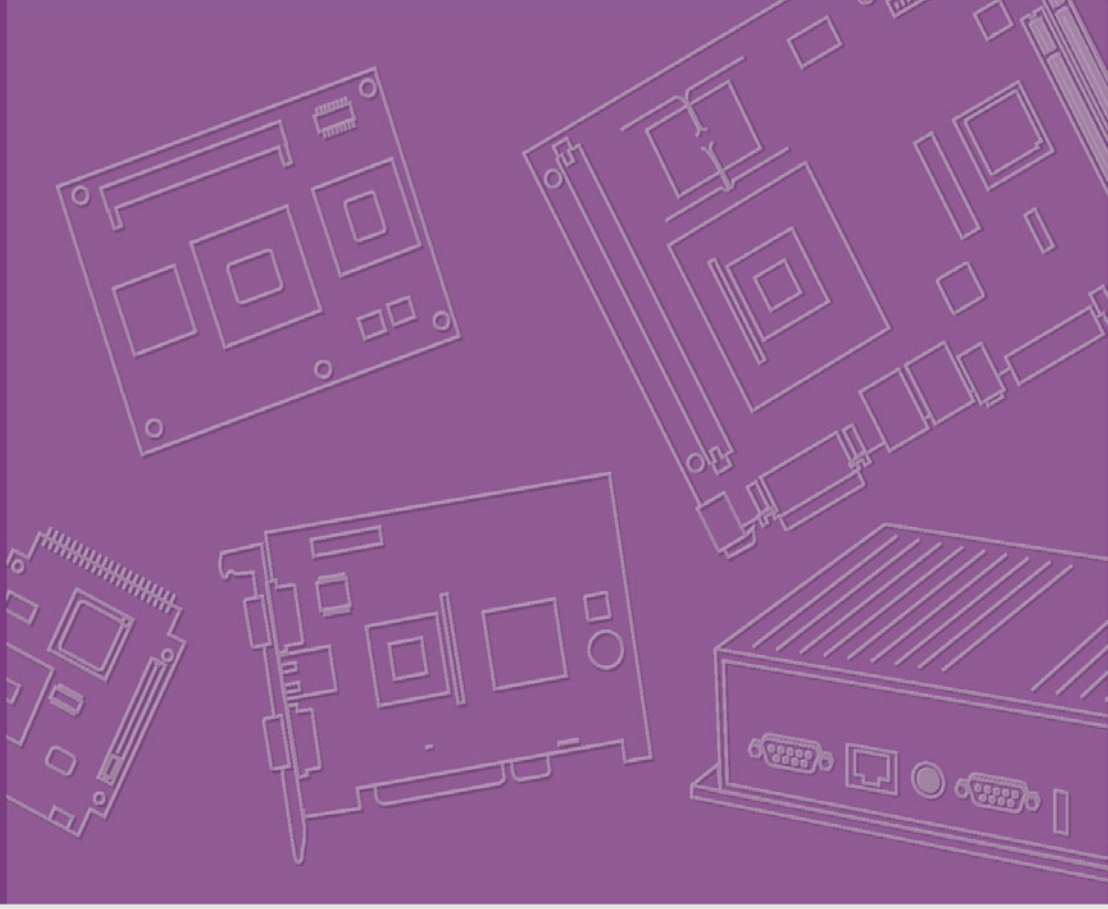

User Manual

PCM-4372

Onboard VIA Eden™ EPIC CPU Module

Trusted ePlatform Services

ADVANTECH

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It is possible to obtain a replacement (cross-shipment) during the first 30 days of the purchase (45 days for Channel Partners), if the products were purchased directly from ADVANTECH and the product is DOA (Dead-on-Arrival). DOA cross-shipment excludes any customized and/or build-to-order products. The cross-shipment agreement signed by customers is required for initiating/releasing cross shipment with ADVANTECH confirmation and verification. The only conditions for cross-shipment are: a) the return must not be damaged, altered or marked, b) all parts and accessories must be included as originally shipped; and c) proof of purchase must be included. Any returns that do not meet mentioned requirements above, or any wrong user settings/configurations will be denied, or subject to additional handling/service charges as determined by the ADVANTECH Repair Service Department. For those products which are not DOA, the return fee to an authorized ADVANTECH repair facility will be at the customers' expense. The shipping fee for reconstructive products from ADVANTECH back to customers' sites will be at ADVANTECH's expense.

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- The product has been found to be defective after expiry of the warranty period.
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- The product has been misused, abused, or subjected to unauthorized disassembly/modification; placed in an unsuitable physical or operating environment; improperly maintained by the customer; or failure caused which ADVANTECH is not responsible whether by accident or other cause. Such conditions will be determined by ADVANTECH at its sole unfettered discretion.
- The product is damaged beyond repair due to a natural disaster such as a lighting strike, flood, earthquake, etc.
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1. Visit the Advantech web site at http://www.advantech.com/ where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:

- Product name and serial number
- Description of your peripheral attachments
- Description of your software (operating system, version, application software, etc.)
- A complete description of the problem
- The exact wording of any error messages

Declaration of Conformity

CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class A

This device complies with the requirements in part 15 of the FCC rules: Operation is subject to the following two conditions:

1.This device may not cause harmful interference, and

2. This device must accept any interference received, including interference that may cause undesired operation

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this device in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own

expense. The user is advised that any equipment changes or modifications not expressly approved by the party responsible for compliance would void the compliance to FCC regulations and therefore, the user's authority to operate the equipment.

FM

This equipment has passed the FM certification. According to the National Fire Protection Association, work sites are classified into different classes, divisions and groups, based on hazard considerations. This equipment is compliant with the specifications of Class I, Division 2, Groups A, B, C and D indoor hazards.

Document Feedback

To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such - in writing to: support@advantech.com

Packing List

Before setting up the system, check that the items listed below are included and in good condition. If any item does not accord with the table, please contact your dealer immediately.

Item	Part Number
1 PCM-4372 SBC	
1 Startup manual	
1 Utility CD	
1 mini jumper pack	9689000002
FLAT Cable 50P 20CM 3Com & LPT 1.27mm to D-sub	1700002034
FLAT Cable 44P IDC 44P/44P/40P keyed 50CM	1701440504
Cable 20P/10P 10CM EPIC ATX Power	1700002055
Cable 6pin, 6-pin; 20CM long: PS/2 KB & Mouse	1700060202
USB CABLE 20 Pin TO 2 Port, L=30 cm PCM-43xx series	1700004891
CABLE Serial ATA 7P/7P 100cm	1700071000
Wire RS-422/485 W/D-SUB COM 4P 15cm	1703040157

Ordering Information

Model Number Description
PCM-4372F-S0A1E Eden ULV 1.0GHz w/CF/VGA/LCD/LVDS/SATA
PCM-4372U-S0A1E Eden ULV 1.0GHz w/USB-DOM/VGA/LCD/LVDS/SATA
PCM-4372F-M0A1E Eden 600MHz w/CF/VGA/LCD/LVDS/SATA
PCM-4372F-J0A1E Eden 400MHz w/CF/VGA/LCD/LVDS/SATA

Optional accessories

Model Number Description
PCD-USBH1I-MS0256 USB-DOM, 256 MB, -40 ~ 85 ° C
PCD-USBH1I-MS0512 USB-DOM, 512 MB, -40 ~ 85 ° C
PCD-USBH1I-MS1024 USB-DOM, 1 GB, -40 ~ 85 ° C
PCD-USBH1I-MS2048 USB-DOM, 2 GB, -40 ~ 85 ° C
PCM-410B-00A1E HD Audio/USB module for EPIC
PCM-410-00A1E Audio/USB/COM/LPT daughter board for EPIC

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
15. The power cord or plug is damaged.
16. Liquid has penetrated into the equipment.
17. The equipment has been exposed to moisture.
18. The equipment does not work well, or you cannot get it to work according to the user's manual.
19. The equipment has been dropped and damaged.
20. The equipment has obvious signs of breakage.

Chapter 1

General Information

This chapter gives background information on the PCM-4372

Sections include:

- Introduction
- Features
- Specifications

1.1 General Information

PCM-4372 is an EPIC SBC (Single Board Computer) with high performance and lower power based on VIA Eden processors. The PCM-4372, in conjunction with VIA CX700 chipset, supports processors clocked at up to 1GHz, six USB 2.0 compatible ports, dual 10/100Base-T Ethernet interface, 2 Channel LVDS interface, and one MIO expansion connector (CF or USB-DOM), and can accommodate up to 1GB of ECC DDR RAM memory. The PCM-4372 also supports two SATA and four COM ports.

1.2 Product Features

1.2.1 General

- CPU Embedded VIA Eden processor
- System Chipset VIA CX700
- BIOS AWARD 4 Mbit Flash BIOS
- System Memory 200-pin SODIMM socket, support ECC Double Data Rate (DDR2) 128 MB to 1 GB, accept 128/256/512/1 GB DDR 400/533 DRAM
- Power Management APM1.2, ACPI support
- SSD Supports CompactFlash Card TYPE I/II (shared 1st IDE Channel) USB memory, uDOC (Optional)
- Watchdog Timer Single chip Watchdog 255-level interval timer, setup by software
- Expansion Interface Supports 8/16 bit ISA bus for standard PC/104 device
- (ITE 8888g), PC/104-Plus
- Battery 2-pin wafer box for external Battery on board I/O
- I/O Interface 1 x EIDE (UDMA 33), 1 x K/B, 1 x KB/mouse, 3 x RS232, 1 x RS232/422/485, 1 x LPT
- USB 6 x USB 2.0 compliant Ports (2 ports on board connector, 4 ports pinhead)
- Audio CX700 HD 3D surround stereo sound Supports Line -in, Line-out, Microphone-in (with PCM-410 option)
- IrDA N/A
- GPIO 8-bit general purpose input/output Ethernet
- Chipset Intel 82551, 82541PI (Gigabit for optional)
- Speed 10/100 Mbps
- Interface 2 x RJ45
- Standard IEEE 802.3u 100Base-T

1.2.2 Display

- Chipset VIA CX700 chip integrated. (Extreme Graphics 2)
- Memory Size Optimized Shared Memory Architecture, supports up to 64 MB frame buffer using system memory
- Resolution CRT Display mode: pixel resolution up to 1600 x 1200 at 85-Hz and 2048 x 1536 at 75-Hz LCD Display mode: Dual channel LVDS panel supports up to UXGA panel resolution with frequency range from 25 MHz to 112 MHz
- LCD Interface 2 Channel
- 1 x 24/48-bit LVDS
- 1 x 24/48-bit LVDS
- LVDS Two Hirose connectors support up to 2 channel LVDS LCD Panel
- Dual Independent CRT + LVDS, LVDS + LVDS (optional)

1.3 Specifications

1.3.1 Processor: VIA Eden CPU:

- Supports 400 MHz FSB VIA Eden CPU.
- Supports 400M / 600M / ULV1.0GHz CPU.
  21mm *21mm Flip Chip Nano-BGA2.

1.3.2 Chipset: VIA CX700 chipset:

Memory:

DDR2 533/400 SDRAM.

Maximum 1GB DDR2 SDRAM.

Socket:

1 x 200 pin SO-DIMM socket type *1

Graphic and Video Controllers : VIA CX700 chipset supports:

DuoView+ Capability

- Dual displays: CRT+LVDS1, LVDS1+LVDS2. (These use different BIOS.)
- WinXP, Extended desktop support.

LVDS1 Panel Display Interface

- Compatible with TIA/EIA-644.
- Supports panel resolution from VGA through UXGA (1600 x 1200)
- Supports 1 x Dual-Channel LVDS panel.
  LVDS connector : Hirose DF13 type 40 pin

CRT

- CRT display interface with 30-bit true-color RAMDAC up to 350 MHz pixel rate with gamma correction capability.
- Supports CRT resolutions up to 2048x1536.
  Analog CRT Connector : D-sub 15-pin 5mm (Black)

IDE Interface: VIA CX700 chip supports:

- Single channel EIDE controller supporting 2 Enhanced IDE devices.
- Data transfer rate up to 33MB/sec to cover PIO mode 4, Multi-word DMA mode 2, and UltraDMA-33 interface.
- Supports ATPAI compliant devices including DVD devices.
- Supports PCI native and ATA compatibility modes.

IDE Primary Connector:

- 40pin 2.54 mm Box Header

SSD:

Option 1: VIA CX700 chip supports:

IDE Interface Master Mode default.

- Supports Compact Flash Card Type I.

Socket:

- 50 pin Compact Flash Card Type I connector.

Option 2: VIA CX700 chip supports:

- uDOC (uDiskONChip from M-Systems) socket on board, occupying USB 2.0 port no. 5

HD Audio Link: VIA CX700 controller chip supports:

- High performance audio controller with 192KHz sample rate, 32-bit per sample and up to 8 channels.
- Line-in, Line-out, Mic-in (Mono), CD-in, Side-Surround, Back-Surround, Center-out, Bass out.

Connectors:

- HD Link : Pin header 8*2P (M) 2.0mm

Module:

- PCM-410.

PC/104-plus expansion:

PCI-104: VIA CX700 chip supports.

- PCI 2.2 compliant.
- 32-bit 3.3V 33MHz PCI interface with 5V tolerant inputs.
- Supports PC/PCI DMA

PCI Socket:

- 30*4(F) 2.00mm PC/104+ Solder 63.35mm*7.87mm*9.35mm.

PC104: ITE8888G supports:

- Supports full ISA compatible functions
- Supports ISA at 1/4 of PCI frequency

PC104 Socket:

Socket2. 20*2(F) 2.54mm 51.86mm*5.01mm*11.45mm p=3.40mm

Socket3. 32*2(F) 2.54mm 82.34mm*5.01mm*11.45mm p=3.40mm

SATA Connector: VIA CX700 chip supports:

- Supports up to 2 SATA devices.
- Supports 1.5Gbit/s transfer rate.
- Complies with SATA specification rev.1.0.

SATA connectors.

- Serial ATA 7pins 1.27mm*2

USB Interface: VIA CX700 chip supports:

- Six USB 2.0 ports.
- Legacy keyboard and PS/2 mouse support.

USB Connector:

- (USB1~2) 2 USB connector on front site.
- (USB3~4) Audio pin header.

Module:

- PCM-410.
- (USB5~6) 2 set 5x2pin 2.0mm pin header (USB5: supports Advantech MIO-USB type flash Standard Specification.)

Power Management: VIA CX700 chip supports:

- Supports both ACPI (Advanced Configuration and Power Interface) 2.0 and legacy APM V1.2 power management.

BIOS : VIA CX700 chip supports:

- Phoenix 4M bit Flash BIOS, supports Plug & Play, APM 1.2/ACPI 1.1.
- FWH Type.

Socket:

- 32 pin PLCC socket

1.3.3 Other Functions

Graphic and Video Controllers

LVDS2 Interface

LVDS Transmitter chip:VIA VT1636 supports.

- Double-data-rate data transfer with clock rates up to 165MHz
- Supports panel resolution from VGA through UXGA (1600x1200)
- Supports 1 x Dual-Channel LVDS panel

LVDS connector : Hirose DF13 type 40 pin

Serial Ports: Winbond W83627HF (LPC Super I/O) and Fintek F81216DG supports.

- 2 full function serial ports by Winbond W83627
- 2 full function serial ports by Fintek F81216DG
- High Speed NS16C550A Compatible UARTs with Data rates to 1.5Mbps
- Supports IRQ Sharing among serial ports

Connectors:

- COM1: (RS-232) 1x DB9 on front site
- COM2: (RS-232/422/485) 1 x 1.27mm box header
- COM3~4: (RS-232) 1 x 1.27mm box header
- Module:PCM-410

Thermal Sensor: WinbondW 83627HF (LPC Super I/O) supports.

Parallel Port: Winbond W83627HF (LPC Super I/O) supports.

- One Parallel Port
- SPP/EPP (1.7,1.9)/ECP (IEEE 1284 Compliant) mode

Connector:

- Box header 15*2P (M) 1.27mm
- Module:PCM-410

Keyboard/Mouse Connector: Winbond W83627HF supports.

- PS/2 Keyboard and Mouse interface

Connector: Mini-Din 6P On Front Site

LAN: Intel 82551 supports.

- 82551: Integrated IEEE 802.3 10BASE-T and 100BASE-TX compatible PHY
- Two LAN chips

Connectors:

- Phone Jack RJ45 8P 90D(F)*2

GPIO: PCA9554 supports.

- SMbus expansion
- 8 I/O Pins
- 5V tolerance I/Os

Connectors:

- Connector: 10 pins 2.0mm pin header

Fan:

Connector:

- 3 pins 2.0mm Wafer box

Battery Backup:

- 2 pin wafer box for external Battery on board

1.3.4 Mechanical Specification

Dimension (mm)

- L 164 mm x W115 mm

Height on Top (mm)

- 27.6 mm (Heatsink)

Height on Bottom (mm)

- 7.5 mm (CN10)

Heatsink Dimension (mm)

- L 109 mm x W 52 mm x H 27.6 mm

Weight(g) with Heatsink

- 340g

1.3.5 Power Supply Voltage

Voltage requirement with ATX Power:

+5 V DC +/-5%

+5 V DC Standby +/- 5%

+3.3 V DC +/-5%

+12 V DC (For DDR PWM Power enable, some PC/104, PC/104+ cards and two LVDS inverter power)

-12 V DC (For some PC/104, PC/104+ cards)

Voltage requirement with AT Power:

+5 V DC +/-5%

+12 V DC (For DDR PWM Power enable, some PC/104, PC/104+ cards and two LVDS inverter power)

1.3.6 Power Supply Current

Supply Current (Typical)

Table 1.1: CPU : Eden ULV 1.0 GHz , RAM:533 MHz 1 GB DDR2 SDRAM

	ATX					
	5V	12V	3.3V	5V Standby	5V	12V
Dos	1.91A	0.12A	0.53A	0.30A	2.42A	0.12A
BIOS	1.91A	0.09A	0.52A	0.31A	2.42A	0.12A
WINXP Idle	1.59A	0.09A	0.53A	0.28A	2.06A	0.12A
WINXP HCT11.0	2.05A	0.12A	0.54A	0.37A	2.69A	0.14A
WINXP 3DMARK2001SE	2.21A	0.12A	0.53A	0.49A	3.25A	0.11A

Supply Current (Maximum)

Table 1.2: CPU : Eden ULV 1.0 GHz , RAM:533 MHz 1 GB DDR2 SDRAM

	ATX				**AT**	
	5V	**12V**	**3.3V**	**5V Standby**	**5V**	**12V**
Eden ULV 1.0 GHz + 533 MHz 1.0 GB DDR2 SDRAM	**2.21A**	**0.12A**	**0.54A**	**0.49A**	**3.25 A**	**0.14 A**

1.3.7 RTC Battery

Typical Voltage : 3.0V

Normal discharge capacity : 210mAh

1.3.8 Environmental Specification

Operating Temperature

The VIA EDEN is specified for proper operation when the junction temperature is within the specified range of 0° C to 100° C.

