User's Manual

3302140

Version 1.0

March 2007

Copyrights

Trademarks

Packing List

NOTE:

If any of the components listed in the checklist below are missing, please do not proceed with the installation. Contact Global American, Inc. (GAI) or contact a GAI sales representative directly. To contact a GAI sales representative, please send an email to salesinfo@globalamericaninc.com.

The items listed below should all be included in the 3302140 package.

- 1 x 3302140 single board computer
- 1 x Enclosure heat sink
- 1 x Audio cable
- 1 x IDE flat cable 44p/44p
- 1 x PS2 keyboard/mouse cable
- 1 x 4 COM port RS-232 cable
- 1 x Mini jumper pack
- 1 x Quick installation guide
- 1 x Utility CD

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

Table of Contents

List of Figures

List of Tables

Glossary

AC '97	Audio Codec 97
ACPI	Advanced Configuration and Power Interface
APM	Advanced Power Management
ARMD	ATAPI Removable Media Device
ASKIR	Shift Keyed Infrared
ATA	Advanced Technology Attachments
BIOS	Basic Input/Output System
CFII	Compact Flash Type 2
CMOS	Complementary Metal Oxide Semiconductor
CPU	Central Processing Unit
Codec	Compressor/Decompressor
COM	Serial Port
DAC	Digital to Analog Converter
DDR	Double Data Rate
DIMM	Dual Inline Memory Module
DIO	Digital Input/Output
DMA	Direct Memory Access
EIDE	Enhanced IDE
EIST	Enhanced Intel SpeedStep Technology
FFIO	Flexible File Input/Output
FIFO	First In/First Out
FSB	Front Side Bus
IrDA	Infrared Data Association
HDD	Hard Disk Drive
IDE	Integrated Data Electronics
I/O	Input/Output
ICH4	I/O Controller Hub 4
L1 Cache	Level 1 Cache
L2 Cache	Level 2 Cache
LCD	Liquid Crystal Display
LPT	Parallel Port Connector
LVDS	Low Voltage Differential Signaling
MAC	Media Access Controller
OS	Operating System
PCI	Peripheral Connect Interface
PIO	Programmed Input Output
PnP	Plug and Play
POST	Power On Self Test
RAM	Random Access Memory
SATA	Serial ATA
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology
SPD	Serial Presence Detect
S/PDI	Sony/Philips Digital Interface
SDRAM	Synchronous Dynamic Random Access Memory
SIR	Serial Infrared
UART	Universal Asynchronous Receiver-transmitter
USB	Universal Serial Bus
VGA	Video Graphics Adapter

THIS PAGE IS INTENTIONALLY LEFT BLANK

Chapter

1

Introduction

1.1 3302140 Overview

The 3302140 is a fanless single board computer using the Intel® Celeron® M processor with high performance and low power consumption. The 3302140 is shipped with an enclosure heat sink for maximum heat dissipation. The 3302140 also comes with an expansion PCI-104 slot which allows flexible implementations. The 3302140 supports various peripheral device interfaces, including Ethernet ports, serial ports, USB 2.0 ports and VGA port. Multiple display support adds versatility to the system enabling system integrators and designers increased flexibility in selecting display panel options.

1.1.1 3302140 Board Variations

Four 3302140 models are available. The models are listed in Table 1-1.

3302140	CPU	Clock Speed— Ultra Low Voltage	Cashe	FSB	TPM
3302140A	Intel Celeron M	1 GHz	Zero cache	400 MHz	No
3302140B	Intel Celeron M	600 MHz	512 KB L2 cache	400 MHz	No
3302140C	Intel Celeron M	1 GHz	Zero cache	400 MHz	Yes
3302140D	Intel Celeron M	600 MHz	512 KB L2 cache	400 MHz	Yes

Table 1-1: 3302140 Board Variations

1.1.2 3302140 Applications

The 3302140 is designed for applications in the following areas:

- Kiosks and Point of Sales
- Restaurants
- Human Machine Interface (HMI) applications
- Marine, GPS and transportation applications
- Financial, retail and kiosk applications

1.1.3 3302140 Benefits

Some of the 3302140 benefits include:

- Reduced hardware costs
- Reduced software costs
- Reduced maintenance costs
- Client crash prevention
- Central resource control
- Security protection

1.1.4 3302140 Features

Some of the 3302140 features are listed below:

- 3.5” form factor
- RoHS compliant
- Fanless design
- ULV Intel® Celeron® M processor installed
- Digital dual-independent display functionality
- Two high performance gigabit Ethernet controllers on-board
- CPU and chipset on the solder side for easy system thermal control
- CompactFlash® card and PCI-104 slot solutions
- Integrated audio
- TPM v1.2 hardware security function supported

1.2 3302140 Board Overview

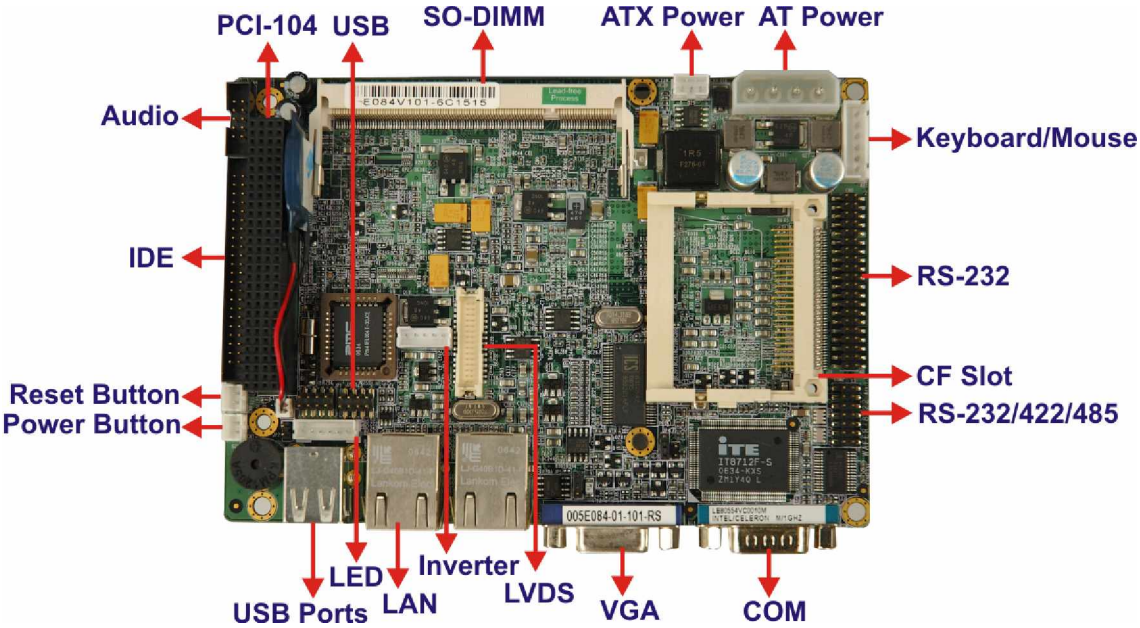


Figure 1-1: 3302140 Overview

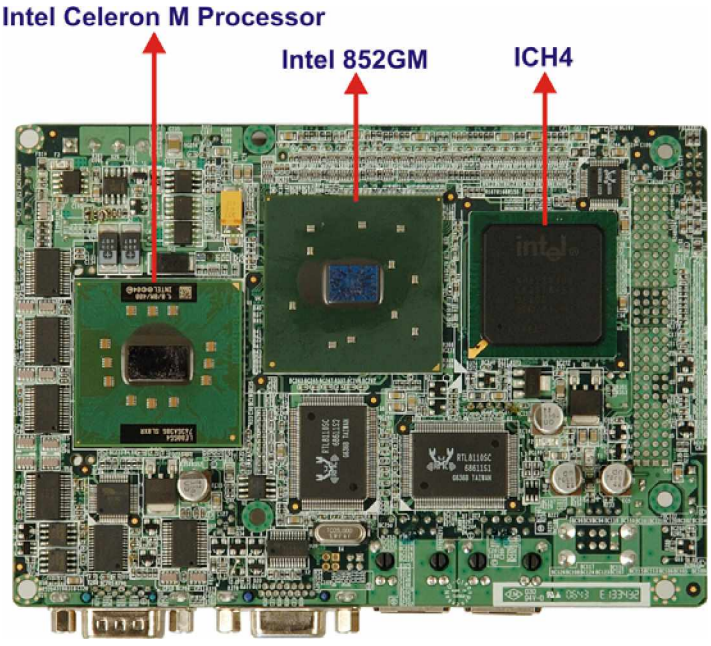


Figure 1-2: 3302140 Solder Side Overview

1.2.1 3302140 Connectors

The 3302140 has the following connectors on-board:

- 1 x AT power connector
- 1 x ATX power connector
- 1 x Audio connector
- 1 x Compact Flash (CF) connector
- 1 x IDE Interface connector
- 1 x Inverter connector
- 1 x Keyboard/mouse connector
- 1 x LED connector
- 1 x PCI-104 connector
- 1 x Power button connector
- 1 x Reset button connector
- 1 x RS-232/422/485 serial port connector
- 1 x RS-232 serial port connector (COM3~COM6)
- 1 x TFT LCD LVDS connector
- 1 x USB connector

The 3302140 has the following connectors on the board rear panel:

- 1 x VGA connector
- 1 x Serial port connector
- 2 x USB 2.0 connectors
- 2 x LAN RJ-45 connectors

The 3302140 has the following on-board jumpers:

- Clear CMOS
- CF Card Setup
- COM Port Jumper Settings
- LCD Voltage Setup
- LCD Panel Resolution Setup

1.2.2 Technical Specifications

3302140 technical specifications are listed in **Table 1-2**. Detailed descriptions of each specification can be found in **Chapter 2**.

Specification	3302140
CPU (On-board)	Intel® Celeron M 600Mhz 512K cache / 1.0GHz zero cache
System Chipset	Intel® 852GM + ICH4
Display	CRT integrated in Intel® 852GM Dual channel 18-bit LVDS
Memory	Supports one 200-pin DDR 266 SO-DIMM module up to 1GB
BIOS	AMI BIOS
SSD	CompactFlash® Type II
Audio	AC'97 Codec Realtek ALC655
LAN	Dual Realtek RTL8110SC GbE
COM	Five RS-232 and One RS-232/RS-422/RS-485
USB2.0	Four USB 1.1 or USB 2.0 devices supported
IDE	One 44-pin IDE connects to two Ultra ATA33/66/100 devices
TPM	One TPM v1.2 module (SINOSUN SSX35) onboard
Watchdog Timer	Software programmable 1-255 sec. by supper I/O
IrDA	One IrDA connector
Expansion	One PCI-104 slot
Power Supply	AT/ATX power support

Temperature	0°C - 60°C
Humidity (operating)	5%~95% non-condensing
Dimensions	146mm x 102mm
Weight (GW/NW)	700g/175g

Table 1-2: Technical Specifications

THIS PAGE IS INTENTIONALLY LEFT BLANK

Chapter

2

Detailed Specifications

2.1 Overview

This chapter describes the specifications and on-board features of the 3302140 in detail.

2.2 Dimensions

2.2.1 Board Dimensions

The dimensions of the board are listed below:

- **Length**: 146mm
- **Width**: 102mm

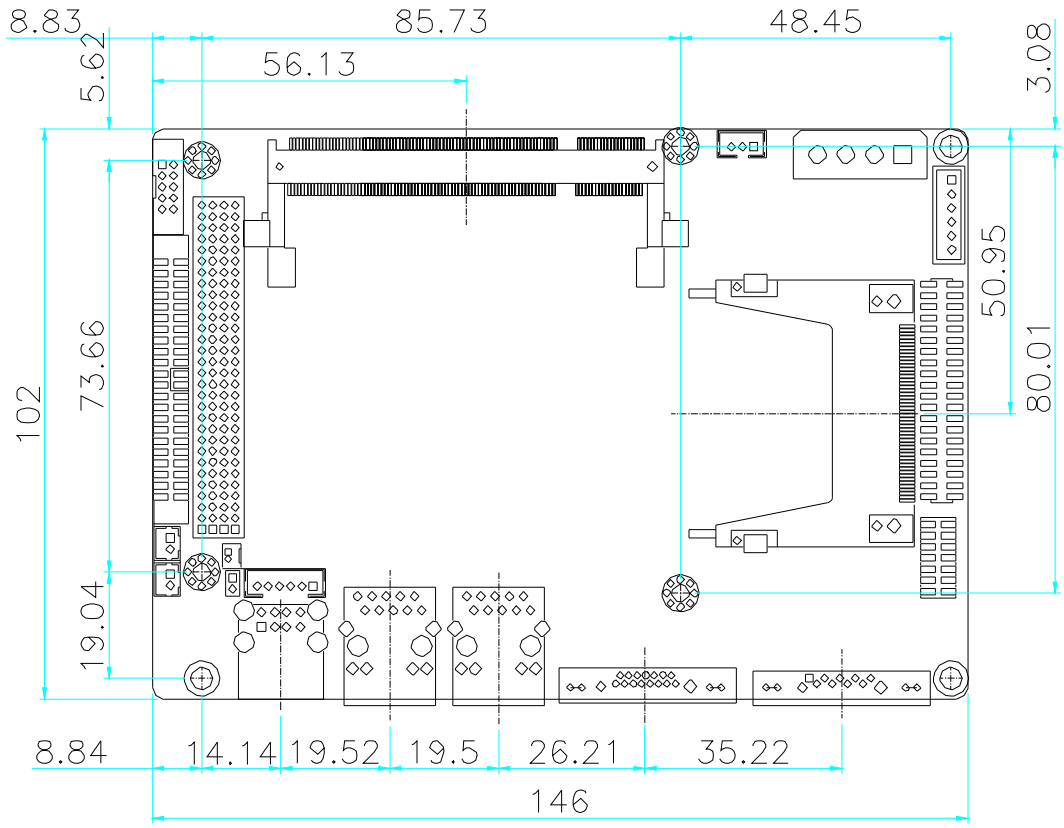


Figure 2-1: 3302140 Dimensions (mm)

2.2.2 External Interface Panel Dimensions

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

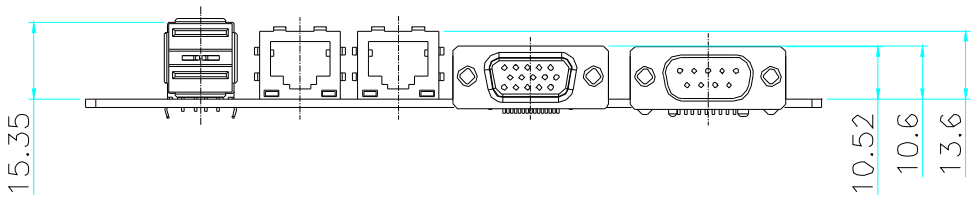
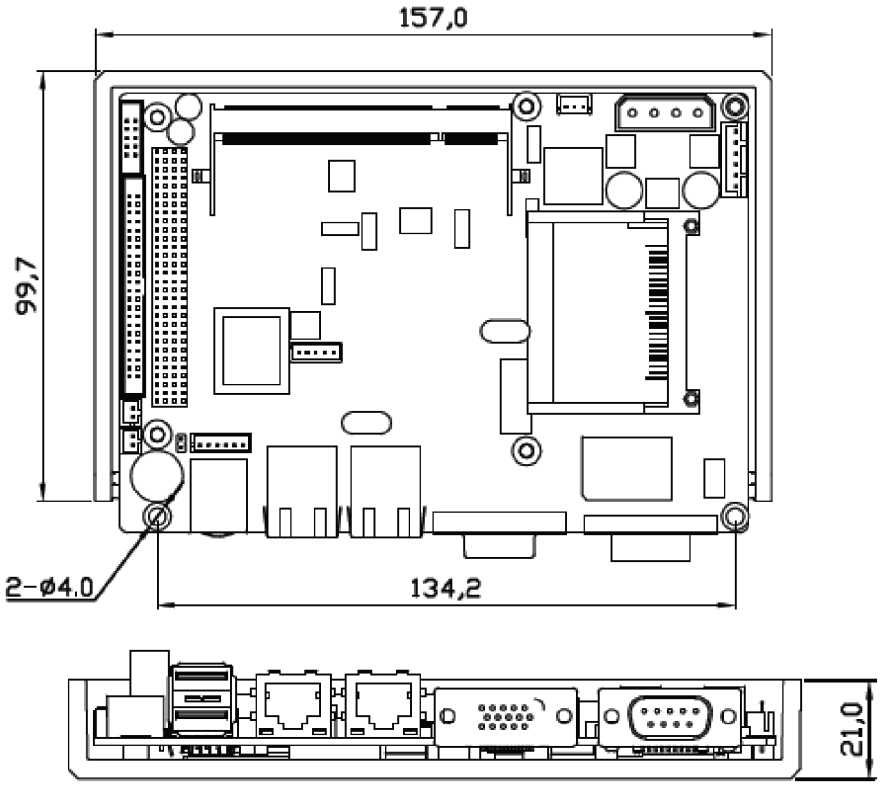


Figure 2-2: External Interface Panel Dimensions (mm)

2.2.3 Enclosure Heat Sink Dimensions

The dimensions of the 3302140 with the enclosure heat sink are shown in **Figure 2-3**.



