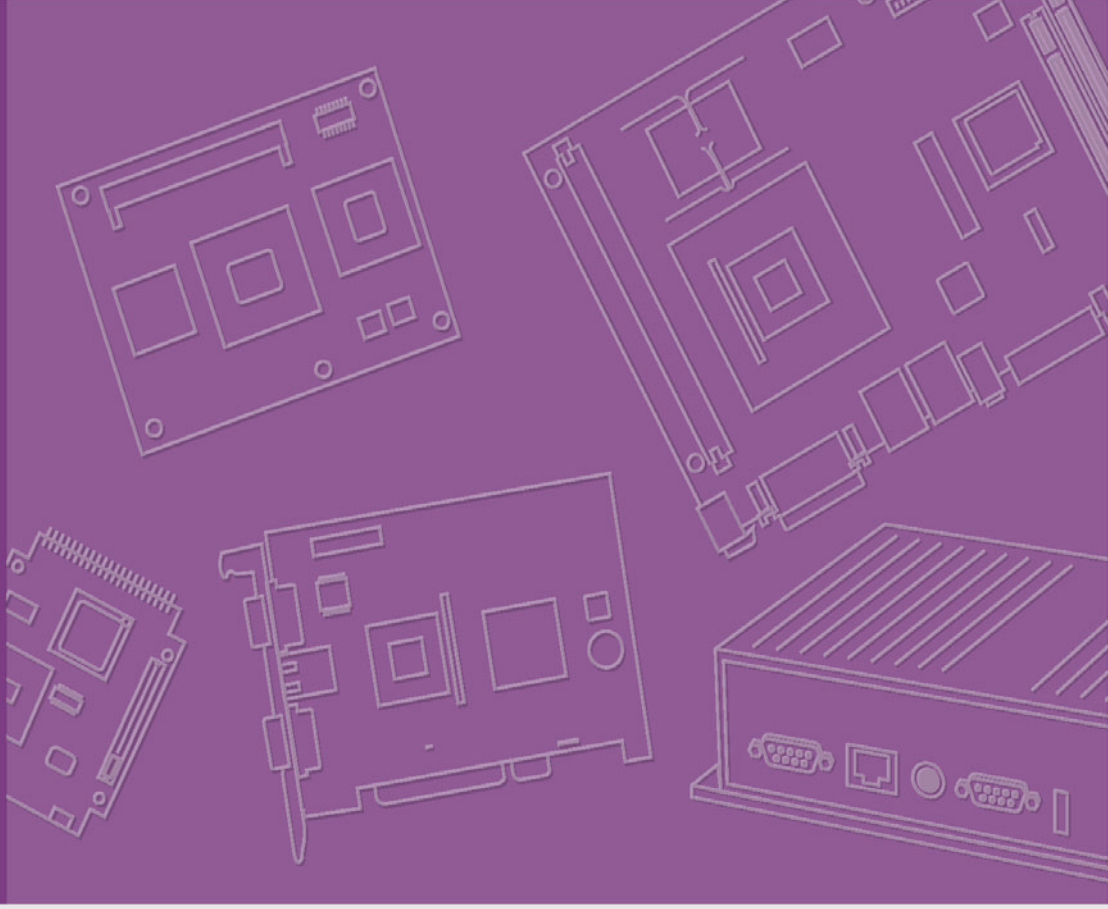


User Manual

PCM-4381

Trusted ePlatform Services

ADVANTECH

Copyright

Acknowledgements

Award is a trademark of Award Software International, Inc.

VIA is a trademark of VIA Technologies, Inc.

IBM, PC/AT, PS/2 and VGA are trademarks of International Business Machines Corporation.

Intel and Pentium are trademarks of Intel Corporation.

Microsoft Windows® is a registered trademark of Microsoft Corp.

RTL is a trademark of Realtek Semi-Conductor Co., Ltd.

ESS is a trademark of ESS Technology, Inc.

UMC is a trademark of United Microelectronics Corporation.

SMI is a trademark of Silicon Motion, Inc.

Creative is a trademark of Creative Technology LTD.

CHRONTEL is a trademark of Chrontel Inc.

AMD,Turion and Sempron are trademark of AMD Corporation.

All other product names or trademarks are properties of their respective owners.

Part No. 2006438110 Edition 1

Printed in China September 2008

Product Warranty

Warranty Period

ADVANTECH aims to meet the customer's expectations for post-sales service and support; therefore, in addition to offering 2 years global warranty for ADVANTECH's standard products, a global extended warranty service is also provided for customers upon request. ADVANTECH customers are entitled to a complete and prompt repair service beyond the standard 2 years of warranty.

Standard products manufactured by ADVANTECH are covered by a 2 year global warranty from the date of shipment. Products covered by extended warranty and cross-region repair services against defects in design, materials, and workmanship, are also covered from the date of shipment. All key parts assembled into ADVANTECH system products such as LCD, Touch Screen, Power Supply, and peripherals etc, will be also covered by the standard 2 year warranty.

Repairs under Warranty

It is possible to obtain a replacement (Cross-Shipment) during the first 30 days of 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.

Exclusions from Warranty

- The product is excluded from warranty if:
  - The product has been found to be defective after expiry of the warranty period.
  - Warranty has been voided by removal or alternation of product or part identification labels.
  - 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.
  - Product updates/upgrades and tests upon the request of customers who are without warranty.

Declaration of Conformity

FCC

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.

Caution! *There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.*

Technical Support and Assistance

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

For more information about this and other Advantech products, please visit our web-site at:

http://www.advantech.com/

http://www.advantech.com/ePlatform/

For technical support and service, please visit our support website at:

http://support.advantech.com.tw/support/

Packing List

Before installation, please ensure the following items have been shipped:

- Item Part Number
  - 1 PCM-4381 SBC
  - 1 Startup manual
  - 1 Utility CD
  - 1 mini jumper pack 9689000002
  - 1 50 * 50 * 23 mm 12 V Cooler 1750001620
    (Only for PCM-4381F-00A1E model)

Ordering Information

Number	PCM-4381L-M0A1E	PCM-4381F-S0A1E	PCM-4381F-00A1E
CPU	Celeron M 600 MHz	Celeron M 1.0 MHz	SKT 479
L2 Cache	512 K	0	CPU
Chipset	910 GMLE	910 GMLE	915 GME
Giga LAN	1	2	2
LVDS	2 channel 48-bit	2 channel 48/48-bit	2 channel 48/48-bit
VGA	1	1	1
USB 2.0	6	6	6
COM	4 ports	4 ports	4 ports
GPIO	16	16	16
LPT	1	1	1
CF	Yes	Yes	Yes
SATA II	2	2	2
Audio	Yes	Yes	Yes
PC-104	Yes	Yes	Yes
Opeartion Temperature	0 ~ 60°C	0 ~ 60°C	0 ~ 60°C
Thermal Solution	Passive	Passive	Active

Optional accessories

Model Number Description

PCM-410C-00A1E	COM/LPT daughter board for EPIC
1700090301	COM2 RS-422/485 D-Sub 9P to 4P cable. 30 cm

Contents

Chapter 1

General Introduction

This chapter gives background information on PCM-4381.

Sections include:

- Introduction
- Specifications

1.1 Introduction

- This model has two types. One is with an onboard CPU (CPU type) the other is a socket type.
  - CPU type: Support Celeron M 600/1G MHz + 910GMLE + ICH6M
  - Socket type: Support Socket 479 (It can support Celeron M and Pentium M) + 915GME + ICH6M
- One DDR2 SODIMM up to 2 GB. (910GMLE 400Mhz / 915GME 400/533 MHz)
- Integrates a DirectX 9.0 compliant 2D/3D graphics core
- Optimized shared memory architecture up to 128MB system memory
- Supports Dual independent display (CRT + LVDS / LVDS + LVDS)
- Support two Ethernet ports (RTL8111B-GR up to 10/100/1000 Mbps)
- One Compact Flash slot (support Type 1 and Type 2)
- One PCI-104 slot
- Supports 6 x USB 2.0, 4 x COM,1 x LPT , 2 x SATA
- 16 bit GPIO

1.2 Product Feature

1.2.1 General

- **CPU:** This model has two types.One is with an onboard CPU (CPU type) the other is a socket type.
  - CPU type : Support Celeron M 600/1G MHz + 910GMLE + ICH6M
  - Socket type: Support Socket 479 (It can support Celeron M and Pentium M) + 915GME + ICH6M
- **L2 Cache:** Depends on CPU (0 ~2 MB)
- **System Chipset:** 910GMLE/915GME + ICH6M
- **BIOS:** Award 4 Mb LPC BIOS
- **System Memory:** 1x DDR2 SODIMM up to 2 GB (915GME: 400/533 MHz / 910GMLE: 400 Mhz)
- **Power Management:** APM 1.2, ACPI support
- **Watchdog Timer:** 255-level interval timer, setup by software, Super I/O integrated, SMSC Controller
- **Expansion Interface:** Supports one PCI-104 slot
- **Battery:** Lithium 3 V / 210 mAH

1.2.2 I/O

- **I/O Interface:**
  - LPT: 1
  - RS-232: 3
  - RS-232/422/485: 1
  - K/B: 1
  - Mouse: 1
  - USB: 6 x USB 2.0
  - Audio: AC97, Line-in, Line-out, Mic-in
  - GPIO: 16-bit general purpose input/output (Optional)

1.2.3 Ethernet

- **Chipset:** 2 x Realtek RTL8111B-GR
- **Speed:** 10/100/1000 Mbps
- **Interface:** 2 x RJ45
- **Standard:** IEEE 802.3u 100Base-T & IEEE 802.3ab 1000Base-T

1.2.4 Display

Display	Controller	Intel 910GMLE/915GME
	VRAM	Optimized Shared Memory Architecture 128 MB system memory
	LVDS LCD	1 x 36-bit LVDS1, 1 x 48-bit LVDS2 (optional)
	Dual Independent Display	CRT+LVDS, LVDS+LVDS

1.3 Chipset

1.3.1 Functional Specifications

1.3.1.1 Processor

- CPU type : Support Celeron M 600/1G MHz + 910GMLE + ICH6M
- Socket type: Support Socket 479 (It can support Celeron M and Pentium M) + 915GME + ICH6M

CPU Type	Intel Celeron M 90nm processor 600 MHz Intel Celeron M 90nm processor 1.0 GHz Chipset is 910GMLE
Socket Type	The Intel® Pentium® M Processor with 2 MB L2 Cache processor support (533-MHz) Intel® Pentium® M Processor Low Voltage support Intel® Pentium® M Processor Ultra Low Voltage support Intel® Celeron® M 90 nm processor support Intel® Celeron® M 90 nm processor ULV support Chipset is 915GME Support FSB 400/533 MHz
FSB	Socket type support up to Pentium M 2.0 GHz (FSB 533MHz), 2 MB L2
Hyper Transport	533 MHz 2.0 GHz
Package	479-pin micro-FCPGA or mFCBGA type
L2 Cache	Socket type support up to 2 MB L2 Cache

1.3.1.2 Chipset (910GMLE/915GME)

North Bridge	
Chipset	Intel® 910GMLE/915GME chipset
FSB	400 MHz for 910GMLE, 400/533 MHz for 915GME
Display	■ VGA port ■ LVDS1 (36 bit) (LVDS2 48 bit optional) Chrontel CH7308 x1 for 18 or 24-bit single/dual channel LVDS
Features	■ Intel GMA 900 (166 MHz/160 MHz @ 1.05 v) ■ 2D Display core frequency support from 133 MHz & 190/200 MHz @ Vcc = 1.05 / 1.5 V depending on Host/Memory configuration ■ 3D Render core frequency support from 133 MHz & 160/166 MHz @ Vcc = 1.05 / 1.5 V depending on Host/Memory configuration ■ Two SDVO ports multiplexed with PCI Express graphic interface ■ Dual Channel LVDS interface support 36 bits ■ CRT monitor resolutions supported: Supports up to QXGA (2048 x 1536) ■ LVDS panel resolution supported: Supports up to SXGA (1400 x 1050) Dual independent display options with digital display

Display	
Dual Independent Display	LVDS + LVDS, CRT + LVDS
VGA	■ Analog CRT DAC interface support ■ Supports max DAC frequency up to 400 MHz ■ 24-bit RAMDAC support ■ DDC2B compliant ■ Digital/Analog Converter for CRT: QXGA (2048 x 1536)

LVDS1	■ LVDS: Up to SXGA (1400 x 1050) --- 910GMLE Up to UXGA (1600 x 1200) --- 915GME ■ Integrated dual channel LVDS interface supported on Display Pipe B only ■ Supports 25 to 112 MHz single/dual channel LVDS interface ■ Single channel LVDS interface support: 1 x 18 bpp ■ Dual channels LVDS interface support: 2 x 18 bpp ■ TFT panel type supported ■ Maximum Panel size supported up to SXGA (910GMLE) or UXGA (915GME) ■ Maximum Wide panel size supported up to WUXGA ■ Ambient Light Sense support for automatic backlight brightness adjustments ■ Intel Display Power Savings Technology 2.0 support ■ Supports Single pipe simultaneous display with the CRT DAC and the LVDS ports under the following conditions 1. Timings must match for both display 2. Panel Fitting. Panning, and Center mode supported 3. Spatial Dithering support to emulate up to 16 million colors for 18bpp TFT panels 4. Spread spectrum clocking (SSC) supported 5. Supports down and center SSC via an SSC clock from an external SSC clock chip 6. Supports down spread of - 2.5% or center spread of ± -1.25% in reference 30-50 kHz modulation rate 7. SSC must be disabled for LVDS port and CRT DAC single pipe simultaneous display mode 8. Panel Power Sequencing support 9. Power down state can be either zero volt or high impedance 10. Integrated PWM interface for LCD Backlight Inverter Control
LVDS2	Chrontel 7308 supports: ■ Single/Dual LVDS Transmitter up to 165 Mpixels/s ■ Panel fitting scaler, up-scale to a maximum resolution of 1600 x 1200 ■ LVDS 18-bit and 24-bit outputs ■ Complete Windows and DOS driver support ■ Offered in a 64-pin LQFP package
Internal Graphics Features	Intel GMA 900 ■ 910GMLE: – 2D Display core frequency support from 133 MHz & 190/200 MHz @ Vcc = 1.05 / 1.5 V depending on Host/Memory configuration – 3D Render core frequency support from 133 MHz & 160/166 MHz @ Vcc = 1.05 / 1.5 V depending on Host/Memory configuration ■ 915GME: – 2D Display core frequency at 133 or 190/200 MHz @ Vcc=1.05 V depending on the host/memory configurations – 3D Render core frequency at 133, 160/166 or 190/200 MHz @ Vcc=1.05 V depending on the host/memory configurations – 2D Display core frequency at 133, 200 or 333MHz @ Vcc=1.5 V depending on the host/memory configurations – 3D Render core frequency at 133, 160/166, 200 or 333 MHz @ Vcc=1.5 V depending on the host/memory configurations

