MSI
MICRO-STAR INTERNATIONAL

Fuzzy CX700/CX700D

MS-9802 (V1.X) Mainboard

G52-98021X1

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Revision History

Revision	Revision History	Date
V1.0	First release	February 2007

Technical Support

If a problem arises with your system and no solution can be obtained from the user's manual, please contact your place of purchase or local distributor. Alternatively, please try the following help resources for further guidance.

- Visit the MSI website at ***http://www.msi.com.tw/program/service/faq/faq/esc_faq_list.php*** for FAQ, technical guide, BIOS updates, driver updates, and other information.
- Contact our technical staff at ***http://support.msi.com.tw/***.

Safety Instructions

1. Always read the safety instructions carefully.
2. Keep this User's Manual for future reference.
3. Keep this equipment away from humidity.
4. Lay this equipment on a reliable flat surface before setting it up.
5. The openings on the enclosure are for air convection hence protects the equipment from overheating. DO NOT COVER THE OPENINGS.
6. Make sure the voltage of the power source and adjust properly 110/220V before connecting the equipment to the power inlet.
7. Place the power cord such a way that people can not step on it. Do not place anything over the power cord.
8. Always Unplug the Power Cord before inserting any add-on card or module.
9. All cautions and warnings on the equipment should be noted.
10. Never pour any liquid into the opening that could damage or cause electrical shock.
11. If any of the following situations arises, get the equipment checked by service personnel:
    - † The power cord or plug is damaged.
    - † Liquid has penetrated into the equipment.
    - † The equipment has been exposed to moisture.
    - † The equipment does not work well or you can not get it work according to User's Manual.
    - † The equipment has dropped and damaged.
    - † The equipment has obvious sign of breakage.
12. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT UNCONDITIONED, STORAGE TEMPERATURE ABOVE 60°C (140°F), IT MAY DAMAGE THE EQUIPMENT.

CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.

警告使用者:
這是甲類的資訊產品，在居住的環境中使用時，可能會造成無線電干擾，在這種情況下，使用者會被要求採取某些適當的對策。

廢電池請回收

For better environmental protection, waste batteries should be collected separately for recycling or special disposal.

FCC-B Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the measures listed below.

CE N1996

† Reorient or relocate the receiving antenna.

† Increase the separation between the equipment and receiver.

† Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

† Consult the dealer or an experienced radio/television technician for help.

Notice 1

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Notice 2

Shielded interface cables and A.C. power cord, if any, must be used in order to comply with the emission limits.

VOIR LA NOTICE D'INSTALLATION AVANT DE RACCORDER AU RESEAU.

FC **Micro-Star International**
MS-9802

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and

(2) this device must accept any interference received, including interference that may cause undesired operation.

WEEE (Waste Electrical and Electronic Equipment) Statement

ENGLISH

To protect the global environment and as an environmentalist, MSI must remind you that...

Under the European Union ("EU") Directive on Waste Electrical and Electronic Equipment, Directive 2002/96/EC, which takes effect on August 13, 2005, products of "electrical and electronic equipment" cannot be discarded as municipal waste anymore and manufacturers of covered electronic equipment will be obligated to take back such products at the end of their useful life. MSI will comply with the product take back requirements at the end of life of MSI-branded products that are sold into the EU. You can return these products to local collection points.

DEUTSCH

Hinweis von MSI zur Erhaltung und Schutz unserer Umwelt

Gemäß der Richtlinie 2002/96/EG über Elektro- und Elektronik-Altgeräte dürfen Elektro- und Elektronik-Altgeräte nicht mehr als kommunale Abfälle entsorgt werden. MSI hat europaweit verschiedene Sammel- und Recyclingunternehmen beauftragt, die in die Europäische Union in Verkehr gebrachten Produkte, am Ende seines Lebenszyklus zurückzunehmen. Bitte entsorgen Sie dieses Produkt zum gegebenen Zeitpunkt ausschliesslich an einer lokalen Altgerätesammelstelle in Ihrer Nähe.

FRANÇAIS

En tant qu'écologiste et afin de protéger l'environnement, MSI tient à rappeler ceci...

Au sujet de la directive européenne (EU) relative aux déchets des équipement électriques et électroniques, directive 2002/96/EC, prenant effet le 13 août 2005, que les produits électriques et électroniques ne peuvent être déposés dans les décharges ou tout simplement mis à la poubelle. Les fabricants de ces équipements seront obligés de récupérer certains produits en fin de vie, MSI prendra en compte cette exigence relative au retour des produits en fin de vie au sein de la communauté européenne. Par conséquent vous pouvez retourner localement ces matériels dans les points de collecte.

РУССКИЙ

Компания MSI предпринимает активные действия по защите окружающей среды, поэтому напоминаем вам, что....

В соответствии с директивой Европейского Союза (ЕС) по предотвращению загрязнения окружающей среды использованным электрическим и электронным оборудованием (директива WEEE 2002/96/EC), вступающей в силу 13 августа 2005 года, изделия, относящиеся к электрическому и электронному оборудованию, не могут рассматриваться как бытовой мусор, поэтому производители вышеперечисленного электронного оборудования обязаны принимать его для переработки по окончании срока службы. MSI обязуется соблюдать требования по приему продукции, проданной под маркой MSI на территории ЕС, в переработку по окончании срока службы. Вы можете вернуть эти изделия в специализированные пункты приема.

ESPAÑOL

MSI como empresa comprometida con la protección del medio ambiente, recomienda:
Bajo la directiva 2002/96/EC de la Unión Europea en materia de desechos y/o equipos electrónicos, con fecha de rigor desde el 13 de agosto de 2005, los productos clasificados como "eléctricos y equipos electrónicos" no pueden ser depositados en los contenedores habituales de su municipio, los fabricantes de equipos electrónicos, están obligados a hacerse cargo de dichos productos al termino de su periodo de vida. MSI estará comprometido con los términos de recogida de sus productos vendidos en la Unión Europea al final de su periodo de vida. Usted debe depositar estos productos en el punto limpio establecido por el ayuntamiento de su localidad o entregar a una empresa autorizada para la recogida de estos residuos.

NEDERLANDS

Om het milieu te beschermen, wil MSI u eraan herinneren dat....
De richtlijn van de Europese Unie (EU) met betrekking tot Vervuiling van Electrische en Electronische producten (2002/96/EC), die op 13 Augustus 2005 in zal gaan kunnen niet meer beschouwd worden als vervuiling.
Fabrikanten van dit soort producten worden verplicht om producten retour te nemen aan het eind van hun levenscyclus. MSI zal overeenkomstig de richtlijn handelen voor de producten die de merknaam MSI dragen en verkocht zijn in de EU. Deze goederen kunnen geretourneerd worden op lokale inzamelingspunten.

SRPSKI

Da bi zaštitili prirodnu sredinu, i kao proizvođač koje vodi računa o okolini i prirodnoj sredini, MSI mora da vas podseti da...
Po Direktivi Evropske unije ("EU") o odbačenoj elektronskoj i električnoj opremi, Direktiva 2002/96/EC, koja stupa na snagu od 13. Avgusta 2005, proizvodi koji spadaju pod "elektronsku i električnu opremu" ne mogu više biti odbačeni kao običan otpad i proizvođači ove opreme biće prinuđeni da uzmu natrag ove proizvode na kraju njihovog uobičajenog veka trajanja. MSI će poštovati zahtev o preuzimanju ovakvih proizvoda kojima je istekao vek trajanja, koji imaju MSI oznaku i koji su prodati u EU. Ove proizvode možete vratiti na lokalnim mestima za prikupljanje.

POLSKI

Aby chronić nasze środowisko naturalne oraz jako firma dbająca o ekologię, MSI przypomina, że...
Zgodnie z Dyrektywą Unii Europejskiej ("UE") dotyczącą odpadów produktów elektrycznych i elektronicznych (Dyrektywa 2002/96/EC), która wchodzi w życie 13 sierpnia 2005, tzw. "produkty oraz wyposażenie elektryczne i elektroniczne " nie mogą być traktowane jako śmieci komunalne, tak więc producenci tych produktów będą zobowiązani do odbierania ich w momencie gdy produkt jest wycofywany z użycia. MSI wypełni wymagania UE, przyjmując produkty (sprzedawane na terenie Unii Europejskiej) wycofywane z użycia. Produkty MSI będzie można zwracać w wyznaczonych punktach zbiorczych.

TÜRKÇE

Çevreci özelliğiyle bilinen MSI dünyada çevreyi korumak için hatırlatır:

Avrupa Birliği (AB) Kararnamesi Elektrik ve Elektronik Malzeme Atığı, 2002/96/EC Kararnamesi altında 13 Ağustos 2005 tarihinden itibaren geçerli olmak üzere, elektrikli ve elektronik malzemeler diğer atıklar gibi çöpe atılamayacak ve bu elektonik cihazların üreticileri, cihazların kullanım süreleri bittikten sonra ürünleri geri toplamakla yükümlü olacaktır. Avrupa Birliği'ne satılan MSI markalı ürünlerin kullanım süreleri bittiğinde MSI ürünlerin geri alınması isteği ile işbirliği içerisinde olacaktır. Ürünlerinizi yerel toplama noktalarına bırakabilirsiniz.

ČESKY

Záleží nám na ochraně životního prostředí - společnost MSI upozorňuje...

Podle směrnice Evropské unie ("EU") o likvidaci elektrických a elektronických výrobků 2002/96/EC platné od 13. srpna 2005 je zakázáno likvidovat "elektrické a elektronické výrobky" v běžném komunálním odpadu a výrobci elektronických výrobků, na které se tato směrnice vztahuje, budou povinni odebírat takové výrobky zpět po skončení jejich životnosti. Společnost MSI splní požadavky na odebírání výrobků značky MSI, prodávaných v zemích EU, po skončení jejich životnosti. Tyto výrobky můžete odevzdat v místních sběrnách.

MAGYAR

Annak érdekében, hogy környezetünket megvédjük, illetve környezetvédőként fellépve az MSI emlékezteti Önt, hogy ...

Az Európai Unió („EU") 2005. augusztus 13-án hatályba lépő, az elektromos és elektronikus berendezések hulladékairól szóló 2002/96/EK irányelve szerint az elektromos és elektronikus berendezések többé nem kezelhetőek lakossági hulladékként, és az ilyen elektronikus berendezések gyártói kötelessé válnak az ilyen termékek visszavételére azok hasznos élettartama végén. Az MSI betartja a termékvisszavétellel kapcsolatos követelményeket az MSI márkanév alatt az EU-n belül értékesített termékek esetében, azok élettartamának végén. Az ilyen termékeket a legközelebbi gyűjtőhelyre viheti.

ITALIANO

Per proteggere l'ambiente, MSI, da sempre amica della natura, ti ricorda che....

In base alla Direttiva dell'Unione Europea (EU) sullo Smaltimento dei Materiali Elettrici ed Elettronici, Direttiva 2002/96/EC in vigore dal 13 Agosto 2005, prodotti appartenenti alla categoria dei Materiali Elettrici ed Elettronici non possono più essere eliminati come rifiuti municipali: i produttori di detti materiali saranno obbligati a ritirare ogni prodotto alla fine del suo ciclo di vita. MSI si adeguerà a tale Direttiva ritirando tutti i prodotti marchiati MSI che sono stati venduti all'interno dell'Unione Europea alla fine del loro ciclo di vita. È possibile portare i prodotti nel più vicino punto di raccolta.