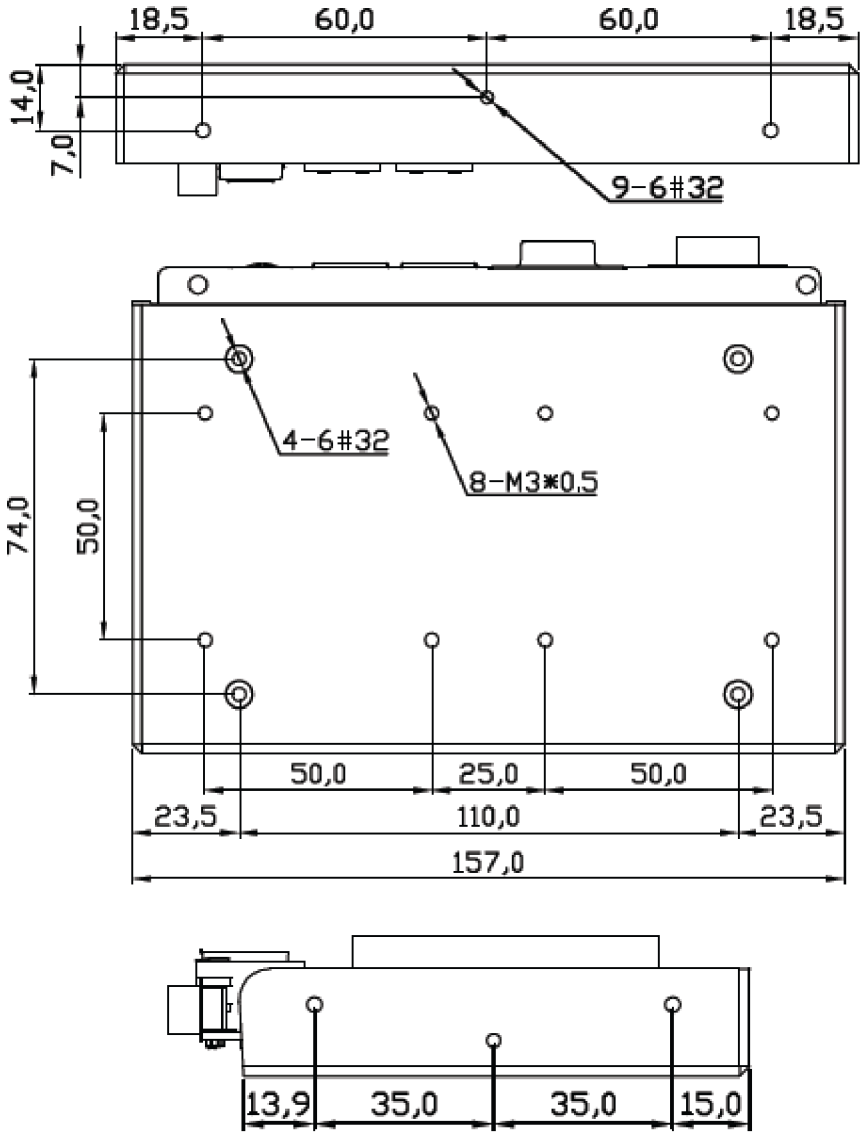


Figure 2-3: Enclosure Heat Sink Dimensions (mm)

2.3 Data Flow

The 3302140 motherboard comes with an Intel® Celeron M CPU. **Figure 2-4** shows the data flow between the system chipset, the CPU and other components installed on the motherboard.

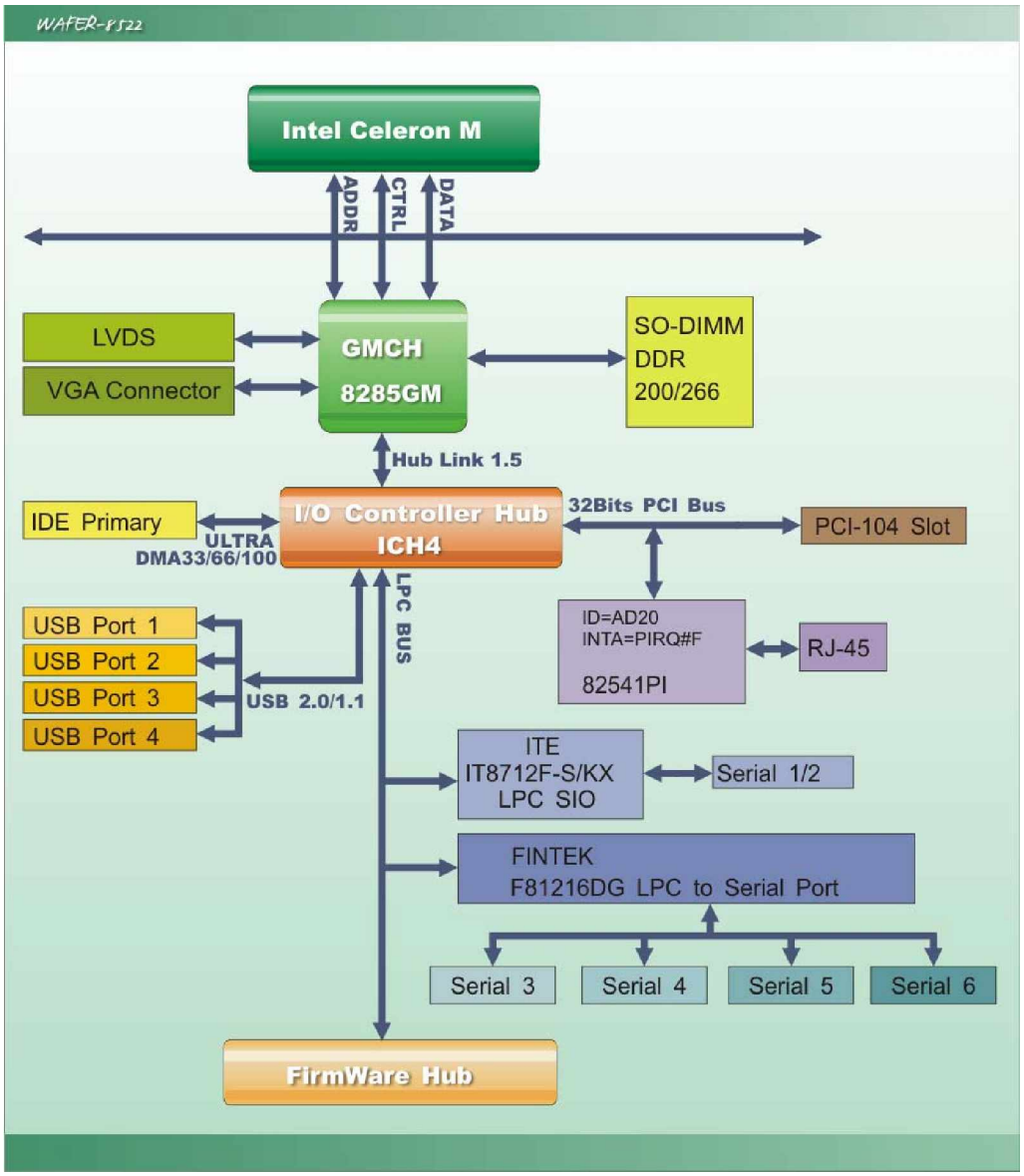


Figure 2-4: Data Flow Block Diagram

2.4 Compatible Processor

2.4.1 CPU Overview

The ULV Intel® Celeron® M processor is installed on the 3302140 motherboard. Specifications for the processors are listed in **Table 2-1** below:

Family	Architecture	Cache	Clock Speed	FSB
ULV Intel® Celeron® M	90 nm	512 KB L2	1.0 GHz	400 MHz
ULV Intel® Celeron® M	90 nm	512 KB L2	600 MHz	400 MHz

Table 2-1: Supported Processors

2.4.2 Intel® Celeron® M

The (ULV) Intel® Celeron® M processor comes with the following features:

- Intel® Streaming SIMD Extensions accelerates 3D graphics performance, video decoding/encoding, and speech recognition.
- Advanced power management features
- Compatible with IA-32 software.
- Advanced branch prediction and data prefetch logic

2.5 Intel® 855GME Chipset Graphics Memory Controller Hub

2.5.1 Intel® 852GM Overview

The Intel® 852GM chipset comes with the following features:

- Supports Intel® NetBurst® micro-architecture
- 400 MHz system bus delivers a high-bandwidth connection between the processor and the platform
- Supports integrated graphics utilizing Intel® Extreme Graphics 2 technology
- Three USB host controllers provide high performance peripherals with 480 Mbps of bandwidth, while enabling support for up to six USB 2.0 ports.
- The latest AC '97 implementation delivers 20-bit audio for enhanced sound quality and full surround-sound capability.

- LAN Connect Interface (LCI) provides flexible network solutions such as 10/100 Mbps Ethernet and 10/100 Mbps Ethernet with LAN manageability
- Dual Ultra ATA/100 controllers, coupled with the Intel® Application Accelerator supports faster IDE transfers to storage devices
- Intel Application Accelerator software provides additional performance over native ATA drivers by improving I/O transfer rates and enabling faster O/S load time, resulting in accelerated boot times

2.5.2 Intel® 852GM Memory Support

The Intel® 852GM supports one DDR memory module with frequencies up to 266MHz. The 3302140 has one 200-pin DDR SDRAM SO-DIMM socket that supports one 200MHz or 266MHz DDR SO-DIMM memory module with a maximum capacity of 1GB.

2.5.3 Intel® 852GM Internal Graphics Controller

The Intel® Extreme Graphics 2 is integrated on the Intel® 852GM Northbridge chipset. The Intel® Extreme Graphics 2 features are listed below.

- **Enhanced Rapid Pixel and Texel Rendering**: Optimized visual quality and performance from the addition of hardware to support of texel formatting, bicubic filter, color blending accuracy, and video mixing render, resulting in optimized visual quality and performance.
- **Zone Rendering 2 Technology**: Enhances the performance of zone rendering by using larger zones and new commands that improve graphics pipeline efficiency.
- **Dynamic Video Memory Technology v2.0**: Increases total system performance by optimizing the efficiency of AGP dynamic video memory by increasing its size of Video RAM allocation to 96 MB.
- **Enhanced Intelligent Memory Management**: Improves memory bandwidth efficiency and platform performance by improving the memory management arbitration between CPU, system memory and graphics memory.

Intel® Extreme Graphics 2 specifications are listed below:

- Enhanced 2D:

- 256-bit internal path
- 8/16/32bpp
- DirectDraw*, GDI, GDI+
- Anti-aliased text support
- Alpha blending
- Alphas stretch blitter
- Hardware alpha blended RGB cursor
- Color space conversion
- 5x2 overlay support
- Rotate, scale and translate operations

„ High-performance 3D:

- 256-bit internal path
- 32bpp/ 24ZorW/ 8 Stencil
- DX7*/DX8*/OGL*1.1
- DXTn texture compression
- Up to 4 textures / pixel on a single pass
- Cubic reflection map
- Embossed/DOT3 bump mapping
- Multi-texture
- DOT3 bump-mapping
- Point sprites

„ Video and Display:

- DirectShow*/DirectVA*
- Hardware motion compensation support for DVD playback
- 4x2 overlay filter
- 350 MHz DAC frequency
- Maximum DVO pixel rate of up to 330MP/s
- Flat panel monitors and TV-out support via AGP Digital Display (ADD) cards
- 350 MHz DAC for 1800x1440 @ 85Hz max CRT resolution or 2048x1536@60Hz max FP resolution
- Synchronous display for dual monitor capabilities
- 350MHz RAMDAC for up to QXGA analog monitor support
- Dual DVO ports for up to QXGA digital display support

„ Multiple display types (LVDS, DVI, TV-out, CRT)

2.6 Intel® 82801DB I/O Controller Hub (ICH4)

2.6.1 Intel® ICH4 Overview

The Intel® ICH4 I/O controller hub comes with the following features:

- PCI Local Bus Specification, Revision 2.2-compliant with support for 33 MHz PCI operations.
- ACPI Power Management Logic Support
- Enhanced DMA controller, Interrupt controller, and timer functions
- Integrated IDE controller supports Ultra ATA100/66/33
- USB host interface with support for 4 USB ports; 3 UHCI host controllers; 1 EHCI high-speed
- USB 2.0 Host controller
- Integrated LAN controller
- System Management Bus (SMBus) Specification, Version 2.0 with additional support for I^2C devices
- Supports Audio Codec '97, Revision 2.3 specification
- Low Pin Count (LPC) interface
- Firmware Hub (FWH) interface support
- Alert On LAN* (AOL) and Alert On LAN 2* (AOL2)

2.6.2 Intel® ICH4 IDE Interface

The single 3302140 IDE connector supports two IDE hard disks and ATAPI devices. 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:

The onboard ATA-6 controller 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
- **Ultra ATA/33**, with data transfer rates up to 33MB/s

Specification	TA/100	TA/66	TA/100
IDE devices	2	2	2
PIO Mode	0 – 4	0 – 4	0 – 4
PIO Max Transfer Rate	16.6 MB/s	16.6 MB/s	16.6 MB/s
DMA/UDMA designation	UDMA 3 - 4	UDMA 3 – 4	UDMA 2
DMA/UDMA Max Transfer	100MB/s	66MB/s	33MB/s
Controller Interface	5V	5V	5V

Table 2-2: Supported HDD Specifications

2.6.3 Intel® ICH4 Compact Flash Interface

The 3302140 CompactFlash socket supports standard CF Type II cards. The chipset flash interface is multiplexed with an IDE interface and can be connected to an array of industry standard NAND Flash or NOR Flash devices.