The VIA CX700 chipset operating temperature runs at a maximum of 85° C.

Operating temperature: 0 ~ 60° C (32~140° F)

Operating Humidity

Operating Humidity: 0% ~ 90% Relative Humidity, non-condensing

Storage Temperature

Standard products (0~60° C)

Storage temperature: -20~70° C

Phoenix products (-20~80° C)

Storage temperature: -20~80° C

Platinum Phoenix products (-40~85° C)

Storage temperature: -40~85° C

Storage Humidity

Standard products (0~60° C)

Relative Humidity: 95% @ 60° C

Phoenix products (-20~80° C)

Relative Humidity: 95% @ 60° C

Platinum Phoenix products (-40~85° C)

Relative Humidity: 95% @ 60° C

Chapter 2

H/W Installation

This chapter explains the setup procedures of the PCM-4372 hardware, including instructions on setting jumpers and connecting peripherals, switches, indicators and mechanical drawings. Be sure to read all safety precautions before you begin the installation procedure.

2.1 H/W Installation

2.2 Jumpers

This chapter explains the setup procedures of PCM-4372 hardware, including instructions on setting jumpers and connecting peripherals, switches, indicators and mechanical drawings. Be sure to read all safety precautions before you begin the installation procedure.

2.2.1 Jumper List

J1 Clear CMOS
J2 COM2 Setting
J3 LVDS0 Power
J4 LVDS1 Power
J5 PCI VIO Setting

Table 2.1: J1	
J1	**Clear CMOS**
Setting	**Function**
(1-2)	**Normal**
(2-3)	**Clear CMOS**

Table 2.2: J2	
J2	**COM2 Setting**
Setting	**Function**
(1-2)	**RS232**
(3-4)	**RS485**
(5-6)	**RS422**

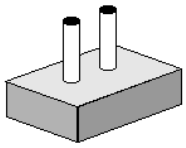
Table 2.3: J3	
J3	**LVDS0 Power**
Setting	**Function**
(1-2)	**+5 V**
(2-3)	**+3.3 V**

Table 2.4: J4	
J4	**LVDS1 Power**
Setting	**Function**
(1-2)	**+5 V**
(2-3)	**+3.3 V**

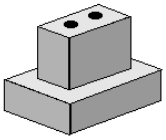
Table 2.5: J5	
J5	**PCI VIO Setting**
Setting	**Function**
(1-2)	**+5 V**
(2-3)	**+3.3 V**

2.2.2 Jumper Description

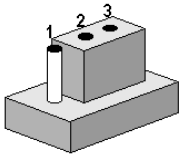
You can configure your card to match the needs of your application by setting jumpers. A jumper is a metal bridge used to close an electric circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To close a jumper you connect the pins with the clip. To open a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2, or 2 and 3.



open

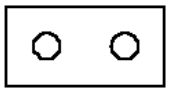


closed

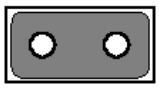


closed 2-3

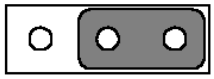
The jumper settings are schematically depicted in this manual as follows:



open



closed



closed 2-3

A pair of needle-nose pliers may be helpful when working with jumpers. If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes. Generally, you simply need a standard cable to make most connections.

Table 2.6: PCI VIO Setting (J5)

Setting	Function
1-2	+5V
2-3	+3.3V

Warning! *To avoid damaging the computer, always turn off the power supply before setting.Clear CMOS. Before turning on the power supply, set the jumper back to 3.0 V Battery On.*

2.3 Connector Settings

2.3.1 Connectors List

CN1 Battery Con.
CN2 GPIO
CN3 Power Switch
CN4 COM1
CN5 COM2/3/4 & LPT
CN6 RS-422/485
CN7 System FAN
CN8 KB_MS
CN9 IDE0
CN10 Compack II W/O Ejector
CN11 HD & Power LED
CN12 Inverter Power0
CN13 LVDS0 Connector
CN14 VGA Connector
CN15 LAN1(RJ45)
CN16 LAN2(RJ45)
CN17 USB0/1
CN18 USB2/3 & AC97 (AUDIO I/F)
CN19 USB4/5(MIO-USB)
CN20 Inverter Power1
CN21 LVDS1 Connector
CN23 PC104/+
CN24 ISA_-5V
CN26 ATX Power Con.
CN27 USB4/5
DIMM1 DDR-SODIMM(RVS)-5.2mm
SA1 SATA1
SA2 SATA2

2.3.2 GPIO (General Purpose Input Output) (CN2)

The board supports 8-bit GPIO via a GPIO connector. The 8 digital in/out-puts can be programmed to read or control devices, with input or out- puts defined. The default setting is 4 bits input and 4 bits output.

2.3.3 COM Port Connector (CN4, CN5, CN6)

PCM-4372 provides 4 serial ports (COM1: RS-232; COM2: RS-232/422/485) in one DB-9 connector (COM1) and one 50-pin dual-inline, male header. It provides connections for serial devices (mouse, etc.) or a communication network. You can find the pin assignments for the COM port connector in Appendix A.

2.3.4 Parallel Port Connector (CN5)

Normally, the parallel port is used to connect the card to a printer. The board includes a multi-mode (ECP/EPP/SPP) parallel port accessed via CN5 and a 50-pin flat-cable connector. You will need an adapter cable if you use a traditional DB-25 connector. The adapter cable has a 50-pin connector on one end, and a DB-25 connector on the other.

The parallel port is designated as LPT1, and can be disabled in the system BIOS setup.

The parallel port interrupt channel is designated IRQ7.

You can select ECP/EPP DMA channel via BIOS setup.

2.3.5 Power Connectors (CN5, CN26)

Main power connector, +3.3V, +5 V, +12 V (CN26).

Supplies main power to the PCM-4372 (+5 V), and to devices that require +12 V.

2.3.6 Fan Power Supply Connector (CN7)

Provides +5 V power supply to the CPU cooling fan.

2.3.7 Keyboard and PS/2 Mouse Connector (CN8)

The board provides a keyboard connector that supports both a keyboard and a PS/2 style mouse. In most cases, especially in embedded applications, a keyboard is not used. If the keyboard is not present, the standard PC/AT BIOS will report an error or fail during power-on self-test (POST) after a reset. The product's BIOS standard setup menu allows you to select *All but Keyboard* under the *Halt On* section. This allows no-keyboard operation in embedded system applications, without the system halting under POST.

2.3.8 IDE, CDROM Hard Drive Connector (CN9)

The board provides 1 IDE channel which you can attach up to two Enhanced Integrated Device Electronics hard disk drives or CDROM to the boards internal controller, which uses a PCI interface.

This advanced IDE controller supports faster data transfer, PIO mode 4, Multi-word DMA mode 2 and an UltraDMA-33 interface.

Connecting the hard drive

Connecting drives is done in a daisy-chain fashion. This package includes One 44PIN IDE cable that can connect to 1.8" and 2.5" drives.

1. Connect one end of the cable to Hard Drive connector. Make sure that the red (or blue) wire corresponds to pin 1 on the connector, which is labeled on the board (on the right side).

2. Plug the other end of the cable into the Enhanced IDE hard drive, with pin 1 on the cable corresponding to pin 1 on the hard drive.

(See your hard drives documentation for the location of the connector.)

If desired, connect a second drive as described above.

Unlike floppy drives, IDE hard drives can connect to either end of the cable. If you install two drives, you will need to set one as the master and one as the slave by using jumpers on the drives. If you install only one drive, set it as the master.

2.3.9 Solid State Disk: CompactFlash (CN10)

PCM-4372 provides a CompactFlash card type I socket. The CompactFlash card shares a secondary IDE channel which can be enabled/disabled via the BIOS settings.

2.3.10 Power & HDD LED Connector (CN11)

Next, you may want to install external switches to monitor and control the board. These features are optional: install them only if you need them. The Power & HDD LED connector is a 4-pin pin-header connector, which provides connections for a power and hard disk access indicator.

The HDD LED indicator for hard disk access is an active low signal (24mA sink rate).

2.3.11 Power Reset Button (S1)

Momentarily pressing the reset button will activate a reset. The switch should be rated for 10 mA, 5 V.

2.3.12 VGA/LCD/LVDS Interface Connections (CN13, CN14, CN21)

PCM-4372's PCI VGA interface can drive conventional CRT displays and is capable of driving a wide range of flat panel displays, including passive LCD and active LCD displays. The board has connectors to support these displays: one for standard CRT VGA monitors, one for flat panel displays, and one for LVDS type LCD panels.

CRT display connector (CN14)

The CRT display connector is a 15-pin D-SUB connector used for conventional CRT displays.

LVDS LCD panel connector (CN13, CN21)

The board supports 2 channel 36bit/ 48bit LVDS LCD panel displays.

2.3.13 Ethernet Configuration (CN15, CN16)

The board is equipped with 2 high performance 32-bit PCI-bus Ethernet interface which are fully compliant with IEEE 802.3 10/100Mbps, and are supported by all major network operating systems.

100Base-T (CN15, CN16) connections are made via the on-board RJ-45 connector.

2.3.14 USB Connectors (CN17, CN18, CN27)

The board provides up to six USB (Universal Serial Bus) ports. This gives complete Plug and Play, and hot attach/detach for up to 127 external devices. The USB interfaces comply with USB specification Rev. 2.0 which supports 480 Mbps transfer rate, and are fuse protected.

The USB interface is accessed through one 8 x 2-pin flat-cable connectors, CN27. You will need an adapter cable if you use a standard USB connector. The adapter cable has a 8 x 2-pin connector on one end and a USB connector on the other. The USB interfaces can be disabled in the system BIOS setup.

2.3.15 SATA Connector (SA1, SA2)

PCM-4372 supports Serial ATA via two connectors (SA1, SA2). Data transfer rates up to 150 MB/s are possible, enabling very fast data and file transfer, and independent DMA operation on two ports.

