EOS-1000

4-CH Compact Vision System

User's Manual

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Contact us should you require any service or assistance.

ADLINK Technology Inc.
Address: 9F, No.166 Jian Yi Road, Chungho City,
Taipei County 235, Taiwan
台北縣中和市建一路 166 號 9 樓
Tel: +886-2-8226-5877
Fax: +886-2-8226-5717
Email: service@adlinktech.com

Ampro ADLINK Technology Inc.
Address: 5215 Hellyer Avenue, #110, San Jose, CA 95138, USA
Tel: +1-408-360-0200
Toll Free: +1-800-966-5200 (USA only)
Fax: +1-408-360-0222
Email: info@adlinktech.com

ADLINK Technology Beijing
Address: 北京市海淀区上地东路 1 号盈创动力大厦 E 座 801 室
(100085)
Rm. 801, Power Creative E, No. 1, B/D
Shang Di East Rd., Beijing 100085, China
Tel: +86-10-5885-8666
Fax: +86-10-5885-8625
Email: market@adlinktech.com

ADLINK Technology Shanghai
Address: 上海市漕河泾高科技开发区钦江路 333 号 39 幢 4 层
(200233)
Tel: +86-21-6495-5210
Fax: +86-21-5450-0414
Email: market@adlinktech.com

ADLINK Technology Shenzhen
Address: 深圳市南山区科技园南区高新南七道 数字技术园
A1 栋 2 楼 C 区 (518057)
2F, C Block, Bld. A1, Cyber-Tech Zone,
Gao Xin Ave. Sec 7, High-Tech Industrial Park S.,
Shenzhen, 518054 China
Tel: +86-755-2643-4858
Fax: +86-755-2664-6353
Email: market@adlinktech.com

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ADLINK Technology Inc. (German Liaison Office)
Address: Nord Carree 3, 40477 Duesseldorf, Germany
Tel: +49-211-495-5552
Fax: +49-211-495-5557
Email: emea@adlinktech.com

ADLINK (French Liaison Office)
Address: 15 rue Emile Baudot, 91300 MASSY Cedex, France
Tel: +33 (0) 1 60 12 35 66
Fax: +33 (0) 1 60 12 35 66
Email: france@adlinktech.com

ADLINK Technology Japan Corporation
Address: 151-0072 東京都渋谷区幡ヶ谷
1-1-2 朝日生命幡ヶ谷ビル 8F
Asahiseimei Hatagaya Bldg. 8F
1-1-2 Hatagaya, Shibuya-ku, Tokyo 151-0072, Japan
Tel: +81-3-4455-3722
Fax: +81-3-5333-6040
Email: japan@adlinktech.com

ADLINK Technology Inc. (Korean Liaison Office)
Address: 서울시 서초구 서초동 1506-25 한도 B/D 2 층
2F, Hando B/D, 1506-25, Seocho-Dong,
Seocho-Gu,Seoul, 137-070, Korea
Tel: +82-2-2057-0565
Fax: +82-2-2057-0563
Email: korea@adlinktech.com

ADLINK Technology Singapore Pte Ltd.
Address: 84 Genting Lane #07-02A, Cityneon Design Centre,
Singapore 349584
Tel: +65-6844-2261
Fax: +65-6844-2263
Email: singapore@adlinktech.com

ADLINK Technology Singapore Pte Ltd. (Indian Liaison Office)
Address: No. 1357, "Anupama", Sri Aurobindo Marg, 9th Cross,
JP Nagar Phase I, Bangalore - 560078, India
Tel: +91-80-65605817
Fax: +91-80-22443548
Email: india@adlinktech.com

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1 Introduction

1.1 Product Overview

The EOS-1000 is a rugged compact vision system that features an Intel® multi-core processor and four independent Gigabit Ethernet ports with PoE (Power over Ethernet) functionality. It is ideal for high computing power, and multi-camera imaging application, such as 3D vision robotic guidance.

By selecting long life embedded components, and providing system monitoring features to monitor CPU temperature and fan speed, and a watchdog timer makes the EOS-1000 a robust and reliable system for mission critical applications.

Key Features

- Compact and rugged system design
- Embedded Intel® Core™ 2 Duo CPU
- Multi-camera solution, up to four Gigabit Ethernet cameras
- PoE, IEEE 802.3af Compliant, Powered Device (PD) auto detection
- Ample I/O support: RS-232/485, USB, and isolated digital I/Os
- Dual storage support: HDD, and Compact Flash

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1.2 Specifications

EOS-1000

Item	Specification
CPU	Intel® Core 2 Duo P8400, 2.26GHz
System Memory	Up to 4 GB DDR3
Camera Interface	4 Ch Power Over Ethernet IEEE 802.3af Compliant, Max. power output 7W per channel
Chipset	Intel® GM45 / ICH9 Chipset
VGA	Analog CRT support up to 1600 x 1200
USB	Four USB ports, USB 2.0 compliant
Audio (Optional)	AC97, Mic In / Speaker Out
COM Ports	COM1/COM2: RS-232/RS-422/RS-485(BIOS Setting)
Digital I/O (Optional)	16-CH Isolated Digital Input, and Output, 5.0 KV isolation protection
Keyboard/Mouse	Combed PS/2 type mini-DIN connectors
Power Supply	DC: 10-30 VDC, AT mode AC: 90-240 VAC, AT mode
Operating Temp.	0˚C to 55˚C
Humidity	0% to 90%
Dimensions	200(W) x 165(D) x 85(H) mm
Power Consumption	With 2 GB DDRAM, and 2GB CompactFlash, 50 W
Storage	One CompactFlash Type I; One 2.5' SATA HDD(Option)
Random Vibration	Operating: 5 to 100Hz, 0.00142 g2/Hz; 100 to 500Hz, -6 dB/Octave, 0.5 Grms, 3 axes, 30 minutes/axis
Safety compliance	CE/FCC, RoHS

Table 1-1: EOS-1000 Specifications

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Warning: Always disconnect the power cord from your chassis whenever you are working on it. Do not connect the power cord while the power switch is on. A sudden rush of power can damage sensitive electronic components. Only authorized and experienced electronics personnel should open the chassis.