CONTENTS

Copyright Notice iii
Trademarks iii
Revision History iii
Technical Support iii
Safety Instructions iii
FCC-B Radio Frequency Interference Statement v
WEEE (Waste Electrical and Electronic Equipment) Statement v
Chapter 1 Product Overview 1-1
Mainboard Layout 1-2
Chapter 2 Product Specifications 2-1
Mainboard Specifications 2-2
Safety Compliance & MTBF 2-5
Block Diagram 2-5
Board Dimension 2-7
I/O Shield Drawing 2-7
Chapter 3 Electrical Specifications 3-1
Power Consumption 3-2
General Purpose I/O Lines 3-2
Onboard Connector Part Number 3-4
Chapter 4 Hardware Setup 4-1
Quick Components Guide 4-2
Memory 4-3
Installing DDR2 Modules 4-3
Power Supply 4-4
ATX 20-Pin System Power Connector: ATX1 4-4
Back Panel 4-5
Connectors 4-7
IDE Connector: IDEB1 4-7
CompactFlash Card Slot: CF1 4-7
CF Mode Selecting Jumper: JCF_SEL1 4-7
Serial ATA Connectors: SATA1, SATA2 4-8
Audio Amplifier Connector: JAUD1 4-9
Front Audio Connector: JAUD2 4-9
Front Panel Connector: JFP1 4-10
Digital IO Connector: J6 4-11

Parallel Port Header: JLPT1 4-12
Fan Power Connectors: CPUFAN1, SYSFAN1 4-12
Serial Port Connector: COM3, COM4 4-13
Front USB Connector: F_USB1 4-13
CD-In Connector: JCD1 4-14
LVDS Flat Panel Connector: JLVDS1 4-14
IrDA Infrared Module Header: IRDA1 4-15
I2C Bus Connector: J1 4-15
TV-Out Connector: JTV1 4-15
Jumpers 4-16
Display Jumper: TV/CRT1 4-16
Clear CMOS Jumper: CLR_CMOS1 4-16
LCD Power Source Jumper: J7 4-17
COM Port Power Jumpers: J2, J3, J4, J5 4-17
Slots 4-18
PCI (Peripheral Component Interconnect) Slot 4-18
PCI Interrupt Request Routing 4-18
Mini PCI Slot 4-19
Installing Mini PCI Cards 4-19
Removing Mini PCI Cards 4-20
Chapter 5 BIOS Setup 5-1
Entering Setup 5-2
Control Keys 5-3
Getting Help 5-3
General Help <F1> 5-3
The Menu Bar 5-4
Main 5-5
Advanced 5-7
Boot 5-20
System 5-22
Security 5-23
PC Health 5-24
Exit 5-26
Chapter 6 System Resources 6-1
Watch Dog Timer Setting 6-3

Award POST Code 6-4
Check Point & Beep Code List 6-10
PCI Configuration 6-16
Resource List 6-19

Chapter 1
Product Overview

Thank you for choosing the Fuzzy CX700/CX700D (MS-9802 v1.X) Mini ITX mainboard from MSI.

Noiseless, fanless and low power consumption are the advantages of the Fuzzy CX700/CX700D, making it an ideal choice for IPC special application.

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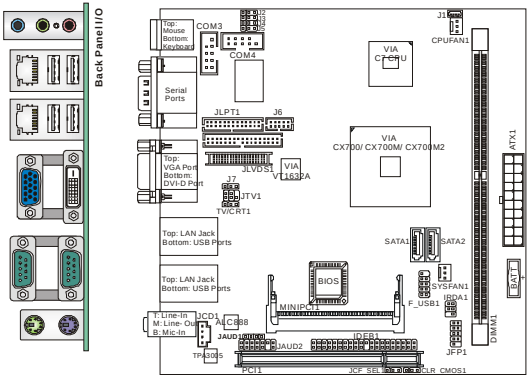
Mainboard Layout



Fuzzy CX700/CX700D (MS-9802 v1.X) Mini ITX Mainboard

Chapter 2
Product Specifications

Based on the innovative VIA CX700/ CX700M/ CX700M2 controller for optimal system efficiency, the Fuzzy CX700/CX700D accommodates VIA C7/ Eden/ Eden ULV processor and supports one 240-pin 400/533MHz DDR2 DIMM slot to provide the maximum of 2GB memory capacity.

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Mainboard Specifications

Processor Support

- VIA C7/ Eden/ Eden ULV processor with nanoBGA2 footprint
- 3-pin CPU fan pinheader with Smart Fan Speed Control
- Power Saver™ Technology enabled

Supported FSB

- 400/ 533 MHz

Chipset

- Single chip solution: VIA CX700/ CX700M/ CX700M2

Memory Support

- DDR2 400/533 SDRAM (2GB Max) or ECC DDR2 400 only
- 1 DDR2 DIMM slot (240pin / 1.8V)

LAN

- 2 PCI Gb LAN by Realtek RTL8110SC

Audio

- Realtek® ALC888 7.1-channel HDA codec
- 6 watt amplifier

IDE

- 1 40-pin IDE connector
- Supports 2 IDE devices

CF

- 1 CF Type II socket

SATA

- 2 SATA II ports by VIA CX700/ CX700M/ CX700M2
- Supports storage and data transfers at up to 300MB/s

Expansion Slots

- 1 PCI slot
- 1 Mini PCI socket

Connectors

- **Rear I/O**
  - 1 PS/2 mouse port
  - 1 PS/2 keyboard port
  - 1 COM port stack connector (2 RS-232 ports)
  - 1 VGA/ DVI stack connector
  - 2 RJ45/ USB stack connectors
  - 1 3-jack audio connector

- **Onboard Connector**
  - 1 USB connector (2 ports)
  - 1 parallel port connector (LPT)
  - 2 COM port connectors (RS-232)
  - 1 LVDS connector
  - 1 DIO connector (4 IN/ 4 OUT)
  - 1 TV-Out connector
  - 1 audio connector (7.1-channel)
  - 1 amplifier connector
  - 1 front panel connector
  - 1 SMBUS connector
  - 1 CPU fan connector
  - 1 system fan connector
  - 2 SATA connectors

Form Factor

- Mini-ITX (17.0cm X17.0cm)

Mounting

- 4 mounting holes

Environmental

- **Operating Temperature**
  - Temperature: -10°C ~ 70°C
  - Humidity: 0% ~ 85% RH

- **Storage Temperature**
  - Temperature: -20°C ~ 80°C
  - Humidity: 25% ~ 90% RH

For more information on compatible components, please visit
http://www.msi.com.tw/program/products/server/svr/pro_svr_qvl.php

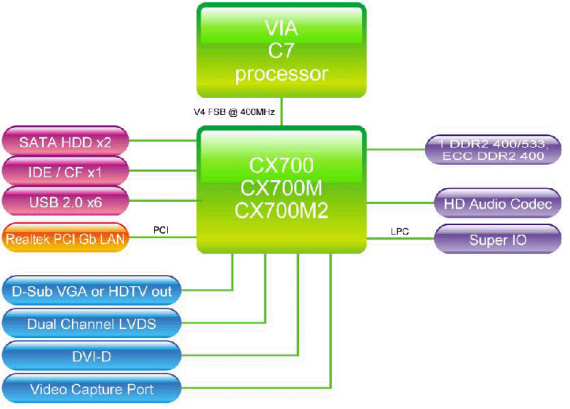
Safety Compliance & MTBF

Certification	Standard number		Title of standard
CE	RFI	EN 55022:1998+A1:2000+A2:2003 Class B	Product family standard
		EN 6100-3-2:2000 Class D	Limits for harmonic current emission
		EN 6100-3-3:1995+A1:2001	Limitation of voltage fluctuation and flicker in low-voltage supply system
	Immunity	EN 55024:1998+A1:2001+A2:2003	Product family standard
BSMI	CNS 13438 乙類(1997年版)		
C-Tick	AS/NZS CISPR 22:2004		
FCC	FCC CFR Title 47 Part 15 Subpart B: 2005 Class B		
	CISPR 22: 2005		
VCCI	VCCI V-3:2004, Class B		
	VCCI V-4:2004, Class B		

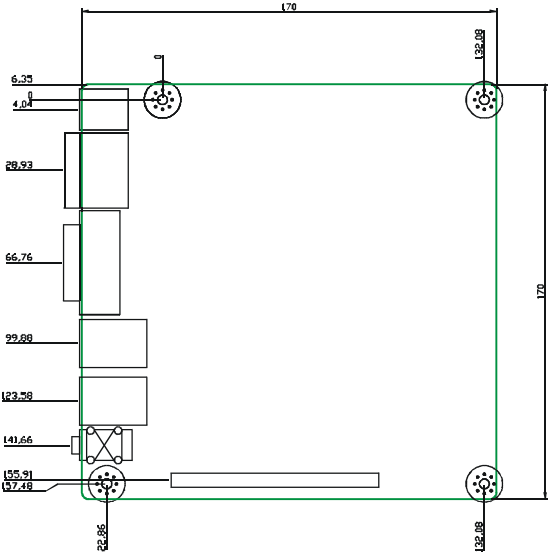
MTBF - Reliability Prediction

Calculation Model	Operation Temperature	Operating Environment	Duty Cycle	MTBF
Telcordia Issue 1	35	Ground Benign	100%	186,718
MIL-HDBK-217 FN2	55	Ground Mobile	100%	3,182

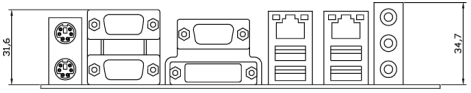
Block Diagram

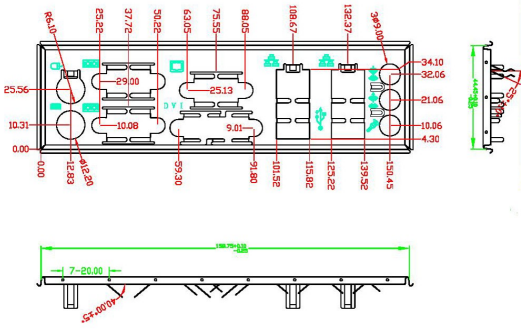


Board Dimension



I/O Shield Drawing





Chapter 3
Electrical Specifications

This chapter provides detailed electrical specifications of this mainboard. For safety concern, users are advised to read this chapter first before powering on the mainboard.

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Power Consumption

Configuration
CPU：VIA C7 1GHz
Memory：Samsung PC2-3200 1GB
SATA HDD：HITACHI 80GB
SATA HDD：Maxtor 80GB
CDROM：Samsung CD-RW/DVD

Power Consumption					
	Mainboard +3.3V	Mainboard +5V	Mainboard 5VSB	Mainboard +12V	System Consumption
	Current (A)	Current (A)	Current (A)	Current (A)	Watts
A. Full Running (CPU / Memory / HDD / LAN stress & Play Audio CD)	1.33	1.07	0.04	0.67	18.0773
B. Running Network Application - Files Copy	1.33	1.04	0.039	0.6	17.0905
C. Idle	0.56	0.94	0.04	0.39	11.482
D. S3 Mode	0	0	0.318	0	1.6345
E. Running 3D stress	1.972	6.2115	0.1748	7.709	16.0673

General Purpose I/O Lines

General Purpose I/O Lines			
Parameter	Conditions	Min	Max
Input High Voltage (VIH)	-	2V	2V
Input High Voltage (VIL)	-	-0.5V	0.8V
Input Current (II)	-	-	+(-)1uA
Out High Voltage (VoH)	IOH = -50uA	4.4V	-
	IOH = -16uA	3.8V	-
Out Low Voltage (VoL)	IOL = 50uA	-	0.1V
	IOH = 16uA	-	0.55V

Onboard Connector Part Number

Onboard Connector	Part Number	Description
DC 12V power connector	HORNG TONG (E20221-222123)	2x2-pin, 4.2mm
AMP audio header	FOXCONN (HB1104H)	1x4-pin, 2.54mm
GPIO box header	HORNG TONG (A10271-0A1129)	2x5-pin, 2mm
Parallel port box header	HORNG TONG (A26371-0A1120)	2x13-pin, 2mm
LVDS panel box header	HORNG TONG (B2205J-926430)	2x20pin, 1.25mm
RS-232 box header (internal)	HORNG TONG (A10332-A12220)	2x5pin, 2.54mm (take out of 1-pin)
TV-OUT header	HORNG TONG (C2036A-21212R)	2x3-pin, 2.54mm (take out of 1-pin)
Front panel I/O header	HORNG TONG (C205A1-21412Z)	2x5-pin, 2.54mm (take out of 1-pin)
IrDA header	HORNG TONG (C2035A-21212R)	2x3-pin, 2.54mm (take out of 1-pin)
USB header (internal)	HORNG TONG (C2059A-21412X)	2x5-pin, 2.54mm (take out of 1-pin)
Front audio header	HORNG TONG (C2074A-25212R)	2x7-pin, 2.54mm (take out of 1-pin)

Chapter 4
Hardware Setup

This chapter provides you with the information about hardware setup procedures. While doing the installation, be careful in holding the components and follow the installation procedures. For some components, if you install in the wrong orientation, the components will not work properly.

Use a grounded wrist strap before handling computer components. Static electricity may damage the components.

