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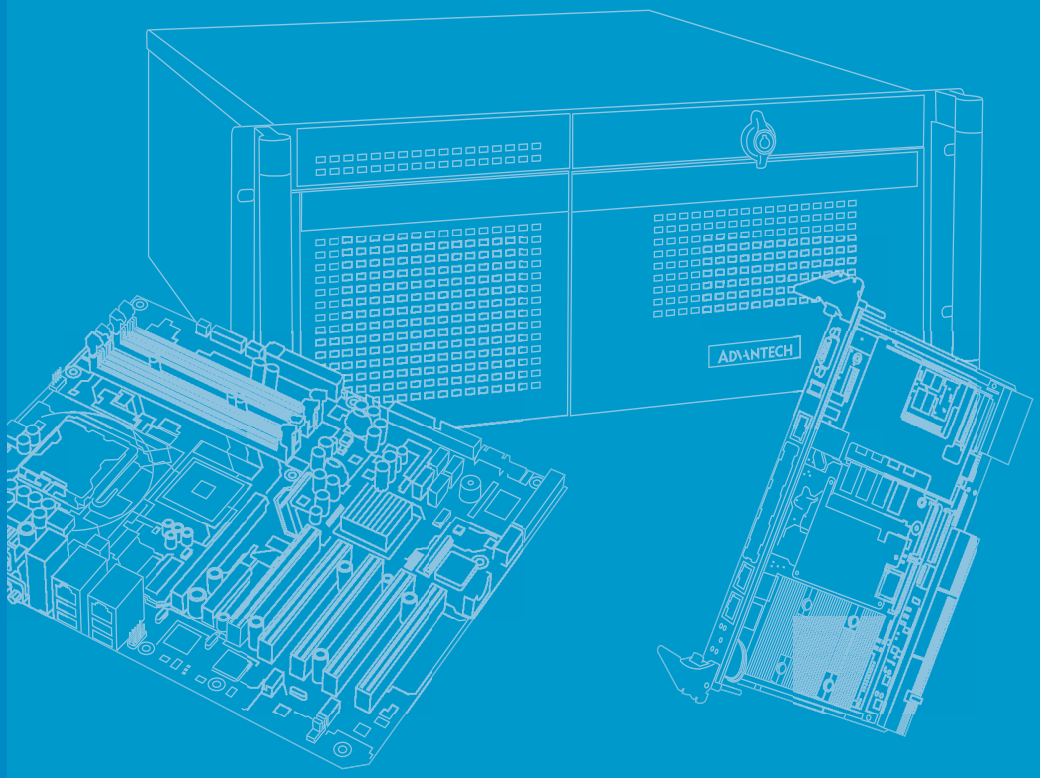

User Manual

PCE-5026

LGA1155
Intel® Core™ i7/i5/i3/Pentium®
PICMG 1.3 System Host Board
with DDR3 / SATA2.0 / USB2.0 /
Single GbE LAN

ADVANTECH

Enabling an Intelligent Planet

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Product Warranty (2 years)

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 merchandise 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.

Part No. 2006502610 Edition 1

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Declaration of Conformity

FCC Class A

Note: 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 equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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.*

A Message to the Customer

Advantech Customer Services

Each and every Advantech product is built to the most exacting specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your new Advantech equipment is destined for the laboratory or the factory floor, you can be assured that your product will provide the reliability and ease of operation for which the name Advantech has come to be known.

Your satisfaction is our primary concern. Here is a guide to Advantech's customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

Technical Support

We want you to get the maximum performance from your products. So if you run into technical difficulties, we are here to help. For the most frequently asked questions, you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone.

So please consult this manual first. If you still cannot find the answer, gather all the information or questions that apply to your problem, and with the product close at hand, call your dealer. Our dealers are well trained and ready to give you the support you need to get the most from your Advantech products. In fact, most problems reported are minor and are able to be easily solved over the phone.

In addition, free technical support is available from Advantech engineers every business day. We are always ready to give advice on application requirements or specific information on the installation and operation of any of our products.