Always ground yourself to remove any static electric charge before touching EOS-1000. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag.

1.3 Unpacking Checklist

Before unpacking, check the shipping carton for any damage. If the shipping carton and/or contents are damaged, inform ADLINK immediately. Retain the shipping carton and packing materials for inspection. Obtain authorization from your dealer before returning any product to ADLINK, check if the following items are included in the package.

Product	Included Items
EOS-1000	▶ All-in-one support CD-ROM (software & manuals) ▶ Wall mounting kit: ▷ Wall mounting bracket (x4) ▷ M4 8 mm screws (8) ▶ Power cord (L=1.8M, country of use to be specified while ordering) (for AC type only) ▶ PS/2 Y cable

Table 1-2: Unpacking Checklist

Note: The packaging for the OEM version with non-standard configuration, functionality, or package may vary according to different configuration requests.

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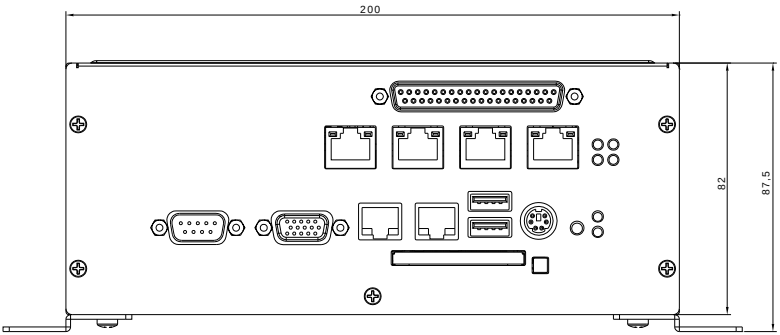
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2 System Description

This section describes the appearance and connectors of the EOS-1000, including chassis dimensions, front panel connectors, and internal IO connectors.

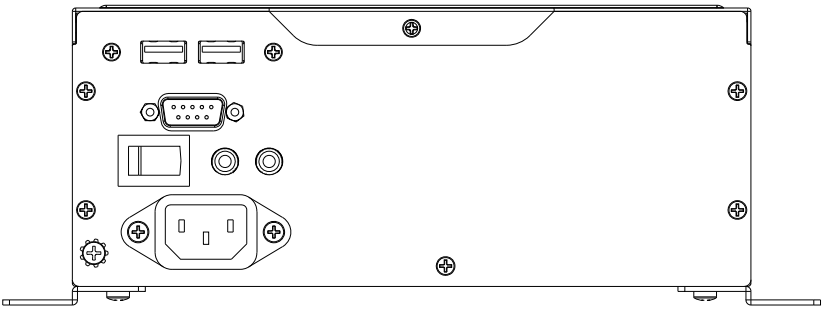
2.1 Mechanical Drawings

2.1.1 Front View

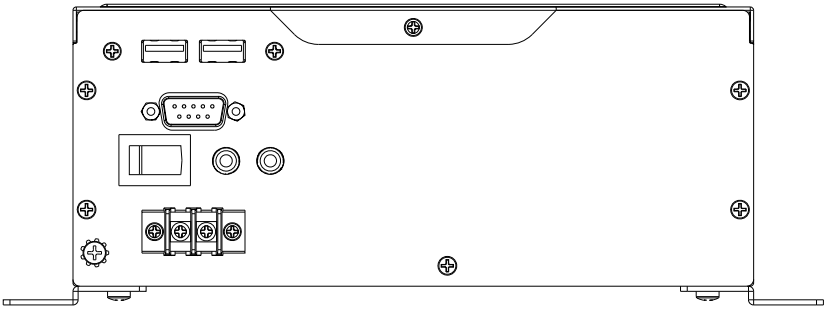


2.1.2 Rear View

AC Power:

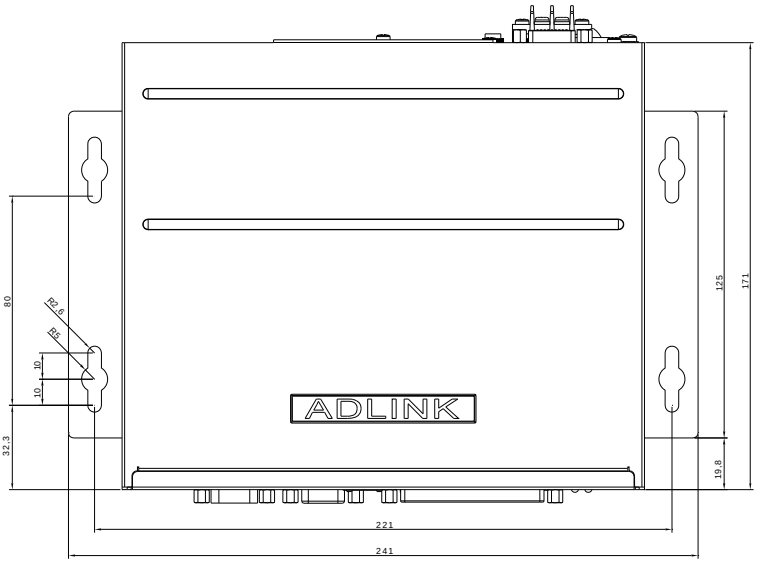


DC Power:

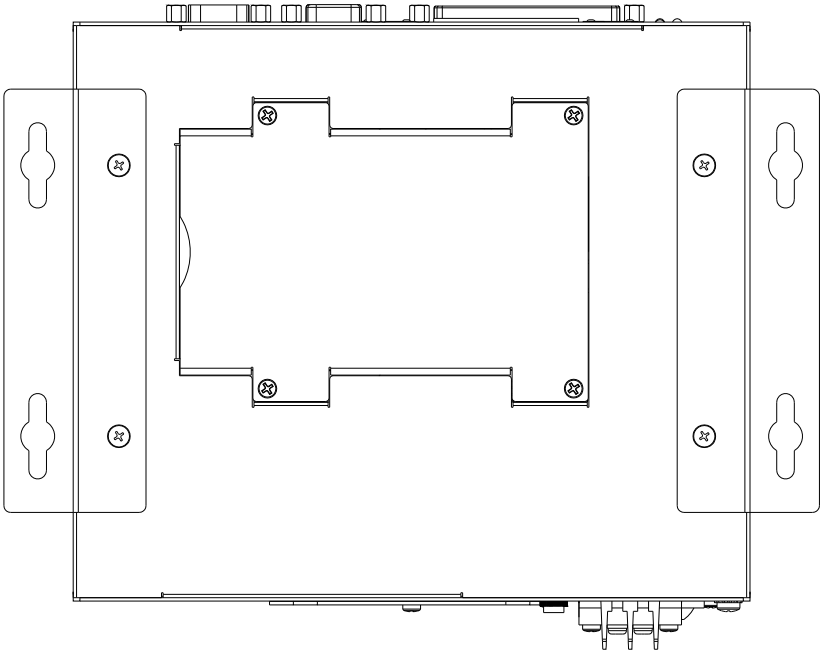


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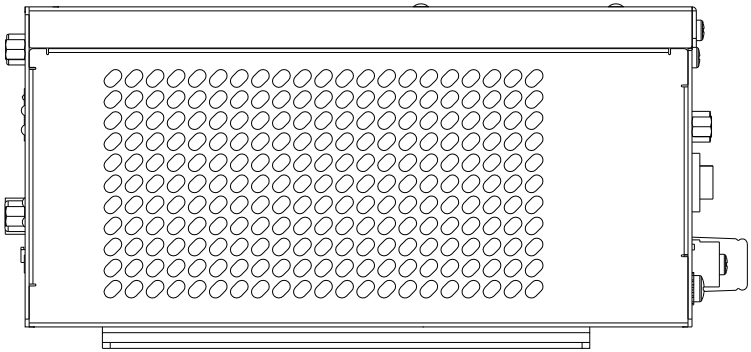
2.1.3 Top View



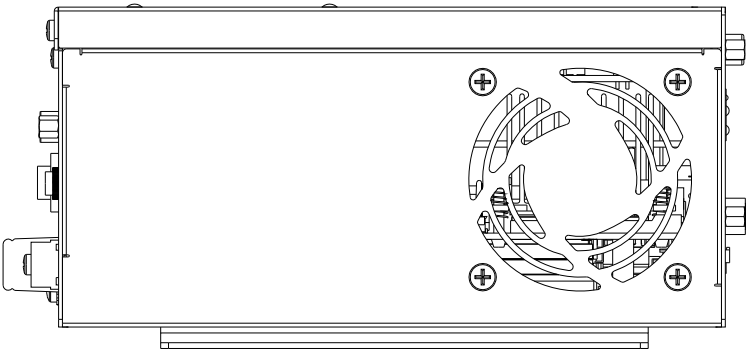
2.1.4 Bottom View



2.1.5 Side View (Right)

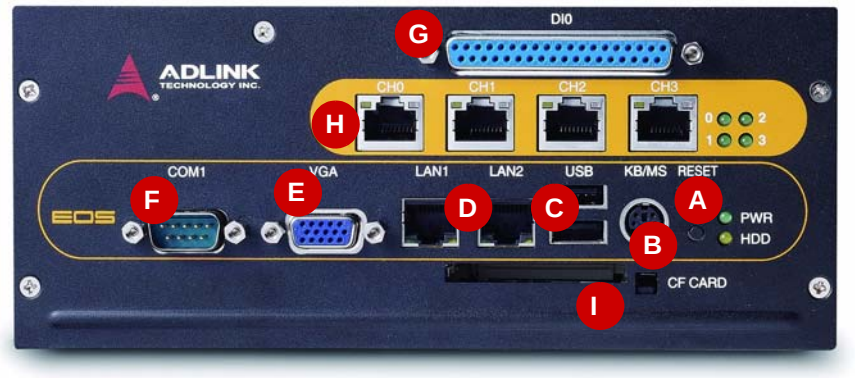


2.1.6 Side View (Left)



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2.2 Front Panel I/O Connectors

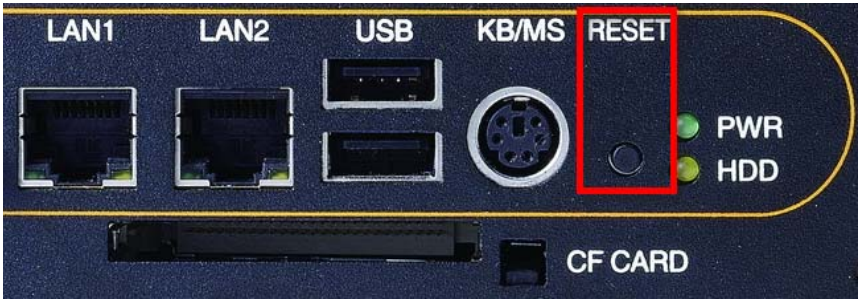


Symbol	Function
A	Reset button
B	PS2 keyboard & mouse
C	USB2.0 ports
D	Dual Gigabit Ethernet ports
E	VGA connector
F	COM port
G	Digital I/O connector
H	4 channel Power over Ethernet Connectors
I	Compact Flash socket

Figure 2-1: Front Panel I/O Connectors

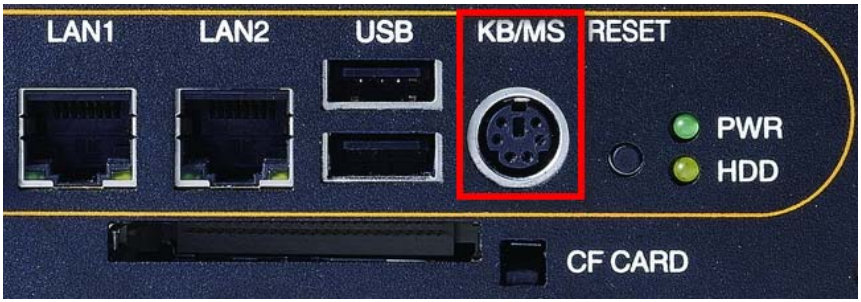
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2.2.1 Reset Button



The reset button is used to perform a hard reset on the EOS-1000. A pin-like object can be used to push the reset button.

