

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Acromag / Xembedded / Xycom XVME-661* at our website: ***Click HERE***

XVME–661

Single-Slot VMEbus Low Power Intel® Pentium® III Processor Module

User Manual

© 2003 XYCOM™ AUTOMATION, INC.

Printed in the United States of America

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Revision	*Description*	*Date*
A	Manual released	08/03
B	Modified byte-swap information	09/03

Trademark Information

Brand or product names are trademarks or registered trademarks of their respective owners. Intel and Pentium are registered trademarks and Celeron is a trademark of Intel Corporation. Windows and Windows NT are registered trademarks of Microsoft Corporation in the US and in other countries.

Copyright Information

This document is copyrighted by Xycom Automation, Incorporated (Xycom Automation) and shall not be reproduced or copied without expressed written authorization from Xycom Automation.

The information contained within this document is subject to change without notice. Xycom Automation does not guarantee the accuracy of the information.

WARNING

This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

WARNING for European Users – Electromagnetic Compatibility

European Union Directive 89/336/EEC requires that this apparatus comply with relevant ITE EMC standards. EMC compliance demands that this apparatus is installed within a VME enclosure designed to contain electromagnetic radiation and which will provide protection for the apparatus with regard to electromagnetic immunity. This enclosure must be fully shielded. An example of such an enclosure is a Schroff 7U EMC-RFI VME System chassis, which includes a front cover to complete the enclosure.

The connection of non-shielded equipment interface cables to this equipment will invalidate European Free Trade Area (EFTA) EMC compliance and may result in electromagnetic interference and/or susceptibility levels that are in violation of regulations which apply to the legal operation of this device. It is the responsibility of the system integrator and/or user to apply the following directions, as well as those in the user manual, which relate to installation and configuration:

All interface cables should be shielded, both inside and outside of the VME enclosure. Braid/foil type shields are recommended for serial, parallel, and SCSI interface cables. Whereas external mouse cables are not generally shielded, an internal mouse interface cable must either be shielded or looped (1 turn) through a ferrite bead at the enclosure point of exit (bulkhead connector). External cable connectors must be metal with metal backshells and provide 360-degree protection about the interface wires. The cable shield must be terminated directly to the metal connector shell; shield ground drain wires alone are not adequate. VME panel mount connectors that provide interface to external cables (e.g., RS232, SCSI, keyboard, mouse, etc.) must have metal housings and provide direct connection to the metal VME chassis. Connector ground drain wires are not adequate.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table of Contents

Chapter 1 – Introduction 1

Module Features 1
Architecture 2
CPU Chip 2
Onboard Memory 2
SDRAM Memory 2
Flash BIOS 2
Video Controller 2
Ethernet Controller 3
PCI Local Bus Interface 3
Universal Serial Bus Port 3
Fast IDE controller and Floppy Drive Controller 3
IDE Devices and Floppy Drives 3
Compact Flash Site 4
VMEbus Interface 4
Serial and Parallel Ports 5
Keyboard / Mouse Interface 5
PMC Expansion 5
Further PMC and PC/104 Expansion Options 5
Watchdog Timer 5
Software Support 5
Operational Description Diagram 6
Hardware Specifications 7
Environmental Specifications 8
System Configuration and Expansion Options Tables 8

Chapter 2 – Installation and Configuration 10

Jumper Settings 11
Switch Settings 12
Registers 12
Register 218h – Abort/CMOS Clear Register 13
Register 219h – LED/BIOS Port 13
Register 233h – Watchdog Timer Register 14
Register 234h – Flash Paging and Byte Swap Register 14
Connectors 15
Front Bezel Connectors 16
Keyboard/Mouse PS/2 Port Connector (P7) 16
RJ-45 10/100 BaseT Connectors (P11 and P14) 16
VGA Connector (P9) 16
PMC Host Connectors (J11 and J12) 17
COM1 Serial Port Connector (P12) 19
VME Bus Connectors 20
P1 Connector (P1) 20
P2 Connector (P2) 21
Interboard Connector 1 (P4) 22
Interboard Connector 2 (P3) 24

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Installing the XVME-661 into a Backplane 26
Enabling the PCI Ethernet Controller....29
Loading the Ethernet Driver 29
Pinouts for the RJ-45 10/100 BaseT Connector....29

Chapter 3 – BIOS Setup Menus 30

Navigating the BIOS Setup Menus 30
Main Setup Menu....31
IDE Primary and Secondary Master and Slave Submenus 33
Cache RAM Submenu....35
Shadow RAM Submenu....37
Advanced Menu....38
I/O Device Configuration Submenu....40
Advanced Chipset Control Submenu 42
PCI Configuration Submenu 43
Daughter PMC #1 PCI, Daughter PMC #2 PCI and 661 PMC Submenus 44
PCI/PNP ISA UMB Region Exclusion Submenu 45
PCI/PNP ISA IRQ Resource Exclusion Submenu 46
Security Menu....47
Power Menu....49
Device Monitoring Submenu 51
Boot Menu 53
VMEbus Menu....54
System Controller Submenu....55
Master Interface Submenu....57
Slave Interface Submenus 58
Exit Menu 59
BIOS Compatibility....60

Chapter 4 – Programming.... 61

Memory Map....61
I/O Map 62
IRQ Map....63
VME Interface....64
System Resources 64
VMEbus Master Interface....64
VMEbus Slave Interface....65
VMEbus Interrupt Handling 66
VMEbus Interrupt Generation 66
VMEbus Reset Options....67
PCI BIOS Functions....67
Calling Conventions....67
16-Bit Interface 67
32-Bit Interface 68
PCI BIOS Function Calls....69
Locating the Universe Chip....69
Read Configuration Byte....70
Read Configuration Word 71
Read Configuration Dword 71
Write Configuration Byte....72

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Write Configuration Word 72
Write Configuration Dword 73
Software-Selectable Byte-Swapping Hardware 74
Byte-Ordering Schemes 74
Numeric Consistency 76
Address Consistency 77

Chapter 5 – XVME-973/1 Drive Adapter Module & XVME-974/1 Expansion Module 78

XVME-973/1 Drive Adapter Module 79
XVME-973/1 P1 Connector 79
XVME-973/1 P2 Connector 81
XVME-973/1 P3 Connector 82
XVME-973/1 P4 Connector 83
XVME-973/1 P5 Connector 84
XVME-974/1 Expansion Module 85
XVME-974/1 P2 Connector 86
XVME-974/1 P3 Connector 87
XVME-974/1 P4 Connector 87
XVME-974/1 P5 Connector 88
XVME-974/1 P6 LPT1 Parallel 89
XVME-974/1 P7 Serial COM2 90

Appendix A – SDRAM Installation 91

Installing SDRAM 91
SDRAM Manufacturers 92

Appendix B – Drawing 93

Index v

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Chapter 1 – Introduction

The XVME-661 VMEbus Intel® Pentium® III PC-compatible VMEbus processor module combines the high performance and rugged packaging of the VMEbus with the broad application software base of the IBM PC/AT standard. It integrates the latest processor and chipset technology.

Module Features

The XVME-661 offers the following features:

- Intel Pentium III Low Power at 700MHz
- Up to 256 MB SDRAM
- 256 KB on die level 2 cache on PIII (running at the speed of the processor)
- Advanced Graphics Port (AGP) Video controller with 4MB integrated VRAM
- Enhanced IDE controller, capable of driving two EIDE devices on P2 (Compatible with XVME-977 and XVME-979, and direct drive connection using the XVME973 or 974 breakout adapter)
- Floppy disk controller, capable of driving one floppy drive on P2 (Compatible with XVME-977 or direct drive connection using the XVME 973 or XVME 974 breakout adapter)
- Dual 10/100 Base-T Ethernet controllers with front panel RJ-45 connectors
- Type I/II Compact Flash site
- VME64 VMEbus interface with programmable hardware byte swapping
- Two RS-232 serial ports:
  - One RS-232 serial port on front panel with electrical isolation
  - One RS-232 serial port on P2 (requires XVME 974 interface adapter to P2)
- Two Universal Serial Bus (USB) ports on P2 (requires XVME 974 interface adapter to P2)
- EPP/ECP configurable parallel port on P2
- Combined PS/2 compatible keyboard/mouse port
- PCI and ISA 80-pin Expansion Connectors (Compatible with XVME-976 expansion modules)
- 32-bit PMC (PCI Mezzanine Card) site with front panel I/O
- Front panel ABORT/RESET switch with indicating lights. Red for “fail” and green for “pass”
- Electrical isolation and noise immunity on the Ethernet ports, Serial Port, and PMC site.
- Latching Ejector Tab with optional micro-switch.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Architecture

CPU Chip

The Intel Pentium III processor integrates P6 Dynamic Execution micro-architecture, Dual Independent Bus (DIB) Architecture, a multi-transaction system bus, Intel MMX™ media enhancement technology, and the Intel Processor Serial Number. In addition, it offers Internet Streaming SIMD Extensions, 70 new instructions enabling advanced imaging, 3D, streaming audio and video, and speech recognition. The Intel Pentium III processor also has two16 KB L1 caches, instruction and data, and one 256 KB Advanced Transfer Cache (full speed, synchronous L2 cache with Error Correcting Code). The Pentium III processor supports a 100 MHz front-side bus.

Onboard Memory

SDRAM Memory

The XVME-661 has a socket for a single 144-pin SODIMM, providing up to 256 MB of SDRAM. The XVME-661 configurations include 32 MB, 64 MB, 128 MB, and 256 MB. Approved SDRAM suppliers are listed in Appendix A.

Flash BIOS

The XVME-661 system BIOS is contained in a 512 KB flash device to facilitate system BIOS updates.

Video Controller

The 69030 video controller features a 64-bit graphics engine, with 24-bit RAMDAC for true color support. It has 4 MB of VRAM and supports resolutions of up to 1600x1200 and up to 16 million colors (24-bit). The video controller resides on the AGP port and provides 1x acceleration, which is a bus speed of 66 MHz (twice as fast as on the PCIbus). The maximum video modes supported are listed in the following table. The highest supported interlaced monitor mode is 1280x1024, 16-bit/65k color, and 43 Hz. Video output is available on the front panel through a standard 15-pin D shell connector.

Table 1–1. Maximum Video Modes Supported

Resolution	Bit Depth/Colors	Vertical Refresh
640x480	24-bit/16M color	100 Hz
800x600	24-bit/16M color	100 Hz
1024x768	24-bit/16M color	100 Hz
1280x1024	24-bit/16M color	75 Hz
1600x1200	16-bit/65k color	60 Hz

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Ethernet Controller

The XVME-661 uses two Intel 82559ER 10 Base-T/100 Base-TX Ethernet controllers with a 32-bit PCI bus-mastering interface to sustain 100 Mbits per second bus transfers. The RJ-45 connectors on the module's front panel provide auto-sensing for 10Base-T and 100Base-TX connections. Each RJ-45 connector has two indicator lights. When mounted vertically, the top light on each is the link/activity light and the bottom light on each (the one closer to the COM ports) is the 10Base-T/100Base-TX indicator. When it is off, the connection is 10Base-TX; when it is on, the connection is 100Base-TX.

PCI Local Bus Interface

The PIIX4 PCI-to-ISA bridge device provides an accelerated PCI-to-ISA interface that integrates a high-performance enhanced IDE controller, PCI and ISA master/slave interfaces, enhanced DMA functions, UltraDMA 33 support, USB support, and a plug-and-play port for onboard devices. The bridge device also provides many common I/O functions found in ISA-based systems, including two 87C37 DMA controllers that provide seven channels, two 82C59 interrupt controllers, and an 82C54 timer/counter.

Universal Serial Bus Port

The XVME-661 incorporates two Universal Serial Bus (USB) ports compatible with USB devices. The ports terminate on the P2 connector, and are accessible through the Xycom XVME 974 Expansion Module that utilizes a standard USB two-pin connector.

Fast IDE controller and Floppy Drive Controller

The enhanced IDE controller supports programmed I/O (PIO), bus-mastering DMA with transfer rates to 22 MB/second, and UltraDMA 33 (33 MB/second). The controller contains an 8 x 32 bit buffer for bus master IDE PCI burst transfers, and will support up to two IDE devices. This controller can also handle a single optional floppy drive device. If present, this floppy drive will be designated Drive A.

IDE Devices and Floppy Drives

The XVME-661 primary IDE and floppy drive signals are routed through the P2 connector, providing a simplified method of connecting up to two IDE devices and one external floppy drive. The secondary IDE master signals support the compact flash site and the secondary IDE slave signals are not supported.

When used with the XVME-977 or the XVME-979 mass storage modules, the IDE devices and floppy drives do not need to be located next to the processor. Using the supplied six-inch ribbon cable (which connects the XVME boards J2 VME backplane connectors), the XVME-977 or the XVME-979 can be installed up to six slots away from the XVME-661 on the VME backplane. This allows greater flexibility in configuring the VMEbus card cage.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

For applications that require mass storage outside the VMEbus chassis, the XVME-973/1, 973/5 or 974/1 drive adapter can be used. Either adapter plugs onto the VMEbus J2 connector. Each adapter provides industry standard connections for IDE and floppy signals. One floppy drive can be connected to the XVME-973/1. This drive may be 2.88 MB, 1.44 MB, 1.2 MB, or 720 KB, 360 KB in size. The XVME 973/1 mounts to J1 on the backside of the VME backplane while the 973/5 mounts internally for reduction in external cabling. While the 973/x adapters are designed for Pentium class XVME CPU modules, the XVME 974/1 is designed specifically for use with the 661 and provides drive connectivity and COM2, USB and LPT connectors. For more information on the XVME-973x and XVME 974/1 refer to Chapter 5.

Caution

The IDE controller supports enhanced PIO modes, which reduce the cycle times for 16-bit data transfers to the hard drive. Check with your drive manual to see if the drive you are using supports these modes. The higher the PIO mode, the shorter the cycle time will be. As the IDE cable length increases, this reduced cycle time can lead to erratic operation. As a result, it is in your best interest to keep the IDE cable as short as possible.

The PIO modes can be selected in the BIOS setup (see p. 33). The Auto-configuration will attempt to classify the connected drive if the drive supports the auto ID command. If you experience problems, change the **Transfer Mode** to *Standard*.

Caution

The total cable length must not exceed 18 inches. Also, if two drives are connected, they must be no more than six inches apart.

Compact Flash Site

The compact flash socket on the mainboard will support type I or type II Compact Flash cards. The compact flash resides as a master on the secondary IDE port. There are no unique drivers required. The XVME-661 can be booted from the compact flash drive if configured in the BIOS **Boot** menu (move *Bootable Add-in Cards* higher in the list).

VMEbus Interface

The XVME-661 uses the PCI local bus to interface to the VMEbus. The VMEbus interface supports full DMA to and from the VMEbus, integral FIFOs for posted writes, block mode transfers, and read-modify-write operations. The interface contains one master and eight slave images that can be programmed in a variety of modes to allow the VMEbus to be mapped into the XVME-661 local memory. This makes it easy to configure VMEbus resources in protected and real mode programs. The XVME-661 also incorporates onboard hardware byte-swapping (see Table 1-2).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Serial and Parallel Ports

PC peripherals include two high-speed 16550-compatible serial ports (RS-232C) and an ECP or EPP configurable parallel port. COM2 and LPT1 signals are routed to the P2 connector and are accessible through the Xycom XVME-974/1 Expansion Module.

Keyboard / Mouse Interface

A combined keyboard and mouse port PS/2 connector is provided on the front panel. A PS/2 splitter cable (Xycom PN 140232) may be used to separate the two ports so that both devices may be simultaneously connected to the module. Without the splitter cable, a keyboard can be connected to the PS/2 port.

PMC Expansion

The XVME-661 provides a PMC site for use with standard PMC modules. For electrical isolation, the PMC front panel bezel is not connected to the main CPU ground.

Further PMC and PC/104 Expansion Options

The XVME-661 supports optional PMC (PCI Mezzanine Card), PC/104, short ISA, and short PCI expansion using XVME-976 expansion modules. These XVME-976 modules are designed to plug directly into the XVME-661 using the two 80-pin expansion board connectors on the daughtercard.

Watchdog Timer

The XVME-661 incorporates a watchdog timer. When enabled, the timer can either generate an interrupt or a master reset, depending on how you configure the watchdog timer port. The timer input needs to be toggled within 1.0 second to prevent timeout. Timeout can cause either a reset or IRQ10 (see p. 14).

Note

The timeout range is from 1.0 second to 2.25 seconds; it will typically be 1.6 seconds.

Software Support

The XVME-661 is fully PC-compatible and will run "off-the-shelf" PC software, but most packages will not be able to access the features of the VMEbus. To solve this problem, Xycom Automation has developed extensive Board Support Packages (BSPs) that simplify the integration of VMEbus data into PC software applications. Xycom Automation's BSPs provide users with an efficient high-level interface between their applications and the VMEbus-to-PCI bridge device. Board Support Packages are available for MS-DOS (XVME983/1), Windows 3.x (XVME 984/1), Windows NT® (XVME 984/4), Windows 2000 (XVME 984/5), and QNX® (XVME 987/1).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Operational Description Diagram

Figure 1–1 is the block diagram for the XVME-661.

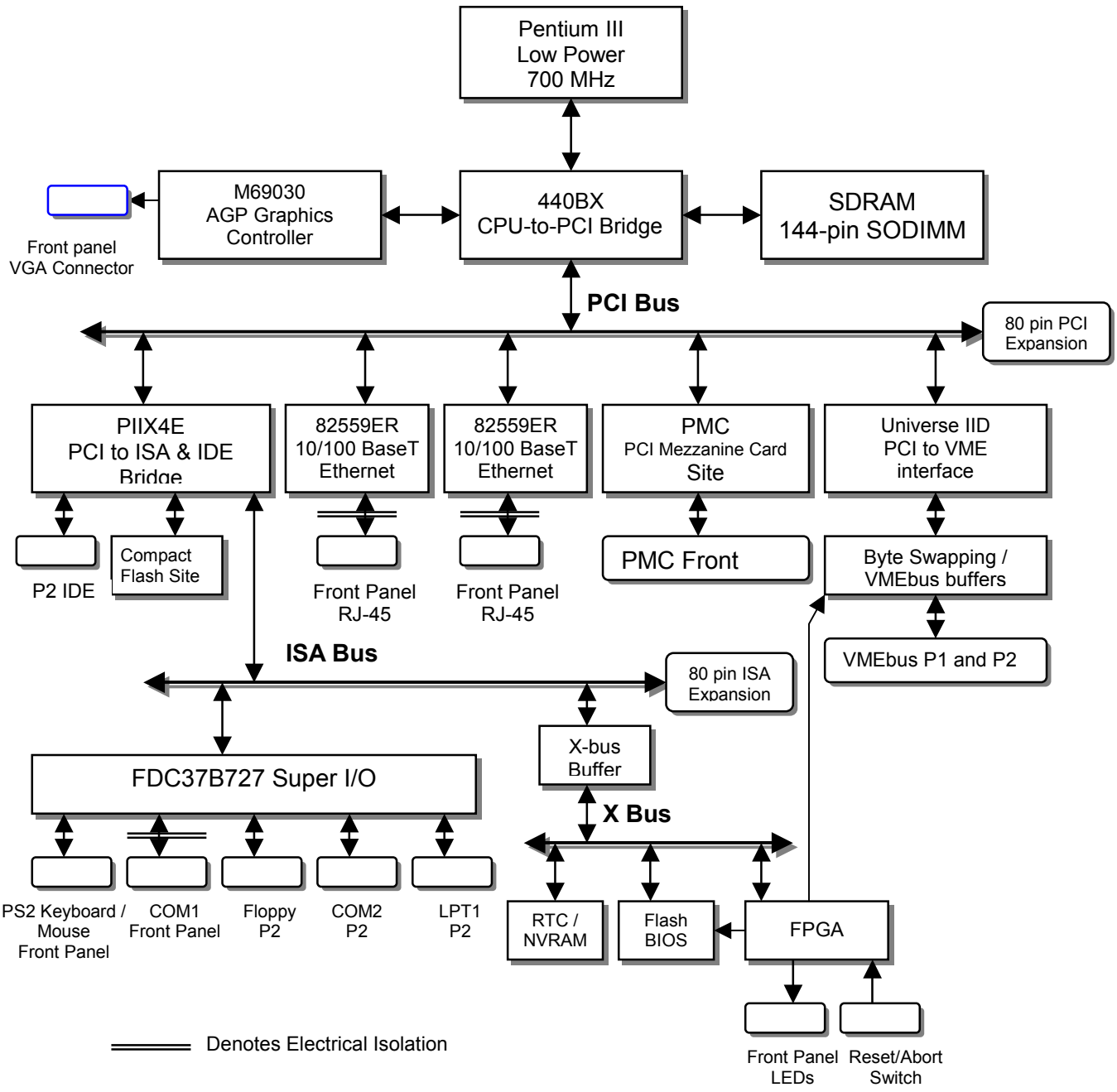


Figure 1–1. XVME-661 Block Diagram

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Hardware Specifications

Table 1–2. Hardware Specifications

Characteristic	Specification
Power Specifications	3.8 A (typical); 4.4 A (maximum)
Voltage Specifications	+5V, +12V, -12V; all ±5%
CPU speed	Intel Pentium III Low Power Processor 700 MHz
L2 Cache	Intel Pentium III Low Power Processor 256 KB
Onboard memory	SDRAM, up to 256 MB (one 144-pin SODIMM)
AGP Graphics Controller	1600 x 1200 maximum resolution, 24-bit color maximum; 4 MB VRAM
Ethernet Controllers (2)	Intel 82559 10Base-T/100Base-TX Fast Ethernet; RJ-45
Serial Ports	Two RS-232C, 16550 compatible Two USB
Parallel Interface	One EPP/ECP compatible
Regulatory Compliance	European Union – CE; Electromagnetic Compatibility - 89/336/EEC
VMEbus Compliance	Complies with VMEbus Specification ANSI/VITA 1–1994 A32/A24/A16:D64/D32/D16/D08(EO) DTB Master A32/A24/A16:D64/D32/D16/D08(EO) DTB Slave R(0-3) Bus Requester Interrupter I(1)-I(7) DYN IH(1)-IH(7) Interrupt Handler SYSCLK and SYSRESET Driver PRI, SGL, RRS Arbiter RWD, ROR bus release Form Factor: DOUBLE 233.7 mm x 160 mm (9.2" x 6.3")

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Environmental Specifications

Table 1–3. Environmental Specifications

Characteristic	Specification
Temperature	
Operating (300 lfm airflow)	0 to 55°C (32 to 131°F)
Nonoperating	-40 to 85°C (-40 to 185°F)
Humidity	10% to 90% RH, non-condensing
Shock	
Operating	30 G peak acceleration, 11 msec duration
Nonoperating	50 G peak acceleration, 11 msec duration
Vibration (5 to 2000 Hz)	
Operating	0.015" (0.38 mm) peak-to-peak displacement 2.5 G (maximum) acceleration
Nonoperating	0.030" (0.76 mm) peak-to-peak displacement 5.0 G (maximum) acceleration
Regulatory Compliance	
	CE
Immunity	EN 55022
Emissions	EN 55024

System Configuration and Expansion Options Tables

Your XVME-661 can be ordered in a variety of configurations and expanded as well. The following tables show these options.

Table 1–4. XVME-661 CPU and DRAM Configurations

XVME-661 Intel 700 MHz Pentium III Low Power CPU	
Ordering Number	**SDRAM**
XVME-661/710	None
XVME-661/713	32 MB
XVME-661/714	64 MB
XVME-661/715	128 MB
XVME-661/716	256 MB

The ordering number is broken into two parts. The model number is the 661. The tab number is the three digits after the slash. For the XVME-661, the tab number indicates the amount of SDRAM memory (the third digit). Memory options are explained more fully in Appendix A.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

There are also several expansion module options for the XVME-661.

Table 1–5. XVME-661 Expansion Module Options

Ordering Number	Description
XVME-974/1	Drive Adapter Module for external drives, cables out back of VME backplane, COM2, LPT1, 2 USB ports
XVME-976/201	PMC and PC/104 Expansion Module
XVME-976/202	16-bit short ISA card Expansion Module (occupies 2 VME slots)
XVME-976/203	Dual PMC Expansion Module
XVME-976/204	Dual PC/104 Expansion Module
XVME-976/205	Short PCI card Expansion Module (occupies 2 VME slots)
XVME-977	Single-slot Mass Storage Module with hard drive and floppy drive
XVME-979/1	Single-slot Mass Storage System with CD-ROM and external floppy connector
XVME-979/2	Single-slot Mass Storage System with CD-ROM, hard drive, and external floppy connector
XVME-979/3	Single-slot Mass Storage System with RW CD-ROM and external floppy connector
XVME-979/4	Single-slot Mass Storage System with RW CD-ROM, hard drive, and external floppy connector
XVME-9000-EXF	External Floppy Drive for use with XVME-979

The XVME-976, XVME-977, and XVME-979 expansion modules are described in their own manuals. The XVME-974/1 is described in Chapter 5.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Chapter 2 – Installation and Configuration

This chapter provides information on configuring the XVME-661 module. It also provides information on installing the XVME-661 into a backplane and enabling the Ethernet controller. Figure 2–1 shows the jumper, switch, and connector locations on the XVME-661.

