IPC Series

BOX-PC®
for IPC-BX720-AC Series

User's Manual

CONTEC CO.,LTD.

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1. Introduction

IPC-BX720-AC is the "BOX-PC (R) 720 Series" of embedded computers based on the Intel(R) Celeron (R) 2.0 GHz processor with a Windows OS preinstalled. The 720 Series is a compact BOX-PC with a high-power CPU while clearing severe environment conditions for ambient temperatures based on its dust cooling system providing high cooling efficiency and dust resistance. The BOX-PC has a wealth of extension interfaces, with all the connectors including the PCI slots concentrated on the front panel, providing superb maintainability and other added values unique to CONTEC. As the BOX-PC incorporates handpicked components such as the embedded types of CPU and chipset, it excels in reliability and stable supply for an extended period of time, offering usability without anxiety.

* The BOX-PC is a registered trademark of CONTEC CO., LTD.

Features

High performance

- Equipped with a high-performance CPU of Intel (R) Celeron (R) processor 2.0 GHz (400-MHz FSB), supporting high-speed data acquisition/arithmetic applications.
- High-power CPU based compact PC serviceable in a guaranteed operating range of ambient temperatures from 0 to 50 degrees centigrade (*1).

Assorted extension interfaces

- Coming standard with a variety of extensions such as two PCI slots, five serial ports (RS-232C x 4, RS-422/485 x 1 [inside a RAS connector]), two LAN connectors (100BASE-T x 1, 100BASE-TX x 1), a CF slot (bootable), and the RAS connector.

High maintainability

- The front panel with all the connectors and PCI slots and the slot-in system facilitating the mounting and demounting of storage devices.
- PCI slots in the riser unit structure removable from the system unit, making it easy to plug and unplug PCI boards.
- Long-life fan (life expectancy of six years (*2)) in an easily replaceable fan unit

High reliability and secure design

- Duct cooling system with high cooling efficiency and dust resistance, using the fan unit to directly cool the CPU and the left and right ducts to exhaust the isolated air from heat sources.
- Equipping with a falling-off stopper clamp for the AC power cable, a falling-off stopper bracket for the CF slot, and a strong falling-off stopper clamp for the PCI-slot.
- EEPROM retaining the BIOS settings, capable of booting even when the battery is dead.

Stable supply

- Long-life design with handpicked components such as the CPU and chipset for embedded computing, remaining in stable supply for an extended period of time as industrial equipment.

(*1) The temperature range is for the silicon disk drive mounted model with a Windows OS preinstalled. For the HDD mounted model, the guaranteed operating range of temperatures is 5 to 45 degrees centigrade.
(*2) The period of time is expected assuming the continuous operation at an ambient temperature of 40 degrees centigrade.

Supported OS

- Windows XP Professional
- Windows XP Embedded

Customer Support

CONTEC provides the following support services for you to use CONTEC products more efficiently and comfortably.

Web Site

Japanese	http://www.contec.co.jp/
English	http://www.contec.com/
Chinese	http://www.contec.com.cn/

Latest product information

CONTEC provides up-to-date information on products.
CONTEC also provides product manuals and various technical documents in the PDF.

Free download

You can download updated driver software and differential files as well as sample programs available in several languages.

Note! For product information

Contact your retailer if you have any technical question about a CONTEC product or need its price, delivery time, or estimate information.

Limited One-Year Warranty

CONTEC Products are warranted by CONTEC CO., LTD. to be free from defects in material and workmanship for up to one year from the date of purchase by the original purchaser.

Repair will be free of charge only when this device is returned freight prepaid with a copy of the original invoice and a Return Merchandise Authorization to the distributor or the CONTEC group office, from which it was purchased.

This warranty is not applicable for scratches or normal wear, but only for the electronic circuitry and original products. The warranty is not applicable if the device has been tampered with or damaged through abuse, mistreatment, neglect, or unreasonable use, or if the original invoice is not included, in which case repairs will be considered beyond the warranty policy.

How to Obtain Service

For replacement or repair, return the device freight prepaid, with a copy of the original invoice. Please obtain a Return Merchandise Authorization number (RMA) from the CONTEC group office where you purchased before returning any product.

* No product will be accepted by CONTEC group without the RMA number.

Liability

The obligation of the warrantor is solely to repair or replace the product. In no event will the warrantor be liable for any incidental or consequential damages due to such defect or consequences that arise from inexperienced usage, misuse, or malfunction of this device.

Safety Precautions

Understand the following definitions and precautions to use the product safely.

Safety Information

This document provides safety information using the following symbols to prevent accidents resulting in injury or death and the destruction of equipment and resources. Understand the meanings of these labels to operate the equipment safely.

⚠ DANGER	DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.

Handling Precautions

⚠ WARNING

- Always check that the power supply is turned off before connecting or disconnecting power cables.
- Do not modify the product.
- Always turn off the power before inserting or removing circuit boards or cables.
- This product is not intended for use in aerospace, space, nuclear power, medical equipment, or other applications that require a very high level of reliability. Do not use the product in such applications.
- If using this product in applications where safety is critical such as in railways, automotive, or disaster prevention or security systems, please contact your retailer.

⚠ CAUTION

- Do not use or store the product in a location exposed to extremely high or low temperature or susceptible to rapid temperature changes.
  Example: - Exposure to direct sun
  - In the vicinity of a heat source
- Do not use the product in extremely humid or dusty locations. It is extremely dangerous to use the product with its interior penetrated by water or any other fluid or conductive dust. If the product must be used in such an environment, install it on a dust-proof control panel, for example.
- Avoid using or storing the device in locations subject to shock or vibration.
- Do not use the product in the vicinity of devices that generate strong magnetic force or noise. Such devices will cause this device to malfunction.
- Do not use or store the product in the presence of chemicals.
- To clean the BOX-PC, wipe it gently with a soft cloth dampened with either water or mild detergent. Do not use chemicals or a volatile solvent, such as benzene or thinner, to prevent pealing or discoloration of the paint.
- Hard disks have a limited life span. Please perform systematic backup and maintenance.
- CONTEC does not provide any guarantee for the integrity of data on hard disks.
- To prevent corruption of files, always shutdown the OS before turning off the BOX-PC.
- 2.5 inches hard disk drive (HDD) of our company has not guaranteed use by continuation and continuation power for 24 hours. When it is used by continuation operation and continuation power, a life fails extremely. In the case of a 24 hours operation system, use of our company silicon disk drive (SDD) is recommended.
- Be sure to unplug the power cable from a wall outlet before plugging or unplugging an expansion board or any connector.
- CONTEC does not provide any guarantee for the integrity of data on hard disks.
- In the event of failure or abnormality (foul smells or excessive heat generation), unplug the power cord immediately and contact your retailer.
- To connect with peripherals, use a grounded, shielded cable.
- The AC cable must use the one that suited the power-supply voltage and the outlet plug used. (Supplied cable is for 125VAC.)
- Connection USB apparatus

There is USB apparatus by which current flows conversely to BOXPC through a connection cable at the time of power supply off of BOXPC. When such apparatus is connected, since 5V power supply does not turn off completely, BOXPC may be unable to be started. In such a case, please remove USB apparatus and connect again after a power supply injection. However, please connect again before performing apparatus detection, when using USB apparatus as a boot device.

- Component Life:

(1) Power supply--- When continuously operating at 40°C, the estimated life expectancy is about five years(The horizontal installation). However, it decreases according to the use temperature (high temperature).

(2) Battery--- The internal calendar clock and CMOS RAM are backed by a Lithium primary battery. The backup time at a temperature of 25°C with the power disconnected is 10 years or more.

(3) FAN--- When continuously operating at 40°C, the estimated life expectancy is about six years. However, it decreases according to the use temperature (high temperature).

* Replacement of expendables is handled as a repair (there will be a charge).

FCC PART 15 Class A Notice

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 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 at his own expense.

WARNING TO USER

Change or modifications not expressly approved the manufacturer can void the user's authority to operate this equipment.

2. Overview

Specifications

Table 2.1. Functional Specifications *< 1 / 2 >*

Item		Specification
CPU		Intel(R) Celeron(R) Processor 2.0GHz(FSB400MHz)
Chipset		Intel(R) 845GV
Memory	L2 Cache	256KB
	Main memory	Standard 512MB *1 2GB(1GB x 2)(Max.), 2.5V 184 pin DDR SDRAM PC2100 DIMM Socket x 2
	BIOS ROM	128KB E0000H - FFFFFH (Award)
Video	Controller	Intel(R) 845GV (Built into the controller)
	Video RAM	Main memory shared
	Video BIOS	48KB (C0000H - CBFFF)
	Display I/F	DVI-I 29 pin *2
System resolution		640 x 480(16,770,000 colors), 800 x 600(16,770,000 colors), 1,024 x 768(16,770,000 colors), 1,280 x 1,024(16,770,000 colors), 1,600 x 1,200(16,770,000 colors)
Audio		AC97 compliant LINE IN: ϕ3.5 Stereo mini jack Full-scale input level 1.3Vrms(Typ.) LINE OUT: ϕ3.5 Stereo mini jack Full-scale output level 1.0Vrms(Typ.), Dual 250mW Amplifier MIKE IN: ϕ3.5 Monaural mini jack Full-scale input level 1.3Vrms(Typ.)
IDE HDD I/F	Primary	Ultra DMA/100 One 2.5-inch IDE HDD or silicon disk drive mounted (Primary IDE Master)
	Secondary	Equipped with a dedicated 36pin, half-pitch connector (for connection of an optional CD-ROM/DVD-ROM drive) (Secondary IDE Master)
CF card slot		CF CARD Type I, II x 1(dedicated to memory card)(Secondary IDE Slave)
Serial I/F		RS-232C(general-purpose): 4ch (SERIAL PORT1, 2, 3, 4) 9 pin D-SUB connector RS-232C(touch panel): 1ch (SERIAL PORT5) [inside the DVI connector] *3 RS-422/485(general-purpose): 1ch (SERIAL PORT6) [inside the RAS connector] Baud rate: SERIAL1, 2 is 115,200bps, SERIAL3 - 6 is 230,400bps
LAN1	I/F	Ethernet 100BASE-TX/10BASE-T RJ-45 connector
	Controller	Intel(R) ICH4(Built into the controller)
LAN2	I/F	Ethernet 1000BASE-T/100BASE-TX/10BASE-T RJ-45 connector
	Controller	Intel(R) 82541PI
USB I/F		4ch(USB 2.0 specification)
keyboard I/F		Corresponding to PS/2 keyboard (6pin mini-DIN connector)
Mouse I/F		Corresponding to PS/2 mouse (6pin mini-DIN connector)

Table 2.1. Functional Specifications *< 2 / 2 >*

Item		Specification
General-purpose I/O		3 opto-isolated inputs and outputs (However, one output also serves as an external WDT output and one input also serves as remote reset. They become available when switched.)
RAS function		WDT: 1sec - 255sec (RESET, interrupt or external output is allowed at time expiration) Remote reset: External input signal
Expansion board slot		PCI slot x 2 (PCI Rev2.0 compliant) Usable board dimension: 190.00(L) x 106.68(H)mm (Max.)
RTC/CMOS		Lithium backup battery life: 10 years or more The real-time clock is accurate within ±3 minutes (at 25°C) per month (ICH4 built in RTC) *4, ±1 minute/per month (a high-precision RTC) *4.
Power supply	Input supply voltage	85 - 132VAC/170 - 264VAC(47 - 63Hz) input automatic operation switch
	Current consumption	190VA (Max.)
	External device power supply capacity *5	- CF card slot: +5V: 500mA *6 - USB I/F: +5V: 2A (500mA x 4) *6 - Expansion board slot: +5V: 2A (1A x 2 slot) *6, +3.3V: 2A(1A x 2 slot), -5V: unsupply, +12V: 0.5A, -12V: 80mA
External dimension (mm)		242(W) x 262(D) x 115(H) (No protrusion)
Weight		About 5.6kg(At the time of the HDD(SDD) uninstalling)

*1 512MB memory module is plugged.

*2 The interface can connect the PC to a CONTEC Panel Link input type display (using an optional cable) or an ordinary analog RGB input display (using the bundled DVI-analog RGB adapter).

*3 The interface is used for the CONTEC Panel Link or touch panel type display.

*4 This product contains a high-precision RTC (±1 minute/per month) beside the ICH4 integrated RTC. You can use the RTC utility to synchronize the ICH4 integrated RTC with the high-precision RTC. For using the RTC utility, refer to IPC-SLIB-01.

*5 If an external device rapidly consumes current immediately after the power is turned on, the BOX-PC may not work normally even when the supply source capacity is within the specified range.

*6 The total supply capacity for +5V external devices must be within 3 A.

Table 2.2. Installation Environment Requirements

Item			Specification
Power supply specifications	Allowable instantaneous power outage		Less than 20ms
	Dielectric strength		One minute each for 2.0kV AC (input - FG) 20mA
			50MΩ (500VDC)
Ambient specifications	Operating temperature		0 - 50°C(Using the SDD *1), 5 - 45°C(Using the HDD)
	Storage temperature		-10 - 60°C
	Operating humidity		10 - 90%RH(No condensation)
	Floating dust particles		Not to be excessive
	Corrosive gases		None
	Line-noise resistance	Line noise	AC line/±2kV, Signal line/±1kV (IEC61000-4-4Level 3, N61000-4-4Level 3)
		Static electricity resistance *3	Contact discharge/±4kV (IEC61000-4-2Level 2, EN61000-4-2Level 2) Atmospheric discharge/±8kV (IEC61000-4-2Level 3, EN61000-4-2 Level 3)
	Vibration resistance *2	Sweep resistance	10 - 57Hz/semi-amplitude 0.15mm 57 - 150Hz/2.0G 40 min. each in x, y, and z directions (JIS C0040-compliant, IEC68-2-6-compliant)
	Impact resistance *2		10G, half-sine shock for 11 ms in x, y, and z directions (JIS C0041-compliant, IEC68-2-27-compliant)
	Grounding		Class D grounding (previous class 3 grounding)

*1 When Windows OS operates(Please consult about operation excluding Windows OS)

*2 When the HDD is not in use.

*3 CPU heat sink and the duct opening are excluded.

System Configuration

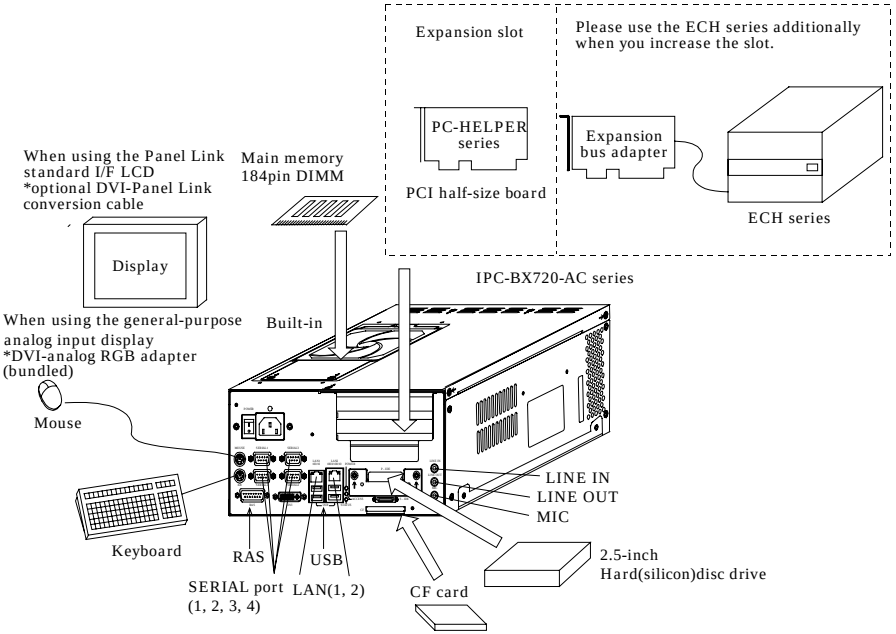


Figure 2.1. System Configuration

External Dimensions

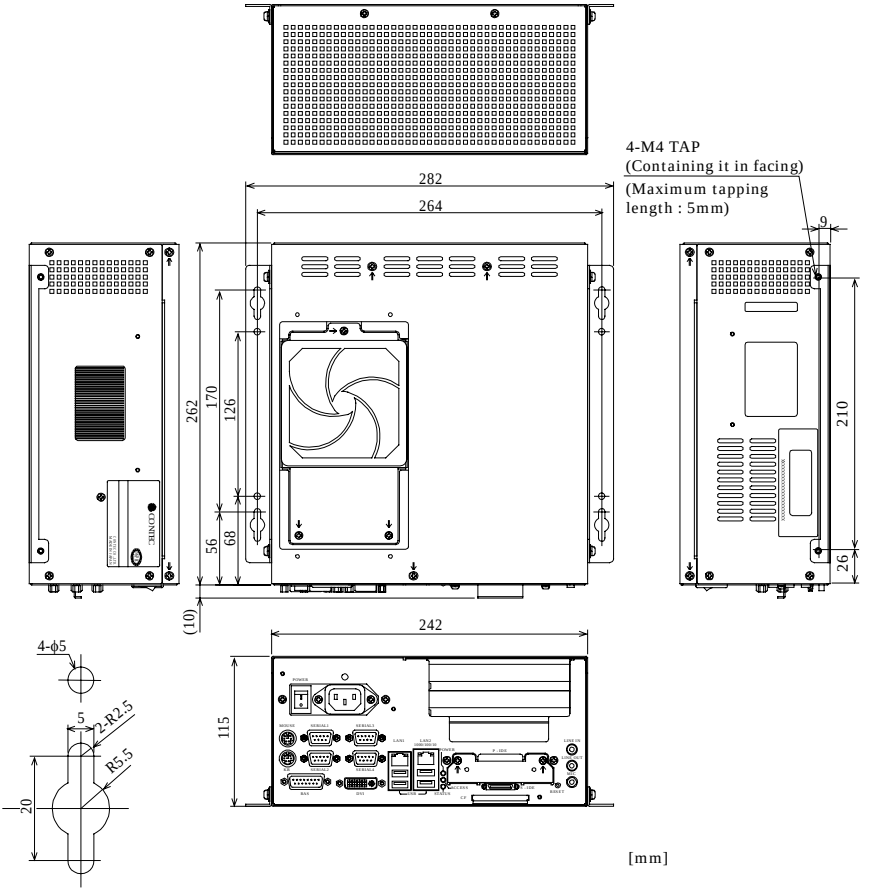


Figure 2.2. IPC-BX720-AC

Air flows

The following sketches illustrate air flows of this product. Before installing the product, consider the air flows, ventilation, and installation conditions for its use.