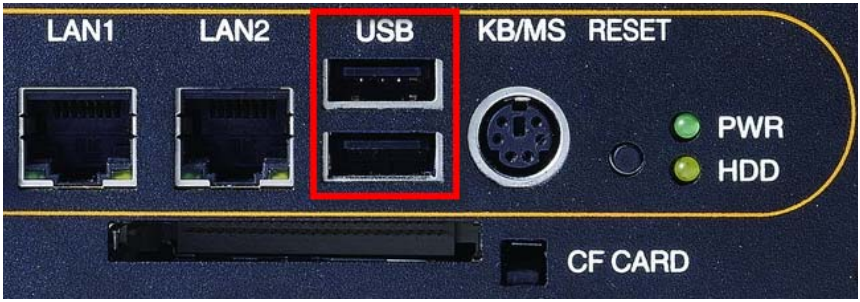
2.2.2 Keyboard and Mouse PS2 connectors



The EOS-1000 provides connectors for connecting PS2 keyboard and mouse. The green connector is for PS/2 mouse and the purple one is for PS/2 key-board.

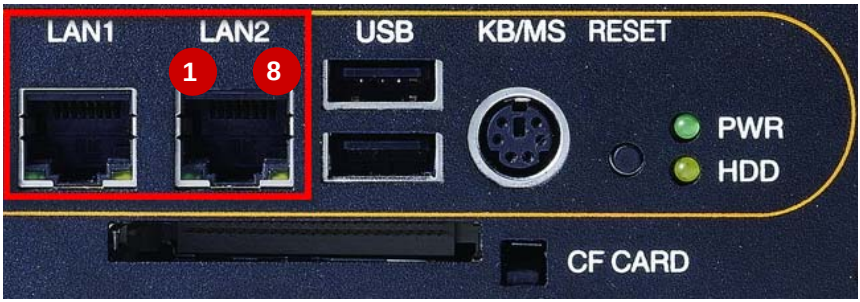
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2.2.3 USB 2.0 Connectors



The EOS-1000 provides two USB 2.0 ports via Type A USB connectors on the front panel. All USB ports are compatible with high-speed, full-speed and low-speed USB devices. The EOS-1000 supports multiple boot devices, including USB flash drives, USB external hard drive, USB floppy, USB CD-ROM, etc. The boot priority and boot device can be configured in the BIOS.

2.2.4 Gigabit Ethernet Ports



Pin	Signal	Pin	Signal
1	MDI0+	5	MDI2-
2	MDI0-	6	MDI1-
3	MDI1+	7	MDI3+
4	MDI2+	8	MDI3-

Table 2-1: Gigabit Ethernet Port Pinout

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2.2.5 VGA Connector



The D-sub 15-pin VGA connector is used to connect the EOS-1000 to a monitor. The EOS-1000 supports only analog (VGA) monitors.

2.2.6 COM1 Port



The EOS-1000 provides one COM port in the form of D-Sub 9P connectors on the front panel. The COM1 port supports RS-232 only.

Pin	Signal Name	Pin	Signal Name
RS-232			
1	DCD#	6	DSR#
2	RXD#	7	RTS#
3	TXD#	8	CTS#
4	DTR#	9	RI#
5	GND		

Table 2-2: COM1 Port Pinout

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2.2.7 Digital I/O (PCM-7230+)

The EOS-1000 features a 16 channels isolated digital I/O card (PCM-7230+). The onboard digital I/O card supports the following features:

16-CH Isolated DI

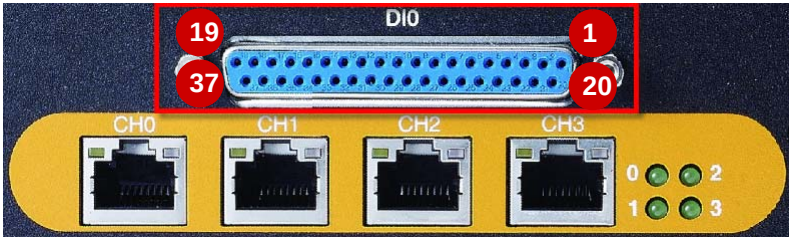
- Logic high: 3 – 24 V
- Logic low: 0 – 1 V
- Input resistance: 1.2 k @ 0.5 W
- Isolation voltage: 5000 Vrms
- Interrupt source: DI channel 0 and 1

16-CH Isolated DO

- Output type: Darlington transistors
- Output voltage: open collector 5 V(min.), up to 35 VDC(max.).
- Sink current:
  - 500 mA max @ 100% duty, for one of the eight transistor devices ON.
  - 370 mA @ duty 10% for all transistors devices ON.
  - 140 mA @ duty 50% for all transistors devices ON.

  Note: the pulse width is 25 ms for one duty cycle.
- Isolated voltage: 5000 Vrms.

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Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
1	IDI_0	14	IDO_6	27	IDI_15
2	IDI_2	15	IDO_8	28	EOGND
3	IDI_4	16	IDO_10	29	EOGND
4	IDI_6	1	IDO_12	30	IDO_1
5	IDI_8	18	IDO_14	31	IDO_3
6	IDI_10	19	VDD	32	IDO_5
7	IDI_12	20	IDI_1	33	IDO_7
8	IDI_14	21	IDI_3	34	IDO_9
9	EICOM	22	IDI_5	35	IDO_11
10	EOGND	23	IDI_7	36	IDO_13
11	IDO_0	24	IDI_9	37	IDO_15
12	IDO_2	25	IDI_11		
13	IDO_4	26	IDI_13		

Table 2-3: Digital I/O Pinout

Legend:

IDI_n: Isolated digital input channel #n.

IDO_n: Isolated digital output channel #n.

