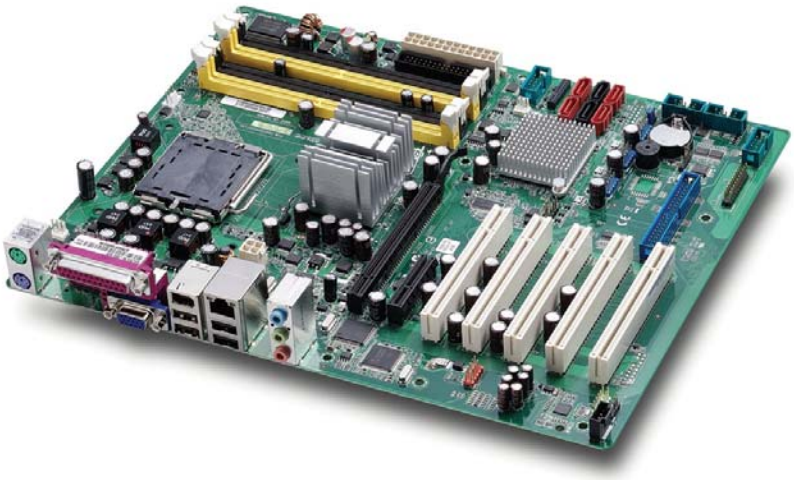
M-302

ATX Industrial Motherboard with
Intel® Q965 Chipset

User's Manual



Manual Rev.: 2.01

Revision Date: July 30, 2012

Part No: 50-13062-1010

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Revision History

Revision	Release Date	Description of Change(s)
2.00	2009/09/08	Initial Release
2.01	2012/07/30	Correct CPU Fan Connector pin definition; remove CHA_FAN1; add WDT sample code; update audio codec for boards with ordering numbers ending in “0070” and higher; update CPU support.

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Preface

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Using this Manual

Audience and Scope

The M-302 User's Manual is intended for hardware technicians and systems operators with knowledge of installing, configuring and operating industrial grade computers.

Manual Organization

This manual is organized as follows:

Preface: Presents copyright notifications, disclaimers, trademarks, and associated information on the proper usage of this document and its associated product(s).

Chapter 1, Introduction: Introduces the M-302, its features, applications, and specifications, including functional descriptions and board layout.

Chapter 2, Connectors & Jumpers: Provides technical information on connectors, jumpers and pin assignments for configuring the M-302.

Chapter 3, Getting Started: Describes how to install components and drivers on the M-302.

Chapter 4, BIOS Setup: Presents information and illustrations to help understand and configure the system BIOS.

Appendix B, System Resources: Presents information on I/O mapping, IRQ routing, and resource allocation.

Important Safety Instructions: Presents safety instructions all users must follow for the proper setup, installation and usage of equipment and/or software.

Getting Service: Contact information for ADLINK's worldwide offices.

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Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.


NOTE:

Additional information, aids, and tips that help users perform tasks.


CAUTION:

Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.


WARNING:

Information to prevent ***serious*** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

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1 Introduction

This chapter will introduce the M-302, its features, specifications, functional description, and mechanical layout.

1.1 Package Contents

Please check that your package contains the items below. If you discover damaged or missing items, please contact your vendor.

- M-302 Industrial ATX Motherboard
- I/O shield
- 2x SATA cable
- 2x SATA power cable
- 4x COM port cable with bracket
- Driver CD
- User's Manual



DO NOT install or apply power to equipment that is damaged or if there is missing/incomplete equipment. Retain the shipping carton and packing materials for inspection. Please contact your ADLINK dealer/vendor immediately for assistance. Obtain authorization from your dealer before returning any product to ADLINK.

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1.2 Overview

The ADLINK M-302 is an ATX industrial motherboard supporting the Intel® Core™2 Duo, Intel® Pentium® Dual-Core, Intel® Pentium® 4, Intel® Celeron®, and Intel® Celeron® D processors in the LGA775 package to deliver a high-performance, full-featured motherboard for a wide array of embedded computing applications. The M-302 supports a broad range of processing speeds, complete I/O functions, and high-bandwidth network connectivity .

These advanced features, coupled with a dual-channel DDR2 system memory architecture, diverse I/O, storage, expansion slots, and audio interfaces make the M-302 suitable for automation control, transportation, and telecom applications requiring an easy-to-deploy, and cost-effective mainboard.

1.3 Features

- ATX form factor (305 x 244 mm)
- Supports the following CPUs in the LGA775 package:
  - Intel® Core™2 Duo (E7400*, E6400, E4300)
  - Intel® Pentium® Dual-Core (E5300*, E2160)
  - Intel® Pentium® 4 (651, 551, 531)
  - Intel® Celeron® (440)
  - Intel® Celeron® D (352, 341)

  *Requires BIOS version A1.2
- Dual channel DDR2 up to 8GB max. memory (4x DIMM slots)
- Intel® Graphics Media Accelerator 3000, shared system memory up to 256MB, CRT up to 2048 x 1536 @ 75 Hz (QXGA)
- PCI Express x16 external graphics slot
- 6x SATA ports 300 MB/s, 4x RS-232 serial ports
- GbE, 10x USB 2.0, IEEE-1394a, HD audio codec
- PCIe x16, PCIe x4, 5x PCI expansion slots
- Floppy & parallel ports, PS/2 keyboard/mouse
- Optional Trusted Platform Module (TPM) via add-on card
- RoHS compliant

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1.4 Specifications

System	
CPU/Cache	• Intel® Core™2 Duo Processor E7400*, 45nm, 3 MB L2, 2.8 GHz, 1066 MHz • Intel® Core™2 Duo Processor E6400, 65nm, 2 MB L2, 2.13 GHz, 1066 MHz • Intel® Core™2 Duo Processor E4300, 65nm, 2 MB L2, 1.8 GHz, 800 MHz • Intel® Pentium ® Dual Core Processor E5300*, 45nm, 2 MB L2, 2.6 GHz, 800 MHz • Intel® Pentium ® Dual Core Processor E2160, 65nm, 1 MB L2, 1.8 GHz, 800 MHz • Intel® Pentium ® 4 Processor 651, 65nm, 2 MB L2, 3.4 GHz, 800 MHz • Intel® Pentium ® 4 Processor 551, 90nm, 1 MB L2, 3.4 GHz, 800 MHz • Intel® Pentium ® 4 Processor 531, 90nm, 1 MB L2, 3.0 GHz, 800 MHz • Intel® Celeron ® Processor 440, 65nm, 512KB L2, 2.0 GHz, 800 MHz • Intel® Celeron ®D Processor 352, 65nm, 512KB L2, 3.2 GHz, 533 MHz • Intel® Celeron ®D Processor 341, 90nm, 512KB L2, 2.93 GHz, 533 MHz *Requires BIOS version A1.2
FSB	• 533/800/1066 MHz
Chipset	• North Bridge: Intel® Q965 • South Bridge: Intel® ICH8DO
Memory	• DDR2 533/667/800 SDRAM (8GB max.) • 4x 240-pin DDR2 DIMM slots
BIOS	• AMI BIOS with 16 Mb Flash ROM
TPM	• Onboard header for optional TPM
Audio	• ADI AD1988 HD audio codec (Realtek ALC892 on boards with ordering numbers ending in “0070” and higher) • Supports line-in, line-out and mic-in
Watchdog Timer	• 1-255 second/minute programmable
Hardware Monitor	• CPU/System temperature, fan speed and onboard DC voltage
Operating System	• Microsoft® Windows® XP Professional • Microsoft® Windows® Vista Enterprise (32/64-bit) • Fedora Core 7 (i386, x86_64) • Fedora Core 8 (i386)

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I/O Interfaces	
Serial ATA	• 6x Serial ATA ports with 300 MB/s data transfer
Parallel ATA	• 1x IDE port by PCIe • Supports UltraATA 66/100/133 mode
Onboard I/O	• 3x USB 2.0 pin headers (6 ports) • 4x serial port connectors • 1x floppy port • 1x front panel pin header • 1x IEEE-1394a pin header
Rear I/O	• 1x RJ-45 LAN port • 4x USB 2.0 ports • 1x D-Sub VGA connector • 1x parallel port • 1x IEEE-1394a port (6-pin) • 2x PS2 keyboard/mouse ports • 3x audio jacks (line-in, line-out and mic-in)
Expansion Slots	• 1x PCIe x16 slot • 1x PCIe x4 slot • 5x PCI slots
Display	
VGA	• GMA 3000 integrated in Q965 GMCH
VRAM	• Shared system memory up to 256 MB
CRT	• Dsub-15 connector, up to 2048x1536 @ 75 Hz
External	• PCI Express x16 external graphics slot
Ethernet	
Controller	• Intel® 82566DM
Ports	• RJ-45 Ethernet port
Mechanical and Environment	
Form Factor	• ATX Industrial Motherboard
Dimensions	• 305 x 244 mm (L x W)
Operating Temp.	• 0°C to 60°C
Storage Temp.	• -20ºC to 80ºC
Rel. Humidity	• 10 - 90% RH
Safety	• CE, FCC Class A

Table 1-1: M-302 General Specifications

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1.5 Power Consumption

Intel® Pentium® 4 processor 651, 65nm, SL9KE, 2MB L2, 3.40GHz, FSB 800MHz

Test Configuration	
Memory	Transcend 2G DDR2-800 DIMM
Graphics	82Q963/965 Integrated Graphics Controller
IDE Channel	Seagate Barracuda 7200.7 80G ST380013A
Power Supply	ZIPPY P1G-6250P 250W

DOS				
Power Req.	+3.3V	+5V	+12V	Total
Current (A)	2.550	2.897	2.965	8.412
Watts (W)	8.414	14.487	35.575	58.467
Linux, Idle				
Power Req.	+3.3V	+5V	+12V	Total
Current (A)	2.542	3.035	1.382	6.834
Watts (W)	8.388	15.173	16.584	40.144
Windows XP, Idle				
Power Req.	+3.3V	+5V	+12V	Total
Current (A)	2.560	3.087	1.474	7.120
Watts (W)	8.447	15.437	17.683	41.566
Windows XP, CPU 100% Usage				
Power Req.	+3.3V	+5V	+12V	Total
Current (A)	2.560	3.099	3.913	9.571
Watts (W)	8.447	15.493	46.955	70.895

Table 1-2: Pentium® 4 651 Power Consumption

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Intel® Core™2 Duo processor E6400, 65nm, SL9T9, 2MB L2, 2.13GHz, FSB 1066MHz

Test Configuration	
Memory	Transcend 2G DDR2-800 DIMM
Graphics	82Q963/965 Integrated Graphics Controller
IDE Channel	Seagate Barracuda 7200.7 80G ST380013A
Power Supply	ZIPPY P1G-6250P 250W

DOS				
Power Req.	+3.3V	+5V	+12V	Total
Current (A)	2.488	3.041	2.058	7.587
Watts (W)	8.210	15.204	24.700	48.115
Linux, Idle				
Power Req.	+3.3V	+5V	+12V	Total
Current (A)	2.529	3.090	1.240	6.859
Watts (W)	8.345	15.450	14.882	38.677
Windows XP, Idle				
Power Req.	+3.3V	+5V	+12V	Total
Current (A)	2.524	3.186	1.370	7.080
Watts (W)	8.329	15.929	16.439	40.697
Windows XP, CPU 100% Usage				
Power Req.	+3.3V	+5V	+12V	Total
Current (A)	2.529	3.125	3.698	9.652
Watts (W)	8.345	15.625	44.378	68.348

Table 1-3: Core™2 Duo E6400 Power Consumption

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1.6 Block Diagram

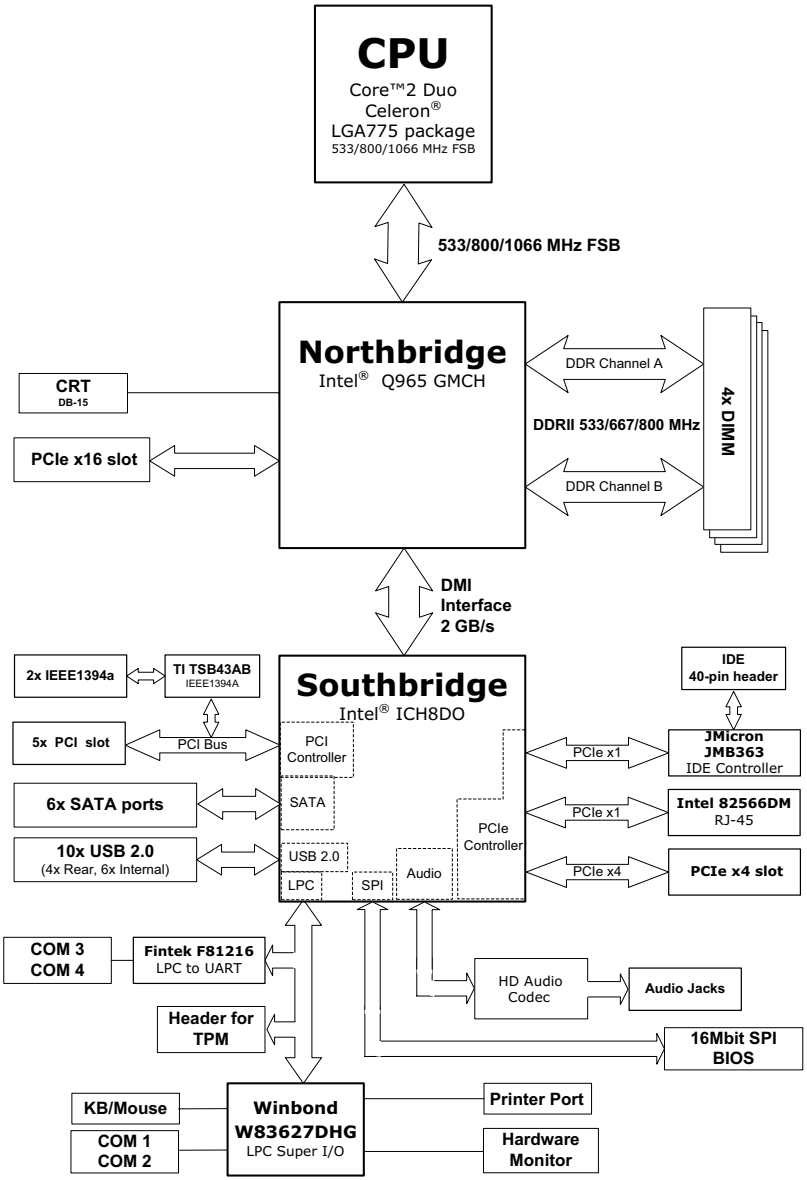


Figure 1-1: M-302 Block Diagram

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1.7 Functional Description

Processor Support

The M-302 motherboard supports Intel processors in the LGA775 package in a range of 533/800/1066 MHz Front Side Bus (FSB).

