

MAT-890

Intel® Pentium® M
Half Size PISA CPU Card

USER'S MANUAL

Version 1.0

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Table of Contents

Introduction.....	1
Product Description	1
Checklist	2
MAT-890 Specifications.....	3
Board Dimensions.....	4
Installations.....	5
Installing the CPU	6
Installing the Memory	7
Setting the Jumpers.....	8
Connectors on MAT-890	13
Watchdog Timer Configuration.....	24
Digital I/O Sample Code.....	28
BIOS Setup	31
Drivers Installation	53
Intel Chipset Software Intallation Utility	54
VGA Drivers Installation	56
AC97 Codec Audio Driver Installation.....	58
Intel PRO LAN Drivers Installation	59
Appendix.....	61
A. I/O Port Address Map.....	61
B. Interrupt Request Lines (IRQ)	62

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Introduction

Product Description

MAT-890 Half Size CPU card incorporates the Intel® advanced 855GME Chipset that contains two core components: the Memory Controller Hub (GMCH) and ICH4. The GMCH integrates a 400MHz Pentium® M processor front side bus controller, integrated graphics controller hub, integrated LVDS interface, two digital video out ports multiplexed with an AGP 4x controller, a 200/266/333 MHz DDR-SDRAM controller, and a high-speed accelerated hub architecture interface for communication with the ICH4.

The ICH4 integrates an Ultra ATA 100/66/33 controller, USB host controller that supports the USB 1.1 and USB 2.0 specification, LPC interface, FWH Flash BIOS interface controller, AC'97 digital controller and a hub interface for communication with the GMCH.

The Pentium® M processor is a higher performance, lower power processor with several microarchitectural enhancements over existing Intel low-power processors. Some key features of the Pentium® M processor microarchitecture include dynamic execution, data pre-fetch logic, 400MHz source-synchronous Front Side Bus (FSB), on-die 1 Mbyte second level cache (on-die 512Kbyte second level cache on Celeron M processor) with advanced transfer cache architecture, streaming SIMD extensions 2 (SSE2), and Enhanced Intel SpeedStep technology.

MAT-890 has the following main features:

- supports Pentium® M / Celeron® M processors with speeds up to 1.6GHz
- 1 DDR DIMM with 1GB capacity
- Integrated VGA with shared memory. Supports CRT/LVDS
- Integrated 10/100 BaseT Ethernet
- Watchdog timer, Digital I/O, PCI to ISA bridge
- Type 2 CF socket on board, Mini PCI slot
- 3 USB (2.0) ports support, 3 serial ports

MAT-890 card has dimensions of 186mm by 129mm.

Checklist

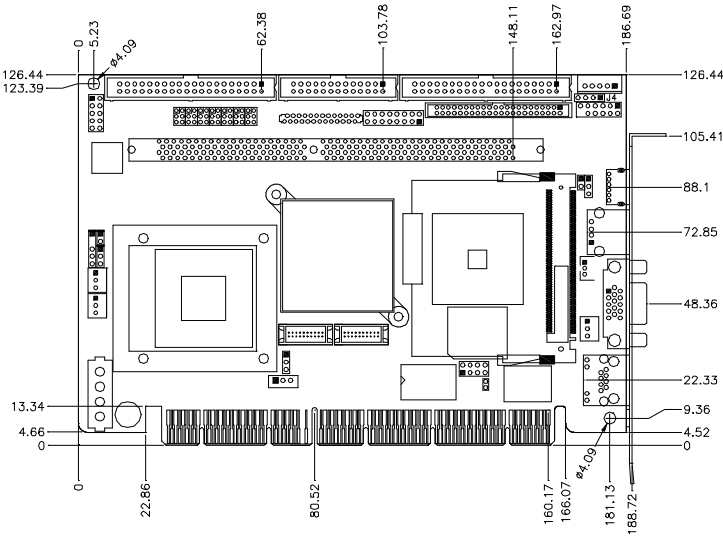
Your MAT-890 package should include the items listed below.

- The MAT-890 Pentium[®] M CPU card
- This User's Manual
- 1 CD containing chipset drivers and flash memory utility
- Optional cables such as:
 - 1 slim FDD Ribbon Cable
 - 2 IDE Ribbon Cables (40-pin & 44-pin)

MAT-890 Specifications

CPU Type	Intel Pentium® M / Celeron® M Processor
CPU Voltage	0.700V~1.708V
System Speed	900M~1.6GHz
CPU Operating Frequency	400MHz
Green /APM	APM1.2
Chipset	Intel 82855GME Chipset GMCH: 82855GME 732-pin Micro-FCBGA ICH4: 82801DB 421-pin BGA FWH
BIOS	Award BIOS, supports ACPI function
Cache	1M Level 2 cache
VGA	Intel 82855GME integrated, support CRT & LVDS interface (Max. 24-bit) DF13 socket x2
LAN	ICH4 integrated LAN controller (10/100Mb) + Phy 82562ET
Audio	ICH4 Built-in Sound controller + AC97 Codec ALC650 6-channel (Line-in, Line-out, MIC) pin header
Memory type	1 x DDR 184-pin DIMM 2.5V (DDR200/266/333MHz), Max. capacity - 1GB, support ECC function
LPC I/O	Winbond 83627HF: IrDax1 Parallel x1, COM1 (RS-232), COM2 (RS-232/RS422/RS485), FDC 1.44MB (Slim), Hardware monitor (3 thermal inputs, 6 voltage monitor inputs , VIDO-5, 2 Fan Header)
Secondary I/O	Fintek F81216D COM3 & COM4 (RS-232) (40pin header COM1~4)
PS/2 Keyboard / Mouse	Winbond 83627HF built-in (controller)
EPP/ECP	Yes
IDE	ICH4 built-in ,IDE1 40pin box header (Ultra DMA 33/66/100) ; IDE2 44pin header 2mm (Ultra DMA 33)
Compact Flash Type II	1 port, uses IDE2 Slave channel
PCI TO ISA	Winbond W83628F & W83629D
Digital I/O	4 IN 4 OUT 2x5 Pin Header
D-type connectors	PS/2 keyboard/ Mouse, VGA CRT), RJ-45, USB x1
Expansion Slots	Mini PCI slot
USB	3 ports, USB 2.0, 2x4 pin header x1
Watchdog Timer	Yes (256 segments, 0,1,2...255. sec/min)
Power Connector	4-pin AT power input
System Voltages	+5V, +12V, 5VSB
Form Factor	PISA board
Dimensions	186mm x 129mm

Board Dimensions



Installations

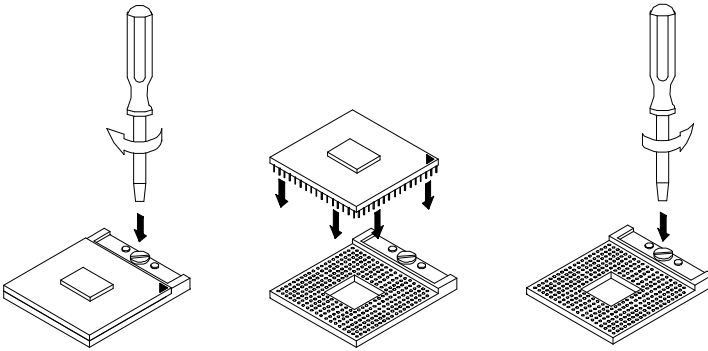
This section provides information on how to use the jumpers and connectors on MAT-890 in order to set up a workable system. The topics covered are:

- Installing the CPU
- Installing the Memory
- Setting the Jumper
- Connectors on MAT-890
- Watchdog Timer Configuration
- Digital I/O Sample Code

Installing the CPU

MAT-890 CPU cardf supports a Socket 479 processor socket for Intel® Pentium® M or Celeron® M processors.

The processor socket comes with a screw to secure the processor. As shown in the left picture below, loosen the screw first before inserting the processor. Place the processor into the socket by making sure the notch on the corner of the CPU corresponds with the notch on the inside of the socket. Once the processor has slide into the socket, fasten the screw. Refer to the figures below.



