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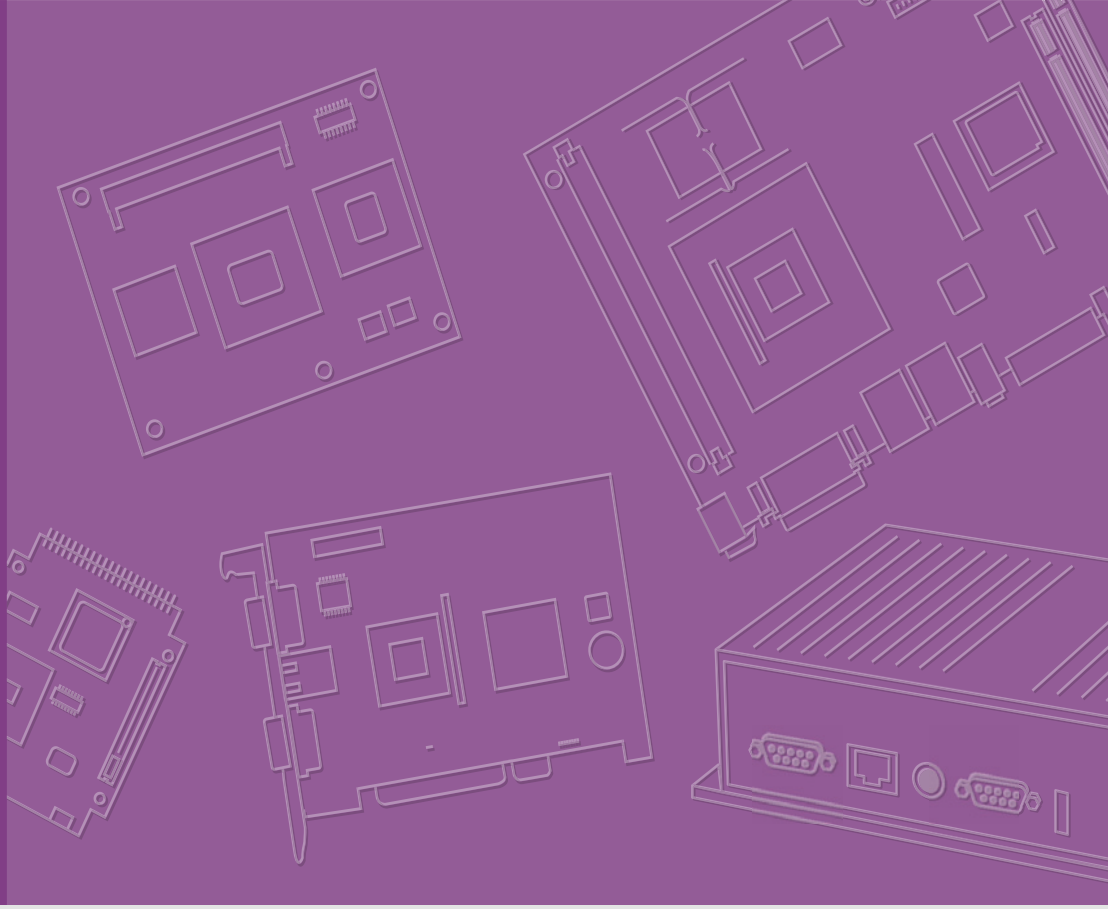

User Manual

PCM-9376

AMD G-Series T16R 3.5" SBC, DDR3 SODIMM, PC/104, 48-bit LVDS, VGA, 18-bit TTL, 2GbE, Mini PCIe, mSATA, LPC, iManager

ADVANTECH

Enabling an Intelligent Planet

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Part No. 2006937610 Edition 1

Printed in China May 2014

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Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandize authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Technical Support and Assistance

1. Visit the Advantech web site at http://support.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

Packing List

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

Item Part Number

- 1 PCM-9376 SBC
- 1 Startup manual
- 1 Pack of mini jumper
- Cables

Part Number	Description
1700019414	COM2 cable 2*5P-2.0/D-SUB, 30cm
1701200220	COM3/4 cable 2*10P-2.0/D-SUB*2, 22cm
1700017863	LAN2 cable 2*5P-2.0/RJ45, 15cm
1700019071	USB cable 2*5P-2.0/USB*2 w/o bracket, 12cm
1700008941	SATA cable 7P/7P w/ lock, 32cm
1700018785	5V/12V SATA Power cable 4P-2.5/SATA 15P, 35cm
1703100152	Audio cable 2*5P-2.0/Jack*3, 20cm
1700060202	PS/2 cable M-DIN 6P/M-DIN 6P*2, 20cm

