Global
AMERICAN

2808225
Wide Range Temperature
Mini ITX Industrial Motherboard

User's Manual
Version 1.0

2010.01

RoHS *VERIFIED*

+85ºC
‹ ›
-40ºC

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Table of Contents

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Chapter 1

Introduction

1.1 Copyright Notice

All Rights Reserved.

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1.2 About this User's Manual

This User's Manual is intended for experienced users and integrators with hardware knowledge of personal computers. If you are not sure about any description in this User's Manual, please consult your vendor before further handling.

1.3 Warning

Single Board Computers and their components contain very delicate Integrated Circuits (IC). To protect the Single Board Computer and its components against damage from static electricity, you should always follow the following precautions when handling it :

1. Disconnect your Single Board Computer from the power source when you want to work on the inside.

2. Hold the board by the edges and try not to touch the IC chips, leads or circuitry.

3. Use a grounded wrist strap when handling computer components.

4. Place components on a grounded antistatic pad or on the bag that came with the Single Board Computer, whenever components are separated from the system.

1.4 Replacing the Lithium Battery

Incorrect replacement of the lithium battery may lead to a risk of explosion.

The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer.

Do not throw lithium batteries into the trashcan. It must be disposed of in accordance with local regulations concerning special waste.

1.5 Technical Support

If you have any technical difficulties, please do not hesitate to call or e-mail our customer service.

1.6 Warranty

This product is warranted to be in good working order for a period of two years from the date of purchase. Should this product fail to be in good working order at any time during this period, we will, at our option, replace or repair it at no additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster.

Vendor assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, or inability to use this product. Vendor will not be liable for any claim made by any other related party.

Vendors disclaim all other warranties, either expressed or implied, including but not limited to implied warranties of merchantibility and fitness for a particular purpose, with respect to the hardware, the accompanying product's manual(s) and written materials, and any accompanying hardware. This limited warranty gives you specific legal rights.

Return authorization must be obtained from the vendor before returned merchandise will be accepted. Authorization can be obtained by calling or faxing the vendor and requesting a Return Merchandise Authorization (RMA) number. Returned goods should always be accompanied by a clear problem description.

1.7 Packing List

Before you begin installing your single board, please make sure that the following materials have been shipped:
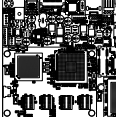
1 x 2808225 Mini-ITX industrial motherboard

1 x Driver CD

1 x Quick Installation Guide

If any of the above items is damaged or missing, contact your vendor immediately.

1.8 Ordering Information

2808225	Mini-ITX Intel N270 1.6GHz Processor industrial motherboard
	Cable Kit 　　1 x USB Cable 　　1 x TV-out Cable 　　1 x Audio Cable 　　1 x One port COM Cable 　　1 x Two ports COM Cable 　　1 x IDE Cable 　　1 x LPT Cable 　　1 x Keyboard & Mouse Y-Cable 　　1 x SATA Cable 　　1 x SATA power Cable 　　3 x COM port RJ-45 Cables

1.9 Specifications

Form Factor	Mini-ITX industrial motherboard
CPU	Intel® Atom™ N270 CPU 1.6GHz w/ 533MHz FSB
Chipset	Intel® 945GSE + Intel® ICH7M
System Memory	Soldered onboard 1GB DDR2 533MHz SDRAM
VGA/ LCD Controller	Integrated Intel Graphics Media Accelerator 950
Ethernet	1 x Realtek 8111C PCIe Gigabit Ethernet
I/O Chips	Winbond W83627HG
BIOS	Phoenix-Award PnP Flash BIOS
Audio	Realtek ALC888 HD Audio Codec, MIC-in/Line-In/Line-Out Support SPDIF output
Storage	1 x Ultra ATA, support 2 IDE devices 2 x Serial ATA with 150MB/s HDD transfer rate
Serial Port	6 x COM ports (COM1, 2, 5, 6: RS-232, COM3, 4: RS-232/422/485 selectable)
Parallel Port	1 x LPT Port (SPP/EPP/ECP mode selectable)
KBMS	6-pin box wafer connector for Keyboard and Mouse
Universal Serial Bus	6 x USB 2.0 ports
Expansion Interface	1 x PCI Slot 1 x Mini-Card Slot
Power Input	DC +12V input only (By DC Jack or ATX 4-pin power connector)
Operation Temp.	-40°C ~ 85°C (-40°F ~ 185°F)
Watchdog Timer	1~255 levels Reset
Dimension (L x W)	170 x 170 mm (6.7" x 6.7")

1.10 Board Dimensions

Unit: mm
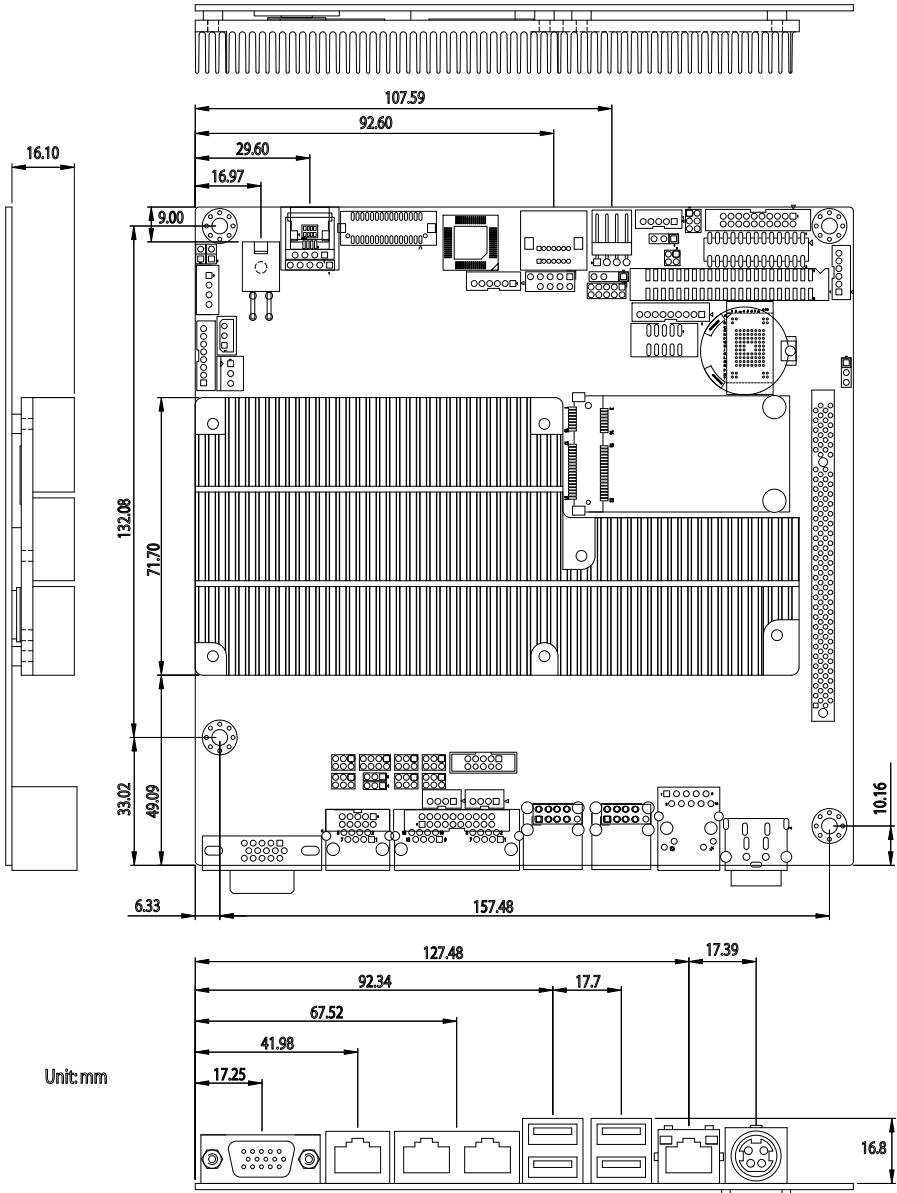
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Chapter 2

Installation

2.1 Block Diagram
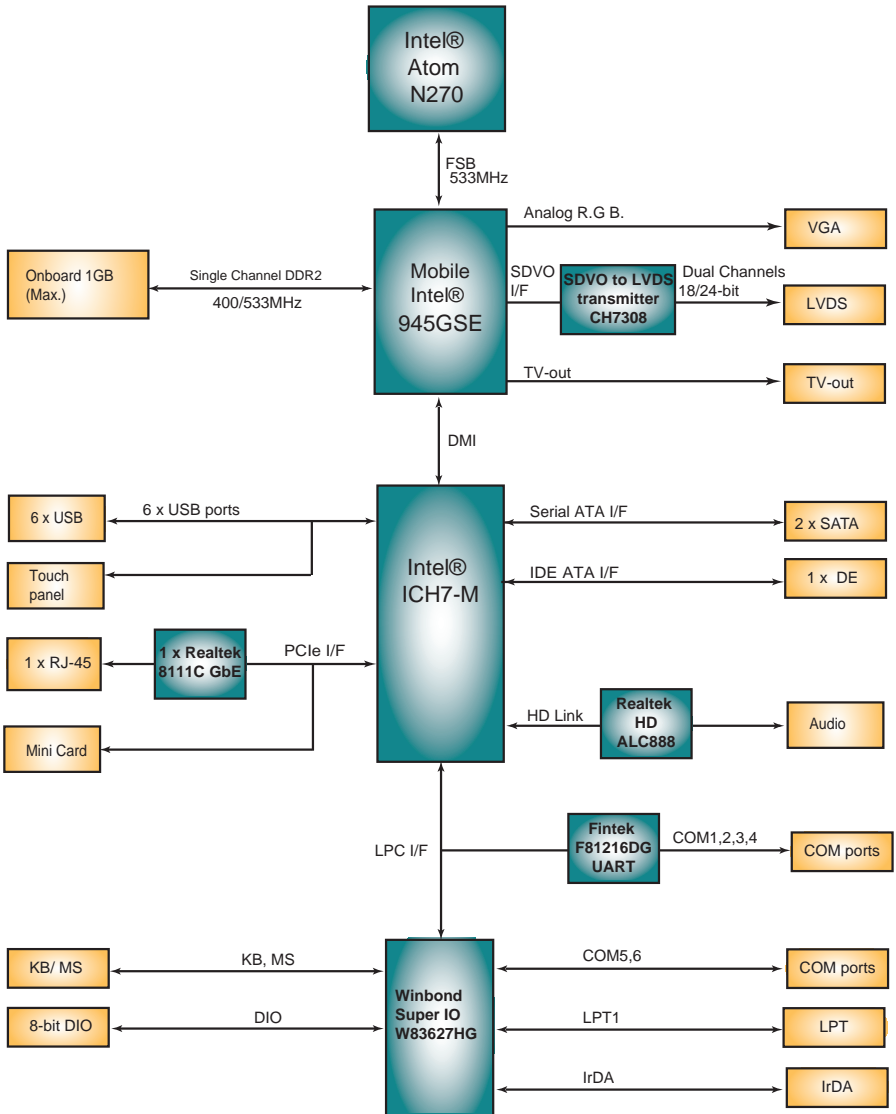
2.2 Jumpers and Connectors Location
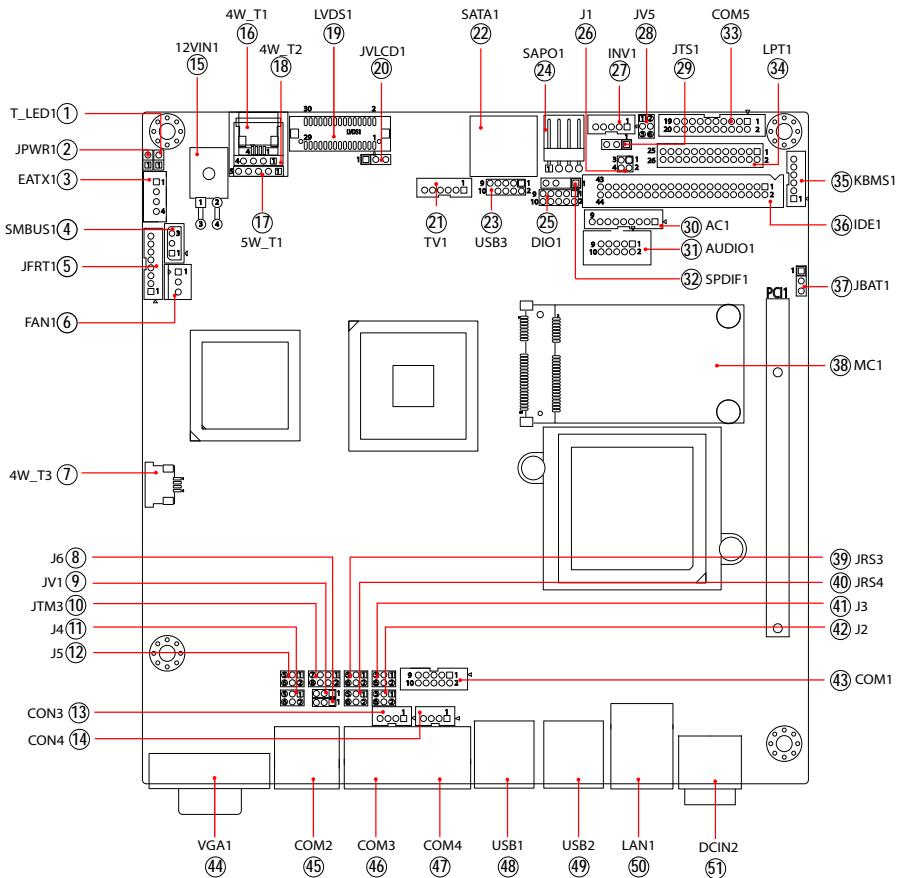
2.3 Jumpers

JPWR1: AT/ATX Power Mode Selection (2)

The power mode jumper selects the power mode for the system.
Connector type:
2.54mm pitch 1x2-pin headers.