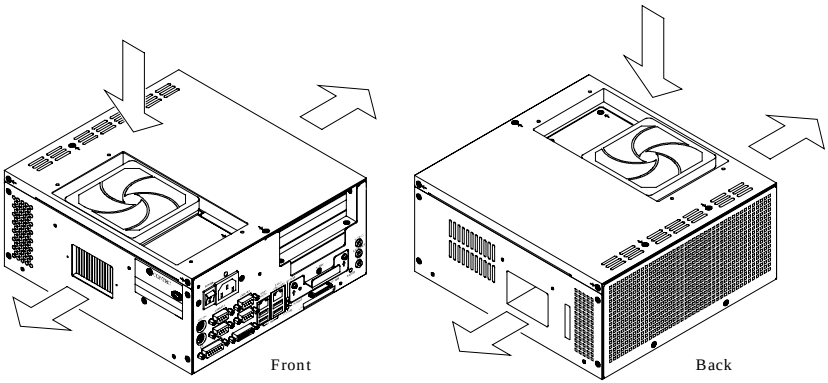


Figure 2.3. Air flows

3. Hardware Setup

Before Using the BOX-PC for the First Time

Follow the next steps to set up the BOX-PC:

STEP1 Install the hard disk and set jumper switches.
By referring to the information in this chapter, set the BOX-PC.

STEP2 Connect cables.
Connect necessary external devices, such as a printer and a CRT, to the BOX-PC using appropriate cables.

STEP3 Turn on the power.
After verifying that you have correctly followed steps 1 and 2, turn on the power. If you feel something is wrong after turning on the power, turn off the power immediately and check to see if the BOX-PC has been set up correctly.

STEP4 Set up BIOS.
By referring to Chapter 4, set up BIOS. This setup requires a keyboard and a display.

* Before using the BOX-PC, be sure to execute "Load Optimized Defaults" to initialize the BIOS settings to their default values. (See Chapter 4, "Main Menu.")

⚠ CAUTION

If your BOX-PC is a Windows preinstalled model, be sure to connect the keyboard and mouse to it before turning the power on for the first time.

Hardware Setup

- Please confirm the power supply is turning off before it works.
- Please do not remove excluding the explained screw.

How to attach the PCI board

(1) Use a Phillips screwdriver to remove the screws and top cover as shown below.

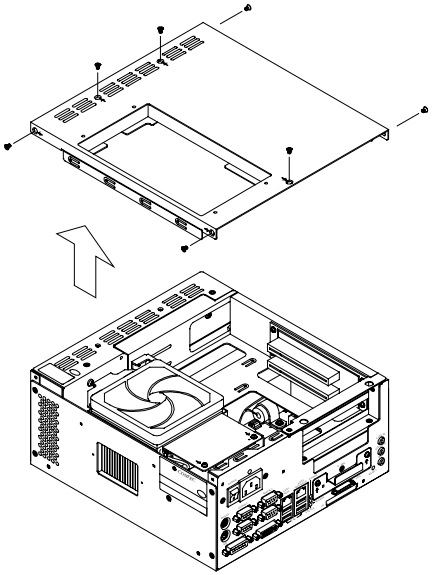


Figure 3.1. Removing the top cover

(2) Remove the PCI Riser bracket.

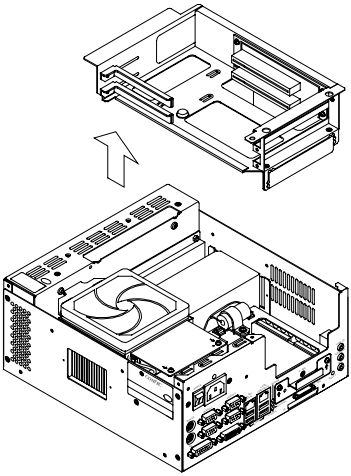


Figure 3.2. Removing the PCI Riser bracket

(3) Insert each PCI board into the PCI riser bracket and attach the plug board holding bracket.

⚠ CAUTION

Make sure carefully that the board has been secured in the slot.

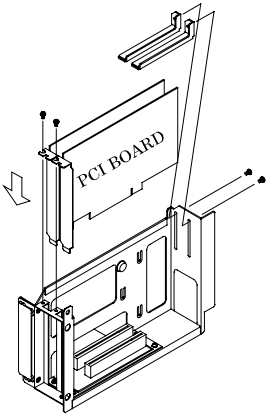


Figure 3.3. Setting the PCI Boards on the PCI Riser Bracket

(4) Mount the PCI riser bracket with PCI boards on the system unit.

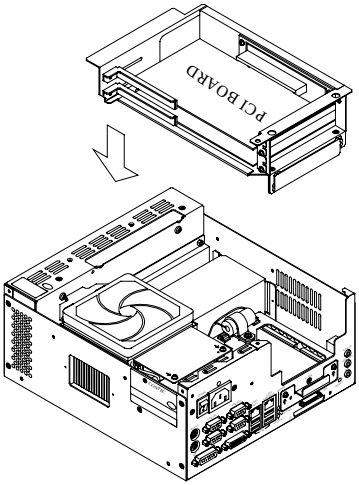


Figure 3.4. Setting the PCI Riser Bracket

(5) Set the top cover.

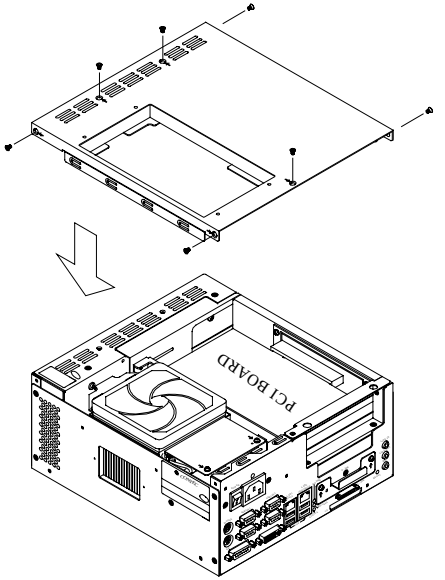


Figure 3.5. Setting the PCI Riser Bracket

Locations and Settings of DIMM Sockets and Jumpers

(1) Remove the top cover.

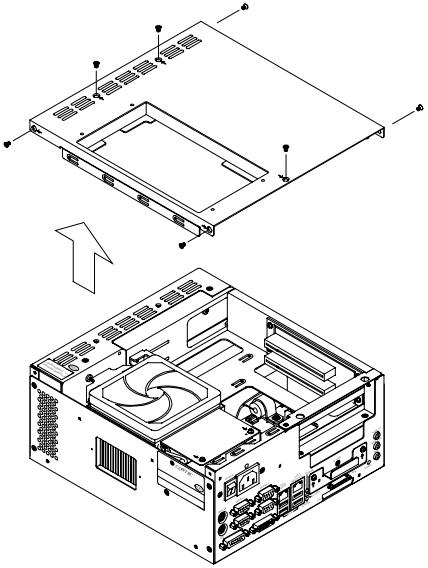


Figure 3.6. Removing the top cover

(2) Remove the PCI riser bracket and the fan bracket.

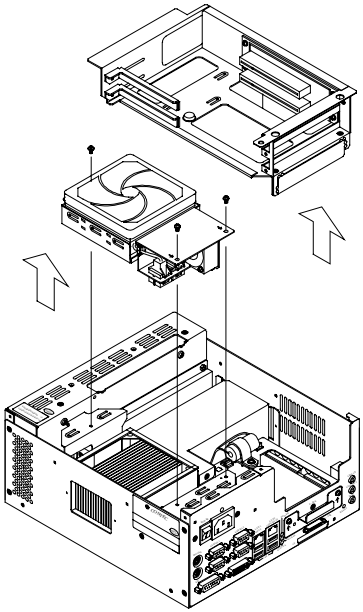


Figure 3.7. Removing the PCI Riser Bracket, FAN Bracket

(3) Remove the power duct bracket.

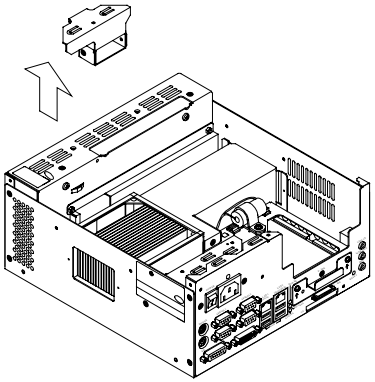


Figure 3.8. Removing the power duct bracket

When you have removed the top cover and brackets, you can see the DIMM sockets and a series of jumpers as shown below.

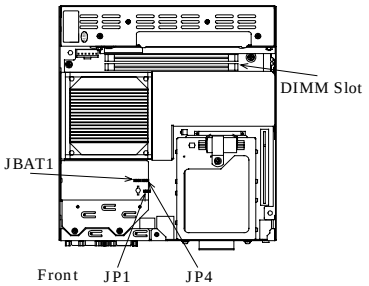


Figure 3.9. Locations and Settings of Jumpers and Connectors inside the Top Cover

(4) Set the jumpers according to Tables 2.1 and 2.2.

Table 3.1. Jumper List

No.	Function	Factory setting	Reference Page	Remarks
JBAT1 JP4	Clear CMOS(EEPROM)	1-2 shorted	47	
JP1	Sets RS-485 termination	2-3 shorted	61	

Table 3.2. Internal Connector List

Name	Function	Reference page
DIMM1, DIMM2	Memory socket (184 pin DIMM Socket)	----

(5) To increase the memory capacity, plug appropriate modules into the DIMM1 and DIMM2 sockets.

Compatible DIMM Types

Obtain the following special option products.

- Package type : 184 pin DIMM
- Specifications : PC2700/DDR333 2.5V
- Capacity : 512MB
- Type : SDRAM
- Optional memories * : PC-MDD512-184A(512MB)

* Operation is not guaranteed if memory parts other than CONTEC option products are used.

(6) After setting the jumpers and plugging the DIMMs, put the brackets and top cover back in place in reverse order.

Installing the Hard Disk

(1) Remove the Hard Disk bracket from the IPC-BX720-AC.

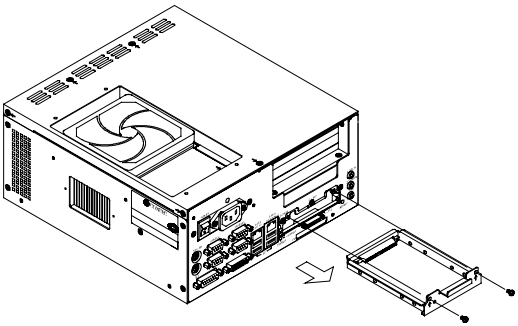


Figure 3.10. Removing the Hard Disk Bracket

(2) Install the hard disk (silicon disk) to the hard disk bracket. Plug the HDD into the socket first, then fasten it with four screws.
Fasten the disk using the outer or inner hole depending on the model you are using. (The figure below shows an example that uses the inner screw hole.)

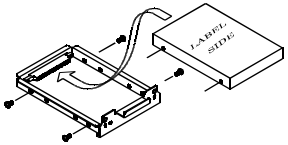


Figure 3.11. Installing the Hard Disk to the bracket

⚠ CAUTION

Connect the HDD cable in alignment with pins from the left end of the connector on the HDD side. Four master/slave setting pins are left unconnected on the right side. Be aware that connecting the power with the connector misaligned will damage the cable.

(3) Insert the HDD mounted bracket into the system unit and fasten them with screws.

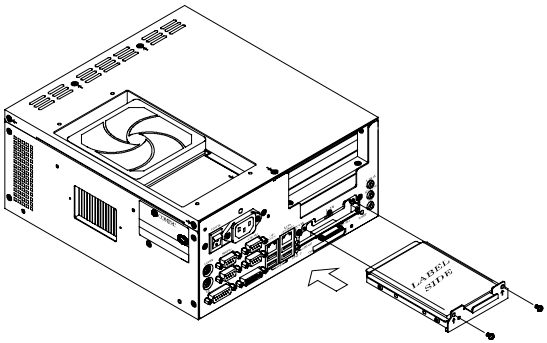


Figure 3.12. Installing the Hard Disk Bracket

⚠ CAUTION

When tightening the screws to fasten the HDD to the bracket or the HDD mounted bracket to the system unit, do not use any tool such as an electric screwdriver, which vibrates the HDD. Not doing so will damage the HDD.

Attaching the CF card stopper

(1) After plugging the CF card, attach the bundled CF card stopper with a screw.

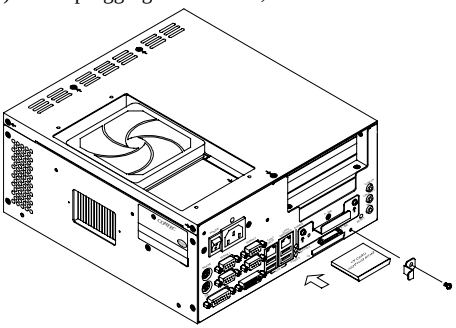


Figure 3.13. Attaching the CF Card Stopper

⚠ CAUTION

Insert the CF card with the bottom face down.

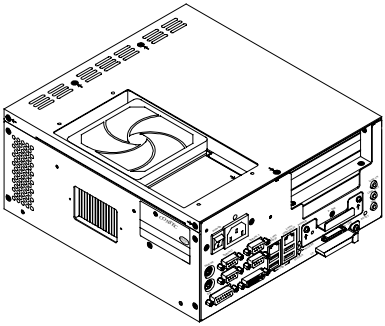


Figure 3.14. After the CF Card Stopper is Attached

Fastening the AC Power Cable

The “Power Cable Fixed Clamp” is attached to the main case.

(1) Attach the tip of the cable tie to the hole above the AC inlet.

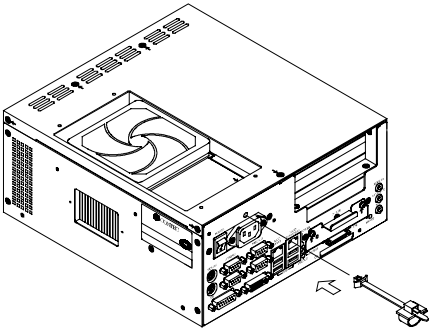


Figure 3.15. Attaching the cable tie

(2) Plug the AC power cable into the AC inlet.

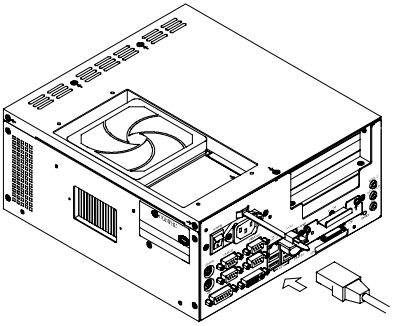


Figure 3.16. Plugging the Power Cable

(3) Apply the clamp to the AC power cable.

