Global AMERICAN

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User's Manual

Full-Size PICMG 1.2 SBC 3301611

Version 1.1

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Trademarks

Regulatory Information

This equipment has been demonstrated to show compliance with mandatory U.S. and international electromagnetic compatibility standards when properly installed in an agency approved chassis.

Warning: Changes or modifications to this device not expressly approved by Diversified Technology could void the user's authority to operate the equipment.

The 3301611 requires a ferrite to be installed on the printer cable before connecting a printer to the unit. If a ferrite is not installed, the system may be violating FCC rules.

FCC (USA):

This equipment 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 instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

Industry Canada:

This Class A digital apparatus meets all requirements of the Canadian Interference Causing Equipment Regulations. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouiller du Canada. Le present appareil numérique n'emet pas de bruits radioélectriques dépassant les limites applicables aux appareils numeriques de le Classe A préscrites dans le Reglement sur le brouillage radioélectrique édits par le ministere des Communications du Canada.

Table of Contents

How to Use This Manual

The manual describes how to configure your 3301611 system to meet various operating requirements. It is divided into six chapters, with each chapter addressing a basic concept and operation of the Single Board Computer (SBC).

Chapter 1: System Overview. Presents the contents of the package and gives the user an overview of the product specifications and basic system architecture for this model of the SBC.

Chapter 2: Hardware Configuration. This chapter provides an overview of the definitions and locations of Jumpers and Connectors that the user can easily use to configure the system.

Chapter 3: System Installation. Describes how to properly install the CPU, main memory and CompactFlash card and provides a programming guide of the Watch-Dog Timer function.

Chapter 4: Troubleshooting. Provides the user with a few useful tips to quickly get the 3301611 running with no failures. With basic hardware installation addressed in Chapter 3, this chapter will focus on system integration issues, in terms of backplane setup, BIOS settings, and OS diagnostics.

Appendix. Mechanical drawing of 3301611 with proprietary CPU cooler, examples of enhanced fixation for CPU cooler, I/O port address map and interrupt request lines (IRQs).

The content of this manual and the EC declaration document is subject to change without prior notice. These changes will be incorporated in new editions of the document. **Global American Inc.** may make supplements or change in the products described in this document at any time.

Updates to this manual, technical clarification, and answers to frequently asked questions will be shown on the following web site : http://globalamericaninc.com

Chapter 1
System Overview

1.1 Introduction

The 3301611 is based on the Intel® E7501 chipset with 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 3301611 utilizes 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. The board also offers two independent PCI-X buses for further I/O expansion. The I/O bandwidth of the PCI-X bus allows for delivering high volumes of data traffic created by Gigabit Ethernet, SCSI, image processing created by massive data flow applications. With the dual independent PCI-X bus design, it is flexible enough 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. The 3301611 SBC is available with dual Gigabit Ethernet ports via a copper or fibre channel connection.

1.2 Check List

The 3301611 package should cover the following basic items -

- One 3301611 Single Board Computer
- One proprietary CPU cooler
- Four screws with spring for 604-pin CPU and four screws and springs for 603-pin CPU
- One dummy CPU pad for single 604-pin CPU and one for 603-pin single CPU
- Two Al blocks for the regulators are included for 604-pin or 603-pin CPUs

- One I/O expansion adapter board with bracket (For 3301611)
- One adapter cable for I/O expansion adapter board
- One IDE cable
- One Floppy Disk cable
- One Y-cable cable for PS/2 keyboard and mouse
- One Parallel & Serial port cables with bracket
- One Product Documentation and Software CD

If any of these items are damaged or missing, please contact Global American Inc. and keep all packing materials for future replacement and maintenance.

1.3 Product Specification

- **Main processor**
  Single or dual Intel® 604-pin Xeon™ processor(s) with 533/400MHz front side (system) bus speed. (603-pin Xeon supported)
- **BIOS**
  Phoenix (Award) system BIOS with 4Mb Flash ROM with easy upgrade function ACPI, DMI, Green function and Plug and Play Compatible
- **Main Memory**
  Two DIMM sockets supporting up to 4GB of registered ECC DDR 266/200 SDRAM

  Note:
  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 Interface**
  - PICMG 1.2 Rev 1.0 standard (dual PCI-X buses)
  - Fully complies with PCI-X Addendum to the PCI Local Bus specification V1.0
  - PCI IDE Interface supporting 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**
  Supports two high-speed 16C550 compatible UARTs with 16-byte T/R FIFOs
- **Parallel Port**
  Supports one parallel port with SPP, EPP and ECP modes
- **USB Interface**
  Supports four USB (Universal Serial Bus) 1.1 ports for high-speed I/O peripheral devices
- **PS/2 Mouse and Keyboard Interface**
  Supports PS/2 mouse/keyboard connection through the I/O expansion adapter board via Y-Cable separation
- **Auxiliary I/O Interfaces**
  System reset switch, external speaker, Keyboard lock, Ethernet access LED and HDD active LED, etc.
- **Real Time Clock/Calendar (RTC)**
  Supports Y2K Real Time Clock/Calendar with battery backup for 7-year data retention
- **Watchdog Timer**
  - Supports WDT function through software programming for enable/disable and interval setting
  - Generates system reset
- **CompactFlash Socket**
  - True IDE mode, compatible with the ATA/ATAPI-4 specification
  - One Type II CF socket on secondary IDE channel for supporting up to 1GB memory
  - Bootable if no drives are installed on primary channel
- **VGA Display**
  - ATI Rage XL graphic controller works in combination with 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**
  Supports three 3-pin connectors for CPU and System fans

- **System Monitoring Feature**
  Monitors CPU temperature and major power sources, etc.
- **Bracket**
  Supports dual Ethernet ports with 2 activity indicators, one PS/2 Keyboard / Mouse, and one CRT port
- **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
- **Power Requirements:**
  - +12V (CPU1) @ 3.7A
  - +12V (CPU2) @ 2.8A
  - +12V (System) @ 1.2A
  - +5V (System) @ 3.1A
  - +3.3V (System) @ 2.9A

  - Test configuration:

    CPU: Dual Intel® Xeon 2.0GHz / 400MHz FSB / 512KB L2 Cache

    Memory: Dual DDR SDRAM 512MBx2

    Primary Master IDE HDD: Seagate ST32042A (20GB)