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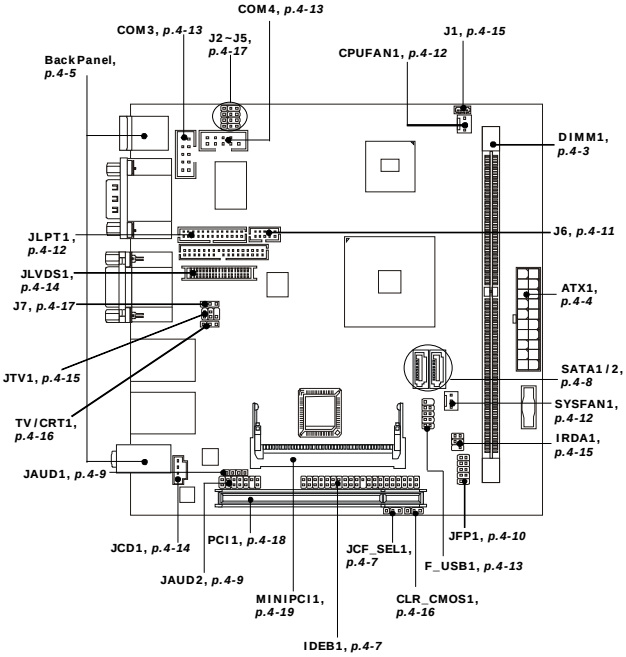
MICRO-STAR INTERNATIONAL

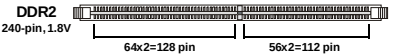
Quick Components Guide



Memory

The mainboard provides one 240-pin **non-ECC DDR2 400/533** and **ECC DDR2 400** DIMM slot and supports up to 2GB system memory.

For more information on compatible components, please visit ***http://www.msi.com.tw/program/products/server/svr/pro_svr_qvl.php***.



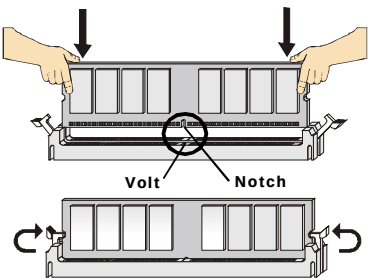
Installing DDR2 Modules

1. The memory module has only one notch on the center and will only fit in the right orientation.
2. Insert the memory module vertically into the DIMM slot. Then push it in until the golden finger on the memory module is deeply inserted in the DIMM slot.

Important

You can barely see the golden finger if the memory module is properly inserted in the DIMM slot.

3. The plastic clip at each side of the DIMM slot will automatically close.

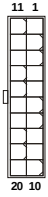


Power Supply

ATX 20-Pin System Power Connector: ATX1

This connector allows you to connect to an ATX power supply. To connect to the ATX power supply, make sure the plug of the power supply is inserted in the proper orientation and the pins are aligned. Then push down the power supply firmly into the connector.

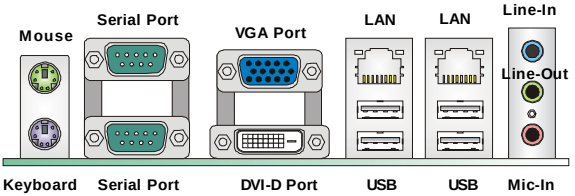
ATX1



ATX1 Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	3.3V	11	3.3V
2	3.3V	12	-12V
3	GND	13	GND
4	5V	14	PS_ON
5	GND	15	GND
6	5V	16	GND
7	GND	17	GND
8	PW_OK	18	-5V
9	5V_SB	19	5V
10	12V	20	5V

Back Panel



▶ Mouse/Keyboard Connector
The standard PS/2® mouse/keyboard DIN connector is for a PS/2® mouse/keyboard.

▶ Serial Port
The serial port is a 16550A high speed communications port that sends/ receives 16 bytes FIFOs. You can attach a serial mouse or other serial devices directly to the connector.

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

▶ DVI-D Port
The DVI (Digital Visual Interface) connector allows you to connect an LCD monitor. It provides a high-speed digital interconnection between the computer and its display device. To connect an LCD monitor, simply plug your monitor cable into the DVI connector, and make sure that the other end of the cable is properly connected to your monitor (refer to your monitor manual for more information.)

Display Matrix				
	CRT	DVI	LVDS	TV OUT
CRT		V	V	X
DVI	V		V	V
LVDS	V	V		V
TV OUT	X	V	V	

V : Support X : No Support

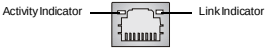
▶ USB Connectors
The UHCI (Universal Host Controller Interface) Universal Serial Bus root is for attaching USB devices such as keyboard, mouse, or other USB-compatible devices.

▶ Audio Port Connectors
These audio connectors are used for audio devices. You can differentiate the color of the audio jacks for different audio sound effects.

- **Line-In (Blue)** - Line In is used for external CD player, tapeplayer or other audio devices.
- **Line-Out (Green)** - Line Out, is a connector for speakers or headphones.
- **Mic-In (Pink)** - Mic In, is a connector for microphones.

▶ LAN (RJ-45) Jacks

The standard RJ-45 jacks are for connection to Local Area Network (LAN). You can connect network cables to them.



		Left LED	Right LED
		Active LED	**100M/1000M Speed LED**
LED Color		Yellow	Green/Orange
10M Cable Plug-in	**No Transmission**	OFF	OFF
	Transition	Yellow(Blinking)	OFF
100M Cable Plug-in	**No Transmission**	OFF	Green(Lighting)
	Transition	Yellow(Blinking)	Green(Lighting)
1000M Cable Plug-in	**No Transmission**	OFF	Orange(Lighting)
	Transition	Yellow(Blinking)	Orange(Lighting)
In S3/S4/S5 Standby State		OFF	OFF

Connectors

IDE Connector: IDEB1

The mainboard has a 32-bit Enhanced PCI IDE and Ultra DMA 33/66/100/133 controller that provides PIO mode 0~4, Bus Master, and Ultra DMA 33/66/100/133 function. You can connect hard disk drives, CD-ROM and other IDE devices.

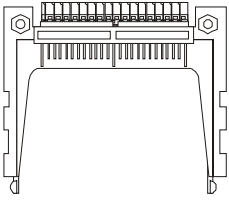
The Ultra ATA133 interface boosts data transfer rates between the computer and the hard drive up to 133 megabytes (MB) per second.

IDEB1

CompactFlash Card Slot: CF1

This CompactFlash slot shares one channel of the IDE controller. You can install one CompactFlash typel / type II device.

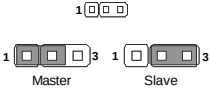
CF1



CF Mode Selecting Jumper: JCF_SEL1

This jumper is used to select Master/ Slave mode of the CF device.

JCF_SEL1

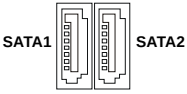


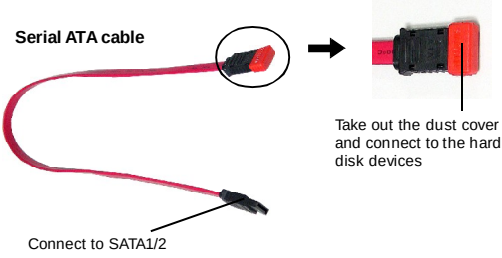
Important

* *The CF1 slot and the IDEB1 connector shares and uses the same channel. CF1 and IDEB1 can support up to 2 IDE devices without CF device or 1 IDE device with 1 CF device.*
* *If you install two IDE devices, you must configure the second drive to Slave mode by setting its jumper. Refer to the hard disk documentation supplied by hard disk vendors for jumper setting instructions.*
* *If you install one IDE device with ATA133 IDE cable and one CF device, you must configure the CF drive to Master mode by setting jumper JCF_SEL1. CF only supports Master mode by using the ATA133 IDE cable.*
* *CF only supports Slave mode by using ATA33 IDE cable.*

Serial ATA Connectors: SATA1, SATA2

SATA1~SATA2 are high-speed SATA interface ports and support SATA data rates of 300MB/s. Each SATA connector can connect to 1 hard disk device and is fully compliant with Serial ATA 2.0 specifications.





Important

Please do not fold the Serial ATA cable into 90-degree angle. Otherwise, data loss may occur during transmission.

Audio Amplifier Connector: JAUD1

The 6W JAUD1 is used to connect audio amplifiers to enhance audio performance.

Pin Definition

PIN	SIGNAL
1	AMP_R+
2	AMP_R-
3	AMP_L+
4	AMP_L-

Front Audio Connector: JAUD2

This connector is designed to connect an optional audio bracket that provides extra front panel audio IO jacks.

JAUD2

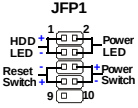
Audio Bracket
(Optional)

JAUD2 Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	5V_SB	2	VCC3
3	SPDF_OUT	4	NA
5	GND	6	SPDF_IN
7	LEF_OUT	8	SURR_OUT_R
9	CEN_OUT	10	SURR_OUT_L
11	JAUD_DET	12	AUDIO GND
13	SIDE_SURR_L	14	SIDE_SURR_R

Front Panel Connector: JFP1

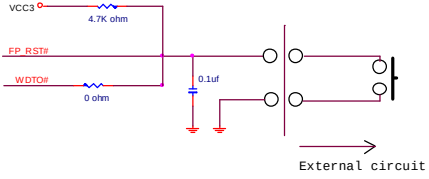
The mainboard provides one front panel connector for electrical connection to the front panel switches and LEDs. The JFP1 is compliant with Intel® Front Panel I/O Connectivity Design Guide.



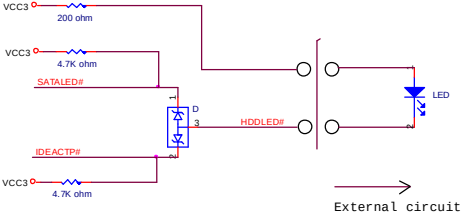
JFP1 Pin Definition

PIN	SIGNAL	DESCRIPTION
1	HD_LED +	Hard disk LED pull-up
2	FPPWR/SLP	MSG LED pull-up
3	HD_LED -	Hard disk active LED
4	FPPWR/SLP	MSG LED pull-up
5	RST_SW-	Reset Switch low reference pull-down to GND
6	PWR_SW+	Power Switch high reference pull-up
7	RST_SW+	Reset Switch high reference pull-up
8	PWR_SW-	Power Switch low reference pull-down to GND
9	RSVD_DNU	Reserved. Do not use.

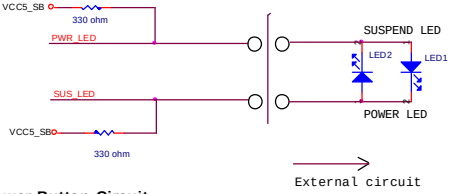
Reset Circuit



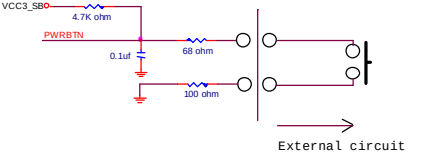
HDD LED Circuit



Power LED Circuit



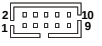
Power Button Circuit



Digital IO Connector: J6

The J6 connects to the General-Purpose Input/Output (GPIO) peripheral module.

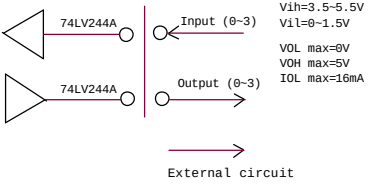
J6



J6 Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	GND	2	VCC5F
3	N_GPO3	4	N_GPO1
5	N_GPO2	6	N_GPO0
7	N_GPI3	8	N_GPI1
9	N_GPI2	10	N_GPI0

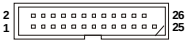
DIO Circuit



Parallel Port Header: JLPT1

The mainboard provides a 26-pin header for connection to an optional parallel port bracket. The parallel port is a standard printer port that supports Enhanced Parallel Port (EPP) and Extended Capabilities Parallel Port (ECP) mode.

JLPT1



PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL
1	RSTB#	2	AFD#	15	PRND6	16	GND
3	PRND0	4	ERR#	17	PRND7	18	GND
5	PRND1	6	PINIT#	19	ACK#	20	GND
7	PRND2	8	LPT_SLIN#	21	BUSY	22	GND
9	PRND3	10	GND	23	PE	24	GND
11	PRND4	12	GND	25	SLCT	26	GND
13	PRND5	14	GND				

Fan Power Connectors: CPUFAN1, SYSFAN1

The fan power connectors support system cooling fan with +12V. When connecting the wire to the connectors, always take note that the red wire is the positive and should be connected to the +12V, the black wire is Ground and should be connected to GND. If the mainboard has a System Hardware Monitor chipset on-board, you must use a specially designed fan with speed sensor to take advantage of the CPU fan control.

CPUFAN1

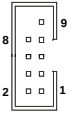
SYSFAN1

Important

Please refer to the recommended CPU fans at VIA's official website or consult the vendors for proper CPU cooling fan.

Serial Port Connector: COM3, COM4

The mainboard provides two 9-pin headers as serial ports. These ports are 16550A high speed communication port that sends/receives 16 bytes FIFOs. You can attach a serial mouse or other serial devices directly to them.