Pin 1-2	Mode	
Short	AT Mode	1 ▭ 2
Open	ATX Mode (Default)	1 ▭○ 2
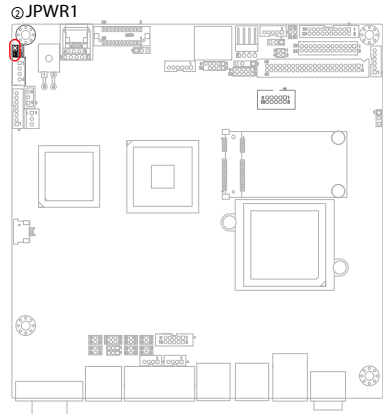
J6: COM2 Pin-1 Signal Selection (8)

The signal of COM2 pin-1 could be selected by J6 in DSR# or RI#.
Connector type:
2.00 mm pitch 1x3-pin headers

Pin	Voltage	
1-2	Set to DSR# (Default)	3 2 1 ○▭
2-3	Set to RI#	3 2 1 ▭□
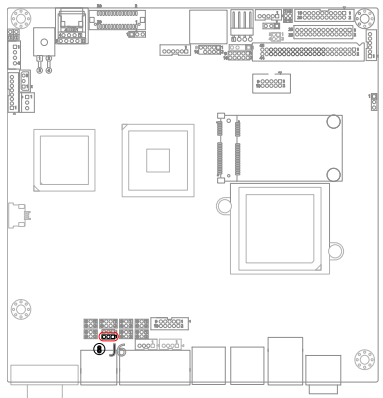
JV1: COM1 port Power Special Support (9)

The COM1 port's voltage could be
selected by JV1 respectively to +5V
or +12V.
Connector type:
2.00mm pitch 1x3-pin headers.
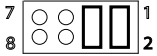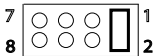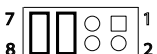
Pin	Setup	
1-2	pin-1 is setting to +5V (Default)	
2-3	pin-1 is setting to +12V	
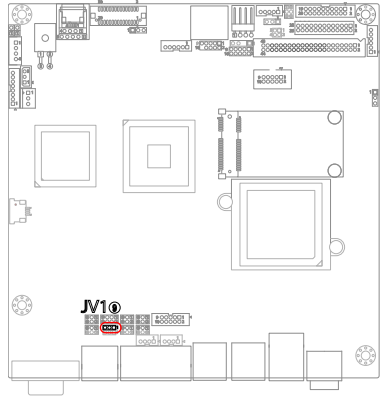
JTM3: RS-422/485 Terminator (10)

Connector type:
2.00 mm pitch 2x4-pin headers
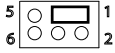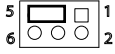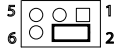
Pin	Terminator	
COM3	RS-422	
	RS-485	
COM4	RS-422	
	RS-485	
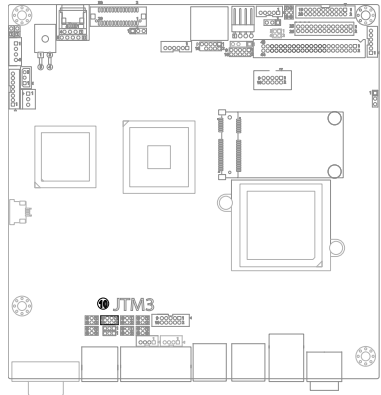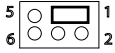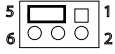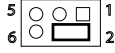
J4, J5: COM4 RS-232/422/485 Selection (11, 12)

Connector type:
2.00 mm pitch 2x3-pin headers

J4	Description	
1-3	Pin-1 is setting to DSR# (Default)	
3-5	Pin-1 is setting to TX+	
2-4	Pin-2 is setting to DCD (Default)	
4-6	Pin-2 is setting to TX-	

J5	Description	
1-3	Pin-7 is setting to CTS# (Default)	
3-5	Pin-7 is setting to RX+	
2-4	Pin-8 is setting to RTS# (Default)	
4-6	Pin-8 is setting to RX-	
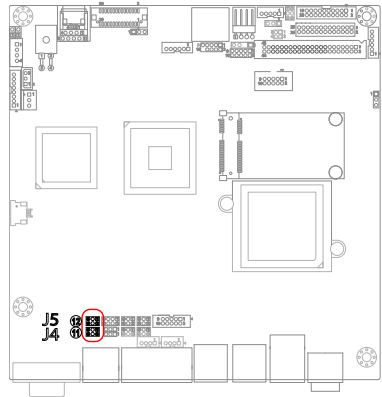
JVLCD1: LCD Panel Voltage Selection (20)

The voltage of LCD panel could be selected by JVLCD1 in +5V or +3.3V.
Connector type:
2.54 mm pitch 1x3-pin headers

Pin	Voltage	
1-2	+5V	
2-3	+3.3V (Default)	
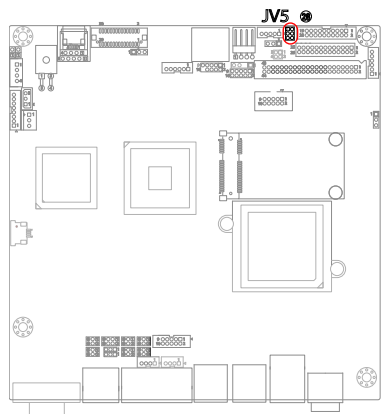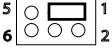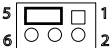
JV5: COM5/ COM6 Port Power Special Support (28)
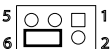
Connector type:
2.00 mm pitch 2x3-pin headers
COM5:

Pin	Description	
1-3	pin-10 is setting to +5V (Default)	5 ⊙☐☐ 1 6 ⊙⊙⊙ 2
3-5	pin-10 is setting to +12V	5 ☐☐☐ 1 6 ⊙⊙⊙ 2

COM6:

Pin	Description	
2-4	pin-20 is setting to +5V (Default)	5 ⊙⊙☐ 1 6 ⊙☐☐ 2
4-6	pin-20 is setting to +12V	5 ⊙⊙☐ 1 6 ☐☐⊙ 2
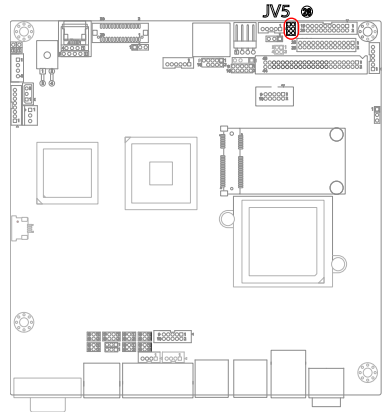
JTS1: 4-wire/ 5-wire Touch Screen Selection (29)

The Touch Screen type could be selected by JTS1 to 4-wire or 5-wire.
Connector type:
2.54mm pitch 1x3-pin headers.

Pin	Setup	
1-2	5-wire (Default)	3 2 1 ⊙☐☐
2-3	4-wire	3 2 1 ☐☐☐
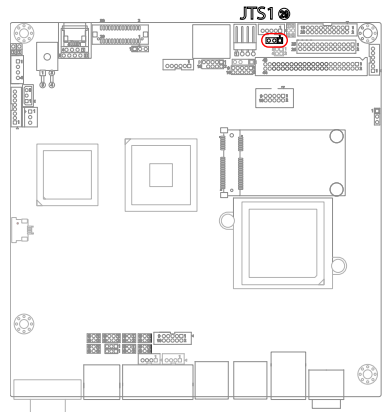
JBAT1: Clear CMOS Setting (37)

If the board refuses to boot due to inappropriate CMOS settings here is how to proceed to clear (reset) the CMOS to its default values.
Connector type:
2.54 mm pitch 1x3-pin headers

Pin	Mode	
1-2	Keep CMOS (Default)	3 2 1
2-3	Clear CMOS	3 2 1
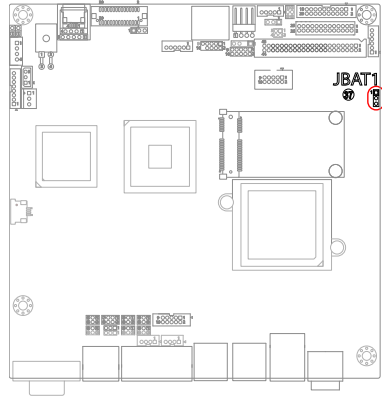
You may need to clear the CMOS if your system cannot boot up because you forgot your password, the CPU clock setup is incorrect, or the CMOS settings need to be reset to default values after the system BIOS has been updated.
Refer to the following solutions to reset your CMOS setting:
Solution A:
1. Power off the system and disconnect the power cable.
2. Place a shunt to short pin 1 and pin 2 of JBAT1 for five seconds.
3. Place the shunt back to pin 2 and pin 3 of JBAT1.
4. Power on the system.
Solution B:
If the CPU Clock setup is incorrect, you may not be able to boot up. In this case, follow these instructions:
1. Turn the system off, then on again. The CPU will automatically boot up using standard parameters.
2. As the system boots, enter BIOS and set up the CPU clock.
Note:
If you are unable to enter BIOS setup, turn the system on and off a few times.

JRS3~4: COM3/ COM4 RS-232/422/485 Selection (39, 40)

The onboard COM3, COM4 ports can be configured to operate in RS-422 or RS-485 modes. RS-422 modes differ in the way RX/TX is being handled. Jumper JRS3, JRS4 switches between RS-232 or RS-422/485 mode. When JRS3/ JRS4 is setting to RS-422 or RS-485 mode, there will be only +12V output let while JRS3/ JRS4 is setting. All RS-232/422/482 modes are available on COM3/ COM4.

It can be configured COM3, COM4 to operate in RS-232, RS-422 or RS-485 mode.

Connector type: 2.00mm pitch 2x3-pin headers.
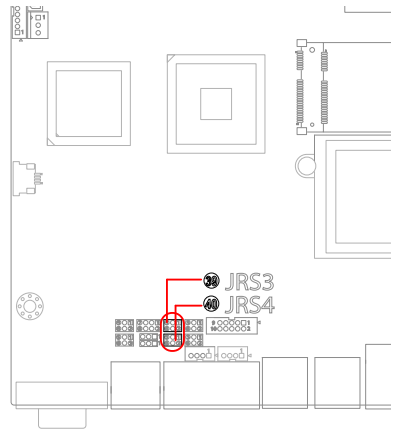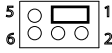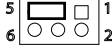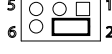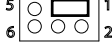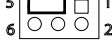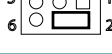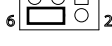
Mode	RS-232 (Default)	RS-422	RS-485
1-2	ON	OFF	OFF
3-4	OFF	ON	OFF
5-6	OFF	OFF	ON

J2, J3: COM3 RS-232/422/485 Selection (42, 41)

Connector type:
2.00 mm pitch 2x3-pin headers

J2	Description	
1-3	Pin-1 is setting to DSR# (Default)	
3-5	Pin-1 is setting to TX+	
2-4	Pin-2 is setting to DCD (Default)	
4-6	Pin-2 is setting to TX-	

J3	Description	
1-3	Pin-7 is setting to CTS# (Default)	
3-5	Pin-7 is setting to RX+	
2-4	Pin-8 is setting to RTS# (Default)	
4-6	Pin-8 is setting to RX-	
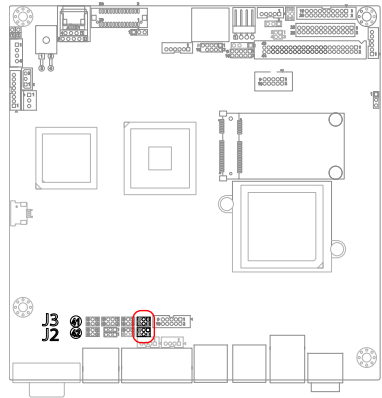
2.4 Connectors

T_LED1: Touch Screen LED Indicator (1)

Connector type:
2.54mm pitch 1x2-pin headers.

Pin	Mode
1	Positive
2	GND
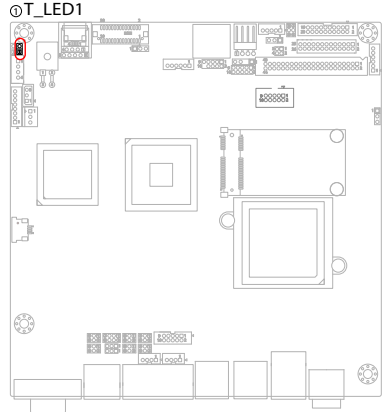
EATX1: ATX Feature Connector (3)

Connector type: 2.54mm pitch 1x4-pin box wafer connector

Pin	Description
1	PS-ON
2	GND
3	5V_SB
4	ATX_PWRGD
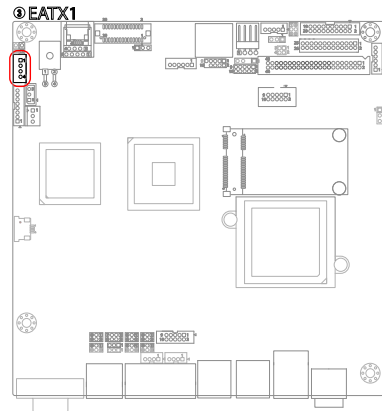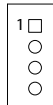
SMBUS1: External SMBUS Connector (4)

Connector type: 2.00mm pitch 1x3 box wafer connector.

