Single Board Computer-E7501-VEG2/H User's Guide
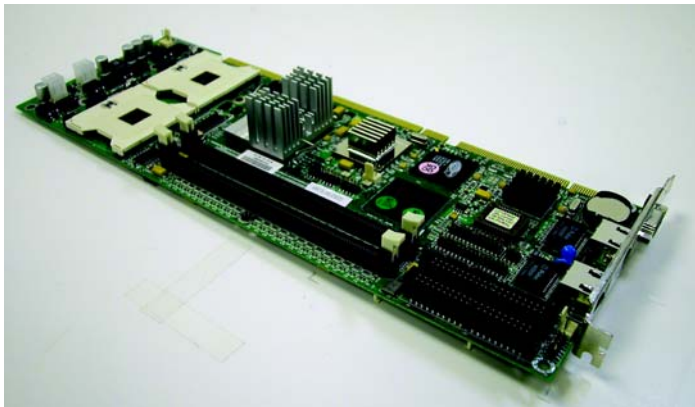
kontron

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➤ Safety Instructions

Contents

➤ *Before You Begin*

Before handling the SBC-E7501-VEG2/H card, read the instructions and safety guidelines on the following pages to prevent damage to the product and to ensure your own personal safety. Refer to the "Advisories" section in the Preface for advisory conventions used in this user's guide, including the distinction between Warnings, Cautions, Important Notes, and Notes.

♦   Always use caution when handling/operating the computer. Only qualified, experienced, authorized electronics service personnel should access the interior of the computer. The power supplies produce high voltages and energy hazards, which can cause bodily harm.

♦   Use extreme caution when installing or removing components. Refer to the installation instructions in this user's guide for precautions and procedures. If you have any questions, please contact Kontron Post-Sales Technical Support.

WARNING

High voltages are present inside the chassis when the unit's power cord is plugged into an electrical outlet. Turn off system power, turn off the power supply, and then disconnect the power cord from its source before removing the chassis cover. Turning off the system power switch does not remove power to components.

➤ *When Working Inside a Computer*

Before taking covers off a computer, perform the following steps:

1) Turn off the computer and any peripherals.

2) Disconnect the computer and peripherals from their power sources or subsystems to prevent electric shock or system board damage. This does not apply when hot swapping parts.

3) Follow the guidelines provided in "Preventing Electrostatic Discharge" on the following page.

4) Disconnect any telephone or telecommunications lines from the computer.

In addition, take note of these safety guidelines when appropriate:

♦ To help avoid possible damage to system boards, wait five seconds after turning off the computer before removing a component, removing a system board, or disconnecting a peripheral device from the computer.

♦ When you disconnect a cable, pull on its connector or on its strain-relief loop, not on the cable itself. Some cables have a connector with locking tabs. If you are disconnecting this type of cable, press in on the locking tabs before disconnecting the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before connecting a cable, make sure both connectors are correctly oriented and aligned.

CAUTION

Do not attempt to service the system yourself except as explained in this user's guide. Follow installation and troubleshooting instructions closely.

➤ *Preventing Electrostatic Discharge*

Static electricity can harm system boards. Perform service at an ESD workstation and follow proper ESD procedure to reduce the risk of damage to components. Kontron strongly encourages you to follow proper ESD procedure, which can include wrist straps and smocks, when servicing equipment.

You can also take the following steps to prevent damage from electrostatic discharge (ESD):

♦ When unpacking a static-sensitive component from its shipping carton, do not remove the component's antistatic packing material until you are ready to install the component in a computer. Just before unwrapping the antistatic packaging, be sure you are at an ESD workstation or grounded. This will discharge any static electricity that may have built up in your body.

♦ When transporting a sensitive component, first place it in an antistatic container or packaging.

♦ Handle all sensitive components at an ESD workstation. If possible, use antistatic floor pads and workbench pads.

♦ Handle components and boards with care. Don't touch the components or contacts on a board. Hold a board by its edges or by its metal mounting bracket.

♦ Do not handle or store system boards near strong electrostatic, electromagnetic, magnetic, or radioactive fields.

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➤ Preface

Contents

➤ *How to Use This Guide*

This guide is designed to be used as step-by-step instructions for installation, and as a reference for operation, troubleshooting, and upgrades.

> **Note:** Additional technical information, BIOS updates, and drivers are available on our web site, *www.kontron.com*, under Technical Support.

The following is a summary of the chapter contents:

➤ *Customer Comments*

If you have any difficulties using this user's guide, discover an error, or just want to provide some feedback, please send us a message using the online form under "Contact" on our Web site (*www.kontron.com*) under "Customer Services." Detail any errors you find. We will correct the errors or problems as soon as possible and post the revised user's guide in our online Support Library. Thank you.

> **Note:** You may also use the online form on our web site to submit comments or concerns about our products, or request technical support.

➤ *Advisory Conventions*

Four types of advisories are used throughout the user guides to provide helpful information or to alert you to the potential for hardware damage or personal injury. They are Notes, Cautions, and Warnings. The following is an example of each type of advisory. Use caution when servicing electrical components.

Note: A note is used to make helpful information stand out.

Important: An important note indicates information that is important for you to know.

CAUTION

A CAUTION indicates potential damage to hardware and tells you how to avoid the problem.

WARNING

A WARNING indicates the potential for bodily harm and tells you how to avoid the problem.

Disclaimer: We have tried to identify all situations that may pose a warning or caution condition in this user's guide. However, Kontron does not claim to have covered all situations that might require the use of a Caution or Warning.

Preface

➤ *Unpacking*

When unpacking, follow these steps:

1) After opening the box, save it and the packing material for possible future shipment.

2) Remove all items from the box. If any items listed on the purchase order are missing, notify Kontron customer service immediately.

3) Inspect the product for damage. If there is damage, notify Kontron customer service immediately. Refer to "Guarantee and Warranty Policy" for the return procedure.

➤ *Regulatory Compliance Statements*

This section provides the FCC compliance statement for Class A devices and describes how to keep the system CE compliant.

➤ *FCC Compliance Statement for Class A Devices*

The product(s) described in this user's guide has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the user's guide, may cause harmful interference to radio communications. Operation of this equipment in a residential area (domestic environment) is likely to cause harmful interference, in which case the user will be required to correct the interference (take adequate measures) at their own expense.

Changes or modifications not expressly approved by Kontron could void the user's authority to operate the equipment.

Note: The assembler of a personal computer system may be required to test the system and/or make necessary modifications if a system is found to cause harmful interference or to be noncompliant with the appropriate standards for its intended use.

➤ *CE Certification*

The product(s) described in this user's guide complies with all applicable European Union (CE) directives if it has a CE marking. The CE declaration of conformity is provided on the last page of this user's guide. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques. Although Kontron offers accessories, the customer must ensure that these products are installed with proper shielding to maintain CE compliance. Kontron does not offer engineering services for designing cabling systems. In addition, Kontron will not retest or recertify systems or components that have been reconfigured by customers.

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➤ *Guarantee and Warranty Policy*

➤ Guarantee

A thirty day money-back guarantee is provided on all standard products sold. Special order products are covered by our Limited Warranty, *however they may not be returned for refund or credit. EPROMs, RAM, Flash EPROMs or other forms of solid electronic media are not returnable for credit - but for replacement* only. An extended warranty is available. Consult the factory.

➤ *Refunds*

In order to receive a refund on a product for the purchase price, the product must not have been damaged by the customer or by the common carrier chosen by the customer to return the goods and the product must be returned complete (meaning all user's guides, software, cables, etc.) within 30 days of receipt and in an as-new and resalable condition. The "Return Procedure" must be followed to assure a prompt refund.

➤ *Restocking Charges*

Product returned *after* 30 days, and *before* 60 days, of the purchase will be subject to a minimum 20% restocking charge and charges for any damaged or missing parts. Products not returned within 60 days of purchase, or products which are not in an as-new and resalable condition, are not eligible for a credit return and will be returned to the customer.

➤ Limited Warranty

Effective April 1, 1998, all products carry a 2-year limited warranty. Within 2 years of purchase, Kontron will repair or replace, at our option, any defective product. Kontron will service the warranty for all standard catalog products for the first two years from the date of shipment. Please note: The 2-year warranty may not apply to special promotion items. Please consult the factory for warranty verification.

The limited warranty is void if the product has been subjected to alteration, neglect, misuse, or abuse; if any repairs have been attempted by anyone other than Kontron or its authorized agent; or if the failure is caused by accident, acts of God, or other causes beyond the control of Kontron or the manufacturer. Neglect, misuse, and abuse shall include any installation, operation, or maintenance of the product other than in accordance with the user's guide.

No agent, dealer, distributor, service company, or other party is authorized to change, modify, or extend the terms of this Limited Warranty in any manner whatsoever. Kontron reserves the right to make changes or improvements in any product without incurring any obligation to similarly alter products previously purchased.

➤ Return Procedure

For any Guarantee or Limited Warranty return, please contact Kontron Customer Service at 800-480-0044 or 858-677-0877 and obtain a Return Material Authorization (RMA) Number. All product(s) returned to Kontron for service or credit **must** be accompanied by a Return Material Authorization (RMA) Number. Freight on all returned items **must** be prepaid by the customer who is responsible for any loss or damage caused by common carrier in transit. Returns for Warranty **must** include a Failure Report for each unit, by serial number(s), as well as a copy of the original invoice showing the date of purchase.

To reduce risk of damage, returns of product must be in an Kontron shipping container. If the original container has been lost or damaged, new shipping containers may be obtained from Kontron Customer Service at a nominal cost.

Kontron owns all parts removed from repaired products. Kontron uses new and reconditioned parts made by various manufacturers in performing warranty repairs and building replacement products. If Kontron repairs or replaces a product, its warranty term is not extended.

Kontron will normally return your replacement or repaired items via ground. Overnight delivery or delivery via other carriers is available at an additional charge.

Shipments not in compliance with this Guarantee and Limited Warranty Return Policy will not be accepted by Kontron.

➤ Limitation of Liability

In no event shall Kontron be liable for any defect in hardware, software, loss, or inadequacy of data of any kind, or for any direct, indirect, incidental, or consequential damages in connection with or arising out of the performance or use of any product furnished hereunder. Kontron's liability shall in no event exceed the purchase price of the product purchased hereunder. The foregoing limitation of liability shall be equally applicable to any service provided by Kontron or its authorized agent.

Some sales items and customized systems are **not** subject to the guarantee and limited warranty. However in these instances, any deviations will be disclosed prior to sales and noted in the original invoice. **Kontron reserves the right to refuse returns or credits on software or special order items.**

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Chapter 1

➤ Introduction

Contents

➤ Overview

Single Board Computer (SBC)-E7501-VEG2/H boards use Intel's E7501 chipset and a 533-MHz system bus. The combination of dual Intel® Xeon™ processors optimized Intel® NetBurst™ micro-architecture and Hyper-Threading Technology creates a balanced platform with unparalleled price-performance, scalability and flexibility. Coupled with the dual port Intel® 82546EB Gigabit Controller, the board is a synergy of high computing and communication power to adapt to the diverse environment of medical/laboratory, industrial control and automation, instrumentation, data acquisition, transportation monitoring, COTS defense/aerospace and communication markets. ePCI-X (PICMG 1.2) is a new standard that is gaining traction in the embedded and communications market segments. The Intel® Xeon™ processor-based ePCI-X boards will provide high performance in very attractive form factors, allowing for implementation of communications, appliances and industrial control applications.

The SBC-E7501-VEG2/H use dual channel DDR-266/200 memory to tremendously accelerate the speed of the data transaction, and it is capable of supporting up to 4 GB of registered DDR 266/200 ECC memory. Besides, the board also offers two independent PCI-X buses for further I/O expansion. The I/O bandwidth of PCI-X bus allows for delivering high volume of data traffic created by Gigabit Ethernet, SCSI, image processing and so on massive data flow applications. With dual independent bus design, it is flexible to accommodate legacy add-on cards with lower speed bus without sacrificing the performance of other high-speed add-on cards running in another bus.

A tailor-made thermal solution is provided to guarantee the highest reliability during peak workloads. To maximize the high-bandwidth I/O architecture of the Intel® E7501 chipset, up to four full-speed PCI-X buses are available through a specially designed interface.

➤ SBC-E7501-VEG2/H

The SBC-E7501-VEG2/H are classified by dual Gigabit Ethernet port over copper or fiber connection and proprietary Hub Link 2.0 expansion connector. The SBC-E7501-VEG2H features an additional Hub Link 2.0 Connector.

