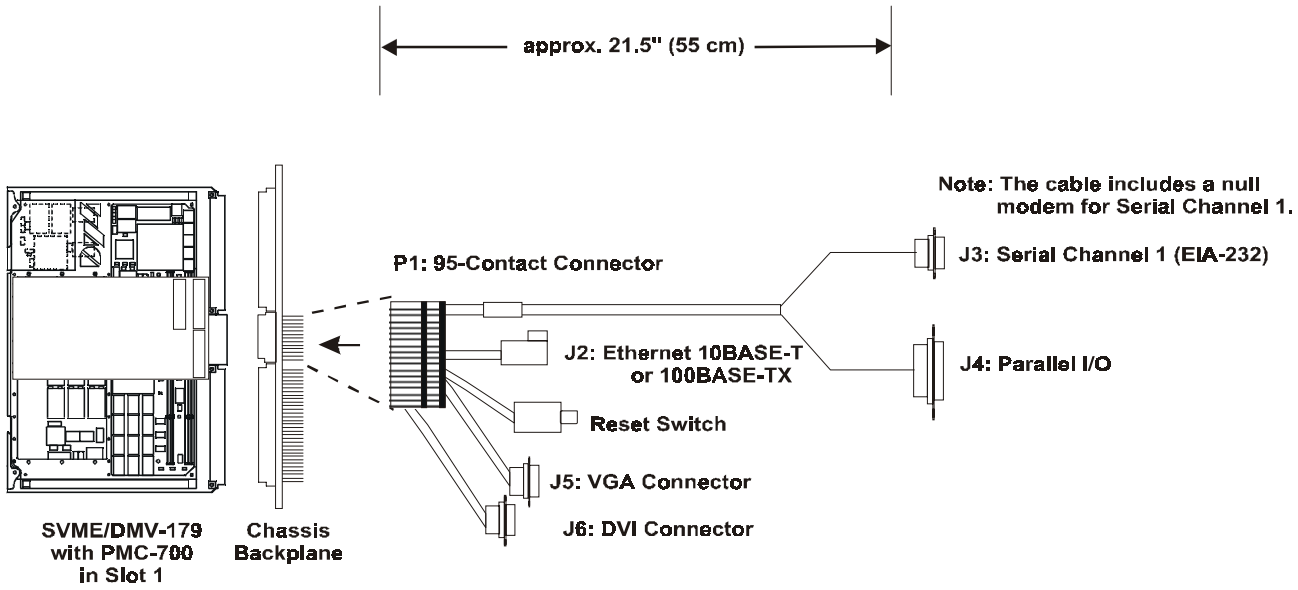


Figure 3.2 CBL-700-001 P0 Cable (901434-001)

Table 3.1: Discrete Digital I/O Connector (J4) Pinout

Signal Name	J4 Contact
PI0(0)	1
PIO(1)	3
PIO(2)	5
PIO(3)	7
PIO(4)	9
PIO(5)	11
PIO(6)	13
PIO(7)	14
PIO(8)	16
PIO(9)	18
PIO(10)	20
PIO(11)	22
GND	2, 6, 10, 17, 21

Using the Basecard Front Panel Connector

An SVME basecard has a single connector on the front panel that provides access to two EIA-232 serial channels (1 and 2). Some basecards also provide an Ethernet 10BaseT or 100BaseTX interface, plus a COP/JTAG interface for debugging purposes. The front panel cable routes the different interfaces to separate connectors.

For more information on the front panel cable, consult Chapter 3 of the Getting Started Manual for your basecard.

Connect a Monitor

PMC-700-X00 is in PMC Slot 2

If the PMC-700-X00 is installed in PMC slot 2, use the P2 interface (as shown in Figure 3.1 on page 3-5), to connect a monitor. The mapping of signals between the basecard P2 connector and the DVI and VGA connectors on the CBL-700-000 cable is shown in Table 3.2.

