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User's Manual

Single Board Computer 3301470

Version 1.0, March 2005

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Table of Contents

Chapter 1
General Information

Features

- Support socket 604 dual Intel® Xeon™ / LV Xeon™ processors with 400/533MHz FSB up to 3.06GHz
- Max. 8GB DDR SDRAM support, DDR DIMM x 4
- Intel® E7501 chipsets
- Intel® P64H2 x 1
- ATI Rage™ XL VGA controller w/8MB frame buffer memory
- Dual Intel® 82545EM Gigabit Ethernet control-lers
- Customized 2U heatsink/FAN for CPU

Specifications

System Architecture

- Full size SBC with 64bit/66MHz PCI/ISA Golden finger
- PCI V2.2 compliant
- PICMG 1.0 (Rev.2.0) compliant

CPU Support

- Socket 604 dual Intel® Xeon™ / LV Xeon™ processors with 400/533MHz FSB, speed up to 3.06GHz
- On board intelligent switching type power regulator x 2
- Support streaming SIMD instruction
- SMP support is requiring
- Support uni-processor implementation.
- Support Hyper-Threading technology

Main Memory

- DDR SDRAM DIMM x4 support max. memory up to 8GB (DDR200/266)
- Support two 64-bit DDR channels
- Registered/ECC DIMMs only

BIOS

- Award System BIOS
- Plug & Play support
- Advanced Power Management support
- ACPI 2.0 compliant
- 4M bits flash ROM

Chipsets

- Intel® E7501 chipsets
- Intel® ICH3-S (82801CA)
- Intel® P64H2 (82870P2) x1
- Intel® Firmware Hub (FWH)
- PCI V2.2 compliant

On Board LAN

- Dual Intel® 82545EM Gigabit Ethernet controllers
- Compliant with PCI V2.1/V2.2, IEEE802.3, IEEE 802.3u, IEEE802.3x, IEEE802.3y, IEEE802.3ab
- WfM 2.0, PC2001 compliant
- RJ45 with LED connector x 2

On Board VGA

. ATI Rage™ XL with 8MB frame buffer memory
. Fully PC 98 and PC 99 Compliant
. 15 pin CRT connector x 1

On Chip I/O (ICH3-S)

. On board USB port x 4
. SMBus 2.0 controller
. FWH interface
. LPC interface
. AC' 97 2.0 interface
. PCI 2.2 interface
. USB 1.1 compliant
. Integrated System Management Controller

On Board Super I/O

. Onboard ITE 8712F-A super I/O
. SIO x 2, with 2 x 16C550 UARTs, 10 pin header x 2
. PIOx 1, bi-directional, EPP/ECP support, 26 pin connector x1
. Floppy Disk controller: 34 pin connector x 1
. 6 pin mini DIN connector x 1, for PS/2 keyboard/mouse, 5 pin connector x 1 (for external keyboard)
. On Board buzzer x 1
. GPIO (4 in 4 out)
. On board 2 pin header for I2C;
. On Board 2 pin header for reset SW / 2 pin for IDE active LED / 2 pin ATX power SW
. One 3 pins power header for 3 pins Power Cable connect to Backplane Board to support ATX Power On function.
. On board 4 Pin Additional Power Source Input
. AC97 output, 10 pin header x 1

System Monitor

. Derived from Super IO ITE 8712F-A to support system monitor.
. 8 voltage (For+1.5V, +3.3V, +5V, -5V, +12V, -12V, Vcore and Vcc5VStand-By)
. One Fan speed for CPU ;Temperature x 2 (one for CPU internal use, another for external system use)

ACPI Function

(only when 3 pins Power cable connect to Backplane which connect with ATX Power Source)

. Soft Power off
. Power-on by Keyboard
. Wake-up by LAN
. Wake-up by Ring

Real Time Clock

. On chip RTC with battery back up
. External Li Battery x 1

Watchdog Timer

. Watchdog timeout can be programmable by Software from 1,2,4,8,16,32,…...256 seconds
. Reserved 32 bit PCI interface for GAI expansion module
. PCI to ISA Bridge & ISAMAX Support
. ITE 8888F x 1 PCI to ISA Bridge
. Provide 64mA high driving capability to maximize ISA signals for support ISA cards up to 20 on the backplane ISA Slot.