Memory Compatibility

PCE-5026 Compatible Memory

Brand	Capacity	Speed	Type	ECC	Vendor PN	Memory	Advantech PN
Transcend	1GB	1066	DDR3	N	TS128MLK64V1U	SEC K4B1G0846G-BCH9	96D3-1G1066NN-TR
	2GB	1066	DDR3	N	TS256MLK64V1U	SEC K4B1G0846G-BCH9	96D3-2G1066NN-TR
	1GB	1333	DDR3	N	TS128MLK64V3U	ELPIDA EDJ1108BFBG-DJ-F	96D3-1G1333NN-TR
	2GB	1333	DDR3	N	TS256MLK64V3U	SEC K4B1G0846G-BCH9	96D3-2G1333NN-TR4
	4GB	1600	DDR3	N	TS512MLK64V6N	MICRON IUM22 D9PFJ	N/A
	2GB	1600	DDR3	N	TS256MLK64V6N	MICRON IRM72 D9PFJ	N/A
	8GB	1600	DDR3	N	TS1GLK64V6H	Micron IZD27 D9PBC 512x8	N/A
Apacer	1GB	1066	DDR3	N	78.01GC3.420	ELPIDA J1108BDBG-DJ-F (128x8)	96D3-1G1066NN-AP
	2GB	1066	DDR3	N	78.A1GC3.421	ELPIDA J1108BDBG-DJ-F (128x8)	96D3-2G1066NN-AP
	4GB	1066	DDR3	N	78.B1GDJ.AF1	HYNIX H5TQ2G83BFR-H9C	N/A
	1GB	1333 1333	DDR3	N	78.01GC6.AF0	H5TQ1G83DFR-H9C H5TQ1G83TFR-H9C	96D3-1G1333NN-AP1
	2GB	1333	DDR3	N	78.A1GDE.4200C	ELPIDA J2108BCSE-DJ-F	96D3-2G1333NN-AP2
	2GB	1333	DDR3	N	78.A1GDE.AF00C	Hynix H5TQ2G838FR(256x8)	96D3-2G1333NN-AP1
	4GB	1333	DDR3	N	78.B1GDE.AF1	HYNIX H5TQ2G83BFR-H9C	96D3-4G1333NN-AP
	8GB	1333	DDR3	N	78.C1GEP.4210C	ELPIDA J4208BASE-DJ-F 512x8	96D3-8G1333NN-AP
	8GB	1600	DDR3	N	78.C1GET.ATF0C	Micron 2FD27 D9PCP (512x8)	96D3-8G1600NN-APL
Kingston	4GB	1333	DDR3	N	KVR1333D3N9/4G	KINGSTON D2568JENCPGD9U(512x64)	N/A
DSL	2GB	1600	DDR3	N	D3US56081XH12AA	SEC 113 HCK0 K4B2G0846C 256x8	N/A
	4GB	1600	DDR3	N	D3US56082XH12AA	SEC 113 HCK0 K4B2G0846C 256x8	N/A
ATP	8GB	1600	DDR3	N	XQ16B8N8GS-9-AV	SEC K4B4G0846B (512x8)	N/A

Specification Comparison

Part Number	PCH	Memory	Backplane	LAN	VGA	DVI-D	COM	SATA 2.0	USB 2.0	Raid	iAMT
PCE-5026VG-00A1E	H61	Non-ECC	PCE-5BXX	1	Yes	Optional	2	4	10	N/A	N/A

Processor Support

PN / Processor	PCE-5026VG-00A1E
Core i7-3770	Yes
Core i7-2600	Yes
Core i5-3550S	Yes
Core i5-2400	Yes
Core i3-3220	Yes
Core i3-2120	Yes
Pentium G2120	Yes
Pentium G850	Yes
Celeron G540	Yes

Backplane Support Matrix Table

Backplane / Model	PCE-5XXX	PCE-7XXX
PCE-5026VG-00A1E	Yes	-

Note!

If PCE-5026 is used on different backplanes which have different PCIe configurations the message below will be displayed the first time the unit is powered on. The user has to turn off AC power and then turn it back on for PCIe re-configuration.

Caution!

PCIe configuration error! Please turn off AC power before re-configuration.

Initial Inspection

Before you begin installing your motherboard, please make sure that the following materials have been shipped:

- 1 PCE-5026 PICMG 1.3 System Host Board
- 1 PCE-5026 startup manual
- 1 CD with utility
- 2 Serial ATA HDD data cable P/N: 1700003194
- 2 Serial ATA HDD power cable P/N: 1703150102
- 1 COM + printer ports cable kit P/N: 1701260305
- 1 4-port USB cable kit P/N: 1700008461
- Keyboard and mouse Y cable P/N: 1700060202
- 1 jumper package P/N: 9689000068
- 1 warranty card

If any of these items are missing or damaged, contact your distributor or sales representative immediately. We have carefully inspected the PCE-5026 mechanically and electrically before shipment. It should be free of marks and scratches and in perfect working order upon receipt. As you unpack the PCE-5026, check it for signs of shipping damage. (For example, damaged box, scratches, dents, etc.) If it is damaged or it fails to meet the specifications, notify our service department or your local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier. After inspection, we will make arrangements to repair or replace the unit.

Contents

Chapter 1

Hardware Configuration

1.1 Introduction

PCE-5026, id a PICMG 1.3 full size form-factor system host board, designed with an Intel® H61 PCH for industrial applications needing high computing power and strong I/O capability. PCE-5026 features either Intel® 22nm or 32nm manufacturing technology processors: Intel® Core™ i7/i5/i3 and Pentium® LGA1155. It comes with integrated memory and graphic controllers, supporting DDR3 1066/1333/1600* DRAM up to 16 GB (8GB per DIMM). Within advanced silicon technology, PCE-5026 is suitable for power hungry industrial computing applications.

PCE-5026 has excellent 3D graphics processing capability and provides strong 2D transcoding power with an embedded Intel® HD Graphics processor. With the embedded graphics controller, there is no additional cost for discrete graphics cards. Moreover, it also reduces system power consumption and thermal output.

PCE-5026 also has rich I/O interfaces and supports Advantech PCE-5BXX backplanes to offer various expansions such as PCI, PCI-X and PCIe interfaces. PCE-5026 provides four SATA 2.0, ten USB 2.0 and two RS-232 ports for general industrial applications. With flexible I/O interfaces and powerful graphics capability, PCE-5026 is an excellent, cost effective graphics or I/O oriented hardware platform. Accompanied by outstanding performance and exceptional features, PCE-5026 is the ideal computing solution for most industrial applications.