- Thermal solution:

Part Number	Description
1960060631T001	Heatsink 134 x 6.9 x 19.5 mm

Ordering Information

Model P/N	Memory	LVDS	TTL	Operating Temp
PCM-9376E-M0A1E	SODIMM	48-bit	-	0 ~ 60° C
PCM-9376F-M0A1E	SODIMM	-	18-bit	0 ~ 60° C
PCM-9376EZ-M0A1E	SODIMM	48-bit	-	-20 ~ 80° C
PCM-9376EZ2-M0A1E	SODIMM	48-bit	-	-40 ~ 85 ° C

Optional Accessories

P/N	Description
1703200201	ATX Power cable, 20 cm
1700018259	5V SATA Power cable 2P-2.0/SATA 15P, 20 cm
TBC	Heat spreader
PCA-COM232-00A1E	4 RS-232 LPC extension module, 31.5 x 48 mm
PCA-COM485-00A1E	4 RS-422/485 LPC extension module, 31.5 x 48 mm
PCA-TPM-00A1E	LPC extension TPM module, 31.5 x 48 mm

Certification and Safety Instructions

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.*

Contents

Chapter 1

General Introduction

This chapter gives background information on the PCM-9376.

Sections include:

- Introduction
- Product Features
- Specifications

1.1 Introduction

AMD G-Series T16R single core 615 MHz processor. The PCM-9376 can support DDR3 SODIMM up to 4 GB or 1 GB SDRAM on-board, PC/104, Mini PCIe and LPC (Low Pin Count) expansion, VGA, 48-bit LVDS, 18-bit TTL, 2 GbE, 2 SATAII, mSATA, 2 RS-232/422/485, 2 RS-232, 4 USB2.0, SMBus, I^2C, 8-bit GPIO, PS/2. 5V AT/ATX supported.

1.2 Specifications

1.2.1 Functional Specifications

APU: AMD G-Series T16R

- Single core 615 MHz
- Supports sleep states including S0, S3, S4 and S5 (but USB ports are not supported S3)
- AMD64 64-bit ISA

System Memory Support

- SODIMM: Up to DDRIII 1066 MHz
- SDRAM on-board: 1 GB DDRIII 800MHz (Supported by T-P/N)

Graphic/Display

- **Discrete Class Graphics:** AMD Radeon™ HD 6250
- **GPU Core Frequency:** 276MHz
- 384MB Video RAM shared with system memory
- **2D Acceleration:** Highly-optimized 128-bit engine
- **3D Acceleration:**
  - Full DirectX® 11 support, including full speed 32-bit floating point per component operations
  - Shader Model 5
  - OpenCL™ 1.1 support
  - OpenGL 4.0 support
- **Motion Video Acceleration:**
  - Dedicated hardware (UVD 3) for H.264, VC-1 and MPEG2 decode
  - HD HQV and SD HQV support
- Support Extend and Clone mode under dual display
- Display interfaces: VGA, LVDS and TTL (Dual display supported for any two combination)
  - VGA: analog RGB display output up to resolution 1920x1200 at 85Hz
  - LVDS: 48-bit LVDS up to 1920x1200 at 60Hz (PCM-9376E)
  - TTL: 18-bit TTL up to 1024x600 at 60Hz (PCM-9376F)

Gigabit Ethernet

- **Controller:** Realtek RTL8111E-VL-CG
- 10/100/1000 Mb/s Ethernet, supporting wake on LAN
- Support Jumbo Frame to 9K bytes
- Supports IEEE 802.3, IEEE 802.3u, IEEE 802.ab