Table 3.2: Signal Mapping from Basecard P2 Connector to Video Connectors

P2 Pin	Signal Name	DVI Pin	VGA Connectors
C1	TXC-	24	
C2	TXC+	23	
C3	GND	22	
A1	TX0-	17	
A2	TX0+	18	
A3	GND	19	
C18	TX1-	9	
A17	TX1+	10	
C17	GND	11	
C31	TX2-	1	
C32	TX2+	2	
C30	GND	3	
A20	FPDDCCLK	6	
A21	FPDDCDATA	7	
B1	+5 V POWER	14	
B2	GND	15	
A32	CRT_GREEN		2
A31	CRT_GREEN_ RTN		7
A28	CRT_BLUE		3
A27	CRT_BLUE_RTN		8
A30	CRT_RED		1
A29	CRT_RED_RTN		6
A23	CRT_HSYNC		13
A22	CRT_HSYNC_RTN		5
A24	CRT_VSYNC		14
A25	CRT_VSYNC_RTN		10

PMC-700-X00 is in PMC Slot 1

If the PMC-700-X00 is installed in PMC slot 1, use the P0 interface (as shown in Figure 3.2 on page 3-6), to connect a monitor. The mapping of signals between the basecard P0 connector and the DVI and VGA connectors on the CBL-700-001 is shown in Table 3.3.

Table 3.3: Signal Mapping from Basecard P0 Connector to Video Connectors

P0 Pin	Signal Name	DVI Pin	VGA Connectors
E4	TXC-	24	
C4	TXC+	23	
A4	GND	22	
D4	TX0-	17	
B4	TX0+	18	
E5	GND	19	
A13	TX1-	9	
B13	TX1+	10	
C13	GND	11	
E19	TX2-	1	
C19	TX2+	2	
B18	GND	3	
A14	FPDDCCLK	6	
D15	FPDDCDATA	7	
B19	CRT_GREEN		2
D19	CRT_GREEN_ RTN		7
E18	CRT_BLUE		3
B17	CRT_BLUE_RTN		8
A18	CRT_RED		1
C18	CRT_RED_RTN		6
E16	CRT_HSYNC		13
B15	CRT_HSYNC_RTN		5
C16	CRT_VSYNC		14
A16	CRT_VSYNC_RTN		10

Apply Power

Power up the chassis.

Immediately after the chassis is powered on, the red FAIL LED and green STATUS LED come on.

Once the basecard passes its initial diagnostics, the Card Level Diagnostics (CLD) routines turn the red FAIL LED off. If the CLD routines detect a failure, the red FAIL LED stays on. In either case, the green STATUS LED stays on. The two green LEDs on the PMC-700 front panel should be lit, indicating that the PMC-700-X00 has 3.3 V and 2.5 V power.

Cross Reference

For additional information on the power-up sequence, refer to Chapter 3 of the *Getting Started Manual* for your basecard.

Cross Reference

If the red FAIL LED on the basecard stays on after power-up, then the CLD suite found one or more problems. Refer to "TroubleShooting" in your basecard Getting Started Manual for information about locating the problem.

Display the GPM Prompt

Press any key on the terminal keyboard to display the initial screen message. The initial screen message shows the card's VME base address, which should be 4000 0000 if the card is installed in Slot 1.

Cross Reference

For information on the General Purpose Monitor (GPM), refer to Chapter 6 of the FFW User's Manual (808006).

Boot the Operating System

Once the hardware is correctly configured and installed in the chassis, the next step is to boot the operating system.

VxWorks and DY 4 BSP

If you are using VxWorks, install and configure the Board Support Package software (BSP). See the section “BSP Installation Procedure”, in Chapter 1 of your BSP Target Document. The BSP Target Document is provided on the BSP CD-ROM. It is also installed in the Tornado tree when the BSP is installed.

Tip

There is also a BSP installation demo on the Technical Documentation CD-ROM.

Note

You must configure your VxWorks kernel to map the PMC-700-X00 PCI memory spaces into the basecard processor space. See the X Server User’s Manual (in the /doc directory of the software CD-ROM) for more details.

Install the PMC-700 Software

If you have purchased an OpenGL/X Server package, install it now. See the documentation in the /doc directory of the software CD-ROM.