After you have installed the processor into the socket, check if the jumpers for the CPU type and speed are correct.

NOTE: *Ensure that the CPU heat sink and the CPU top surface are in total contact to avoid CPU overheating problem that would cause your system to hang or be unstable.*

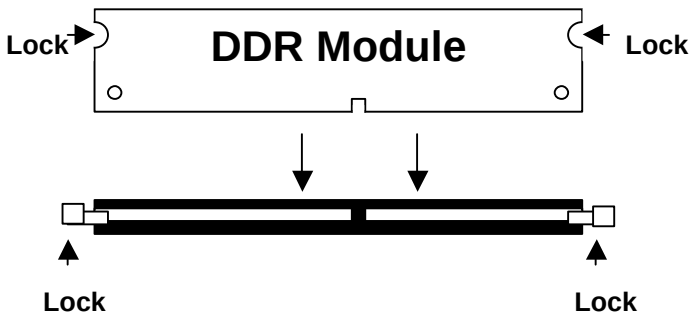
Installing the Memory

MAT-890 card supports one DDR memory sockets for a maximum total memory of 1GB in DDR memory type. The memory module capacities supported are 128MB, 256MB, 512MB and 1GB. The following table lists the supported DDR DIMM configurations. Intel® 855GME supports configurations defined in the JEDEC DDR DIMM specification only. Non-JEDEC standard DIMMs such as double-sided x16 DDR SDRAM DIMMs are not supported.

Installing and Removing Memory Modules

To install the DDR modules, locate the memory slot on the CPU card and perform the following steps:

1. Hold the DDR module so that the key of the DDR module align with those on the memory slot.
2. Gently push the DDR module in an upright position until the clips of the slot close to hold the DDR module in place when the DDR module touches the bottom of the slot.
3. To remove the DDR module, press the clips with both hands.

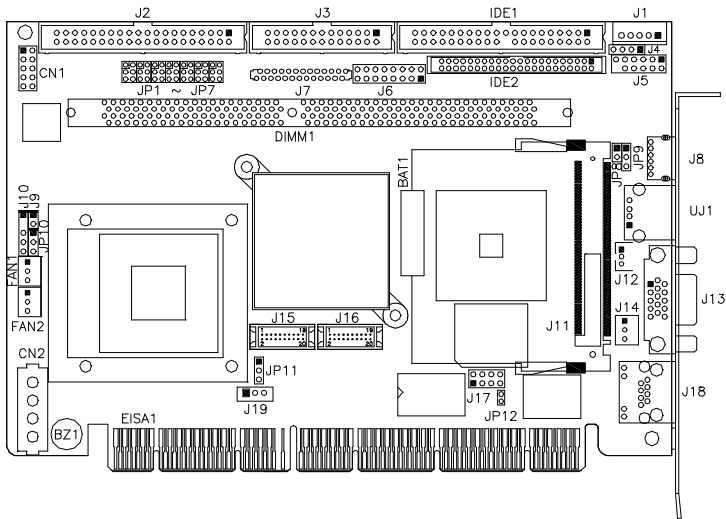


Setting the Jumpers

Jumpers are used on MAT-890 to select various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your needs. The following lists the connectors on MAT-890 and their respective functions.

Jumper Locations on MAT-890.....	9
JP8: Compact Flash Slave/Master	10
JP9: Clear CMOS Contents.....	10
JP10: AT / ATX Power Select.....	10
JP11: LVDS Panel Power.....	10
JP12: Processor Operating Frequency	11
JP5, JP4, JP7: RS232/422/485 (COM2) Selection	11
JP6: COM1 RS232 Pin9 Setting.....	11
JP3: COM2 RS232 Pin9 Setting.....	12
JP1: COM3 RS232 Pin9 Setting.....	12
JP2: COM4 RS232 Pin9 Setting.....	12

Jumper Locations on MAT-890



Jumpers on MAT-890	Page
JP8: Compact Flash Slave/Master	10
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JP3: COM2 RS232 Pin9 Setting.....	12
JP1: COM3 RS232 Pin9 Setting.....	12
JP2: COM4 RS232 Pin9 Setting.....	12

JP8: Compact Flash Slave/Master

JP8	Compact Flash
 Open	Slave
 Short	Master

JP9: Clear CMOS Contents

Use JP9 to clear the CMOS contents. *Note that the ATX-power connector should be disconnected from the CPU card before clearing CMOS.*

JP9	Setting	Function
 1 2 3	Pin 1-2 Short/Closed	Normal
 1 2 3	Pin 2-3 Short/Closed	Clear CMOS

JP10: AT / ATX Power Select

JP10	Power Supply
 1 2 3	ATX
 1 2 3	AT

JP11: LVDS Panel Power

JP11	LVDS Panel Power
 1 2 3	+3.3V (default)
 1 2 3	+5V

JP12: Processor Operating Frequency

JP12	CPU FSB
 Open	133MHz
 Short	100MHz

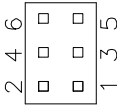
JP5, JP4, JP7: RS232/422/485 (COM2) Selection

COM1 is fixed for RS-232 use only.

COM2 is selectable for RS232, RS-422 and RS-485.

The following table describes the jumper settings for COM2 selection.

COM2 Function	RS-232	RS-422	RS-485
Jumper Setting (pin closed)	JP5: 3-5 & 4-6	JP5: 1-3 & 2-4	JP5: 1-3 & 2-4
	JP4: 3-5 & 4-6	JP4: 1-3 & 2-4	JP4: 1-3 & 2-4
	JP7: 1-2	JP7: 3-4	JP7: 5-6



JP6: COM1 RS232 Pin9 Setting

Pin #	Signal Name	JP6	Signal Name	Pin #
1	RI		+12V	2
3	RI (Default)		RI (Default)	4
5	RI		+5V	6

COM1 Settings: Pin 1-2 short = +12V, Pin 5-6 short = +5V, Pin 3-4 RI Signal (default)

JP3: COM2 RS232 Pin9 Setting

Pin #	Signal Name	JP10	Signal Name	Pin #
1	RI		+12V	2
3	RI (Default)		RI (Default)	4
5	RI		+5V	6

COM1 Settings: Pin 1-2 short = +12V, Pin 5-6 short = +5V, Pin 3-4 RI Signal

JP1: COM3 RS232 Pin9 Setting

Pin #	Signal Name	JP10	Signal Name	Pin #
1	RI		+12V	2
3	RI (Default)		RI (Default)	4
5	RI		+5V	6

COM3 Settings: Pin 1-2 short = +12V, Pin 5-6 short = +5V, Pin 3-4 RI Signal

JP2: COM4 RS232 Pin9 Setting

Pin #	Signal Name	JP10	Signal Name	Pin #
1	RI		+12V	2
3	RI (Default)		RI (Default)	4
5	RI		+5V	6

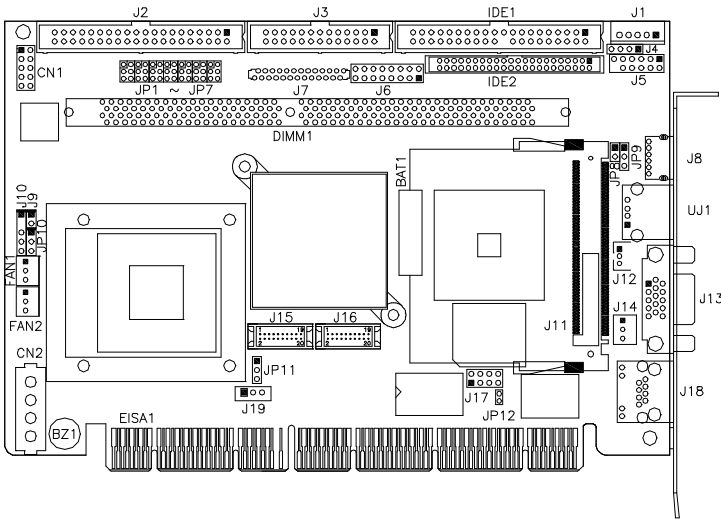
COM4 Settings: Pin 1-2 short = +12V, Pin 5-6 short = +5V, Pin 3-4 RI Signal

Connectors on MAT-890

Connectors on MAT-890 allows you to connect external devices such as keyboard, floppy disk drives, hard disk drives, printers, etc. The following table lists the connectors on MAT-890 and their respective functions.