EOCOM: Common Ground or Common power of isolated input channels.

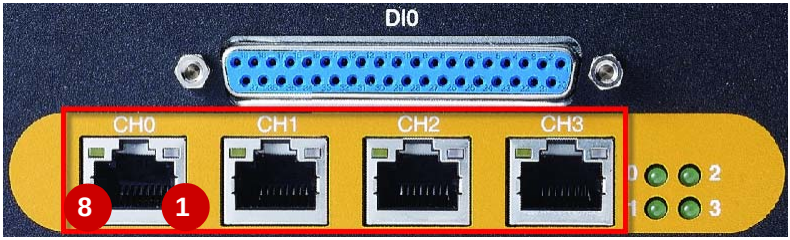
EOGND: Ground return path of isolated output channels.

VDD: Power input signal for fly-wheel diode of DO channels.

Note: The VDD must be supplied by an external power supply of 5 to 35 VDC

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2.2.8 Power Over Ethernet Port



Pin	Signal Name	Pin	Signal Name
1	MDI0+ (PoE_DC48V)	5	MDI2- (PoE_DC48V)
2	MDI0- (PoE_DC48V)	6	MDI1- (PoE_DC0V)
3	MDI1+ (PoE_DC0V)	7	MDI3+ (PoE_DC0V)
4	MDI2+ (PoE_DC48V)	8	MDI3- (PoE_DC0V)

Table 2-4: Power Over Ethernet Port Pinout

- Four full-integrated Gigabit Ethernet Media Access Control (MAC) and physical layer (PHY) ports
- The Power over Gigabit Ethernet controller complies with the IEEE 802.3.af standard for a minimum of 15.4 watts with power up to 48 V over the existing CAT-5 watts with power up to 48 V over the existing CAT-5 Ethernet infrastructure without the need to make any modifications
- The Power over Gigabit Ethernet Controller provides a standard IEEE 802.3 Ethernet interface for 1000BASE-T, 100BASE-TX, and 10BASE-T applications (802.3, 802.3u, and 802.3ab)
- 9 kB jumbo frame support

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2.2.9 CompactFlash Socket



The CompactFlash socket of EOS supports both DMA and PIO mode.

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2.3 Back Panel I/O Connectors



Item	Function	Item	Function
J	USB2.0 ports	M	Mic in and speaker out
K	COM port	N	Power in (AC model shown)
L	Power switch	O	Chassis ground

Table 2-5: Back Panel I/O Connectors

2.3.1 USB 2.0 Connectors



The EOS-1000 provides two USB 2.0 ports as Type A USB connectors on the back panel. All USB ports are compatible with high-speed, full-speed and low-speed USB devices. The EOS-1000 supports multiple boot devices, including USB flash drive, USB external hard drive, USB floppy, USB CD-ROM and etc. The boot priority and boot device can be configured in BIOS.

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2.3.2 COM2 Port



The EOS-1000 provides one COM port in the form of D-Sub 9P connectors on the front panel. COM2 port supports RS-232 only.

Pin	Signal Name	Pin	Signal Name
RS-232			
1	DCD#	6	DSR#
2	RXD#	7	RTS#
3	TXD#	8	CTS#
4	DTR#	9	RI#
5	GND		

Table 2-6: COM2 Port Pinout

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2.3.3 Power Switch



O	Off
I	On

Table 2-7: Power Switch

2.3.4 AC Power Input Connector



The AC power input connector is a standard 100-240 VAC 50/60 Hz three-pin connector.

2.3.5 DC Power Input Connector



The DC power input connector of the EOS-1000 controller consists of two pins, V+ and V- from left to right respectively. V+ and V- pins are for DC power input. The DC power input of EOS-1000 allows a voltage input from 10 VDC to 30 VDC.

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2.3.6 Chassis Ground



The chassis ground, isolated from power ground, is shorted to the internal signal ground.

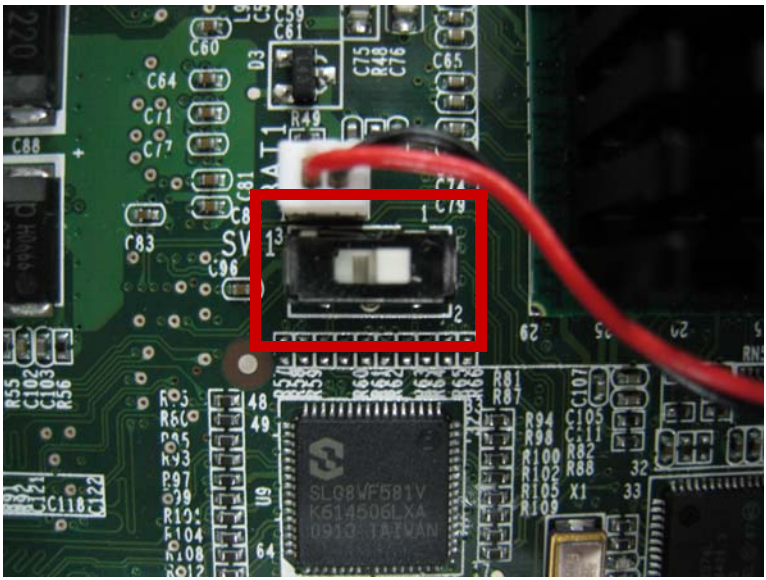
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2.4 Internal I/O Connectors