Providing high-performance computing and energy-efficiency, the M-302 is designed for Intel® Core™2 Duo, Intel® Pentium® Dual-Core, Intel® Pentium® 4, Intel® Celeron®, and Intel® Celeron® D processors. The M-302 supports dual-core processors containing multiple physical cores and dedicated L2 caches to meet the ever-increasing demands of industrial computing.

Intel® Q965 Express chipset

The Intel® Q965 Express chipset, featuring the Intel® Q965 graphics memory controller hub (GMCH) and the Intel® ICH8DO I/O controller hub, provides the vital interfaces for the motherboard. The Intel® Q965 comes with the Intel® Graphics Media Accelerator 3000, an integrated graphics engine with enhanced 3D/2D graphics rendering and video capabilities. The GMCH also provides the interface for the processor and system memory.

The Intel® ICH8DO Southbridge is the eighth generation of Intel I/O controller hub that provides key interfaces such as PCI Express®, USB 2.0, and SATA II.

Dual-channel DDR2 memory

To meet the requirements of memory-intensive applications, the M-302 has a dual-channel memory architecture supporting DDR2 533/667/800 MHz DIMMs. The high-bandwidth memory specification, meets the requirements of the latest 3D graphics, multimedia, and network application, and boosts system performance by eliminating bottlenecks.

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Intel® Graphics Media Accelerator 3000

The Intel® Graphics Media Accelerator (GMA) 3000 revolutionizes integrated graphics with new capabilities that provide significant increase in graphics performance. With support for DirectX 9 hardware acceleration, 333 MHz display clock, and up to 256 MB of video memory, the Intel GMA 3000 provides a cost-effective and high-performance graphics solution. The M-302 comes with the dual-independent display technology, enabling different contents to be displayed on two separate display terminals or a single content stretched across two display devices for expanded workspace.

Gigabit Ethernet

The M-302 is equipped with the Intel® 82566DM PCI Express controller.

Serial ATA

Storage is efficient and secure with the Serial ATA interface. Utilizing the Intel® ICH8DO, the M-302 supports up to six Serial ATA devices capable of reading/writing data at up to 3 Gbps. The SATA specification improves chassis airflow via thinner and more flexible cables with lower pin count.

USB 2.0

The M-302 incorporates the Universal Serial Bus (USB) 2.0 specification that increases peripheral connection speed from 12 Mbps (USB 1.1) to 480 Mbps. USB 2.0 is backward compatible with USB 1.1.

Hardware monitoring

A built-in, proactive hardware monitoring system in the ASIC monitors the CPU temperature, system fan rotations, and voltage levels to prevent overheating and/or component damage, effect timely failure detection, and ensure stable supply of current for critical motherboard components.

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Watchdog Timer

The watchdog timer (WDT) monitors system operations based on user-defined configurations. The WDT can be programmed for different time-out periods, such as from 1 to 255 seconds or from 1 to 255 minutes. The WDT generates a reset signal, then a reset request, after failure to strobe it within the programmed time period. A register bit may be enabled to indicate if the watchdog timer caused the reset event. The WDT register is cleared during the power-on sequence to enable the operating system to take appropriate action when the watchdog generates a reboot.

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1.8 Board Layout

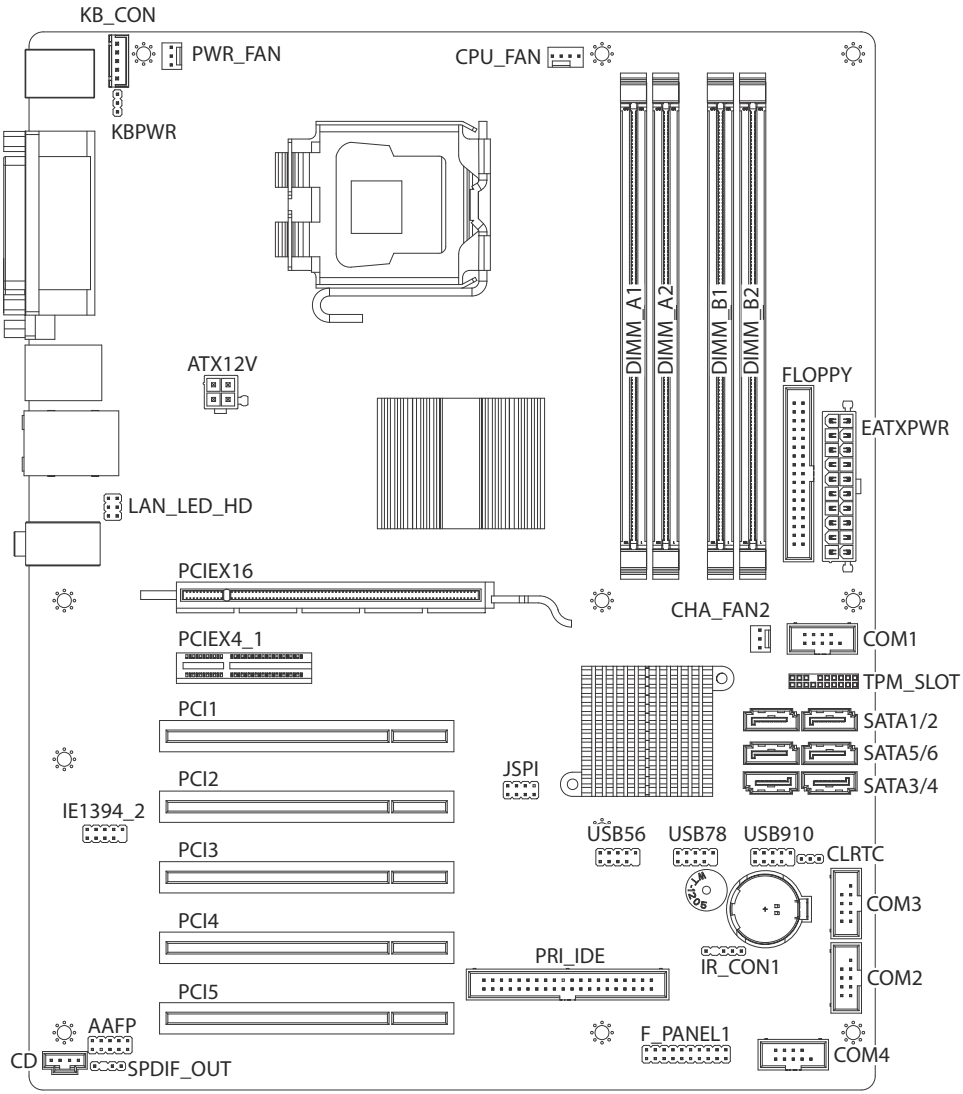


Figure 1-2: M-302 Board Layout

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AAFP	Front Panel Audio pin header	**JSPI**	Reserved
ATX12V	ATX 12V connector	**KB_CON**	Reserved
CD	CD audio in connector	**KBPWR**	Keyboard Power jumper
CHA_FAN2	System Fan connectors	**LAN_LED_HD**	LAN LED pin header
CLRTC	Clear CMOS jumper	**PCI1-5**	PCI slots
COM1-4	Serial port connectors	**PCIEX16**	PCIe x16 slot
CPU_FAN	CPU Fan connector	**PCIEX4_1**	PCIe x4 slot
DIMM_A1-B2	Memory slots	**PRI_IDE**	IDE connector
EATXPWR	ATX power connector	**PWR_FAN**	Power Fan connector
F_PANEL1	System Panel connector	**SATA1-6**	SATA connectors
FLOPPY	Floppy connector	**SPDIF_OUT**	SPDIF pin header
IE1394_2	IEEE 1394a pin header	**TPM_SLOT**	TPM connector
IR_CON1	IrDA pin header	**USB5-10**	USB pin headers

Table 1-4: M-302 Board Layout Legend

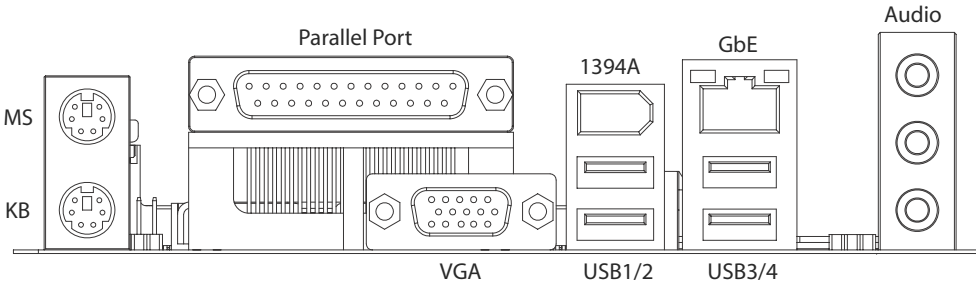
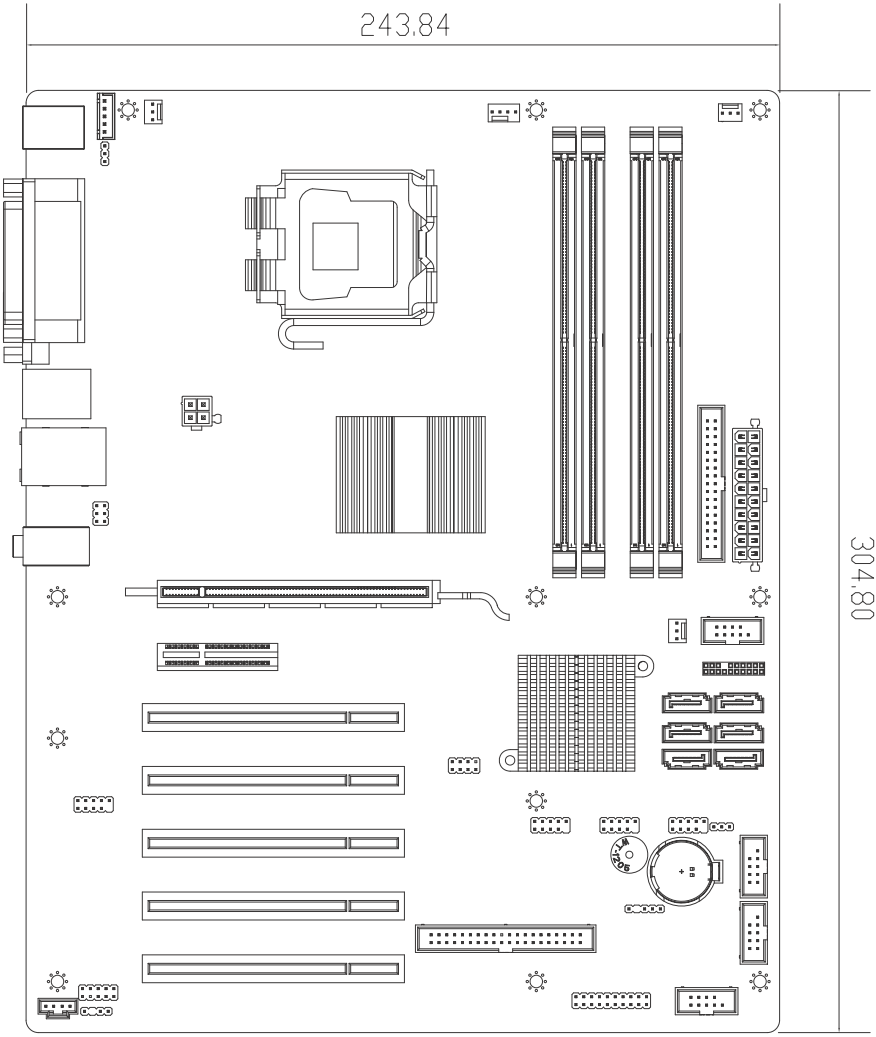


Figure 1-3: M-302 Rear I/O Layout

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1.9 Mechanical Drawing



Dimensions in mm

Figure 1-4: M-302 Board Dimensions

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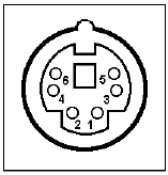
2 Connectors & Jumpers

The connectors and jumpers on the M-302 allow you to connect and configure external devices. The following specify the pin assignments for connectors and jumper on the M-302. Refer to **Figure 1-2: M-302 Board Layout** and **Figure 1-3: M-302 Rear I/O Layout** for connector and jumper locations.

2.1 Rear I/O Connectors

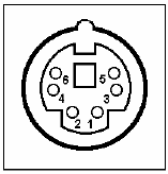
PS/2 Mouse Port (green)

Pin #	Signal	Function
1	MSDATA	Mouse Data
2	NC	not connected
3	GND	Ground
4	+5V	Power
5	CLK	Clock
6	NC	not connected



PS/2 Keyboard Port (purple)

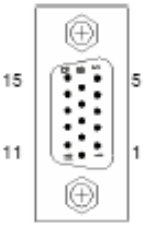
Pin #	Signal	Function
1	KBDATA	Keyboard Data
2	NC	not connected
3	GND	Ground
4	+5V	Power
5	CLK	Clock
6	NC	not connected



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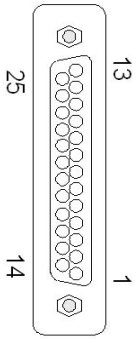
VGA Connector.