Model Name	Copper BvE	Hub Link 2.0 Connector
SBC-E7501-VEG2	X	
SBC-E7501-VEG2H	X	X

➤ *What's Included*

- ♦ One SBC-E7501-VEG2 or SBC-E7501-VEG2H series system host board

- ♦ One proprietary CPU cooler

- ♦ Four screws with spring for 604-pin CPU and four for 603-pin CPU

- ♦ One dummy CPU pad for single 604-pin CPU and one for 603-pin single CPU

- ♦ Two Al block for regulator depends on 604-pin or 603-pin CPU was adopted

- ♦ One adapter board with bracket

- ♦ One adapter cable for the SBC-E7501-VEG2

- ♦ One IDE cable

- ♦ One FDC cable

- ♦ One Y-cable for PS/2 keyboard and mouse

- ♦ One parallel & serial port cable with bracket

Introduction

Chapter 2

➤ Specifications

Contents

➤ *Functional Specifications*

➤ Main Processor

♦ Single or dual Intel® 604-pin Xeon™ processor(s) at 533/400MHz front side (system) bus speed. (603-pin Xeon supported)

➤ BIOS

♦ Phoenix (Award) system BIOS with 4MB Flash ROM with ACPI, DMI, Green function and Plug and Play compatibility

➤ Main Memory

♦ Two DIMM sockets support up to 4GB of registered ECC DDR 266/200 SDRAM (Interleaved memory; requires memory modules to be installed in pairs. DDR 266 must be used with 533MHz FSB speed processors)

➤ L2 Cache Memory

♦ 512KB built-in Intel® Xeon™ Processor

➤ Chipset

♦ Intel® E7501 MCH and ICH3-S chipset

▶ Bus Interfaces

- ◆ Follows PICMG 1.2 Rev 1.0 standard (dual PCI-X buses)

- ◆ Complies with PCI-X Addendum to the PCI Local Bus specification V1.0

- ◆ PCI IDE Interface supports two enhanced IDE ports up to four HDD devices with PIO Mode 4 and Ultra DMA/33/66/100 mode transfer and Bus Master feature

▶ Floppy Drive Interface

- ◆ Supports one FDD port, up to two floppy drives and 5-1/4"(360K, 1.2MB), 3-1/2" (720K, 1.2MB, 1.44MB, 2.88MB) diskette format and 3-mode FDD

▶ Serial Ports

- ◆ Two high-speed 16C550 compatible UARTs with 16-byte T/R FIFOs

▶ Parallel Port

- ◆ One parallel port with SPP, EPP and ECP modes

▶ USB Interface

- ◆ Four USB (Universal Serial Bus) 1.1 ports for high-speed I/O peripheral devices

▶ PS/2 Mouse and Keyboard Interface

- ◆ PS/2 mouse/keyboard connection through Y cable separation

▶ Auxiliary I/O Interfaces

- ◆ System-reset switch, external speaker, keyboard lock, Ethernet-access LED, and HDD-active LED

Real Time Clock/Calendar (RTC)

♦ Real Time Clock/Calendar with battery backup for seven-year data retention

Watchdog Timer

♦ Support WDT function through software programming for enable/disable and interval setting

♦ Generate system reset

Compact Flash Socket

♦ True IDE mode, compatible with the ATA/ATAPI-4 specification

♦ One Type II CF socket on secondary IDE channel to support up to 1GB memory

♦ Bootable for no drives on primary channel

VGA Display

♦ ATI Rage XL graphic controller works in combination with a 8MB DDR-SDRAM

♦ Display resolution up to 1600 x 1200 @ 85Hz

On-board Gigabit Ethernet

♦ Intel® 82546EB PCI-X dual Gigabit Ethernet controller

Cooling Fan Power Connector

♦ Support for three, three-pin connectors for CPU and system fans

➤ System Monitoring Features

♦ Monitoring of CPU temperature and major power sources

♦ Dual Ethernet port with two indicators

➤ *Mechanical Specifications*

➤ Outline Dimension (L x W)

♦ 338.5mm (13.33") x 122mm (4.8")

➤ CPU Cooler Dimension

♦ (L x W x H): 124 x 112 x 41 mm

➤ Fan Speed

♦ 1,000 rpm

➤ Heat Sink Material

♦ Copper

➤ Rated Voltage

♦ 12V DC

➤ Thermal Resistance

♦ 0.395

➤ Weight

♦ 970g

➤ *Electrical Specifications*

♦ +12V (CPU1) @ 3.7A

♦ +12V (CPU2) @ 2.8A

♦ +12V (System) @ 1.2A

♦ +5V (System) @ 3.1A

♦ +3.3V (System) @ 2.9A

➤ *Environmental Specifications*

➤ Operating Temperature

♦ -5°C ~ 50°C (23°F ~ 122°F)

➤ Storage Temperature

♦ -20°C ~ 80°C

➤ Relative Humidity

♦ 0% ~ 95%, non-condensing

Specifications

➤ Mechanical Drawing
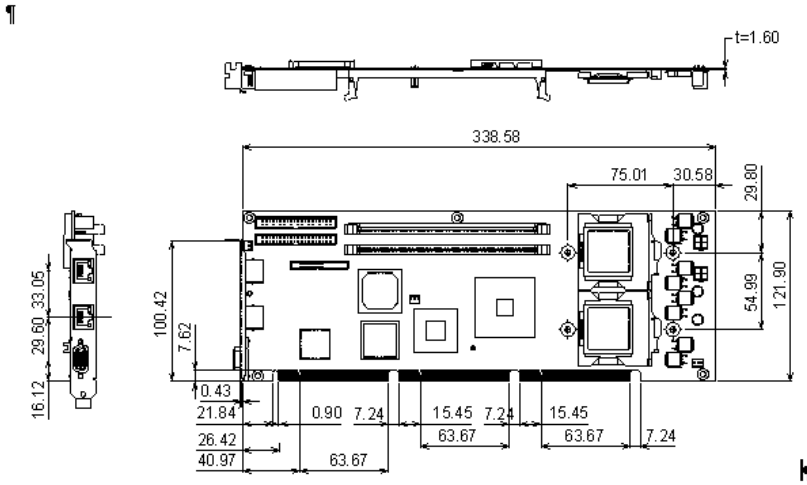
➤ *System Architecture*

The architecture of SBC-E7501-VEG2/H includes the following:

Intel®'s memory controller hub E7501

I/O controller hub ICH3-S

Hub Link 2.0 to PCI/PCI-X bus bridge P64H2

PCI-X interface dual Gigabit Ethernet controller 82546EB

The E7501 chipset supports single or dual 533/400MHz Xeon™ processor (s), registered DDR 266/200 ECC SDRAM ICH3-S supports a PCI bus interface, which was utilized to hook a ATI Rage XL graphic controller for the standard display requirement of server application, APM, ACPI compliant power management, USB port, SM Bus communication, and Ultra DMA/33/66/100 IDE Master, bridge P64H2 providing two PCI-X buses of the system via golden finger of the SHB, 82546EB was on-board device attached to one of the PCI-X buses.

The W83627HF (I/O Controller) is responsible for PS/2 Keyboard/Mouse, UARTs, FDC, Hardware Monitor, Parallel, and Watchdog Timer.

The propriety Hub Link 2.0 connector supports two additional P64H2 for additional four PCI/PCI-X buses for future extension. A single P64H2 interface (Hublink-PCIX), giving four PCFPCI-X buses, is available.

Specifications

➤ Block Diagram
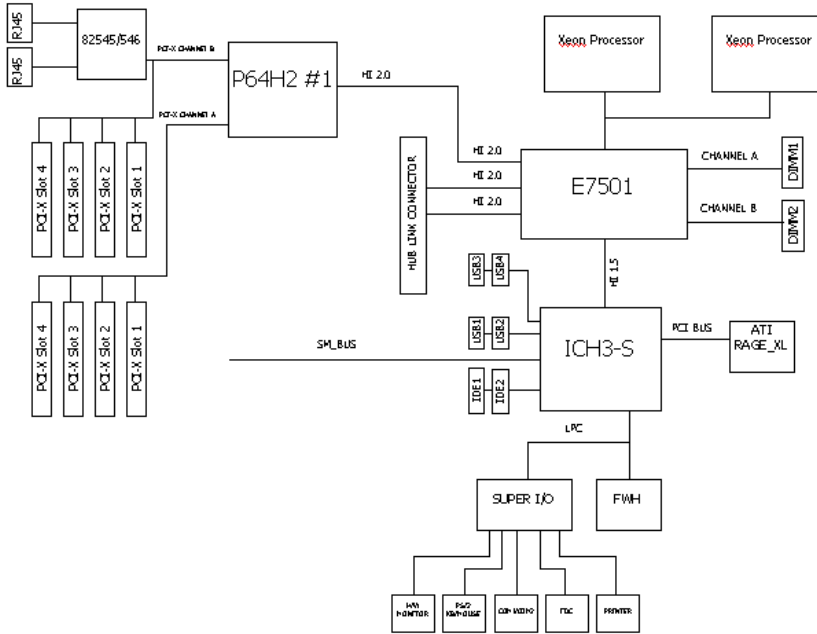
Chapter 3

Hardware Configuration

Contents

➤ *Hardware Configuration*

This chapter indicates jumpers', headers' and connectors' locations. Users may find useful information related to hardware settings. Default settings are indicated with a star sign (*).

➤ *Jumper Settings*

Jumper settings enable users to customize SBC-E7501-VEG2/H series features. For this product, jumper settings are needed for JP1 - ATX and CMOS Clear. Short means covering a jumper cap over jumper pins; Open or N/C (Not Connected) means removing a jumper cap from jumper pins.
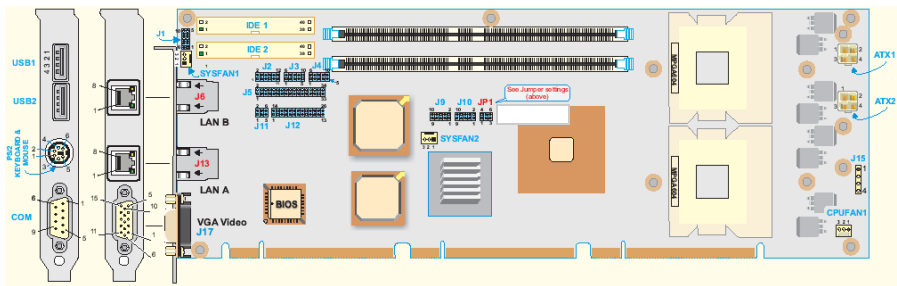
Figure 3-1. Jumper/Connector Location

➤ JP1: CMOS Clear and AT Power Emulation

JP1	Function
1-2 Short	ATX mode *
2-3 Short	AT Power Emulation
4-5 Short	CMOS Normal *
5-6 Short	CMOS Clear

Note: The SBC-E7501-VEG2/H can only be used in the environment with an ATX power supply. "AT Power Emulation" means the SBC-E7501-VEG2/H are able to powered automatically after the power cord is plugged into the ATX power supply. However, in ATX mode, users should go to the BIOS setup menu and change "PWRON after PWR FAIL" to "ON" if auto power-up is needed.

➤ *Connector Location*

I/O peripheral devices connect to the interface connectors on this single board computer (SBC).

There is a 26-pin, 2-mm cable included in the cable set. The RED LINE is Pin 1 of the cable. This cable splits into three cable groups. The first 10-pin cable group is for USB. The second 6-pin cable group is for PS2 KB/mouse, and the third 10-pin cable group is for the COM port.

Connector	Connector	Remark
J1	LAN speed and keylock	
J2	Misc	
J3	COM2 Serial Port	
J4	COM1 Serial Port	
J5	FDC	
J6	Gigabit RJ45 Port B	SBC-E7501-VEG2
J8/J16	MCH Heat Sink Hooker	
J9	USB0, USB1	
J11	PS/2 keyboard, mouse	
J12	Print port	
J13	Gigabit RJ45 Port A	SBC-E7501-VEG2
J15	Speaker	
J17	VGA port	
J21	Reserved for debugging	
J22	Compact Flash connector	
J23	Hyper Link Bus connector for additional PCI-X	Reserve for future use
IDE1	Primary IDE connector	
IDE2	Secondary IDE connector	

Connector Pin Assignments

J1: LAN Speed and Keylock

Pin	Signal Description	Pin	Signal Description
1	VCC	6	LAN A ACT# (A+)
2	NC	7	LAN A LINK# (A-)
3	PWRLED	8	LAN B ACT# (B+)
4	Keylock#	9	LAN A LINK# (B-)
5	GND	10	NC

Note: Pin 1 ~ Pin5 is the connector for Keylock & Power LED function. Pin 6 ~ Pin10 is the connector for LAN LED function. The LAN LED function is designed for LAN Link/Activity LED. Pin 6 is connected to LAN A LED anode. Pin 7 is connected to LAN A LED cathode. Pin 8 is connected to LAN B LED anode. Pin 9 is connected to LAN B LED cathode. Link/Activity LED brightens when it is linked to a LAN port. The LED blinks continuously while data transaction occurs.

J2: Miscellaneous

Pin	Signal Description	Pin	Signal Description	Remark
1	HDD LED# (-)	2	VCC3 (+)	Pin 1~2 is for HDD LED
3	OVER TEMP# (-)	4	VCC3 (+)	Pin 3~4 is for over temperature LED
5	RESET#	6	GND	Pin 5~6 is for reset button
7	GPIO32	8	3VSY	Pin 7~8 is reserved
9	INTRUDER	10	VCC_RTC	Pin 9~10 is for intruder detection. (See below.)
11	AP BUTTON	12	GND	See below

Note: Pin 9 ~ 10 serves as the intruder detection button. The default is short and is used to detect an open chassis. This button needs to be connected to the chassis open detection mechanism if desired. The BIOS shows a warning message while booting if the chassis is open. The BIOS does not support this function yet.

Pin 11~ 12 is designed for those users who need a "set to default" button. The methodology is that the customer's application can use this button to detect when a user presses "set to default," then auto-configures the software environment to the default setting or to other options.

➤ J3/J4: COM2/COM1 Serial Port 2/1 Connector

Pin	Signal Description
1	DCD (Data Carrier Detect)
2	RXD (Receive Data)
3	TXD (Transmit Data)
4	DTR (Data Transmission)
5	GND (Ground)
6	DSR (Data Set Ready)
7	RTS (Request to Send)
8	CTS (Clear to Send)
9	RI (Ring Indicator)
10	N/C

Note: The RED LINE of the third cable group is connected to Pin 1 of the COM port connector.

J5: FDC Interface Connector

Pin	Signal Description	Pin	Signal Description
1	Ground	2	Density Select 0
3	Ground	4	N/C
5	Ground	6	Density Select 1
7	Ground	8	Index#
9	Ground	10	Motor ENA#
11	Ground	12	Drive Select B#
13	Ground	14	Drive Select A#
15	Ground	16	Motor ENB#
17	Ground	18	Direction#
19	Ground	20	Step#
21	Ground	22	Write Data#
23	Ground	24	Write Gate#
25	Ground	26	Track 0#
27	Ground	28	Write Protect#
29	N/C	30	Read Data#
31	Ground	32	Head Select#
33	N/C	34	Disk Change#

Hardware

➤ J6/J13: Gigabit RJ45 Port B

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

J9/J10 USB Connector

Pin	Signal Description	Pin	Signal Description
1	5V	2	Ground
3	USB0-/USB2-	4	Ground
5	USB0+/USB2+	6	USB1+/USB3+
7	Ground#	8	USB1-/USB3-
9	Ground	10	5V

Note: The RED LINE of the third cable group is connected to Pin 2 of the USB port connector.