Peripheral Interface

- **PC/104 expansion:** Fully ISA supported. If user needs booting/power from PC/104, supported by T-P/N)
- **LPC connector:**
  - Controller: ITE 8760E
  - LPC module: PCA-COM232-00A1E (4 RS-232 ports), PCA-COM485-00A1E (4 RS-422/485 ports), and PCA-TPM-00A1E.
  - Not support 5 Vsb
- 2 Serial-ATA ports, up to 3.0Gb/s (300 MB/s)
- 1 full-size mSATA slot, with USB interface (PCIe interface supported by T-P/N)
- 1 half-size Mini PCIe slot, with PCIe and USB interface
- 4 USB 2.0 compliant ports
- 2 RS-232 from COM3/4, 2 RS-232/422/485 from COM1/2 (ESD protection: air gap ±15 kV, contact ±8 kV), support RS-485 auto flow control
- SMBus or I^2C (auto detection by iManager)
- Support standard PC/AT keyboard and PS/2 mouse
- 8-bit programmable GPIO (General Purpose Input/Output) with 5V tolerance
- 1 Reset button
- **Watchdog timer:** 255 levels timer interval, programmable by software, multi-level WDT (set by iManager)
- **Audio:** Realtek ALC892, High Definition Audio, Line-in, Line-out, Mic-in

BIOS

- AMI 32 Mbit SPI Flash ROM

OS Support

PCM-9376 supports Win7, WinXP, WinCE 6.0, WEC7, WES7, XPE and Linux Ubuntu 12.04.

For further information about OS support, please visit Advantech website: www.advantech.com or contact with technical support center.

iManager

- **Power Sequence:** Control by iManager
- **Power Saving:**
  - Deep sleep mode
  - Backlight control
  - Brightness control
- **Hardware Monitor:**
  - Battery voltage
  - Read CPU temperature
  - 5 V, 12 V, Vcore
- **Multi-control Interface:** GPIO, SMBus or I^2C
- **Watchdog Timer:** Output system reset, programmable counter from 1-255 min/sec (set by iManager)
- **Board Information:**
  - Running hour
  - Booting record
- **Security data area:** 64 bytes on EEPROM for customer saving sensitive data

1.2.2 Mechanical Specifications

- **Dimensions:** 146 x 102 mm (5.7" x 4")
- **Height:**
  - Total: 23.9 mm
  - Top side: 15.5 mm (PCB top to heatsink)
  - Bottom side: 6.8 mm (PCB bottom to Mini PCIe slot)
- **Reference Weight:** 500 g (including whole package)

1.2.3 Electrical Specifications

- **Power supply type:** AT / ATX
- **Power management:** ACPI
- **Power requirement:** +5 V ± 5% (+12 V optional for PC/104 add-on module and LCD inverter)
  - AT: +5 V ± 5%
  - ATX: +5 V ± 5%, +5 Vsb
- **RTC battery:**
  - Typical voltage: 3.0 V
  - Normal discharge capacity: 210 mAh

1.3 Environmental Specifications

- **Operating temperature:** 0 ~ 60° C (32 ~ 140° F)
- **Operating humidity:** 40° C @ 95% RH Non-condensing
- **Storage temperature:** -40 ~ 85° C (-40 ~ 185° F)
- **Storage humidity:** 60° C @ 95% RH Non-condensing