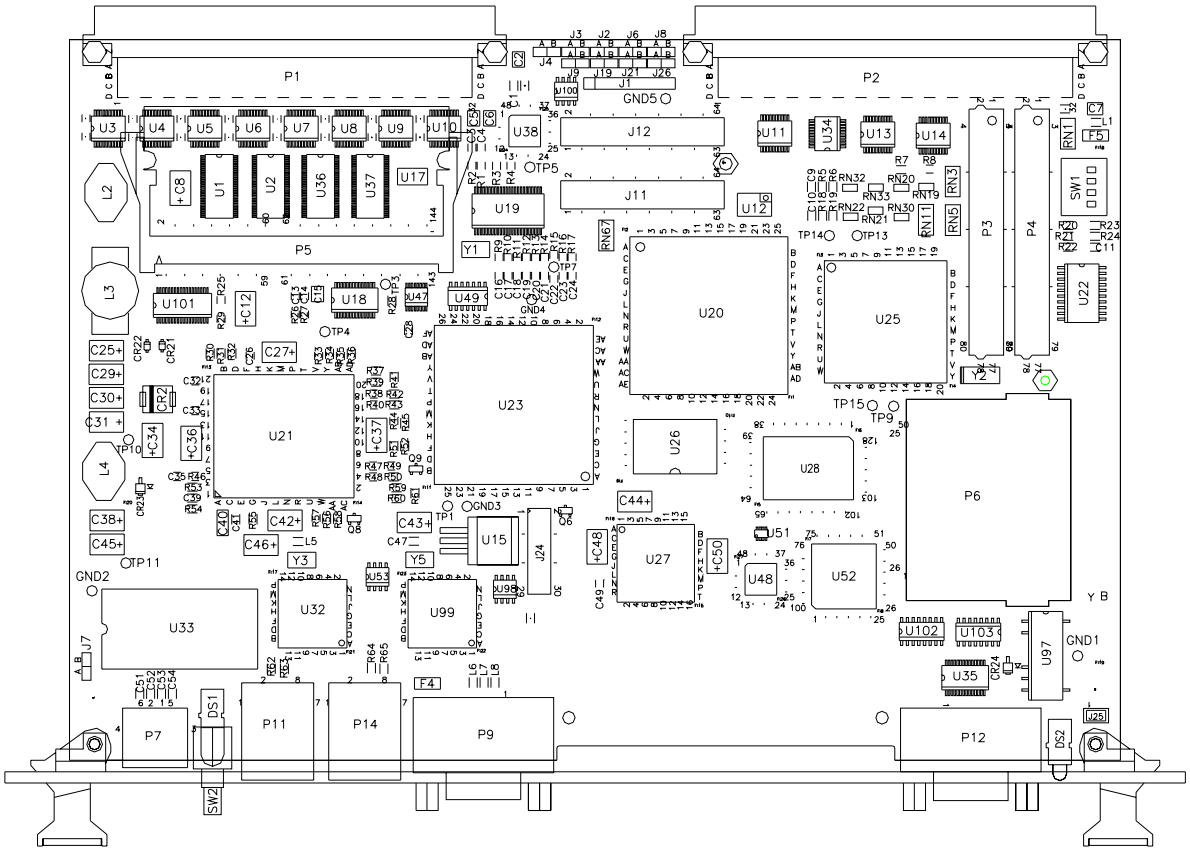


Figure 2–1. XVME-661 Mainboard Jumper, Switch, and Connector Locations

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Jumper Settings

The following tables list the XVME-661 jumpers, their default positions (checked) and their functions. Jumper locations are shown in Figure 2–1.

Table 2–1. XVME-661 Mainboard Jumper Settings

Jumper	Position	Function
J2	A B √	XVME-661 cannot generate SYSFAIL* XVME-661 generates SYSFAIL* normally
J3	A B √	Disables system resources (no auto SYSCON) Enables system resources (auto SYSCON)
J4	A√ B	XVME-661 can reset VMEbus XVME-661 cannot reset VMEbus
J6	A√ B	Boot from FLASH Boot from ROM
J7	A B√	Orb ground not connected to logic ground Orb ground connected to logic ground
J8	A B √	Ethernet controller 1 isolated from PCI bus Normal
J9	A B √	Ethernet controller 2 isolated from PCI bus Normal
J19	A B √	Reserved
J21	A B √	Clear CMOS memory Normal CMOS memory
J26	A B √	Put 69030 graphics controller in standby mode Normal

√ = default setting

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Switch Settings

The XVME-661 has one four-position DIP switch (SW1) (see Figure 2–1). The switches functions are explained in Table 2–2. This switch controls the system response to the front panel Abort switch (SW2).

Table 2–3 shows the switch settings required to reset on the XVME-661 CPU, to reset only the VME backplane, or to reset both. The switch 3 is reserved and should always be closed. The XVME-661 is shipped with all four switches in the closed position (which causes SW2 to reset both the XVME-661 and the VME backplane).

Table 2–2. Four-Position DIP Switch (SW1) Functions

Switch	Open	Closed
1	Do not respond to SYSRESET*	Respond to SYSRESET*
2	No SYSRESET* on toggle (SW2)	SYSRESET* on toggle (SW2)
3	SYSFAIL* asserted on power up	SYSFAIL* not asserted on power up
4	No local reset on toggle (SW2)	Local reset on toggle (SW2)

Table 2–3. Four-Position DIP Switch (SW1) Reset Settings

For the front panel reset switch (SW2) operation :	The four-position DIP switch (SW1) setting :		
	1	2	4
No Resets	Closed	Open	Open
Reset the VME backplane only	Open	Closed	Open
Reset the XVME-661 CPU only	Open	Open	Closed
Reset both the VME backplane and the XVME-661 CPU (default setting)	Closed	Closed	Closed

Registers

The XVME-661 module contains the following Xycom-defined I/O registers: 218h, 219h, 233h, and 234h.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Register 218h – Abort/CMOS Clear Register

This register controls the abort toggle switch and allows you to read the CMOS clear jumper (J21).

Table 2–4. Abort/CMOS Clear Register Settings

Bit	Signal	Description	Access
0	RESERVED	Reserved	
1	RESERVED	Reserved	
2	EJECT_STS	Eject Status 1 = Ejector Unlatched.	R
3	EJECT_CLR	0 = Clear and Disable Eject 1 = Enable Eject	R/W
4	ABORT_STS	Abort Status 1 = Abort Toggle Switch Caused Interrupt	R
5	ABORT_CLR	0 = Clear and Disable Abort 1= Enable Abort	R/W
6	RESERVED	Reserved	
7	CLRCMOS	0 = Clear CMOS 1 = CMOS OK	R

Register 219h – LED/BIOS Port

This register controls the following LEDs and signals.

Table 2–5. LED/BIOS Register Settings

Bit	LED/Signal	Result	R/W
0	FAULT	0= Fault LED on 1= Fault LED off	R/W
1[1]	PASS	0= PASS LED off 1= PASS LED on	R/W
2	FLB_A18_EN	1= Flash Write is enabled and A18 is controllable	R/W
3[1]	FLB_A18	Reads Jumper J19 when FLB_A18_EN = 0 Flash BIOS address A18 when FLB_A18_EN = 1	R/W
4	STATUS_LED	0 = STATUS_LED OFF 1 = STATUS_LED ON	R/W
5	RESERVED	Reserved	
6	RESERVED	Reserved	
7	RESERVED	Reserved	

[1]A18, along with control ROM/RAM 15-17 are to be used to page the Flash when FLB_A18_EN is asserted.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Register 233h – Watchdog Timer Register

This register controls watchdog timer operation.

Table 2–6. Watchdog Timer Register Settings

Bit	Signal	Result
0	RESERVED	Reserved
1	RESERVED	Reserved
2	RESERVED	Reserved
3	RESERVED	Reserved
4	WDOG_EN	1 = Enables the Watchdog Timer
5	MRESET_EN	1 = Timeout generates RESET
6	WDOG_STS	Watchdog Timer Status Bit
7	WDOG_CLR	Toggling this bit clears the watchdog timer back to a zero count.

Note

Before enabling the watchdog timer for the first time, it is necessary to reset the count back to zero by toggling bit 7 (WDOG_CLR). Toggling implies changing the state of bit (0 to 1 or 1 to 0).

Register 234h – Flash Paging and Byte Swap Register

This register controls access to the Flash paging and byte-swapping functions.

Table 2–7. Flash Paging and Byte Swap Register Settings

Bit	Signal	Result
0	FLB_A15	Flash address 15 - page control bit
1	FLB_A16	Flash address 16 - page control bit
2	FLB_A17	Flash address 17 - page control bit
3	Unused	Always reads “0”
4	Unused	Always reads “0”
5	Unused	Always reads “0”
6	SWAPS	1 = No swapping (no swapping= no data invariance) occurs during Slave cycles. (This byte can only be set for byte-swapping modules.)
7	SWAPM	1 = No swapping (no swapping= no data invariance) occurs during Master cycles. (This byte can only be set for byte-swapping modules.)

The following table lists ranges that are defined by bits 4 and 5 in register 234h, as well as byte-swapping bits 6 and 7.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 2–8. Register 234h Defined Ranges

Range Select Bits		
Bit 5	**Bit 4**	**Range**
0	0	No range
0	1	CC000-CFFFF
1	0	D0000-D7FFF
1	1	D8000-DFFFF

Byte-Swapping Bits		
Bit 7	**Bit 6**	**Description**
0	0	Byte swap all*
0	1	Byte swap master
1	0	Byte swap slave
1	1	Byte swap none

* Same as non-byte swap board

Connectors

The XVME-661 provides access to the following on its bezel (listed in order, from the top of the bezel to the bottom):

- Combined PS/2 keyboard/mouse port,
- 2 RJ-45 Ethernet ports,
- VGA port,
- PMC expansion card front bezel, and
- COM1 serial port.

The IDE hard drive and floppy drive interfaces are routed to the VME P2 connector with the same pin assignments as the XVME-65x and XVME-660. COM2, LPT1, and USB are also on the VME P2 connector and can be utilized using the XVME 974 interface adapter.

Two 80-pin connectors provide PC/104 (AT-bus) and PCI bus signals to optional 976/n expansion modules or 6U size daughter card.

Refer to the EMC warning at the beginning of this manual before attaching cables.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Front Bezel Connectors

Keyboard/Mouse PS/2 Port Connector (P7)

Table 2–9. Keyboard Port Connector Pinout

Pin	Signal
1	Keyboard Data
2	Mouse Data
3	Ground
4	+5V
5	Keyboard Clock
6	Mouse Clock

RJ-45 10/100 BaseT Connectors (P11 and P14)

Table 2–10. RJ-45 10/100 BaseT Connector Pinout

Pin	Signal
1	TX+
2	TX-
3	RX+
4	GND
5	GND
6	RX-
7	GND
8	GND

VGA Connector (P9)

Table 2–11. VGA Connector Pinout

Pin	Signal
1	RED
2	GREEN
3	BLUE
4	NC
5	GND
6	GND
7	GND
8	GND
9	25MIL_VIDA
10	GND
11	NC
12	LDDCDAT
13	HSYNC
14	VSYNC
15	LDDCCLK

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

PMC Host Connectors (J11 and J12)

The following table shows the pinout for the PMC Host Connector 1 (J11).

Table 2–12. XVME-661 PMC Host Connector 1 Pinout

Pin	Signal	Pin	Signal
1	TCK	33	FRAME*
2	-12V	34	GND
3	GND	35	GND
4	INTA*	36	IRDY*
5	INTB*	37	DEVSEL*
6	INTC*	38	+5V
7	BUSMODE1*	39	GND
8	+5V	40	PLOCK*
9	INTD*	41	SDONE
10	PCI-RSVD14B	42	SBO*
11	GND	43	PAR
12	PCI-RSVD14A	44	GND
13	PCICLK	45	V_I/O
14	GND	46	AD(15)
15	GND	47	AD(12)
16	GNT*	48	AD(11)
17	REQ*	49	AD(9)
18	+5V	50	+5V
19	V_I/O	51	GND
20	PAD(31)	52	C_BE*(0)
21	PAD(28)	53	AD(6)
22	PAD(27)	54	AD(5)
23	PAD(25)	55	AD(4)
24	GND	56	GND
25	GND	57	V_I/O
26	C_BE*(3)	58	AD(3)
27	AD(22)	59	AD(2)
28	AD(21)	60	AD(1)
29	AD(19)	61	AD(0)
30	+5V	62	+5V
31	V_I/O	63	GND
32	AD(17)	64	REQ64*

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

The following table shows the pinout for the PMC Host Connector 2 (J12).

Table 2–13. XVME-661 PMC Host Connector 2 Pinout

Pin	Signal	Pin	Signal
1	+12V	33	GND
2	TRST*	34	PMC-RSVD_PN2-34
3	TMS	35	TRDY*
4	TDO	36	+3.3V
5	TDI	37	GND
6	GND	38	STOP*
7	GND	39	PERR*
8	PCI-RSVD9A	40	GND
9	PCI-RSVD10B	41	+3.3V
10	PCI-RSVD11A	42	SERR*
11	BUSMODE2* (V_IO)	43	C_BE*(1)
12	+3.3V	44	GND
13	RST*	45	AD(14)
14	BUSMODE3* (GND)	46	AD(13)
15	+3.3V	47	GND
16	BUSMODE4* (GND)	48	AD(10)
17	PCI-RSVD19A	49	AD(8)
18	GND	50	+3.3V
19	AD(30)	51	AD(7)
20	AD(29)	52	PMC-RSVD_PN2-52
21	GND	53	+3.3V
22	PAD(26)	54	PMC-RSVD_PN2-54
23	PAD(24)	55	NC
24	+3.3V	56	GND
25	IDSEL*	57	NC
26	AD(23)	58	NC
27	+3.3V	59	GND
28	AD(20)	60	NC
29	AD(18)	61	ACK64*
30	GND	62	+3.3V
31	AD(16)	63	GND
32	CE_BE*(2)	64	RES (NC)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

COM1 Serial Port Connector (P12)

Table 2–14. COM1 Serial Port Connector Pinout

COM1 (RS-232)	
Pin	**Signal**
1	DCD1
2	RXD1
3	TXD1
4	DTR1
5	GND
6	DSR1
7	RTS1
8	CTS1
9	RI1

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

VME Bus Connectors

P1 Connector (P1)

Table 2–15. P1 Connector Pinout

Pin	Row Z	Row A	Row B	Row C	Row D
1	NC	D00	BBSY*	D08	NC
2	GND	D01	BCLR*	D09	GND
3	NC	D02	ACFAIL*	D10	NC
4	GND	D03	BG0IN*	D11	NC
5	NC	D04	BG0OUT	D12	NC
6	GND	D05	BG1IN*	D13	NC
7	NC	D06	BG1OUT	D14	NC
8	GND	D07	BG2IN*	D15	NC
9	NC	GND	BG2OUT	GND	NC
10	GND	SYSCLK	BG3IN*	SYSFAIL	NC
11	NC	GND	BG3OUT	BERR*	NC
12	GND	DS1*	BR0*	SYSRES	NC
13	NC	DS0*	BR1*	LWORD*	NC
14	GND	WRITE*	BR2*	AM5	NC
15	NC	GND	BR3*	A23	NC
16	GND	DTACK*	AM0	A22	NC
17	NC	GND	AM1	A21	NC
18	GND	AS*	AM2	A20	NC
19	NC	GND	AM3	A19	NC
20	GND	IACK*	GND	A18	NC
21	NC	IACKIN*	NC	A17	NC
22	GND	IACKOU	NC	A16	NC
23	NC	AM4	GND	A15	NC
24	GND	A07	IRQ7*	A14	NC
25	NC	A06	IRQ6*	A13	NC
26	GND	A05	IRQ5*	A12	NC
27	NC	A04	IRQ4*	A11	NC
28	GND	A03	IRQ3*	A10	NC
29	NC	A02	IRQ2*	A09	NC
30	GND	A01	IRQ1*	A08	NC
31	NC	-12V	NC	+12V	GND
32	GND	+5V	+5V	+5V	NC

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

P2 Connector (P2)

Table 2–16. P2 Connector Pinout

Pin	Row Z	Row A	Row B	Row C	Row D
1	NC	+5V	+5V	IDERST1*	NC
2	GND	+5V	GND	HD0	NC
3	NC	+5V	RES	HD1	PSTROBE*
4	GND	RI2	A24	HD2	PPACK*
5	NC	CTS2	A25	HD3	PPBUSY
6	GND	RTS2	A26	HD4	PPE
7	NC	DSR2	A27	HD5	PSELECT
8	GND	GND	A28	HD6	PAUTOFEED*
9	NC	DTR2	A29	HD7	PPERROR*
10	GND	TXD2	A30	HD8	PINIT*
11	NC	RXD2	A31	HD9	PSELIN*
12	GND	DCD2	GND	HD10	PPD(0)
13	NC	NC	+5V	HD11	PPD(1)
14	GND	NC	VD16	HD12	PPD(2)
15	NC	NC	VD17	HD13	PPD(3)
16	GND	NC	VD18	HD14	PPD(4)
17	USBC (USB1_GND)	NC	VD19	HD15	PPD(5)
18	GND	PDIAG (1)	VD20	GND	PPD(6)
19	USB1+	GND	VD21	DIOW*	PPD(7)
20	GND	FRWC*	VD22	DIOR*	NC
21	USB1-	IDX*	VD23	IORDY	NC
22	GND	MO0*	GND	Pulled up to +5V	NC
23	USBA (USB1_PWR)	HDRQ0*	VD24	IRQ14	NC
24	GND	FDS0*	VD25	IOCS16* (nc)	NC
25	USBD (USB0_GND)	HDAK0*	VD26	DA0	NC
26	GND	FDIRC*	VD27	DA1	NC
27	USB0+	FSTEP*	VD28	DA2	NC
28	GND	FWD*	VD29	CS1P*	NC
29	USB0-	**FWE***	VD30	CS3P*	**NC**
30	GND	FTK0*	VD31	IDEATP* (nc)	NC
31	USBB (USB0_PWR)	FWP*	GND	FHS*	GND
32	GND	FRDD*	+5V	DCHG*	NC (VPC1)

Note: PDIAG is used by the IDE interface but not received or driven by the XVME-661. It is only shown here as a reminder that this pin cannot be used for another function.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Interboard Connector 1 (P4)

This high-speed micro-strip connector is a custom pin out for the AT-bus. In order to keep the connectors for PCI and the AT-bus the same, some signals had to be removed from the AT-bus interface. The following signals are not supported:

MASTER*, 0WS*, DRQ0, DACK0*, DRQ3, DACK3*, DRQ7, & DACK7*

The PC/104 interface does not support master cycles and will only have one 8-bit DMA channel and two 16-bit DMA channels available.

The table on the following page shows the pinout for the interboard connector 1.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 2–17. Interboard Connector 1 Pinout

Pin	Signal	Pin	Signal
1	SYSCLK	41	SA10
2	OSC	42	SA11
3	SD(15)	43	SA12
4	SD(14)	44	SA13
5	SD(13)	45	SA14
6	SD(12)	46	SA15
7	SD(11)	47	SA16
8	SD(10)	48	SA17
9	SD(9)	49	SA18
10	SD(8)	50	SA19
11	MEMW*	51	BALE
12	MEMR*	52	TC
13	DRQ5	53	DACK2*
14	DACK5*	54	IRQ3
15	DRQ6	55	IRQ4
16	DACK6*	56	SBHE*
17	LA17	57	IRQ5
18	LA18	58	IRQ6
19	LA19	59	IRQ7
20	LA20	60	REF*
21	LA21	61	DRQ1
22	LA22	62	DACK1*
23	LA23	63	RESETDRV
24	IRQ14	64	IOW*
25	IRQ15	65	IOR*
26	IRQ12	66	SMEMW*
27	IRQ11	67	AEN
28	IRQ10	68	SMEMR*
29	IOCS16*	69	IOCHRDY
30	MEMCS16*	70	SD0
31	SA0	71	SD1
32	SA1	72	SD2
33	SA2	73	SD3
34	SA3	74	SD4
35	SA4	75	SD5
36	SA5	76	SD6
37	SA6	77	SD7
38	SA7	78	DRQ2
39	SA8	79	IRQ9
40	SA9	80	IOCHCK*

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Interboard Connector 2 (P3)

This high-speed micro-strip connector has all the PCI signals along with 2 separate PCI clocks and the 2 requests and grants predefined. The CPU board and the Interface boards are keyed for either 3.3V or 5V signaling. The keying mechanism is based on standoffs. Currently, all 661 CPU modules are 5V PCI signaling. The V/IO pins on the connector are used to define the signaling level to the other PCI boards.

This connector provides power through the center pins. The following table shows the pinout for this connector.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 2–18. Interboard Connector 2 Pinout

Pin	Signal	Pin	Signal
1	TCLK	41	AD23
2	TRST*	42	AD22
3	TMS	43	AD21
4	TDO	44	AD20
5	TDI	45	AD19
6	+12 V	46	AD18
7	+12 V	47	AD17
8	PCI-RSVD11A	48	AD16
9	PCI-RSVD14A	49	BE2*
10	-12 V	50	FRAME*
11	-12 V	51	IRDY*
12	PMC-RSVD Pn2-34	52	TRDY*
13	PMC-RSVD Pn2-52	53	DEVSEL*
14	PMC-RSVD Pn2-54	54	STOP*
15	PCICLK3 (Note 1)	55	PLOCK*
16	PIRQA*	56	PERR*
17	PIRQB*	57	SDONE
18	PIRQC*	58	SBO*
19	PIRQD*	59	SERR*
20	REQ3* (Note 2)	60	PAR
21	PCICLK2	61	BE1*
22	REQ1*	62	AD15
23	GNT3* (Note 2)	63	AD14
24	PCICLK1	64	AD13
25	GNT1*	65	AD12
26	PCIRST*	66	AD11
27	PCICLK0 (Note 1)	67	AD10
28	GNT0*	68	AD9
29	REQ0*	69	AD8
30	REQ2*	70	BE0*
31	AD31	71	AD7
32	AD30	72	AD6
33	AD29	73	AD5
34	AD28	74	AD4
35	AD27	75	AD3
36	AD26	76	AD2
37	AD25	77	AD1
38	AD24	78	AD0
39	BE3*	79	ACK64* (+5V pullup)
40	GNT2*	80	REQ64* (+5V pullup

Although not shown, this connector supplies Vi/o = +5v, VCC=+5V, and GND through the center pins.

Notes:

(1)PCICLK2 and PCICLK3 are not supplied by the XVME-661. These clocks were needed for on board PCI devices and were not used by any currently supported daughtercards.

(2)The REQ3*/GNT3* signals are shared with the 2nd Ethernet interface.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Installing the XVME-661 into a Backplane

This section provides the information to install the XVME-661 into the VMEbus backplane. The XVME-661 is a double-high (6U), single-slot VMEbus module.

Note

Xycom Automation XVME modules are designed to comply with all physical and electrical VMEbus backplane specifications.

Caution

Do not install the XVME-661 on a VMEbus system without a P2 backplane.

Warning

Never install or remove any boards before turning off the power to the bus and all related external power supplies.

1. Turn the VME bus card cage power OFF. .
2. Make sure backplane connectors P1 and P2 are available.
3. Verify that all jumper settings on the 661 CPU are correct for desired operation. Default settings from the factory can be used in most systems.
4. Verify that the card cage slot is clear and accessible.
5. Install the XVME-661 in the card cage by centering the unit on the plastic guides in the slots (P1 connector facing up). Push the board slowly toward the rear of the chassis until the P1 and P2 connectors engage. The board should slide freely in the plastic guides.

Caution

Do not use excessive force or pressure to engage the connectors. If the boards do not properly connect with the backplane, remove the module and inspect all connectors and guide slots for damage or obstructions.