2.4 Mechanical

2.4.1 Jumper & Connector Location

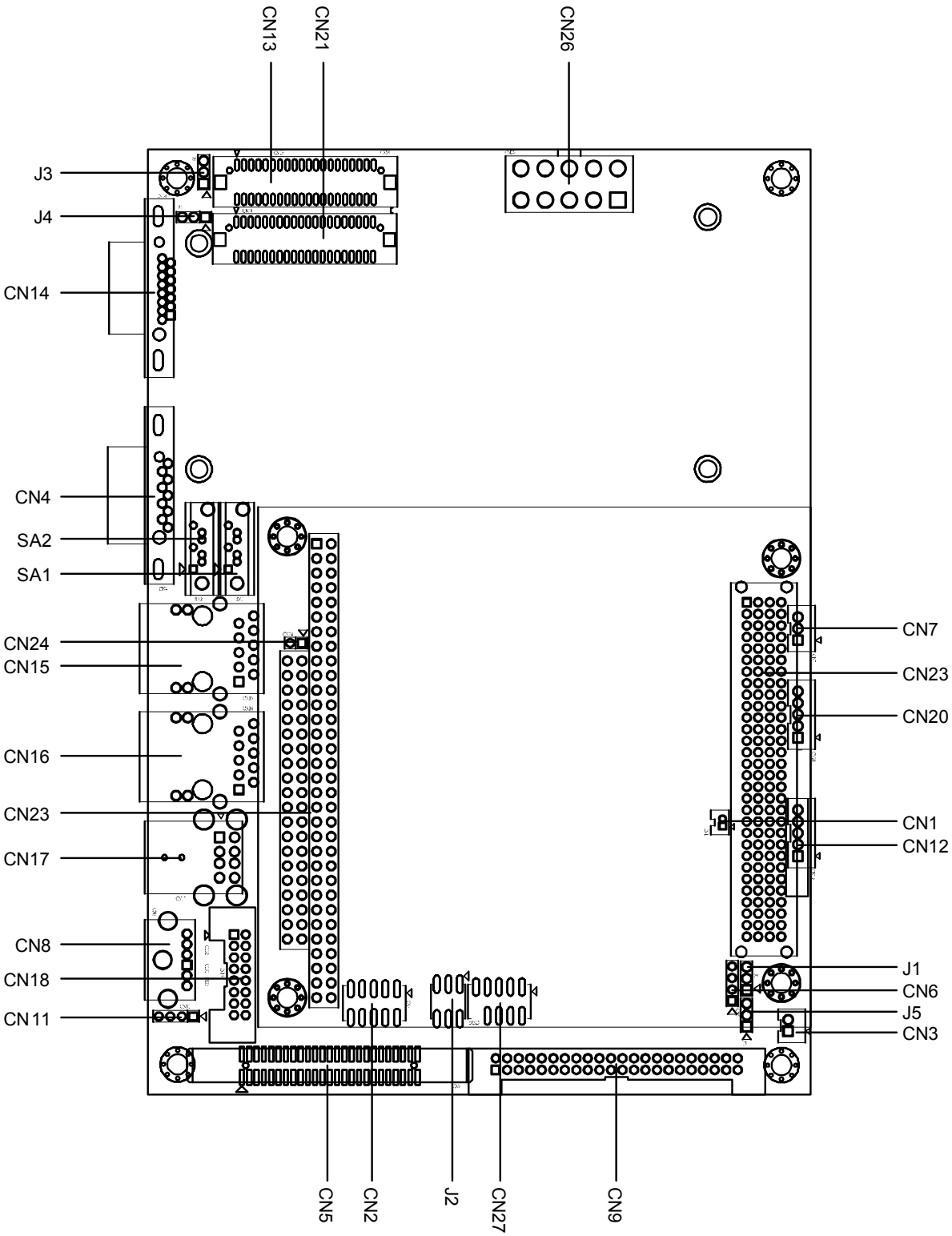


Figure 2.1 PCM-4372 Position TOP

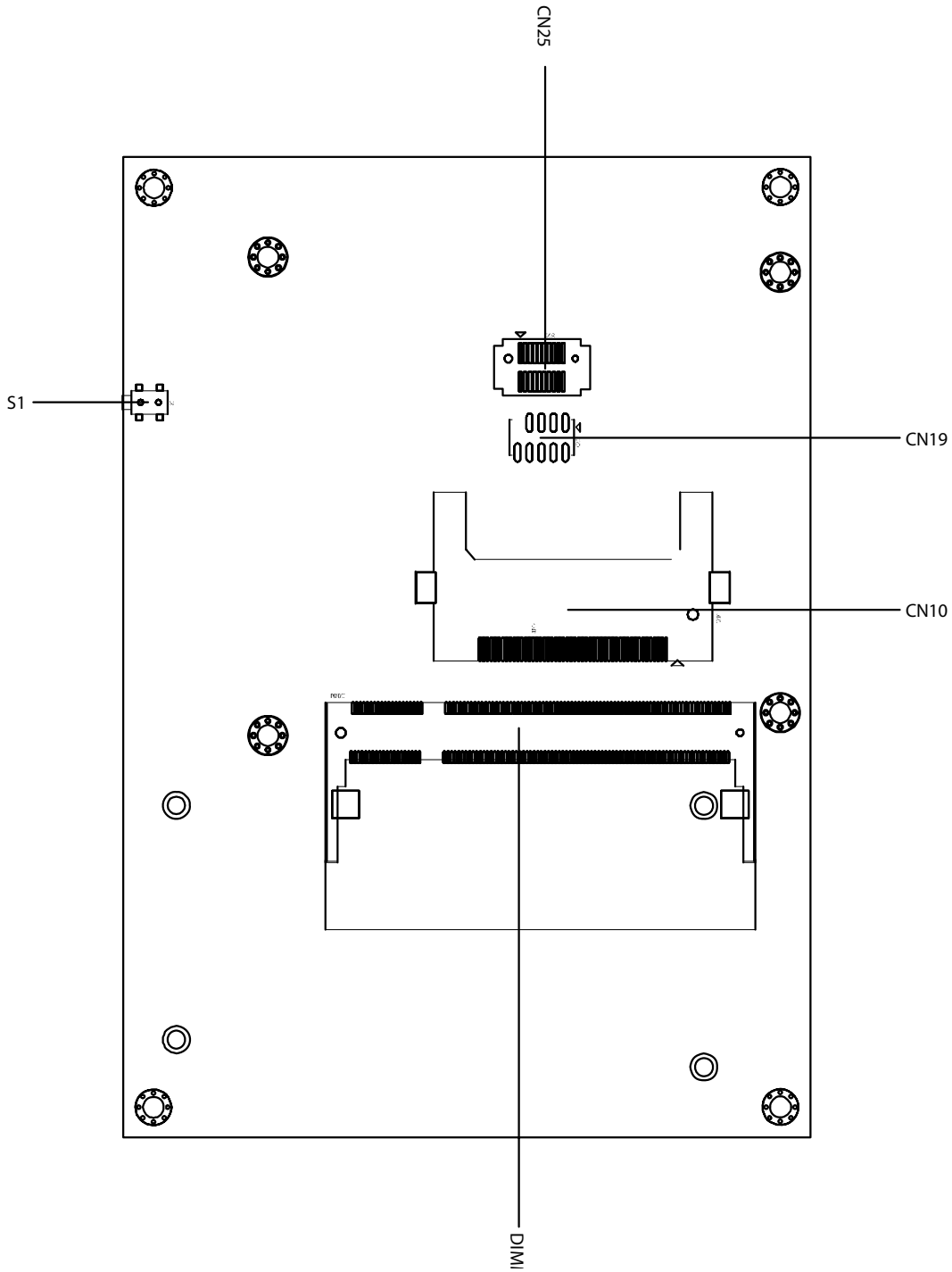


Figure 2.2 PCM-4372 Position BOTTOM

2.4.2 Board Dimension

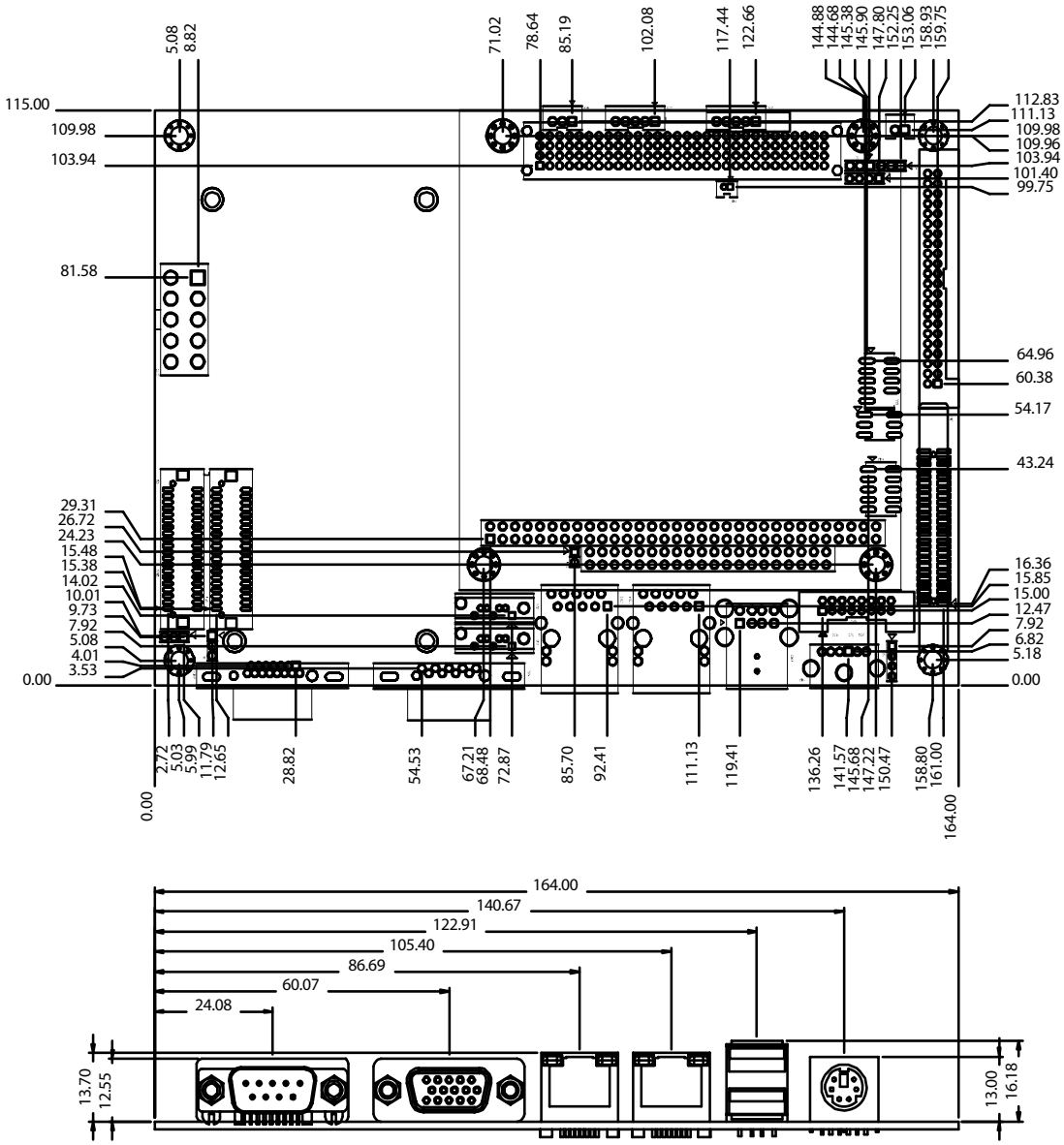


Figure 2.3 PCM-4372 Dimension TOP

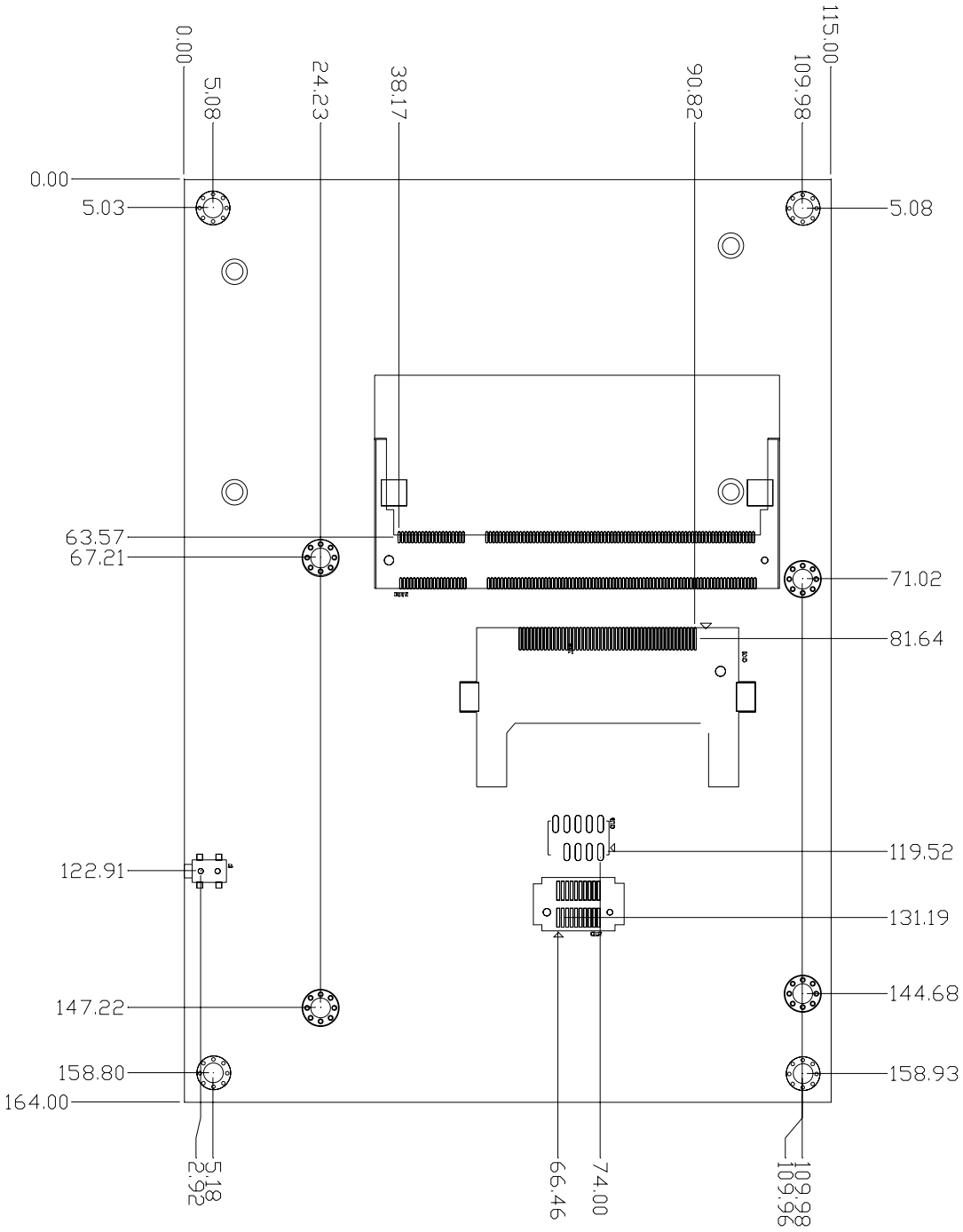


Figure 2.4 PCM-4372 Dimension BOTTOM

Chapter 3

BIOS Settings

3.1 BIOS Operation

Introduction

Advantech provides the full-featured Award BIOS 6.0 BIOS which delivers superior performance, compatibility and functionality that manufactures of Industrial PCs and Embedded boards want, it's many options and extensions let you customize your products to a wide range of designs and target markets.

The modular, adaptable Award BIOS 6.0 BIOS supports the broadest range of third-party peripherals and all popular chipsets, plus Intel, AMD, nVidia, VIA, and compatible CPUs from 386 through Pentium and AMD Geode, K7 and K8 (including multiple processor platforms), and VIA Eden C3 and C7 CPU processors.

You can use Advantech's utilities to select and install the features to suit your customers design needs.

3.2 BIOS Setup

PCM-4372 has built-in Award BIOS with a CMOS SETUP utility which allows users to configure the required settings or to activate certain system features.

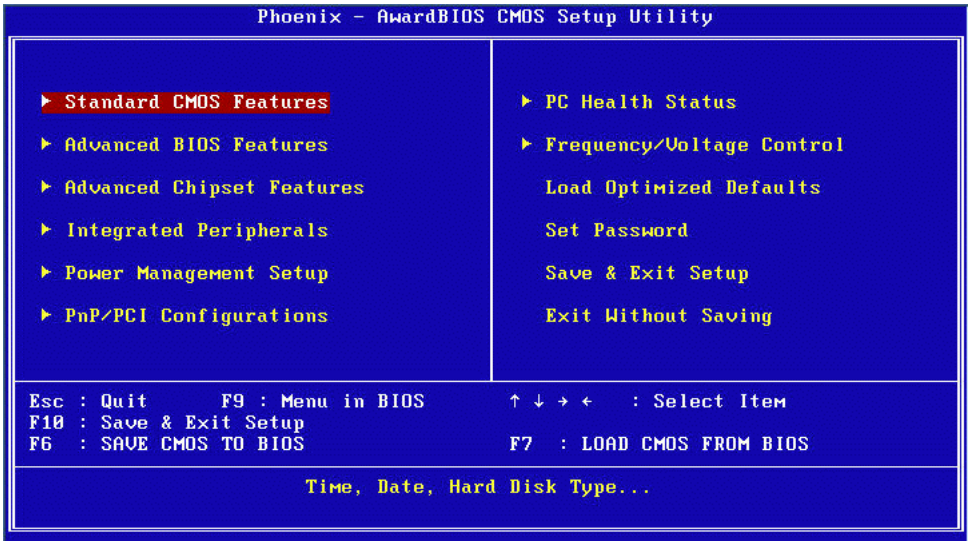
The CMOS SETUP saves the configuration in the CMOS RAM of the motherboard. When the power is turned off, the battery on the board supplies the necessary power to the CMOS RAM.

When the power is turned on, press the <Del> button during the BIOS POST (Power-On Self Test) will take you to the CMOS SETUP screen.

CONTROL KEYS	
<↑><↓><←><→>	**Move to select item**
<Enter>	**Select Item**
<Esc>	**Main Menu - Quit and not save changes into CMOS** **Sub Menu - Exit current page and return to Main Menu**
<Page Up/+>	**Increase the numeric value or make changes**
<Page Down/->	**Decrease the numeric value or make changes**
<F1>	**General help, for Setup Sub Menu**
<F2>	**Item Help**
<F5>	**Load Previous Values**
<F7>	**Load Optimized Default**
<F10>	**Save all CMOS changes**

3.2.1 Main Menu

Press <Del> to enter Award BIOS CMOS Setup Utility, the Main Menu will appear on the screen. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.



- Standard CMOS Features

This setup page includes all the items in the standard compatible BIOS.

- Advanced BIOS Features

This setup page includes all the items of the Award BIOS enhanced features.

- Advanced Chipset Features

This setup page includes all the items of the Chipset configuration features.

- Integrated Peripherals

This setup page includes all the onboard peripheral devices.

- Power Management Setup

This setup page includes all the items of the Power Management features.

- PnP/PCI Configurations

This setup page includes the PnP OS and PCI device configurations.

- PC Health Status

This setup page includes the system auto detect CPU and system temperature, voltage, fan speed settings.

- Frequency/Voltage Control

This setup page includes CPU host clock control, frequency ratio and voltage settings.

- Load Optimized Defaults

This setup page includes Load system optimized values, for the best performance configuration.

- Set Password

Establish, change or disable passwords.

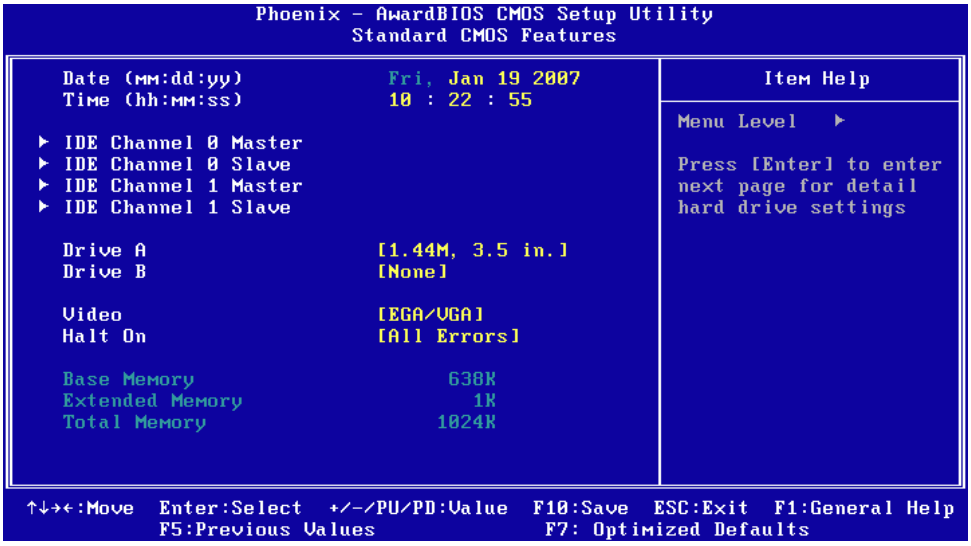
- Save & Exit Setup

Save CMOS value settings to CMOS and exit BIOS setup.

- Exit Without Saving

Abandon all CMOS value changes and exit BIOS setup.

3.2.2 Standard CMOS Features



- Date

The date format is <week>, <month>, <day>, <year>.

- Week — From Sun to Sat, determined and display by BIOS only
- Month — From Jan to Dec.
- Day — From 1 to 31
- Year — From 1999 through 2098

- Time

The times formats are in <hour> <minute> <second>, based on the 24-hour time

- IDE Channel 0 Master/Slave
  - IDE HDD Auto-Detection Press "Enter" for automatic device detection.
- IDE Channel 1 Master/Slave
  - IDE HDD Auto-Detection Press "Enter" for automatic device detection.
- Drive A / Drive B

The Item identifies the types of floppy disk drive A or drive B

- None — No floppy drive installed
- 360K, 5.25" — 5.25 inch PC-type standard drive; 360K byte capacity
- 1.2M, 5.25" — 5.25 inch AT-type high-density drive; 1.2M byte capacity
- 720K, 3.5" — 3.5 inch double-sided drive; 720K byte capacity
- 1.44M, 3.5" — 3.5 inch double-sided drive; 1.44M byte capacity
- 2.88M, 3.5" — 3.5 inch double-sided drive; 2.88M byte capacity

- Halt on

This determines whether the computer will stop if an error is detected during power up.

– No Errors	The system boot will not stop for any error
– All Errors	Whenever the BIOS detects a non-fatal error the system will be stopped.
– All, But Keyboard	The system boot will not stop for a keyboard error; it will stop for all other errors. (Default value)
– All, But Diskette	The system boot will not stop for a disk error; it will stop for all other errors.
– All, But Disk/Key	The system boot will not stop for a keyboard or disk error; it will stop for al other errors.

- Base Memory

The POST of the BIOS will determine the amount of base (or conventional) memory installed in the system.

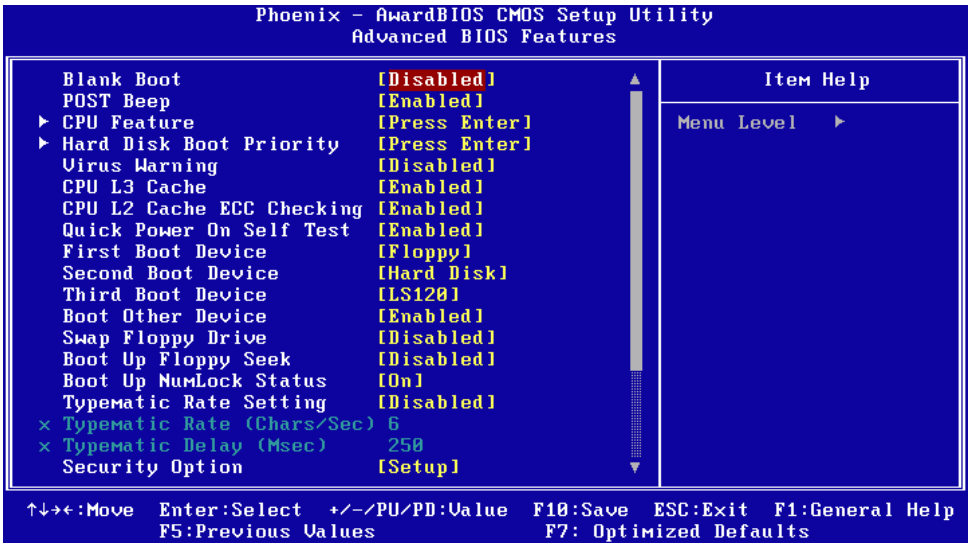
- Extended Memory

The POST of the BIOS will determine the amount of extended memory (above 1MB in the CPU memory address map) installed in the system.