Signal Name	Pin #	Pin #	Signal Name
Red	1	2	Green
Blue	3	4	VCC pull-up
GND	5	6	GND
GND	7	8	GND
VCC	9	10	GND
VCC pull-up	11	12	DDC2B DATA
HSYNC	13	14	VSYNC
DDC2B CLK	15		



Parallel Port.

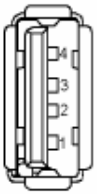
Pin #	Signal Name	Pin #	Signal Name
1	STROBE	2	AUTO FEED
3	DATA0	4	ERROR
5	DATA1	6	INIT
7	DATA2	8	SELECT IN
9	DATA3	10	GND
11	DATA4	12	GND
13	DATA5	14	GND
15	DATA6	16	GND
17	DATA7	18	GND
19	ACKNOWLEDGE	20	GND
21	BUSY	22	GND
23	PAPER EMPTY	24	GND
25	SELECT		



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USB Connectors

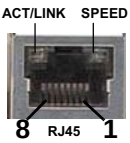
Pin #	Signal Name
1	Vcc
2	USB-
3	USB+
4	GND



LAN Port (RJ-45)

This port allows gigabit connection to a Local Area Network (LAN) using a network hub. The LAN port comes with two LEDs to indicate link, activity and speed. Refer to the tables below for the LAN port pin and LED definitions .

Pin #	10BASE-T/100BASE-TX	1000BASE-T
1	TX+	BI_DA+
2	TX-	BI_DA-
3	RX+	BI_DB+
4	--	BI_DC+
5	--	BI_DC-
6	RX-	BI_DB-
7	--	BI_DD+
8	--	BI_DD-



Status		ACT/LINK	SPEED
Network link is not established or system powered off		OFF	--
10 Mbps	Link	Orange	OFF
	Active	Blinking	
100 Mbps	Link	Orange	Orange
	Active	Blinking	
1000 Mbps	Link	Orange	Green
	Active	Blinking	

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IEEE 1394a Port

Pin #	Signal Name
1	+12V
2	GND
3	B0-
4	B0+
5	A0-
6	A0+



Audio I/O port

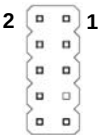
The three-jack audio I/O supports Line-In, Line-Out, and Mic-In functions. The blue Line-In jack onnects to an audio source such as a CD player. The green Line-Out port connects to a speaker or headphone, while the pink Mic-In jack connects to a microphone.

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2.2 Onboard Connectors

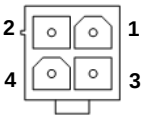
Front Panel Audio Pin Header (AAFP)

Pin #	Signal
1	MIC2_L
2	GND
3	MIC2_R
4	FP_PRES#
5	LIN2_R
6	SRTN1
7	SENSE A
8	NC
9	LIN2_L
10	SRTN2



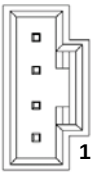
ATX 12V Power Connector (ATX12V)

Pin #	Signal
1	GND
2	GND
3	+12V DC
4	+12V DC



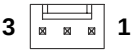
CD-in Connector (CD)

Pin #	Signal
1	Left Audio Channel
2	CD_GND
3	CD_GND
4	Right Audio Channel



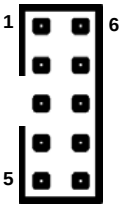
System Fan Connector (CHA_FAN2)

Pin #	Signal
1	GND
2	Fan Power (+12V)
3	Fan Tachometer



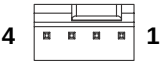
Serial Port Connectors (COM1-4)

Pin #	Signal	Functions
1	DCD	Data Carrier Detect
2	TXD	Transmit Data
3	GND	Ground
4	RTS	Request to Send
5	RI	Ring Indicate
6	RXD	Receive Data
7	DTR	Data Terminal Ready
8	DSR	Data Set Ready
9	CTS	Clear to Send
10	NC	Not Connect



CPU Fan Connector (CPU_FAN)

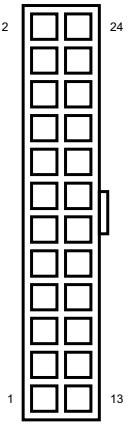
Pin #	Signal
1	GND
2	Fan Power (+12V)
3	Fan Tachometer
4	Fan Speed Control



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ATX Power Connector (EATXPWR)

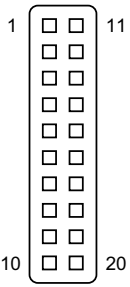
Pin #	Signal	Pin #	Signal
1	+3.3V	13	+3.3V
2	+3.3V	14	-12V
3	GND	15	GND
4	+5V	16	PS-ON#
5	GND	17	GND
6	+5V	18	GND
7	GND	19	GND
8	PWRGD	20	NC
9	+5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	24-pin detection	24	GND



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System Panel Connector (F_PANEL1)

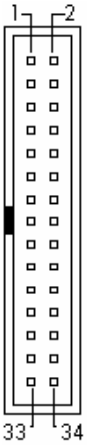
Pin #	Signal	Function	Pin Group
1	P5V	Power for +5v	Power LED
2	NC		
3	HC_PLED-L	Power LED signal	
4	NC		Reserved
5	GND	Ground	
6	GND	Ground	
7	NC		
8	ATX_PSON-L	ATX Power-on signal	
9	P5V_SB_ATX	Power for +5v Standby	
10	NC		
11	HC_SPKR	Speaker signal	Chassis Speaker
12	NC		
13	NC		
14	P5V	Power for +5v	
15	HC_RSTBN-L	RESET signal	Reset Button
16	GND	Ground	
17	HDLED_PWR	Hard Disk LED signal	Hard Disk LED
18	P5V	Power for +5v	
19	HC_PBTNJ	Power-on signal	Power-on Button
20	GND	Ground	



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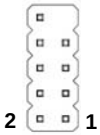
Floppy disk drive connector (FLOPPY)

Pin #	Signal	Pin #	Signal
1	GND	2	Extended Density
3	GND	4	No Connect
5	NC	6	Data Rate
7	GND	8	Index
9	GND	10	Motor A Select
11	GND	12	Drive B Select
13	GND	14	Drive A Select
15	GND	16	Motor B Select
17	GND	18	Step Direction
19	GND	20	Step Pulse
21	GND	22	Write Data
23	GND	24	Write Gate
25	GND	26	Track 0
27	GND	28	Write Protect
29	GND	30	Read Data
31	GND	32	Side 1
33	GND	34	Disk Change



IEEE 1394a Pin Header (IE1394_2)

Pin #	Signal
1	TPA_1-
2	TPA_1+
3	GND
4	GND
5	TPB_1-
6	TPB_1+
7	1394_+12V
8	1394_+12V
9	NC
10	GND



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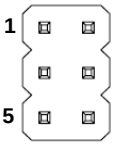
IrDA Pin Header (IR_CON1)

Pin #	Signal
1	+5V
2	NC
3	IRRX
4	GND
5	IRTX



LAN LED Pin Header (LAN_LED_HD)

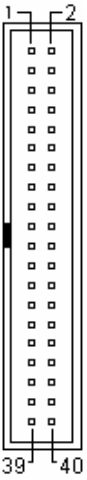
Pin #	Signal
1	ACTLEDP
2	NIN_ACTLED#
3	NIN_LINKLED1#
4	R_NIN_LINKLED2#
5	R_NIN_LINKLED2#
	NIN_LINKLED1#



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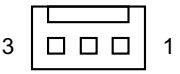
IDE Connector (PRI_IDE)

Pin #	Signal	Pin #	Signal
1	Reset	2	Ground
3	Data 7	4	Data 8
5	Data 6	6	Data 9
7	Data 5	8	Data 10
9	Data 4	10	Data 11
11	Data 3	12	Data 12
13	Data 2	14	Data 13
15	Data 1	16	Data 14
17	Data 0	18	Data 15
19	Ground	20	-
21	Request	22	Ground
23	I/O Write	24	Ground
25	I/O Read	26	Ground
27	I/O Ready	28	Cable Select
29	DMA Ack	30	Ground
31	Interrupt Request	32	No Connect
33	Device Address 1	34	ATA 66/100 Detect
35	Device Address 0	36	Device Address 2
37	Chip Select 1	38	Chip Select 3
39	Device Active	40	Ground



Power Fan Connector (PWR_FAN)

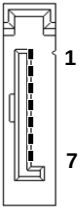
Pin #	Signal
1	GND
2	Fan Power (+12V)
3	Fan Tachometer



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SATA Connectors (SATA1-6)

Pin #	Signal
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND



SPDIF Pin Header (SPDIF_OUT)

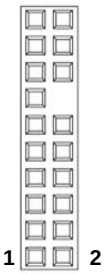
Pin #	Signal
1	+5V
2	NC
3	SPDIF0
4	GND



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TPM Connector (TPM_SLOT)

Pin #	Signal
1	CK-LPC_TPM
2	GND
3	LFRAME#
4	SMBDATA_DDR
5	PLTRST#
6	SMBCLK_DDR
7	LAD3
8	LAD2
9	+3V
10	LAD1
11	LAD0
12	GND
13	+3V
14	NC
15	+3VSB
16	SERIRQ
17	GND
18	CLKRUN#
19	LPCPD#
20	NC



USB 2.0 Connector (USB5-10)

Pin #	Signal	Pin #	Signal
1	+5V	2	+5V
3	USB0-	4	USB1-
5	USB0+	6	USB01+
7	GND	8	GND
9	Key	10	NC



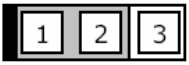
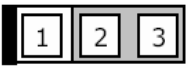
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2.3 Jumpers

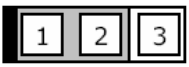
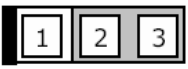
Clear CMOS Jumper (CLRTC)

The CMOS RAM data contains the date / time and BIOS setting information. CMOS is powered by the onboard button cell battery. To erase the CMOS RAM data:

1. Unplug the M-302
2. Short the CLRTC pins 2-3
3. Turn the power on. After power on, remove the jumper cap from pins 2-3 and reinstall it to pins 1-2.

RTC status	Connection	CLRTC
Normal	1 – 2	
Clear CMOS	2 – 3	

Keyboard Power Status (KBPWR)

RTC status	Connection	KBPWR
+5V (Default)	1 – 2	
+5VSB	2 – 3	

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3 Getting Started

This chapter provides information on how to install components to the M-302 SBC. Specifically, the installation of CPU, memory modules, and operating system are explained.

3.1 Installing the CPU

The M-302 Supports the Intel® Core™2 Duo, Intel® Pentium® Dual-Core, Intel® Pentium® 4, Intel® Celeron®, and Intel® Celeron® D processors via the surface mount LGA775 socket (Socket T).

WARNING:

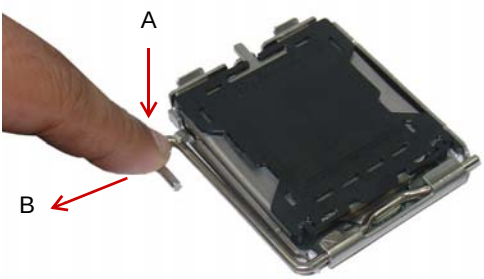
Disconnect all power supply to the board before installing a CPU to prevent damaging the board and CPU.

Do not touch socket contacts. Damaging the contacts voids the product warranty. Follow the installation instructions carefully to avoid damaging motherboard components.



To install the CPU:

1. Press the load lever (A), then disengage it from the retention tab (B).



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2. Lift and rotate the load lever to a 135° angle



3. Lift the load plate to a 100° angle using your thumb and forefinger

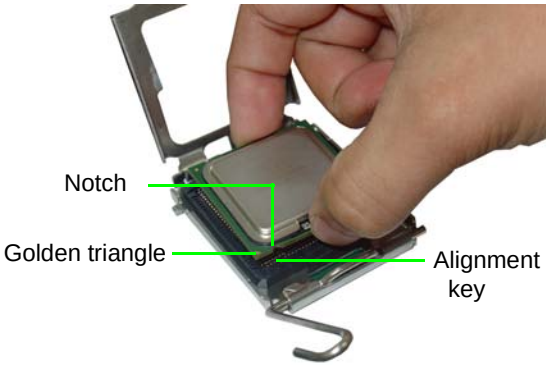


4. Use your thumb to push and remove the protective socket cover (plastic) from the load plate



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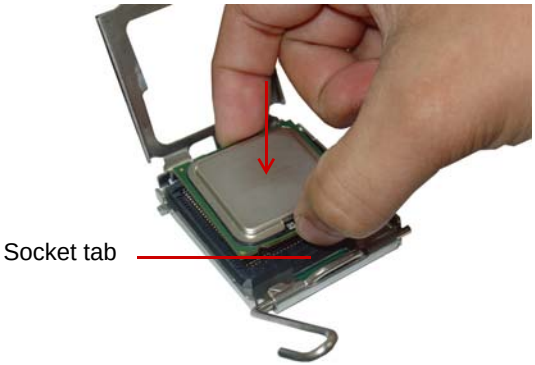
5. Position the CPU over the socket, then match the notches on the CPU side with the alignment keys on the socket. The golden triangle on the CPU must be positioned on the bottom-left corner of the socket .