1.3.1.3 Chipset (ICH6M)

South Bridge	
Controller Hub	Intel ICH6M
PCI Compliant	Supports 33MHz PCI 2.2 specification Supports for 64-bit addressing on PCI using DAC protocol
PCI Bus	PCI masters
PCI-E	■ PCI-E masters – Giga LAN1 (RTL8111B-GR) – Giga LAN2 (RTL8111B-GR)
Other Feature	■ 6 USB 2.0 ports, 480MB/s ■ 2 Serial ATA(150MB/s) ■ Power Management ■ FWH interface to Flash BIOS ■ 4 COM ports; 3 x RS-232; 1X RS-232/422/485 (support Auto flow control)

1.3.1.4 Others (Chipset)

LAN	
Chipset	LAN 1 / LAN 2: Realtek RTL8111B-GR
IEEE Compliant	Fully compliant with IEEE 802.3, IEEE 802.3u and IEEE 802.3ab
LAN LED	LED1: Off for 10 M LAN, Green for 100 M LAN, Orange for 1000 M LED2: Off for Link, flash for active,
Disable LAN through BIOS	Yes
Wake on LAN	Yes (S1 only)
Boot from LAN	Yes (S5 only)
LED connector	NA (Coast line exists)

Audio	
Chipset	AC97 Audio
Codec	ALC203
Rear panel output	Line-In, Line-out, Mic-In
Amplifier	NA

Hardware Monitor	
Chipset	LPC I/O for onboard alarm SMSC3114
Fan	Programmable automatic fan monitor based on temperature System FAN Power Connector x 1 It should be added near by the CPU socket Connector type: 2.0mm Wafer box 3x1 Default is +12 V Fan Pin1: GND Pin2: +12 V Pin3: Fan speed signal input
Temperature	CPU Temperature
Voltage	2.5 V, Vcore, 12 V, 5 V, 3.3 V

Super I/O	
Chipset	SMSC3114
Fan speed monitor	Yes
Temperature	Yes

1.3.2 Mechanical Specifications

1.3.2.1 Dimension (mm)

115 mm (L) * 165 mm (W) (4.5" x 6.5")

1.3.2.2 Height on Top (mm)

PCM-4381F-00A1E 17 mm (USB connector)
PCM-4381F-S0A1E 27.6 mm (Heat sink)
PCM-4381L-M0A1E 27.6 mm (Heat sink)

1.3.2.3 Height on Bottom (mm)

9.2 mm (memory socket)

1.3.2.4 Cooler Dimension (mm)

PCM-4381F-00A1E : 50 * 50 * 23 mm (Cooler)

1.3.2.5 Weight (g) with Cooler

110 g

1.3.3 Electrical Specifications

1.3.3.1 Power Supply Voltage

Power	Power Type	AT/ATX
	Power Supply Voltage	ATX: + 5 V ± 5%, ± 12 V ± 5%
		AT: 5 V only to boot up, 12 V option for LCD Inverter
	Power Management	APM, ACPI

1.3.3.2 Power Supply Current

Note: *Testing conditions are as follow:*

1. *OS - Windows XP SP2*
2. *Add-in Card - None*
3. *CF Card - None*
4. *MiniPCI Card - None*
5. *HDD - 80GB SATA *1*
6. *BIOS - 4381V110.bin*
7. *KeyBoard/Mouse - USB or PS/2 Interface*
8. *Display - CRT*
9. *Memory*

   512MB Transcend DDR2 533 64 MB X 8

   1G Apacer DDR2 533 64 MB X 16

   2G DSL DDR2 667 128 MB X 16

PS: Please use suitable power supply if there is expansion with higher power voltage.

AT Power:

CPU Type	Status	+5 V	+12 V	+5 V	+12 V	+5 V	+12 V
		512 MB*1/533 MHz		1 GB*1/533 MHz		2 GB*1/533 MHz	
Pentium M 2.13 GHz SL7SL	BIOS Picture	6.66	unused	6.83	unused	6.82	unused
	DOS Idle	7.37	unused	7.53	unused	7.42	unused
	Win Idle	5.06	unused	5.15	unused	4.96	unused
	Win HCT12.0	8.9	unused	9.35	unused	9.15	unused
	3DMark2005	8.99	unused	9.32	unused	9.52	unused

CPU Type	Status	+5 V	+12 V	+5 V	+12 V	+5 V	+12 V
		512 MB*1/533 MHz		1 GB*1/533 MHz		2 GB*1/533 MHz	
Pentium M 1.8 GHz SL7EN	BIOS Picture	6.19	unused	6.33	unused	6.13	unused
	DOS Idle	6.66	unused	6.82	unused	6.65	unused
	Win Idle	4.9	unused	4.97	unused	4.83	unused
	Win HCT12.0	8.06	unused	8.49	unused	8.25	unused
	3DMark2005	8.12	unused	8.38	unused	8.23	unused

CPU Type	Status	+5 V	+12 V	+5 V	+12 V	+5 V	+12 V
		512 MB*1/533 MHz		1 GB*1/533 MHz		2 GB*1/533 MHz	
Celeron-M 600 MHz SL8FM	BIOS Picture	2.49	unused	2.53	unused	2.52	unused
	DOS Idle	2.45	unused	2.5	unused	2.49	unused
	Win Idle	2.19	unused	2.29	unused	2.32	unused
	Win HCT12.0	3.31	unused	3.5	unused	3.41	unused
	3DMark2005	3.5	unused	3.65	unused	3.58	unused

CPU Type	Status	+5 V	+12 V	+5 V	+12 V	+5 V	+12 V
		512 MB*1/533 MHz		1 GB*1/533 MHz		2 GB*1/533 MHz	
Celeron-M 1 GHz SL8XR	BIOS Picture	3.05	unused	3.17	unused	3.18	unused
	DOS Idle	3.03	unused	3.15	unused	3.17	unused
	Win Idle	2.78	unused	2.9	unused	2.89	unused
	Win HCT12.0	4.02	unused	4.25	unused	4.24	unused
	3DMark2005	4.18	unused	4.3	unused	4.33	unused

ATX Power:

TEST SAMPLE	CPU type	Status	+5 V	+5 V_{SB}	+5 V	+5 V_{SB}	+5 V	+5 V_{SB}
			512 MB*1/533 MHz		1 GB*1/533 MHz		2 G*1/533 MHz	
AKS0005548	Pentium M 2.13 GHz SL7SL	BIOS Picture	6.86	0.19	7.2	0.24	6.85	0.05
		DOS Idle	7.52	0.1	7.54	0.21	7.58	0.04
		Win Idle	4.98	0.11	5	0.12	5.05	0.04
		Win HCT11.2	8.48	0.03	8.85	0.14	8.55	0.04
		3DMark2005	8.97	0.17	9.01	0.27	9.41	0.04

TEST SAMPLE	CPU type	Status	+5 V	+5 V_{SB}	+5 V	+5 V_{SB}	+5 V	+5 V_{SB}
			512 MB*1/533 MHz		1 GB*1/533 MHz		2 G*1/533 MHz	
AKS0005548	Pentium M 1.8 GHz SL7EN	BIOS Picture	5.9	0.07	5.96	0.07	6.04	0.04
		DOS Idle	6.41	0.07	6.47	0.06	6.48	0.04
		Win Idle	4.83	0.06	4.64	0.06	4.99	0.04
		Win HCT11.2	7.01	0.07	7.22	0.09	7.33	0.05
		3DMark2005	7.53	0.08	8.22	0.09	8.27	0.04

TEST SAMPLE	CPU type	Status	+5 V	+5 V_{SB}	+5 V	+5 V_{SB}	+5 V	+5 V_{SB}
			512 MB*1/533 MHz		1 GB*1/533 MHz		2 G*1/533 MHz	
AKS0005520	Celeron-M 600 MHz SL8FM	BIOS Picture	2.51	0.04	2.52	0.04	2.49	0.04
		DOS Idle	2.43	0.05	2.49	0.05	2.51	0.05
		Win Idle	2.62	0.04	2.24	0.04	2.18	0.04
		Win HCT11.2	2.65	0.04	2.81	0.07	2.69	0.04
		3DMark2005	3.31	0.04	3.44	0.05	3.46	0.04

TEST SAMPLE	CPU type	Status	+5 V	+5 V_{SB}	+5 V	+5 V_{SB}	+5 V	+5 V_{SB}
			512 MB*1/533 MHz		1 GB*1/533 MHz		2 G*1/533 MHz	
ESE0035890	Celeron-M 1 GHz SL8XR	BIOS Picture	3.06	0.05	3.27	0.04	3.23	0.04
		DOS Idle	3.18	0.07	3.22	0.03	3.24	0.05
		Win Idle	2.81	0.06	2.1	0.05	2.88	0.05
		Win HCT11.2	3.63	0.04	3.57	0.04	3.62	0.04
		3DMark2005	4.05	0.05	4.2	0.04	4.22	0.04

1.3.3.3 RTC Battery

Typical Voltage: 3.0 V

Normal discharge capacity: 210 mAh

1.3.4 Enviroment Specifications

1.3.4.1 Operating Temperature

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

1.3.4.2 Operating Humidity

0% ~ 90% Relative Humidity, non-condensing

1.3.4.3 Storage Temperature

Standard products (0 ~ 60°C)

Storage temperature: -20 ~ 70°C

1.3.4.4 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-4381 hardware, including instructions on setting jumpers and connecting peripherals, switches, indicators and mechanical drawings.

Please make sure to read all safety precautions before you begin the installation procedure.

2.1 Jumpers

2.1.1 Jumper list

2.1.1.1 Switch Setting:

JP1	CLEAR CMOS
JP2	COM2 RS232/422/485 Select
JP3	External LVDS PANEL POWER Select
JP4	Internal LVDS PANEL POWER Select
JP5	PCIVIO POWER Select

2.1.2 Jumper Settings

JP1	**CLEAR CMOS**
Part Number	1653003101
Footprint	JH3X1V-2M
Description	PIN HEADER 3*1P 180D (M) 2.0 mm DIP SQUARE W/O Pb
Setting	Function
(1-2)	NORMAL (Default)
(2-3)	CLEAR CMOS

JP2	**COM2 RS232/422/485 Select**
Part Number	1653003260
Footprint	PH3x2P-S2.00
Description	PIN HEADER 3*2P 180D (M) 2.0 mm SMD SOUARE PIN
Setting	Function
(1-2)	RS232 (Default)
(3-4)	RS485
(5-6)	RS422

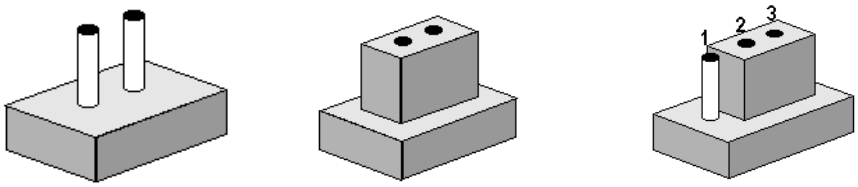
JP3	**External LVDS PANEL POWER Select**
Part Number	1653003101
Footprint	JH3X1V-2M
Description	PIN HEADER 3*1P 180D (M) 2.0 mm DIP SQUARE W/O Pb
Setting	Function
(1-2)	5 V for LVDS2 POWER Select
(2-3)	3.3 V for LVDS2 POWER Select (Default)

JP4	Internal LVDS PANEL POWER Select
Part Number	1653003101
Footprint	JH3X1V-2M
Description	PIN HEADER 3*1P 180D (M) 2.0 mm DIP SQUARE W/O Pb
Setting	Function
(1-2)	5 V for LVDS2 POWER Select
(2-3)	3.3 V for LVDS2 POWER Select (Default)

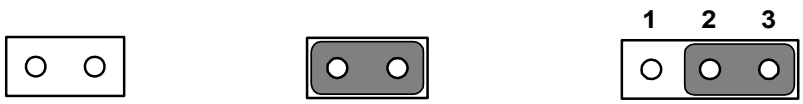
JP5	PCI VI/O POWER Select
Part Number	1653003101
Footprint	JH3X1V-2M
Description	PIN HEADER 3*1P 180D (M) 2.0 mm DIP SQUARE W/O Pb
Setting	Function
(1-2)	With +5 V
(2-3)	With +3.3 V (Default)

2.1.3 Jumper Description

Cards can be configured 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.



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



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.

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

2.2 Connectors

2.2.1 Connector List

Table 2.1: Connector List	
CN1	POWER connector
CN2	CPU Socket 479
CN3	DDR2 SO-DIMM
CN4	BATTERY connector
CN6	ATX POWER button connector
CN7	GPIO1 connector
CN8	LAN1 (RJ45)
CN9	LAN2 (RJ45)
CN11	CompactFlash connector
CN13	HD & Power LED
CN14	Internal LVDS connector
CN15	Internal LCD Backlight
CN16	CRT connector
CN18	USB0/1
CN19	KB/MS connector
CN20	USB2/3
CN21	COM1
CN22	AUDIO connector
CN23	USB4/5
CN25	PCI-104 connector
CN26	RS422/458 connector
CN29	GPIO2 connector
CN30	COM2/3/4 & LPT
CN32	SATA1 connector
CN33	SATA2 connector
CN34	External LVDS connector
CN35	External LCD Backlight
FAN1	CPU FAN connector

2.2.2 Connector Setting

2.2.2.1 Power Connector (CN1)

Main power connector, +3.3 V, +5 V, +12 V, -12 V.

PCM-4381 can support both ATX and AT power supplies and it can use different power cables.

1. For ATX power supply: you need to use ATX power cable (PN: 1700002055 Cable 20P/10P EPIC ATX POWER 10CM).
2. For AT power supply: you need to use AT power cable (PN: 1700003931 AT Power Cable 2*4P/10P EPIC AT POWER 15 cm).

CN1 connector is 10-Pin power connector and it allows you to connect to an ATX or AT power supply with different power cables.

2.2.2.2 CPU Socket 479 (CN2)

CN2 is a CPU socket. It can support Pentium M and Celeron M series processors.

2.2.2.3 DDR2 SO-DIMM (CN3)

A SO-DIMM, or small outline dual in-line memory module, is a type of computer memory built using integrated circuits.PCM-4381 has 1 x 200 pin SO-DIMM and can support memory size up to 2 GB.

2.2.2.4 Battery Connector (CN4)

CN4 is for battery connection.

2.2.2.5 ATX Power Button Connector (CN6)

CN6 connects to power button of PCM-4381. It is 2 pin wafer type.

2.2.2.6 GPIO1 (General Purpose Input Output) (CN7)

The general-purpose input/output (GPIO) peripheral provides dedicated general-purpose pins that can be configured as either inputs or outputs. When configured as an output, you can write to an internal register to control the state driven on the output pin. When configured as an input, you can detect the state of the input by reading the state of an internal register. PCM-4381 supports 16 bit GPIO so you can connect to device via CN7 and CN29.

2.2.2.7 Ethernet Connector (CN8)

The board is equipped with 2 high performance Ethernet interface which use RJ45 connectors. One is CN8 and another one is CN9. The ethernet port performance is fully compliant with IEEE 802.3, IEEE 802.3u and IEEE 802.3ab.

2.2.2.8 Ethernet connector (CN9)

The board is equipped with 2 high performance Ethernet interface which use RJ45 connectors. One is CN9 and another one is CN8. The ethernet port performance is fully compliant with IEEE 802.3, IEEE 802.3u and IEEE 802.3ab.