Note! *PCE-5026 supports PCE-5Bxx series backplane.*

1.2 Features & Benefits

Features	Benefits
PCE-5026 supports Intel 3rd and 2nd generation processors	Intel's 3rd and 2nd generation Core i7/i5/i3/Pentium processor with quad/dual-core computing power brings quantum-leap performance improvements.
PCE-5026 supports DDR3 1066/1333/1600* SDRAM up to 16GB (8GB per DIMM). *DDR3 1600 is supported by Intel Generation 3 CPU.	To provide higher memory data transmitting and processing efficiency, bringing higher system performance.
PCE-5026 provides one PCIe x16 to backplane.	PCE-5026 supports up to 19 PCE-5BXX series backplanes.
Fully supports Advantech SUSI APIs and Utilities.	To reduce customer S/W development effort with more reliable S/W quality, also provides value-added utilities such as system monitor and Embedded Security ID.
Internal USB type A connector	PCE-5026 supports 2 USB 2.0 type A connectors for USB key lock or dongles to enhance system security.

1.3 Specifications

1.3.1 System

- **CPU:** LGA1155-socket Core i7/i5/i3 and Pentium processors
- **L2 Cache:** Please refer to CPU specifications for detailed information.
- **BIOS:** AMI SPI BIOS (64 Mb SPI)
- **System Chipset:** Intel H61
- **SATA hard disk drive interface:** Four SATA 2.0(300MB/s) ports, can be enabled or disabled in BIOS menu.

Note! *PCE-5026 does NOT support PATA(IDE) interface.*

1.3.2 Memory

- **RAM:**
  - PCE-5026: Up to 16 GB (8GB per DIMM) in two 240-pin DIMM sockets. Supports dual-channel DDR3 1066/1333/1600* MHz SDRAM WITHOUT ECC function.

Note! *Wrong memory configuration may cause no boot or system instability problems.*

Only Intel generation 3 CPU can support up to DDR3 1600.

1.3.3 Input/Output

- **Backplane Support:**
  Backplane Support Matrix Table:

Model	Backplane
PCE-5026VG-00A1E	PCE-5BXX

- **PCI bus:** Four PCI masters to the backplane, 32-bit, 33 MHz PCI 2.2 compliant.
- **Enhanced parallel port:** This EPP/SPP/ECP port can be configured for LPT1, LPT2, LPT3 or disabled. A standard DB-25 female is connector provided.
- **Serial ports:** Two RS-232 serial ports
- **PS/2 keyboard and mouse connector:** One 6-pin mini-DIN connector is located on the mounting bracket for easy connection to a PS/2 keyboard and mouse via the Y-cable included in the package.
- **USB port:** Supports 10 USB 2.0 ports with transfer rate of up to 480 Mbps. (6 ports are on the CPU card and 4 ports are on the backplane)

1.3.4 Graphics

- **Controller:** Intel® HD Graphics controller is embedded in Intel processor.
- **Display memory:** Shared memory is subject to operating system (Please install 2 GB or above memory for basic system configuration).
- **CRT:** Up to 2048 x 1536 resolution, 400 MHz RAMDAC.
- **PCI express x16 slot on the backplane:** A discrete graphics card can be installed in the PCI-E x16 slot for stronger 2D/3D graphic capability.

1.3.5 Ethernet LAN

- Supports single 10/100/1000 Mbps Ethernet port via the dedicated PCI Express x1 bus which provides 500 MB/s data transmission rate.
- **Controller:** LAN 1: Intel® 82579V

1.3.6 Industrial Features

- **Watchdog timer:** To generate a system reset. The watchdog timer is programmable, with each unit equal to one second or one minute (255 levels).

1.3.7 Mechanical and Environmental Specifications

- **Operating temperature:** 0 ~ 60° C (32 ~ 140° F, Depending on CPU)
- **Storage temperature:** -40 ~ 85° C (-40 ~ 185° F)
- **Humidity:** 20 ~ 95% non-condensing
- **Power supply voltage:** +12 V, +5 V, +3.3 V, +5 V_{SB}
- **Power consumption:** Processor: Intel Core i7-3770; Memory: DDR3 1333 8 GB x 2

Voltage	+12 V	+5 V	+3.3 V	+5 V_{SB}
Current	5.87 A	0.89 A	1.96 A	0.21 A

- **Board size:** 338.58 mm (L) x 126.39 mm (W) (13.3" x 4.98")
- **Board weight:** 0.490 kg

1.4 Jumpers and Connectors

Connectors on the PCE-5026 system host board link it to external devices such as hard disk drives and a keyboard. In addition, the board has a number of jumpers used to configure the system for your application.

The tables below list the function of each of the board jumpers and connectors. Later sections in this chapter give instructions on setting jumpers. Chapter 2 gives instructions for connecting external devices to the motherboard.

Table 1.1: Jumper List

Label	Function
JCMOS1	CMOS clear
JWDT1	Watchdog Reset
JOBS1	HW Monitor Alarm

Table 1.2: Connectors

Label	Function
LPT1	Parallel port, supports SPP/EPP/ECP mode
LAN1	Intel 82579V for all SKUs
VGA1	D-SUB connector
KBMS1	PS/2 keyboard and mouse connector
KBMS2	External keyboard/mouse connector
COMD1	9-pin D-SUB connector
COM2	Serial port: COM2; RS-232 (9-pin Box Header)
JIR1	Infrared connector
JFP3 (Keyboard Lock and Power LED)	Power LED
	Suspend: Fast flash (ATX/AT)
	System On: ON (ATX/AT)
	System Off: OFF (AT)
	System Off: Slow flash (ATX)
JFP2	External speaker / SATA HDD LED connector
JFP1	Power Switch / Reset connector
JCASE1	Case Open
CPUFAN1	CPU FAN connector (4-pin)
LANLED1	LAN1/2 LED extension connector
HDAUD1	HD audio extension module connector
USB12	USB port 0, 1
USB34	USB port 2, 3
USB5	USB port 4
USB6	USB port 5
SATA1	Serial ATA1
SATA2	Serial ATA2
SATA3	Serial ATA3
SATA4	Serial ATA4
CPU1	CPU Socket
DIMMA1	Memory connector channel A
DIMMB1	Memory connector channel B
GPIO1	GPIO pin header (SMD pitch-2.0 mm)
LPC1	COM port module expansion pin-header