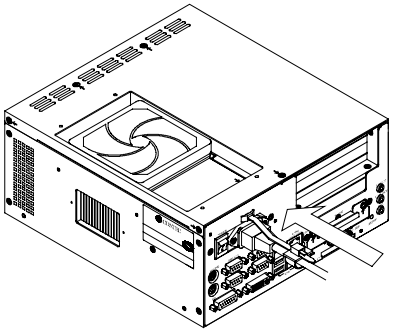


Figure 3.17. Installing the Clamp

(4) Move the clamp as close to the AC inlet as possible, then tighten the clamp to fasten the AC power cable.

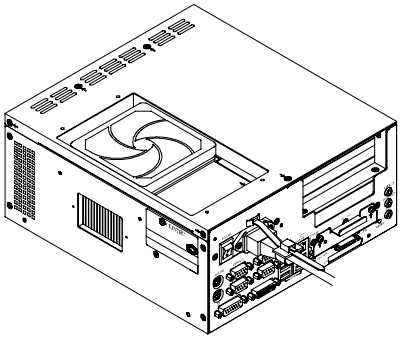


Figure 3.18. Fixing the Clamp

Installation Requirements

The BOX-PC can be installed in any orientation (1) through (3). Avoid orientation (4) through (6) since it might not adequately dissipate heat. Similarly, to maintain the ambient temperature within the range specified in the specifications, ensure a clearance between the unit and surrounding equipment of at least 100mm for the top and rear and 50mm for the bottom and sides.
Installation Orientation

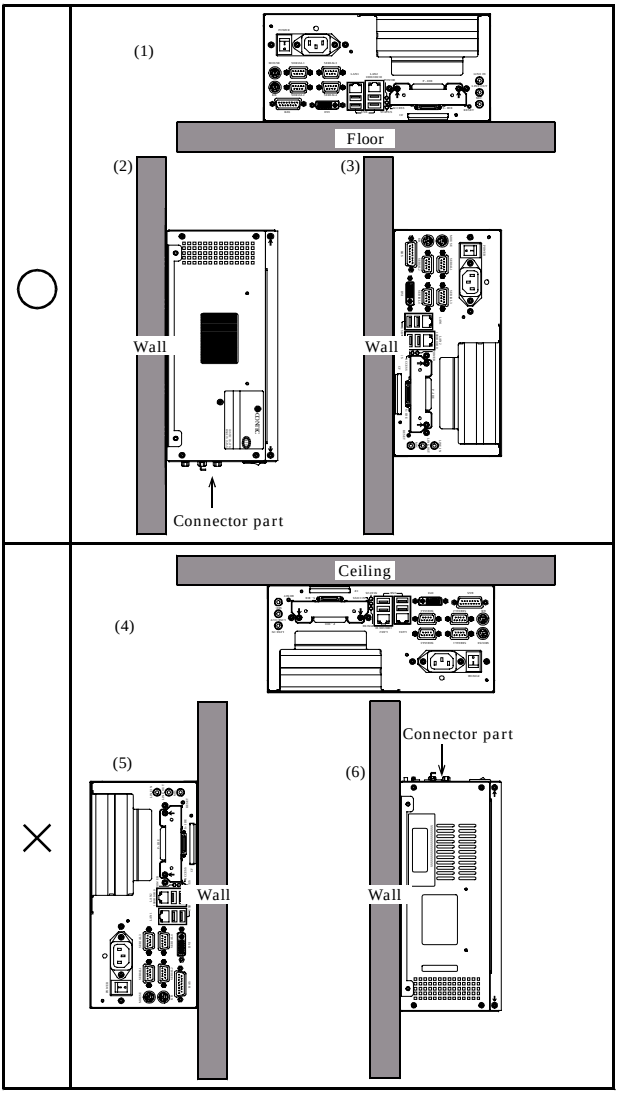


Figure 3.19. Installation Orientation

Distances between the BOX-PC and Its Vicinity

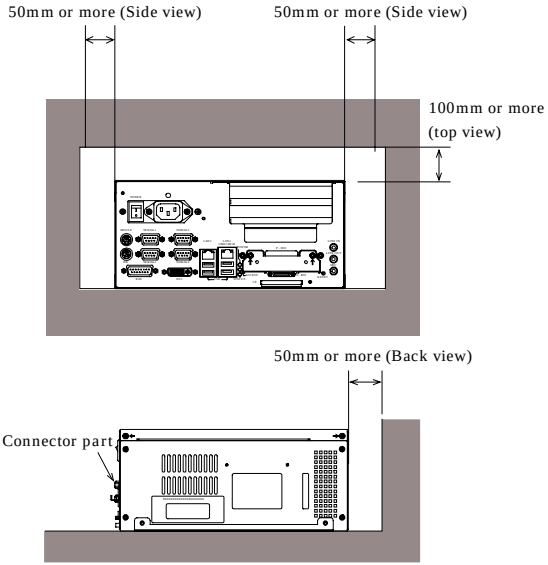


Figure 3.20. Distances between the BOX-PC and Its Vicinity

4. BIOS Setup

BIOS Setup

BIOS setup sets various settings during startup. When using the system for the first time, be sure to run BIOS setup. Once set up, the specified details will be backed up.

Starting the Setup Screen

When you turn on the system power supply, the BOX-PC displays the following initial screen as long as the system is normal. Press the <F2> key at the keyboard.

```
Phoenix - AwardBIOS v6.00PG, An Energy Star Ally
Copyright(C) 1984-2003, Phoenix Technologies, LTD

IPC-F720 series BIOS ver. x.xx

Main Processor : Intel(R) Celeron(R) CPU 2.8GHz(133x21.0)
Memory Testing : 253952K OK + 8192K Shared Memory
CPU Brand Name : Intel(R) Celeron(R) CPU 2.8GHz

Memory Frequency For DDR333
Primary Master   : None
Primary Slave    : None
Secondary Master : None
Secondary Slave  : None


Press DEL to enter SETUP
```

Figure 4.1. Initial Screen

Using Setup

In general, you use the arrow keys to highlight items, press <Enter> to select, use the <PageUp> and <PageDown> keys to change entries, press <F1> for help and press <Esc> to quit.

Table 4.1. Using Setup program

Key	Function
Up Arrow	Move to the previous item
Down Arrow	Move to the next item
Left Arrow	Move to the item on the left (menu bar)
Right Arrow	Move to the item on the right (menu bar)
Esc	Main Menu: Quit without saving changes Submenus: Exit Current page to the next higher level menu
Move Enter	Move to the item you desired
PgUp key	Increase the numeric value or make changes
PgDn key	Decrease the numeric value or make changes
+ key	Increase the numeric value or make changes
- key	Decrease the numeric value or make changes
Esc key	Main Menu -- Quit and not save changes into CMOS(EEPROM) Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
F1 key	General help on Setup navigation keys
F5 key	Load previous values from CMOS(EEPROM)
F6 key	Load the fail-safe defaults from BIOS default table
F7 key	Load the optimized defaults
F10 key	Save all the CMOS(EEPROM) changes and exit

Getting Help

Press <F1> to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press <Esc> or the <F1> key again.

Note on the setup

Information in this chapter is subject to change without notice.

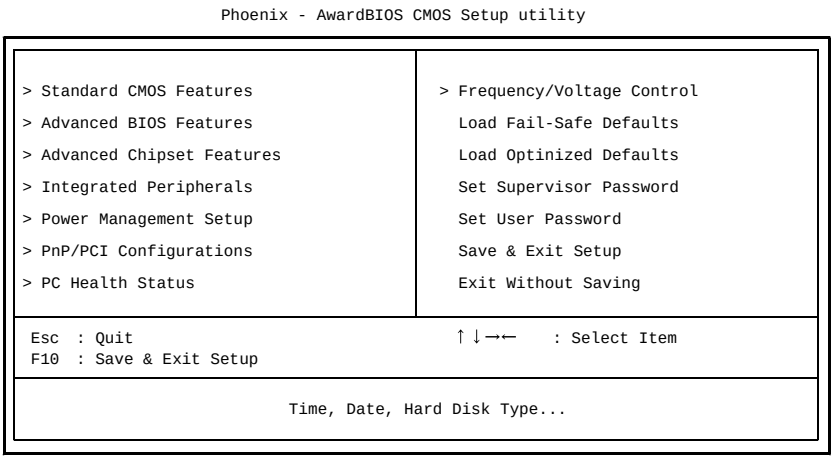


Figure 4.2. Main window

Main Menu

Once you enter the Award BIOS CMOS Setup Utility, the Main Menu will appear on the screen. The Main Menu allows you to select from several setup functions and two exit choices. Use the arrow keys to select among the items and press <Enter> to accept and enter the sub-menu.

Note that a brief description of each highlighted selection appears at the bottom of the screen.

Setup Items

The main menu includes the following main setup categories.

Standard CMOS Features

Use this menu to set the standard CMOS function available on your system.

Advanced BIOS Features

This section allows you to configure your system for basic operation.

Advanced Chipset Features

Use this menu to set up some features of the chipset.

Integrated Peripherals

Use this menu to set up peripheral devices such as IDE and PCI devices.

Power Management Setup

Use this menu to specify your settings for power management.

PnP / PCI Configuration

Use this menu to configure the PCI bus system.

PC Health Status

Use this menu to reference internal voltages and temperatures of the PC.

Frequency/Voltage Control

You do not have to use this menu for setup on this machine.

Load Fail-Safe Defaults

Use this menu to load the Fail-Safe Defaults values.

Load Optimized Defaults

Use this menu to load the BIOS appropriate default values.

Supervisor / User Password

Use these menu items to specify passwords for BIOS Setup.

You can set up all the BIOS setup items in supervisor mode but not in user mode.

⚠ CAUTION

Once a password is registered, even the password function itself cannot be cancelled without the password. Passwords should be handled with great care.

Save & Exit Setup

Use this option to save all the changes made on the Setup screen to CMOS (EEPROM) and reboot the PC.

Exit Without Save

Use this option to reboot the PC with the last saved settings without saving any changes made on the Setup screen to CMOS (EEPROM).

Standard CMOS Setup

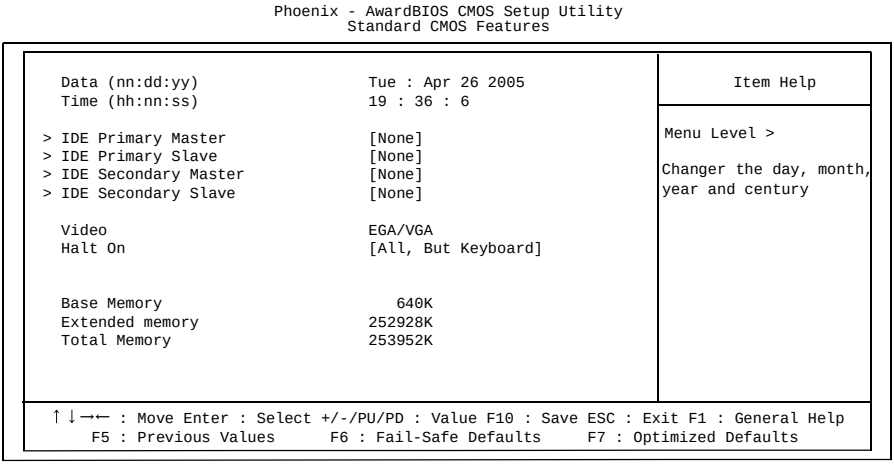


Figure 4.3. Standard CMOS Setup Window (factory setting)

The items in Standard CMOS Setup Menu are divided into 10 categories. Each category includes no, one or more than one setup items. Use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.

Selection from the Standard CMOS Setup

This table shows the selections that you can make on the **Standard CMOS Setup**.

Table 4.2. Selecting item of the Standard CMOS Setup

Item	Option	Description
Date	Month DD YYYY	Sets the date on the equipment calendar clock. Note that the 'Day' automatically changes when you set the date.
Time	HH : MM : SS	Sets the time on the equipment calendar clock.
IDE Primary Master	None Auto Manual	Set the type of HDD(SDD *1) to be used as the first drive. Selecting this field changes the screen to the submenu for manually setting drive configuration data such as the number of cylinders. This field is set to [Auto] by default. You can leave it intact for normal use.
IDE Primary Slave	None Auto Manual	Connection not allowed. Set to "None."
IDE Secondary Master	None Auto Manual	Usually, set this item to "None." If you have connected a CD-ROM drive to the secondary IDE connector, set this to "Auto" or "Manual" as required.
IDE Secondary Slave	None Auto Manual	Usually, set this item to "None." If you have connected a CF card to the CF connector, set this to "Auto" or "Manual" as required.
Halt On	All Errors No Errors All, but Keyboard All, but Diskette All, but Disk/Key	The default is "All, but Keyboard"; you usually do not have to change this setting.
Video	EGA/VGA	Displays the detected amount of Video card installed on the system.
Base Memory	N/A	Displays the detected amount of memory installed on the system.
Extended Memory	N/A	Displays the detected amount of memory installed on the system.
Total Memory	N/A	Displays the detected amount of memory installed on the system.

*1 To use a PC-SDD V series product with a capacity of 500 MB or less, set the item to "Manual" and select the CHS mode. For drive information such as the number of cylinders, see the manual for the PC-SDD series.

Advanced BIOS Features Setup

This section allows you to configure your system for basic operation.

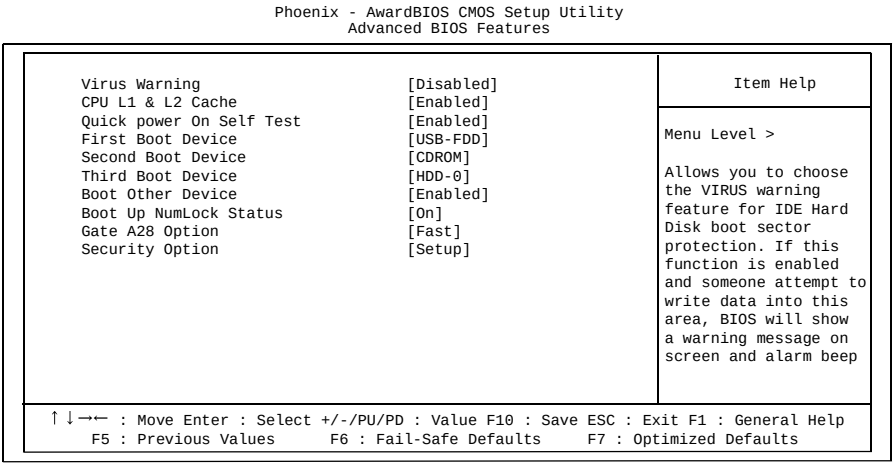


Figure 4.4. Advanced BIOS Features Window (factory setting)

Selection from the Advanced BIOS Features Setup

This table shows the selections that you can make on the **Advanced BIOS Features Setup**.

Table 4.3. Selecting item of the Advanced BIOS Features Setup *< 1 / 2 >*

Item	Option	Description
Virus Warning	Enabled Disabled	If you enable this feature, a warning message is displayed when a program (a virus in particular) attempts to write to the boot sector or partition table of the hard disk drive. *1
CPU L1 & L2 Cache	Enabled Disabled	The default is "Enabled"; you usually do not have to change this setting.
Quick Power On Self Test	Disabled Enabled	Setting this item to "Disabled" causes Power On Self Test (POST) to be performed in more detail. The default is "Enabled"; you usually do not have to change this setting.
First/Second/Third/Boot Device	HDD-0 SCSI CDROM HDD-1 HDD-2 HDD-3 USB-FDD USB-CDROM USB-HDD LAN Disabled	BIOS starts booting the system in the device order selected here. Set these items depending on the devices connected. - HDD-0 : Internal HDD (SDD) *2 - SCSI : SCSI device if an SCSI board has been plugged in an expansion slot - CD-ROM : Optional CD-ROM drive (IDE connection) - HDD-1 : Card plugged in the CF connector on the system unit *2 (IDE connection) - HDD-2/3 : Not available - USB-FDD/CDROM/HDD : - Device connecting to the USB - LAN : For boot-up from a network *3
Boot Other Device	Disable Enable	In the case that it is not possible boot with the First/Second/Third setting devices, BIOS tries the boot from other devices. The default is "Enabled"; you usually do not have to change this setting.
Boot Up NumLock Status	Off On	Select a NumLock key status at system startup. The default is "On"; you usually do not have to change this setting.
Gate A20 option	Nomal Fast	The default is "Fast"; you usually do not have to change this setting.

Table 4.3. Selecting item of the Advanced BIOS Features Setup *< 2 / 2 >*

Item	Option	Description
Security Option	Setup System	Select whether the password is required every time the system boots or only when you enter setup. Select whether the password be requested whenever the system boots up or only upon startup of Setup. The default is "Setup"; you usually do not have to change this setting. System: The system won't boot up and access to Setup will be denied unless the correct password is entered at the prompt. Setup: The system will boot, but access to Setup will be denied if the correct password is not entered at the prompt. *4

*1 If a warning message appears, run an antivirus program. This feature protects only the boot sector. Note that the feature does not protect the entire hard disk drive. A virus warning message may be displayed in response to various diagnostic and installation programs which access the boot sector table. You should disable Virus Warning before running such a program.