Dimensions

. 338.58mm(L) x 122mm(W)
13.3"(L) x 4.8"(W)

Customized Heatsink/FAN

. Customized heatsink/FAN to cover dual processors
. Height: 2U

Power Requirements

Voltage	Maximum
+5V	25A
+12V	20A

Environments

- Operating temperatures: 0°C to 60°C
  (0°C to 50°C for 2.8GHz CPU)
- Storage temperatures: -20°C to 80°C
- Relative humidity: 10% to 90%
  (Non-condensing)

Certification

- CE
- FCC

1.3 Board Layout

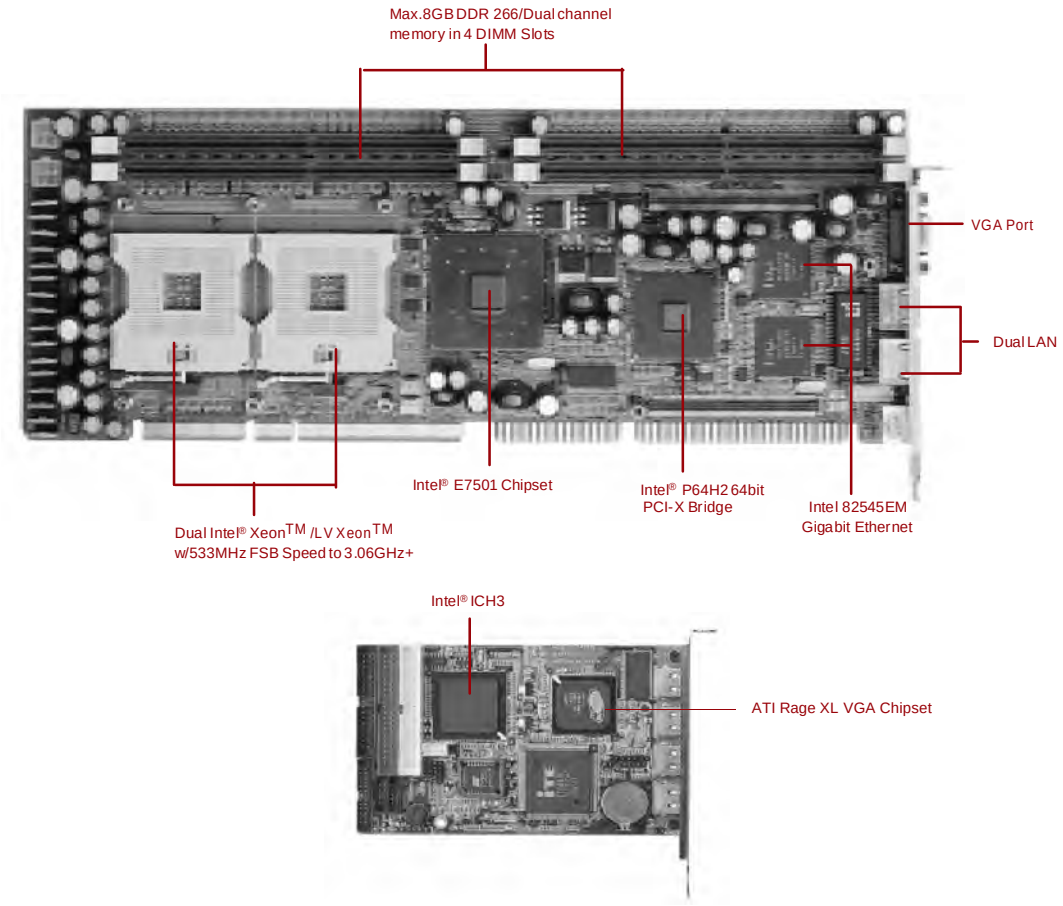


Figure 1-1: Birdeye's View of 3301470

1.4 Checklist

After opening the package of the 3301470, please check and make sure you have all of the following items:

- **One 3301470 SBC**
  (A mechanical drawing of this model is shown below.)
- **One 3301470 Quick Reference Guide**
- **One 50CM Cable JST 2.5mm 3 pin to 3 pin (5V standby ATX Power-on Cable)**
- **One Y Cable for Keyboard and Mouse**
- **One 180 mm AUX Power Cable (for J2)**
- **One Cable Set (FDD x1, SIO+PIO x1, SIO x1/Keyboard x1/IDE66 x1)**
- **One USB Cable with Bracket**
- **One Driver Manual CD**