Chapter 4

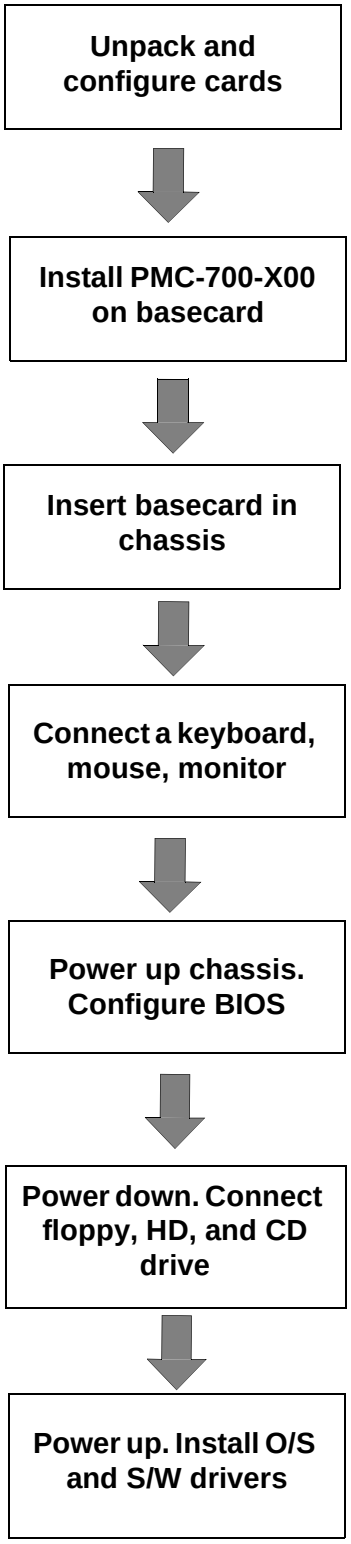
Hardware Installation on a DY 4 Pentium™ Basecard

In this chapter...

This chapter explains how to install the PMC-700-X00 on a DY 4 Systems Pentium Single Board Computer (SBC) and verify that it is operating correctly.

Installation Procedure Summary - Pentium Basecard

Below is a summary of the installation procedure described in this chapter. Experienced users may wish to use it as a quick installation procedure.



Installation Procedure - DY 4 Pentium Basecard

Before You Begin...

Warning

This card uses components that are sensitive to electrostatic discharges. It must be kept in its conductive package until just before the installation begins. Remove the card from its protective package only at a grounded workstation while wearing an approved grounding wrist strap. Avoid touching any metal contacts on the card; static discharge can damage integrated circuits.

Turn the power off before inserting or removing cards from the VME chassis. Failure to do so could damage the card circuitry or cause personal injury.

Unpack and Configure the Cards

Before installing the card into a chassis, ensure that you complete the pre-installation tasks described in Chapter 2 of the *Getting Started Manual* for the DY 4 basecard and in Chapter 2 of this manual.

Install the PMC-700 on the Basecard

If you received your PMC-700-X00 as a stand-alone product, install it on your basecard using the DY 4 mounting kit.

Choosing a Slot Location

Select Slot 1, the left-most slot in the VME chassis, if you want the card to be the System Controller (SYSCON). If you intend to use another card as the SYSCON, select the left-most unoccupied slot. All VME cards should be installed in adjacent slots; leaving empty slots may cause problems with interrupts and Bus Grant signals.

Insert the Basecard in the Chassis

Ensure that the chassis power is turned off before inserting the card.

An SVME-193 basecard is equipped with a faceplate compliant with IEEE 1101.10. The large ejectors on this faceplate facilitate insertion of the basecard into the 160-contact, 5-row connectors for P1 and P2. If the faceplate is not compatible with your chassis, you can purchase an alternate faceplate from DY 4. Use the basecard generic drawing to determine how to mount the faceplate on the card.

With SVME-193 basecards with the alternate faceplate and with SVME-192 and DMV-193 basecards, proper mating of these connectors with the VME backplane requires a significant amount of insertion force. Use extra care when aligning and inserting your basecard into your chassis, to ensure that a secure mechanical and electrical connection is made between the card and the backplane mating connectors.