*2 If the system unit contains no HDD (SDD), "HDD-0" causes the system to be booted from the card in the CF connector on the system unit. ("HDD-1" is disabled.)

*3 Boot-up from a network uses the PXE (Pre-Boot eXecution Environment) client feature.
Boot-up from a LAN requires a server supporting the PXE client. (Such as a Windows remote install server)

*4 To disable security, select PASSWORD SETTING at Main Menu and then you will be asked to enter password. Do not type anything and just press <Enter>, it will disable security. Once the security is disabled, the system will boot and you can enter Setup freely.

⚠ CAUTION

- If a warning message appears, run an antivirus program. This feature protects only the boot sector. Note that the feature does not protect the entire hard disk drive. A virus warning message may be displayed in response to various diagnostic and installation programs which access the boot sector table. You should disable Virus Warning before running such a program.
- To disable security, select PASSWORD SETTING at Main Menu and then you will be asked to enter password. Do not type anything and just press <Enter>, it will disable security. Once the security is disabled, the system will boot and you can enter Setup freely.

Advanced Chipset Features Setup

Use this menu to set up some features of the chipset.

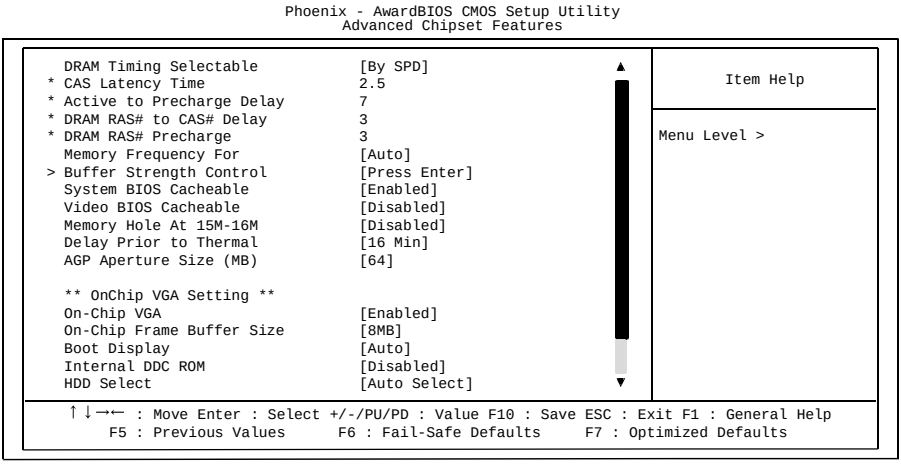


Figure 4.5. Advanced Chipset Features Window (factory setting)

Selection from the Advanced Chipset Features Setup

This table shows the selections that you can make on the **Advanced Chipset Features Setup**.

Table 4.4. Selecting item of the Advanced Chipset Features Setup *< 1 / 3 >*

Item	Option	Description
DRAM Timing Selectable	Manual By SPD	The default is "By SPD"; you usually do not have to change this setting.
CAS Latency Time	1.5 2 2.5	This item is disabled with "DRAM Timing Selectable " set to " By SPD." You usually do not have to change this setting.
Active to precharge Delay	7 6 5	This item is disabled with "DRAM Timing Selectable" set to " By SPD." You usually do not have to change this setting.
DRAM RAS# to CAS# Delay	3 2	This item is disabled with "DRAM Timing Selectable" set to " By SPD." You usually do not have to change this setting.
DRAM RAS# Precharge	3 2	This item is disabled with "DRAM Timing Selectable" set to " By SPD." You usually do not have to change this setting.

Table 4.4. Selecting item of the Advanced Chipset Features Setup *< 2 / 3 >*

Item	Option	Description
Memory Frequency For	DDR333 DDR266 Auto	The default is "Auto"; you usually do not have to change this setting.
System BIOS Cacheable	Disabled Enabled	The default is "Disabled"; you usually do not have to change this setting.
Video BIOS Cacheable	Disabled Enabled	The default is "Disabled"; you usually do not have to change this setting.
Momory Hole At 15M-16M	Disabled Enabled	The default is "Disabled"; you usually do not have to change this setting.
Delay Prior to Thermal	1 Min 2 Min 4 Min 8 Min 16 Min 32 Min	
AGP Aperture Size (MB)	4 8 16 32 64 128 256	The default is "64M"; you usually do not have to change this setting.
On-Chip VGA	Disabled Enabled	The default is "Enabled"; you usually do not have to change this setting.
On-Chip Frame Buffer Size	1MB 8MB	Specifies the size of video memory for the on-board graphics chip. The specified size of main memory is allocated as the video memory.
Boot Display	Auto CRT EFP CRT+EFP	Sets the monitor. Selecting "Auto" automatically detects and displays the the currently connected monitor. Select "EFP" if the monitor to be used is connected via the DVI/panel link (see Chapter 7 " List of Options ").
Internal DDC ROM	Disabled Enabled	The default is "Disabled"; you usually do not have to change this setting.
HDD Select	Auto Select UDMA33	Set the transfer mode of the HDD (SDD) connected. The default is "Auto Serect"; you usually do not have to change this setting.

Table 4.4. Selecting item of the Advanced Chipset Features Setup *< 3 / 3 >*

Item	Option	Description
WDT Output to PO2	Disabled Enabled	Set watchdog timer output to PO2. Selecting "Enabled" connects the output of the watchdog timer to the PIO2 pin in the RAS connector. The output value changes depending on the "WDT Power-on State" and "WDT Time-up State" settings.
WDT Power-on State	Off On	This item is enabled with "WDT Output to PO2" set to " Enabled." Set the state of output from the watchdog timer when the power is turned on.
WDT Time-up State	On Off	This item is enabled with "WDT Output to PO2" set to " Enabled." Set the state of output from the watchdog timer when the time-up.

Integrated Peripherals

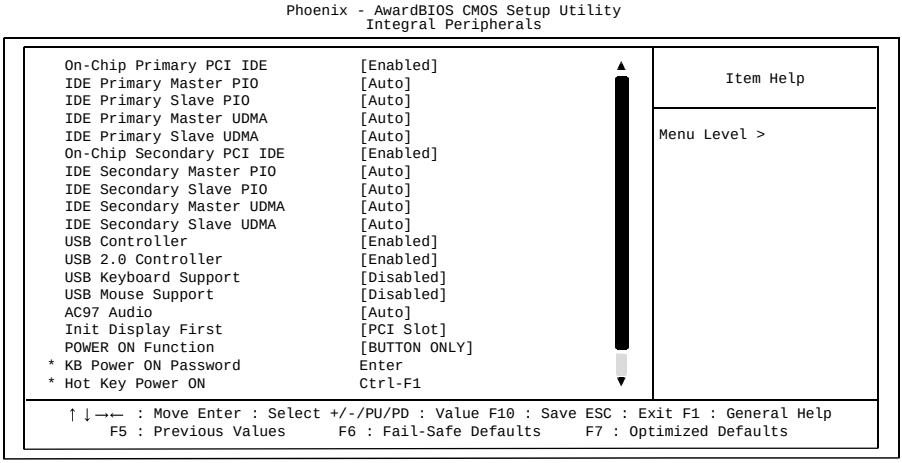


Figure 4.6. Integrated Peripherals Window (factory setting)

For details on each item, see the corresponding menu given below.

Selection from the Integrated Peripherals Setup

This table shows the selections that you can make on the **Integrated Peripherals Setup**.

Table 4.5. Selecting item of the Integrated Peripherals Setup *< 1 / 3 >*

Item	Option	Description
On-Chip Primary PCI IDE	Disabled Enabled	The default is "Enabled"; you usually do not have to change this setting.
IDE Primary Master/Slave PIO	Auto Mode 0 Mode 1 Mode 2 Mode 3 Mode 4	The default is "Auto"; you usually do not have to change this setting.
IDE Primary Master/Slave UDMA	Disabled Auto	The default is "Enabled"; you usually do not have to change this setting.
On-Chip Secondary PCI IDE	Disabled Enabled	The default is "Auto"; you usually do not have to change this setting.

Table 4.5. Selecting item of the Integrated Peripherals Setup *< 2 / 3 >*

Item	Option	Description
IDE Secondary Master/Slave PIO	Auto Mode 0 Mode 1 Mode 2 Mode 3 Mode 4	The default is "Auto"; you usually do not have to change this setting.
IDE Secondary Master/Slave UDMA	Disabled Auto	The default is "Auto"; you usually do not have to change this setting.
USB Controller	Disabled Enabled	Enable or disable the USB port.
USB 2.0 Controller	Disabled Enabled	Enable or disable the use of the USB ports for USB2.0. When "Disabled" is selected, the USB port works as a USB1.1 port.
USB Keyboard Support	Disabled Enabled	Select whether to emulate a USB keyboard as a PS/2 keyboard. Set this item to "Enabled" to install an OS with a USB keyboard. You do not have to set this to "Enabled" to place the keyboard under control of the OS's driver after starting the OS.
USB Mouse Support	Disabled Enabled	Select whether to emulate a USB mouse as a PS/2 mouse. The default is "Disabled"; you usually do not have to change this setting.
AC97 Audio	Auto Disabled	Enable or disable the audio feature.
Init Display First	PCI Slot Onboard	The default is "PCI Slot"; you usually do not have to change this setting.
POWER ON Function	Password Hot KEY Mouse Left Mouse Right Any Key BUTTON ONLY Keyboard98	Selects the method of returning from standby mode.
KB Power ON Password	Enter	Allows you to specify a password with "POWER ON Function" set to "Password".

Table 4.5. Selecting item of the Integrated Peripherals Setup *< 3 / 3 >*

Item	Option	Description
Hot Key Power ON	Ctrl-F1 Ctrl-F2 Ctrl-F3 Ctrl-F4 Ctrl-F5 Ctrl-F6 Ctrl-F7 Ctrl-F8 Ctrl-F9 Ctrl-F10 Ctrl-F11 Ctrl-F12	You can select hot keys with "POWER ON Function" set to "HotKEY".
Onboard Serial Port 1	Disabled 3F8/IRQ4 2F8/IRQ3 3E8/IRQ4 2E8/IRQ3 Auto	Select the base I/O address and IRQ for serial port 1. - Selecting "3F8/IRQ4" assigns the port to COM1 - Selecting "2F8/IRQ3" assigns the port to COM2 - Selecting "3E8/IRQ4" assigns the port to COM3 - Selecting "2E8/IRQ3" assigns the port to COM4 in Windows.
Onboard Serial Port 2	Disabled 3F8/IRQ4 2F8/IRQ3 3E8/IRQ4 2E8/IRQ3 Auto	Select the base I/O address and IRQ for serial port 1. - Selecting "3F8/IRQ4" assigns the port to COM1 - Selecting "2F8/IRQ3" assigns the port to COM2 - Selecting "3E8/IRQ4" assigns the port to COM3 - Selecting "2E8/IRQ3" assigns the port to COM4 in Windows.

Power Management Setup

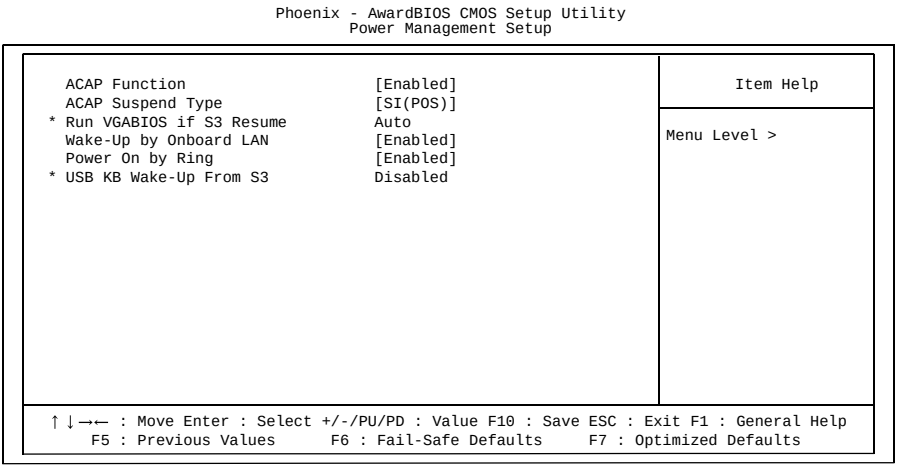


Figure 4.7. Power Management Setup Window (factory setting)

Selection from the Power Management Setup

This table shows the selections that you can make on the **Power Management Setup**.

Table 4.6. Selecting item of the Power Management Setup

Item	Option	Description
ACPI Function	Enabled Disabled	The default is "Enabled"; you usually do not have to change this setting.
ACPI Suspend Type	S1(POS) S3(STR) S1&S3	Please use it by default setting "S1(POS)".
Wake-Up by Onboard LAN	Enabled Disabled	Enable or disable the LAN to turn the power on with Windows in the sleep/hibernate/shutdown state. *1
Power On by Ring	Enabled Disabled	Enable or disable the Ring to turn the power on with Windows in the sleep/hibernate/shutdown state.

*1 To use the Wake Up On LAN feature, this machine must receive a magic packet to awaken itself. The magic packet contains six bytes of FF followed by 16 contiguous copies of the MAC address (irrespective of the protocol used).

PnP/PCI Configurations Setup

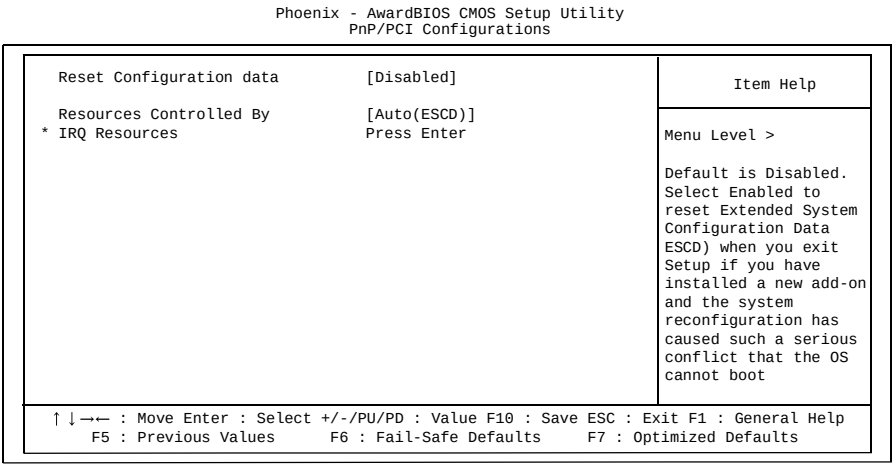


Figure 4.8. PnP/PCI Configurations Setup Window (factory setting)

Selection from the PnP/PCI Configurations Setup

This table shows the selections that you can make on the **PnP/PCI Configurations Setup**.

Table 4.7. Selecting item of the PnP/PCI Configurations Setup

Item	Option	Description
Reset Configuration Data	Enabled Disabled	The default is "Disabled"; you usually do not have to change this setting. After upgrading the BIOS, start it up with "Enabled" selected, then select "Disabled" again.
Resources Controlled By	Auto(ESCD) Manual	The default is “Auto(ESCD)”. If you have set the watchdog timer or PIO event to an IRQ, set this item to "Enabled" and the IRQ to be used to "Reserved" in the submenu of "IRQ Resources".
IRQ Resources	Press Enter	Pressing the Enter key opens the submenu.

IRQ Resources

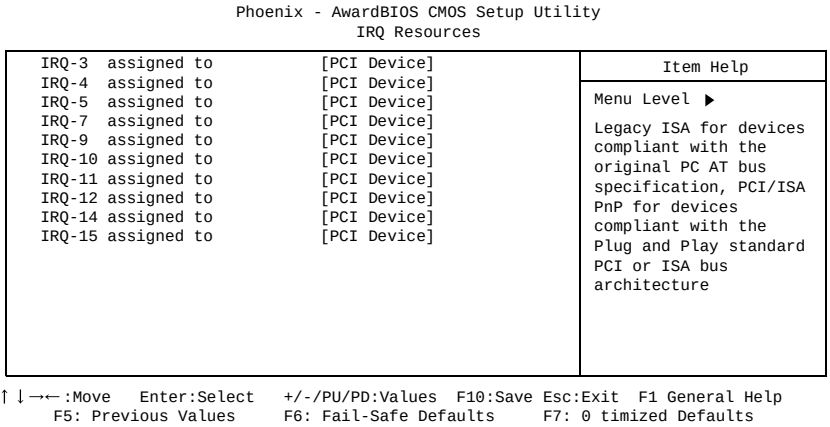


Figure 4.9. IRQ Resources Window (factory setting)

If you have set the watchdog timer or PIO event to an IRQ, set that IRQ to "Reserved". Use the other IRQs set to "PCI Device".