2.6.4 Intel® ICH4 Audio Codec 97 (AC'97) Controller

The 3302140 has an integrated REALTEK ALC655 CODEC. The ALC655 CODEC is a 16-bit, full-duplex AC'97 Rev. 2.3 compatible six-channel audio CODEC designed for PC multimedia systems, including host/soft audio and AMR/CNR-based designs. Some of the features of the codec 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
- LINE input shared with surround output; MIC input shared with Center and LFE output
- Built-in 50mW/20ohm amplifier for both Front-out and Surround-Out
- External Amplifier Power Down (EAPD) capability
- Power management and enhanced power saving features
- Supports Power-Off CD function
- Adjustable VREFOUT control
- Supports 48KHz S/PDIF output, complying with AC'97 Rev 2.3 specifications
- Supports 32K/44.1K/48KHz S/PDIF input
- Power support: Digital: 3.3V; Analog: 3.3V/5V
- Standard 48-pin LQFP package
- EAX™ 1.0 & 2.0 compatible
- Direct Sound 3D™ compatible
- A3D™ compatible
- I3DL2 compatible
- HRTF 3D positional audio
- 10-band software equalizer
- Voice cancellation and key shifting in Karaoke mode
- AVRack® Media Player
- Configuration Panel for improved user convenience

2.6.5 Intel® ICH4 USB Controller

Two external USB ports on the 3302140 board are interfaced to the chipset USB controller. Four USB 1.1 or USB 2.0 devices can be connected simultaneously to the 3302140. The chipset USB controller has the following specifications:

- 4 USB ports
- USB 1.1 and USB 2.0 compliant

- 3 Universal Host Controller Interface (UHCI) controllers
- High-speed, full-speed and low-speed capable

2.6.6 Intel® ICH4 PCI Interface

The PCI interface on the ICH4 is compliant with the PCI Revision 2.2 implementation. Some of the features of the PCI interface are listed below.

- PCI Revision 2.2 compliant
- 33MHz
- 5V tolerant PCI signals (except PME#)
- Integrated PCI arbiter supports up to six PCI bus masters

2.6.7 Intel® ICH4 Low Pin Count (LPC) Interface

The ICH4 LPC interface complies with the LPC 1.0 specifications. The LPC bus from the ICH4 is connected to the following components:

- BIOS chipset
- Super I/O chipset

2.6.8 BIOS

The BIOS flash memory chip on the 3302140 has a licensed copy of AMI BIOS loaded onto it. The BIOS flash memory chip is connected to the chipset via the LPC bus. The flash BIOS features are listed below:

- SMIBIOS (DMI) compliant
- Console redirection function support
- PXE (**P**re-Boot E**x**ecution **E**nvironment) support
- USB booting support

2.7 PCI Bus Components

2.7.1 PCI Bus Overview

The PCI bus controller on the ICH4 is compliant with PCI Revision 2.2 specifications and has a 33MHz PCI clock. The components listed below are all connected to the PCI bus:

- PCI-104 socket
- Realtek RTL8110SC GbE interface

2.7.2 GbE Ethernet

A highly integrated and cost-effective single-chip, fast RealTek RTL8110SC GbE Ethernet controller is interfaced through first the PCI bus to the CPU and system chipset. The RealTek RTL8110SC controller provides 10Mbps, 100Mbps or 1000Mbps Ethernet connectivity to the 3302140. Some of the features of the RealTek RTL8110SC are listed below.

- Integrated 10/100/1000 transceiver
- Auto-Negotiation with Next Page capability
- Supports PCI rev.2.3, 32-bit, 33/66MHz
- Supports CLKRUNB and MiniPCI v1.0
- Supports pair swap/polarity/skew correction
- Crossover Detection & Auto-Correction
- Wake-on-LAN and remote wake-up support
- Microsoft® NDIS5 Checksum Offload (IP, TCP, UDP) and largesend offload 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
- 3.3V signaling, 5V PCI I/O tolerant
- Transmit/Receive FIFO (8K/64K) support
- Supports power down/link down power saving
- Supports PCI Message Signaled Interrupt (MSI)

2.7.3 PCI-104 Slot

The PCI-104 socket supports PCI-104 modules that are compliant with PCI Specification, Revision 1.0. The PCI-104 modules are easily installed into the socket. The standard PCI-104 modules are 95.89mm wide, 90.17mm long.

2.8 LPC Bus Components

2.8.1 LPC Bus Overview

The LPC bus is connected to components listed below:

- BIOS chipset
- Super I/O chipset

2.8.2 BIOS Chipset

The BIOS chipset has a licensed copy of AMI BIOS installed on the chipset. Some of the BIOS features are listed below:

- AMI Flash BIOS
- SMIBIOS (DMI) compliant
- Console redirection function support
- PXE (Pre-boot Execution Environment) support
- USB booting support

2.8.3 Super I/O Chipset

The iTE IT8712F Super I/O chipset is connected to the ICH4 through the LPC bus. The iTE IT8712F is an LPC interface-based Super I/O device that comes with Environment Controller integration. Some of the features of the iTE IT8712F chipset are listed below:

- LPC Interface
- PC98/99/2001, ACPI and LANDesk Compliant
- Enhanced Hardware Monitor
- SmartGuardian Controller
- Single +5V Power Supply

- Two 16C550 UARTs for serial port control
- One IEEE 1284 Parallel Port
- Keyboard Controller
- Watchdog Timer
- Serial IRQ Support
- Vbat & Vcch Support
- Single +5V Power Supply

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

2.8.3.1 Super I/O 16C550 UARTs

The onboard 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 four serial port connectors (COM3, COM4, COM5 and COM6).

2.8.3.2 Super I/O Keyboard Controller

The Super I/O keyboard 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

2.9 TPM Module

The 3302140 has one SINOSUN SSX35 TPM v1.2 module on-board. Some of the TPM module features are listed below:

- Fully compatible with TCG v1.2 Specifications
- SINOSUN 8-bit CPU core
- Embedded 16KB secure data FLASH memory and 16KB RAM

- 128KB program FLASH memory supporting online update of firmware
- RSA engine supports up to 2048 bits RSA algorithm
- Embedded SHA-1 algorithm engine

2.10 Environmental and Power Specifications

2.10.1 System Monitoring

Three thermal inputs on the 3302140 Super I/O Enhanced Hardware Monitor monitor the following temperatures:

- System temperature
- Temperature Sensor #1

Eight voltage inputs on the 3302140 Super I/O Enhanced Hardware Monitor monitor the following voltages:

- CPU Core
- VCC
- +3.3V
- +5.0V
- +1.5V
- VBAT

The 3302140 Super I/O Enhanced Hardware Monitor also monitors the CPU fan speeds.

2.10.2 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the 3302140 are listed below.

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

A cooling fan and 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.

2.10.3 Power Consumption

Table 2-3 shows the power consumption parameters for the 3302140 when an Intel® Celeron® M 1.0GHz CPU is running with one 1GB 400MHz DDR SDRAM memory module.

Voltage	Current
5V	3.43A
12V	0.13A

Table 2-3: Power Consumption

THIS PAGE IS INTENTIONALLY LEFT BLANK

Chapter

3

Unpacking

3.1 Anti-static Precautions

 **WARNING:**

Failure to take ESD precautions during the installation of the 3302140 may result in permanent damage to the 3302140 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the 3302140. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the 3302140, 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 3302140, place it on an antic-static pad. This reduces the possibility of ESD damaging the 3302140.
- ***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 3302140 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 3302140 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 some of the components listed in the checklist below are missing, please do not proceed with the installation. Contact GAI or contact a GAI sales representative directly. To contact a GAI sales representative, please send an email to salesinfo@globalamericaninc.com.

3.3.1 Package Contents

The 3302140 is shipped with the following components:

Quantity	Item	Image
1	3302140 single board computer	
1	Enclosure heat sink	
1	Audio cable	
1	IDE flat cable 44p/44p	
1	PS2 keyboard/mouse cable	

1	4 COM port RS-232 cable	
1	Mini jumper pack	
1	Quick installation guide	
1	Utility CD	

Table 3-1: Package List Contents

Chapter

4

Connector Pinouts

4.1 Peripheral Interface Connectors

Section 4.1.2 shows peripheral interface connector locations. Section 4.1.2 lists all the peripheral interface connectors seen in Section 4.1.2.

4.1.1 3302140 Layout

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

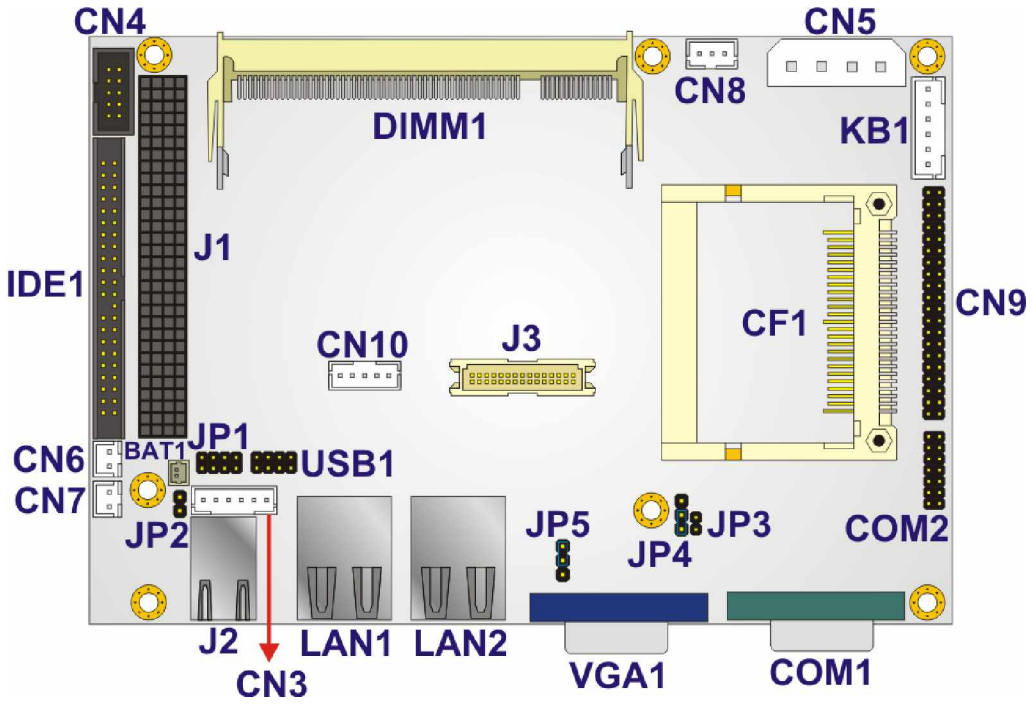


Figure 4-1: Connector and Jumper Locations

4.1.2 Peripheral Interface Connectors

Table 4-1 shows a list of the peripheral interface connectors on the 3302140. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
AT power connector	4-pin wafer connector	CN5
ATX power connector	3-pin wafer connector	CN8
Audio connector	10-pin box header	CN4
Compact Flash (CF) connector	50-pin CF slot	CF1
IDE Interface connector	44-pin box header	IDE1
Inverter connector	5-pin wafer connector	CN10
Keyboard/mouse connector	6-pin wafer connector	KB1
LED connector	6-pin header	CN3
PCI-104 connector	PCI-104 slot	J1
Power button connector	2-pin wafer connector	CN7
Reset button connector	2-pin wafer connector	CN6
RS-232/422/485 serial port connector	14-pin header	COM2
RS-232 serial port connector (COM3~COM6)	40-pin header	CN9
TFT LCD LVDS connector	30-pin crimp connector	LVDS1
USB connector	8-pin header	USB1

Table 4-1: Peripheral Interface Connectors

4.1.3 External Interface Panel Connectors

Table 4-2 lists the rear panel connectors on the 3302140. Detailed descriptions of these connectors can be found in **Section 4.2.15** on **page 54**.

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

RS-232 serial port connector	DB-9 connector	COM1
USB ports	USB port	J2
VGA port connector	15-pin female	VGA1

Table 4-2: Rear Panel Connectors

4.2 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 3302140.

4.2.1 AT Power Connector

CN Label: **CN5**

CN Type: 4-pin wafer connector (1x4)

CN Location: See **Figure 4-2**

CN Pinouts: See **Table 4-3**

The 4-pin AT power connector is connected to an AT power supply.

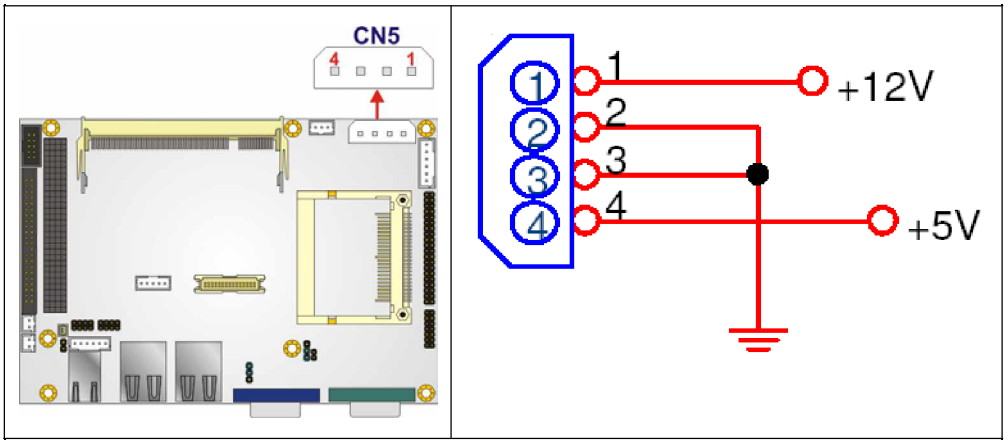


Figure 4-2: AT Power Connector Location

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

Table 4-3: AT Power Connector Pinouts

4.2.2 ATX Power Connector

CN Label: **CN8**

CN Type: 3-pin wafer connector (1x3)

CN Location: See **Figure 4-3**

CN Pinouts: See **Table 4-4**

The 3-pin ATX power connector is connected to an ATX power supply.

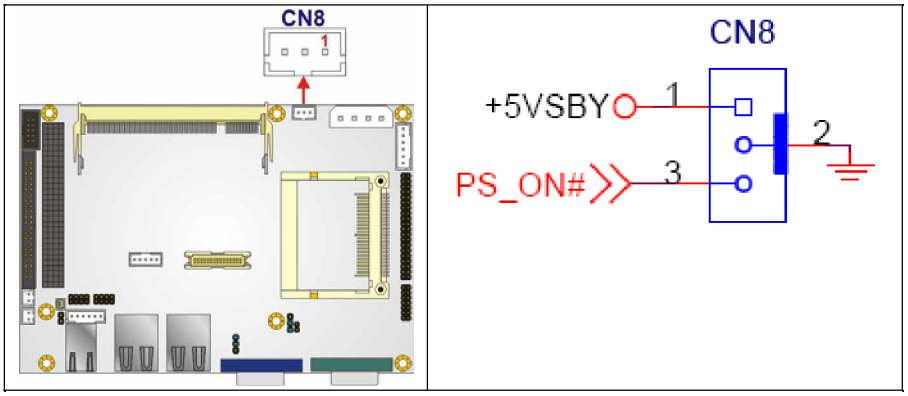


Figure 4-3: ATX Power Connector Location

PIN NO.	DESCRIPTION
1	+5V_SB
2	GROUND

3	PS_ON

Table 4-4: ATX Power Connector Pinouts

4.2.3 Audio Connector

CN Label: **CN4**

CN Type: 10-pin box header (2x5)

CN Location: See **Figure 4-4**

CN Pinouts: See **Table 4-5**

The 10-pin audio connector is connected to speakers the output of audio signals from the system.