Connector Locations on MAT-890	14
FAN1: Fan Power Connector.....	15
FAN2: CPU Fan Power Connector	15
IDE1, IDE2: EIDE Connectors.....	15
J1: External Keyboard Connector	16
CN1: Digital 4-in 4-out I/O Connector	16
CN2: AT H2/+5V Power Connector	17
J2: Serial Ports	17
J3: Parallel Port Connector	17
J4: CD-In Audio Connector	18
J5: External Audio Connector	18
J6: System Function Connector	18
J7: Floppy Drive Connector	20
J8: PS/2 Keyboard and Mouse Connector	20
J10: IrDA Connector	20
J12: Wake On LAN Connector	21
J13: VGA CRT Connector.....	21
J14: ATX Power Connector	21
J15, J16: LVDS Connectors (1st channel, 2nd channel).....	22
J17, UJ1: USB Connectors	22
J18: RJ45 Connector	22
J19: Panel Inverter Power Connector	23

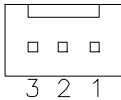
Connector Locations on MAT-890



Connectors on MAT-890	Page
FAN1: Fan Power Connector	15
FAN2: CPU Fan Power Connector	15
IDE1, IDE2: EIDE Connectors	15
J1: External Keyboard Connector	16
CN1: Digital 4-in 4-out I/O Connector	16
CN2: AT H2/+5V Power Connector	17
J2: Serial Ports	17
J3: Parallel Port Connector	17
J4: CD-In Audio Connector	18
J5: External Audio Connector	18
J6: System Function Connector	18
J7: Floppy Drive Connector	20
J8: PS/2 Keyboard and Mouse Connector	20
J10: IrDA Connector	20
J12: Wake On LAN Connector	21
J13: VGA CRT Connector	21
J14: ATX Power Connector	21
J15, J16: LVDS Connectors (1st channel, 2nd channel)	22
J17, UJ1: USB Connectors	22
J18: RJ45 Connector	22
J19: Panel Inverter Power Connector	23

FAN1: Fan Power Connector

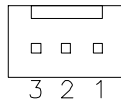
FAN1 is a 3-pin header for fan power. The fan must be a 12V fan.



Pin #	Signal Name
1	Ground
2	+12V
3	Rotation detection

FAN2: CPU Fan Power Connector

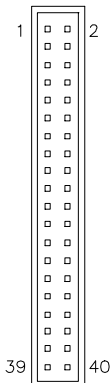
FAN2 is a 3-pin header for the CPU fan. The fan must be a 12V fan.



Pin #	Signal Name
1	Ground
2	+12V
3	Rotation detection

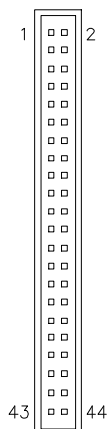
IDE1, IDE2: EIDE Connectors

IDE1: Primary IDE Connector



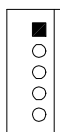
Signal Name	Pin #	Pin #	Signal Name
Reset IDE	1	2	Ground
Host data 7	3	4	Host data 8
Host data 6	5	6	Host data 9
Host data 5	7	8	Host data 10
Host data 4	9	10	Host data 11
Host data 3	11	12	Host data 12
Host data 2	13	14	Host data 13
Host data 1	15	16	Host data 14
Host data 0	17	18	Host data 15
Ground	19	20	Protect pin
DRQ0	21	22	Ground
Host IOW	23	24	Ground
Host IOR	25	26	Ground
IOCHRDY	27	28	Host ALE
DACK0	29	30	Ground
IRQ14	31	32	No connect
Address 1	33	34	No connect
Address 0	35	36	Address 2
Chip select 0	37	38	Chip select 1
Activity	39	40	Ground

IDE2: Secondary IDE Connector



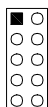
Signal Name	Pin #	Pin #	Signal Name
Reset IDE	1	2	Ground
Host data 7	3	4	Host data 8
Host data 6	5	6	Host data 9
Host data 5	7	8	Host data 10
Host data 4	9	10	Host data 11
Host data 3	11	12	Host data 12
Host data 2	13	14	Host data 13
Host data 1	15	16	Host data 14
Host data 0	17	18	Host data 15
Ground	19	20	Key
DRQ0	21	22	Ground
Host IOW	23	24	Ground
Host IOR	25	26	Ground
IOCHRDY	27	28	Host ALE
DACK0	29	30	Ground
IRQ14	31	32	No connect
Address 1	33	34	No connect
Address 0	35	36	Address 2
Chip select 0	37	38	Chip select 1
Activity	39	40	Ground
Vcc	41	42	Vcc
Ground	43	44	N.C.

J1: External Keyboard Connector



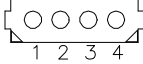
Pin #	J1
1	KB clock
2	KB data
3	N.C.
4	Ground
5	Vcc

CN1: Digital 4-in 4-out I/O Connector



Signal Name	Pin	Pin	Signal Name
Ground	1	2	Vcc
Out3	3	4	Out1
Out2	5	6	Out0
Int3	7	8	Int1
Int2	9	10	Int0

CN2: AT H2/+5V Power Connector



Pin #	Signal Name
1	+12V
2	Ground
3	Ground
4	+5V

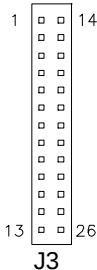
J2: Serial Ports



Pin #	Signal Name (RS-232)
1	DCD, Data carrier detect
2	RXD, Receive data
3	TXD, Transmit data
4	DTR, Data terminal ready
5	Ground
6	DSR, Data set ready
7	RTS, Request to send
8	CTS, Clear to send
9	RI, Ring indicator
10	No Connect.

J3: Parallel Port Connector

The following table describes the pin out assignments of this connector.



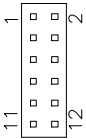
Signal Name	Pin #	Pin #	Signal Name
Line printer strobe	1	14	AutoFeed
PD0, parallel data 0	2	15	Error
PD1, parallel data 1	3	16	Initialize
PD2, parallel data 2	4	17	Select
PD3, parallel data 3	5	18	Ground
PD4, parallel data 4	6	19	Ground
PD5, parallel data 5	7	20	Ground
PD6, parallel data 6	8	21	Ground
PD7, parallel data 7	9	22	Ground
ACK, acknowledge	10	23	Ground
Busy	11	24	Ground
Paper empty	12	25	Ground
Select	13	N/A	N/A

J4: CD-In Audio Connector



Pin #	Signal Name
1	CD Audio R
2	Ground
3	Ground
4	CD Audio L

J5: External Audio Connector



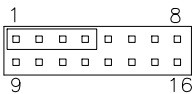
Signal Name	Pin #	Pin #	Signal Name
LINEOUT R	1	2	LINEOUT L
Ground	3	4	Ground
LINEIN R	5	6	LINEIN L
Ground	7	8	Ground
Mic-In	9	10	VREFOUT
Ground	11	12	Protect pin

J6: System Function Connector

J6 provides connectors for system indicators that provide light indication of the computer activities and switches to change the computer status. J5 is a 16-pin header that provides interfaces for the following functions.

Speaker: Pins 1 - 4

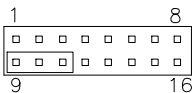
This connector provides an interface to a speaker for audio tone generation. An 8-ohm speaker is recommended.



Pin #	Signal Name
1	Speaker out
2	No connect
3	Ground
4	+5V

Power LED: Pins 9-11

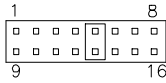
The power LED indicates the status of the main power switch.