COM3

COM4

Pin Definition

PIN	SIGNAL	DESCRIPTION
1	DCD	Data Carry Detect
2	SIN	Serial In or Receive Data
3	SOUT	Serial Out or Transmit Data
4	DTR	Data Terminal Ready
5	GND	Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	VCC_COM3	Power Source

Front USB Connector: F_USB1

The mainboard provides one USB 2.0 pinheader that is compliant with Intel® I/O Connectivity Design Guide. USB 2.0 technology increases data transfer rate up to a maximum throughput of 480Mbps, which is 40 times faster than USB 1.1, and is ideal for connecting high-speed USB interface peripherals such as **USB HDD**, **digital cameras**, **MP3 players**, **printers**, **modems and the like**.

F_USB1

Pin Definition

PIN	SIGNAL	PIN	SIGNAL
1	VCC	2	VCC
3	USB0-	4	USB1-
5	USB0+	6	USB1+
7	GND	8	GND
9	Key (no pin)	10	USBOC

Important

Note that the pins of VCC and GND must be connected correctly to avoid possible damage.

CD-In Connector: JCD1

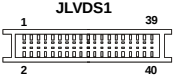
The connector is for CD-ROM audio connector.

LVDS Flat Panel Connector: JLVDS1

The LVDS (Low Voltage Differential Signal) connector provides a digital interface typically used with flat panels. After connecting an LVDS interfaced flat panel to the JLVDS1, be sure to check the panel datasheet and set the J1 LVDS Power Selection Jumper to a proper voltage.

Display Matrix				
	CRT	DVI	LVDS	TV OUT
CRT		V	V	X
DVI	V		V	V
LVDS	V	V		V
TV OUT	X	V	V	

V : Support X : No Support



SIGNAL	PIN		SIGNAL
+12V	2	1	+12V
+12V	4	3	+12V
GND	6	5	+12V
GND	8	7	VCC3/VCC5
LCD_VDD	10	9	LCD_VDD
LDDC_DATA	12	11	LDDC_CLK
LVDS_VDDEN	14	13	L_BKLTCTL
GND	16	15	L_BKLTEN
LA_DATA0	18	17	LA_DATA0#
LA_DATA1	20	19	LA_DATA1#
LA_DATA2	22	21	LA_DATA2#
LA_CLK	24	23	LA_CLK#
LA_DATA3	26	25	LA_DATA3#
GND	28	27	GND
LB_DATA0	30	29	LB_DATA0#
LB_DATA1	32	31	LB_DATA1#
LB_DATA2	34	33	LB_DATA2#
LB_CLK	36	35	LB_CLK#
LB_DATA3	38	37	LB_DATA3#
GND	40	39	GND

TV-Out Connector: JTV1

The mainboard provides a TV-Out connector.

JTV1

Display Matrix				
	CRT	DVI	LVDS	TV OUT
CRT		V	V	X
DVI	V		V	V
LVDS	V	V		V
TV OUT	X	V	V	

V : Support X : No Support

JTV1 Pin Definition

Pin	Description	Pin	Description
1	TVGND	2	LCVBS
3	LY	4	TVGND
5	LC	6	Key (no pin)

IrDA Infrared Module Header: IRDA1

The connector allows you to connect to IrDA Infrared module. You must configure the setting through the BIOS setup to use the IR function. IRDA1 is compliant with Intel® Front Panel I/O Connectivity Design Guide.

IRDA1

Pin Definition

Pin	Signal
1	NC
2	Key (no pin)
3	VCC5
4	GND
5	IRTX
6	IRRX

I2C Bus Connector: J1

The mainboard provides one I2C (also known as I^2C) Bus connector for users to connect System Management Bus (SMBus) interface.

J1

Pin Definition

Pin	Signal
1	VCC5F
2	SMBCLK
3	GND
4	SMBDATA-

Jumpers

Display Jumper: TV/CRT1

This jumper is used to select the display type.

Display Matrix				
	CRT	DVI	LVDS	TV OUT
CRT		V	V	X
DVI	V		V	V
LVDS	V	V		V
TV OUT	X	V	V	

V : Support X : No Support

Clear CMOS Jumper: CLR_CMOS1

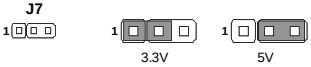
There is a CMOS RAM onboard that has a power supply from external battery to keep the data of system configuration. With the CMOS RAM, the system can automatically boot OS every time it is turned on. If you want to clear the system configuration, set this jumper to clear data.

Important

You can clear CMOS by shorting 2-3 pin while the system is off. Then return to 1-2 pin position. Avoid clearing the CMOS while the system is on; it will damage the mainboard.

LCD Power Source Jumper: J7

This jumper is used to select the power source of LCD.

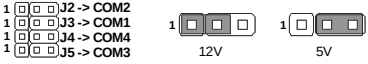


Pin Definition

Pin	Signal
1	VCC3
2	LCD_SRC (default VCC3)
3	VCC5

COM Port Power Jumpers: J2, J3, J4, J5

These jumpers specify the operation voltage of the serial port COM1~4.



Pin Definition

Pin	Signal
1	VCC12F
2	VCC_COM
3	VCC5F

Slots

PCI (Peripheral Component Interconnect) Slot

The PCI slot supports LAN cards, SCSI cards, USB cards, and other add-on cards that comply with PCI specifications. At 32 bits and 33 MHz, it yields a throughput rate of 133 MBps.

32-bit PCI Slot

PCI Interrupt Request Routing

The IRQ, acronym of interrupt request line and pronounced I-R-Q, are hardware lines over which devices can send interrupt signals to the microprocessor. The PCI IRQ pins are typically connected to the PCI bus pins as follows:

	Order 1	Order 2	Order 3	Order 4
32-bit PCI1	INT A#	INT B#	INT C#	INT D#

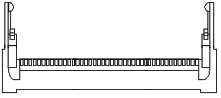
Important

When adding or removing expansion cards, make sure that you unplug the power supply first. Meanwhile, read the documentation for the expansion card to configure any necessary hardware or software settings for the expansion card, such as jumpers, switches or BIOS configuration.

Mini PCI Slot

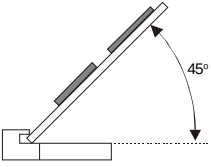
This is a 32 bits, 33 MHz and 133 MBps PCI slot, only select the MiniPCI adapters can be installed.

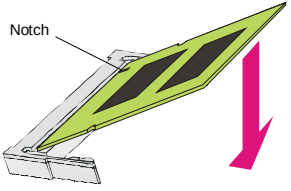
Mini PCI Slot

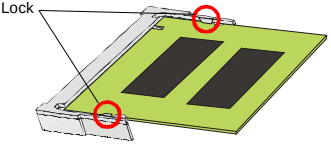


Installing Mini PCI Cards

1. Insert the card at an angle of 45 degrees into the Mini PCI slot, Line up the notch in the card with the small tab in the slot and slide the card into the slot until the golden finger is almost invisible.
2. Push the Mini PCI card down until the two snaps on either side of the card lock into place.

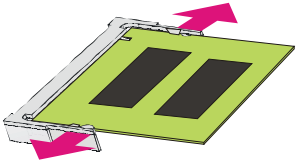


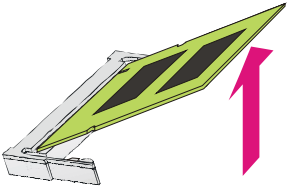




Removing Mini PCI Cards

If you need to remove a card in the Mini PCI slot, spread the tabs in the slot away from the notches in the card. The card should pop up slightly. Lift the card to a 45-degree angle and then gently slide the card out of the slot.





Chapter 5
BIOS Setup

This chapter provides information on the BIOS Setup program and allows you to configure the system for optimum use.
You may need to run the Setup program when:

- An error message appears on the screen during the system booting up, and requests you to run SETUP.
- You want to change the default settings for customized features.

MSI
MICRO-STAR INTERNATIONAL

Entering Setup

Power on the computer and the system will start POST (Power On Self Test) process. When the message below appears on the screen, press <F1> key to enter Setup.

Press F1 to enter SETUP

If the message disappears before you respond and you still wish to enter Setup, restart the system by turning it OFF and On or pressing the RESET button. You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

Important

1. *The items under each BIOS category described in this chapter are under continuous update for better system performance. Therefore, the description may be slightly different from the latest BIOS and should be held for reference only.*
2. *Upon boot-up, the 1st line appearing after the memory count is the BIOS version. It is usually in the format:*

   P9802VMS V1.0 011507 where:

   1st digit refers to BIOS maker as A = AMI, W = AWARD, and P = PHOENIX.
   2nd - 5th digit refers to the model number.
   6th digit refers to the chipset as I = Intel, N = nVidia, and V = VIA.
   7th - 8th digit refers to the customer as MS = all standard customers.
   V1.0 refers to the BIOS version.
   011507 refers to the date this BIOS was released.

Control Keys

<↑>	Move to the previous item
<↓>	Move to the next item
<←>	Move to the item in the left hand
<→>	Move to the item in the right hand
<Enter>	Select the item
<Esc>	Jumps to the Exit menu or returns to the main menu from a submenu
<+/PU>	Increase the numeric value or make changes
<-/PD>	Decrease the numeric value or make changes
<F6>	Load Optimized Defaults
<F7>	Load Fail-Safe Defaults
<F10>	Save all the CMOS changes and exit

Getting Help

After entering the Setup menu, the first menu you will see is the Main Menu.

Main Menu

The main menu lists the setup functions you can make changes to. You can use the arrow keys (↑↓) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

Sub-Menu

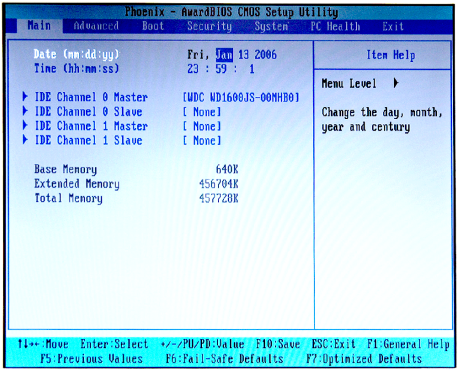
If you find a right pointer symbol (as shown in the right view) appears to the left of certain fields that means a sub-menu can be launched from this field. A sub-menu contains additional options for a field parameter. You can use arrow keys (↑↓) to highlight the field and press <Enter> to call up the sub-menu. Then you can use the control keys to enter values and move from field to field within a sub-menu. If you want to return to the main menu, just press the <Esc >.

▶ [DE Channel 0 Master
▶ [DE Channel 1 Master

General Help <F1>

The BIOS setup program provides a General Help screen. You can call up this screen from any menu by simply pressing <F1>. The Help screen lists the appropriate keys to use and the possible selections for the highlighted item. Press <Esc> to exit the Help screen.

The Menu Bar



▶ Main
Use this menu for basic system configurations, such as time, date etc.

▶ Advanced
Use this menu to set up the items of special enhanced features available on your system's chipset.

▶ Boot
Use this menu to specify the priority of boot devices.

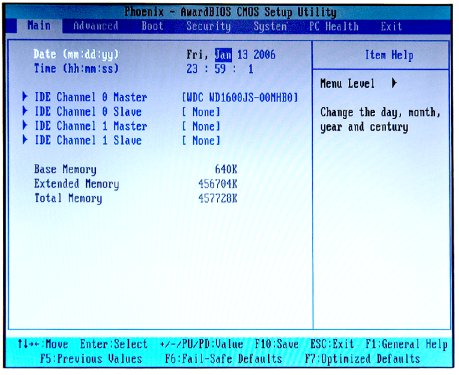
▶ Security
Use this menu to set Supervisor and User Passwords.

▶ System
This entry shows your system summary.

▶ PC Health
This entry monitors your hardware health status.

▶ Exit
This menu allows you to load the BIOS default values or factory default settings into the BIOS and exit the BIOS setup utility with or without changes.

Main



▶ Date (mm:dd:yy)
The date format is <Day>, <Month> <Date> <Year>.

▶ Time (hh:mm:ss)
The time format is <Hour> <Minute> <Second>.

▶ IDE Channel 0/1 Master/Slave
Press <Enter> to enter the sub-menu.

▶ IDE HDD Auto-Detection
Press [Enter] to auto-detect the HDD on this channel. If detection is successful, it fills the remaining fields on this menu.

▶ IDE Channel 0/1 Master/Slave
Selecting “manual” lets you set the remaining fields on this screen. It selects the type of fixed disk. “User Type” will let you select the number of cylinders, heads, etc.
Note: PRECOMP=65535 means NONE!

▶ Access Mode
Choose the access mode for this hard disk.

▶ Capacity
This setting shows the formatted size of the storage device. Note that this size is usually slightly greater than the size of a formatted disk given by a disk checking program.

▶ Cylinder
Set the number of cylinders for this hard disk.

▶ Head
Set the number of read/write heads.

▶ Precomp
This setting specifies the write precompensation.
Warning: Setting avalue of 65535 means no hard disk.

▶ Landing Zone
This setting shows cylinder location of the landing zone.