Insert the basecard in the selected slot in the chassis.

Connect a Keyboard and Mouse

On a DMV basecard, install a Backpack module on the backplane behind the slot in which the basecard is installed.

On an SVME basecard, connect the basecard to a keyboard, mouse (optional), and any other required peripherals via either the front panel J1 connector or a Backpack module.

Refer to Chapter 3 of the Getting Started Manual for your basecard for details.

Connect a Monitor

If the PMC-700-X00 is installed in PMC Site 1 (at the centre of the basecard), connect a custom cable to the J29 header of the Backpack module as shown in Figure 4.1.

If the PMC-700-X00 is installed in PMC Site 2 (near the P2 connector), connect a custom cable to the J30 header of the Backpack module as shown in Figure 4.1.

Table 4.1 on page 4-7 gives the video signal pinout for the J29 and J30 headers on the Backpack module. This information may be used to build custom cables to connect to a monitor.

Note

You may not obtain the maximum resolution when using the DVI interface through the Backpack module. The additional connector interfaces can cause signal degradation.

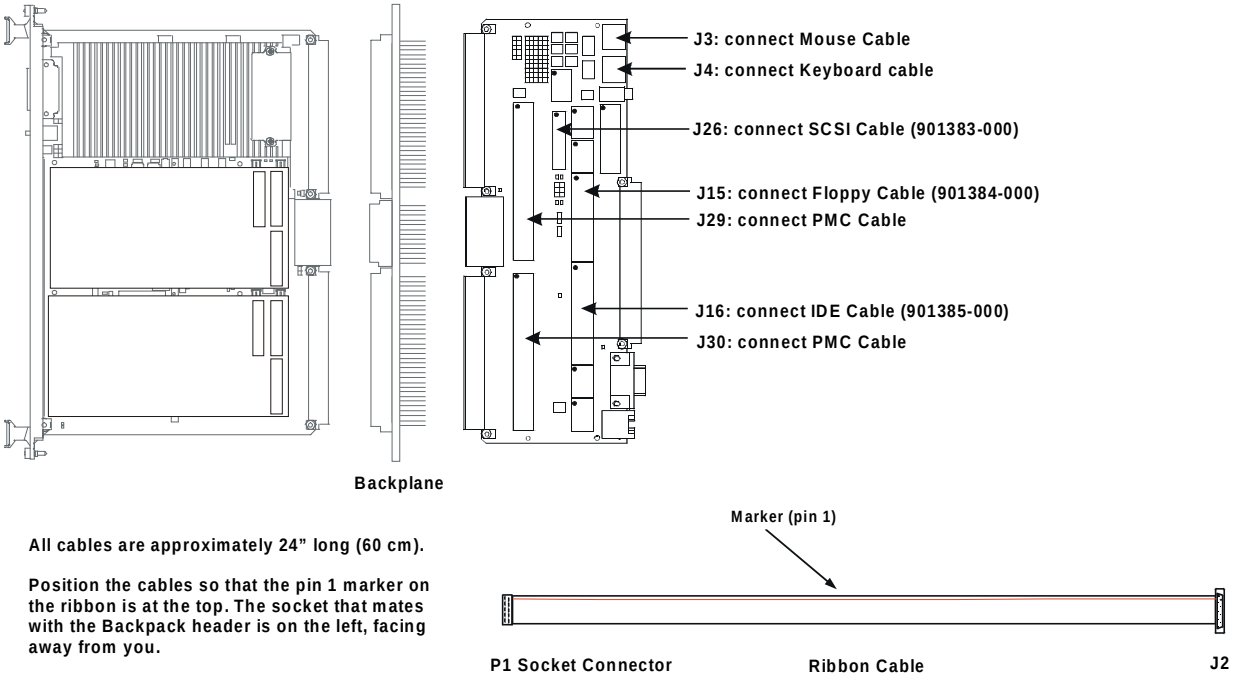
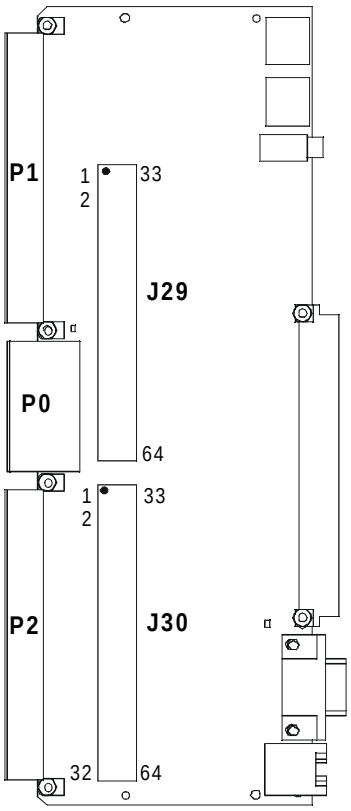