6. Secure the module to the chassis by tightening the machine screws at the top and bottom of the board.
7. Connect all remaining peripherals by attaching each interface cable into the appropriate connector on the front of the XVME-661 board as shown in Table 2-19.
8. Turn ON power to the VMEbus card cage.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 2–19. Front Panel Connector Labels

Connector	Label
Keyboard/Mouse	KEYBD/MOUSE
Ethernet cable	10/100T
Display cable	VGA
PMC card	PMC
Serial device	COM 1

Note

The floppy drive and hard drive are either cabled across P2 to an XVME-977 or an XVME-979 mass storage module, or they are connected to the XVME-974/1 board. The two USB ports, COM2, and LPT1 ports are also connected to the XVME-974/1 Drive Expansion/Transition module. Refer to Chapter 5 for more information on the XVME-974/1.

Figure 2–2 illustrates the XVME-661 front panel, showing panel connectors.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

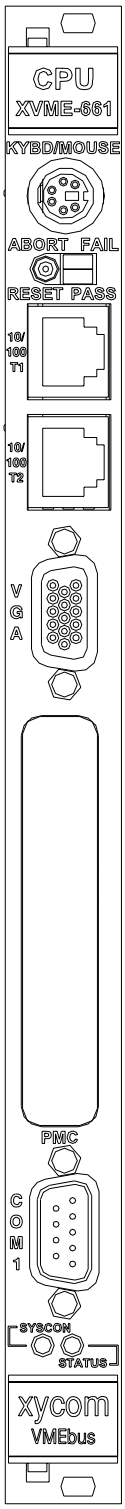


Figure 2–2. XVME-661 Front Panel

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Enabling the PCI Ethernet Controller

Loading the Ethernet Driver

To enable the Ethernet controllers, you must load the Ethernet driver for your operating system from the Documentation and Support Library CD (Xycom PN 140050) included with the XVME-661. Microsoft Windows based operating systems and MS-DOS drivers are provided on the Documentation and Support Library CD. Each set of drivers is extensively tested at the time of release, and updated periodically. While the manufactures of integrated controllers may have newer drivers, for best results always use the supplied drivers.

Pinouts for the RJ-45 10/100 BaseT Connector

Table 2–20. RJ-45 10/100 BaseT Connector Pinouts

Pin	Signal
1	TX+
2	TX-
3	RX+
4	GND
5	GND
6	RX-
7	GND
8	GND

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Chapter 3 – BIOS Setup Menus

The XVME-661 customized BIOS is designed to surpass the functionality provided for normal PCs. This custom BIOS allows you to access the value-added features on the XVME-661 module without interfacing to the hardware directly.

Navigating the BIOS Setup Menus

Press F2 during boot-up after the memory tests and before the system loads to access the BIOS setup menus. You may need to press F2 repeatedly after boot up. A `Press <F2> to enter SETUP` prompt may appear (depending on BIOS settings), but will be shown only briefly.

General instructions for navigating through the screens are described in the table below:

Table 3–1. Navigation Instructions for BIOS Setup Menus

Key	Result
F1 or ALT-H	Accesses the general Help window
ESC or ALT-X	Exits the menu and selects the Exit menu from a top-level menu
← or → arrow keys	Selects a different menu on the Menu Bar
↑ or ↓ arrow keys	Moves the cursor up or down in a menu
TAB or SHIFT-TAB	Cycles the cursor in the System Time and System Date fields
HOME or END	Moves the cursor to the top or bottom of the window
PGUP or PGDN	Moves the cursor to the next or previous page
F5 or -	Selects the previous value for the field
F6 or + or SPACE	Selects the next value for the field
F9	Loads the default Setup configuration values
F10	Opens window to save current Setup settings and exit Setup
ENTER	Executes a command field, opens a ▸ submenu, cycles the cursor in the System Time and System Date fields, and opens a popup window of choices in a menu field

To select an item, use the arrow keys to move the cursor to the field you want and use the **ENTER** key to select a submenu, if any (indicated by a triangle bullet, ▸). Then use the <+> and <–> keys or the F5 and F6 keys to select a value for that field. The commands in the **Exit** menu allow you to save the new values.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

The BIOS setup menus use color-coding. The fields are blue, except for the currently selected field, which is green. User-configurable field values are in brackets and are black. Values that can be affected by the user on a different menu are in brackets and are blue.

Note

The default values given in the descriptions are for the XVME-661 board with no peripheral devices attached.

Main Setup Menu

```
                        Xycom BIOS Setup Utility
  Main      Advanced      Security      Power      Boot      VMEbus      Exit
                                                              Item Specific
                                                                  Help
  System Time:              [HH:MM:SS]
  System Date:              [MM/DD/YYYY]                    If the selected field has a
                                                            help
                                                            message, it is shown
                                                            here.
  Diskette A:               [1.44 MB, 3½"]
  Diskette B:               [Disabled]

▸ IDE Primary Master        [None]
▸ IDE Primary Slave         [None]
▸ IDE Secondary             [None]
Master
▸ IDE Secondary Slave       [None]

  System Memory:            640 KB
  Extended Memory:          64512 KB
▸ Cache Ram                 [128 KB]
▸ Shadow Ram                [384 KB]

F1 Help   ↑↓ Select Item   -/+  Change Values      F9 Setup Defaults
Esc Exit  ←→ Select Menu   Enter Select ▸ Sub-Menu  F10  Save and Exit
```

Figure 3–1. Main Setup Menu

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 3–2. Main Setup Menu Options

Option	Description
System Time (*HH*:*MM*:*SS*)	Sets the real-time clock for hour (*HH*), minute (*MM*), and seconds (*SS*). The hour is calculated according to the 24 hour military clock (00:00:00 through 23:59:59). Use TAB or ENTER to move the cursor right, and SHIFT-TAB to move it left. Use the number keys, 0-9, to change the field values. It is not necessary to enter the seconds or type zeros in front of numbers.
System Date (*MM*/*DD*/*YYYY*)	Sets the real-time clock for the month (*MM*), day (*DD*), and year (*YYYY*). The valid values in this field are 01/01/1981 through 12/31/2099. Use TAB or to ENTER move the cursor right, and SHIFT-TAB to move it left. Use the number keys, 0-9, to change the field values. It is not necessary to type zeros in front of numbers.
Diskette A Diskette B	Selects the floppy disk drive installed in your system. You should use only the Diskette A field, because the XVME-661 hardware does not support Diskette B. The choices in these fields are *Disabled*, *360Kb, 5¼"*, *1.2MB, 5¼"*, *720Kb, 3½"*, *1.44MB, 3½"*, and *2.88MB, 3½"*. The default value for Diskette A is *1.44MB, 3½"*. The default value for Diskette B is *Disabled*.
IDE Primary Master IDE Primary Slave IDE Secondary Master IDE Secondary Slave	These items show the IDE configuration. Press ENTER on any of these fields to open the IDE submenu for that particular setting. The default value for each field is *None*.
System Memory	This field displays the amount of conventional memory detected during bootup. This field is not user configurable.
Extended Memory	This field displays the amount of extended memory detected during bootup. This field is not user configurable.
Cache Ram	This field displays the amount of cache detected. This amount is calculated by the system and is not editable. Press ENTER to open the Cache Ram submenu.
Shadow Ram	This field displays the amount of Shadow RAM available. This amount is calculated by the system and is not editable. Press ENTER to open the Shadow Ram submenu, where Shadow RAM access is enabled or disabled.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

IDE Primary and Secondary Master and Slave Submenus

The IDE Primary and Secondary Master and Slave submenus are used to configure IDE device information. If only one device is attached to one of the IDE adapters, then only the parameters in the Master Submenu need to be entered. If two devices are connected to one IDE adapter, both Master and Slave Submenu parameters will need to be entered. All four submenus contain the same information.

The IDE Secondary Master is used for the Compact Flash adapter. The IDE Secondary Slave is not connected, and so should not be used.

The screen in figure 3–2 shows all possible fields. Because of this, it is not a configuration that would actually appear. The fields on the screen change based on the option chosen in the **Type** field.

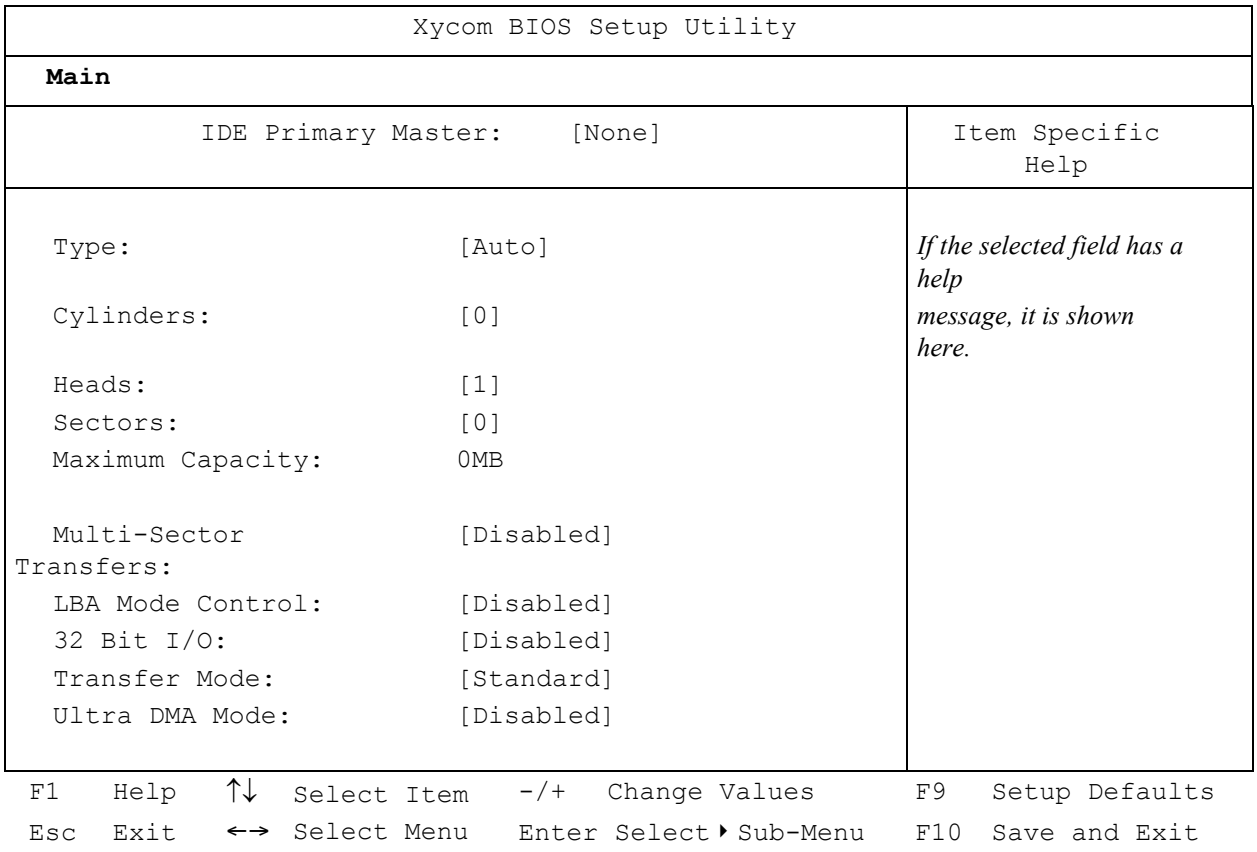


Figure 3–2. IDE Adapter Submenu

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 3–3. IDE Adapter Submenu Options

Option	Description
Type	Displays the type of device. Options include *None*, *IDE Removable*, *ATAPI Removable*, *CD-ROM*, *Other ATAPI*, *User*, and *Auto*. The *Auto* option causes the system to autotype at each boot and display the settings; it does not allow you to edit the remaining fields. The *Auto* option (the default value) causes the system to fill in the other field values. The *User* option allows the user to fill in the other fields. The other options allow the user to configure other IDE devices.
Cylinders	This field only appears if the *User* Type option is chosen. It displays the number of cylinders on the hard drive. This information is automatically detected by the system. Valid values are 0 to 65535.
Heads	This field only appears if the *User* Type option is chosen. It displays the number of read/write heads on the hard drive. This information is automatically detected by the system. Valid values are 1 to 16.
Sectors	This field only appears if the *User* Type option is chosen. It displays the number of sectors per track on the hard drive. Valid values are 1 to 63.
Maximum Capacity	This field only appears if the *User* Type option is chosen. It displays the maximum storage capacity of the hard drive. This information is automatically detected dynamically by the system as the other values change.
Multi-Sector Transfers	Sets the number of sectors per block. There is no default value; the value is detected by the system. The options are *Disabled* (default) *2 Sectors*, *4 Sectors*, *8 Sectors*, and *16 Sectors*. Choose *Auto* Type to allow the system to set the value to the highest number supported by the drive.
LBA Mode Control	Enables Logical Block Access to be used in place of Cylinders, Heads, and Sectors. The options are *Disabled* and *Enabled*. The default (*Disabled*) should work with most hard drives.
32 Bit I/O	Enables or disables 32-bit communication between CPU and IDE interface. Enabling requires PCI or local bus. The options are *Disabled* (default) and *Enabled*.
Transfer Mode	Selects the method for transferring data to and from the device. Available options are determined by the device type and can include *Standard* (default), *Fast PIO 1*, *Fast PIO 2*, *Fast PIO 3*, *Fast PIO 4*, *FPIO 3 / DMA 1*, and *FPIO 4 / DMA 2*. Choose *Auto* Type to allow the system to select the optimum mode.
Ultra DMA Mode	Selects the Ultra DMA mode used for transferring data to and from the device. Available options are determined by the device type and can include *Disabled* (default), *Mode 0*, *Mode 1*, and *Mode 2*. Choose *Auto* Type to allow the system to select the optimum mode.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Cache RAM Submenu

Enabling cache saves time for the CPU, and increases its performance by holding data most recently accessed in regular memory in a special high-speed storage area called cache. The XVME-661 provides two levels of cache memory, L1 and L2, both internal to the CPU. The Celeron processor has 128KB L2 cache and the Pentium III processor has 256 KB L2 cache. Both processors have 32KB L1 cache.

The cache RAM submenu screen is shown in figure 3–3. Table 3–4 describes the options of the submenu.

```
                        Xycom BIOS Setup Utility
  Main
┌──────────────────────────────────────────────┬──────────────────────────┐
│              Cache Ram [128 KB]              │ Item Specific Help       │
│                                              │                          │
│  Memory Cache:              [Enabled]        │ If the selected field has│
│                                              │ a help                   │
│  Cache System BIOS area:    [Write Protect]  │ message, it is shown     │
│                                              │ here.                    │
│  Cache Video BIOS area:     [Write Protect]  │                          │
│  Cache Base 0-512k:         [Write Back]     │                          │
│  Cache Base 512-640k:       [Write Back]     │                          │
│  Cache Extended Memory      [Write Back]     │                          │
│Area:                                         │                          │
│                                              │                          │
│  Cache C800-CBFF:           [Disabled]       │                          │
│  Cache CC00-CFFF:           [Disabled]       │                          │
│  Cache D000-D3FF:           [Disabled]       │                          │
│  Cache D400-D7FF:           [Disabled]       │                          │
│  Cache D800-DBFF:           [Disabled]       │                          │
│  Cache DC00-DFFF:           [Disabled]       │                          │
└──────────────────────────────────────────────┴──────────────────────────┘
 F1   Help  ↑↓  Select Item   -/+   Change Values     F9   Setup Defaults
 Esc  Exit  ←→  Select Menu   Enter Select ▸ Sub-Menu F10  Save and Exit
```

Figure 3–3. Memory Cache Submenu

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 3–4. Memory Cache Submenu Options

Option	Description
External Cache	Controls the state, *Enabled* (default) or *Disabled*, of L2 cache memory. The system BIOS automatically disables L2 cache if it is not installed.
Cache System BIOS Area	Allows the system BIOS memory area to be cached (*Write Protect*, default) or not (*uncached*). Caching increases system performance.
Cache Video BIOS Area	Allows the video BIOS memory area to be cached (*Write Protect*, default) or not (*uncached*). Caching increases system performance.
Cache Base 0-512k	Controls caching of the 0-512k base memory. The options are *Write Back* (default), *uncached*, *Write Through*, and *Write Protect*. Enabling cache may increase system performance, depending on how the extended BIOS is accessed.
Cache Base 512k-640k	Controls caching of the 512k-640k memory. The options are *Write Back* (default), *uncached*, *Write Through*, and *Write Protect*. Enabling cache may increase system performance, depending on how the extended BIOS is accessed.
Cache Extended Memory Area	Controls caching of the system memory above 1 MB. The options are *Write Back* (default), *uncached*, *Write Through*, and *Write Protect*. Enabling cache may increase system performance, depending on how the extended BIOS is accessed.
Cache C800-CBFF Cache CC00-CFFF Cache D000-D3FF Cache D400-D7FF Cache D800-DBFF Cache DC00-DFFF	Controls caching of the corresponding area of system memory. The options are *Disabled* (default), *Write Back*, *Write Through*, and *Write Protect*. Enabling cache may increase system performance, depending on how the extended BIOS is accessed.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Shadow RAM Submenu

The summary screen displays the amount of shadow memory in use. Shadow memory is used to copy system and/or video BIOS into RAM to improve performance. The XVME-661 displays the number of KB allocated to Shadow RAM on the summary screen.

The XVME-661 is shipped with both the system BIOS and video BIOS shadowed.

Figure 3–4 shows the shadow RAM submenu screen. Table 3–5 describes the options of the submenu.

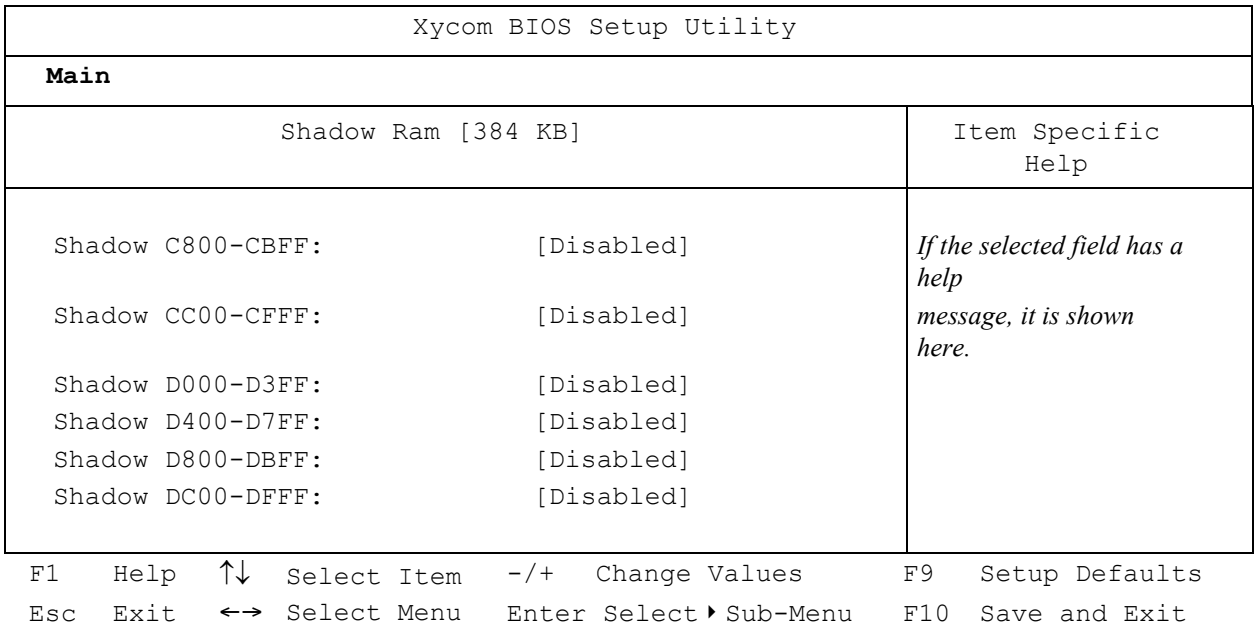


Figure 3–4. Memory Shadow Submenu

Table 3–5. Memory Shadow Submenu Options

Option	Description
Shadow C800-CBFF Shadow CC00-CFFF Shadow D000-D3FF Shadow D400-D7FF Shadow D800-DBFF Shadow DC00-DFFF	These memory segments are *Enabled* or *Disabled* (default) using these fields. Each segment is 16 KB and each segment range represents the first four digits of the linear address range affected. For example, CC00-CFFF represents the address range CC000-CFFFF.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Advanced Menu

This menu allows you to change the peripheral configuration, advanced chipset control, disk access mode, and related settings.

Figure 3–5 shows the Advanced Menu screen. Table 3–6 describes the options of the advanced menu.

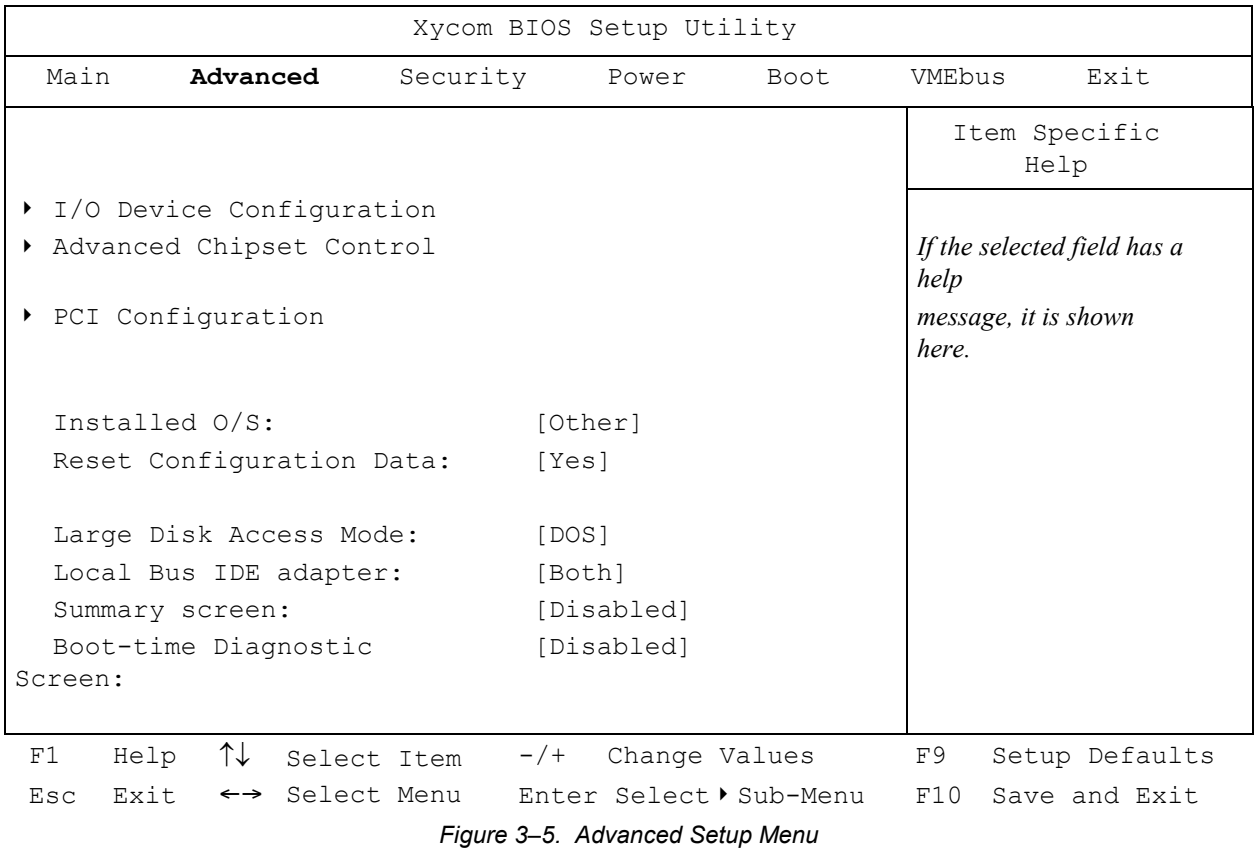


Figure 3–5. Advanced Setup Menu

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 3–6. Advanced Setup Menu Options

Option	Description
I/O Device Configuration	Press ENTER to open the I/O Device Configuration submenu.
Advanced Chipset Control	Press ENTER to open the Advanced Chipset Control submenu.
PCI Configuration	Press ENTER to open the PCI Configuration submenu.
Installed O/S	The options are *Other* (default) and *Win95*. Select *Win95* if you are using an operating system with Plug & Play capabilities. Choosing the incorrect setting may cause unexpected OS behavior.
Reset Configuration Data	The options are *Yes* (default) and *No*. Choosing *Yes* will cause the system to clear the Extended System Configuration Data (ESCD) area, which will reset the Plug & Play configuration data table when new devices are added to the system or when the BIOS is upgraded. This field is automatically toggled to No after the data is cleared. This ESCD clearing function is automatically performed every time the BIOS is changed, saved, and exited, so you will only need to use this function if you want to clear the data without changing the other BIOS settings.
Large Disk Access Mode	A large disk has more than 1024 cylinders, more than 16 heads, or more than 63 sectors per track. Select *DOS* (default) if your system is DOS-based (DOS or Windows OS); select *Other* if you have another OS (such as a Unix, Novell Netware, etc.). If you are installing new software and the drive fails, change this field selection, and try to reinstall the software. Different systems require different representations of drive geometries.
Local Bus IDE adapter	This field determines the configuration of the local bus IDE adapter. The options are *Both* (primary and secondary, default), *Disabled*, *Primary*, and *Secondary*.
Summary screen	This field determines whether the system configuration is displayed on powerup. If this field is *Enabled*, the computer will display and pause at the system information screen. The other option is *Disabled* (default).
Boot-time Diagnostic Screen	This field determines whether the company logo or the diagnostics screen is displayed on powerup. The choices are *Enabled* (no logo) or *Disabled* (the logo is shown instead of the diagnostics screen, default).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

I/O Device Configuration Submenu

This submenu is opened from the **Advanced** menu **I/O Device Configuration** field. All of the fields are shown below with default values, so this is not a valid screen configuration.