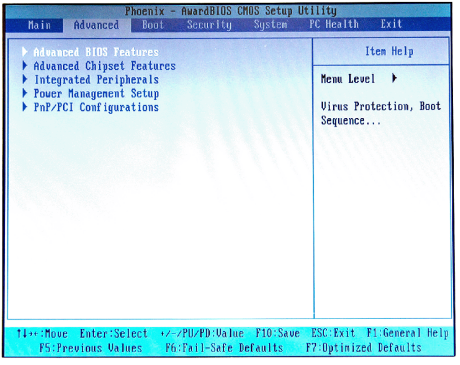
▶ Sector
This setting shows the number of sectors per track.

▶ Base Memory
This setting displays the amount of conventional memory detected during boot up.

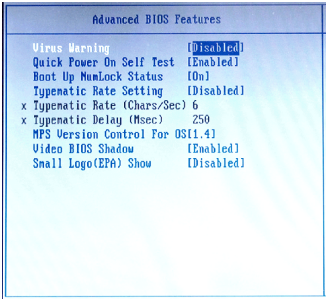
▶ Extended Memory
This setting displays the amount of extended memory detected during boot up.

▶ Total Memory
This setting displays the total memory available in the system.

Advanced



► Advanced BIOS Features



► Virus Warning

The item is to set the Virus Warning feature for IDE Hard Disk boot sector

protection. If the function is enabled and any attempt to write data into this area is made, BIOS will display a warning message on screen and beep.

▶ Quick Power On Self Test
Select [Enabled] to reduce the amount of time required to run the power-on self-test (POST). A quick POST skips certain steps. We recommend that you normally disable quick POST. Better to find a problem during POST than lose data during your work.

▶ Boot Up NumLock Status
This setting is to set the Num Lock status when the system is powered on. Setting to [On] will turn on the Num Lock key when the system is powered on. Setting to [Off] will allow users to use the arrow keys on the numeric keypad.

▶ Typematic Rate Setting
This item is used to enable or disable the typematic rate setting including Typematic Rate & Typematic Delay.

▶ Typematic Rate (Chars/Sec)
After Typematic Rate Setting is enabled, this item allows you to set the rate (characters/second) at which the keys are accelerated.

▶ Typematic Delay (Msec)
This item allows you to select the delay between when the key was first pressed and when the acceleration begins.

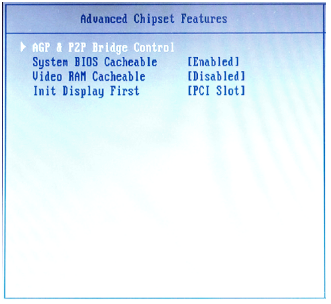
▶ MPS Version Control For OS
This field allows you to select which MPS (Multi-Processor Specification) version to be used for the operating system. You need to select the MPS version supported by your operating system. To find out which version to use, consult the vendor of your operating system.

▶ Video BIOS Shadow
This allows you to copy Video BIOS to shadow RAM. When setting to [Enabled], the performance improves.

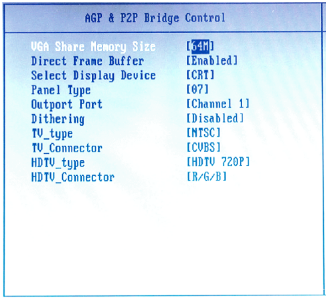
▶ Small Logo(EPA) Show
This item enables you to show the EPA logo (brand specific graphics) on the bootup screen. Settings are:

[Disabled]	Shows the normal POST screen at boot.
[Enabled]	Shows a still image (EPA logo) on the screen at boot.

► Advanced Chipset Features



► AGP & P2P Bridge Control



► VGA Share Memory Size

The system shares memory to the onboard VGA card. This setting controls the exact memory size shared to the VGA card.

► Direct Frame Buffer

When [Enabled], a fixed VGA frame buffer from A000h to BFFFh and a CPU-to-PCI write buffer are implemented.

▶ Select Display Device
Use the field to select the type of device you want to use as the display(s) of the system.

▶ Panel Type
Use this field to specify the panel type.

▶ Output Port
Use this field to specify the video output channel.

▶ Dithering
Dithering is the most common means of reducing the color range of images down to the 256 (or fewer) colors seen in 8-bit GIF images. It is the process of juxtaposing pixels of two colors to create the illusion that a third color is present. Setting this field to [Enabled] can improve the appearance of a graphic when few colors are available.

*** Refer to the following table for configuration of ***Panel Type***, ***Output Port***, and ***Dithering***.

Panel ID	Resolution	Channel	Dithering
0	640x480	1	Enable
1	800x600	1	Enable
2	1024x768	1	Enable
3	1280x768	1	Enable
4	1280x1024	2	Enable
5	1400x1050	2	Enable
6	1600x1200	2	Enable
7	1280x800	1	Enable
8	800x480	1	Enable
9	1024x768	2	Enable
A	1024x768	1	Disable
B	1024x768	2	Disable
C	1280x768	1	Disable
D	1280x1024	2	Disable
E	1400x1050	2	Disable
F	1600x1200	2	Disable

Dithering Enable is for 18 bits panel and Disable is for 24 bits panel.

▶ TV Type
Select the TV standard which is used as the video signal format of your TV if you have connected a TV to the system.

▶ TV Connector
This setting specifies the TV connector.

▶ HDTV Type
Select the HDTV standard which is used as the video signal format of your HDTV if you have connected a HDTV to the system.

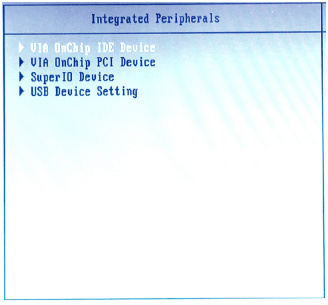
▶ HDTV Connector
This setting specifies the HDTV connector.

▶ System BIOS Cacheable
Selecting [Enabled] allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

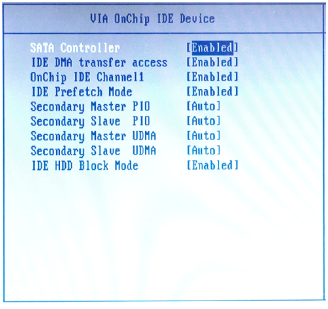
▶ Video RAM Cacheable
Selecting [Enabled] allows caching of the video memory (RAM) at A0000h to AFFFFh, resulting in better video performance. However, if any program writes to this memory area, a memory access error may result.

▶ Init Display First
This item specifies which VGA card is your primary graphics adapter.

▶ Integrated Peripherals



▶ VIA OnChip IDE Device



▶ SATA Controller
This setting enables/disables the on-chip SATA controller.

▶ IDE DMA Transfer Access
Setting to [Enabled] will open DMA bus master and execute DMA action in DOS, which will make the data transferring faster.

▶ OnChip IDE Channel 1
The integrated peripheral controller contains an IDE interface with support for one IDE channel. Choose [Enabled] to activate the IDE channel 1.

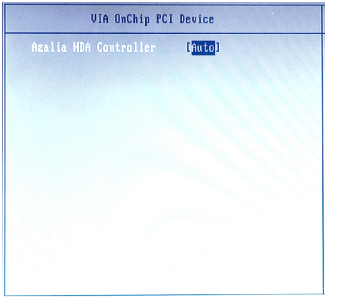
▶ IDE Prefetch Mode
The onboard IDE drive interfaces support IDE prefetching, for faster drive accesses. When you install a primary and/or secondary add-in IDE interface, set this option to [Disabled] if the interface does not support prefetching.

▶ Secondary Master/Slave PIO
The IDE PIO (Programmed Input/Output) fields let you set a PIO mode for the IDE devices that the onboard IDE interface supports. Modes 0 through 4 provide successively increased performance. In [Auto] mode, the system automatically determines the best mode for each device.

▶ Secondary Master/Slave UDMA
Ultra DMA 33/66/100/133 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows ME, XP or a third-party IDE bus master driver). If your hard drive and your system software both support Ultra DMA/33, Ultra DMA/66, Ultra DMA/100 and Ultra DMA/133, select [Auto] to enable BIOS support.

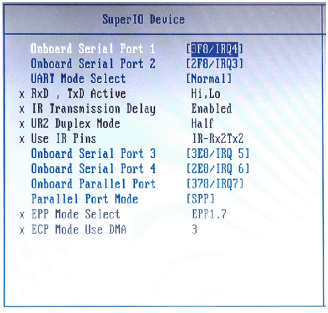
▶ IDE HDD Block Mode
Block mode is also called block transfer, multiple commands, or multiple sector read/write. If your IDE hard drive supports block mode (most new drives do), select [Enabled] for automatic detection of the optimal number of block read/writes per sector the drive can support.

▶ VIA OnChip PCI Device



► Azalia HDA Controller
Azalia is the codename of "High Definition Audio." This setting controls the High Definition Audio interface integrated in the Southbridge.

► Super IO Device



► Onboard Serial Port 1 / 2
Select an address and corresponding interrupt for Serial Port 1/2.

► UART Mode Select
This setting allows you to specify the operation mode for serial port 2.

[Normal]	RS-232C Serial Port
[IrDA]	IrDA-compliant Serial Infrared Port
[ASKIR]	Amplitude Shift Keyed Infrared Port

► RxD, TxD Active
This setting controls the receiving and transmitting speed of the IR peripheral in use.

► IR Transmission Delay
This setting determines whether the IR transmission rate will be delayed while converting to receiving mode.

► UR2 Duplex Mode
This setting controls the operating mode of IR transmission/reception. Under [Full] Duplex mode, synchronous, bi-directional transmission/reception is allowed. Under [Half] Duplex mode, only asynchronous, bi-directional transmission/reception is allowed.

▶ Use IR Pins
Consult your IR peripheral documentation to select the correct setting of the TxD and RxD signals.

▶ Onboard Serial Port 3 / 4
Select an address and corresponding interrupt for Serial Port 3/4.

▶ Onboard Parallel Port
This setting specifies the I/O port address and IRQ of the onboard parallel port.

▶ Parallel Port Mode

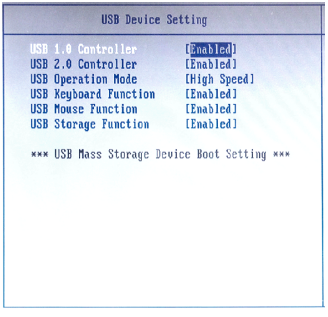
[SPP]	Standard Parallel Port
[EPP]	Enhanced Parallel Port
[ECP]	Extended Capability Port
[ECP+EPP]	Extended Capability Port + Enhanced Parallel Port

To operate the onboard parallel port as Standard Parallel Port only, choose [SPP]. To operate the onboard parallel port in the EPP mode simultaneously, choose [EPP]. By choosing [ECP], the onboard parallel port will operate in ECP mode only. Choosing [ECP + EPP] will allow the onboard parallel port to support both the ECP and EPP modes simultaneously.

▶ EPP Mode Select
Select EPP port type 1.7 or 1.9, as required by your parallel peripheral.

▶ ECP Mode Use DMA
The ECP mode has to use the DMA channel, so choose the onboard parallel port with the ECP feature. After selecting it, the following message will appear: "ECP Mode Use DMA." At this time, the user can choose between DMA channel [3] or [1].

▶ USB Device Setting



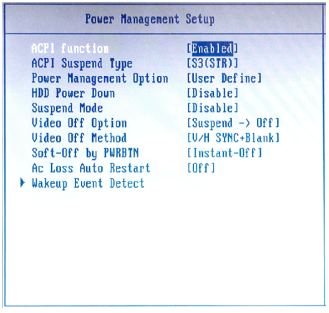
▶ USB 1.1 Controller
This setting is used to enable/disable the onboard USB 1.1 controller.

▶ USB 2.0 Controller
This setting is used to enable/disable the onboard USB 2.0 controller.

▶ USB Operation Mode
This setting controls the USB operation speed.

▶ USB Keyboard / Mouse / Storage Function
Set to [Enabled] if your need to use a USB-interfaced keyboard/mouse/ storage device in the operating system that does not support or have any USB driver installed, such as DOS and SCO Unix.

▶ Power Management Setup



▶ ACPI Function
This item is to activate the ACPI (Advanced Configuration and Power Management Interface) Function. If your operating system is ACPI-aware, such as Windows 98SE/2000/ME, select [Enabled].

▶ ACPI Suspend Type
This item specifies the power saving modes for ACPI function. If your operating system supports ACPI, such as Windows 98SE, Windows ME and Windows 2000, you can choose to enter the Standby mode in S1 (POS) or S3 (STR) fashion through the setting of this field. Options are:

[S1(POS)] The S1 sleep mode is a low power state. In this state, no system context is lost (CPU or chipset) and hardware maintains all system context.