PC Health Status Setup

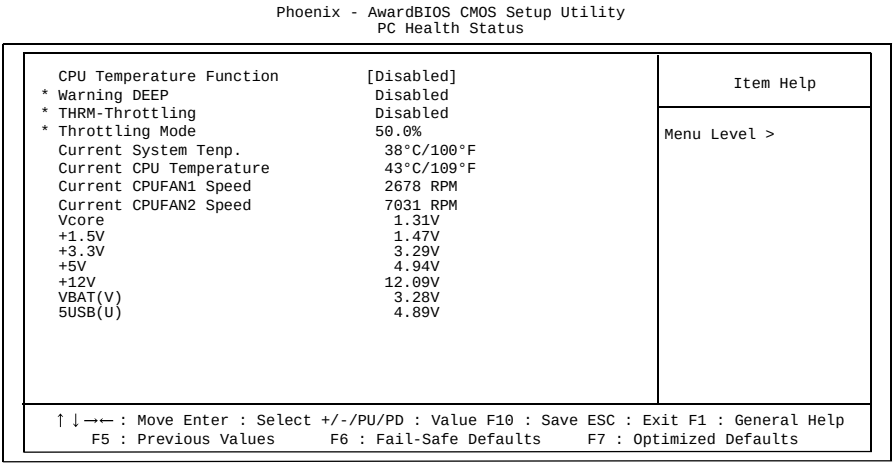


Figure 4.10. PC Health Status Setup Window

Selection from the PC Health Status Setup

This table shows the selections that you can make on the **PC Health Status Setup**.

Table 4.8. Selecting item of the PC Health Status Setup ***< 1 / 2 >***

Item	Option	Description
CPU Temperature Function	Disabled 50°C/122°F 53°C/127°F 56°C/133°F 60°C/140°F 63°C/145°F 66°C/151°F 70°C/158°F 75°C/167°F 80°C/176°F 85°C/185°F 90°C/194°F 95°C/205°F	If the CPU temperature reaches the set value, the system beeps or activates the throttling function.
Warning BEEP	Disabled Enabled	The system beeps when the CPU temperature reaches the value set under "CPU Temperature Function" with this item set to "Enabled".

Table 4.8. Selecting item of the PC Health Status Setup *< 2 / 2 >*

Item	Option	Description
THRM-Throttling	Disabled Enabled	Throttling starts when the CPU temperature reaches the value set under "CPU Temperature Function" with this item set to "Enabled".
Throttling Mode	87.5% 75.0% 62.5% 50.0% 37.5% 25.0% 12.5%	Allows you to set a mode for throttling with "THRM Throttling" set to "Enabled".
Current System Temperature	N/A	Displays the temperature detected by the sensor at the center of the board.
Current CPU Temperature	N/A	Displays the temperature detected by the CPU board temperature sensor.
Vcore/+1.5V/+3.3V/+5V/ +12V/VBAT(V)/5VSB(V)	N/A	Displays the CPU core, +1.5V, +3.3V, +5V, +12V, battery, and 5VSB voltages.

Frequency/Voltage Control

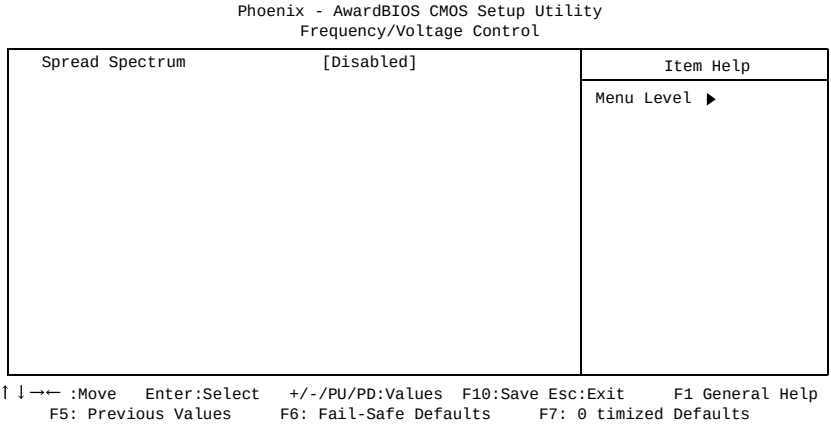


Figure 4.11. Frequency/Voltage Control Window (factory setting)

Description	Choice
Spread Spectrum This item is not used for the module. Use the module with this item set to "Disabled" by default.	Disable Enable

Load Fail-Safe Defaults

When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

Load Fail-Safe Defaults (Y/N) ? N

Press the <Y> key loads the most safe settings.

Load Optimized Defaults

When you press <Enter> on this item you get a confirmation dialog box with a message similar to:
Load Optimized Defaults (Y/N) ? N

Pressing the <Y> key loads the values optimized by the BIOS. The BIOS optimized settings are factory defaults.

Supervisor/User Password Setting

You can set either supervisor or user password, or both of then. The differences between are:

SUPERVISOR PASSWORD: can enter and change the options of the setup menus.

USER PASSWORD: just can only enter but do not have the right to change the options of the setup menus. When you select this function, the following message will appear at the center of the screen to assist you in creating a password.

ENTER PASSWORD:

Enter a password within eight characters and press the <Enter> key, and you will be prompted to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the selection and not enter a password.

To disable a password, just press <Enter> when you are prompted to enter the password. A message will confirm the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

PASSWORD DISABLED.

When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

You can also set up the password so that you are prompted to enter it whenever the system is rebooted. This would prevent unauthorized use of your computer.

You determine when the password is required within the BIOS Features Setup Menu and its Security option. If the Security option is set to “System”, the password will be required both at boot and at entry to BIOS Setup. If set to “Setup”, prompting only occurs when trying to enter BIOS Setup.

Save & Exit Setup

Pressing <Enter> on this item asks for confirmation:

Save to CMOS and EXIT (Y/N)? Y

Pressing the <Y> key saves the changes made on the Setup screen to CMOS (EEPROM).
Pressing “Y” stores the selections made in the menus in CMOS(EEPROM) – a special section of memory that stays on after you turn your system off. The next time you start up your computer, the BIOS configures your system according to the value stored in CMOS(EEPROM). After saving the values the system is restarted again.

Exit Without Saving

Pressing <Enter> on this item asks for confirmation:

Quit Without Saving (Y/N)? N

Pressing the <Y> key quits Setup without saving the changes made on the Setup screen to CMOS (EEPROM). Quitting Setup without saving leaves the last saved settings in effect, with which the system is rebooted after that.

Clear CMOS (EEPROM) data

If an unexpected startup failure occurs after BIOS setup, you can boot the system with the current BIOS settings disabled by handling JBAT1 and JP4 in the following steps:

(1) Remove the top cover and so on so that you can touch JBA1 and JP4. To remove the cover, see Chapter 3 "Hardware Setup".
(2) With the system unit turned off, connect pins 2 and 3 on JBAT1 using the jumper plug.
(3) Remove the jumper plug connecting JBAT1 pins 2 and 3 and connect pins 1 and 2 instead.
(4) Connect pins 2 and 3 on JP4 using the jumper plug.
(5) Turn on the system unit to start the system. During system startup, invoke BIOS Setup to set up the BIOS again.
(6) After BIOS setup, remove the jumper plug connecting JP4 pins 2 and 3, connect pins 1 and 2 instead, then save the settings and reboot the system.

POST Messages

During the Power On Self-Test (POST), if the BIOS detects an error requiring you to do something to fix, it will either sound a beep code or display a message.

POST Beep

The BIOS reports errors using two types of beeps when they cannot be reported with on-screen messages. One is a long beep followed by two short beeps. This indicates an error in the video system.
The other is a repetition of a long beep, indicating a DRAM error.

Error Messages

One or more of the following messages may be displayed if the BIOS detects an error during the POST.

DISK BOOT failure
[INSERT SYSTEM DISK AND PRESS ENTER]

No boot device was found.

This message appears, for example, when the BIOS cannot find any drive from which to boot the system. Check whether a bootable device has been connected and whether the connectors and cables have been plugged correctly.

Error encountered initializing hard drive
Error initializing hard disk controller
Hard disk(s) fail (80)
Hard disk(s) fail (40)
Hard disk(s) fail (20)
Hard disk(s) fail (10)
Hard disk(s) fail (08)

The HDD (SDD) is abnormal.

These messages appear when the HDD (SDD) connected is detected to be abnormal in some way. If any of the messages is displayed, check the connection of the drive and its settings.

Primary IDE Channel no 80 conductor cable installed
Secondary IDE Channel no 80 conductor cable installed

These messages appear when the system unit cannot recognize a connected ATA100 IDE device as an ATA100 device. If either of the messages is displayed, check that "HDD Select" in the "Advanced Chipset Features" menu has been set to "Auto Select."

Keyboard error or no keyboard present

This message appear with no keyboard connected.

The message may also appear if a key remains held down during a boot-up.

If this message is displayed, check the connection of the keyboard and its situation during startup.

If you use the module with no keyboard connected, use BIOS Setup to set "Halt On" in the "Standard CMOS Feature" menu to "All, But Keyboard."

Keyboard is locked out – Unlock the key

A key remains held down during a system boot. Check that the keyboard is connected correctly and that no key is pressed during a system boot.

Memory address error at…
Memory parity error at…
Memory verify error at…
Memory test fail

These error messages appear when system memory is abnormal.

They may appear when a BIOS Setup value is abnormal.

Run BIOS Setup again if possible.

Press F1 to disable NMI, F2 to REBOOT

This message appears when the system detects a nonmaskable interrupt (NMI).

You can select whether to continue processing with the NMI disable or to reboot the system with the NMI enabled after the message is cleared.

Press a key to REBOOT

This message appears along with another message for an error, indicating that the error requires a reboot.

Press any key and the system will reboot.

System halted, (CTRL-ALT-DEL) to REBOOT…

This message appears along with another message as well, but indicating that the system has been hung. Press and hold down the <CTRL> and <ALT> keys and press <DEL> to re-start the system.

BIOS ROM checksum error - System halted

BIOS ROM data is invalid. This message appears, for example, when an attempt to upgrade the BIOS has failed. BIOS ROM must be removed for repair.

5. Each Component Function

Component Name

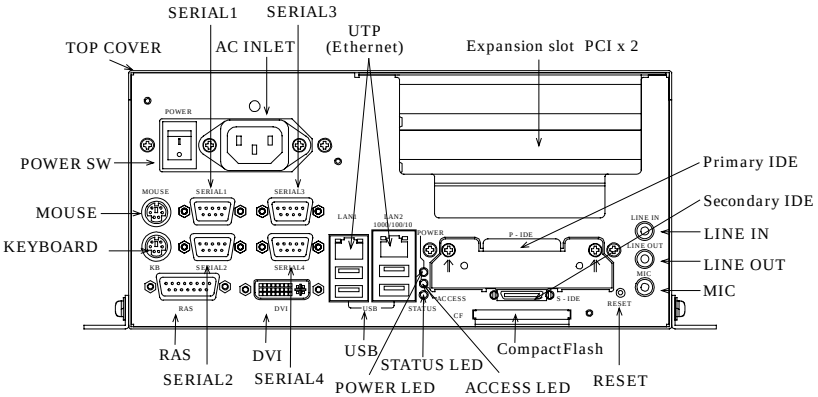


Figure 5.1. Component Name

Table 5.1. Component Function

Name	Function
LINE IN	Line in (ϕ3.5 PHONE JACK)
LINE OUT	Line out (ϕ3.5 PHONE JACK)
MIC	Mike in (ϕ3.5 PHONE JACK)
RESET	Hard reset push button
P-IDE	Primary IDE connector (dedicated to 44 pin socket)
S-IDE	Secondary IDE connector (dedicated to 36 pin half pitch connector)
CF	CF card slot (secondary IDE connection)
POWER	Power ON display LED
ACCESS	IDE disk access display LED
STATUS	General-purpose LED
LAN1	Ethernet 100BASE-TX/10BASE-T RJ-45 connector
LAN2	Ethernet 1000BASE-T/100BASE-TX/10BASE-T RJ-45 connector
USB	USB port connector
SERIAL1	Serial port 1 connector (9 pin D-SUB/male)
SERIAL2	Serial port 2 connector (9 pin D-SUB/male)
SERIAL3	Serial port 3 connector (9 pin D-SUB/male)
SERIAL4	Serial port 4 connector (9 pin D-SUB/male)
KB	Keyboard connector (6 pin mini-DIN)
MOUSE	PS/2 mouse connector (6 pin mini-DIN)
DVI	DVI connector (DVI-I 29 pin)
RAS	RAS function and RS-485 connector (15 pin D-SUB/female)
POWER	Power SW & AC power input connector
Expansion slot	PCI x 2

Component Function

Line in Interface : LINE IN

A line input connector is provided. You can connect the audio output, for example, of a CD player to this connector to record data from the CD or to play it through LINE OUT.

Line out Interface : LINE OUT

A line output connector is provided. You can plug a headphone or amplifier-integrated speakers into this connector.

MIC input Interface : MIC

A MIC input connector is provided. You can plug a microphone to this connector for sound input.

Audio driver

The audio driver is required to use the line input, line output, and microphone input interfaces.

Install the appropriate audio driver for your OS from the bundled CD-ROM [IPC-SLIB-01].
(For information on the latest version of IPC-SLIB-01, check the CONTEC's web site.)

Reset SW : RESET

The BOX-PC is equipped with a hardware reset switch. To prevent it from being pressed by mistake, the switch is designed to be difficult to press. Use a pointed object to push the switch with.

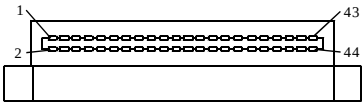
Connector for the Internal Drive

(Primary IDE Master Connection) : P-IDE

The BOX-PC is equipped with an E-IDE controller to allow a 2.5inch IDE hard disk to be connected to connector on the board by using the bundled hard disk bracket.

Table 5.2. Primary IDE Connector (CN3)

Connector in use	44-wire header type (2mm pitch)



Pin No.	Signal name	Direction	Pin No.	Signal name	Direction
1	RESET-	Output	2	GND	-------
3	DD7	I/O	4	DD8	I/O
5	DD6	I/O	6	DD9	I/O
7	DD5	I/O	8	DD10	I/O
9	DD4	I/O	10	DD11	I/O
11	DD3	I/O	12	DD12	I/O
13	DD2	I/O	14	DD13	I/O
15	DD1	I/O	16	DD14	I/O
17	DD0	I/O	18	DD15	I/O
19	GND	-------	20	N.C.	-------
21	DDRQ	Input	22	GND	-------
23	DIOW-	Output	24	GND	-------
25	DIOR-	Output	26	GND	-------
27	IOCHRDY	Input	28	CSEL	Output
29	DDACK-	Output	30	GND	-------
31	INTRQ	Input	32	N.C.	-------
33	DA1	Output	34	N.C.	Output
35	DA0	Output	36	DA2	Output
37	CSI-	Output	38	CS3-	-------
39	DACT-	Output	40	GND	-------
41	+5V	-------	42	+5V	-------
43	GND	-------	44	N.C.	

Secondary IDE Connector

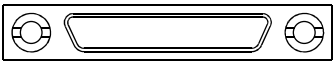
(Secondary IDE Master Connection) : S-IDE

Use the dedicated option cable “IPC-CDC-03” to connect the dedicated option DVD-ROM / CD-ROM drive.

Before plugging or unplugging the cable, be sure to turn the power off.

The cable is not intended to connect devices (such as hard disks) other than CONTEC option products.

Table 5.3. Secondary IDE Connector (S-IDE)

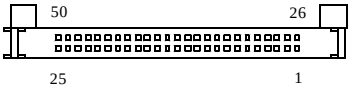
Connector in use	36 pin half-pitch type (0.8mm pitch)				
18 1  36 19					
Pin No.	Signal name	Direction	Pin No.	Signal name	Direction
1	RESET-	Output	19	DDRQ	Input
2	GND		20	GND	
3	DD7	I/O	21	DIOW-	Output
4	DD8	I/O	22	GND	
5	DD6	I/O	23	DIOR-	Output
6	DD9	I/O	24	GND	
7	DD5	I/O	25	IOCHRDY	Input
8	DD10	I/O	26	DDACK-	Output
9	DD4	I/O	27	GND	
10	DD11	I/O	28	INTRQ	Input
11	DD3	I/O	29	+5V	
12	DD12	I/O	30	DA1	Output
13	DD2	I/O	31	PDIAG-	Output
14	DD13	I/O	32	DA0	Output
15	DD1	I/O	33	DA2	Output
16	DD14	I/O	34	CS1-	Output
17	DD0	I/O	35	CS3-	Output
18	DD15	I/O	36	DACT-	Output

CF Card Connector (Secondary IDE Slave Connection) : CF

The CF Card (Type I and II x 1 : dedicated to the memory card) can be connected.
Please go after turning off the power supply without fail when the CF card is pulled out and it opens.