- Total Memory

This item displays the total system memory size.

3.2.3 Advanced BIOS Features



- Blank Boot [Disabled] (* Advantech feature enhancement)

This item allows the system to only display blank screens during BIOS Post stage.

- POST Beep [Enabled] (* Advantech feature enhancement)

This item allows the system to send out Beep sounds during BIOS Post stage.

- CPU Feature

This item allows users to adjust CPU features, CPU ratio, VID and Thermal and special feature like XD flag.

- Hard Disk Boot Priority

This item allows the user to select the boot sequence for system devices: HDD, SCSI, RAID.

- Virus Warning[Disabled]

This item allows users to choose the VIRUS warning feature for IDE Hard Disk boot sector protection.

- CPU L3 Cache [Enabled]

This item allows users to enable CPU L3 cache.

- CPU L2 Cache ECC Checking [Enabled]

This item allows user to enable CPU L2 cache and ECC checking function.

- Quick Power On Self Test [Enabled]

This field speeds up the Power-On Self Test (POST) routine by skipping re-testing a second, third and forth time. Setup setting default is enabled.

- First / Second / Third / Other Boot Drive

– Floppy	Select boot device priority by Floppy
– LS120	Select boot device priority by LS120
– Hard Disk	Select boot device priority by Hard Disk
– CDROM	Select boot device priority by CDROM
– ZIP	Select boot device priority by ZIP
– USB-FDD	Select boot device priority by USB-FDD.
– USB-ZIP	Select boot device priority by USB-ZIP.
– USB-CDROM	Select boot device priority by USB-CDROM.
– USB-HDD	Select boot device priority by USB-HDD.
– LAN	Select boot device priority by LAN.
– Disabled	Disable this boot function.

- Swap Floppy Drive [Disabled]

This item enables users to swap floppy “A” and “B” identified without changing hardware cable connection.

- Boot Up Floppy Seek [Disabled]

When enabled, the BIOS will seek the floppy “A” drive first

- Boot Up NumLock Status [Disabled]

This item enables users to activate the Number Lock function upon system boot

- Typematic Rate Setting

This item enables users to set the two typematic controls items.

This field controls the speed:

– Typematic Rate (Chars/Sec)	This item controls the speed at system registers repeated keystrokes. Eight settings are 6, 8, 10, 12, 15, 20, 24 and 30.
– Typematic Delay (Msec)	This item sets the time interval for displaying the first and second characters. Four delay rate options are 250, 500, 750 and 1000.

- Security Option [Setup]

– System	System can not boot and can not access the Setup page if the correct password is not entered at the prompt
– Setup	System will boot, but access to Setup if the correct password is not entered at the prompt. (Default value)

- MPS Version Control for OS [1.4]

This item sets the operating system multiprocessor support version.

- OS Select For DRAM > 64M [Non-OS2]

Select OS2 only if system is running OS/2 operating system with greater than 64MB of RAM on the system

- Video BIOS Shadow [Enabled]

Enabled copies Video BIOS to shadow RAM improves performance

- Full Screen Logo Show [Enabled]

Show full screen logo during post stage, (Logo picture can be customized).

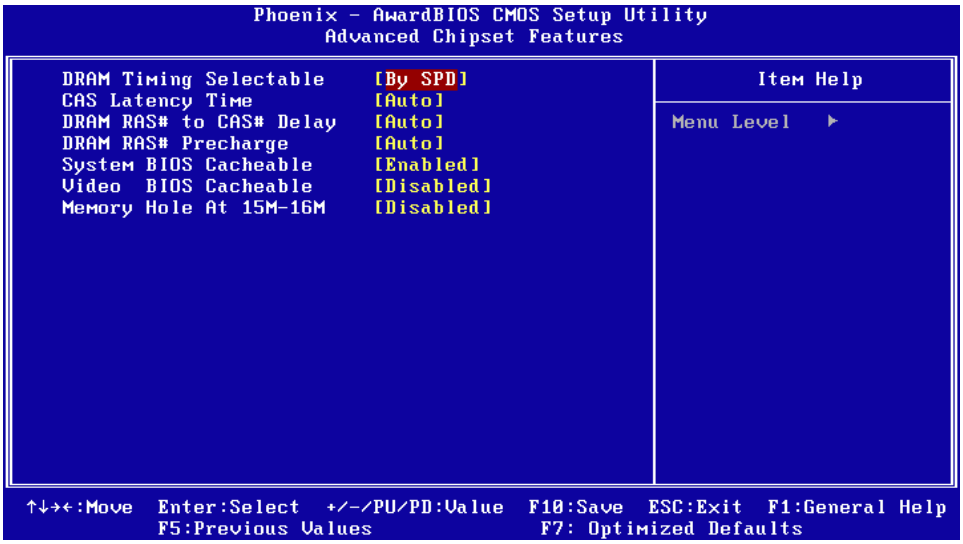
- Small Logo (EPA) Show [Enabled]

Show EPA logo during system post stage

- Summary Screen Show [Enabled]

Show system status in Summary screen page

3.2.4 Advanced Chipset Features



Note!

The "Advanced Chipset Features" option controls the configuration of the board's chipset, this page is developed by Chipset independent, for control chipset register setting and fine tune system performance. It is strongly recommended only technical users make changes to the default settings.

- DRAM Timing Selectable [By SPD]

This item enables users to set the optimal timings for items 2 through to 5, the system default setting of "By SPD" ensures the system is running in a stable and optimal performance.

- CAS Latency Time [Auto]

This item enables users to set the timing delay in clock cycles before SDRAM starts a read command after receiving it.

- DRAM RAS# to CAS# Delay [Auto]

This item enables users to set the timing of the transition from RAS (Row Address Strobe) to CAS (Column Address Strobe) as both rows and columns are separately addressed shortly after DRAM is refreshed.

- DRAM RAS# Precharge [Auto]

This item enables users to set the DRAM RAS# precharge timing, the system default is set to “Auto” to reference the data from SPD ROM.

- System BIOS Cacheable [Enabled]

This item allows the system BIOS to be cached to allow faster execution and better performance.

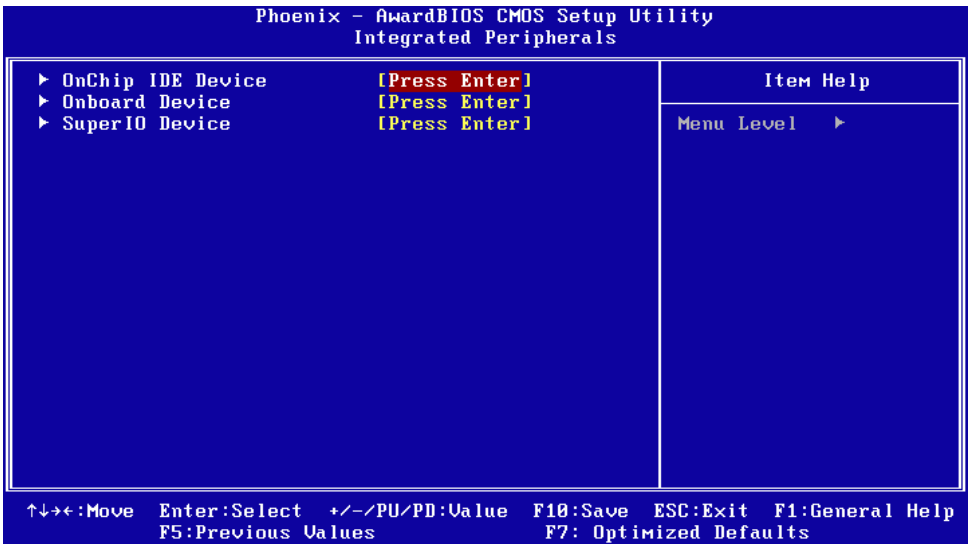
- Video BIOS Cacheable [Disabled]

This item allows the video BIOS to be cached to allow faster execution and better performance.

- Memory Hole At 15M-16M [Disabled]

This item reserves 15MB-16MB memory address space to ISA expansion cards that specifically require the setting. Memory from 15MB-16MB will be unavailable to the system because the expansion cards can only access memory at this area.

3.2.5 Integrated Peripherals



Note! *This “Integrated Peripherals” option controls the configuration of the board’s chipset, includes IDE, ATA, SATA, USB, AC97, MC97 and Super IO and Sensor devices, this page is developed by Chipset independent.*

- OnChip IDE Device

This item enables users to set the OnChip IDE device status, includes enable IDE devices and setting PIO and DMA access mode, and some of new chipset also support for SATA device (Serial-ATA)

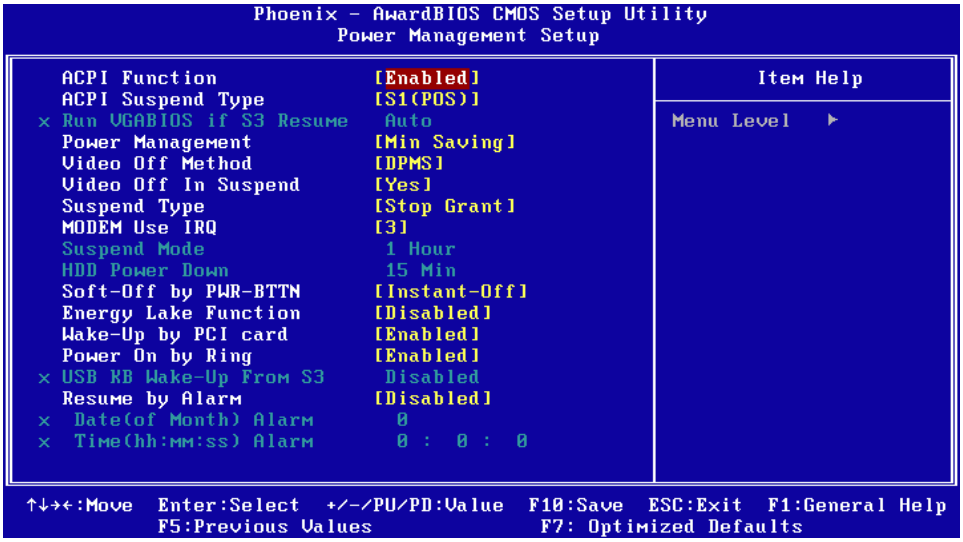
- Onboard Device

This item enables users to set the onboard device status, includes enable USB, AC97, MC97 and LAN devices.

- Super IO Device

This item enables users to set the Super IO device status, includes enable Floppy, COM, LPT, IR and control GPIO and Power fail status.

3.2.6 Power Management Setup



Note! *This "Power management Setup" option configure system to most effectively saving energy while operating in a manner consistent with your computer use style.*

- ACPI Function [Enabled]

This item defines the ACPI (Advanced Configuration and Power Management) feature that makes hardware status information available to the operating system, and communicates PC and system devices for improving power management.

- ACPI Suspend Type [S1 (POS)]

This item allows the user to select sleep state when in suspend mode.

– S1(POS)	The suspend mode is equivalent to a software power down.
– S3(STR)	The system shuts down with the exception of a refresh current to the system memory.

- Run VGA BIOS if S3 Resume[Auto]

This item allows system to re initialize VGA BIOS after system resume from ACPI S3 mode.

- Power Management [Min Saving]

This item allows user to select system power saving mode.

– Min Saving	Minimum power management. Suspend Mode=1 hr.
– Max Saving	Maximum power management. Suspend Mode=1 min.
– User Define	Allows user to set each mode individually. Suspend

Mode= Disabled or 1 min ~1 hr.

- Video Off Method [DPMS]

This item allows the user to determine the manner is which the monitor is blanked.

– V/H SYNC+Blank	This option will cause system to turn off vertical and horizontal synchronization ports and write blanks to the video buffer.

- Blank Screen — This option only writes blanks to the video buffer
- DPMS — Initial display power management signaling.

■ Video Off In Suspend [Yes]

This item allows user to turn off Video during system enter suspend mode.

■ Suspend Type [Stop Grant]

This item allows user to determine the suspend type.

■ Modem use IRQ [3]

This item allows user to determine the IRQ which the MODEM can use.

■ Suspend Mode [1 Hour]

This item allows user to determine the time of system inactivity, all devices except the CPU will be shut off.

■ HDD Power Down Mode [15 Min]

This item allows user to determine the time of system inactivity, when the hard disk drive will be powered down.

■ Soft-Off by PWR-BTN [Enabled]

This item allows the user to define the power button function.

- Instant-Off — Press power button then Power off instantly.
- Delay 4 Sec — Press power button for 4 sec. to Power off.

■ Wake-Up by PCI card [Enabled]

This item allows the user to define PCI cards to wake up the system from suspend mode.

■ Power On by Ring [Enabled]

This item allows the user to define when the system will resume by modem ring activation.

■ USB KB Wake-Up From S3 [Enabled]

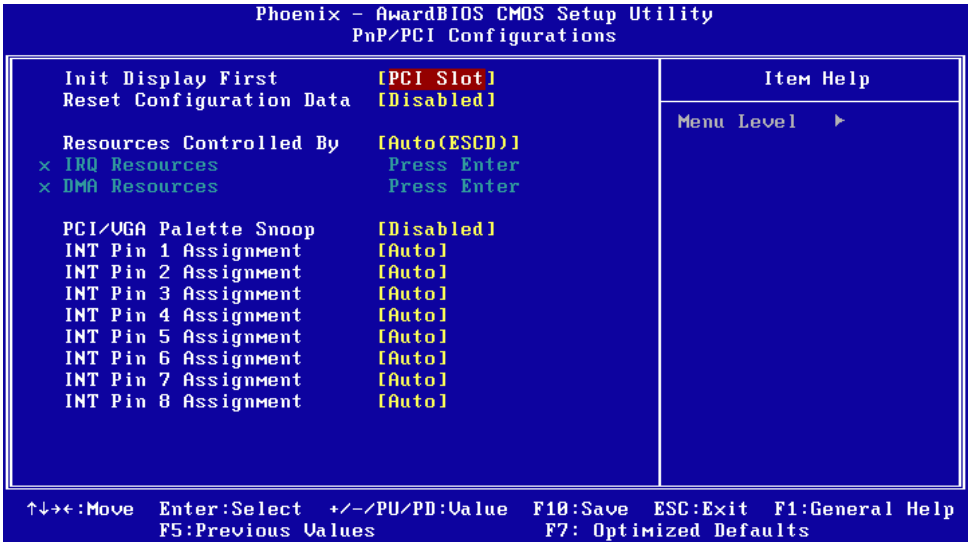
This item allows user to enable using a USB keyboard, and allow a keystroke to wake up the system from power saving mode.

■ Resume by Alarm [Disabled]

This item allows user to enable and key in a Date/time to power on the system

- Disabled — Disable this function.
- Enabled — Enable alarm function to power on system
- Data (of month) — Alarm 1-31
- Time (HH:MM:SS) — Alarm (0-23): (0-59): 0-59

3.2.7 PnP/PCI Configurations



Note! *This "PnP/PCI Configurations" option is setting up the IRQ and DMA (both PnP and PCI bus assignments.*

- Init Display First [PCI Slot]

This item is setting for start up Video output from PCI or Onboard device.

- Reset Configuration Data [Disabled]

This item allow the user to clear any PnP configuration data stored in the BIOS.

- Resources Controlled By [Auto (ESCD)]

– IRQ Resources — This item allows you respectively assign an interruptive type for IRQ-3, 4, 5, 7, 9, 10, 11, 12, 14, and 15.

– DMA Resources — This item allows you respectively assign an interruptive type for DMA, 0, 1, 2, 3, 4, 5, 6, and 7.

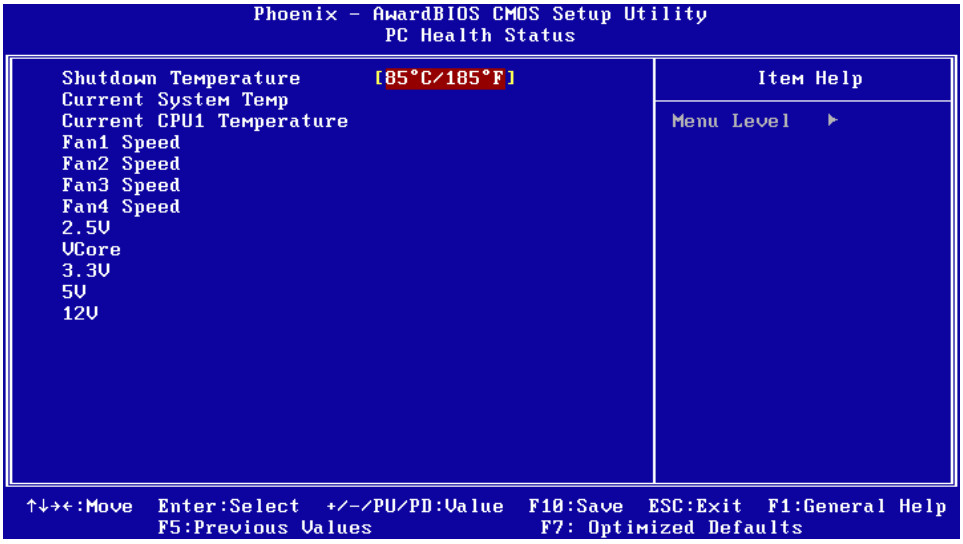
- PCI VGA Palette Snoop [Disabled]

The item is designed to solve problems caused by some non-standard VGA cards. A built-in VGA system does not need this function.