Figure 4.1 Backpack Module

Table 4.1: Video Signal Pinout for J29 and J30 Backpack Headers

Pin No.	Signal	Pin Position	Pin No.	Signal
1	TXC-		33	TX1 GND
2	TX0-		34	TX1+
3	TXC+		35	TX1-
4	TX0+		40	DDC CLK
5	TXC GND		42	DDC DATA
6	TX0 GND		44	CRT_HSYNC_RTN
			46	CRT_HSYNC
			48	CRT_VSYNC
			50	CRT_VSYNC_RTN
			54	CRT_BLUE_RTN
			56	CRT_BLUE
			58	CRT_RED_RTN
			59	TX2 GND
			60	CRT_RED
			61	TX2-
			62	CRT_GREEN_RTN
			63	TX2+
			64	CRT_GREEN

Power Up the Chassis

Power up the chassis. During the power-up sequence, the red FAIL LED is lit while the basecard performs its Enhanced Power On Self Test (POST). When POST completes successfully, the LED is turned off.

For additional information on the power-up sequence, refer to Chapter 3 of the Getting Started Manual for your basecard.

Set Up the BIOS

If you received your PMC-700-X00 as a standalone card, you must update the BIOS on your basecard. Contact DY 4 Systems for details.

Press the F2 key any time during the memory check to display the BIOS setup screen. The Setup program allows you to specify the various startup, configuration, and VME settings for the card.

Cross Reference

Refer to Chapter 4 of the Getting Started Manual for your basecard for more information.

Connect a Floppy Drive, Hard Drive, and a CD Drive

Refer to Chapter 3 of the Getting Started Manual for your basecard for more information.

Install the Operating System and Software Drivers

See Chapter 1 of the *Support Package User's Manual* for your basecard and operating system.

Install the 3DLabs Software Drivers

If you are using the PMC-700-X00 in a Windows environment, download and install the drivers from 3DLabs. Visit http://www.3dlabs.com.

Appendix A

PN1, PN2, and PN4 Interface Pin-outs

In this appendix...

Cross Reference

This appendix lists the standard pin-outs for the PMC-700-X00.

Please also consult the *Product Release Notes* for your particular card variant, which may contain information describing any variant-specific alterations to the interface configuration of your card, if any have been implemented.

PMC Connector Pin Assignments

PMC Connector PN1

Table A.1 lists the pin assignments for the connector referenced PN1. This connector is referenced as Pn1/Jn1 in the PMC specification P1386.1/Draft 2.0.

Table A.1: PN1 Connector

Pin #	Signal Name	Signal Name	Pin #
1	TCK	-12V	2
3	GND	INTA#	4
5	INTB#	INTC#	6
7	BUSMODE1#	+5V	8
9	INTD#	RESERVED	10
11	GND	RESERVED	12
13	CLK	GND	14
15	GND	GNT#	16
17	REQ#	+5V	18
19	RESERVED	AD[31]	20
21	AD[28]	AD[27]	22
23	AD[25]	GND	24
25	GND	C/BE[3]#	26
27	AD[22]	AD[21]	28
29	AD[19]	+5V	30
31	RESERVED	AD[17]	32
33	FRAME#	GND	34
35	GND	IRDY#	36
37	DEVSEL#	+5V	38
39	GND	LOCK#	40
41	SDONE#	SBO#	42
43	PAR	GND	44
45	V (I/O)	AD [15]	46
47	AD[12]	AD[11]	48
49	AD[09]	+5V	50
51	GND	C/BE[0]#	52
53	AD[06]	AD[05]	54
55	AD[04]	GND	56
57	RESERVED	AD[03]	58
59	AD[02]	AD[01]	60
61	AD[00]	+5V	62
63	GND	REQ#64	64