[S3(STR)] The S3 sleep mode is a lower power state where the information of system configuration and open applications/files is saved to main memory that remains powered while most other hardware components turn off to save energy. The information stored in memory will be used to restore the system when a "wake up" event occurs.

▶ Power Management Option

This item is used to select the degree (or type) of power saving and is related to these modes: ***Suspend Mode*** and ***HDD Power Down***. There are three options for power management:

[Min Saving]	Minimum Power Management. Suspend Mode=1 Hour
[Max Saving]	Maximum Power Management. Suspend Mode=1 Min
[User Define]	Allows end users to configure each mode separately.

▶ HDD Power Down

If HDD activity is not detected for the length of time specified in this field, the hard disk drive will be powered down while all other devices remain active.

▶ Suspend Mode

After the selected period of system inactivity, all devices except the CPU shut off.

▶ Video Off Option

This setting is used to control the mode in which the monitor will shut down. Setting options:

[Always On]	Monitor remains on during power-saving modes.
[Suspend -> Off]	Monitor blanked when system enters Suspend mode.
[Susp, Stby->Off]	Monitor blanked when system enters either Suspend or Standby mode.
[All Modes ->Off]	Monitor blanked when system enters any power sav

▶ Video Off Method

This setting determines the manner in which the monitor is blanked.

▶ Soft-Off by PWRBTN

This feature allows users to configure the power button function. Settings are:

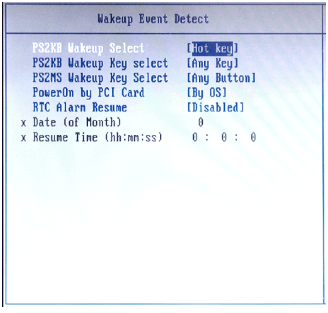
[Instant-Off]	The power button functions as a normal power-on/-off button.
[Delay 4 Sec.]	When you press the power button, the computer enters the suspend/sleep mode, but if the button is pressed for more than four seconds, the computer is turned off.

▶ AC Loss Auto Restart

This setting specifies whether your system will reboot after a power failure or interrupt occurs. Available settings are:

[Off]	Leaves the computer in the power off state.
[On]	Leaves the computer in the power on state.
[Former-sts]	Restores the system to the status before power failure or interrupt occurred.

▶ Wakeup Event Detect



▶ PS2 KB Wakeup Select

The item specifies how the system will be awakened from power saving mode when input signal of the PS2 keyboard is detected. Use the <PageUp> & <PageDown> keys to select the options. When selecting [Password], enter the desired password.

▶ PS2 KB Wakeup Key Select

This setting only works when ***PS2 KB Wakeup Select*** is set to [Hot Key].

▶ PS2 MS Wakeup Key Select

This setting determines whether the system will be awakened from power saving modes when input signal of the PS/2 mouse is detected.

▶ Power On by PCI Card

When setting to [Enabled], this setting allows your system to be awakened from the power saving modes through any event on PCI PME (Power Management Event).

▶ RTC Alarm Resume

When [Enabled], your can set the date and time at which the RTC (real-time clock) alarm awakens the system from suspend mode.

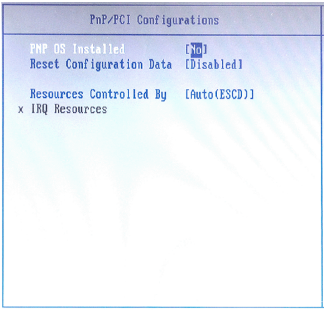
▶ Date (of Month)

When ***RTC Alarm Resume*** is set to [Enabled], the field specifies the month for it.

▶ Resume Time (hh:mm:ss)

You can choose what hour, minute and second the system will boot up.

▶ PnP/PCI Configurations



▶ PNP OS Installed

When set to [Yes], BIOS will only initialize the PnP cards used for booting (VGA, IDE, SCSI). The rest of the cards will be initialized by the PnP operating system like Windows 98. When set to [No], BIOS will initialize all the PnP cards. So, select [Yes] if your operating system is Plug & Play aware.

▶ Reset Configuration Data

The ESCD (Extended System Configuration Data) NVRAM (Non-volatile Random Access Memory) is where the BIOS stores resource information for both PNP and non-PNP devices in a bit string format. When the item is set to [Enabled], the system will reset ESCD NVRAM right after the system is booted up and then set the setting of the item back to [Disabled] automatically.

▶ Resources Controlled By

The Award Plug and Play BIOS has the capacity to automatically configure all of the boot and Plug and Play compatible devices. However, this capability means absolutely nothing unless you are using a Plug and Play operating system such as Windows® 98/2000. If you set this field to [Manual], choose specific resources by going into each sub-menu that follows this field.

▶ IRQ Resources

Press <Enter> to enter the sub-menu.

▶ IRQ 3/4/5/7/9/10/11/14/15

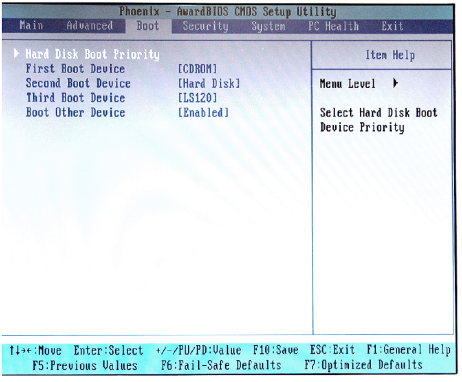
These items specify the bus where the specified IRQ line is used.
The settings determine if BIOS should remove an IRQ from the pool of available IRQs passed to devices that are configurable by the system BIOS. The available IRQ pool is determined by reading the ESCD NVRAM. If more IRQs

must be removed from the IRQ pool, the end user can use these settings to reserve the IRQ by assigning an [Reserved] setting to it. Onboard I/O is configured by BIOS. All IRQs used by onboard I/O are configured as [Available]. If all IRQs are set to [Reserved], and IRQ 14/15 are allocated to the onboard PCI IDE, IRQ 9 will still be available for PCI and PnP devices.

Important

IRQ (Interrupt Request) lines are system resources allocated to I/O devices. When an I/O device needs to gain attention of the operating system, it signals this by causing an IRQ to occur. After receiving the signal, when the operating system is ready, the system will interrupt itself and perform the service required by the I/O device.

Boot



▶ Hard Disk Boot Priority

This setting allows users to set the boot priority of the specified hard disk devices. First press <Enter> to enter the sub-menu. Then you may use the arrow keys (↑↓) to select the desired device, then press <+>, <-> or <PageUp>, <PageDown> key to move it up/down in the priority list.

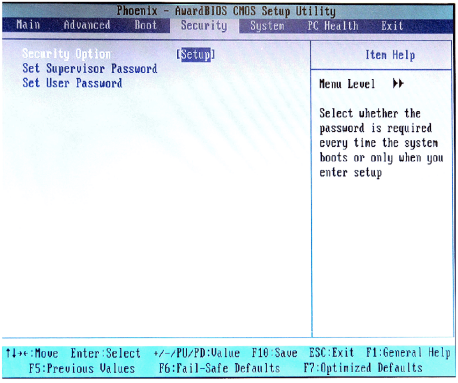
▶ First / Second / Third Boot Device

The items allow you to set the sequence of boot devices where BIOS attempts to load the disk operating system.

▶ Boot Other Device

Setting the option to [Enabled] allows the system to try to boot from other device if the system fails to boot from the first/second/third boot device.

Security



▶ Security Option
Select whether the password is required every time the system boots or only when you enter Setup.

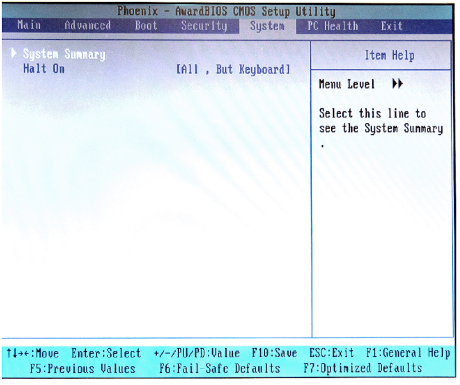
System	The system will not boot and access to Setup will be denied if the correct password is not entered at the prompt.
Setup	The system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.

Note: 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.

▶ Set Supervisor Password
Supervisor Password controls access to the BIOS Setup utility.

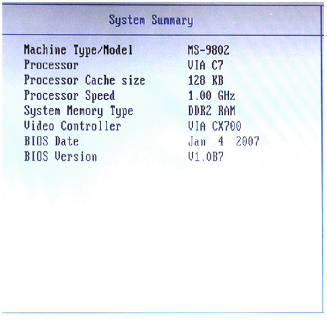
▶ Set User Password
User Password controls access to the system at boot.

System



▶ System Summary

These items show the hardware specifications of your system. Read only.

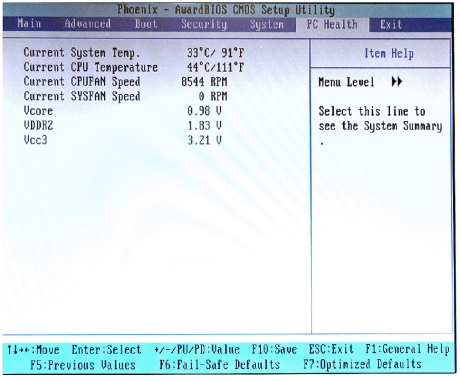


▶ Halt On

The setting determines whether the system will stop if an error is detected at boot. When the system stops for the errors preset, it will halt on for 15 seconds and then automatically resume its operation. Available options are:

[All Errors]	The system stops when any error is detected.
[No Errors]	The system doesn't stop for any detected error.
[All, But Keyboard]	The system doesn't stop for a keyboard error.

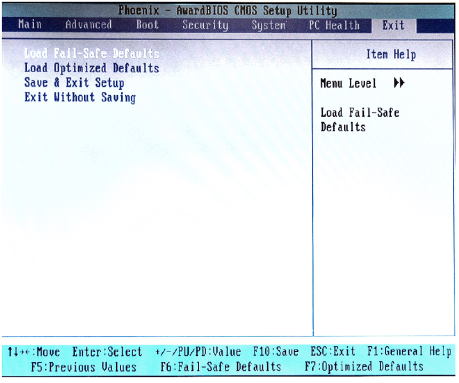
PC Health



►Current System Temp., Current CPU Temperature, Current CPUFAN Speed, Current SYSFAN Speed, Vcore, VDDR2, VCC3

These items display the current status of all of the monitored hardware devices/ components such as CPU voltage, temperatures and all fans' speeds.

Exit



▶ Load Fail-Safe Defaults
Use this menu to load the default values set by the BIOS vendor for stable system performance.

▶ Load Optimized Defaults
Use this menu to load the default values set by the mainboard manufacturer specifically for optimal performance of the mainboard.

▶ Save & Exit Setup
Save changes to CMOS and exit setup.

▶ Exit Without Saving
Abandon all changes and exit setup.

Chapter 6
System Resources

This chapter provides information on the following system resources:

1. Watch Dog Timer Setting (p.6-2);

2. Award POST Code (p.6-4);

3. Check Point & Beep Code List (p.6-10);

4. PCI Configuration (p.6-17);

5. Resource List (p.6-18).

MSI
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Watch Dog Timer Setting

Logical Device 7 (Game Port and GPIO Port 1)

CRF3 (PLED mode register. Default 0x00)

Bit [7:3] : Reserved .

Bit 2: select WDTO count mode.

0 second

1 minute

Bit [1:0]: select PLED mode

00 Power LED pin is tri-stated.

01 Power LED pin is droved low.

10 Power LED pin is a 1Hz toggle pulse with 50 duty cycle.

11 Power LED pin is a 1/4Hz toggle pulse with 50 duty cycle.

CRF4 (Default 0x00)

Watch Dog Timer Time-out value. Writing a non-zero value to this register causes the counter to load the value to Watch Dog Counter and start counting down. Reading this register returns current value in Watch Dog Counter instead of Watch Dog Timer Time-out value.

Bit [7:0]: = 0x00 Time-out Disable

= 0x01 Time-out occurs after 1 second/minute

= 0x02 Time-out occurs after 2 second/minutes

= 0x03 Time-out occurs after 3 second/minutes

.....

= 0xFF Time-out occurs after 255 second/minutes

CRF5 (Default 0x00)

Bit [7] : Reserved .

Bit [6] : invert Watch Dog Timer Status

Bit 5: Force Watch Dog Timer Time-out, Write only*

1 Force Watch Dog Timer time-out event; this bit is self-clearing.

Bit 4: Watch Dog Timer Status, R/W

1 Watch Dog Timer time-out occurred.

0 Watch Dog Timer counting

Bit [3:0]: These bits select IRQ resource for Watch Dog. Setting of 2 selects S MI.