Pin #	Signal Name
9	Power LED
10	NC
11	Ground

ATX Power ON Switch: Pins 5 and 13

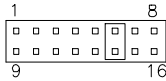
This 2-pin connector is an “ATX Power Supply On/Off Switch” on the system that connects to the power switch on the case. When pressed, the power switch will force the system to power on. When pressed again, it will force the system to power off.



Pin #	Signal Name
5	PS_ON
13	Ground

SMI/Hardware Switch: Pins 6 and 14

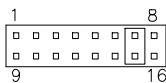
This connector supports the "Green Switch" on the control panel, which, when pressed, will force the system into the power-saving mode immediately.



Pin #	Signal Name
6	SMI
14	Ground

Reset Switch: Pins 7 and 15

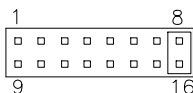
The reset switch allows the user to reset the system without turning the main power switch off and then on again. Orientation is not required when making a connection to this header.



Pin #	Signal Name
7	Reset#
15	Ground

Hard Disk Drive LED Connector: Pins 8 and 16

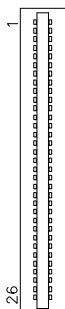
This connector connects to the hard drive activity LED on control panel. This LED will flash when the HDD is being accessed.



Pin #	Signal Name
8	HDD Active
16	5V

J7: Floppy Drive Connector

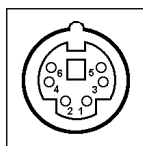
J7 is a slim 26-pin connector and will support up to 2.88MB FDD.



Signal Name	Pin #	Pin #	Signal Name
VCC	1	2	INDEX
VCC	3	4	DRV_SEL
VCC	5	6	DSK_CH
NC	7	8	NC
NC	9	10	MOTOR
DINST	11	12	DIR
NC	13	14	STEP
GND	15	16	WDATA
GND	17	18	WGATE
GND	19	20	TRACK
NC	21	22	WPROT
GND	23	24	RDATA
GND	25	26	SIDE

J8: PS/2 Keyboard and Mouse Connector

J8 uses a Y-cable for a PS/2 keyboard and a PS/2 mouse.

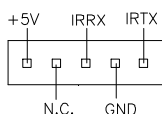


J8

Pin #	Signal Name
1	Mouse data
2	Keyboard data
3	Ground
4	Vcc
5	Mouse Clock
6	Keyboard Clock

J10: IrDA Connector

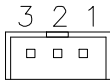
J10 is used for an optional IrDA connector for wireless communication.



Pin #	Signal Name
1	+5V
2	No connect
3	Ir RX
4	Ground
5	Ir TX

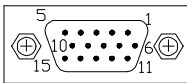
J12: Wake On LAN Connector

J12 is a 3-pin header for the Wake On LAN function on the CPU card. The following table shows the pin out assignments of this connector. Wake On LAN will function properly only with an ATX power supply with 5VSB that has 200mA.



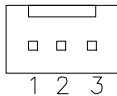
Pin #	Signal Name
1	+5VSB
2	Ground
3	-PME

J13: VGA CRT Connector



Signal Name	Pin	Pin	Signal Name
Red	1	2	Green
Blue	3	4	N.C.
GND	5	6	GND
GND	7	8	GND
N.C.	9	10	GND
N.C.	11	12	N.C.
HSYNC	13	14	VSYNC
NC	15		

J14: ATX Power Connector



Pin #	Signal Name
1	Ground
2	PS_On
3	+5VSB

J15, J16: LVDS Connectors (1st channel, 2nd channel)

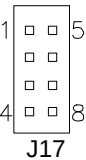
The LVDS connectors are composed of the first channel (J15) and second channel (J16) to support 24-bit or 48-bit.

201

Signal Name	Pin #	Pin #	Signal Name
TX0-	2	1	TX0+
Ground	4	3	Ground
TX1-	6	5	TX1+
5V/3.3V	8	7	Ground
TX3-	10	9	TX3+
TX2-	12	11	TX2+
Ground	14	13	Ground
TXC-	16	15	TXC+
5V/3.3V	18	17	ENABKL
+12V	20	19	+12V

J17, UJ1: USB Connectors

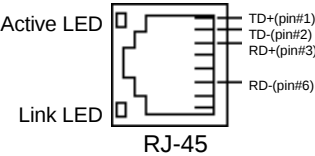
UJ1 is the single-port USB connector that is on the bracket of the CPU card. J17, on the other hand, is a pin header that supports another two USB ports. The following table shows the pin outs of the USB pin header.

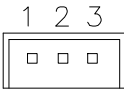


Signal Name	Pin	Pin	Signal Name
Vcc	1	5	Ground
USB0-	2	6	USB1+
USB0+	3	7	USB1-
Ground	4	8	Vcc

J18: RJ45 Connector

J18 is the RJ-45 connector based on the chipset integrated LAN. The figure below shows the pin out assignments of the connector and its corresponding input jack.



J19: Panel Inverter Power Connector

Pin #	Signal Name
1	+12V
2	ENABKL
3	Ground

Watchdog Timer Configuration

The WDT is used to generate a variety of output signals after a user programmable count. The WDT is suitable for use in the prevention of system lock-up, such as when software becomes trapped in a deadlock. Under these sort of circumstances, the timer will count to zero and the selected outputs will be driven. Under normal circumstance, the user will restart the WDT at regular intervals before the timer counts to zero.

SAMPLE CODE:

This code and information is provided "as is" without warranty of any kind, either expressed or implied, including but not limited to the implied warranties of merchantability and/or fitness for a particular purpose.

```
;[=====
; Name  : Enable_And_Set_Watchdog
; IN    : AL - 1sec ~ 255sec
; OUT   : None
;[=====
Enable_And_Set_Watchdog Proc    Near
    push    ax                ;save time interval
    call Unlock_Chip

    mov     cl, 2Bh
    call Read_Reg
    and     al, NOT 10h
    call Write_Reg            ;set GP24 as WDTO

    mov     cl, 07h
    mov     al, 08h
    call Write_Reg            ;switch to LD8
```

```

        mov cl, 0F5h
        call Read_Reg
        and     al, NOT 08h
        call Write_Reg      ;set count mode as second

        pop ax
        mov     cl, 0F6h
        call Write_Reg      ;set watchdog timer

        mov     al, 01h
        mov     cl, 30h
        call Write_Reg      ;watchdog enabled

        call Lock_Chip
        ret
Enable_And_Set_Watchdog Endp
;[=====
; Name : Disable_Watchdog
; IN   : None
; OUT  : None
;[=====
Disable_Watchdog Proc      Near
        call Unlock_Chip

        mov     cl, 07h
        mov     al, 08h
        call Write_Reg      ;switch to LD8

        xor al, al
        mov     cl, 0F6h
        call Write_Reg      ;clear watchdog timer

        xor al, al
        mov     cl, 30h
        call Write_Reg      ;watchdog disabled

        call Lock_Chip
        ret
Disable_Watchdog Endp
;[=====

```

```

; Name : Unlock_Chip
; IN : None
; OUT : None
;[]=====
Unlock_Chip Proc Near
    Mov dx, 4Eh
    mov al, 87h
    out dx, al
    out dx, al
    ret
Unlock_Chip Endp
;[]=====
; Name : Lock_Chip
; IN : None
; OUT : None
;[]=====
Unlock_Chip Proc Near
    mov dx, 4Eh
    mov al, 0AAh
    out dx, al
    ret
Unlock_Chip Endp
;[]=====
; Name : Write_Reg
; IN : CL - register index
; AL - Value to write
; OUT : None
;[]=====
Write_Reg Proc Near
    push ax
    mov dx, 4Eh
    mov al, cl
    out dx, al
    pop ax
    inc dx
    out dx, al
    ret
Write_Reg Endp
;[]=====

```

```
; Name : Read_Reg
; IN: CL - register index
; OUT  : AL - Value to read
;[]=====
===
Read_Reg  Proc    Near
    Mov al, cl
    mov    dx, 4Eh
    out dx, al
    inc dx
    in  al, dx
    ret
Read_Reg  Endp
;[]=====
```