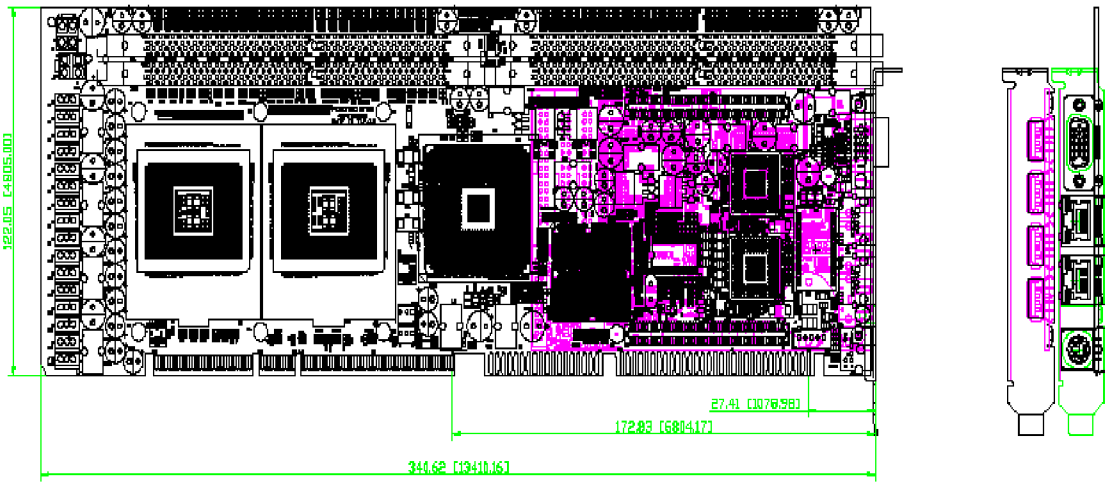


Figure 1-2: Mechanical Drawing of 3301470

Chapter 2
Jumper & Switch Settings

This chapter of the User's Manual describes how to set jumpers.
Note: The procedures that follow are generic for all of the 3301470 models

Before You Begin

Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.

Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:

‹ A Philips screwdriver
‹ A flat-tipped screwdriver
‹ A set of jewelers Screwdrivers
‹ A grounding strap
‹ An anti-static pad

Using your fingers can disconnect most of the connections. It is recommended that you do not use needle-nosed pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.

Before working on internal components, make sure that the power is off. Ground yourself before touching any internal components, by touching a metal object. Static electricity can damage many of the electronic components. Humid environment tend to have less static electricity than dry environments. A grounding strap is warranted whenever danger of static electricity exists.

Precautions

Computer components and electronic circuit boards can be damaged by discharges of static electricity. Working on the computers that are still connected to a power supply can be extremely dangerous. Follow the guidelines below to avoid damage to your computer or yourself.

‹ Always disconnect the unit from the power outlet whenever you are working inside the case.
‹ If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal body of any other grounded appliance.
‹ Hold electronic circuit boards (such as the 3301470 board) by the edges only. Do not touch the components on the board unless it is necessary to do so. Don't flex or stress the circuit board.
‹ Leave all components inside the static-proof packaging that they shipped with until they are ready for installation.
‹ Use correct screws and do not over tighten screws.

2.1 Functions of Jumpers

You can use jumpers to set configuration options. The table below defines function of each jumper:

Jumper	Function	Jumper	Function
J1,J2	Power Connector	JP1	Speaker J4,J5
	Fan Connector	JP3	GPIO
J5 on Daughter Board	ATX Power	JP4	On-board RTC
J6	AC'97	JP5	SMBUS
J7	IDE Active LED	JP6	Reset Button
J13	AT/ATX Selection	JP7	Power Button
		JP9	Keyboard Lock

Table 2-1: Functions of Jumpers

2.2 Setting Jumpers

A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is SHORT. If you remove the jumper cap, or place the jumper cap on just one pin, the jumpr is OPEN. Please see the following illustrations:

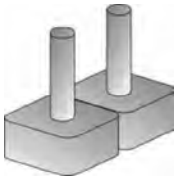
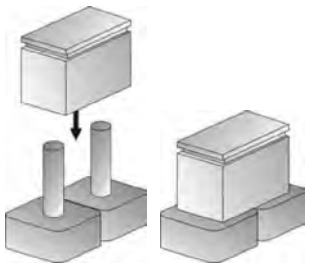
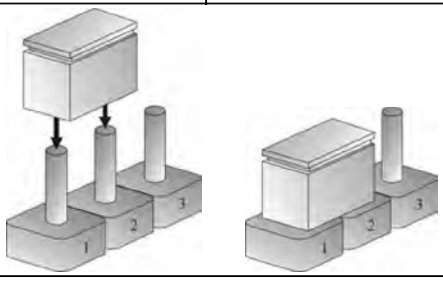
<table>
<tr><td rowspan="2">The illustrations on the right show a 2-pin jumper. When the jumper cap is placed on both pins, the jumper is SHORT. If you remove the jumper cap, or place the jumper cap on just one pin, the jumper is OPEN.</td><td>  </td><td>  </td></tr>
<tr><td>Open (Off)</td><td>Short (On)</td></tr>
<tr><td>These illustrations show a 3-pin jumper. Pins 1 and 2 are SHORT.</td><td colspan="2">  </td></tr>
</table>