Pin	Description
1	SMB_Data
2	SMB_Clock
3	SMB_Alert#
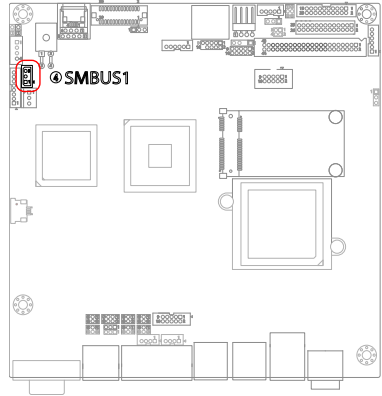
JFRT1: Switches and Indicators (5)

It provides connectors for system indicators that provides light indication of the computer activities and switches to change the computer status.
Connector type:
2.00mm pitch 1x8-pin box wafer connector

Pin	Description
1	PLED+
2	PLED-
3	HDLED+
4	HDLED-
5	P_SW+
6	P_SW-
7	RST+
8	RST-
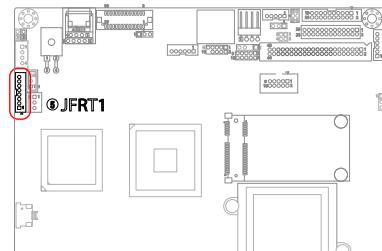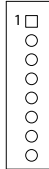
PLED: Power LED Connector, pin 1-2.
This 2-pin connector connects to the case-mounted power LED. Power LED can be indicated when the CPU card is on or off. And keyboard lock can be used to disable the keyboard function so the PC will not respond by any input.
HLED: HDD LED Connector, pin 3-4.
This 2-pin connector connects to the case-mounted HDD LED to indicate hard disk activity.
PWRBTN: ATX soft power switch, pin 5-6.
This 2-pin connector connects to the case-mounted Power button.
RES: Reset Button, pin 7-8.
This 2-pin connector connects to the case-mounted reset switch and is used to reboot the system.

FAN1: CPU Fan Connector (6)

FAN1 is 3-pin headers for the system fan. The fan must be a +12V fan.

Pin	Description
1	GND
2	+12V
3	FAN_Detect
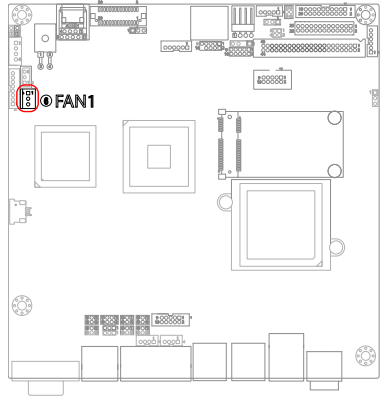
4W_T3: 4-Wire Touch Screen FPC Connector (7)

Connector type: 4-pin 1.0mm FPC connector

Pin	Description
1	X+
2	Y+
3	X-
4	Y-
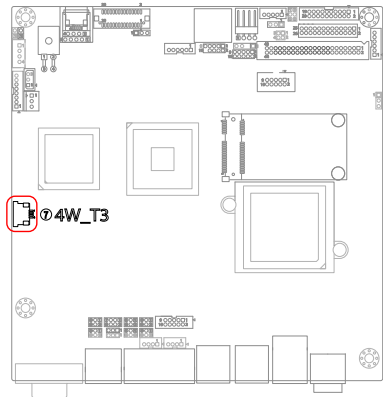
CON3, 4: RS-422/ 485 Connectors (13, 14)

Connector type: 2.00mm pitch 1x4 box wafer connector

Pin	RS-422	RS-485
1	TX+	Data+
2	TX-	Data-
3	RX+	N/C
4	RX-	N/C
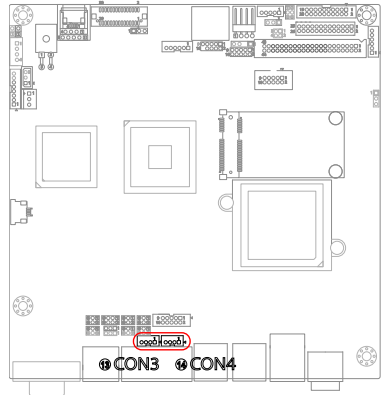
12VIN1: ATX +12V Connector (15)

12VIN1 supplies the CPU operation ATX +12V (Vcore).

Pin	Desc.	Pin	Desc.
2	GND	1	GND
4	+12V	3	+12V
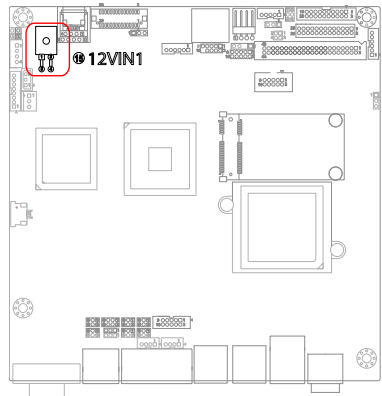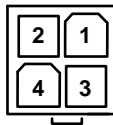
4W_T1: 4-Wire Touch Screen FPC Connector (16)

Connector type: 4-pin 1.0mm FPC connector

Pin	Description
1	X+
2	Y+
3	X-
4	Y-
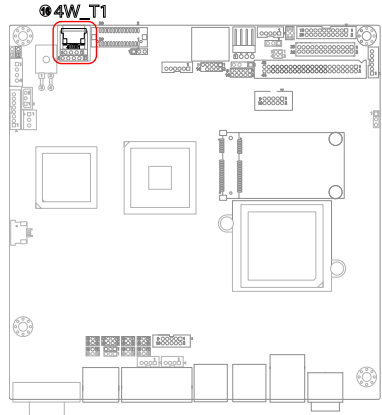
5W_T1: 5-Wire Touch Screen Connector (17)

Connector type:
2.54mm pitch 1x5-pin headers

Pin	Description
1	UL
2	UR
3	PROBE
4	LR
5	LL
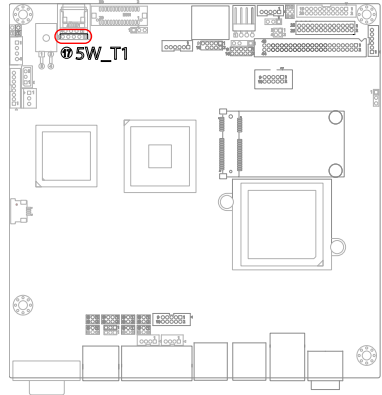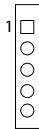
4W_T2: 4-Wire Touch Screen Connector (18)

Connector type: 2.54mm pitch 1x4-pin headers

Pin	Description
1	X+
2	Y+
3	X-
4	Y-
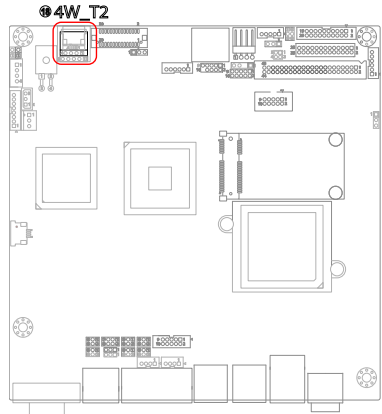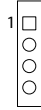
LVDS1: LVDS Connector (19)

The LVDS connector supports 24-bit LVDS.
VDD could be selected by JVLCD1 in +5V or +3.3V.
Connector type: DF-13-30DP-1.25V

Pin	Description	Pin	Description
2	VDD	1	VDD
4	TX2CLK+	3	TX1CLK+
6	TX2CLK-	5	TX1CLK-
8	GPIO15	7	GPIO14
10	TX2D0+	9	TX1D0+
12	TX2D0-	11	TX1D0-
14	GND	13	GND
16	TX2D1+	15	TX1D1+
18	TX2D1-	17	TX1D1-
20	GND	19	GND
22	TX2D2+	21	TX1D2+
24	TX2D2-	23	TX1D2-
26	GND	25	GND
28	TX2D3+	27	TX1D3+
30	TX2D3-	29	TX1D3-
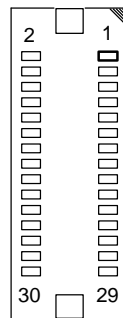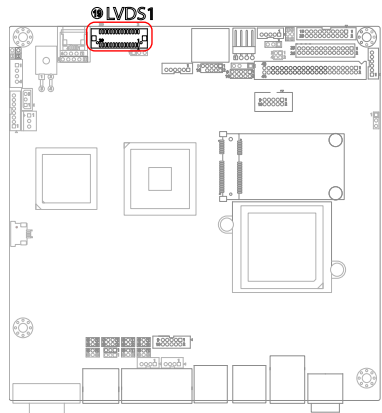
TV1: TV-out Connector (21)

The TV out connector is for output to a television.

Connector type: 2.00mm pitch 1x6-pin box wafer connector
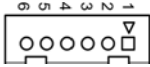
Composite Video

1	CVBS	2	GND
3	Unused	4	GND
5	Unused	6	GND

S-Video

1	Unused	2	GND
3	Luminance	4	GND
5	Chrominance	6	GND
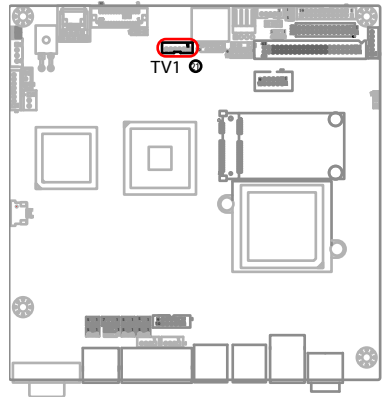
SATA1: Serial ATA Connectors (22)

2808225 on board supports two SATA connectors, second generation SATA drives transfer data at speeds as high as 150MB/s, twice the transfer speed of first generation SATA drives.

Pin	Description
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND
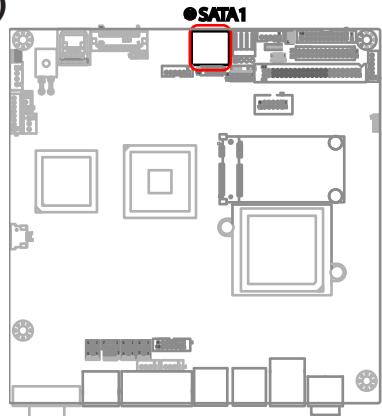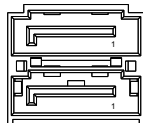
USB3: USB Connector (23)

2808225 on board supports
one pin-header USB3 that can connect
up to six high-speed (Data transfers at
480Mb/s), full-speed (Data transfers at
12Mb/s) or low-speed (Data transfers
at 1.5Mb/s) USB devices.
Connector type: 2.00mm 2x5-pin headers
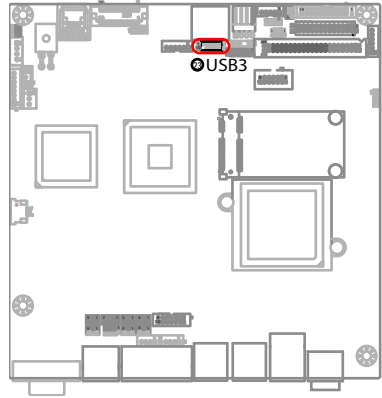
Pin	Description	Pin	Description
1	+5V	2	+5V
3	USBD-	4	USBD-
5	USBD+	6	USBD+
7	GND	8	GND
9	GND	10	N/C (Key)
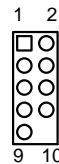
SAPO1: Small 4P Power Connector (24)

Connector type: 2.54mm pitch 1x4-pin
wafer one wall 90D connector

Pin	Description
1	+5V
2	GND
3	GND
4	+12V
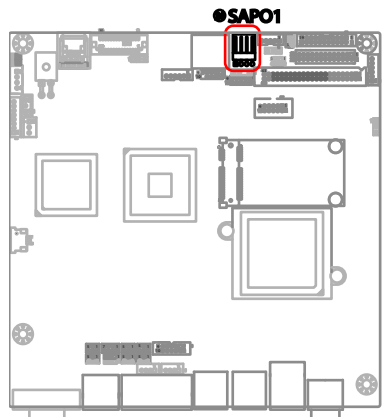
DIO1: Digital I/O Connector (25)

DIO1 is a 8-bit DIO connector that supports programmable Input and Output. The default I/O address is 2Eh/ 2Fh.
Connector type:
2.00 mm pitch 2x5-pin headers.

Pin	Desc.	Pin	Desc.
1	DIO1	2	DIO2
3	DIO3	4	DIO4
5	DIO5	6	DIO6
7	DIO7	8	DIO8
9	+5V	10	GND
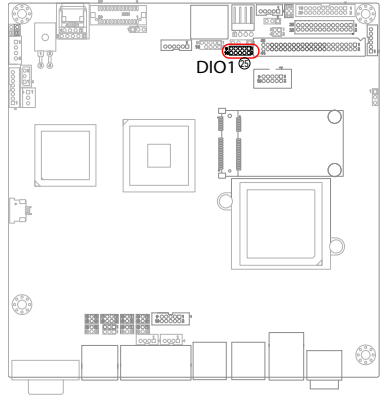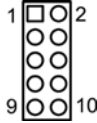
INV1: LCD Inverter Connector (27)

Connector type:
2.00mm pitch 1x5-pin box wafer connector.

Pin	Description
1	+12V
2	GND
3	Backlight on/off
4	Brightness control
5	GND
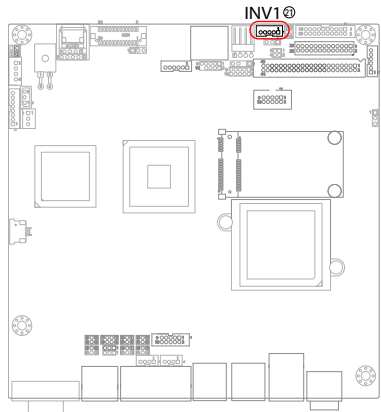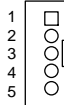
- Backlight:
    Setting to High: On
    Setting to Low: Off.
    This signal is used to gate power into the backlight circuitry.