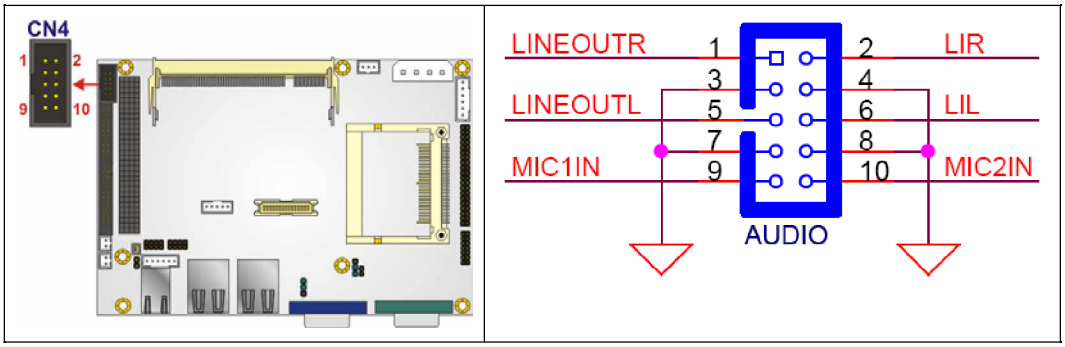


Figure 4-4: Audio Connector Pinouts

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LINEOUT_R	2	LINEIN_R
3	GROUND	4	GROUND
5	LINEOUT_L	6	LINEIN_L
7	GROUND	8	GROUND
9	MIC1IN	10	MIC2IN

Table 4-5: Audio Connector Pinouts

4.2.4 Compact Flash Socket

CN Label: **CF1**

CN Type: 50-pin CF slot (2x25)

CN Location: See **Figure 4-5**

CN Pinouts: See **Table 4-6**

A CF Type II memory card is inserted to the CF socket of the 3302140.

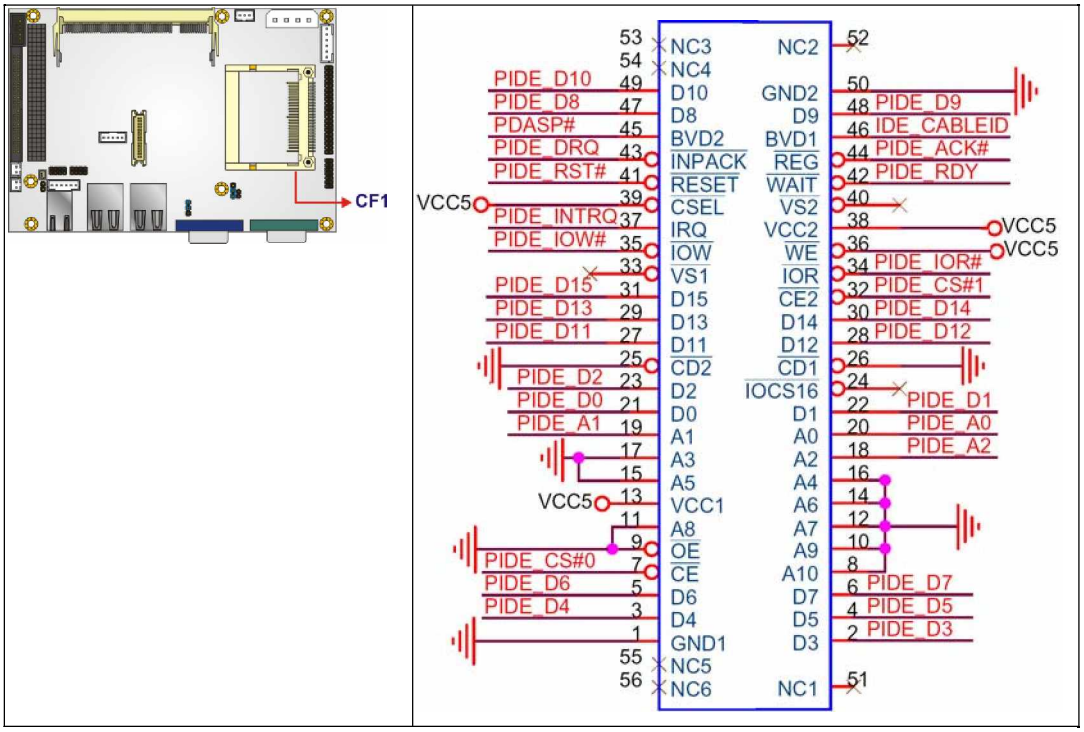


Figure 4-5: CF Card Socket Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	26	GROUND

2	D3	27	D11
3	D4	28	D12
4	D5	29	D13
5	D6	30	D14
6	D7	31	D15
7	CS1#	32	CS3#
8	N/C	33	N/C
9	GROUND	34	IOR#
10	N/C	35	IOW#
11	N/C	36	VCC
12	N/C	37	IRQ15
13	VCC	38	VCC
14	N/C	39	MASTER/SLAVE
15	N/C	40	N/C
16	N/C	41	RESET#
17	N/C	42	IORDY
18	A2	43	DMARQ
19	A1	44	DMACK#
20	A0	45	ACTIVE#
21	D0	46	PDIAG#
22	D1	47	D8
23	D2	48	D9
24	N/C	49	D10
25	GROUND	50	GROUND

Table 4-6: CF Card Socket Pinouts

4.2.5 IDE Connector

CN Label: **IDE1**

CN Type: 44-pin box header (2x22)

CN Location: See **Figure 4-6**

CN Pinouts: See **Table 4-7**

One 44-pin IDE device connector on the 3302140 supports connectivity to two hard disk drives.

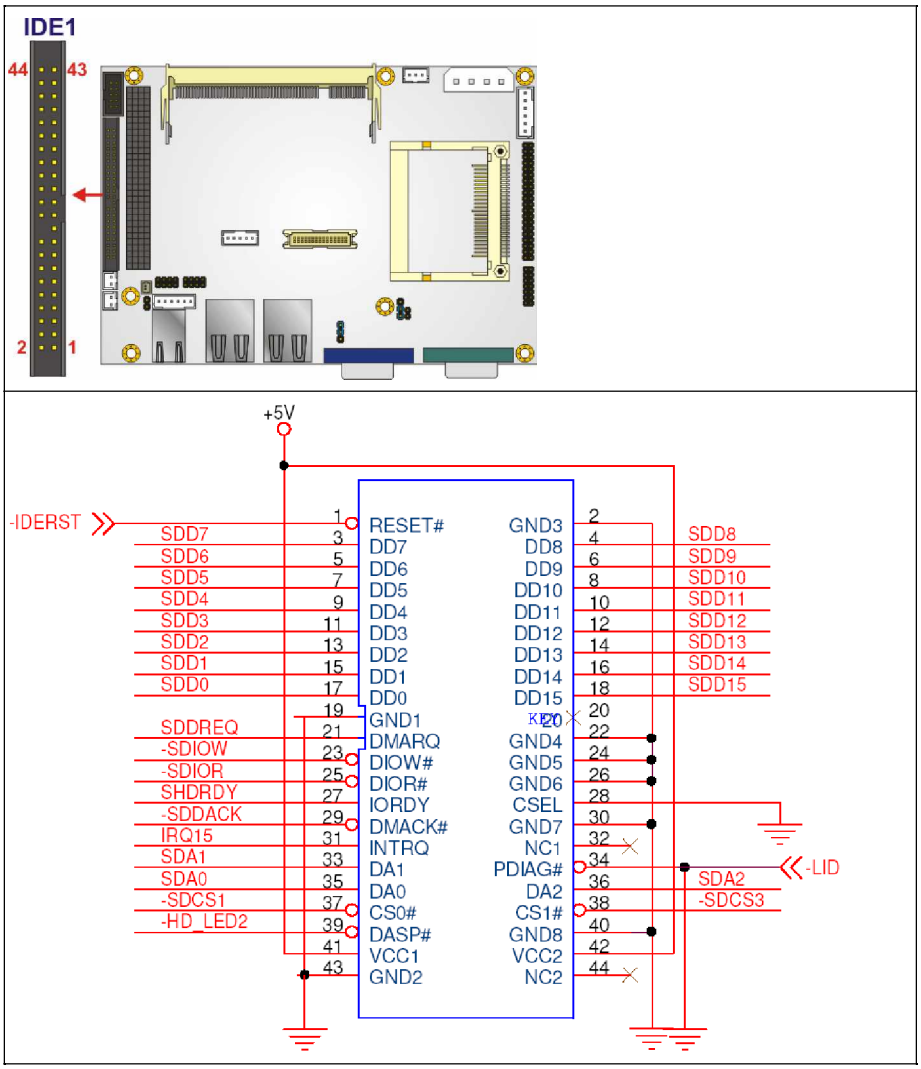


Figure 4-6: IDE Device Connector Location

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	DMARQ	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	IORDY	28	BALE
29	DMACK#	30	GROUND
31	INTERRUPT	32	N/C
33	SA1	34	PDIAG
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND
41	+5V	42	+5V
43	GROUND	44	N/C

Table 4-7: IDE Connector Pinouts

4.2.6 Inverter Power Connector

CN Label: **CN10**

CN Type: 5-pin wafer connector (1x5)

CN Location: See **Figure 4-7**

CN Pinouts: See **Table 4-8**

The inverter connector is connected to the LCD backlight.

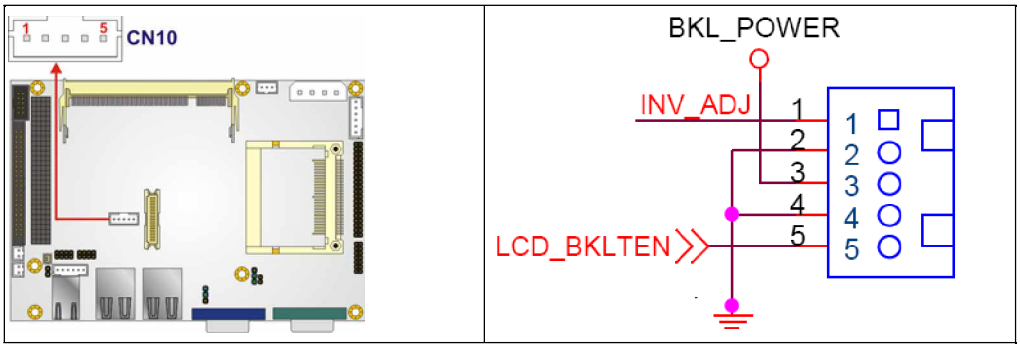


Figure 4-7: Inverter Connector Location

PIN NO.	DESCRIPTION
1	INV_ADJ
2	GND
3	+12V
4	GND
5	(H)ON/OFF(L)

Table 4-8: Inverter Power Connector Pinouts

4.2.7 Keyboard/Mouse Connector

CN Label: **KB1**

CN Type: 6-pin wafer connector (1x6)

CN Location: See **Figure 4-8**

CN Pinouts: See **Table 4-9**

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

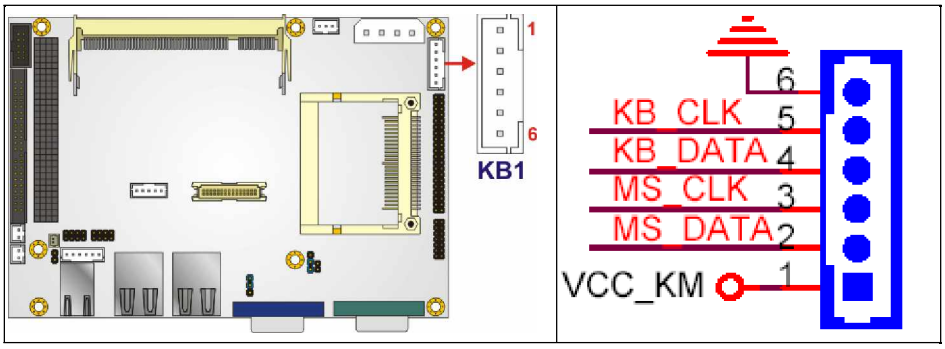


Figure 4-8: Keyboard/Mouse Connector Location

PIN NO.	DESCRIPTION
1	+5V
2	MS DATA
3	MS CLK
4	KB DATA
5	KB CLK
6	GROUND

Table 4-9: Keyboard/Mouse Connector Pinouts

4.2.8 LED Connector

CN Label: **CN3**

CN Type: 6-pin header (1x6)

CN Location: See **Figure 4-9**

CN Pinouts: See **Table 4-10**

The LED connector connects to an HDD indicator LED and a power LED on the system chassis to inform the user about HDD activity and the power on/off status of the system.

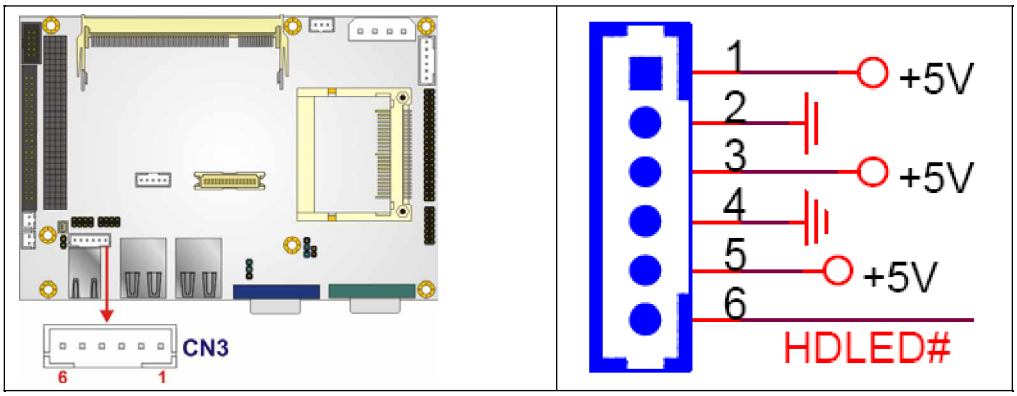


Figure 4-9: LED Connector Locations

PIN NO.	DESCRIPTION
1	+5V
2	GROUND
3	+5V
4	GROUND
5	HDLED+
6	HDLED-

Table 4-10: LED Connector Pinouts

4.2.9 PCI-104 Slot

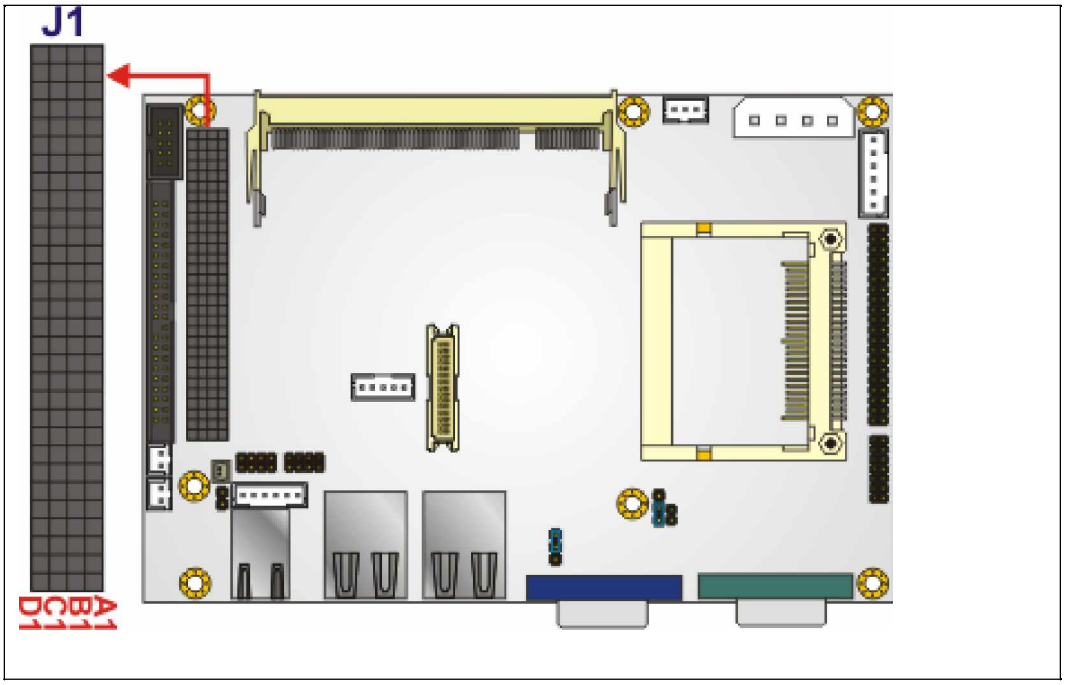
CN Label: **J1**

CN Type: 120-pin PCI-104 slot

CN Location: See **Figure 4-10**

CN Pinouts: See **Table 4-11**

The PCI-104 slot enables a PCI-104 compatible expansion module to be connected to the board.