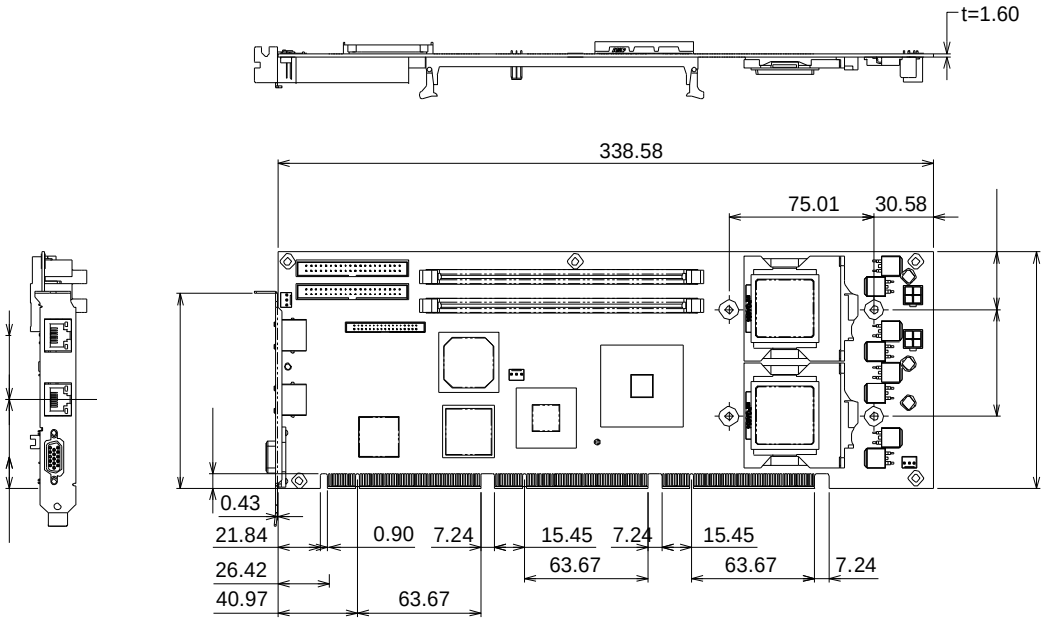
    OS: Windows Server 2000 with SP3

    Test Programs: 3D Mark 2001 PRO and Burning Test V3.0

    Connected Fans: Only CPU fan connected

    Run Time: 10 minutes
- **Operating Temperature:**
  -5°C ~ 50°C (23°F ~ 122°F)
- **Storage Temperature:**
  -20°C ~ 80°C
- **Relative Humidity:**
  0% ~ 95%, non-condensing

1.3.1 Mechanical Drawing



1.4 System Architecture

The architecture of the 3301611 includes Intel®'s memory controller hub E7501, I/O controller hub ICH3-S, PCI/PCI-X Bus Bridge P64H2 and PCI-X interface dual Gigabit Ethernet controller 82546EB.

The E7501 chipset supports single or dual 533/400MHz Xeon™ processors and registered DDR 266/200 ECC SDRAM. The ICH3-S supports the PCI bus interface, which is utilized to hook an ATI Rage XL graphics controller for the standard display requirement. It is also used to provide APM, ACPI compliant power management, USB ports, SMBus communication, and Ultra DMA/33/66/100 IDE Master. The P64H2 bridge chip provides two PCI-X buses for the system via the golden fingers of the SBC; the 82546EB on-board Ethernet adapter is also attached to one of the PCI-X buses.

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

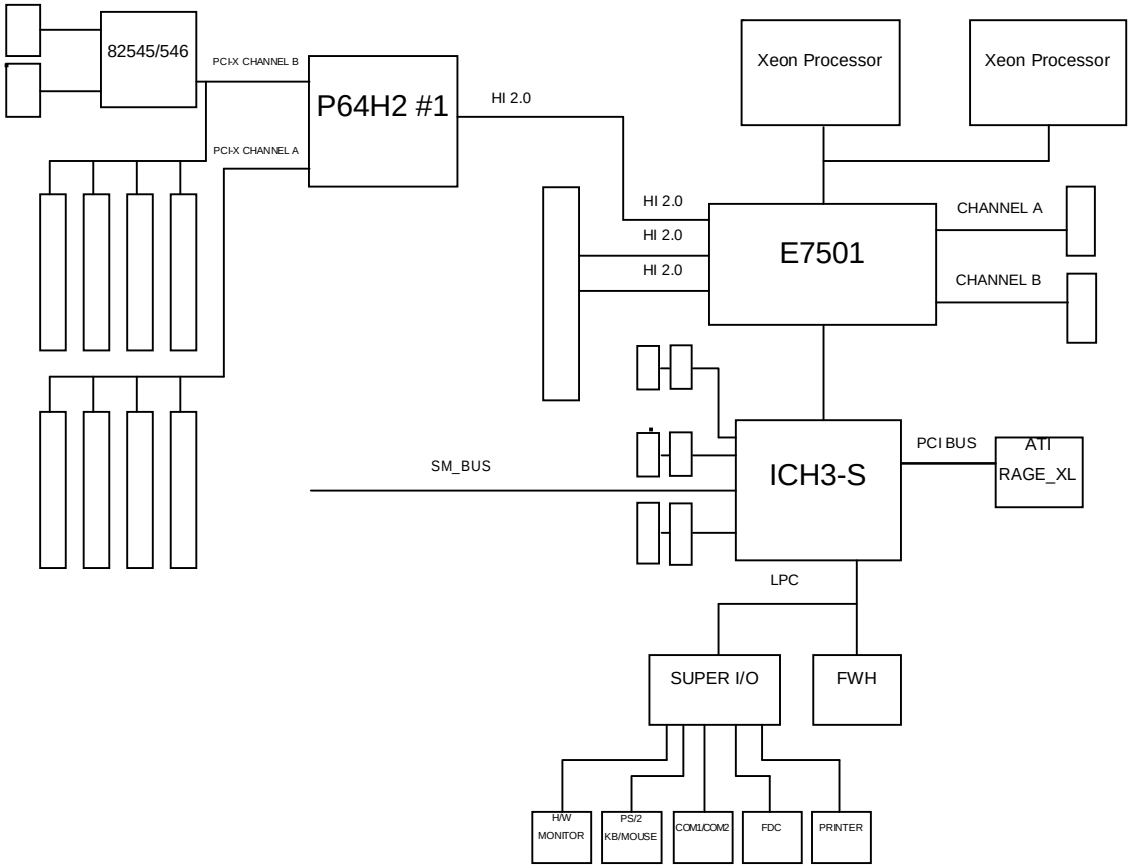


Figure 1-1 System Block Diagram of 3301611

Chapter 2
Hardware Configuration

This chapter indicates jumper, header and connector locations. Users may find useful information related to hardware settings in this chapter. The default settings are indicated with a star sign (Ì).

2.1 Jumper Settings

In the following sections, **Short** means covering a jumper cap over jumper pins; **Open** or **N/C** (Not Connected) means removing a jumper cap from jumper pins. Users can refer to Figure 2-1 for the Jumper locations.