1.4 Block Diagram

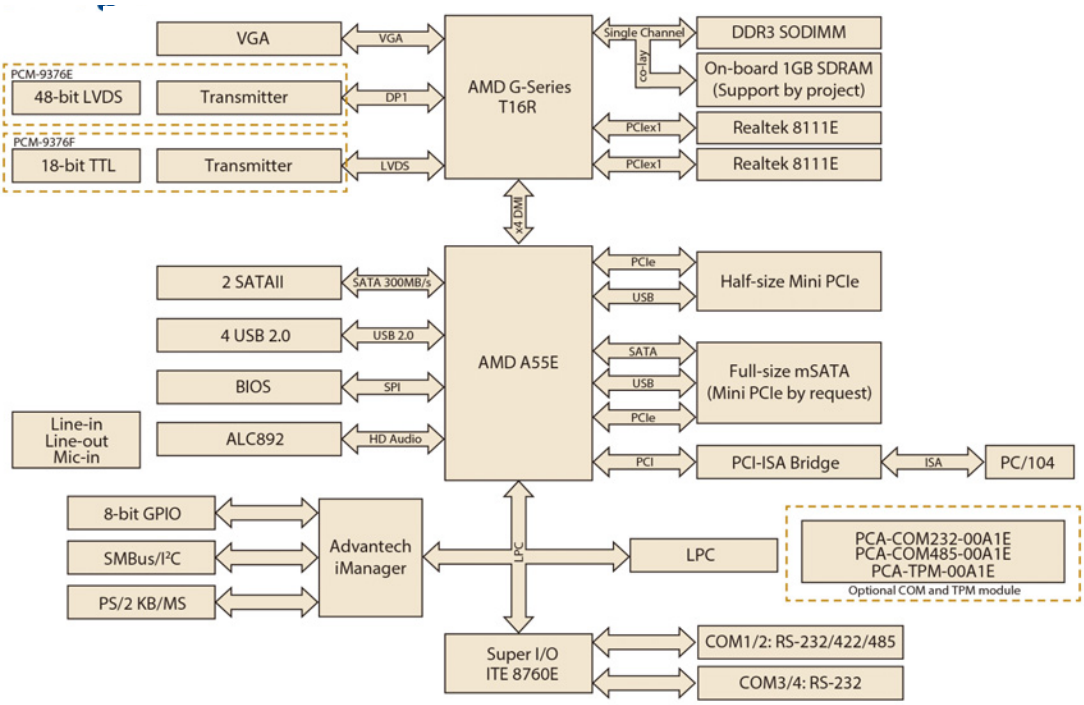


Figure 1.1 Block Diagram

Chapter 2

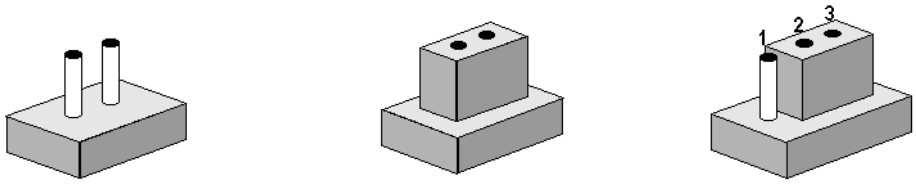
H/W Installation

This chapter explains the setup procedures of the PCM-9376 hardware, including instructions on setting jumpers and connecting peripherals, as well as switches, indicators and mechanical drawings. Be sure to read all safety precautions before you begin the installation procedure.

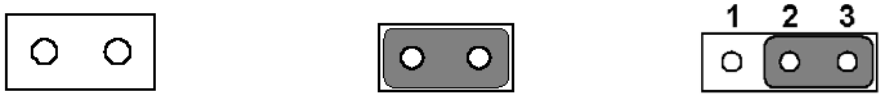
2.1 Jumpers

2.1.1 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.

Generally, you simply need a standard cable to make most connections.

Warning! *To avoid damaging the computer, always turn off the power supply before setting jumpers.*

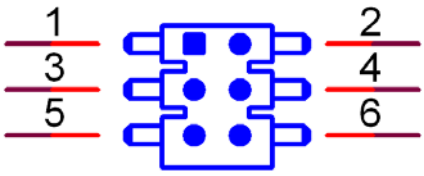
2.1.2 Jumper List

Table 2.1: Jumper List	
J1	AT/ATX power supply
J2	LCD Power
J3	Clear CMOS

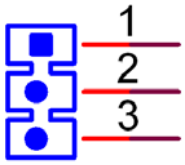
2.1.3 Jumper Settings

J1	AT/ATX power supply
Part Number	1653002101
Footprint	HD_2x1P_79_D
Description	PIN HEADER 2*1P 180D(M)SQUARE 2.0mm DIP W/O Pb
Setting	Function
NC	ATX
(1-2)*	AT
*: default	

J2	LCD Power
Part Number	1653003201
Footprint	HD_3x2P_79_D
Description	PIN HEADER 3x2P 2.0mm 180D(M) SMD 21N22050
Setting	Function
(1-3)*	+3.3 V
(3-5)	+5 V
(3-4)	+12 V
*: default	



J3	Clear CMOS
Part Number	1653003101
Footprint	HD_3x1P_79_D
Description	PIN HEADER 3x1P 2.0mm 180D(M) DIP 2000-13 WS
Setting	Function
(1-2)*	* Normal
(2-3)	Clear COMS
*: default	