PMC Connector PN2

Table A.2 lists the pin assignments for the connector referenced PN2. This connector is referenced as Pn2/Jn2 in the PMC specification P1386.1/Draft 2.0.

Table A.2: PN2 Connector

Pin #	Signal Name	Signal Name	Pin #
1	+12V	TRST#	2
3	TMS	TDO	4
5	TDI	GND	6
7	GND	RESERVED	8
9	RESERVED	RESERVED	10
11	BUSMODE2#	+3.3V	12
13	RST#	BUSMODE3#	14
15	+3.3V	BUSMODE4#	16
17	RESERVED	GND	18
19	AD[30]	AD[29]	20
21	GND	AD[26]	22
23	AD[24]	+3.3V	24
25	IDSEL	AD[23]	26
27	+3.3V	AD[20]	28
29	AD[18]	GND	30
31	AD[16]	C/BE[2]#	32
33	GND	RESERVED	34
35	TRDY#	+3.3V	36
37	GND	STOP#	38
39	PERR#	GND	40
41	+3.3V	SERR#	42
43	C/BE[1]#	GND	44
45	AD[14]	AD[13]	46
47	GND	AD[10]	48
49	AD[08]	+3.3V	50
51	AD[07]	RESERVED	52
53	+3.3V	RESERVED	54
55	RESERVED	GND	56
57	RESERVED	RESERVED	58
59	GND	RESERVED	60
61	ACK64#	+3.3V	62
63	GND	RESERVED	64

PMC Connector PN4

Table A.3 lists the pin assignments for the connector referenced PN4. This connector is referenced as Pn4/Jn4 in the PMC specification P1386.1/Draft 2.0.

Table A.3: PN4 Connector

Pin #	Signal Name	Signal Name	Pin #
1	TXC-	TX0-	2
3	TXC+	TX0+	4
5	GND	GND	6
7	PN4_7 (NC)	PN4_8 (NC)	8
9	PN4_9 (NC)	PN4_10 (NC)	10
11	PN4_11 (NC)	PN4_12 (NC)	12
13	PN4_13 (NC)	PN4_14 (NC)	14
15	PN4_15 (NC)	PN4_16 (NC)	16
17	PN4_17 (NC)	PN4_18 (NC)	18
19	PN4_19 (NC)	PN4_20 (NC)	20
21	PN4_21 (NC)	SENSE	22
23	PN4_23 (NC)	STEREO_SYNC	24
25	PN4_25 (NC)	STEREO_SYNC_RTN	26
27	PN4_27 (NC)	PN4_28 (NC)	28
29	PN4_29 (NC)	PN4_30 (NC)	30
31	PN4_31 (NC)	GND	32
33	GND	TX1+	34
35	TX1-	GND	36
37	GND	GND	38
39	PN4_39 (NC)	FPDDCCLK	40
41	PN4_41 (NC)	FPDDCDATA	42
43	PN4_43 (NC)	CRT_HSYNC_RTN	44
45	PN4_45 (NC)	CRT_HSYNC	46
47	PN4_47 (NC)	CRT_VSYNC	48
49	GND	CRT_VSYNC_RTN	50
51	GND	PN4_52 (NC)	52
53	GND	CRT_BLUE_RTN	54
55	GND	CRT_BLUE	56
57	PN4_57 (NC)	CRT_RED_RTN	58
59	GND	CRT_RED	60
61	TX2-	CRT_GREEN_RTN	62
63	TX2+	CRT_GREEN	64

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