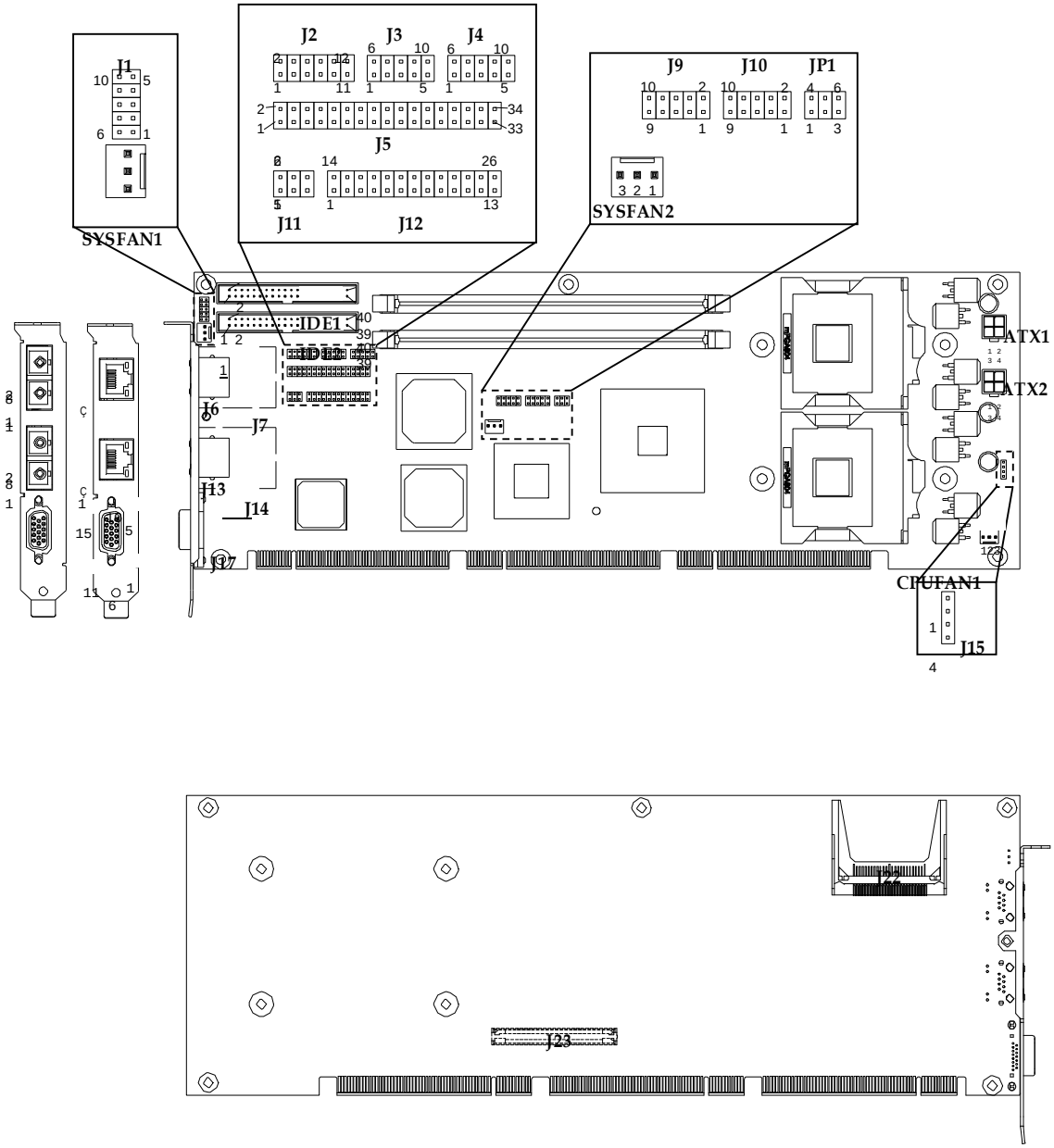


Figure 2-1 Jumper/Connector Locations for the 3301611

JP1: CMOS clear & AT Power Emulation

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

Note:
The 3301611 has only been evaluated in an environment with an ATX power supply. "AT Power Emulation" means the 3301611 is able to be auto powered up once the power cord is plugged in an ATX power supply. However, the user needs to set the BIOS setup menu option "PWRON after PWR FAIL" to "ON" if the auto power up function is needed.

2.2 Connector Allocation

I/O peripheral devices and flash disks are connected to the interface connectors on the SBC (Figure 2-1).

There is a 26 pin 2mm cable included in the cable set that is used to connect the 3301611 to the I/O adapter board included in the accessory kit. The first RED LINE is Pin 1 of the cable. The cable is divided into 3 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's Function List

Connector	Function	Remark
J1	LAN speed & Keylock	
J2	Misc.	
J3	COM2 Serial Port	
J4	COM1 Serial Port	
J5	FDC	
J6/J13	Gigabit RJ45 Port B	3301611C only
J7/J14	Gigabit Fiber Port B	3301611F only
J8/J16	MCH Heat Sink Hooker	
J9	USB0, USB1 Connector	
J10	USB2, USB3 Connector	
J11	PS/2 keyboard/Mouse Connector	
J12	Print Port	
J13	Gigabit RJ45 Port A	3301611C only
J14	Gigabit Fiber Port A	3301611F only

J15	Speaker connector	
J17	VGA Port	
J21	Reserved for debugging	
J22	Compact Flash connector	
J23	Hyper Link Bus connector for additional	Reserve for future use
IDE1	Primary IDE connector	
IDE2	Secondary IDE connector	

Pin Assignments of Connectors

J1: LAN speed & Keylock

PIN No.	Signal Description	PIN No.	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 B LINK# (B-)
5	GND	10	NC

Note:
Pin 1 – Pin 5 is the connector for the Keylock & Power LED function. Pin 6 – Pin 10 is the connector for the LAN LED function. The LAN LED function is designed to indicate LAN Link/Activity LED. Pin 6 is connected to LAN A LED anode, and Pin 7 is connected to LAN A LED cathode. Pin 8 is connected to LAN B LED anode, and Pin 9 is connected to LAN B LED cathode. The Link/Activity LED will be bright when indicating link to a LAN port and blinking while data transactions are occurring.

J2: Misc.

PIN No.	Signal Description	PIN No.	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	3VSBY	Pin 7 ~ 8 is reserved
9	INTRUDER#	10	VCC_RTC	Ì Pin9 ~ 10 is for Intruder detection.
11	AP Button	12	GND	

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

PIN No.	Signal Description
	RS-232
1	DCD (Data Carrier Detect)
2	RXD (Receive Data)
3	TXD (Transmit Data)
4	DTR (Data Terminal Ready)
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 in the I/O adapter board cable is connected to Pin 1 of the COM port connector.

J5: FDC Interface Connector

PIN No.	Signal Description	PIN No.	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#

J6/J13: Gigabit RJ45 Port B

PIN No.	Signal Description
1	MD0 +
2	MD0 -
3	MD1 +
4	MD1 -
5	MD2 +
6	MD2 -
7	MD3 +
8	MD3 -

J7/J14: Gigabit Fiber Port B

PIN No.	Signal Description
1	RX
2	TX

J9/J10: USB Connector (USB0,USB1/USB2,and USB3)

PIN No.	Signal Description	PIN No.	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 first cable group of the I/O adapter board cable is connected to Pin2 of the USB port connector.

J11: PS/2 Keyboard/Mouse Connector

PIN No.	Signal Description
1	Mouse Data
2	Keyboard Data
3	Ground
4	5V
5	Mouse Clock
6	Keyboard Clock

Note:
The RED LINE of second cable group of the I/O board adapter cable is connected to Pin 1 of PS/2 KB/Mouse connector

J12: Parallel Port Connector (Printer Port)

PIN No.	Signal Description	PIN No.	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	Data 3	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	N/C

J15: Speaker Connector

PIN No.	Signal Description
1	Speaker Signal Output
2	N/C
3	Ground
4	+5V

J17: VGA Port

PIN No.	Signal Description	PIN No.	Signal Description
1	R	9	VCC
2	G	10	GND
3	B	11	NC
4	NC	12	MONID 1
5	GND	13	HSYNC#
6	GND	14	VSYNC#
7	GND	15	MONID 2
8	GND		

IDE1/IDE2: Primary/Secondary IDE Connector

PIN No.	Signal Description	PIN No.	Signal Description
1	RESET#	2	Ground
3	Data 7	4	Data 8
5	Data 6	6	Data 9
7	Data 5	8	Data 10
9	Data 4	10	Data 11
11	Data 3	12	Data 12
13	Data 2	14	Data 13
15	Data 1	16	Data 14
17	Data 0	18	Data 15
19	Ground	20	N/C
21	DMA REQ	22	Ground
23	IOW#	24	Ground
25	IOR#	26	Ground
27	IOCHRDY	28	Pull-down
29	DMA ACK#	30	Ground
31	INT REQ	32	N/C
33	DA1	34	CBLID#
35	DA0	36	DA2
37	HDC CS0#	38	HDC CS1#
39	HDD Active#	40	Ground

ATX1, ATX2

PIN No.	Signal Description
1	GND
2	GND
3	+12V
4	+12V

SYSFAN1, SYSFAN2, CPUFAN1

PIN No.	Signal Description
1	GND
2	+12V
3	Fan speed detection

Chapter 3
System Installation

This chapter provides instructions to set up the system. Additional installation information is provided to illustrate installation of a CompactFlash card. Watch Dog Timer software programming instructions are also included.