2.2 Connectors

2.2.1 Connector List

Table 2.2: Connector List	
CN2	PC/104 -5/-12V power input
CN5	SATA
CN6	2 x Internal USB
CN7	2 x Internal USB
CN8	Internal COM3/4: RS-232
CN9	Internal COM2: RS-232/422/485
CN10	GPIO
CN11	Audio
CN12	Power input
CN13	SATA
CN14	ATX standby power input
CN15	SMBus / I^2C
CN16	PC/104
CN17	TTL
CN18	Inverter power
CN19	SATA power (5V/12V)
CN20	SATA power (5V)
CN21	Internal GbE
CN22	LVDS
CN23	External GbE
CN24	PS/2
CN25	Power Switch
CN26	External COM1: RS-232/422/485
CN27	VGA
CN28	Half-size Mini-PCIe
CN29	LPC
CN30	Full-size mSATA
CN31	DDR3 SODIMM

2.2.2 Connector Settings

2.2.2.1 RTC Battery Connector (BH1)

Removing battery will clear CMOS.

2.2.2.2 PC/104 -5/-12 V Power Input (CN2)

Supplies main power +5 V to PCM-9376 via 6 x 2-pin connector, and to devices that require +12 V. AT power cable is included in standard packing, but ATX power cable (P/N: 1703200201) is an optional accessory requiring additional order.

2.2.2.3 SATA (CN5/13)

PCM-9376 features two high performance Serial ATA interface (up to 300 MB/s) via standard SATA 7-pin connectors.

2.2.2.4 2 x Internal USB (CN6/7)

PCM-9376 provides four USB (Universal Serial Bus) 2.0 ports Plug and Play via 5 x 2-pin header connectors which provide 1 A power for each port. The USB interface complies with high speed USB specification Rev. 2.0 which supports 480 Mbps transfer rate, and are fuse protected.

Note! *Due to 5 V power connector type's limitation, USB ports don't support ACPI and S3 wake-up.*

2.2.2.5 Serial Ports (CN8/9/26)

PCM-9376 provides four serial ports: two RS-232 ports (COM3/4) and two RS-232/422/485 (COM1/2). It provides connections for serial devices or communication network.

- COM1: RS-232/422/485 (CN26)
  Connector: standard 9-pin D-SUB at coastline, selecting by BIOS settings.
- COM2: RS-232/422/485 (CN9)
  Connector: 5x2-pin box header, selecting by BIOS settings.
- COM3/4: RS-232 (CN8)
  Connector: 10 x 2-pin box header

2.2.2.6 GPIO (CN10)

PCM-9376 supports 8-bit GPIO (5 V tolerance) through this 5x2-pin box header connector, controlled by iManager.

The 8 digital inputs and outputs can be programmed to read or control devices, with each input or output defined.

2.2.2.7 Audio (CN11)

High Definition audio with Realtek ALC892 codec via 5x2-pin box header connector, supporting line-in/ line-out/ mic-in output.

2.2.2.8 Power Input (CN12)

Supplies main power +5 V to PCM-9376 via 1x4-pin connector, and to devices that require +12 V.

AT power cable is included in standard packing, but ATX power cable (P/N: 1703200201) is an optional accessory requiring additional order.

2.2.2.9 ATX Standby Power Input (CN14)

The 3-pin wafer box connector provides PS on, can be used by ATX power cable (P/N: 1703200201)

2.2.2.10 SMBus / I^2C (CN15)

PCM-9376 provides 4-pin wafer connector with 5 V@ 0.3 A power for customer connecting to SMBus or I^2C protocol embedded device (auto detection by iManager). Advantech also provides SMBus API allowing developer to interface with an embedded system environment and transfer serial messages using the SMBus protocols, allowing multiple simultaneous device control.

2.2.2.11 PC/104 (CN16)

Standard 104-pin PC/104 short pin connector which provides 1 A power for 8/16-bit ISA. If user needs to boot up from PC/104 or with long pin PC/104, that can be supported by T-P/N.

2.2.2.12 TTL (CN17)

The TTL interface is a 20 x 2-pin board-to-board connector which provides 1A power for 18-bit TTL panel.