Table 5.4. CF Card Connector

Connector in use	50-wire header type (1.27mm pitch)



Pin No.	Signal name	Direction	Pin No.	Signal name	Direction
1	GND		26	N.C	
2	DD3	I/O	27	DD11	I/O
3	DD4	I/O	28	DD12	I/O
4	DD5	I/O	29	DD13	I/O
5	DD6	I/O	30	DD14	I/O
6	DD7	I/O	31	DD15	I/O
7	CS0-	Output	32	CD3-	Output
8	GND		33	N.C	
9	GND		34	DIOR-	Output
10	GND		35	DIOW-	Output
11	GND		36	+5V	
12	GND		37	INTRQ	Input
13	+5V		38	+5V	
14	GND		39	CSEL-	Output
15	GND		40	N.C	
16	GND		41	RESET-	Output
17	GND		42	IOCHRDY	Input
18	DA2	Output	43	DDRQ	Input
19	DA1	Output	44	DDACK-	Output
20	DA0	Output	45	DACT-	Output
21	DD0	I/O	46	PDIAG-	Output
22	DD1	I/O	47	DD8	I/O
23	DD2	I/O	48	DD9	I/O
24	N.C		49	DD10	I/O
25	N.C		50	GND	

Fast-Ethernet : LAN1

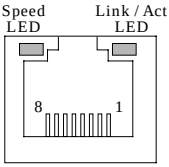
A Fast Ethernet interface is provided.

- Network type : 100BASE-TX/10BASE-T
- Transmission speed* : 100M/10M bps
- Max. network path length : 100m/segment
- Controller : ICH2 integrated (Intel)

* Operation at 100Mbps requires a category 5 cable.

Table 5.5. Ethernet Connector

Connector type	RJ-45



Pin No.	Signal name	Meaning
1	TD+	Transmitted data(+)
2	TD-	Transmitted data(-)
3	RD+	Received data(+)
4	N.C.	Not connected
5	N.C.	Not connected
6	RD-	Received data(+)
7	N.C.	Not connected
8	N.C.	Not connected

LEDs for display of network statuses:

Left LED: Speed LED

10M: OFF, 100M: Orange ON

Right LED: Link / Operation LED

Normal connection: Yellow ON, Operation: Yellow Blinking

LAN drivers

Install the appropriate audio driver for your OS from the bundled CD-ROM [IPC-SLIB-01].
(For information on the latest version of IPC-SLIB-01, check the CONTEC's web site.)

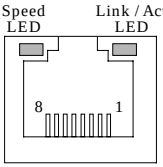
Giga bit ethernet : LAN2

A Giga Ethernet interface is provided.

- Network type : 1000BASE-T/100BASE-TX/10BASE-T
- Transmission speed* : 1000M/100M/10M bps
- Max. network path length : 100m/segment
- Controller : 82541PI(Intel)

* Operation at 100Mbps requires a category 5 cable.

Table 5.6. Ethernet Connector

Connector type	RJ-45	
		
Pin No.	Signal name	
	10/100BASE-TX	1000BASE-T
1	**TD+**	**TP0+**
2	TD-	TP0-
3	RD+	TP1+
4	N.C.	TP2+
5	N.C.	TP2-
6	RD-	TP1-
7	N.C.	**TP3+**
8	N.C.	TP3-

LEDs for display of network statuses:

Left LED: Speed LED

10M : OFF, 100M : Green ON, 1000M : Orange ON

Right LED: Link / Operation LED

Normal connection: Green ON, Operation: Green Blinking

LAN drivers

Install the appropriate audio driver for your OS from the bundled CD-ROM [IPC-SLIB-01].
(For information on the latest version of IPC-SLIB-01, check the CONTEC's web site.)

USB Ports

The BOX-PC is equipped with four USB 2.0 interface channels.

Table 5.7. USB Connector

Pin No.	Signal name
1	USB VCC
2	USB -Data
3	USB0 +Data
4	USB GND

⚠ CAUTION

To recover the OS using a retail USB-connected CD-ROM drive, refer to the bundled "Recovery Procedures" and follow the procedures therein.

Serial Port Interface

⚠ CAUTION

Serial ports 3 - 6 are implemented by mounting a CONTEC PCI serial communication board "COM-4(PCI)H" on the CPU board.
The board ID on the CPU board is 0.
When installing the COM-4(PCI)H in a PCI expansion slot, use the board ID other than 0.

SERIAL1, 2(RS-232C Ports)

The product has two channels of RS-232C compliant serial ports supporting up to a baud rate of 115,200bps with a 16-byte transmission-dedicated data buffer and a 16-byte reception-dedicated data buffer. You can use BIOS Setup (described in Chapter 4) to configure an I/O address, interrupt and unused state for each of the ports independently. (The same I/O address and IRQ cannot be shared with any other device.)

Table 5.8. SERIAL 1 and 2 I/O Addresses and Interrupts

COM	I/O address	Interrupt
1	3F8h - 3FFh	IRQ 3 IRQ 4
2	2F8h - 2FFh	
3	3E8h - 3EFh	
4	2E8h - 2EFh	

The BIOS defaults to the following factory settings:

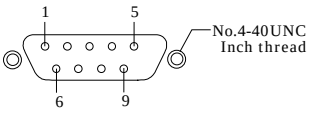
```
Serial port 1: COM1(3F8h-3FFh),IRQ4
Serial port 2: COM2(2F8h-2FFh),IRQ3
```

SERIAL3, 4(RS-232C Ports)

The product has two channels of RS-232C compliant serial ports supporting up to a baud rate of 230,400 bps with a 64-byte transmission-dedicated data buffer and a 64-byte reception-dedicated data buffer.

Table 5.9. RS-232C Port Connector

Connector used on the product	9-socket D-SUB (MALE)



Pin No.	Signal name	Meaning	Direction
1	CD	Carrier detect	Input
2	RD	Received data	Input
3	TD	Transmitted data	Output
4	DTR	Data terminal ready	Output
5	GND	Signal ground	-----
6	DSR	Data set ready	Input
7	RTS	Request to send	Output
8	CTS	Clear to send	Input
9	RI	Ring indicator	Input

SERIAL5 (touch panel)

One channel of serial port is provided for use as a touch panel connector (for a CONTEC flat panel display).

SERIAL6 (RS-422/485 Ports)

One channel of serial port is provided for use as a RS-422/485 ports supporting up to a baud rate of 230,400 bps with a 64-byte transmission-dedicated data buffer and a 64-byte reception-dedicated data buffer.

Table 5.10. RS-422/485 Port Connector (Inside the RAS Connector)

Pin No.	Signal name	Meaning
2	TX +	Transmitted data +
10	TX -	Transmitted data -
3	RX +	Received data +
11	RX -	Received data -

Reference

For more information on the RAS connector see Table 5.18, "RAS connector."

RS-422/RS-485 Specifications

- Transmission method : RS-422/RS-485-compliant, asynchronous, serial transmission, half duplex/full duplex
- Baud rate : 50 - 230,400bps (programmable)
- Signal extension distance : 1.2km Max.

Terminal Resistor when RS-485 is in Use

Set with JP1 inside the top cover. The factory setting is " terminal resistor not available."

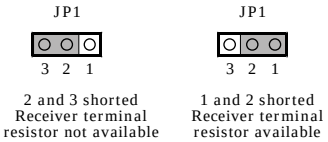


Figure 5.2. Terminal Resistor Settings

Control of Transmitted Data in Half-Duplex Mode

In half-duplex mode, the transmission buffer needs to be controlled in order to prevent collision of transmitted data. The BOX-PC uses RTS and controls the buffer with modem control register's bit 1. Transmission and reception gate control by the register setting of port address 4006h and 4007h is allowed only for the RS-422/485 (Serial port D). For more information see section, "General-purpose I/O and Remote Reset" in Chapter 5.

Modem control register

(Set I/O address +4H) bit 1 : 0 … RTS is High. (Disable transmission)
1 … RTS is Low. (Enable transmission)

I/O Addresses and Instructions

The I/O addresses and instructions of COM1 are shown next.

Table 5.11. I/O Addresses

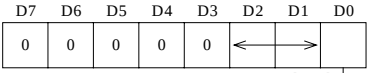
I/O address	DLAB	Read/Write	Register	
03F8H	0	W	Transmitter holding register	THR
		R	Receive buffer register	RBR
	1	W	Divisor latch register	DLL
03F9H	1	W	Divisor latch register	DLM
	0	W	Interrupt enable register	IER
03FAH	X	R	Interrupt ID register	IIR
03FBH	X	W	Line control register	LCR
03FCH	X	W	Modem control register	MCR
03FDH	X	R	Line status register	LSR
03FEH	X	R	Modem status register	MSR
03FFH	X	R/W	Scratch register	SCR

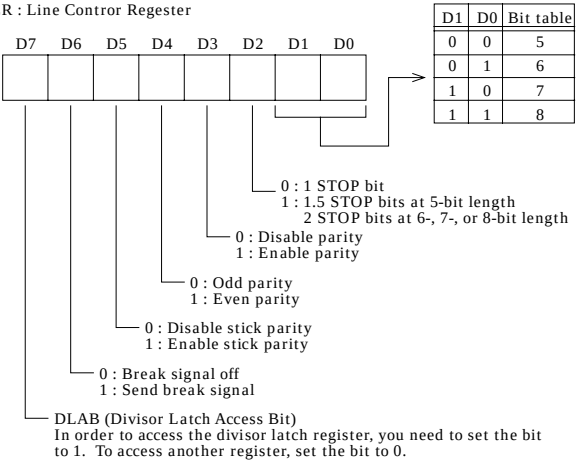
DLAB (Divisor Latch Access Bit) : The value in bit 7 of the line control register

Table 5.12. Function of Each Register ***< 1 / 4 >***

I/O address	Description
03F8H	THR: Transmitter Holding Register [DLAB=0] D7 D6 D5 D4 D3 D2 D1 D0 bit7 MSB ← → bit0 LSB Register dedicated to write transmitted data to
03F8H	RBR: Reciever Buffer Register [DLAB=O] D7 D6 D5 D4 D3 D2 D1 D0 bit7 MSB ← → bit0 LSB Register dedicated to read received data from
03F8H	DLL: Divisor Latch (LSB) [DLAB=1] D7 D6 D5 D4 D3 D2 D1 D0 bit7 MSB ← → bit0 LSB Baud rate setting register (LSB)
03F9H	DLH: Divisor Latch (MSB) [DLAB=1] D7 D6 D5 D4 D3 D2 D1 D0 bit7 MSB ← → bit0 LSB Baud rate setting register (MSB)
03F9H	IER: Interrupt Enable Register [DLAB=0] D7 D6 D5 D4 D3 D2 D1 D0 0 0 0 0 EMS ELSI ETHREI ERDAI ERDAI: Received data Interrupt enable ETHREI: Received data register empty Interrupt enable ELSI: Receiver line status Interrupt enable EMS: Modem status interrupt enable [Always used at 0.] 1: Enable interrupt 0: Disable interrupt

Table 5.12. Function of Each Register ***< 2 / 4 >***

<table>
<tr><th>I/O address</th><th>Description</th></tr>
<tr><td>03FAH</td><td>
IIR : Interrupt Identification Register


<table>
<tr><th>bit2</th><th>bit1</th><th>bit0</th><th>Priority</th><th>Description</th></tr>
<tr><td>0</td><td>0</td><td>1</td><td>——</td><td>Interrupts are not generated.</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>1 (high)</td><td>Generated by overrun, parity, framing error or break interrupt.
Cleared when the line status register is read.</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>2</td><td>Generated when the receive buffer register is ready.
Cleared when the receiving buffer is read.</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>3</td><td>Generated when the transmitter holding register is empty. Cleared when the IIR is read or when transmitted data is written to THR.</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>4 (low)</td><td>Modem status interrupt is generated.
(CTS, DSR, RI, CD)
Cleared when the modem status register is read.</td></tr>
</table>
</td></tr>
<tr><td>03FBH</td><td>
LCR : Line Contror Regester


<table>
<tr><th>D1</th><th>D0</th><th>Bit table</th></tr>
<tr><td>0</td><td>0</td><td>5</td></tr>
<tr><td>0</td><td>1</td><td>6</td></tr>
<tr><td>1</td><td>0</td><td>7</td></tr>
<tr><td>1</td><td>1</td><td>8</td></tr>
</table>
</td></tr>
</table>

Table 5.12. Function of Each Register ***< 3 / 4 >***

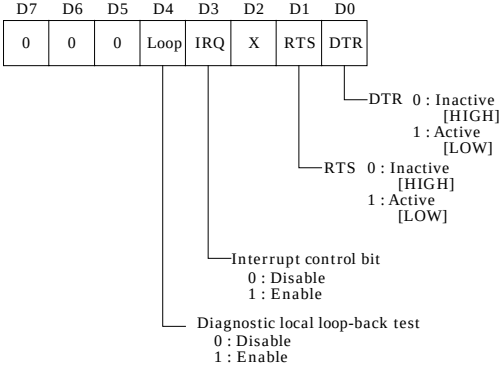
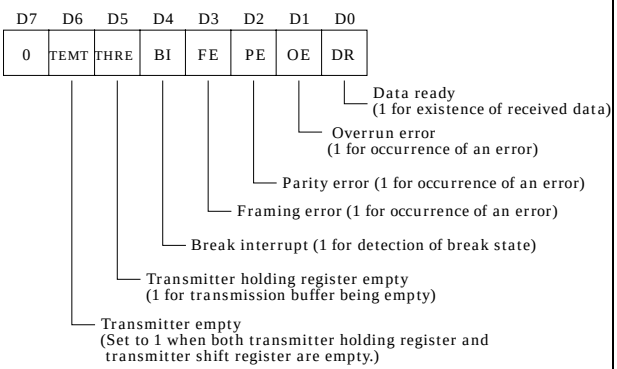
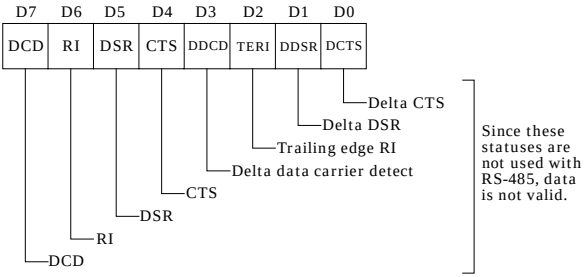
I/O address	Description
03FCH	MCR: Modem Control Register 
03FDH	LSR: Line Status Regester 

Table 5.12. Function of Each Register ***< 4 / 4 >***

I/O address	Description
03FEH	MSR : Modem Status Register 
03FFH	SCR : Scratchpad Register This is an 8-bit, readable/writable register which is available to the user to allow data to be saved temporarily.

Baud Rate Settings

A baud rate is set by software by dividing the clock input (1.8432MHz). The baud rate in terms of hardware can be set to a maximum of 115,200 bps for SERIAL1, 2 and 230,400bps for SERIAL3 - 6. The baud rates available in practice depend on the operating environment (cable, software, etc.). The table below lists typical baud rates and their respective values to be written to the divisor latch register (LSB, MSB).

Table 5.13. Baud Rate Settings

Baud rate to be set	SERIAL1, 2 Clock input (1.8432MHz)		SERIAL3 - 6 Clock input (14.7456MHz)	
	Value to be set in the divisor register (Decimal)	Setting error (%)	Value to be set in the divisor register (Decimal)	Setting error (%)
50	2304	---	18432	---
75	1536	---	12288	---
110	1047	0.026	8378	0.0022
134.5	857	0.058	6852	0.0006
150	768	---	6144	---
300	384	---	3072	---
600	192	---	1536	---
1200	96	---	768	---
1800	64	---	512	---
2000	58	0.69	461	0.04
2400	48	---	384	---
3600	32	---	256	---
4800	24	---	192	---
7200	16	---	128	---
9600	12	---	96	---
14400	8	---	64	---
19200	6	---	48	---
28800	4	---	32	---
38400	3	---	24	---
57600	2	---	16	---
76800	---	---	12	
115200	1	---	8	---
153600	---	---	6	---
230400	---	---	4	---

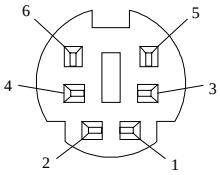
Example : To set 9,600 bps, write "00" to the (MSB) divisor latch register and "12 (decimal)" to the (LSB) divisor latch register.