- INT Pin 1~8 Assignment [Auto]

The interrupt request (IRQ) line assigned to a device connected to the PCI interface on your system.

3.2.8 PC Health Status



Note! *This "PC Health Status" option controls the Thermal, FAN and Voltage status of the board. this page is developed by Chipset independent.*

- Shutdown Temperature [Disabled]

This item enables users to set the limitation of CPU temperature, the range is from 85×C through 100×C.

- Current System/CPU Temp [Show Only]

This item displays current system and CPU temperature.

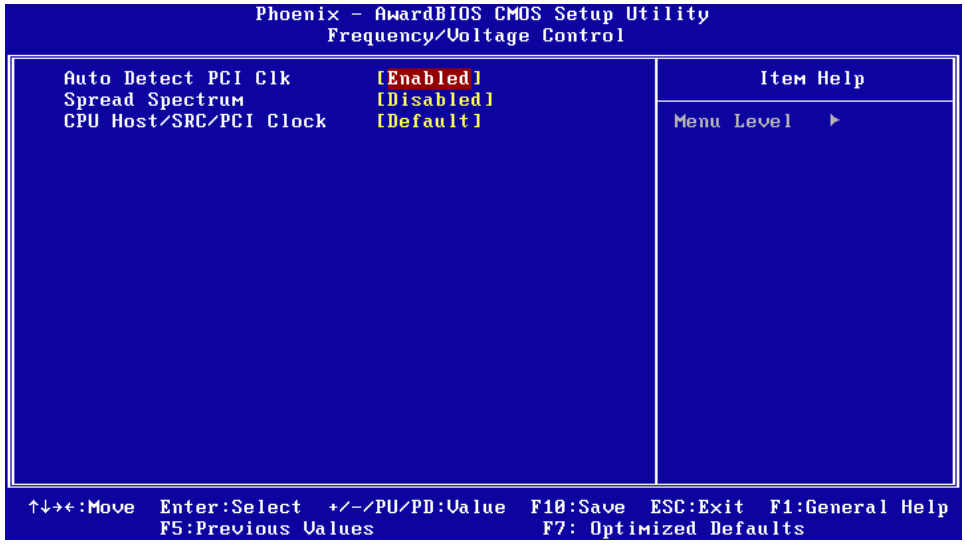
- FAN 1 / FAN2 / FAN3 / FAN4 Speed [Show Only]

This item displays current system FAN speed.

- 2.5V / 3.3V / 5V / 12V and VCore [Show Only]

This item displays current CPU and system Voltage.

3.2.9 Frequency/voltage Control



Note! *This "Frequency/Voltage Control" option controls the CPU Host and PCI frequency, this page is developed by CPU and Chipset independent, some items will show up when you install a processor which supports this function.*

- Auto Detect PCI Clk [Enabled]

This item enables users to set the PCI Clk by system automatic detection or by manual.

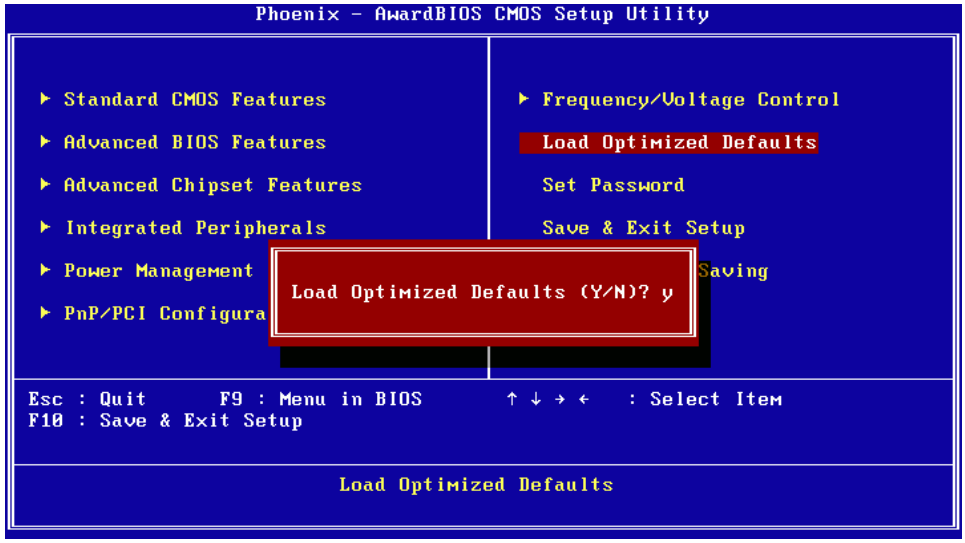
- Spread Spectrum [Disabled]

This item enables users to set the spread spectrum modulation.

- CPU Host/SRC/PCI Clock [Default]

This item enables users to set the CPU Host and PCI clock by system automatic detection or by manual

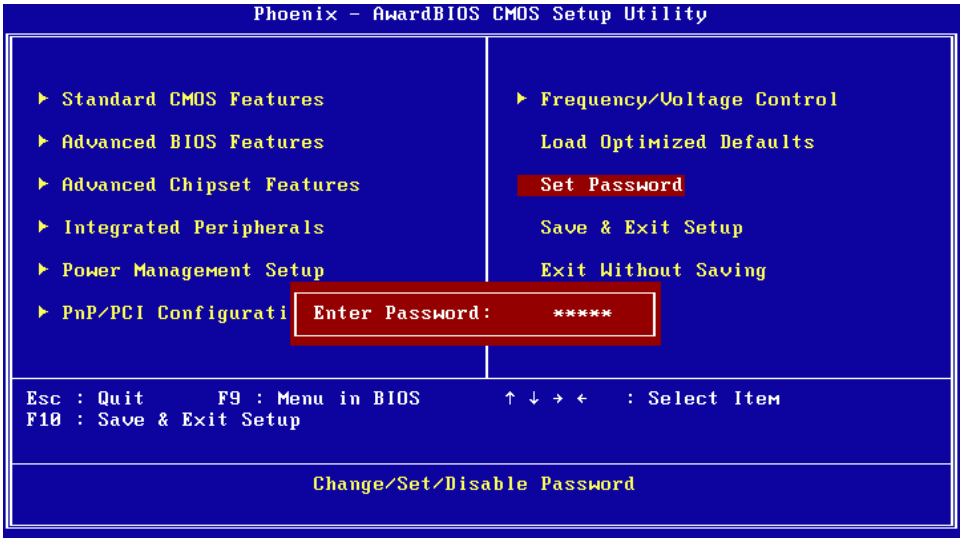
3.2.10 Load Optimized Defaults



Note! *Load Optimized Defaults loads the default system values directly from ROM. If the stored record created by the Setup program should ever become corrupted (and therefore unusable).*

These defaults will load automatically when you turn PCM-4372 on.

3.2.11 Set Password



Note! *To enable this feature, you should first go to the Advanced BIOS Features menu, choose the Security Option, and select either Setup or System, depending on which aspect you want password protected. Setup requires a password only to enter Setup. System requires the password either to enter Setup or to boot the system. A password may be at most 8 characters long.*

To Establish Password

1. Choose the Set Password option from the CMOS Setup Utility main menu and press <Enter>.
2. When you see “Enter Password”, enter the desired password and press <Enter>.
3. At the “Confirm Password” prompt, retype the desired password, then press <Enter>.
4. Select Save to CMOS and EXIT, type <Y>, then <Enter>.

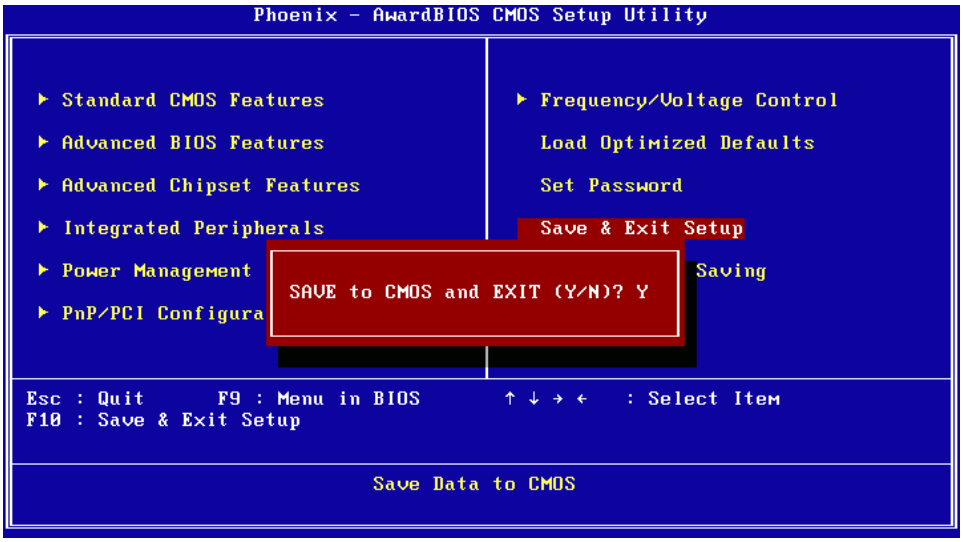
To Change Password

1. Choose the Set Password option from the CMOS Setup Utility main menu and press <Enter>.
2. When you see “Enter Password”, enter the existing password and press <Enter>.
3. Next you will see “Confirm Password”. Type it again, and press <Enter>.
4. Select Set Password again, and at the “Enter Password” prompt, enter the new password and press <Enter>.
5. At the "Confirm Password” prompt, retype the new password, and press <Enter>.
6. Select Save to CMOS and EXIT, type <Y>, then <Enter>.

To Disable Password

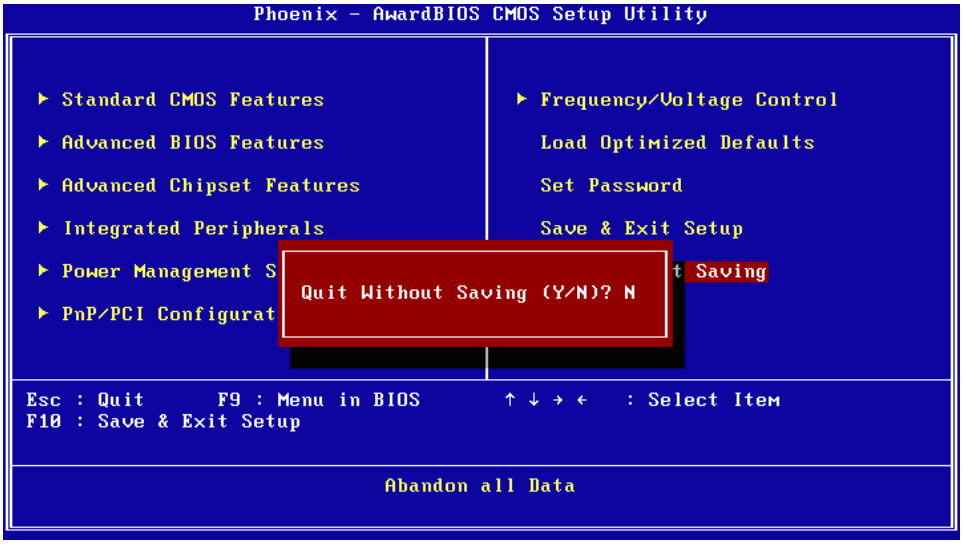
1. Choose the Set Password option from the CMOS Setup Utility main menu and press <Enter>.
2. When you see “Enter Password”, enter the existing password and press <Enter>.
3. You will see “Confirm Password”. Type it again, and press <Enter>.
4. Select Set Password again, and at the “Enter Password” prompt, don’t enter anything; just press <Enter>.
5. At the “Confirm Password” prompt, again, don’t type in anything; just press <Enter>.
6. Select Save to CMOS and EXIT, type <Y>, then <Enter>.

3.2.12 Save & Exit Setup



Note! *Typing “Y” will quit the BIOS Setup Utility and save user setup value to CMOS. Type “N” will return to BIOS Setup Utility.*

3.2.13 Quit Without Saving



Note! *Typing "Y" will quit the BIOS Setup Utility without saving to CMOS. Type "N" will return to BIOS Setup Utility.*

Chapter 4

S/W Installation

4.1 S/W Installation

The mission of Advantech Embedded Software Services is to “Enhance quality of life with Advantech platforms and Microsoft Windows® embedded technology.” We enable Windows® Embedded software products on Advantech platforms to more effectively support the embedded computing community. Customers are freed from the hassle of dealing with multiple vendors (Hardware suppliers, System integrators, Embedded OS distributor) for projects. Our goal is to make Windows® Embedded Software solutions easily and widely available to the embedded computing community.

4.2 Driver Installation

To install the drivers, insert the CD into CD-Rom, select the drivers that you want to install, then run the .exe (set up) file under each chipset folder. Follow the on-screen instructions to complete the installation.

4.3 SUSI Application Library

4.3.1 SUSI Introduction

To make hardware easier and more convenient to access for programmers, Advantech has released a suite of APIs (Application Programming Interface) in the form of a program library. The program library is called the “Secured and Unified Smart Interface” (SUSI) library.

In modern operating systems, user space applications cannot access hardware directly. Drivers are required to access hardware. User space applications access hardware through drivers. Different operating systems usually define different interfaces for drivers. This means that user space applications call different functions for hardware access in different operating systems. To provide a uniform interface for accessing hardware, an abstraction layer is built on top of the drivers and SUSI is such an abstraction layer. SUSI provides a uniform API for application programmers to access the hardware functions in different operating systems and on different Advantech hardware platforms.

Application programmers should invoke the functions exported by SUSI instead of calling the drivers directly. The benefit of using SUSI is portability. The same APIs can be used for different Advantech hardware platforms. Besides, the same set of APIs is implemented in different operating systems including Windows XP and Windows CE. This user manual describes some sample programs and the API in SUSI. The hardware functions currently supported by SUSI can be grouped into a few categories including Watchdog, I^2C, SMBus, GPIO, and VGA control. Each category of the API in SUSI is briefly described below.

4.3.2 SUSI Functions

4.3.2.1 The GPIO API

General Purpose Input/Output (GPIO) is a flexible parallel interface that allows a variety of custom connections. You can control cash drawers with GPIO.

4.3.2.2 The I^2C API

I^2C is a bidirectional two wire bus that was developed by Phillips for use in their televisions in the 1980s. It is used in various types of embedded systems nowadays. The strict timing requirements defined in the I^2C protocol has been taken care of by SUSI.

Instead of asking application programmers to figure out the strict timing requirements in the I^2C protocol, the I^2C API in SUSI can be used to control I^2C devices just like invoking other function calls. Therefore, the development process of your products can be accelerated by using SUSI. Besides, SUSI provides a consistent programming interface for different Advantech boards. This means programs using SUSI are portable across different Advantech boards as long as the boards and SUSI provide the required functionality.

4.3.2.3 The SMBus API

The System Management Bus (SMBus) is a two-wire interface defined by Intel® Corporation in 1995. It is based on the same principles of operation as I^2C and is used in personal computers and servers for low-speed system management communications. It can be seen in many types of embedded systems. As with other APIs in SUSI, the SMBus API is available on many platforms including Windows XP and Windows CE.

4.3.2.4 The VGA Control API

There are two kinds of VGA control API in SUSI: backlight on/off control and brightness control. Backlight on/off control can allow a developer to turn on or turn off the backlight. Our API allows a developer to turn on/off the backlight and to control brightness smoothly.

4.3.2.5 The Watchdog API

A watchdog timer (WDT) is a hardware device which triggers an action, e.g. rebooting the system, if the system does not reset the timer within a specific period of time. The WDT API in the SUSI provides developers with functions such as starting the timer, reset the timer, and set the time-out value if the hardware supports customized a time-out value.

4.3.2.6 The Hardware Monitor API

The hardware monitor (HWM) is a system health supervision function that uses an I/O chip along with sensors to monitor items such as fan speed, temperature and voltage.

Commercial hardware monitoring chips are not accurate, so Advantech has developed a unique scheme for hardware monitoring. This uses a dedicated microprocessor and algorithms specifically designed for providing accurate real-time data, to protect your system in a more reliable manner.

4.3.2.7 4.3.3 SUSI Installation

SUSI supports many different operating systems. Each subsection describes how to install SUSI and related software on a specific operating system. Please refer to the subsection matching your operating system.

4.3.2.8 Windows XP

In windows XP, you can install libraries, drivers and demo programs on to the platform easily by using the SUSI Library Installer. After the installer is executed, the SUSI Library and related files for Windows XP can be found in the target directory you choose during installation. The files are listed in the following table.

Directory	Contents
\Library	Susi.lib: Library for developing applications on Windows XP. Susi.dll: Dynamic library for SUSI on Windows XP.
\Demo	SusiDemo.exe: Demo program on Windows XP. Susi.dll: Dynamic library for SUSI on Windows XP.
\Demo\SRC	Source code of the demo program on Windows XP.

The following section of [Installation] illustrates all the process of installation.

Note! *The version shown on each SUSI Library Installer screen may.*

Installation:

1. Extract Susi.zip.
2. Double-click the "Setup.exe" file.

The installer searches for a previous installation of SUSI Library. If it locates one, a screen opens asking whether you want to modify, repair or remove the software. If a previous version is located, please see the section of [Maintenance Setup]. If it is not located, the following screen shot opens. Click Next.

4.3.2.9 Windows CE

In windows CE, there are three ways to install SUSI Library. You can install it manually, use Advantech CE-Builder to install the library or just copy the programs and the library into a CompactFlash card.