Figure 3–6 shows the I/O Device Configuration submenu screen. Table 3–7 describes the options of the submenu.

```
                        Xycom BIOS Setup Utility
                              Advanced
+-----------------------------------------------------+-----------------------+
|              I/O Device Configuration               |  Item Specific Help   |
|                                                     |                       |
|  COM A:                        [Auto]               | If the selected field |
|                                                     | has a help            |
|    Base I/O address/IRQ:       [3F8/IRQ 4]          | message, it is shown  |
|                                                     | here.                 |
|  COM B:                        [Auto]               |                       |
|    Base I/O address/IRQ:       [2F8/IRQ 3]          |                       |
|  Parallel port:                [Auto]               |                       |
|    Mode:                       [Bi-directional]     |                       |
|    Base I/O address:           [378]                |                       |
|    Interrupt:                  [IRQ 7]              |                       |
|    DMA channel:                [DMA 1]              |                       |
|  Floppy disk controller:       [Enabled]            |                       |
|    Base I/O address:           [Primary]            |                       |
+-----------------------------------------------------+-----------------------+
F1   Help  ↑↓ Select Item   -/+   Change Values       F9   Setup Defaults
Esc  Exit  ←→ Select Menu   Enter Select ▸ Sub-Menu   F10  Save and Exit
```

Figure 3–6. I/O Device Configuration Submenu

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 3–7. I/O Device Configuration Submenu Options

Option	Description
COM A COM B	These fields control the configuration of the COM ports (A or B). The choices are *Auto* (the system sets up the port, default), *Disabled* (port turned off), and *Enabled* (the user configures the port). If the OS disallows manual setup of the port, *(OS Controlled)* will be displayed and this will be a read-only field.
Base I/O address/IRQ	This field will appear under either of the COM A or COM B fields when they are set to *Enabled*. The settings are *3F8/IRQ 4* (default for COM A), *2F8/IRQ 3* (default for COM B), *3E8/IRQ 4*, and *2E8/IRQ 3*. If you configure both ports to share the same base I/O address, yellow asterisks will appear beside the COM A and COM B fields, signifying a conflict.
Parallel port	This field controls the configuration of the parallel port (LPT1). The choices are *Auto* (the system sets up the port, default), *Disabled* (port turned off), and *Enabled* (the user configures the port). If the OS disallows manual setup of the port, *(OS Controlled)* will be displayed and this will be a read-only field.
Mode	This field controls the mode for the parallel port. The choices are *Bi-directional* (default, two-way ECP), *EPP*, *ECP*, and *Output only*.
Base I/O address	This field appears if the Parallel port setting is *Enabled* and the Mode setting is *Bi-directional* (default), *ECP*, or *Output only*. The choices are *378* (default), *278*, and *3BC*.
Interrupt	This field appears if the Parallel port setting is *Enabled*. The choices are *IRQ 7* (default) and *IRQ 5*.
DMA channel	This field appears if the Parallel port setting is *Enabled* and the Mode setting is *ECP*. The choices are *DMA 1* (default) and *DMA 3*.
Floppy disk controller	This field controls the configuration of the legacy diskette controller. The choices are *Enabled* (default) and *Disabled* (turns off all on-board legacy diskette drives).
Base I/O address	This field controls the base I/O address for the diskette controller. The options are *Primary* (default) and *Secondary*.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Advanced Chipset Control Submenu

This submenu is opened from the **Advanced** menu **Advanced Chipset Control** field. All of the fields are shown below with default values.

Figure 3–7 shows the Advanced Chipset Control submenu. Table 3–8 describes the options of the submenu.

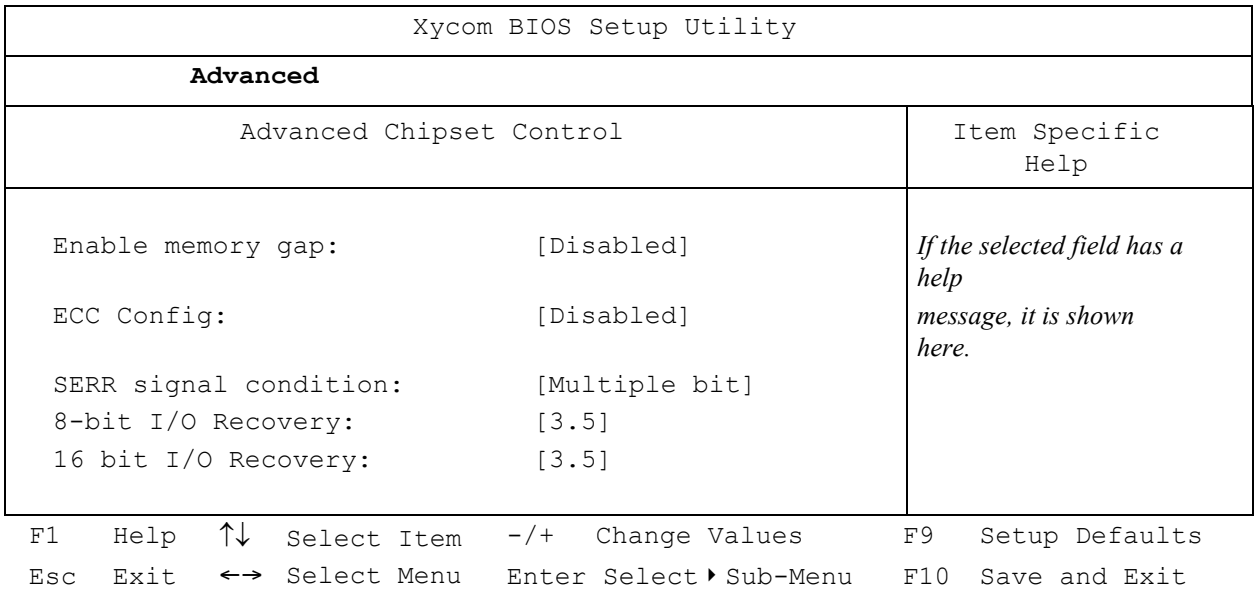


Figure 3–7. Advanced Chipset Control Submenu

Table 3–8. Advanced Chipset Control Submenu Options

Option	Description
Enable memory gap	This field allows creation of a memory gap (free address space in the system RAM) for use with an option card. This gap is 128 KB in the conventional memory from 512 KB to 640 KB or 1 MB in extended memory from 15 MB to 16 MB and this requires the use of conventional or extended memory. The choices are *Disabled* (default) or *Conventional*, and *Extended*.
ECC Config	The XVME-661 does not support ECC memory, so this field should not be used.
SERR signal condition	The XVME-661 does not support ECC memory, so this field should not be used.
8-bit I/O Recovery 16 bit I/O Recovery	These fields control configuration of the number of ISA clock cycles inserted between back-to-back I/O operations. The options for 8-bit IOR are *3.5* (default), *8.0*, *1.0*, *2.0*, *3.0*, *4.0*, *5.0*, *6.0*, and *7.0*. The options for 16-bit IOR are *3.5* (default), 3.*0*, *1.0*, *2.0*, and *4.0*.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

PCI Configuration Submenu

This submenu is opened from the **Advanced** menu **PCI Configuration field**. All of the fields are shown below with default values.

Figure 3–8 shows the PCI Configuration submenu. Table 3–9 describes the options of this submenu.

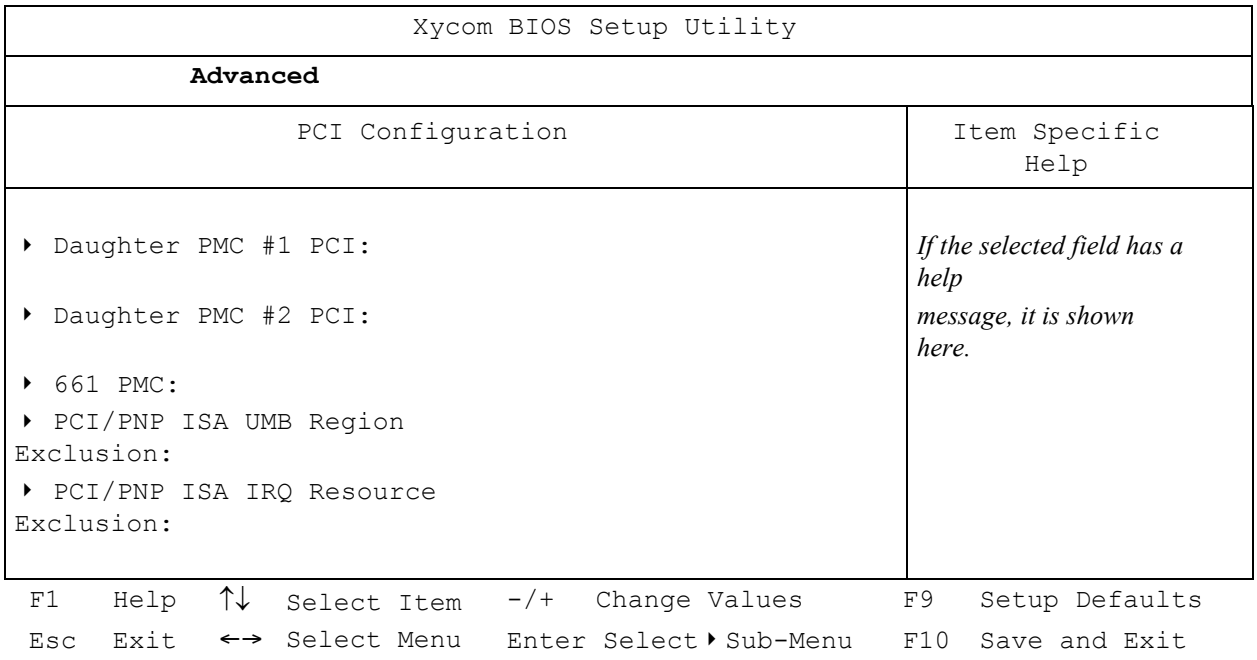


Figure 3–8. PCI Configuration Submenu

Table 3–9. PCI Configuration Submenu Options

Option	Description
Daughter PMC #1 PCI Daughter PMC #2 PCI 661 PMC PCI	Press ENTER to open the appropriate PCI device configuration submenu.
PCI/PNP ISA UMB Region Exclusion	Press ENTER to open the submenu used to reserve specific upper memory blocks for use by legacy ISA devices.
PCI/PNP ISA IRQ Resource Exclusion	Press ENTER to open the submenu used to reserve specific IRQs for use by legacy ISA devices.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Daughter PMC #1 PCI, Daughter PMC #2 PCI and 661 PMC Submenus

These submenus are opened from the **PCI Configuration** submenu in the **Advanced** menu. The **Daughter PMC #1 PCI** submenu is shown as an example with all of the fields displayed with default values.

Figure 3–9 shows the Daughter PMC #1 PCI submenu. Table 3–10 describes the options of this submenu.

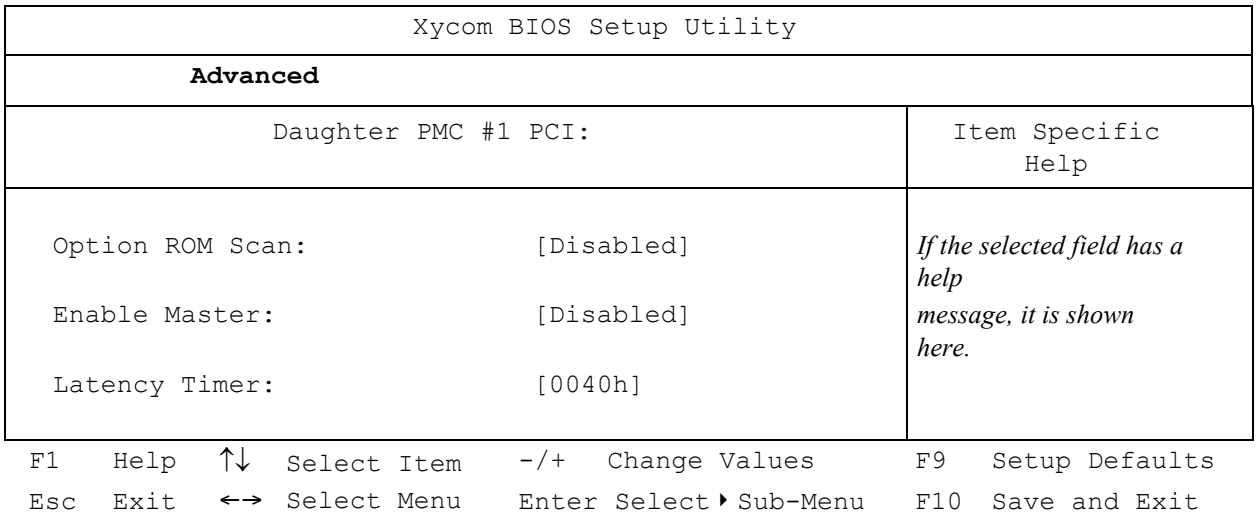


Figure 3–9. Daughter PMC #1 PCI Submenu

Table 3–10. Daughter PMC #1 PCI Submenu Options

Option	Description
Option ROM Scan	This field controls initialization of device expansion ROM. The choices are *Disabled* (default) and *Enabled*.
Enable Master	This field determines whether this device is enabled as a PCI bus master. The choices are *Disabled* (default) and *Enabled*. This field should be *Enabled* when the PCI device (PMC card in this submenu) requires PCI bus mastering (uses DMA transfers), but the device drivers do not enable PCI bus mastering.
Latency Timer	This field allows determination of the minimum guaranteed time slice allotted for bus mastering, in units of PCI bus clocks. The choices are *0020h*, *0040h* (default), *0060h*, *0080h*, *00A0h*, *00C0h*, *00E0h*, and *Default*.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

PCI/PNP ISA UMB Region Exclusion Submenu

This submenu is opened from the **PCI Configuration** submenu in the **Advanced** menu. All of the fields are shown below with default values.

Figure 3–10 shows the PCI/PNP ISA UMB Region Exclusion submenu. Table 3–11 describes the options of the submenu.

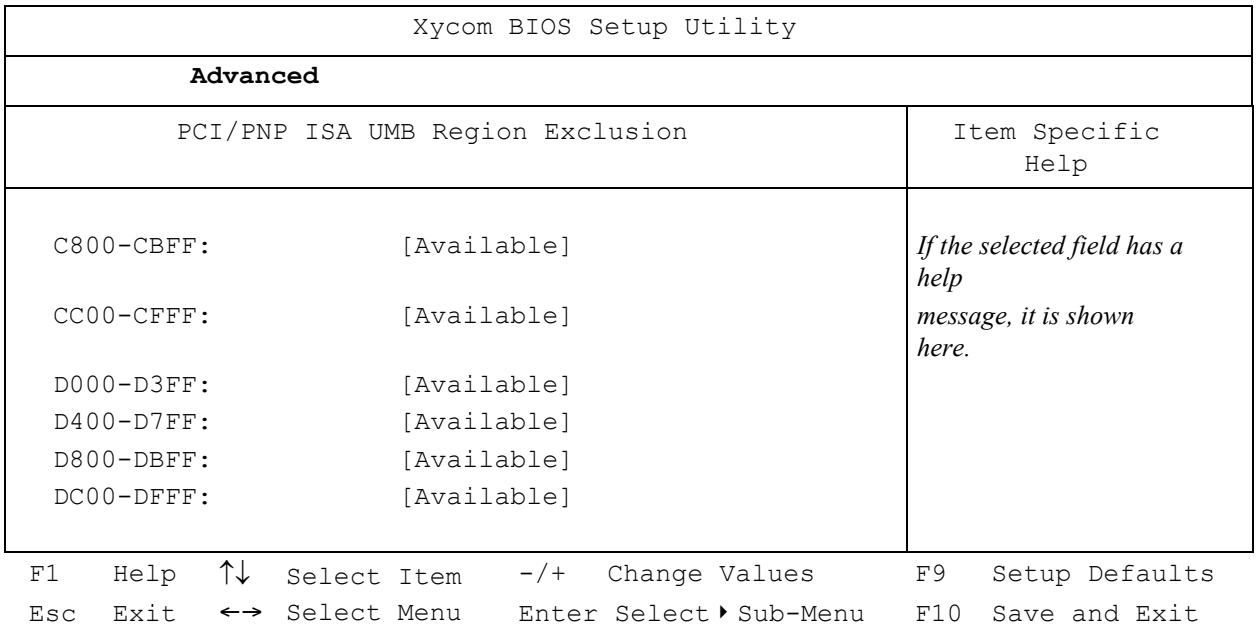


Figure 3–10. PCI/PNP ISA UMB Region Exclusion Submenu

Table 3–11. PCI/PNP ISA UMB Region Exclusion Submenu Options

Option	Description
C800-CBFF CC00-CFFF D000-D3FF D400-D7FF D800-DBFF DC00-DFFF	These fields can be used to reserve upper memory segments for use by legacy ISA devices. The choices are *Available* (default) or *Reserved*. Each segment is 16 KB and each segment range represents the first four digits of the linear address range affected. For example, CC00-CFFF represents the address range CC000-CFFFF.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

PCI/PNP ISA IRQ Resource Exclusion Submenu

This submenu is opened from the **PCI Configuration** submenu in the **Advanced** menu. All of the fields are shown below with default values.

Figure 3–11 shows the PCI/PNP ISA IRQ Resource Exclusion submenu. Table 3–12 describes the options of this submenu.

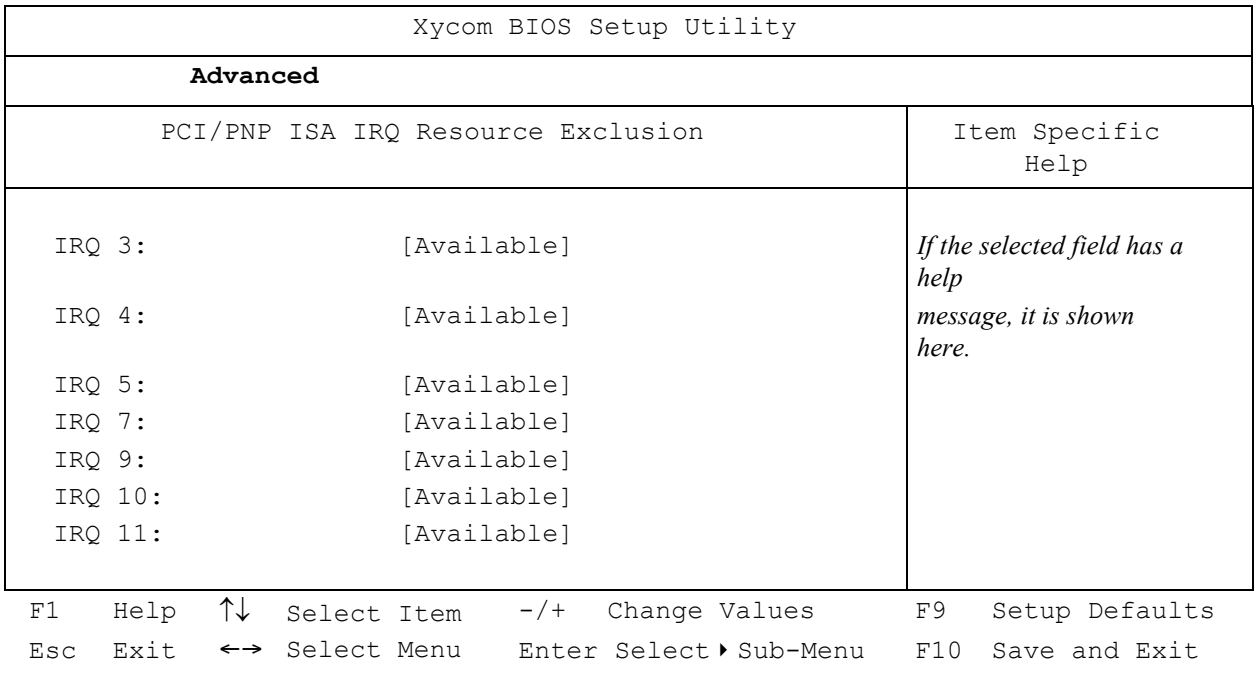


Figure 3–11. PCI/PNP ISA IRQ Resource Exclusion Submenu

Table 3–12. PCI/PNP ISA IRQ Resource Exclusion Submenu Options

Option	Description
IRQ 3 IRQ 4 IRQ 5 IRQ 7 IRQ 9 IRQ 10 IRQ 11	These fields can be used to reserve IRQs for use by legacy ISA devices. The choices are *Available* (default) or *Reserved*. If reserving an IRQ causes a conflict with another known system resource, a yellow asterisk will appear beside the conflicting IRQ field and a note will appear at the bottom of the screen explaining that there is a conflict.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Security Menu

Use this menu to define system passwords and set other security options. If you set a password, you must enter it a second time to verify it. Passwords can be used to limit access to the setup menus or prevent unauthorized booting of the unit.

Logging in to the BIOS setup with the user password restricts access to most of the menu fields. Only the following fields are available to a user:

Table 3–13. Fields Available to User

Menu	Available Fields for a User
Main	System Time, System Date
Advanced	I/O Device Configuration submenu: Floppy disk controller Base I/O address
Security	Set User Password
Power	Power Savings
Boot	All fields available
VMEbus	No fields available
Exit	All fields available except for Load Setup Defaults
Other	F9 is not available

```
                        Xycom BIOS Setup Utility
  Main     Advanced     Security     Power     Boot     VMEbus     Exit

                                                      Item Specific
                                                          Help

  Supervisor Password Is:     Clear
  User Password Is:           Clear                   If the selected field has a
                                                      help
                                                      message, it is shown
                                                      here.
  Set Supervisor Password     [Enter]
  Set User Password           [Enter]

  Password on boot:           [Disabled]
  Fixed disk boot sector:     [Normal]
  Diskette access:            [Supervisor]
  User Mode:                  [Normal]

  Virus check reminder:       [Disabled]
  System backup reminder:     [Disabled]

F1 Help   ↑↓ Select Item    -/+   Change Values      F9   Setup Defaults
Esc Exit  ←→ Select Menu    Enter Select ▸ Sub-Menu  F10  Save and Exit
```

Figure 3–12. Security Menu

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 3–14. Security Menu Options

Option	Description
Supervisor Password Is	This read-only field indicates whether a supervisor password has been created (*Set*) or not (*Clear*, default).
User Password Is	This read-only field indicates whether a user password has been created (*Set*) or not (*Clear*, default).
Set Supervisor Password	Press ENTER to open a Set Supervisor Password window where you can enter a password of up to eight alphanumeric characters. To clear the password, press ENTER in the Enter New Password and Confirm New Password fields of the Set Supervisor Password window.
Set User Password	This field is inactive until a supervisor password has been set. Press ENTER to open a Set User Password window where you can enter a password of up to eight alphanumeric characters. To clear the password, press ENTER in the Enter New Password and Confirm New Password fields of the Set User Password window.
Password on boot	This field is inactive until a supervisor password has been set. If the supervisor and user passwords are set and this option is enabled, you must enter a password (either one) during the boot sequence. Entering an incorrect password three times in a row causes the system to shut down. If only the supervisor password is set and this option is enabled, you must enter the supervisor password during the boot sequence. If no passwords are set and this option is enabled, nothing happens. The choices are *Disabled* (default) and *Enabled*.
Fixed disk boot sector	This field allows protection of the boot sector of the hard disk to protect against viruses. The options are *Normal* (unprotected, default) and *Write Protect* (protected).
Diskette access	This field is inactive until a supervisor password has been set. When *Supervisor* is selected (default), only the supervisor can access the floppy drive. When *User* is selected, anyone can access the floppy drive.
User Mode	The choices are Normal (default) and Restricted. When *Restricted* is chosen, the user cannot access any fields of the Power or Boot menus in addition to the restrictions listed in the table above the Security menu diagram on the last page.
Virus check reminder	This field is used to configure the virus check reminder. The choices are *Disabled* (default), *Daily*, *Weekly*, and *Monthly*. If enabled, the reminder will be displayed at every boot until answered with a *Yes*. Then it will not reappear until the start of the next time increment.
System backup reminder	This field is used to configure a reminder to backup the system. The choices are *Disabled* (default), *Daily*, *Weekly*, and *Monthly*. If enabled, the reminder will be displayed at every boot until answered with a *Yes*. Then it will not reappear until the start of the next time increment.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Power Menu

This menu is used to configure system power management features.