- Brightness control:
    This signal is used as the PWM Clock input signal.

AC1: HD AUDIO daughterboard Connector (30)

The onboard audio connector can connect to an optional audio kit through an onboard audio connector. The codec on the optional audio kit is connected to the ALC888 audio controller through the High Definition audio interface.
Connector type: 2.00mm pitch 1x9 box wafer connector.

Pin	Description
1	+12V
2	+3.3V
3	AC_SYNC
4	AC_SD-OUT
5	GND
6	AC-BCLK
7	GND
8	AC_RST#
9	AC_SDIN0
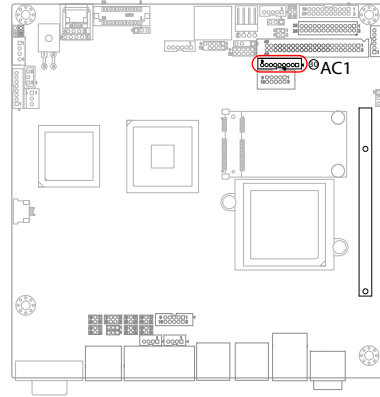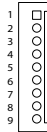
AUDIO1: AUDIO Connector (31)

Connect a tape player or another audio source to the light blue Line-in connector to record audio on your computer or to play audio through your computer's sound chip and speakers. Connect a micro-phone to the pink microphone connector to record audio to your computer.

Connector type:

2.00mm pitch 2x5-pin box headers.

Pin	Description	Pin	Description
1	Line-in Left	2	Line-in Right
3	GND	4	GND
5	MIC1	6	MIC2
7	GND	8	GND
9	Speaker Left	10	Speaker Right
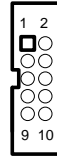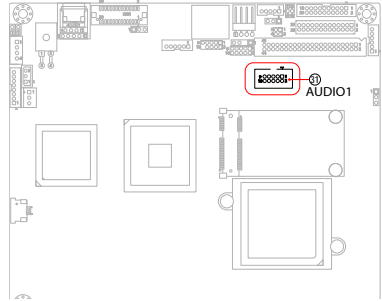
SPDIF1: Digital Audio Output (32)

The S/PDIF output is capable of providing digital audio to external speakers or compressed AC3 data to an external Dolby Digital Decoder. Use this feature only when your stereo system has digital input function. Use S/PDIF In feature only when your device has digital output function. Be careful with the polarity of the SPDIF1 connector.

Check the pin assignment carefully while you connector the S/PDIF cable, incorrect connection between the cable and connector will make the device unable to work or even damage it. For optional S/PDIF cable, please contact your local dealer.

Connector type: 2.54mm pitch 1x4-pin headers

Pin	Description
1	+5V
2	N/C
3	SPDIF_Out
4	GND
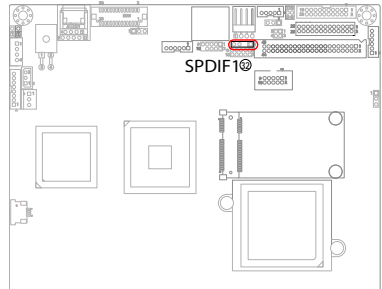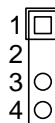
COM5: Serial Port Connector (33)

This connector includes two RS-232 serial ports.
Connector type:
2.00mm pitch 2x10-pin box headers.
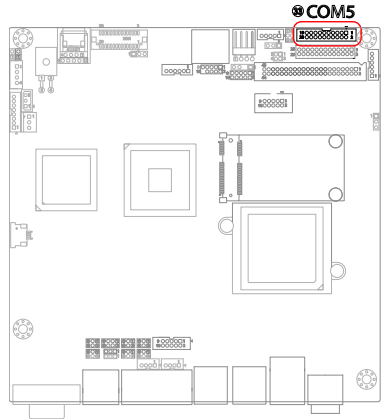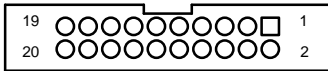
Port	Pin	Description	Pin	Description
COM5	1	DCD#1	2	RXD1
	3	TXD1	4	DTR#1
	5	GND	6	DSR#1
	7	RTS#1	8	CTS#1
	9	RI#1	10	CV1
COM6	11	DCD#2	12	RXD2
	13	TXD2	14	DTR#2
	15	GND	16	DSR#2
	17	RTS#2	18	CTS#2
	19	RI#2	20	CV2

Note:
The signals of pin-10 and pin-20 could be selected by JV5 in +5V or +12V.

LPT1: Parallel Port Connector (34)

Connector type: 2.00 pitch 2x13-pin headers.

Pin	Desc.	Pin	Desc.
1	STB#	14	AFD#
2	PTD0	15	ERROR#
3	PTD1	16	INIT#
4	PTD2	17	SLIN#
5	PTD3	18	GND
6	PTD4	19	GND
7	PTD5	20	GND
8	PTD6	21	GND
9	PTD7	22	GND
10	ACK#	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SELECT	26	N/C
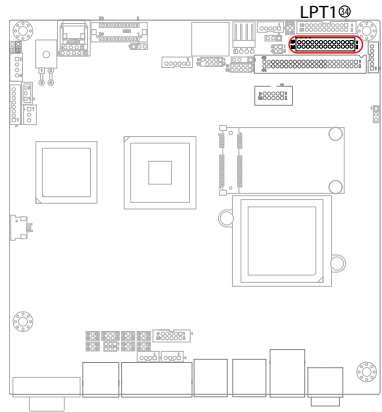
KBMS1: Keyboard & Mouse Connector (35)

Connector type: 2.0mm pitch 1x6-pin box wafer connector.

Pin	Description
1	KB_DATA
2	GND
3	MS_DATA
4	KB_CLK
5	PS2_VCC
6	MS_CLK
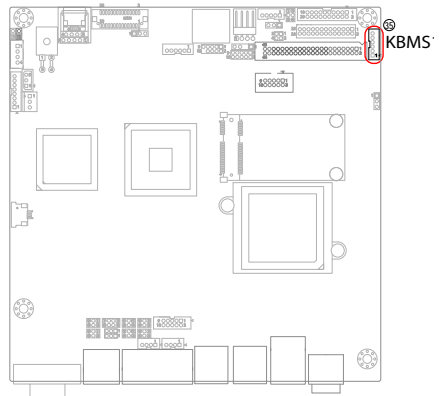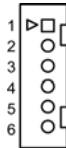
IDE1: Primary IDE Connector (36)

An IDE drive ribbon cable has two connectors to support two IDE devices. If a ribbon cable connects to two IDE drives at the same time, one of them has to be configured as Master and the other has to be configured as Slave by setting the drive select jumpers on the drive.
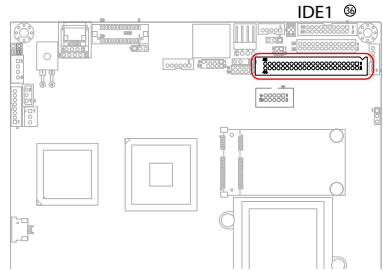
Consult the documentation that came with your IDE drive for details on jumper locations and settings. You must orient the cable connector so that the pin 1 (color) edge of the cable corresponds to pin 1 of the IDE connector.

Connector type: 2.00mm pitch 2x22-pin box headers

Pin	Description	Pin	Description
1	RESET#	2	GND
3	DATA7	4	DATA8
5	DATA6	6	DATA9
7	DATA5	8	DATA10
9	DATA4	10	DATA11
11	DATA3	12	DATA12
13	DATA2	14	DATA13
15	DATA1	16	DATA14
17	DATA0	18	DATA15
19	GND	20	N/C
21	DREQ	22	GND
23	IOW#	24	GND
25	IOR#	26	GND
27	IRDY	28	IDSEL
29	ACK#	30	GND
31	IRQ	32	N/C
33	AD1	34	ATA66 DETECT
35	AD0	36	AD2
37	CS1#	38	CS3#
39	ACT#	40	GND
41	+5V	42	+5V
43	GND	44	N/C
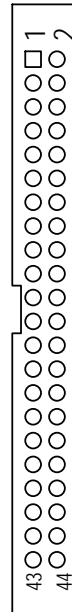
MC1: Mini-Card Slot (38)
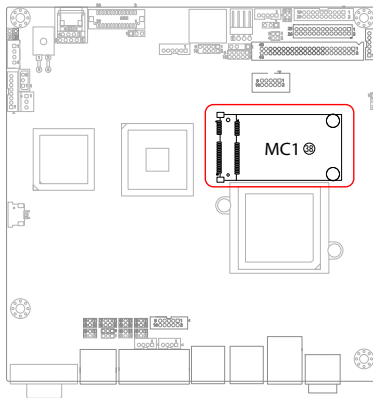
COM1: Serial Port Connector (43)

Connector type:
2.00mm pitch 2x5-pin box headers

Pin	Desc.	Pin	Desc.
1	DCD#3	2	RXD3
3	TXD3	4	DTR#3
5	GND	6	DSR#3
7	RTS#3	8	CTS#3
9	RI#3	10	CV3
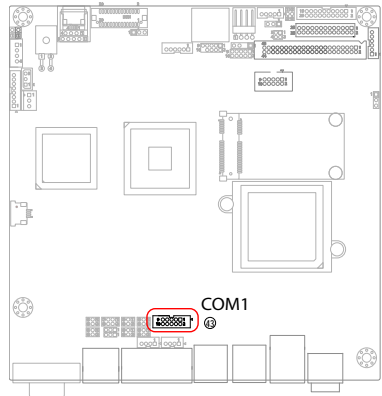
VGA1: Analog RGB Connector (44)

Connector type: VGA: D-Sub 15-pin female.
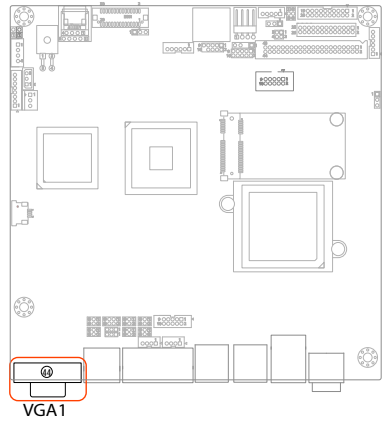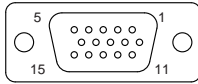
Pin	Description	Pin	Description	Pin	Description
1	RED	6	GND	11	N/C
2	GREEN	7	GND	12	VDDAT
3	BLUE	8	GND	13	HSYNC
4	N/C	9	+5V	14	VSYNC
5	GND	10	GND	15	VDCLK

COM2~4: Serial Port Connectors (45, 46, 47)

Connector type: RJ-45 jack
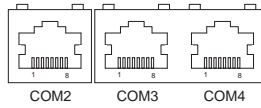
Pin	COM2	COM3	COM4
1	COM4_SEL1	COM5_SEL1	COM6_SEL1
2	DCD#4	COM5_SEL2	COM6_SEL2
3	DTR#4	DTR#5	DTR#6
4	GND	GND	GND
5	RXD4	RXD5	RXD6
6	TXD4	TXD5	TXD6
7	CTS#4	COM5_SEL7	COM6_SEL7
8	RTS4	COM5_SEL8	COM6-SEL8
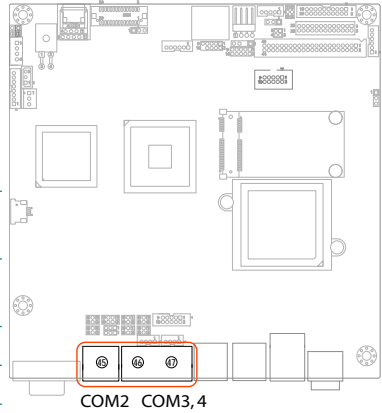
Note:

The signals of COM4_SEL1, COM5_SE:1. COM5_SEL2, COM5_SEL7, COM5_SEL8, COM6_SEL1, COM6_SEL2, COM6_SEL7 and COM6_SEL8 could be selected by J6, J2, J3, J4 and J5 respectively.