2.2.2.9 Compact Flash (CN11)

The board provides a Compact Flash (Card type I/II) socket. There are two main subdivisions of CF cards, Type I (3.3 mm thick) and the thicker Type II (CF2) cards (5 mm thick). The CF Type II slot is used by Microdrives and some other devices.

2.2.2.10 HD and Power LED (CN13)

CN13 is an indication LED connector for HD and power. When Power on or HD is accessed, the indication LED will turn on.

2.2.2.11 LVDS Connector (CN14)

Low-voltage differential signaling, or LVDS, is an electrical signaling system that can run at very high speeds over inexpensive twisted-pair copper cables. CN14 is LVDS1 connector. You can connect to 36 bit LVDS LCD panel by this connector.

2.2.2.12 Inverter Connector (CN15)

CN15 is a 5-pin connector. PCM-4381 can provide +5 V and +12 V and signal to LCD inverter board.

2.2.2.13 VGA Connector (CN16)

The DB15-pin female connector is provided for video monitors.

2.2.2.14 USB Connectors (CN18)

PCM-4381 USB ports gives complete Plug and Play, and hot attach/detach for up to 127 external devices, and complies with USB specification Rev. 2.0. and supports 480 Mbps transfer rate.

PCM-4381 provides up to 6 x USB (Universal Serial Bus) ports - CN18, CN20 or CN23. CN18 is a USB type A connector and CN20 and CN23 are pin header types. PCM-4381 USB ports provide complete Plug and Play, and hot attach/detach for up to 127 external devices. They comply with USB specification Rev. 2.0 which supports 480 Mbps transfer rate and they are fuse protected.

2.2.2.15 Keyboard and PS/2 Mouse Connector (CN19)

You can connect to PS/2 keyboard and mouse via CN19.

2.2.2.16 USB Connectors (CN20)

PCM-4381 USB ports offers complete Plug and Play, and hot attach/detach for up to 127 external devices, and compies with USB specification Rev. 2.0. which supports 480 Mbps transfer rates.

PCM-4381 provides up to 6 x USB (Universal Serial Bus) ports - CN18, CN20 or CN23. CN18 is a USB type A connector and CN20 and CN23 are pin header types.

2.2.2.17 COM Port Connector (CN21)

PCM-4381 provides 4 serial communication ports. CN21 is one of the serial communication ports. CN21 is 9 pin D-shell connector used for the RS 232 serial port.

2.2.2.18 Audio Interface (CN22)

PCM-4381 support Audio Codec 97 and the audio interface are Line-in, Line-out and Mic-in.

2.2.2.19 USB Connectors (CN23)

PCM-4381 USB ports gives complete Plug and Play, and hot attach/detach for up to 127 external devices and complies with USB specification Rev. 2.0. which supports 480 Mbps transfer rate.

PCM-4381 provides up to 6 x USB (Universal Serial Bus) ports - CN18, CN20 or CN23. CN18 is a USB type A connector and CN20 and CN23 are pin header types.

2.2.2.20 PCI-104 Connector (CN25)

CN25 is a PCI-104 connector. PCI-104 form factor includes the PCI connector. It is intended for industrial embedded computing environments where applications depend on reliable data acquisition.

2.2.2.21 RS422/485 Connector (CN26)

RS-422 and RS-485 are serial communication protocol and transmission signal is differential signal. You can connect to RS-422 or RS-485 device by CN26.

2.2.2.22 GPIO2 (General Purpose Input Output) (CN29)

The general-purpose input/output (GPIO) peripheral provides dedicated general-purpose pins that can be configured as either inputs or outputs. When configured as an output, you can write to an internal register to control the state driven on the output pin. When configured as an input, you can detect the state of the input by reading the state of an internal register. PCM-4381 supports 16 bit GPIO so you can connect to device via CN7 and CN29.

2.2.2.23 COM Port Connector (CN30)

CN30 is a connector and includes COM2, COM3, COM4 and LPT signal. You can use a one to four connector cable (PN:1700002034) to connect to your device. CN30 is a 2 x 25P box header.

2.2.2.24 SATA Connector (CN32)

PCM-4381 supports 2 serial ATA (CN32 and CN33). Data transfer rates up to 150 MB/s, enabling very fast data and file transfer, and independent DMA operation on two ports.

2.2.2.25 SATA Connector (CN33)

PCM-4381 supports 2 serial ATA (CN32 and CN33). Data transfer rates up to 150 MB/s, enabling very fast data and file transfer, and independent DMA operation on two ports.

2.2.2.26 External LVDS Connector (CN34)

CN34 is LVDS2 (Low Voltage Differential Signal) connector. You can connect to 48bit LVDS LCD panel.

2.2.2.27 External LCD Backlight (CN35)

CN35 is 5-pin connector. PCM-4381 can provide +5 V and +12 V and signal to LCD inverter board.

2.2.2.28 CPU Fan Power Supply Connector (FAN1)

Provides power supply +12 V to CPU cooling fan, and fan speed detects signal input.

2.3 Mechanical

2.3.1 Jumper and Connector Location

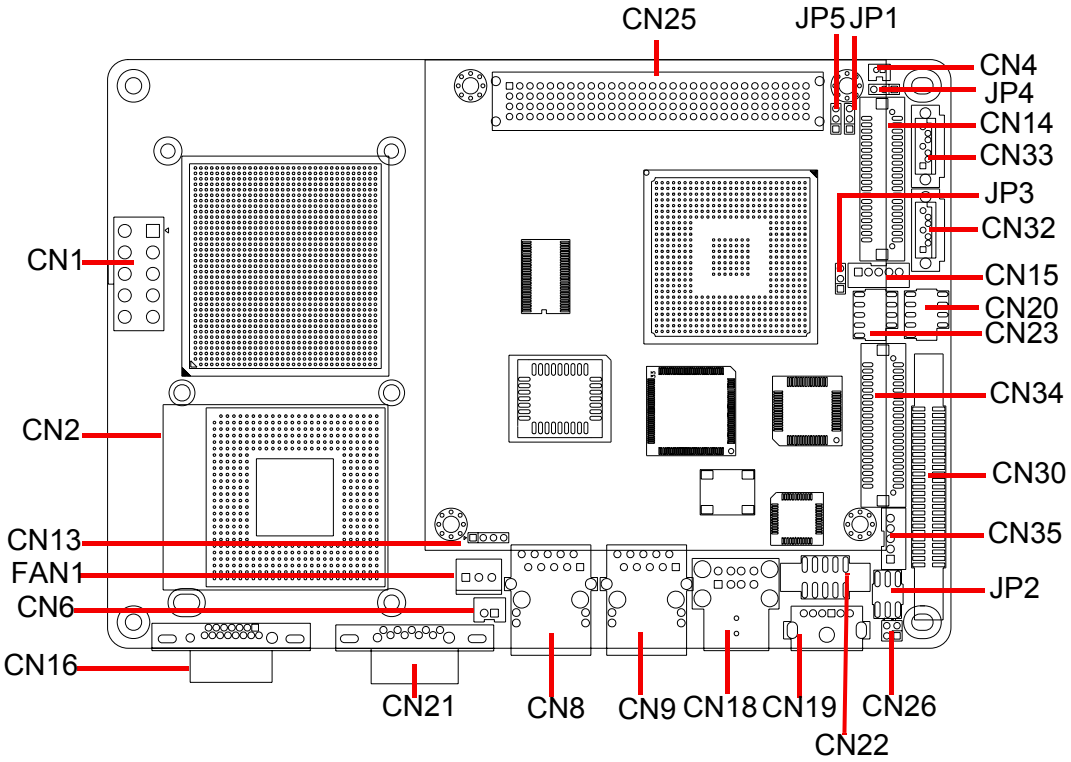


Figure 2.1 Jumper and Connector Layout (Component Side)

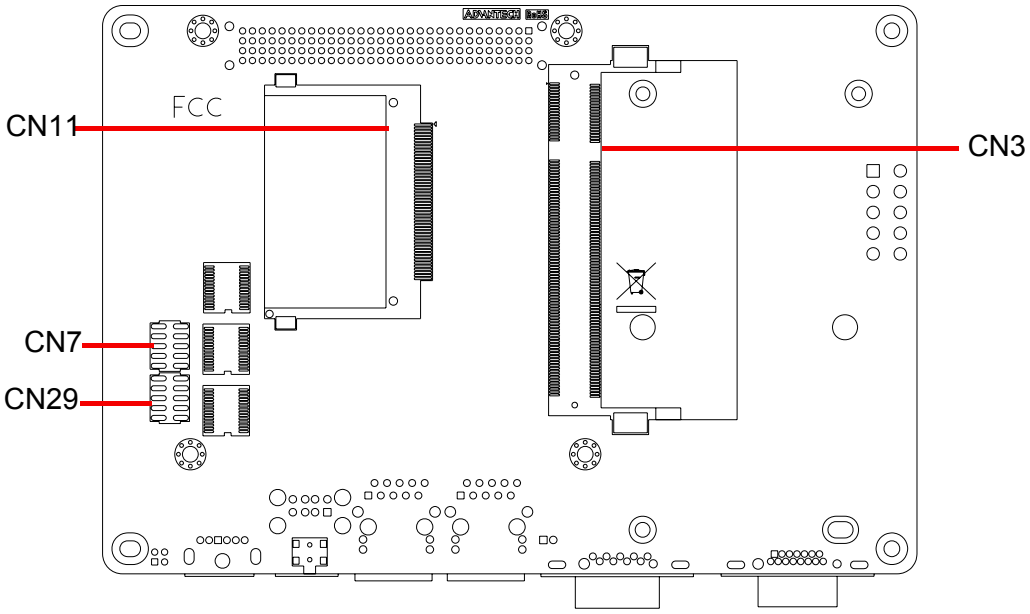


Figure 2.2 Jumper and Connector Layout (Solder Side)

2.3.2 Board Dimension

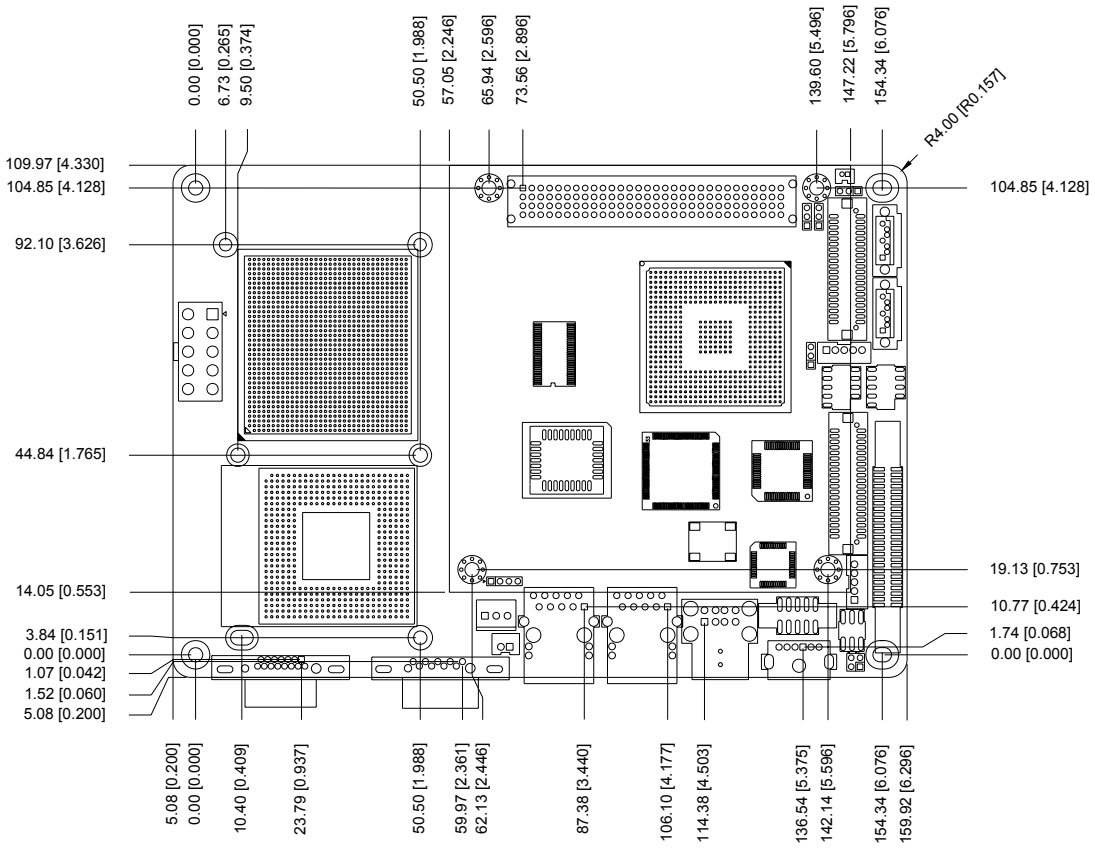


Figure 2.3 Board Dimension Layout (Component Side)

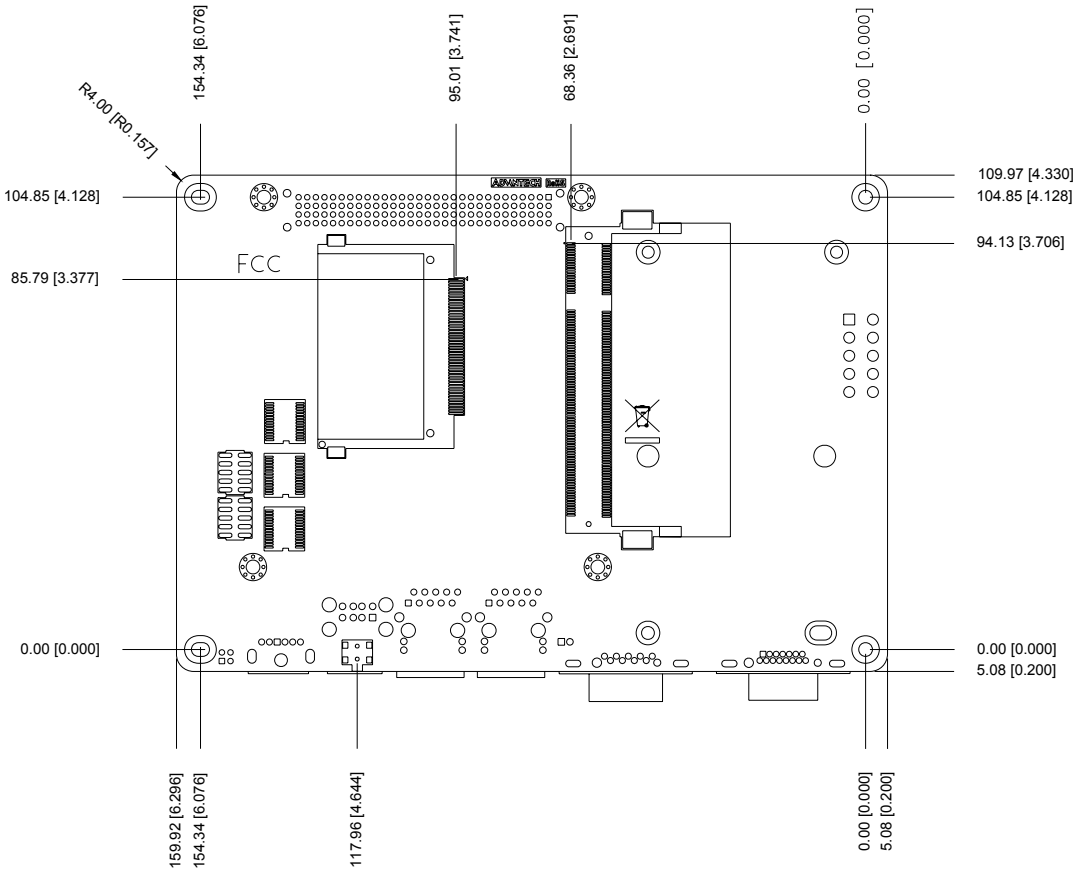


Figure 2.4 Board Dimension Layout (Solder Side)