Important Notice

One must take special care when handling the 3301611 after the CPU heatsink has been installed. The heatsink is extremely heavy and the board must be supported in the area underneath the heatsink at all times while handling the 3301611.

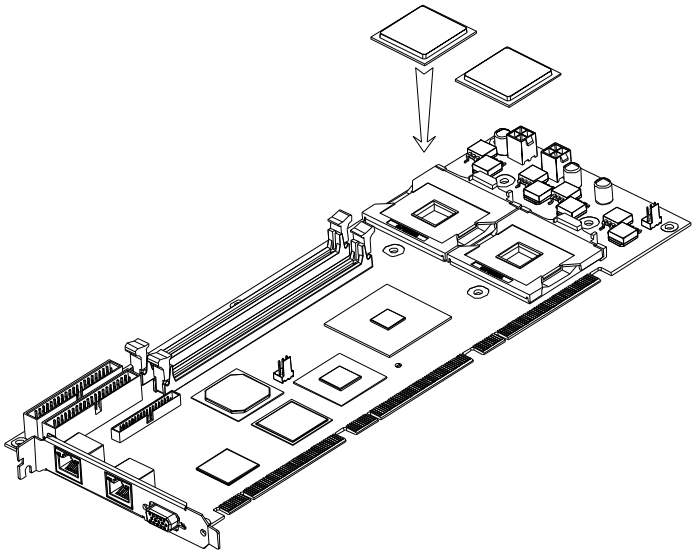
3.2 Xeon Processor

Installing Processor

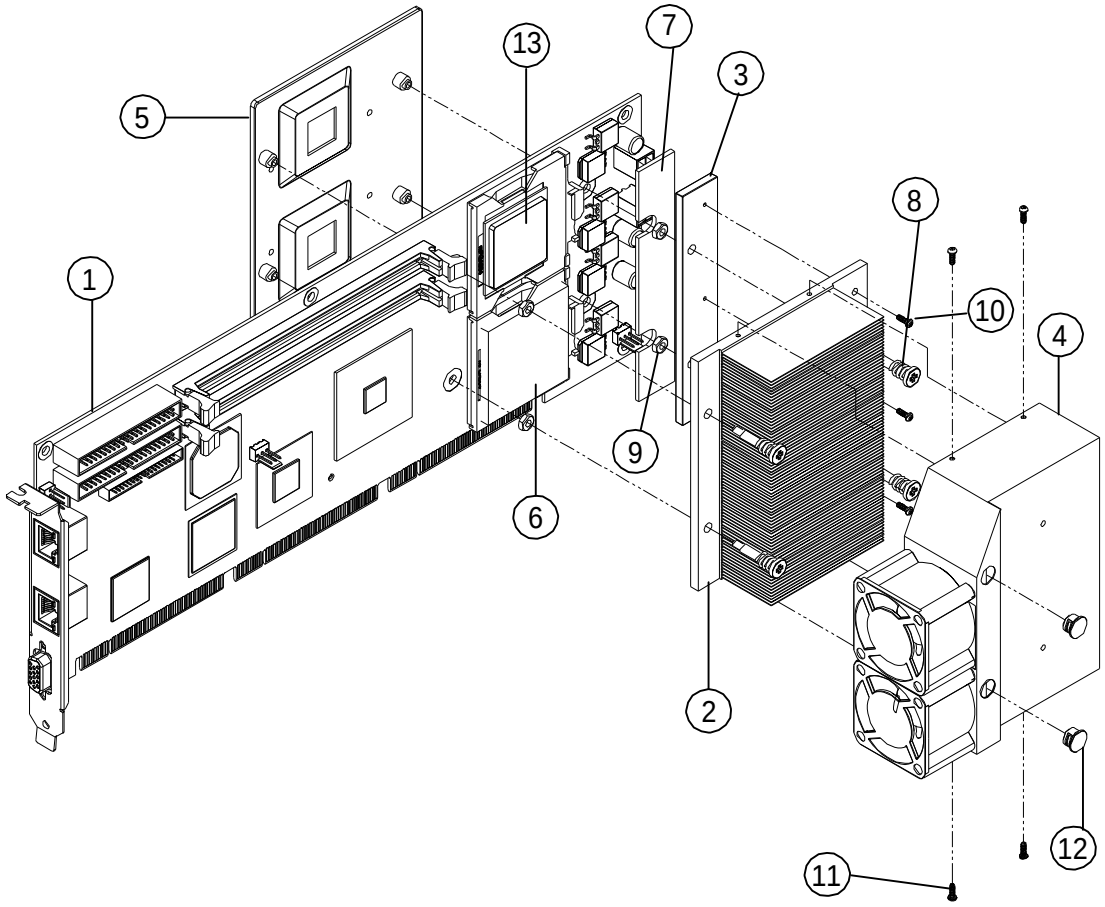
1) Lift the handling lever of CPU socket outwards and upwards to the other end.
2) Align the processor pins with the pinholes on the socket. Make sure that the notched corner or dot mark (pin 1) of the CPU corresponds to the socket's bevel end. Then press the CPU gently until it fits into place. If this operation is not easy or smooth, don't do it forcibly. Damage to processor pins may occur if the installation is not performed correctly.
3) Push down the lever to lock the processor chip into the socket once the processor has been installed.
4) Follow the installation guide for installing the cooling fan or heat sink.

Note:

1) When dual processors are installed, they must be the same core speed, bus speed, and the same number of pins.
2) When a single processor is installed, it must be installed in the socket closest to the DIMM modules.