WARNING:

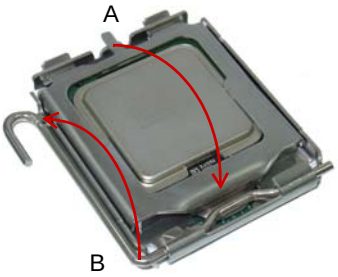
The CPU fits the socket in only one orientation. DO NOT force it into the socket to avoid damaging it.

6. Carefully place the CPU on the socket in a vertical motion. The socket has tabs that accommodate your fingers during installation .



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7. Close the load plate (A), then fasten the load lever on the retention tab (B) .



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3.2 System Memory

The M-302 supports up to 8 GB of DDR2 533/667/800 SDRAM in four 240-pin DIMM sockets. See Figure 1-2 on page 11 for DIMM socket locations.

Memory Configurations

Dual channel configuration is supported by the M-302 as follows:

Channel A: DIMM_A1 and DIMM_A2

Channel B: DIMM_B1 and DIMM_B2

Unbuffered non-ECC DDR2 DIMMs with capacities of 256 MB, 512 MB, 1 GB and 2GB can be installed into the DIMM sockets as follows:

- Memory modules of varying sizes may be installed in Channel A and Channel B. The system maps the total size of the channel with the lowest capacity for dual-channel configuration. Any excess memory from the channel with higher capacity is then mapped for single-channel operation.
- Always install DIMMs with the same CAS latency. For optimum compatibility, it is recommended that you obtain memory modules from the same vendor.
- Due to chipset resource allocation, the system may detect less than 4 GB system memory when four 1 GB DDR2 memory modules are installed. This limitation occurs in Windows® XP 32-bit operation system, which does not support Physical Address Extension (PAE).
- The M-302 does not support memory modules with 128 Mb chips or double-sided x16 memory modules.

Memory Module Installation

The DDR2 memory modules are notched to facilitate correct installation in the DIMM sockets.



Disconnect all power supply to the board before installing a memory module to prevent damaging the board and memory module .

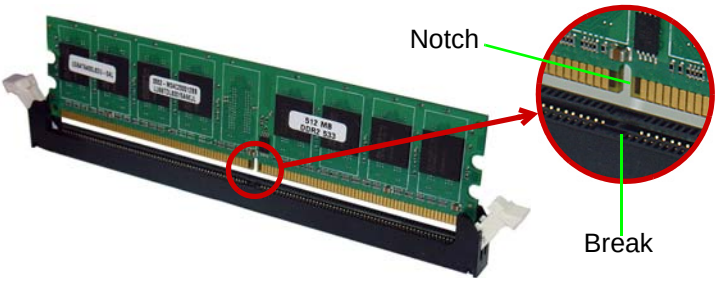
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To install a memory module:

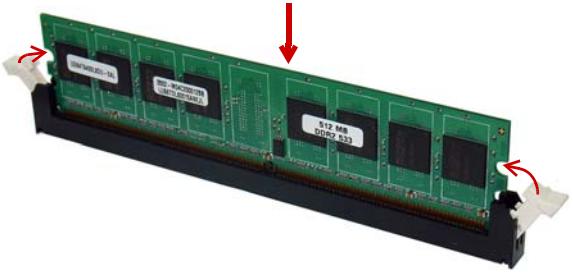
1. Locate the DIMM slots on the motherboard.
2. Press the socket's retaining clips outward to unlock.



3. Align the memory module on the socket making sure that the notch matches the break on the socket.



4. Insert the module firmly into the slot until the retaining clips snap back inwards and the module is securely seated.



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3.3 Driver Installation

The M-302 drivers for **Windows XP 32-bit** are located in the following directories on the Driver DVD, or can be downloaded from the ADLINK website (**http://www.adlinktech.com**):

Chipset	X:\M-302 Driver\INF
Display	X:\M-302 Driver\VGA\WIN2KXP_32
LAN	X:\M-302 Driver\LAN\Windows\2000_ XP_2003 Server
Audio	X:\M-302 Driver\Audio\32bit\2K_XP (X:\M-302 Driver\Audio\XP 32_64 for boards with ordering numbers ending in “0070” and higher)

Follow the instructions below to install the required M-302 drivers:

1. Install the Windows operating system before installing any driver. Most standard I/O device drivers are installed during Windows installation.
2. Install the **Chipset driver** by running the program **X:\M-302 Driver\INF\setup.exe**. Follow the instructions given and reboot when instructed.
3. Install the **Display driver** and utilities by running the program **X:\M-302 Driver\VGA\WIN2KXP_32\setup.exe**. Follow the instructions given and reboot when instructed.
4. Install the **LAN driver** by running the program **X:\M-302 Driver\LAN\Windows\2000_ XP_2003 Server\PRO2KXP.exe**. Follow the instructions given and reboot if required.
5. Install the Audio driver by running the program **X:\M-302 Driver\Audio\32bit\2K_XP\setup.exe** (X:\M-302 Driver\Audio\XP 32_64 for boards with ordering numbers ending in “0070” and higher). Follow the instructions given and reboot if required.

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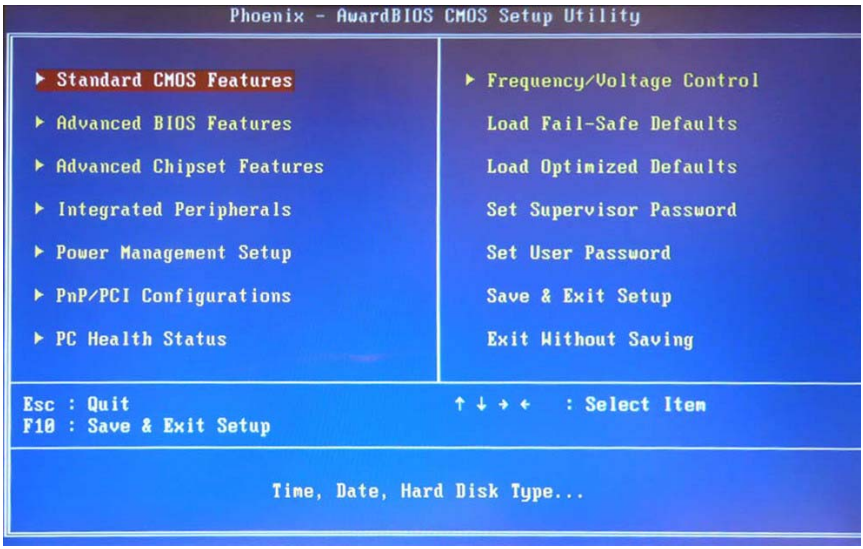
4 BIOS Setup

The following chapter describes basic navigation for the Phoenix AwardBIOS Setup Utility.

4.1 Starting the BIOS

To enter the setup screen, follow these steps:

1. Power on the motherboard
2. Press the <Delete> key on your keyboard during the Power-On-Self-Test (POST) to enter the Setup utility.
3. After you press the < Delete > key, the main BIOS Setup Menu will be displayed.



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Navigation

Use the keys described below to navigate through the BIOS Setup Utility

Key(s)	Function Description
F1	General help, only for Status Page Setup Menu and Option Page Setup Menu
Esc	Return to the main menu from a sub-menu or prompts you to quit the setup program.
← , →	Move to the item on the left or right
↑ , ↓	Move to previous or next item
Enter	Brings up a selection menu for the highlighted field.
+ or PgUp	Moves the cursor to the first field
- or PgDn	Moves the cursor to the last field
F5	Loads the previous values
F6, F7	Loads the fail-safe / optimized defaults
F10	Saves changes and exits Setup

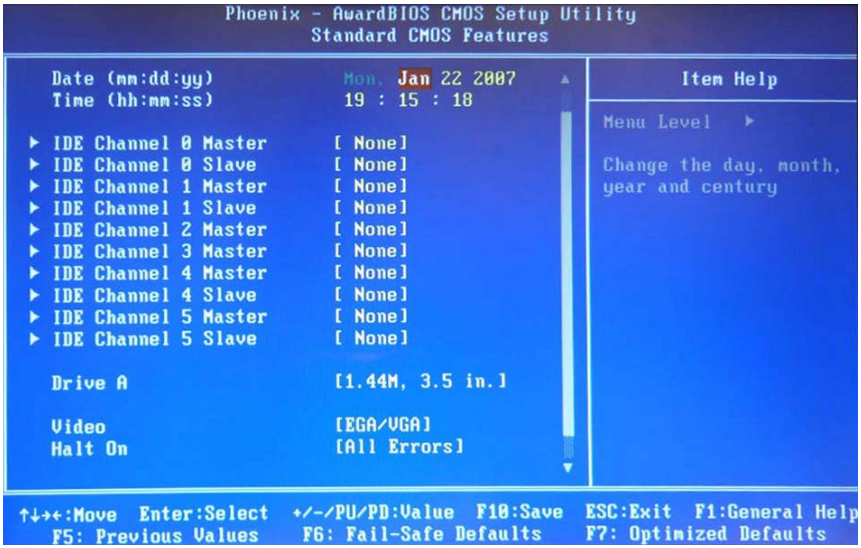
Submenus

Note that a right pointer symbol (▶) appears to the left of certain fields. This pointer indicates that you can display a submenu from this field. A sub-menu contains additional options for a field parameter. To display a sub-menu, move the highlight to the field and press <Enter>. The sub-menu appears. Use the legend keys to enter values and move from field to field within a sub-menu as you would within a menu. Use the <Esc> key to return to the main menu.

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4.2 Standard CMOS Features

The main menu includes the following setup categories. Recall that some systems may not include all entries.



Date/Time

Use this option to change the system time and date. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

Note: The time is in 24-hour format. For example, 5:30 A.M. appears as 05:30:00, and 5:30 P.M. as 17:30:00.

IDE Channel Master/Slave

This selection brings up the configuration submenu of the designated device.

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IDE HDD Auto-detection: Press Enter Press Enter to auto-detect the HDD on the selected channel.

IDE Device Setup: None/Auto/Manual Selecting 'manual' allows the user to set the remaining fields on the submenu. Selects the type of fixed disk. "User Type" will let you select the number of cylinders, heads, etc.


NOTE:

PRECOMP=65535 means NONE.

Capacity: Auto display disk size Disk drive capacity (approximated).


NOTE:

Disk size is usually slightly greater than the size of a formatted disk given by a disk checking program.

Access Mode: CHS/LBA/Large/Auto Selects the access mode for a hard disk The following options are selectable only if the 'IDE Primary Master' item is set to 'Manual'

Cylinder: Min = 0 Max = 65535 Sets the number of cylinders for a hard disk.

Head: Min = 0 Max = 255 Sets the number of read/write heads

Precomp: Min = 0 Max = 65535


WARNING:

Setting a value of 65535 means no hard disk

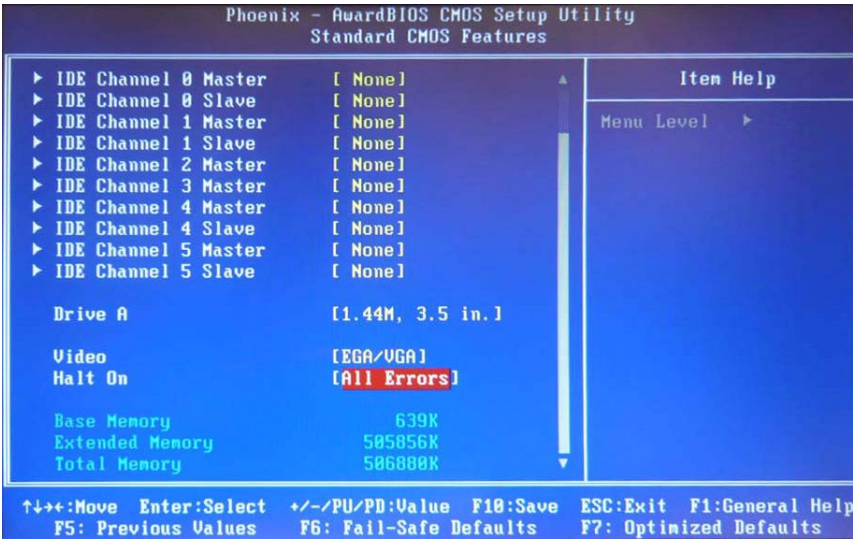
Landing zone: Min = 0 Max = 65535


WARNING:

Setting a value of 65535 means no hard disk

Sector: Min = 0 Max = 255 Number of sectors per track

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Drive A

Specifies the capacity and physic al size of diskette drive A. Do not select [None] if you are using a floppy disk drive. Configuration options: [None] [360K, 5.25 in.] [1.2M , 5.25 in.] [720K , 3.5 in.] [1.44M, 3.5 in.] [2.88M, 3.5 in.]

Video

This category detects the type of adapter used for the primary monitor that matches your video display card and monitor.

- EGA / VGA: Enhanced Graphics Adapter/Video Graphics Array. For EGA, VGA, SVGA, or PGA monitor adapters
- CGA 40: Color Graphics Adapter, power up in 40 column mode
- CGA 80: Color Graphics Adapter, power up in 80 column mode
- MONO: Monochrome adapter, includes high resolution monochrome adapters

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Halt On

During the Power On Self Test (POST), the computer stops if the BIOS detects a hardware error. The BIOS can be instructed to ignore certain errors during POST and continue the bootup process. The options are as follows:

- **No errors:** POST does not stop for any errors.
- **All errors:** POST stops for any nonfatal error and will prompt the user to take any corrective measures.
- **All, But Keyboard:** POST does not stop for a keyboard error, but stops for all other errors.
- **All, But Diskette:** POST does not stop for diskette drive errors, but stops for all other errors.
- **All, But Disk/Key:** POST does not stop for a keyboard or disk errors, but stops for all other errors.

Base Memory

Displays the amount of conventional memory detected during boot up.

Extended Memory

Displays the amount of extended memory detected during boot up.