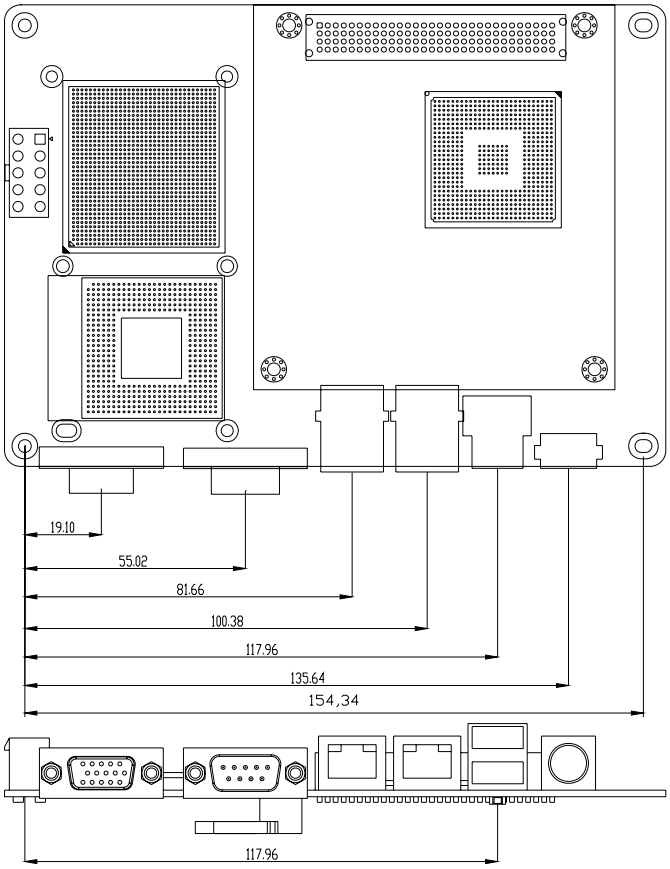


Figure 2.5 Coast Line Layout

Chapter 3

BIOS Operation

3.1 BIOS Introduction

Advantech provides the fully-featured AwardBIOS 6.0 which delivers superior performance, compatibility and functionality that manufactures of Industrial PC and Embedded boards demand; it's many options and extensions let you customize your products to a wide range of applications and target markets.

The modular, adaptable AwardBIOS 6.0 supports the broadest range of processors, third-party peripherals and popular chipsets including: Intel, AMD, nVidia, and VIA processors, from 386 through Pentium, and AMD Geode to K7 and K8. Advantech also provides utilities to easily select and install features that suit the customers own designs.

Note! *Different BIOS versions maybe have different function so we will show a standard BIOS operation guide here.*

3.2 BIOS Setup

The PCM-4381 system has build-in AwardBIOS with a CMOS SETUP utility which allows user to configure 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.

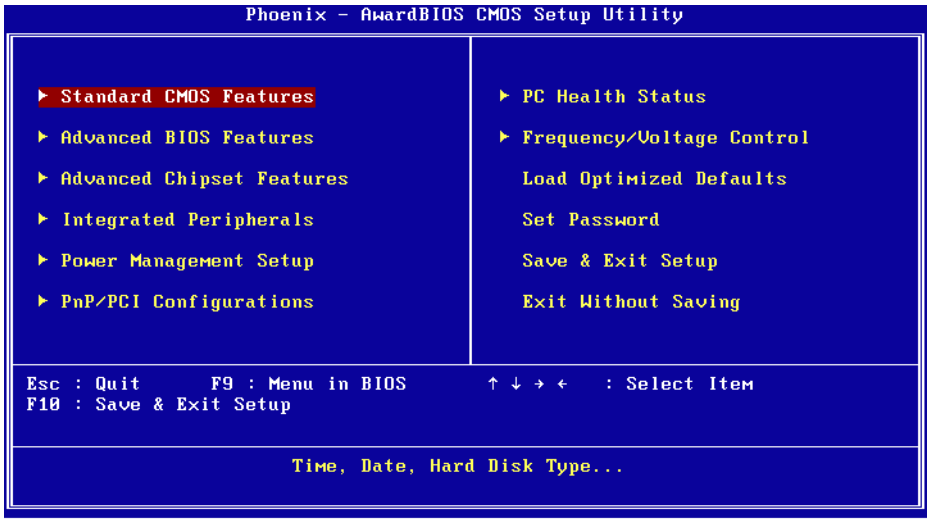
When the power is turned on, press the <Del> button during the BIOS POST (Power-On Self Test) will take you to the CMOS SETUP screen.

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

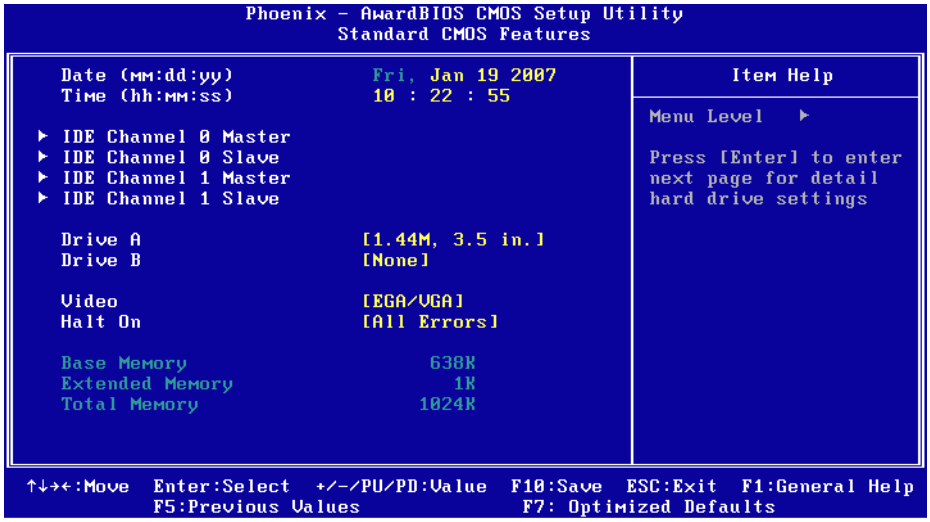
3.2.1 Main Menu

Press <Del> to enter AwardBIOS 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 standard compatible BIOS.
- Advanced BIOS Features
  This setup page includes all the items of Award BIOS enhanced features.
- Advanced Chipset Features
  This setup page includes all the items of Chipset configuration features.
- Integrated Peripherals
  This setup page includes all onboard peripheral devices.
- Power Management Setup
  This setup page includes all the items of Power Management features.
- PnP/PCI Configurations
  This setup page includes PnP OS and PCI device configuration.
- PC Health Status
  This setup page includes the system auto detect CPU and system temperature, voltage, fan speed.
- Frequency/Voltage Control
  This setup page includes CPU host clock control, frequency ratio and voltage.
- Load Optimized Defaults
  This setup page includes Load system optimized value, for best performance configuration.
- Set Password
  Establish, change or disable user password.
- 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 format in <hour> <minute> <second>, base 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

  The item 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 CPU's memory address map) installed in the system.

- Total Memory

  This item displays the total system memory size.

3.2.3 Advanced BIOS Features

```
Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features

  Blank Boot                  [Disabled]        Item Help
  POST Beep                   [Enabled]
▶ CPU Feature                 [Press Enter]     Menu Level ▶
▶ Hard Disk Boot Priority     [Press Enter]
  Virus Warning               [Disabled]
  CPU L3 Cache                [Enabled]
  CPU L2 Cache ECC Checking   [Enabled]
  Quick Power On Self Test    [Enabled]
  First Boot Device           [Floppy]
  Second Boot Device          [Hard Disk]
  Third Boot Device           [LS120]
  Boot Other Device           [Enabled]
  Swap Floppy Drive           [Disabled]
  Boot Up Floppy Seek         [Disabled]
  Boot Up NumLock Status      [On]
  Typematic Rate Setting      [Disabled]
x Typematic Rate (Chars/Sec) 6
x Typematic Delay (Msec)     250
  Security Option             [Setup]

↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
           F5:Previous Values             F7: Optimized Defaults
```

- Blank Boot [Disabled] (* Advantech feature enhancement)
  This item allows system only displays blank screen during BIOS Post stage.
- POST Beep [Enabled] (* Advantech feature enhancement)
  This item allows system send out Beep sound during BIOS Post stage.
- CPU Feature
  This item allows user to adjust CPU features, CPU ratio, VID and Thermal and special feature like XD flag.
- Hard Disk Boot Priority
  This item allows user to select boot sequence for system device HDD, SCSI, RAID.
- Virus Warning [Disabled]
  This item allows user to choose the VIRUS Warning feature for IDE Hard Disk boot sector protection.
- CPU L3 Cache [Enabled]
  This item allows user to enable CPU L3 cache.
- CPU L2 Cache ECC Checking [Enabled]
  This item allows users 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 retesting 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 change hardware cable connection.

- Boot Up Floppy Seek [Disabled]

  When enabled, the BIOS will seek the floppy “A” drive one time.

- 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 at

  – 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 to 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 > 64 M [Non-OS2]

  Select OS2 only if system is running OS/2 operation system with greater than 64 MB 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, and the Logo picture can be customization.

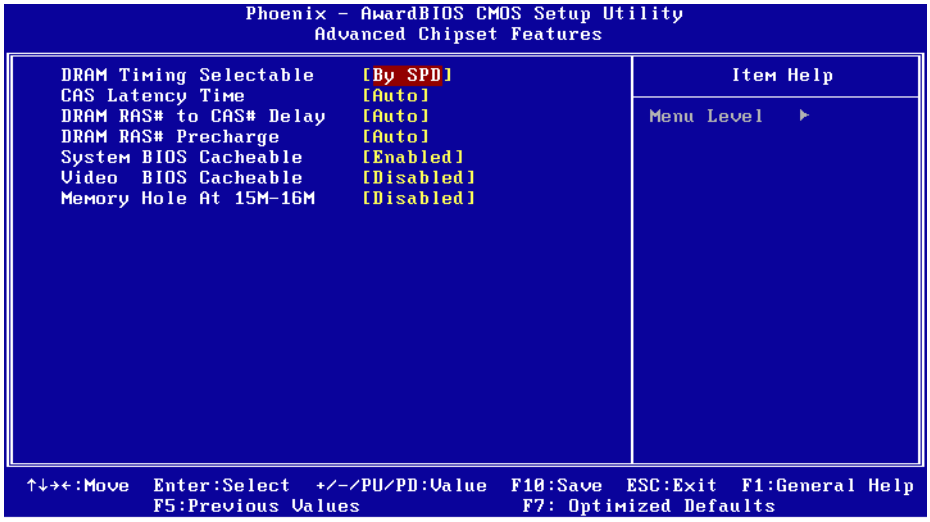
- Small Logo (EPA) Show [Enabled]

  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! *This "Advanced Chipset Features" option controls the configuration of the board's chipset, this page is developed to be Chipset independent, for controlling chipset register settings and fine tuning 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 5, system default setting of “By SPD” to follow the SPD information and ensure the system running in 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 column are separately addressed shortly after DRAM is refreshed.
- DRAM RAS# Precharge [Auto]

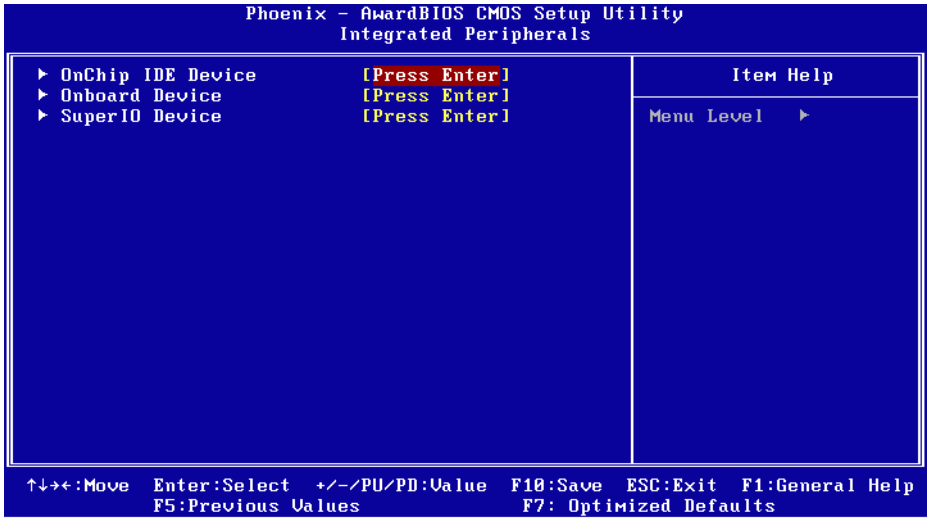
  This item enables users to set the DRAM RAS# precharge timing, system default is setting to “Auto” to reference the data from SPD ROM.
- System BIOS Cacheable [Enabled]

  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 15 M-16 M [Disabled]

  This item reserves 15MB-16MB memory address space to ISA expansion cards that specifically require the setting. Memory from 15 MB-16 MB will be unavailable to the system because of 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 to be chipset independent.*

- South 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.

- Onboard Device

  This item enables users to set the Onboard device status, includes enable, HD Azalia Audio, AC97, and SATA controller 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

```
Phoenix - AwardBIOS CMOS Setup Utility
Power Management Setup

  ACPI Function                [Enabled]          Item Help
  ACPI Suspend Type            [S1(POS)]
x Run VGABIOS if S3 Resume      Auto              Menu Level  ►
  Power Management             [Min Saving]
  Video Off Method             [DPMS]
  Video Off In Suspend         [Yes]
  Suspend Type                 [Stop Grant]
  MODEM Use IRQ                [3]
  Suspend Mode                  1 Hour
  HDD Power Down                15 Min
  Soft-Off by PWR-BTTN         [Instant-Off]
  Energy Lake Function         [Disabled]
  Wake-Up by PCI card          [Enabled]
  Power On by Ring             [Enabled]
x USB KB Wake-Up From S3        Disabled
  Resume by Alarm              [Disabled]
x  Date(of Month) Alarm          0
x  Time(hh:mm:ss) Alarm          0 :  0 :  0

↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
           F5:Previous Values             F7: Optimized Defaults
```

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 communicate PC and system devices for improving the power management.

- ACPI Suspend Type [S1 (POS)]

  This item allows user to select sleep state when suspend.

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 reinitialize 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 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, the hard disk drive will be powered down.
- Soft-Off by PWR-BTTN [Enabled]

  This item allows user to define function of power button.