➤ J11: PS/2 Keyboard-Mouse Connector

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

Note: The RED LINE of the third cable group is connected to Pin 1 of the PS/2 KB-Mouse connector. J11 will work as a KBD port if a y-cable is not used.

J12: Parallel Port Connector (Printer Port)

Pin	Signal Description	Pin	Signal Description
1	Strobe#	14	Auto Form Feed
2	Data 0	15	Error #
3	Data 1	16	Initialization#
4	Data 2	17	Printer Select IN#
5	Data3	18	Ground
6	Data 4	19	Ground
7	Data 5	20	Ground
8	Data 6	21	Ground
9	Data 7	22	Ground
10	Acknowledge#	23	Ground
11	Busy	24	Ground
12	Paper Empty	25	Ground
13	Printer Select	26	NC

J15: Speaker Connector

Pin	Signal Description
1	Speaker Signal Output
2	N/C
3	Ground
4	5V

➤ J17: VGA Port

Pin	Signal Description	Pin	Signal Description
1	R	9	NC
2	G	10	GND
3	B	11	NC
4	NC	12	MONID1
5	GND	13	HSYBC#
6	GND	14	VSYNC#
7	GND	15	MONID2
8	GND		

IDE1/IDE2: Primary/Secondary IDE Connector

Pin	Signal Description	Pin	Signal Description
1	Ground	2	Density Select 0
3	Ground	4	N/C
5	Ground	6	Density Select 1
7	Ground	8	Index#
9	Ground	10	Motor ENA#
11	Ground	12	Drive Select B#
13	Ground	14	Drive Select A#
15	Ground	16	Motor ENB#
17	Ground	18	Direction#
19	Ground	20	Step#
21	Ground	22	Write Data#
23	Ground	24	Write Gate#
25	Ground	26	Track 0#
27	Ground	28	Write Protect#
29	N/C	30	Read Data#
31	Ground	32	Head Select#
33	N/C	34	Disk Change#
35	DA0	36	DA2
37	HDC CS0#	38	HDC CS1#
39	HDD Active#	40	Ground

➤ ATX1, ATX2

Pin	Signal Description
1	GND
2	GND
3	+12V
4	+12V

➤ SYSFAN1, SYSFAN2, CPUFAN1

Pin	Signal Description
1	GND
2	+12V
3	Fan Speed Detection

Chapter 4

➤ # System Installation

Contents

➤ *Overview*

This chapter provides instructions to set up your system. Additional information is enclosed to help you configure the Compact Flash card and handle WDT operation.

Important: Users should handle the edges of the CPU/CPU cooler to avoid damaging the board.

➤ *Installing Xeon Processors*

1) Lift the lever handle of the CPU socket.

2) Align the processor pins with pinholes on the socket. Make sure that the notched corner or dot mark (Pin 1) of the CPU corresponds to the socket's bevel end. Then press the CPU gently until it fits into place. Do not force the CPU.

3) Push down the lever to lock processor chip into the socket after installing the CPU.

4) Use the installation guide when installing the cooling fan or heat sink on the CPU surface. Lock it on Socket 604.

Note: Dual CPUs must have the same core speed, bus speed, and pin numbers. Install single CPUs in the socket near the DIMM.
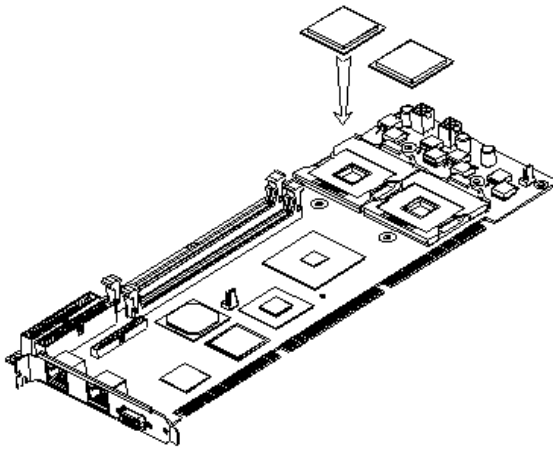
Figure 4-1. Inserting Xeon Processors

➤ Identifying CPU Cooler
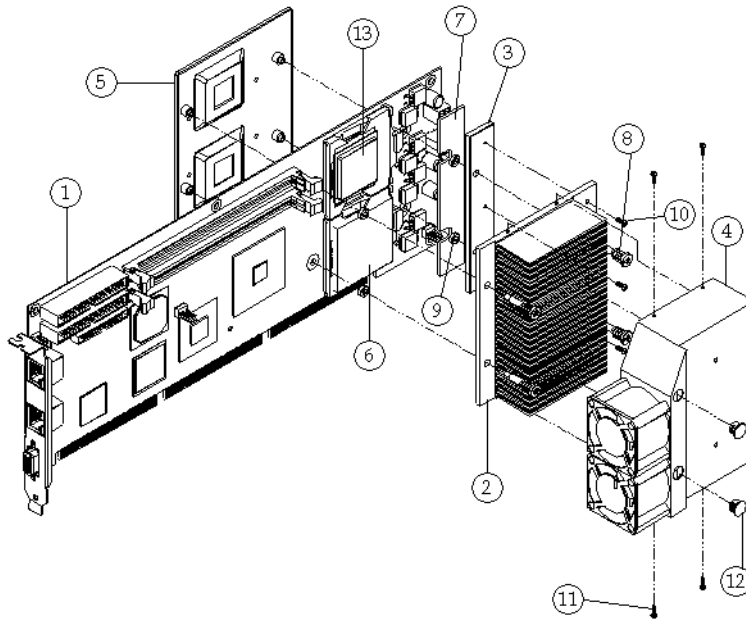
Item	Description	Quantity
1	SBC-E7501-VEG2/H	1
2	Heat sink	1
3	Al block	2
4	Air duct	1
5	Cooler backplate	1
6	Dummy CPU pad	2
7	Thermal pad	2

Item	Description	Quantity
8	Cooler mounting screw and spring	8
9	Nut	4
10	Flat head M3 screw	3
11	Rounded head M2.5 screw	4
12	Cap for screw driver hole	2
13	Xeon processor	1 or 2

➤ Installing Single CPU Cooler

To install a single CPU cooler:

1) Adhere a dummy pad on the socket.

2) Change cooler mounting screws and spring (if installing a 603-pin Xeon) by removing air duct and cooling fans (Longer cooler mounting screws are used for 603-pin Xeon processors).
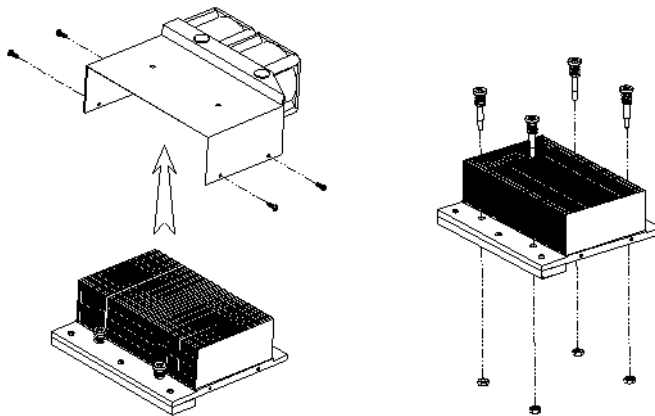
Figure 4-2. Installing CPU

3) Tighten nuts on cooler mounting screws before installing it on the backplate.

4) Change the Al block on CPU cooler if installing a 603-pin Xeon.
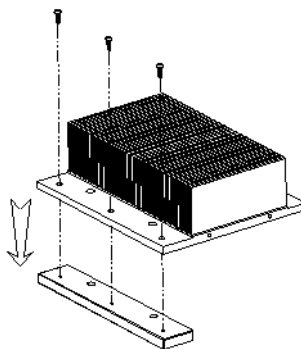
5) Adhere the thermal block according to CPU type.
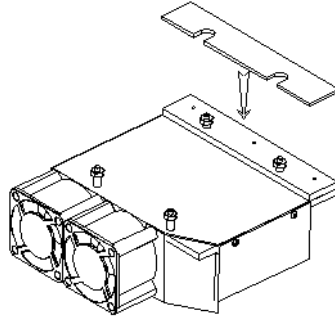
6) Put the cooler backplate at the bottom of the SHB.

7) Tear off the thermal tape protection from the thermal pad on the Al block.
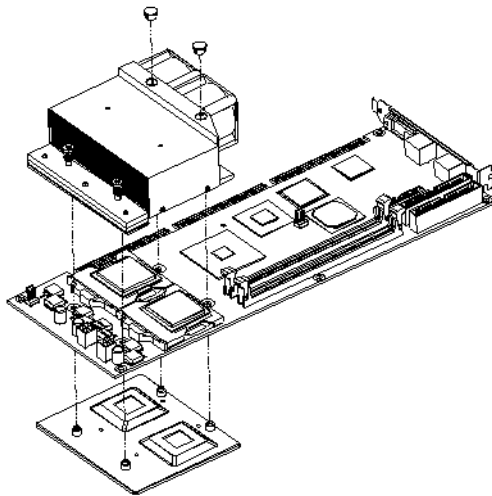
8)   Put the CPU cooler on the SHB. (The cooling fans are near the DIMM sockets.)

9)   Fix screws of the CPU cooler according to the 603-pin or 604-pin CPU.

10) Cover the screw holes on the air duct.

➤ Installing Dual CPUs

To install dual CPUs, follow the previous procedure, but skip Step 1.

➤ Removing CPUs

1)   Unlock the CPU cooler.

2)   Lift the lever of CPU socket.

3)   Lift CPU.

4)   Follow the steps of installing a CPU to change to another one or place handling bar to close the opened socket.

➤ *Main Memory*

The SBC-E7501-VEG2/H provide two DDR-SDRAM DIMM slots to support 2.5V DDR-SDRAM as on-board main memory. The maximum memory size can be up to 4GB. Auto detecting memory clock depends upon BIOS CMOS settings.

For system compatibility and stability, please use branded memory modules. Because the memory scheme is interleaved, paired installation in required. If you use a 533MHz front-side bus processor(s), you must use DDR 266 SDRAM. If you're using a 400MHz front-side bus processor(s), either DDR 266 or DDR 200 SDRAM is acceptable.

Please be aware of the contact and lock integrity of the memory module in the socket, which can impact system reliability. Follow normal procedures to install DRAM modules into the memory sockets. Before locking, make sure that all modules are fully inserted into the card slots.

Note: To maintain system stability, do not change DRAM parameters in BIOS setup because the system automatically selects optimal settings.

➤ *Compact Flash Cards*

The SBC-E7501-VEG2/H include a Type II Compact Flash socket for a CompactFlash card up to 1GB.

➤ Installing Compact Flash Cards

1) Carefully handle the card and always hold it by the edges. Holding the center of the card probably won't damage it, but holding the card by the edges provides an extra measure of protection.

2) Slide CompactFlash card into the socket.

3) If CompactFlash card doesn't slide into the socket easily, do not force it. It may be reversed. Turn it around, and try inserting it again.

WARNING

Keep CompactFlash card away from direct sunlight, moisture, and magnetic fields.
The true IDE mode does not support hot insertion and removal because of the probability of disrupted signals on the system bus.

► Driver Installation

To install the SBC-E7501-VEG2/H into a standard chassis or proprietary environment, do the following:

1) Make sure all jumpers are set in the proper position.

2) Place the SBC-E7501-VEG2/H into the dedicated position in your system.

3) Attach cables to existing peripheral devices and secure it.

4) Attach two 4-pin 12V power cables of ATX power supply to on board 12V CPU supplementary connectors (ATX1, ATX2).

► *Clearing CMOS*

The following table indicates how to enable/disable CMOS Clear Function hardware circuit by placing jumpers at the proper position.

To correctly operate CMOS Clear function, turn off the system, move JP1 jumper to short pin 5 and 6. To clear CMOS, please turn the power back on and turn it off again for AT system, or press the toggle switch a few times for ATX system. Move the JP1 back to 1-2 position (Normal Operation) and start the system. System will then produce a "CMOS Check Sum Error" message. Users may then follow the displayed message to load BIOS default setting.

JP1	Function
4-5 Short	Normal operation
5-6 Short	Clear CMOS contents

➤ *Watchdog Timer Function*

The working algorithm of the Watchdog Timer (WDT) function can be simply described as a counting process. The Time-Out Interval can be set through software programming. The availability of the time-out interval settings by software or hardware varies from board to board.

The SBC-E7501-VEG2/H allow users to control the WDT through dynamic software programming. The WDT starts counting when it is activated. It sends out a signal to system reset, when time-out interval ends. To prevent the time-out interval from running out, a re-trigger signal will need to be sent before the counting reaches its end. This action restarts the counting process.

A well-written WDT program keeps the counting process running under normal conditions. WDT should never generate a system reset or NMI signal unless the system runs into trouble.

The related Control Registers of WDT are all included in the following sample program that is written in C language. Users can fill a non-zero value into the Time-out Value Register to enable/refresh WDT. System will be reset after the Time-out Value to be counted down to zero. Or users can directly fill a zero value into Time-out Value Register to disable WDT immediately.

To ensure successful access to the content of desired Control Register, the sequence of following program codes should be run step-by-step again when each register is accessed.