Identify CPU Cooler



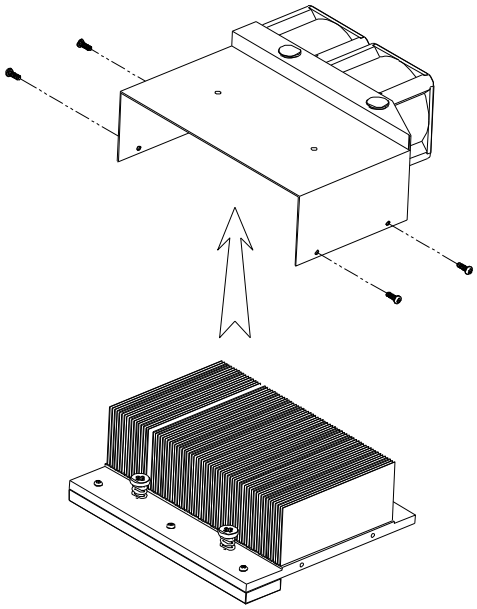
Item	Description	Quantity
1	3301611 SBC	1
2	Heat sink	1
3	Al block	2
4	Air duct	1
5	Cooler Backplate	1
6	Dummy CPU pad	2
7	Thermal pad	2
8	Cooler mounting screw and spring	8
9	Nut	4
10	Flat head M3 screw	3
11	Rounded head M2.5 screw	4
12	Cap for screw driver hole	2
13	Xeon processor	1 or 2

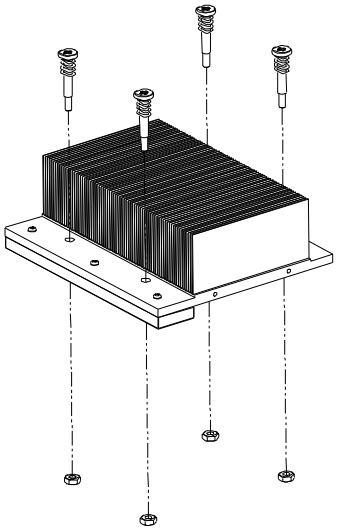
Install CPU Cooler

Case 1 : Single CPU

1) Adhere the dummy pad on the empty socket where no CPU will be installed (the socket farthest from the DIMM sockets).

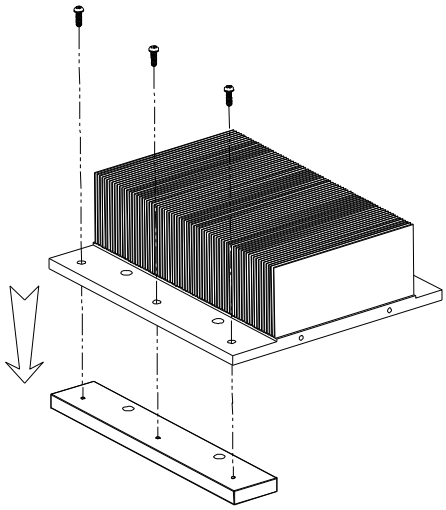
2) Change the cooler mounting screws and spring if installing a 603-pin Xeon processor by removing the air duct and cooling fans (Longer mounting screws are used for 603-pin Xeon processors).



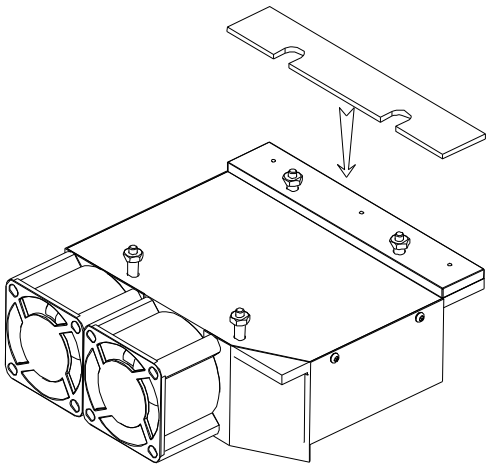


3) Be sure to fix nuts tight on the cooler mounting screws before installing it on the backplate.

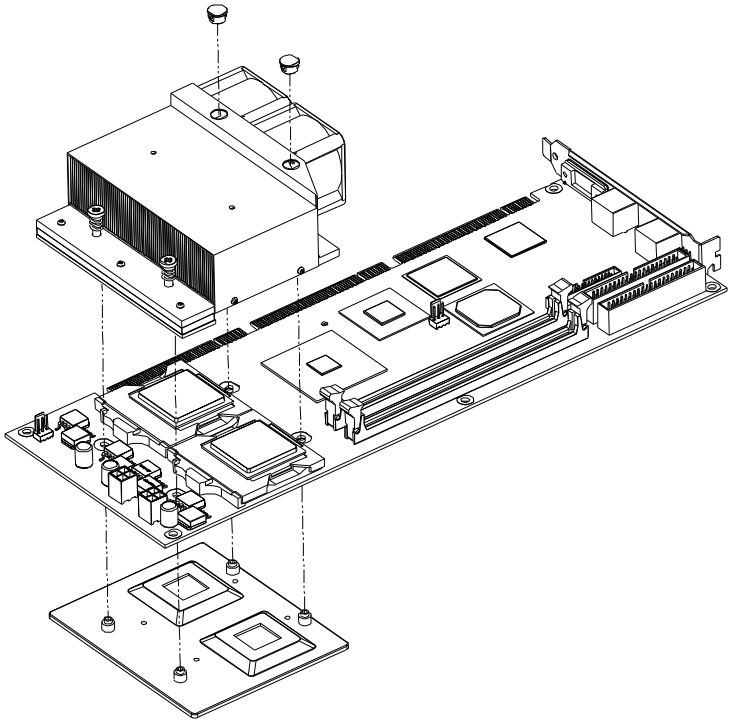
4) Change Al block on the CPU cooler if installing a 603-pin Xeon processor.



5) Adhere thermal pad on the Al block according to CPU type.



6) Place the cooler backplate on the backside of the 3301611.
7) Tear off the protective cover off the thermal tape on the thermal pad attached to the Al block.



8) Install the CPU cooler on the SBC (Cooling fans nearest the DIMM sockets).
11) Cover the screw holes on air duct.

Case 2 : Dual CPU
Same procedure as Case 1 (single processor) except skip step 1.

Removing CPU

1) Remove the CPU cooler first.
2) Lift the lever of CPU socket outwards and upwards to the other end.
3) Carefully lift up the existing CPU to remove it from the socket.
4) Follow the steps for installing a CPU to change to another one or re-lock the locking mechanism on the processor socket.

Configuring System Bus

The 3301611 will automatically detect the CPU used.

3.3 Main Memory

The 3301611 provides 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. The memory clock is auto detecting by default but can be changed in the BIOS CMOS settings.

The memory scheme is interleaved so modules must be installed in pairs. When using 533MHz front side bus processor(s), DDR 266 SDRAM must be used. When using 400MHz front side bus processor(s), either DDR 266 or DDR 200 SDRAM may be used.

Be sure that all memory modules are installed firmly and latched into place. Loose memory modules may affect the stability of the system. Follow normal procedures for installing DRAM modules into the memory sockets.

3.4 CompactFlash Card

The 3301611 reserves one Type II CompactFlash socket for installing CompactFlash media up to 1GB.

Installing CF

1) To protect your card, always hold it by the edges.
2) Slide the CompactFlash card into the socket.
3) If the CompactFlash card doesn't slide into the socket easily, don't try to force it. It won't fit if it is installed backward. Turn it around and try inserting it again.

WARNING

1) Keep CompactFlash cards away from direct sunlight, moisture, and magnetic fields.
2) The True IDE mode does not support hot insertion and removal because of the probable disruption of signals on the system bus.

3.5 Installing the Single Board Computer

To install the 3301611 into a standard chassis or proprietary environment, you need to perform the following:

Step 1: Check all jumpers settings.

Step 2: Install and configure the processor(s), CPU cooler, and memory modules in the proper manner.

Step 3: Place the 3301611 into the dedicated position in your system. Step

4: Attach cables to any existing peripheral devices and secure them.

Step 5: Attach two 4-pin 12V power cables from the ATX power supply to the on board 12V CPU supplementary connectors (ATX1, ATX2). These are provided in the accessory kit.