Figure 2-1 : How to Set Jumpers

2.3 Location of Jumpers

The illustration below shows the location of the mainboard jumpers:

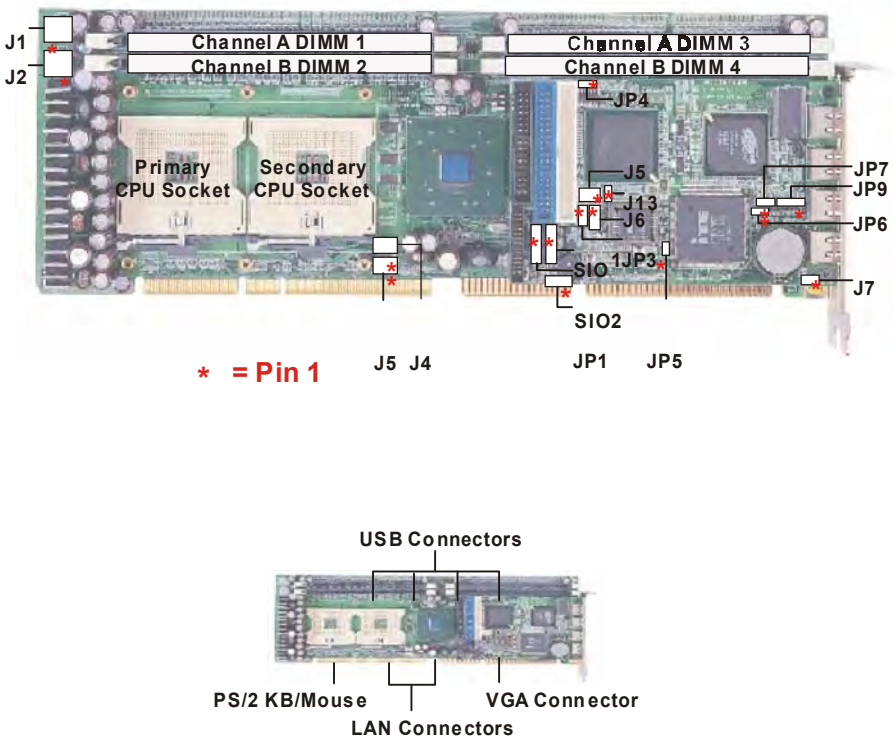


Figure 2-2 : Location of Jumpers

2.4 Jumper Setting

Mainboard

- **J1,J2 : Power Connector**

Pin	Definition	Pin	Definition
1	GND	2	GND
3	+V12	4	+V12

- **J4,J5 : Single Ramp System FAN Connector**

Pin No.	Description	Pin No.	Description
1	Ground	2	+12V
3	Sense		

- **J7 : External Keyboard Function Connector**

Pin No.	Description	Pin No.	Description
1	KCLK	2	KDAT
3	NC	4	GND
5	+V5.0		

- **J8 : Keyboard & Mouse Mini Din**

Pin No.	Description	Pin No.	Description
1	KBDATA-	2	MOUSEDATA
3	GND	4	VCC
5	KBCLK		MOUSECLK

- **J9,J10 : LAN RJ45 Connector**

Pin	Definition	Pin	Definition
1	TXD_0P	2	TXD_0N
3	TXD_1P	4	TXD_2P
5	TXD_2N	6	TXD_1N
7	TXD_3P	8	TXD_3N
9	SPEED_LED	10	+VSBY3.3
11	LINK_LED	12	ACTIVE_LED
13	PD to TERMPLANE	14	PD to TERMPLANE

* **PD** means Pull-Down.

Daughterboard

- **J1 : 2x13 2.0mm Box Header for PIO Connector**

Pin	Definition	Pin	Definition
1	STB-	14	AFD-
2	PD0	15	ERR-
3	PD1	16	INIT-
4	PD2	17	SLIN-
5	PD3	18	GND
6	PD4-	19	GND
7	PD5	20	GND
8	PD6	21	GND
9	PD7	22	GND
10	ACK-	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SLCT	26	GND