J1

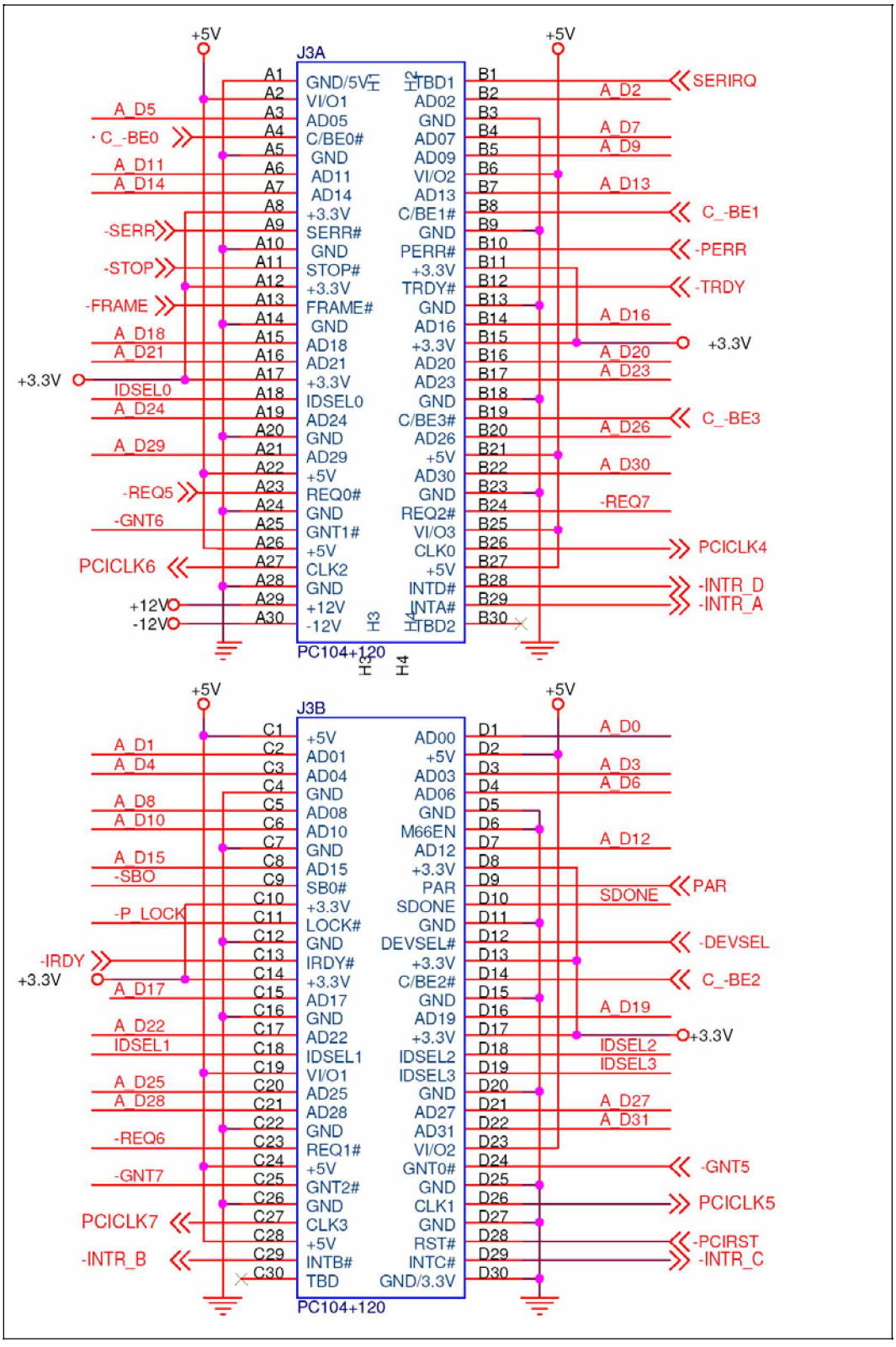

J3A
PC104+120
J3B
PC104+120
+5V
+3.3V
+12V
-12V
GND
A_D5
C_-BE0
A_D11
A_D14
-SERR
-STOP
-FRAME
A_D18
A_D21
IDSEL0
A_D24
A_D29
-REQ5
-GNT6
PCICLK6
SERIRQ
A_D2
A_D7
A_D9
A_D13
C_-BE1
-PERR
-TRDY
A_D16
A_D20
A_D23
C_-BE3
A_D26
A_D30
-REQ7
PCICLK4
-INTR_D
-INTR_A
A_D1
A_D4
A_D8
A_D10
A_D15
-SBO
-P_LOCK
-IRDY
A_D17
A_D22
IDSEL1
A_D25
A_D28
-REQ6
-GNT7
PCICLK7
-INTR_B
A_D0
A_D3
A_D6
A_D12
PAR
SDONE
-DEVSEL
C_-BE2
A_D19
IDSEL2
IDSEL3
A_D27
A_D31
-GNT5
PCICLK5
-PCIRST
-INTR_C

Figure 4-10: PCI-104 Slot Location

Pin No.	Column A	Column B	Column C	Column D
1	GND/5V	TBD1	5V	AD00
2	VI/O1	AD02	AD01	+5V
3	AD05	GND	AD04	AD03
4	C/BE0#	AD07	GND	AD06
5	GND	AD09	AD08	GND
6	AD11	VI/O2	AD10	M66EN
7	AD14	AD13	GND	AD12
8	+3.3V	C/BE1#	AD15	+3.3V
9	SERR#	GND	SB0#	PAR
10	GND	PERR#	+3.3V	SDONE
11	STOP#	+3.3V	LOCK#	GND
12	+3.3V	TRDY#	GND	DEVSEL#
13	FRAME#	GND	IRDY#	+3.3V
14	GND	AD16	+3.3V	C/BE2#
15	AD18	+3.3V	AD17	GND
16	AD21	AD20	GND	AD19
17	+3.3V	AD23	AD22	+3.3V
18	IDSEL0	GND	IDSEL1	IDSEL2
19	AD24	C/BE3#	VI/O1	IDSEL3
20	GND	AD26	AD25	GND
21	AD29	+5V	AD28	AD27
22	+5V	AD30	GND	AD31
23	REQ0#	GND	REQ1#	VI/O2
24	GND	REQ2#	+5V	GNT0#
25	GNT1#	VI/O3	GNT2#	GND
26	+5V	CLK0	GND	CLK1
27	CLK2	+5V	CLK3	GND

28	GND	INTD#	+5V	RST#
29	+12V	INTA#	INTB#	INTC#
30	-12V	TBD2	TBD	GND/3.3V

Table 4-11: PCI-104 Slot Connector Pinouts

4.2.10 Power Button Connector

CN Label: **CN7**

CN Type: 2-pin wafer connector (1x2)

CN Location: See **Figure 4-11**

CN Pinouts: See **Table 4-12**

The power button connector is connected to a power switch on the system chassis to enable users to turn the system on and off.

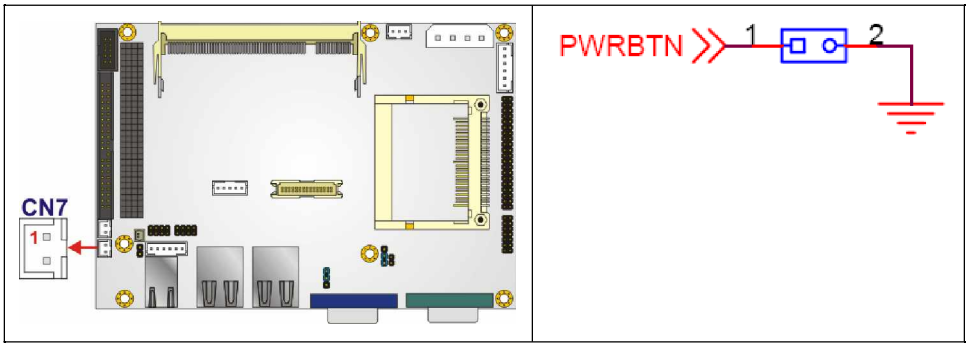


Figure 4-11: Power Button Connector Location

PIN NO.	DESCRIPTION
1	Button+
2	Button-

Table 4-12: Power Button Connector Pinouts

4.2.11 Reset Button Connector

CN Label: **CN6**

CN Type: 2-pin wafer connector (1x2)

CN Location: See **Figure 4-12**

CN Pinouts: See **Table 4-13**

The reset button connector is connected to a reset switch on the system chassis to enable users to reboot the system when the system is turned on.

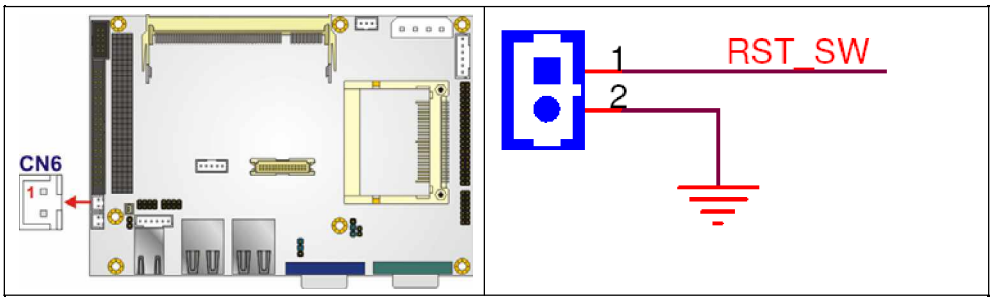


Figure 4-12: Reset Button Connector Locations

PIN NO.	DESCRIPTION
1	RESET#
2	GROUND

Table 4-13: Reset Button Connector Pinouts

4.2.12 Serial Port Connector (RS-232/422/485)

CN Label: **COM2**

CN Type: 14-pin header (2x7)

CN Location: See **Figure 4-13**

CN Pinouts: See **Table 4-14**

The serial port connectors connect to RS-232, RS-422 or RS-485 serial port device.

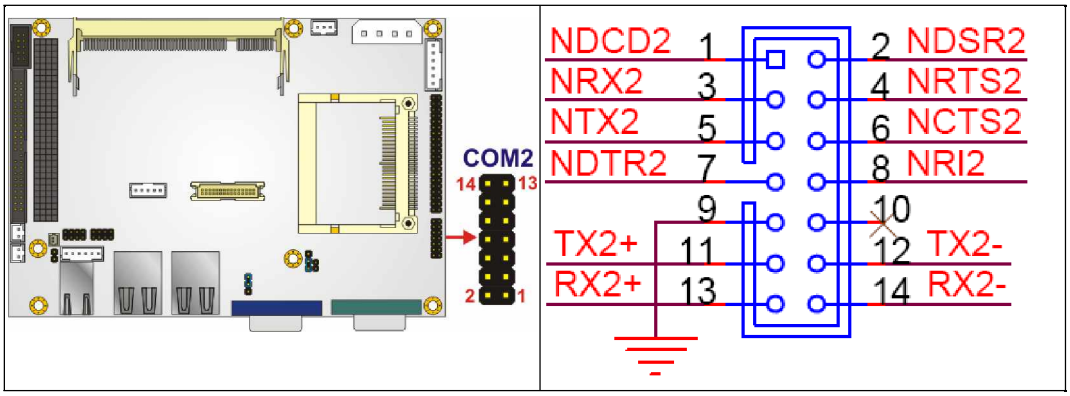


Figure 4-13: Serial Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	GND
11	(RS422/485) TX+	12	(RS422/485) TX-
13	(RS422) RX+	14	(RS422) RX-

Table 4-14: RS-232/422/485 Serial Port Connector Pinouts

4.2.13 Serial Port Connector (COM 3, COM 4, COM 5 and COM 6)

CN Label: **CN9**

CN Type: 40-pin header (2x20)

CN Location: See **Figure 4-14**

CN Pinouts: See **Table 4-15**

The 40-pin serial port connector contains the following four serial ports, COM 3, COM 4, COM 5 and COM 6. All four serial ports are RS-232 serial communications channels. The serial port locations are specified below.

- COM 3 is located on pin 1 to pin 10

- COM 4 is located on pin 11 to pin 20
- COM 5 is located on pin 21 to pin 30
- COM 6 is located on pin 31 to pin 40

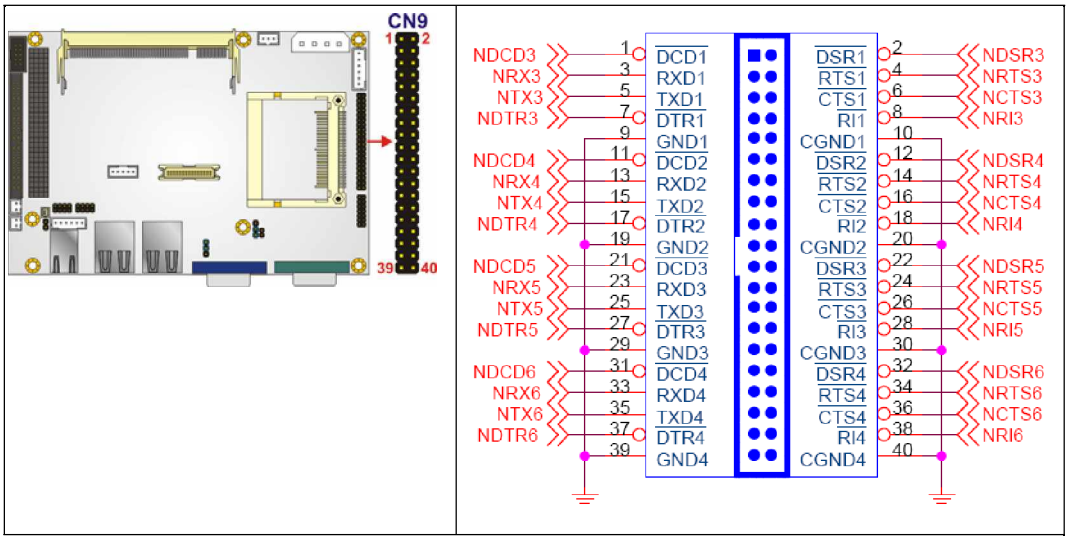


Figure 4-14: RS-232 Serial Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD_COM3	2	DSR_COM3
3	RXD_COM3	4	RTS_COM3
5	TXD_COM3	6	CTS_COM3
7	DTR_COM3	8	RI_COM3
9	GND	10	GND
11	DCD_COM4	12	DSR_COM4
13	RXD_COM4	14	RTS_COM4
15	TXD_COM4	16	CTS_COM4
17	DTR_COM4	18	RI_COM4
19	GND	20	GND
21	DCD_COM5	22	DSR_COM5
23	RXD_COM5	24	RTS_COM5
25	TXD_COM5	26	CTS_COM5
27	DTR_COM5	28	RI_COM5
29	GND	30	GND

31	DCD_COM6	32	DSR_COM6
33	RXD_COM6	34	RTS_COM6
35	TXD_COM6	36	CTS_COM6
37	DTR_COM6	38	RI_COM6
39	GND	40	GND

Table 4-15: RS-232 Serial Port Connector Pinouts

4.2.14 TFT LCD LVDS Connector

CN Label: **J3**

CN Type: 30-pin crimp connector (2x15)

CN Location: See **Figure 4-15**

CN Pinouts: See **Table 4-16**

The 30-pin TFT LCD LVDS can be connected to a TFT LCD screen directly.