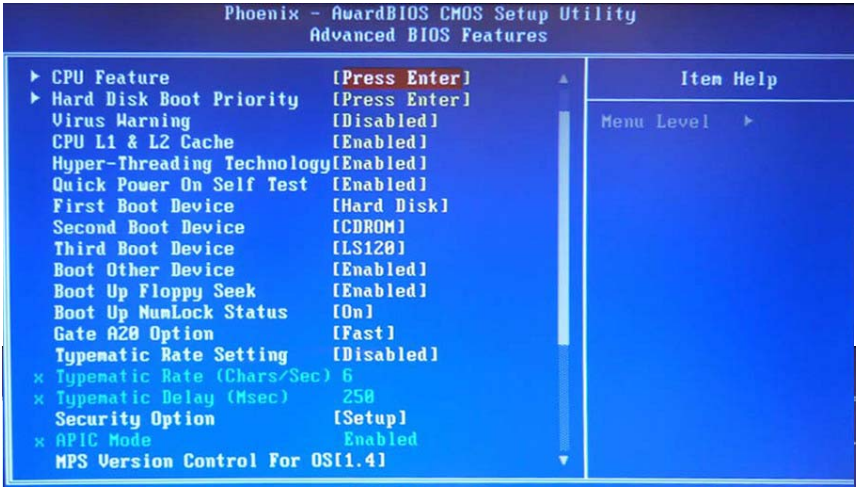
Total Memory

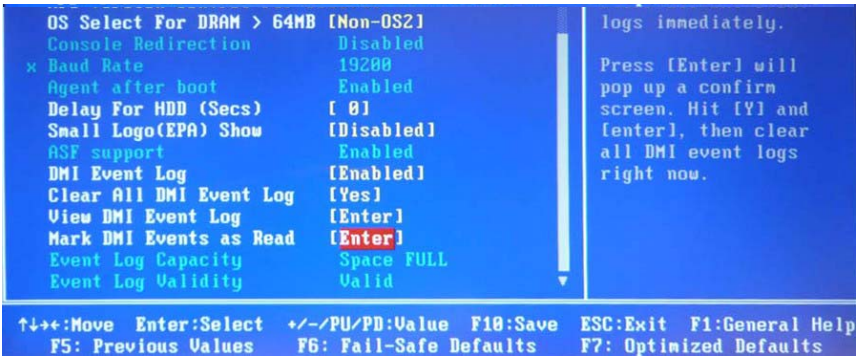
Displays the total memory available on the system.

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4.3 Advanced BIOS Features

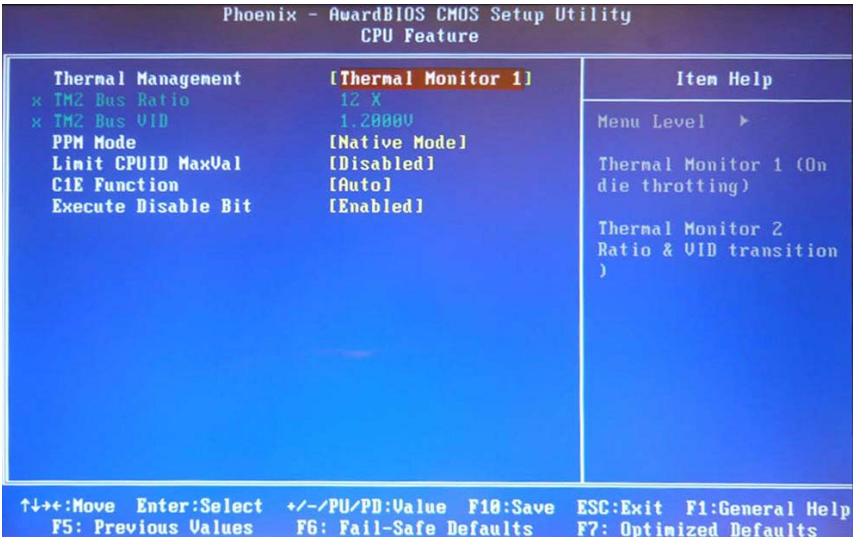
This section allows users to configure the Advanced BIOS Features of the system.





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CPU Features



Thermal Management

Options: Thermal Monitor 1 and Thermal Monitor 2.

PPM Mode

Options: Native Mode/SMM Mode

Limit CPUID MaxVal

Set Limit CPUID MaxVal to 3. This should be disabled for WinXP

C1E Function

CPU C1E function select

Execute Disable Bit

When disabled, forces the XD feature flag to always return 0

Hard Disk Boot Priority

Sets hard disk boot device priority.

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Virus Warning

Enables or disables the virus warning.

CPU L1 & L2 Cache

Enables or disables the CPU L1 & L2 Cache. Enabling this feature speeds up memory access.

Hyper-Threading Technology

Enables or disables the Hyper-Threading function of the CPU.

Quick Power On Self Test

Speeds up the Power On Self Test (POST). If enabled, the BIOS will shorten the test time or skip some check items during POST.

First/Second/Third Boot Device

Pressing <Enter> displays the Boot Device Menu. The BIOS will attempt to load the operating system from the selected devices in sequence.

Boot Other Device

Enables the BIOS to boot from a second or third device if booting from the first device fails. When disabled the BIOS will not attempt to boot from alternative devices.

Boot Up Floppy Seek

If enabled, the system will search for disk drives during boot up. Disabling will speed up the boot process.

Boot-Up NumLock Status

Selects the power on state for system NumLock. Options: On/Off

Gate A20 Option

Gate A20 is a device used to address memory above 1 MB. The options are Fast and Normal. The Fast setting is controlled by a chipset specific method. Normal setting is controlled by keyboard controller or chipset hardware.

Typematic Rate Setting

Manually sets the Typematic Rate or the Typematic Delay.

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Typematic Rate (Chars/Sec.)

Sets number of characters that can be typed per second on the keyboard.

Typematic Delay (Msec)

The time (in milliseconds) needed before accepting a subsequent keystroke on the keyboard.

Security Option

Selects whether a password is required every time the system boots or only when setup is entered. Options include:

- **System:** The system will not boot without password access and access to Setup will be denied if an incorrect password is entered at the prompt.
- **Setup:** The system will boot, but access to Setup will be restricted without password access.

To disable security, select PASSWORD SETTINGS in the Main Menu. The user will then be prompted to enter a password. To disable security, DO NOT type anything, only press <Enter>. Once security is disabled, the system will boot and setup can be accessed.

APIC Mode

Enables or disables the APIC Mode.

MPS Version Control for OS

This option is only valid for multiprocessor motherboards as it specifies the version of the Multiprocessor Specification (MPS) that the motherboard will use. The MPS is a specification by which PC manufacturers design and build Intel architecture systems with two or more processors.

MPS 1.1 was the original specification. MPS version 1.4 adds extended configuration tables for improved support of multiple PCI bus configurations and greater expandability in the future. In addition, MPS 1.4 introduces support for a secondary PCI bus without requiring a PCI bridge.

OS Select for DRAM > 64MB

Select the type of operating system for systems with greater than 64MB of RAM. Options: Non-OS2, OS2

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Console Redirection

Enables/Disables the remote Console Function.

Baud Rate

When Console Redirection is Enabled, the BIOS will allow users to set the serial port's operating baud rate. Options: 9600 bps, 19200 bps, 38400 bps, 57600 bps, and 115200 bps.

Agent After Boot

Monitors text-based applications (such as DOS) after POST. The default setting is Disabled.

Delay for HDD (Secs)

This setting is used to delay the initialization of such IDE devices during the booting up process. Min = 0, Max=15.

Small Logo (EPA) Show

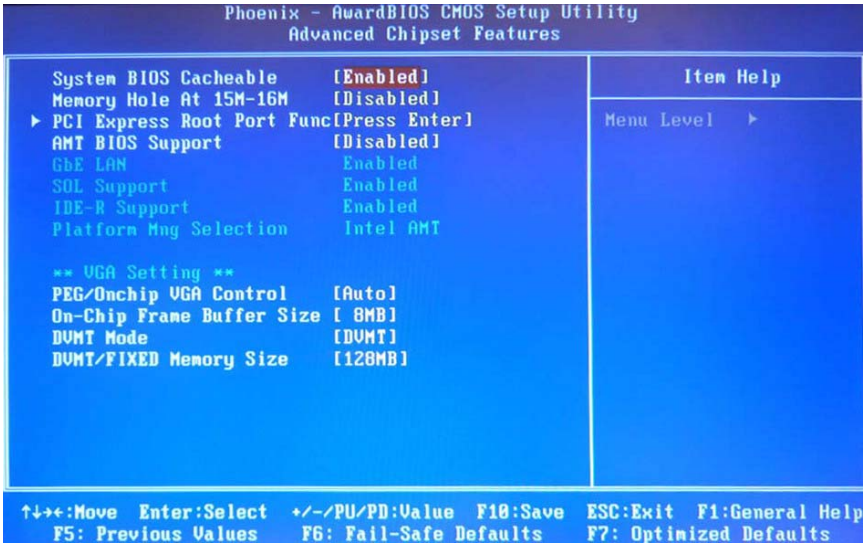
This item allows you enabled/disabled display of the small EPA logo during POST.

DMI Event Log

Enables/Disables the Desktop Management Interface (DMI) Event Log.

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4.4 Advanced Chipset Features



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 data to this memory area, a system error may occur. The options are “Enabled”, and “Disabled”.

Memory Hole at 15M-16M

Enabling this feature reserves 15 MB to 16 MB memory address space for ISA expansion cards that specifically require this setting. This makes memory from 15 MB and up unavailable to the system. Expansion cards can only access memory up to 16 MB. The default setting is “Disabled”.

AMT BIOS Support

Enables/Disables AMT BIOS Support.

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VGA Settings

PEG/Onchip VGA Control

The options are “Auto”, “Onchip VGA” or “PEG Port”.

On-Chip Frame Buffer Size

The On-Chip Frame Buffer Size can be set to 1 MB or 8 MB. This memory is shared with the system memory.

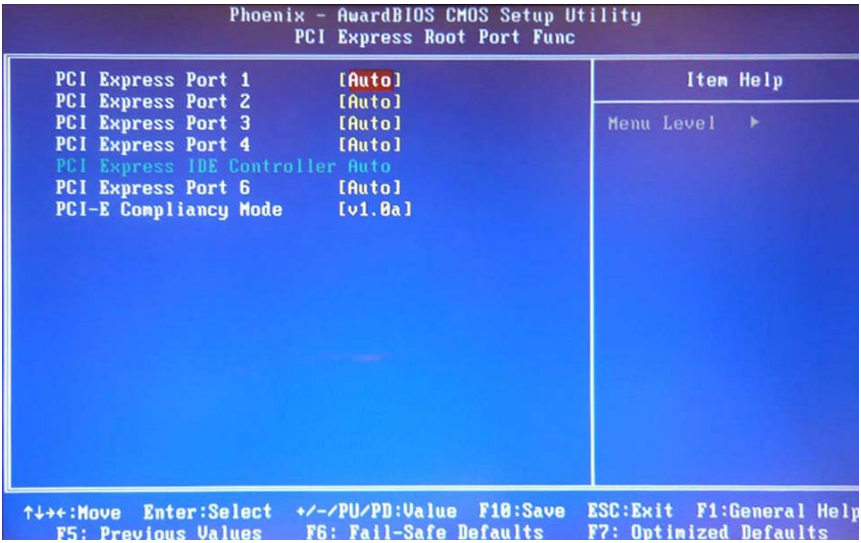
DVMT Mode

Use this field to select the memory to allocate for video memory. The options are “Fixed”, “DVMT” and “BOTH”.

DVMT/FIXED Memory Size

Specify the size of DVMT/system memory to allocate for video memory.

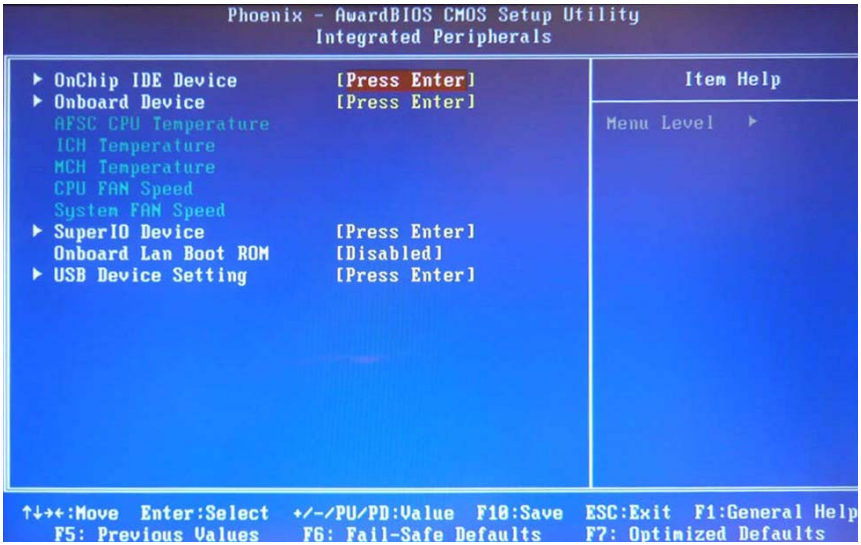
PCI Express Root Port Function



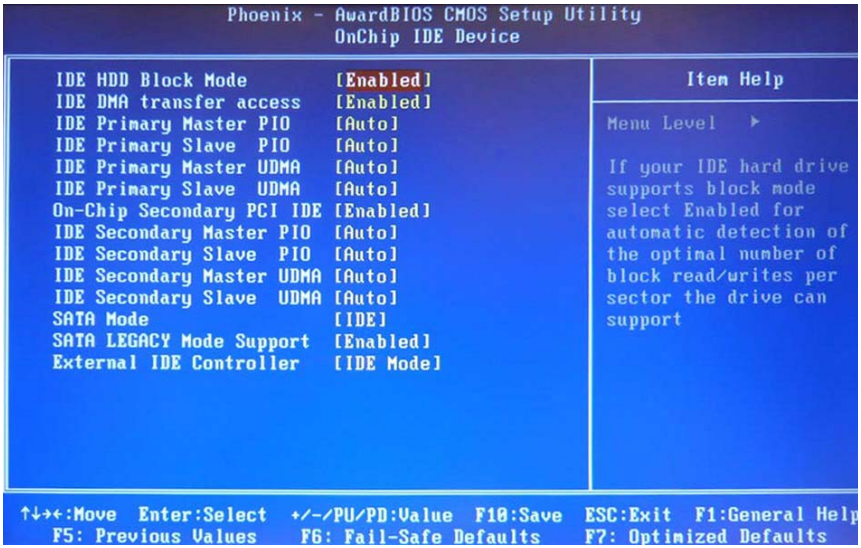
These options allow you to enable/disable specific PCI Express ports.