- **J2 : Floppy Disk Connector**

Pin	Description	Pin	Description
1	GND	2	REDWC#
3	GND	4	NC
5	GND	6	NC
7	GND	8	INDEX#
9	GND	10	MOTSA#
11	GND	12	DRVSB#
13	GND	14	DRVSA#
15	GND	16	MOTEB#
17	GND	18	DIR#
19	GND	20	STEP#
21	GND	22	WDATA#
23	GND	24	WGATE#
25	GND	26	TK00#
27	GND	28	WPT#
29	GND	30	RDATA#
31	GND	32	SIDE1#
33	GND	34	DSKCHG#

- **J3 : SIO2 Connector**

Pin	Definition	Pin	Definition
1	DCD2#(Data Carrier Detect 2)	2	RXD2 (Receive Data 2)
3	TXD2 (Transmit Data 2)	4	DTR2#(Data Terminal Ready 2)
5	GND (Chassis Ground)	6	DSR2#(Data Set Ready 2)
7	RTS2#(Request To Send 2)	8	CTS2#(Clear To Send 2)
9	RI2#(Ring Indicator 2)	10	GND (Chassis Ground)

- **J4 : SIO1 Connector**

Pin	Definition	Pin	Definition
1	DCD1#(Data Carrier Detect 2)	2	RXD1 (Receive Data 2)
3	TXD1 (Transmit Data 2)	4	DTR1#(Data Terminal Ready 2)
5	GND (Chassis Ground)	6	DSR1#(Data Set Ready 2)
7	RTS1#(Request To Send 2)	8	CTS1#(Clear To Send 2)
9	RI1#(Ring Indicator 2)	10	GND (Chassis Ground)

- **J5 : ATX Power Connector (daughterboard)**

Pin	Description	Pin	Description
1	5VSTB	2	GND
3	Power Up		

- **J6 : AC' 97 Connector**

Pin	Definition	Pin	Definition
1	SDATOUT	2	VCC5V
3	RST	4	GND
5	SYNC	6	VCC12V
7	SDATAIN0	8	SDATAIN1
9	BITCLK	10	NC

- **J7 : 1x2 2.54mm Pin Header for IDE LED**

Pin	Description	Pin	Description
1	+5V	2	IDE_LED

- **J8,J9,J10,J11 : USB Single Upright Right-angle Connector**

Pin	Description	Pin	Description
1	VCC	2	USBP0 minus
3	USBP0 plus	4	Ground

- **J13 : 1x3 2.54mm Pin Header for AT/ATX Selection**

Pin	Description
1, 2 Short	ATX Mode
*2, 3 Short	AT Mode

*** = Default**

- **JP1 : 1x4 2.54mm Pin Header for Speaker Function**

Pin	Description	Pin	Description
1	Speaker	2	GND
3	GND	4	+V5.0

- **JP3 : 2x4 2.0mm Pin Header for Digital IO**

Pin	Definition	Pin	Definition
1	GP27_D_IN1	2	GP23_D_OUT1
3	GP26_D_IN2	4	GP22_D_OUT2
5	GP25_D_IN3	6	GP21_D_OUT3
7	GP24_D_IN4	8	GP20_D_OUT4

- **JP4 : 1x3 2.0mm Pin Header for On Board RTC**

Pin	Description
*1, 2 Short	Operation Mode
2, 3 Short	Clear CMOS

*** = Default**

- **JP5 : 1x2 2.0mm Pin Header for SMBUS External Connector**

Pin	Description	Pin	Description
1	SMB_CLK	2	SMB_DAT

- **JP6 : 1x2 2.54mm Pin Header for Reset Button**

Pin	Description	Pin	Description
1	Ground	2	Reset

- **JP7 : 1x2 2.54mm Pin Header for Power Button**

Pin	Description	Pin	Description
1	Power Up	2	GND

- **JP9 : 1x5 2.54mm Pin Header for Keyboard Lock Function**

Pin	Definition	Pin	Definition
1	KL_VCC	2	NC
3	GND	4	KEYLOCK
5	GND	6	

- **CON1: Primary IDE Connector**

Pin	Definition	Pin	Definition
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	NC
21	DMA REQ	22	Ground
23	IOW	24	Ground
25	IOR	26	Ground
27	IOCHRDY	28	Pull Down
29	DMA ACK	30	Ground
31	Interrupt 14	32	NC
33	Disk Address 1	34	DMA66 Detect
35	Disk Address 0	36	Disk Address 2
37	HDC CS100	38	HDC CS300
39	HDD Active Led	40	Ground

- **CON2: IDE (Secondary) Connector**

Pin	Description	Pin	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	NC
21	DMA REQ	22	Ground
23	IOW	24	Ground
25	IOR	26	Ground
27	IOCHRDY	28	Pull Down
29	DMA ACK	30	Ground
31	Interrupt 15	32	NC
33	Disk Address 1	34	DMA66 Detect
35	Disk Address 0	36	Disk Address 2
37	HDC CS100	38	HDC CS300
39	HDD Active Led	40	Ground

Chapter 3
Expansion Capabilities

3.1 System Memory

Your system memory is provided by DIMM's (Dual In-line Memory Modules) on the CPU board. The CPU board contains two memory banks: Bank 0 and 1, corresponding to connector DIMM1, DIMM2.