Figure 3–13 shows the Power menu screen. Table 3–15 describes the options of this menu.

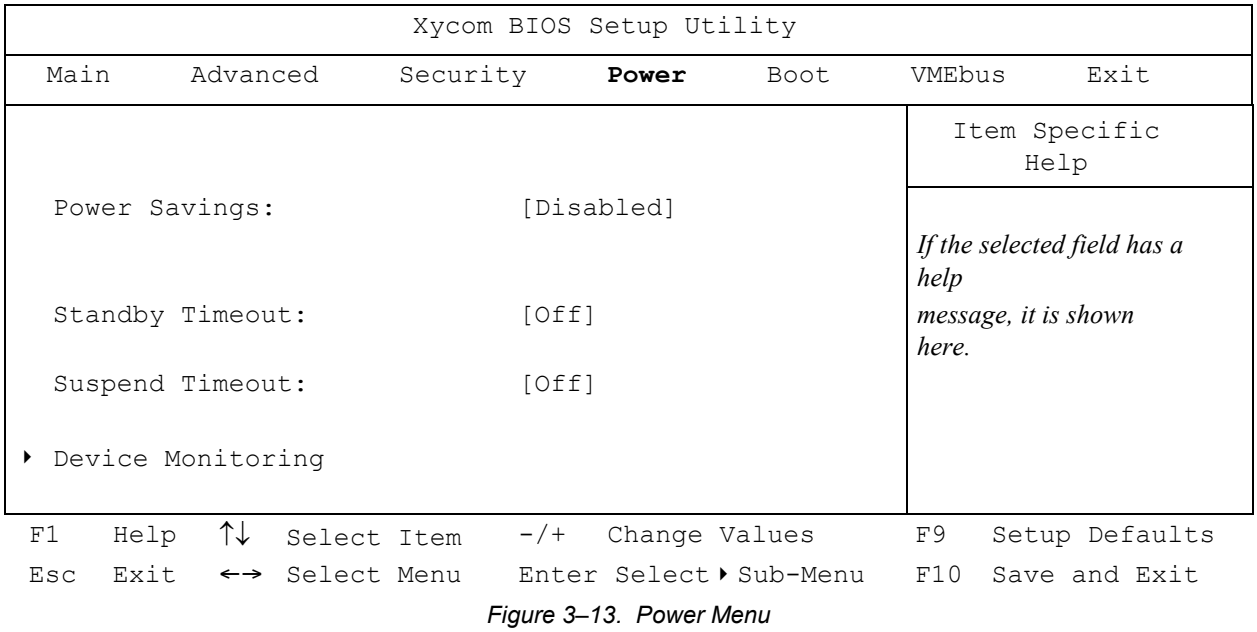


Figure 3–13. Power Menu

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 3–15. Power Menu Options

Option	Description
Power Savings	This field is used to configure or disable power management features. The choices are: 1. *Disabled* (default) – no power management. 2. *Customized* – user can change Standby Timeout and Suspend Timeout fields. 3. *Maximum Power Savings* – Standby Timeout set to *1 Minute* and Suspend Timeout set to *5 Minutes*. These settings are read-only and conserve the greatest amount of system power. 4. *Maximum Performance* – Standby Timeout set to *16 Minutes* and Suspend Timeout set to *60 Minutes*. These settings are read-only. They allow the greatest system performance while still having some power management.
Standby Timeout	This is the amount of time the system needs to be in Idle Mode before entering Standby Mode (partial power shutdown). Standby Mode turns off various system devices, including the screen, until you start using the computer again. This field is user-configurable only when the Power Savings field is set to *Customized*. Read-only values for other Power Savings settings are given above. When editable, the choices are *Off* (default), *1 Minute*, *2 Minutes*, *4 Minutes*, *6 Minutes*, *8 Minutes*, *12 Minutes*, and *16 Minutes*.
Suspend Timeout	This is the amount of the system needs to be in Standby mode before entering Suspend Mode (maximum power shutdown). Suspend Mode turns off more system devices than Standby Mode. This field is user-editable only when the Power Savings field is set to *Customized*. Read-only values for other Power Savings settings are given above. When editable, the choices are *Off* (default), *5 Minutes*, *10 Minutes*, *15 Minutes*, *20 Minutes*, *30 Minutes*, *40 Minutes*, and *60 Minutes*.
Device Monitoring	Press ENTER to open the Device Monitoring submenu, where the user can set certain devices to interrupt Standby Mode and Suspend Mode.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Device Monitoring Submenu

This menu is used to configure system power management features. All possible fields are shown below with default values, so this is not a legitimate screen configuration.

Figure 3–14 shows the Device Monitoring submenu screen. Table 3–16 describes the options of this submenu.

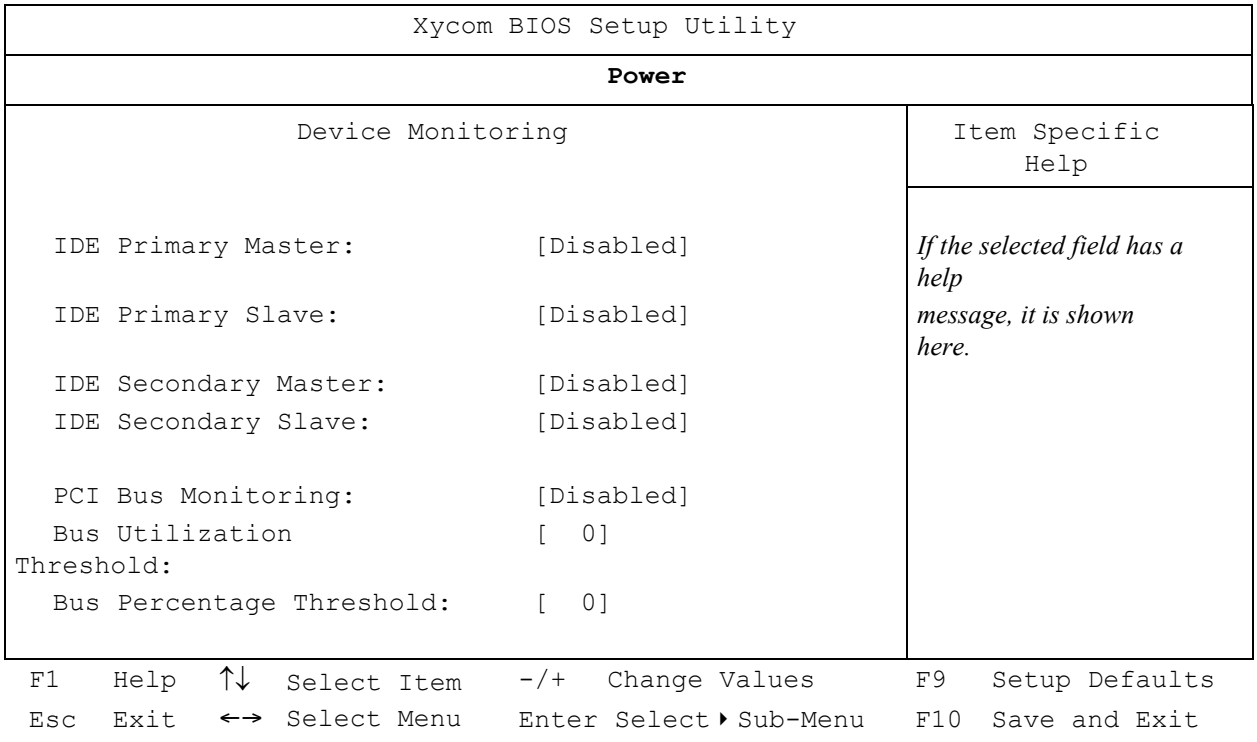


Figure 3–14. Device Monitoring Submenu

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 3–16. Device Monitoring Submenu Options

Option	Description
IDE Primary Master IDE Primary Slave IDE Secondary Master IDE Secondary Slave	When a given IDE device is *Enabled*, activity on the device will interrupt Standby Mode, Suspend Mode, and the standby timer. The choices are *Disabled* (default) and *Enabled*. Note: If the device is a CD-ROM and the OS constantly polls the CD-ROM (as Windows 95 and Windows 98 do), enabling monitoring on this device can prevent the system from ever entering Suspend Mode. Note: On the XVME-661, the IDE Secondary Master is wired to the Compact Flash adapter, and the IDE Secondary Slave is not connected.
PCI Bus Monitoring	When this field is *Enabled*, activity on the PCI bus will interrupt Standby Mode, Suspend Mode, and the standby timer. The choices are *Disabled* (default) and *Enabled*.
Bus Utilization Threshold Bus Percentage Threshold	These fields appear if the PCI Bus Monitoring setting is *Enabled*. Since the PCI bus is always active, these fields allow a threshold to be set. These threshold settings specify how much PCI bus activity must exist to prevent the system from entering Standby Mode or Suspend Mode. The Bus Utilization Threshold setting is the number of data phases detected in a 256 clock cycle period; the default setting is *0*. The Bus Percentage Threshold is the percentage of time that the Bus Utilization Threshold must be exceeded in order to reload the standby timer, or interrupt Standby or Suspend Mode; the default setting is *0*, the maximum value is 100.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Boot Menu

This menu is used to set the device boot order for the system. When the unit is powered up, it will attempt to boot off of the devices listed in the order listed. All default devices are shown, so the screen configuration is not valid.

Figure 3–15 shows the Boot menu screen. Table 3–17 describes the boot menu options.

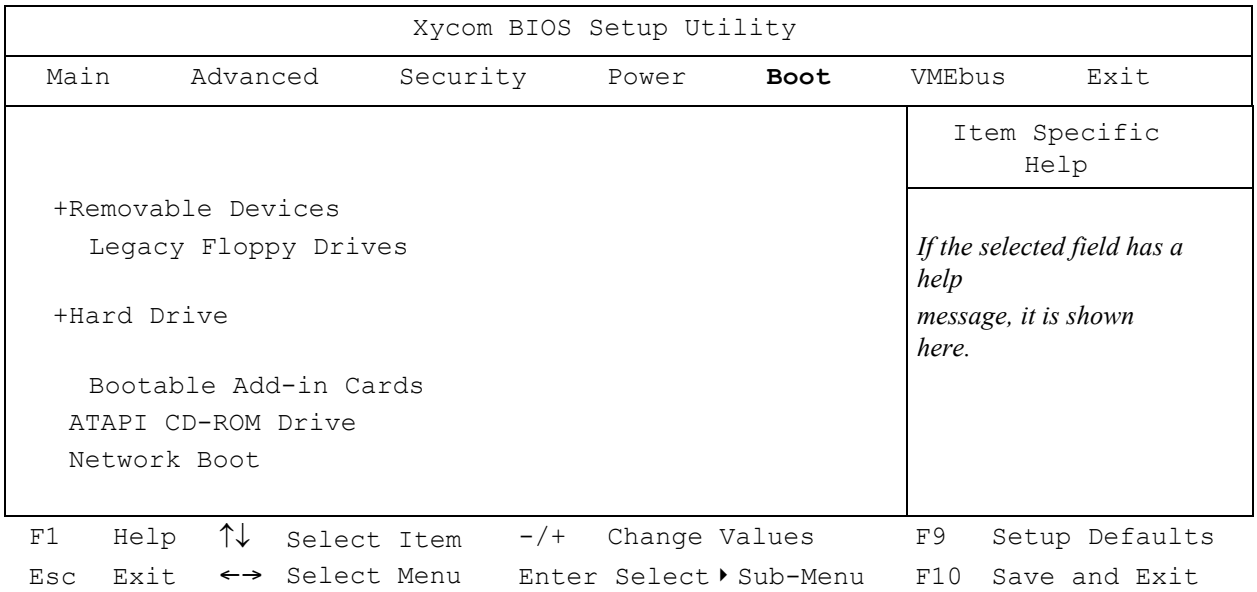


Figure 3–15. Boot Menu

Table 3–17. Boot Menu Options

Option	Description
All Devices and Groups of Devices Listed	This menu allows you to specify the boot order for the unit. When you power the unit up, it will attempt to boot off of each listed device, in the order listed. The removable and fixed drives are device groups that may contain more than one device. The system will only attempt to boot off the first listed device in a group before it continues through the boot order. To change the order of groups and devices, select an item with the up and down arrow keys and move it up or down the list with the <+> key (up) and the <–> key (down). Devices inside of groups will only move up and down within the group. You can toggle between listing or not listing the devices in a group by selecting the group and pressing ENTER, and you can press CTRL-ENTER to view all devices in all groups. ATAPI removable devices, such as LS120 or Iomega IDE Zip® drives, may appear under either group. You can move these devices between the groups by selecting them and pressing the <n> key.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

VMEbus Menu

Using the VMEbus Setup menus, you are able to configure the XVME-661 VMEbus master and slave interfaces and the system controller.

Figure 3–16 shows the VMEbus menu screen. Table 3–18 describes the options of this menu.

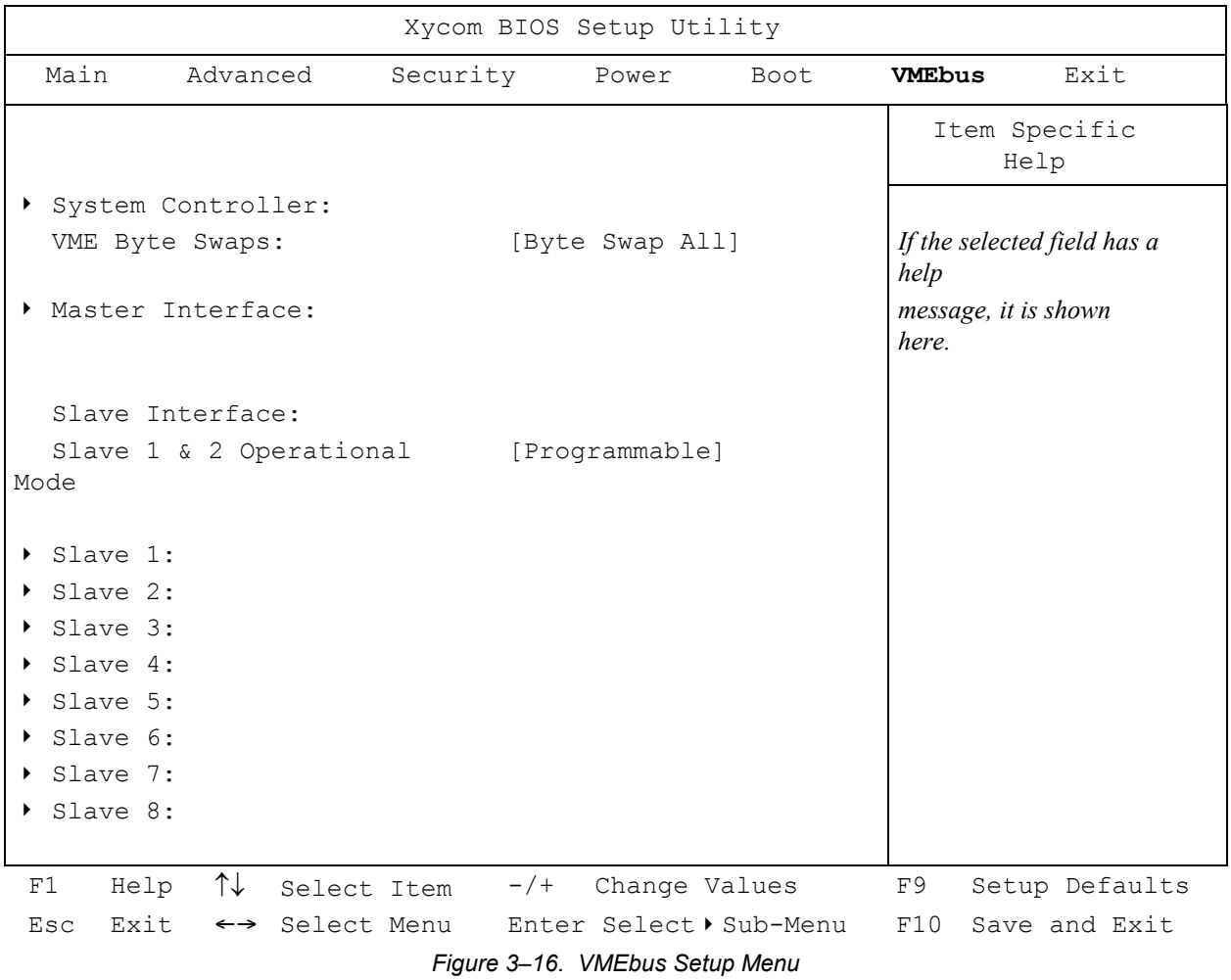


Figure 3–16. VMEbus Setup Menu

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 3–18. VMEbus Setup Menu Options

Option	Description
System Controller	Press ENTER to open the System Controller submenu, where VMEbus system resources are configured.
VME Byte Swaps	This field is used to configure VMEbus Master and Slave byte-swapping options. The choices are *Byte Swap All* (default), *Byte Swap Slave*, *Byte Swap Master*, and *Disabled*.
Master Interface	Press ENTER to open the Master Interface submenu, where the VMEbus master interface is configured.
Slave Interface	This is a heading, not a field.
Slave 1 & 2 Operational Mode	This field allows configuration of VMEbus Slaves 1 and 2. The choices are *Programmable* (default) and *Compatible*. Selecting *Programmable* allows you to configure and enable VMEbus slaves 1 and 2 just like slaves 3, 4, 5, 6, 7, and 8. When *Compatible* is selected, the BIOS automatically configures and enables VMEbus slaves 1 and 2. *Compatible* sets up the XVME-661 slave interface so that it is compatible with older Xycom Automation VME PC processor boards which did not use the Universe chip. Slaves 1 and 2 are configured using the Slave 1 menu, so the Slave 2 field will disappear.
Slave 1, Slave 2 Slave 3, Slave 4 Slave 5, Slave 6 Slave 7, Slave 8	Press ENTER to open the Slave # configuration submenus, where the VMEbus interface parameters are configured.

System Controller Submenu

The XVME-661 automatically provides slot 1 system resource functions. The system resource functions are explained in the Universe manual. (Contact Tundra at *www.tundra.com* for a PDF version of the Universe manual.) This function can be disabled using mainboard jumper J3. Refer to **Jumper Settings** in Chapter 2 for more information. System resources are VMEbus Arbiter, BERR timeout, SYSCLK, and IACK daisy chain driver. These resources must be provided by the module installed in the system controller slot. The status of the XVME-661 system resources is reported in a read-only field.

Figure 3–17 shows the System Controller submenu screen. Table 3–19 describes the options of this submenu.

Note

The BERR timeout is the VMEbus error timeout value.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

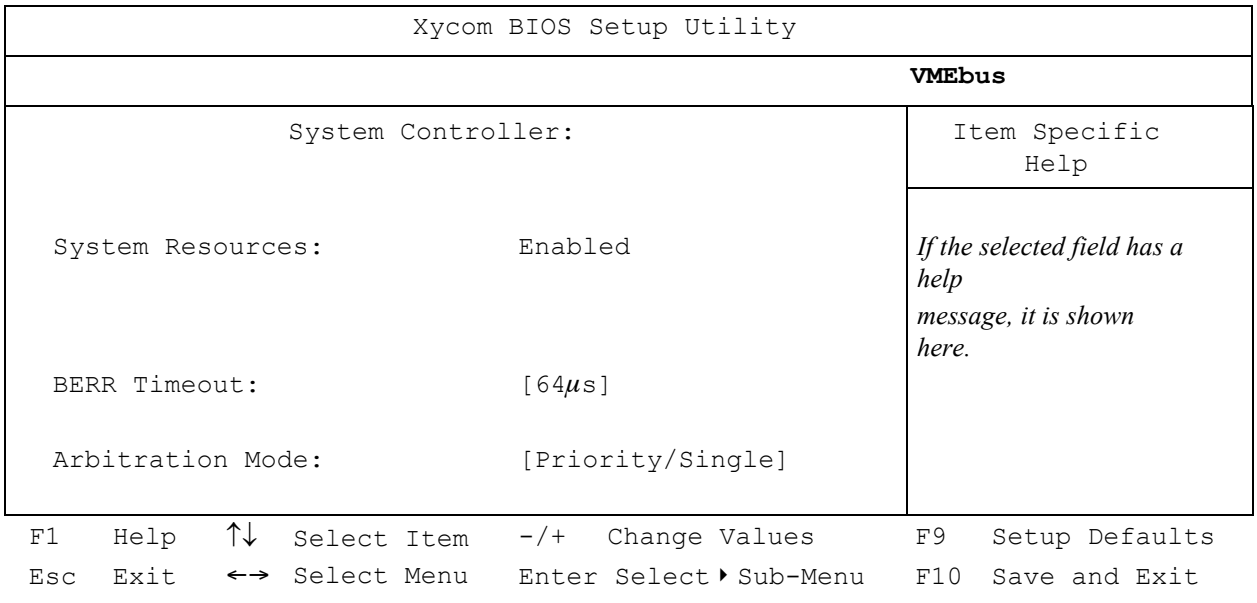


Figure 3–17. System Controller Submenu

Table 3–19. System Controller Submenu Options

Option	Description
System Resources	This read-only field displays the status (*Enabled* or *Disabled*) of the XVME-661 system resources. This value is automatically detected.
BERR Timeout*	This field is used to set the VMEbus error timeout. Choices are *16µs*, *32µs*, *64µs* (default), *128µs*, *256µs*, *512µs*, *1024µs*, and *Disabled*.
Arbitration Mode*	This field is used to set the VMEbus arbitration mode. Choices are *Priority/Single* (default) or *Round Robin*.

Note

These fields are only referenced if the board is the system controller. If it is not, the setup field values are ignored, **BERR Timeout** is set to *Disabled* (0), and **Arbitration Mode** is set to *Round Robin*, with an Arbitration timeout value of 0 (*Disabled*).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Master Interface Submenu

The VMEbus master setup lets you configure the XVME-661 VMEbus master interface.

Figure 3–18 shows the Master Interface submenu screen. Table 3–20 describes the options of this submenu.

> **Note**
>
> When the master interface setting is turned on, master image 0 is reserved for BIOS use. To avoid conflict, master images 1, 2, and 3 are available for use.