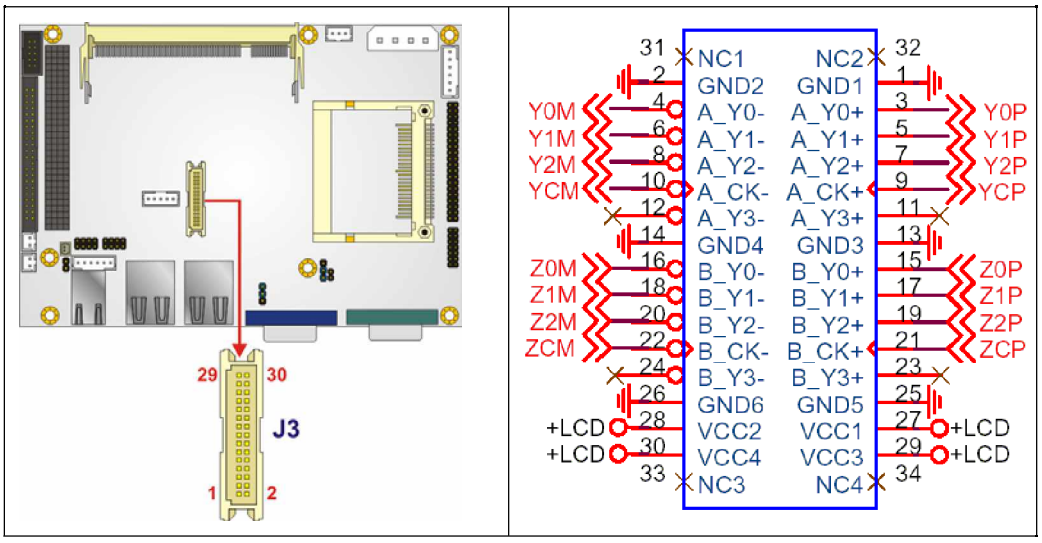


Figure 4-15: TFT LCD LVDS Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND

3	Rin0+	4	Rin0-
5	Rin1+	6	Rin1-
7	Rin2+	8	Rin2-
9	CLK1+	10	CLK1-
11	Rin3+	12	Rin3-
13	GND	14	GND
15	Rin4+	16	Rin4-
17	Rin5+	18	Rin5-
19	Rin6+	20	Rin6-
21	CLK2+	22	CLK2-
23	Rin7+	24	Rin7-
25	GND	26	GND
27	LCD_VDD	28	LCD_VDD
29	LCD_VDD	30	LCD_VDD

Table 4-16: TFT LCD LVDS Port Connector Pinouts

4.2.15 Internal USB Connectors

CN Label: **USB1**

CN Type: 8-pin header (2x4)

CN Location: See **Figure 4-16**

CN Pinouts: See **Table 4-17**

One 2x4 pin connector provides connectivity to two USB 2.0 ports. The USB ports are used for I/O bus expansion.

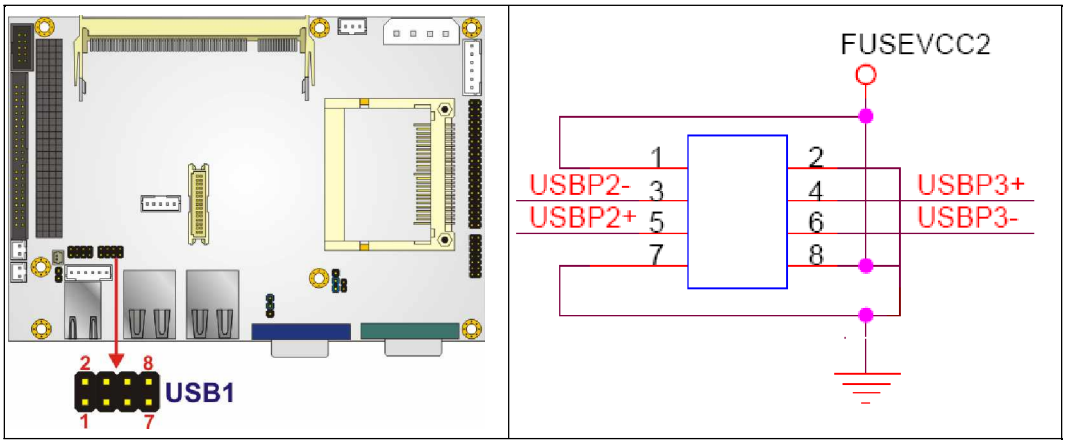


Figure 4-16: Internal USB Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	GROUND
3	DATA0-	4	DATA0+
5	DATA0+	6	DATA0-
7	GROUND	8	VCC

Table 4-17: Internal USB Connector Pinouts

4.3 External Peripheral Interface Connectors

4.3.1 External Peripheral Interface Connector Overview

The 3302140 external peripheral interface connectors are listed below and shown in **Figure 4-17**:

- 2 x RJ-45 Ethernet connector
- 1 x Serial communications port
- 2 x USB combo ports
- 1 x VGA port

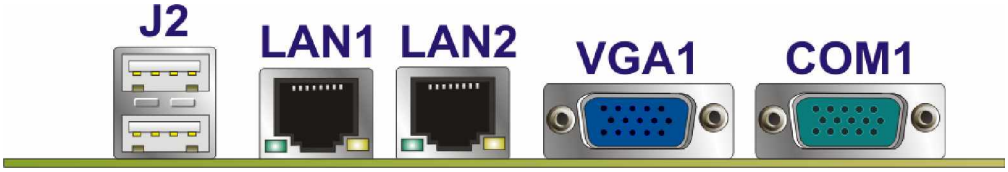


Figure 4-17: 3302140 On-board External Interface Connectors

4.3.2 RJ-45 Ethernet Connector

CN Label: **LAN1** and **LAN2**

CN Type: RJ-45

CN Location: See **Figure 4-17**

CN Pinouts: See **Table 4-18**

The RJ-45 Ethernet connector on the 3302140 provides connectivity to a GbE Ethernet connection between the 3302140 and a Local Area Network (LAN) through a network hub.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	TX0+	5	TX2-
2	TX0-	6	TX1-
3	TX1+	7	TX3+
4	TX2+	8	TX3-

Table 4-18: RJ-45 Ethernet Connector Pinouts

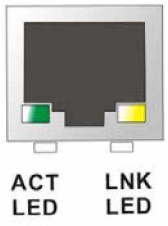


Figure 4-18: LAN Connector

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 4-19**.

SPEED LED		ACT/LINK LED	
STATUS	**DESCRIPTION**	**STATUS**	**DESCRIPTION**
OFF	10Mbps connection	OFF	No link
ORANGE	100Mbps connection	YELLOW	Linked
GREEN	1Gbps connection	BLINKING	Data Activity

Table 4-19: RJ-45 Ethernet Connector LEDs

4.3.3 Serial Port Connector (COM1)

CN Label: **COM1**

CN Type: DB-9 connector

CN Location: See **Figure 4-17**

CN Pinouts: See **Table 4-20** and **Figure 4-19**

The 9-pin DB-9 COM 1 serial port connector is connected to RS-232 serial communications devices.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTX
4	DTR	9	RI
5	GND		

Table 4-20: RS-232 Serial Port (COM 1) Pinouts

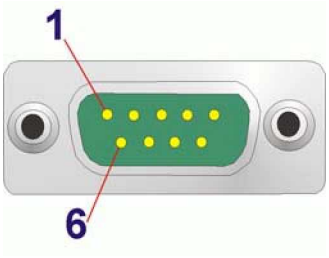


Figure 4-19: Serial Port Pinout Locations

4.3.4 USB Combo Ports

CN Label: **J2**

CN Type: USB Combo port

CN Location: See **Figure 4-17**

CN Pinouts: See **Table 4-21**

The two USB combo ports provide connectivity to USB devices. The USB port support both USB 1.1 and USB 2.0.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	USBVCC0	5	USBVCC1
2	USBP0-	6	USBP1-
3	USBP0+	7	USBP1+
4	USBGND0	8	USBGND1

Table 4-21: USB Connector Pinouts

4.3.5 VGA Connector

CN Label: **VGA1**

CN Type: DB15

CN Location: See **Figure 4-17**

CN Pinouts: See **Figure 4-20** and **Table 4-22**

The standard 15-pin female DB15 VGA connector connects to a CRT or LCD monitor directly.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	RED	9	+5V
2	GREEN	10	GROUND
3	BLUE	11	NC
4	NC	12	DDCDAT
5	GROUND	13	HSYNC
6	+5V	14	VSYNC
7	GROUND	15	DDCCLK
8	GROUND		

Table 4-22: VGA Connector Pinouts

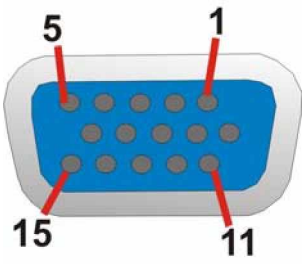


Figure 4-20: VGA Connector

THIS PAGE IS INTENTIONALLY LEFT BLANK

Chapter

5

Installation

5.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the 3302140 may result in permanent damage to the 3302140 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the 3302140. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the 3302140, 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 3302140, place it on an antic-static pad. This reduces the possibility of ESD damaging the 3302140.
- ***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 3302140 is installed. All installation notices pertaining to the installation of the 3302140 should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the 3302140 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 3302140, 3302140 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 3302140 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 3302140 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 3302140 off**:

- When working with the 3302140, 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 3302140 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 3302140 is properly installed.

- All the items in the packing list are present (see **Chapter 4**)
- A compatible memory module is properly inserted into the slot (see **Chapter 2**)
- The CF Type II card is properly installed into the CF socket
- The jumpers have been properly configured
- The 3302140 is installed into a chassis with adequate ventilation
- The correct power supply is being used
- The following devices are properly connected
  - Audio kit
  - Power supply
  - Serial port cables
- The following external peripheral devices are properly connected to the chassis:
  - VGA screen
  - RS-232 serial communications device
  - USB devices

5.3 SO-DIMM Module Installation and CF Card Installation

5.3.1 SO-DIMM Installation

WARNING:

Using incorrectly specified SO-DIMM may cause permanently damage the 3302140. Please make sure the purchased SO-DIMM complies with the memory specifications of the 3302140. SO-DIMM specifications compliant with the 3302140 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**.

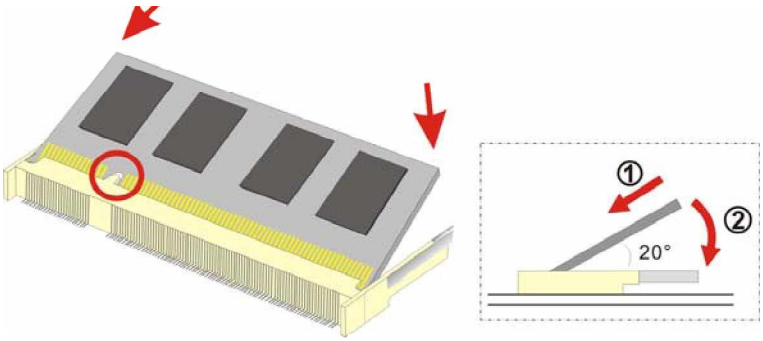


Figure 5-1: SO-DIMM Installation

Step 1: **Locate the SO-DIMM socket**. Place the 3302140 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.

5.3.2 CF Card Installation

NOTE:

The 3302140 can support CF Type II cards. For the complete specifications of the supported CF cards please refer to **Chapter 2**.

To install a CF Type II card onto the 3302140, please follow the steps below:

Step 1: **Locate the CF card socket**. Place the 3302140 on an anti-static pad and 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**.

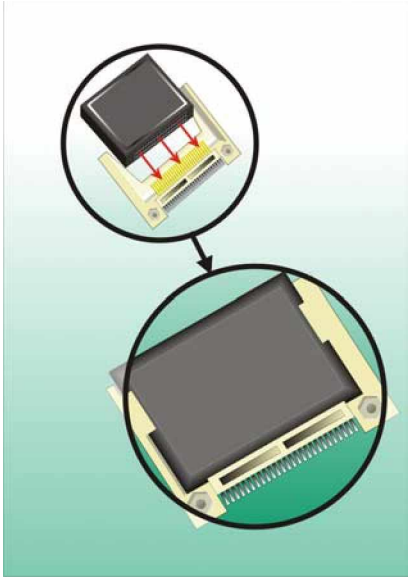


Figure 5-2: CF Card Installation

5.3.3 Mounting the 3302140 Embedded Module

The 3302140 embedded module has a standard PCI-104 connector on the front side. Baseboards can be designed by the end user, customized by GAI, or purchased from GAI. For more information visit the GAI website (www.globalamericaninc.com) or contact a GAI sales representative.

To install the module, follow the instructions below.

Step 1: Remove the four retention screws that secure the 3302140 to the enclosure heat sink.

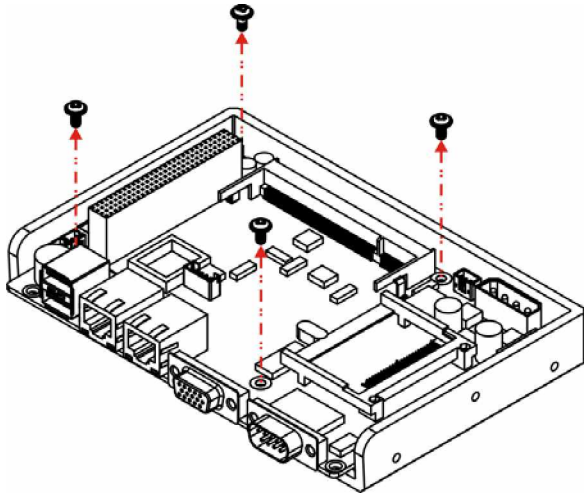


Figure 5-3: Enclosure Heat Sink Retention Screws

Step 2: Insert four hexagonal copper pillars (M3*25mm) to the retention screw holes.

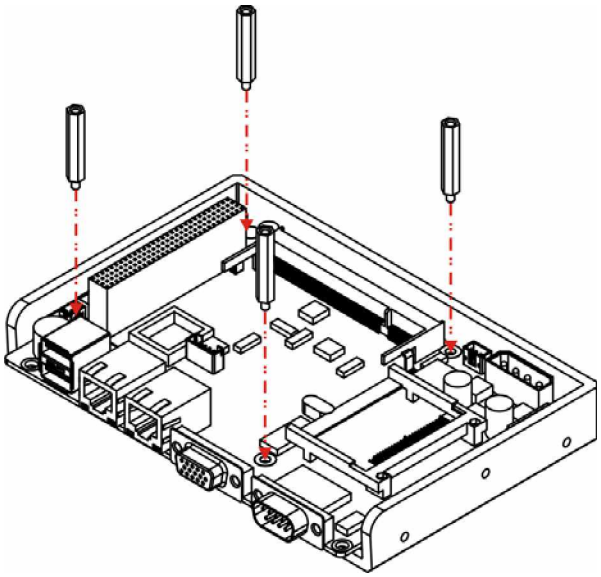


Figure 5-4: PCI-104 Module Installation (Hexagonal Copper Pillars)

Step 3: Align the PCI-104 connector with the corresponding connector on a compatible module.