1.5 Board Layout: Jumper and Connector Locations

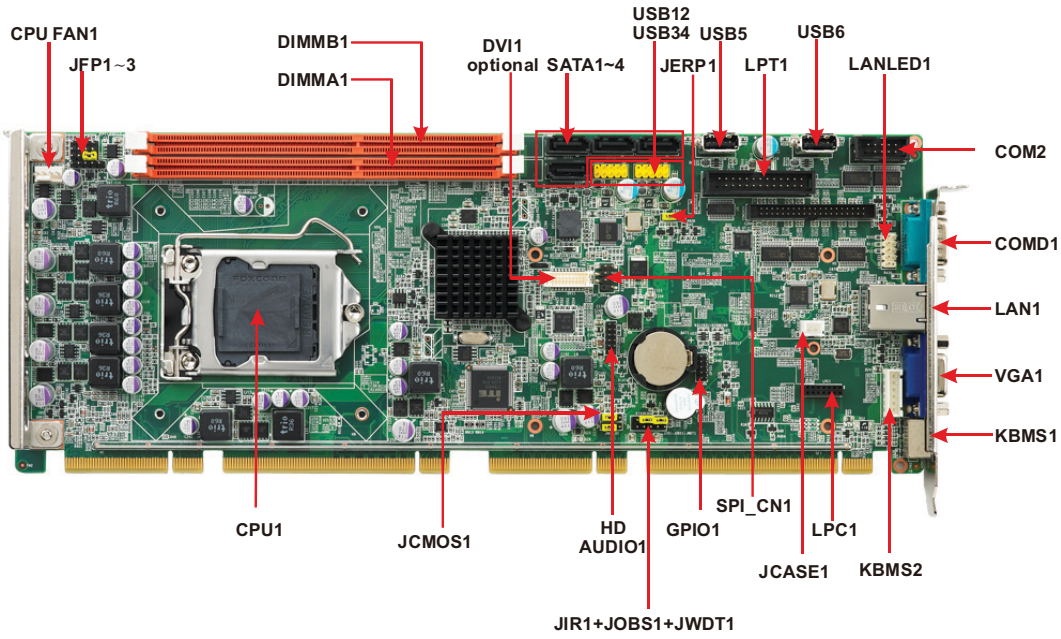


Figure 1.1 Jumper and Connector Locations

1.6 Block Diagram

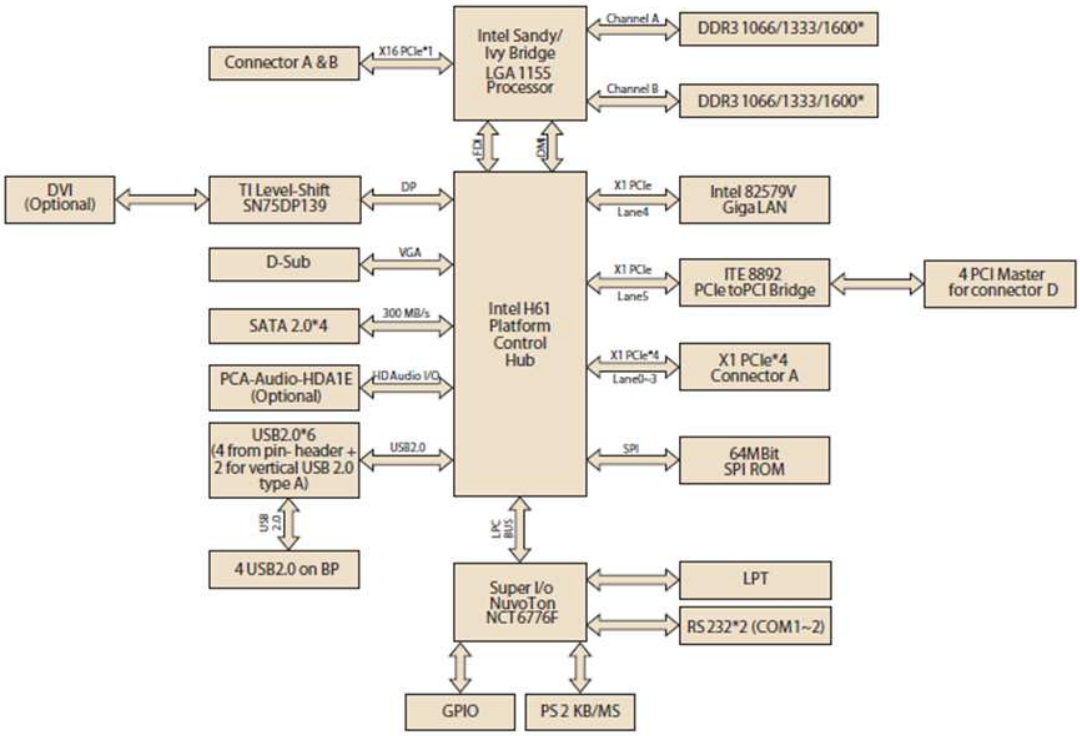


Figure 1.2 PCE-5026 Block Diagram

1.7 Safety Precautions

Warning! *Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges. Only experienced electronics personnel should open the PC chassis.*

Caution! *Always ground yourself to remove any static charge before touching the motherboard. Modern electronic devices are very sensitive to static electrical discharges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis.*

Caution! *The computer is provided with a battery-powered real-time clock. There is a danger of explosion if battery is incorrectly replaced. Replace only with same or equivalent type recommended by the manufacturer. Discard used batteries according to manufacturer's instructions.*

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.*

1.8 Jumper Settings

This section provides instructions on how to configure your motherboard by setting the jumpers. It also includes the motherboard's default settings and your options for each jumper.