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

- Wake-Up by PCI card [Enabled]

  This item allows user to defines PCI cards to wake up the system from the suspend mode.
- Power On by Ring [Enabled]

  This item allows user to define the system will resume by activating of modem ring.
- 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 Date/time to power on 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)

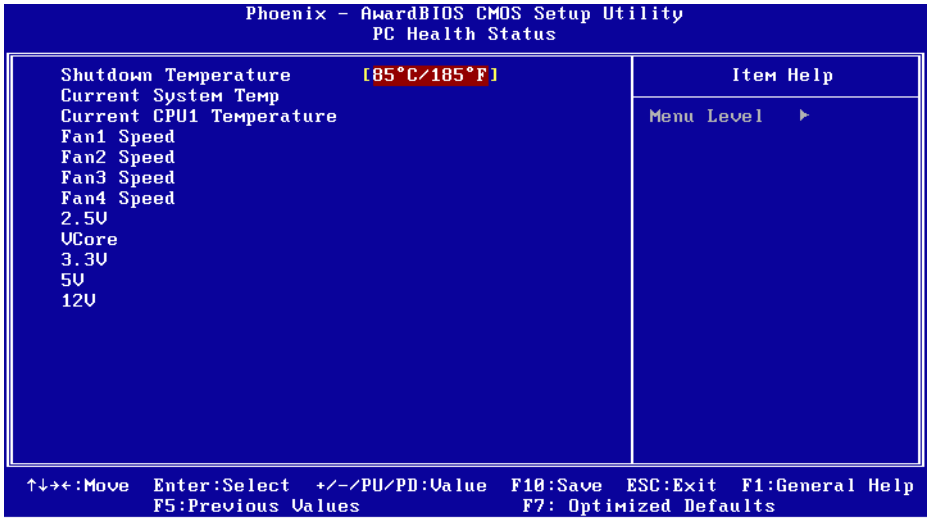
3.2.7 PnP/PCI Configurations

```
Phoenix - AwardBIOS CMOS Setup Utility
PnP/PCI Configurations

  Init Display First          [PCI Slot]        Item Help
  Reset Configuration Data    [Disabled]
                                                Menu Level  ▶
  Resources Controlled By     [Auto(ESCD)]
x IRQ Resources                Press Enter
x DMA Resources                Press Enter

  PCI/VGA Palette Snoop       [Disabled]
  INT Pin 1 Assignment        [Auto]
  INT Pin 2 Assignment        [Auto]
  INT Pin 3 Assignment        [Auto]
  INT Pin 4 Assignment        [Auto]
  INT Pin 5 Assignment        [Auto]
  INT Pin 6 Assignment        [Auto]
  INT Pin 7 Assignment        [Auto]
  INT Pin 8 Assignment        [Auto]

↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
           F5:Previous Values             F7: Optimized Defaults
```

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 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.

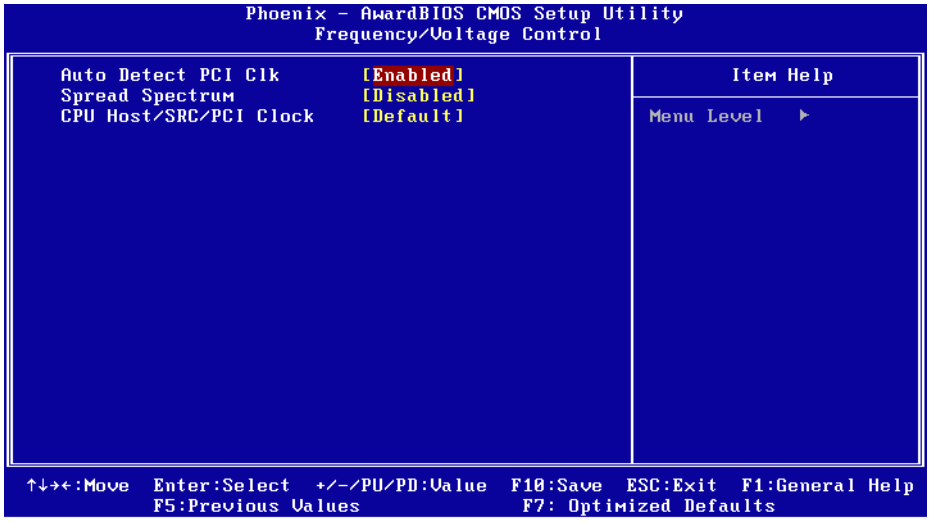
3.2.8 PC Health Status



Note! *This "PC Health Status" option controls the Thermal, FAN and Voltage status of the board. this page is developed to be 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 to be CPU and chipset independent, some items will show up when you install a processor which supports this function.*

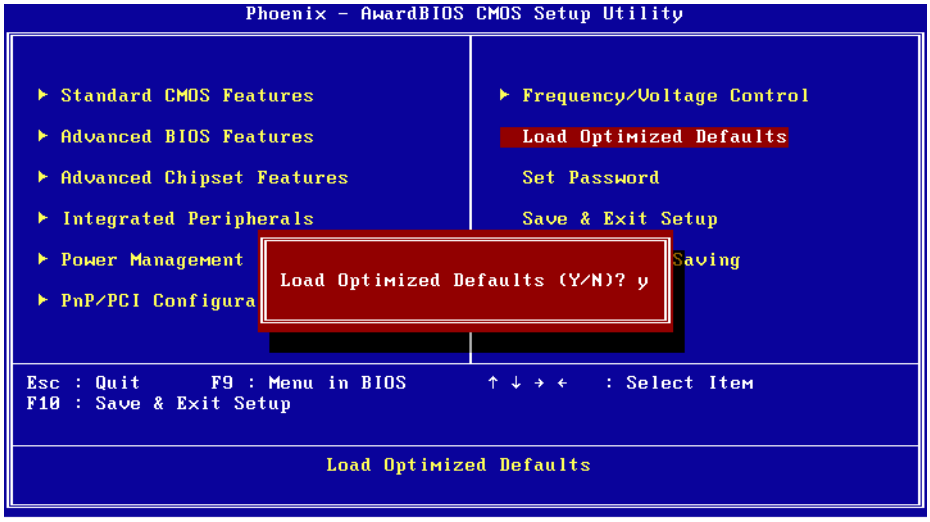
- Auto Detect PCI Clk [Enabled]

  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]

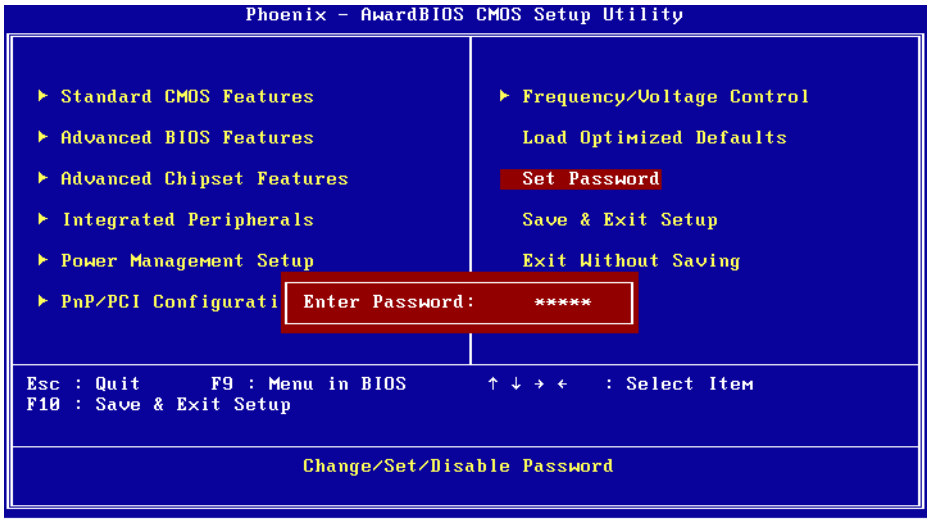
  This item enables users to set the CPU Host and PCI clock by system automatic detection or by manual

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-4381 Series system on.

3.2.11 Set Supervisor 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>.

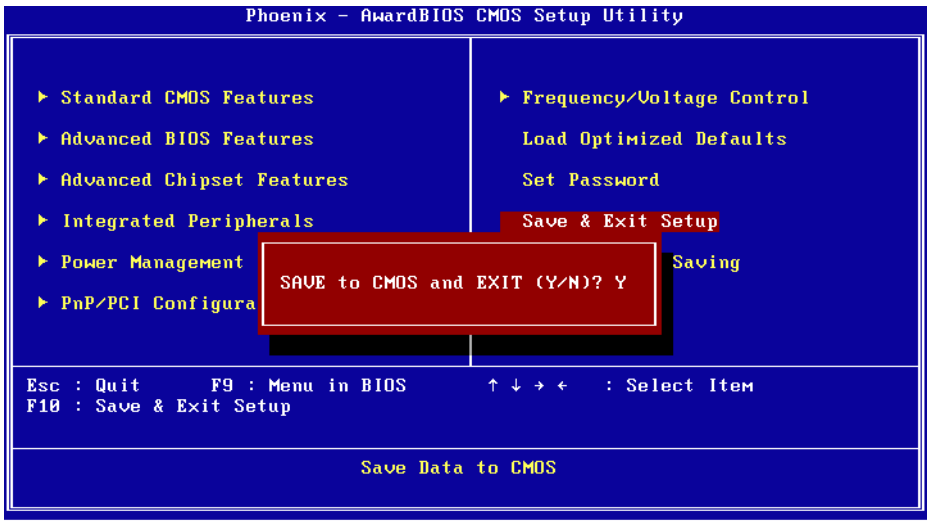
To Change Password

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. 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

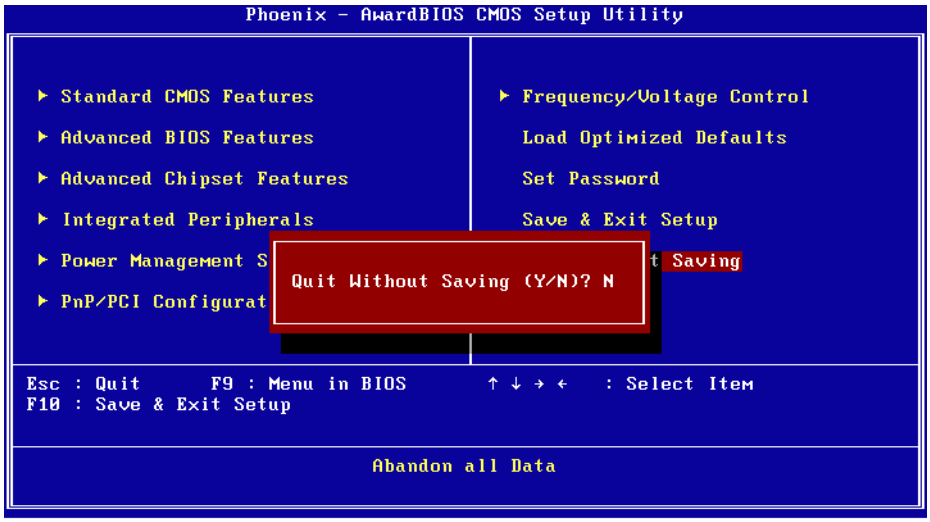
1. Choose the Set Password option from the CMOS Setup Utility main menu and press <Enter>.
2. When you see “Enter Password”, enter the existing password and press <Enter>.
3. You will see “Confirm Password”. Type it again, and press <Enter>.
4. Select Set Password again, and at the ”Enter Password” prompt, please 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! *Type "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! *Type "Y" will quit the BIOS Setup Utility without saving to CMOS.*
Type "N" will return to BIOS Setup Utility.

Chapter 4

S/W Introduction & Installation

Sections include:

- S/W Introduction
- Driver Installation
- SUSI Application Library

4.1 S/W Introduction

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

4.2.1 Windows XP professional

To install the drivers insert the CD into CD-ROM, select the drivers that you want to install, then run .exe (set up) file under each chipset folder and follow Driver Setup instructions to complete the installation.

4.2.2 Other OS

To install the drivers for Other Windows OS or Linux, please browse the CD to run the setup file under each chipset folder on the CD-ROM.

4.3 SUSI Application Library

4.3.1 SUSI Introduction

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

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 interface 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 can invoke the functions exported by SUSI instead of calling the drivers directly. The benefit of using SUSI is portability. The same set of API is defined for different Advantech hardware platforms. Also, the same set of API is implemented in different Operating Systems including Windows XP and Windows CE. This user's 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 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, and supports digital I/O devices.

4.3.2.2 The I^2C API

I^2C is a bi-directional two-wire bus that was developed by Phillips for use in their televisions in the 1980s and nowadays is used in various types of embedded systems. 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 by invoking other function calls. SUSI provides a consistent programming interface for different Advantech boards. That means user programs using SUSI are portable among different Advantech boards as long as the boards and SUSI provide the required functionalities. Overall product development times can be greatly reduced using SUSI.

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 of I^2C and is used in personal computers and servers for low-speed system management communications. Nowadays, it can be seen in many types of embedded systems. As with other API 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 APIs, backlight on/off control and brightness control. Backlight on/off control allows a developer to turn on or off the backlight, and to control brightness smoothly.

4.3.2.5 The Watchdog API

A watchdog timer (abbreviated as 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 SUSI provides developers with functions such as starting the timer, resetting the timer, and setting the timeout value if the hardware requires customized timeout values.

4.3.2.6 The Hardware Monitor API

The hardware monitor (abbreviated as HWM) is a system health supervision capability achieved by placing certain I/O chips along with sensors for inspecting the target of interests for certain condition indexes, such as fan speed, temperature and voltage etc.

However, due to the inaccuracy among many commercially available hardware monitoring chips, Advantech has developed a unique scheme for hardware monitoring - achieved by using a dedicated micro-processor with algorithms specifically designed for providing accurate, real-time and reliable data content; helping protect your system in a more reliable manner

4.3.3 SUSI Installation

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

4.3.3.1 Windows XP

In windows XP, you can install the library, drivers and demo programs onto the platform easily using the installation tool - **The SUSI Library Installer**. After the installer has executed, the SUSI Library and related files for Windows XP can be found in the target installation directory. The files are listed in the following table.

Directory	Contents
\Library	■ Susi.lib Library for developing the 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 illustrates the installation process.

Note! *The version of the SUSI Library Installer shown on each screen shot below depends on your own particular version.*

*Note:

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

The installer searches for a previous installation of the SUSI Library. If it locates one, a screen shot 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.

4.3.3.2 Windows CE

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

Express Installation:

You can use Advantech CE-Builder to load the library into the image.

- First, you click the My Component tab.
- In this tab, you click Add New Category button to add a new category, eg. the SUSI Library.
- Then you can add a new file in this category, and upload the SUSI.dll for this category.
- After these steps, you can select the SUSI Library category you created for every project.

Manual Installation:

You can add the SUSI Library into the image by editing any bib file.

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

4.3.4 SUSI Sample Programs

4.3.4.1 Sample Programs

The sample programs demonstrate how to incorporate SUSI into your program. There are sample programs for two categories of operating system, i.e. 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.