USB1, 2: Double Stacks USB type A Connectors (48, 49)

Connector type: double stack USB type A.
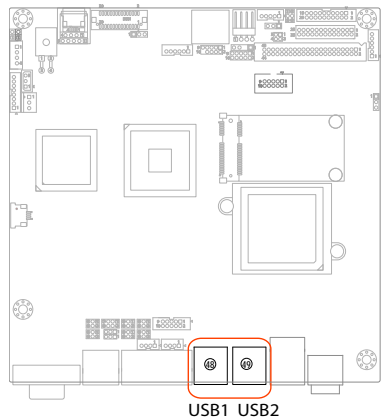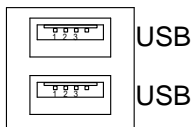
LAN1: GbE RJ-45 Connector (50)

Connector type: RJ-45

LAN1
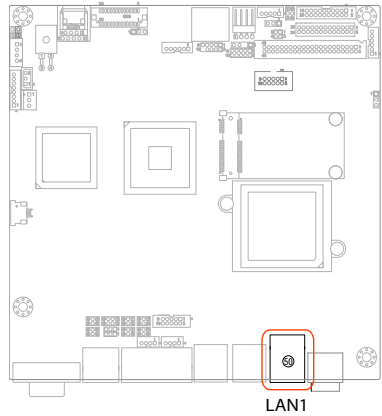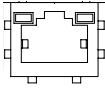
DCIN2: DC Power Input (51)

Pin	Description
1	+12V
2	+12V
3	GND
4	GND

DCIN2
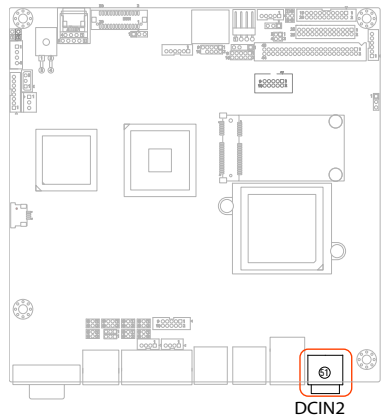
PCI1: 32-bit PCI Slot
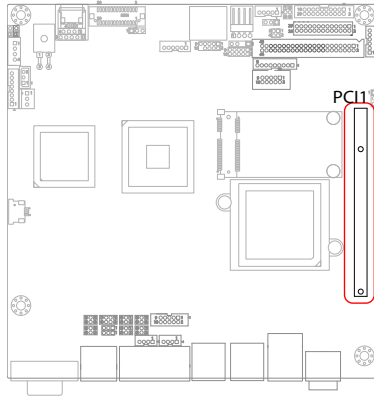
Pin	Description	Pin	Description
B1	-12V	A1	TRST
B2	TCK	A2	+12V
B3	GND	A3	TMS
B4	TDO	A4	TDI
B5	+5V	A5	+5V
B6	+5V	A6	INTA#
B7	INTB#	A7	INTC#
B8	INTD#	A8	+5V
B9	PRSTN1	A9	RSVD
B10	RSVD	A10	+5V
B11	PRSTN2	A11	RSVD
B12	GND	A12	GND
B13	GND	A13	GND
B14	RSVD	A14	3.3V_AUX
B15	GND	A15	RST#
B16	CLK	A16	+5V
B17	GND	A17	GNT#
B18	REQ#	A18	GND
B19	+5V	A19	PME#
B20	AD31	A20	AD30
B21	AD29	A21	+3.3V
B22	GND	A22	AD28
B23	AD27	A23	AD26

B24	AD25	A24	GND
B25	+3.3V	A25	AD24
B26	C/BE3#	A26	IDSEL
B27	AD23	A27	+3.3V
B28	GND	A28	AD22
B29	AD21	A29	AD20
B30	AD19	A30	GND
B31	+3.3V	A31	AD18
B32	AD17	A32	AD46
B33	C/BE2#	A33	+3.3V
B34	GND	A34	FRAME#
B35	IRDY#	A35	GND
B36	+3.3V	A36	TRDY#
B37	DEVSEL#	A37	GND
B38	GND	A38	STOP#
B39	LOCK#	A39	+3.3V
B40	PERR#	A40	SDONE
B41	+3.3V	A41	SBO#
B42	SERR#	A42	GND
B43	+3.3V	A43	PAR
B44	C/BE1#	A44	AD15
B45	AD14	A45	+3.3V
B46	GND	A46	AD13
B47	AD12	A47	AD11
B48	AD10	A48	GND
B49	GND	A49	AD9
B52	AD6	A52	C/BE0#
B53	AD7	A53	+3.3V
B54	+3.3V	A54	AD6
B55	AD5	A55	AD4
B56	AD3	A56	GND
B57	GND	A57	AD2
B58	AD1	A58	AD0
B59	+5V	A59	+5V
B60	ACK64#	A60	REQ64#
B61	+5V	A61	+5V
B62	+5V	A62	+5V

2.5 The Installation Paths of CD Driver

Windows 2000 & XP

Driver	Path
AUDIO	\AUDIO\REALTEK_HD\WINDOWS_R209
CHIPSET	\CHIPSET\INTEL\INF 8.3
LAN	\ETHERNET\REALTEK\8111B_WIN5698
VGA	\GRAPHICS\INTEL_2K_XP_32\1432

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Chapter 3

BIOS

3.1 BIOS Introduction

The Award BIOS (Basic Input/Output System) installed in your computer system's. The BIOS provides for a standard device such as disk drives, serial ports and parallel ports. It also adds password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.

```
          Phoenix - AwardBIOS CMOS Setup Utility

  ▶ Standard CMOS Features          ▶ PC Health Status

  ▶ Advanced BIOS Features             Load Optimized Defaults

  ▶ Advanced Chipset Features          Set Password

  ▶ Integrated Peripherals             Save & Exit Setup

  ▶ Power Management Setup             Exit Without Saving

  ▶ PnP/PCI Configurations


  Esc : Quit      F9 : Menu in BIOS      ↑ ↓ → ←   : Select Item
  F10 : Save & Exit Setup

                   Time, Date, Hard Disk Type...
```
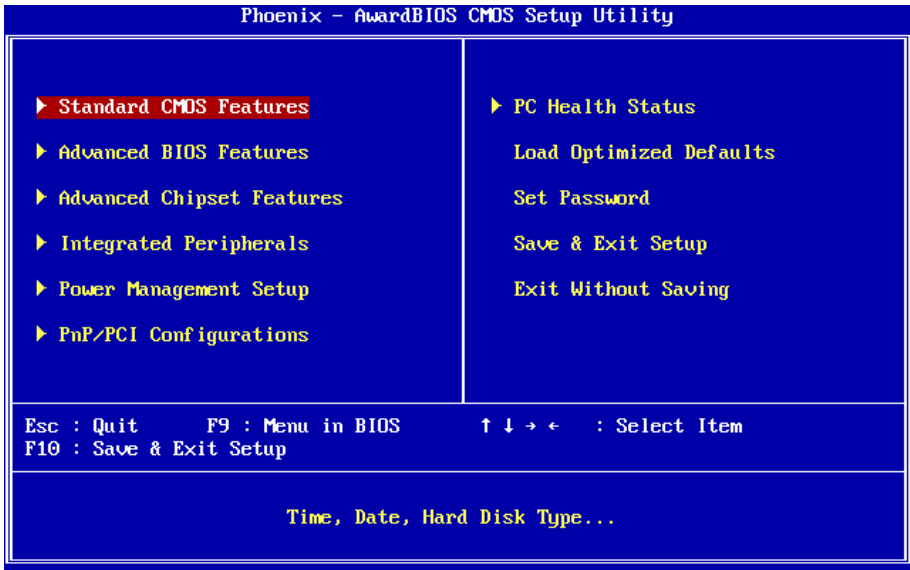
3.2 BIOS Setup

The Award BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility.

When you turn on the computer, the Award BIOS is immediately activated. Pressing the <Del> key immediately allows you to enter the Setup utility. If you a little bit late press the <Del> key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup.

If you still wish to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system Off and back On again.

The following message will appear on the screen:

Press <DEL> to Enter Setup

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

3.3 Standard CMOS Features

```
         Phoenix - AwardBIOS CMOS Setup Utility
                 Standard CMOS Features

  Date (mm:dd:yy)        Thu, Jan  8 2009      │    Item Help
  Time (hh:mm:ss)        14 : 21 : 54          │
                                               │ Menu Level  ▶
▶ IDE Channel 0 Master                         │
▶ IDE Channel 0 Slave                          │ Change the day, month,
▶ IDE Channel 2 Master                         │ year and century
▶ IDE Channel 2 Slave                          │
                                               │ year and century
                                               │
  Video                  [EGA/VGA]             │
  Halt On                [All Errors]          │
                                               │
  Base Memory                  640K            │
  Extended Memory            15360K            │
  Total Memory               16384K            │
```
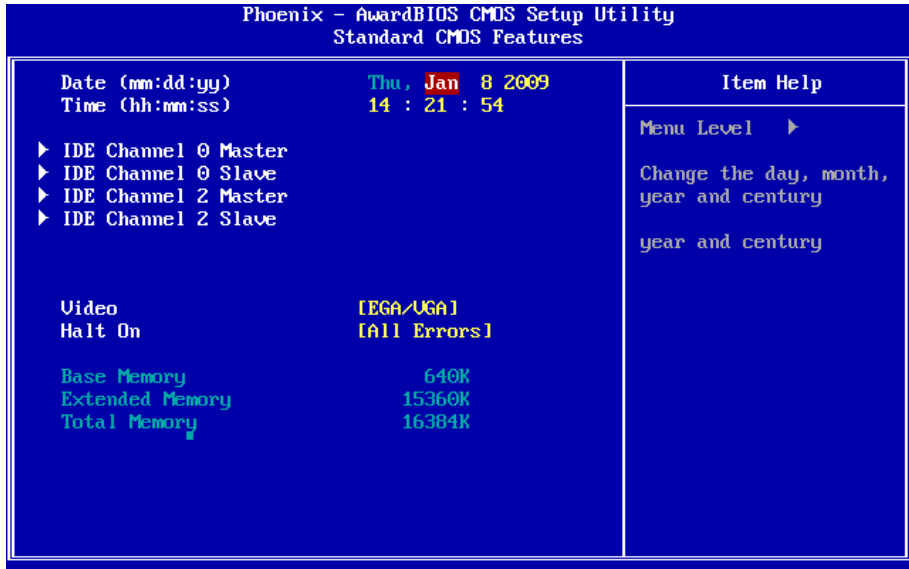
"Standard CMOS Features" allows you to record some basic hardware configurations in your computer system and set the system clock and error handling. If the CPU card is already installed in a working system, you will not need to select this option.

You will need to run the Standard CMOS option, however, if you change your system hardware configurations, shch as onboard battery fails, or the configuration stored in the CMOS memory was lost or damaged.

Date

The date format is:　　　　**Day :** Sun to Sat
　　　　　　　　　　　　Month : 1 to 12
　　　　　　　　　　　　Date : 1 to 31
　　　　　　　　　　　　Year : 1999 to 2099

Time

The time format is:　　　　**Hour :** 00 to 23
　　　　　　　　　　　　Minute : 00 to 59
　　　　　　　　　　　　Second : 00 to 59

To set the date & time, highlight the "Date" & "Time" and use the <PgUp>/ <PgDn> or +/- keys to set the current time.

IDE Primary HDDs

The onboard PCI IDE connectors provide Primary channel for connecting up to four IDE hard disks or other IDE devices.
Each channel can support up to two hard disks; the first is the "Master" and the second is the "Slave".
Press <Enter> to configure the hard disk. The selections include Auto, Manual, and None. Select 'Manual' to define the drive information manually. You will be asked to enter the following items.

Cylinder:	Number of cylinders
Head:	Number of read/write heads
Precomp:	Write precompensation
Landing Zone:	Landing zone
Sector:	Number of sectors

The Access Mode selections are as follows:

CHS	(HD < 528MB)
LBA	(HD > 528MB and supports Logical Block Addressing)
Large	(for MS-DOS only)
Auto	

Video

This field selects the type of video display card installed in your system. You can choose the following video display cards:

EGA/VGA	For EGA, VGA, SEGA, SVGA or PGA monitor adapters. (default)
CGA 40	Power up in 40 column mode.
CGA 80	Power up in 80 column mode.
MONO	For Hercules or MDA adapters.

Halt On

This field determines whether or not the system will halt if an error is detected during power up.

All errors (default)	Whenever the BIOS detects a non-fatal error, the system will stop and you will be prompted.
No errors	The system boot will not be halted for any error that may be detected.
All, But Keyboard	The system boot will not be halted for a keyboard error; it will stop for all other errors.
All, But Diskette	The system boot will not be halted for a disk error; it will stop for all other errors.
All, But Disk/Key	The system boot will not be halted for a keyboard or disk error; it will stop for all others.

3.4 Advanced BIOS Features

```
         Phoenix - AwardBIOS CMOS Setup Utility
                 Advanced BIOS Features
┌─────────────────────────────────────────┬──────────────────────────┐
│ ▶ Hard Disk Boot Priority   [Press Enter]│        Item Help         │
│   CPU L3 Cache              [Enabled]     ├──────────────────────────┤
│   Hyper-Threading Technology[Enabled]     │  Menu Level    ▶         │
│   Quick Power On Self Test  [Enabled]     │                          │
│   First Boot Device         [Hard Disk]   │  Select Hard Disk Boot   │
│   Second Boot Device        [CDROM]       │  Device Priority         │
│   Boot Other Device         [Enabled]     │                          │
│   Boot Up NumLock Status    [On]          │                          │
│   Security Option           [Setup]       │                          │
│   APIC Mode                 [Enabled]     │                          │
│                                           │                          │
│                                           │                          │
│                                           │                          │
│                                           │                          │
├───────────────────────────────────────────┴──────────────────────────┤
│ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help │
│    F5: Previous Values   F6: Fail-Safe Defaults   F7: Optimized Defaults     │
└───────────────────────────────────────────────────────────────────────┘
```

Hard Disk Boot Priority

It allows you to set the priority for hard disk boot. When you press enter, the selections shows the current hard disks used in your system as well as the "Bootable Add-in Card" that is relevant to other boot sources media such as SCSI cards and LAN cards.

CPU L3 Cache

Cache memory is additional memory that is faster than conventional DRAM (system memory).
CPUs from 486-type on up contain internal cache memory, and most, but not all, modern PCs have additional (external) cache memory.
When the CPU requests data, the system transfers the requested data from the main DRAM into cache memory, for even faster access by the CPU. These allow you to enable (speed up memory access) or disable the cache function.

Quick Power On Self Test

When enabled, it speeds up the Power On Self Test (POST) after the system is turned on.
If it is set to Enabled, BIOS will skip some items.
Setting: Disabled, Enabled (Default).

First/ Second Boot Device

These fields determine the drive that the system searches first for an operating system. The options available include
Setting: Floppy, Hard Disk, CDROM, USB-FDD, USB-ZIP,
USB-CDROM, LAN and Disabled.

Boot Other Device

It allows the system to search for an OS from other devices other than the ones selected in the First/ Second/ Third Boot Device.
Setting: Disabled, Enabled (Default).

Boot Up NumLock Status

It allows you to activate the NumLock function after you power up the system.
Setting: Off, On (Default).