Express Installation:

To use Advantech CE-Builder to help you include the library in the image:

1. Click the My Component tab.
2. Click the Add New Category button to add a new category, e.g. SUSI Library.
3. Add a new file in this category and upload the SUSI.dll for this category.

After doing these steps, you can just select the SUSI Library category you created for every project.

Manual Installation:

To add the SUSI Library to the image by editing a bib file:

1. Open project.bib in the platform builder.
2. Add this line to the MODULES section of project.bib
   Susi.dll $(_FLATRELEASEDIR)\Susi.dll NK SH
3. If you want to run the window-based demo, add following line:
   SusiTest.exe $(_FLATRELEASEDIR)\SusiTest.exe
4. If you want to run the console-based demo, add following lines:
   Watchdog.exe $(_FLATRELEASEDIR)\Watchdog.exe NK S
   GPIO.exe $(_FLATRELEASEDIR)\GPIO.exe NK S
   SMBUS.exe $(_FLATRELEASEDIR)\SMBUS.exe NK S
5. Place the three files into any files directory.
6. Build your new Windows CE operating system.

4.3.3 SUSI Sample Programs

4.3.3.1 Sample Programs

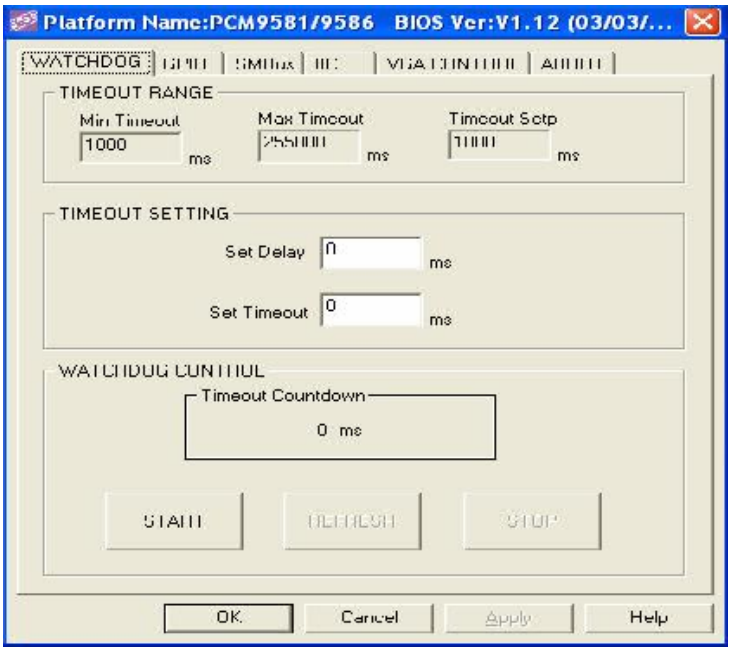
The sample programs demonstrate how to incorporate SUSI into your program. There are sample programs for Windows XP and Windows CE. The sample programs run in graphics mode in Windows XP and Windows CE. The sample programs are described in the subsections below.

4.3.3.2 Windows Graphics Mode

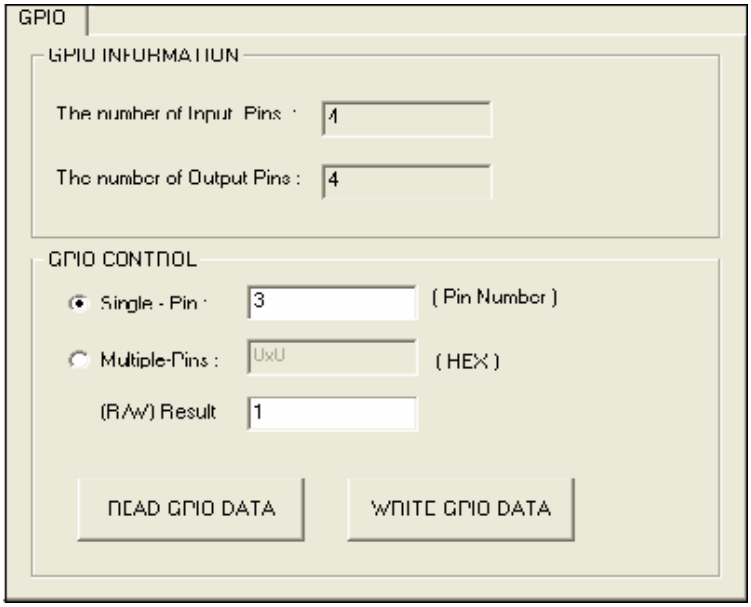
There are sample programs in Windows graphics mode for Windows CE and Windows XP. Each demo application release package contains an executable file SusiDemo.exe, a shared library Susi.dll and source code. The Windows CE and Windows XP files are not compatible with each other. SusiDemo.exe is an executable file that requires the shared library, Susi.dll, to demonstrate SUSI functions. The Windows CE source code of SusiDemo.exe must be compiled with Microsoft Embedded Visual C++ 4.0 on Windows CE and the Windows XP version must be compiled with Microsoft Visual C++ 6.0 on Windows XP. Developers must add the header file Susi.h and library Susi.lib to their own projects when they want to develop something with SUSI.

4.3.3.3 SusiDemo.exe

The SusiDemo.exe test application is an application that uses all functions of the SUSI Library. It consists of Watchdog, GPIO, SMBus, I^2C and VGA control. The following screen is shown when you execute SusiDemo.exe. You can click function tabs to select test functions respectively. Some function tabs will not show on the test application if your platform does not support such functions. Refer to Appendix A for a complete support list. We describe steps to test all functions of this application.



4.3.3.4 GPIO



When the application is executed, it will display GPIO information in the GPIO INFORMATION group box. It displays the number of input pins and output pins. You can click a radio button to choose to test either single or multiple pins. The GPIO pin assignments of the supported platforms are shown in Appendix B.

To test read a single input pin:

1. Click the single pin radio button.
2. Key in the pin number to read the value of the input pin. Pin numbers start from '0'.
3. Click the READ GPIO DATA button to show the status of the GPIO pin in the (R/W) Result field.

To test read multiple input pins:

1. Click the multiple pin radio button.
2. Key in a pin number from 0x01 to 0x0F to read the value of the input pin(s). The pin numbers are bitwise-ordered, i.e. bit 0 stands for GPIO 0, bit 1 stands for GPIO 1, etc. For example, if you want to read pin 0, 1, and 3, the pin numbers should be 0x0B.
3. Click the READ GPIO DATA button to show the statuses of GPIO pins in the (R/W) Result field.

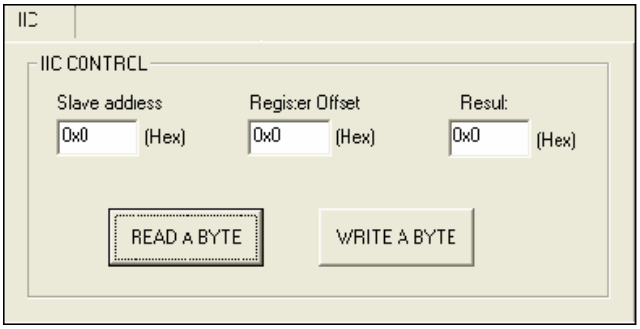
To test write a single output pin:

1. Click the single pin radio button.
2. Key in the pin number you want to write to. Pin numbers start from '0'.
3. Key either '0' or '1' into the (R/W) Result field to write the output pin you chose in the step 1.
4. Click the WRITE GPIO DATA button to write to the GPIO output pin.

To test write multiple output pins:

1. Click the multiple pin radio button.
2. Key in a pin number from 0x01 to 0x0F to choose the multiple pin numbers to write to. The pin numbers are bitwise-ordered, i.e. bit 0 stands for GPIO 0, bit 1 stands for GPIO 1, etc. For example, if you want to write pin 0, 1, and 3, the pin numbers should be 0x0B
3. Key a value into the (R/W) Result field from 0x01 to 0x0F to write the value of the output pin. The pin numbers are bitwise-ordered, i.e. bit 0 stands for GPIO 0, bit 1 stands for GPIO 1, etc. For example, if you want to set pin 0 and 1 high, 3 to low, the pin number should be 0x0B and the (R/W) Result field 0x0A
4. Click the WRITE GPIO DATA button to write to the GPIO output pins.

4.3.3.5 I2C



When the application is executed, you can read or write a byte of data through I2C devices. All data must be read or written in hexadecimal.

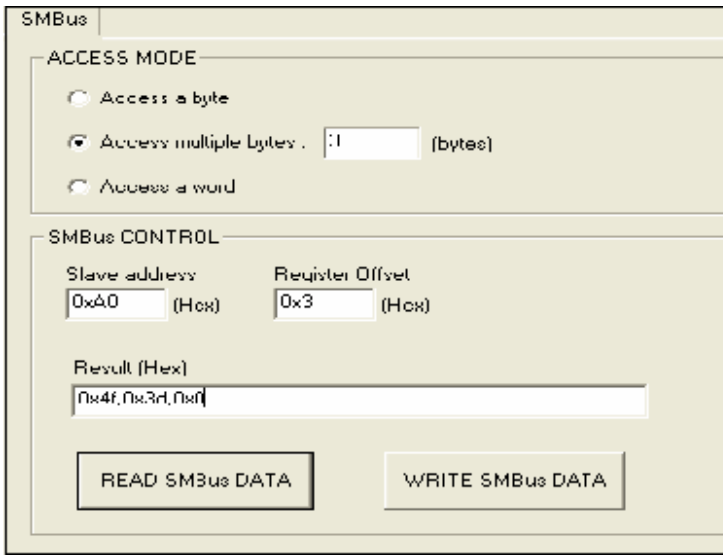
To read a byte:

1. Key the slave device address into the Slave Address field.
2. Key the register offset into the Register Offset field.
3. Click the READ A BYTE button to show a byte in the Result field.

To write a byte:

1. Key the slave device address into the Slave Address field.
2. Key the register offset into the Register Offset field.
3. Key the desired data into the Result field to write to the device.
4. Click the WRITE A BYTE button to write to the device through I2C.

4.3.3.6 SMBus



When the application is executed, you can click a radio button to choose to test each access mode, i.e. Access a byte, Access multiple bytes and Access a word. All data must be read or written in hexadecimal, except the number of bytes of the Access multiple bytes mode, which must be written in the decimal system. You can test the watchdog timer as follows.

To read a byte:

1. Click Access a byte radio button.
2. Key the slave device address into the Slave Address field.
3. Key the register offset into the Register Offset field.
4. Click the READ SMBus DATA button to show a byte of data from the device in the Result field.

To write a byte:

1. Click the Access a byte radio button.
2. Key the slave device address into the Slave Address field.
3. Key the register offset into the Register Offset field.
4. Key the desired data into the Result field.
5. Click the WRITE SMBus DATA button to write to the device through SMBus.

To read a word:

1. Click Access a word radio button.
2. Key the slave device address into the Slave address field.
3. Key the register offset into the Register Offset field.
4. Click the READ SMBus DATA button to show a word of data from the device in the Result field.

To write a word:

1. Click the Access a word radio button.
2. Key the slave device address into Slave address field.
3. Key the register offset into Register Offset field.
4. Key the desired data, such as 0x1234, into the Result field.
5. Click the WRITE SMBus DATA button to write the data to the device through SMBus.

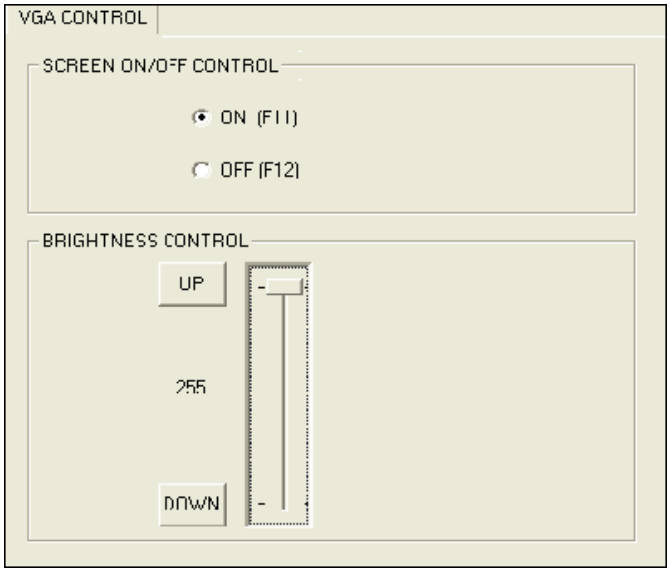
To read Multiple bytes:

1. Click the Access multiple bytes radio button.
2. Key the slave device address into the Slave address field.
3. Key the register offset into the Register Offset field.
4. Key the desired number of bytes, such as 3, into the field at the right of the Access multiple bytes radio button. The number must be written in decimal.
5. Click the READ SMBus DATA button. All data from the device will be delimited by commas and shown in the Result field.

To write multiple bytes:

1. Click the Access multiple bytes radio button.
2. Key the slave device address into the Slave Address field.
3. Key the register offset into the Register Offset field.
4. Key the desired number of bytes, such as 3, into the field at the right of the Access multiple bytes radio button. The number must be written in decimal.
5. Key the desired data into the Result field in hexadecimal format. The data must be delimited by commas, e.g., 0x50,0x60,0x7A.
6. Click the WRITE SMBus DATA button to write to the device through SMBus.

4.3.3.7 VGA Control



When the application is executed, it will display two blocks of VGA control functions. The application can turn on or turn off the screen shot freely, and it also can tune the brightness of the panels if your platform is supported. You can test the functionality of VGA control as follows.

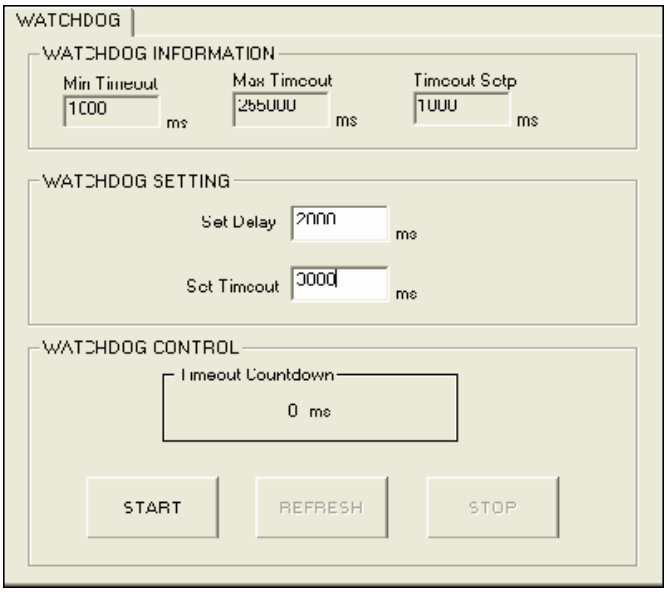
To configure the screen on/off function:

1. Click the ON radio button, or push the F11 key to turn on the panel screen.
2. Click the OFF radio button or push the F12 key to turn off the panel screen.
3. The platform display chip must be in the support list in Appendix A, or this function will not work.

To configure the brightness:

- To move the slider in increments: use the mouse, the direction keys or click the UP button to increase the brightness.
- To move the slider in decrements: use either the mouse or the direction keys, or click the DOWN button to decrease the brightness.

4.3.3.8 Watchdog

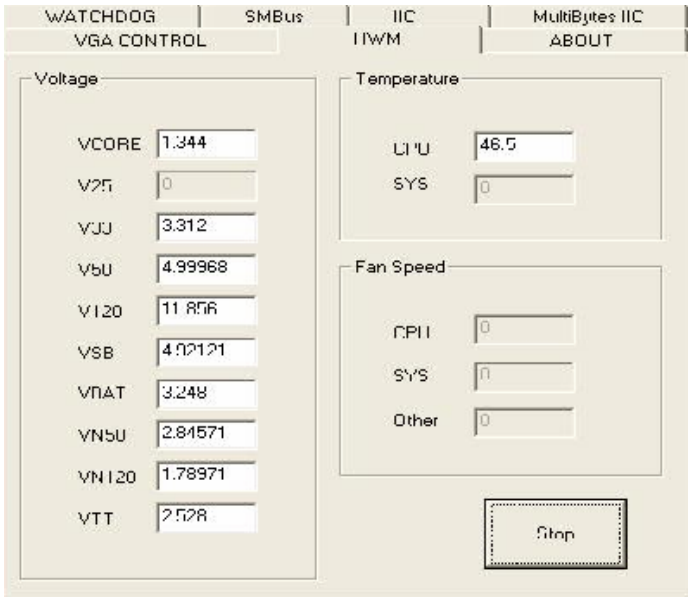


When the application is executed, it will display watchdog information in the WATCHDOG INFORMATION group box. It displays maximum time-out, minimum time-out,

and time-out step in milliseconds. For example, a 1 ~ 255 seconds watchdog has a maximum time-out of 255000 ms, a minimum time-out of 1000 ms, and a 1000 ms resolution. You can test the functionality of the watchdog timer as follows.

- Set the time-out value, e.g. 3000 (3 seconds), in the SET TIMEOUT field and set a delay value, e.g. 2000 (2 seconds), in the SET DELAY field, and then click the START button. The Time-out Countdown field will show the watchdog timer counting down, starting at 5000 (5 seconds) if you set the example values.
- Before the timer counts down to zero, you can reset the timer by clicking the REFRESH button. After you click this button, the Time-out Countdown field will display the value of the SET TIMEOUT field.
- If you want to stop the watchdog timer, click the STOP button.

4.3.3.9 Hardware Monitor



When the application is executed by clicking the Monitor button, it will display hardware monitoring data values. If certain data value are not supported on the platform, the corresponding data field will be shown in gray with value 0.

Chapter 5

Installing Extension I/O

This appendix gives instructions for installing extension I/O modules.