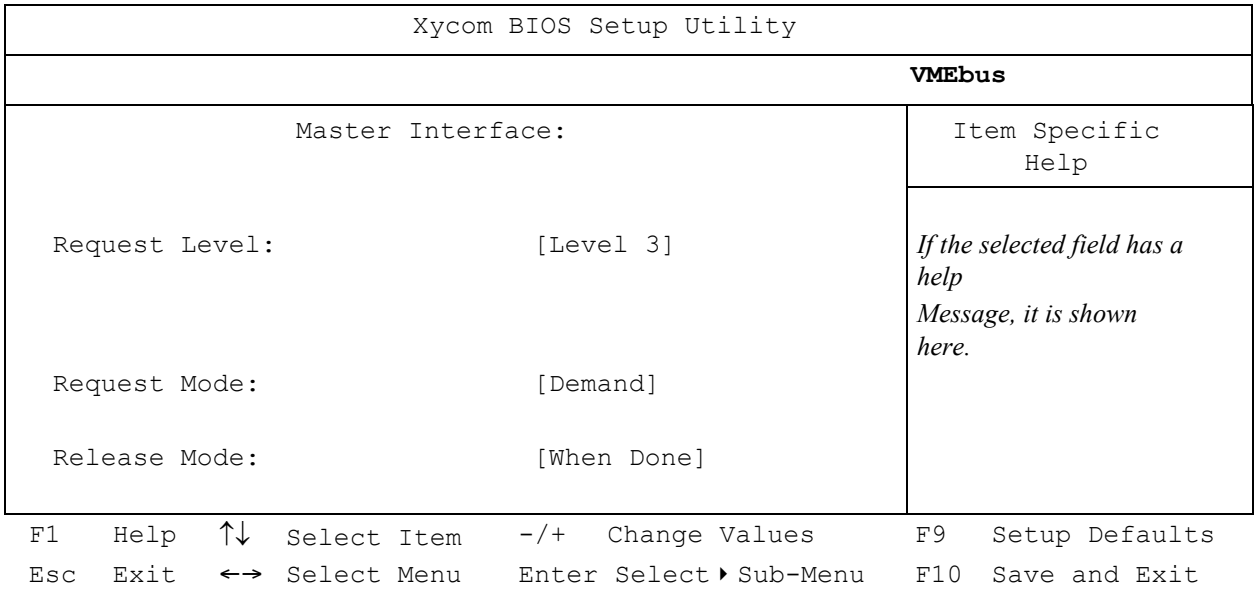


Figure 3–18. Master Interface Submenu

Table 3–20. Master Interface Submenu Options

Option	Description
Request Level	This field is used to set the bus request level when requesting use of the VMEbus. The choices are *Level 0*, *Level 1*, *Level 2*, or *Level 3* (default).
Request Mode	This field is used to set the bus request mode. Choices are *Demand* (default) or *Fair*.
Release Mode	This field is used to set the bus release mode used when controlling the VMEbus. The choices are *When Done* (default) and *On Request*.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Slave Interface Submenus

The VMEbus slave setup allows configuration of the XVME processor board's VMEbus slave interfaces.

Figure 3–19 shows the Slave Interface submenu screen. Table 3–21 describes the options of this submenu.

Note

When the Slave 1 & 2 Operational Mode setting is *Compatible*, slave images 0 and 1 are reserved for BIOS use. See p. 55 for more details.

```
                    Xycom BIOS Setup Utility
                                                          VMEbus
                      Slave 1:                      Item Specific
                                                         Help

  Slave Interface:              [Off]               If the selected field has a
                                                    help
                                                    message, it is shown
                                                    here.
  Address Modifiers:            [Data]
                                [Non-Privileged]

  Address Space:                [VMEbus Extended]

  Size:                         [1MB]

  Base Address High Nibble:     [A]
  Base Address Med. Nibble:     [A]
  Base Address Low Nibble:      [4]

F1   Help  ↑↓  Select Item   -/+   Change Values      F9   Setup Defaults
Esc  Exit  ←→  Select Menu   Enter Select ▸ Sub-Menu  F10  Save and Exit
```

Figure 3–19. Slave Interface Submenu

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 3–21. Slave Interface Submenu

Option	Description
Slave Interface	Used to turn the slave interface boot state *On* or *Off* (default). When turned *Off*, other VME masters cannot access memory on the XVME-661.
Address Modifiers	Determines which type of VMEbus slave access is permitted to read or write to the XVME-661 dual-access memory. The first field determines whether the slave interface responds to *Data* access only (default), *Program* access only, or *Both*. The second field determines whether the slave interface responds to *Supervisory* access only, *Non-Privileged* access only (default), or *Both*.
Address Space	Determines if VME masters access the slave's dual-access memory in the *VMEbus Standard* (A24) or VMEbus Extended (A32) address space. The default is *VMEbus Extended*.
Size	Determines the amount of dual-access memory that is available to external VMEbus masters. The slave memory size cannot be more than the total memory size, or greater than 16 MB for *VMEbus Standard* Address Space. The choices are *1MB* (default), *2MB*, *4MB*, *8MB*, *16MB*, and *32MB* (unavailable for *VMEbus Standard* Address Space).
Base Address High Nibble Base Address Med. Nibble Base Address Low Nibble	These fields determine the base VMEbus address prefix for the first 12 bits of the address to which the VMEbus slave interface will respond. The three fields are the high (H), middle (M), and low (L) nibbles of these 12 bits. The address is HML00000h. In the default screen configuration H is *A*, M is *A*, and L is *4*, so the address is AA400000h. The values change depending on the Size and Address Space field values. When the Address Space value is *VMEbus Standard*, the dual-access memory must be located on a 1 MB boundary and the upper two nibbles are ignored, so the high and medium nibbles are changed to *0* and are made read-only. When the Address Space value is *VMEbus Extended*, the slave address must be a multiple of the slave memory size. When the Size is greater than 1 MB, the low nibble is truncated to an even value. Note: The address that is set with these fields is the address that is used by the VMEbus processors. The PC/AT processor on the XVME-661 will see a translated address. This translation (and the amount of translation) is calculated by the BIOS and is not user-configurable in the BIOS setup. See p. 65 for a discussion of translation addresses.

Exit Menu

This menu allows you to exit the setup, save changes, discard changes, and load default setup values.

Figure 3–20 shows the Exit menu screen. Table 3–22 describes the options of this menu.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

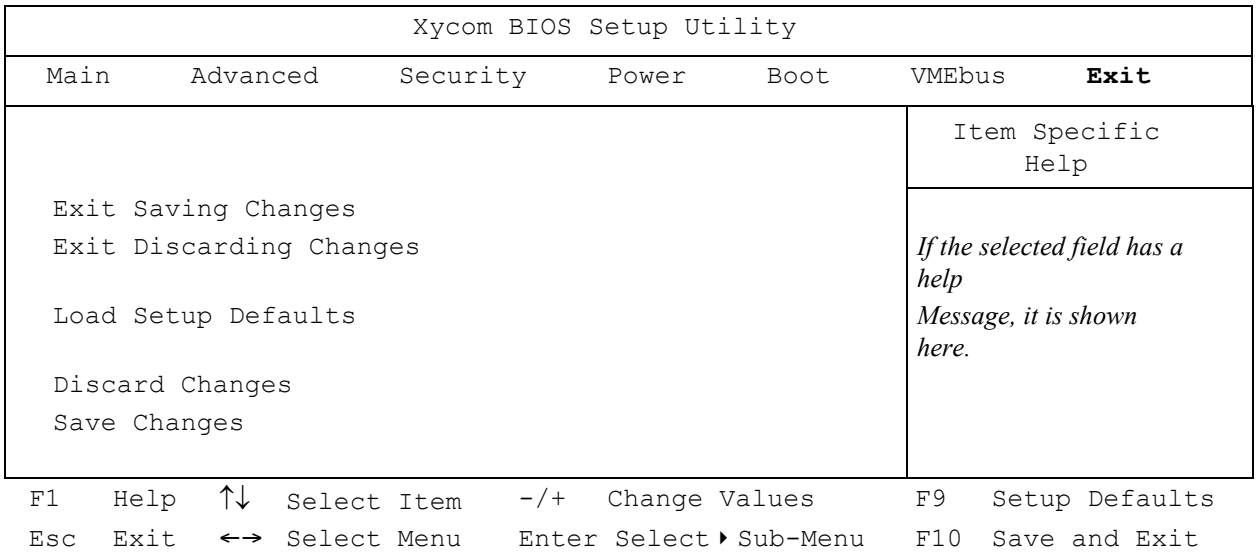


Figure 3–20. Exit Menu

Table 3–22. Exit Menu Options

Option	Description
Exit Saving Changes	After making changes that should be saved, always select either Exit Saving Changes or Save Changes. Both procedures store the changes in battery-backed CMOS RAM. The next time you boot your computer, the BIOS configures your system according to the setup selections stored in CMOS. If those values cause the system boot to fail, reboot and enter the BIOS setup. In the BIOS setup, you can load the default values (Load Setup Defaults) or try to change the selections that caused the boot to fail.
Exit Discarding Changes	This option exits the BIOS setup without storing any changes. The previous settings remain in effect. If you have made changes, you will be notified that changes have been made and you will be prompted to save those changes.
Load Setup Defaults	This option loads the default values for all the BIOS setup menus. The new settings are not in effect until they have been saved and the system has been restarted.
Discard Changes	This option returns any unsaved changes to their previous state. The new settings are not in effect until they have been saved and the system has been restarted.
Save Changes	This option saves your selections without exiting BIOS setup.

BIOS Compatibility

This BIOS is IBM PC compatible with additional CMOS RAM and BIOS data areas used.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Chapter 4 – Programming

Memory Map

The memory map of the XVME-661 as seen by the CPU is shown below. The I/O designation refers to memory which is viewed as part of the AT bus or as part of VMEbus depending on how the Universe is programmed.

Table 4–1. XVME-661 Memory Map

Hex Range	Size	Device
FFF80000 - FFFFFFFF	512K	SYSTEM BIOS
end of DRAM –FFF7FFFF	xxxK	I/O MEMORY**, [1]
00100000 – end of DRAM	xxxK	DRAM[2]
000F0000 – 000FFFFF	64K	SYSTEM BIOS
000E0000 – 000EFFFF	64K	SYSTEM BIOS
000DC000 – 000DFFFF	16K	SYSTEM BIOS
000D8000 – 000DBFFF	16K	Open memory block
000D0000 – 000D7FFF	32K	Open memory block
000CC000 – 000CFFFF	16K	Open memory block
000C8000 – 000CBFFF	16K	Open memory block
000C0000 – 000C7FFF	32K	VGA BIOS
000A0000 – 000BFFFF	128K	VGA DRAM MEMORY
0009F800 – 0009FFFF	2K	DRAM BIOS XBDA
00000000 – 0009F7FF	638K	DRAM

**The PCI devices are located at the very top of memory just below the system BIOS.

[1] If the PCI configuration space is changed from the defaults set by the BIOS, this information should not be moved within the DRAM space. PCI configuration data in the DRAM space will take precedence over the DRAM settings and cause system problems.

[2] See the Intel 440BX PCI datasheet for a description of optional settings for memory holes or gaps in the memory map area.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

I/O Map

This I/O map for the XVME-661 contains I/O ports of the IBM AT architecture plus some additions for PCI I/O registers and Xycom specific I/O registers.

Table 4–2. XVME-661 I/O Map

Hex Range	Device	Hex Range	Device
000-01F	DMA controller 1, 8237A-5 equivalent	233	Watch dog timer register
020-021	Interrupt controller 1, 8259 equivalent	234	Flash Paging and Byte Swap port
022-023	Available	235-277	Available
025-02F	Interrupt controller 1, 8259 equivalent (note 3)	278-27F	Parallel Port 2 (note 1)
040-05F	Timer, 8254-2 equivalent	280-2F7	Available
060-06F	8742 equivalent (keyboard)	2F8-2FF	Serial Port 2 (note 1)
070-07F	Real Time Clock bit 7 NMI mask (note 3)	300-36F	Available
080-091	DMA page register (note 3)	376	Secondary IDE Controller (Generates CS3*)
92	Fast GateA20 and Fast CPU Init	378-37F	Parallel Port 1 (note 1)
93-9F	DMA page register (note 3)	380-3BF	Available
0A0-0BF	Interrupt controller 2, 8259 equivalent (note 3)	3C0-3DF	VGA/EGA2 (note 2)
0C0-0DF	DMA controller 2, 8237A-5 equivalent (note 3)	3E0-3EF	Available
0F0	N/A	3F0-3F5	Primary Floppy disk controller
0F1	N/A	3F6	Primary IDE Controller (Generates CS3*)
0F2-0FF	N/A	3F8-3FF	Serial port 1 (note 1)
170-177	Secondary IDE Controller (Generates CS1*)	400-47F	Industry Pack (IP) I/O (note 5)
180-183	IP Interrupt (note 5)	480-4BF	Industry Pack (IP) ID (note 5)
185	IP Control/Status (note 5)	4D0	ELCR1 (Edge or level triggered)
1F0-1F7	Primary IDE Controller (Generates CS1*)	4D1	ELCR2 (Edge or level triggered)
218	Xycom ABORT/CMOS CLEAR port	CF8	PCI configuration address register (note 4)
219	Xycom Flash control register	CF9	Reset Control Register
220-232	Available	CFC	PCI configuration data register (note 4)

Note 1: The serial and parallel port addresses may be changed or the port may be disabled. Therefore these address maybe used for some applications and not for others.
Note 2:Reference the Chips 69030 data book for detailed information.
Note 3:Reference the Intel PIIX4E datasheet for detailed information
Note 4: Reference “The PCI local bus specification rev 2.2”, 440 BX chip set data book, and Chips 69030 data book for PCI configuration information.
Note 5: IP I/O addresses for reference only. The 960 daughtercard is not supported by the XVME-661 in a standard product configuration.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

IRQ Map

Table 4–3. AT-bus IRQ Map

INT#	Function
IRQ0	System Timer
IRQ1	Keyboard
IRQ2	Intuerrupt Cascade (reserved)
IRQ3	COM2
IRQ4	COM1
IRQ5	Ethernet
IRQ5	PMC 2
IRQ6	Floppy
IRQ7	Parallel Port (LPT1)
IRQ8	Real Time Clock
IRQ9	Universe IID
IRQ9	AGP Video
IRQ10	WDT/Abort/Microswitch
IRQ11	PMC 1
IRQ11	Ethernet 2
IRQ12	Mouse
IRQ13	Math Coprocessor (reserved)
IRQ14	Primary IDE
IRQ15	Secondary IDE

The above interrupt mapping is one possible scenario. The user or operating system may choose a different mapping for some of these interrupts based on what devices are actually in the system and require interrupts. If COM2 or LPT1 are not used, then these would free up IRQ3 and IRQ7 respectively. If the user does not require the WDT / Abort / Microswitch, then IRQ10 could also be used for a PCI device interrupt. Device drivers should be designed to be capable of sharing interrupts.

Note

This configuration is for an XVME-661 module with all peripheral devices installed, except for a PMC card on an expansion module. Devices may move to different IRQs when fewer devices are detected on startup. In general, PCI devices that share an interrupt will continue to share an interrupt.

- Serial and parallel port IRQs are available if the OS or software does not use the ports or does not use the interrupt.
- Ethernet and PMC2 are on IRQ5 if there is a PMC card installed on the XVME-661, otherwise they are on IRQ11.
- PIIX4E and PMC1 are on IRQ11 if there is a PMC card installed on the XVME-661. If there is no PMC card installed, PIIX4E and SCSI are on IRQ5.
- If there is no Compact Flash card in the adapter on startup, the Secondary IDE controller is not detected and PIIX4E will be on IRQ15.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

VME Interface

The VME interface is the Tundra Universe IIB chip, which is a PCI bus-to-VMEbus bridge device. The XVME-661 implements a 32-bit PCI bus and a 32/64-bit VMEbus interface. The Universe chip configuration registers are located in a 4 KB block of PCI memory space. This memory location is programmable and defined by PCI configuration cycles. The Universe configuration registers should be set up using PCI interrupt calls provided by the BIOS.

Information on accessing the PCI bus is in the PCI BIOS Functions section (p. 67).

Note

PCI memory slave access = VMEbus master access

PCI memory master access = VMEbus slave access

System Resources

The XVME-661 automatically provides slot 1 system resource functions. The system resource functions are explained in the Universe manual. (Contact Tundra at *www.tundra.com* for a PDF version of the Universe manual.) This function can be disabled using mainboard jumper J3. See **Jumper Settings** in Chapter 2 (p. 11).

VMEbus Master Interface

The XVME-661 can act as a VMEbus master by accessing a PCI slave channel or by the DMA channel initiating a transaction. The Universe chip contains eight PCI slave images. Slave images 1 and 5 have a 4 KB resolution; the others (2-4, 6-8) have a 64 KB resolution. Slave images 1 through 8 have been implemented on the XVME-661. The VMEbus master can generate A16, A24, or A32 VMEbus cycles for each PCI slave image.

Note

XVME-661 BIOS Slave 1 corresponds to Tundra Universe Slave 0 and so on, up to BIOS Slave 8 corresponding to Universe Slave 7.

The address mode and type are programmed on a PCI slave image basis. The PCI memory address location for the VMEbus master cycle is specified by the base and bound address. The VME address is calculated by adding the base address to the translation offset address. All PCI slave images are located in the PCI bus memory space.

All VMEbus master cycles are byte-swapped by the Universe chip to maintain address coherency. For more information on the Xycom Automation software selectable byte-swapping hardware on the XVME-661, refer to p. 74.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

VMEbus Slave Interface

The XVME-661 acts as a VMEbus slave by accessing a VMEbus slave image or by the DMA channel initiating a transaction. There are eight PCI slave images. Slave images 1 and 5 have a 4 KB resolution; the others (2-4, 6-8) have a 64 KB resolution. Slave images 1 through 8 have been implemented on the XVME-661. The slave can respond to A16, A24, or A32 VMEbus cycles.

> **Note**
>
> XVME-661 BIOS Slave 1 corresponds to Tundra Universe Slave 0 and so on, up to BIOS Slave 8 corresponding to Universe Slave 7.

The address mode and type are programmed on a VMEbus slave image basis. The VMEbus memory address location for the VMEbus slave cycle is specified by the base and bound address. The PCI address is calculated by adding the base address to the translation offset address. The translation address is set differently depending on the Slave number and on the BIOS settings. There are three cases:

- Slaves 3-8: The translation address defaults to zero when the Universe chip is power cycled. Any changes to the translation address are lost on power cycling.
- Slave 1-2, BIOS **Boot** menu **Slave 1 & 2 Operational Mode** set to *Programmable*: The BIOS sets the translation address to zero on boot up. Any changes to the translation address are overwritten with a zero on any boot.
- Slave 1-2, BIOS **Boot** menu **Slave 1 & 2 Operational Mode** set to *Compatible*: The translation address is set by the BIOS.

  The first VMEbus slave image will have the base and bound register set to 640 KB by the BIOS. For example:

  VMEbus Slave Image 0: BS= 0000000h BD= A0000h TO = 0000000h

  The second VMEbus slave image will have the base register set to be contiguous with the bound register from the first VMEbus Slave image by the BIOS. The bound register is limited by the total XVME-661 DRAM. The translation offset register is offset by 384 KB, which is equivalent to the A0000h-FFFFFh range on the XVME-661 board. For example:

  VMEbus Slave Image 1: BS=A0000h BD= 400000h TO = 060000h

> **Note**
>
> For information on changing the translation addresses, see the Universe chip manual and the PCI bus specification.

The XVME-661 DRAM memory is based on the PC architecture and is not contiguous. The VMEbus slave images may be set up to allow this DRAM to appear as one contiguous block.

Mapping defined by the PC architecture can be overcome if the VMEbus slave image window is always configured with a 1 MB translation offset. From a user and

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

software standpoint, this is desirable because the interrupt vector table, system parameters, and communication buffers (keyboard) are placed in low DRAM. This provides more system protection.

Caution

When setting up slave images, the address and other parameters should be set first. Only after the VMEbus slave image is set up correctly should the VMEbus slave image be enabled. If a slave image is going to be re-mapped, disable the slave image first, and then reset the address. After the image is configured correctly, re-enable the image.

The VMEbus slave cycle becomes a master cycle on the PCI bus. The PCI bus arbiter is the Intel 82443BX chip. It arbitrates between the various PCI masters, the CPU, and the PCI bus IDE bus mastering controller. Because the VMEbus cannot be retried, all VMEbus slave cycles must be allowed to be processed. This becomes a problem when a PCI cycle to a PCI slave image is in progress while a VMEbus slave cycle to the onboard DRAM is in progress. The PCI cycle will not give up the PCI bus and the VMEbus slave cycle will not give up the VMEbus, causing the XVME-661 to become deadlocked. If the XVME-661 is to be used as a master and a slave at the same time, the VMEbus master cycles must obtain the VMEbus prior to initiating VMEbus cycles.

All VMEbus slave interface cycles are byte-swapped to maintain address coherency. For more information on the Xycom Automation software selectable byte-swapping hardware on the XVME-661, refer to p. 74.

VMEbus Interrupt Handling

The XVME-661 can service VME IRQ[7:1]. A register in the Universe chip enables the interrupt levels that will be serviced by the XVME-661. When a VMEbus IRQ is asserted, the Universe requests the VMEbus and generates an IACK cycle. Once the IACK cycle is complete, a PCI bus interrupt is generated to allow the proper Interrupt Service Routine (ISR) to be executed. Although, the Universe connects to all four PCI bus interrupts, only PIRQA is used in order to maintain PCI compatibility for single-function devices. Other PCI bus devices may share these interrupts. The BIOS maps the Universe PCI bus interrupts to the AT-bus interrupt controller on IRQ9.

Because the PCI devices share interrupt lines, all ISR routines must be prepared to chain the interrupt vector to allow the other devices to be serviced.

Caution

IRQ10 is defined for the Abort toggle switch.

VMEbus Interrupt Generation

The XVME-661 can generate VMEbus interrupts on all seven levels. There is a unique STATUS/ID associated with each level. Upper bits are programmed in the STATUS/ID register. The lowest bit is cleared if the source of the interrupt is a

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

software interrupt, and set for all other interrupt sources. Consult the Universe manual for a more in-depth explanation.

VMEbus Reset Options

When the front panel **Reset** switch is toggled, the XVME-661 can perform the following reset options:

Reset the VME backplane only.

Reset the XVME-661 CPU only.

Reset both.

Reset neither.

See **Switch Settings** on p. 12 for information on how to configure the **Reset** options.

PCI BIOS Functions

Special PCI BIOS functions provide a software interface to the Universe chip, providing the PCI-to-VMEbus interface. These PCI BIOS functions are invoked using a function and subfunction code. Users set up the host processor's registers for the function and subfunction desired and call the PCI BIOS software. The PCI BIOS function code is B1h. Status is returned using the Carry flag ([CF]) and registers specific to the subfunction invoked.

Access to the PCI BIOS special functions for 16-bit callers is provided through interrupt 1Ah. Thirty-two bit (i.e., protect mode) access is provided by calling through a 32-bit protect mode entry point.

Calling Conventions

The PCI BIOS functions preserve all registers and flags except those used for return parameters. The Carry Flag [CF] will be altered as shown to indicate completion status. The calling routine will be returned to with the interrupt flag unmodified and interrupts will not be enabled during function execution. These are re-entrant routines require 1024 bytes of stack space and the stack segment must be the same size (i.e., 16- or 32-bit) as the code segment.

The PCI BIOS provides a 16-bit real and protect mode interface and a 32-bit protect mode interface.

16-Bit Interface

The 16-bit interface is provided through the Int 1Ah software interrupt. The PCI BIOS Int 1Ah interface operates in either real mode, virtual-86 mode, or 16:16 protect mode. The Int 1Ah entry point supports 16-bit code only.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

32-Bit Interface

The protected mode interface supports 32-bit protect mode callers. The protected mode PCI BIOS interface is accessed by calling through a protected mode entry point in the PCI BIOS. The entry point and information needed for building the segment descriptors are provided by the BIOS32 Service Directory. Thirty-two bit callers invoke the PCI BIOS routines using CALL FAR.

The BIOS32 Service Directory is implemented in the BIOS in a contiguous 16-byte data structure, beginning on a 16-byte boundary somewhere in the physical address range 0E0000h-0FFFFFh. The address range should be scanned for the following valid, checksummed data structure containing the following fields:

Table 4–4. BIOS32 Service Table

Offset	Size	Description
0	4 bytes	Signature string in ASCII. The string is *_32_*. This puts an underscore at offset 0, a *3* at offset 1, a *2* at offset 2, and another underscore at offset 3.
4	4 bytes	Entry point for the BIOS32 Service Directory. This is a 32-bit physical address.
8	1 byte	Revision level.
9	1 byte	Length of the data structure in 16-byte increments. (This data structure is 16 bytes long, so this field contains 01h.)
0Ah	1 byte	Checksum. This field is the checksum of the complete data structure. The sum of all bytes must add up to 0.
0Bh	5 bytes	Reserved. Must be zero.

The BIOS32 Service Directory is accessed by doing a FAR CALL to the entry point obtained from the Service data structure. There are several requirements about the calling environment that must be met. The CS code segment selector and the DS data segment selector must be set up to encompass the physical page holding the entry point as well as the immediately following physical page. They must also have the same base. The SS stack segment selector must be 32-bit and provide at least 1 KB of stack space. The calling environment must also allow access to I/O space.