1.8.1 How to Set Jumpers

You can configure your motherboard to match the needs of your application by setting the jumpers. A jumper is a metal bridge that closes an electrical circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To "close" (or turn ON) a jumper, you connect the pins with the clip. To "open" (or turn OFF) a jumper, you remove the clip. Sometimes a jumper consists of a set of three pins, labeled 1, 2 and 3. In this case you connect either pins 1 and 2, or 2 and 3. A pair of needle-nose pliers may be useful when setting jumpers.

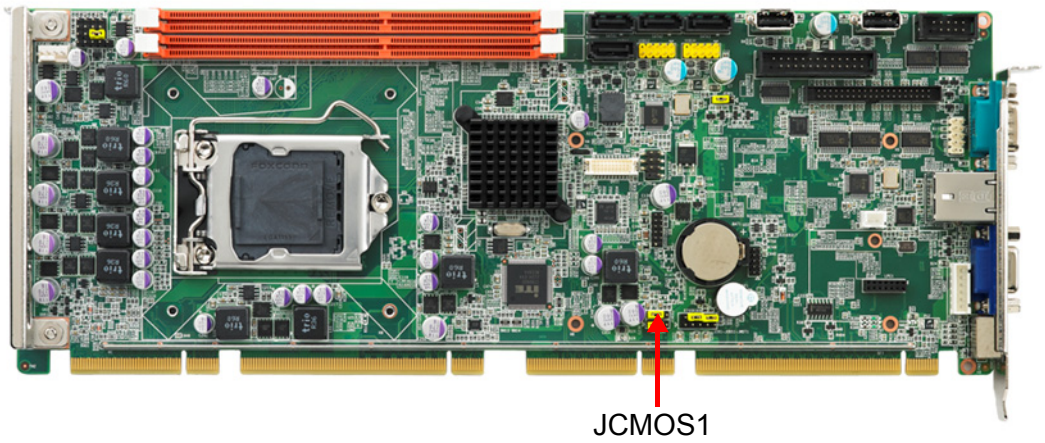
1.8.2 BIOS CMOS (JCMOS1)

The PCE-5026 CPU card contains a jumper that can erase BIOS CMOS resetting data about the system BIOS information. Normally this jumper should be set with pins 1-2 closed. If you want to reset data, set JCMOS1 to 2-3 closed for just a few seconds, and then move the jumper back to 1-2 closed. This procedure will reset the CMOS to its last status or default setting.

Table 1.3: Clear BIOS CMOS/Data (JCMOS1)

Function	Jumper Setting
*Keep BIOS CMOS data	1  1-2 closed
Clear BIOS CMOS data	1  2-3 closed

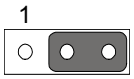
* default setting



1.8.3 Watchdog Timer Output (JWDT1)

The PCE-5026 contains a watchdog timer that will reset the CPU in the event the CPU stops processing. This feature means the PCE-5026 will recover from a software failure or an EMI problem. The JWDT1 jumper settings control the outcome of what the computer will do in the event the watchdog timer is triggered.

Table 1.4: Watchdog Timer Output (JWDT1)

Function	Jumper Setting
* Reset	 2-3 closed

*default setting

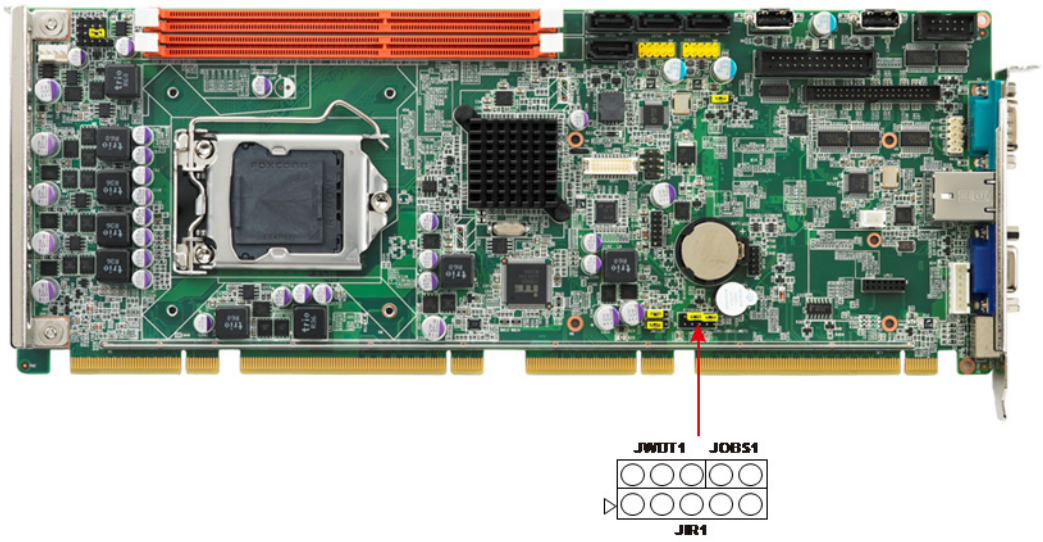


Table 1.5: H/W Monitor Alarm (JOBS1)

Function	Jumper Setting
Enabled	 1-2 closed
Disabled	 1-2 opened

(JOBS1) is a 2-pin connector for enabling/disabling alarm while the on-board security event is active.