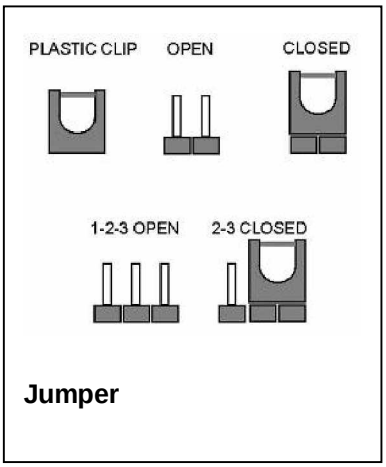
Step 4: Gently push the embedded module down to ensure the connectors are properly connected. Align the retention screw holes in the PCI-104 module with the copper pillars.

Step 5: Re-insert the four previously removed retention screws into the PCI-104 module.

5.4 Jumper Settings

NOTE:

A jumper is a metal bridge that is used to close an electrical circuit. It consists of two 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.



Jumper

Before the 3302140 is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the 3302140 are listed in **Table 5-1**.

Description	Label	Type
CF card setup	JP3	2-pin header
Clear CMOS	JP2	2-pin header
COM port select	JP4	3-pin header
LCD voltage select	JP5	3-pin header
LCD panel resolution select	JP1	8-pin header

Table 5-1: Jumpers

5.4.1 CF Card Setup Jumper Settings

Jumper Label: **JP3**

Jumper Type: 2-pin header

Jumper Settings: See **Table 5-2**

Jumper Location: See **Figure 5-5**

The CF Card Setup jumper sets the compact flash card as either the slave device or the master device. Make the necessary jumper setting in accordance with the settings shown in **Table 5-2**.

CF Card Setup	Description	
Short	Master	Default
Open	Slave	

Table 5-2: CF Card Setup Jumper Settings

The location of the CF Card Setup jumper is shown in **Figure 5-5** below.

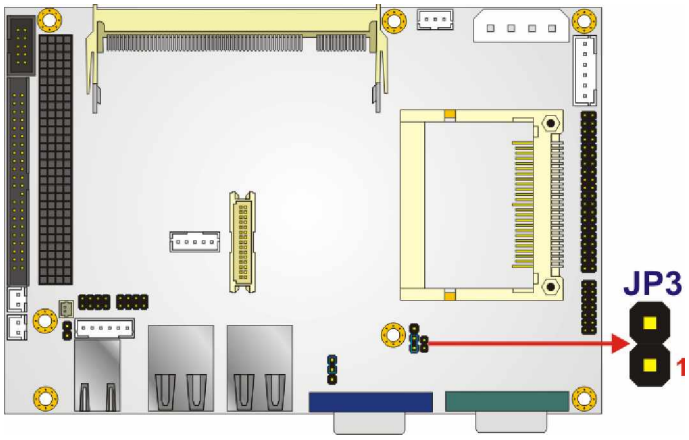


Figure 5-5: CF Card Setup Jumper Location

5.4.2 Clear CMOS Jumper

Jumper Label:	**JP2**
Jumper Type:	2-pin header
Jumper Settings:	See **Table 5-3**
Jumper Location:	See **Figure 5-6**

If the 3302140 fails to boot due to improper BIOS settings, the CMOS can be cleared using the battery connector. Disconnect the battery from the connector for a few seconds then reconnect the battery. The CMOS should be cleared.

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 5-3**.

Clear CMOS	Description	
Open	Keep CMOS Setup	Default
Short	Clear CMOS Setup	

Table 5-3: JP2 Clear CMOS Jumper Settings

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

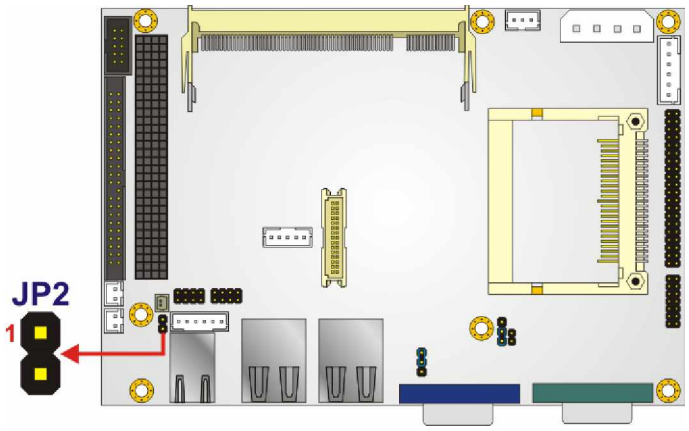


Figure 5-6: JP2 Clear CMOS Jumper

5.4.3 COM Port Setting Jumper

Jumper Label: **JP4**

Jumper Type: 3-pin header

Jumper Settings: See **Table 5-4**

Jumper Location: See **Figure 5-7**

The JP4 jumper sets the communication protocol used by the second serial communications port (COM 2) as RS-232, RS-422 or RS-485. The COM Port Setting jumper selection options are shown in **Table 5-4**.

JP4	Description	
Short 1-2	RS-232	Default
Short 2-3	RS-422/485	

Table 5-4: COM Port Setting Jumper Settings

The COM Port Setting jumper location is shown in **Figure 5-7** below.

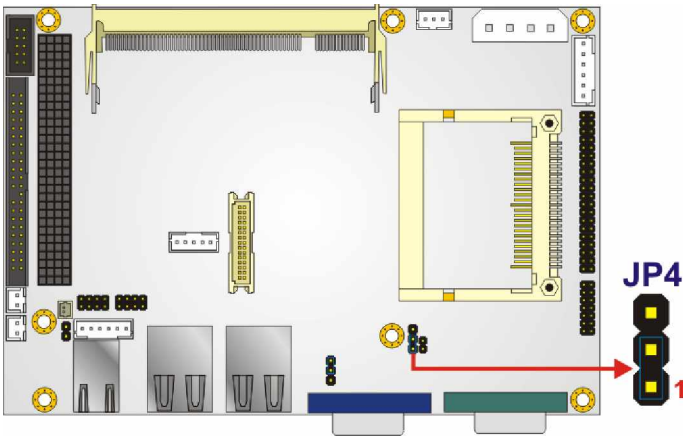


Figure 5-7: COM Port Setting Jumper Location

5.4.4 LCD Voltage Selection

WARNING:

Permanent damage to the screen and 3302140 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: **JP5**

Jumper Type: 3-pin header

Jumper Settings: See **Table 5-5**

Jumper Location: See **Figure 5-8**

The LCD Voltage Selection jumper allows the LCD screen voltage to be set. The LCD Voltage Selection jumper settings are shown in Table 5-5.

AT Power Select	Description	
Short 1-2	+5V LVDS	
Short 2-3	+3.3V LVDS	Default

Table 5-5: LCD Voltage Selection Jumper Settings

The LCD Voltage Selection jumper location is shown in **Figure 5-8**.

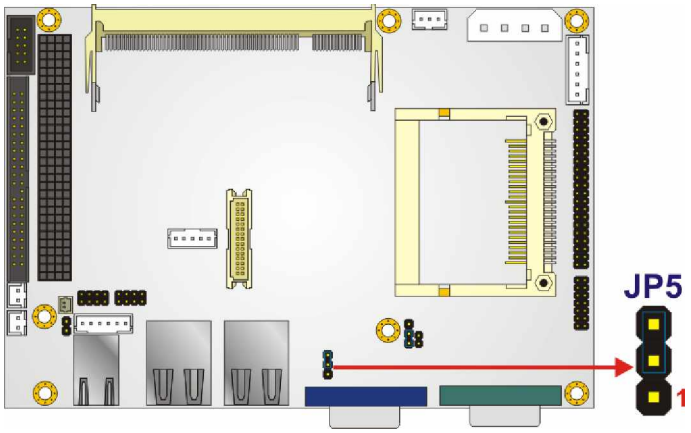


Figure 5-8: LCD Voltage Selection Jumper Location

5.4.5 LCD Resolution Selection

Jumper Label: **JP1**

Jumper Type: 8-pin header

Jumper Settings: See **Table 5-6**

Jumper Location: See **Figure 5-9**

Use the LCD Resolution jumper to select the resolution of the LCD. The LCD Resolution settings are shown in **Table 5-6**.

PIN NO.				Description
7-8	5-6	3-4	1-2	
Open	Open	Open	Open	For BIOS Setting
Open	Open	Open	Short	Type 0: 640x480 18-bit
Open	Open	Short	Open	Type 1: 800x600 18-bit
Open	Open	Short	Short	Type 2: 1024x768 18-bit
Open	Short	Open	Open	Type 3: 1280x1024 48-bit
Open	Short	Open	Short	Type 4: 1400x1050 48-bit

Open	Short	Short	Open	Type 5: 1400x1050 36-bit
Open	Short	Short	Short	Type 6: 1600x1200 48-bit
Short	Open	Open	Open	Type 7: 1280x768 18-bit
Short	Open	Open	Short	Type 8: 1600x1050 48-bit
Short	Open	Short	Open	Type 9: 1920x1200 36-bit
Short	Open	Short	Short	Type 10: 1024x768 24-bit
Short	Short	Open	Open	Type 11: Reserved
Short	Short	Open	Short	Type 12: Reserved
Short	Short	Short	Open	Type 13: Reserved
Short	Short	Short	Short	Type 14: Reserved

Table 5-6: LCD Resolution Jumper Settings

The LCD resolution jumper location is shown in **Figure 5-9**.

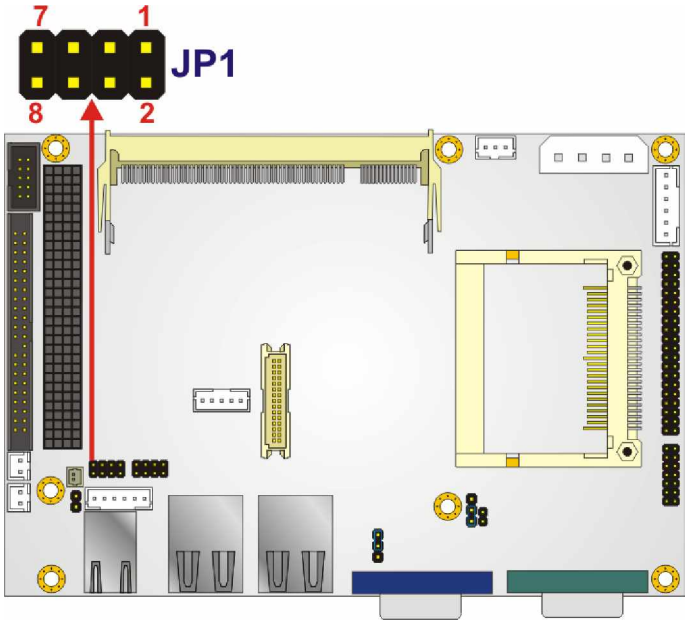


Figure 5-9: LCD Resolution Jumper Location

5.5 Chassis Installation

5.5.1 Airflow

WARNING:

Airflow is critical to the cooling of the CPU and other onboard components. The chassis in which the 3302140 must have air vents to allow cool air to move into the system and hot air to move out.

The 3302140 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.

5.5.2 Motherboard Installation

To install the 3302140 motherboard into the chassis please refer to the reference material that came with the chassis.

5.6 Internal Peripheral Device Connections

5.6.1 Peripheral Device Cables

The cables listed in **Table 5-7** are shipped with the 3302140.

Quantity	Type
1	Audio cable
1	IDE flat cable 44p/44p
1	4 COM port RS-232 cable
1	PS2 Keyboard/Mouse cable

Table 5-7: Provided Cables

5.6.2 ATA Flat Cable Connection

The IDE flat cable connects to the 3302140 to one or two IDE devices. To connect an IDE HDD to the 3302140 please follow the instructions below.

Step 1: **Locate the IDE connector**. The location/s of the IDE device connector/s is/are shown in **Chapter 3**.

Step 2: **Insert the connector**. Connect the IDE cable connector to the onboard connector. See Figure 5-10. A key on the front of the cable connector ensures it can only be inserted in one direction.

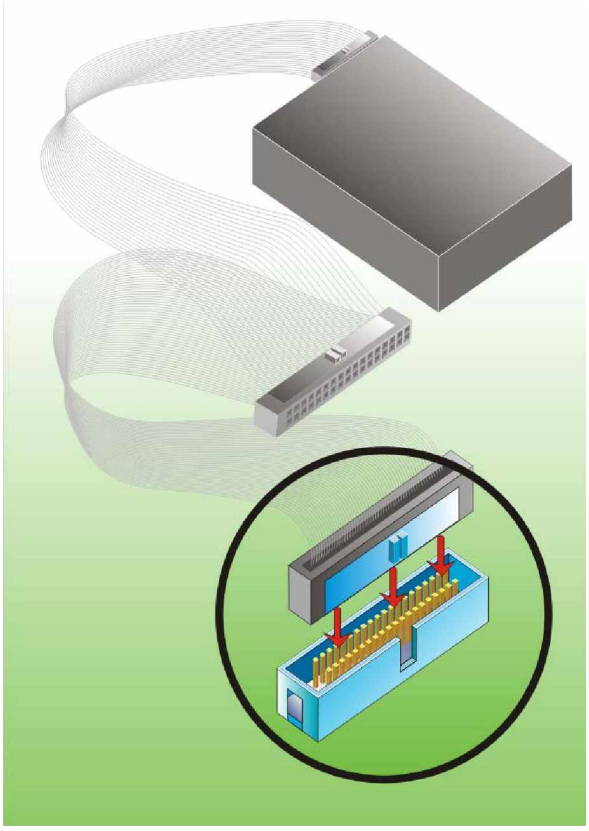


Figure 5-10: IDE Cable Connection

Step 3: **Connect the cable to an IDE device**. Connect the two connectors on the other side of the cable to one or two IDE devices. Make sure that pin 1 on the cable corresponds to pin 1 on the connector.

5.6.3 Audio Kit Installation

The Audio Kit that came with the 3302140 connects to the 10-pin audio connector on the 3302140. 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 onboard connector with pin 1 on the audio kit connector. Pin 1 on the audio kit connector is indicated with a white dot. See **Figure 5-11**.

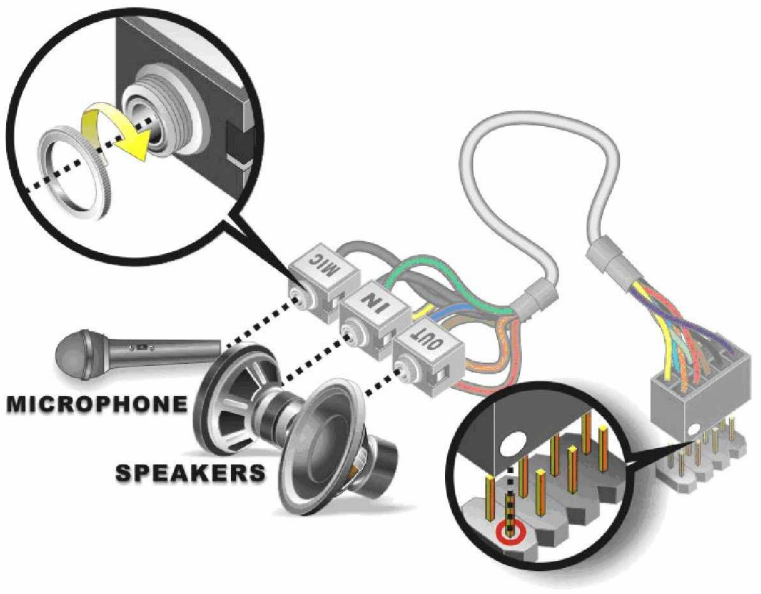


Figure 5-11: IDE Cable Connection

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.