2.2.2.13 Inverter Power (CN18)

LCD inverter is connected to this 5-pin box wafer connector to provide +5 V @ 1 A / +12 V @ 0.5 A power.

2.2.2.14 SATA Power: 5/12 V (CN19)

4-pin wafer box connector is provided 5V@1A / 12V@0.5A power, corresponding cable P/N is 1700018785.

2.2.2.15 SATA Power: 5 V (CN20)

Another 5V SATA power is provided 1 A via 2-pin wafer box, optional cable (P/N: 1700018259) can be ordered additionally.

2.2.2.16 GbE (CN21/23)

- **Connector:** GbE1 at coastline, GbE2 is 5x2-pin box header
- **Controller:** Realtek 8111E-VL-CG

2.2.2.17 LVDS (CN22)

The LVDS interface is a 20 x 2-pin board-to-board connector for 48-bit LVDS panel up to 1920 x 1200 at 60 Hz which provides 3.3/5/12V with 1A power.

2.2.2.18 PS/2 (CN24)

PCM-9376 provides a standard mini din 6-pin connector that supports both keyboard and PS/2 interface mouse.

2.2.2.19 ATX Power Button (CN25)

2-pin box wafer connector for power switch.

2.2.2.20 VGA (CN27)

The VGA interface is a standard 15-pin D-SUB connector as coastline for conventional CRT display.

Resolution: 1920 x 1200 at 85Hz

2.2.2.21 Half-size Mini-PCIe (CN28)

Half-size Mini-PCIe is with PCIe and USB signal interface which provides 3.3 V @ 0.75 A / 3.3 Vsb @ 0.25 A / 1.5 V @ 0.375 A.

2.2.2.22 LPC (CN29)

Advantech provides three LPC modules to choose: PCA-COM232-00A1E, PCACOM485-00A1E and PCA-TPM-00A1E (standard BIOS can support already).

If using other LPC module, BIOS modification is needed.

Connector: 7x2-pin female header

2.2.2.23 Full-size mSATA (CN30)

Full-size mSATA slot is with SATA and USB interface which provides 3.3 V @ 0.75 A / 1.5 V @ 0.375 A, can support PCIe interface by T-P/N.

2.2.2.24 DDR3 SODIMM (CN31)

One 204-pin DDR3 SODIMM socket supports DDRIII 1066 MHz up to 4 GB.

2.2.2.25 Reset Button

Momentarily pressing the button will activate a reset.