Keyboard Interface : KB

The BOX-PC is equipped with a keyboard connector

Table 5.14. Keyboard Connector

Connector type	Equivalent to the MD-DS12300-14S-14 (JST)



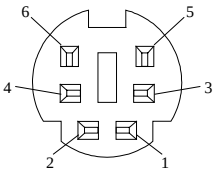
Pin No.	Signal name	Pin No.	Signal name
1	+KBD DATA	5	+KBD CLK
2	N.C.	6	N.C.
3	GND	SHIELD	GND
4	+5.0V DC	---	

Mouse Interface : MOUSE

The BOX-PC is equipped with a mouse connector

Table 5.15. Mouse Connector

Connector type	Equivalent to the MD-DS12300-14S-14(JST)



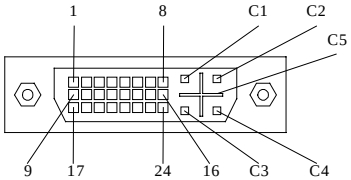
Pin No.	Signal name	Pin No.	Signal name
1	+MOUSE DATA	5	+MOUSE CLK
2	N.C.	6	N.C.
3	GND	SHELD	GND
4	+5.0V DC	---	

DVI Interface : DVI

A DVI interface is provided. You can use it to connect a CRT (even a 15 pin D-SUB connector is acceptable by using the bundled DVI-analog RGB adapter) or a CONTEC Panel Link display. The connector is named DVI (DVI-I 29-pin connector).

Table 5.16. DVI Connector

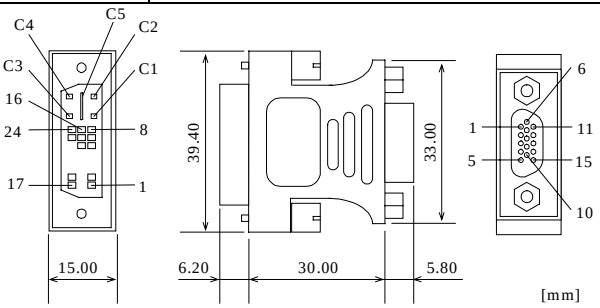
Connector type	DVI-I 29pin



Pin No.	Signal name	Pin No.	Signal name	Pin No.	Signal name
1	DATA2-	13	N.C.	C1	RED
2	DATA2+	14	+5V	C2	GREEN
3	DATA2 SHIELD	15	GND	C3	BLUE
4	N.C.	16	HPD	C4	HSYNC
5	N.C.	17	DATA0-	C5	GND
6	DDC CLK	18	DATA0+		
7	DDC DATA	19	DATA0 SHIELD		
8	VSYNC	20	TXD		
9	DATA1-	21	RXD		
10	DATA1+	22	DATA0 SHIELD		
11	DATA1 SHIELD	23	CLK+		
2	N.C.	24	CLK-		

Table 5.17. DVI-Analog RGB conversion adapter

Connector	DVI-I 29pin



Analog RGB signals			
Pin No.	Signal name	Pin No.	Signal name
1	RED	9	HPD
2	GREEN	10	GND
3	BLUE	11	N.C.
4	N.C.	12	DDC DATA
5	GND	13	HSYNC
6	GND	14	VSYNC
7	GND	15	DDC CLK
8	GND		

For the LCDs that can be connected, please refer to “Chapter7 List of Options”.

Display driver

Install the appropriate audio driver for your OS from the bundled CD-ROM [IPC-SLIB-01].
(For information on the latest version of IPC-SLIB-01, check the CONTEC's web site.)

Serial Interface for Touch Panel (Inside the DVI connector)

The BOX-PC is equipped with a serial port (SERIAL5) to communicate with a touch panel when an LCD equipped with a touch panel is used. The I/O address, interrupt, or "not in use" can be set with BIOS setup (see Chapter 4). (Do not set to the same I/O address and interrupt as those of another device.) Set to the same values as were set during installation of the touch-panel driver software.

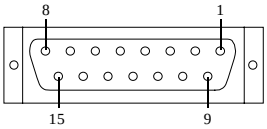
Install the appropriate audio driver for your OS from the bundled CD-ROM [IPC-SLIB-01].
(For information on the latest version of IPC-SLIB-01, check the CONTEC's web site.)

RAS Functions

A RAS port is provided for this product. This port offers watchdog timer, remote reset, and general-purpose I/O RAS functions.

Table 5.18. RAS Connector

Connector type	15pin D-SUB(FEMALE) (DALC-J15SAF-20L9) JAE



Pin No.	Signal	Function
1	SPK	External speaker signal
9	GND	External speaker ground
2	TX +	RS-485 transmitting line
10	TX -	
3	RX +	RS-485 receiving line
11	RX -	
4	NCOM	Minus common dedicated to PO2
12	PO2/WDT	General-purpose output or watchdog timer alarm output
5	PO0	General-purpose output
13	PO1	
6	NCOM	General-purpose output minus common
7	PI1	General-purpose input
14	PI2/IRQ	General-purpose input or interrupt input
8	PCOM	General-purpose input plus common
15	PI0	General-purpose input

*Fastening screw: No. 4-40UNC inch thread

RAS port address: 4000h - 4007h

⚠ CAUTION

Pin 4 NCOM (minus common dedicated to PO2) and pin 6 NCOM (minus common shared by PO0 and PO1) are electrically separated from each other.

Watchdog Timer

The watchdog timer is started by output of A5 to I/O port address 4002h. A second output of A5 to the same port within the specified expiration time once again triggers the watchdog timer. If a time-out occurs, a reset or an interrupt is generated according to the 4004h port setting or an alarm is output according to the 4004h port setting.

The time-out period can be set between 1 - 255 seconds depending on the timer value setting for the WDT counter port (4003h).

The watchdog timer stops by reading port 4002h. The alarm-out output is cancelled at the same time.

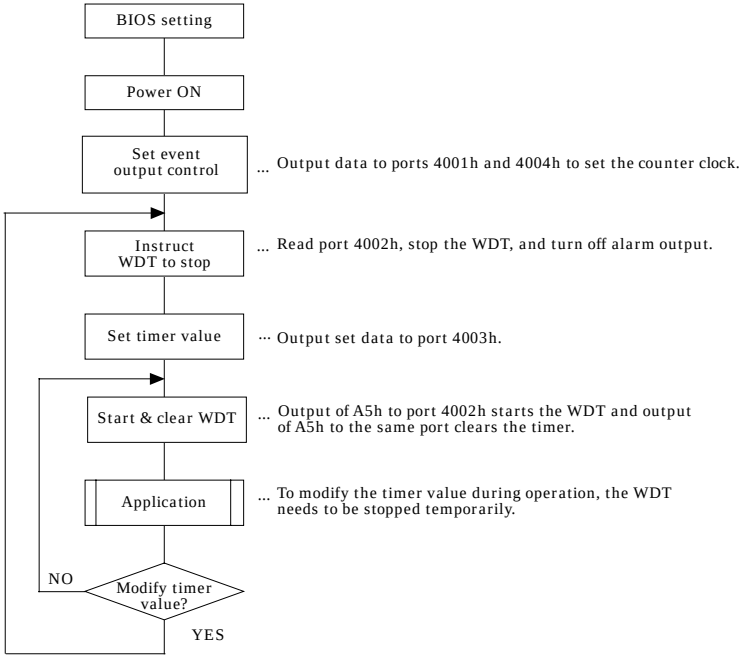
The alarm out is output from the RAS connector's PO2/WDT (pin 12) and cancelled when reset.

The alarm-out output can be set to BIOS startup by BIOS setup (see Chapter 4), watchdog timer startup, or watchdog timer time-up.

Specifications

- Time to be set: 1sec - 255sec
- Interrupt or reset: Resets or generates an interrupt at time-up (Port setting).
- External alarm output: Photocoupler insulated open-collector output (the output status is set by software). For more information, see the general-purpose I/O specifications.
- I/O addresses: 4000h - 4007h (RAS port)

How to Use the Watchdog Timer



*WDT: Watch Dog Timer

Figure 5.3. How to Use the Watchdog Timer

Example usage **:** To assign IRQ5 to the event whose time-up value is 15sec:

Out 4004h 01h : Set the event at the time of WDT expiration to IRQ5.

In 4002h : Stop the WDT timer and cancel the alarm.

Out 4003h 0Fh : Set the WDT expiration time to 15sec.

Out 4002h A5h : Start and clear the WDT.

In 4002h : Stop the WDT and cancel the alarm.

*** 4001h (bit4-6): Alarm out output control**

D7	D6	D5	D4	D3	D2	D1	D0	
---	WD_S1	WD_S0	PO2_M	RESET	PIM2	PIM1	PIM0	R/W (Default: XXXX0000b)

Figure 5.4. Alarm Out Output Control Port (4001h)

PO2_M : PO PO2/WDT pin output setting
- 0 : Set the RAS connector's PO2/WDT(12) signal to PO2 (general-purpose output).
- 1 : Set the RAS connector's PO2/WDT(12) signal to alarm out.

Table 5.19. WD_S1, WD_S0: Alarm-out Output Status Settings

WD_S1	WD_S0	External alarm output status			
		When power is turned off	When BIOS starts	When WDT starts	When time expires on WDT
0	0	OFF	OFF	OFF	ON
1	0	OFF	OFF	ON	OFF
1	1	OFF	ON	ON	OFF
0	1	OFF	ON	OFF	ON

*** 4002h: WDT control**

D7	D6	D5	D4	D3	D2	D1	D0	
—	—	—	—	—	—	—	—	R/W

Figure 5.5. WDT Control Port (4002h)

R : Cancels WDT stop/alarm.
Read data is undefined.

W : Start and clear the WDT
Write A5h to start and clear the WDT.

*** 4003h: WDT counter**

D7	D6	D5	D4	D3	D2	D1	D0	
T7	T6	T5	T4	T3	T2	T1	T0	W

Figure 5.6. WDT Counter Port (4003h)

W : Writes watchdog timer count data.
Write watchdog timer counter expiration time data.

1sec → 01h
8sec → 08h
15sec → 0Fh
30sec → 1Eh

*** 4004h : Event output control**

D7	D6	D5	D4	D3	D2	D1	D0	
---	---	---	---	RESET	WM2	WM1	WM0	R/W (Default: XXXX0000b)

Figure 5.7. Event Output Control Port (4004h)

Table 5.20. WM2-WM0: Interrupt Output Modes

WM2	WM1	WM0	Interrupt output at occurrence of WDT errors
0	0	1	Output to IRQ5 when time expires on the WDT.
0	1	0	Output to IRQ7 when time expires on the WDT.
0	1	1	Output to IRQ9 when time expires on the WDT.
1	0	0	Output to IRQ10 when time expires on the WDT.
1	0	1	Output to IRQ11 when time expires on the WDT.
1	1	0	Output to NMI when time expires on the WDT.
Others			Inhibits output when time expires on the WDT.

Table 5.21. RESET: Reset Output Modes

RESET	RESET output at occurrence of WDT errors
0	Inhibits RESET output when time expires on the WDT.
1	Allows RESET output when time expires on the WDT.

Note! : When time expires on WDT, the alarm-out is output irrelevant to the settings of the port for controlling event output.

*** 4005h : RAS status port**

D7	D6	D5	D4	D3	D2	D1	D0	
—	—	—	—	—	—	—	WDT	R (Default: XXXXXXX0b)

Figure 5.8. RAS Status Port (4005h)

R : RAS status port

WDT : WDT status

This is the WDT status bit. This bit is cleared when the WDT stops (read port 4002h).

0 : The WDT is either stopped or counting.

1 : The time set on the WDT expired.

General-purpose I/O and Remote Reset

The BOX-PC is equipped with three general-purpose insulated signals each for input and output. The input signals can also be used for interrupt input or remote reset input.

Specifications

[Input]

- Input specifications : Current-driven input by photocoupler insulation.
- Input resistance : 4.7kΩ
- Input signal count : 3 [One of them can be used for remote reset and interrupt input. (bit2<fixed>)]
- Input protection circuit : Equipped with a reverse-connection protection diode
- Input response time : Less than 100μsec
- External circuit power supply: 12 - 24VDC (±10%)

[Output]

- Output specifications : Open-collector output by photocoupler insulation
- Output rating : Max. 30VDC, 100mA
- Output signal count : 3 [One of them can be used for WDT alarm output. (bit2<fixed>)]
- Output response time : Less than 300μsec

[Common]

- I/O addresses 4000h and 4001h

How to Use General-purpose I/O and Remote Reset

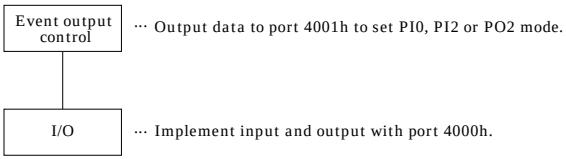


Figure 5.9. How to Use General-purpose I/O and Remote Reset

I/O Addresses and Instructions

*** 4000h: General-purpose I/O**

D7	D6	D5	D4	D3	D2	D1	D0	
—	—	—	—	—	PIO2	PIO1	PIO0	R/W

Figure 5.10. General-purpose Input Port (4000h)

R : Read data from PI0, PI1 and PI2.

W : Set data to be output to PO0, PO1 and PO2.

*** 4001h (bit0-3): PI2/IRQ(14) event input control**

D7	D6	D5	D4	D3	D2	D1	D0
—	WD_S1	WD_S0	PO2_M	RESET	PIM2	PIM1	PIM0

Figure 5.11. Event Input Control Port (4001h)

Table 5.22. PIM2 - PIM0 : Interrupt output mode

RIM2	RIM1	RIM0	PI2/IRQ (14) interrupt input
0	0	1	Input the RAS connector's PI2/IRQ (14) signal to IRQ5.
0	1	0	Input the RAS connector's PI2/IRQ (14) signal to IRQ7.
0	1	1	Input the RAS connector's PI2/IRQ (14) signal to IRQ9.
1	0	0	Input the RAS connector's PI2/IRQ (14) signal to IRQ10.
1	0	1	Input the RAS connector's PI2/IRQ (14) signal to IRQ11.
1	1	0	Input the RAS connector's PI2/IRQ (14) signal to NMI.
Others			Inhibit the RAS connector's PI2/IRQ (14) signal interrupt to be set.

Table 5.23. RESET: RESET: Reset Input Modes

RESET	PI2/IRQ (14)'s RESET input
0	Inhibit the remote reset input function of the RAS connector's PI2/IRQ (14) signal.
1	Use as the remote reset input function of the RAS connector's PI2/IRQ (14) signal.

⚠ CAUTION

A bit indicated with "rsv" is used by the system. Do not modify the bit.

*** 4006h: Index address setting**

D7	D6	D5	D4	D3	D2	D1	D0	
—	—	—	—	—	—	AD1	AD0	W

Figure 5.12. Index Address Setting Port (4006h)

W : Index address setting
When specifying the RS-485 setting with port 4007h, output 00h to this port before you specify the setting. (* Index addresses other than 00h are used by the system. Do not set addresses except for 00h.)

*** 4007h: Control of RS-485 transmission and reception**

D7	D6	D5	D4	D3	D2	D1	D0		
—	—	—	—	RE_GATE	TE_GATE	TE_SEL	rsv*	R/W	(Default: XXXX0000b)

Figure 5.13. RS-485 Transmission and Reception Control Port (4007h)

TE_SEL : Select the RS-485 transmission enable signal.
- 0 : Sets the RTS signal to the RS-485 transmission enable signal. (factory setting)
- 1 : Sets the TE_GATE value to the RS-485 transmission enable signal.

TE_GATE : RS-485 transmission enable signal. Valid only when the TE_SEL value is "1."
- 0 : RS-485 transmission Enable (factory setting)
- 1 : RS-485 transmission Disable

RE_GATE : RS-485 transmission enable signal.
- 0 : RS-485 reception Enable (factory setting)
- 1 : RS-485 reception Disable

⚠ CAUTION

A bit indicated with "rsv" is used by the system. Do not modify the bit.