1.9 System Memory

PCE-5026 has two 240-pin memory sockets for Non-ECC DDR3 1066/1333/1600* memory modules with maximum capacity of 16 GB. (Maximum 8 GB for each DIMM)

Note! *PCE-5026 does NOT support registered DIMMs (RDIMMs).*

1.10 Memory Installation Procedures

To install DIMMs, first make sure the two handles of the DIMM socket are in the "open" position; e.g., the handles lean outward. Slowly slide the DIMM module along the plastic guides on both ends of the socket. Then press the DIMM module right down into the socket, until you hear a click. This is when the two handles have automatically locked the memory module into the correct position of the DIMM socket. To remove the memory module, just push both handles outward, and the memory module will be ejected by the mechanism in the socket.

1.11 Cache Memory

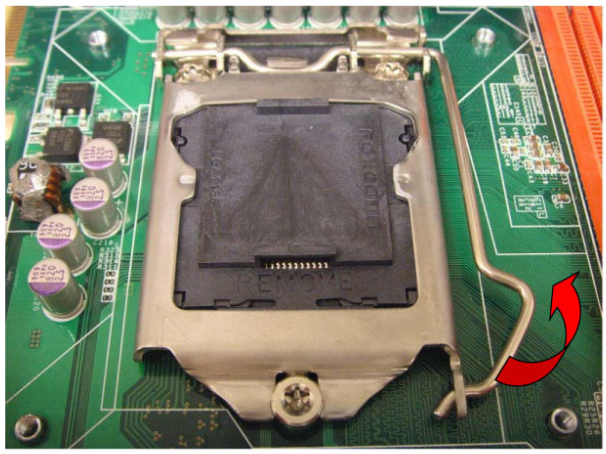
Intel CPU supports L3 cache. Please refer to the Intel CPU data sheet for detailed information.

1.12 Processor Installation

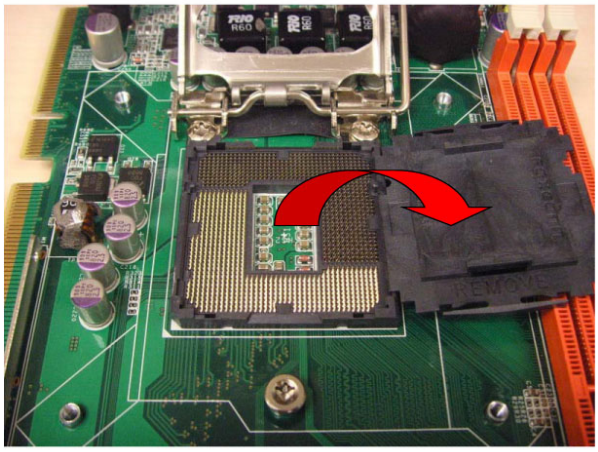
Warning! *Without a fan or heat sink, the processor will overheat and cause damage to both the processor and the system host board computer. To install a processor, first turn off your system.*

The PCE-5026 is designed for Intel® LGA 1155 socket processors.

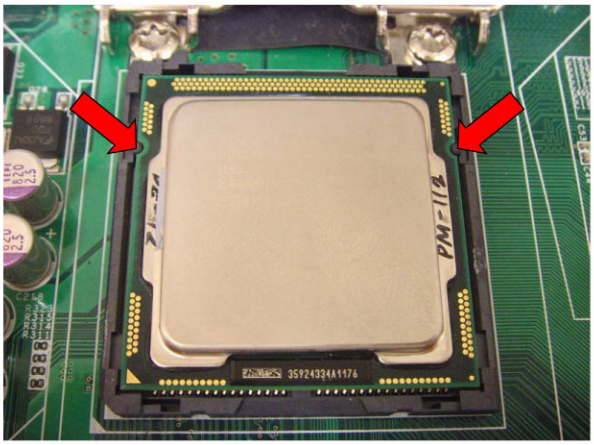
1. Pull the bar beside the processor socket outward and lift it.



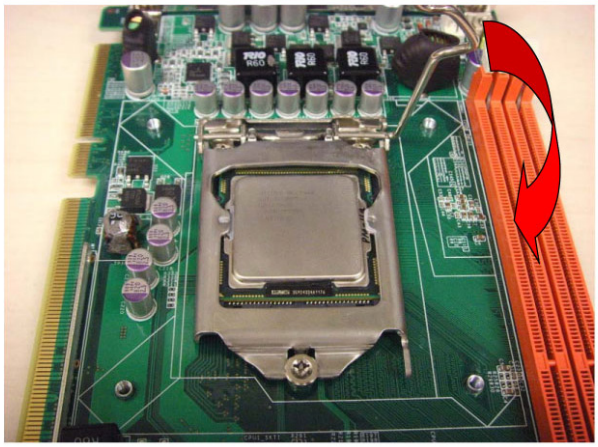
2. Remove the socket protection cap.