The table below shows possible DIMM configurations for the memory banks. Please be noted that the 3301470 supports 8 GB DDR SDRAM. Configura- tions using different brands of memory modules are not recommended.

DIMM1 Channel A	DIMM3 Channel A	DIMM2 Channel B	DIMM4 Channel B	Total Memory
128MB	128MB	Empty	Empty	256MB
256MB	256MB	Empty	Empty	512MB
512MB	512MB	Empty	Empty	1024MB
1024MB	1024MB	Empty	Empty	2048MB
Empty	Empty	128MB	128MB	256MB
Empty	Empty	256MB	256MB	512MB
Empty	Empty	512MB	512MB	1024MB
Empty	Empty	1024MB	1024MB	2048MB
128MB	128MB	128MB	128MB	512MB
256MB	256MB	256MB	256MB	1024MB
512MB	512MB	512MB	512MB	2048MB
1024MB	1024MB	1024MB	1024MB	4096MB
2048MB	2048MB	2048MB	2048MB	8192MB

Table 3-1 : 3301470 DIMM Configurations

3.2 Installing DIMM

To install DIMM:

1. Make sure the two handles of the DIMM sockets are in the “open” position, i.e. the handles stay outward.

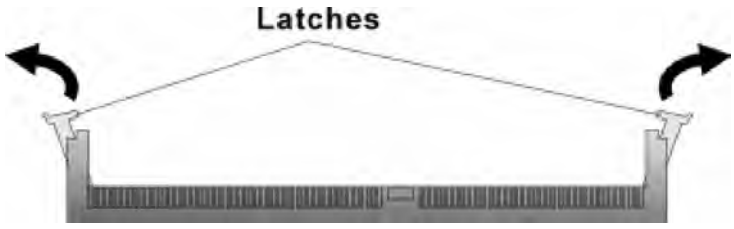


Figure 3-1 : How to Install DIMM (1)

2. Slowly slide the DIMM modules along the plastic guides in the both ends of the socket.

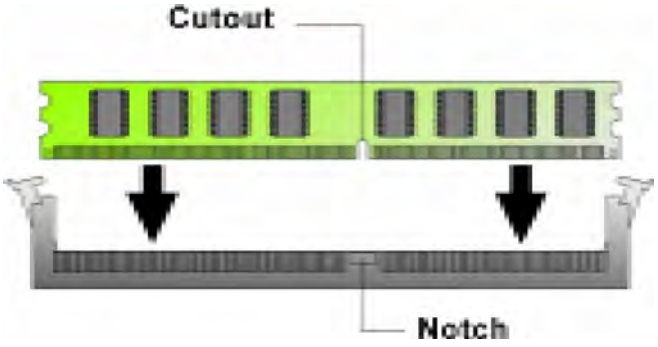


Figure 3-2 : How to Install DIMM (2)

3. Then press the DIMM module down right into the socket, until a click is heard. That means the two handles automatically locked the memory modules into the right position of the DIMM socket.

Figure 3-3 : How to Install DIMM (3)

4. To take away the memory module, just push the both handles outward, the memory module will be ejected by the mechanism in the socket.

Figure 3-4 : How to Install DIMM (4)

3.3 Changing CPU

To change the CPU:

1. Pull the handling bar of the socket upward to the other end to loosen the socket's openings. Carefully lift the existing CPU up to remove it from the socket.

2. Place the new CPU on the middle of the socket, orienting its beveled corner to line up with the socket's beveled corner. Make sure the pins of the CPU fit evenly to the socket openings. Replace the handling bar to fasten the CPU to the socket.