Additionally, there are maximum two seconds of counting tolerance that should be considered by the user's application program. For more information about WDT, please refer to the Winbond W83627HF data sheet.

You can use two PnP I/O port addresses to configure WDT:

- ♦ 0x2E:EFIR (Extended Function Index Register, for identifying CR index number)

- ♦ 0x2F:EFDR (Extended Function Data Register, for accessing desired CR)

➤ WDT Code Examples

The following example codes demonstrates the use of WDT.

// Enter Extended Function Mode

outp(0x002E, 0x87);

outp(0x002E, 0x87);

// Assign Pin 89 to be a WDTO

outp(0x002E, 0x2B);

outp(0x002F, inp(0x002F) & 0xEF);

// Select Logic Device 8

outp(0x002E, 0x07);

outp(0x002F, 0x08);

// Active Logic Device 8

outp(0x002E, 0x30);

outp(0x002F, 0x01);

// Select Count Mode

outp(0x002E, 0xF5);

outp(0x002F, (inp(0x002F) & 0xF7) | **(Count-mode Register** & 0x08**)**);

// Specify Time-out Value

outp(0x002E, 0xF6);

outp(0x002F, **Time-out Value Register**);

// Disable WDT reset by keyboard/mouse interrupts

outp(0x002E, 0xF7);

outp(0x002F, 0x00);

// Exit Extended Function Mode

outp(0x002E, 0xAA);

➤ Variable Definitions

➤ *Value of Count-mode Register*

1) 0x00 -- Count down in seconds (Bit3=0)

2) 0x08 -- Count down in minutes (Bit3=1)

➤ *Value of Time-out Value Register*

1) 0x00 -- Time-out Disable

2) 0x01~0xFF -- Value for counting down

Chapter 5

➤ BIOS

Contents

➤ Overview

The SBC-E7501-VEG2/H come with the Phoenix (AWARD) BIOS stored in Flash ROM. This BIOS has a built-in setup program that allows users to modify basic system configuration. This type of information is stored in CMOS RAM so that it is retained during power-off periods. When the system is turned on, the system communicates with peripheral devices and check its hardware resources against the configuration information stored in the CMOS memory. If errors are detected, or the CMOS parameters need to be initially defined, the diagnostic program will prompt the user to enter the SETUP program. Some errors are significant enough to abort the start-up.

➤ Entering Setup

Turn on or reboot the computer. When the message "Hit <DEL> if you want to run SETUP" appears, press <Del> key immediately to enter BIOS setup program. If the message disappears before you respond, but you still wish to enter Setup, please restart the system to try "COLD START" again by turning it OFF and then ON, or touch the "RESET" button. You also may restart from "WARM START" by pressing <Ctrl>, <Alt>, and <Delete> keys simultaneously. If you do not press the keys at the right time and the system will not boot, an error message will be displayed and you will again be asked to: Press <F1> to Run SETUP or Resume.

BIOS

In the HIFLEX BIOS setup, users can use the keyboard to choose among options or modify the system parameters to match the options with their system. The table below shows keystroke functions available in the BIOS setup.

General Help	
□ □ □ □	: Move
Enter	: Select
+ / - / PU / PD	: Value
ESC	: Exit
F1	: General Help
F2	: Item Help
F5	: Previous Values
F6	: Fail-Safe Defaults
F7	: Optimized Defaults
F9	: Menu in BIOS
F10	: Save

➤ *Main Menu*

After you enter SBC-E7501-VEG2/H AWARD BIOS CMOS Setup Utility, start with the Main Menu. The Main Menu allows you to select from 11 setup functions and two exit choices. Use arrow keys to switch among items and press <Enter> key to accept or bring up the submenu.

```
            Phoenix-Award Workstation BIOS CMOS Setup Utility

┌────────────────────────────────┬────────────────────────────────┐
│  Standard CMOS Features         │  Frequency/Voltage Control      │
│  Advanced BIOS Features         │  Load Fail-Safe Defaults        │
│  Advanced Chipset Features      │  Load Optimized Defaults        │
│  Integrated Peripherals         │  Set Supervisor Password        │
│  Power Management Setup          │  Set User Password              │
│  PnP/PCI Configurations          │  Save & Exit Setup             │
│  PC Health Status               │  Exit Without Saving            │
├────────────────────────────────┴────────────────────────────────┤
│  Esc : Quit                     ↑↓ ← → : Select Item             │
│  F10 : Save & Exit Setup                                         │
├───────────────────────────────────────────────────────────────────┤
│               Time, Date, Hard Disk Type....                     │
└───────────────────────────────────────────────────────────────────┘
```

Note: Kontron recommends that you reload the Optimized Setting if the CMOS is lost or the BIOS is updated.

➤ *Standard CMOS Features*

This setup page includes all the items in a standard compatible BIOS. Use the arrow keys to highlight the item and then use the <PgUp>/<PgDn> or <+>/<-> keys to select the value or number you want in each item and press <Enter> key to certify it.

Follow command keys in CMOS Setup table to change Date, Time, Drive type, and Boot Sector Virus Protection Status.

```
                Phoenix- Award Workstation BIOS CMOS Setup Utility
                             Standard CMOS Features

 Date: (mm:dd:yy)          Mon, Jun 16 2003             Item Help
 Time: (hh.mm.ss)          16:51:13
                                                  Menu Level      ►
 ►  IDE PrimaryMaster      [ST320424A]
 ►  IDE Primary Slave      None                  Change the day, month,
 ►  IDE Secondary Master   None                  year and century
 ►  IDE Secondary Slave    None

    Drive A                1.44M, 3.5 in.
    Drive B                None

    Video                  EGA/ VGA
    Halt On                All, But Keyboard

    Based Memory           640K
    Extended Memory        260096K
    Total Memory           261120K

 ↑↓→←: Move   Enter: Select  +/-/PU/PD: Value   F10: Save   ESC: Exit   F1: General Help
        F5: Previous Values      F6: Fail-Safe Defaults   F7: Optimized Defaults
```

➤ Menu Selections

Item	Options	Description
Date	mm:dd:yy	Change the day, month, year and century
Time	hh:mm:ss	Change the internal clock
IDE Primary Master	Options are in its sub menu (described in 4.4 Table)	Press <Enter> to enter next page for detail hard drive settings
IDE Primary Slave	Options are in its sub menu (described in 4.4 Table)	Press <Enter> to enter next page for detail hard drive settings
IDE Secondary Master	Options are in its sub menu (described in 4.4 Table)	Press <Enter> to enter next page for detail hard drive settings
IDE Secondary Slave	Options are in its sub menu (described in 4.4 Table)	Press <Enter> to enter next page for detail hard drive settings
80 Drive A Drive B	None 360K, 5.25 in 1.2M, 5.25 in 720K, 3.5 in 1.44M, 3.5 in 2.88M, 3.5 in	Select the type of floppy disk drive installed in your system
Video	EGA/VGA CGA 40 CGA 80 MONO	Select the default video device
Halt On	All Errors No Errors All, but Keyboard All, but Diskette All, but Disk/Key	Select the situation in which you want the BIOS to stop the POST process and notify you
Base Memory	640K	Displays the amount of conventional memory detected during boot up
Extended Memory	N/A	Displays the amount of extended memory detected during boot up
Total Memory	N/A	Displays the total memory available in the system

BIOS

▶ *IDE Adapters Setup Menu*

The IDE adapters control the IDE devices, such as hard disk drive or CD-ROM drive. It uses a submenu to configure each hard-disk drive.

```
            Phoenix- Award Workstation BIOS CMOS Setup Utility
                            IDE Primary Master

  IDE HDD Auto-Detection      Press Enter          Item Help

  IDE Primary                 Auto         Menu Level      ▶
  Access Mode                 Auto
                                           To auto-detect the HDD's
  Capacity                    20405MB      size, head... on this channel

  Cylinder                    39535
  Head                        16
  Precomp                     0
  Landing Zone                39534
  Sector                      63

  ↑↓→←: Move   Enter Select  +/-/PU/PD: Value   F10: Save   ESC: Exit   F1: General Help
          F5: Previous Values     F6: Fail-Safe Defaults      F7: Optimized Defaults
```

➤ Menu Selections

Item	Options	Description
IDE HDD Auto-detection	Press Enter	To auto-detect the HDD's size, head ... on the channel
IDE Primary Master / Slave IDE Secondary Master / Slave	None Auto Manual	Selecting 'manual' lets you set the remaining fields on this screen. Selects the type of fixed disk. "User Type" will let you select the number of cylinders, heads, etc. Note: PRECOMP=65535 means NONE !
Access Mode	CHS LBA Large Auto	Choose the access mode for this hard disk
Capacity	Auto Display your disk drive size	Disk drive capacity (Approximated). Note that this size is usually slightly greater than the size of a formatted disk given by a disk checking program.
The following options are selectable only if the 'IDE Primary Master' item is set to 'Manual'		
Cylinder	Min = 0 Max = 65535	Set the number of cylinders for this hard disk.
Head	Min = 0 Max = 255	Set the number of read/write heads
Precomp	Min = 0 Max = 65535	**** Warning: Setting a value of 65535 means no hard disk
Landing zone	Min = 0 Max = 65535	****
Sector	Min = 0 Max = 255	Number of sectors per track

BIOS

➤ *Advanced BIOS Features*

This section allows you to configure your system for basic operation. You can select the system's default speed, boot-up sequence, keyboard operation, shadowing and security.

```
              Phoenix – Award Workstation BIOS CMOS Setup Utility
                            Advanced BIOS Features
    ┌──────────────────────────────────────┬──────────────────────────┐
    │  Virus Warning            Disabled    │       Item Help          │
    │  CPU L1 & L2 Cache        Enabled     ├──────────────────────────┤
    │  Hyper-Threading Technology Enabled   │  Menu Level      ►        │
    │  Quick Power On Self Test  Enabled    │                          │
    │  First Boot Device        Floppy      │                          │
    │  Second Boot Device       HDD-0       │                          │
    │  Third Boot Device        HDD-1       │                          │
    │  Boot Other Device        Enabled     │                          │
    │  Swap Floppy Drive        Disabled    │                          │
    │  Boot Up Floppy Seek      Disabled    │                          │
    │  Boot Up NumLock Status   On          │                          │
    │  Get A20 Option           Fast        │                          │
    │  Typematic Rate Setting   Disabled    │                          │
    │ X Typematic Rate (Chars/sec)  6       │                          │
    │ X Typematic delay (Msec)   250        │                          │
    │  Security Option          Setup       │                          │
    │  MPS Version Control For OS 1.4       │                          │
    │  Console Radirection      Disabled    │                          │
    │ X Baud Rate               19200       │                          │
    │  Agent Connect via        Null        │                          │
    │  Agent wait time (min)    1           │                          │
    │  Agent after boot         Disabled    │                          │
    ├──────────────────────────────────────┴──────────────────────────┤
    │ ↑↓←→: Move   Enter Select  +/-/PU/PD: Value  F10: Save  ESC: Exit  F1: General Help │
    │       F5: Previous Values    F6: Fail-safe defaults    F7: Optimized Defaults       │
    └──────────────────────────────────────────────────────────────────┘
```

➤ Virus Warning

Virus Warning allows you to choose the Virus warning feature for IDE Hard-Disk boot sector protection. If this function is enabled and someone attempts to write data to this area, the BIOS issues a warning message and causes an alarm to beep.

Enabled	Activates automatically when the system boots up, causing a warning message to appear when anything attempts to access the boot sector or hard-disk petition table.
Disabled	No warning message will be appear when anything attempts to access the boot sector or hard-disk petition table.

➤ CPU L1 Cache/L2 Cache

These two categories speed up memory access. However, the speed depends on the design of the CPU and chipset.

Enabled	Enable quick cache.
Disabled	Disable cache.

➤ Hyper Threading Technology

"Enabled" for Windows XP and Linux 2.4X (OS optimized for Hyper-Threading Technology and "Disabled" for OS not optimized for Hyper-Threading Technology.

The choice: Enabled, Disabled.

➤ Quick Power On Self Test

This allows the system to skip certain tests while booting, while decreasing the amount of time needed to boot the system.

Enabled	Enable Quick Post
Disabled	Normal Post

➤ First/Second/Third/Other Boot Device

The BIOS attempts to load the operating system from the devices in the sequence selected in these items.

Choices include: Floppy, LS120, HDD-0, SCSI, CDROM, HDD-1, HDD-2 HDD-3, ZIP100, USB-FDD, USB-ZIP, USB-CDROM, USB-HDD, LAN and Disabled.

➤ Other Boot Device

The choice: Enabled, Disabled.

➤ Swap Floppy Drive

If the system has two floppy drives, choose enable to assign physical driver B to logical drive A or physical driver A to logical drive B.

The choice: Enabled, Disabled.

➤ Boot Up Floppy Seek

Enabled tests floppy drives to determine whether they have 40 or 80 tracks.

The choice: Enabled, Disabled.

➤ Boot Up NumLock Status

Select power on state for NumLock.

The choice: Off, On.

➤ Get A20 Option

This selection offers a normal and fast choice. Fast allows chipsets to control Gate A20. Normal allows a pin in the keyboard controller to control Gate A20. Fast is the default.

➤ Typematic Rate Setting

Keystrokes repeat at a rate determined by the keyboard controller. When enabled, the typematic rate and typematic delay can be selected.

The choice: Enabled, Disabled.

➤ Typematic Rate (Chars/sec)

The rate at which character repeats when you hold down a key.

The choice: 6, 8, 10, 12, 15, 20, 24, 30.

➤ Typematic delay (Msec)

The delay before keystrokes begin to repeat.

The choice: 250, 500, 750, 1000.

► Security Option

Select whether a password is required for system boots or only when users enter setup.

System	The system will not boot and access to Setup will be denied if the correct password is not entered at the prompt.
Setup	The system will booth, but access to Setup will be denied if the correct password is not entered at the prompt.