2.3 Mechanical

2.3.1 Jumper and Connector Locations

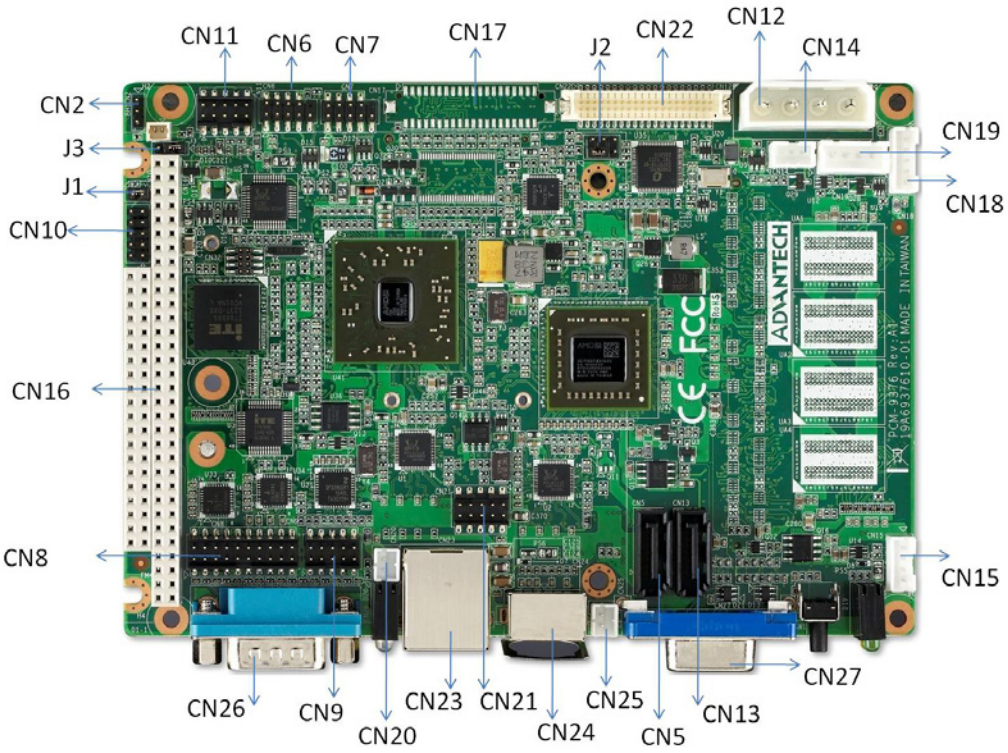


Figure 2.1 Jumper and Connector Layout (Top Side)

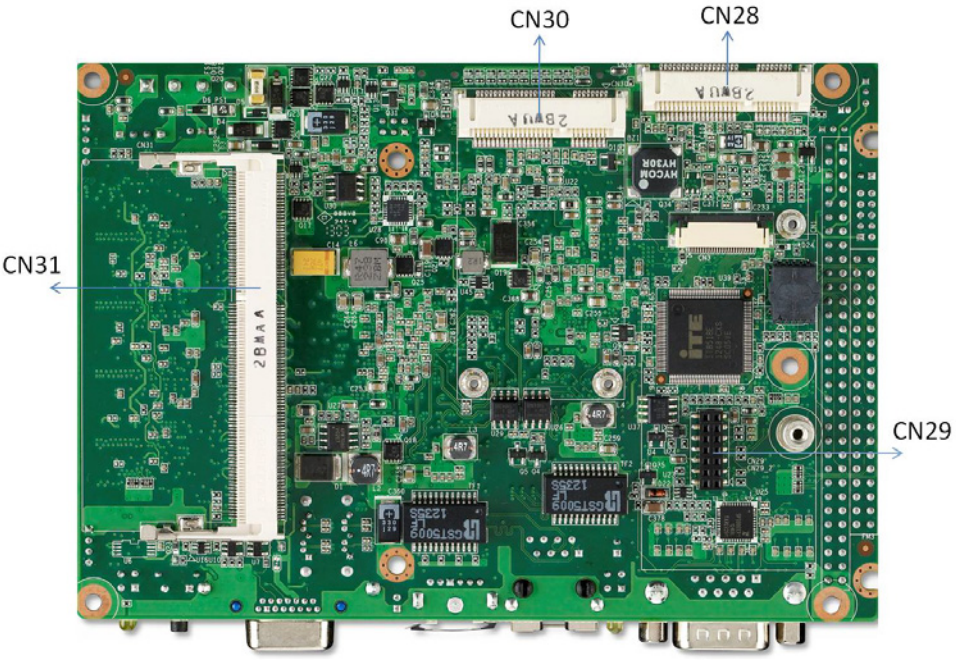


Figure 2.2 Jumper and Connector Layout (Bottom Side)