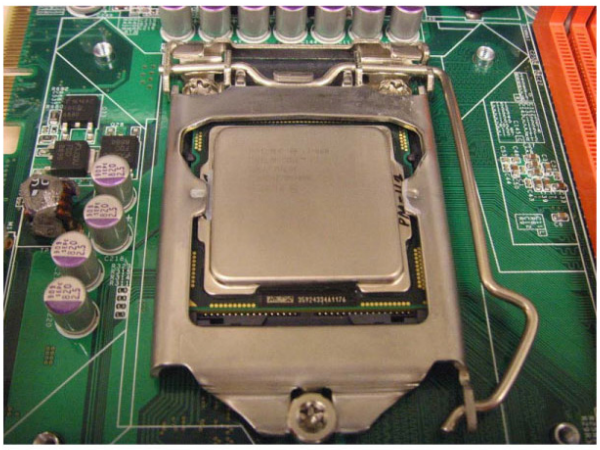
3. Align the cuts on the processor with the edges of the socket.



4. Replace the socket cap; lower the retainer bar and clip it shut.



5. Finished processor installation.



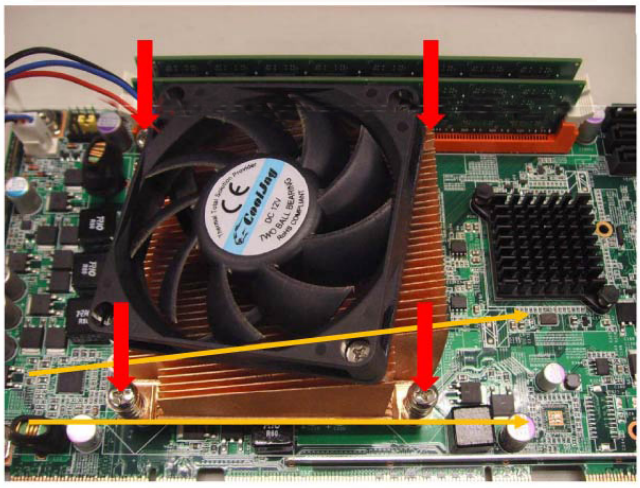
1.13 Processor Cooler Installation

Purchasing PCE-5026's proprietary CPU cooler (P/N: 1960047831N001) from Advantech is a must. Other brand CPU coolers are NOT compatible with PCE-5026.

Advantech offers a specially designed CPU cooler for PCE-5026 for better heat dissipation efficiency and enhancing rigidity of the CPU card: part number 1960047831N001. Buy it only for the PCE-5026 CPU card since it is NOT compatible with other brand CPU coolers (it is also not compatible with Intel boxed CPU cooler).

Please install P/N 1960047831N001 CPU cooler following these instructions:

Attach the CPU cooler on CPU card by fastening four screws of the CPU cooler into the steel back-plate on the PCB.



Note the direction of CPU cooler; it must follow the diagram shown above. Installing a CPU cooler in the wrong direction may cause poor heat dissipation that could damage the CPU card.

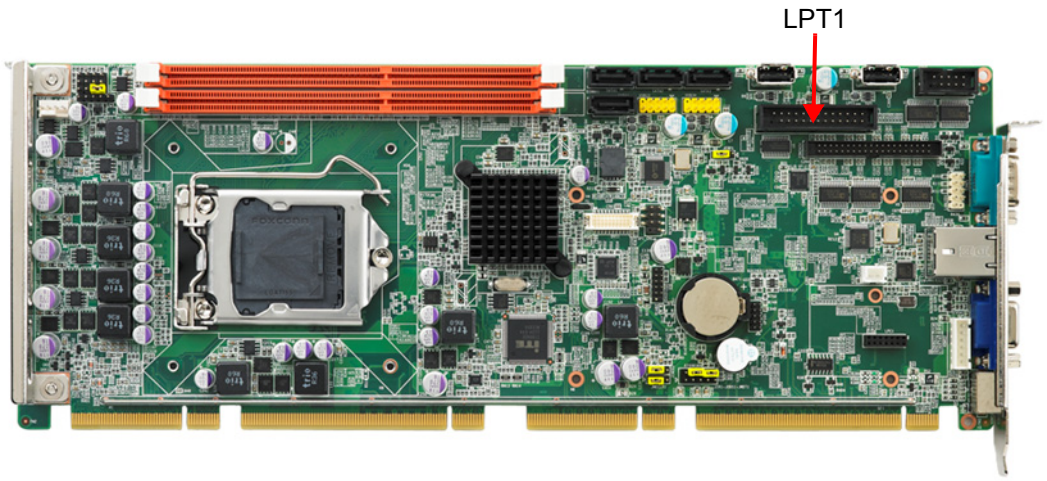
Chapter 2

Connecting Peripherals

2.1 Introduction

You can access most of the connectors from the top of the board. If you have a number of cards installed, you may need to partially remove the card to make all the connections.