WARNING

Please ensure that your SBC is properly inserted and secured to the chassis. Otherwise, the system might be unstable or may not be functional due to bad contact between the golden fingers and the backplane.

Note:

Please refer to sections 3-5-1 to 3-5-3 for instructions to install INF/VGA/LAN drivers.

3.5.1 Chipset Component Driver

The chipset on the 3301611 is a new chipset that a few older operating systems might not be able to recognize. To overcome this compatibility issue, for Windows Operating Systems such as Windows-95/98/98SE/2000, please install the proper INF before any other Drivers are installed. The chipset component driver is located in the Product Documentation and Software CD-title that should be located in the accessory kit.

3.5.2 ATI Rage XL Graphic Integrated Chipset

The 3301611 uses the ATI Rage XL high performance graphics integrated chipset, which is aimed to gain server grade graphic performance. It is accompanied by 8MB of DDR-SDRAM. This combination makes the 3301611 an excellent piece of any server platform.

Drivers Support

The ATI Rage XL driver is located in the Product Documentation and Software CD-title. Drivers support is available for Windows-98/98SE/ME, Windows-NT 3.51/4.0, Windows-2000, OS2, and Linux.

Windows-98/98SE: Please execute the exe file to start the graphics driver installation, or bring up the Display Control Panel and update the graphics driver.

Windows-NT 4.0: Please install Windows-NT 4.0 Service Pack 4 or above first, then execute the exe file, or simply bring up the Display Control Panel and update the graphics driver.

Windows-2000: Start the Device Manager and update the graphics drivers.

Red Hat Linux V6.2: Please refer to the related documentation for graphic drivers installation.

3.5.3 Gigabit Ethernet Controller

Drivers Support

The Intel® 82546EB dual port Gigabit Ethernet driver is located on the Product Documentation and Software CD-title. The drivers support Windows-NT 4.0, Windows-98/98SE/ME, Windows-2000, Windows-XP, and Linux.

LED Indicator (for LAN status)

The 3301611 provides three LED indicators to report the status of the 82546EB Gigabit Ethernet interfaces. Please refer to the table below as a quick reference guide.

82546EB	Name of LED	Operation of Ethernet Port	
		ON	Off
Amber	LAN Linked & Active LED	Linked	Active (Blinking)
Green	LAN speed LED	100 Mbps	10 Mbps

3.6 Clear CMOS Operation

The following table indicates how to enable/disable the CMOS Clear Function hardware circuit. The function is enabled/disabled by putting jumpers at the proper position.

JP1	FUNCTION
1-2 Short	Normal Operation
2-3 Short	Clear CMOS Contents

To correctly utilize the CMOS Clear function, users must turn off the system, move the JP1 jumper to pins 2 and 3. To clear the CMOS settings, turn the power back on and turn it off again for an AT system, or press the toggle switch a few times for an ATX system. Move the JP1 jumper back to pins 1-2 (Normal Operation) and start the system. The system will then produce a "CMOS Check Sum Error" message and halt. Users may then follow the displayed message to load BIOS default settings.

3.7 Watch Dog Timer Function

The working algorithm of the 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 boards to boards.

The 3301611 allows control of the WDT through dynamic software programming. The WDT starts counting when it is activated. It sends out a signal to system reset or to a non-maskable interrupt (NMI), when the time-out interval ends. To prevent the time-out interval from running out, a re-trigger signal will need to be sent before the count reaches its end. This action will restart the counting process.

A well-written WDT program should keep the counting process running under normal conditions. The WDT should never generate a system reset or NMI signal unless the system experiences a failure.

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

To ensure a successful access to the content of the desired Control Register, the following sequence of program code should be executed step-by-step with each register access.

Additionally, there is a maximum of 2 seconds of counting tolerance that should be considered for each specific application program. For more information about the WDT, please refer to the Winbond W83627HF data sheet.

There are two PnP I/O port addresses that can be used to configure WDT,

1) 0x2E:EFIR (Extended Function Index Register, for identifying CR index number)
2) 0x2F:EFDR (Extended Function Data Register, for accessing desired CR)