5.1 MIO Introduction

5.1.1 M2M Concept

Due to many devices needed to connect to IP & Mobile networks, Advantech has done a lot research and development to fulfill the concept of Machine to Machine or Machine to Mobile communication in Industrial application fields.

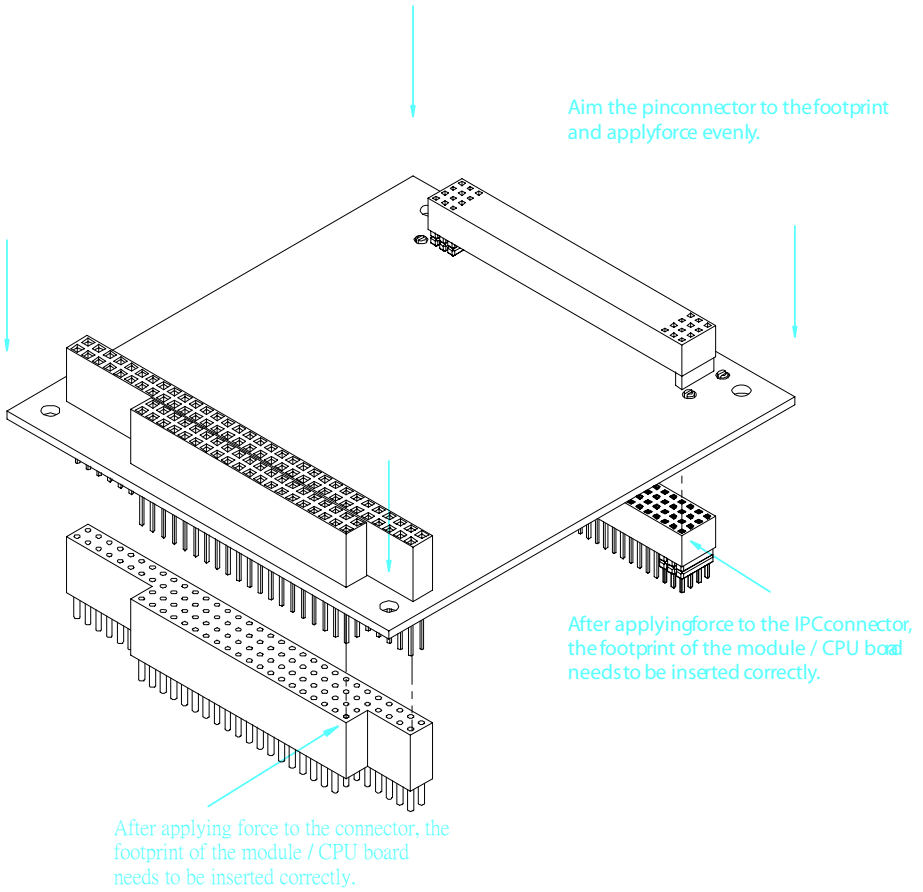
5.1.2 Easy Wireless Technology For Your Embedded Motherboard

Advantech MIO-series products provide Wireless/Bluetooth/GSM/GPRS modules through onboard USB interface. Also, there are more advanced applications like GPS, Zigbee, and RFID that are going to be introduced in the near future.

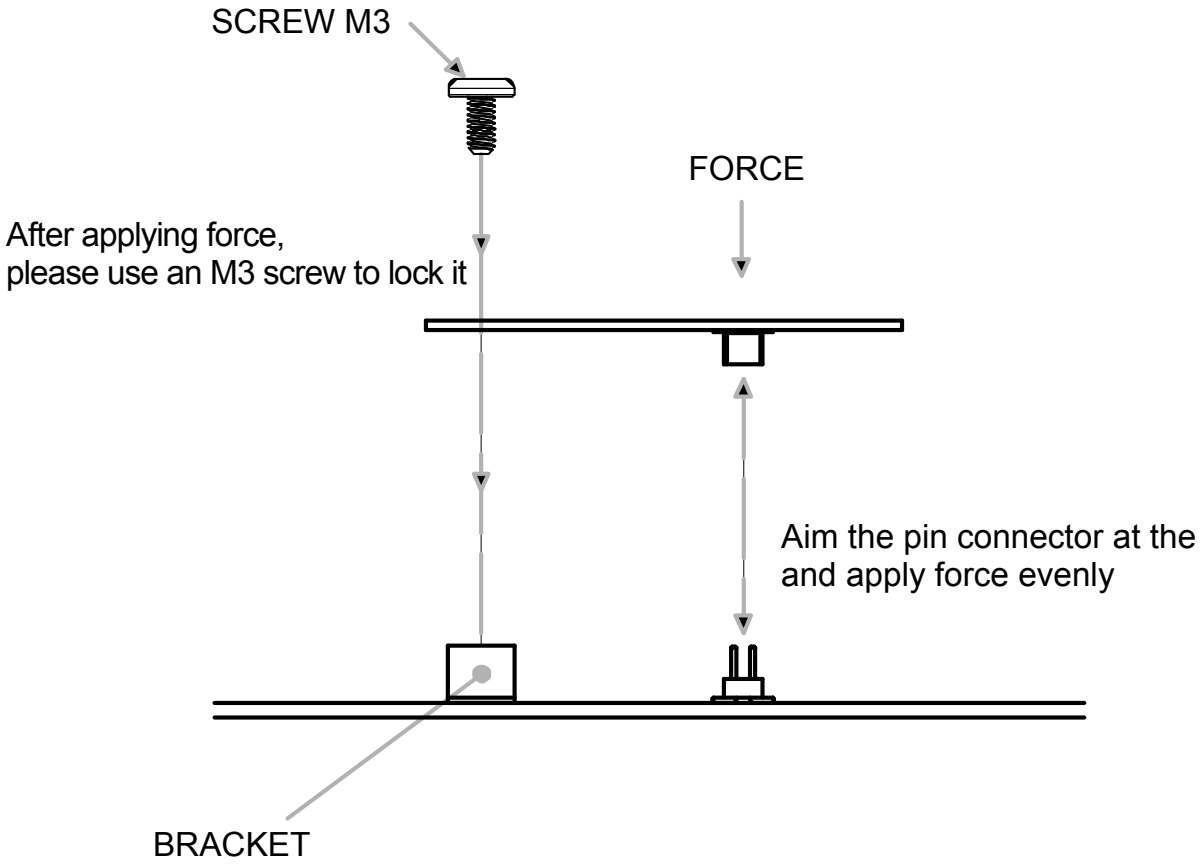
5.1.3 Best Board Combination

Figure 5.1 PCM-4372 + MIO 2320

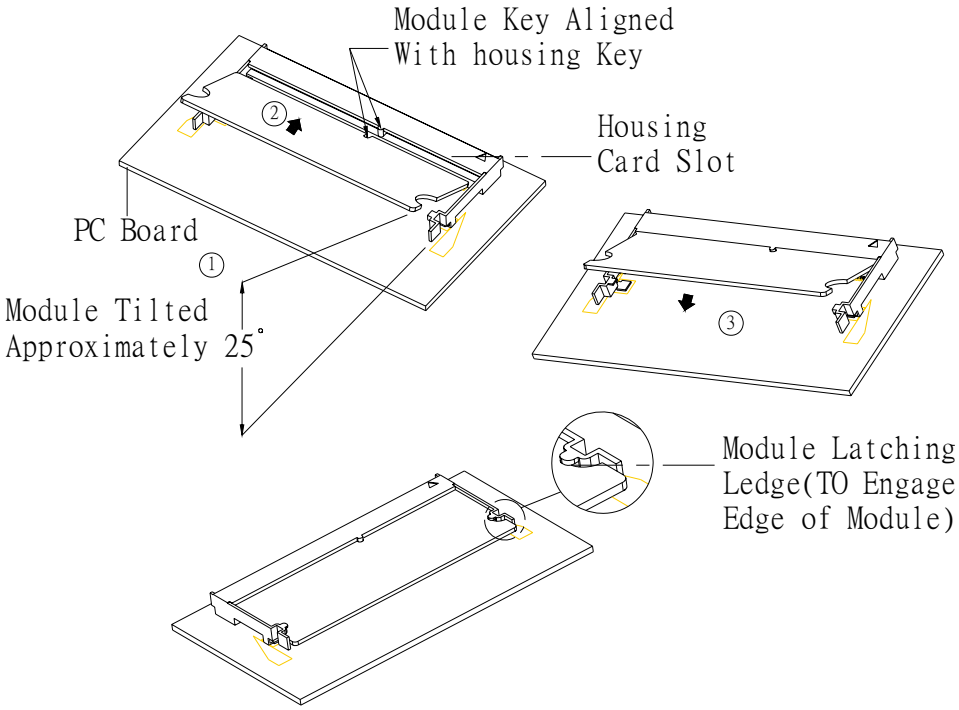
5.2 PC/104 Module Introduction



5.3 MIO-USB Introduction



5.4 Installing SO-DIMM



The procedures for installing SODIMMs are described below. Please follow these steps carefully. You can install SDRAM memory modules using 200-pin SODIMMs (Small Outline Dual In-line Memory Modules).

1. Ensure that all power supplies to the system are switched off.
2. Tilt the SODIMM card approximately 25° above the board, and move it in the direction of the housing card slot. Make sure that the key in the module and the key in the housing are aligned.
3. Push the module into the socket until the module bottoms. There should be a slight insertion force to engage the module into the contacts.

5.5 Optional Modules

5.5.1 MIO-2310 Wireless Module

- Support 802.11b/g
- Data rate up to 54Mbps
- RoHS compliance

5.5.2 MIO-2320 GSM/GPRS Module

- Support Quad-band: GSM 850/900/1800/1900MHz
- Support Multi-slot Class 12
- RoHS compliance

5.5.3 MIO-3121 Mini-PCI to 4 COMs Module

- Compliant with PCI Specification, revision 2.3
- Support Four 16C950 High performance UART channels
- Support 32-bit, 33MHz MiniPCI interface, fully compliant to PCI Local Bus specification 3.0
- RoHS compliance

5.5.4 MIO-3140 Mini-PCI to 2 SATA Module

- Compliant with PCI Specification, revision 2.3
- Supports 66MHz PCI with 32-bit data
- Supports two independent Serial ATA channels
- RoHS compliance

5.5.5 MIO-3150 Mini-PCI to Video Capture Module

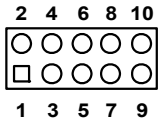
- PCI 2.2 Compliant
- All-standards TV decoder: NTSC, PAL and SECAM
- Output in YUV and RGB
- RoHS compliance

Appendix A

PIN Assignments

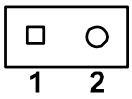
A.1 PIN Assignements

Table A.1: GPIO Connector (CN2)



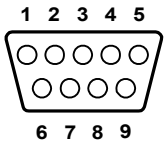
Part Number	1653005261		
Footprint	JH5X2S-2M		
Description	PIN HEADER SMD 5*2P 180D(M) 2.0mm		
Pin	Pin Name	Signal Type	Signal Level
1	+5V	PWR	+5V
2	GPIO4	I/O	+5V
3	GPIO0	I/O	+5V
4	GPIO5	I/O	+5V
5	GPIO1	I/O	+5V
6	GPIO6	I/O	+5V
7	GPIO2	I/O	+5V
8	GPIO7	I/O	+5V
9	GPIO3	I/O	+5V
10	GND		

Table A.2: Power Switch (CN3)



Part Number	1655302020		
Footprint	WHL2V-2M		
Description	WAFER BOX 2P 180D 2.0mm MALE W/Lock		
Pin	Pin Name	Signal Type	Signal Level
1	+5V	PWR	+5V
2	FP_PSIN IN +5V		

Table A.3: COM1 (CN4)

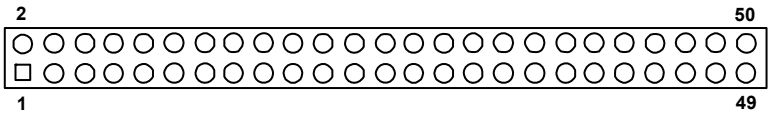


Part Number	1654000056
Footprint	DBCOM-VM5MS

Table A.3: COM1 (CN4)

Description	D-SUB CON. 9P 90D(M) DIP 070241MR009S200ZU SUYIN		
Pin	**Pin Name**	**Signal Type**	**Signal Level**
1	DCD#	IN	+5V
2	RXD#	IN	+5V
3	TXD#	OUT	+5V
4	DTR#	I/O	+5V
5	GND		
6	DSR#	IN	+5V
7	RTS#	I/O	+5V
8	CTS#	IN	+5V
9	RI#	IN	+5V
10	NC		
11	NC		
12	GND		
13	GND		
14	GND		
15	GND		
16	GND		
17	GND		
18	GND		
19	GND		
20	GND		
21	GND		

Table A.4: CN5 COM2/3/4 & LPT

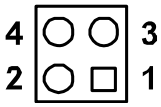


Part Number	1653000320		
Footprint	BH25X2SV-1.27M		
Description	BOX HEADER 25*2P 180D(M) 1.27mm SMD SEH-50-D		
Pin	**Pin Name**	**Signal Type**	**Signal Level**
1	COM1_DCD#	IN	+5V
2	COM1_DSR#	IN	+5V
3	COM1_RXD	IN	+5V
4	COM1_RTS#	I/O	+5V
5	COM1_TXD	OUT	+5V
6	COM1_CTS#	IN	+5V
7	COM1_DTR#	I/O	+5V

Table A.4: CN5 COM2/3/4 & LPT			
8	COM1_RI#	IN	+5V
9	GND		
10	GND		
11	COM2_DCD#	IN	+5V
12	COM2_DSR#	IN	+5V
13	COM2_RXD	IN	+5V
14	COM2_RTS#	I/O	+5V
15	COM2_TXD	OUT	+5V
16	COM2_CTS#	IN	+5V
17	COM2_DTR#	I/O	+5V
18	COM2_RI#	IN	+5V
19	GND		
20	GND		
21	COM3_DCD#	IN	+5V
22	COM3_DSR#	IN	+5V
23	COM3_RXD	IN	+5V
24	COM3_RTS#	I/O	+5V
25	COM3_TXD	OUT	+5V
26	COM3_CTS#	IN	+5V
27	COM3_DTR#	I/O	+5V
28	COM3_RI#	IN	+5V
29	GND		
30	GND		
31	LPT_STB#	OUT	+5V
32	LPT_AFD#	OUT	+5V
33	LPT_PRD0	I/O	+5V
34	LPT_ERR#	IN	+5V
35	LPT_PRD1	I/O	+5V
36	LPT_INIT#	OUT	+5V
37	LPT_PRD2	I/O	+5V
38	LPT_SLIN#	OUT	+5V
39	LPT_PRD3	I/O	+5V
40	LPT_PRD4	I/O	+5V
41	LPT_PRD5	I/O	+5V
42	LPT_PRD6	I/O	+5V
43	LPT_PRD7	I/O	+5V
44	LPT_ACK#	IN	+5V
45	LPT_BUSY	IN	+5V
46	LPT_PE	IN	+5V

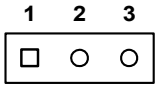
Table A.4: CN5 COM2/3/4 & LPT			
47	LPT_SLCT	I/O	+5V
48	GND		
49	GND		
50	GND		

Table A.5: RS-422/485 (CN6)



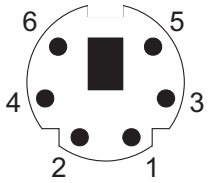
Part Number	1653004101		
Footprint	JH4X1V-2M		
Description	PIN HEADER 4*1P 180D(M) SQUARE 2.0mm		
Pin	Pin Name	Signal Type	Signal Level
1	422_RXD-	IN	+5V
2	422_RXD+	IN	+5V
3	485-422_TXD+	OUT	+5V
4	485-422_TXD-	OUT	+5V

Table A.6: System FAN (CN7)



Part Number	1655303020		
Footprint	WHL3V-2M		
Description	WAFER BOX 2.0mm 3P 180D w/LOCK		
Pin	Pin Name	Signal Type	Signal Level
1	FAN_IO	IN	+5V
2	+12V	PWR	+12V
3	GND		

Table A.7: KB_MS (CN8)



Part Number	1654606203		
Footprint	MINIDIN6-H		
Description	MINI DIN 6P 90D(F) D Short body W/Shielding W/Pb		
Pin	Pin Name	Signal Type	Signal Level
1	KB_DAT	I/O	+5V
2	MS_DAT	I/O	+5V
3	GND		
4	+5V	PWR	+5V
5	KB_CLK	I/O	+5V
6	MS_CLK	I/O	+5V

Table A.8: IDE0 (CN9)

Part Number	1653000263		
Footprint	BH22X2DV		
Description	BOX Header 2*22P 180D(M)2.0mm DIP W/Lock		
Pin	Pin Name	Signal Type	Signal Level
1	IDE0_RST#	OUT	+5V
2	GND		
3	IDE0_D7	I/O	+5V
4	IDE0_D8	I/O	+5V
5	IDE0_D6	I/O	+5V
6	IDE0_D9	I/O	+5V
7	IDE0_D5	I/O	+5V
8	IDE0_D10	I/O	+5V
9	IDE0_D4	I/O	+5V
10	IDE0_D11	I/O	+5V
11	IDE0_D3	I/O	+5V
12	IDE0_D12	I/O	+5V
13	IDE0_D2	I/O	+5V
14	IDE0_D13	I/O	+5V
15	IDE0_D1	I/O	+5V
16	IDE0_D14	I/O	+5V
17	IDE0_D0	I/O	+5V