Software code

```
SIO_IDX    equ    4EH
SIO_DTA    equ    4FH
Timer      equ    10          ;reset after 10 seconds
1.     Enter configuration mode
       mov   dx,SIO_IDX
       mov   al,87h
       out   dx,al
       out   dx,al

2      Set Pin118 to WDTO#
       mov   dx,SIO_IDX
       mov   al,2Bh
       out   dx,al
       mov   dx,SIO_DTA
       in    al,dx
       and   al,not 04h
       out   dx,al

3.     Set to and active LDN 08
       mov   dx,SIO_IDX
       mov   al,07h
       out   dx,al
       mov   dx,SIO_DTA
       mov   al,08h
       out   dx,al

       mov   dx,SIO_IDX
       mov   al,30h
       out   dx,al
       mov   dx,SIO_DTA
       in    al,dx
       or    al,01h
       out   dx,al

4.     Set WatchDog Timer
       mov   dx,SIO_IDX
       mov   al,0f4h
       out   dx,al
       mov   dx,SIO_DTA
       mov   al,Timer
       out   dx,al

5.     Exit configuration mode
       mov   dx,SIO_IDX
       mov   al,0AAh
       out   dx,al
```

Award POST Code

Award BIOS Error Message and Check Point (POST code) List (Need to be modified, TBD)

- **Error/Process Message.**

#	Short Name	Description	Possible FRUS
1	CMOS checksum error - Defaults loaded	Checksum of CMOS is incorrect, so the system loads the default equipment configuration. A checksum error may indicate that CMOS has become corrupt. This error may have been caused by a weak battery. Check the battery and replace if necessary.	System board
2	CPU at nnnn	Displays the running speed of the CPU.	processor
3 4	Press ESC to skip memory test Floppy disk(s) fail	The user may press Esc to skip the full memory test. Cannot find or initialize the floppy drive controller or the drive. Make sure the controller is installed correctly. If no floppy drives are installed, be sure the Diskette Drive selection in Setup is set to NONE or AUTO.	System board system board
5	HARD DISK initializing Please wait a moment	Some hard drives require extra time to initialize.	System board
6	HARD DISK INSTALL FAILURE	Cannot find or initialize the hard drive controller or the drive. Make sure the controller is installed correctly. If no hard drives are installed, be sure the Hard Drive selection in Setup is set to NONE.	System board
7	Keyboard error or no keyboard present	Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are pressed during POST. To purposely configure the system without a keyboard, set the error halt condition in Setup to HALT ON ALL, BUT KEYBOARD. The BIOS then ignores the missing keyboard during POST.	System board
8	Memory Test:	This message displays during a full memory test, counting down the memory areas being tested.	DIMM System board

- **Check Point List**

POST (hex)	Description
CFh	Test CMOS R/W functionality.
C0h	Early chipset initialization: -Disable shadow RAM -Disable L2 cache (socket 7 or below) -Program basic chipset registers
C1h	Detect memory -Auto-detection of DRAM size, type and ECC. -Auto-detection of L2 cache (socket 7 or below)
A1h	Set Initial Conditions (Default Values) in EBP
A2h	Determine FSB frequency.
A3h	Begin Detection of installed DIMMS
A4h	Check for Column Latency
A5h	200Mhz or 266Mhz
A6h	Check for tRAS timing
A7h	Check for tRP timing
A8h	Check for tRCD timing
A9h	Check for ECC Support
AAh	Check for refresh timing
ABh	Verify that the DIMM's are in matched pairs
C3h	Expand compressed BIOS code to DRAM
C5h	Call chipset hook to copy BIOS back to E000 & F000 shadow RAM.
01h	Expand the Xgroup codes locating in physical address 1000:0
02h	Reserved
03h	Initial Superio_Early_Init switch.
04h	Reserved
05h	1. Blank out screen 2. Clear CMOS error flag
06h	Reserved
07h	1. Clear 8042 interface 2. Initialize 8042 self-test
08h	1. Test special keyboard controller for Winbond 977 series Super I/O chips. 2. Enable keyboard interface.
09h	Reserved
0Ah	1. Disable PS/2 mouse interface (optional). 2. Auto detect ports for keyboard & mouse followed by a port & interface swap (optional). 3. Reset keyboard for Winbond 977 series Super I/O chips.
0Bh	Reserved
0Ch	Reserved
0Dh	Reserved
0Eh	Test F000h segment shadow to see whether it is R/W-able or not. If test fails, keep beeping the speaker.
0Fh	Reserved

10h	Auto detect flash type to load appropriate flash R/W codes into the run time area in F000 for ESCD & DMI support.
11h	Reserved
12h	Use walking 1's algorithm to check out interface in CMOS circuitry. Also set real-time clock power status, and then check for override.
13h	Reserved
14h	Program chipset default values into chipset. Chipset default values are MODBINable by OEM customers.
15h	Reserved
16h	Initial Early_Init_Onboard_Generator switch.
17h	Reserved
18h	Detect CPU information including brand, SMI type (Cyrix or Intel) and CPU level (586 or 686).
19h	Reserved
1Ah	Reserved
1Bh	Initial interrupts vector table. If no special specified, all H/W interrupts are directed to SPURIOUS_INT_HDLR & S/W interrupts to SPURIOUS_soft_HDLR.
1Ch	Reserved
1Dh	Initial EARLY_PM_INIT switch.
1Eh	Reserved
1Fh	Load keyboard matrix (notebook platform)
20h	Reserved
21h	HPM initialization (notebook platform)
22h	Reserved
23h	1. Check validity of RTC value: e.g. a value of 5Ah is an invalid value for RTC minute. 2. Load CMOS settings into BIOS stack. If CMOS checksum fails, use default value instead. 3. Prepare BIOS resource map for PCI & PnP use. If ESCD is valid, take into consideration of the ESCD's legacy information. 4. Onboard clock generator initialization. Disable respective clock resource to empty PCI & DIMM slots. 5. Early PCI initialization: -Enumerate PCI bus number -Assign memory & I/O resource -Search for a valid VGA device & VGA BIOS, and put it into C000:0.
24h	Reserved
25h	Reserved
26h	Reserved
27h	Initialize INT 09 buffer
28h	Reserved
29h	1. Program CPU internal MTRR (P6 & PII) for 0-640K memory address. 2. Initialize the APIC for Pentium class CPU. 3. Program early chipset according to CMOS setup. Example: onboard IDE controller. 4. Measure CPU speed. 5. Invoke video BIOS.

2Ah	Reserved
2Bh 2Ch	Reserved Reserved
2Dh	1. Initialize multi-language 2. Put information on screen display, including Award title, CPU type, CPU speed ….
2Eh	Reserved
2Fh	Reserved
30h	Reserved
31h	Reserved
32h	Reserved
33h	Reset keyboard except Winbond 977 series Super I/O chips.
34h	Reserved
35h	Reserved
36h	Reserved
37h	Reserved
38h	Reserved
39h	Reserved
3Ah	Reserved
3Bh	Reserved
3Ch	Test 8254
3Dh	Reserved
3Eh	Test 8259 interrupt mask bits for channel 1.
3Fh 40h	Reserved Test 8259 interrupt mask bits for channel 2.
41h	Reserved
42h	Reserved
43h	Test 8259 functionality.
44h 45h	Reserved Reserved
46h	Reserved
47h	Initialize EISA slot
48h	Reserved
49h	1. Calculate total memory by testing the last double word of each 64K page. 2. Program write allocation for AMD K5 CPU.
4Ah	Reserved
4Bh	Reserved
4Ch 4Dh	Reserved Reserved
4Eh	1. Program MTRR of M1 CPU 2. Initialize L2 cache for P6 class CPU & program CPU with proper cacheable range. 3. Initialize the APIC for P6 class CPU. 4. On MP platform, adjust the cacheable range to smaller one in case the cacheable ranges between each CPU are not identical.
4Fh	Reserved

50h	Initialize USB
51h	Reserved
52h	Test all memory (clear all extended memory to 0)
53h	Reserved
54h	Reserved
55h	Display number of processors (multi-processor platform)
56h	Reserved
57h	1. Display PnP logo 2. Early ISA PnP initialization -Assign CSN to every ISA PnP device.
58h	Reserved
59h	Initialize the combined Trend Anti-Virus code.
5Ah	Reserved
5Bh	(Optional Feature) Show message for entering AWDFLASH.EXE from FDD (optional)
5Ch	Reserved
5Dh	1. Initialize Init_Onboard_Super_IO switch. 2. Initialize Init_Onbaord_AUDIO switch.
5Eh	Reserved
5Fh	Reserved
60h	Okay to enter Setup utility; i.e. not until this POST stage can users enter the CMOS setup utility.
61h	Reserved
62h	Reserved
63h	Reserved
64h	Reserved
65h	Initialize PS/2 Mouse
66h	Reserved
67h	Prepare memory size information for function call: INT 15h ax=E820h
68h	Reserved
69h	Turn on L2 cache
6Ah	Reserved
6Bh	Program chipset registers according to items described in Setup & Auto-configuration table.
6Ch	Reserved
6Dh	1. Assign resources to all ISA PnP devices. 2. Auto assign ports to onboard COM ports if the corresponding item in Setup is set to “AUTO”.
6Eh	Reserved
6Fh	1.Initialize floppy controller 2.Set up floppy related fields in 40:hardware.
70h	Reserved
71h	Reserved
72h	Reserved
73h	(Optional Feature) Enter AWDFLASH.EXE if : -AWDFLASH is found in floppy drive. -ALT+F2 is pressed
74h	Reserved
75h	Detect & install all IDE devices: HDD, LS120, ZIP, CDROM…..

76h	Reserved
77h 78h	Detect serial ports & parallel ports. Reserved
79h	Reserved
7Ah	Detect & install co-processor
7Bh	Reserved
7Ch	Reserved
7Dh	Reserved
7Eh	Reserved
7Fh	1. Switch back to text mode if full screen logo is supported. -If errors occur, report errors & wait for keys -If no errors occur or F1 key is pressed to continue: wClear EPA or customization logo.
80h	Reserved
81h	Reserved
82h	1. Call chipset power management hook. 2. Recover the text fond used by EPA logo (not for full screen logo) 3. If password is set, ask for password.
83h	Save all data in stack back to CMOS
84h 85h	Initialize ISA PnP boot devices 1. USB final Initialization 2. NET PC: Build SYSID structure 3. Switch screen back to text mode 4. Set up ACPI table at top of memory. 5. Invoke ISA adapter ROMs 6. Assign IRQs to PCI devices 7. Initialize APM 8. Clear noise of IRQs.
86h	Reserved
87h	Reserved
88h	Reserved
89h	Reserved
90h	Reserved
91h	Reserved
92h	Reserved
93h	Read HDD boot sector information for Trend Anti-Virus code
94h	1. Enable L2 cache 2. Program boot up speed 3. Chipset final initialization. 4. Power management final initialization 5. Clear screen & display summary table 6. Program K6 write allocation 7. Program P6 class write combining
95h	1. Program daylight saving 2. Update keyboard LED & typematic rate
96h FFh	1. Build MP table 2. Build & update ESCD 3. Set CMOS century to 20h or 19h 4. Load CMOS time into DOS timer tick 5. Build MSIRQ routing table. Boot attempt (INT 19h)

Check Point & Beep Code List

Bootblock Initialization Code Checkpoints

Checkpoint	Description
Before D0	If boot block debugger is enabled, CPU cache-as-RAM functionality is enabled at this point. Stack will be enabled from this point.
D0	Early Boot Strap Processor (BSP) initialization like microcode update, frequency and other CPU critical initialization. Early chipset initialization is done.
D1	Early super I/O initialization is done including RTC and keyboard controller. Serial port is enabled at this point if needed for debugging. NMI is disabled. Perform keyboard controller BAT test. Save power-on CPUID value in scratch CMOS. Go to flat mode with 4GB limit and GA20 enabled.
D2	Verify the boot block checksum. System will hang here if checksum is bad.
D3 D4	Disable CACHE before memory detection. Execute full memory sizing module. If memory sizing module not executed, start memory refresh and do memory sizing in Boot block code. Do additional chipset initialization. Re-enable CACHE. Verify that flat mode is enabled. Test base 512KB memory. Adjust policies and cache first 8MB. Set stack.
D5	Bootblock code is copied from ROM to lower system memory and control is given to it. BIOS now executes out of RAM. Copies compressed boot block code to memory in right segments. Copies BIOS from ROM to RAM for faster access. Performs main BIOS checksum and updates recovery status accordingly.
D6	Both key sequence and OEM specific method is checked to determine if BIOS recovery is forced. If BIOS recovery is necessary, control flows to checkpoint E0. See *Bootblock Recovery Code Checkpoints* section of document for more information.
D7	Restore CPUID value back into register. The Bootblock-Runtime interface module is moved to system memory and control is given to it. Determine whether to execute serial flash.
D8	The Runtime module is uncompressed into memory. CPUID information is stored in memory.
D9 DA	Store the Uncompressed pointer for future use in PMM. Copying Main BIOS into memory. Leaves all RAM below 1MB Read-Write including E000 and F000 shadow areas but closing SMRAM. Restore CPUID value back into register. Give control to BIOS POST (ExecutePOSTKernel). See *POST Code Checkpoints* section of document for more information.
DC	System is waking from ACPI S3 state
E1-E8 EC-EE	OEM memory detection/configuration error. This range is reserved for chipset vendors & system manufacturers. The error associated with this value may be different from one platform to the next.