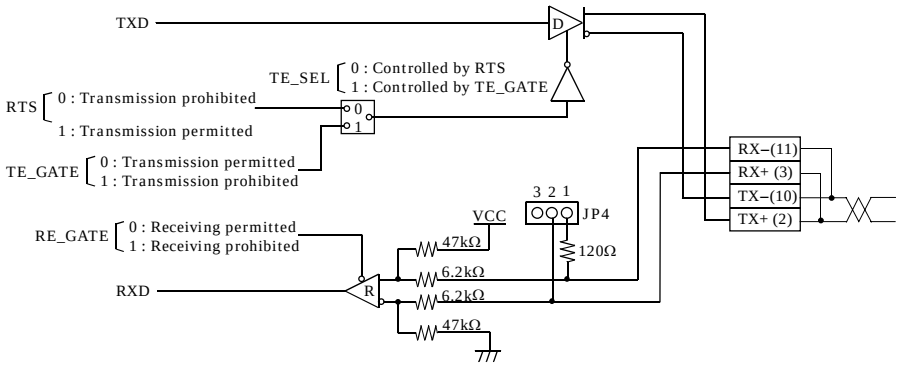


Figure 5.14. Half-Duplex Connection Method

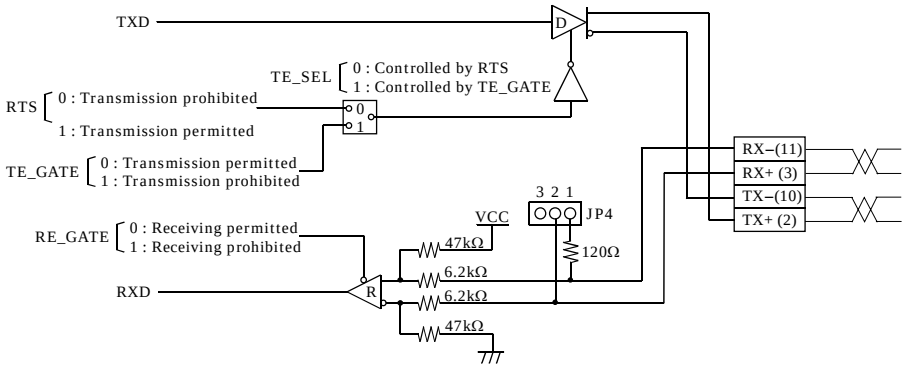


Figure 5.15. Full-Duplex Connection Method

External I/O Circuit

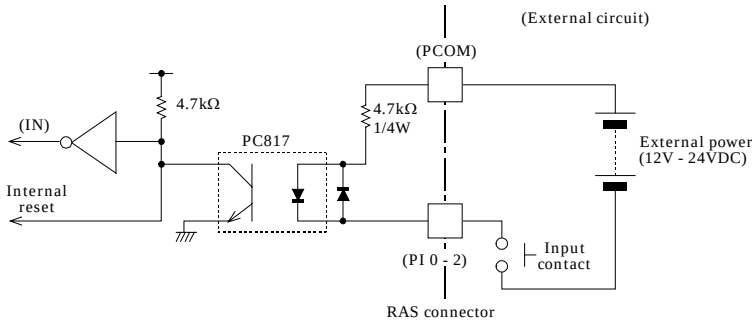


Figure 5.16. Input Circuit

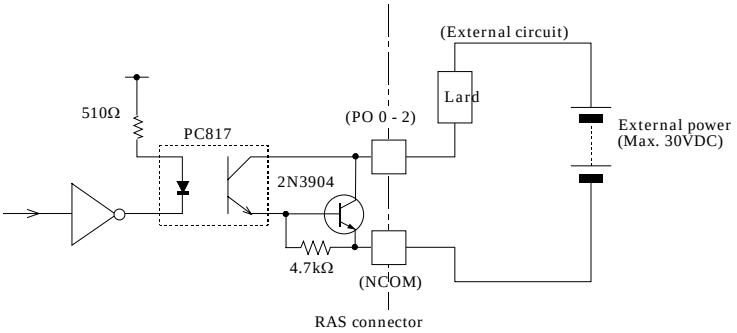


Figure 5.17. Output Circuit

Expansion Slots

This product has two PCI bus expansion slots to hold PCI bus boards.

Board Dimensions Allowed

Figure 5.18. Expansion Board Dimensions

⚠ CAUTION

A board that uses the back of the board edge connector (the shaded area in the figure) may not be mounted.

6. Appendix

Memory Map

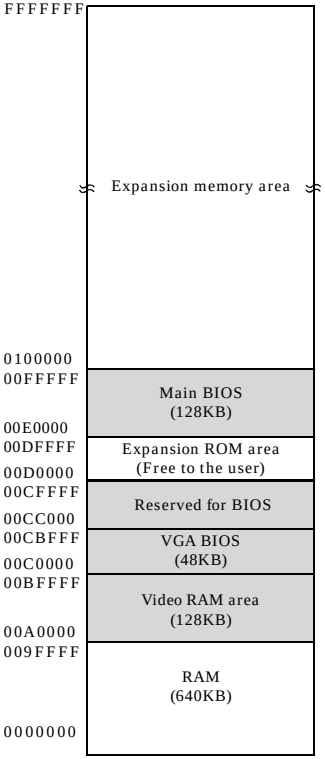


Figure 6.1. Memory Map

I/O Port Addresses

Table 6.1. I/O Port Addresses *< 1 / 2 >*

ADDRESS(hex)	Description	Remark
000-00F	DMA controller 1 (slave)	ch0 - 3(8-bit transfer)
010-01F	Reserved for system	
020-03F	Interrupt controller 1 (master)	
040-05F	Timer	
060-06F	Keyboard controller	
070-07F	RTC, NMI mask	
080-09F	DMA page register	
0A0-0BF	Interrupt controller 2 (slave)	
0C0-0DF	DMA controller 2 (master)	ch5 - 7(16-bit transfer)
0E0-0FF	Reserved for system	
170-17F	IDE hard disk controller	Secondary
180-18F	Reserved for system	
1E8-1EF	Reserved for system	
1F0-1FF	IDE hard disk controller	Primary
270-27F	Reserved for system	
290-297	Reserved for system	
2E8-2EF	Reserved for system	
2F8-2EF	Serial port	COM2
370-375	Reserved for system	
376-377	IDE hard disk controller	Secondary
378-3AF	Reserved for system	
3B0-3BB	Reserved for system	
3BC-3BF	Reserved for system	
3C0-3DF	Reserved for system	
3E8-3EF	Reserved for system	
3F0-3F7	FD controller	
3F8-3FF	Serial port	COM1
400-4BF	Reserved for system	
4D0-4D1	Reserved for system	
510-51F	SMBus controller	
A78-A7B	Reserved for system	
B78-B7B	Reserved for system	
BBC-BBF	Reserved for system	

Table 6.1. I/O Port Addresses ***< 2 / 2 >***

ADDRESS(hex)	Description	Remark
CF0-CFF	Reserved for system	
4000-4007	RAS function	
4008-400F	Reserved for system	
4020-402F	RTC function	
4030-403F	Reserved for system	
46E8	Reserved for system	
83D0-B3D3	Reserved for system	

Interrupt Level List

Table 6.2. Hardware Interrupt Levels (Factory Settings)

Type	8259	Priority	Description	Vector	Remarks
NMI		High	-I/O CH CK	02H	
IRQ0	MASTER	↑	Timer 0	08H	
IRQ1	"	|	Keyboard	09H	
IRQ2	"	|	Interrupt controller 2 (slave)	0AH	
IRQ8	SLAVE	|	Real-time clock	70H	
IRQ9	"	|	Reserved for PCI device	71H	
IRQ10	"	|	Not in use	72H	Available to user
IRQ11	"	|	Not in use	73H	Available to user
IRQ12	"	|	Reserved for PS/2 mouse	74H	
IRQ13	"	|	Reserved for coprocessor	75H	
IRQ14	"	|	Reserved for hard disk	76H	Primary
IRQ15	"	|	Reserved for CF card / optional CD-ROM	77H	Secondary
IRQ3	MASTER	|	Serial port B (COM2)	0BH	
IRQ4	"	|	Serial port A (COM1)	0CH	
IRQ5	"	|	Not in use	0DH	Available to user
IRQ6	"	↓	Reserved for floppy disk	0EH	
IRQ7	"	Low	Not in use	0FH	Available to user

Utility Soft

The following gives a brief description of utility software found on the bundled CD-ROM "IPC-SLIB-01". For detailed information and usage, refer to the help file in IPC-SLIB-01.

Hardware monitor Utility MTView

MTView is a utility to monitor the following items using the hardware monitor and SMART features:

- CPU temperature
- MB temperature
- Rotational speed of CPU fan
- Rotational speed of SYSTEM fan
- SMART information

You should set threshold values for the above items in advance (except for SMART information items). If the system becomes abnormal with any of the threshold values exceeded, the utility can take the following reaction while recording that condition to the system event log:

- Shut down the system
- Reboot the system
- Start the application

Monitoring is performed with MTView up and running. Once started, MTView accesses the hardware monitors periodically at user-specified time intervals to check various states.

You can use API functions as well as MTView to access the hardware monitors. For details, refer to the help file in IPC-SLIB-01.

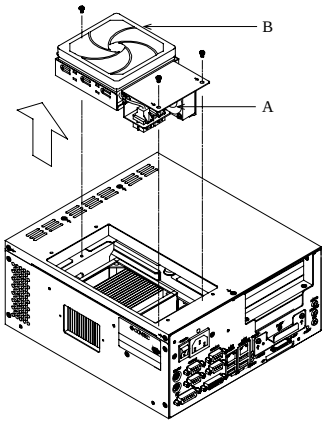
RTC utility RTCSync

This product contains a high-precision RTC (hereafter the master RTC) as well as the ICH4 integrated RTC. While the ICH4 integrated RTC is managed by the OS, the master RTC is independent of the OS. You can use the RTCSync utility to access the master RTC.

RTCSync is intended to read the time from the master RTC and set it as the system clock for the OS (collectively referred to as synchronization). This synchronization can be executed either manually via a setup dialog box or automatically at a specific time pre-set by the scheduling function.

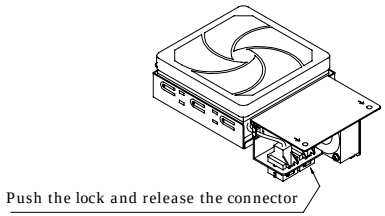
How to exchange the FAN

1. Remove the screw and dismount FAN bracket from system from main case.

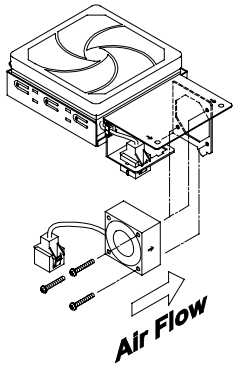


A. Case of 40mm FAN (IPC-FAN4020S)

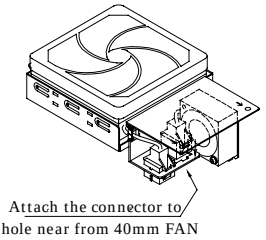
[1] Release the lock of the connector which fixed to the bracket.



[2] Remove old FAN and attach new FAN to bracket. Then be careful of wind direction.

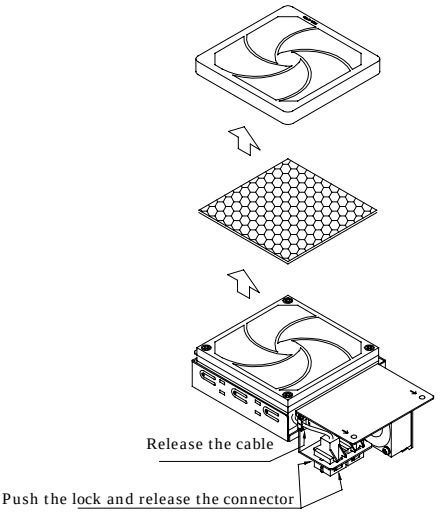


[3] Attach connector to bracket.

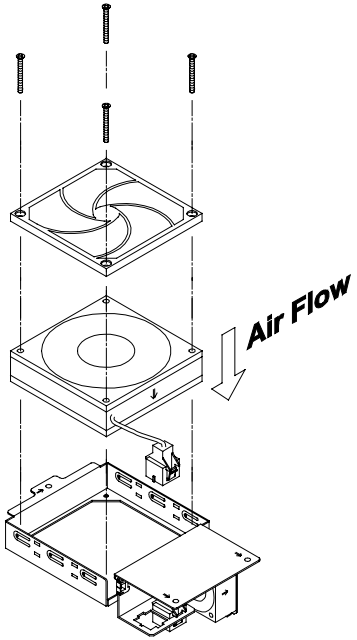


B. Case of 92mm FAN (IPC-FAN9225S)

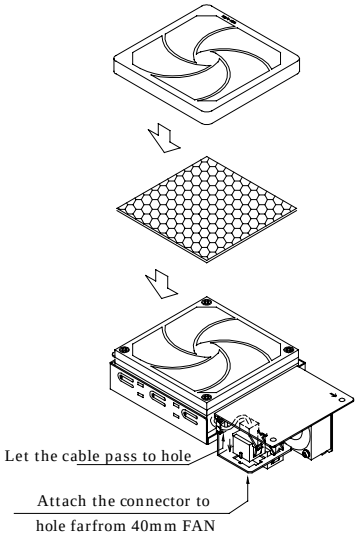
[1] Remove the FAN filter and release the lock of the connector which fixed to the bracket.



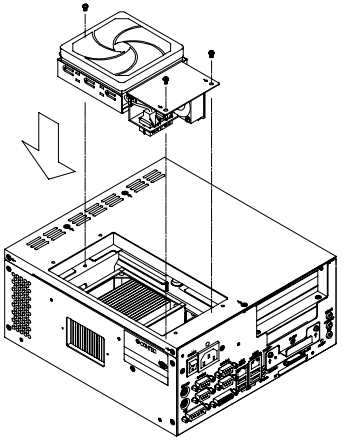
[2] Remove old FAN and attach new FAN to bracket. Then be careful of wind direction.



[3] Attach FAN filter and attach connector to bracket.



2. Mount the FAN bracket to main case and fasten the screw.



7. List of Options

Memory for extension (184 pin DIMM)

- PC-MDD512-184A PC2700 512MB DIMM memory module

Silicon disk drive for extension (IDE 2.5inch)

[PC-ESD Series]

- PC-ESD500V 512MB silicon disk drive
- PC-ESD1000V 1GB silicon disk drive
- PC-ESD2000V 2GB silicon disk drive
- PC-ESD4000V 4GB silicon disk drive
- PC-ESD8000V 8GB silicon disk drive

[PC-SDD V Series]

- PC-SDD64V 64MB silicon disk drive
- PC-SDD128V 128MB silicon disk drive
- PC-SDD192V 192MB silicon disk drive
- PC-SDD320V 320MB silicon disk drive
- PC-SDD500V 512MB silicon disk drive
- PC-SDD1000V 1GB silicon disk drive
- PC-SDD2000V 2GB silicon disk drive

CF Card

- CF-1GB-R 1GB CompactFlash for Fix Disk
- CF-2GB-R 2GB CompactFlash for Fix Disk
- CF-4GB-R 4GB CompactFlash for Fix Disk
- CF-8GB-R 8GB CompactFlash for Fix Disk

Terminal block for connecting the RAS connector

- IPC-PSD-20 Terminal block for connecting the RAS connector

TFT color liquid-crystal display

< Analog RGB/DVI-D types >

- IPC-DT/H61XT-DC1 (15 inch 1024 x 768 dots, Panel mounted type)
- IPC-DT/L61SVT-DC1 (12.1 inch 800 x 600 dots, Panel mounted type)
- IPC-DT/M61VT-DC1 (10.4 inch 640 x 480 dots, Panel mounted type)
- IPC-DT/S61VT-DC1 (6.5 inch 640 x 480 dots, Panel mounted type)
- IPC-DT/H65XT-DC1 (15 inch 1024 x 768 dots, Embedded type)
- IPC-DT/L65SVT-DC1 (12.1 inch 800 x 600 dots, Embedded type)

- IPC-DT/M65VT-DC1 (10.4 inch 640 x 480 dots, Embedded type)
- IPC-DT/S65VT-DC1 (6.5 inch 640 x 480 dots, Embedded type)

< Panel Link types >

- IPC-DT/H40X(PC)T (15 inch 1024 x 768 dots, Panel mounted type)
- IPC-DT/L40S(PC)T (12.1 inch 800 x 600 dots, Panel mounted type)
- IPC-DT/L440(PC)TA (12.1 inch 800 x 600 dots, Desktop/wall-mounted)
- IPC-DT/L440(PC)TB (12.1 inch 800 x 600 dots, Desktop/wall-mounted, anti-glare type)

< Analog RGB types >

- IPC-DT/M20V(PC)T (10.4 inch 640 x 480 dots)
- IPC-DT/L20S(PC)T (12.1 inch 800 x 600 dots)
- IPC-DT/H20X(PC)T (15 inch 1024 x 768 dots)

Display cable only for DVI-D

- IPC-DVI/D-020 DVI-D type display cable (2m)
- IPC-DVI/D-050 DVI-D type display cable (5m)

Display cable only for PanelLink

- IPC-DVIPL-020 DVI-PanelLink conversion display cable (2m)
- IPC-DVIPL-050 DVI-PanelLink conversion display cable (5m)

Touch-panel cable for an analog RGB display

- IPC-CBL3-2 AT host Touch panel, COM cable (2m)
- IPC-CBL3-5 AT host Touch panel, COM cable (5m)

CD-ROM/ DVD-ROM drive

- IPC-CDD-02 CD-ROM/ DVD-ROM drive

CD-ROM/ DVD-ROM drive connection cable

- IPC-CDC-03 CD-ROM/DVD-ROM CABLE

FAN, FAN Filler

- IPC-FAN9225S FAN for IPC-Series (92 x 25mm)
- IPC-FAN4020S FAN for IPC-Series (40 x 20mm)
- IPC-FLT92 FAN Filter (92 x 92mm 10pcs)

IPC-BX720-AC Series

User's Manual

IPC-BX720-AC

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