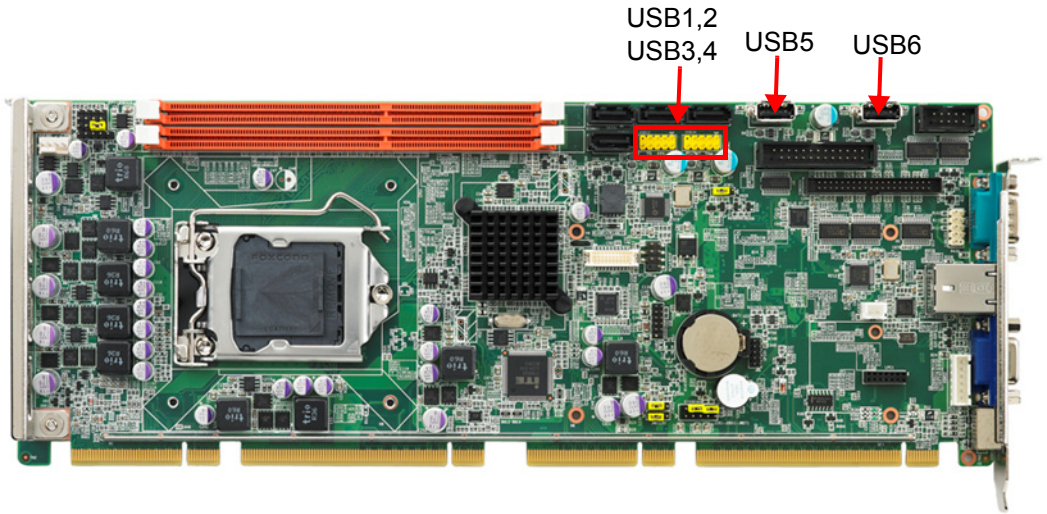
2.2 Parallel Port (LPT1)



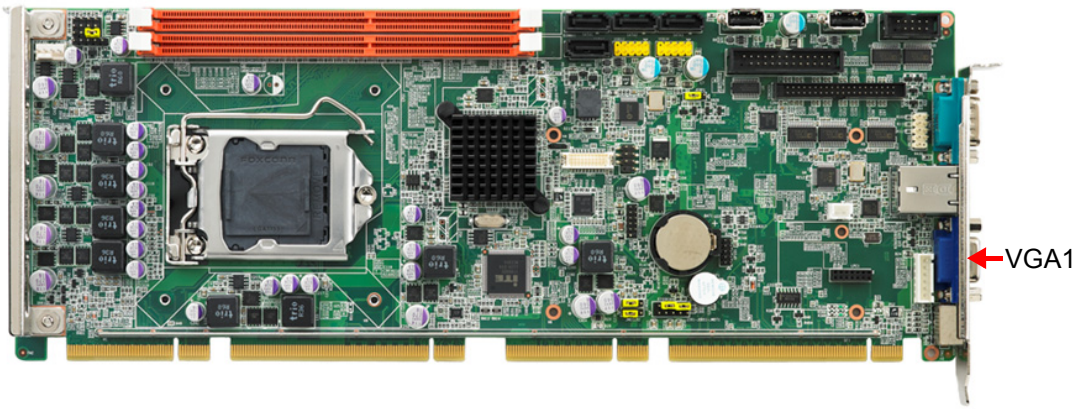
The parallel port is normally used to connect the motherboard to a printer. The PCE-5026 includes an onboard parallel port, accessed through a 26-pin flat-cable connector, LPT1.

2.3 USB Ports (USB12, USB34, USB5, USB6)

The PCE-5026 provides up to 6 USB (Universal Serial Bus) on-board ports with complete Plug & Play and hot swap support for up to 127 external devices. These USB ports comply with USB Specification 2.0, supporting transfer rates up to 480 Mbps (USB2.0). The USB interface can be disabled in the system BIOS setup.

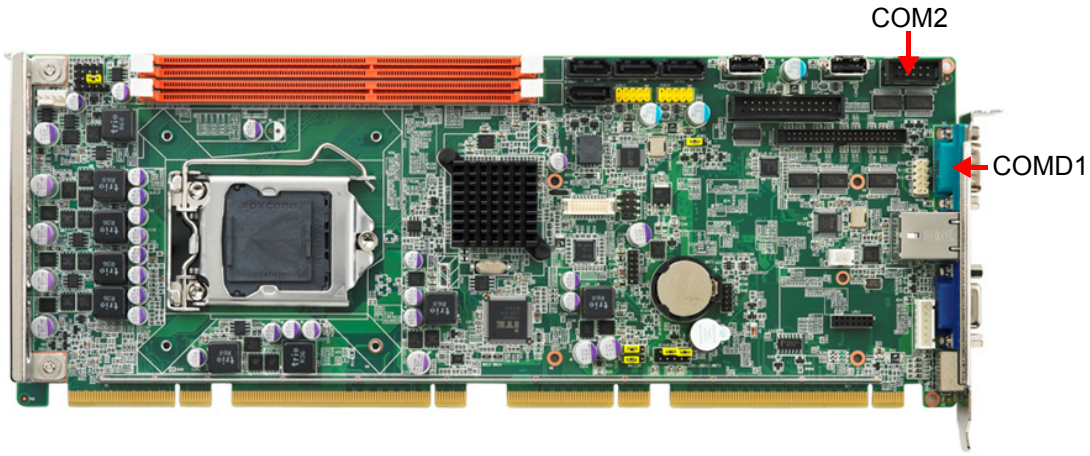


2.4 VGA Connectors (VGA1)



This CPU card has VGA outputs that can drive conventional CRT displays. VGA1 is a standard 15-pin D-SUB connector commonly used for VGA.

2.5 Serial Ports (COMD1 & COM2)



The PCE-5026 offers two serial ports. These ports can connect to serial devices, such as a communication network device.

The IRQ and address ranges for both ports are fixed. However, if you want to disable the port or change these parameters later, you can do this in the system BIOS setup.