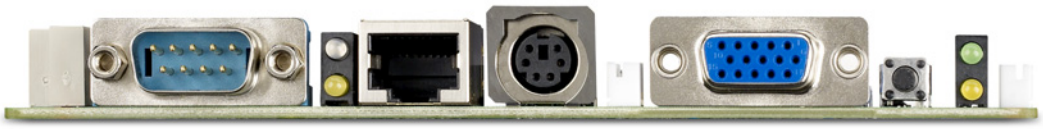


Figure 2.3 Coastline Layout

2.3.2 Board Dimensions

2.3.2.1 CPU Board Drawing

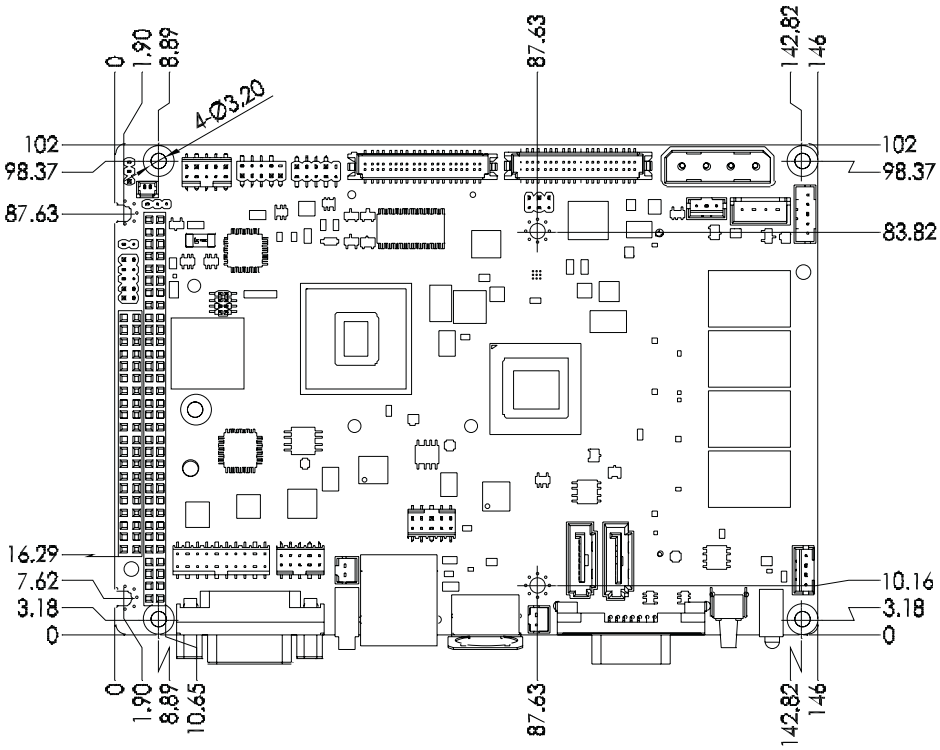


Figure 2.4 Board Dimension Layout (Top Side)

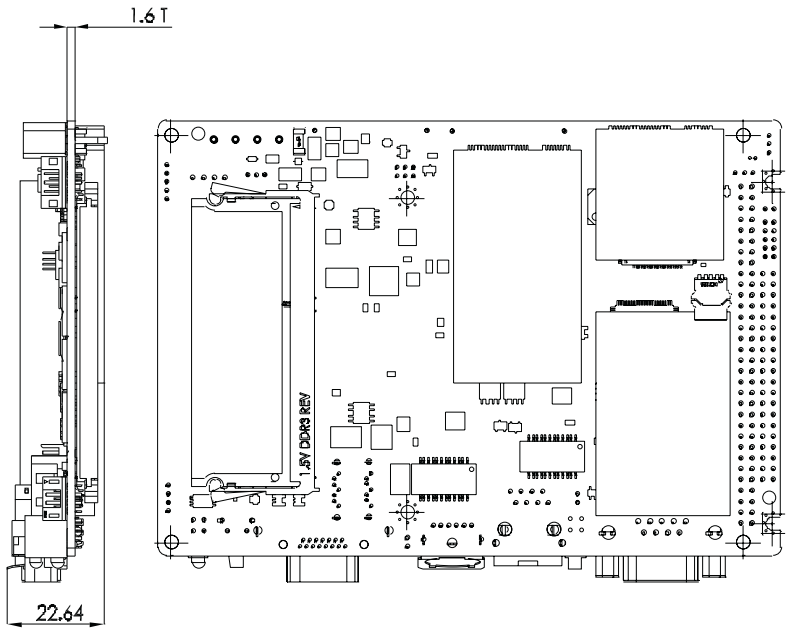


Figure 2.5 Board Dimension Layout (Bottom Side)

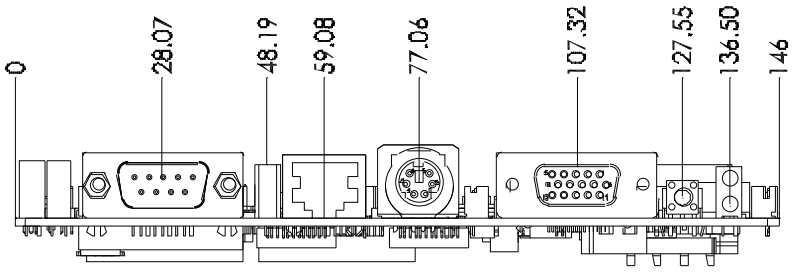


Figure 2.6 Board Dimension Layout (Coastline)

Chapter 3

BIOS Settings