2.4.1Clear CMOS Switch

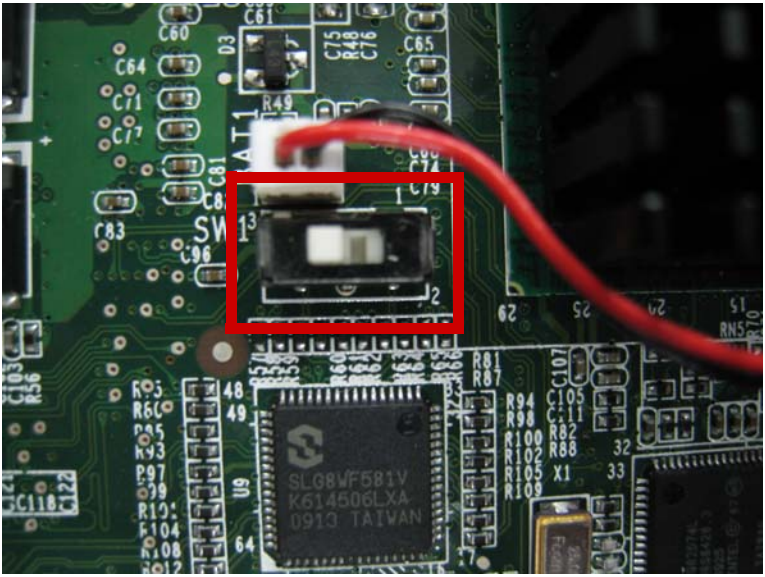
If abnormal condition that causes the EOS-1000 controller fail to boot are experienced, you can try to clear the BIOS content stored in the CMOS and restore to the default setting. To clear the CMOS, just press the button and hold for 1-2 seconds before release it. The CMOS will then be restored to its factory default setting.

Normal Mode:



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Clear CMOS Mode:



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3 Software Support

Selecting an operating system (OS) suitable for the application requirements is vital for system developers. The EOS-1000 is compatible with several operating systems for maximum flexibility.

3.1 Operation System Support

3.1.1 Windows XP

Windows XP supports the EOS-1000 chipset drivers, allowing simple installation of this OS. ADLINK also provides pre-installation services for Windows XP on the EOS-1000 (requires the Windows XP license to be pre-purchased from ADLINK).

3.1.2 Windows XP Embedded

Windows XP is a multitasking OS known for its stability. As a result of its overwhelming popularity, human-machine interfaces, and plentiful development tools, developing applications in Windows XP is comparatively simple. Microsoft carried over the advantages of Windows XP when releasing Embedded XP. The concept behind the design of Embedded XP is simply a modularized Windows XP. System developers only select the needed Windows XP components and functions and then organize them together to construct an XP Embedded OS.

By using this architectural modularization, system integrators can readily reduce the storage space requirements of XP Embedded. The only factor determining storage space requirements is the number of function modules needed. Because XP Embedded is completely compatible with Windows XP, developers can compile controller software in the Windows XP environment, and then transfer the code to Embedded XP for immediate use. System developers do not need to learn any new tools to use XP Embedded. Their experience on Windows XP can be directly transferred to XP Embedded, thus lowering software development costs. Another advantage is that the cost of licensing Embedded XP is much less than that of Windows XP.

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ADLINK currently provides standard XP Embedded OS images for the EOS-1000 (XP Embedded license pre-purchase from ADLINK is required). The standard XP Embedded OS image provided by ADLINK is about 1.4 GB, and the key features included in the standard XP Embedded OS image are as follows

- XP Embedded OS Kernel
- Drivers for EOS H/W and peripheral cards
- TCP/IP Networking
- TCP/IP with file sharing and client for Microsoft network
- Internet Explorer
- File Manager
- Language Support

The standard XP Embedded OS image meets most application needs. If you have special functional requirements for XP Embedded, please contact ADLINK for more details about this OEM service.

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3.2 Driver Installation

After installing the operating system, you need to install all related drivers to make your system work accordingly. This section describes the drivers needed for Windows operating systems and the procedures to install them. For other OS support, please contact ADLINK for further information.

To install Windows drivers, please follow the steps below:

1. Properly install Windows before installing any drivers. Most of the standard I/O device drivers have been included in Windows.
2. Install the chipset driver.
3. Install the graphics driver.
4. Install the Ethernet driver.
5. Install the audio driver.
6. Install the PCM-7230+ driver.

3.2.1 Installing the Chipset Driver

The chipset driver outlines to the operating system how to configure the Intel® GM45 chipset components in order to ensure that the following features function properly:

- Core PCI and ISAPNP Services
- PCIe Support
- SATA Storage Support
- USB Support
- Identification of Intel® Chipset Components in the Device Manager

Please follow the following steps to install the chipset driver:

1. Close any running applications
2. Execute Chipset.exe and follow the on-screen instructions to complete the setup
3. Reboot your system

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3.2.2 Installing the Graphics Driver

The EOS-1000 is equipped with the Intel® GMA4500 graphics media accelerator integrated in the Intel Mobile Intel® GM45 chipset. Please follow the following steps to install graphics driver:

1. Close any running applications
2. Execute Video.exe and follow the on-screen instructions to complete the setup
3. Reboot your system

3.2.3 Installing the Ethernet Driver

Please follow the following steps to install the driver for the Intel® Gigabit Ethernet controller:

1. Close any running applications
2. Execute Network.exe and follow the on-screen instructions to complete the setup
3. Reboot your system

3.2.4 Installing the Audio Driver

The EOS-1000 controller supports Intel High Definition audio using the Realtek ALC888 chip. Please follow the following steps to install the audio driver for the EOS-1000:

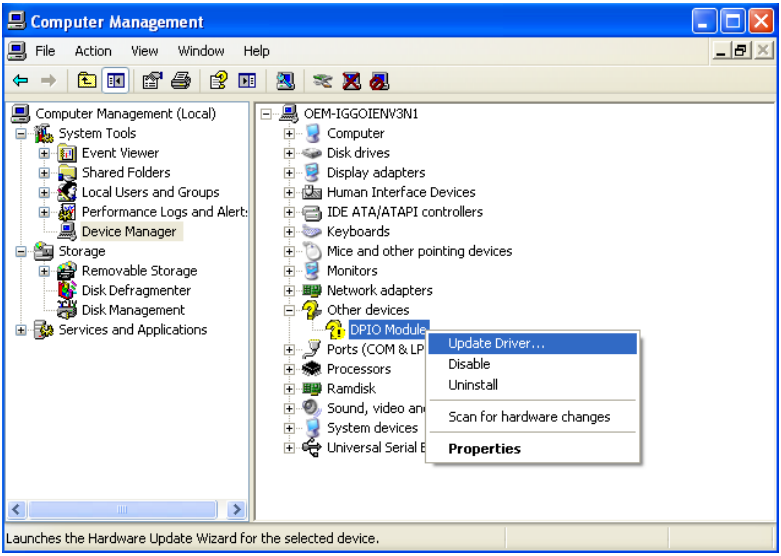
1. Close any running applications
2. Execute Audio.exe and follow the on-screen instructions to complete the setup
3. Reboot your system