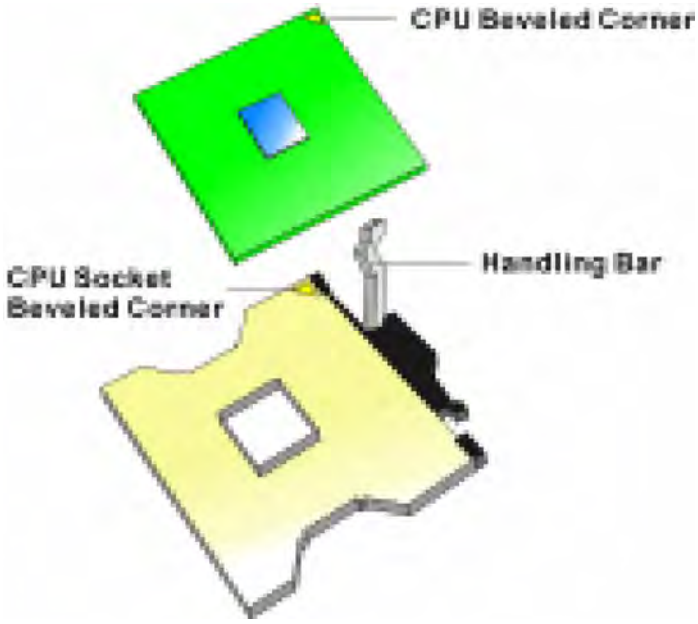
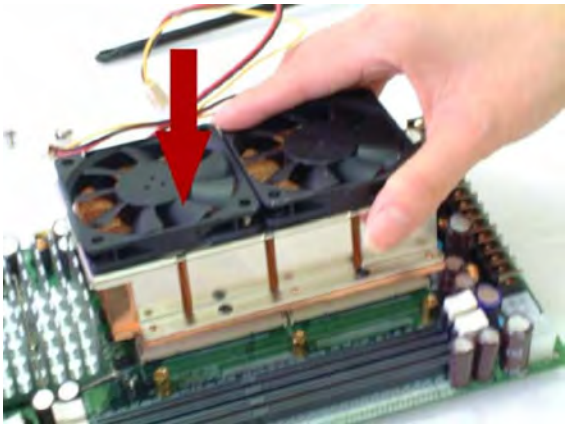


Figure 3-5 : How to Change CPU

3.4 Installing the Fan Heatsink

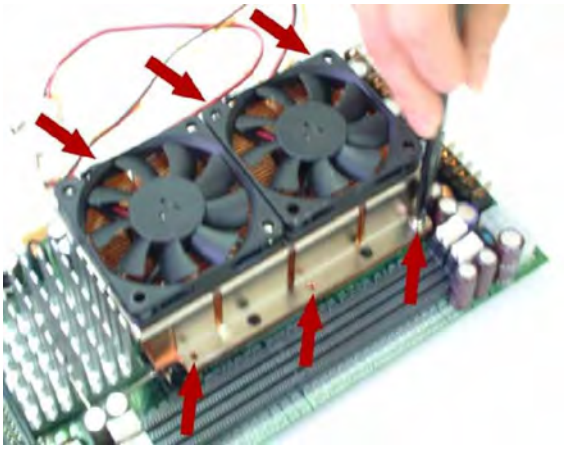
Step 1

Insert the fan in the CPU bed.



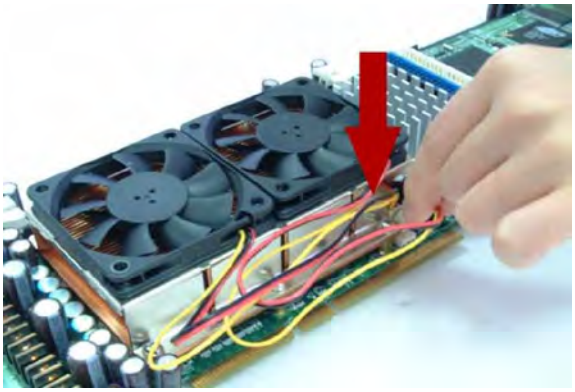
Step 2

As shown in the picture, screw tight.



Step 3

Then get the fan connector connected.



Appendix: Watchdog Timer Setting

1 Watchdog Timer Working Procedure

Watchdog Timer (WDT) is a special hardware device that monitors the computer system during normal operation. WDT has a clock circuit that times down from a set number to zero. If a monitored item occurs before the timer reaches zero, WDT resets and counts down again. If for some reason the monitored item doesn't occur before the timer reaches zero, WDT performs an action, such as a diagnostic operation (rebooting the computer).

You must enter timer values into WDT Configuration Register (Write the control value to the Configuration Port), and clear WDT counter (read the Configuration Port).

WDT Configuration port	F2	Default at F2
Watch Dog Timer	Disabled	1. Default at disabled
	Enabled	2. Enabled for user's programming
WDT Active Time	1 sec	Default at 64 sec
	2 sec	
	4 sec	
	8 sec	
	16 sec	
	32 sec	
	64 sec	
	128 sec	

Table B-1 : Watchdog Timer Character and Function

2 Watchdog Timer Control Register

The Watchdog Timer Control Register controls the WDT working mode. Write the value to the WDT Configuration Port. The following table describes the Control Register bit definition:

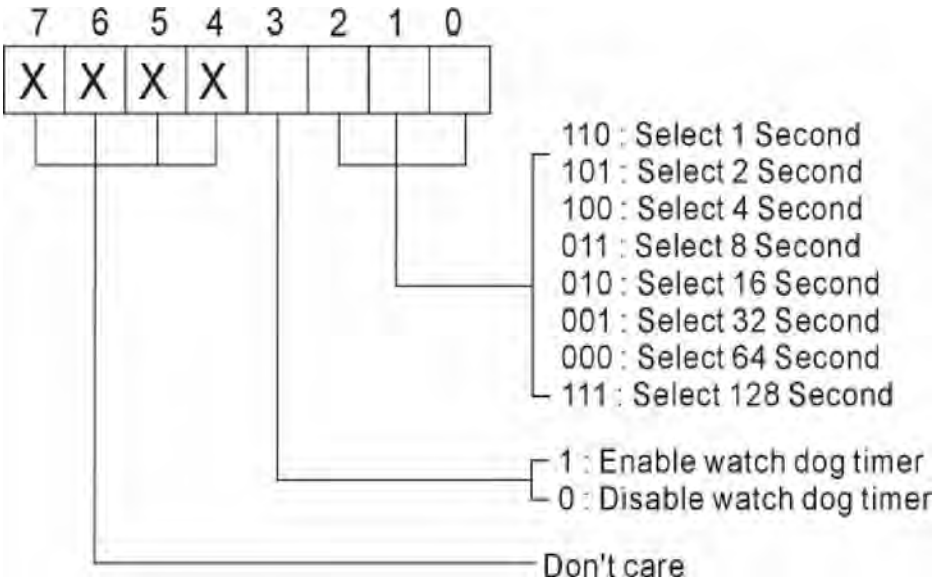


Table B-2 : WDT Control Register Bit Definition

3 Watchdog Timer Programming Procedure

.

3.1 Power On or Reset the System

The initial value of WDT Control Register (D3~D0) is zero (0), when power is on or the system has been reset. The following table indicates the initial value of WDT (00000000b) :

Bit	Value	Mean
3	0	Disable Watchdog Timer
2, 1, 0	0 0 0	Select 64 second

Table B-3 : WDT Control Register Initial Value

B.3.2 Clear the WDT

WDT counter interval cannot be longer than the preset time, otherwise, WDT sends a reset signal to the system.

The following is an example of clearing the WDT program in Intel 8086 assembly language.

```
; ( Clear the WDT)
Mov   dx,  F2h   ;Setting the WDT configuration port
In    al,  dx
```

Note: Before running WDT, you must clear WDT to ensure that the initial value is zero.

B.3.3 WDT Control Register

Note: This register writes to WDT configuration port.

Set WDT Control Register to control the WDT working mode. The initial value of WDT Control Register is shown as follows:

```
; (Setting the WDT Control Register as AL)
Mov       al, 0h  ; Setting initial value = 0 for the WDT Control Register
```

Follow these instructions to set the register:

1. Select the time-out intervals of WDT (decide the values of D2, D1, D0 in F2)

   Example: If D2~D0 = 0, the time-out interval is 64 seconds.

```
AND       al, 11111000b  ; Setting the time-out interval as 64 sec.
```

2. Enable or Disable WDT (decide D3 value in F2)

   i.e. D3=0, Disables WDT

```
AND      al, 11110111b  ; Disable the WDT
```

i.e. D3=1, Enables WDT

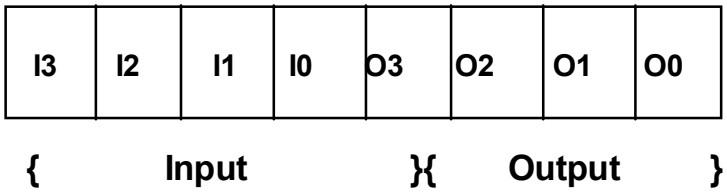
```
OR      al, 00001000b  ; Enable the WDT
```

After finishing the above settings, you must output the Control Register's value to WDT Configuration Port. Then WDT will start according to the above settings.

```
MOV     dx, F2h    ; Setting WDT Configuration Port
OUT     dx, al     ; Output the Control Register Value
```

GPIO User Guide

Digital I/O UESD Port 801



JP17

IN 0	1	2	OUT 0
IN 1	3	4	OUT 1
IN 2	5	6	OUT 2
IN 3	7	8	OUT 3

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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