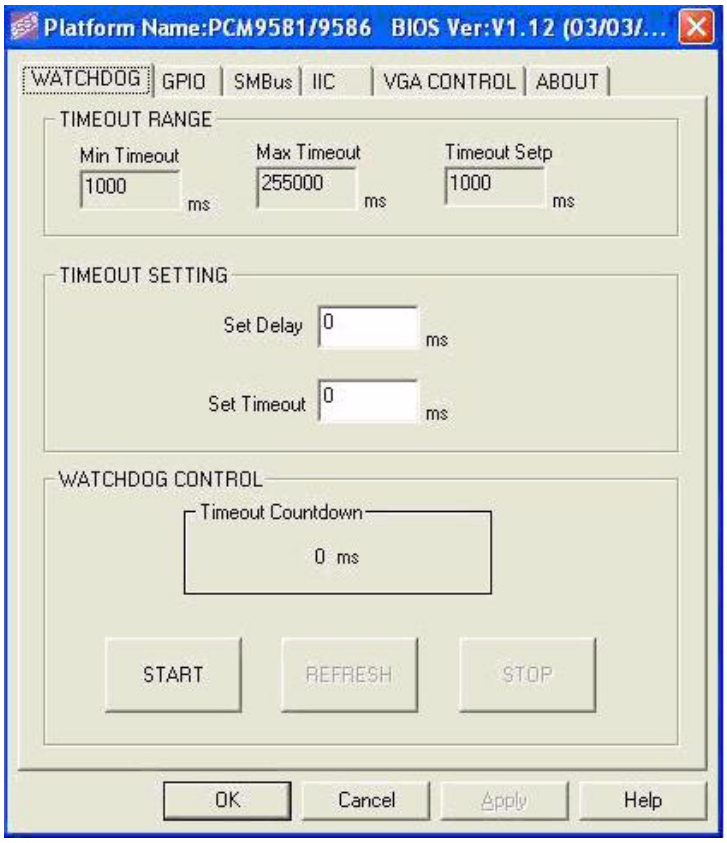
4.3.4.2 Windows Graphics Mode

There are sample programs of Windows in graphics mode for two categories of operating system, i.e. Windows CE and Windows XP. Each demo application contains an executable file SusiDemo.exe, a shared library Susi.dll and source code within the release package. The files of Windows CE and Windows XP are not compatible with each other.

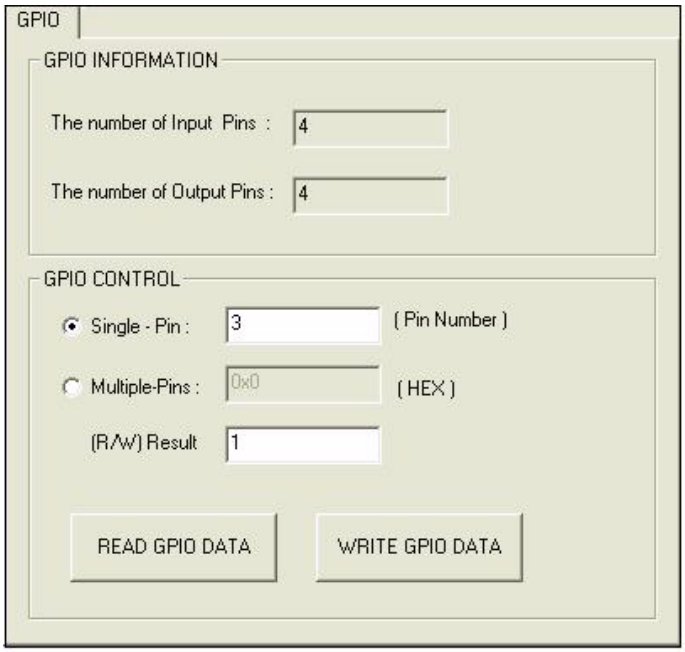
SusiDemo.exe is an executable file and it requires the shared library, Susi.dll, to demonstrate the SUSI functions. The source code of SusiDemo.exe also has two versions, i.e. Windows CE and Windows XP, and must be compiled under Microsoft Visual C++ 6.0 on Windows XP or under Microsoft Embedded Visual C++ 4.0 on Windows CE. Developers must add the header file Susi.h and library Susi.lib to their own projects when they want to develop something with SUSI.

4.3.4.3 SusiDemo.exe

The SusiDemo.exe test application is an application which uses all functions of the SUSI Library. It has five major function blocks: Watchdog, GPIO, SMBus, I^2C and VGA control. The following screen shot appears 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. For a complete support list, please refer to Appendix A. We describe the steps to test all functions of this application.



4.3.4.4 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 the radio button to choose to test either the single pin function or multiple pin functions. The GPIO pin assignments of the supported platforms are located in Appendix B.

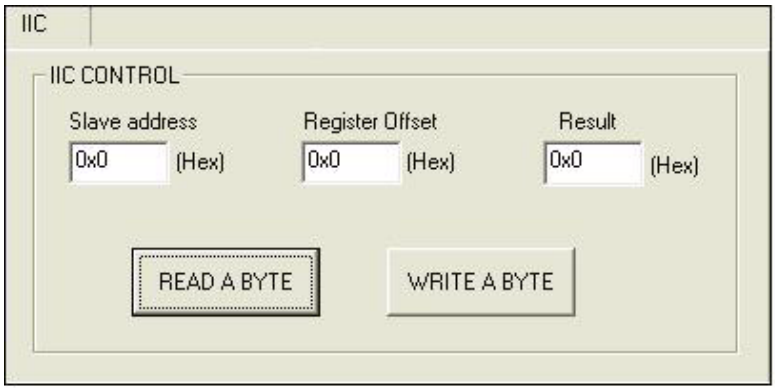
- Test Read Single Input Pin
  - Click the radio button- Single-Pin.
  - Key in the pin number to read the value of the input pin. The Pin number starts from '0'.
  - Click the READ GPIO DATA button and the status of the GPIO pin will be displayed in (R/W) Result field.

- Test Read Multiple Input Pin
  - Click the radio button- Multiple-Pins.
  - Key in the pin number from ‘0x01’ to ‘0x0F’ to read the value of the input pin. The pin numbers are ordered bitwise, 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’.
  - Click READ GPIO DATA button and the statuses of the GPIO pins will be displayed in (R/W) Result field.

- Test Write Single Output Pin
  - Click the radio button- Single-Pin.
  - Key in the pin numbers you want to write. Pin numbers start from '0'.
  - Key in the value either '0' or '1' in (R/W) Result field to write the output pin you chose above step.
  - Click the WRITE GPIO DATA button to write the GPIO output pin.

- Test Write Multiple Output Pins
  - Click the radio button- Multiple-Pins.
  - Key in the pin number from ‘0x01’ to ‘0x0F’ to choose the multiple pin numbers to write the value of the output pin. The pin numbers are ordered bitwise, 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’.
  - Key in the value in (R/W) Result field from ‘0x01’ to ‘0x0F’ to write the value of the output pin. The pin numbers are ordered bitwise, 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 then you should key in the value ‘0x0A’ to write.
  - Click the WRITE GPIO DATA button to write the GPIO output pins.

4.3.4.5 I²C

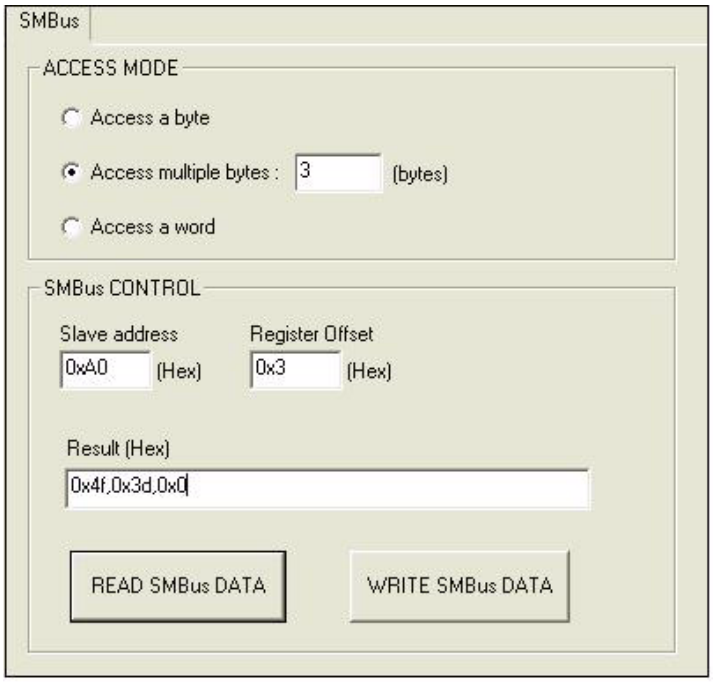


When the application is executed, you can read or write a byte of data through I²C devices. All data must be read or written in hexadecimal system.

- Read a byte
  - Key in the slave device address in Slave address field.
  - Key in the register offset in Register Offset field.
  - Click the READ A BYTE button and then a byte of data from the device will be shown on the Result field.

- Write a byte
  - Key in the slave device address in Slave address field.
  - Key in the register offset in Register Offset field.
  - Key in the desirous of data in Result field to write to the device.
  - Click the WRITE A BYTE button and then the data will be written to the device through I²C.

4.3.4.6 SMBus



When the application has executed, you can click the 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 numbers for radio button: Access multiple bytes mode must be written in decimal. You can test the functionalities of the watchdog as follows:

- Read a byte
  - Click the radio button- Access a byte.
  - Key in the slave device address in the Slave address field.
  - Key in the register offset in the Register Offset field.
  - Click the READ SMBus DATA button and a byte of data from the device will be shown on the Result field.

- Write a byte
  - Click the radio button- Access a byte.
  - Key in the slave device address in Slave address field.
  - Key in the register offset in Register Offset field.
  - Key the desired data in the Result field to write to the device.
  - Click the WRITE SMBus DATA button and then the data will be written to the device through SMBus.

- Read a word
  - Click the radio button- Access a word.
  - Key in the slave device address in the Slave address field.
  - Key in the register offset in the Register Offset field.
  - Click the READ SMBus DATA button and then a word of data from the device will be shown on the Result field.

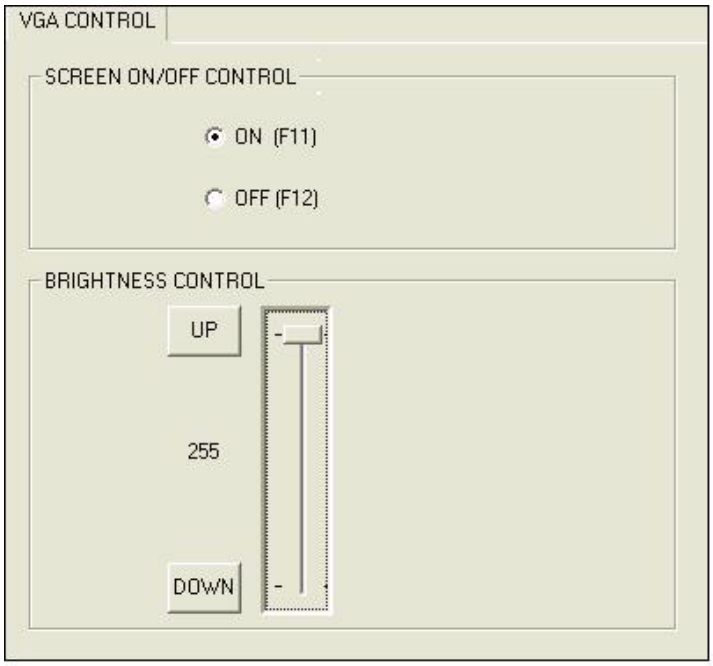
- Write a word

- Click the radio button- Access a word.
- Key in the slave device address in the Slave address field.
- Key in the register offset in the Register Offset field.
- Key in the desired data, such as 0x1234, in the Result field to write to the device.
- Click the WRITE SMBus DATA button and the data will be written to the device through the SMBus.

■ Read Multiple bytes
- Click the radio button- Access multiple bytes.
- Key in the slave device address in the Slave address field.
- Key in the register offset in the Register Offset field.
- Key in the desired number of bytes, such as 3, in the right side field of radio button- Access multiple bytes. The number must be written in decimal.
- Click the READ SMBus DATA button and then all data from the device will be divided from each other by commas and be shown in the Result field.

■ Write Multiple bytes
- Click the radio button- Access multiple bytes.
- Key in the slave device address in the Slave address field.
- Key in the register offset in the Register Offset field.
- Key in the desired number of bytes, such as 3, in the right side field of the radio button- Access multiple bytes. The number must be written in decimal.
- Key in all the desired data in the Result field in hexadecimal format, divided by commas, for example, 0x50,0x60,0x7A.
- Click the WRITE SMBus DATA button and all of the data will be written to the device through the SMBus.

4.3.4.7 VGA Control

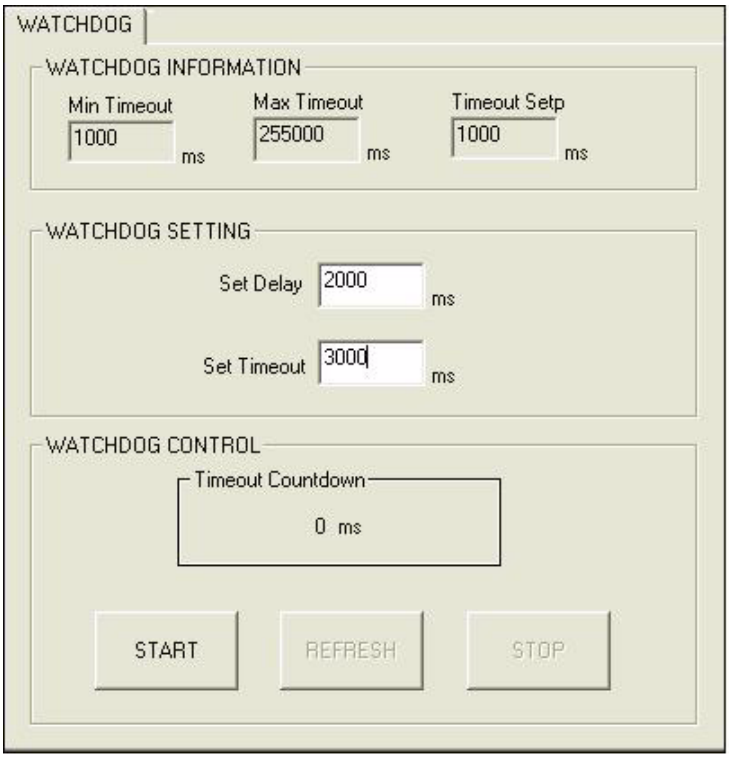


When the application is executed, it will display two blocks of VGA control functions. The application can turn on or turn off the screen shot freely, and it also can tune the brightness of the panels if your platform is being supported. You can test the functionalities of VGA control as follows:

- Screen on/off control
  - Click the radio button ON or push the key F11 to turn on the panel screen.
  - Click the radio button OFF or push the key F12 to turn off the panel screen.
  - The display chip of your platform must be in the support list in Appendix A, or this function cannot work.

- Brightness control
  - Move the slider in increments, using either the mouse or the direction keys, or click the UP button to increase the brightness.
  - Move the slider in decrements, using either the mouse or the direction keys, or click the DOWN button to decrease the brightness.