Security Option

It allows you to limit access to the System and Setup.
When you select System, the system prompts for the User Password every time you boot up.
When you select Setup, the system always boots up and prompts for the Supervisor Password only when the Setup utility is called up.
Setting: Setup (Default), System.

APIC Mode

APIC stands for Advanced Programmable Interrupt Controller.
Setting: Disabled, Enabled (Default).

3.5 Advanced Chipset Features

```
         Phoenix - AwardBIOS CMOS Setup Utility
              Advanced Chipset Features
 ┌─────────────────────────────────────────┬──────────────────────┐
 │ On-Chip Frame Buffer Size [ 8MB]         │      Item Help       │
 │ DVMT Mode                 [DVMT]         │                      │
 │ DVMT/FIXED Memory Size    [ 128MB]       │ Menu Level    ▶      │
 │ Boot Display              [CRT]          │                      │
 │ SDVO Panel Nu             [800×600]      │                      │
 │ TV Format                 [NTSC]         │                      │
 │                                          │                      │
 │                                          │                      │
 │                                          │                      │
 │                                          │                      │
 │                                          │                      │
 │                                          │                      │
 │                                          │                      │
 │                                          │                      │
 │                                          │                      │
 ├──────────────────────────────────────────┴─────────────────────┤
 │ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help │
 │    F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults   │
 └──────────────────────────────────────────────────────────────────┘
```
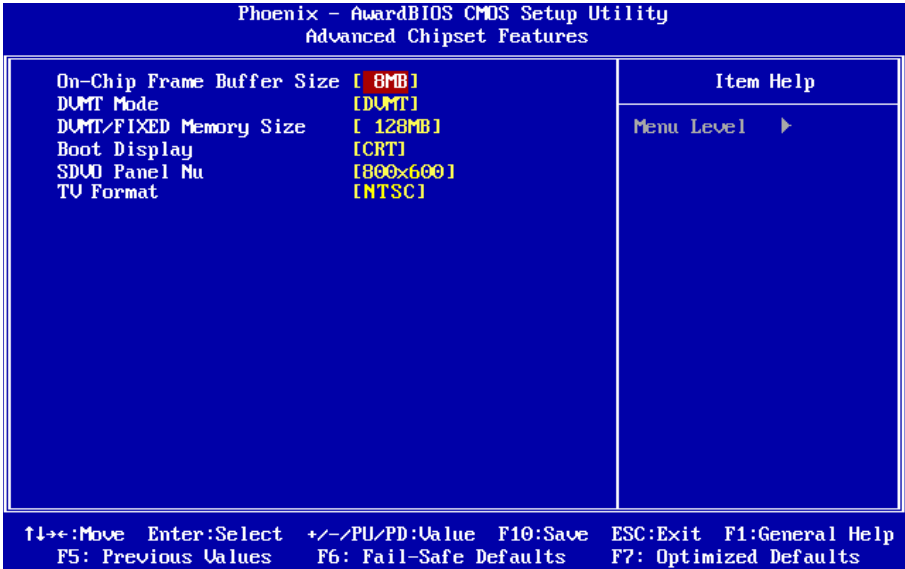
VGA Setting >>>

On-Chip Frame Buffer Size

Setting: 1MB, 8MB (Default).

DVMT Mode

Setting: FIXED, DVMT (Default), BOTH.

DVMT/FIXED Memory Size

Setting: 64MB, 128MB (Default), 224MB.

Boot Display

Setting: CRT (Default), SDVO LVDS, TV, CRT+SDVO LVDS

SDVO Panel Number

It allows you to select the LCD Panel type as below ---
Setting:

800x600 (18)   (Default)
1024x768 (18)
1024x768 (24)
1280x1024 (24D)

TV Format

Setting: NTSC (Default), PAL.

3.6 Integrated Peripherals

```
         Phoenix - AwardBIOS CMOS Setup Utility
                  Integrated Peripherals

 ▶ OnChip IDE Device        [Press Enter]        │    Item Help
 ▶ SuperIO Device           [Press Enter]        │
 ▶ USB Device Setting       [Press Enter]        │ Menu Level    ▶
   Azalia Audio             [Azalia]             │
   Onboard Lan Boot ROM     [Disabled]           │



 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
    F5: Previous Values    F6: Fail-Safe Defaults  F7: Optimized Defaults
```

OnChip IDE Device >>>

```
            Phoenix - AwardBIOS CMOS Set
                     OnChip IDE Device

 IDE HDD Block Mode         [Enabled]
 On-Chip Primary   PCI IDE  [Enabled]
 IDE Primary Master PIO     [Auto]
 IDE Primary Slave  PIO     [Auto]
 IDE Primary Master UDMA    [Auto]
 IDE Primary Slave  UDMA    [Auto]
 On-Chip Serial ATA         [Enhanced Mode]
```

IDE HDD Block Mode

It allows HDD controller to use the fast block mode to transfer data to and from HDD.
Setting: Disabled, Enabled (Default).

On-Chip Primary PCI IDE

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select Enabled to activate each channel separately. Setting: Disabled, Enabled (Default).

IDE Primary Master/Slave PIO

It allows your system HDD controller to run faster.
Rather than having the BIOS issue with a series of commands that transferring to or from the disk drive, PIO (Programmed Input/Output) allows the BIOS to communicate with the controller and CPU directly.
When Auto is selected, the BIOS will select the best available mode.
Setting: Auto (Default), Mode 0, Mode 1, Mode 2, Mode 3, Mode 4.

IDE Primary Master/Slave UDMA

It allows your system to improve disk I/O throughput to 33MB/sec with the Ultra DMA33 feature.
Setting: Disabled, Auto.

SuperIO Device >>>

```
            Phoenix - AwardBIOS CMOS Setup Utility
                        SuperIO Device
┌─────────────────────────────────────────────┬──────────────────────┐
│   Serial Port 1              [3E8]           │      Item Help       │
│   Serial Port 1 Use IRQ      [IRQ10]         │                      │
│   Serial Port 2              [2E8]           │   Menu Level    ▶▶   │
│   Serial Port 2 Use IRQ      [IRQ10]         │                      │
│   Serial Port 3              [4F8]           │                      │
│   Serial Port 3 Use IRQ      [IRQ10]         │                      │
│   Serial Port 4              [4E8]           │                      │
│   Serial Port 4 Use IRQ      [IRQ10]         │                      │
│   Serial Port 1-4 IRQ Share  [Enabled]       │                      │
│   Serial Port 5              [3F8]           │                      │
│   Serial Port 5 Use IRQ      [IRQ4]          │                      │
│   Serial Port 6              [2F8]           │                      │
│   Serial Port 6 Use IRQ      [IRQ3]          │                      │
│   Onboard Parallel Port      [378/IRQ7]      │                      │
│   Parallel Port Mode         [SPP]           │                      │
│   EPP Mode Select            [EPP1.7]        │                      │
│   ECP Mode Use DMA           [3]             │                      │
│   PWRON After PWR-Fail       [Off]           │                      │
├─────────────────────────────────────────────┴──────────────────────┤
│ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help │
│    F5: Previous Values    F6: Fail-Safe Defaults   F7: Optimized Defaults │
└─────────────────────────────────────────────────────────────────────┘
```

Onboard Serial Port 1, 2, 3, 4, 5, 6/ Parallel Port

It allows you to select the serial and parallel ports with their addresses.

Setting:	Serial Port 1	3E8/IRQ10 (Default)
	Serial Port 2	2E8/IRQ10 (Default)
	Serial Port 3	4F8/IRQ10 (Default)
	Serial Port 4	4E8/IRQ10 (Default)
	Serial Port 5	3F8/IRQ4 (Default)
	Serial Port 6	2F8/IRQ3 (Default)
	Parallel Port	378/IRQ7 (Default)

Serial Port 1-4 IRQ Share

If Enabled, Serial Port 1, 2, 3, 4 will use the same IRQ setting by Serial 1 used IRQ control Item.
Note: Windows NT 4.0 does not support IRQ sharing.
Setting: Enabled (Default), Disabled.

Parallel Port Mode

Setting: SPP (Default)
                  EPP
                  ECP
                  ECP+EPP
                  Normal

EPP Mode Select

Setting: EPP1.9, EPP1.7 (Default)

ECP Mode Use DMA

Setting: 1, 3 (Default).

PWRON After PWR-Fail

It sets the system power status whether on or off when power returns to the system from a power failure situation.
Setting: Off (Default), On, Former-Sts.

USB Device Setting >>>

```
          Phoenix - AwardBIOS CMOS Se
                       Onboard Device

  USB 1.0 Controller        [Enabled]
  USB 2.0 Controller        [Enabled]
  USB Operating Mode        [High Speed]
  USB Keyboard Function     [Enabled]
  USB Storage Function      [Enabled]
```
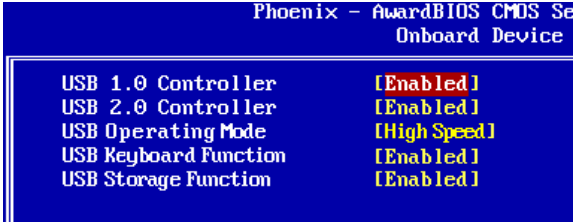
USB 1.0 Controller

Setting: Enabled (Default), Disabled.

USB 2.0 Controller

For using USB 2.0, it is necessary OS drivers must be installed first. Please update your system to at least Windows 2000 SP4 or Windows XP SP2.
Setting: Enabled (Default), Disabled.

USB Operating Mode

High Speed: Auto decide USB device operation mode. If USB device is high Speed device, then it operates in high Speed mode. If USB device is full/ low speed device, then it operates on full/low speed mode.
Full/ Low Speed: All of USB devices operate on Full/ Low speed mode.
Setting: Full/ Low Speed, High Speed (Default).

USB Keyboard Function

Setting: Disabled, Enabled (Default).

USB Storage Function

Setting: Disabled, Enabled (Default).

Azalia Audio

Setting: Azalia (Default), Disabled.

Onboard Lan Boot ROM

Decide whether to invoke the boot ROM of the onboard LAN chip.
Setting: Enabled, Disabled (Default).

3.7 Power Management Setup

```
            Phoenix - AwardBIOS CMOS Setup Utility
                    Power Management Setup

   ACPI Function          [Enabled]              Item Help
   PCI Express PME        [Disabled]
   Soft-Off by PWR-BTTN   [Instant-Off]    Menu Level    ▶
   Wake-Up by PCI card    [Disabled]
   Power On by Ring       [Disabled]










 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
     F5: Previous Values    F6: Fail-Safe Defaults   F7: Optimized Defaults
```
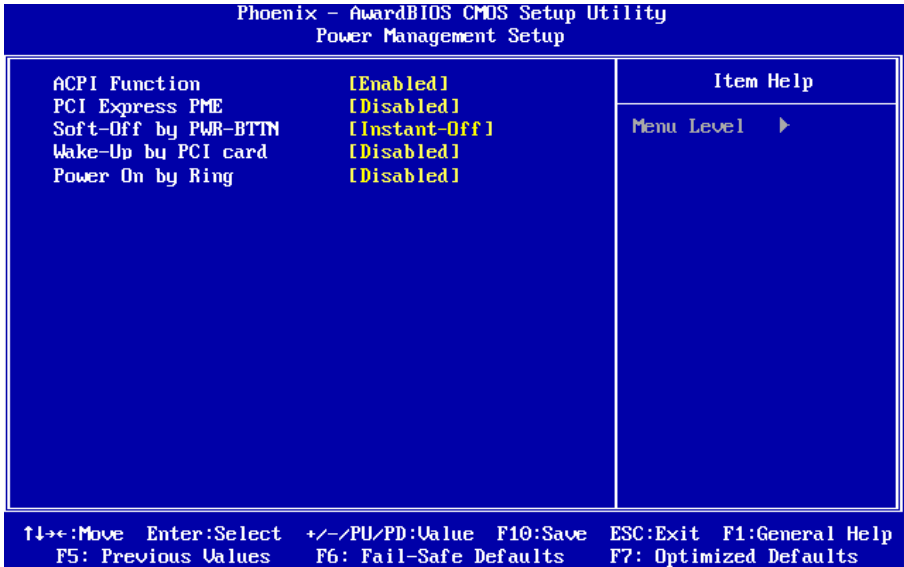
ACPI Function

It supports ACPI (Advance Configuration and Power Interface).
Setting: Enabled (Default), Disabled.

PCI Express PME

Setting: Disabled (Default), Enabled

Soft-Off by PWR-BTTN

It defines the power-off mode when using an ATX power supply.
In the Instant Off mode, It allows powering off immediately upon pressing the power button.
In the Delay 4 Sec mode, the system powers off when the power button is pressed for more than 4 seconds or enters the suspend mode when pressed for less than 4 seconds.
Setting: Instant-off (Default), Delay 4 Sec. .

Wake-Up by PCI Card

It allows the system to wake up from a signal received from a PCI card such as a LAN card.
Setting: Disabled (Default), Enabled.

Power On by Ring

It enables or disables the power on of the system through the modem connected or LAN.
Setting: Disabled (Default), Enabled.