Digital I/O Sample Code

Filename: W627hf.h

```
//=====
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//=====
#ifndef __W627HF_H
#define __W627HF_H                1
//=====
#define W627_IOBASE                0x4E
//=====
#define W627HF_INDEX_PORT    (W627_IOBASE+0)
#define W627HF_DATA_PORT    (W627_IOBASE+1)
//=====
#define W627HF_REG_LD        0x07
//=====
#define W627HF_UNLOCK        0x87
#define W627HF_LOCK          0xAA
//=====
void Set_W627HF_LD( unsigned char);
void Set_W627HF_Reg( unsigned char, unsigned char);
unsigned char Get_W627HF_Reg( unsigned char);
//=====
#endif    // __W627HF_H
```

Filename: W627hf.cpp

```
//=====
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//=====
#include "W627HF.H"
#include <dos.h>
//=====
void Unlock_W627HF (void);
void Lock_W627HF (void);
//=====
void Unlock_W627HF (void)
{
    outportb(W627HF_INDEX_PORT, W627HF_UNLOCK);
    outportb(W627HF_INDEX_PORT, W627HF_UNLOCK);
}
//=====
void Lock_W627HF (void)
{
    outportb(W627HF_INDEX_PORT, W627HF_LOCK);
}
//=====
void Set_W627HF_LD( unsigned char LD)
{
    Unlock_W627HF();
    outportb(W627HF_INDEX_PORT, W627HF_REG_LD);
    outportb(W627HF_DATA_PORT, LD);
    Lock_W627HF();
}
//=====
void Set_W627HF_Reg( unsigned char REG, unsigned char DATA)
{
    Unlock_W627HF();
    outportb(W627HF_INDEX_PORT, REG);
    outportb(W627HF_DATA_PORT, DATA);
    Lock_W627HF();
}
//=====
unsigned char Get_W627HF_Reg( unsigned char REG)
{
    unsigned char Result;
    Unlock_W627HF();
    outportb(W627HF_INDEX_PORT, REG);
    Result = inportb(W627HF_DATA_PORT);
    Lock_W627HF();
    return Result;
}
//=====
File of the Main.cpp
```

```
//=====
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//=====
#include <dos.h>
#include <conio.h>
#include <stdio.h>
#include <stdlib.h>
#include "W627HF.H"
//=====
void ClrKbBuf(void);
int main (int argc, char *argv[]);
//=====
int main (int argc, char *argv[])
{
    unsigned char ucDO = 0;                //data for digital output
    unsigned char ucDI;                    //data for digital input
    unsigned char ucBuf;

    Set_W627HF_LD( 0x07);                  //switch to logic device 7

    Set_W627HF_Reg(0xF1, 0x00);            //clear
    ucDI = Get_W627HF_Reg(0xF1) & 0x0F;

    ClrKbBuf();
    while(1)
    {
        ucDO++;
        Set_W627HF_Reg(0xF1, ((ucDO & 0x0F) << 4));
        ucBuf = Get_W627HF_Reg(0xF1) & 0x0F;
        if (ucBuf != ucDI)
        {
            ucDI = ucBuf;
            printf("Digital I/O Input Changed. Current Data is 0x%X\n",ucDI);
        }

        if (kbhit())
        {
            getch();
            break;
        }
        delay(500);
    }
    return 0;
}
//=====
void ClrKbBuf(void)
{
    while(kbhit())
    {
        getch();
    }
}
//-----
```

BIOS Setup

This chapter describes the different settings available in the Award BIOS that comes with the CPU card. The topics covered in this chapter are as follows:

BIOS Introduction.....	32
BIOS Setup	32
Standard CMOS Setup	34
Advanced BIOS Features.....	37
Advanced Chipset Features	40
Integrated Peripherals	43
Power Management Setup	46
PNP/PCI Configurations	49
PC Health Status	50
Frequency/Voltage Control.....	51
Load Fail-Safe Defaults.....	52
Load Optimized Defaults.....	52
Set Supervisor/User Password	52
Save & Exit Setup	52
Exit Without Saving.....	52

BIOS Introduction

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

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 key immediately allows you to enter the Setup utility. If you are a little bit late pressing the 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 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.

Phoenix - AwardBIOS CMOS Setup Utility

Standard CMOS Features	Frequency/Voltage Control
Advanced BIOS Features	Load Fail-Safe Defaults
Advanced Chipset Features	Load Optimized Defaults
Integrated Peripherals	Set Supervisor Password
Power Management Setup	Set User Password
PnP/PCI Configurations	Save & Exit Setup
PC Health Status	Exit Without Saving
ESC : Quit	↑ ↓ → ← : Select Item
F10 : Save & Exit Setup	
Time, Date, Hard Disk Type...	

The section below the setup items of the Main Menu displays the control keys for this menu. At the bottom of the Main Menu just below the control keys section, there is another section, which displays information on the currently highlighted item in the list.

Note: *If the system cannot boot after making and saving system changes with Setup, the Award BIOS supports an override to the CMOS settings that resets your system to its default.*

Warning: *It is strongly recommended that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both Award and your system manufacturer to provide the absolute maximum performance and reliability. Changing the defaults could cause the system to become unstable and crash in some cases.*

Standard CMOS Setup

“Standard CMOS Setup” choice 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, the onboard battery fails, or the configuration stored in the CMOS memory was lost or damaged.

Phoenix - AwardBIOS CMOS Setup Utility
Standard CMOS Features

Date (mm:dd:yy)	Wed, Apr 28, 2004	Item Help
Time (hh:mm:ss)	00 : 00 : 00	Menu Level >
IDE Primary Master	None	Change the day, month, Year and century
IDE Primary Slave	None	
IDE Secondary Master	None	
IDE Secondary Slave	None	
Drive A	1.44M, 3.5 in.	
Drive B	None	
Video	EGA/VGA	
Halt On	All Errors	
Base Memory	640K	
Extended Memory	129024K	
Total Memory	130048K	

At the bottom of the menu are the control keys for use on this menu. If you need any help in each item field, you can press the <F1> key. It will display the relevant information to help you. The memory display at the lower right-hand side of the menu is read-only. It will adjust automatically according to the memory changed. The following describes each item of this menu.

Date

The date format is:

Day : Sun to Sat
Month : 1 to 12
Date : 1 to 31
Year : 1999 to 2099

To set the date, highlight the “Date” field and use the PageUp/PageDown or +/- keys to set the current time.

Time

The time format is: **Hour : 00 to 23**

Minute : 00 to 59

Second : 00 to 59

To set the time, highlight the “Time” field and use the <PgUp>/<PgDn> or +/- keys to set the current time.

IDE Primary HDDs / IDE Secondary HDDs

The onboard PCI IDE connectors provide Primary and Secondary channels 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.

CYLS :	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

Drive A / Drive B

These fields identify the types of floppy disk drive A or drive B that has been installed in the computer. The available specifications are:

360KB	1.2MB	720KB	1.44MB	2.88MB
5.25 in.	5.25 in.	3.5 in.	3.5 in.	3.5 in.

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.

No errors	The system boot will not be halted for any error that may be detected.
All errors	Whenever the BIOS detects a non-fatal error, the system will stop and you will be prompted.
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.

Advanced BIOS Features

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.

Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features

CPU Feature		ITEM HELP
Virus Warning	Disabled	Menu Level >
CPU L1 and L2 Cache	Enabled	
Quick Power On Self Test	Enabled	
First Boot Device	Floppy	
Second Boot Device	HDD-0	
Third Boot Device	CDROM	
Boot Other Device	Enabled	
Swap Floppy Drive	Disabled	
Boot Up Floppy Seek	Disabled	
Boot Up NumLock Status	On	
Gate A20 Option	Fast	
Typematic Rate Setting	Disabled	
Typematic Rate (Chars/Sec)	6	
Typematic Delay (Msec)	250	
Security Option	Setup	
APIC Mode	Enabled	
MPS Version Control for OS	1.4	
OS Select For DRAM>64MB	Non-OS2	
Report No FDD For WIN 95	Yes	
Small Logo (EPA) Show	Enabled	

CPU Feature

Press Enter to configure the settings relevant to CPU Feature.