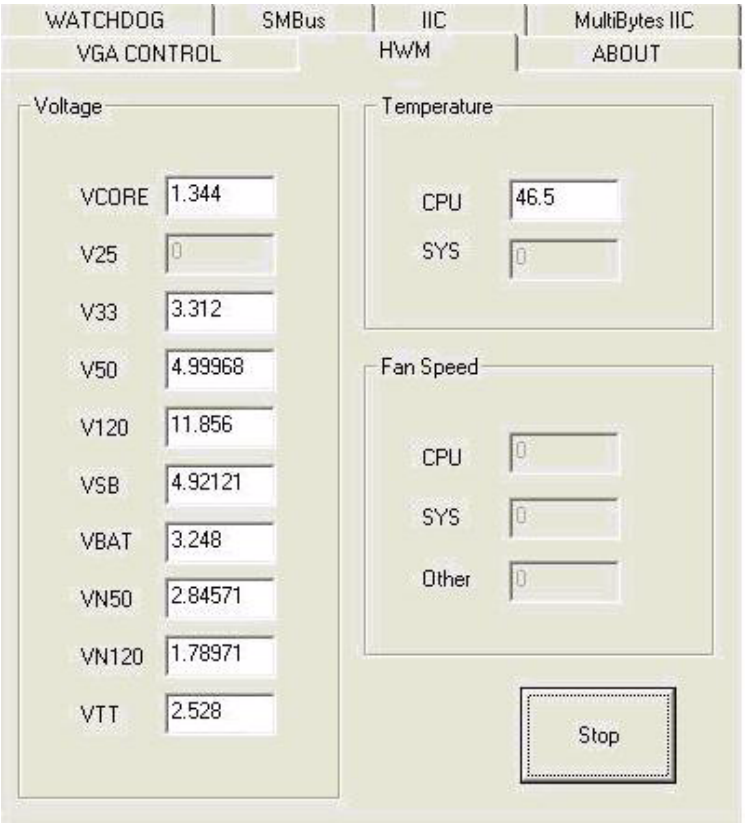
4.3.4.8 Watchdog



When the application is executed, it will display watchdog information in the WATCHDOG INFORMATION group box. It displays max timeout, min timeout, and timeout steps in milliseconds. For example, a 1~255 seconds watchdog will has 255000 max timeout, 1000 min timeout, and 1000 timeout steps. You can test the functionality of the watchdog as follows:

- Set the timeout value 3000 (3 sec.) in the SET TIMEOUT field and set the delay value 2000 (2 sec.) in the SET DELAY field, then click the START button. The Timeout Countdown field will countdown the watchdog timer and display 5000 (5 sec.).
- Before the timer counts down to zero, you can reset the timer by clicking the REFRESH button. After you click this button, the Timeout Countdown field will display the value of the SET TIMEOUT field.
- If you want to stop the watchdog timer, you just click the STOP button.

4.3.4.9 Hardware Monitor

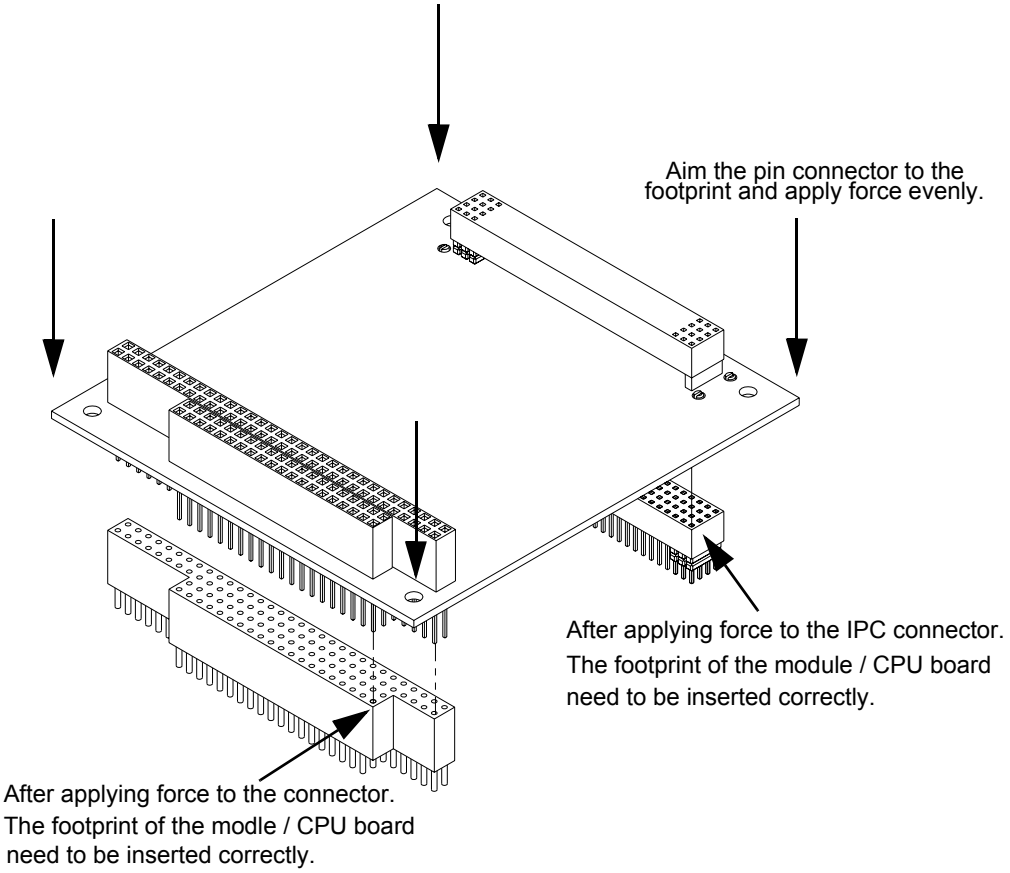


When the Monitor application is executed by clicking the button, hardware monitoring data values will be displayed. If certain data values are not supported by the platform, the correspondent data field will be grayed-out with a value of 0.

Chapter 5

Extension I/O Installation

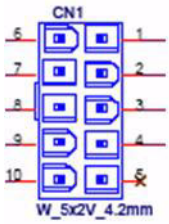
5.1 PC/104 Series Expansion



Appendix A

Pin Assignments

A.1 Power Connector (CN1)



CN1	**Power Connector**		
Part Number	1655000042		
Footprint	ATXCON-2X5-42-1		
Description	WAFER 4.2mm 10P 180D(M) DIP 4200-WS-A1-2*5		
Pin	Pin Name	Signal Type	Signal Level
1	SIO_PSON#	IN	+5 V
2	GND		
3	GND		
4	+12 V	PWR	+12 V
5	NC	PWR	+3.3 V
6	+5 VSB_ATX	PWR	+5 V
7	+5 V	PWR	+5 V
8	+5 V	PWR	+5 V
9	-12 V	PWR	-12 V
10	GND		

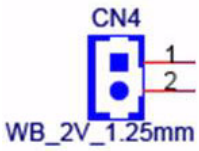
A.2 CPU Socket 479 (CN2)

CN2	**CPU Socket 479**
Part Number	1651600900
Footprint	SOCKET479-A
Description	*ZIF SKT 479P mPGA 3 mm CAM TYPE SMD 0-1674770-7

A.3 DDR2 SO-DIMM (CN3)

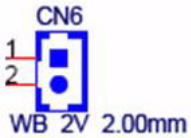
CN3	**DDR2 SO-DIMM**
Part Number	1651000089
Footprint	DDRSODIMM-H92S18
Description	SKT DDR2-SODIMM 200P H=9.2 SMD AS0A426-NASN-7F

A.4 Battery Connector (CN4)



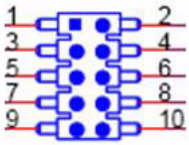
CN4	**BATTERY connector**		
Part Number	1655902032		
Footprint	WHL2V-125		
Description	WAFER 2P 180D (M) 1.25 mm 53047-0210		
Pin	Pin Name	Signal Type	Signal Level
1	+VBAT	PWR	+3.3 V
2	GND	GND	

A.5 ATX Power Button Connector (CN6)



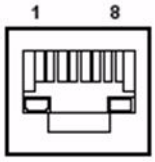
CN6	**ATX Power Switch**		
Part Number	1655302020		
Footprint	WHL2V-2M		
Description	WAFER BOX 2P 180D 2.0 mm MALE W/Lock		
Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	FP_PSIN	IN	+5 V

A.6 GPIO1 (General Purpose Input Output) (CN7)



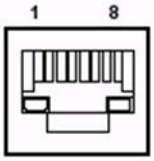
CN7	**GPIO1 connector**		
Part Number	1653000383		
Footprint	JH5X2S-2M-21N22050		
Description	PIN HEADER 5*2P 90D (M) 2.0 MM SMD WO/Pb		
Pin	Pin Name	Signal Type	Signal Level
1	+5 V	PWR	+5 V
2	GPIO4	I/O	+5 V
3	GPIO0	I/O	+5 V
4	GPIO5	I/O	+5 V
5	GPIO1	I/O	+5 V
6	GPIO6	I/O	+5 V
7	GPIO2	I/O	+5 V
8	GPIO7	I/O	+5 V
9	GPIO3	I/O	+5 V
10	GND		

A.7 Ethernet Connector (CN8)



CN8	**LAN1(RJ45+1G Transformer)**		
Part Number	1652000147		
Footprint	RJ45X10-LED-1AX9		
Description	Phone Jack RJ45 14P 90D (F) W/Xfam P26 @ P07-1AM9		
Pin	Pin Name	Signal Type	Signal Level
1	LAN1_TX+	OUT	Analog
2	LAN1_TX-	OUT	Analog
3	LAN1_RX+	OUT	Analog
4	LAN1_MID0+	I/O	Analog
5	LAN1_MID0-	I/O	Analog
6	LAN1_RX-	I/O	Analog
7	LAN1_MID1+	I/O	Analog
8	LAN1_MID1-	I/O	Analog

A.8 Ethernet connector (CN9)

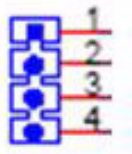


CN9	**LAN2(RJ45+1G Transformer)**		
Part Number	1652000147		
Footprint	RJ45X10-LED-1AX9		
Description	Phone Jack RJ45 14P 90D (F) W/Xfam P26 @ P07-1AM9		
Pin	Pin Name	Signal Type	Signal Level
1	LAN2_TX+	OUT	Analog
2	LAN2_TX-	OUT	Analog
3	LAN2_RX+	OUT	Analog
4	LAN2_MID0+	I/O	Analog
5	LAN2_MID0-	I/O	Analog
6	LAN2_RX-	I/O	Analog
7	LAN2_MID1+	I/O	Analog
8	LAN2_MID1-	I/O	Analog

A.9 Compact Flash (CN11)

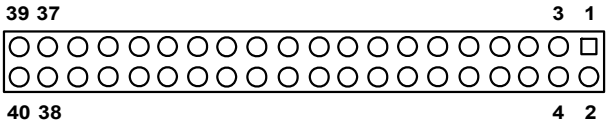
CN11	**Compact Flash connector**
Part Number	1653002086
Footprint	SPEED_N016-0140-104
Description	CF HEADER 50P 90D (M) 1.27 mm SMD Type2 Standoff=2

A.10 HD and Power LED (CN13)



CN13	**HD & Power LED**		
Part Number	1653004101		
Footprint	JH4X1V-2M		
Description	PIN HEADER 4*1P 180D (M) SQUARE 2.0 mm		
Pin	Pin Name	Signal Type	Signal Level
1	+VCC_1	PWR	+5 V
2	GND		
3	+VCC_2	PWR	+5 V
4	HD_LED	OUT	+5 V

A.11 LVDS Connector (CN14)



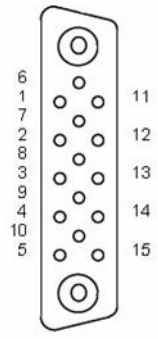
CN14	**Internal LVDS Connector**		
Part Number	1653920200		
Footprint	SPH20X2		
Description	*CONN. 40P 90D 1.25 mm SMD WO/Pb DF13-40DP-1.25V		
Pin	Pin Name	Signal Type	Signal Level
1	+VLVDS_PANEL	PWR	+5 V/+3.3 V
2	+VLVDS_PANEL	PWR	+5 V/+3.3 V
3	GND		
4	GND		
5	+VLVDS_PANEL	PWR	+5 V/+3.3 V
6	+VLVDS_PANEL	PWR	+5 V/+3.3 V
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_D+-	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 _DDC_SC	I/O	+3 V~+5 V
32	LVDS0_DDC_SD	I/O	+3 V~+5 V
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	LVDS

A.12 Inverter Connector (CN15)

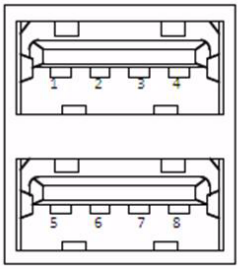
Pin	Signal
1	+12 V
2	GND
3	LVDS0_ENA
4	LVDS0_VBR
5	+5 V

A.13 VGA Connector (CN16)



CN16	**CRT Connector**		
Part Number	1654000055		
Footprint	DBVGA-VF5MS		
Description	D-SUB Conn. 15P 90D (F) DIP 070242FR015S200ZU		
Pin	Pin Name	Signal Type	Signal Level
1	VGA_z_R	OUT	Analog
2	VGA_z_G	OUT	Analog
3	VGA_z_B	OUT	Analog
4	NC		
5	GND	GND	
6	GND	GND	
7	GND	GND	
8	GND	GND	
9	+5 V_b_VGA	PWR	+5 V
10	GND	GND	
11	NC		
12	VGA_y_DDAT	OUT	+5 V
13	VGA_y_HS	OUT	+5 V
14	VGA_y_VS	OUT	+5 V
15	VGA_y_DCLK	OUT	+5 V

A.14 USB Connectors (CN18)

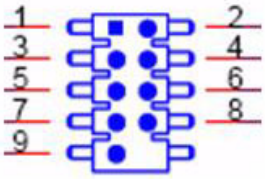


CN18	**USB0/1**		
Part Number	1654908100		
Footprint	USBX2-V		
Description	USB Conn. DUAL port 8P 90D (M) Black PC99		
Pin	Pin Name	Signal Type	Signal Level
1	+5 VDUAL_USB0	PWR	+5 V
2	USB0_z_P-	I/O	
3	USB0_z_P+	I/O	
4	GND		
5	+5 VDUAL_USB0	PWR	+5 V
6	USB1_z_P-	I/O	
7	USB1_z_P+	I/O	
8	GND		
9	GND		
10	GND		
11	GND		
12	GND		

A.15 Keyboard and PS/2 Mouse Connector (CN19)

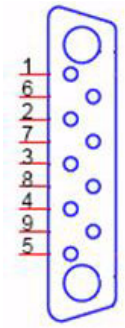
CN19	**KB/MS Connector**		
Part Number	1654003199		
Footprint	CONTEK_MQN3261F1G400		
Description	MINIDIN 6P Short body W/Shielding90D (F) DIP		
Pin	Pin Name	Signal Type	Signal Level
1	KB_z_DAT#	I/O	+5 V
2	MS_z_DAT#	I/O	+5 V
3	GND		
4	+V5DUAL_PS2	PWR	+5 V
5	KB_z_CLK#	I/O	+5 V
6	MS_z_CLK#	I/O	+5 V