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3.2.5 Installing the PCM-7230+ Driver

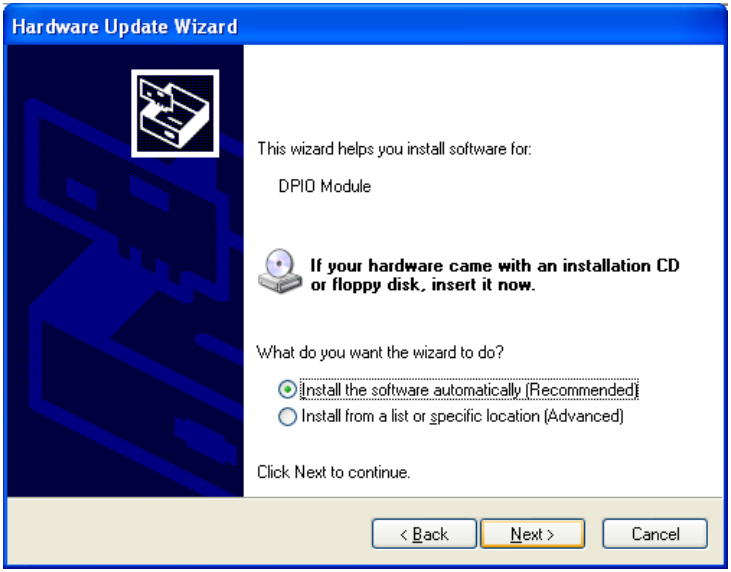
Please follow the following steps to install the driver for ADLINK's PCM-7230+:

1. Close any running applications
2. Execute 7230.exe and follow the on-screen instructions to complete the setup
3. Reboot your system
4. Go to Device Manager and install the driver manually as follows:

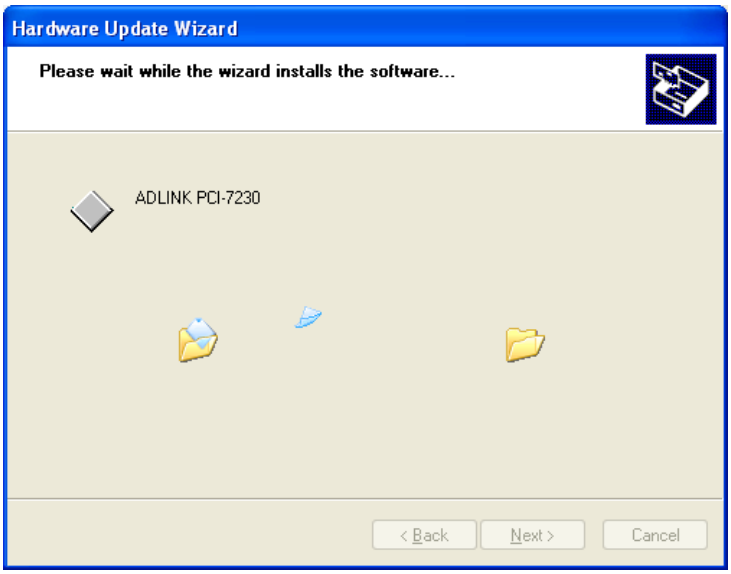


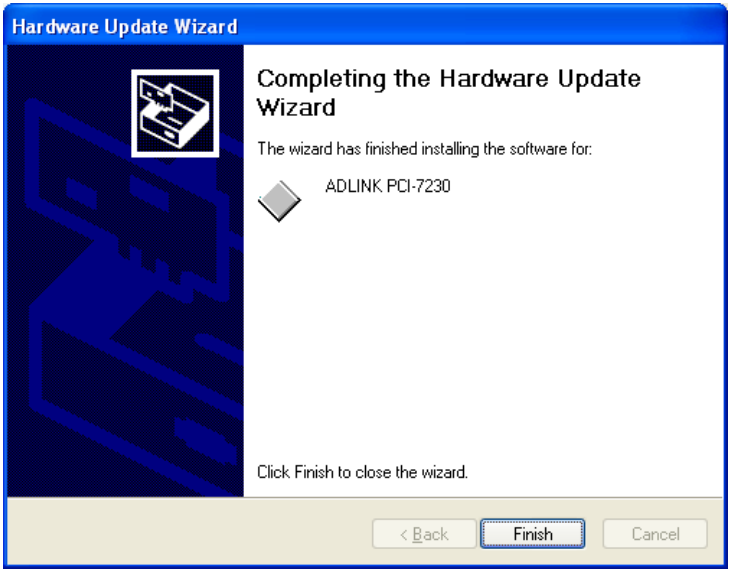
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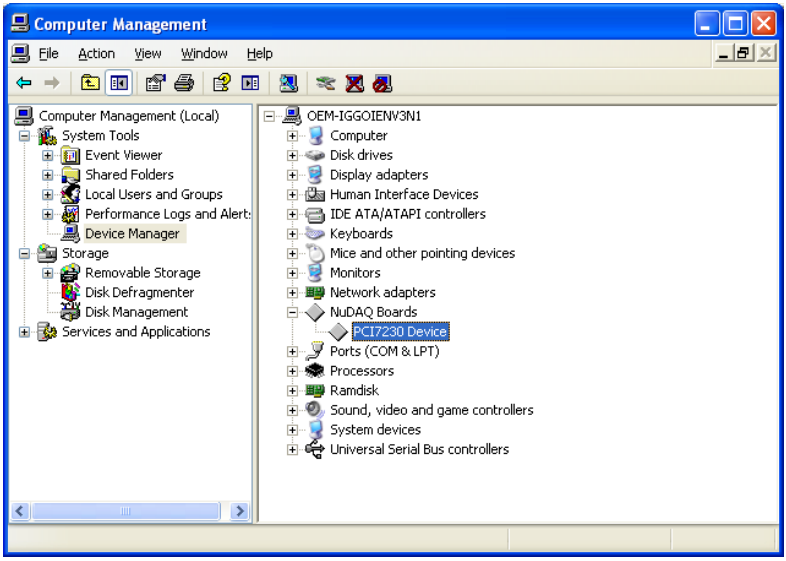