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4.5 Integrated Peripherals



On Chip IDE Device



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IDE HDD Block Mode

If your IDE hard drive supports block mode select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support.

IDE DMA Transfer Access

Use this field to enable or disable IDE DMA transfer access.

IDE Primary/Secondary Master/Slave PIO/UDMA Mode (Auto).

Each IDE channel has both a master and a slave, making four IDE devices possible. Because two IDE devices may have a different Mode timing (0, 1, 2, 3, 4), it is necessary for these to be independent. The default setting “Auto” will allow auto detection to ensure optimal performance.

On-Chip Secondary PCI IDE

Enable/disable the Secondary IDE channel.

SATA Mode

Choose the interface of SATA controller. The default setting is “IDE” which lets SATA function as a parallel ATA controller. The “RAID” setting allows the SATA controller to support RAID. The Advanced Host Controller Interface (AHCI) is a hardware mechanism that allows software to communicate with SATA devices, such as hot-plugging and Native Command Queuing (NCQ).

SATA LEGACY Mode Support

The options: Disabled, Enabled.

External IDE Controller

The options: Disable, IDE Mode, RAID+IDE Mode, AHCI+IDE Mode

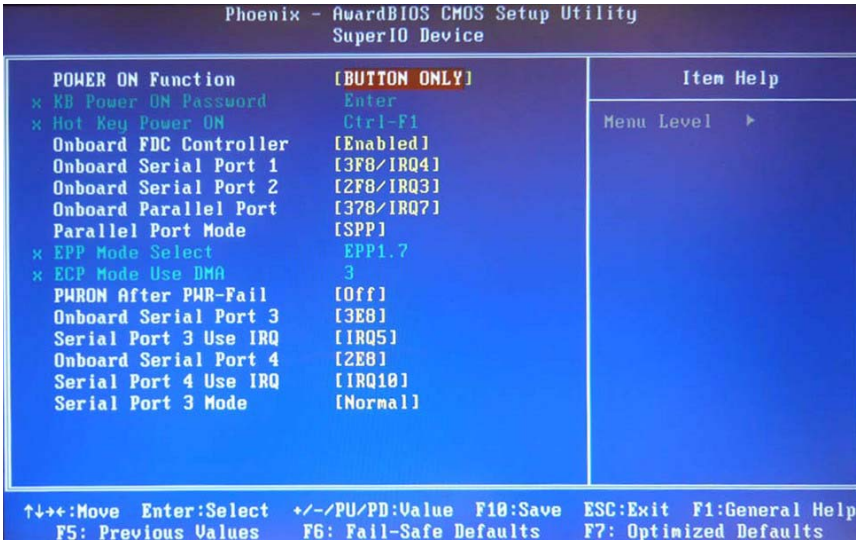
Onboard Device

HD Audio CODEC

Enable/disable the HD Audio CODEC.

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Super I/O Device



Power ON Function

This feature allows you to wake up the system using any of the listed options. The selections are “Hot KEY”, “Mouse Left”, “Mouse Right”, “Any KEY” and “BUTTON ONLY”.

Hot Key Power ON

Awaken the system by pressing the hot key button. The options are “Ctrl-F1”, “Ctrl-F2”, “Ctrl-F3” to “Ctrl-F8”.

Onboard FDC Controller

When enabled, this field allows you to connect your floppy disk drives to the onboard floppy disk drive connector instead of a separate controller card. If you want to use a different controller card to connect the floppy disk drives, set this field to Disabled.

Onboard Serial Port 1/ Port 2

The settings are “3F8/IRQ4”, “2F8/IRQ3”, “3E8/IRQ4”, “2E8/IRQ3”, and “Disabled” for the on-board serial connector.

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Onboard Parallel Port

This field sets the address of the on-board parallel port connector. You can select “378/IRQ7”, “278/IRQ5”, “3BC/IRQ7”, or “Disabled”. If you install an I/O card with a parallel port, make sure there is no conflict in the address assignments. The single board computer can support up to three parallel ports.

Parallel Port Mode

This field allows you to set the operation mode of the parallel port. The setting “Normal” allows normal speed operation, but in one direction only. “EPP” allows bidirectional parallel port operation at maximum speed. “ECP” allows the parallel port to operate in bidirectional mode and at a speed faster than the maximum data transfer rate. “ECP + EPP” allows normal speed operation in a two-way mode.

EPP Mode Select

This field allows you to select EPP port type 1.7 or 1.9. The options are “EPP1.9” and “EPP1.7”.

ECP Mode Use DMA

This selection is available only if you select “ECP” or “ECP + EPP” in the Parallel Port Mode field. In ECP Mode, you can select DMA channel 1 or DMA channel 3. Leave this field on the default setting.

PWRON After PWR-Fail

Determines which state the computer enters when AC power is restored after a power loss. The options for this value are On, Off, and Former-Sts.

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USB Device Setting



USB 1.0 / 2.0 Controller

The options: Disabled, Enabled.

USB Operation Mode

Allows you to configure the USB 2.0 controller in HiSpeed (480 Mbps) or Full Speed (12 Mbps). Configuration options: [Full/Low Speed] [HiSpeed]

USB Keyboard Function

The options: Disabled, Enabled.

USB Mouse Function

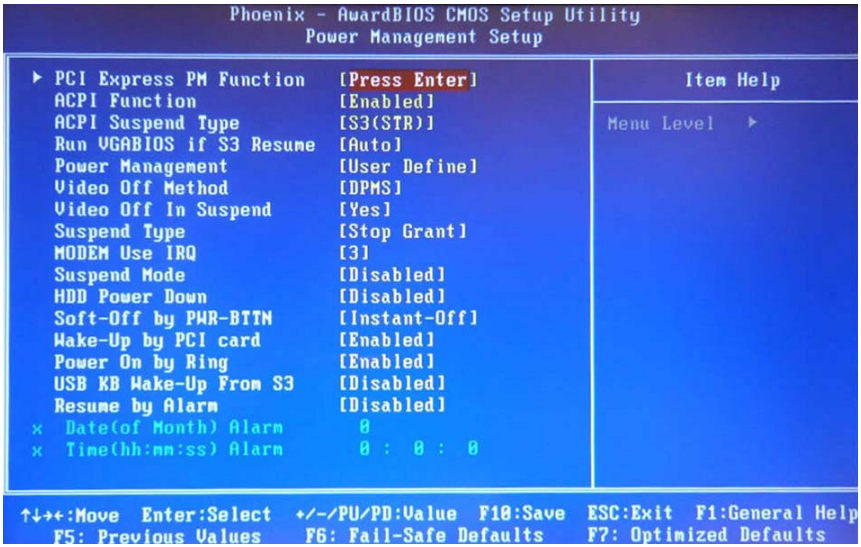
The options: Disabled, Enabled.

USB Storage Function

The options: Disabled, Enabled.

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4.6 Power Management Setup



PCI Express PM Function

This option enables/disables system wake up by PCI Express device.

ACPI Function

The options are “Enabled” and “Disabled”.

ACPI Suspend Type

This item allows you to set ACPI suspend type to S1/POS (Power On Suspend) or S3/STR (Suspend To RAM).

Run VGABIOS if S3 Resume

Select “Auto” to run VGA BIOS if S3 resume automatically. The “Yes” enables running VGA BIOS if S3 resume. The “No” disables this function.

Power Management

There are three selections for Power Management, and each of them has fixed mode settings.

- Min. Power Saving: Minimum power management, HDD Power Down = 15 Min,

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- Max. Power Saving: Maximum power management, HDD Power Down =1 Min
- User Defined: Allows you to set each mode individually. When not disabled, each of the ranges are from 1 min. to 1 hr. except for HDD Power Down which ranges from 1 min. to 15 min. and disable.

Video Off Method

Use this to select the method to turn off the video. The options are “Blank Screen”, “V/H SYNC+ Blank”, and “DPMS”.

Video Off In Suspend

When the system is in suspend mode, the video will turn off. The options are “No” and “Yes”.

Suspend Type

Select the suspend type. The choice: Stop Grant, Pwron suspend.

MODEM Use IRQ

This determines the IRQ in which the MODEM can use. The options: NA, 3, 4, 5, 7, 9, 10, 11.

Suspend Mode

Enable/disable system suspend.

HDD Power Down

Select “1-15 mins” to enable HDD Power Down mode between 1 to 15 mins. Select “Disabled” to disable HDD Power Down function.

Soft-Off by PWR-BTTN: Configures the power button:

- Instant-Off: The power button functions as a normal power-on/-off button.
- Delay 4 Sec: The system is turned off if the power button is pressed for more than four seconds. Pressing the button momentarily (for less than 4 seconds) will switch the system to “suspend” mode.

Wake-Up by PCI card

The options are “Enabled” and “Disabled”.

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Power On by Ring

Select “Enabled” to power on the system from a soft off state by an input signal on the serial Ring Indicator (RI) line. The options are “Enabled” and “Disabled”.

USB KB Wake-Up from S3

When “Enabled”, enter any key to wake up the system from S3 state. The options are “Enabled” and “Disabled”.

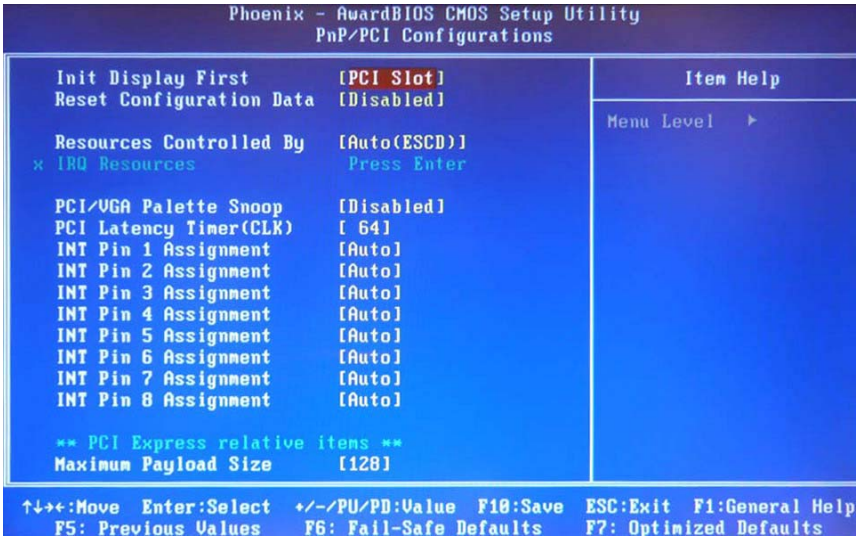
Resume by Alarm

When “Enabled”, set the date and time at which the RTC (real-time clock) alarm awakens the system from suspend mode. The options are “Enabled” and “Disabled”.

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4.7 PnP/PCI Configurations

This section describes configuring the PCI (Personal Computer Interconnect) bus system. PCI is a system which allows I/O devices to operate at speeds nearing the speed the CPU itself uses when communicating with its own components.



Init Display First

This item allows you to choose the first display interface to initiate while booting. The choice is “PCI Slot” or “Onboard”.

Reset Configuration Data

The default is “Disabled”. Select Enabled to reset Extended System Configuration Data (ESCD) if you have installed a new add-on card, and system configuration is in such a state that the OS cannot boot.

Resource Controlled By

The commands here are “Auto(ESCD)” or “Manual”. Choosing “Manual” requires you to choose resources from the following submenu. “Auto(ESCD)” automatically configures all of the boot and Plug and Play devices, but you must be using Windows 95 or above.

PCI/VGA Palette Snoop

This is set to “Disabled” by default.

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PCI/VGA Palette Snoop

PCI Latency Timer (CLK). Min = 0 , Max = 225

INT Pin 1/2/3/4/5/6/7/8 Assignment

The options: Auto, 3, 4, 5, 7, 9, 10, 11

Maximum Payload Size

This allows you to set the maximum TLP payload size for PCI Express devices. The options are [128 bytes], [256 bytes], [512 bytes], [1024 bytes], [2048 bytes], and [4096 bytes].