5.6.4 Keyboard/Mouse Y-cable Connector

The 3302140 is shipped with a keyboard/mouse Y-cable connector. The keyboard/mouse Y-cable connector connects to a keyboard/mouse connector on the 3302140 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 3302140 keyboard/mouse connector. See **Figure 5-12**.

Step 3: **Insert the cable connectors** Once the cable connector is properly aligned with the keyboard/mouse connector on the 3302140, connect the cable connector to the onboard connectors. See **Figure 5-12**.

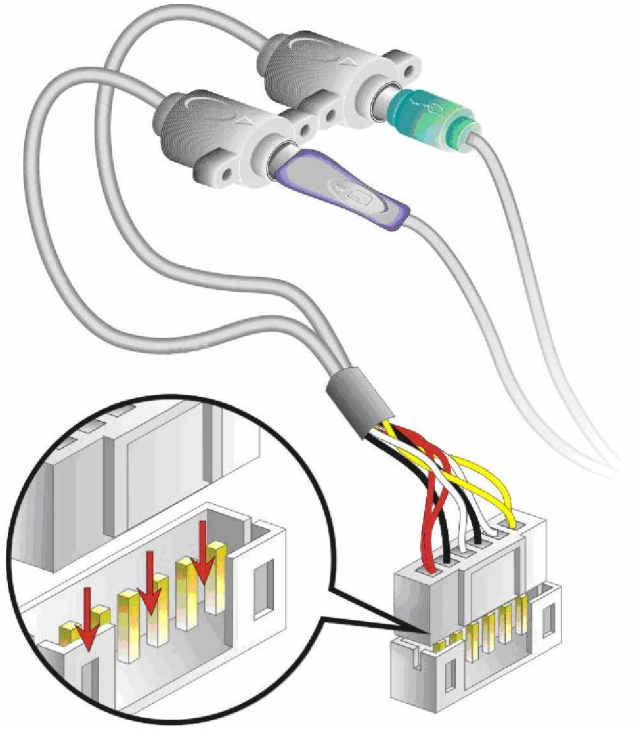


Figure 5-12: Keyboard/mouse Y-cable Connection

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.

5.6.5 Four Serial Port Connector Cable

The 3302140 is shipped with one four serial port connector cable. The four serial port connector cable connects four serial port connectors on the cable to the 40-pin serial port connectors on the 3302140. To connect the four serial port connector cable please follow the steps below.

Step 1: **Locate the serial port connector**. The location of the 40-pin serial port connector is shown in **Chapter 3**.

Step 2: **Align the connectors**. Correctly align pin 1 on the cable connector with pin 1 on the 3302140 40-pin serial port connector. See **Figure 5-12**.

Step 3: **Insert the cable connectors** Once the cable connector is properly aligned with the 40-pin serial port connector on the 3302140, connect the cable connector to the onboard connectors. See **Figure 5-12**.

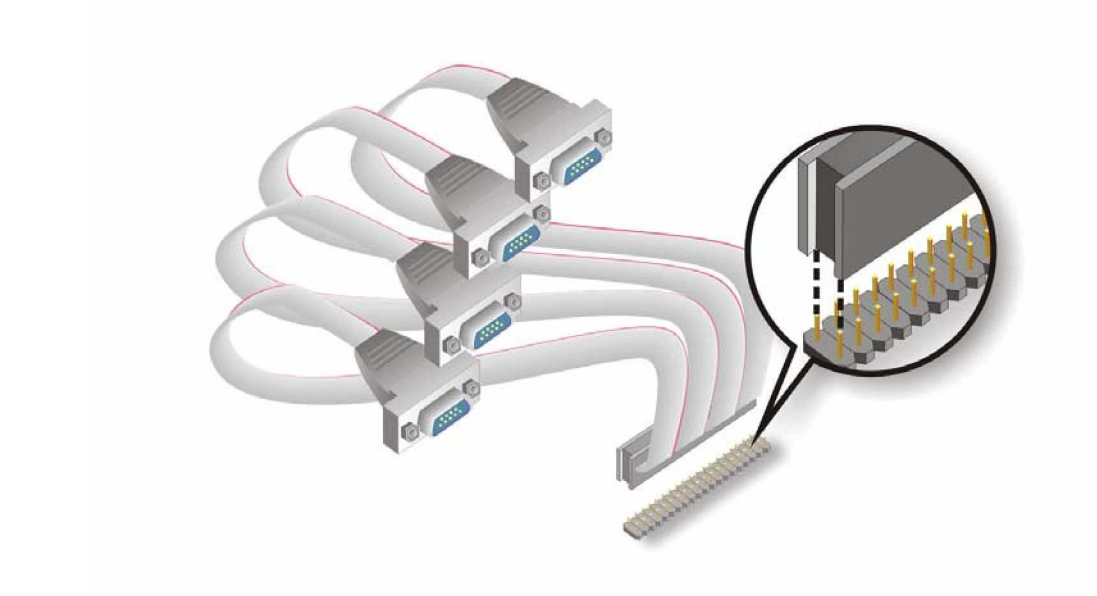


Figure 5-13: Four Serial Port Connector Cable Connection

Step 4: **Attach DB-9 serial port connectors to the chassis**. The four DB-9 serial port connectors can be inserted into four preformed holes in the chassis. Once, inserted the DB-9 connectors should be secured to the chassis with the retention screws.

5.7 External Peripheral Interface Connection

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

- RJ-45 Ethernet cable connectors
- Serial port devices
- USB devices
- VGA monitors

To install these devices, connect the corresponding cable connector from the actual device to the corresponding 3302140 external peripheral interface connector making sure the pins are properly aligned.

THIS PAGE IS INTENTIONALLY LEFT BLANK

Appendix

A

Watchdog Timer

NOTE:

The following discussion applies to DOS environment. GAI support is contacted or the GAI website visited for specific drivers for more sophisticated operating systems, e.g., Windows and Linux.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMI or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer:

INT 15H:

AH – 6FH Sub-function:	
AL – 2:	Sets the Watchdog Timer's period.
BL:	Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

Table A-1: AH-6FH Sub-function

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. While the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the Watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

NOTE:

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system resets.

Example program:

```
; INITIAL TIMER PERIOD COUNTER
;
W_LOOP:

        MOV     AX, 6F02H       ;setting the time-out value
        MOV     BL, 30          ;time-out value is 48 seconds
        INT      15H
 ;
; ADD THE APPLICATION PROGRAM HERE
;
        CMP      EXIT_AP, 1     ;is the application over?
        JNE      W_LOOP         ;No, restart the application

        MOV     AX, 6F02H       ;disable Watchdog Timer
        MOV     BL, 0           ;
        INT      15H
;
; EXIT ;
```

Appendix

B

Address Mapping

B.1 Address Map

I/O address Range	Description
000-01F	DMA Controller
020-021	Interrupt Controller
040-043	System time
060-06F	Keyboard Controller
070-07F	System CMOS/Real time Clock
080-09F	DMA Controller
0A0-0A1	Interrupt Controller
0C0-0DF	DMA Controller
0F0-0FF	Numeric data processor
1F0-1F7	Primary IDE Channel
2E0-2E7	Serial Port 6 (COM6)
2E8-2EF	Serial Port 4 (COM4)
2F0-2F7	Serial Port 5 (COM5)
2F8-2FF	Serial Port 2 (COM2)
378-37F	Parallel Printer Port 1 (LPT1)
3B0-3BB	Intel Graphics Controller
3C0-3DF	Intel Graphics Controller
3E8-3EF	Serial Port 3 (COM3)
3F6-3F6	Primary IDE Channel
3F8-3FF	Serial Port 1 (COM1)

Table B-1: IO Address Map

B.2 1st MB Memory Address Map

Memory address	Description
00000-9FFFF	System memory
A0000-BFFFF	VGA buffer
F0000-FFFFF	System BIOS
1000000-	Extend BIOS

Table B-2: 1st MB Memory Address Map

B.3 IRQ Mapping Table

IRQ0	System Timer	IRQ8	RTC clock
IRQ1	Keyboard	IRQ9	ACPI
IRQ2	Available	IRQ10	COM4/COM6
IRQ3	COM2	IRQ11	COM3/COM5
IRQ4	COM1	IRQ12	PS/2 mouse
IRQ5	SMBus Controller	IRQ13	FPU
IRQ6	FDC	IRQ14	Primary IDE
IRQ7	Available	IRQ15	Secondary IDE

Table B-3: IRQ Mapping Table

B.4 DMA Channel Assignments

Channel	Function
0	Available
1	Available
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

Table B-4: IRQ Mapping Table

Appendix

C

External AC'97 Audio CODEC

C.1 Introduction

The motherboard comes with an on-board Realtek ALC203 CODEC. Realtek ALC203 is a 16-bit, full duplex AC'97 Rev. 2.3 compatible audio CODECwith a sampling rate of 48KHz.

C.1.1 Accessing the AC'97 CODEC

The CODEC is accessed through a connector on the 3302140 motherboard. Connect the audio kit to the connector.

After rebooting the sound effect configuration utility appears in the Windows Control Panel (see **Figure C-1**). If the peripheral speakers are properly connected, sound effects should be heard.

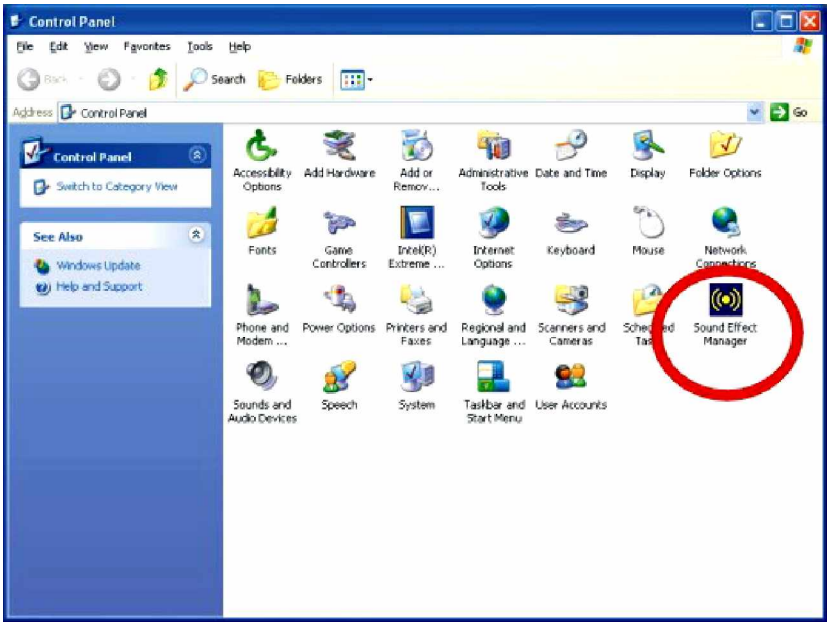


Figure C-1: Sound Effect Manager Control Panel

C.2 Sound Effect Configuration

C.2.1 Accessing the Sound Effects Manager

To access the **Sound Effects Manager**, please do the following:

Step 6: Install the audio CODEC driver.

Step 7: Click either:

- The Sound Effect Manager icon in the Notification Area of the system task bar (see **Figure C-2**), or
- The Sound Effect Manager icon in the Control Panel (**Figure C-3**).

Figure C-2: Sound Effect Manager Icon [Task Bar]

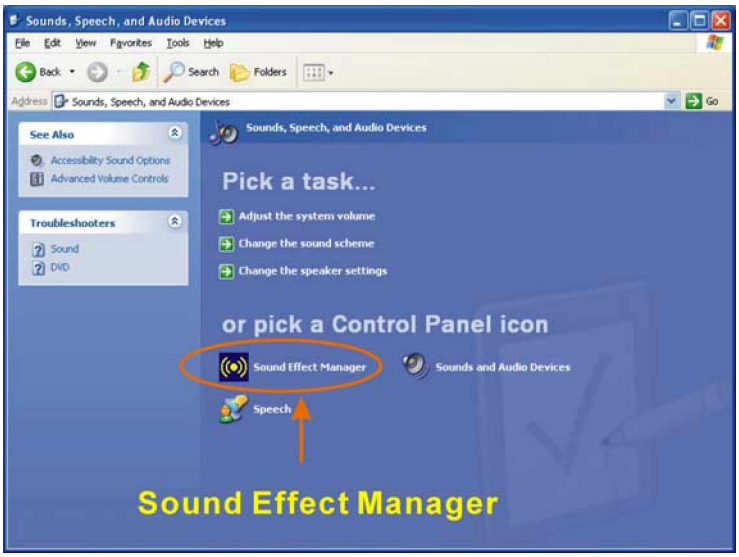


Figure C-3: Sound Effect Manager Icon [Control Panel]

Step 8: The sound effect manager appears.

NOTE:

The Sound Effect Manager shown above is for the RealTek ALC655 audio CODEC. Different CODECs may have different sound manager appearances.

The following section describes the different configuration options in the Sound Effect Manager.

C.2.2 Sound Effect Manager Configuration Options

The **Sound Effects Manager** enables configuration of the items listed below. To configure these items click the corresponding menu tab in the **Sound Effects Manager**.

NOTE:

The **Karaoke Mode** is configured in the **Sound Effect** menu. To access Karaoke configuration settings, click on the **Sound Effect** menu tab.

- Sound Effect
- Karaoke Mode
- Equalizer
- Speaker Configuration
- Speaker Test
- S/PDIF-In
- S/PDIF-Out
- Connector Sensing
- HRTF Demo
- Microphone Effect
- General

NOTE:

Not all RealTek **Sound Effect Managers** have all the above listed options. The Sound Effect Manager loaded onto the system may only have some of the options listed above.

Below is a brief description of the available configuration options in the **Sound Effects Manager**.

- ***Sound Effect***:- Select a sound effect from the 23 listed options in the drop down menu. Selected sound effect properties can be edited. To edit the sound effect click "**EDIT**."
- ***Karaoke Mode***:- The **Karaoke Mode** is accessed in the Sound Effect window. The **Voice Cancellation** disables the vocal part of the music being played. The **Key adjustment** up or down arrow icons enables users to define a key that fits a certain vocal range.

- ***Equalizer Selection***:- Preset equalizer settings enable easy audio range settings. Ten frequency bands can be configured.

- ***Speaker Configuration***:- Multi-channel speaker settings are configured in this menu. Configurable options include:
  - Headphone
  - Channel mode for stereo speaker output
  - Channel mode for 4 speaker output
  - Channel mode for 5.1 speaker output
  - Synchronize the phonejack switch with speakers settings

- ***Speaker Test*:-** Each speaker connected to the system is tested individually to see if the 4-channel or 6-channel audio operates properly.

- ***S/PDIF-In & S/PDIF-Out***:- These functions are currently not supported.

- ***Connector Sensing***:- Realtek ALC655 detects if an audio device is plugged into the wrong connector. If an incorrect device is plugged in a warning message appears.

- ***HRTF Demo***:- Adjust HRTF (Head Related Transfer Functions) 3D positional audio here before running 3D applications.

- ***Microphone Effect***:- Microphone noise suppression is enabled in this menu.

- ***General***:- General information about the installed AC'97 audio configuration utility is listed here.

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 you for your products, projects and business.

Global American Inc.

Address:	17 Hampshire Drive Hudson, NH 03051
TEL:	Toll Free (U.S. Only) 800-833-8999 (603)886-3900
FAX:	(603)886-4545
Website:	http://www.globalamericaninc.com
E-Mail:	salesinfo@globalamericaninc.com