The BIOS32 Service Directory provides a single function call to locate the PCI BIOS service. All parameters to the function are passed in registers. Parameter descriptions are provided below. Three values are returned by the call. The first is the base physical address of the PCI BIOS service, the second is the length of the service, and the third is the entry point to the service encoded as an offset from the base. The first and second values can be used to build the code segment selector and data segment selector for accessing the service.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

ENTRY:

[EAX] **Service Identifier = "$PCI"** (049435024h)

[EBX] Set to Zero

EXIT:

[AL] Return Code:

00h = Successful

80h = Service_Identifier_not_found

81h = Invalid value in [BL]

[EBX] Physical address of the base of the PCI BIOS service

[ECX] Length of the PCI BIOS service

[EDX] Entry point into the PCI BIOS Service – This is an offset from the base provided in [EBX].

PCI BIOS Function Calls

The available function calls are used to identify the location of resources and to access configuration space of the VMEbus interface. Special functions allow the reading and writing of individual bytes, words, and dwords in the configuration space. PCI BIOS routines (for both 16- and 32-bit callers) must be invoked with appropriate privilege so that interrupts can be enabled/disabled and the routines can access I/O space.

Locating the Universe Chip

This function returns the location (bus number) of the Universe chip providing the PCI interface to the VMEbus.

ENTRY:

[AH] **BIOS_FUNCTION_ID = B1h**

[AL] **BIOS_SUBFUNCTION_ID = 02h**

[CX] **Device ID = 0**

[DX] **Vendor ID = 10E3h**

[SI] **Index = 0**

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

EXIT:

[BH] Bus Number (**0-255**)

[BL] Device Number in upper 5 bits;

Function Number is bottom 3 bits

[AH] Return Code:

00h = Successful

86h = Device_not_found

83h = Bad_Vendor_ID

[CF] Completion Status, **set** = error, **reset** = success

Read Configuration Byte

This function reads individual bytes from the configuration space of the VMEbus interface.

ENTRY:

[AH] **BIOS_FUNCTION_ID = B1h**

[AL] **BIOS_SUBFUNCTION_ID = 08h**

[BH] Bus Number (**0-255**)

[BL] Device Number in upper 5 bits

Function Number is bottom 3 bits

[DI] Register Number (**0**...**255**)

EXIT:

[CL] Byte Read

[AH] Return Code:

00h = Successful

87h = Bad_Register_Number

[CF] Completion Status, **set** = error, **reset** = success

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Read Configuration Word

This function reads individual words from the configuration space of the VMEbus interface. The Register Number parameter must be a multiple of two (bit 0 must be set to 0).

ENTRY:

[AH] **BIOS_FUNCTION_ID = B1h**

[AL] **BIOS_SUBFUNCTION_ID = 09h**

[BH] Bus Number (**0-255**)

[BL] Device Number in upper 5 bits

Function Number is bottom 3 bits

[DI] Register Number (**0**, **2**, **4**, ... , **254**)

EXIT:

[CL] **Word Read**

[AH] Return Code:

00h = Successful

87h = Bad_Register_Number

[CF] Completion Status, **set** = error, **reset** = success

Read Configuration Dword

This function reads individual dwords from the configuration space of the VMEbus interface. The Register Number parameter must be a multiple of four (bits 0 and 1 must be set to 0).

ENTRY:

[AH] **BIOS_FUNCTION_ID = B1h**

[AL] **BIOS_SUBFUNCTION_ID = 0Ah**

[BH] Bus Number (**0-255**)

[BL] Device Number in upper 5 bits

Function Number is bottom 3 bits

[DI] Register Number (**0**, **4**, **8**, ... , **252**)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

EXIT:

[ECX] **Dword Read**

[AH] Return Code:

00h = Successful

87h = Bad_Register_Number

[CF] Completion Status, **set** = error, **reset** = success

Write Configuration Byte

This function writes individual bytes from the configuration space of the VMEbus interface.

ENTRY:

[AH] **BIOS_FUNCTION_ID = B1h**

[AL] **BIOS_SUBFUNCTION_ID = 0Bh**

[BH] Bus Number (**0-255**)

[BL] Device Number in upper 5 bits

Function Number is bottom 3 bits

[DI] Register Number (**0**...**255**)

[CL] Byte Value to Write

EXIT:

[AH] Return Code:

00h = Successful

87h = Bad_Register_Number

[CF] Completion Status, **set** = error, **reset** = success

Write Configuration Word

This function writes individual words from the configuration space of the VMEbus interface. The Register Number parameter must be a multiple of two (bit 0 must be set to 0).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

ENTRY:

[AH] **BIOS_FUNCTION_ID = B1h**

[AL] **BIOS_SUBFUNCTION_ID = 0Ch**

[BH] Bus Number (**0-255**)

[BL] Device Number in upper 5 bits

Function Number is bottom 3 bits

[DI] Register Number (**0**, **2**, **4**, ... , **254**)

[CX] Word Value to Write

EXIT:

[AH] Return Code:

00h = Successful

87h = Bad_Register_Number

[CF] Completion Status, **set** = error, **reset** = success

Write Configuration Dword

This function writes individual dwords from the configuration space of the VMEbus interface. The Register Number parameter must be a multiple of four (bits 0 and 1 must be set to 0).

ENTRY:

[AH] **BIOS_FUNCTION_ID = B1h**

[AL] **BIOS_SUBFUNCTION_ID = 0Dh**

[BH] Bus Number (**0-255**)

[BL] Device Number in upper 5 bits

Function Number is bottom 3 bits

[DI] Register Number (**0**, **4**, **8**, ... , **252**)

[ECX] Dword Value to Write

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

EXIT:

[AH] Return Code:

00h = Successful

87h = Bad_Register_Number

[CF] Completion Status, **set** = error, **reset** = success

Software-Selectable Byte-Swapping Hardware

Software selectable byte-swapping hardware is integrated into the XVME-661 to allow for the difference between the Intel and Motorola byte-ordering schemes, allowing easy communication over the VMEbus. The byte-swapping package incorporates several buffers either to pass data straight through or to swap the data bytes as they are passed through.

Note

The configurable byte-swapping hardware does not support 64-bit byte-swapping. If needed, this should be implemented through software.

Byte-Ordering Schemes

The Motorola family of processors stores data with the least significant byte located at the highest address and the most significant byte at the lowest address. This is referred to as a big-endian bus and is the VMEbus standard. The Intel family of processors stores data in the opposite way, with the least significant byte located at the lowest address and the most significant byte located at the highest address. This is referred to as a little-endian (or PCI) bus. This fundamental difference is illustrated in Figure 4–1, which shows a 32-bit quantity stored by both architectures, starting at address *M*.

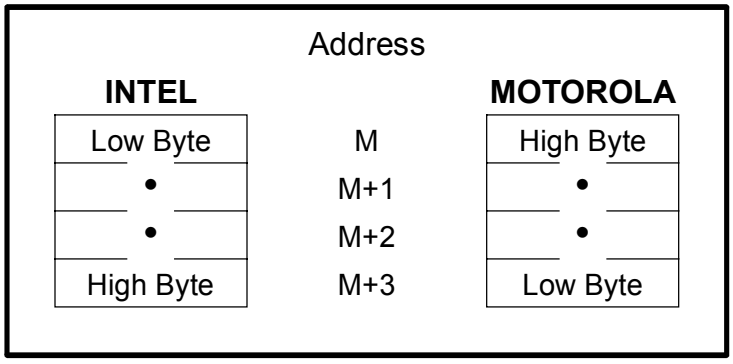


Figure 4–1. Byte Ordering Schemes

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Note

The two architectures differ only in the way in which they store data into memory, not in the way in which they place data on the shared data bus.

The XVME-661 contains a Universe chip that performs address-invariant translation between the PCI bus (Intel architecture) and the VMEbus (Motorola architecture), and byte-swapping hardware to reverse the Universe chip byte-lane swapping. (Contact Tundra at *www.tundra.com* for a PDF version of the Universe manual.) Figure 4-2 shows address-invariant translation between a PCI bus and a VMEbus.

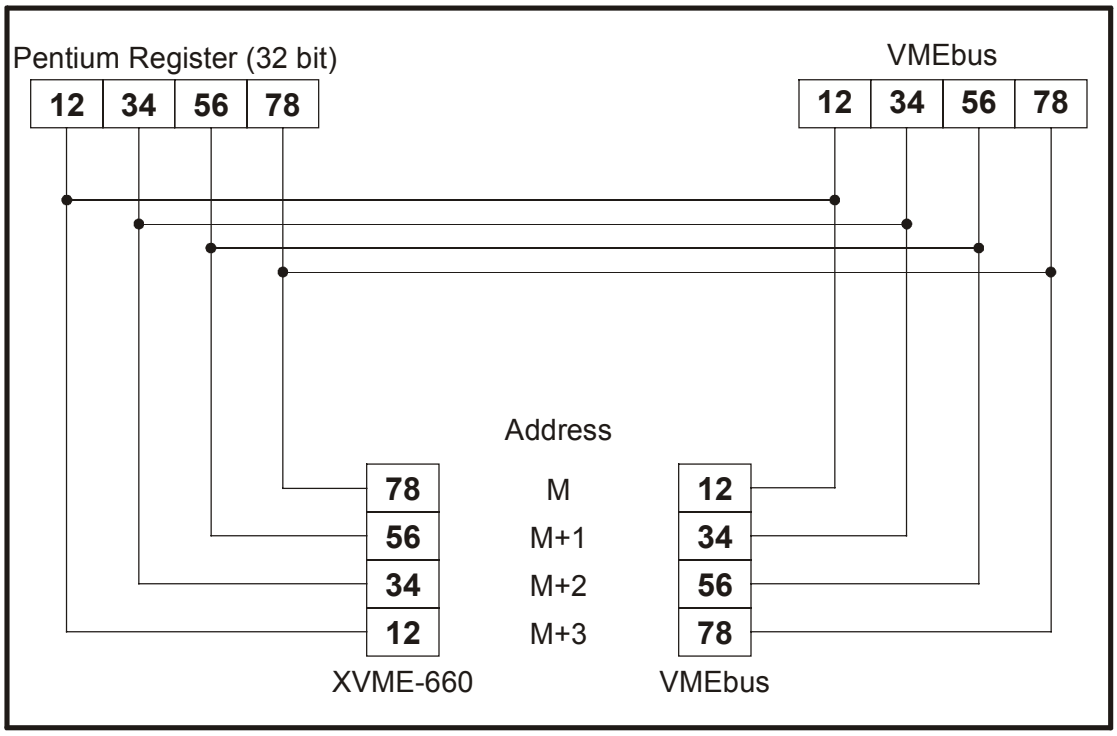


Figure 4–2. Address-Invariant Translation

Notice that the internal data storage scheme for the PCI (Intel) bus is different from that of the VME (Motorola) bus. For example, the byte **78** (the least significant byte) is stored at location *M* on the PCI machine while the byte **78** is stored at the location *M+3* on the VMEbus machine. Therefore, the data bus connections between the architectures must be mapped correctly.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Numeric Consistency

Numeric consistency, or data consistency, refers to communications between the XVME-661 and the VMEbus in which the byte-ordering scheme described above is maintained during the transfer of a 16-bit or 32-bit quantity. Numeric consistency is achieved by setting the XVME-661 buffers to pass data straight through, which allows the Universe chip to perform address-invariant byte-lane swapping. Numeric consistency is desirable for transferring integer data, floating-point data, pointers, etc. Consider the long word value **12345678h** stored at address *M* by both the XVME-661 and the VMEbus, as shown in Figure 4–3.

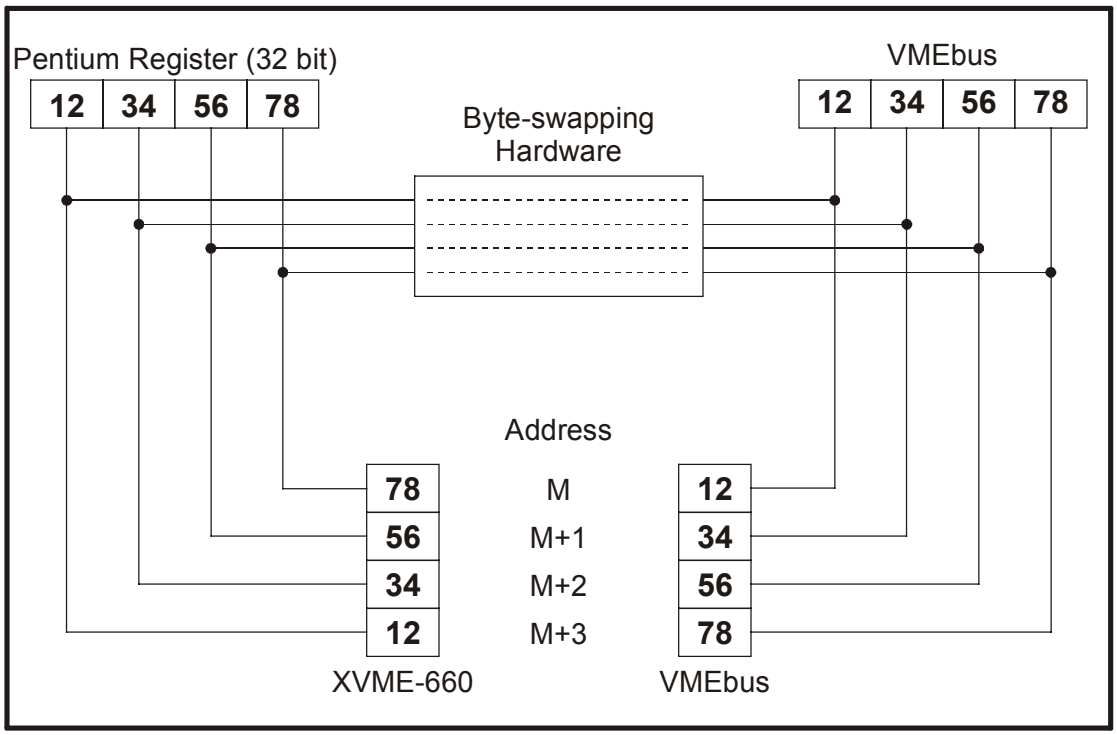


Figure 4–3. Maintaining Numeric Consistency

Due to the Universe chip, the data must be passed straight through the byte-swapping hardware. To do this, maintaining numeric consistency, enable the straight-through buffers by setting bits 6 and 7 of the Flash Paging and Byte Swap register (register 234h) both to 0 (same as non-byte swap board); see p. 14. That is, hardware byte swapping is disabled, so tundra data invariation is active.

Note

With the straight-through buffers enabled, the XVME-661 does not support unaligned transfers. Sixteen-bit or 32-bit transfers must have an even address.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Address Consistency

Address consistency, or address coherency, refers to communications between the XVME-661 and the VMEbus in which both architectures' addresses are the same for each byte. In other words, the XVME-661 and the VMEbus memory images appear the same. Address consistency is desirable for byte-oriented data such as strings or video image data. Consider the example of transferring the string `Text` to the VMEbus memory using a 32-bit transfer in Figure 4–4.

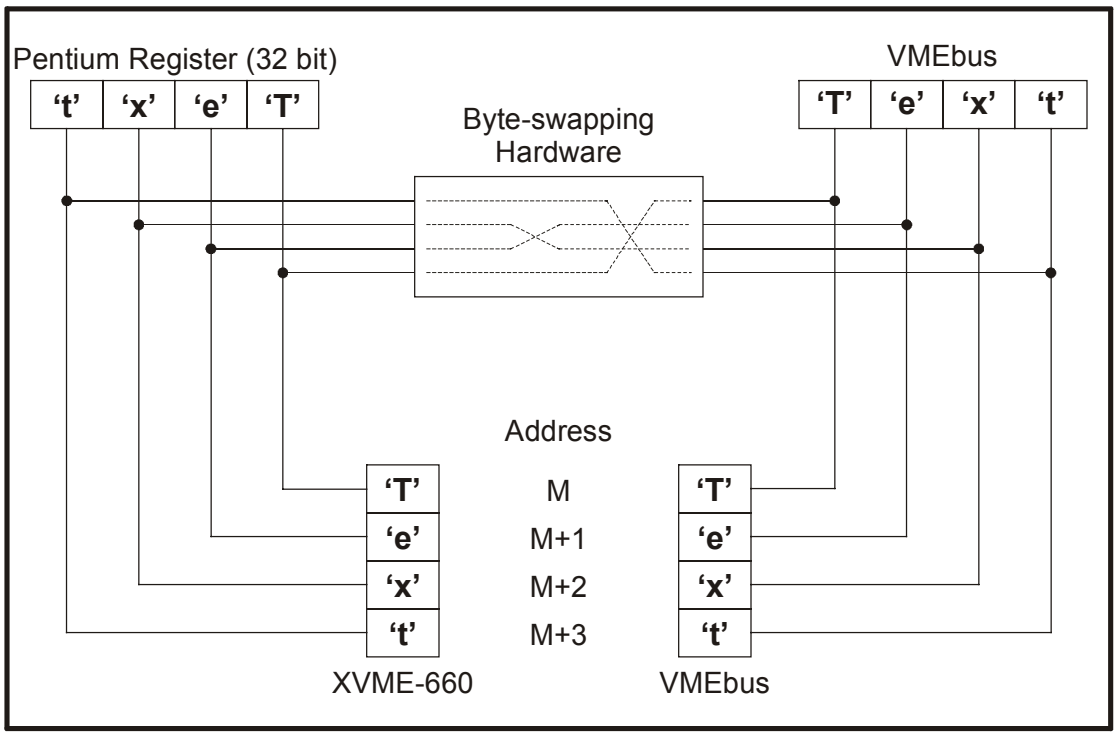


Figure 4–4. Maintaining Address Consistency

Notice that the data byte at each address is identical. To achieve this, the data bytes need to be swapped as they are passed from the PCI bus to the VMEbus. To maintain address consistency, enable the byte-swapping buffers by setting bits 6 and 7 of the Flash Paging and Byte Swap register (register 234h) both to 1 (see p. 14). That is, hardware byte swapping is enabled, so tundra data invariation is neutralized.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Chapter 5 – XVME-973/1 Drive Adapter Module & XVME-974/1 Expansion Module

There are four Xycom Automation mass storage expansion modules: the XVME-977 (IDE hard drive and floppy drive module), the XVME-979 (IDE CD-ROM, hard drive, with floppy drive connector for external EXF-9000 floppy drive), XVME-973 (for use with external 3.5" hard and floppy drives), and the XVME-974 (for use with external 3.5" hard and floppy drive connectors, and COM2, LPT1, and USB connectors for the 661). There are separate XVME-977 and XVME-979 manuals; the XVME-973 and XVME-974 are described in this chapter.

The XVME-973 Drive Adapter Module is used to connect an external 3.5" IDE hard drive and a floppy drive to your XVME-661 module. It has a single edge 96 pin VME Amp connector with 3 rows of sockets, labeled P2. The XVME-974 Expansion Module is also used to connect a 3.5" IDE hard drive and a floppy drive to your XVME-661 module. The 974 also has connectors for use of COM2, LPT1, and 2 USB ports on the 661. It has a single edge 160-pin VME64 Amp connector with 5 rows of pins, labeled P2. These P2 connectors connect to the P2 backplane connector on the rear of either a standard 96 pin VME chassis or a 160 pin VME64 VME chassis. Figure 5–1 illustrates how to connect the XVME-973/1 to the VME chassis backplane P2 connector. The XVME-974/1 connects in the same way using the three inmost rows for connection to P2 on the card cage.

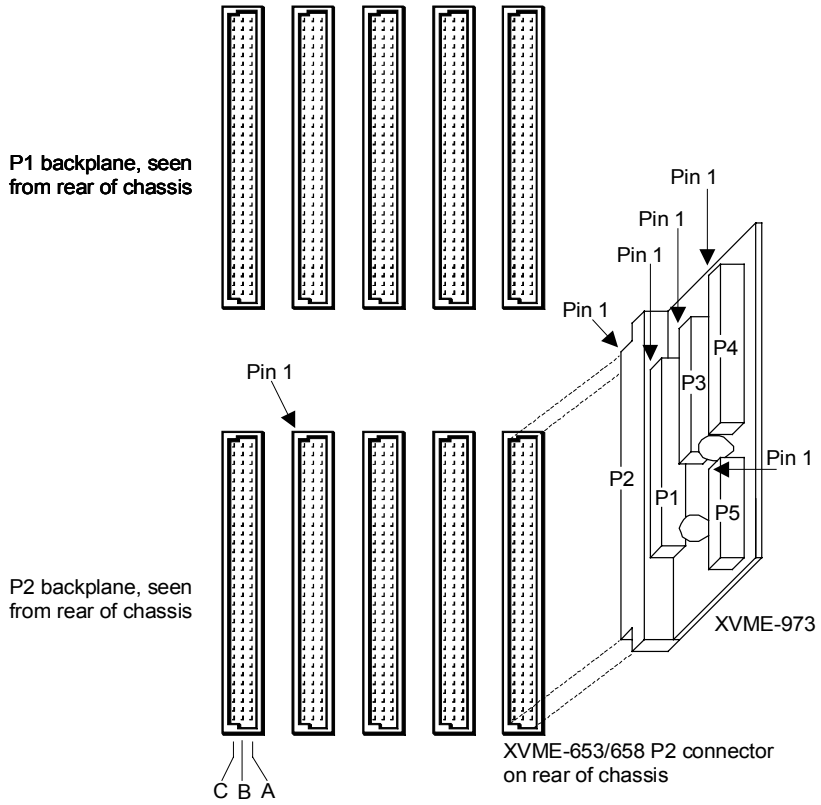


Figure 5–1. XVME-973/1 Installation

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

XVME-973/1 Drive Adapter Module

The XVME-973/1 module has four connectors on it for the connection of up to two IDE hard drives and one 3.5" floppy drive. Pinouts for all of the connectors are in this chapter.

The P3 connector is for a single 3.5" floppy drive and the P5 connector is for a single 3.5" floppy drive of the type found in many laptop computers. Both of these connectors are routed to the same signal lines on the P2 connector, so only one may be used at a time.

Similarly, the P1 connector connects up to two standard 3.5" hard drives and the P4 connector connects up to two 2.5" hard drives. Both of these connectors also use the same P2 connector signal lines, so only one may be used at a time.

The XVME-973/1 is shipped with cables for the P1 and the P3 connectors. The pinouts in this chapter may be used as references to make cables for the P2 and P4 connectors.

Note

Since each of the four Xycom Automation mass storage expansion modules below shares the P2 connector with the XVME-661, the user may use ANY ONE of them:

- XVME-977 (IDE hard drive and floppy drive module),
- XVME-979 (IDE CD-ROM, hard drive, with floppy drive connector for external EXF-9000 floppy drive),
- XVME-973 (for use with external 3.5” hard and floppy drives), or
- XVME-974 (for use with external 3.5” hard and floppy drive connectors, and COM2, LPT1, and USB connectors for the 661).

XVME-973/1 P1 Connector

The P1 connector connects up to two 3.5" hard drives. Power for the drives is *not* supplied by the XVME-973/1. Connection to the chassis power supply should be utilized for powering external drives.

Table 5–1 shows the pinout for this connector.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 5–1. XVME-973/1 P1 Connector Pinout

Pin	Signal		Pin	Signal
1	HDRESET*		21	HDRQ
2	GND		22	GND
3	HD7		23	DIOW*
4	HD8		24	GND
5	HD6		25	DIOR*
6	HD9		26	GND
7	HD5		27	IORDY
8	HD10		28	ALE
9	HD4		29	HDACK*
10	HD11		30	GND
11	HD3		31	IRQ14
12	HD12		32	IOCS16*
13	HD2		33	DA1
14	HD13		34	NC
15	HD1		35	DA0
16	HD14		36	DA2
17	HD0		37	CS1P*
18	HD15		38	CS3P*
19	GND		39	IDEATP*
20	KEY (NC)		40	GND

Caution

The IDE controller supports enhanced PIO modes, which reduce the cycle times for 16-bit data transfers to the hard drive. Check with your drive manual to see if the drive you are using supports these modes. The higher the PIO mode, the shorter the cycle time. As the IDE cable length increases, this reduced cycle time can lead to erratic operation. As a result, it is in your best interest to keep the IDE cable within the 18” IDE cable specification.

The PIO modes can be selected in the BIOS setup (see p. 33). The Autoconfiguration will attempt to classify the connected drive if the drive supports the auto ID command. If you experience problems, change the **Transfer Mode** to *Standard*.

Caution

The total cable length must not exceed 18 inches. Also, if two drives are connected, they must be no more than six inches apart.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

XVME-973/1 P2 Connector

The XVME-973/1 P2 connector connects directly to the XVME-661 P2 connector through the VME chassis backplane.