Note: To disable security, select PASSWORD SETTING at Main Menu and then you will be asked to enter password. Do not type anything; press <Enter>, it will disable security. After the security is disabled, the system will boot and you can enter Setup freely.

► Console Redirection

Enable - Attempt to redirect console via COM port.

Disable - Attempt to redirect console when keyboard absent.

► Baud Rate

Specify Baud Rate of console redirection.

The choice: 9600, 19200, 38400, 57600, 115200.

➤ Agent Connect Via

Connection modes: NULL - Direct connection Agent wait time (min).

➤ Agent Wait Time (min)

Timeout for connection.

The choice: 1, 2, 4, 8.

➤ Agent After Boot

Keep Agent running after OS boot.

The choice: Enabled, Disabled.

➤ *Advanced Chipset Features*

This section allows users to configure the system based on the specific features of the Intel 82845E chipset. This chipset manages bus speeds and access to system memory resources such as DRAM (SDRAM) and the external cache. It also coordinates communications between the conventional ISA bus and the PCI bus. It must be stated that these items should never need to be altered. The default settings have been chosen because they provide the best operating conditions for your system. The only time you might consider making any changes would be if you discovered that data was being lost while using your system.

```
          Phoenix – Award Workstation BIOS CMOS Setup Utility
                        Advanced BIOS Features
  ┌─────────────────────────────────────────┬──────────────────────┐
  │ Virus Warning              Disabled      │      Item Help       │
  │ CPU L1 & L2 Cache          Enabled       ├──────────────────────┤
  │ Hyper-Threading Technology Enabled       │ Menu Level    ►      │
  │ Quick Power On Self Test   Enabled       │                      │
  │ First Boot Device          Floppy        │                      │
  │ Second Boot Device         HDD-0         │                      │
  │ Third Boot Device          HDD-1         │                      │
  │ Boot Other Device          Enabled       │                      │
  │ Swap Floppy Drive          Disabled      │                      │
  │ Boot Up Floppy Seek        Disabled      │                      │
  │ Boot Up NumLock Status     On            │                      │
  │ Get A20 Option             Fast          │                      │
  │ Typematic Rate Setting     Disabled      │                      │
  │ X Typematic Rate (Chars/sec)  6          │                      │
  │ X Typematic delay (Msec)      250        │                      │
  │ Security Option            Setup         │                      │
  │ MPS Version Control For OS 1.4           │                      │
  │ Console Radirection        Disabled      │                      │
  │ X Baud Rate                19200         │                      │
  │ Agent Connect via          Null          │                      │
  │ Agent wait time (min)      1             │                      │
  │ Agent after boot           Disabled      │                      │
  ├─────────────────────────────────────────┴──────────────────────┤
  │ ↑↓←→: Move  Enter Select  +/-/PU/PD: Value  F10: Save  ESC: Exit  F1: General Help │
  │         F5: Previous Values    F6: Fail-safe defaults   F7: Optimized Defaults     │
  └─────────────────────────────────────────────────────────────────┘
```

This chipset settings deal with CPU access to dynamic random access memory (DRAM). The default timings have been carefully chosen and should only be altered if data is being lost. Such a scenario might occur if the system has mixed speed DRAM chips so that greater delays may be required to preserve the integrity of the data held in the slower memory chips.

➤ DRAM Timing Control

Press Enter for DRAM Timing Control Setup.

➤ DRAM Data Integrity Mode

There are two options available. The DRAM integrity mode will be implemented by the parity algorithm when this option is set to "Non-ECC".

The choice: Non ECC, ECC.

➤ System BIOS Cacheable

Selecting Enabled allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

The choice: Enabled, Disabled.

➤ Video BIOS Cacheable

Select "Enabled" to enable caching VGA BIOS into L2 cache to get higher display performance. "Disabled" to ignore this BIOS caching function.

The choice: Enabled, Disabled.

► Memory Hole At 15-16M

To improve performance, certain space in memory is reserved for ISA cards. This memory must be mapped into the memory space below 16MB.

The choice: Enabled, Disabled.

```
       Phoenix – Award Workstation BIOS CMOS Setup Utility
                      DRAM Timing Control

    DRAM Timing Configure      By SPD          Item Help
  X – CAS Latency Time           2
  X – Active to Precharge Delay  5
  X – DRAM RAS# to CAS# Delay    2        Menu Level    ►
  X – DRAM RAS# Precharge        2

  ↑↓←→ Move   Enter: Select   +/-/PU/PD: Value   F10: Save   ESC: Exit   F1: General Help
    F5: Previous Values      F6: Fail-Safe Defaults      F7: Optimized Defaults
```

► DRAM Timing Configure

This option provides DIMM plug-and-play support by serial presence detect (SPD) mechanism via the system management bus (SMBUS) interface.

The choice: Manual, By SPD.

► CAS Latency Time

This option controls the number of SCLKs between the time a read command is sampled by the SDRAMs and the time the GMCH samples correspondent data from the SDRAMs.

The choice: 1.5, 2, 2.5 SCLKs.

➤ Active to Precharge Delay

This is to DDR standard accordingly.

The choice: 7, 6, 5.

➤ DRAM RAS# to CAS# Delay

This option controls the number of SCLKs (SDRAM Clock) from a row activate command to a read or write command. If your system uses quality SDRAM, set this option to "3 SCLKs" to obtain better memory performance. The option is set to Auto.

The choice: 2 or 3.

➤ DRAM RAS# Precharge

This option controls the number of SCLKs for RAS# precharge. If users install quality SDRAM, they can set the option to "3 SCLSs" to obtain better memory performance. The default is auto.

➤ *Integrated Peripherals*

```
Phoenix – Award Workstation BIOS CMOS Setup Utility
              Integrated Peripherals
┌─────────────────────────────────────┬──────────────────┐
│ ▶ OnChip IDE Device    [Press Enter] │    Item Help     │
│ ▶ Onboard Device       [Press Enter] │                  │
│ ▶ Supper IO Device     [Press Enter] │ Menu Level    ▶  │
└─────────────────────────────────────┴──────────────────┘
↑↓←→: Move  Enter Select  +/-/PU/PD: Value  F10: Save  ESC: Exit  F1: General Help
      F5: Previous Values     F6: Fail-Safe Defaults    F7: Optimized Defaults
```

➤ OnChip IDE Device

Press Enter for OnChip IDE Device Setup.

```
Phoenix – Award Workstation BIOS CMOS Setup Utility
              OnChip IDE Device
┌─────────────────────────────────────┬──────────────────┐
│ IDE HDD Block Mode          [Enabled]│    Item Help     │
│ On-Chip Primary PCI IDE     [Enabled]│                  │
│ IDE Primary Master PIO      [Auto]   │ Menu Level    ▶  │
│ IDE Primary Slave PIO       [Auto]   │                  │
│ IDE Primary Master UDMA     [Auto]   │                  │
│ IDE Primary Slave UDMA      [Auto]   │                  │
│ On-Chip Secondary PCI IDE   [Enabled]│                  │
│ IDE Secondary Master PIO    [Auto]   │                  │
│ IDE Secondary Slave PIO     [Auto]   │                  │
│ IDE Secondary Master UDMA   [Auto]   │                  │
│ IDE Secondary Slave UDMA    [Auto]   │                  │
└─────────────────────────────────────┴──────────────────┘
↑↓←→: Move  Enter Select  +/-/PU/PD: Value  F10: Save  ESC: Exit  F1: General Help
      F5: Previous Values     F6: Fail-Safe Defaults    F7: Optimized Defaults
```

➤ OnChip Primary/Secondary PCI IDE

The chipset contains a PCI IDE interface with support for two IDE channels. Select Enabled to activate the primary IDE interface. Select Disabled to deactivate this interface.

The choice: Enabled, Disabled.

IDE Primary/Secondary Master/Slave PIO

The four IDE PIO (Programmed Input/Output) fields let you set a PIO mode (0-4) for each of the four IDE devices that the onboard IDE interface supports. Modes 0 through 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device.

The choice: Auto, Mode 0, Mode 1, Mode 2, Mode 3, Mode 4.

IDE Primary/Secondary Master/Slave UDMA

Ultra DMA/33/66/100 implementation is possible only if the IDE hard drive supports it, and the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If your hard drive and your system software both support Ultra DMA/33/66/100, select Auto to enable BIOS support.

The choice: Auto, Disabled.

Onboard Device

Press Enter for Onboard Device Setup.

```
┌─────────────────────────────────────────────────────────────┐
│         Phoenix – Award Workstation BIOS CMOS Setup Utility  │
│                        Onboard Device                        │
├──────────────────────────────────────┬──────────────────────┤
│ USB Controller          [Enabled]    │      Item Help        │
│ USB Keyboard Support    [Enabled]    │                       │
│                                      │  Menu Level    ►      │
├──────────────────────────────────────┴──────────────────────┤
│ ↑↓←→: Move   Enter Select   +/-/PU/PD: Value   F10: Save     │
│        ESC: Exit   F1: General Help                          │
│        F5: Previous Values   F6: Fail-Safe Defaults          │
│        F7: Optimized Defaults                                │
└─────────────────────────────────────────────────────────────┘
```

➤ USB Controller

This item allows you to enable/disable USB (Universal Serial Bus) function.

The choice: Enabled, Disabled.

➤ USB Keyboard Support

This item allows you to enable USB keyboard function under POST, BIOS setup menu, DOS, or Windows-NT with no USB driver loaded.

The choice: Enabled, Disabled.

➤ Super IO Device

Press Enter for Super I/O Device Setup.

```
              Phoenix – Award Workstation BIOS CMOS Setup Utility
                                Super IO Device

     Onboard FDC Controller      [Enabled]              Item Help
     Onboard Serial Port 1        [3F8/IRQ4]
     Onboard Serial Port 2        [2F8/IRQ3]         Menu Level    ▶
     Onboard Parallel Port        [378/IRQ7]
     Parallel Port Mode           [ECP]
   X EPP Mode Select              EPP1.9
     ECP Mode Use DMA             [3]
     PWRON After PWR-Fail         [off]

   ↑↓←→: Move   Enter: Select   +/-/PU/PD: Value   F10: Save   ESC: Exit   F1: General Help
             F5: Previous Values      F6: Fail-Safe Defaults     F7: Optimized Defaults
```

➤ Onboard Serial Port1/Port2

Select an address and corresponding interrupt for the first and second serial ports.

The choice: 3F8/IRQ4, 2E8/IRQ3, 3E8/IRQ4, 2F8/IRQ3, Disabled, Auto.

➤ Onboard Parallel Port

This item allows you to configure I/O address of the onboard parallel port.

The choice: Disabled, 378/IRQ7, 278/IRQ5, 3BC/IRQ7.

➤ Parallel Port Mode

There are four modes for the onboard parallel port:

SPP	Switch to SPP mode
EPP	Switch to EPP mode
ECP	Switch to ECP mode
ECP+EPP	Switch to ECP + EPP mode
Normal	Switch to Normal mode

➤ EPP Mode Select

Select different version of EPP mode.

The choice: EPP1.7, EPP1.9.

➤ ECP Mode Use DMA

Select a proper DMA channel for ECP mode.

The choice: 3, 1.

► PWRON After PWR-Fail

This item allows users to configure the power status of the ATX power supply after a power loss.

On	System automatically restores power back.
Off	System stays at power off.

► *Power Management Setup*

The Power Management Setup allows users to configure their system to most effectively save energy while operating in a manner consistent with their style of computer use.

```
                Phoenix – Award Workstation BIOS CMOS Setup Utility
                             Power Management Setup
    ┌──────────────────────────────────────────────────────────────────┐
    │  ACPI Function              Enabled          Item Help            │
    │  Power Management           User Define                           │
    │  Video Off Method           DPMS         Menu Level   ►           │
    │  Video Off In Suspend       Yes                                   │
    │  Suspend Type               Stop Grant                            │
    │  Suspend Mode               Disabled                              │
    │  HDD Power Down             Disabled                              │
    │  Soft-Off by PWR-BTTN       Instant-Off                          │
    │  Intruder# Detection        Disabled                             │
    │  Wake-Up by LAN Device      Disabled                             │
    │  Power On by Ring           Disabled                             │
    │  Resume by Alarm            Disabled                             │
    │ X Date (of Month) Alarm     0                                     │
    │ X Time (hh:mm:ss) Alarm     0  0  0                               │
    │           ** Reload Global Timer Events **                       │
    │  Primary IDE 0              Disabled                             │
    │  Primary IDE 1              Disabled                             │
    │  Secondary IDE 0            Disabled                             │
    │  Secondary IDE 1            Disabled                             │
    │  FDD,COM,LPT Port           Disabled                             │
    │  PCI PIRQ[A-D]#             Disabled                             │
    ├──────────────────────────────────────────────────────────────────┤
    │ ↑↓→←:Move  Enter: Select  +/-/PU/PD: Value  F10: Save  ESC: Exit  F1: General Help │
    │        F5: Previous Values   F6: Fail-Safe Defaults   F7: Optimized Defaults     │
    └──────────────────────────────────────────────────────────────────┘
```

➤ ACPI Function

This item allows you to enable/disable Advanced Configuration and Power Management (ACPI).

The choice: Enabled, Disabled.

➤ Power Management

This category allows you to select the type (or degree) of power saving and is related to "HDD Power Down" and "Suspend Mode."

There are three selections for Power Management, three of which have fixed mode settings.

User Defined	Allows you to set each mode individually. When not disabled, Suspend Mode ranges from 1 min. to 1 hour and HDD Power Down ranges from 1 min. to 15 min.
Min Power Saving	Min. power management. Suspend Mode = 1 hour, and HDD power down = 15 min.
Max Power Saving	Max. power management. Suspend Mode = 1 min, and HDD Power Down = 1 Min.

➤ Video Off Method

Blank Screen	This option writes blanks to the video buffer.
V/H SYNC + Blank	This selection causes the system to turn off the vertical and horizontal synchronization ports and writes blanks to the video buffer.
DPMS	Initial Display power management signaling.

➤ Video Off In Suspend

This allows users to enable/disable video off in Suspend Mode.

The choice: Yes, No.

➤ Suspend Type

Two options are available: Stop Grant and PwrOn Suspend.

The choice: Stop Grant, PwrOn Suspend.

➤ Suspend Mode

When enabled and after a set time of inactivity, all devices except the CPU shut off.

The choice: Disabled, 1 Min, 2 Min, 4 Min, 8 Min, 12 Min, 20 Min, 30 Min, 40 Min, 1 Hour.

➤ HDD Power Down

When enabled and after a set time of inactivity, the hard-disk drive will be powered down while all other devices remain active.

The choice: Disabled, 1 Min, 2 Min, 3 Min, 4 Min, 5 Min, 6 Min, 7 Min, 8 Min, 9 Min, 10 Min, 11 Min, 12 Min, 13 Min, 14 Min, 15 Min.

➤ Soft-Off by PWR-BTTN

This item allows users to set the time to remove the power after the power button is pressed.

The choice: Instant-Off, Delay 4 Sec.

➤ Intruder# Detection

The choice: Enabled, Disabled.

➤ Wake-Up by LAN Device

This option can be enabled to support Wake Up by LAN device.

The choice: Disabled, Enabled.

➤ Power On by Ring

When select "Enabled," a system that is at soft-off mode will awake via a modem signal.

The choice: Enabled, Disabled.

➤ Resume by Alarm

This item allows users to enable/disable the resume by alarm function. When "Enabled" is selected, system using ATX power supply could be powered on if a customized time and day is approached.

The choice: Enabled, Disabled.

➤ Date(of Month) Alarm

When "Resume by Alarm" is enabled, this item allows users to configure the date parameter of the timing dateline on which to power on the system.

The choices: 0 ~ 31.

➤ Time(hh:mm:ss) Alarm

When "Resume by Alarm" is enabled, this item allows users to configure the time parameter of the timing dateline on which to power on the system.

The choice: hh (0~23), mm (0~59), ss (0 ~59).

➤ Primary/Secondary IDE 0/1

This item is used to configure IDE devices being monitored by the system to keep it out of suspend mode if the associated device is busy.

The choice: Enabled, Disabled.

➤ FDD, COM, LPT Port

This item is used to configure floppy device, COM ports, and parallel port being monitored by system so as to keep system out of suspend mode if the associated device is busy.

The choice: Enabled, Disabled.

➤ PCI PIRQ[A-D]#

This option detects PCI device activities. If there are activities, the system goes into sleep mode.

The choice: Enabled, Disabled.

➤ *PnP/PCI Configurations*

This section describes configuring the Personal Computer Interconnect (PCI) bus system, which allows I/O devices to operate at speeds nearing the speed the CPU uses when communicating with its components. This section covers some very technical items. Only experienced users should change default settings.

```
┌──────────────────────────────────────────────────────────────┐
│         Phoenix – Award Workstation BIOS CMOS Setup Utility    │
│                    PnP/PCI Configurations                      │
├──────────────────────────────────────┬───────────────────────┤
│  PnP OS Installed          [Yes]      │      Item Help        │
│  Reset Configuration Data  Disabled   │                       │
│                                       │  Menu Level    ▶      │
│  Resources Controlled By   Auto(ESCD) │                       │
│ X IRQ Resources            Press Enter│  BIOS can automatically│
│  PCI/VGA Palette Snoop     Disabled   │  configure all the boot and Plug│
│                                       │  and Play compatible devices. If│
│                                       │  you choose Auto, you cannot│
│                                       │  select IRQ DMA and memory│
│                                       │  base address fields, since BIOS│
│                                       │  automatically assigns them│
├──────────────────────────────────────┴───────────────────────┤
│ ↑↓→←: Move   Enter Select   +/-/PU/PD: Value   F10: Save   ESC: Exit   F1: General Help│
│          F5: Previous Values    F6: Fail-Safe Defaults   F7: Optimized Defaults│
└──────────────────────────────────────────────────────────────┘
```

➤ PNP OS Installed

Select Yes if you are using a Plug and Play operating system. Select No if you need the BIOS to configure non-boot devices.

The choice: Yes, No.

➤ Reset Configuration Data

Default is Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the OS cannot boot.

The choice: Enabled, Disabled.

➤ Resource Controlled By

BIOS can automatically configure all the boot and plug and play compatible devices. If you choose Auto, you cannot select IRQ DMA and memory base address fields because the BIOS automatically assigns them.

The choice: Auto (ESCD), Manual.

➤ IRQ Resources

When resources are controlled manually, assign each system interrupt a type, depending on the type of device using the interrupt.

The choice: Press Enter.

IRQ-3/IRQ-4/IRQ-5/IRQ-7/IRQ-9/IRQ-10/IRQ-11/IRQ-12/IRQ-14/IRQ-15 assigned, PCI PnP for devices compliant with the plug and play standard whether designed for PCI bus architecture.

The choice: PCI Device, Reserved.

➤ PCI/VGA Palette Snoop

Leave this field at Disabled.

The choice: Enabled, Disabled.

➤ PC Health Status

```
         Phoenix – Award Workstation BIOS CMOS Setup Utility
                          PC Health Status
┌─────────────────────────────────────────┬──────────────────────┐
│ CPU 1 TEMP                    37□/98□     │      Item Help       │
│ CPU 2 TEMP                    35□/95□     │                      │
│ Current CPU FAN1 Speed        10546RPM    │ Menu Level    ▶      │
│ Current SYS FAN1 Speed        7670RPM     │                      │
│ Current SYS FAN2 Speed        12053RPM    │                      │
│ CPU                           1.45V       │                      │
│ +2.5V                         2.48V       │                      │
│ +3.3V                         3.36V       │                      │
│ +5V                           5.10V       │                      │
│ +12V                          12.03V      │                      │
│ -12V                          -12.03V     │                      │
│ 5VSB(V)                       4.96V       │                      │
├─────────────────────────────────────────┴──────────────────────┤
│ ↑↓→←: Move   Enter: Select   +/-/PU/PD: Value   F10: Save   ESC: Exit   F1: General Help │
│       F5: Previous Values      F6: Fail-Safe Defaults     F7: Optimized Defaults         │
└─────────────────────────────────────────────────────────────────┘
```

➤ Frequency/Voltage Control

```
         Phoenix – Award Workstation BIOS CMOS Setup Utility
                       Frequency/Voltage Control
┌─────────────────────────────────────────┬──────────────────────┐
│ CPU Clock Ratio              [16X]        │      Item Help       │
│                                           │                      │
│                                           │ Menu Level    ▶      │
├─────────────────────────────────────────┴──────────────────────┤
│ ↑↓→←: Move   Enter: Select   +/-/PU/PD: Value   F10: Save   ESC: Exit   F1: General Help │
│       F5: Previous Values      F6: Fail-Safe Defaults     F7: Optimized Defaults         │
└─────────────────────────────────────────────────────────────────┘
```

➤ *Default Menu*

Selecting "Defaults" from the main menu shows you two options:

♦ Load Fail-Safe Defaults

♦ Load Optimized Defaults

➤ Load Fail-Safe Defaults

When you press <Enter>, you get a confirmation dialog box with a message similar to:

Load Fail-Safe Defaults (Y/N) ? N

Pressing 'Y' loads BIOS default values for the most stable, minimal system performance.

➤ Load Optimized Defaults

When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

Load Optimized Defaults (Y/N) ? N

Pressing 'Y' loads default values that are factory settings for optimal system operation.

➤ *Supervisor/User Password Setting*

You can set either a supervisor or a user password, or both.

Set supervisor password: allows supervisors to enter and change setup options.

Set user password: allows users to enter but not change options in setup menus. When you select this function, a message appears to assist you in creating a password.

➤ Enter Password

Type a password (up to eight characters) and press <Enter>. The new password clears previously entered passwords from CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You also can press <Esc> to abort the selection and not enter a password.

To disable a password, just press <Enter> when you are prompted to enter the password. A message will confirm the password will be disabled. After the password is disabled, the system will boot and you can enter Setup freely.

➤ Password Disabled

When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing the system configuration.

Additionally, when a password is enabled, you also can require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of your computer.

You determine when the password is required within the BIOS Features Setup Menu and its Security option (see Section 3). If the Security option is set to "System", the password will be required both at boot and at entry to Setup. If set to "Setup", prompting only occurs when trying to enter Setup.

➤ *Exiting Selection*

➤ Save & Exit Setup

Pressing <Enter> on this item asks for confirmation:

Save to CMOS and EXIT (Y/N)? Y

Pressing "Y" stores the selections made in the menus in CMOS - a special section of memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configures your system according to the Setup selections stored in CMOS. After saving the values, the system is restarted again.

➤ Exit Without Saving

Pressing <Enter> on this item asks for confirmation:

Quit without saving (Y/N)? N

This allows you to exit Setup without storing in CMOS any change. The previous selections remain in effect. This exits the Setup utility and restarts your computer.

➤ *POST Messages*

During the Power On Self-Test (POST), if the BIOS detects an error requiring you to do something to fix, it will either sound a beep code or display a message. If a message is displayed, it will be accompanied by:

PRESS F1 TO CONTINUE, CTRL-ALT-ESC OR DEL TO ENTER SETUP

➤ POST Beep

Currently there are two kinds of beep codes in BIOS. This code indicates that a video error has occurred and the BIOS cannot initialize the video screen to display additional information. This

beep code consists of a single long beep followed by two short beeps. The other code indicates that a DRAM error has occurred. This beep code consists of a single long beep repeatedly.

BIOS

➤ Error Messages

One or more of the following messages may be displayed if the BIOS detects an error during the POST. This list includes messages for the ISA and the EISA BIOS.

➤ CMOS BATTERY HAS FAILED

The CMOS battery is no longer functional. It should be replaced.

➤ CMOS CHECKSUM ERROR

Checksum of CMOS is incorrect. This can indicate that CMOS has become corrupt. This error may have been caused by a weak battery. Check the battery and replace if necessary.

➤ DISK BOOT FAILURE, INSERT SYSTEM DISK AND PRESS ENTER

No boot device was found. This could mean that either a boot drive was not detected or the drive does not contain proper system boot files. Insert a system disk into Drive A: and press <Enter>. If you assumed the system would boot from the hard drive, make sure the controller is inserted correctly and all cables are properly attached. Also be sure the disk is formatted as a boot device. Then reboot the system.

➤ DISKETTE DRIVES OR TYPES MISMATCH ERROR - RUN SETUP

Type of diskette drive installed in the system is different from the CMOS definition. Run Setup to reconfigure the drive type correctly.

➤ DISPLAY SWITCH IS SET INCORRECTLY

Display switch on the motherboard can be set to either monochrome or color. This indicates the switch is set to a different setting than indicated in Setup. Determine which setting is correct, and turn off the system and change the jumper, or enter Setup and change the VIDEO selection.

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➤ *DISPLAY TYPE HAS CHANGED SINCE LAST BOOT*

Since last powering off the system, the display adapter has been changed. You must configure the system for the new display type.

➤ *ERROR ENCOUNTERED INITIALIZING HARD DRIVE*

The hard drive cannot be initialized. Be sure the adapter is installed correctly and all cables are correctly and firmly attached. Make sure that the correct hard-drive type is selected in Setup.

➤ *ERROR INITIALIZING HARD DISK CONTROLLER*

Cannot initialize controller. Make sure the cord is correctly and firmly installed in the bus. Make sure that the correct hard drive type is selected in Setup. Check if jumpers needs to be set correctly on the hard drive.

➤ *FLOPPY DISK CNTRLR ERROR OR NO CNTRLR PRESENT*

Cannot find or initialize the floppy drive controller. Make sure the controller is installed correctly and firmly. If there are no floppy drives installed, be sure the Diskette Drive selection in Setup is set to NONE.

➤ *KEYBOARD ERROR OR NO KEYBOARD PRESENT*

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot.

If you are purposely configuring the system without a keyboard, set the error halt condition in Setup to HALT ON ALL, BUT KEYBOARD. This will cause the BIOS to ignore the missing keyboard and continue the boot.

➤ *Memory Address Error at...*

Indicates a memory address error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.

➤ *Memory parity Error at...*

Indicates a memory parity error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.

➤ *MEMORY SIZE HAS CHANGED SINCE LAST BOOT*

Memory has been added or removed since the last boot. In EISA mode use Configuration Utility to reconfigure the memory configuration. In ISA mode enter Setup and enter the new memory size in the memory fields.

➤ *Memory Verify Error at...*

Indicates an error verifying a value already written to memory. Use the location along with your system's memory map to locate the bad chip.

➤ *OFFENDING ADDRESS NOT FOUND*

This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem cannot be isolated.

➤ OFFENDING SEGMENT

This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem has been isolated.

➤ PRESS A KEY TO REBOOT

This will be displayed at the bottom screen when an error occurs that requires you to reboot. Press any key and the system will reboot.

➤ PRESS F1 TO DISABLE NMI, F2 TO REBOOT

When BIOS detects a Non-maskable Interrupt condition during boot, this will allow you to disable the NMI and continue to boot, or you can reboot the system with the NMI enabled.

➤ RAM PARITY ERROR - CHECKING FOR SEGMENT ...

Indicates a parity error in Random Access Memory.

Should Be Empty But EISA Board Found

➤ SYSTEM HALTED, (CTRL-ALT-DEL) TO REBOOT ...

Indicates the present boot attempt has been aborted and the system must be rebooted. Press and hold down the CTRL and ALT keys and press DEL.

➤ *Wrong Board In Slot*

PLEASE RUN EISA CONFIGURATION UTILITY

The board ID does not match the ID stored in the EISA non-volatile memory.

Note: When this error appears, the system will boot in ISA mode, which allows you to run the EISA Configuration Utility.

FLOPPY DISK(S) fail (80) ® Unable to reset floppy subsystem.

FLOPPY DISK(S) fail (40) ® Floppy Type mismatch.

Hard Disk(s) fail (80) ® HDD reset failed

Hard Disk(s) fail (40) ® HDD controller diagnostics failed.

Hard Disk(s) fail (20) ® HDD initialization error.

Hard Disk(s) fail (10) ® Unable to recalibrate fixed disk.

Hard Disk(s) fail (08) ® Sector Verify failed.

Keyboard is locked out - Unlock the key.

Keyboard error or no keyboard present.

Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot.

BIOS ROM checksum error - System halted.

The checksum of ROM address F0000H-FFFFFH is bad.

Memory test fail.

BIOS reports the memory test fail if the onboard memory is tested error.

► *BIOS POST Check Point List*

AWARD BIOS provides all IBM standard Power On Self Test (POST) routines as well as enhanced AWARD BIOS POST routines. The POST routines support CPU internal diagnostics. The POST checkpoint codes are accessible via the Manufacturing Test Port (I/O port 80h).

Whenever a recoverable error occurs during the POST, the system BIOS displays an error message describing the message and explains the problem.

During the POST, the BIOS signals a checkpoint by issuing one code to I/O address 80H. This code can be used to establish how far the BIOS has executed through the power-on sequence and what test is currently being performed. This is done to help troubleshoot a faulty system board.

If the BIOS detects a terminal error condition, it will halt the POST process and attempt to display the checkpoint code written to port 80H. If the system hangs before the BIOS detects the terminal error, the value at port 80H will be the last test performed. In this case, the terminal error cannot be displayed on the screen. The following POST checkpoint codes are valid for all AWARDBIOS products with a core BIOS date of 07/15/95 version 6.27 (Enhanced).

Code	Description
CFh	Test CMOS R/W functionality
C0h	Early chipset initialization: - Disable shadow RAM - Disable L2 cache (socket 7 or below) - Program basic chipset registers
C1h	Detect memory - Auto-detection of DRAM size, type and ECC. - Auto-detection of L2 cache (socket 7 or below)
C3h	Expand compressed BIOS code to DRAM
C5h	Call chipset hook to copy BIOS back to E000 & F000 shadow RAM.
0h1	Expand the Xgroup codes locating in physical address 1000:0
02h	Reserved
03h	Initial Superio_Early_Init switch
04h	Reserved
05h	1. Blank out screen 2. Clear CMOS error flag
06h	Reserved
07h	1. Clear 8042 interface 2. Initialize 8042 self-test
08h	1. Test special keyboard controller for Winbond 977 series Super I/O chips 2. Enable keyboard interface
09h	Reserved
0Ah	Disable PS/2 mouse interface (optional). Auto detect ports for keyboard & mouse followed by a port & interface swap (optional). Reset keyboard for Winbond 977 series Super I/O chips.
0Bh	Reserved
0Ch	Reserved
0Dh	Reserved
0Eh	Test F000h segment shadow to see whether it is R/W-able or not. If test fails, keep beeping the speaker.
0Fh	Reserved
10h	Auto detect flash type to load appropriate flash R/W codes into the run time area in F000 for ESCD & DMI support.
11h	Reserved
12h	Use walking 1's algorithm to check out interface in CMOS circuitry. Also set real-time clock power status, and then check for override.
13h	Reserved
14h	Program chipset default values into chipset. Chipset default values are MODBINable by OEM customers.
15h	Reserved
16h	Initial Early_Init_Onboard_Generator switch
17h	Reserved

Code	Description
18h	Detect CPU information including brand, SMI type (Cyrix or Intel) and CPU level (586 or 686).
19h	Reserved
1Ah	Reserved
1Bh	Initial interrupts vector table. If no special specified, all H/W interrupts are directed to SPURIOUS_INT_HDLR & S/W interrupts to SPURIOUS_soft_HDLR.
1Ch	Reserved
1Dh	Initial EARLY_PM_INIT switch
1Eh	Reserved
1Fh	Load keyboard matrix (notebook platform)
20h	Reserved
21h	HPM initialization (notebook platform)
22h	Reserved

23h	1. Check validity of RTC value:
	   e.g. a value of 5Ah is an invalid value for RTC minute.
	2. Load CMOS settings into BIOS stack. If CMOS checksum fails, use default value instead.
	3. Prepare BIOS resource map for PCI & PnP use. If ESCD is valid, take into consideration of the ESCD's legacy information.
	4. Onboard clock generator initialization. Disable respective clock resource to empty PCI & DIMM slots.
	5. Early PCI initialization:
	   – Enumerate PCI bus number
	   – Assign memory & I/O resource
	   – Search for a valid VGA device & VGA BIOS, and put it into C000:0.

24h	Reserved
25h	Reserved
26h	Reserved
27h	Initialize INT 09 buffer
28h	Reserved
29h	Program CPU internal MTRR (P6 & PII) for 0-640K memory address. Initialize the APIC for Pentium class CPU. Program early chipset according to CMOS setup. Example: onboard IDE controller. Measure CPU speed. Invoke video BIOS.
2Ah	Reserved
2Bh	Reserved
2Ch	Reserved
2Dh	Initialize multi-language. Put information on screen display, including Award title, CPU type, CPU speed.
2Eh	Reserved
2Fh	Reserved
30h	Reserved
31h	Reserved

Code	Description
32h	Reserved
33h	Reset keyboard except Winbond 977 series Super I/O chips
34h	Reserved
35h	Reserved
36h	Reserved
37h	Reserved
38h	Reserved
39h	Reserved
3Ah	Reserved
3Bh	Reserved
3Ch	Test 8254
3Dh	Reserved
3Eh	Test 8259 interrupt mask bits for channel 1
3Fh	Reserved
40h	Test 8259 interrupt mask bits for channel 2
41h	Reserved
42h	Reserved
43h	Test 8259 functionality
44h	Reserved
45h	Reserved
46h	Reserved
47h	Initialize EISA slot
48h	Reserved
49h	Calculate total memory by testing the last double word of each 64K page
4Ah	Reserved
4Bh	Reserved
4Ch	Reserved
4Dh	Reserved
4Eh	1. Initialize L2 cache for P6 class CPU & program CPU with proper cacheable range 2. Initialize the APIC for P6 class CPU 3. On MP platform, adjust the cacheable range to smaller one in case the cacheable ranges between each CPU are not identical
4Fh	Reserved
50h	Initialize USB
51h	Reserved
52h	Test all memory (clear all extended memory to 0)
53h	Reserved
54h	Reserved
55h	Display number of processors (multi-processor platform)
56h	Reserved
57h	1. Display PnP logo 2. Early ISA PnP initialization - Assign CSN to every ISA PnP device

Code	Description
58h	Reserved
59h	Initialize the combined Trend Anti-Virus code
5Ah	Reserved
5Bh	(Optional Feature) Show message for entering AWDFLASH.EXE from FDD (optional)
5Ch	Reserved
5Dh	1. Initialize Init_Onboard_Super_IO switch 2. Initialize Init_Onbaord_AUDIO switch
5Eh	Reserved
5Fh	Reserved
60h	Okay to enter Setup utility; i.e. not until this POST stage can users enter the CMOS setup utility.
61h	Reserved
62h	Reserved
63h	Reserved
64h	Reserved
65h	Initialize PS/2 Mouse
66h	Reserved
67h	Prepare memory size information for function call: INT 15h ax=E820h
68h	Reserved
69h	Turn on L2 cache
6Ah	Reserved
6Bh	Program chipset registers according to items described in Setup & Auto-configuration table.
6Ch	Reserved
6Dh	1. Assign resources to all ISA PnP devices. 2. Auto assign ports to onboard COM ports if the corresponding item in Setup is set to "AUTO".
6Eh	Reserved
6Fh	1. Initialize floppy controller 2. Set up floppy related fields in 40:hardware
70h	Reserved
71h	Reserved
72h	Reserved
73h	(Optional Feature) Enter AWDFLASH.EXE if: – AWDFLASH is found in floppy drive. – ALT+F2 is pressed
74h	Reserved
75h	Detect & install all IDE devices: HDD, LS120, ZIP, CDROM.....
76h	Reserved
77h	Detect serial ports & parallel ports
78h	Reserved
79h	Reserved
7Ah	Detect & install co-processor

Code	Description
7Bh	Reserved
7Ch	Reserved
7Dh	Reserved
7Eh	Reserved
7Fh	Switch back to text mode if full screen logo is supported
	- If errors occur, report errors & wait for keys
	- If no errors occur or F1 key is pressed to continue:
	. Clear EPA or customization logo
80h	Reserved
81h	Reserved
82h	1. Call chipset power management hook
	2. Recover the text fond used by EPA logo (not for full screen logo)
	3. If password is set, ask for password
83h	Save all data in stack back to CMOS
84h	Initialize ISA PnP boot devices
85h	1. USB final Initialization
	2. NET PC: Build SYSID structure
	3. Switch screen back to text mode
	4. Set up ACPI table at top of memory
	5. Invoke ISA adapter ROMs
	6. Assign IRQs to PCI devices
	7. Initialize APM
	8. Clear noise of IRQs
86h	Reserved
87h	Reserved
88h	Reserved
89h	Reserved
90h	Reserved
91h	Reserved
92h	Reserved
93h	Read HDD boot sector information for Trend Anti-Virus code
94h	1. Enable L2 cache
	2. Program boot up speed
	3. Chipset final initialization
	4. Power management final initialization
	5. Clear screen & display summary table
	6. Program K6 write allocation
	7. Program P6 class write combining
95h	1. Program daylight saving
	2. Update keyboard LED & typematic rate
96h	1. Build MP table
	2. Build & update ESCD
	3. Set CMOS century to 20h or 19h
	4. Load CMOS time into DOS timer tick
	5. Build MSIRQ routing table
FFh	Boot attempt (INT 19h)

➤ *BIOS Flash Utility*

Utilize AWARD Flash BIOS programming utility to update on-board BIOS for the future new BIOS version. Please contact Kontron technical support to get this utility if necessary.

Note: Remark or delete any installed Memory Management Utility (such as HIMEM.SYS, EMM386.EXE, QEMM.EXE, ..., etc.) in the CONFIG.SYS files before running Flash programming utility.

Appendix A

➤ Troubleshooting

➤ Overview

This chapter provides tips to get your SBC-E7501-VEG2/H boards running. Basic hardware installation has been addressed in an earlier chapter. This chapter will focus on system-integration issues such as backplane setup, BIOS settings, and OS diagnostics.

➤ Backplane

The SBC-E7501-VEG2/H are full-sized SHBs with new PICMG, 64- bit PCI-X architecture that run at speeds up to 133 MHz. The SBC-E7501-VEG2/H can only run on PICMG 64 bit PCI/PCI-X backplanes.

The PCI specification allows for three PCI add-on cards:

♦   3.3V

♦   5V

♦   "Universal" adapter

Only 3.3V signaling is allowed for 66MHz or greater operations per specification. New PCI controllers are manufactured to operate at 3.3V, while older options operate at 5V.

► PCI Slots Specification

Please check the specification of the PCI devices before using any of them. Make sure that the specification of the PCI Device meets our design of PCI/ PCI-X architecture for SBC-E7501-VEG2/H. The Pin Definition (Golden Fingers) of the PCI device had differences between the 3.3V, 64bit PCI device and 5V, 64bit PCI device. The picture below shows the differences between them:
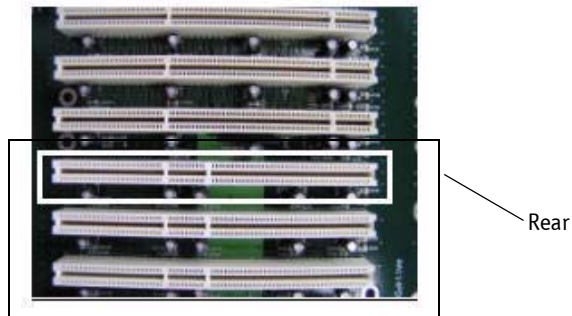

Rear

Figure 5-1. 3.3V, 64-bit PCI slots

Rear

Figure 5-2. 5V, 64-bit PCI Slot

➤ *Bus Specification*

Bus Width	Bus Frequency	Bus Bandwidth	PCI Slots	PCI-X Slots
32 bit	33 MHz (5V, 3.3V, Universal)	133 MB/Sec	4	N/A
64 bit	33 MHz (5V, 3.3V, Universal)	133 MB/Sec	4	N/A
64 bit	66 MHz (3.3V, Universal)	533 MB/Sec	2	4
64 bit	100 MHz (3.3V, Universal)	800 MB/Sec	N/A	2
64 bit	133 MHz (3.3V, Universal)	1.066 GB/Sec	N/A	1

➤ P4 Power Connector

SBC-E7501-VEG2/Hrequire power drawn from the 12V connector. The CPU supplementary power connector (ATX1, ATX2) should be connected at all time for this P4 system to run properly. If the system's main power comes from a backplane, the CPU supplementary power connector (ATX1, ATX2) should still be connected.
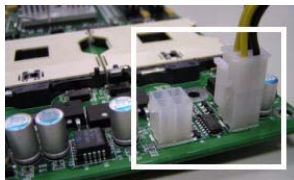
➤ ATX Power

The SBC-E7501-VEG2/His designed to support ATX mode. Please refer to the following instruction to apply ATX power on your SBC-E7501-VEG2/H and backplane.
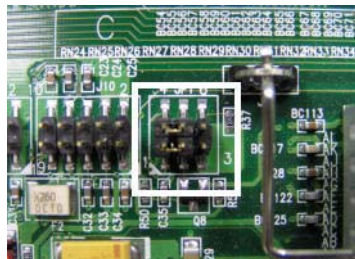
1) Connect 20-pin power cable of the ATX POWER with ATX POWER CONNECTOR (20-pin) on the backplane.

2) Connect the 12V power connector (4 pin) to ATX1 and/or ATX2.

3) Check JP1's jumper setting; the default setting will short the 1-2 pin for ATX Mode.

4) Connect MOMENTARY SWITCH with J1 connector (2 pin) on the Backplane. The system power of the SBC-E7501-VEG2/H is controlled by the TOGGLE SWITCH, which is connected to the backplane.

5) The figure below is the MOMENTARY SWITCH, which is used to switch the ATX Power on/off for SHB. Usually the MOMENTARY SWITCH is located on the chassis front panel. Pressing the switch button once will turn power on. Press it again to turn it off.

➤ *ATX FAQs*

Q: Is there anything to do to finish up an ATX system?

A: Yes. The SBC-E7501-VEG2/Hneed to be configured to support ATX function for the above cabling.

Q: How can I build up AT system using an ATX power supply?

A: Short the JP1 Jumper of Pin 2, and Pin 3 on the SBC-E7501-VEG2/Hto set the AT mode. The SBC-E7501-VEG2/Hcan stimulate AT Mode.

If the ATX power supply has a switch, use the power supply switch as the system power on switch when using the AT Mode.

When using the ATX Mode, users need to apply a two-pin AT (on/off) MOMENTARY SWITCH connect on the backplane J1 connector. However, the power supply switch needs to be moved to "on", if there is one.

➤ *Hardware Installation*

For the SBC-E7501-VEG2, there is one adapter board with a bracket. The Extensive Daughter Board had two USB connectors, one PS2 Keyboard/ Mouse connector, and one COM port connector.

The picture below shows the adapter board; from left to right, one COM port connector, one PS2 Keyboard/ Mouse connector, and two USB connectors. The Single Board Computer-E7501-VEG2 monitors the I/Os from its hublink board.

Q: I finished installing the hardware, but nothing happens when I power on the system. Why?

A: You may have a power-on failure. Check the following:

1) Check the SBC-E7501-VEG2/H jumper JP1. For ATX power supplies used in AT mode, set JP1 at 2-3. Otherwise, set the jumper at 1-2. Incorrect power settings will not allow you to power on the system.

2) Double check if every connector is attached with the correct cable.

3) If you have changed a processor that uses a different system clock, please move the JP1 jumper, which also acts as the CMOS clear Jumper, to 5-6. Power on the system to clear CMOS (move on/off switch from off to on for AT mode, or toggle the switch for ATX mode), power off the system, move JP1 back to 4-5, and power on again.

➤ *Hardware FAQs*

Q: How do I connect my keyboard and mouse?

A: Users may always adopt PS/2 keyboard and mouse over the PS/2 interface (using a Y-cable) on the adapter board of the Single Board Computer-E7501-VEG2 and the hublink board of the Single Board Computer-E7501-VEG2. If you do not use a Y cable, the default setting of the PS/2 connector is for Keyboard usage.

Q: I power on the system, but the CPU speed is not correct. Why?

A: If you load the BIOS optimal defaults, the BIOS picks up the default CPU core/bus ratio as well. The SBC-E7501-VEG2/Hdo not have switches or jumpers to configure the CPU core/bus ratio. This is done through BIOS automatically. Please check in the "Frequency/Voltage Control" section in the BIOS chapter to adjust this clock/bus ratio. System default setting is automatically setting for safety CPU Clock Ratio, which should be "MIN = 16x". When you plug in the Xeon processors from Intel, you will need to set the CPU Clock Ratio in the BIOS setting.

Q: I connect two IDE devices over one IDE flat cable, but the system either does not start, or just hangs from time to time. Why?

A: Make sure that you have configured the two IDE devices as a master device and a slave device, respectively.

➤ *BIOS Settings*

It is assumed that users have correctly adopted modules and connected all the device cables required before turning on AT power. CPU, CPU fan, CPU fan power cable, 184-pin DDR SDRAM, keyboard, mouse, floppy drive, IDE hard disk, printer, VGA connector, device power cables, ATX accessories or 12V 4-pin power cable are good examples that deserve attention. With no assurance of properly and correctly accommodating these modules and devices, it is very possible to encounter system failures that result in malfunction of any device.

To ensure a successful initialization with the SBC-E7501-VEG2/H, it is recommended that when going with the boot-up sequence, hit the "DEL" key and enter the BIOS setup menu to perform the following operations:

◆ Loading Default Optimal Setting -- When prompted with the main setup menu, please scroll down to "Load Optimal Defaults", press "Enter" and "Y" to load in default optimal BIOS setup. This forces your BIOS settings back to the factory configuration. Users can load the default BIOS setting any time when the system appears to be unstable in boot-up sequence.

◆ Auto Detect Hard Disks -- In the BIOS => Standard CMOS setup menu, pick up any one from Primary/Secondary Master/Slave IDE ports, and press the "Enter" key. Setup the selected IDE port and its access mode to "Auto". This forces the system to automatically pick up the IDE devices that are being connected each time the system boots up.

Troubleshooting

➤ Improper Disable Operation

There are too many occasions in which users disable a certain device/feature in one application from the BIOS setting. These variables may not be set back to the original values when needed. These devices/features will certainly fail to be detected.

When the above conditions happen, it is strongly recommended to check the BIOS settings. Make sure certain items are set as they should be. These include the floppy drive, COM1/COM2 ports, parallel port, USB ports, external cache, on-board VGA, and Ethernet.

It is also very common that users would like to disable a certain device/port to release IRQ resources. A few good examples are:

♦ Disable COM1 serial port to release IRQ #4

♦ Disable COM2 serial port to release IRQ #3

♦ Disable parallel port to release IRQ #7

♦ Disable PS/2 mouse to release IRQ #12

To generate more IRQ resources, disable some of the I/O devices listed above.

➤ *OS Diagnostics*

What will be presented here is a brief guide to properly house-in the driver for any Microsoft Windows-95/98/NT device. For other operating systems, please refer to OS manual/guidebook.

➤ Booting

Users may find quite a lot of hang time during the Windows 95/98 loading sequence. If the Windows logo stays with no progress, or no display appears, restart the system and hit "F5" and enter "Safe mode". Users will always be allowed to enter "Safe mode" to remove devices that are not properly running or installed. Devices with removed drivers will be automatically detected again. Drivers in the system's database will load automatically.

For Windows-NT 4.0 users, it is always not recommended to change hardware configuration after the first installation. However, if such a change is needed, please note that sometimes Windows-NT 4.0 will stop loading and prompt error messages on a blue screen. Please note that reinstallation of this NT hard disk may be required and backup is highly recommended. If this NT hard disk is installed with FAT16 disk format, please boot up your system with any Windows OS. Data will be retrievable from this hard disk. If this is a NT hard disk with NTFS, data can only be retrieved from a NTFS OS.

➤ Display Setup

By default, any Windows OS starts with 640 x 480 with 16 colors display. The display driver provided in the SBC-E7501-VEG2/H product CDROM Disc can be installed into Operating System to maximize the VGA performance. If the monitor used can not be identified by Microsoft® Windows, user may need to set in the display from the setup menu, a system monitor to correctly retrieve display output. For Windows-NT 4.0 users, SBC-E7501-VEG2/H provides AGP on-board display feature, Service Pack 3.0 or above is required to activate this display feature.

► **Network Setup**

► *Windows-95/98 Users*

1) Please apply a PCI network card over PCI slot, or simply use the on-board Fast Ethernet device.

2) Start Windows-95/98 and let Window-95/98 automatically detect your network adapter.

3) Provide the driver and complete installation.

4) Restart Windows.

5) Upon reloading Windows, go to Control Panel -> System -> Device Manager and check if the network adapter has been properly installed. A warning sign will appear if the network adapter has not been installed properly.

6) If a network adapter has not been installed properly, please remove the network device from the system setup menu and restart Windows.

7) After you install the hardware, go to Control Panel -> Network to set your networking configuration. This includes DNS, IP, and Gateway. Appropriate protocols are required to carry your networking activities. Please contract your local network administrator for additional assistance.

► *Windows-NT 4.0 Users*

1) Please install your network adapter manually in Control Panel -> Network -> Adapter. Drivers are required at this stage.

2) Proceed with "Binding" after you load the driver.

3) Change to Protocol label and load in the protocols that you are interested (generally, TCP/IP). Configuring IP, gateway and DNS is required for TCP/IP protocol.

4) Proceed to "Binding" after completing the protocol loading.

5) Restart system.

6) There is also a situation in which the installed network adapter is not functional anymore or an old network driver stays in the system after the network device had changed. Please remove all the network adapters and protocols from network setup menu and reload driver and protocols again.

7) A network setup within Windows-NT 4.0 may require in-depth knowledge of Windows network environment.

Note: For all other OS, additional technical information, and latest updates, please check the CD the came with the board and which contains the drivers and or visit Kontron's Web site.

Appendix B

➤ System Resources

Contents

➤ System Memory Address Map

Each on-board device is assigned a set of memory addresses, which also can be identical of the device. The following table lists the system memory address used.

Memory Area	Size	Device Description
0000 – 003F	1K	Interrupt Area
0040 – 004F	0.3K	BIOS Data Area
0050 – 006F	0.5K	System Data
0070 – 0629	22K	DOS
062A – 0E01	31K	Program Area
0E02 – 9FFF	583K	[Available]
	= Conventional memory ends at 640K =	
A000 – AFFF	64K	VGA Graphics
B000 – B7FF	32K	Unused
B800 – BFFF	32K	VGA Text
C000 – C7FF	32K	Video ROM
C800 – CFFF	32K	ROM
D000 – DFFF	64K	Page Frame
E000 – EFFF	64K	Unused
F000 – FFFF	64K	System ROM
HMA	64K	First 64K Extended

➤ Interrupt Request Lines (IRQ)

IRQ#	Current Use	Default Use
IRQ 0	SMARTDRV	System Timer
IRQ 1	SMARTDRV	Keyboard Event
IRQ 2	[Unassigned]	Usable IRQ
IRQ 3	System ROM	COM 2
IRQ 4	System ROM	COM 1
IRQ 5	[Unassigned]	Usable IRQ
IRQ 6	System ROM	Diskette Event
IRQ 7	[Unassigned]	Usable IRQ
IRQ 8	System ROM	Real-Time Clock
IRQ 9	[Unassigned]	Usable IRQ
IRQ 10	[Unassigned]	Usable IRQ
IRQ 11	[Unassigned]	Usable IRQ
IRQ 12	System ROM	IBM Mouse Event
IRQ 13	System ROM	Coprocessor Error
IRQ 14	System ROM	Hard Disk Event
IRQ 15	[Unassigned]	Usable IRQ

Mechanical Dimensions

➤ Mechanical Dimensions
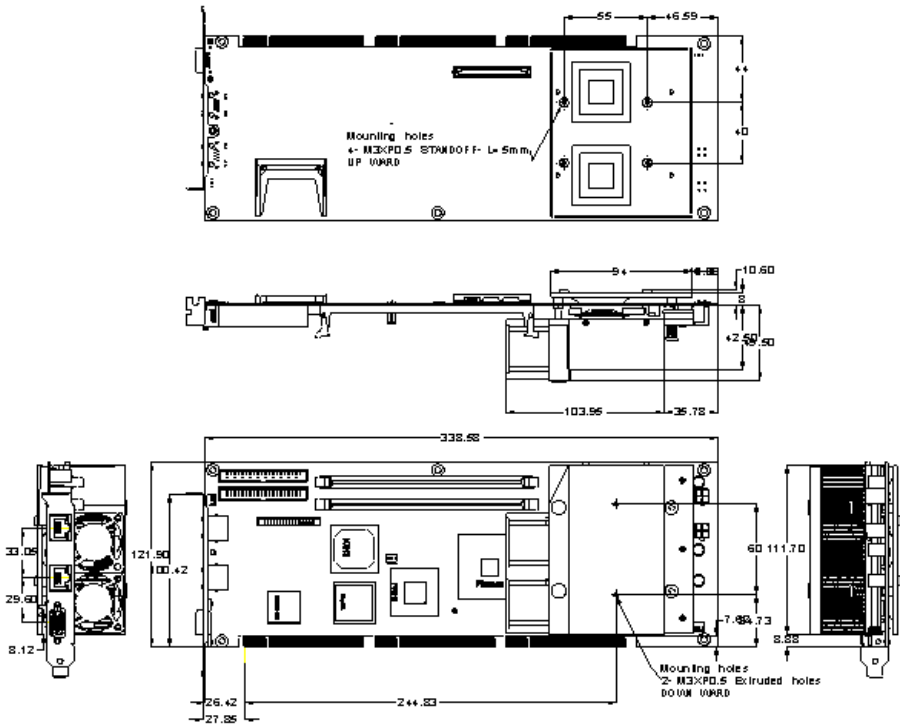
Declaration of Conformity

Information Technology Equipment

The product(s) covered by this declaration has a CE marking:
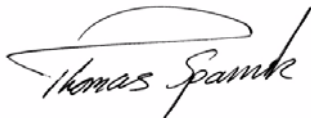
SBC-E7501-VEG2/H

The European Union directives covered by this declaration:

EMC Directive 89/336/EEC and Low Voltage Directive 73/23/EEC

The basis on which conformity is declared:

EN 55022	(1994+A1;1995+A2;1997)
EN 55024	(1998)
EN 61000-3-2	(1995+A1;1998+A2;1998+A14)
EN 61000-3-3	(1995)
IEC 61000-4-2	(1995)
IEC 61000-4-3	(1995)
IEC 61000-4-4	(1995)
IEC 61000-4-5	(1995)
IEC-61000-4-6	(1996)
IEC-61000-4-11	(1994)

l.

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