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4.8 Frequency/Voltage Control



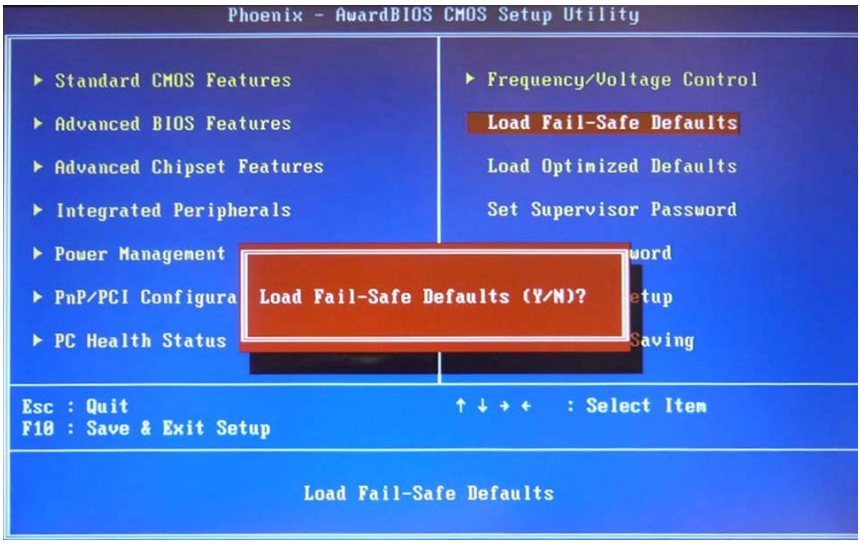
Spread Spectrum

This setting allows you to reduce EMI by modulating the signals the CPU generates so that the spikes are reduced to flatter curves. This is achieved by varying the frequency slightly so that the signal does not use any particular frequency for more than a moment. The options are “Disabled” and “Enabled”.

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4.9 Load Fail-Safe Defaults

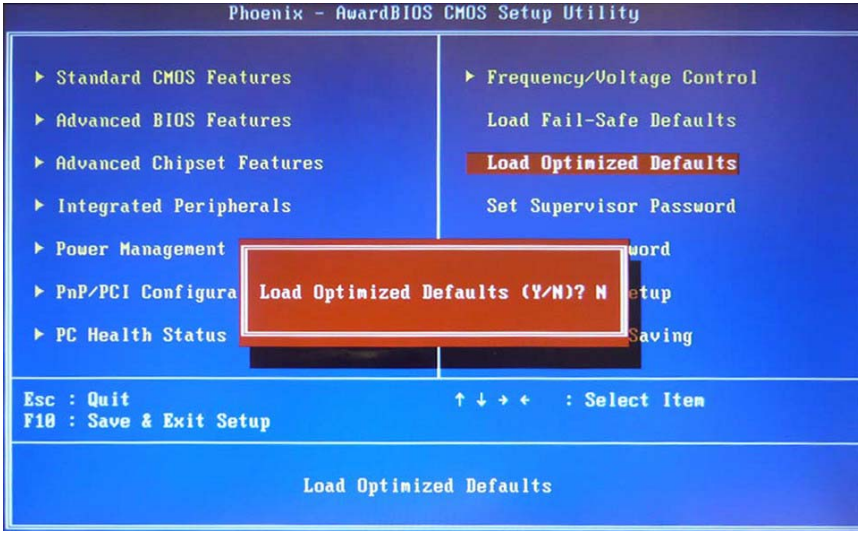
Use this menu to load the BIOS default values for the minimal/stable performance for your system to operate. Press <Y> to load the BIOS default values for the most stable, minimal-performance system operations.



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4.10 Load Optimized Defaults

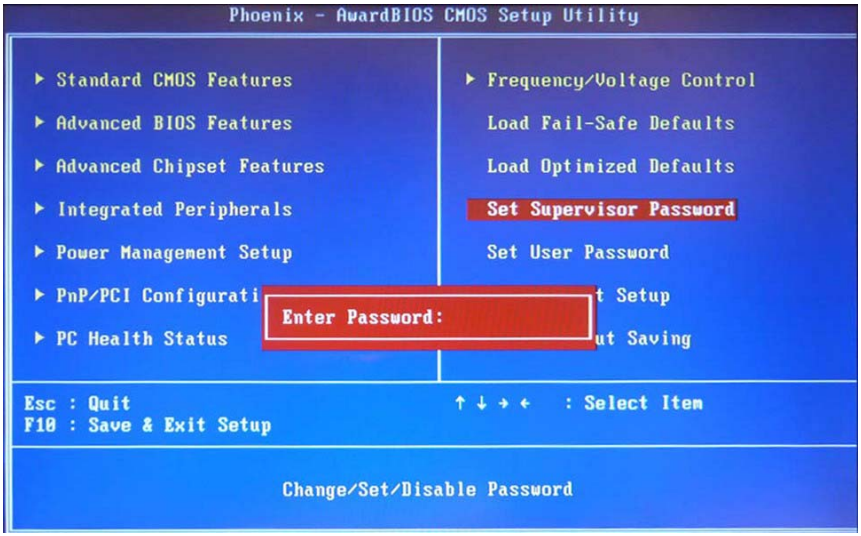
Use this menu to load the BIOS default values that are factory settings for optimal performance system operations. While Award has designed the custom BIOS to maximize performance, the factory can change these defaults to meet its needs. Press <Y> to load the default values setting for optimal performance system operations.



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4.11 Set Supervisor & User Password

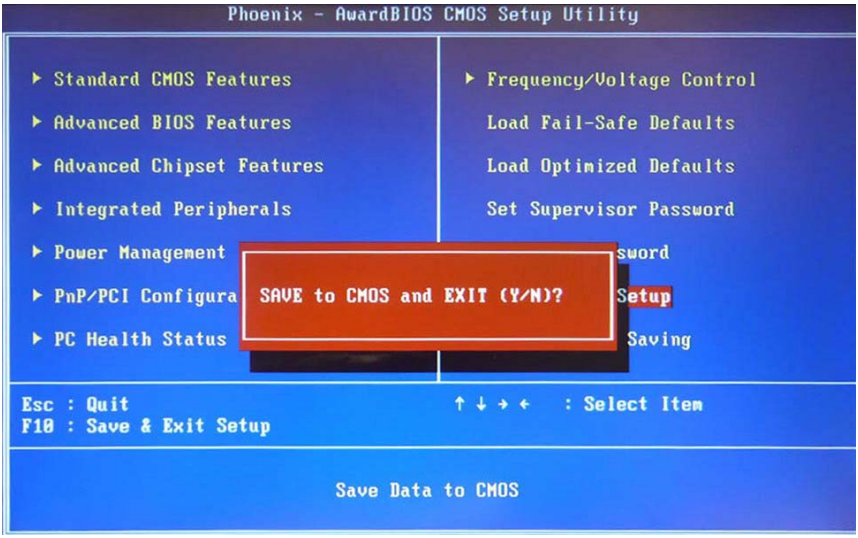
These two options set the system password. Supervisor Password sets a password that will be used to protect the system and Setup utility. User Password sets a password that will be used exclusively on the system. To specify a password, highlight the type you want and press < Enter >. The “Enter Password:” message prompts you on the screen. Type the password, up to eight characters in length, and press < Enter >. The system confirms your password by asking you to type it again. After setting a password, the screen automatically returns to the main screen.



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4.12 Save & Exit Setup

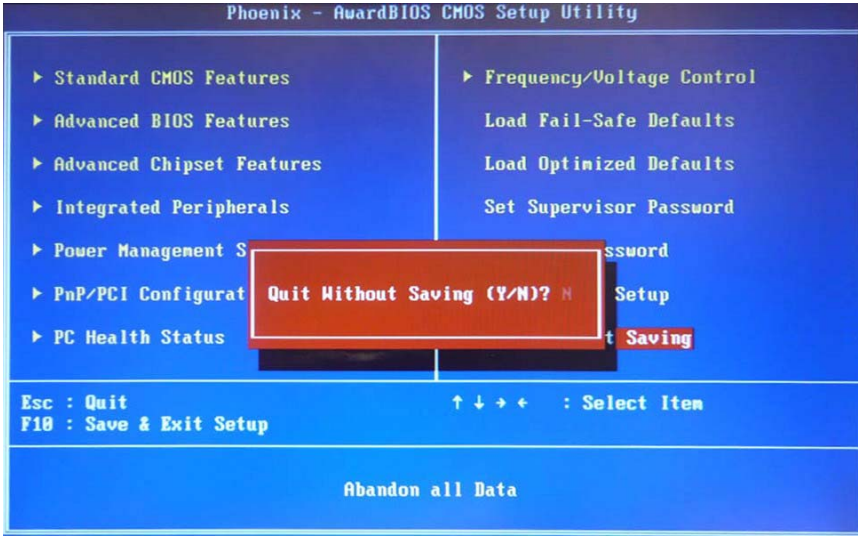
This option allows you to determine whether to accept any modifications or not. Typing `Y` will quit the setup utility and save all changes into the CMOS memory. Typing `N` will return to the Setup Utility Main Screen.



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4.13 Exit Without Saving

Select this option to exit the Setup utility without saving the changes you have made in this session. Typing `Y` will quit the Setup utility without saving any modifications. Typing `N` will return to Setup utility.



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5 POST Codes

The following is a list of M-302 POST Codes.

Code (hex)	Description
CFh	Test CMOS read/write functionality
C0h	Early chipset initialization: Disable shadow RAM, L2 cache (socket 7 and below), program basic chipset registers
C1h	Detect memory: Auto detection of DRAM size, type and ECC, auto detection of L2 cache (socket 7 and below)
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 located in physical memory address 1000:0
02h	Reserved
03h	Initial SuperIO_Early_Init switch
04h	Reserved
05h	Blank out screen; Clear CMOS error flag
06h	Reserved
07h	Clear 8042 interface; Initialize 8042 self test
08h	Test special keyboard controller for Winbond 977 series Super I/O chips; Enable keyboard interface
09h	Reserved
0Ah	Disable PS/2 mouse interface (optional); Auto detect ports for keyboard & mouse followed by a port & interface swap (optional); 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 read/write capable or not. If test fails, keep beeping the speaker
0Fh	Reserved
10h	Auto detect flash type to load appropriate flash read/write 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 overrride

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Code (hex)	Description
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	Check validity of RTC value; Load CMOS settings into BIOS stack. If CMOS checksum fails, use default value instead; Prepare BIOS resource map for PCI & PnP use. If ESCD is valid, take into consideration of the ESCD's legacy information; Onboard clock generator initialization. Disable respective clock resource to empty PCI & DIMM slots; 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

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Code (hex)	Description
29h	Program CPU internal MTRR (P6 & PII) for 0-640K memory address; Initialize the APIC for Pentium class CPU; Program early chipset according to CMOS setup; Measure CPU speed; Invoke video BIOS
2Ah	Reserved
2Bh	Reserved
2Ch	Reserved
2Dh	Initialize multilanguage; Put information on screen display, including Award title, CPU type, CPU speed, etc...
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	Reserved
40h	Test 9259 interrupt mask bits for channel 2
41h	Reserved
42h	Reserved
43h	Test 8259 functionality
44h	Reserved
45h	Reserved
46h	Reserved

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Code (hex)	Description
47h	Initialize EISA slot
48h	Reserved
49h	Calculate total memory by testing the last double last word of each 64K page; Program writes allocation for AMD K5 CPU
4Ah	Reserved
4Bh	Reserved
4Ch	Reserved
4Dh	Reserved
4Eh	Program MTRR of M1 CPU; initialize L2 cache for P6 class CPU & program cacheable range; Initialize the APIC for P6 class CPU; 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	Display PnP logo; Early ISA PnP initialization and assign CSN to every ISA PnP device
58h	Reserved
59h	Initialize the combined Trend Anti-Virus code
5Ah	Reserved
5Bh	Show message for entering AWDFLASH.EXE from FDD (optional feature)
5Ch	Reserved
5Dh	Initialize Init_Onboard_Super_IO switch; Initialize Init_Onboard_AUDIO switch
5Eh	Reserved
5Fh	Reserved
60h	Okay to enter Setup utility
61h	Reserved

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Code (hex)	Description
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	Assign resources to all ISA PnP devices; Auto assign ports to onboard COM ports if the corresponding item in Setup is set to "AUTO"
6Eh	Reserved
6Fh	Initialize floppy controller; Setup floppy related fields in 40:hardware
70h	Reserved
71h	Reserved
72h	Reserved
73h	Enter AWDFLASH.EXE if: AWDFLASH.EXE is found in floppy dive and ALT+F2 is pressed
74h	Reserved
75h	Detect and install all IDE devices: HDD, LS120, ZIP, CDROM...
76h	Reserved
77h	Detect serial ports and parallel ports
78h	Reserved
79h	Reserved
7Ah	Detect and install coprocessor
7Bh	Reserved
7Ch	Reserved
7Dh	Reserved
7Eh	Reserved

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Code (hex)	Description
7Fh	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 continue - Clear EPA or customization logo
80h	Reserved
81h	Reserved
82H	Call chipset power management hook: Recover the text fond used by EPA logo (not for full screen logo), If password is set, ask for password
83H	Save all data in stack back to CMOS
84h	Initialize ISA PnP boot devices
85h	Final USB initialization; NET PC: Build SYSID structure; Switch screen back to text mode; Set up ACPI table at top of memory; Invoke ISA adapter ROM's; Assign IRQ's to PCI devices; Initialize APM; Clear noise of IRQ's
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	Enable L2 cache; Program boot up speed; Chipset final initialization; Power management final initialization; Clear screen and display summary table; Program K^ write allocation; Program P6 class write combining
95h	Program daylight saving; Update keyboard LED and typematic rate
96h	Build MP table; Build and update ESCD; Set CMOS century to 20h or 19h; Load CMOS time into DOS timer tick; Build MSIRQ routing table
FFh	Boot attempt (INT 19h)

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Appendix A - Watchdog Timer

The following is a sample program for configuring the M-302's watchdog timer.