Below is some example code, which demonstrates the use of the 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);
```

Definitions of Variables:

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

3.8 SMBus

The System Management Bus is a two-wire interface through which simple power-related chips can communicate with the rest of the system. It uses the I2C as its backbone.

A system using the SMBus passes messages to and from devices instead of tripping individual control lines.

With the SMBus, a device can provide manufacturer information, tell the system what its model/part number is, save its state for a suspend event, report different types of errors, accept control parameters, and return its status.

The SMBus may share the same host device and physical bus as the ACCESS bus components provided that an appropriate electrical bridge is provided between the internal SMB devices and external ACCESS bus devices.

Chapter 4
Troubleshooting

This chapter provides you a few useful tips to quickly get your 3301611 running with no failures. As basic hardware installation has been addressed in Chapter 3, this chapter will basically focus on system integration issues, in terms of backplane setup, BIOS settings, and OS diagnostics.

4.1 Backplane Setup

Backplane

The 3301611 is a full-sized SBC compliant with the new PICMG 1.2 specification, which utilizes the 64 bit PCI-X architecture with bus speeds up to 133 MHz. Therefore, the 3301611 is only able to run on PICMG 1.2 64 bit PCI/PCI-X Backplane.

The PCI specification allows for three different PCI peripheral cards: 3.3V, 5V and "Universal" adapters, but only 3.3V signaling is allowed for 66MHz or greater operations per the specification. New PCI controllers are manufactured to operate at 3.3V, while older options were 5V.

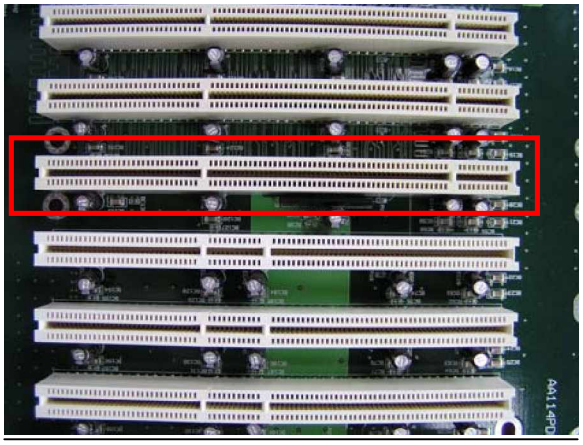
Many backplanes offer the newly designed 3.3V, 64 bit PCI slots, which support PCI / PCI-X architecture as well as 5V slots for older peripheral PCI cards. Please check your system and backplane needs before installing the 3301611 in your backplane.

PCI Slots Specification

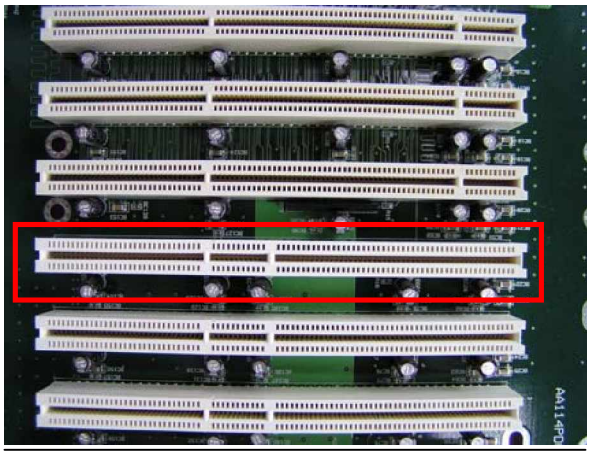
Please check the specification of the PCI devices before using any of them. Please be sure the specification of the PCI Device can meet the specification of the PCI/ PCI-X architecture used on the 3301611.

The Pin Definition (Golden Fingers) of the PCI device has differences between the 3.3V, 64bit PCI device and 5V, 64bit PCI device. The below picture shows the differences between them:

The 3.3V, 64 bit PCI slots



The 5V, 64 bit PCI Slot



The chart below shows the specification for the design of system Bus:

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

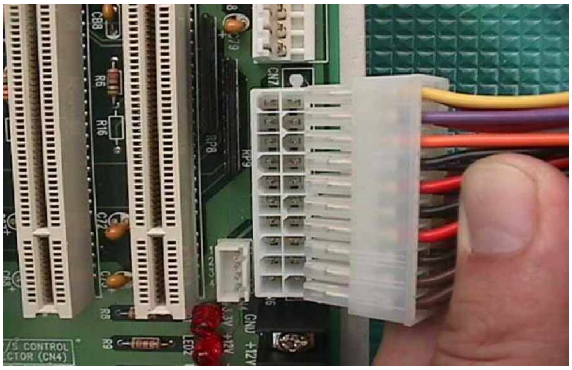
P4 Power connector

The 3301611 requires power directly from the 12V connector. The CPU supplementary power connector (ATX1, ATX2) should be connected at all times for this P4 Xeon 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.

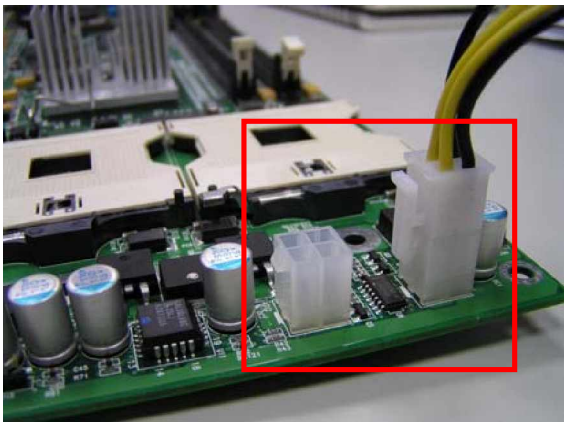
ATX power

The 3301611 is designed to also support ATX mode. Please refer to the following instructions to apply ATX power to your 3301611 and backplane.

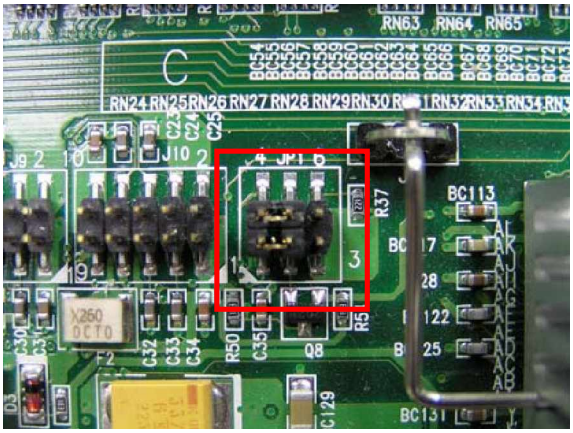
Step1: Connect 20-pin power cable of the ATX power supply with the ATX POWER CONNECTOR (20-pin) on the backplane



Step2: Connect the 12V power connector (4 pin) to ATX1, and ATX2.

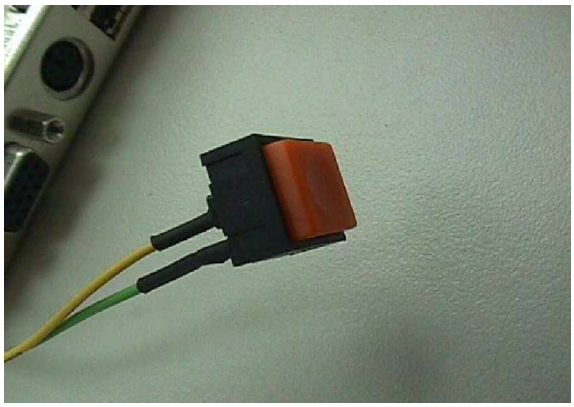


Step3: Check the jumper setting of the JP1, the default setting will short the 1-2 pin for ATX Mode.



Step4: Connect the TOGGLE SWITCH with the switch connector (2 pin) on the Backplane. The system power for the 3301611 is controlled by the TOGGLE SWITCH, which is connected on the Backplane.

Step5: The figure below is the TOGGLE SWITCH, which is used to switch the ATX Power on/off for the SBC. Usually the TOGGLE SWITCH is located on the chassis front panel. Pressing the switch button once will turn power on, and pressing it again will turn it off.



Q: In addition to the above description, is there anything to do to finish up an ATX system?

A: Yes. The 3301611 needs to be configured to support the ATX function for the above cabling.

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

A: Short the JP1 Jumper of pin 2, and pin 3 on the 3301611 to set the AT mode. 3301611 can stimulate AT Mode.

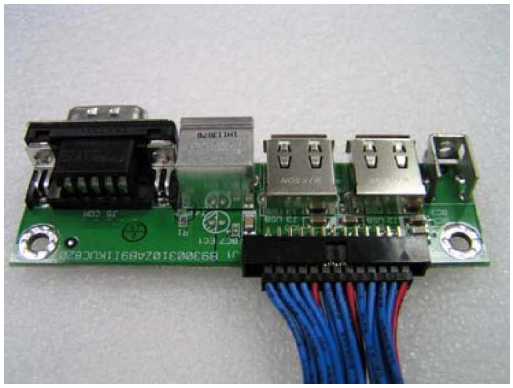
If the ATX power supply has a switch, then use the power supply switch as the system power on switch when using the AT Mode.

In all cases when using the ATX Mode, users need to apply a 2-pin AT (on/off) TOGGLE SWITCH connected to the backplane switch connector of step 4. However, the power supply switch needs to be moved to "on", if there is one.

4.2 Onboard hardware installation

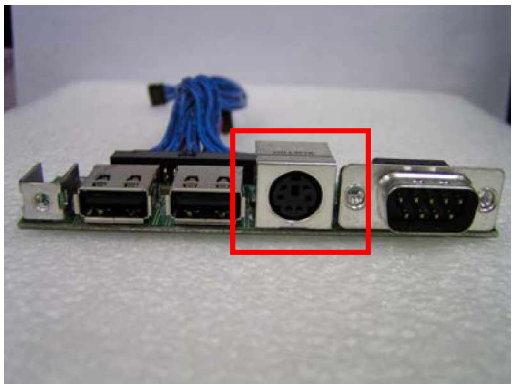
For the 3301611, there is one I/O expansion adapter board with mounting hardware included. The I/O expansion adapter board has 2 USB connectors, 1 PS2 Keyboard/ Mouse connector, and 1 COM port connector. The adapter cable for the I/O expansion board should be installed according to the documentation below, please check and connect the cable correctly.