Table 5–2. XVME-973/1 P2 Connector Pinout

Pin	A	B	C
1	RES	+5V	HDRSTDRV*
2	RES	GND	HD0
3	RES	RES	HD1
4	RES	RES	HD2
5	RES	RES	HD3
6	RES	RES	HD4
7	RES	RES	HD5
8	RES	RES	HD6
9	RES	RES	HD7
10	RES	RES	HD8
11	RES	RES	HD9
12	RES	GND	HD10
13	RES	+5V	HD11
14	RES	RES	HD12
15	RES	RES	HD13
16	RES	RES	HD14
17	RES	RES	HD15
18	RES	RES	GND
19	GND	RES	DIOW*
20	FRWC*	RES	DIOR*
21	IDX*	RES	IORDY
22	MO1*	GND	ALE
23	HDRQ	RES	IRQ14
24	FDS1*	RES	IOCS16*
25	HDACK*	RES	DA0
26	FDIRC*	RES	DA1
27	FSTEP*	RES	DA2
28	FWD*	RES	CS1P*
29	FWE*	RES	CS3P*
30	FTK0*	RES	IDEATP*
31	FWP*	GND	FHS*
32	FRDD*	+5V	DCHG*

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

XVME-973/1 P3 Connector

P3 connects a single 3.5" floppy drive. Only one drive is supported. Power for this drive is *not* supplied by the XVME-973/1. Connection to the chassis power supply should be utilized for powering external drives.

Table 5–3. XVME-973/1 P3 Connector Pinout

Pin	Signal	Pin	Signal
1	GND	18	FDIRC*
2	FRWC*	19	GND
3	GND	20	FSTEP*
4	NC	21	GND
5	KEY (NC)	22	FWD*
6	NC	23	GND
7	GND	24	FWE*
8	IDX*	25	GND
9	GND	26	FTK0*
10	MO1*	27	GND
11	GND	28	FWP*
12	NC	29	GND
13	GND	30	FRDD*
14	FDS1*	31	GND
15	GND	32	FHS*
16	NC	33	GND
17	GND	34	DCHG*

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

XVME-973/1 P4 Connector

P4 connects up to two 2.5" hard drives. Power for 2.5” drives is supplied by the connector.

Table 5–4. XVME-973/1 P4 Connector Pinout

Pin	Signal	Pin	Signal
1	HDRSTDRV*	23	DIOW*
2	GND	24	GND
3	HD7	25	DIOR*
4	HD8	26	GND
5	HD6	27	IORDY
6	HD9	28	ALE
7	HD5	29	HDACK*
8	HD10	30	GND
9	HD4	31	IRQ14
10	HD11	32	IOCS16*
11	HD3	33	DA1
12	HD12	34	NC
13	HD2	35	DA0
14	HD13	36	DA2
15	HD1	37	CS1P*
16	HD14	38	CS3P*
17	HD0	39	IDEATP*
18	HD15	40	GND
19	GND	41	+5V
20	NC	42	+5V
21	HDRQ	43	GND
22	GND	44	NC

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Caution

The IDE controller supports enhanced PIO modes, which reduce the cycle times for 16-bit data transfers to the hard drive. Check with your drive manual to see if the drive you are using supports these modes. The higher the PIO mode, the shorter the cycle time will be. As the IDE cable length increases, this reduced cycle time can lead to erratic operation. As a result, it is in your best interest to keep the IDE cable cable within the 18” IDE cable specification.

The PIO modes can be selected in the BIOS setup (see p. 33). The Autoconfiguration will attempt to classify the connected drive if the drive supports the auto ID command. If you experience problems, change the **Transfer Mode** to *Standard*.

Caution

The total cable length must not exceed 18 inches. Also, if two drives are connected, they must be no more than six inches apart.

XVME-973/1 P5 Connector

P5 connects a single 3.5" floppy drive or the type found in many laptop computers. Power for this drive is supplied by the connector.

Table 5–5. XVME-973/1 P5 Connector Pinout

Pin	Signal	Pin	Signal
1	+5V	14	FSTEP*
2	IDX*	15	GND
3	+5V	16	FWD*
4	FDS1*	17	GND
5	+5V	18	FWE*
6	DCHG*	19	GND
7	NC	20	FTKO*
8	NC	21	GND
9	NC	22	FWP*
10	MO1*	23	GND
11	NC	24	FRDD*
12	FDIRC*	25	GND
13	NC	26	FHS*

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

XVME-974/1 Expansion Module

The XVME-974/1 module has four connectors on it for the connection of up to two IDE hard drives and one 3.5" floppy drive. Pinouts for all of the connectors are in this chapter.

P2 – 160-pin local VME64 bus

P3 – For use w/XVME-977 or XVME-979

P4 – EIDE

P5 – Floppy drive

P6 – LPT1

P7 – COM2

P8 – Orb ground

P8 – 2 - Type A USB

J1 – Connect Orb ground to digital ground

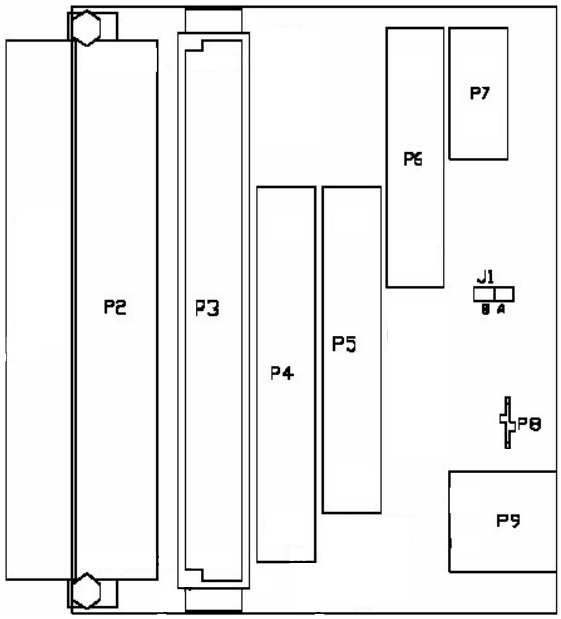


Figure 5–2. XVME-974/1 Expansion Module

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

XVME-974/1 P2 Connector

The XVME-974/1 P2 connector connects directly to the XVME-661 P2 connector through the VME chassis backplane.

Table 5–6. XVME-974/1 P2 Connector Pinout

Pin Number	Row z	Row a	Row b	Row c	Row d
1	NC	+5V	+5V	IDERST1*	NC
2	GND	+5V	GND	HD0	NC
3	NC	+5V	RES	HD1	PSTROBE*
4	GND	RI2	A24	HD2	PPACK*
5	NC	CTS2	A25	HD3	PPBUSY
6	GND	RTS2	A26	HD4	PPE
7	NC	DSR2	A27	HD5	PSELECT
8	GND	GND	A28	HD6	PAUTOFEED*
9	NC	DTR2	A29	HD7	PPERROR*
10	GND	TXD2	A30	HD8	PINIT*
11	NC	RXD2	A31	HD9	PSELIN*
12	GND	DCD2	GND	HD10	PPD(0)
13	NC	NC	+5V	HD11	PPD(1)
14	GND	NC	VD16	HD12	PPD(2)
15	NC	NC	VD17	HD13	PPD(3)
16	GND	NC	VD18	HD14	PPD(4)
17	USBC (USB1_GND)	NC	VD19	HD15	PPD(5)
18	GND	PDIAG (1)	VD20	GND	PPD(6)
19	USB1+	GND	VD21	DIOW*	PPD(7)
20	GND	FRWC*	VD22	DIOR*	NC
21	USB1-	IDX*	VD23	IORDY	NC
22	GND	MO0*	GND	Pulled up to +5V	NC
23	USBA (USB1_PWR)	HDRQ0*	VD24	IRQ14	NC
24	GND	FDS0*	VD25	IOCS16* (nc)	NC
25	USBD (USB0_GND)	HDAK0*	VD26	DA0	NC
26	GND	FDIRC*	VD27	DA1	NC
27	USB0+	FSTEP*	VD28	DA2	NC
28	GND	FWD*	VD29	CS1P*	NC
29	USB0-	FWE*	VD30	CS3P*	NC
30	GND	FTK0*	VD31	IDEATP* (nc)	NC
31	USBB (USB0_PWR)	FWP*	GND	FHS*	GND
32	GND	FRDD*	+5V	DCHG*	NC (VPC1)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

XVME-974/1 P3 Connector

The P3 connector on the XVME-794/1 is used to pass the P2 signals through to an adjacent XVME-977 or XVME-979 drive card. It has the same pinout as rows A, B, and C of P2. The required cable is supplied with the drive card.

XVME-974/1 P4 Connector

The P3 connector connects up to two 3.5" hard drives. Power for the drives is *not* supplied by the XVME-974/1. Connection to the chassis power supply should be utilized for powering external drives.

Table 5–7. XVME-974/1 P4 Connector Pinout

Pin	Signal	Pin	Signal
1	HDRESET*	21	HDRQ
2	GND	22	GND
3	HD7	23	DIOW*
4	HD8	24	GND
5	HD6	25	DIOR*
6	HD9	26	GND
7	HD5	27	IORDY
8	HD10	28	CSEL (pulled to GND)
9	HD4	29	HDACK*
10	HD11	30	GND
11	HD3	31	IRQ14
12	HD12	32	NC
13	HD2	33	DA1
14	HD13	34	PDIAG
15	HD1	35	DA0
16	HD14	36	DA2
17	HD0	37	CS1P*
18	HD15	38	CS3P*
19	GND	39	IDEATP*
20	KEY (NC)	40	GND

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Caution

The IDE controller supports enhanced PIO modes, which reduce the cycle times for 16-bit data transfers to the hard drive. Check with your drive manual to see if the drive you are using supports these modes. The higher the PIO mode, the shorter the cycle time. As the IDE cable length increases, this reduced cycle time can lead to erratic operation. As a result, it is in your best interest to keep the IDE cable cable within the 18" IDE cable specification.

The PIO modes can be selected in the BIOS setup (see p. 33). The Auto-configuration will attempt to classify the connected drive if the drive supports the auto ID command. If you experience problems, change the **Transfer Mode** to *Standard*.

Caution

The total cable length must not exceed 18 inches. Also, if two drives are connected, they must be no more than six inches apart.

XVME-974/1 P5 Connector

P5 connects a single 3.5" floppy drive. Only one drive is supported. Power for this drive is *not* supplied by the XVME-974/1.

Table 5–8. XVME-974/1 P3 Connector Pinout

Pin	Signal	Pin	Signal
1	GND	18	FDIRC*
2	FRWC*	19	GND
3	GND	20	FSTEP*
4	NC	21	GND
5	KEY (NC)	22	FWD*
6	NC	23	GND
7	GND	24	FWE*
8	IDX*	25	GND
9	GND	26	FTK0*
10	MO1*	27	GND
11	GND	28	FWP*
12	NC	29	GND
13	GND	30	FRDD*
14	FDS1*	31	GND
15	GND	32	FHS*
16	NC	33	GND
17	GND	34	DCHG*

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

XVME-974/1 P6 LPT1 Parallel

The signal routing for this connector follows the industry standard for 26-pin header to 25-pin D-Shell.

Table 5–9. XVME-974/1 P6 Pinout

Pin	Signal
1	PSTROBE
2	PAUTOFEED
3	PPD0
4	PPERROR
5	PPD1
6	PINT*
7	PPD2
8	PSELIN*
9	PPD3
10	GROUND
11	PPD4
12	GROUND
13	PPD5
14	GROUND
15	PPD6
16	GROUND
17	PPD7
18	GROUND
19	PDACK*
20	GROUND
21	PPBUSY
22	GROUND
23	PPE
24	GROUND
25	PSELECT
26	GROUND

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

XVME-974/1 P7 Serial COM2

The signal routing for this connector follows the industry standard for 10-pin header to 9-pin D-Shell.

Table 5–10. XVME-974/1 P7 Pinout

Pin	Signal
1	DCD
2	DSR
3	RXD
4	RTS
5	TXD
6	CTS
7	DTR
8	RI
9	GROUND
10	GROUND

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Appendix A – SDRAM Installation

The XVME-661 has one 144-pin small-outline dual inline memory module (SODIMM) site in which memory is inserted.

The XVME-661 supports 32, 64, 128, and 256 MB of PC100 SDRAM. You can use 4Mx64, 8Mx64, 16Mx64, and 32Mx64 SDRAM SODIMM sizes. Table A-1 lists the SODIMM configurations.

Table A–1. SDRAM SODIMM Configurations

SODIMM Size	Configuration
32 MB	4M x 64
64 MB	8M x 64
128 MB	16M x 64
256 MB	32M x 64

Installing SDRAM

Follow these steps to install the SODIMM:

Follow standard antistatic procedures to minimize the chance of damaging the XVME-661 and its components.

Power off the XVME-661, remove it from the VME backplane, and place it on a safe antistatic (grounded) surface.

Remove all connectors if not already removed.

Locate the P5 connector slightly in front of the P1 VME backplane connector (see also the drawing on p. 10).

Pull the metal clips on either side of the SODIMM until it pops up at an angle (roughly 30° from horizontal).

Grasping the upper two corners or the edges of the SODIMM, gently pull it out of the socket and set it to the side.

Insert the new SODIMM until it fits snugly into the connector.

Gently push the SODIMM down until the metal clips snap into place to hold it. If you cannot gently push the SODIMM into position, you may need to reposition the SODIMM to have it be correctly aligned with the memory socket. .

Replace the XVME-661 module, reconnect all connectors, etc.

Power up the unit and make sure that the memory is recognized (during bootup on the Boot-time diagnostic screen that can be turned on in the BIOS, see p. 38).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

SDRAM Manufacturers

Tables A–2 through A–5 list recommended SDRAM manufacturers along with part numbers.

Table A–2. 32 MB SODIMM

Manufacturer	Part Number
Micron	MT4LSDT464HG-10EXX
Advantage Memory	SMD-464-4X16-81VS4
Viking	PC4641U4SN3-2226
Simple Technology	ST1644116G1-10DVG

Table A–3. 64 MB SODIMM

Manufacturer	Part Number
Micron	MT8LSDT864HG-10EXX
Micron	MT4LSDT864HG-10EXX
Advantage Memory	SMD-864-4X16-81VS4
Viking	PC8641U4SN3-2226
Simple Technology	ST1648116G1-10DVG

Table A–4. 128 MB SODIMM

Manufacturer	Part Number
Micron	MT8LSDT1664HG-10EXX
Advantage Memory	SMD-1664-8X16-81VS4
Viking	PC16642U4SN3-2226

Table A–5. 256 MB SODIMM

Manufacturer	Part Number
Advantage Memory	I256/3069
Micron	MT16LSDF3264HG-10EXX

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Appendix B – Drawing

This appendix contains the board assembly drawing (top view) for the XVME-661.

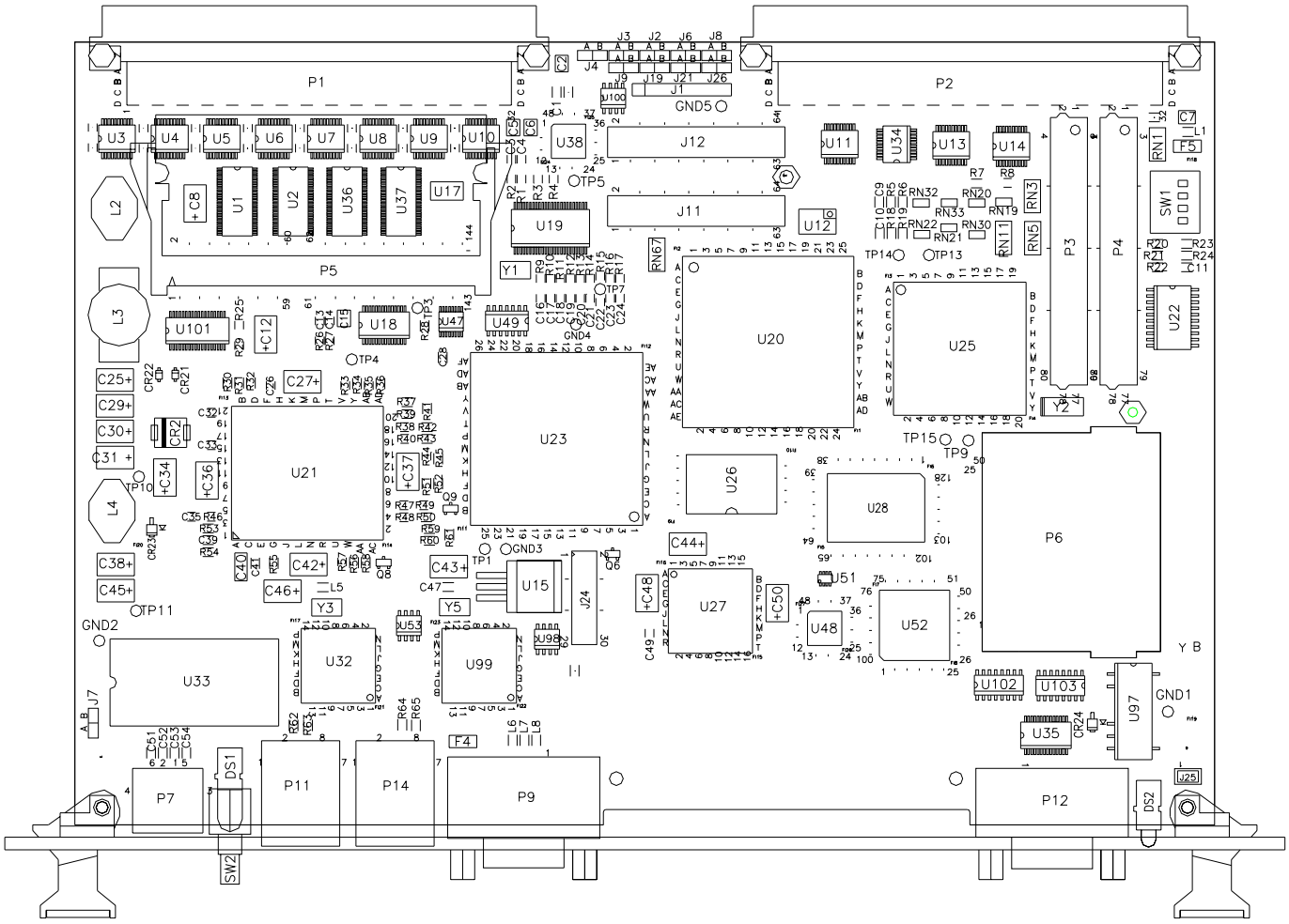


Figure B–1. Assembly Drawing for XVME-661 Mainboard

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Index

Abort toggle switch 66
Abort/Clear CMOS register 13
address, PCI 65
AGP video controller 2, 7
backplane, installing the XVME-661 26
BIOS compatibility 60
BIOS menus
  Advanced menu 38
    Advanced Chipset Control submenu42
    Daughter PMC #1 PCI and Daughter PMC #2 PCI submenus ... 44
    I/O Device Configuration submenu40
    PCI Configuration submenu 43
    PCI/PNP ISA IRQ Resource Exclusion submenu 46
    PCI/PNP ISA UMB Region Exclusion submenu 45
  Boot menu 53
  Exit menu 59
  general navigation information 30
  Main menu
    Cache RAM submenu 35
    IDE Primary and Secondary Master and Slave submenus 33
    Shadow RAM submenu 37
  Power menu 49
    Device Monitoring submenu 51
  Security menu 47
  VMEbus menu 54
    Master Interface submenu 57
    Slave Interface submenus 58
    System Controller submenu 55
BIOS32 Service Directory 68
block diagram 6
byte-swapping 14, 66, 74, 76, 77
cache 35
calling conventions, PCI BIOS functions . 67
COM port ..... *See* serial ports
Compact Flash drive 4
compatibility, BIOS 60
connectors
  keyboard port 16
  location 10
  PMC 17
  RJ-45 10/100 Base-T 16, 29
  serial registers 19
  VGA 16
  VMEbus
    interboard connector 1 (P4/P7) 23
    interboard connector 2 (P3/P8) 24
  XVME-973/1
    P1 79
    P2 81
    P3 82
    P4 83
    P5 84
  XVME-974/1
    P2 86
    P3 87
    P4 87
    P5 88
controllers
  Ethernet 3, 7
  Floppy Drive 3
  IDE 3
  video (AGP) 2, 7
CPU 2, 7
  speed 7
drivers
  loading Ethernet 29
drives
  Compact Flash 4
  floppy 3, 84, 88
  hard 3, 79, 82, 83, 87
environmental specifications 8
Ethernet controller 3, 7
Ethernet driver, loading 29
expansion
  IDE devices 3
  PC/104 5
  PCI 5
  PCM 5
  PMC 5
  short ISA 5
Expansion Options 9
features, XVME-661 1
Flash BIOS 2
Flash Paging and Byte Swap register 14, 76, 77
floppy drive 3
Floppy Drive controller 3
front panel, XVME-661 28
hard drive 3, 33

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

hardware specifications 7
humidity specifications 8
I/O map 62
IDE controller 3
IDE devices 3, 33, 40, 51
installation
SDRAM 91
XVME-661 26
XVME-973/1 78
interboard connector 1 23
interboard connector 2 24
interrupt generation, VMEbus 66
interrupt handling
VMEbus 66
interrupt map 63
IRQ map 63
IRQ10 66
jumper locations 10
jumper settings 11
J3, mainboard 55, 64
keyboard interface 5
keyboard port connector 16
L2 Cache 2, 7
LED/BIOS register 13
memory map 61
memory, SDRAM 2, 7, 8
module features 1
mouse interface 5
P1 connector, XVME-973/1 79
P2 connector, XVME-973/1 81
P2 connector, XVME-974/1 86
P3 connector, XVME-973/1 82
P3 connector, XVME-974/1 87
P4 connector, XVME-973/1 83
P4 connector, XVME-974/1 87
P5 connector, XVME-973/1 84
P5 connector, XVME-974/1 88
parallel port 5, 7
passwords 47
PC/104 5
PCI address 65
PCI BIOS
16-bit interface 67
32-bit interface 68
function calling conventions 67
PCI BIOS functions 67
Locating the Universe Chip 69
Read Configuration Byte 70
Read Configuration Dword 71
Read Configuration Word 71
Write Configuration Byte 72
Write Configuration Dword 73
Write Configuration Word 72
PCI Ethernet controller, enabling 29
PCI local bus interface 3
pinouts
interboard connector 1 23
interboard connector 2 24
keyboard port 16
P1 connector (XVME-973/1) 79
P2 connector (XVME-973/1) 81
P2 connector (XVME-974/1) 86
P3 connector (XVME-973/1) 82
P4 connector (XVME-973/1) 83, 87
P5 connector (XVME-973/1) 84
P5 connector (XVME-974/1) 88
PMC 17
serial ports 19
VGA 16
PMC 5
PMC connectors 17
ports
keyboard 5
mouse 5
parallel 5, 7
serial 5, 7
Universal Serial Bus (USB) 3, 7
power specifications 7
registers
Abort/Clear CMOS 13
Abort/Clear CMOS register 13
Flash Paging and Byte Swap ... 14, 76, 77
LED/BIOS 13
LED/BIOS register 13
watchdog timer 14
Regulatory Compliance 7
reset options, VMEbus 67
RJ-45 10/100 Base-T Connector: 16, 29
SDRAM 2, 7, 8
installation 91
part numbers 92
serial port pinouts 19
serial ports 5, 7, 19
shadow memory 37
shock specifications 8
Software Support 5
specifications
environmental 8
hardware 7
speed, CPU 7
switch location 10
switch settings 12

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

system resources 55, 64
temperature specifications 8
Universal Serial Bus (USB) port..... 3, 7
Universe chip 64, 74, 75, 76, 77
USB ..... *See* Universal Serial Bus (USB)
VGA connector 16
vibration specifications 8
VME interface..... 64
VMEbus
  interface 4
  interrrupt handling..... 66
  interrupt generation 66
  master interface 64
  reset options..... 67
  slave interface..... 65
VMEbus master interface 57
VMEbus slave interface..... 58
VMEbus system resources..... 55
voltage specifications..... 7
watchdog timer..... 5
watchdog timer register..... 14
XVME-9000-EXF..... 9
XVME-973/1 ..... 4, 9, 78
  P1 79
XVME-973/1 Drive Adapter Module..... 78
XVME-973/5 9
XVME-976 ..... 5, 9
XVME-977 ..... 3, 9
XVME-979 ..... 3, 9

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

740661 (B)

Xycom Automation, Inc.
750 North Maple Rd.
Saline, MI 48176
Phone: 734-429-4971
Fax: 734-429-1010
http://www.xycom.com



Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP