



integration with integrity

3308470 User's Manual

5.25" Embedded Controller w/ Intel Atom N270 1.6GHz Processor

Version 1.0 October 2008

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Packing List



NOTE:

If any of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the GAI reseller or vendor you purchased the 3308470 from or contact an GAI sales representative directly. To contact an GAI sales representative, please send an email to sales@globalamericaninc.com.

The items listed below should all be included in the 3308470 package.

- 1 x 3308470 Single Board Computer
- 1 x Audio cable
- 1 x Keyboard/Mouse Y cable
- 4 x RS-232 cables
- 2 x SATA cables
- 1 x USB cable
- 1 x VGA cable
- 1 x Mini Jumper Pack
- 1 x I/O shielding
- 1 x Utility CD
- 1 x QIG

Images of the above items are shown in **Chapter 3**.

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Chapter

1

Introduction

1.1 Overview



Figure 1-1: 3308470

1.1.1 3308470 Introduction

The 3308470 5.25" motherboard is embedded 45 nm Intel® Atom™ processor platforms. The Intel® Atom™ processor N270 embedded on the 3308470 has a 1.60 GHz clock speed, a 533 MHz FSB and a 512 KB L2 cache. The 3308470 also supports one 200-pin 533 MHz 2.0 GB (max.) DDR2 SDRAM SO-DIMM. The board comes with one LVDS connector and supports 18-bit dual-channel LVDS screens. The 3308470 also comes with two PCI Express (PCIe) Gigabit Ethernet (GbE) connectors, two PCIe mini slots and a *PC/104-Plus* expansion slot.

1.2 3308470 Overview

1.2.1 3308470 Overview Photo

The 3308470 has a wide variety of peripheral interface connectors.

Figure 1-2 is a labeled photo of the peripheral interface connectors on the 3308470.

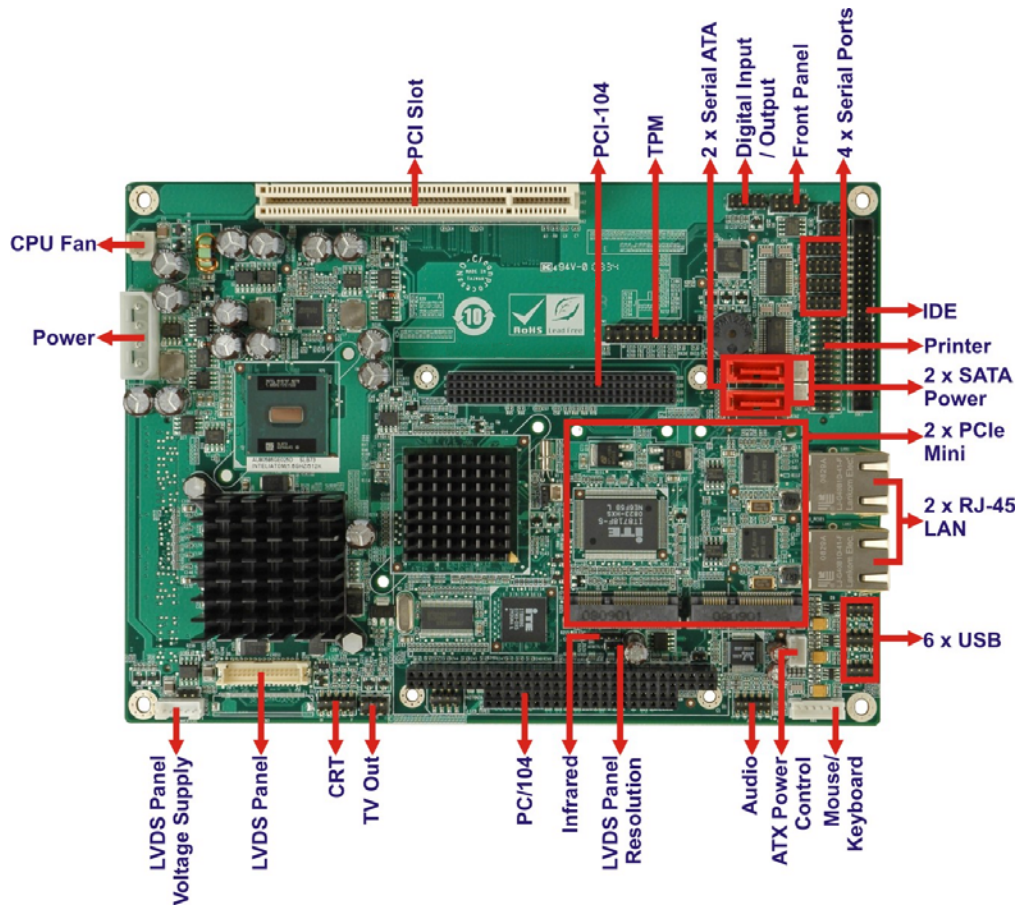


Figure 1-2: 3308470 Overview [Front View]

Figure 1-3 shows the rear side of the 3308470.

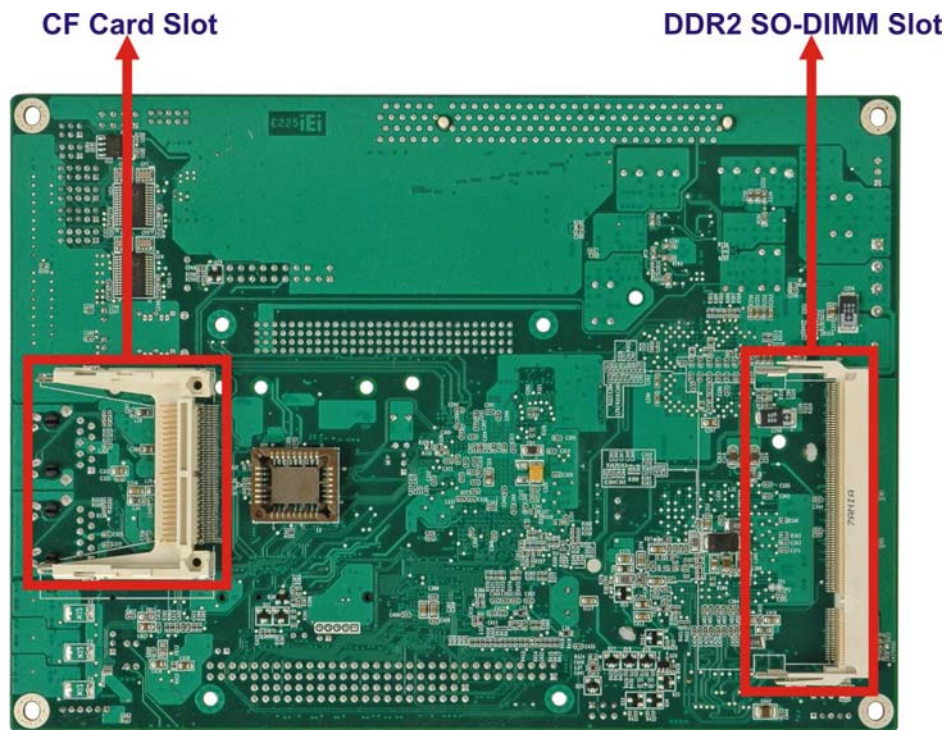


Figure 1-3: 3308470 Overview [Solder Side]

1.2.2 3308470 Peripheral Connectors and Jumpers

The 3308470 has the following connectors on-board:

- 1 x +12V power source connector
- 1 x Audio connector
- 1 x ATX power control connector
- 1 x Backlight inverter connector
- 1 x CompactFlash® socket
- 1 x CRT connector
- 1 x Digital input/output (DIO) connector
- 1 x Fan connector
- 1 x Front panel connector
- 1 x IDE disk drive connectors (44-pin)
- 1 x Infrared interface (IrDA) connector
- 1 x Keyboard/mouse connector
- 1 x LVDS connector

- 1 x Parallel port connector
- 1 x PC/104-*Plus* slot
- 2 x PCIe Mini Card slots
- 2 x Serial ATA (SATA) drive connectors
- 1 x SDVO connector
- 3 x RS-232 serial port connectors
- 1 x RS-232/422/485 serial port connector
- 1 x TPM connector
- 1 x TV Out connector
- 3 x USB 2.0 connectors (supports six USB 2.0 devices)

The 3308470 has the following external peripheral interface connectors on the board rear panel.

- 2 x Ethernet connectors

The 3308470 has the following on-board jumpers:

- AT power selection
- Clear CMOS
- CF card setup
- LVDS Voltage Selection
- LVDS Panel Resolution Selection

1.2.3 Technical Specifications

3308470 technical specifications are listed in Table 1-1. See Chapter 2 for details.

Specification	3308470
System CPU	45 nm 1.6 GHz Intel® Atom™ N270
Front Side Bus (FSB)	533 MHz
System Chipset	Northbridge: Intel® 945GSE Southbridge: Intel® ICH7-M

Memory	One 200-pin SO-DIMM socket supports one 533/400 MHz 2.0 GB (max.) DDR2 SDRAM SO-DIMM
CompactFlash®	One CompactFlash® Type II socket
Super I/O	ITE IT8718F
Display	Analog CRT supports CRT hot-plug HDTV with 1080i maximum resolution supported 18-bit dual-channel LVDS integrated in Intel® 945GSE
BIOS	AMI BIOS label
Audio	Realtek ALC655 AC'97 codec
LAN	Two Realtek RTL8111CP GbE controllers
COM	Three RS-232 serial ports One RS-232/422/485 serial port
USB2.0	Six USB 2.0 devices supported by on-board pin-headers
SATA	Two 1.5 Gbps SATA drives supported
Keyboard/mouse	One 6-pin header for keyboard and mouse
Parallel Port	One 26-pin parallel port connector
Hard Drives	One 44-pin IDE connector connects to two Ultra ATA33/66/100 devices
TPM	One 20-pin header support TPM function
Expansion	One PC/104-Plus expansion slot (ISA + PCI bus) Two PCIe mini card (PCIe bus) One PCI slot (PCI bus)
Digital I/O	One 8-bit digital input/output connector; 4-bit input/4-bit output through the ITE IT8718F super I/O

Watchdog Timer	Software programmable 1-255 sec. through the ITE super I/O
Infrared	One infrared connector through the ITE super I/O. Supports: <ul style="list-style-type: none"> ■ Serial Infrared (SIR) ■ Amplitude Shift Keyed IR (ASKIR)
Power Supply	ATX and AT power supported
Power Consumption	5V @ 2.89A, 12V@0.04A (1.6 GHz Intel® Atom™ N270 CPU with one 1 GB DDR2 SO-DIMM)
Temperature	0°C – 60°C (32°F - 140°F)
Humidity (operating)	5%~95% non-condensing
Dimensions (LxW)	203 mm x 146 mm
Weight (GW/NW)	1000g/400g

Table 1-1: Technical Specifications

Chapter

2

Detailed Specifications

2.1 Dimensions

2.1.1 Board Dimensions

The dimensions of the board are listed below:

- Length: 203 mm
- Width: 146 mm

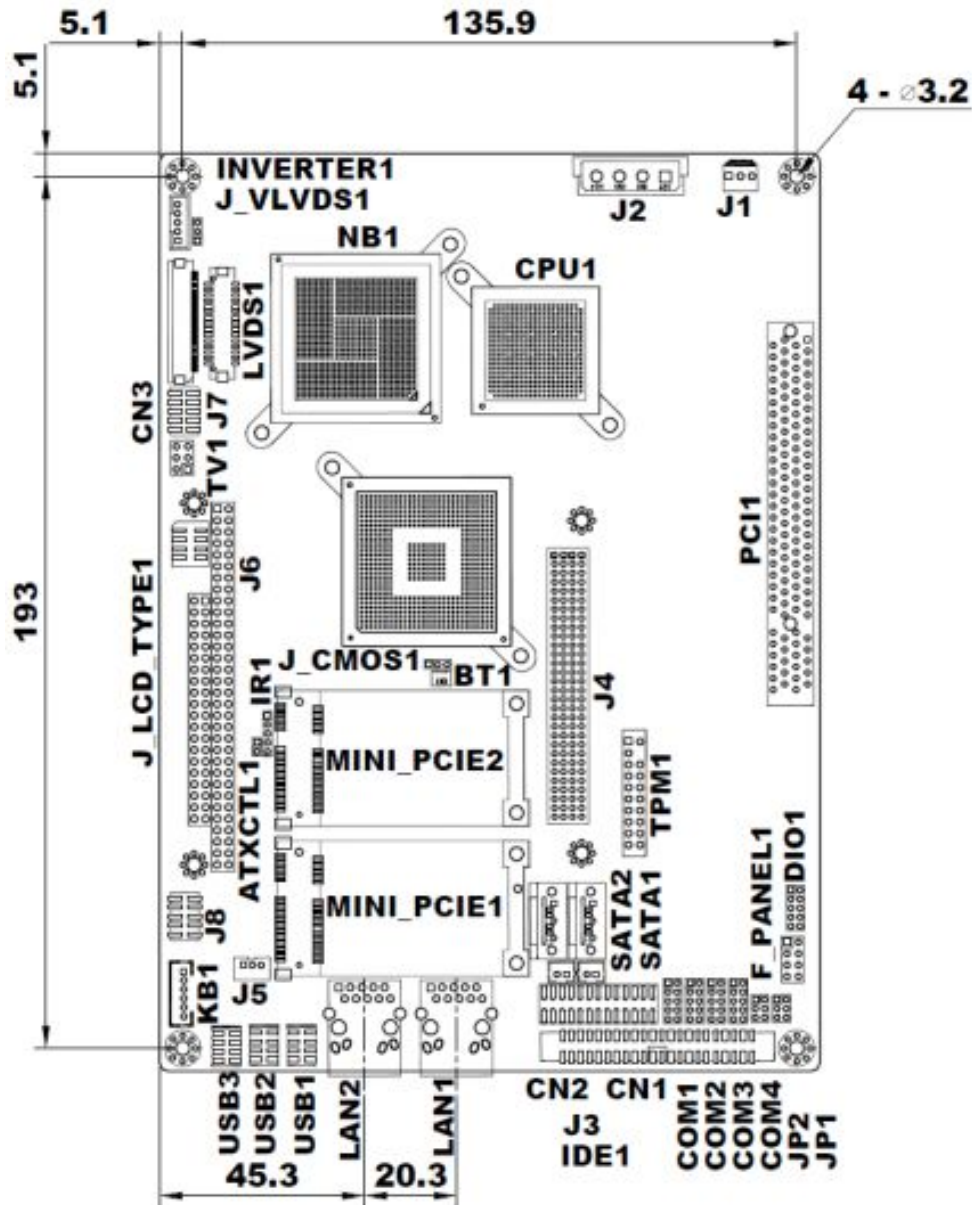


Figure 2-1: 3308470 Dimensions (mm)

2.1.2 External Interface Panel Dimensions

External peripheral interface connector panel dimensions are shown in **Figure 2-2**.

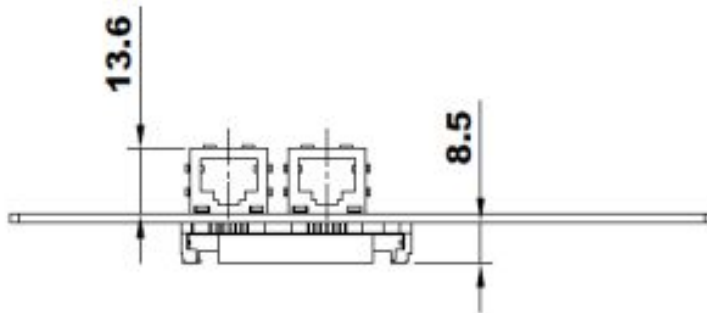


Figure 2-2: External Interface Panel Dimensions (mm)

2.2 Data Flow

Figure 2-3 shows the data flow between the two on-board chipsets and other components installed on the motherboard and described in the following sections of this chapter.

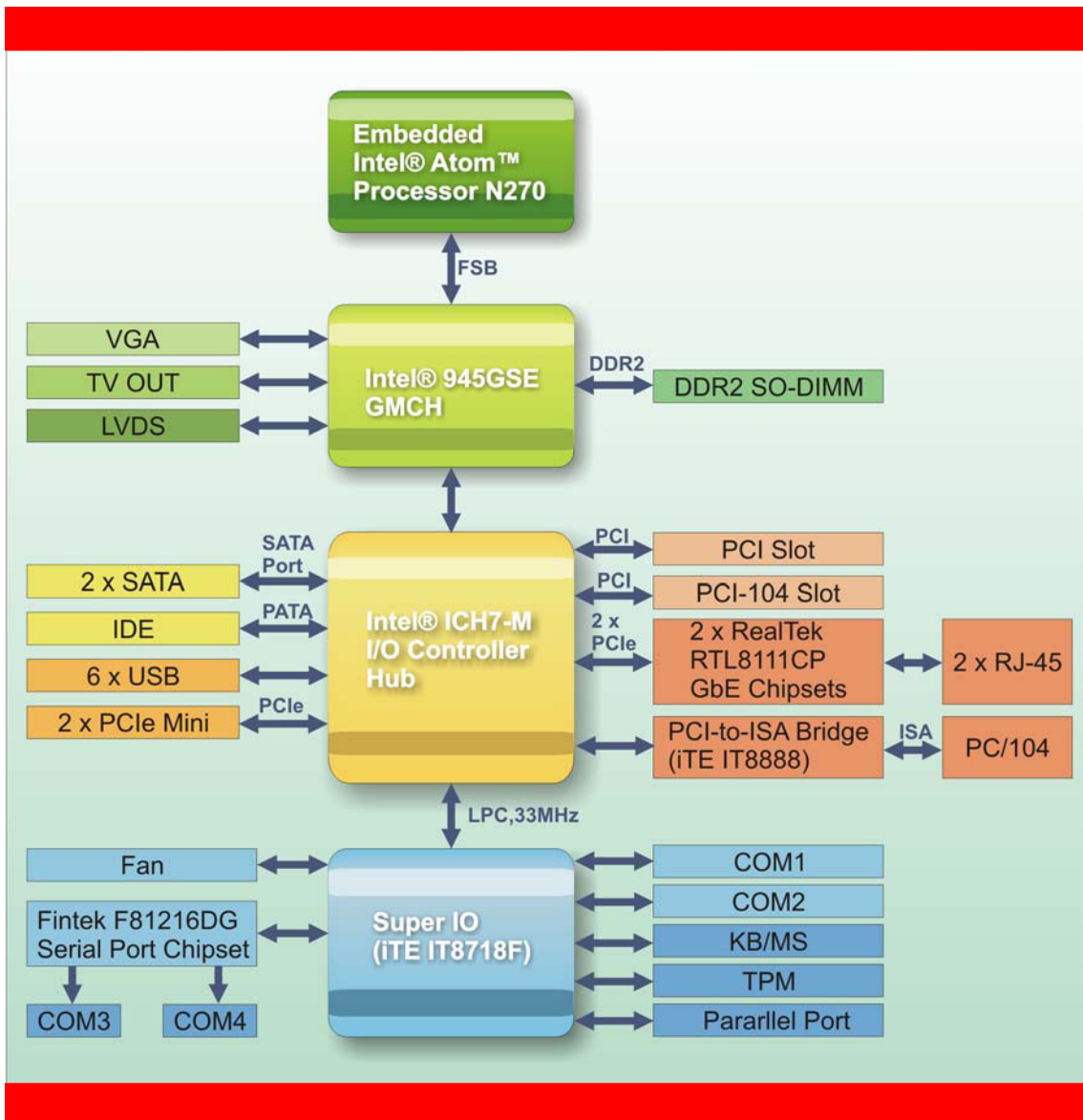


Figure 2-3: Data Flow Block Diagram

2.3 Embedded 3308470 Processor

2.3.1 Overview

The 3308470 comes with an embedded 45 nm 1.60 GHz Intel® Atom™ processor N270. The processor supports a 533 MHz FSB and has a 1.6 GHz 512 KB L2 cache. The low power processor has a maximum power of 2.5 W. The processor is shown in **Figure 2-4** below.

Intel® Atom™ Processor

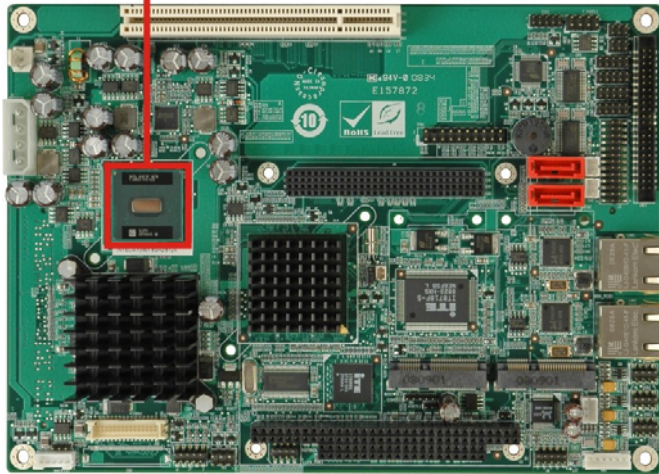


Figure 2-4: Embedded Processor

2.3.2 Features

Some of the features of the Intel® Atom™ processor N270 are listed below

- On-die, primary 32-kB instructions cache and 24-kB write-back data cache
- 533-MHz source-synchronous front side bus (FSB)
- 2-Threads support
- On-die 512-kB, 8-way L2 cache
- Support for IA 32-bit architecture
- Intel® Streaming SIMD Extensions-2 and -3 (Intel® SSE2 and Intel® SSE3) support and Supplemental Streaming SIMD Extension 3 (SSSE3) support
- Micro-FCBGA8 packaging technologies
- Thermal management support via Intel® Thermal Monitor 1 and Intel Thermal Monitor 2
- FSB Lane Reversal for flexible routing
- Supports C0/C1(e)/C2(e)/C4(e)
- L2 Dynamic Cache Sizing
- Advanced power management features including Enhanced Intel SpeedStep® Technology
- Execute Disable Bit support for enhanced security

2.3.3 Front Side Bus (FSB)

The Intel® Atom™ processor on the 3308470 is interfaced to the Intel® 945GSE through a 533 MHz front side bus (FSB). The FSB is shown in **Figure 2-5** below.

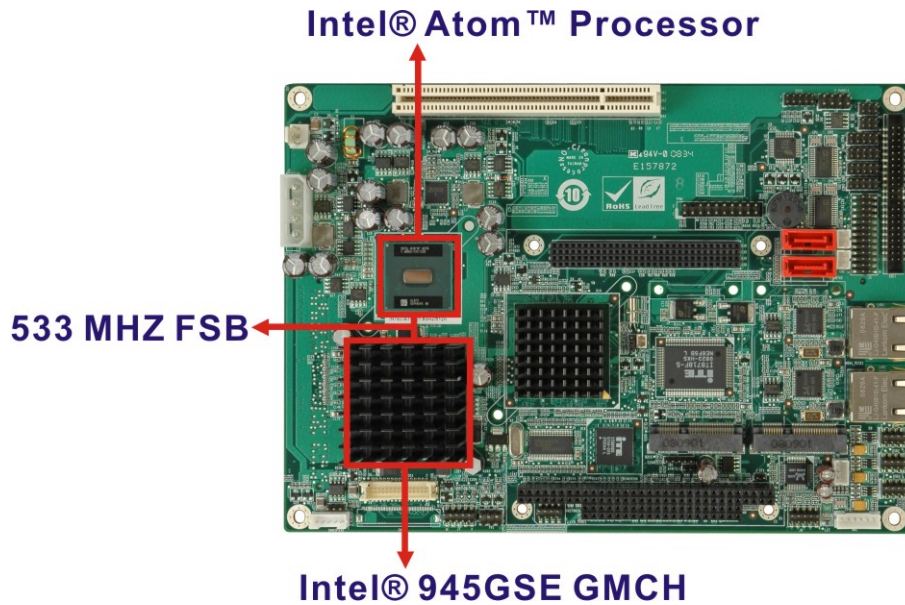


Figure 2-5: Front Side Bus

2.4 Intel 945GSE Northbridge Chipset

2.4.1 Intel® 945GSE Overview

The Intel® 945GSE Graphics and Memory Controller Hub (GMCH) supports the embedded Intel® Atom™ N270 processor. The Intel® 945GSE is interfaced to the processor through a 533 MHz FSB.

2.4.2 Intel® 945GSE DDR2 Controller

There is one 200-pin DDR2 SO-DIMM socket on the 3308470. The socket supports DDR2 SO-DIMM with the following specifications:

- Maximum Memory supported 2 GB
- Support for DDR2 at 400 MHz and 533 MHz
- No support for Dual-Channel Interleaved mode of operation
- Enhanced Addressing support (Swap only)

The SO-DIMM socket is shown in **Figure 2-6** below.

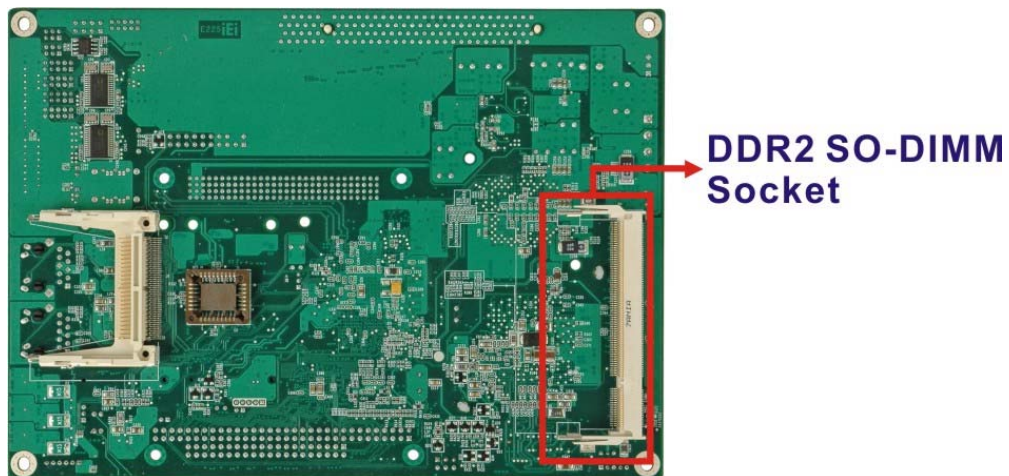


Figure 2-6: DDR2 SO-DIMM Socket

2.4.3 Intel® 945GSE Graphics

The Intel® 945GSE supports CRT, LVDS, TV-Out and SDVO. The internal graphics engine has the following features:

- Intel® Gen 3.5 Integrated Graphics Engine
- 250-MHz core render clock and 200 MHz core display clock at 1.05-V core voltage
- Supports TV-Out, LVDS, CRT and SDVO
- Dynamic Video Memory Technology (DVMT 3.0)
- Intel® Display Power Saving Technology 2.0 (Intel® DPST 2.0)
- Intel® Smart 2D Display Technology (Intel® S2DDT)
- Intel® Automatic Display Brightness
- Video Capture via x1 concurrent PCIe port
- Concurrent operation of x1 PCIe and SDVO
- 4x pixel rate HWMC
- Microsoft DirectX® 9.1 operating system
- Intermediate Z in Classic Rendering
- Internal Graphics Display Device States: D0, D1, D3
- Graphics Display Adapter States: D0, D3.

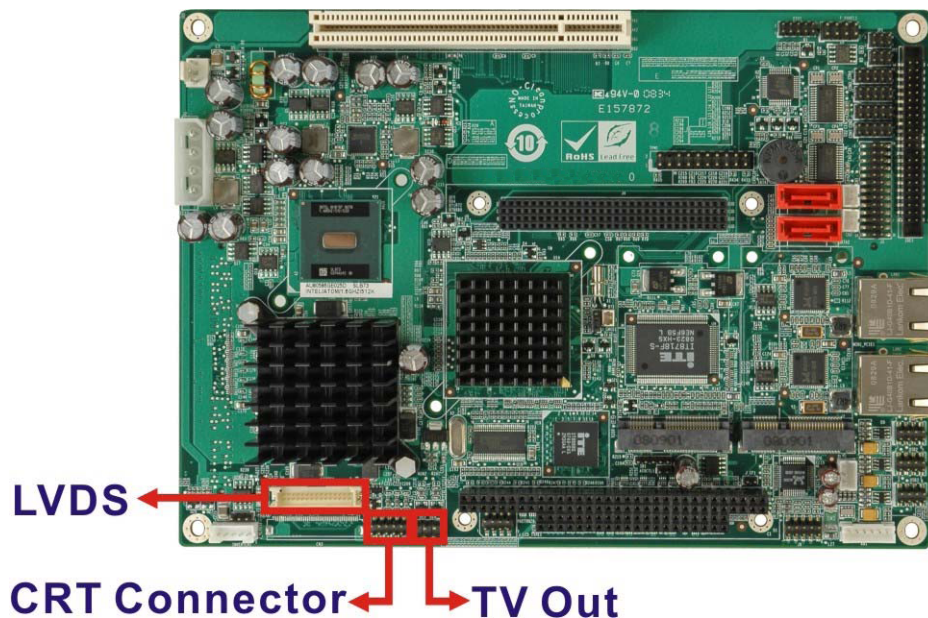


Figure 2-7: CRT, LVDS and TV-Out Connectors

2.4.3.1 Analog CRT Graphics Mode

The analog CRT bus is interfaced to an on-board 10-pin connector. The connector is shown in **Figure 2-7**. Some of the features of the CRT include:

- Integrated 400-MHz RAMDAC
- Analog Monitor Support up to QXGA
- Support for CRT Hot Plug

2.4.3.2 LVDS Interface

The LVDS interface is connected directly to the LVDS connector on the board (**Figure 2-7**).

Some of the features of the LVDS interface include:

- Panel support up to UXGA (1600 x 1200)
- 25-MHz to 112-MHz single-/dual-channel; @18 bpp
 - TFT panel type supported
- Pixel Dithering for 18-bit TFT panel to emulate 24-bpp true color displays
- Panel Fitting, Panning, and Center Mode Supported
- CPIS 1.5 compliant
- Spread spectrum clocking supported
- Panel Power Sequencing support
- Integrated PWM interface for LCD backlight inverter control

2.4.3.3 TV Out Interface

The TV Out interface (**Figure 2-7**) has the following features.

- Three integrated 10-bit DACS
- Overscaling
- NTSC/PAL
- Component, S-Video and Composite Output interfaces
- HDTV support
 - 480p/720p/1080i/1080p

2.5 Intel® ICH7-M Southbridge Chipset

2.5.1 Intel® ICH7-M Overview

The Intel® ICH7-M chipset is connected to the Intel® 945GSE GMCH through the chip-to-chip Direct Media Interface (DMI). Some of the features of the Intel® ICH7-M are listed below.

- Complies with PCI Express Base Specification, Revision 1.0a
- Complies with PCI Local Bus Specification, Revision 2.3 and supports 33MHz PCI operations
- Supports ACPI Power Management Logic
- Contains:
 - Enhanced DMA controller
 - Interrupt controller
 - Timer functions
- Integrated SATA host controller with DMA operations interfaced to two SATA connectors on the 3308470
- Supports the four USB 2.0 devices on the 3308470 with four UHCI controllers and one EHCI controller
- Complies with System Management Bus (SMBus) Specification, Version 2.0
- Supports Audio Codec '97 (AC'97) Revision 2.3
- Supports Intel® High Definition Audio
- Contains Low Pin Count (LPC) interface
- Supports Firmware Hub (FWH) interface
- Serial peripheral interface support

2.5.1.1 Intel® ICH7-M Audio Codec '97 Controller

The Audio Codec '97 (AC'97) controller integrated into the ICH7-M complies with AC'97 Component Specification, Version 2.3. The AC'97 controller is integrated to a RealTek ALC655 audio codec. The RealTek ALC655 is in turn connected to on-board audio connectors, which are then connected to compliant audio devices. The RealTek ALC655 is a 16-bit, full-duplex AC'97 Rev. 2.3 compatible six-channel audio codec. The codec and the audio connectors are shown in **Figure 2-8**.

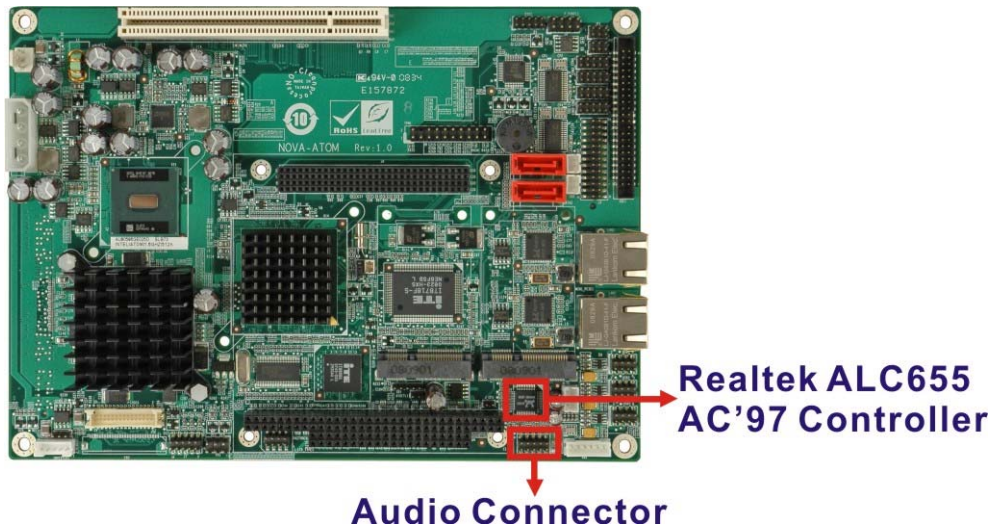


Figure 2-8: Audio Codec and Connectors

Some of the features of the RealTek ALC655 are listed below:

- Meets performance requirements for audio on PC99/2001 systems
- Meets Microsoft WHQL/WLP 2.0 audio requirements
- 16-bit Stereo full-duplex CODEC with 48KHz sampling rate
- Compliant with AC'97 Rev 2.3 specifications
 - Front-Out, Surround-Out, MIC-In and LINE-In Jack Sensing
 - 14.318MHz -> 24.576MHz PLL to eliminate crystal
 - 12.288MHz BITCLK input
 - Integrated PCBEEP generator to save buzzer
 - Interrupt capability
- Three analog line-level stereo inputs with 5-bit volume control, LINE_IN, CD, AUX
- High-quality differential CD input
- Two analog line-level mono inputs: PCBEEP, PHONE-IN
- Two software selectable MIC inputs
- Dedicated Front-MIC input for front panel applications (software selectable)
- Boost preamplifier for MIC input

2.5.2 Intel® ICH7-M IDE Interface

The integrated IDE interface on the ICH7-M southbridge supports two IDE hard disks and ATAPI devices. The IDE connector is shown in **Figure 2-9** below.

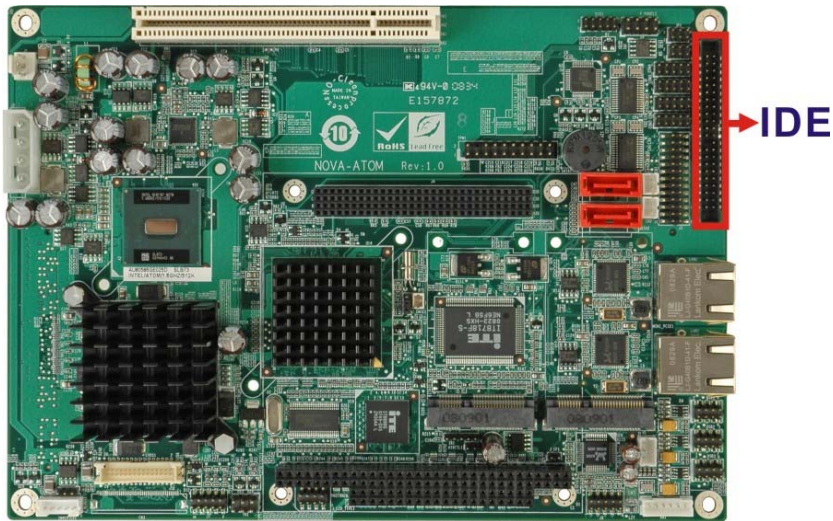


Figure 2-9: IDE Connector

PIO IDE transfers up to 16MB/s and Ultra ATA transfers of 100MB/s. The integrated IDE interface is able to support the following IDE HDDs:

- **Ultra ATA/100**, with data transfer rates up to 100MB/s
- **Ultra ATA/66**, with data transfer rates up to 66MB/s

Specification	Ultra ATA/100	Ultra ATA/66
IDE devices	2	2
PIO Mode	0 – 4	0 – 4
PIO Max Transfer Rate	16.6 MB/s	16.6 MB/s
DMA/UDMA designation	UDMA 3 - 4	UDMA 3 – 4
DMA/UDMA Max Transfer	100MB/s	66MB/s
Controller Interface	5V	5V

Table 2-1: Supported HDD Specifications

2.5.3 Intel® ICH7-M Low Pin Count (LPC) Interface

The ICH7-M LPC interface complies with the LPC 1.1 specifications. The LPC bus from the ICH7-M is connected to the following components:

- BIOS chipset
- Super I/O chipset

2.5.4 Intel® ICH7-M PCI Interface

The PCI interface on the ICH7-M is compliant with the PCI Revision 2.3 implementation. Some of the features of the PCI interface are listed below.

- PCI Revision 2.3 compliant
- 33MHz
- 5V tolerant PCI signals (except PME#)
- Integrated PCI arbiter supports up to seven PCI bus masters

The PCI bus is connected to a PC/104-Plus connector as shown in **Figure 2-10**.

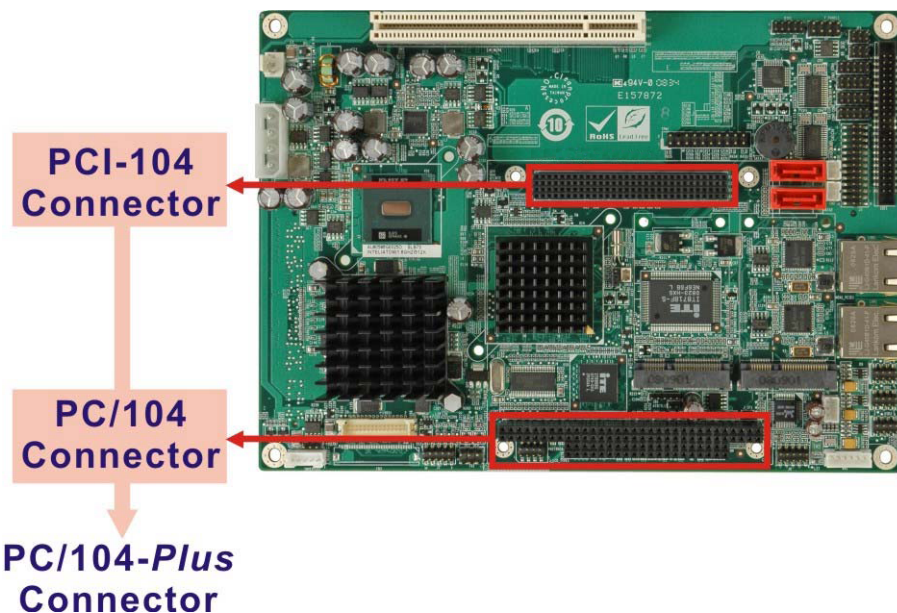


Figure 2-10: PC/104-Plus Connector

2.5.5 Intel® ICH7-M PCIe Bus

The Intel® ICH7-M southbridge chipset has four PCIe lanes. Two of the four PCIe lanes are interfaced to PCIe GbE controller. A third PCIe lane is interfaced to a PCIe mini socket.

2.5.5.1 PCIe GbE Ethernet

Two PCIe lanes are connected to two Realtek RTL8111C PCIe GbE controllers shown in **Figure 2-11** below.

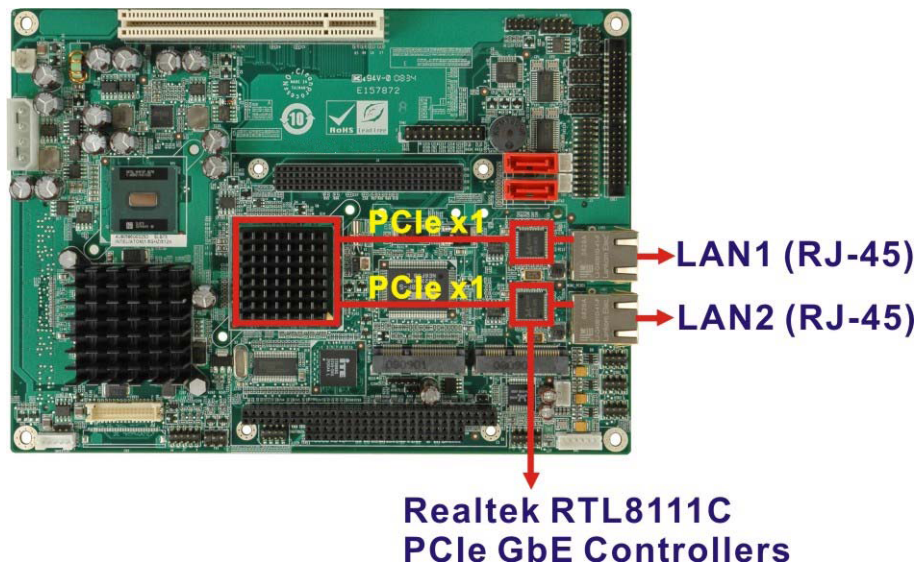


Figure 2-11: Realtek PCI GbE Controllers

The Realtek RTL8111C PCIe GbE controllers combine a triple-speed IEEE 802.3 compliant Media Access Controller (MAC) with a triple-speed Ethernet transceiver, 32-bit PCIe bus controller, and embedded memory. With state-of-the-art DSP technology and mixed-mode signal technology, they offer high-speed transmission over CAT 5 UTP cable or CAT 3 UTP (10Mbps only) cable. Functions such as Crossover Detection & Auto-Correction, polarity correction, adaptive equalization, cross-talk cancellation, echo cancellation, timing recovery, and error correction are implemented to provide robust transmission and reception capability at high speeds.

Some of the features of the Realtek RTL8111CP PCIe GbE controllers are listed below.

-
- Integrated 10/100/1000 transceiver
 - Auto-Negotiation with Next Page capability
 - Supports PCI Express™ 1.1
 - Supports pair swap/polarity/skew correction
 - Crossover Detection & Auto-Correction
 - Wake-on-LAN and remote wake-up support
 - Microsoft® NDIS5, NDIS6 Checksum Offload (IPv4, IPv6, TCP, UDP) and Segmentation Task-offload (Large send and Giant send) support
 - Supports Full Duplex flow control (IEEE 802.3x)
 - Fully compliant with IEEE 802.3, IEEE 802.3u, IEEE 802.3ab
 - Supports IEEE 802.1P Layer 2 Priority Encoding
 - Supports IEEE 802.1Q VLAN tagging
 - Serial EEPROM
 - Transmit/Receive on-chip buffer support
 - Supports power down/link down power saving
 - Supports PCI MSI (Message Signaled Interrupt) and MSI-X
 - Supports Receive-Side Scaling (RSS)

2.5.5.2 PCIe Mini Expansion Slots

Two PCIe x1 lanes in combination with USB port on the ICH7-M is interfaced directly to two PCIe mini expansion slots. These enable the addition of PCIe mini expansion devices. The PCIe mini slots are shown in **Figure 2-12**.

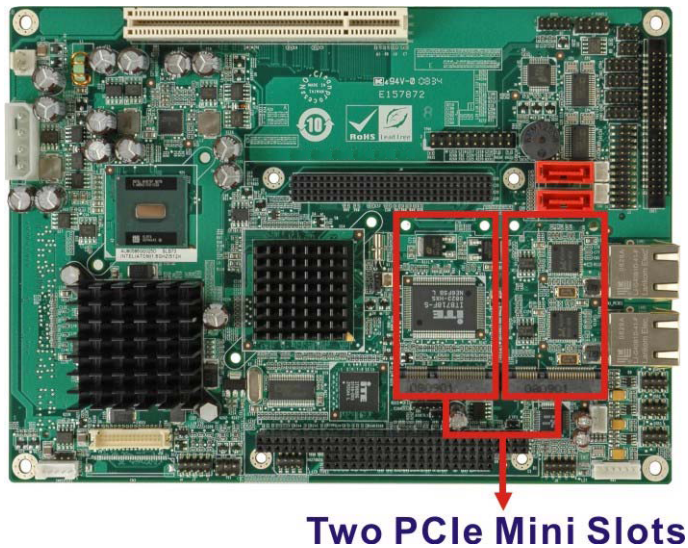


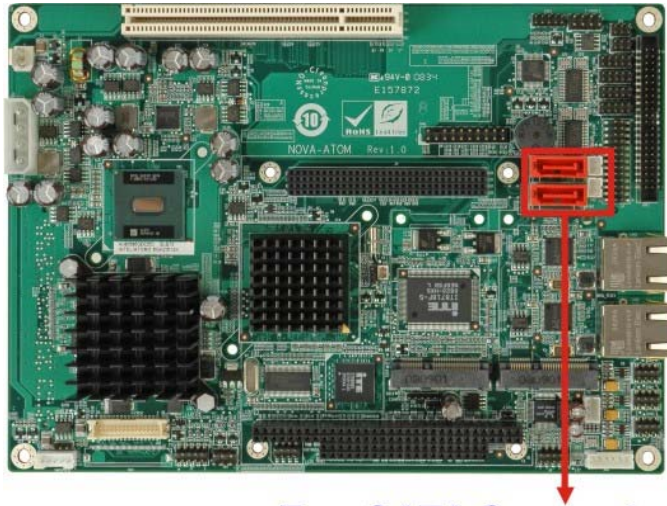
Figure 2-12: PCIe Mini Slots

2.5.6 Intel® ICH7-M Real Time Clock

256 bytes of battery backed RAM is provided by the Motorola MC146818A real time clock (RTC) integrated into the ICH7-M. The RTC operates on a 3V battery and 32.768KHz crystal. The RTC keeps track of the time and stores system data even when the system is turned off.

2.5.7 Intel® ICH7-M SATA Controller

The integrated SATA controller on the ICH7-M supports up to four SATA drives with independent DMA operations. Two SATA controllers are connected to two SATA connectors on the 3308470. The SATA connectors are shown in Figure 2-13



Two SATA Connectors & SATA 5V Power Connectors

Figure 2-13: SATA Connectors

SATA controller specifications are listed below.

- Supports four SATA drives
- Supports 1.5 Gb/s data transfer speeds
- Supports Serial ATA Specification, Revision 1.0a

2.5.8 Intel® ICH7-M USB Controller

Up to six high-speed, full-speed or low-speed USB devices are supported by the ICH7-M on the 3308470. High-speed USB 2.0, with data transfers of up to 480MB/s, is enabled with the ICH7-M integrated Enhanced Host Controller Interface (EHCI) compliant host controller. USB full-speed and low-speed signaling is supported by the ICH7-M integrated Universal Host Controller Interface (UHCI) controllers.

The six USB ports implemented on the 3308470 are connected to three internal connectors. See **Figure 2-14**.

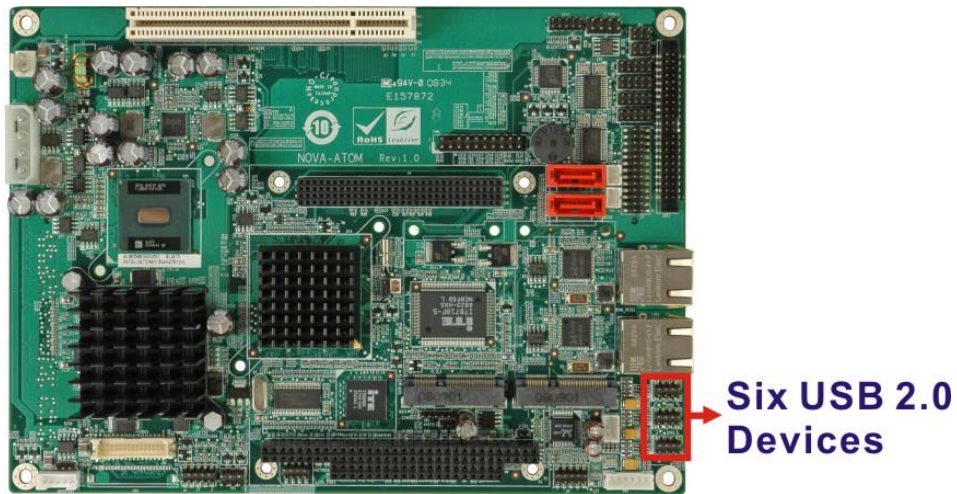


Figure 2-14: On-board USB Implementation

2.6 LPC Bus Components

2.6.1 LPC Bus Overview

The ICH7-M LPC bus is connected to components listed below:

- Super I/O chipset
- LPC Serial Port Chipset

2.6.2 iTE IT8718F Super I/O Chipset

The iTE IT8718F Super I/O chipset is connected to the ICH7-M through the LPC bus.

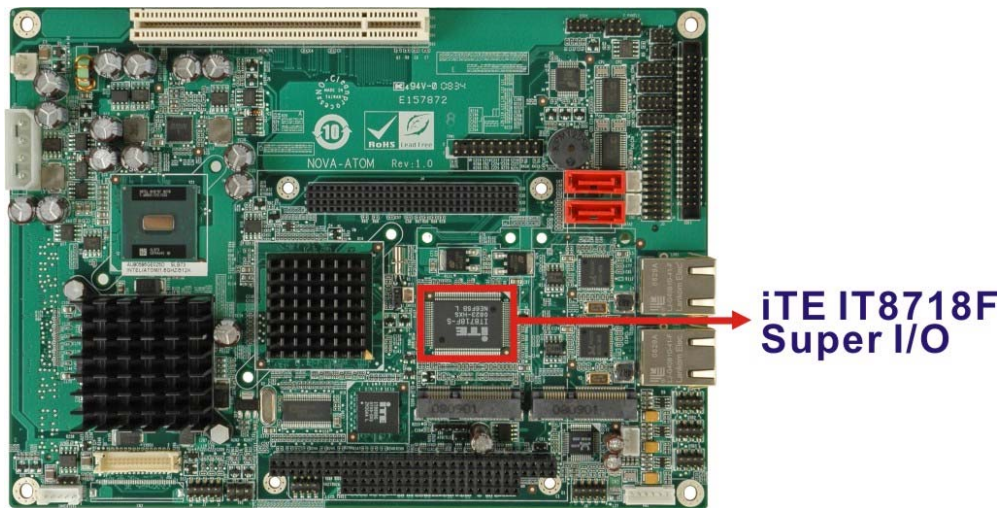


Figure 2-15: Super I/O

The iTE IT8718F is an LPC interface-based Super I/O device that comes with Environment Controller integration. Some of the features of the iTE IT8718F chipset are listed below:

- ACPI and LANDesk Compliant
- Enhanced Hardware Monitor
- Fan Speed Controller
- Two 16C550 UARTs for serial port control
- One IEEE 1284 Parallel Port
- Keyboard Controller
- Watchdog Timer

Some of the Super I/O features are described in more detail below:

2.6.2.1 Super I/O LPC Interface

The LPC interface on the Super I/O complies with the Intel® Low Pin Count Specification Rev. 1.0. The LPC interface supports both LDRQ# and SERIRQ protocols as well as PCI PME# interfaces.

2.6.2.2 Super I/O 16C550 UARTs

The on-board Super I/O has two integrated 16C550 UARTs that can support the following:

- Two standard serial ports (COM1 and COM2)
- IrDa 1.0 and ASKIR protocols

Another chipset connected to the LPC bus provided connectivity to another two serial port connectors (COM3 and COM4).

2.6.2.3 Super I/O Digital Input/Output

The input mode supports switch debouncing or programmable external IRQ routing. The output mode supports two sets of programmable LED blinking periods.

2.6.2.4 Super I/O Enhanced Hardware Monitor

The Super I/O Enhanced Hardware Monitor monitors three thermal inputs, VBAT internally, and eight voltage monitor inputs. These hardware parameters are reported in the BIOS and can be read from the BIOS Hardware Health Configuration menu.

2.6.2.5 Super I/O Fan Speed Controller

The Super I/O fan speed controller enables the system to monitor the speed of the fan. One of the pins on the fan connector is reserved for fan speed detection and interfaced to the fan speed controller on the Super I/O. The fan speed is then reported in the BIOS.

2.6.2.6 Super I/O Keyboard/Mouse Controller

The Super I/O keyboard/mouse controller can execute the 8042 instruction set. Some of the keyboard controller features are listed below:

- The 8042 instruction is compatible with a PS/2 keyboard and PS/2 mouse
- Gate A20 and Keyboard reset output
- Supports multiple keyboard power on events
- Supports mouse double-click and/or mouse move power on events

2.6.2.7 Super I/O Parallel Port

The multi-mode high-performance parallel port supports the bi-directional Standard Parallel Port (SPP), the Enhanced Parallel Port (EPP) and the Extended Capabilities Port (ECP) modes.

2.7 Environmental and Power Specifications

2.7.1 System Monitoring

Two thermal inputs on the 3308470 Super I/O Enhanced Hardware Monitor monitor the following temperatures:

- System temperature
- CPU temperature

Eight voltage inputs on the 3308470 Super I/O Enhanced Hardware Monitor monitor the following voltages:

- CPU Core
- +1.05V
- +3.30V
- +5.00V
- +12.0 V
- +1.5V
- +1.8V
- 5VSB
- VBAT

The 3308470 Super I/O Enhanced Hardware Monitor also monitors the following fan speeds:

- CPU Fan speed

The values for the above environmental parameters are all recorded in the BIOS Hardware Health Configuration menu.

2.7.2 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the 3308470 are listed below.

- Minimum Operating Temperature: 0°C (32°F)
- Maximum Operating Temperature: 60°C (140°F)

A heat sink must be installed on the CPU. Thermal paste must be smeared on the lower side of the heat sink before it is mounted on the CPU. Heat sinks are also mounted on the Northbridge and Southbridge chipsets to ensure the operating temperature of these chips remain low.

2.7.3 Power Consumption

Table 2-2 shows the power consumption parameters for the 3308470 running with a 1.6 GHz Intel® Atom™ processor N270 with 1 GB DDR2 memory.

Voltage	Current
+5V	2.89A
+12V	0.04A

Table 2-2: Power Consumption

Chapter

3

Unpacking

3.1 Anti-static Precautions



WARNING!

Failure to take ESD precautions during the installation of the 3308470 may result in permanent damage to the 3308470 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the 3308470. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the 3308470, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband:*** - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding:***- Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad:*** When configuring the 3308470, place it on an anti-static pad. This reduces the possibility of ESD damaging the 3308470.
- ***Only handle the edges of the PCB:***- When handling the PCB, hold the PCB by the edges.

3.2 Unpacking

3.2.1 Unpacking Precautions

When the 3308470 is unpacked, please do the following:

- Follow the anti-static precautions outlined in **Section 3.1**.
- Make sure the packing box is facing upwards so the 3308470 does not fall out of the box.
- Make sure all the components shown in **Section 3.3** are present.

3.3 Unpacking Checklist











NOTE:

If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the GAI reseller or vendor the 3308470 was purchased from or contact an GAI sales representative directly by sending an email to sales@globalamericaninc.com

3.3.1 Package Contents





The 3308470 is shipped with the following components:

Quantity	Item	Image
1	3308470	 A green printed circuit board (PCB) with various components, including a large black heat sink, capacitors, and connectors.
1	Audio cable	 A white audio cable with a 3.5mm jack on one end and a multi-pin connector on the other.
1	KB/MS PS/2 Y-cable	 A white Y-cable with a PS/2 keyboard connector on one end and two MS-DOS connectors on the other.
4	RS-232 cable (w/o bracket)	 A flat ribbon cable with a 25-pin D-sub connector on one end and a multi-pin connector on the other.
2	SATA cable	 A red SATA-to-IDE adapter cable with a SATA connector on one end and an IDE connector on the other.
1	Dual USB cable (w/o bracket)	 A white cable with two USB-A connectors on one end and a multi-pin connector on the other.

1	VGA cable (P/N: 32000-033804-RS)	
1	Mini jumper pack (2.0mm) (P/N: 33100-000033-RS)	
1	Utility CD	
1	Quick Installation Guide	

3.3.2 Optional Items

The 3308470 is shipped with the following components:

Item	Image
SATA power cable	
HDD cable	
LPT cable (w/o bracket)	
HDTV output cable	

Chapter

4

Connectors

4.1 Peripheral Interface Connectors

Section 4.1.1 shows peripheral interface connector locations. Section 4.3 lists all the peripheral interface connectors seen in Section 4.1.1.

4.1.1 3308470 Layout

Figure 4-1 shows the on-board peripheral connectors, rear panel peripheral connectors and on-board jumpers.

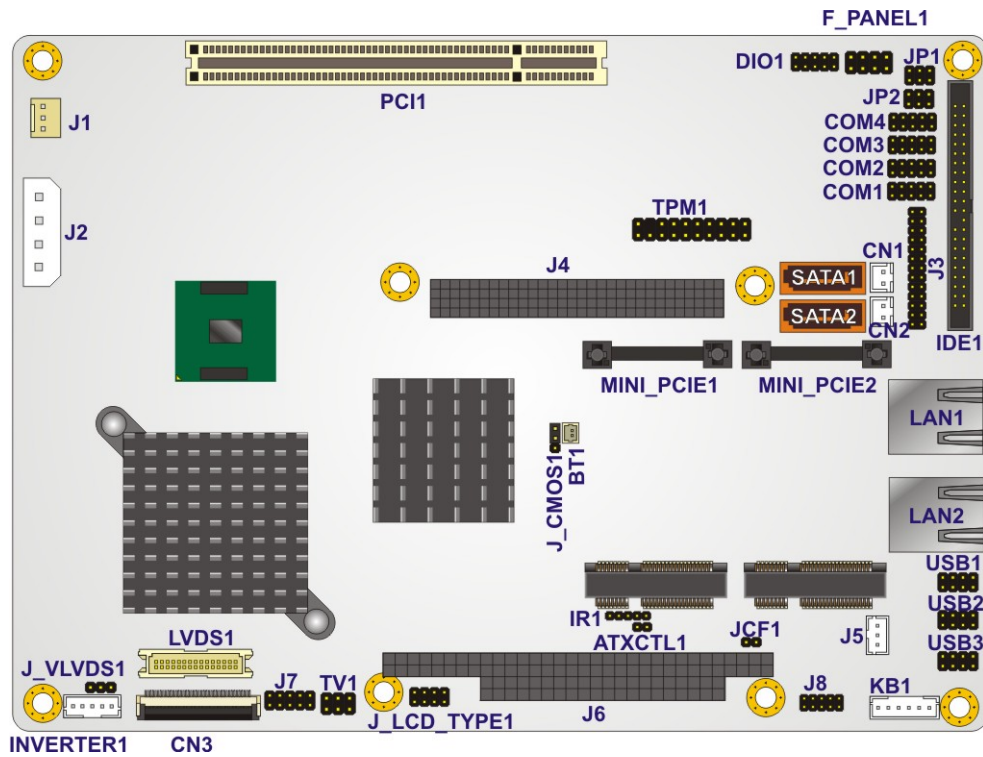


Figure 4-1: Connector and Jumper Locations [Front Side]

Figure 4-2 shows the solder side of the 3308470.

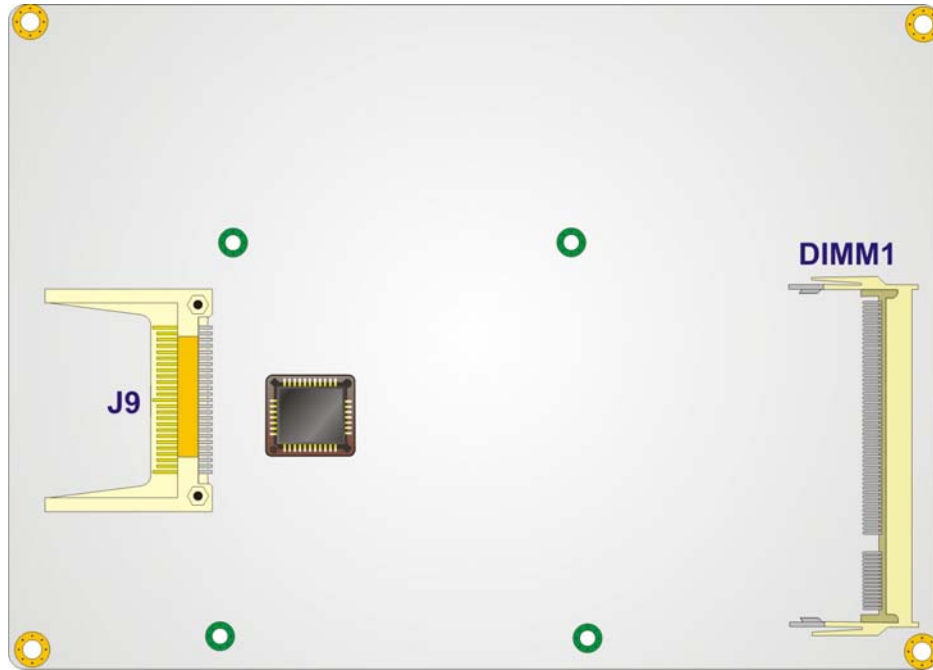


Figure 4-2: Connector and Jumper Locations [Solder Side]

4.2 Peripheral Interface Connectors

Table 4-1 shows a list of the peripheral interface connectors on the 3308470.

Detailed descriptions of these connectors can be found below.

Connector	Type	Label
+12V power source connector	4-pin connector	J2
ATX power control connector	3-pin wafer	J5
Audio connector	9-pin header	J8
Backlight inverter connector	5-pin wafer	INVERTER1
CompactFlash® socket	50-pin CF socket	J9
CRT connector	10-pin box header	J7
DDR SO-DIMM socket	200-pin socket	DIMM1
Digital input/output (DIO) connector	10-pin header	DIO1

Fan connector	3-pin wafer	J1
Front panel connector	8-pin header	F_PANEL1
IDE disk drive connectors (44-pin)	44-pin box header	IDE1
Infrared interface (IrDA) connector	5-pin header	IR1
Keyboard connector	6-pin wafer	KB1
LVDS connector	30-pin crimp	LVDS1
Parallel port connector	26-pin header	J3
PCI-104 slot	120-pin socket	J4
PC/104 slot	104-pin socket	J6
PCIe Mini Card slot	PCIe Mini Slot	MINI_PCIE1
PCIe Mini Card slot	PCIe Mini Slot	MINI_PCIE2
SDVO connector	47-pin connector	CN3
Serial ATA (SATA) drive connector	7-pin SATA	SATA1
Serial ATA (SATA) drive connector	7-pin SATA	SATA2
SATA power connector	2-pin wafer	CN1
SATA power connector	2-pin wafer	CN2
RS-232 serial port connector	10-pin header	COM1
RS-232 serial port connector	10-pin header	COM2
RS-232/422/485 serial port connector	10-pin header	COM3
RS-232 serial port connector	10-pin header	COM4
COM3 RS-422/485 connector	6-pin header	JP2
TPM connector	20-pin header	TPM1
TV Out connector	6-pin header	TV1
USB 2.0 connector	8-pin header	USB1

USB 2.0 connector	8-pin header	USB2
USB 2.0 connector	8-pin header	USB3

Table 4-1: Peripheral Interface Connectors

4.2.1 External Interface Panel Connectors

Table 4-2 lists the rear panel connectors on the 3308470. Detailed descriptions of these connectors can be found in **Section 4.4** on **page 64**.

Connector	Type	Label
Ethernet connector	RJ-45	LAN1
Ethernet connector	RJ-45	LAN2

Table 4-2: Rear Panel Connectors

4.3 Internal Peripheral Connectors

Internal peripheral connectors are found on the motherboard and are only accessible when the motherboard is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the 3308470.

4.3.1 AT Power Connector

- CN Label:** J2
- CN Type:** 4-pin power connector (1x4)
- CN Location:** See **Figure 4-3**
- CN Pinouts:** See **Table 4-3**

The 4-pin +12V AT power connector is connected directly to an AT power supply.

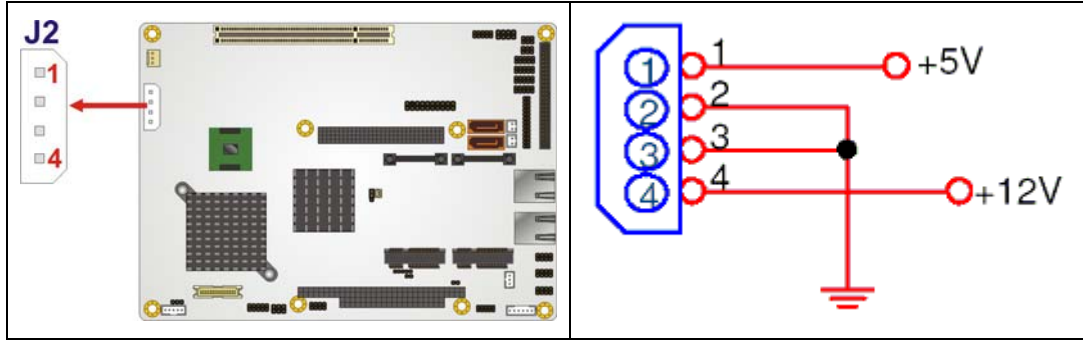


Figure 4-3: AT Power Connector Location

PIN NO.	DESCRIPTION
1	+5V
2	GND
3	GND
4	+12V

Table 4-3: AT Power Connector Pinouts

4.3.2 ATX Power Supply Enable Connector

- CN Label:** J5
- CN Type:** 3-pin wafer (1x3)
- CN Location:** See **Figure 4-4**
- CN Pinouts:** See **Table 4-4**

The ATX power supply enable connector enables the 3308470 to be connected to an ATX power supply. In default mode, the 3308470 can only use an AT power supply. To enable an ATX power supply the AT Power Select jumper must also be configured. Please refer to Chapter 5 for more details.

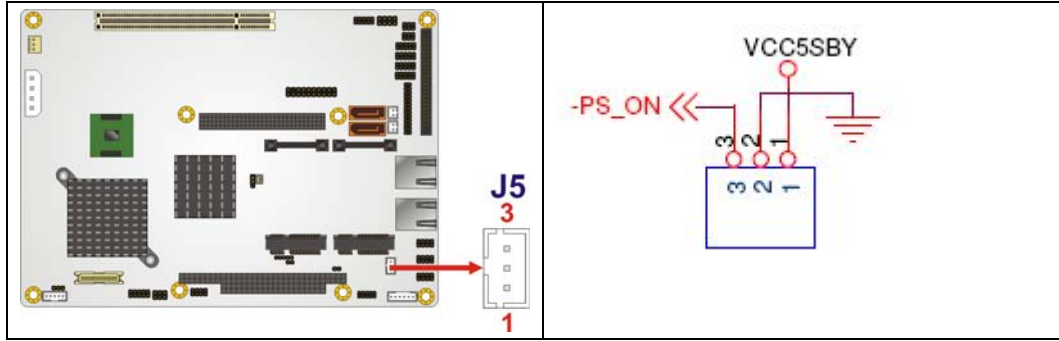


Figure 4-4: ATX Power Supply Enable Connector Location

PIN NO.	DESCRIPTION
1	+5V Standby
2	GND
3	PS-ON

Table 4-4: ATX Power Supply Enable Connector Pinouts

4.3.3 Audio Connector (9-pin)

- CN Label:** J8
- CN Type:** 9-pin header (2x5)
- CN Location:** See Figure 4-5
- CN Pinouts:** See Table 4-5

The 9-pin audio connector is connected to external audio devices including speakers and microphones for the input and output of audio signals to and from the system.

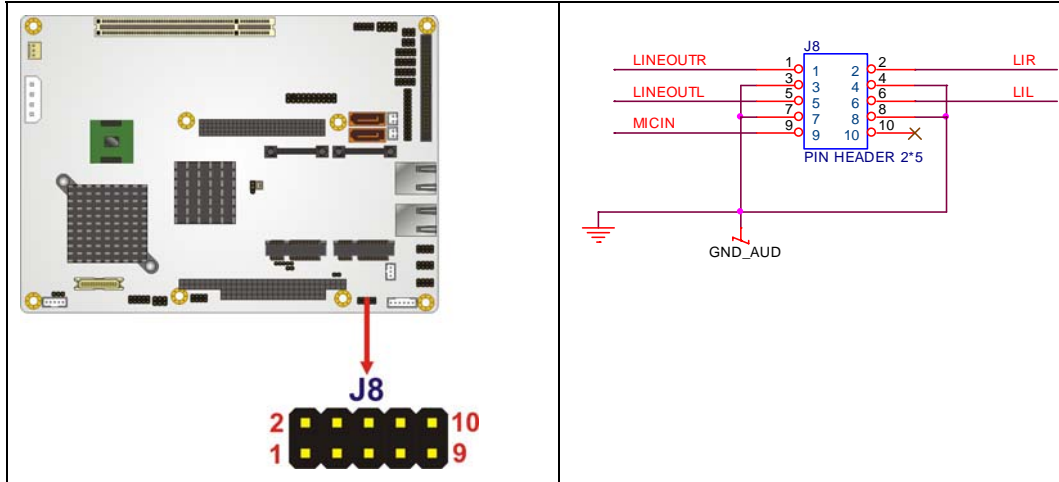


Figure 4-5: Audio Connector Location (9-pin)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LINE_OUTR	2	LIR
3	GND	4	GND
5	LINE_OUTL	6	LIL
7	GND	8	GND
9	MIC_IN	10	N/A

Table 4-5: Audio Connector Pinouts (9-pin)

4.3.4 Backlight Inverter Connector

- CN Label:** INVERTER1
- CN Type:** 5-pin wafer (1x5)
- CN Location:** See Figure 4-6
- CN Pinouts:** See Table 4-6

The backlight inverter connector provides the backlight on the LCD display connected to the 3308470 with +12V of power.

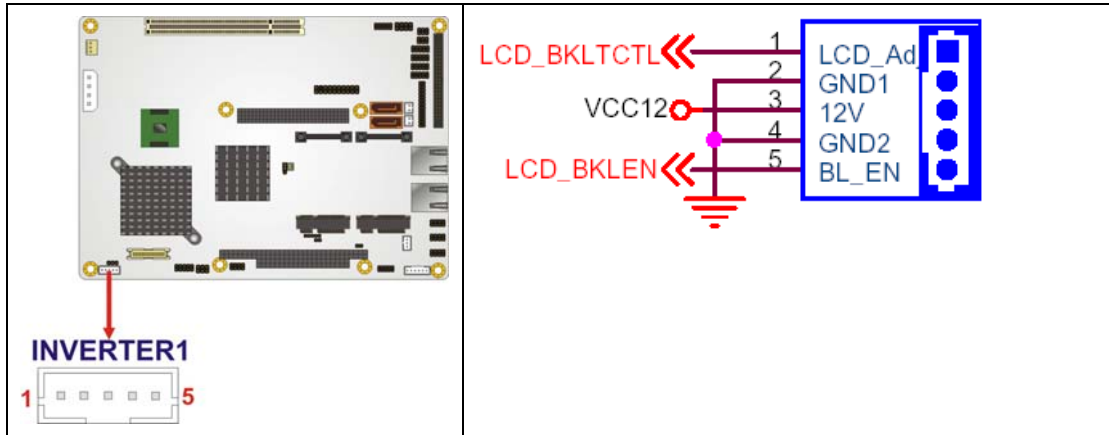


Figure 4-6: Panel Backlight Connector Pinout Locations

PIN NO.	DESCRIPTION
1	LCD Backlight Control
2	GROUND
3	+ 12V
4	GROUND
5	BACKLIGHT Enable

Table 4-6: Panel Backlight Connector Pinouts

4.3.5 CompactFlash® Socket

- CN Label:** J9 (solder side)
- CN Type:** 50-pin header (2x25)
- CN Location:** See Figure 4-7
- CN Pinouts:** See Table 4-7

A CF Type II memory card is inserted to the CF socket on the solder side of the 3308470.

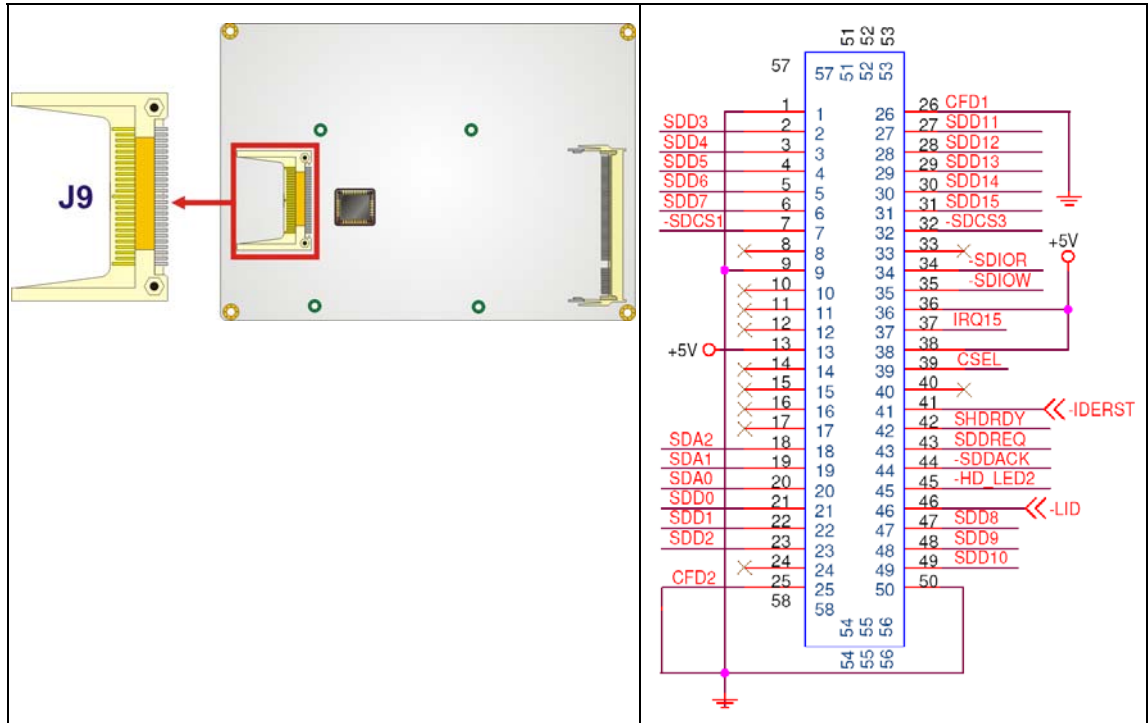


Figure 4-7: CF Card Socket Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	26	VCC-IN CHECK1
2	DATA 3	27	DATA 11
3	DATA 4	28	DATA 12
4	DATA 5	29	DATA 13
5	DATA 6	30	DATA 14
6	DATA 7	31	DATA 15
7	HDC_CS0#	32	HDC_CS1
8	N/C	33	N/C
9	GROUND	34	IOR#
10	N/C	35	IOW#
11	N/C	36	VCC_COM
12	N/C	37	IRQ15
13	VCC_COM	38	VCC_COM
14	N/C	39	CSEL
15	N/C	40	N/C

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
16	N/C	41	HDD_RESET
17	N/C	42	IORDY
18	SA2	43	SDREQ
19	SA1	44	SDACK#
20	SA0	45	HDD_ACTIVE#
21	DATA 0	46	66DET
22	DATA 1	47	DATA 8
23	DATA 2	48	DATA 9
24	N/C	49	DATA 10
25	VCC-IN CHECK2	50	GROUND

Table 4-7: CF Card Socket Pinouts

4.3.6 CRT Connector

- CN Label:** J7
- CN Type:** 10-pin box header (2x5)
- CN Location:** See **Figure 4-8**
- CN Pinouts:** See **Table 4-8**

The 2x5 CRT pin connector provides connectivity to an external VGA port enabling the system to be connected to a standard CRT screen.

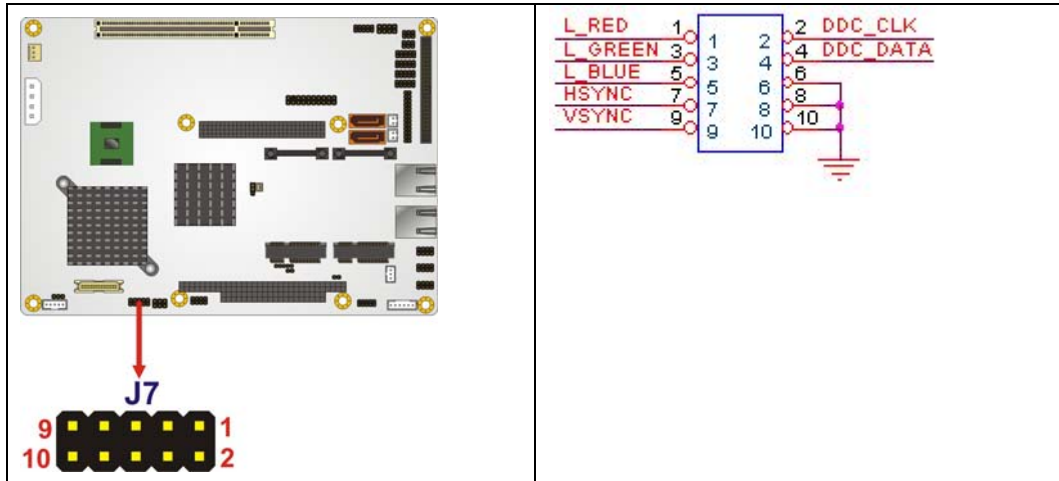


Figure 4-8: VGA Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	L_RED	2	DDC_CLK
3	L_GREEN	4	DDC_DATA
5	L_BLUE	6	GND
7	HSYNC	8	GND
9	VSYNC	10	GND

Table 4-8: VGA Connector Pinouts

4.3.7 Digital Input/Output (DIO) Connector

- CN Label:** DIO1
- CN Type:** 10-pin header (2x5)
- CN Location:** See **Figure 4-9**
- CN Pinouts:** See **Table 4-9**

The digital input/output connector is managed through a Super I/O chip. The DIO connector pins are user programmable.

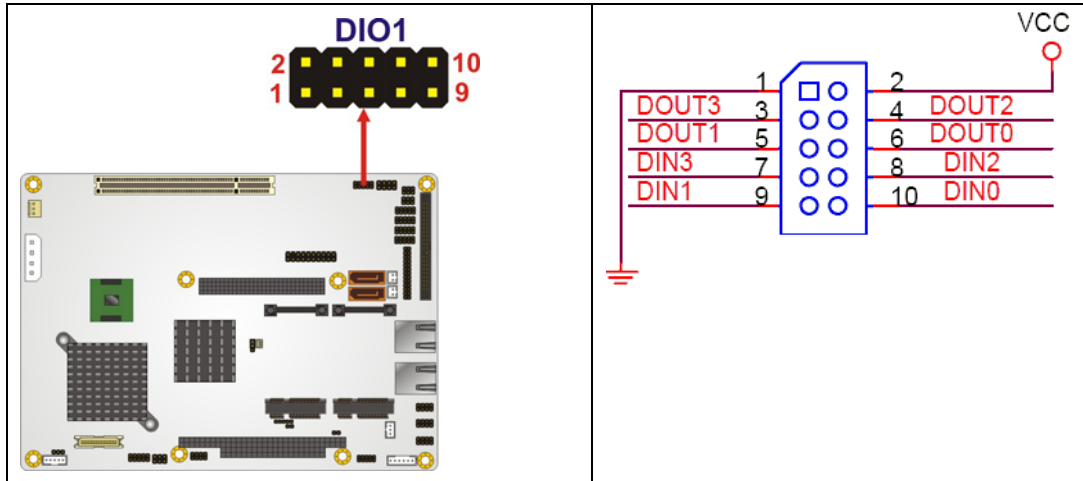


Figure 4-9: DIO Connector Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	VCC5
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

Table 4-9: DIO Connector Pinouts

4.3.8 Fan Connector (+12V, 3-pin)

- CN Label:** J1
- CN Type:** 3-pin wafer (1x3)
- CN Location:** See **Figure 4-10**
- CN Pinouts:** See **Table 4-10**

The cooling fan connector provides a 12V, 500mA current to the cooling fan. The connector has a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.

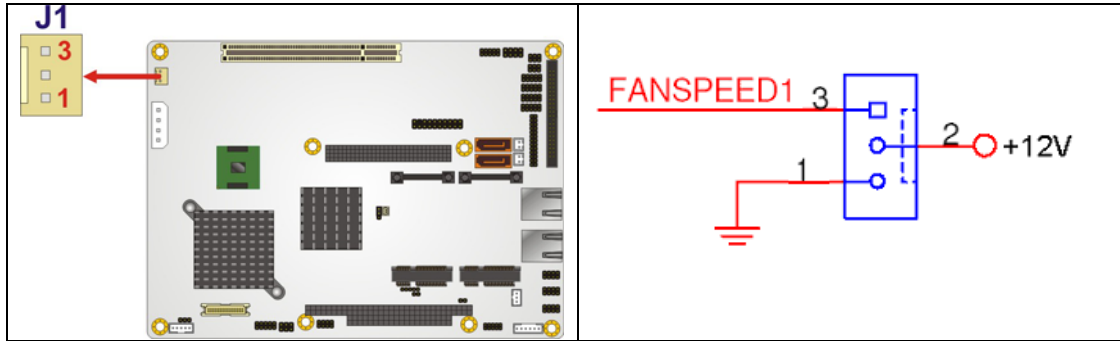


Figure 4-10: +12V Fan Connector Location

PIN NO.	DESCRIPTION
1	GND
2	+12V
3	Fan Speed Detect

Table 4-10: +12V Fan Connector Pinouts

4.3.9 Front Panel Connector (8-pin)

- CN Label:** F_PANEL1
- CN Type:** 8-pin header (2x4)
- CN Location:** See **Figure 4-11**
- CN Pinouts:** See **Table 4-11**

The front panel connector connects to external switches and indicators to monitor and controls the motherboard. These indicators and switches include:

- Power button
- Reset
- Power LED
- HDD LED

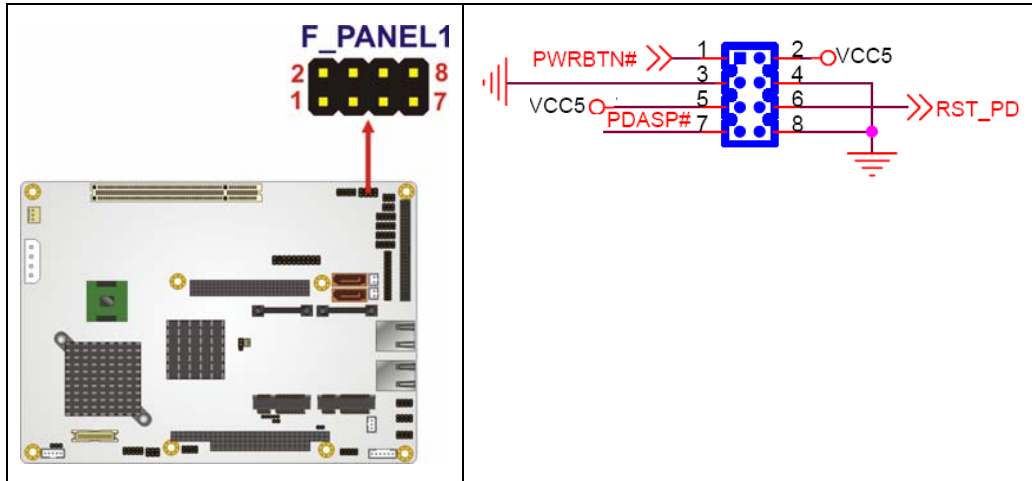


Figure 4-11: Front Panel Connector Pinout Locations (8-pin)

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power Button	1	PWR_BTN	Power LED	2	VCC5
	3	GND		4	GND
HDD LED	5	HDD_LED+	Reset	6	SYSRST-
	7	HDD_LED-		8	GND

Table 4-11: Front Panel Connector Pinouts (8-pin)

4.3.10 IDE Connector (44-pin)

- CN Label:** IDE1
- CN Type:** 44-pin box header (2x22)
- CN Location:** See Figure 4-12
- CN Pinouts:** See Table 4-12

One 44-pin IDE device connector on the 3308470 supports connectivity to two hard disk drives.

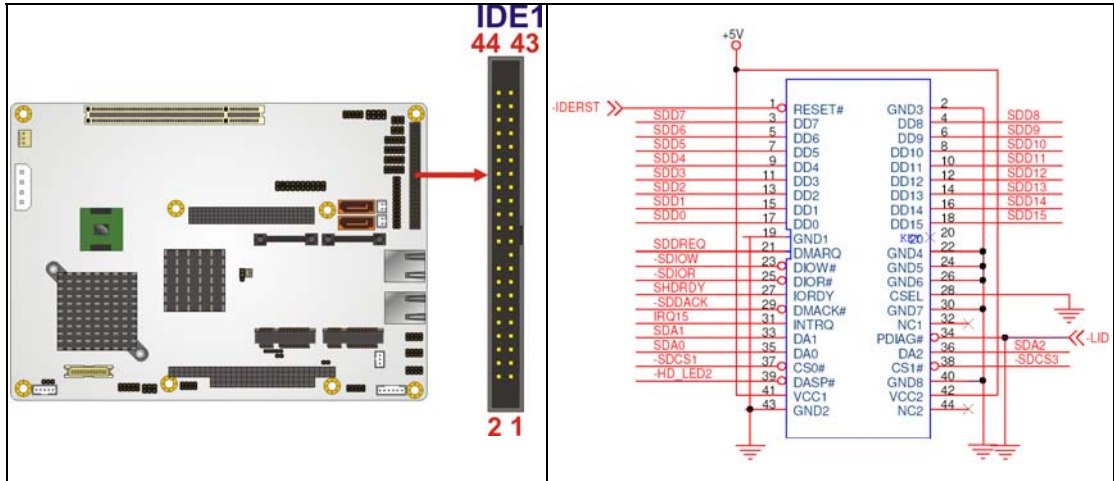


Figure 4-12: Secondary IDE Device Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	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	IDE DRQ	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	IDE CHRDY	28	GROUND
29	IDE DACK	30	GROUND-DEFAULT
31	INTERRUPT	32	N/C
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND

41	VCC	42	VCC
43	GROUND	44	N/C

Table 4-12: Secondary IDE Connector Pinouts

4.3.11 Infrared Interface Connector (5-pin)

- CN Label:** IR1
- CN Type:** 5-pin header (1x5)
- CN Location:** See **Figure 4-13**
- CN Pinouts:** See **Table 4-13**

The infrared interface connector supports both Serial Infrared (SIR) and Amplitude Shift Key Infrared (ASKIR) interfaces.

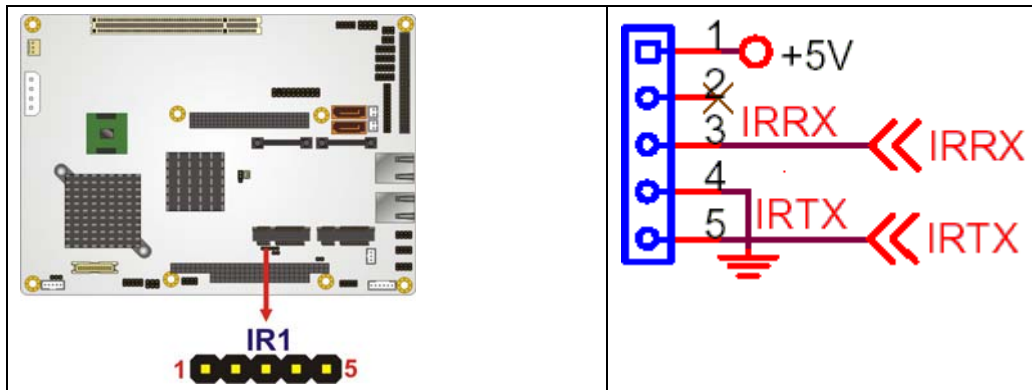


Figure 4-13: Infrared Connector Pinout Locations

PIN NO.	DESCRIPTION
1	VCC
2	NC
3	IR-RX
4	GND
5	IR-TX

Table 4-13: Infrared Connector Pinouts

4.3.12 Keyboard/Mouse Connector

- CN Label:** KB1
- CN Type:** 6-pin wafer (1x6)
- CN Location:** See Figure 4-14
- CN Pinouts:** See Table 4-14

The keyboard and mouse connector can be connected to a standard PS/2 cable or PS/2 Y-cable to add keyboard and mouse functionality to the system.

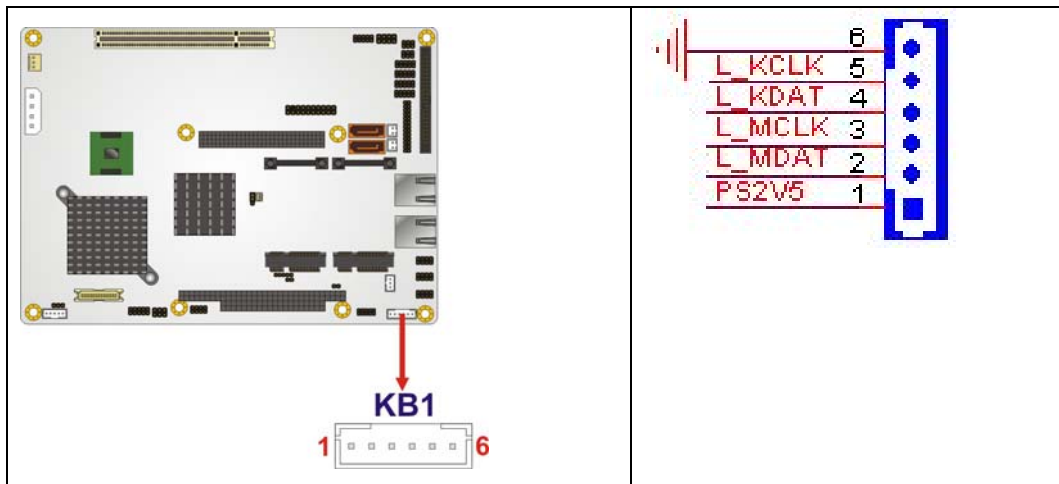


Figure 4-14: Keyboard/Mouse Connector Location

PIN NO.	DESCRIPTION
1	PS2V5
2	L_MS_DATA
3	L_MS_CLK
4	L_KB_DATA
5	L_KB_CLK
6	GROUND

Table 4-14: Keyboard/Mouse Connector Pinouts

4.3.13 LVDS LCD Connector

- CN Label:** LVDS1
- CN Type:** 30-pin crimp (3x10)
- CN Location:** See **Figure 4-15**
- CN Pinouts:** See **Table 4-15**

The 30-pin LVDS LCD connectors can be connected to single channel or dual channel, 18-bit LVDS panel.

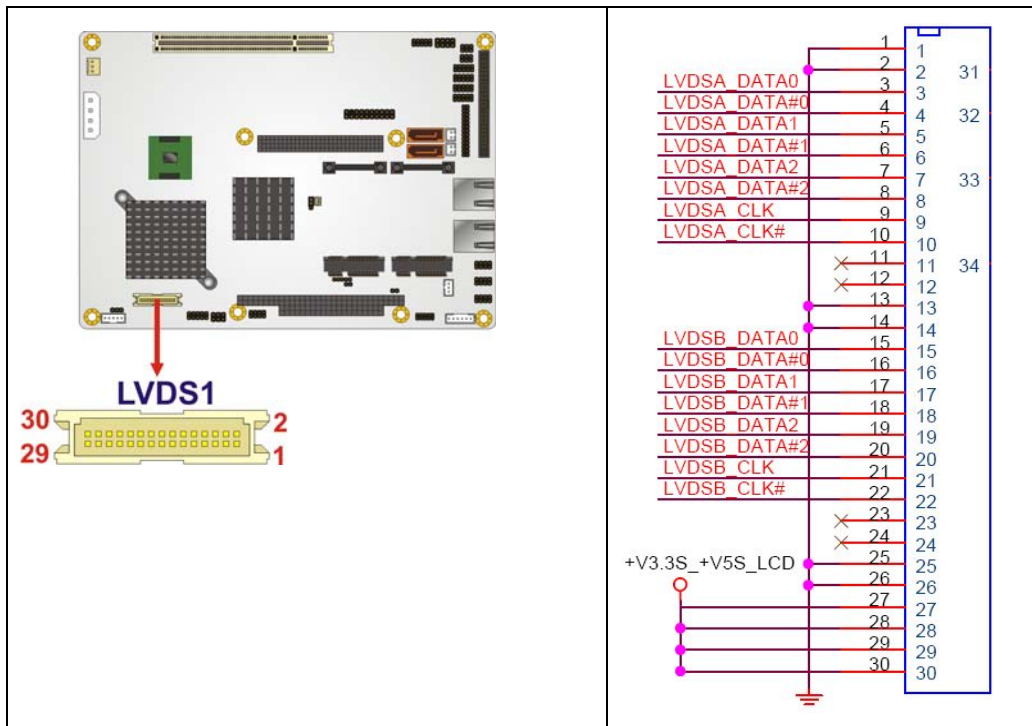


Figure 4-15: LVDS LCD Connector Pinout Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND
3	LVDSA1+	4	LVDSA1-
5	LVDSA2+	6	LVDSA2-
7	LVDSA3+	8	LVDSA3-

9	LVDSACLK+	10	LVDSACLK-
11	NC	12	NC
13	GND	14	GND
15	LVDSB1+	16	LVDSB1-
17	LVDSB2+	18	LVDSB2-
19	LVDSB3+	20	LVDSB3-
21	LVDSBCLK+	22	LVDSBCLK-
23	NC	24	NC
25	GND	26	GND
27	LCDVCC	28	LCDVCC
29	LCDVCC	30	LCDVCC

Table 4-15: LVDS LCD Port Connector Pinouts

4.3.14 Parallel Port Connector

- CN Label:** J3
- CN Type:** 26-pin header (2x13)
- CN Location:** See **Figure 4-16**
- CN Pinouts:** See **Table 4-16**

The 26-pin parallel port connector connects to a parallel port connector interface or some other parallel port device such as a printer.

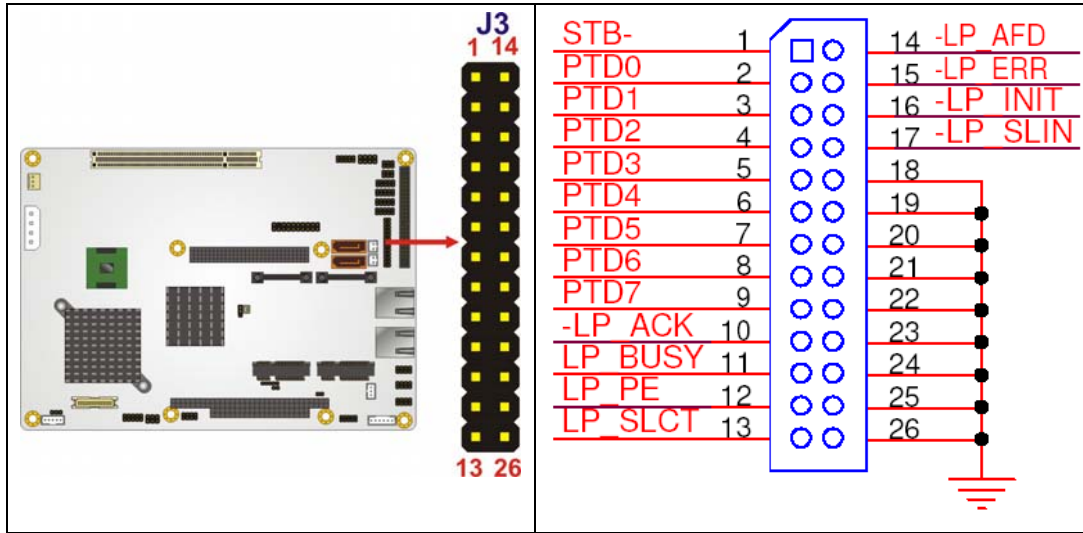


Figure 4-16: Parallel Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	STROBE#	2	DATA 0
3	DATA 1	4	DATA 2
5	DATA 3	6	DATA 4
7	DATA 5	8	DATA 6
9	DATA 7	10	ACKNOWLEDGE
11	BUSY	12	PAPER EMPTY
13	PRINTER SELECT	14	AUTO FORM FEED #
15	ERROR#	16	INITIALIZE
17	PRINTER SELECT LN#	18	GROUND
19	GROUND	20	GROUND
21	GROUND	22	GROUND
23	GROUND	24	GROUND
25	GROUND	26	NC

Table 4-16: Parallel Port Connector Pinouts

4.3.15 SDVO Connector

- CN Label:** CN3
- CN Type:** 47-pin connector (1x47)
- CN Location:** See **Figure 4-17**
- CN Pinouts:** See **Table 4-17**

The SDVO (Serial Digital Video Out) port B connector supports additional video signaling interfaces.

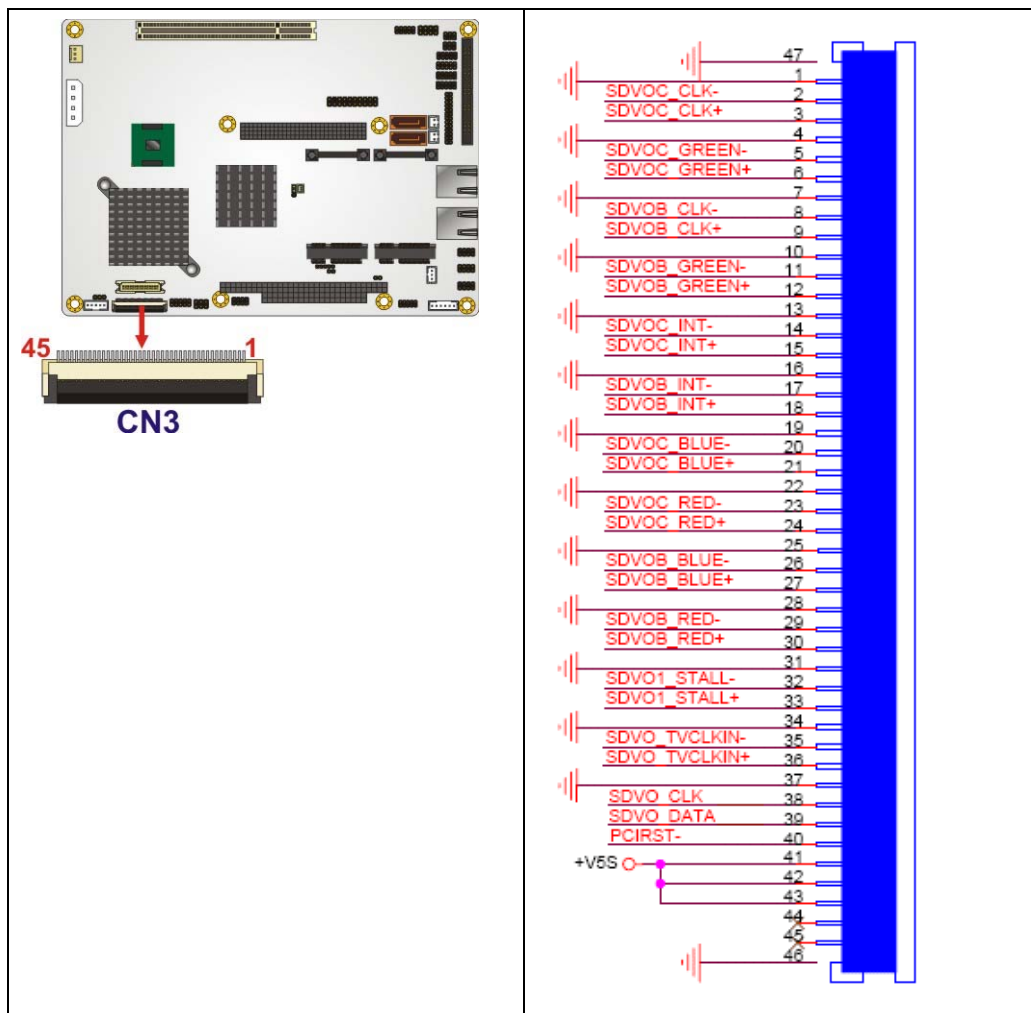


Figure 4-17: SDVO Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	25	GROUND
2	SDVOC_CLK-	26	SDVOB_BLUE-
3	SDVOC_CLK+	27	SDVOB_BLUE+
4	GROUND	28	GROUND
5	SDVOC_GREEN-	29	SDVOB_RED-
6	SDVOC_GREEN+	30	SDVOB_RED+
7	GROUND	31	GROUND
8	SDVOB_CLK-	32	SDVO1_STALL-
9	SDVOB_CLK+	33	SDVO1_STALL+
10	GROUND	34	GROUND
11	SDVOB_GREEN-	35	SDVO_TVCLKIN-
12	SDVOB_GREEN+	36	SDVO_TVCLKIN+
13	GROUND	37	GROUND
14	SDVOC_INT+	38	SDVO_CLK
15	SDVOC_INT+	39	SDVO_DATA
16	GROUND	40	PCIRST
17	SDVOB_INT+	41	+5VS
18	SDVOB_INT+	42	+5VS
19	GROUND	43	+5VS
20	SDVOC_BLUE-	44	NC
21	SDVOC_BLUE+	45	NC
22	GROUND	46	GROUND
23	SDVOC_RED-	47	GROUND
24	SDVOC_RED+		

Table 4-17: SDVO Connector Pinouts

4.3.16 SATA Drive Connectors

- CN Label:** SATA1 and SATA2
- CN Type:** 7-pin SATA drive connectors
- CN Location:** See Figure 4-18
- CN Pinouts:** See Table 4-18

The two SATA drive connectors are each connected to a first generation SATA drive. First generation SATA drives transfer data at speeds as high as 150 Mb/s. The SATA drives can be configured in a RAID configuration.

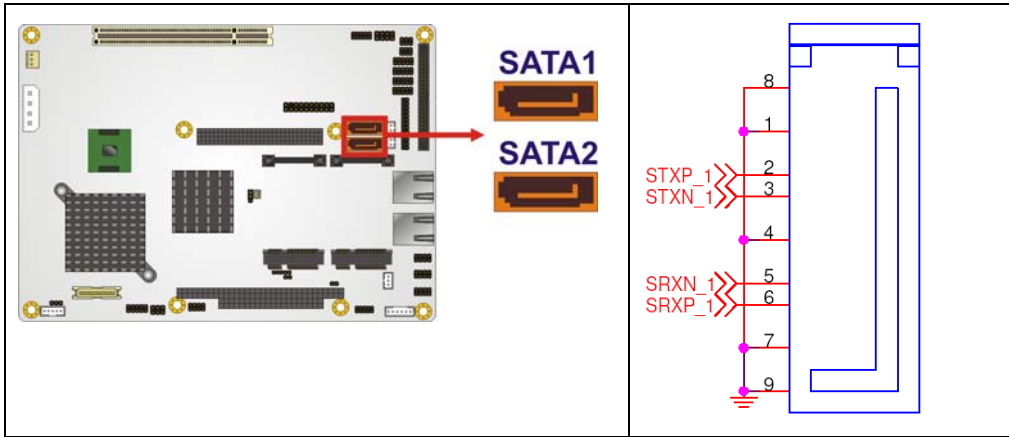


Figure 4-18: SATA Drive Connector Locations

PIN NO.	DESCRIPTION
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

Table 4-18: SATA Drive Connector Pinouts

4.3.17 SATA Power Connectors

- CN Label:** CN1 and CN2
- CN Type:** 2-pin wafer
- CN Location:** See Figure 4-19
- CN Pinouts:** See Table 4-19

The SATA power connector provides +5V power to the SATA drive.

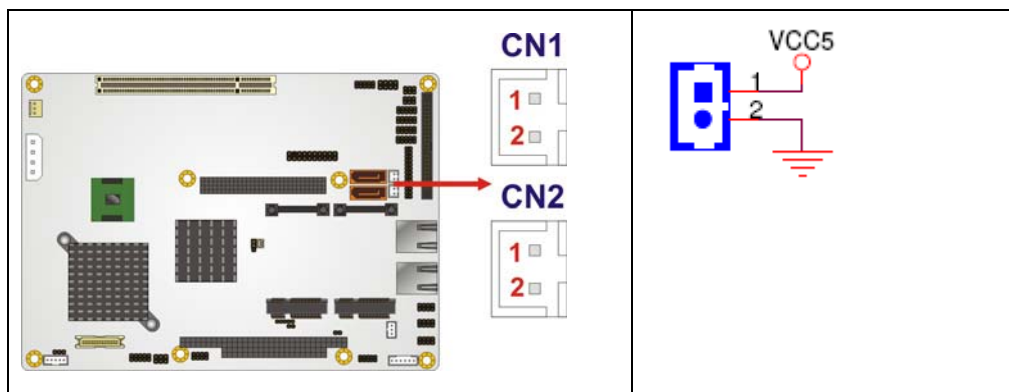


Figure 4-19: SATA Power Connector Locations

PIN NO.	DESCRIPTION
1	+5V
2	GND

Table 4-19: SATA Power Connector Pinouts

4.3.18 Serial Port Connectors (COM 1 ~ COM 4)

- CN Label:** COM1, COM2, COM3 and COM4
- CN Type:** 10-pin header (2x5)
- CN Location:** See Figure 4-20
- CN Pinouts:** See Table 4-20

The 10-pin serial port connector provides a RS-232 serial communications channel. The COM serial port connectors can be connected to external RS-232 serial port devices.

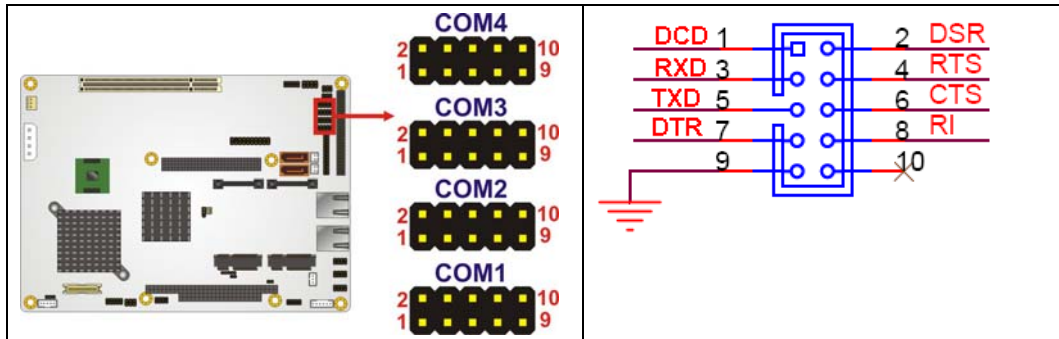


Figure 4-20: COM Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	2	DSR
3	RX	4	RTS
5	TX	6	CTS
7	DTR	8	RI
9	GND	10	N/C

Table 4-20: COM Connector Pinouts

4.3.19 COM 3 RS-422/485 Connector

- CN Label:** JP2
- CN Type:** 6-pin header (2x3)
- CN Location:** See **Figure 4-21**
- CN Pinouts:** See **Table 4-21**

The COM 3 serial port can be set for RS-422/485 connectivity by on-board jumper (refer to **Section 5.5.4**). The JP2 connector provides the RS-422 or RS-485 signals when COM 3 is set for RS-422 or RS-485 devices.

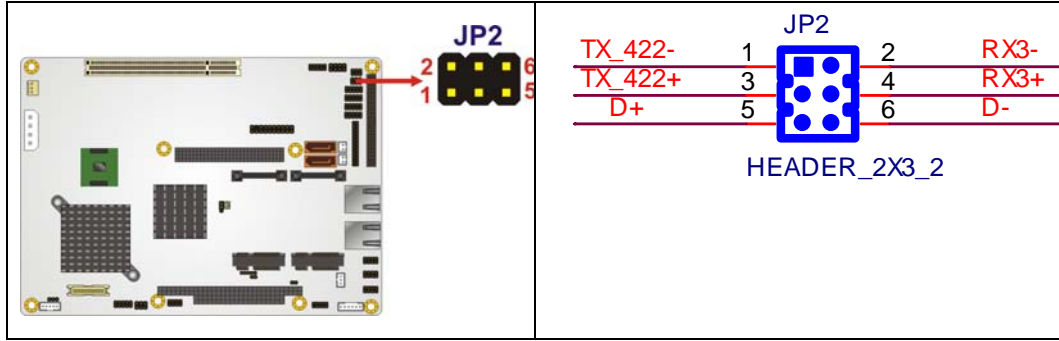


Figure 4-21: COM 3 RS-422/485 Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RS422_TX-	2	RS422_RX-
3	RS422_TX+	4	RS422_RX+
5	RS485_DATA+	6	RS485_DATA-

Table 4-21: COM 3 RS-422/485 Connector Pinouts

4.3.20 Trusted Platform Module (TPM) Connector

- CN Label:** TPM1
- CN Type:** 40-pin header (2x20)
- CN Location:** See **Figure 4-22**
- CN Pinouts:** See **Table 4-22**

The Trusted Platform Module (TPM) connector secures the system on bootup.

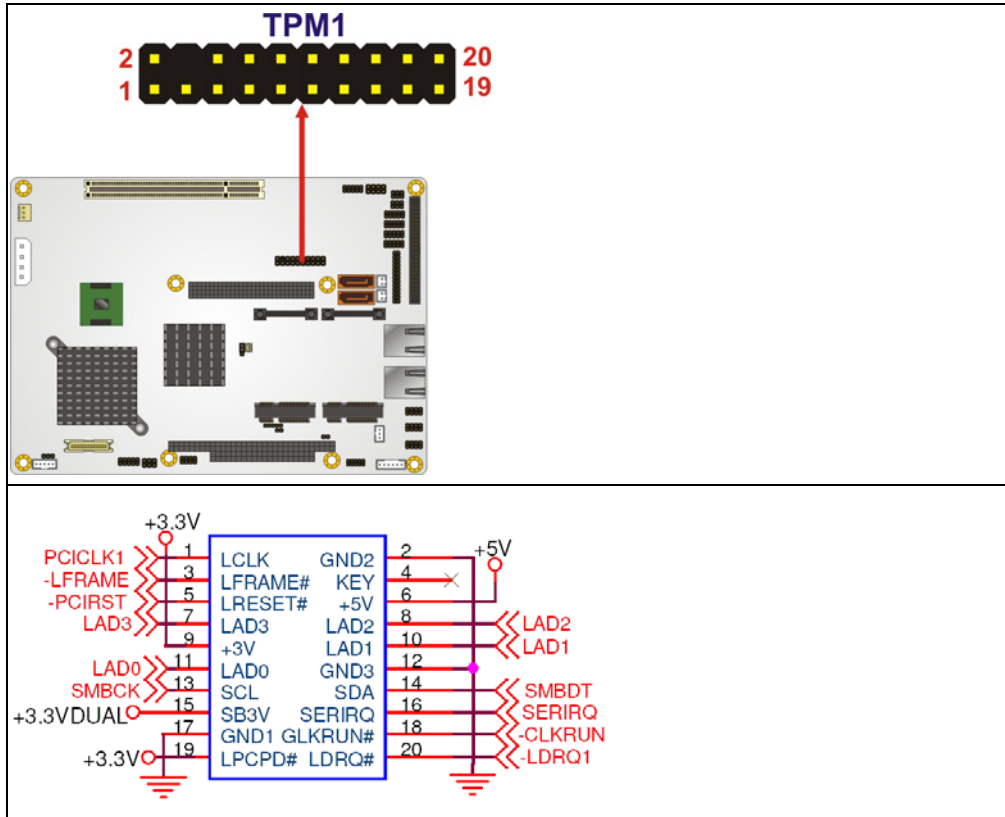


Figure 4-22: TPM Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LCLK	2	GND2
3	LFRAME#	4	KEY
5	LRESET#	6	+5V
7	LAD3	8	LAD2
9	+3V	10	LAD1
11	LAD0	12	GND3
13	SCL	14	SDA
15	SB3V	16	SERIRQ
17	GND1	18	GLKRUN#
19	LPCPD#	20	LDRQ#

Table 4-22: TPM Connector Pinouts

4.3.21 TV Out Connector

- CN Label:** TV1
- CN Type:** 6-pin header (2x3)
- CN Location:** See **Figure 4-23**
- CN Pinouts:** See **Table 4-23**

The 2x3 pin TV out connector connects to a TV output by using an S-Video or RCA connector. The TV out connector makes displaying media data on a television easier.

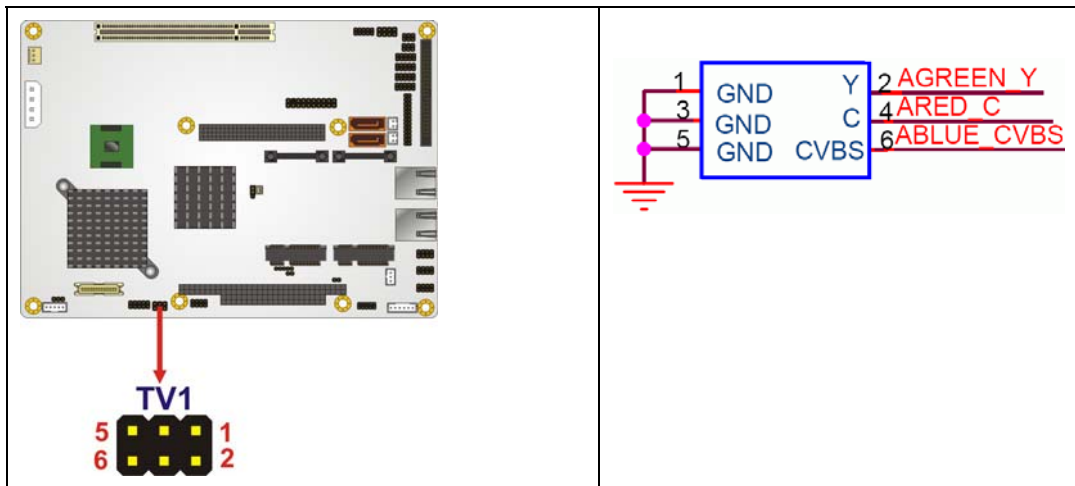


Figure 4-23: TV Connector Pinout Locations

S-Video Connector			
PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	AGREEN_Y
3	GND	4	ARED_C
RCA Connector (only video signal)			
5	GND	6	ABLUE_CVBS

Table 4-23: TV Port Connector Pinouts

4.3.22 USB Connectors (Internal)

CN Label: USB1, USB2 and USB3

CN Type: 8-pin header (2x4)

CN Location: See Figure 4-24

CN Pinouts: See Table 4-24

The 2x4 USB pin connectors each provide connectivity to two USB 1.1 or two USB 2.0 ports. Each USB connector can support two USB devices. Additional external USB ports are found on the rear panel. The USB ports are used for I/O bus expansion.

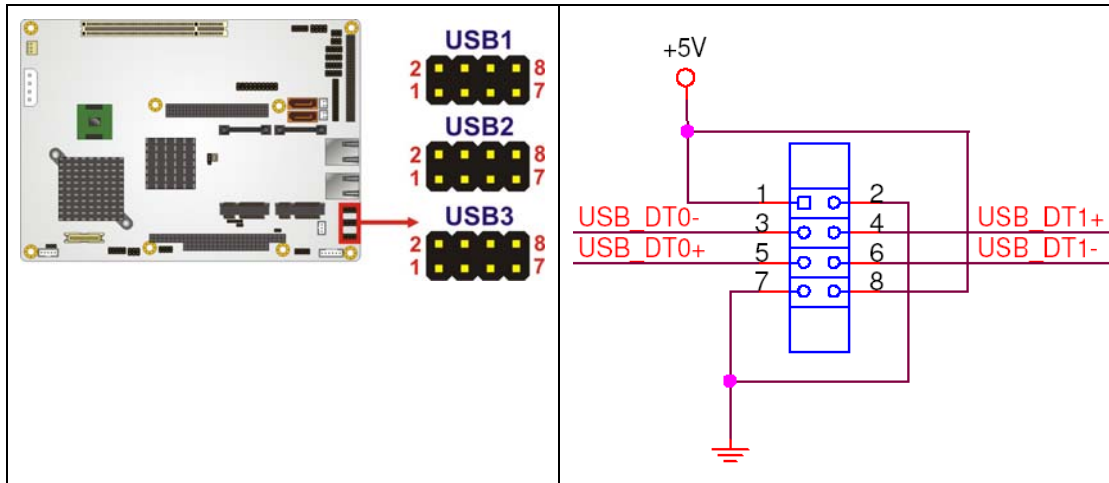


Figure 4-24: USB Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	GND
3	DATA-	4	DATA-
5	DATA+	6	DATA+
7	GND	8	VCC

Table 4-24: USB Port Connector Pinouts

4.4 External Peripheral Interface Connector Panel

Figure 4-25 shows the 3308470 external peripheral interface connector (EPIC) panel.

The 3308470 EPIC panel consists of the following:

- 2 x RJ-45 LAN connectors

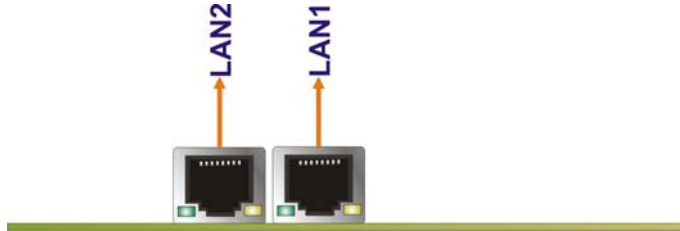


Figure 4-25: 3308470 External Peripheral Interface Connector

4.4.1 LAN Connectors

CN Label: LAN1 and LAN2

CN Type: RJ-45

CN Location: See Figure 4-25

CN Pinouts: See Table 4-25

The 3308470 is equipped with two built-in RJ-45 Ethernet controllers. The controllers can connect to the LAN through two RJ-45 LAN connectors. There are two LEDs on the connector indicating the status of LAN. The pin assignments are listed in the following table:

PIN	DESCRIPTION	PIN	DESCRIPTION
1	MDIA3-	5	MDIA1+
2	MDIA3+	6	MDIA2+
3	MDIA2-	7	MDIA0-
4	MDIA1-	8	MDIA0+

Table 4-25: LAN Pinouts

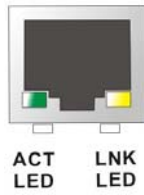


Figure 4-26: RJ-45 Ethernet Connector

The RJ-45 Ethernet connector has two status LEDs, one green and one yellow. The green LED indicates activity on the port and the yellow LED indicates the port is linked. See **Table 4-26**.

STATUS	DESCRIPTION	STATUS	DESCRIPTION
GREEN	Activity	YELLOW	Linked

Table 4-26: RJ-45 Ethernet Connector LEDs

Chapter

5

Installation

5.1 Anti-static Precautions



WARNING:

Failure to take ESD precautions during the installation of the 3308470 may result in permanent damage to the 3308470 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the 3308470. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the 3308470, or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wristband:*** - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding :*** - Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad:*** - When configuring the 3308470, place it on an anti-static pad. This reduces the possibility of ESD damaging the 3308470.
- ***Only handle the edges of the PCB:*** - When handling the PCB, hold the PCB by the edges.

5.2 Installation Considerations



NOTE:

The following installation notices and installation considerations should be read and understood before the 3308470 is installed. All installation notices pertaining to the installation of the 3308470 should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the 3308470 and injury to the person installing the motherboard.

5.2.1 Installation Notices



WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the 3308470, 3308470 components and injury to the user.

Before and during the installation please **DO** the following:

- Read the user manual:
 - The user manual provides a complete description of the 3308470 installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
 - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Place the 3308470 on an antistatic pad:
 - When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- Turn all power to the 3308470 off:

-
- When working with the 3308470, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the 3308470 **DO NOT:**

- Remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- Use the product before verifying all the cables and power connectors are properly connected.
- Allow screws to come in contact with the PCB circuit, connector pins, or its components.

5.2.2 Installation Checklist

The following checklist is provided to ensure the 3308470 is properly installed.

- All the items in the packing list are present
- A compatible memory module is properly inserted into the slot
- The CF Type I or CF Type II card is properly installed into the CF socket
- The jumpers have been properly configured
- The 3308470 is inserted into a chassis with adequate ventilation
- The correct power supply is being used
- The following devices are properly connected
 - Primary and secondary IDE device
 - SATA drives
 - Power supply
 - USB cable
 - Serial port cable
- The following external peripheral devices are properly connected to the chassis:
 - VGA screen
 - Keyboard
 - Mouse
 - RS-232 serial communications device
 - USB devices

5.3 Unpacking

When the 3308470 is unpacked, please check all the unpacking list items listed in Chapter 3 are indeed present. If any of the unpacking list items are not available please contact the 3308470 vendor reseller/vendor where the 3308470 was purchased or contact an GAI sales representative.

5.4 SO-DIMM and CF Card Installation

5.4.1 SO-DIMM Installation



WARNING:

Using incorrectly specified SO-DIMM may cause permanently damage the 3308470. Please make sure the purchased SO-DIMM complies with the memory specifications of the 3308470. SO-DIMM specifications compliant with the 3308470 are listed in **Chapter 2**.

To install a SO-DIMM into a SO-DIMM socket, please follow the steps below and refer to **Figure 5-1**.

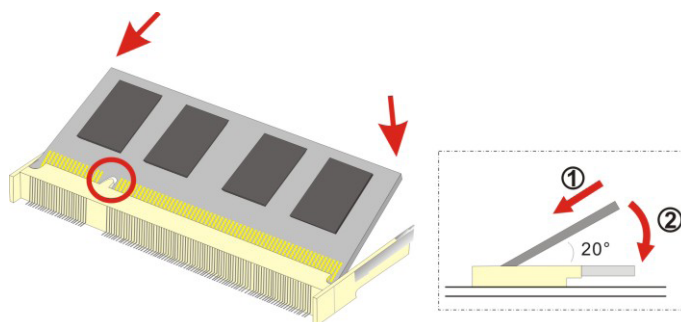


Figure 5-1: SO-DIMM Installation

Step 1: Locate the SO-DIMM socket. Place the 3308470 on an anti-static pad with the solder side facing up.

Step 2: Align the SO-DIMM with the socket. The SO-DIMM must be oriented in such a way that the notch in the middle of the SO-DIMM must be aligned with the plastic bridge in the socket.

Step 3: Insert the SO-DIMM. Push the SO-DIMM chip into the socket at an angle. (See **Figure 5-1**)

Step 4: Open the SO-DIMM socket arms. Gently pull the arms of the SO-DIMM socket out and push the rear of the SO-DIMM down. (See **Figure 5-1**)

Step 5: Secure the SO-DIMM. Release the arms on the SO-DIMM socket. They clip into place and secure the SO-DIMM in the socket.

5.4.2 CF Card Installation



NOTE:

The 3308470 can support both CF Type I cards and CF Type II cards. For the complete specifications of the supported CF cards please refer to **Chapter 2**.

To install the a CF card (Type I or Type II) onto the 3308470, please follow the steps below:

Step 1: Locate the CF card socket. Place the 3308470 on an anti-static pad with the solder side facing up. Locate the CF card.

Step 2: Align the CF card. Make sure the CF card is properly aligned with the CF socket.

Step 3: Insert the CF card. Gently insert the CF card into the socket making sure the socket pins are properly inserted into the socket. See **Figure 5-2**.

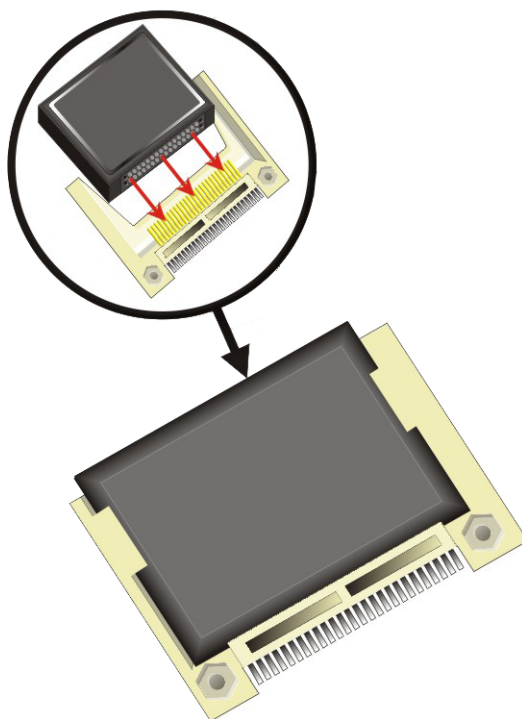


Figure 5-2: CF Card Installation

5.5 Jumper Settings



NOTE:

A jumper is a metal bridge used to close an electrical circuit. It consists of two or three metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.

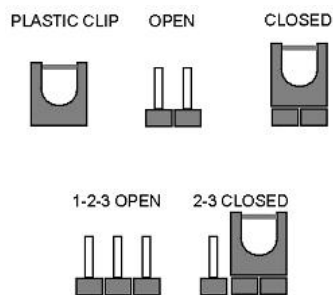


Figure 5-3: Jumper Locations

Before the 3308470 is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the 3308470 are listed in Table 5-1.

Description	Label	Type
AT Power Mode Setting	ATXCTL1	2-pin header
CF Card Setting	J_CF1	2-pin header
Clear CMOS	J_CMOS1	3-pin header
COM3 Function Select	JP1	6-pin header
LVDS Panel Resolution	J_LCD_TYPE1	8-pin header
LVDS Voltage Select	J_VLVDS1	3-pin header

Table 5-1: Jumpers

5.5.1 AT Power Select Jumper Settings

- Jumper Label:** ATXCTL1
- Jumper Type:** 3-pin header
- Jumper Settings:** See Table 5-2
- Jumper Location:** See Figure 5-4

The AT Power Select jumper specifies the systems power mode as AT or ATX. AT Power Select jumper settings are shown in **Table 5-2**.

AT Power Select	Description	
Open	Use ATX power	Default
Short	Use AT power	

Table 5-2: AT Power Select Jumper Settings

The location of the AT Power Select jumper is shown in **Figure 5-4** below.

J_LCD_TYPE1	Description
Open	640 x 480 (18-bit)
Short 1-2	800 x 480 (18-bit)
Short 3-4	800 x 600 (18-bit)
Short 1-2, 3-4	1024 X 768 (18-bit)
Short 5-6	1280X1024 (36-bit)
Short 1-2, 5-6	1400 X 1050 (36-bit)
Short 3-4, 5-6	1400 x 900 (36-bit)
Short 1-2, 3-4, 5-6	1600 x 1200 (36-bit)

Table 5-6: LVDS Panel Resolution Jumper Settings

The LVDS Panel Resolution jumper location is shown in **Figure 5-8**.

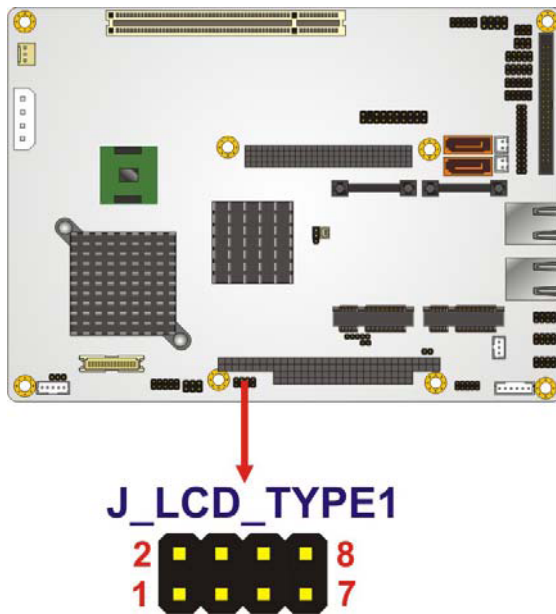


Figure 5-8: LVDS Panel Resolution Jumper Pinout Locations

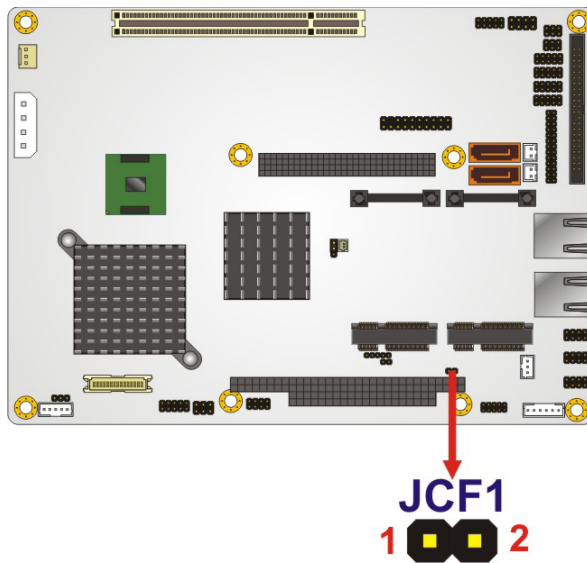


Figure 5-5: CF Card Setup Jumper Location

5.5.3 Clear CMOS Jumper

Jumper Label:	J_CMOS1
Jumper Type:	3-pin header
Jumper Settings:	See Table 5-4
Jumper Location:	See Figure 5-6

If the 3308470 fails to boot due to improper BIOS settings, the clear CMOS jumper clears the CMOS data and resets the system BIOS information. To do this, use the jumper cap to close pins 2 and 3 for a few seconds then reinstall the jumper clip back to pins 1 and 2.

If the “CMOS Settings Wrong” message is displayed during the boot up process, the fault may be corrected by pressing the F1 to enter the CMOS Setup menu. Do one of the following:

- Enter the correct CMOS setting
- Load Optimal Defaults
- Load Failsafe Defaults.

After having done one of the above, save the changes and exit the CMOS Setup menu.

The clear CMOS jumper settings are shown in **Table 5-4**.

Clear CMOS	Description	
Short 1 - 2	Keep CMOS Setup	Default
Short 2 - 3	Clear CMOS Setup	

Table 5-4: Clear CMOS Jumper Settings

The location of the clear CMOS jumper is shown in **Figure 5-6** below.

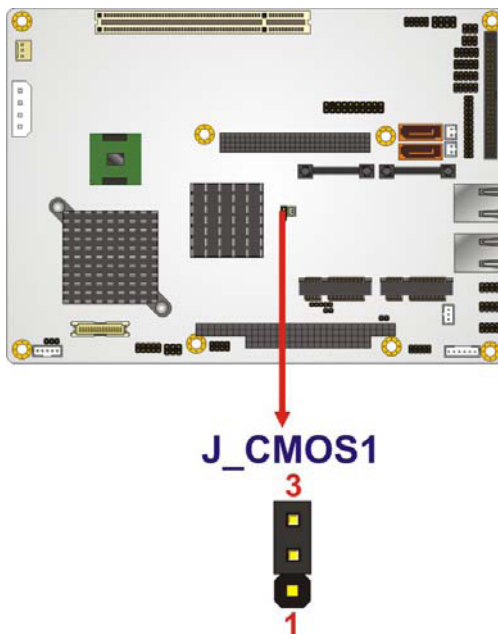


Figure 5-6: Clear CMOS Jumper

5.5.4 COM 3 Function Select Jumper

Jumper Label:	JP1
Jumper Type:	6-pin header
Jumper Settings:	See Table 5-5
Jumper Location:	See Figure 5-7

The COM 3 Function Select jumper sets the communication protocol used by the third serial communications port (COM 3) as RS-232, RS-422 or RS-485. The COM 3 Function Select settings are shown in **Table 5-5**.

COM 3 Function Select	Description	
Short 1-2	RS-232	Default
Short 3-4	RS-422	
Short 5-6	RS-485	

Table 5-5: COM 3 Function Select Jumper Settings

The COM 3 Function Select jumper location is shown in **Figure 5-7**.

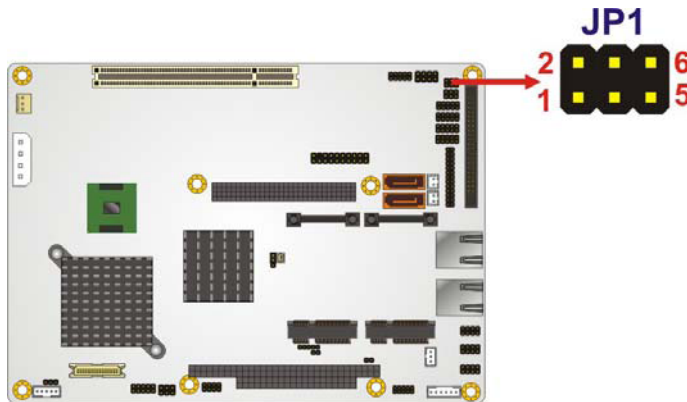


Figure 5-7: COM 3 Function Select Jumper Location

5.5.5 LVDS Panel Resolution Jumper

Jumper Label:	J_LCD_TYPE1
Jumper Type:	8-pin header
Jumper Settings:	See Table 5-6
Jumper Location:	See Figure 5-8

The LVDS Panel Resolution jumper allows the resolution of the LVDS screens connected to the LVDS1 connector to be configured. The LVDS Panel Resolution jumper settings are shown in **Table 5-6**.

J_LCD_TYPE1	Description
Open	640 x 480 (18-bit)
Short 1-2	800 x 480 (18-bit)
Short 3-4	800 x 600 (18-bit)
Short 1-2, 3-4	1024 X 768 (18-bit)
Short 5-6	1280X1024 (36-bit)
Short 1-2, 5-6	1400 X 1050 (36-bit)
Short 3-4, 5-6	1400 x 900 (36-bit)
Short 1-2, 3-4, 5-6	1600 x 1200 (36-bit)

Table 5-6: LVDS Panel Resolution Jumper Settings

The LVDS Panel Resolution jumper location is shown in **Figure 5-8**.

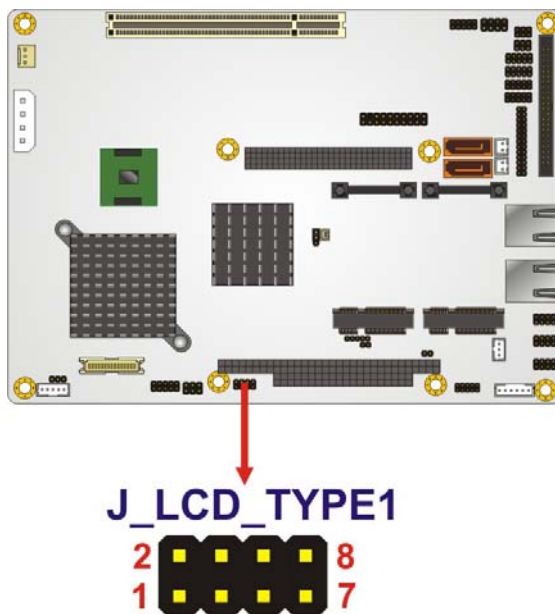


Figure 5-8: LVDS Panel Resolution Jumper Pinout Locations

5.5.6 LVDS Voltage Selection



WARNING:

Permanent damage to the screen and 3308470 may occur if the wrong voltage is selected with this jumper. Please refer to the user guide that came with the monitor to select the correct voltage.

Jumper Label:	J_VLVDS1
Jumper Type:	3-pin header
Jumper Settings:	See Table 5-7
Jumper Location:	See Figure 5-9

The **LVDS Voltage Selection** jumpers allow the LVDS screen voltages to be set. J_VLVDS1 sets the voltage connected to LVDS1 and J_VLVDS2 sets the voltage for the screen connected to LVDS2. The **LVDS Voltage Selection** jumper settings are shown in **Table 5-7**.

LCD Voltage Select	Description	
Short 1-2	+3.3V LVDS	Default
Short 2-3	+5V LVDS	

Table 5-7: LVDS Voltage Selection Jumper Settings

The LVDS Voltage Selection jumper location is shown in **Figure 5-9**.

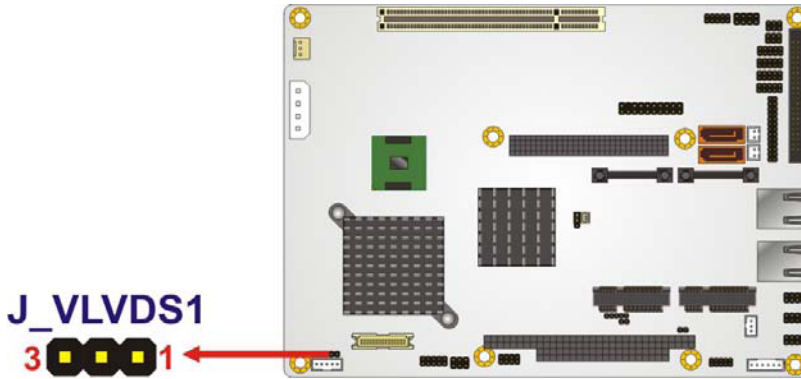


Figure 5-9: LVDS Voltage Selection Jumper Pinout Locations

5.6 Chassis Installation

5.6.1 Airflow



WARNING:

Airflow is critical to the cooling of the CPU and other on-board components. The chassis in which the 3308470 must have air vents to allow cool air to move into the system and hot air to move out.

The 3308470 must be installed in a chassis with ventilation holes on the sides allowing airflow to travel through the heat sink surface. In a system with an individual power supply unit, the cooling fan of a power supply can also help generate airflow through the board surface.



NOTE:

GAI has a wide range of backplanes available. Please contact your 3308470 vendor, reseller or a GAI sales representative at sales@globalamericaninc.com or visit the GAI website (<http://www.globalamericaninc.com>) to find out more about the available chassis.

5.6.2 Motherboard Installation

To install the 3308470 motherboard into the chassis please refer to the reference material that came with the chassis.

5.7 Internal Peripheral Device Connections

5.7.1 Peripheral Device Cables

The cables listed in **Table 5-8** are shipped with the 3308470.

Quantity	Type
1	Audio cable
1	Keyboard and Mouse cable
1	Dual port USB cable
1	RS-232 cable
2	SATA cable
1	VGA cable

Table 5-8: GAI Provided Cables

Some optional items that can be purchased separately and installed on the 3308470 include:

- SATA power cable
- HDD cable
- LPT cable
- HDTV out cable

5.7.2 Audio Kit Installation

The Audio Kit that came with the 3308470 connects to the 10-pin audio connector on the 3308470. The audio kit consists of three audio jacks. One audio jack, Mic In,

connects to a microphone. The remaining two audio jacks, Line-In and Line-Out, connect to two speakers. To install the audio kit, please refer to the steps below:

Step 1: Locate the audio connector. The location of the 10-pin audio connector is shown in **Chapter 3**.

Step 2: Align pin 1. Align pin 1 on the on-board connector with pin 1 on the audio kit connector. Pin 1 on the audio kit connector is indicated with a white dot. See **Figure 5-10**.

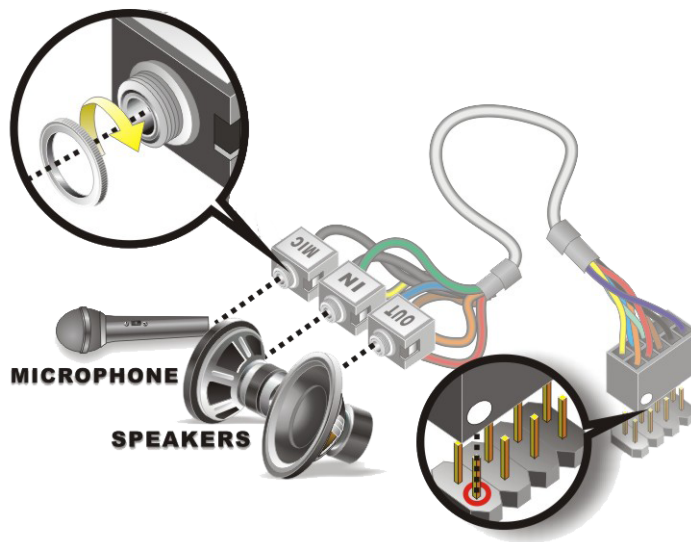


Figure 5-10: Audio Kit Cable Connection

Step 3: Connect the audio devices. Connect one speaker to the line-in audio jack, one speaker to the line-out audio jack and a microphone to the mic-in audio jack.

5.7.3 Keyboard/Mouse Y-cable Connector

The 3308470 is shipped with a keyboard/mouse Y-cable connector. The keyboard/mouse Y-cable connector connects to a keyboard/mouse connector on the

3308470 and branches into two cables that are each connected to a PS/2 connector, one for a mouse and one for a keyboard. To connect the keyboard/mouse Y-cable connector please follow the steps below.

Step 1: Locate the connector. The location of the keyboard/mouse Y-cable connector is shown in **Chapter 3**.

Step 2: Align the connectors. Correctly align pin 1 on the cable connector with pin 1 on the 3308470 keyboard/mouse connector. See Figure 5-11.

Step 3: Insert the cable connectors Once the cable connector is properly aligned with the keyboard/mouse connector on the 3308470, connect the cable connector to the on-board connectors. See **Figure 5-11**.

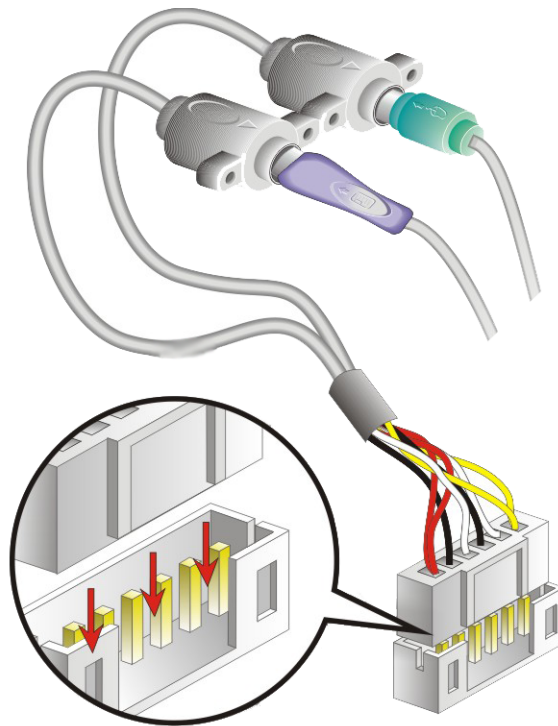


Figure 5-11: Keyboard/mouse Y-cable Connection

Step 4: Attach PS/2 connectors to the chassis. The keyboard/mouse Y-cable connector is connected to two PS/2 connectors. To secure the PS/2 connectors to the chassis please refer to the installation instructions that came with the

chassis.

Step 5: Connect the keyboard and mouse. Once the PS/2 connectors are connected to the chassis, a keyboard and mouse can each be connected to one of the PS/2 connectors. The keyboard PS/2 connector and mouse PS/2 connector are both marked. Please make sure the keyboard and mouse are connected to the correct PS/2 connector.

5.7.4 Single RS-232 Cable (w/o Bracket)

The single RS-232 cable consists of one serial port connector attached to a serial communications cable that is then attached to a D-sub 9 male connector. To install the single RS-232 cable, please follow the steps below.

Step 1: Locate the connector. The location of the RS-232 connector is shown in **Chapter 3**.

Step 2: Insert the cable connector. Insert the connector into the serial port box header. See **Figure 5-12**. A key on the front of the cable connectors ensures the connector can only be installed in one direction.

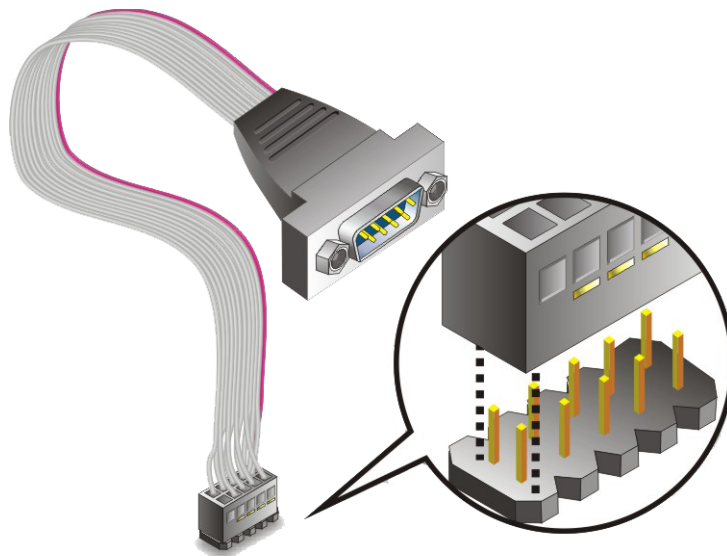


Figure 5-12: Single RS-232 Cable Installation

Step 3: Secure the bracket. The single RS-232 connector has two retention screws that must be secured to a chassis or bracket.

Step 4: Connect the serial device. Once the single RS-232 connector is connected to a chassis or bracket, a serial communications device can be connected to the system.

5.7.5 SATA Drive Connection

The 3308470 is shipped with two SATA drive cables and one SATA drive power cable. To connect the SATA drives to the connectors, please follow the steps below.

Step 1: Locate the connectors. The locations of the SATA drive connectors are shown in **Chapter 3**.

Step 2: Insert the cable connector. Press the clip on the connector at the end of the SATA cable and insert the cable connector into the on-board SATA drive connector. See **Figure 5-13**.

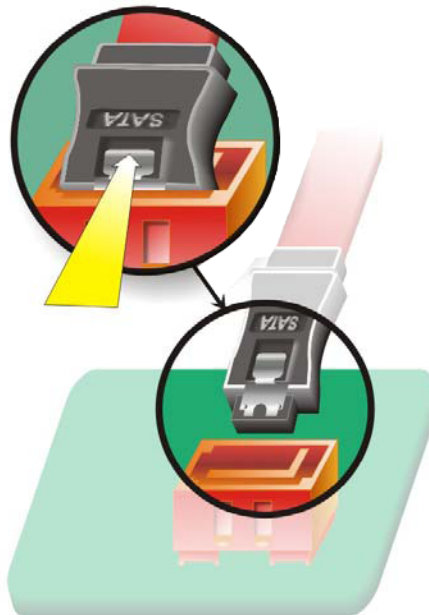


Figure 5-13: SATA Drive Cable Connection

Step 3: Connect the cable to the SATA disk. Connect the connector on the other end of the cable to the connector at the back of the SATA drive. See **Figure 5-14**.

Step 4: Connect the SATA power cable. Connect the SATA power connector to the back of the SATA drive. See **Figure 5-14**.

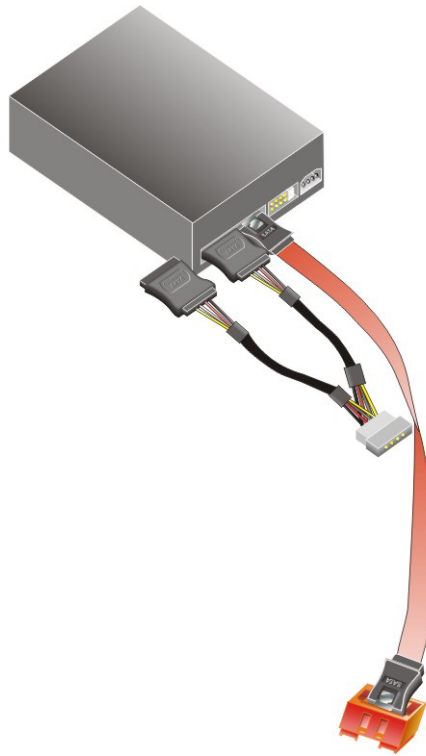


Figure 5-14: SATA Power Drive Connection

5.7.6 USB Cable (Dual Port without Bracket)

The 3308470 is shipped with a dual port USB 2.0 cable. To connect the USB cable connector, please follow the steps below.

Step 1: **Locate the connectors.** The locations of the USB connectors are shown in **Chapter 3**.



WARNING:

If the USB pins are not properly aligned, the USB device can burn out.

Step 2: Align the connectors. The cable has two connectors. Correctly align pin 1 on each cable connector with pin 1 on the 3308470 USB connector.

Step 3: Insert the cable connectors. Once the cable connectors are properly aligned with the USB connectors on the 3308470, connect the cable connectors to the on-board connectors. See **Figure 5-15**.

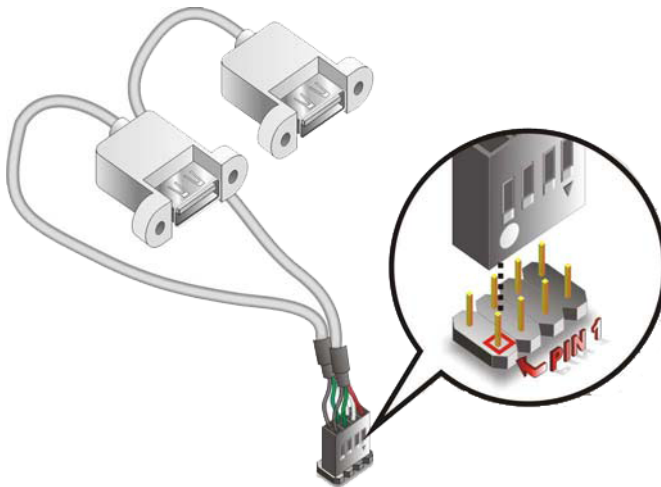


Figure 5-15: Dual USB Cable Connection

Step 4: Attach the USB connectors to the chassis. The USB 2.0 connectors each of two retention screw holes. To secure the connectors to the chassis please refer to the installation instructions that came with the chassis.

5.8 External Peripheral Interface Connection

The following external peripheral devices can be connected to the external peripheral interface connectors.

-
- RJ-45 Ethernet cable connectors

To install these devices, connect the corresponding cable connector from the actual device to the corresponding 3308470 external peripheral interface connector making sure the pins are properly aligned.

5.8.1 LAN Connection (Single Connector)

There are two external RJ-45 LAN connectors. The RJ-45 connectors enable connection to an external network. To connect a LAN cable with an RJ-45 connector, please follow the instructions below.

Step 1: Locate the RJ-45 connectors. The locations of the USB connectors are shown in **Chapter 4**.

Step 2: Align the connectors. Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the 3308470. See Figure 5-16.

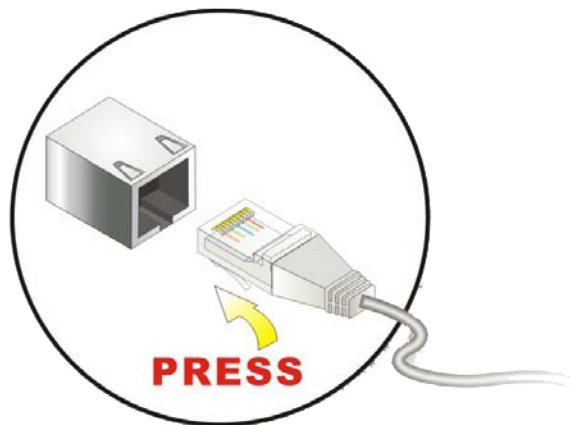


Figure 5-16: LAN Connection

Step 3: Insert the LAN cable RJ-45 connector. Once aligned, gently insert the LAN cable RJ-45 connector into the on-board RJ-45 connector.

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.



Address: Global American, Inc.
17 Hampshire Drive
Hudson, NH 03051

Telephone: Toll Free U.S. Only (800) 833-8999
(603) 886-3900

FAX: (603) 886-4545

Website: <http://www.globalamericaninc.com>

Support: Technical Support at Global American