The picture below shows the I/O expansion adapter board; from left to right there is, 1 COM port connector, 1 PS2 Keyboard/ Mouse connector, and 2 USB connectors.



Q: How do I connect my keyboard and mouse?

A: Users may always use a PS/2 keyboard and mouse through the PS/2 interface (Y-cable required), on the I/O expansion board included with the 3301611. The default setting for the PS/2 connector is for keyboard use.



Q: OK. I have finished hardware installation, but I got nothing when I powered on the system. Why?

A: There are thousands of different reasons to get this power on failure.

1. Check the 3301611 jumper, JP1. For an ATX power supply being used in AT mode, JP1 needs to be set at 2-3. Otherwise, it needs to be set at 1-2. Incorrect power setting will not allow the system to power on.
2. Double-check every connector and make sure it is attached with the correct cable. Also check that all cables are aligned with Pin-1 properly.
3. If you have changed processors with different system clocks, please move the CMOS clear jumper of JP1 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 the CMOS clear jumper of JP1 back to 4-5, and power on again.

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

A: If the BIOS optimal defaults have ever been loaded, it will force the BIOS to pick up the default CPU core/bus ratio. It needs to be emphasized again that the 3301611 does not have switches or jumper settings to configure the CPU core/bus ratio. This is done through the BIOS automatically. Please check in the "Frequency/Voltage Control" section of Chapter 4 to adjust this clock/bus ratio. The system default setting is automatically set for the safety CPU Clock Ratio, which should be "MIN = 16x". When installing the Xeon processors from Intel, the CPU Clock Ratio in the BIOS may need to be set.

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

A: Please make sure that the two IDE devices have been set as a master device and a slave device, respectively.

4.3 BIOS Setting

It is assumed that users have correctly installed the memory 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 cables and devices, it is very possible to encounter system failures that result in malfunction of any device.

Loading the default optimal settings

When prompted with the main setup menu, please scroll down to "**Load Optimal Defaults**", press "Enter" and "Y" to load the default optimal BIOS setup. This will force the BIOS settings back to the initial factory configuration. It is recommended to do this so one can be sure the system is running with the BIOS setting that Global American Inc. has tested. It is a good idea to load the default BIOS settings any time the system appears to be unstable during the boot up sequence.

Auto Detect Hard Disks

In the BIOS => Standard CMOS setup menu, select from the Primary/Secondary, Master/Slave IDE ports, and press the "Enter" key. Setup the selected IDE port and its access mode to "Auto". This will force the system to automatically pick up the IDE devices that are connected each time the system boots up.

Improper disable operation

There are numerous occasions where users disable a certain device/feature in one application through the BIOS settings. Then when these devices/features are needed, they have already been disabled. Thus, 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,
…, etc.

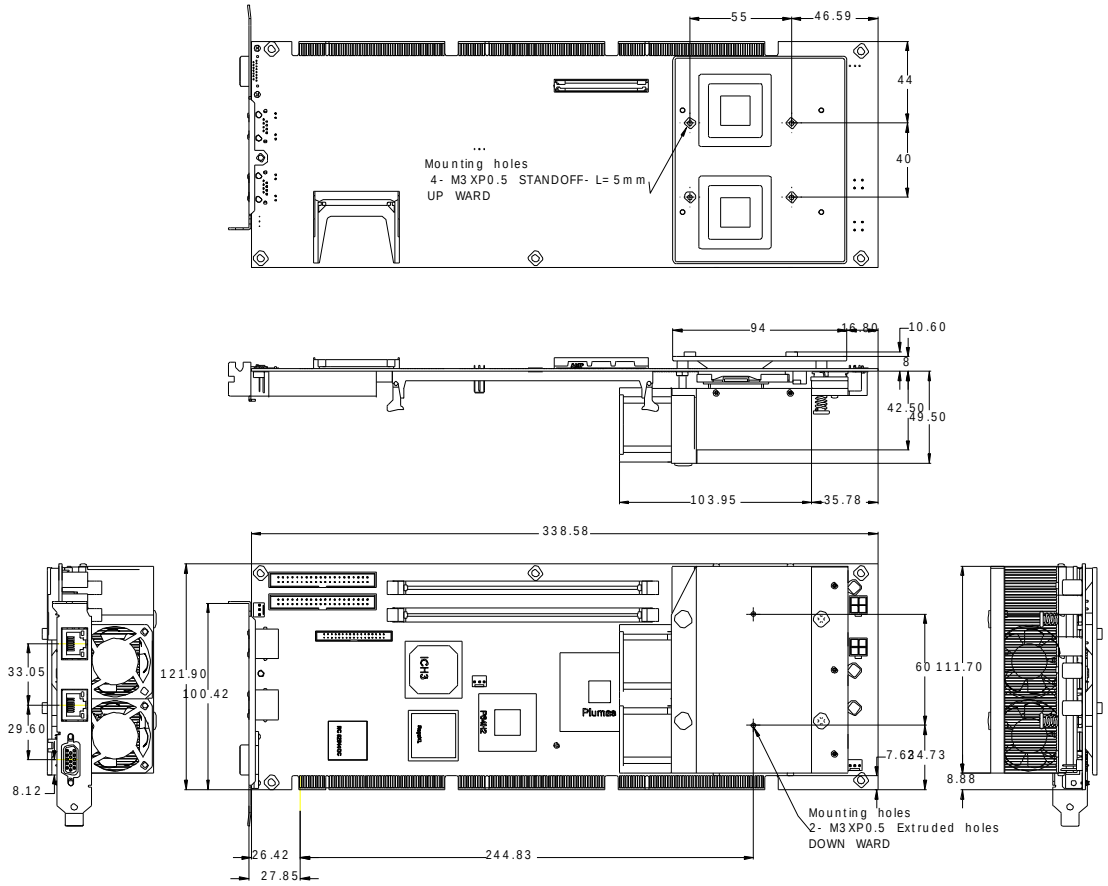
A quick review of the basic IRQ mapping is given in Appendix A, Appendix A.3 Interrupt Request Line (IRQ), is available for reference.

It is then very easy to find out which IRQ resources are available for additional peripherals. If not enough IRQ resources are available, please disable some devices listed above to release further IRQ numbers.

Appendix A

Useful information is provided in this Appendix. The Appendix includes mechanical drawings of the 3301611 with proprietary CPU cooler, examples of enhanced fixation for the CPU cooler, I/O port address map and interrupt request lines (IRQs).

A.1 Mechanical Dimension with CPU Cooler



A.2 System Memory Address Map

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

A.3 Interrupt Request Lines (IRQ)

Peripheral devices can use interrupt request lines to notify the CPU for the service required. The following table shows the IRQ used by the devices on board.

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

Appendix B

Copies of current agency approvals are available from DTI upon request.

B.1 Safety

UL / cUL 60950	Safety of Information Technology Equipment (UL File# E130569)

B.2 Electro Magnetic Compatibility

FCC Part 15, Subpart B	Class A Commercial Equipment
EN 55022:1998	Class A Radiated, Power Line Conducted
EN 50081-1:1992	Emissions-Residential, Commercial
EN 61000-3-2:1995	Power Line Conducted Emissions
EN 61000-3-3:1995	Power Line Fluctuation and Flicker
EN 55024:1998	Immunity- Information Technology Equipment
EN 61000-4-2:1995	Electro-Static-Discharge (ESD)
EN 61000-4-3:1997	Radiated Susceptibility
EN 61000-4-4:1995	Electrical Fast Transient Burst

Any advice or comments about our products and service, or anything we can help you with please don’t hesitate to contact with us. We will do our best to support your products, projects and business.

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