Virus Warning

If this option is enabled, an alarm message will be displayed when trying to write on the boot sector or on the partition table on the disk, which is typical of the virus.

CPU L1 and L2 Cache

Cache memory is additional memory that is much 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 items allow you to enable (speed up memory access) or disable the cache function. By default, these items are Enabled.

Quick Power On Self Test

When enabled, this field 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.

First/Second/Third Boot Device

These fields determine the drive that the system searches first for an operating system. The options available include *Floppy*, *LS120*, *HDD-0*, *SCSI*, *CDROM*, *HDD-1*, *HDD-2*, *HDD-3*, *ZIP100*, *USB-FDD*, *USB-CDROM*, *USB-HDD* and *Disable*.

Boot Other Device

These fields allow the system to search for an OS from other devices other than the ones selected in the First/Second/Third Boot Device.

Swap Floppy Drive

This item allows you to determine whether or not to enable Swap Floppy Drive. When enabled, the BIOS swaps floppy drive assignments so that Drive A becomes Drive B, and Drive B becomes Drive A. By default, this field is set to **Disabled**.

Boot Up Floppy Seek

This feature controls whether the BIOS checks for a floppy drive while booting up. If it cannot detect one (either due to improper configuration or its absence), it will flash an error message.

Boot Up NumLock Status

This allows you to activate the NumLock function after you power up the system.

Gate A20 Option

This field allows you to select how Gate A20 is worked. Gate A20 is a device used to address memory above 1 MB.

Typematic Rate Setting

When disabled, continually holding down a key on your keyboard will generate only one instance. When enabled, you can set the two typematic controls listed next. By default, this field is set to **Disabled**.

Typematic Rate (Chars/Sec)

When the typematic rate is enabled, the system registers repeated keystrokes speeds. Settings are from 6 to 30 characters per second.

Typematic Delay (Msec)

When the typematic rate is enabled, this item allows you to set the time interval for displaying the first and second characters. By default, this item is set to **250msec**.

Security Option

This field allows you to limit access to the System and Setup. The default value is **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.

APIC Mode

APIC stands for Advanced Programmable Interrupt Controller. The default setting is **Enabled**.

MPS Version Control for OS

This option specifies the MPS (Multiprocessor Specification) version for your operating system. MPS version 1.4 added extended configuration tables to improve support for multiple PCI bus configurations and improve future expandability. The default setting is **1.4**.

OS Select for DRAM > 64MB

This option allows the system to access greater than 64MB of DRAM memory when used with OS/2 that depends on certain BIOS calls to access memory. The default setting is **Non-OS/2**.

Report No FDD For WIN 95

If you are using Windows 95/98 without a floppy disk drive, select Enabled to release IRQ6. This is required to pass Windows 95/98's SCT test. You should also disable the Onboard FDC Controller in the Integrated Peripherals screen when there's no floppy drive in the system. If you set this feature to Disabled, the BIOS will not report the missing floppy drive to Win95/98.

Small Logo (EPA) Show

The EPA logo appears at the right side of the monitor screen when the system is boot up. The default setting is **Enabled**.

Advanced Chipset Features

This Setup menu controls the configuration of the chipset.

Phoenix - AwardBIOS CMOS Setup Utility
Advanced Chipset Features

		ITEM HELP
DRAM Timing Selectable	By SPD	Menu Level >
CAS Latency Time	2	
Active to Precharge Delay	6	
DRAM RAS# to CAS# Delay	3	
DRAM RAS# Precharge	3	
DRAM Data Integrity Mode	ECC	
MGM Core Frequency	Auto Max 266MHz	
System BIOS Cacheable	Enabled	
Video BIOS Cacheable	Enabled	
Memory Hole at 15M-16M	Disabled	
Delayed Transaction	Enabled	
Delay Prior to Thermal	16 Min	
AGP Aperture Size (MB)	64	
** On-Chip VGA Setting **		
On-Chip VGA	Enabled	
On-Chip Frame Buffer Size	32MB	
Boot Display	CRT+LFT	
Panel Scaling	Auto	
Panel Number	1024x768 18bit SC	

DRAM Timing Selectable

This option refers to the method by which the DRAM timing is selected. The default is **By SPD**.

CAS Latency Time

You can configure CAS latency time in HCLKs as 2 or 2.5 or 3. The system board designer should set the values in this field, depending on the DRAM installed. Do not change the values in this field unless you change specifications of the installed DRAM or the installed CPU.

Active to Precharge Delay

The default setting for the Active to Precharge Delay is **7**.

DRAM RAS# to CAS# Delay

This option allows you to insert a delay between the RAS (Row Address Strobe) and CAS (Column Address Strobe) signals. This delay occurs when the SDRAM is written to, read from or refreshed. Reducing the delay improves the performance of the SDRAM.

DRAM RAS# Precharge

This option sets the number of cycles required for the RAS to accumulate its charge before the SDRAM refreshes. The default setting for the Active to Precharge Delay is **3**.

DRAM Data Integrity Mode

Select ECC if your memory module supports it. The memory controller will detect and correct single-bit soft memory errors. The memory controller will also be able to detect double-bit errors though it will not be able to correct them. This provides increased data integrity and system stability.

MGM Core Frequency

This field sets the frequency of the DRAM memory installed. The default setting is **Auto Max 266MHz**.

System BIOS Cacheable

The setting of *Enabled* allows caching of the system BIOS ROM at F000h-FFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

Video BIOS Cacheable

The Setting *Enabled* allows caching of the video BIOS ROM at C0000h-F7FFFh, resulting in better video performance. However, if any program writes to this memory area, a system error may result.

Memory Hole At 15M-16M

In order to improve performance, certain space in memory can be reserved for ISA cards. This memory must be mapped into the memory space below 16 MB. The choices are *Enabled* and *Disabled*.

Delayed Transaction

The chipset has an embedded 32-bit posted write buffer to support delay transactions cycles. Select *Enabled* to support compliance with PCI specification version 2.1.

Delay Prior to Thermal

This field activates the CPU thermal function after the systems boots for the set number of minutes. The options are *16Min* and *64Min*.

AGP Aperture Size

The field sets aperture size of the graphics. The aperture is a portion of the PCI memory address range dedicated for graphics memory address space. Host cycles that hit the aperture range are forwarded to the AGP without any translation. The default setting is **64M**.

On-Chip VGA

The default setting is **Enabled**.

On-Chip Frame Buffer Size

The default setting is **32MB**. The options available include **1MB**, **4MB**, **8MB** and **16MB**.

Boot Display

The default setting is **CRT+LFT**. The options available include **CRT** and **LVDS**.

Panel Scaling

The default setting is **Auto**. The options available include **On** and **Off**.

Panel Number

These fields allow you to select the LCD Panel type. The default values for these ports are:

640x480	18bit SC
800x600	18bit SC
1024x768	18bit SC
1280x1024	24bit DC
1400x1050	18bit DC
1024x768	24bit SC
1600x1200	24bit DC
1280x1024	18bit DC

Integrated Peripherals

This section sets configurations for your hard disk and other integrated peripherals. The first screen shows three main items for user to select. Once an item selected, a submenu appears. Details follow.