3.8 PNP/PCI Configurations

```
         Phoenix - AwardBIOS CMOS Setup Utility
                 PnP/PCI Configurations
 ┌─────────────────────────────────────────┬─────────────────────┐
 │ Reset Configuration Data  [Disabled]     │      Item Help      │
 │                                          ├─────────────────────┤
 │ Resources Controlled By   [Auto(ESCD)]   │ Menu Level    ▶     │
 │ x IRQ Resources             Press Enter  │                     │
 │                                          │                     │
 │                                          │                     │
 │                                          │                     │
 │                                          │                     │
 │                                          │                     │
 │                                          │                     │
 │                                          │                     │
 │                                          │                     │
 │                                          │                     │
 │                                          │                     │
 │                                          │                     │
 │                                          │                     │
 └──────────────────────────────────────────┴────────────────────┘
 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
          F5:Previous Values          F7: Optimized Defaults
```
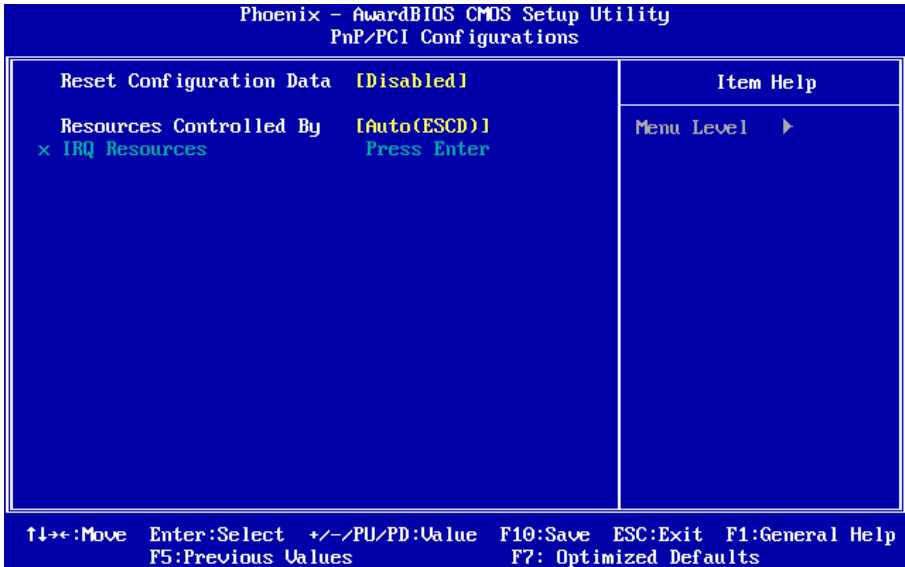
Reset Configuration Data

It allows you to determine whether to reset the configuration data or not.
Setting: Disabled (Default), Enabled.

Resources Controlled By

This PnP BIOS can configure all of the boot and compatible devices with the use of a PnP operating system.
Setting: Auto(ESCD) (Default), Manual.

IRQ Resources

It allows you to configure the IRQ Resources.

3.9 PC Health Status

```
          Phoenix - AwardBIOS CMOS Setup Utility
                      PC Health Status
┌──────────────────────────────────────────┬──────────────────────┐
│ Current System Temp                        │      Item Help        │
│ Current CPU Temperature                    ├──────────────────────┤
│ CPU VCore                                  │ Menu Level    ▶       │
│ 1.5V                                       │                       │
│ VCC3                                       │                       │
│ 5V                                         │                       │
│ VBAT                                       │                       │
│                                            │                       │
│                                            │                       │
│                                            │                       │
│                                            │                       │
│                                            │                       │
│                                            │                       │
└──────────────────────────────────────────┴──────────────────────┘
 ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help
    F5: Previous Values    F6: Fail-Safe Defaults   F7: Optimized Defaults
```
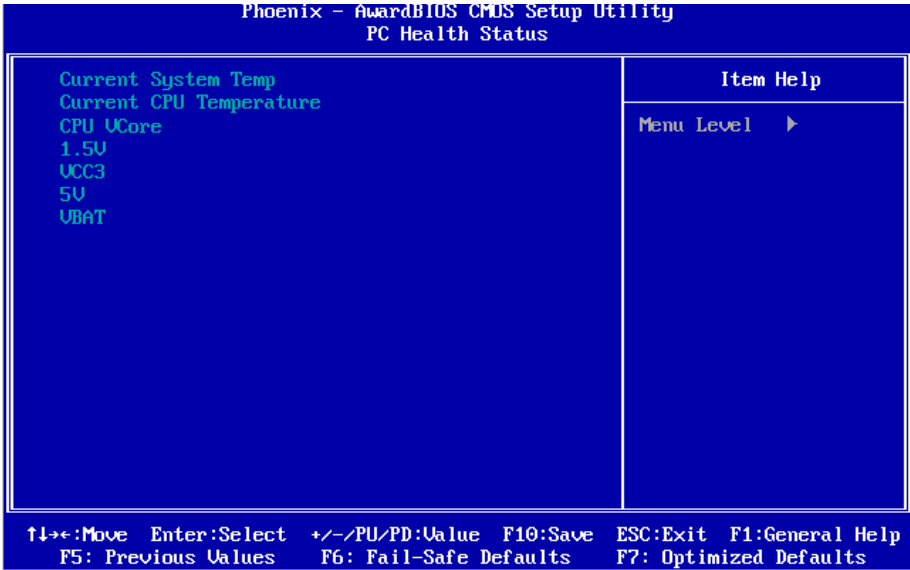
Current System / CPU Temperature
This item shows the internal temperature of System / CPU.

CPU VCore

1.5V/ VCC3/ +5V/ VBAT

3.10 Load Optimized Defaults

```
            Phoenix - AwardBIOS CMOS Setup Utility

  ▶ Standard CMOS Features          ▶ PC Health Status

  ▶ Advanced BIOS Features            Load Optimized Defaults

  ▶ Advanced Chipset Features         Set Password

  ▶ Integrated Peripherals            Save & Exit Setup

  ▶ Power Management        ┌──────────────────────────┐ Saving
                            │  Load Optimized Defaults (Y/N)?  │
  ▶ PnP/PCI Configura       └──────────────────────────┘


  Esc : Quit      F9 : Menu in BIOS      ↑ ↓ → ←   : Select Item
  F10 : Save & Exit Setup

                    Load Optimized Defaults
```
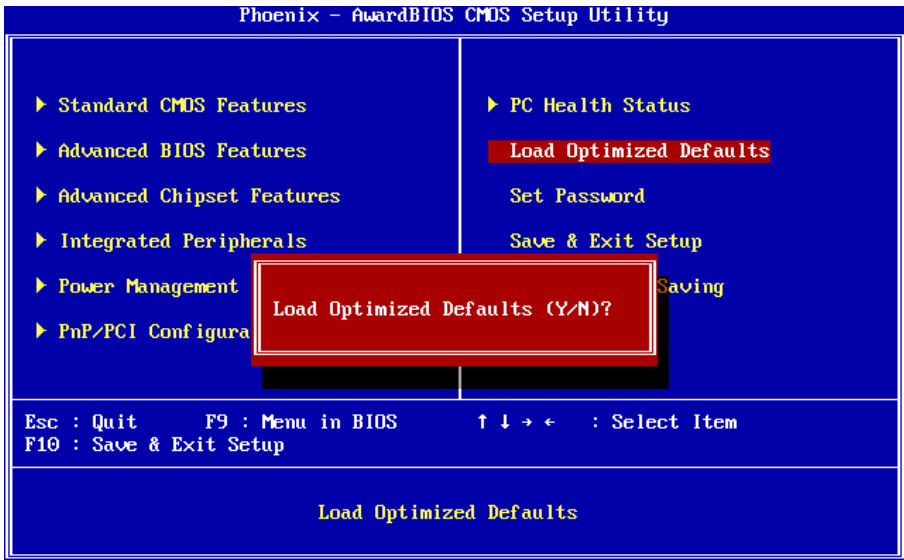
It allows you to load the default values to your system configuration. The default setting is optimal and enabled all high performance features.

3.11 Set Password

```
              Phoenix - AwardBIOS CMOS Setup Utility

    ▶ Standard CMOS Features          ▶ PC Health Status

    ▶ Advanced BIOS Features             Load Optimized Defaults

    ▶ Advanced Chipset Features          Set Password

    ▶ Integrated Peripherals             Save & Exit Setup

    ▶ Power Management Setup             Exit Without Saving

    ▶ PnP/PCI Configurati   Enter Password:


    Esc : Quit      F9 : Menu in BIOS      ↑ ↓ → ←   : Select Item
    F10 : Save & Exit Setup

                    Change/Set/Disable Password
```

Using Password to set 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 on the screen. Type the password, up to eight characters in length, and press <Enter>. And the system confirms your password by asking you to type it again. After setting a password, the screen automatically returns to the main screen.
To disable a password, just press the <Enter> key when you are prompted to enter the password. A message will confirm the password to be disabled. Once the password is disabled, the system will boot, then you can enter BIOS Setup freely.

3.12 Save & Exit Setup

```
              Phoenix - AwardBIOS CMOS Setup Utility

   ▶ Standard CMOS Features           ▶ PC Health Status

   ▶ Advanced BIOS Features              Load Optimized Defaults

   ▶ Advanced Chipset Features           Set Password

   ▶ Integrated Peripherals             Save & Exit Setup

   ▶ Power Management                                        Saving

   ▶ PnP/PCI Configura      SAVE to CMOS and EXIT (Y/N)?


   Esc : Quit      F9 : Menu in BIOS      ↑ ↓ → ←   : Select Item
   F10 : Save & Exit Setup

                       Save Data to CMOS
```
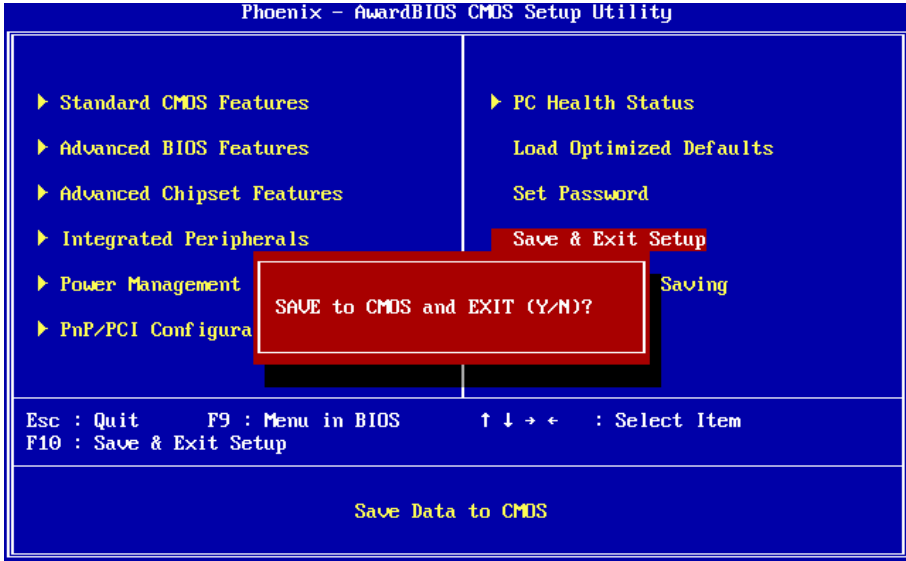
Typing " Y ", you will quit the setup utility and save all the changes into the CMOS memory.
Typing " N ", you will return to Setup utility.

3.13 Exit Without Saving

```
          Phoenix - AwardBIOS CMOS Setup Utility

   ▶ Standard CMOS Features          ▶ PC Health Status

   ▶ Advanced BIOS Features             Load Optimized Defaults

   ▶ Advanced Chipset Features          Set Password

   ▶ Integrated Peripherals            Save & Exit Setup

   ▶ Power Management S             t Saving
                          Quit Without Saving (Y/N)? N
   ▶ PnP/PCI Configurat


   Esc : Quit        F9 : Menu in BIOS      ↑ ↓ → ←   : Select Item
   F10 : Save & Exit Setup

                        Abandon all Data
```
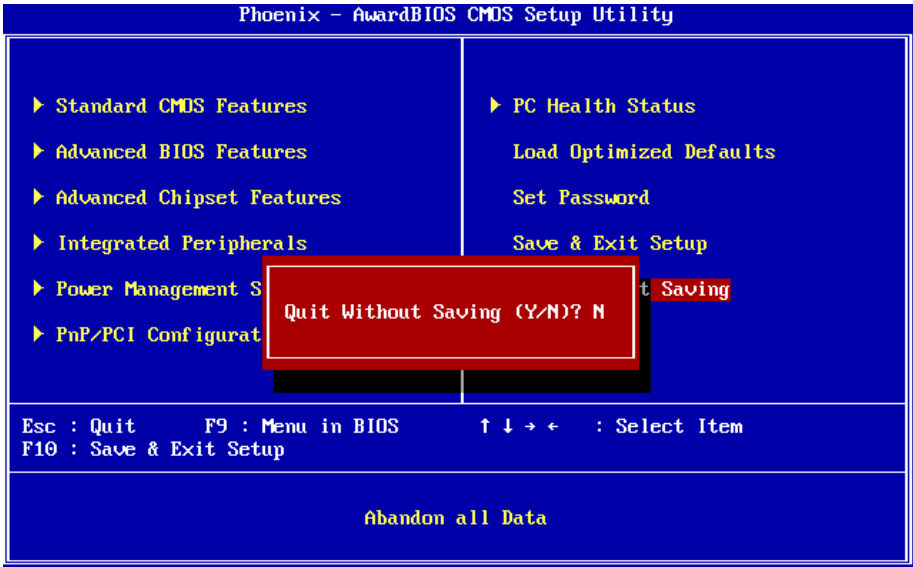
Typing " Y " will quit the Setup utility without saving the modifications.
Typing " N " will return you to Setup utility.