A.1 Sample Code

Unlock W83627DHG-A:

```
outportb(0x2E, 0x87)   ;Unlock Super I/O
outportb(0x2E, 0x87)   ;Unlock Super I/O
```

Select Logical Device:

```
outportb(0x2E, 0x07)   ;Select device number register
outportb(0x2F, 0x08);Set to Logical Device 8
```

Activate WDT:

```
outportb(0x2E, 0x30)   ;Select WDTO# activate register
outportb(0x2F, 0x01)   ;Enable watchdog
```

Set Seconds or Minutes:

```
outportb(0x2E, 0xF5)   ;Select WDTO# control register
outportb(0x2F, mode)   ;where mode=0x00(Sec) or 0x08(Min)
```

Set Base Timer:

```
outportb(0x2E, 0xF6)   ;Select WDTO# counter register
outportb(0x2F, timeout);where timeout=0x00~0xFF
```

Reset Timeout Counter:

```
outportb(0x2E, 0xF6)   ;Select WDTO# counter register
outportb(0x2F, timeout);where timeout=0x00~0xFF
```

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Appendix B - System Resources

B.1 System Memory Map

Address Range (decimal)	Address Range (hex)	Size	Description
(4GB-2MB)	FFE00000 – FFFFFFFF	2 MB	High BIOS Area
(4GB-18MB) – (4GB-17MB-1)	FEE00000 – FEEFFFFF	1 MB	FSB Interrupt Memory Space
(4GB-20MB) – (4GB-19MB-1)	FEC00000 – FECFFFFF	1 MB	APIC Configuration Space
15MB – 16MB	F00000 – FFFFFF	1 MB	ISA Hole
960 K – 1024 K	F0000 – FFFFF	64 KB	System BIOS Area
896 K – 960 K	E0000 – EFFFF	64 KB	Extended System BIOS Area
768 K – 896 K	C0000 – DFFFF	128 KB	PCI expansion ROM area C0000 – CBFFF: Onboard VGA BIOS CC000 – CCFFF: Intel 82566DM PXE option ROM when onboard LAN boot ROM is enabled.
640 K – 768 K	A0000 – BFFFF	128 KB	Video Buffer & SMM space
0 K – 640 K	00000 – 9FFFF	640 KB	DOS Area

Table B-1: System Memory Map

Note: Whole D0000H segment except PXE occupied area can be forwarded to ISA bus.

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B.2 Direct Memory Access Channels

Channel Number	Data Width	System Resource
0	8-bits	Parallel port(1)
1	8-bits	Parallel port(1)
2	8-bits	Diskette drive(1)
3	8-bits	Parallel port(1)
4		Reserved - cascade channel
5	16-bits	Open
6	16-bits	Open
7	16-bits	Open

Table B-2: Direct Memory Access Channels

Note(1): DMA channel 1/3 is selected when using parallel port. Floppy (Winbond default uses DMA 02) and parallel port cannot be used at the same time.

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B.3 Fixed I/O Map

Hex Range	Device
000-01F	DMA controller 1, 82C37 equivalent
020-02D and 030-03F	Interrupt controller 1, 8259 equivalent
02E-02F	LPC SIO (W83627) configuration index/data registers
040-042-043	Timer/Counter
4E-4F	N/A
061	NMI controller
60,62,64,66	N/A(MicroController)
070-077	Real Time Clock Controller
080-9F	DMA Controller, or LPC or PCI
0A0-0AD and 0B4-0BD	Interrupt controller
0B2 and 0B3	Power Management
0C0-0DF	DMA controller
0F0	Read PCI and Master Abord, Write FERR#/IGNNE#/ Interrupt Controller
0170-177	SATA Controller, or PCI
01F0-1F7	SATA Controller, or PCI
0376	SATA Controller, or PCI
03F6	SATA Controller, or PCI
04D0-4D1	Interupt Controller
0CF9	Reset Generator

Table B-3: Fixed I/O Map

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B.4 Variable I/O Map

Hex Range	Device
400	ACPI
Anywhere in 64KB I/O Space	USB UHCI Controller #1
Anywhere in 64KB I/O Space	USB UHCI Controller #2
Anywhere in 64KB I/O Space	USB UHCI Controller #3
Anywhere in 64KB I/O Space	USB UHCI Controller #4
Anywhere in 64KB I/O Space	USB UHCI Controller #5
500	SMBUS
460	TCO
480	GPIO
378-37F	Parallel Port
3F8/2F8/3E8/2E8	Serial Port 1 Serial Port 2
3E8/2E8	Serial Port 3, Serial Port 4
3F0-3F7	Floppy Controller
290	Hardware Monitor

Table B-4: Variable I/O Map

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B.5 Interrupt Request (IRQ) Lines

IRQ Lines PIC Mode

IRQ#	Typical Interrupt Resource	Connected to Pin	Available
0	Counter 0	N/A	No
1	Keyboard controller	N/A	No
2	Cascade interrupt from slave PIC	N/A	No
3	Serial Port 2 (COM2) / PCI / ISA	IRQ3 via SERIRQ, IRQ3 at ISA bus	Note (1)
4	Serial Port 1 (COM1) / PCI / ISA	IRQ4 via SERIRQ, IRQ4 at ISA bus	Note (1)
5	Serial Port 3, (COM3) / PCI / ISA	IRQ5 via SERIRQ, IRQ5 at ISA bus	Note (1)
6	Floppy Drive Controller	IRQ6 via SERIRQ	No
7	Parallel Port 1 (LPT1) / PCI / ISA	IRQ7 via SERIRQ, IRQ7 at ISA bus	Note (1)
8	Real-time clock	N/A	No
9	SCI / PCI	IRQ9 via SERIRQ, IRQ9 at ISA bus	Note (1), (2)
10	Serial Port 4, PCI / ISA	IRQ10 via SERIRQ, IRQ10 at ISA bus	Note (1)
11	PCI / ISA	IRQ11 via SERIRQ, IRQ11 at ISA bus	Note (1)
12	PS/2 Mouse / PCI / ISA	IRQ12 via SERIRQ, IRQ12 at ISA bus	Note (1)
13	Math Processor	N/A	No
14	Primary IDE controller / PCI / ISA	IRQ14 via SERIRQ, IRQ14 at ISA bus	Note (1)
15	Secondary IDE controller / PCI / ISA	IRQ15 via SERIRQ, IRQ15 at ISA bus	Note (1)

Table B-5: IRQ Lines PIC Mode

Note(1): These IRQs can be used for PCI devices when onboard device is disabled. If IRQ is from ISA, user must reserve IRQ for ISA in BIOS setup menu.

Note (2): BIOS does not open IRQ 9 setting for ISA bus.

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IRQ Lines APIC Mode

IRQ#	Typical Interrupt Resource	Connected to Pin	Available
0	System Timer	N/A	No
1	Keyboard controller	N/A	No
2	Cascade interrupt from slave PIC	N/A	No
3	Serial Port 2 (COM2) / PCI / ISA	IRQ3 via SERIRQ, IRQ3 at ISA bus	Note (1)
4	Serial Port 1 (COM1) / PCI / ISA	IRQ4 via SERIRQ, IRQ4 at ISA bus	Note (1)
5	Serial Port 3 (COM3) / PCI / ISA	IRQ5 via SERIRQ, IRQ5 at ISA bus	Note (1)
6	Floppy Drive Controller	IRQ6 via SERIRQ	No
7	Parallel Port 1 (LPT1) / PCI / ISA	IRQ7 via SERIRQ, IRQ7 at ISA bus	Note (1)
8	Real-time clock	N/A	No
9	SCI / PCI	IRQ9 via SERIRQ, IRQ9 at ISA bus	Note (1), (2)
10	Serial Port 4/PCI / ISA	IRQ10 via SERIRQ, IRQ10 at ISA bus	Note (1)
11	PCI / ISA	IRQ11 via SERIRQ, IRQ11 at ISA bus	Note (1)
12	PS/2 Mouse / PCI / ISA	IRQ12 via SERIRQ, IRQ12 at ISA bus	Note (1)
13	Math Processor	N/A	No
14	Primary IDE controller / PCI / ISA	IRQ14 via SERIRQ, IRQ14 at ISA bus	Note (1)
15	Secondary IDE controller / PCI / ISA	IRQ15 via SERIRQ, IRQ15 at ISA bus	Note (1)
16	N/A	PCI Slot INT A, Q965 express chipset, ICH8 root port 1,ICH8 root port 5, USB Universal, PCI express root port 2991,PCI IDE controller	Yes

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IRQ#	Typical Interrupt Resource	Connected to Pin	Available
17	N/A	PCI Slot INT B	Yes
18	N/A	PCI Slot INT C, UHCI Controller 2, EHCI Controller 1, SMBUS, SATA controller 0	Yes
19	N/A	PCI Slot INT D, UHCI Controller 1, SATA controller1	Yes
20	N/A	ICH8 internal GBE controller, TI OHCI 1394 Controller	No
21	N/A	UHCI Controller 5	No
22	N/A	ICH8 HDA	No
23	N/A	UHCI Controller 0, EHCI Controller 0	No

Table B-6: IRQ Lines APIC Mode

Note (1): These IRQs can be used for PCI devices when onboard device is disabled. If IRQ is from ISA, user must reserve IRQ for ISA in BIOS setup menu.

Note (2): BIOS does not open IRQ 9 setting for ISA bus.

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B.6 PCI Configuration Space Map

Bus #	Device #	Function #	Routing	Description
00h	00h	00h	N/A	Intel 965 GME GMCH Host-Hub Interface Bridge
00h	01h	00h	Internal	P.E.G. Root Port
00h	02h	00h	Internal	Intel Integrated Graphics Device
00h	02h	00h	Internal	Intel Integrated Graphics Device
02h	00H	0FFh	N/A	P.E.G. Port
00h	19h	00h	Internal	GbE Controller
00h	1Ah	00h	Internal	Intel USB UHCI Controller 4
00h	1Ah	01h	Internal	Intel USB UHCI Controller 5
00h	1Ah	07h	Internal	Intel USB EHCI Controller 1
00h	1Bh	00h	Internal	High Definition Audio controller
00h	1Ch	00h	Internal	Intel ICH Express Root port 0
00h	1Ch	01h	Internal	Intel ICH Express Root port 1
00h	1Ch	02h	Internal	Intel ICH Express Root port 2
00h	1Ch	03h	Internal	Intel ICH Express Root port 3
00h	1Ch	04h	Internal	Intel ICH Express Root port 4
00h	1Ch	05h	Internal	Intel ICH Express Root port 5
00h	1Dh	00h	Internal	Intel USB UHCI Controller 0
00h	1Dh	01h	Internal	Intel USB UHCI Controller 1
00h	1Dh	02h	Internal	Intel USB UHCI Controller 2
00h	1Dh	03h	Internal	Intel USB UHCI Controller 3
00h	1Dh	07h	Internal	Intel USB EHCI Controller
00h	1Eh	00h	N/A	Intel Hub Interface to PCI Bridge
00h	1Fh	00h	N/A	Intel LPC Interface Bridge
00h	1Fh	01h	Internal	Intel IDE Controller
00h	1Fh	02h	Internal	Intel SATA controller
00h	1Fh	03h	Internal	Intel SMBus Controller
00h	1Fh	05h	Internal	Intel SATA controller1
00h	1Fh	06h	Internal	Thermal Controller
01h	00h	0FFh	Internal	NB PCIE Port #0
02h	00h	0FFh	Internal	SB PCIE Port X4 #0

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Bus #	Device #	Function #	Routing	Description
03h	00h	000h	Internal(PIRQA,B,C,D)	JMicron ATA 2363 (SB PCIE Port #1)
04h	03h	0FFh	PIRQA,B,C,D	External PCI Slot 1
04h	01h	000h	PIRQE(INTA) only	TI 1394 2 (SB PCI bridge)
04h	04h	0FFh	PIRQB,C,D,A	External PCI Slot 2
04h	05h	0FFh	PIRQC,D,A,B	External PCI Slot 3
04h	06h	0FFh	PIRQD,A,B,C	External PCI Slot 4
04h	07h	0FFh	PIRQF,G,H,E	External PCI Slot 5

Table B-7: PCI Configuration Space Map

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B.7 PCI Interrupt Routing Map

INT Line	INT0	INT1	INT2	INT3
P.E.G. Root Port	X	X	X	X
VGA	X			
IDE Controllerr	X			
SATAController1		X		
SMBUS			X	
Thermal Controller			X	
UHCI 0	X			
UHCI 1		X		
UHCI 2			X	
UHCI 3				X
EHCI 0	X			
UHCI 4	X			
UHCI 5		X		
EHCI 0			X	
HDA	X			
Intel GBE	X			
PCIE port 0	X			
JM363 Express IDE controller	X			
PCI Slot0	X	X	X	X
TI 1394	X	X	X	X
PCI Slot2	X	X	X	X
PCI Slot3	X	X	X	X
PCI Slot4	X	X	X	X
PCI Slot5	X	X	X	X

Table B-8: PCI Interrupt Routing Map

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Important Safety Instructions

For user safety, please read and follow all **instructions**, **WARNINGS**, **CAUTIONS,** and **NOTES** marked in this manual and on the associated equipment before handling/operating the equipment.

- Read these safety instructions carefully.
- Keep this user's manual for future reference.
- Read the specifications section of this manual for detailed information on the operating environment of this equipment.
- When installing/mounting or uninstalling/removing equipment:
  - Turn off power and unplug any power cords/cables.
- To avoid electrical shock and/or damage to equipment:
  - Keep equipment away from water or liquid sources;
  - Keep equipment away from high heat or high humidity;
  - Keep equipment properly ventilated (do not block or cover ventilation openings);
  - Make sure to use recommended voltage and power source settings;
  - Always install and operate equipment near an easily accessible electrical socket-outlet;
  - Secure the power cord (do not place any object on/over the power cord);
  - Only install/attach and operate equipment on stable surfaces and/or recommended mountings; and,
  - If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.

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- Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.

A Lithium-type battery may be provided for uninterrupted, backup or emergency power.



Risk of explosion if battery is replaced with one of an incorrect type. Dispose of used batteries appropriately.

- Equipment must be serviced by authorized technicians when:
  - The power cord or plug is damaged;
  - Liquid has penetrated the equipment;
  - It has been exposed to high humidity/moisture;
  - It is not functioning or does not function according to the user's manual;
  - It has been dropped and/or damaged; and/or,
  - It has an obvious sign of breakage.

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