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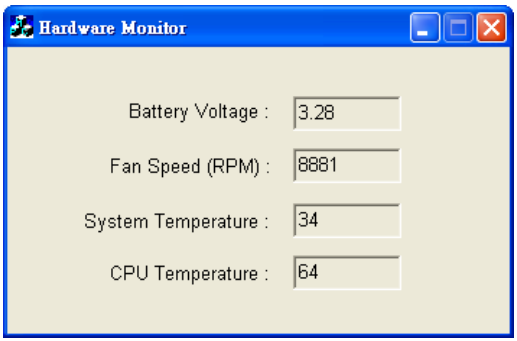
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3.3 Hardware Monitor Application

The Hardware Monitor application provides an easy way to obtain system information from the Winbond W83627HG, including battery voltage, fan speed, system temperature, and CPU temperature. The Hardware Monitor application is as follows:



The Hardware Monitor application updates every 500 ms and provides a quick and easy way to obtain system status information.

3.3.1 Programming Guide

This program is based on the driver (WBHWDOCT.sys) and library (Wbcdflsh.dll) provided by Winbond Electronics Corporation. Before programming, be sure to copy these two files in the proper directories:

WBHWDOCT.sys in C:\WINDOWS\system32\drivers

Wbcdflsh.dll in C:\WINDOWS\system32

In order to obtain system information from Winbond W83627HG, you must

1. Load the driver first by calling LoadWBCDFlshVxD()
2. Initial the bus by calling GetBaseAddressForLPC() and InitialBus()
3. Check for the existence of the chip by calling GetVendeRID()

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Now you can obtain system information by calling GetVBAT(), GetFanSpeed(), GetSystemTemperature(), and GetCPUTemperature as the sample program does. Source code of the Hardware Monitor sample program reside at C:\Program Files\ADLINK\HwMon

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4 BIOS Settings

4.1 Overview

The Basic Input/Output System (BIOS) is a program that provides a basic level of communication between the processor and peripherals. In addition, the BIOS also contains codes for various advanced features. When powering up the system, the BIOS is activated. Immediately pressing the <Del> key allows you to enter the Setup utility. If you are too slow in pressing the <Del> key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking Setup. If you still wish to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system off and back on again. On power up, the following message will appear on the screen:

```
Press <DEL> to Enter Setup
```

In the Setup utility program, you can make changes by pressing the arrow keys to highlight items, <PgUp> and <PgDn> keys to change entries, <Enter> to select, <F1> for help and <Esc> to quit. When you enter the Setup utility, the Main Menu screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

Warning: Changing BIOS settings may lead to incorrect behavior and possibly an unbootable device. If this happens, follow the instructions in Section 2.4 to clear CMOS and then restore the default settings. In general, do not change a BIOS setting unless you are absolutely certain of what it does.

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4.2 Boot Options

4.2.1 Boot Settings Configuration

The BIOS attempts to load the operating system from the devices in the following items. Specify the priority of boot devices. All installed boot devices are detected during POST and displayed on the screen. You can refer to the following steps to specify different boot device.

4.2.2 Boot from a SATA Hard Drive

1. Select **Hard Disk Drives** and press Enter
2. Your SATA hard drive is displayed with its identification string. Specify it as **1st Drive**
3. Go back to upper level and select your SATA hard drive in **1st Boot Device**

4.2.3 Boot from CF Card

1. Select **Hard Disk Drives** and press Enter
2. 2. Your CF card is displayed with its identification string. Specify it as **1st Drive**
3. 3. Go back to upper level and select your CF card in **1st Boot Device**

4.2.4 Boot from USB CD/DVD Drive

1. Select **USB Drives** and press Enter
2. Your CD/DVD drive is displayed with its identification string. Specify it as **1st Drive**
3. Go back to upper level and select your CD/DVD drive in **1st Boot Device**

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4.2.5 Boot from USB Flash disk

1. Select **USB Drives** and press Enter
2. Your USB flash disk is displayed with its identification string. Specify it as **1st Drive**
3. Go back to upper level and select your USB flash disk in

4.2.6 Boot from USB External Hard Drive

1. Select **USB Drives** and press Enter
2. Your USB external hard drive is displayed with its identification string. Specify it as **1st Drive**
3. Go back to upper level and select your USB external hard drive in **1st Boot Device**

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4.3 Serial Port Optiosn

4.3.1 Serial Port Configuration

There are two individual 16550-compatible serial ports in the system, the RS232/RS485/RS422 modes are selected in BIOS Setup under the Advanced/Super I/O Configuration menu, and the RS232 mode is the default (Standard) for any serial port.

Note:	To implement the RS232/RS485/RS422 mode on the serial ports, you must tie the equivalent pins together for the selected port, please refer to section 2.2.6 for the specific pins for the serial ports

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4.4 Exit Options

4.4.1 Save Changes and Exit

When you finish BIOS setting, please select this option to save all changes and reboot the system to make new setting takes effect.

4.4.2 Discard Changes and Exit

Select this option to discard all changes and exit BIOS setup.

4.4.3 Discard Changes

Select this option to discard all changes without exiting BIOS setup.

4.4.4 Load Optimal Defaults

Select this option to set all BIOS options to a complete set of default setting. The Optimal setting is designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Optimal Setup options if your computer encounters system configuration problems.

4.4.5 Load Failsafe Defaults

Select this option to set all BIOS options to a complete set of default setting. The Failsafe setting is designed for maximum system stability, but not maximum performance. Select the Fail-Safe Setup options if your computer encounters system configuration problems.

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