Phoenix - AwardBIOS CMOS Setup Utility
Integrated Peripherals

OnChip IDE Device	Press Enter	ITEM HELP
Onboard Device	Press Enter	Menu Level >
SuperIO Device	Press Enter	
SecondIO Device	Press Enter	

Phoenix - AwardBIOS CMOS Setup Utility
OnChip IDE Device

On-Chip Primary PCI IDE	Enabled	ITEM HELP
IDE Primary Master PIO	Auto	Menu Level >
IDE Primary Slave PIO	Auto	
IDE Primary Master UDMA	Auto	
IDE Primary Slave UDMA	Auto	
On-Chip Secondary PCI IDE	Enabled	
IDE Secondary Master PIO	Auto	
IDE Secondary Slave PIO	Auto	
IDE Secondary Master UDMA	Auto	
IDE Secondary Slave UDMA	Auto	
IDE HDD Block Mode	Enabled	

Phoenix - AwardBIOS CMOS Setup Utility
Onboard Device

USB Controller	Enabled	ITEM HELP
USB 2.0 Controller	Enabled	Menu Level >
USB Keyboard Support	Disabled	
USB Mouse Support	Disabled	
AC97 Audio	Auto	
Init Display First	PCI Slot	
Integrated LAN	Enabled	

Phoenix - AwardBIOS CMOS Setup Utility
SuperIO Device

Onboard FDC Controller	Enabled	ITEM HELP
Onboard Serial Port 1	3F8/IRQ4	Menu Level >
Onboard Serial Port 2	2F8/IRQ3	
UART Mode Select	Normal	
RxD , TxD Active	Hi, Lo	
IR Transmission Delay	Disabled	
UR2 Duplex Mode	Half	
Use IR Pins	IR-RxTx2	
Onboard Parallel Port	378/IRQ7	
Parallel Port Mode	SPP	
EPP Mode Select	EPP1.7	
ECP Mode Use DMA	3	

Onboard Serial Port 3	Disabled	ITEM HELP
Serial Port 3 Use IRQ	IRQ10	Menu Level >
Onboard Serial Port 4	Disabled	
Serial Port 4 Use IRQ	IRQ11	

OnChip Primary/Secondary PCI IDE

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select *Enabled* to activate each channel separately.

IDE Primary/Secondary Master/Slave PIO

These fields allow your system hard disk controller to work faster. Rather than have the BIOS issue a series of commands that transfer to or from the disk drive, PIO (Programmed Input/Output) allows the BIOS to communicate with the controller and CPU directly.

The system supports five modes, numbered from 0 (default) to 4, which primarily differ in timing. When Auto is selected, the BIOS will select the best available mode.

IDE Primary/Secondary Master/Slave UDMA

These fields allow your system to improve disk I/O throughput to 33Mb/sec with the Ultra DMA/33 feature. The options are *Auto* and *Disabled*.

IDE HDD Block Mode

This field allows your hard disk controller to use the fast block mode to transfer data to and from your hard disk drive.

USB Controller

The options for this field are *Enabled* and *Disabled*. By default, this field is set to *Enabled*.

USB 2.0 Controller

The options for this field are *Enabled* and *Disabled*. By default, this field is set to *Enabled*. In order to use USB 2.0, necessary OS drivers must be installed first. ***Please update your system to Windows 2000 SP4 or Windows XP SP1.***

USB Keyboard Support

The options for this field are *Enabled* and *Disabled*. By default, this field is set to *Disabled*.

USB Mouse Support

The options for this field are *Enabled* and *Disabled*. By default, this field is set to ***Disabled***.

AC97 Audio

The default setting of the AC97 Audio is ***Auto***.

Init Display First

The default setting is ***PCI Card***. This determines which VGA controller is initialized when the system boots.

Integrated LAN

The default setting of the LAN controller is ***Enabled***.

Onboard FDC Controller

Select *Enabled* if your system has a floppy disk controller (FDC) installed on the motherboard and you wish to use it. If you install an add-in FDC or the system has no floppy drive, select *Disabled* in this field. This option allows you to select the onboard FDD port.

Onboard Serial/Parallel Port

These fields allow you to select the onboard serial and parallel ports and their addresses. The default values for these ports are:

Serial Port 1	3F8/IRQ4
Serial Port 2	2F8/IRQ3
Serial Port 3	Disabled
Serial Port 4	Disabled
Parallel Port	378H/IRQ7

UART Mode Select

This field determines the UART 2 mode in your computer. The default value is ***Normal***. Other options include *IrDA* and *ASKIR*.

Parallel Port Mode

This field allows you to determine parallel port mode function.

SPP	Standard Printer Port
EPP	Enhanced Parallel Port
ECP	Extended Capabilities Port

Power Management Setup

The Power Management Setup allows you to save energy of your system effectively.

Phoenix - AwardBIOS CMOS Setup Utility
Power Management Setup

		ITEM HELP
Power-Supply Type	ATX	
ACPI Function	Enabled	
Power Management	User Define	Menu Level >
Video Off Method	V/H SYNC+Blank	
Video Off In Suspend	Yes	
Suspend Type	Stop Grant	
Modem Use IRQ	3	
Suspend Mode	Disabled	
HDD Power Down	Disabled	
Soft-Off by PWR-BTTN	Instant-Off	
CPU THRM-Throttling	50%	
Wake-Up by PCI Card	Disabled	
Power On by Ring	Disabled	
Resume by Alarm	Disabled	
Date (of Month) Alarm	0	
Time (hh:mm:ss) Alarm	0 : 0 : 0	
** Reload Global Timer Events **		
Primary IDE 0	Enabled	
Primary IDE 1	Enabled	
Secondary IDE 0	Enabled	
Secondary IDE 1	Enabled	
FDD, COM, LPT Port	Enabled	
PCI PIRQ[A-D] #	Enabled	

Power Supply Type

Use this field to select the power supply type used in the system. The default setting is **ATX**.

ACPI Function

Enable this function to support ACPI (Advance Configuration and Power Interface).

Power Management

This field allows you to select the type of power saving management modes. There are four selections for Power Management.

Min. Power Saving	Minimum power management
Max. Power Saving	Maximum power management.
User Define	Each of the ranges is from 1 min. to 1hr. Except for HDD Power Down which ranges from 1 min. to 15 min.

Video Off Method

This field defines the Video Off features. There are three options.

V/H SYNC + Blank	Default setting, blank the screen and turn off vertical and horizontal scanning.
DPMS	Allows BIOS to control the video display.
Blank Screen	Writes blanks to the video buffer.

Video Off In Suspend

When enabled, the video is off in suspend mode. The default setting is **Yes**.

Suspend Type

The default setting for the Suspend Type field is **Stop Grant**.

Modem Use IRQ

This field sets the IRQ used by the Modem. By default, the setting is **3**.

Suspend Mode

When enabled, and after the set time of system inactivity, all devices except the CPU will be shut off.

HDD Power Down

When enabled, and after the set time of system inactivity, the hard disk drive will be powered down while all other devices remain active.

Soft-Off by PWRBTN

This field defines the power-off mode when using an ATX power supply. The *Instant Off* mode 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 four seconds or enters the suspend mode when pressed for less than 4 seconds.

CPU THRM-Throttling

When the system enters Doze mode, the CPU clock runs only part of the time. You may select the percent of time that the clock runs.

Wake up by PCI Card

By default, this field is disabled.

Power On by Ring

This field enables or disables the power on of the system through the modem connected to the serial port or LAN.

Resume by Alarm

This field enables or disables the resumption of the system operation. When enabled, the user is allowed to set the *Date* and *Time*.

Reload Global Timer Events

The HDD, FDD, COM, LPT Ports, and PCI PIRQ are I/O events that can prevent the system from entering a power saving mode or can awaken the system from such a mode. When an I/O device wants to gain the attention of the operating system, it signals this by causing an IRQ to occur. When the operating system is ready to respond to the request, it interrupts itself and performs the service.

PNP/PCI Configurations

This option configures the PCI bus system. All PCI bus systems on the system use INT#, thus all installed PCI cards must be set to this value.

Phoenix - AwardBIOS CMOS Setup Utility
PnP/PCI Configurations

PNP OS Installed	No	ITEM HELP
Reset Configuration Data	Disabled	Menu Level
Resources Controlled By	Auto (ESCD)	Select Yes if you are using a Plug and Play capable operating system Select No if you need the BIOS to configure non-boot devices
IRQ Resources	Press Enter	
DMA Resources	Press Enter	
PCI/VGA Palette Snoop	Disabled	

PNP OS Installed

Enable the PNP OS Installed option if it is supported by the operating system installed. The default value is **No**.