Bootblock Recovery Code Checkpoints

Checkpoint	Description
E0	Initialize the floppy controller in the super I/O. Some interrupt vectors are initialized. DMA controller is initialized. 8259 interrupt controller is initialized. L1 cache is enabled.
E9 EA	Set up floppy controller and data. Attempt to read from floppy. Enable ATAPI hardware. Attempt to read from ARMD and ATAPI CDROM.
EB	Disable ATAPI hardware. Jump back to checkpoint E9.
EF	Read error occurred on media. Jump back to checkpoint EB.
F0	Search for pre-defined recovery file name in root directory.
F1	Recovery file not found.
F2	Start reading FAT table and analyze FAT to find the clusters occupied by the recovery file.
F3	Start reading the recovery file cluster by cluster.
F5	Disable L1 cache.
FA	Check the validity of the recovery file configuration to the current configuration of the flash part.
FB	Make flash write enabled through chipset and OEM specific method. Detect proper flash part. Verify that the found flash part size equals the recovery file size.
F4	The recovery file size does not equal the found flash part size.
FC	Erase the flash part.
FD	Program the flash part.
FF	The flash has been updated successfully. Make flash write disabled. Disable ATAPI hardware. Restore CPUID value back into register. Give control to F000 ROM at F000:FFF0h.

POST Code Checkpoints

Checkpoint	Description
03	Disable NMI, Parity, video for EGA, and DMA controllers. Initialize BIOS, POST, Runtime data area. Also initialize BIOS modules on POST entry and GPNV area. Initialized CMOS as mentioned in the Kernel Variable "wCMOSFlags."
04	Check CMOS diagnostic byte to determine if battery power is OK and CMOS checksum is OK. Verify CMOS checksum manually by reading storage area. If the CMOS checksum is bad, update CMOS with power-on default values and clear passwords. Initialize status register A. Initializes data variables that are based on CMOS setup questions. Initializes both the 8259 compatible PICs in the system
05	Initializes the interrupt controlling hardware (generally PIC) and interrupt vector table.
06	Do R/W test to CH-2 count reg. Initialize CH-0 as system timer. Install the POSTINT1Ch handler. Enable IRQ-0 in PIC for system timer interrupt. Traps INT1Ch vector to "POSTINT1ChHandlerBlock."
07	Fixes CPU POST interface calling pointer.
08	Initializes the CPU. The BAT test is being done on KBC. Program the keyboard controller command byte is being done after Auto detection of KB/MS using AMI KB-5.
C0	Early CPU Init Start -- Disable Cache – Init Local APIC
C1	Set up boot strap processor Information
C2	Set up boot strap processor for POST
C5	Enumerate and set up application processors
C6	Re-enable cache for boot strap processor
C7	Early CPU Init Exit
0A	Initializes the 8042 compatible Key Board Controller.
0B	Detects the presence of PS/2 mouse.
0C	Detects the presence of Keyboard in KBC port.
0E	Testing and initialization of different Input Devices. Also, update the Kernel Variables. Traps the INT09h vector, so that the POST INT09h handler gets control for IRQ1. Uncompress all available language, BIOS logo, and Silent logo modules.
13	Early POST initialization of chipset registers.
20	Relocate System Management Interrupt vector for all CPU in the system.
24	Uncompress and initialize any platform specific BIOS modules. GPNV is initialized at this checkpoint.

2A	Initializes different devices through DIM. See *DIM Code Checkpoints* section of document for more information.
2C	Initializes different devices. Detects and initializes the video adapter installed in the system that has optional ROMs.
2E	Initializes all the output devices.
31	Allocate memory for ADM module and uncompress it. Give control to ADM module for initialization. Initialize language and font modules for ADM. Activate ADM module.
33	Initializes the silent boot module. Set the window for displaying text information.
37	Displaying sign-on message, CPU information, setup key message, and any OEM specific information.
38	Initializes different devices through DIM. See *DIM Code Checkpoints* section of document for more information. USB controllers are initialized at this point.
39	Initializes DMAC-1 & DMAC-2.
3A	Initialize RTC date/time.
3B	Test for total memory installed in the system. Also, Check for DEL or ESC keys to limit memory test. Display total memory in the system.
3C	Mid POST initialization of chipset registers.
40	Detect different devices (Parallel ports, serial ports, and coprocessor in CPU, … etc.) successfully installed in the system and update the BDA, EBDA…etc.
52	Updates CMOS memory size from memory found in memory test. Allocates memory for Extended BIOS Data Area from base memory. Programming the memory hole or any kind of implementation that needs an adjustment in system RAM size if needed.
60	Initializes NUM-LOCK status and programs the KBD typematic rate.
75	Initialize Int-13 and prepare for IPL detection.
78	Initializes IPL devices controlled by BIOS and option ROMs.
7C	Generate and write contents of ESCD in NVRam.
84	Log errors encountered during POST.
85	Display errors to the user and gets the user response for error.
87	Execute BIOS setup if needed / requested. Check boot password if installed.
8C	Late POST initialization of chipset registers.
8D 8E	Build ACPI tables (if ACPI is supported) Program the peripheral parameters. Enable/Disable NMI as selected

90	Initialization of system management interrupts by invoking all handlers. *Please note this checkpoint comes right after checkpoint 20h*
A1	Clean-up work needed before booting to OS.
A2	Takes care of runtime image preparation for different BIOS modules. Fill the free area in F000h segment with 0FFh. Initializes the Microsoft IRQ Routing Table. Prepares the runtime language module. Disables the system configuration display if needed.
A4	Initialize runtime language module. Display boot option popup menu.
A7	Displays the system configuration screen if enabled. Initialize the CPU's before boot, which includes the programming of the MTRR's.
A9	Wait for user input at config display if needed.
AA	Uninstall POST INT1Ch vector and INT09h vector.
AB	Prepare BBS for Int 19 boot. Init MP tables.
AC	End of POST initialization of chipset registers. De-initializes the ADM module.
B1	Save system context for ACPI. Prepare CPU for OS boot including final MTRR values.
00	Passes control to OS Loader (typically INT19h).

Beep Codes

Boot Block Beep Codes

Number of Beeps	Description
1	Insert diskette in floppy drive A:
2	'AMIBOOT.ROM' file not found in root directory of diskette in A:
3	Base Memory error
4	Flash Programming successful
5	Floppy read error
6	Keyboard controller BAT command failed
7	No Flash EPROM detected
8	Floppy controller failure
9	Boot Block BIOS checksum error
10	Flash Erase error
11	Flash Program error
12	'AMIBOOT.ROM' file size error
13	BIOS ROM image mismatch (file layout does not match image present in flash device)

POST BIOS Beep Codes

Number of Beeps	Description
1	Memory refresh timer error.
2	Parity error in base memory (first 64KB block)
3	Base memory read/write test error
4	Motherboard timer not operational
5	Processor error
6	8042 Gate A20 test error (cannot switch to protected mode)
7	General exception error (processor exception interrupt error)
8	Display memory error (system video adapter)
9	AMIBIOS ROM checksum error
10	CMOS shutdown register read/write error
11	Cache memory test failed

Troubleshooting POST BIOS Beep Codes

Number of Beeps	Troubleshooting Action
1, 2 or 3	Reseat the memory, or replace with known good modules.
4-7, 9-11	Fatal error indicating a serious problem with the system. Consult your system manufacturer. Before declaring the motherboard beyond all hope, eliminate the possibility of interference by a malfunctioning add-in card. Remove all expansion cards except the video adapter. · If beep codes are generated when all other expansion cards are absent, consult your system manufacturer's technical support. · If beep codes are not generated when all other expansion cards are absent, one of the add-in cards is causing the malfunction. Insert the cards back into the system one at a time until the problem happens again. This will reveal the malfunctioning card.
8	If the system video adapter is an add-in card, replace or reseat the video adapter. If the video adapter is an integrated part of the system board, the board may be faulty.

PCI Configuration

PCI Interrupt Request Routing

The IRQ, acronym of interrupt request line and pronounced I-R-Q, are hardware lines over which devices can send interrupt signals to the microprocessor. The PCI IRQ pins are typically connected to the PCI bus pins as follows:

DEVICE	MCP1 INT Pin	IDSEL	CLOCK	REQ# / GNT#
PCI Slot	PIRQA	AD17	PCICLK 0	REQ#0 / GNT#0
Mini PCI Slot	PIRQB	AD18	PCICLK 1	REQ#1 / GNT#1
LAN1	PIRQC	AD21	CLKLAN 1	REQ#2 / GNT#2
LAN2	PIRQD	AD22	CLKLAN 2	REQ#3 / GNT#3

Resource List

I/O Map

I/O Port	Description
0000-000F	DMA Controller 1
0020-0021	Interrupt Controller 1
0040-0043	System Timer
004E-004F	SIO Port
0060,0064	Keyboard Controller
0070-0073	RTC and CMOS
0080-0090	DMA Controller Page Registers
0092	Port 92h
00A0-00A1	Interrupt Controller 2
00B2-00B3	APM register
00C0-00DF	DMA Controller 2
00F0-00FF	Numeric Data Processor
0170-0177	Secondary IDE Controller
01F0-01F7	Primary IDE Controller
02E8-02EF	COM4
02F8-02FF	COM2
0376	Secondary IDE Controller
0378-037F 03E8-03EF	LPT1 COM3
03F6	Primary IDE Controller
03F8-03FF	COM1
0400-045F	ACPI I/O space
0500-050F	SMBus I/O Space
0CF8-0CFF	PCI configuration Port

PCI Devices

Devices	Bus	Dev	Fun	ADSel	Ints
Host and AGP control	0	0	0	Internal	
Error Reporting	0	0	1	Internal	
Host Bus Control	0	0	2	Internal	
Dram Control	0	0	3	Internal	
Power Management Control	0	0	4	Internal	
North-South Module Interface Control	0	0	7	Internal	
PCI to PCI Bridge	0	1	0	Internal	
SATA and EIDE controller	0	15	0	Internal	
USB 1.1 UHCI Controllers	0	16	0~2	Internal	
USB 2.0 EHCI Controller	0	16	4	Internal	
Bus and Power Management Control	0	17	0	Internal	
South-North Module Interface Control	0	17	7	Internal	
PCI to PCIE Bridge	0	19	0	Internal	
PCI to PCI Bridge	0	19	1	Internal	
VIA VGA Controller	1	0	0	Internal	
Realtek Ethernet Controller	2	5	0	AD21	INT C
Realtek Ethernet Controller	2	6	0	AD22	INT D
VIA HDA Controller	128	0	0	Internal	
PCI Slot	2	1	0	AD17	INT A
Mini PCI Socket	2	2	0	AD18	INT B

SMBus Resource Allocation

Device	Address	Description
ICS952906	1101 001X	Clock Generator
MS-7	0101 111X	MSI ACPI Controller
W83786NG	0101 110X	H/W Monitor
DIMM Slot	1010 0000	SPD

ISA Interrupt Allocation

IRQ	Description
IRQ0	System Timer
IRQ1	Keyboard Controller
IRQ2	Cascade Interrupt
IRQ3	COM2
IRQ4	COM1
IRQ5	COM3
IRQ6	COM4
IRQ7	LPT1
IRQ8	RTC
IRQ9	ACPI Controller Interrupt
IRQ10	PCI Device
IRQ11	PCI Device
IRQ12	PS/2 Mouse
IRQ13	Numeric Data Processor
IRQ14	Primary IDE Controller
IRQ15	Secondary IDE Controller

ISA DMA Channel Allocation

DMA Channel	Description
Channel 0	Unassigned 8-bit channel
Channel 1	Unassigned 8-bit channel
Channel 2	Unassigned 8-bit channel
Channel 3	Unassigned 8-bit channel
Channel 4	Cascade channel
Channel 5	Unassigned 16-bit channel
Channel 6	Unassigned 16-bit channel
Channel 7	Unassigned 16-bit channel