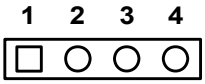
Table A.8: IDE0 (CN9)			
18	IDE0_D15	I/O	+5V
19	GND		
21	IDE0_DREQ	OUT	+5V
22	GND		
23	IDE0_IOW	OUT	+5V
24	GND		
25	IDE0_IOR	OUT	+5V
26	GND		
27	IDE0_IORDY	OUT	+5V
28	IDE0_CSEL	I/O	+5V
29	IDE0_DACK#	OUT	+5V
30	GND		
31	IDE0_IRQ14	IN	+5V
32	IDE0_IOIS16#	IN	+5V
33	IDE0_A1	IN	+5V
34	IDE0_D66DET#	IN	+5V
35	IDE0_A0	IN	+5V
36	IDE0_A2	IN	+5V
37	IDE0_CS#0	OUT	+5V
38	IDE0_CS#1	OUT	+5V
39	IDE0_ASP#	OUT	+5V
40	GND		
41	+5V		
42	+5V		
43	GND		
44	N/A		

Table A.9: Compact II W/Ejector (CN10)			
Part Number	1653025215		
Footprint	COMPACK-T12		
Description	HEADER for CF Type II 50P 90D(M)Standoff 2.0mm		
Pin	Pin Name	Signal Type	Signal Level
1	GND		
2	IDE1_D3	I/O	+5V
3	IDE1_D4	I/O	+5V
4	IDE1_D5	I/O	+5V
5	IDE1_D6	I/O	+5V
6	IDE1_D7	I/O	+5V
7	IDE1_CS#1	OUT	+5V

Table A.9: Compact II W/Ejector (CN10)			
8	IDE1_A10	OUT	+5V
9	IDE1_OE#	OUT	+5V
10	IDE1_A9	OUT	+5V
11	IDE1_A8	OUT	+5V
12	IDE1_A7	OUT	+5V
13	+5V	PWR	+5V
14	IDE1_A6	IN	+5V
15	IDE1_A5	IN	+5V
16	IDE1_A4	IN	+5V
17	IDE1_A3	IN	+5V
18	IDE1_A2	IN	+5V
19	IDE1_A1	IN	+5V
20	IDE1_A0	IN	+5V
21	IDE1_D0	I/O	+5V
22	IDE1_D1	I/O	+5V
23	IDE1_D2	I/O	+5V
24	IDE1_IOIS16#	IN	+5V
25	CF_CD#2	IN	+5V
26	CF_CD#1	IN	+5V
27	IDE1_D11	I/O	+5V
28	IDE1_D12	I/O	+5V
29	IDE1_D13	I/O	+5V
30	IDE1_D14	I/O	+5V
31	IDE1_D15	I/O	+5V
32	IDE1_CS#3	OUT	+5V
33	NC		
34	IDE1_IOR#	OUT	+5V
35	IDE1_IOW#	OUT	+5V
36	IDE1_WE#	OUT	+5V
37	IDE1_IRQ15	IN	+5V
38	+5V	PWR	+5V
39	CF_CSEL#	OUT	+5V
40	NC		
41	IDE1_RST#	OUT	+5V
42	IDE1_IORDY	OUT	+5V
43	IDE1_DREQ	OUT	+5V
44	IDE1_DACK#	OUT	+5V
45	CF_ASP#	I/O	+5V
46	CF_S66DET#	IN	+5V

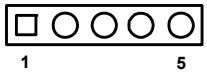
Table A.9: Compact II W/Ejector (CN10)			
47	IDE1_D8	I/O	+5V
48	IDE1_D9	I/O	+5V
49	IDE1_D10	I/O	+5V
50	GND		

Table A.10: HD & Power LED (CN11)



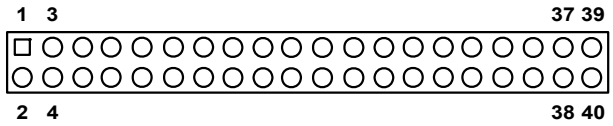
Part Number	1653004101		
Footprint	JH4X1V-2M		
Description	PIN HEADER 4*1P 180D(M) SQUARE 2.0mm		
Pin	Pin Name	Signal Type	Signal Level
1	+5V	PWR	+5V
2	GND		
3	+5V	PWR	+5V
4	HD_LED	OUT	+5V

Table A.11: Inverter Power (CN12)



Part Number	1655305020		
Footprint	WHL5V-2M		
Description	WAFER BOX 2.0mm 5P 180D MALE W/LOCK		
Pin	Pin Name	Signal Type	Signal Level
1	LVDS0_V12	PWR	+V12
2	GND		
3	LVDS0_ENABKL	OUT	+5V
4	LVDS0_VBR	OUT	+5V
5	LVDS0_V5	PWR	+5V

Table A.12: LVDS0 Connector (CN13)

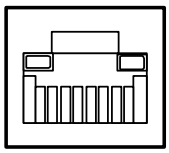


Part Number	**1653920200**		
Footprint	**SPH20X2**		
Description	***CONN. DF13-40DP-1.25V**		
Pin	**Pin Name**	**Signal Type**	**Signal Level**
1	**+5V/+3.3V**	**PWR**	**+5V/+3.3V**
2	**+5V/+3.3V**	**PWR**	**+5V/+3.3V**
3	**GND**		
4	**GND**		
5	**+5V/+3.3V**	**PWR**	**+5V/+3.3V**
6	**+5V/+3.3V**	**PWR**	**+5V/+3.3V**
7	**LVDS0_D0-**	**OUT**	**LVDS**
8	**LVDS1_D0-**	**OUT**	**LVDS**
9	**LVDS0_D0+**	**OUT**	**LVDS**
10	**LVDS1_D0+**	**OUT**	**LVDS**
11	**GND**		
12	**GND**		
13	**LVDS0_D1-**	**OUT**	**LVDS**
14	**LVDS1_D1-**	**OUT**	**LVDS**
15	**LVDS0_D1+**	**OUT**	**LVDS**
16	**LVDS1_D1+**	**OUT**	**LVDS**
17	**GND**		
18	**GND**		
19	**LVDS0_D2-**	**OUT**	**LVDS**
20	**LVDS1_D2-**	**OUT**	**LVDS**
21	**LVDS0_D2+**	**OUT**	**LVDS**
22	**LVDS1_D2+**	**OUT**	**LVDS**
23	**GND**		
24	**GND**		
25	**LVDS0_CLK-**	**OUT**	**LVDS**
26	**LVDS1_CLK-**	**OUT**	**LVDS**
27	**LVDS0_CLK+**	**OUT**	**LVDS**
28	**LVDS1_CLK+**	**OUT**	**LVDS**
29	**GND**		
30	**GND**		
31	**LVDS0_SC_DDC**	**I/O**	**+3V~+5V**

Table A.12: LVDS0 Connector (CN13)			
32	LVDS0_SD_DDC	I/O	+3V~+5V
33	GND		
34	GND		
35	LVDS0_D3-	OUT	LVDS
36	LVDS1_D3-	OUT	LVDS
37	LVDS0_D3+	OUT	LVDS
38	LVDS1_D3+	OUT	LVDS
39	NC		
40	LVDS0_VCON	OUT	0.3V

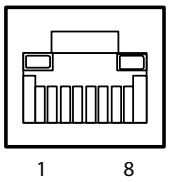
Table A.13: VGA Connector (CN14)			
Part Number	1654000055		
Footprint	DBVGA-VF5MS		
Description	D-SUB Conn. 15P 90D(F) DIP 070242FR015S200ZU		
Pin	Pin Name	Signal Type	Signal Level

Table A.14: LAN1 (RJ45+100M Transformer)(CN15)			



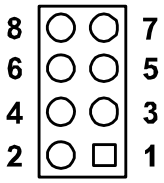
Part Number	1652000147		
Footprint	RJ45X10-LED-1AX9		
Pin	Pin Name	Signal Type	Signal Level
1	LAN_TX+	OUT	Analog
2	LAN_TX-	OUT	Analog
3	LAN_RX+	OUT	Analog
4	LAN_MID0+	I/O	Analog
5	LAN_MID0-	I/O	Analog
6	LAN_RX-	I/O	Analog
7	LAN_MID1+	I/O	Analog
8	LAN_MID1-	I/O	Analog

Table A.15: LAN2 (RJ45+100M Transformer) (CN16)



Part Number	1652000147		
Footprint	RJ45X10-LED-1AX9		
Pin	Pin Name	Signal Type	Signal Level
1	LAN_TX+	OUT	Analog
2	LAN_TX-	OUT	Analog
3	LAN_RX+	OUT	Analog
4	LAN_MID0+	I/O	Analog
5	LAN_MID0-	I/O	Analog
6	LAN_RX-	I/O	Analog
7	LAN_MID1+	I/O	Analog
8	LAN_MID1-	I/O	Analog

Table A.16: USB0/1 (CN17)

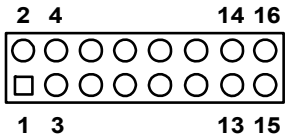


Part Number	1654908100		
Footprint	USBX2-V		
Description	USB Conn. DUAL port 8Pin90D(M) Black		
Pin	Pin Name	Signal Type	Signal Level
1	+5V	PWR	+5V
2	USB0_P-	I/O	
3	USB0_P+	I/O	
4	GND		
5	+5V	PWR	+5V
6	USB1_P-	I/O	
7	USB1_P+	I/O	
8	GND		
9	GND		
10	GND		

Table A.16: USB0/1 (CN17)

11	GND
12	GND

Table A.17: USB2/3 & AC97 (AUDIO I/F) (CN18)



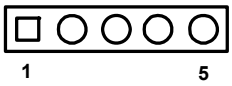
Part Number	1653005260		
Footprint	JH8X2S-2M		
Description	PIN HEADER 8*2P 180D(M) 2.0mm		
Pin	Pin Name	Signal Type	Signal Level
1	AC-SYNC	I/O	
2	+5V	PWR	+5V
3	AC-SDIN0	I/O	
4	AC-RST	I/O	
5	AC-SDOUT	I/O	
6	AC-BITCLK	I/O	
7	+5V	PWR	+5V
8	+5V	PWR	+5V
9	USB2_P-	I/O	
10	USB3_P-	I/O	
11	USB2_P+	I/O	
12	USB3_P+	I/O	
13	GND		
14	GND		
15	GND		
16	N/A		

Table A.18: USB4/5(MIO-USB) (CN19)

Part Number	1653205261
Footprint	BH5X2SV
Description	BOX HEADER SMD 5*2 180D 2.0mm NO.10P
Pin	Pin name
1	+5V
2	+5V
3	UV4-
4	UV5-

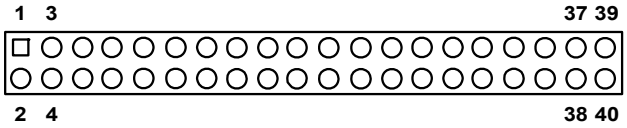
Table A.18: USB4/5(MIO-USB) (CN19)	
5	UV4+
6	UV5+
7	GND
8	GND
9	
10	NC

Table A.19: Inverter Power (CN20)



Part Number	1655305020		
Footprint	WHL5V-2M		
Description	WAFER BOX 2.0mm 5P 180D MALE W/LOCK		
Pin	Pin Name	Signal Type	Signal Level
1	LVDS0_V12	PWR	+V12
2	GND		
3	LVDS0_ENABKL	OUT	+5V
4	LVDS0_VBR	OUT	+5V
5	LVDS0_V5	PWR	+5V

Table A.20: LVDS1 Connector (CN21)



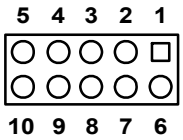
Part Number	1653920200		
Footprint	SPH20X2		
Description	*CONN. DF13-40DP-1.25V		
Pin	Pin Name	Signal Type	Signal Level
1	+5V/+3.3V	PWR	+5V/+3.3V
2	+5V/+3.3V	PWR	+5V/+3.3V
3	GND		
4	GND		
5	+5V/+3.3V	PWR	+5V/+3.3V
6	+5V/+3.3V	PWR	+5V/+3.3V
7	LVDS0_D0-	OUT	LVDS
8	LVDS1_D0-	OUT	LVDS
9	LVDS0_D0+	OUT	LVDS

Table A.20: LVDS1 Connector (CN21)			
10	LVDS1_D0+	OUT	LVDS
11	GND		
12	GND		
13	LVDS0_D1-	OUT	LVDS
14	LVDS1_D1-	OUT	LVDS
15	LVDS0_D1+	OUT	LVDS
16	LVDS1_D1+	OUT	LVDS
17	GND		
18	GND		
19	LVDS0_D2-	OUT	LVDS
20	LVDS1_D2-	OUT	LVDS
21	LVDS0_D2+	OUT	LVDS
22	LVDS1_D2+	OUT	LVDS
23	GND		
24	GND		
25	LVDS0_CLK-	OUT	LVDS
26	LVDS1_CLK-	OUT	LVDS
27	LVDS0_CLK+	OUT	LVDS
28	LVDS1_CLK+	OUT	LVDS
29	GND		
30	GND		
31	LVDS0_SC_DDC	I/O	+3V~+5V
32	LVDS0_SD_DDC	I/O	+3V~+5V
33	GND		
34	GND		
35	LVDS0_D3-	OUT	LVDS
36	LVDS1_D3-	OUT	LVDS
37	LVDS0_D3+	OUT	LVDS
38	LVDS1_D3+	OUT	LVDS
39	NC		
40	LVDS0_VCON	OUT	0.3V

Table A.21: ISA_-5V (CN24)

Part Number	**1653002101**		
Footprint	**JH2X1V-2M**		
Description	**PIN HEADER 2*1P 180D (M)SQUARE 2.0mm**		
Pin	**Pin Name**	**Signal Type**	**Signal Level**

Table A.22: ATX Power Connector (CN26)



Part Number	**1655000042**		
Footprint	**ATXCON-2X5-42-1**		
Description			
Pin	**Pin Name**	**Signal Type**	**Signal Level**
1	**PS_ON**	**IN**	**+5V**
2	**GND**		
3	**GND**		
4	**VCC_12V**	**PWR**	**+12V**
5	**VCC3**	**PWR**	**+3.3V**
6	**VCC_SB**	**PWR**	**+5V**
7	**VCC**	**PWR**	**+5V**
8	**VCC**	**PWR**	**+5V**
9	**V-12V**	**PWR**	**-12V**
10	**GND**		

Table A.23: USB4/5 (CN27)	
Part Number	**1653205261**
Footprint	**BH5X2SV**
Description	**BOX HEADER SMD 5*2 180D 2.0mm NO.10P**
Pin	**Pin name**
1	**+5V**
2	**+5V**
3	**UV4-**
4	**UV5-**
5	**UV4+**
6	**UV5+**
7	**GND**
8	**GND**
9	**GND**
10	**NC**

Appendix B

System Assignments

This chapter gives background information on the PCM-9584.

Sections include:

- Introduction
- Features
- Specifications

Board layout and dimensions

B.1 System Assignments

B.2 System I/O Ports

Table B.1: System I/O ports

Addr. range (Hex)	Device
000-01F	DMA controller
020-021	Interrupt controller 1, master
040-05F	8254 timer
060-06F	8042 (keyboard controller)
070-07F	Real-time clock, non-maskable interrupt (NMI) mask
080-09F	DMA page register
0A0-0BF	Interrupt controller 2
0C0-0DF	DMA controller
0F0	Clear math co-processor
0F1	Reset math co-processor
0F8-0FF	Math co-processor
1F0-1F8	Fixed disk
200-207	Reserved (Game I/O)
278-27F	Reserved (Parallel port 2,LTP3)
2E8-2EF	Reserved (Series port 4)
2F8-2FF	Serial port 2
300-31F	Prototype card
360-36F	Reserved
378-37F	Parallel printer port 1 (LPT 2)
380-38F	SDLC, bisynchronous 2
3A0-3AF	Bisynchronous 1
3B0-3BF	Monochrome display and printer adapter (LPT1)
3C0-3CF	Reserved
3D0-3DF	Color/graphics monitor adapter
3E8-3EF	Reserved (Series port 3)
3F0-3F7	Diskette controller
3F8-3FF	Serial port 1

* PNP audio I/O map range from 220 ~ 250H (16 bytes)
MPU-401 select from 300 ~ 330H (2 bytes)

B.3 1st MB memory map

Table B.2: Table C.2: 1st MB memory map

Addr. range (Hex)	Device
F0000h - FFFFFh	System ROM
*CC000h - EFFFFh	Unused (reserved for Ethernet ROM)
C0000h - CBFFFh	Expansion ROM (for VGA BIOS)
B8000h - BFFFFh	CGA/EGA/VGA text
B0000h - B7FFFh	Unused
A0000h - AFFFFh	EGA/VGA graphics
00000h - 9FFFFh	Base memory

* If Ethernet boot ROM is disabled (Ethernet ROM occupies about 16 KB)
* E0000 - EFFFF is reserved for BIOS POST

B.4 DMA channel assignments

Table B.3: DMA channel assignments

Channel	Function
0	Available
1	Available (audio)
2	Floppy disk (8-bit transfer)
3	Available (parallel port)
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

* Audio DMA select 1, 3, or 5
** Parallel port DMA select 1 (LPT2) or 3 (LPT1)

B.5 Interrupt assignments

Table B.4: Interrupt assignments

Interrupt#	Interrupt source
IRQ 0	Interval timer
IRQ 1	Keyboard
IRQ 2	Interrupt from controller 2 (cascade)
IRQ 3	COM2
IRQ 4	COM1
IRQ 5	Reserved (COM4)
IRQ 6	FDD
IRQ 7	LPT1
IRQ 8	RTC
IRQ 9	Reserved (audio)
IRQ 10	Reserved (COM3)
IRQ 11	Reserved for watchdog timer
IRQ 12	PS/2 mouse
IRQ 13	INT from co-processor
IRQ 14	Primary IDE

* Ethernet interface IRQ select: 9, 11
* PNP audio IRQ select: 9, 11
* PNP USB IRQ select: 9, 11
* PNP ACPI IRQ select: 9, 11