A.16 USB Connectors (CN20)



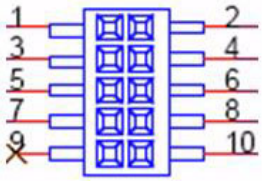
CN20	**USB2/3**		
Part Number	1653005260		
Footprint	HD_5x2P_79_N10		
Description	PIN HEADER 5x2P 180D (M) 2.0 mm SMD IDIOT-PROOF		
Pin	Pin Name	Signal Type	Signal Level
1	+5 VDUAL_USB1	PWR	+5 V
2	+5 VDUAL_USB1	PWR	+5 V
3	USB2_z_P-	I/O	
4	USB3_z_P-	I/O	
5	USB2_z_P+	I/O	
6	USB3_z_P+	I/O	
7	GND		
8	GND		
9	GND		

A.17 COM Port Connector (CN21)



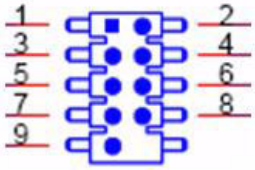
CN21	**COM1**		
Part Number	1654000056		
Footprint	DBCOM-VM5MS		
Description	D-SUB CON. 9P 90D (M) DIP 070241MR009S200ZU SUYIN		
Pin	Pin Name	Signal Type	Signal Level
1	COM0_z_DCD#	IN	+5 V
2	COM0_z_RXD	IN	+5 V
3	COM0_z_TXD	OUT	+5 V
4	COM0_z_DTR#	I/O	+5 V
5	GND		
6	COM0_z_DSR#	IN	+5 V
7	COM0_z_RTS#	I/O	+5 V
8	COM0_z_CTS#	IN	+5 V
9	COM0_z_RI	IN	+5 V

A.18 Audio Interface (CN22)



CN22	**AUDIO connector**		
Part Number	1653205260		
Footprint	BH5x2P-S2.00		
Description	BOX HEADER SMD 5*2 180D (M) 2.0 mm		
Pin	Pin Name	Signal Type	Signal Level
1	LINEOUT_R	Out	Analog
2	LINEIN_R	IN	Analog
3	AGND	GND	
4	AGND	GND	
5	LINEOUT_L	Out	Analog
6	LINEIN_L	IN	Analog
7	AGND	GND	
8	AGND	GND	
9	NC		
10	MIC1_L	IN	Analog

A.19 USB Connectors (CN23)



CN23	**USB2/3**		
Part Number	1653005260		
Footprint	HD_5x2P_79_N10		
Description	PIN HEADER 5x2P 180D (M) 2.0 mm SMD IDIOT-PROOF		
Pin	Pin Name	Signal Type	Signal Level
1	+5 VDUAL_USB1	PWR	+5 V
2	+5 VDUAL_USB1	PWR	+5 V
3	USB4_z_P-	I/O	
4	USB5_z_P-	I/O	
5	USB4_z_P+	I/O	
6	USB5_z_P+	I/O	
7	GND		
8	GND		
9	GND		

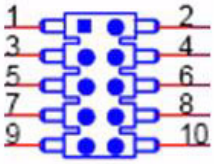
A.20 PCI-104 Connector (CN25)

CN25	**PCI-104 Connector**
Part Number	1653130428
Footprint	PC104-PCI-PLUS
Description	PCB SKT 30*4 180D (F)PC/104+ SOLDER WO/Pb EPT

A.21 RS422/485 Connector (CN26)

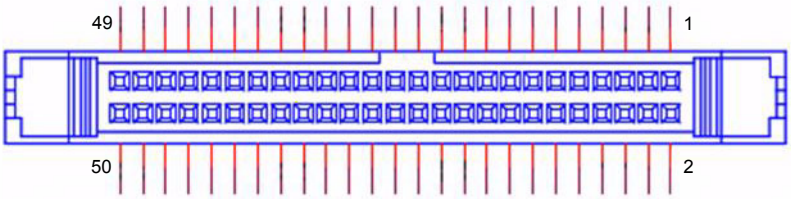
CN26	**RS-422/485 connector**		
Part Number	1653002201		
Footprint	JH2X2V-2M		
Description	PIN HEADER 2*2P 180D (M) SQUARE 2.0 mm		
Pin	Pin Name	Signal Type	Signal Level
1	RS485-422_TXD-	OUT	+5 V
2	RS485-422_TXD+	OUT	+5 V
3	RS422_RXD-	IN	+5 V
4	RS422_RXD+	IN	+5 V

A.22 GPIO2 (General Purpose Input Output) (CN29)



CN29	**GPIO1 connector**		
Part Number	1653000383		
Footprint	JH5X2S-2M-21N22050		
Description	PIN HEADER 5*2P 90D (M) 2.0 MM SMD WO/Pb		
Pin	Pin Name	Signal Type	Signal Level
1	+5 V	PWR	+5 V
2	GPIO12	I/O	+5 V
3	GPIO8	I/O	+5 V
4	GPIO13	I/O	+5 V
5	GPIO9	I/O	+5 V
6	GPIO14	I/O	+5 V
7	GPIO10	I/O	+5 V
8	GPIO15	I/O	+5 V
9	GPIO11	I/O	+5 V
10	GND		

A.23 COM Port Connector (CN30)



CN30	**COM2/3/4 & LPT**		
Part Number	1653001605		
Footprint	BH_25x2P_50_BOX_LOCK		
Description	BOX HEADER 25*2P 180D (M) 1.27 mm SMD CEN LINK		
Pin	Pin Name	Signal Type	Signal Level
1	COM1_DCD#	IN	+5 V
2	COM1_DSR#	IN	+5 V
3	COM1_RXD	IN	+5 V
4	COM1_RTS#	I/O	+5 V
5	COM1_TXD	OUT	+5 V
6	COM1_CTS#	IN	+5 V
7	COM1_DTR#	I/O	+5 V
8	COM1_RI#	IN	+5 V
9	GND		

10	GND		
11	COM2_DCD#	IN	+5 V
12	COM2_DSR#	IN	+5 V
13	COM2_RXD	IN	+5 V
14	COM2_RTS#	I/O	+5 V
15	COM2_TXD	OUT	+5 V
16	COM2_CTS#	IN	+5 V
17	COM2_DTR#	I/O	+5 V
18	COM2_RI#	IN	+5 V
19	GND		
20	GND		
21	COM3_DCD#	IN	+5 V
22	COM3_DSR#	IN	+5 V
23	COM3_RXD	IN	+5 V
24	COM3_RTS#	I/O	+5 V
25	COM3_TXD	OUT	+5 V
26	COM3_CTS#	IN	+5 V
27	COM3_DTR#	I/O	+5 V
28	COM3_RI#	IN	+5 V
29	GND		
30	GND		
31	LPT_z_STB#	OUT	+5 V
32	LPT_z_AFD#	OUT	+5 V
33	LPT_z_PRD0	I/O	+5 V
34	LPT_z_ERR#	IN	+5 V
35	LPT_z_PRD1	I/O	+5 V
36	LPT_z_INIT#	OUT	+5 V
37	LPT_z_PRD2	I/O	+5 V
38	LPT_z_SLIN#	OUT	+5 V
39	LPT_z_PRD3	I/O	+5 V
40	LPT_z_PRD4	I/O	+5 V
41	LPT_z_PRD5	I/O	+5 V
42	LPT_z_PRD6	I/O	+5 V
43	LPT_z_PRD7	I/O	+5 V
44	LPT_ACK#	IN	+5 V
45	LPT_BUSY	IN	+5 V
46	LPT_PE	IN	+5 V
47	LPT_SLCT	I/O	+5 V
48	GND		
49	GND		
50	GND		

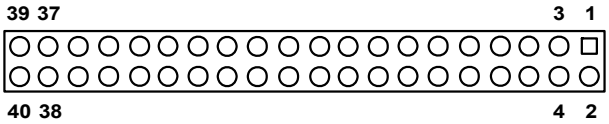
A.24 SATA Connector (CN32)

CN32	**SATA1 connector**		
Part Number	1654003639		
Footprint	SATA_7P_0-1770655-1_D		
Description	Serial ATA Con 7p 180D (M) DIP 1.2 7mm 0-1770655-1		
Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	SATA0_TX+	I/O	Analog
3	SATA0_TX-	I/O	Analog
4	GND	GND	
5	SATA0_RX-	I/O	Analog
6	SATA0_RX+	I/O	Analog
7	GND	GND	

A.25 SATA Connector (CN33)

CN33	**SATA2 connector**		
Part Number	1654003639		
Footprint	SATA_7P_0-1770655-1_D		
Description	Serial ATA Con 7p 180D (M) DIP 1.27 mm 0-1770655-1		
Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	SATA1_TX+	I/O	Analog
3	SATA1_TX-	I/O	Analog
4	GND	GND	
5	SATA1_RX-	I/O	Analog
6	SATA1_RX+	I/O	Analog
7	GND	GND	

A.26 External LVDS Connector (CN34)



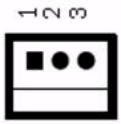
CN34	**External LVDS Connector**		
Part Number	1653920200		
Footprint	SPH20X2		
Description	*CONN. DF13-40DP-1.25 V		
Pin	Pin Name	Signal Type	Signal Level
1	+VLVDS2_PANEL	PWR	+5 V/+3.3 V
2	+VLVDS2_PANEL	PWR	+5 V/+3.3 V
3	GND		
4	GND		
5	+VLVDS2_PANEL	PWR	+5 V/+3.3 V
6	+VLVDS2_PANEL	PWR	+5 V/+3.3 V
7	LVDS2_D0-	OUT	LVDS
8	LVDS3_D0-	OUT	LVDS
9	LVDS2_D0+	OUT	LVDS
10	LVDS3_D0+	OUT	LVDS
11	GND		
12	GND		
13	LVDS2_D1-	OUT	LVDS
14	LVDS3_D1-	OUT	LVDS
15	LVDS2_D+-	OUT	LVDS
16	LVDS3_D1+	OUT	LVDS
17	GND		
18	GND		
19	LVDS2_D2-	OUT	LVDS
20	LVDS3_D2-	OUT	LVDS
21	LVDS2_D2+	OUT	LVDS
22	LVDS3_D2+	OUT	LVDS
23	GND		
24	GND		
25	LVDS2_CLK-	OUT	LVDS
26	LVDS3_CLK-	OUT	LVDS
27	LVDS2_CLK+	OUT	LVDS
28	LVDS3_CLK+	OUT	LVDS
29	GND		
30	GND		
31	LVDS2_SC_DDC	I/O	+3 V ~ +5 V
32	LVDS2_SD_DDC	I/O	+3 V ~ +5 V
33	GND		
34	GND		
35	LVDS2_D3-	OUT	LVDS
36	LVDS3_D3-	OUT	LVDS

37	LVDS2_D3+	OUT	LVDS
38	LVDS3_D3+	OUT	LVDS
39	NC		
40	LVDS2_VCON	OUT	LVDS

A.27 External LCD Backlight (CN35)

CN35	**External LCD Backlight**		
Part Number	1655305020		
Footprint	WHL5V-2M		
Description	WAFER BOX 2.0 mm 5P 180D MALE W/LOCK		
Pin	Pin Name	Signal Type	Signal Level
1	+12 V_LVDS2	PWR	+12 V
2	GND	GND	
3	LVDS2_ENABKL	OUT	+3.3 V
4	LVDS2_VBR	OD	+3.3 V
5	+5 V_LVDS2	PWR	+5 V

A.28 CPU Fan Power Supply Connector (FAN1)



FAN1	**CPU FAN connector**		
Part Number	1655003010		
Footprint	WHP3VA		
Description	Wafer 2.54 mm 3P 180D (M) DIP W/LOCK 22-27-2031		
Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	+12 V_AUS	PWR	+12 V
3	FAN0_DET	OUT	

Appendix B

Prog. GPIO & Watchdog Timer

B.1 Prog. GPIO & Watch dog Timer

```
    ;The SCH3114 Runtime base I/O address is 800h
    ;Setting WatchDog time value location at offset 66h
    ;If set value "0", it is mean disable WatchDog function.
    Superio_GPIO_Port = 800h
    mov   dx,Superio_GPIO_Port + 66h
    mov   al,00h
    out   dx,al

.model small
            .486p
            .stack 256
            .data
            SCH3114_IO   EQU   800h
            .code
            org     100h
 .STARTup
;=====================================================
;47H
;enable WDT function bit [3:2]=11
;=====================================================

            mov   dx,SCH3114_IO + 47h
            mov   al,0ch
            out   dx,al

;=====================================================
;65H
;bit [1:0]=Reserved
;bit [6:2]Reserve=00000
;bit [7] WDT time-out Value Units Select
;Minutes=0 (default) Seconds=1
;=====================================================

            mov   dx,SCH3114_IO + 65h ;
            mov   al,080h
            out   dx,al

;=====================================================
;66H
;WDT timer time-out value
;bit[7:0]=0~255
;=====================================================

            mov   dx,SCH3114_IO + 66h
```

```
            mov   al,01h
            out   dx,al

;=====================================================
;bit[0] status bit R/W
;WD timeout occurred =1
;WD timer counting = 0
;=====================================================

            mov   dx,SCH3114_IO + 68h
            mov   al,01h
            out   dx,al
            .exit
             END
```

Appendix C

2nd RTC

C.1 2nd RTC

A. Configuration:

1. Choose Cofing -> select IO Space
2. Type IO space is 0B00h

B. Read Data from I^2C:

1. Register 04h -> Setting Address 0D1h
2. Register 03h -> Setting 2nd RTC of register, ex: 00h ~ 06h
3. Register 02h -> Write value 48h
4. Register 05h -> Read data form here
5. Register 00h -> Write value 02h

C. Write Data to I^2C:

1. Register 04h -> Setting Address 0D0h
2. Register 03h -> Setting 2nd RTC of register, ex: 00h ~ 06h
3. Register 05h -> Writing user data(Means second, date,year or century)
4. Register 02h -> Write value 48h
5. Register 00h -> Write value 02h

Appendix D

Cables

D.1 Cables Table

Table D.1: Cables			
Cable Part No.	Cable Description	Connector	Terminating Cable
1700002034	3 COM and LPT cable	CN30	FLAT Cable 44P 20 cm 3Com & LPT 1.27 mm to D-sub (Vendor)
1700008894	SATA Cable	CN32, CN33	CABLE SERIAL ATA 7P/7P 180->180 30 cm for PCM-4381
1700002055	ATX Power Cable	CN1	Cable 20P/10P 10 cm EPIC ATX Power
1700060202	Keyboard and PS/2 mouse	CN19	Cable 6pin, 6-pin; 20 cm long: PS/2 KB & Mouse
1700003931	AT Power Cable	CN1	Cable 2*4P/10P EPIC AT POWER 15 cm
1700008902	Audio cable	CN22	Audio Cable IDC-10P 2.0mm 15cm for PCM-4381
1700001267	USB Cable	CN20	CABLE USB*2/10-2.0 mm 29 cm

Trusted ePlatform Services

ADVANTECH

www.advantech.com