3.14 BIOS Memory Mapping

Address	Device Description
E000:0000h - F000:FFFFh	System BIOS Area
D000:2000h - D000:FFFFh	Free space
D000:0000h - D000:1FFFh	LAN ROM
C000:0000h - C000:FFFFh	VGA BIOS
A000:0000h - B000:FFFFh	VGA RAM
0000:0000h - 9000:FFFFh	DOS 640K

3.15 Award BIOS Post Codes

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
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
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
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
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
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 K6 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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Chapter 4

Appendix

4.1 I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device.
The following table lists the I/O port addresses used.

Address	Device Description
00000000 - 00000CF7	PCI bus
00000060 - 00000060	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
00000064 - 00000064	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
00000070 - 00000073	System CMOS/real time clock
000001F0 - 000001F7	Primary IDE Channel
00000274 - 00000277	ISAPNP Read Data Port
00000279 - 00000279	ISAPNP Read Data Port
000002E8 - 000002EF	Communications Port
000002F8 - 000002FF	Communications Port
00000378 - 0000037F	Printer Port
000003B0 - 000003BB	Mobile Intel® 945 Express Chipset Family
000003C0 - 000003DF	Mobile Intel® 945 Express Chipset Family
000003E8 - 000003EF	Communications Port
000003F0 - 000003F5	Standard floppy disk controller
000003F6 - 000003F6	Primary IDE Channel
000003F7 - 000003F7	Standard floppy disk controller
000003F8 - 000003FF	Communications Port
000004E8 - 000004EF	Communications Port
000004F8 - 000004FF	Communications Port
00000778 - 0000077B	Printer Port
00000D00 - 0000FFFF	PCI bus
00000000 - FFFFFFFF	ISAPNP Read Data Port
0000B000 - 0000BFFF	Intel® 82801G (ICH7 Family) PCI Express Root Port - 27D0

0000BE00 - 0000BEFF	Realtek RTL8168C(P)/8111C(P) PCI-E Gigabit Ethernet NIC
0000C000 - 0000CFFF	Intel® 82801G (ICH7 Family) PCI Express Root Port - 27D4
0000D000 - 0000DFFF	Intel® 82801G (ICH7 Family) PCI Express Root Port - 27D2
0000DE00 - 0000DEFF	Realtek RTL8168C(P)/8111C(P) PCI-E Gigabit Ethernet NIC
0000F500 - 0000F50F	Intel® 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
0000F600 - 0000F603	Intel® 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
0000F700 - 0000F707	Intel® 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
0000F800 - 0000F803	Intel® 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
0000F900 - 0000F907	Intel® 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
0000FA00 - 0000FA0F	Intel® 82801G (ICH7 Family) Ultra ATA Storage Controllers - 27DF
0000FB00 - 0000FB1F	Intel® 82801G (ICH7 Family) USB Universal Host Controller - 27CB
0000FC00 - 0000FC1F	Intel® 82801G (ICH7 Family) USB Universal Host Controller - 27CA
0000FD00 - 0000FD1F	Intel® 82801G (ICH7 Family) USB Universal Host Controller - 27C9
0000FE00 - 0000FE1F	Intel® 82801G (ICH7 Family) USB Universal Host Controller - 27C8
0000FF00 - 0000FF07	Mobile Intel® 945 Express Chipset Family

4.2 Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

Level	Function
IRQ 01	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
IRQ 03	Communications Port
IRQ 04	Communications Port
IRQ 06	Standard floppy disk controller
IRQ 08	System CMOS/real time clock
IRQ 09	Microsoft ACPI-Compliant System
IRQ 10	Communications Port
IRQ 12	PS/2 Compatible Mouse
IRQ 14	Primary IDE Channel
IRQ 16	Intel® 82801G (ICH7 Family) USB Universal Host Controller - 27CB
IRQ 16	Intel® 82801G (ICH7 Family) PCI Express Root Port - 27D0
IRQ 16	Microsoft UAA Bus Driver for High Definition Audio
IRQ 16	Realtek RTL8168C(P)/8111C(P) PCI-E Gigabit Ethernet NIC
IRQ 16	Mobile Intel® 945 Express Chipset Family
IRQ 17	Intel® 82801G (ICH7 Family) PCI Express Root Port - 27D2
IRQ 17	Realtek RTL8168C(P)/8111C(P) PCI-E Gigabit Ethernet NIC
IRQ 18	Intel® 82801G (ICH7 Family) PCI Express Root Port - 27D4
IRQ 18	Intel® 82801G (ICH7 Family) USB Universal Host Controller - 27CA
IRQ 19	Intel® 82801G (ICH7 Family) USB Universal Host Controller - 27C9
IRQ 19	Intel® 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
IRQ 23	Intel® 82801G (ICH7 Family) USB Universal Host Controller - 27C8
IRQ 23	Intel® 82801G (ICH7 Family) USB2 Enhanced Host Controller - 27CC

4.3 Memory Resources

This module contains information about your computer's memory resources.

Memory Resources	Description
D0000000 - DFFFFFFF	Mobile Intel® 945 Express Chipset Family
FD600000 - FD6FFFFF	Intel® 82801G (ICH7 Family) PCI Express Root Port - 27D0
FD6F0000 - FD6FFFFF	Realtek RTL8168C(P)/8111C(P) PCI-E Gigabit Ethernet NIC
FD900000 - FD9FFFFF	Intel® 82801G (ICH7 Family) PCI Express Root Port - 27D0
FD9FF000 - FD9FFFFF	Realtek RTL8168C(P)/8111C(P) PCI-E Gigabit Ethernet NIC
FDA00000 - FDAFFFFF	Intel® 82801G (ICH7 Family) PCI Express Root Port - 27D4
FDB00000 - FDBFFFFF	Intel® 82801G (ICH7 Family) PCI Express Root Port - 27D4
FDC00000 - FDCFFFFF	Intel® 82801G (ICH7 Family) PCI Express Root Port - 27D2
FDCF0000 - FDCFFFFF	Realtek RTL8168C(P)/8111C(P) PCI-E Gigabit Ethernet NIC
FDD00000 - FDDFFFFF	Intel® 82801G (ICH7 Family) PCI Express Root Port - 27D2
FDDFF000 - FDDFFFFF	Realtek RTL8168C(P)/8111C(P) PCI-E Gigabit Ethernet NIC
FDE80000 - FDEFFFFF	Mobile Intel® 945 Express Chipset Family
FDF80000 - FDFBFFFF	Mobile Intel® 945 Express Chipset Family
FDFF8000 - FDFFBFFF	Microsoft UAA Bus Driver for High Definition Audio
FDFFE000 - FDFFE3FF	Intel® 82801GBM/GHM (ICH7-M Family) Serial ATA Storage Controller - 27C4
FDFFF000 - FDFFF3FF	Intel® 82801G (ICH7 Family) USB2 Enhanced Host Controller - 27CC
FEB80000 - FEBFFFFF	Mobile Intel® 945 Express Chipset Family

000A0000 - 000BFFFF	PCI bus
000A0000 - 000BFFFF	Mobile Intel® 945 Express Chipset Family
000C0000 - 000DFFFF	PCI bus
3F700000 - FEBFFFFF	PCI bus

4.4 Watchdog Timer (WDT) Setting

WDT is widely used for industry application to monitoring the activity of CPU. Application software depends on its requirement to trigger WDT with adequate timer setting. Before WDT time out, the functional normal system will reload the WDT. The WDT never time out for a normal system. Then, WDT will time out and reset the system automatically to avoid abnormal operation.

This board supports 255 levels watchdog timer by software programming. Below are the source codes written in assembly & C, please take them for WDT application examples.

Assembly Code

```
;-- Initial W83627HG --
        mov     AX, 2Eh
        mov     DX, AX
        mov     AL, 87h
        out     DX, AX          ;
        out     DX, AX          ; initial W83627HG start
;--
        mov     AX, 2Eh
        mov     DX, AX
        mov     AL, 2Bh
        out     DX, AL          ; Select CR2B
        mov     AL, 00h
        inc     DX
        out     DX, AL          ; Set CR2B bit 4=0, PIN89=WDTO
;--
        mov     AX, 2Eh
        mov     DX, AX
        mov     AL, 07h
        out     DX, AL          ; Point to Logical Device Selector
        mov     AL, 08h
        inc     DX
        out     DX, AL          ; Select Logical Device 8
;--
```

```
        mov     AX, 2Eh
        mov     DX, AX
        mov     AL, 30h
        out     DX, AL          ; select CR30
        mov     AL, 01h
        inc     DX
        out     DX, AL          ; update CR30 to 01h
;--
        mov     AX, 2Eh
        mov     DX, AX
        mov     AL, 0F0h
        out     DX, AL          ; select CRF0
        mov     AL, 00h
        inc     DX
        out     DX, AL          ; set CRF0=00h, output
;--
        mov     AX, 2Eh
        mov     DX, AX
        mov     AL, 0F5h
        out     DX, AL          ; select CRF5, WDT Timer unit
        mov     AL, 00h         ; bit2 =0 ->second ; bit2 =1 -> minute
        inc     DX
        out     DX, AL          ; update CRF5 bit2 to 00h
;--
        mov     AX, 2Eh
        mov     DX, AX
        mov     AL, 0F6h
        out     DX, AL          ; select CRF6, WDT Timer
        mov     AL, 05h
        inc     DX
        out     DX, AL          ; update CRF6 to 5 unit
;---
        mov     AX, 2Eh
        mov     DX, AX
        mov     AL, AAh
        out     DX, AX
;-- end
```

C language Code

```
/*-----    Include Header Area -----*/
#include "math.h"
#include "stdio.h"
#include "dos.h"

/*-----    routing, sub-routing -----*/

void main()

{
        outportb(0x2e, 0x87);       /* initial IO port twice */
        outportb(0x2e, 0x87);

        outportb(0x2e, 0x2B);       /* select CR2B */
        outportb(0x2e+1, 0x00);     /* update CR2B bit4 to 00h */
                                    /* Set PIN89 as WDTO */

        outportb(0x2e, 0x07);       /* point to logical device selector */
        outportb(0x2e+1, 0x08);     /* select logical device 8 */
        outportb(0x2e, 0x30);       /* select CR30 */
        outportb(0x2e+1, 0x01);     /* update CR30 to 01h */
        outportb(0x2e, 0xf0);       /* select CRF0 */
        outportb(0x2e+1, 0x00);     /* update CRF0 to 00h */
        outportb(0x2e, 0xf5);       /* select CRF5 to set timer unit */
        outportb(0x2e+1, 0x00);     /* update CRF5 bit2, 0:sec; 1:Min. */
        outportb(0x2e, 0xF6);       /* select CRF6 */
        outportb(0x2e+1, 0x05);     /* update CRF6 to 05h (5 sec) */

        outportb(0x2e, 0xAA);       /* stop program W83627HG, Exit */
}
```

4.5 Digital I/O Setting

Below are the source codes written in assembly & C, please take them for Digital I/O application examples.

Assembly Code

```
;-- Initial W83627HG --
        mov     AX, 2Eh
        mov     DX, AX
        mov     AL, 87h
        out     DX, AX          ;
        out     DX, AX          ; initial W83627HG start
;--
        mov     AX, 2Eh
        mov     DX, AX
        mov     AL, 2Ah
        out     DX, AL          ; Select CR2A
        mov     AL, 0FCh
        INC     DX
        out     DX, AL          ; Set CR2A bit 7=1 as GPIO port 1
;--
        mov     AX, 2Eh
        mov     DX, AX
        mov     AL, 07h
        out     DX, AL          ; Point to Logical Device Selector
        mov     AL, 07h
        inc     DX
        out     DX, AL          ; Select Logical Device 7
;--
        mov     AX, 2Eh
        mov     DX, AX
        mov     AL, 30h
        out     DX, AL          ; select CR30
        mov     AL, 01h
        inc     DX
        out     DX, AL          ; set bit0=1, GPIO port 1 active
;--
        mov     AX, 2Eh
        mov     DX, AX
        mov     AL, 0F0h
        out     DX, AL          ; select CRF0, GP I/O select
        mov     AL, 00h
```

```
        inc     DX
        OUT     DX, AL          ; bit7~bit0 0:output  1:input
;--
        mov     AX, 2Eh
        mov     DX, AX
        mov     AL, 0F1h
        out     DX, AL          ; select CRF1, Data Register
        mov     AL, 0FFh
        inc     DX
        out     DX, AL          ; set all GPIO pin output 1
;--
        mov     AX, 2Eh
        mov     DX, AX
        mov     AL, 0F1h
        out     DX, AL          ; select CRF1, Data Register
        mov     AL, 000h
        inc     DX
        out     DX, AL          ; set all GPIO pin output 0
;---
        mov     AX, 2Eh
        mov     DX, AX
        mov     AL, AAh
        out     DX, AX
;-- end
```

C language Code

```
/*-----      Include Header Area -----*/
#include "math.h"
#include "stdio.h"
#include "dos.h"

/*-----      routing, sub-routing -----*/

void main()

{
        outportb(0x2e, 0x87);        /* initial IO port twice */
        outportb(0x2e, 0x87);

        outportb(0x2e, 0x2a);        /* Select CR2A */
        outportb(0x2e+1, 0xfc);      /* set CR2A bit7=1 as GPIO port 1*/

        outportb(0x2e, 0x07);        /* point to logical device */
        outportb(0x2e+1, 0x07);      /* select logical device 7 */

        outportb(0x2e, 0x30);        /* select CR30 */
        outportb(0x2e+1, 0x01);      /* set bit0=1, GPIO port 1 active */

        outportb(0x2e, 0xf0);        /* select CRF0, GP I/O select */
        outportb(0x2e+1, 0x00);      /* bit7~bit0 0:output  1:input */

        outportb(0x2e, 0xf1);        /* select CRF1, Data Register */
        outportb(0x2e+1, 0xff);      /* set all GPIO pin output 1 */

        outportb(0x2e, 0xf1);        /* select CRF1, Data Register */
        outportb(0x2e+1, 0x00);      /* set all GPIO pin output 0 */

        outportb(0x2e, 0xAA);        /* stop program W83627HG, Exit */

}
```

Any advice or comments about our products and service, or anything we can help you with please don't hesitate to contact with us. We will do our best to support you for your products, projects and business.

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