Reset Configuration Data

This field allows you to determine whether to reset the configuration data or not. The default value is **Disabled**.

Resources Controlled by

This PnP BIOS can configure all of the boot and compatible devices automatically with the use of a use a PnP operating system such as Windows 95.

PCI/VGA Palette Snoop

Some non-standard VGA display cards may not show colors properly. This field allows you to set whether or not MPEG ISA/VESA VGA cards can work with PCI/VGA. When this field is enabled, a PCI/VGA can work with an MPEG ISA/VESA VGA card. When this field is disabled, a PCI/VGA cannot work with an MPEG ISA/VESA card.

PC Health Status

This section shows the parameters in determining the PC Health Status. These parameters include temperatures, fan speeds and voltages.

Phoenix - AwardBIOS CMOS Setup Utility
PC Health Status

		ITEM HELP
CPU Warning Temperature	75°C/167°F	Menu Level >
System Temp.	45°C/113°F	
CPU Temp	52°C/125°F	
CPU FAN Speed (FAN2)	5400 RPM	
System FAN Speed (FAN1)	5463 RPM	
Vcore(V)	1.02 V	
VGMCH(V)	1.32 V	
+3.3V	3.32 V	
+5V	4.94 V	
+12V	12.03 V	
-12V	-11.86V	
VBAT	3.21 V	
5VSB(V)	4.96 V	
Shutdown Temperature	Disabled	

CPU Warning Temperature

This field allows the user to set the temperature so that when the temperature is reached, the system sounds a warning. This function can help prevent damage to the system that is caused by overheating.

Temperatures/Voltages

These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status.

Shutdown Temperature

This field allows the user to set the temperature by which the system automatically shuts down once the threshold temperature is reached. This function can help prevent damage to the system that is caused by overheating.

Frequency/Voltage Control

This section shows the user how to configure the processor frequency.

Phoenix - AwardBIOS CMOS Setup Utility
Frequency/Voltage Control

Auto Detect PCI Clk	Disabled	ITEM HELP
Spread Spectrum Modulated	Disabled	Menu Level >

Auto Detect PCI Clk

This field enables or disables the auto detection of the PCI clock.

Spread Spectrum Modulated

This field sets the value of the spread spectrum. The default setting is **Disabled**. This field is for CE testing use only.

Load Fail-Safe Defaults

This option allows you to load the troubleshooting default values permanently stored in the BIOS ROM. These default settings are non-optimal and disable all high-performance features.

Load Optimized Defaults

This option allows you to load the default values to your system configuration. These default settings are optimal and enable all high performance features.

Set Supervisor 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 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.

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 and you can enter Setup freely.

Save & Exit Setup

This option allows you to determine whether or not to accept the modifications. If you type “Y”, you will quit the setup utility and save all changes into the CMOS memory. If you type “N”, you will return to Setup utility.

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 the modifications. Typing “N” will return you to Setup utility.

Drivers Installation

This section describes the installation procedures for software and drivers under the Windows 98SE, Windows ME, Windows 2000 and Windows XP. The software and drivers are included with the motherboard. If you find the items missing, please contact the vendor where you made the purchase. The contents of this section include the following:

Intel Chipset Software Intallation Utility	54
VGA Drivers Installation	56
AC97 Codec Audio Driver Installation.....	58
Intel PRO LAN Drivers Installation	59

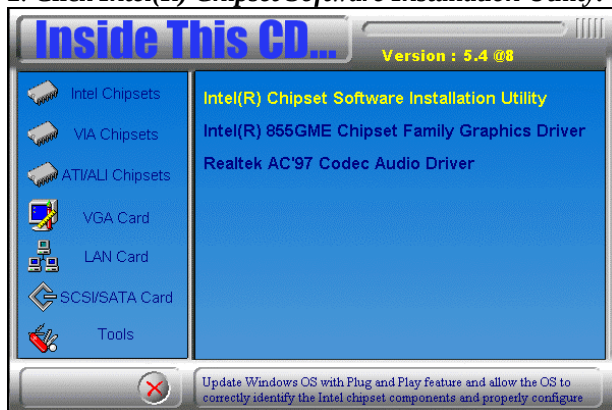
IMPORTANT NOTE:

After installing your Windows operating system (Windows 98SE/ME/2000/XP), you must install first the Intel Chipset Software Installation Utility before proceeding with the drivers installation.

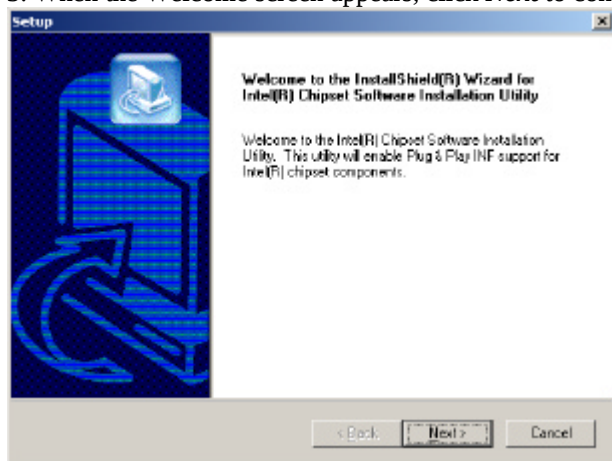
Intel Chipset Software Installation Utility

The Intel Chipset Drivers should be installed first before the software drivers to enable Plug & Play INF support for Intel chipset components. Follow the instructions below to complete the installation under Windows 98SE/ME/2000/XP.

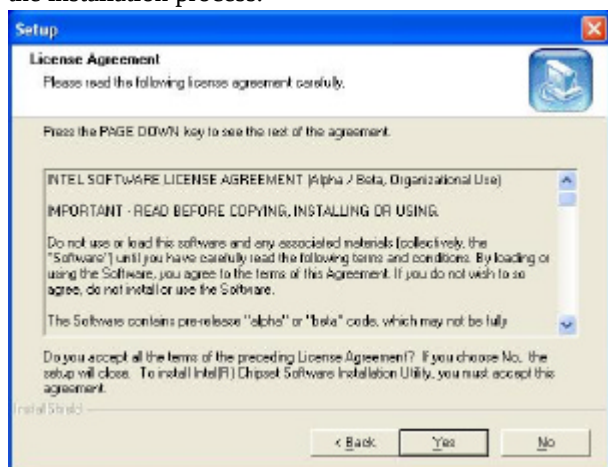
1. Insert the CD that comes with the CPU card. Click **Intel Chipsets** and then **Intel(R) 855GME Chipset Drivers**.
2. Click **Intel(R) Chipset Software Installation Utility**.



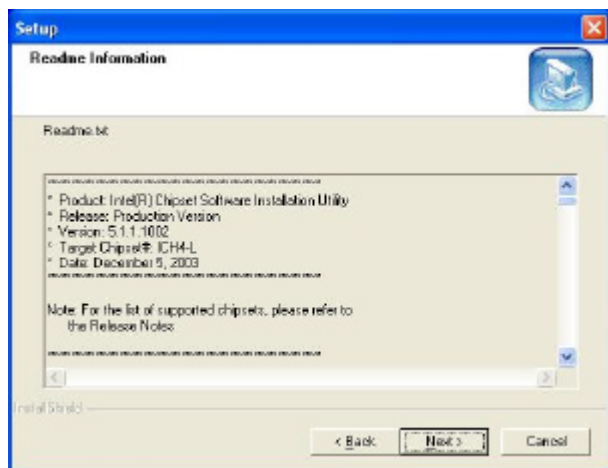
3. When the Welcome screen appears, click **Next** to continue.



4. Click **Yes** to accept the software license agreement and proceed with the installation process.



5. On Readme Information screen, click **Next** to continue the installation.



6. The Setup process is now complete. Click **Finish** to restart the computer and for changes to take effect. When the computer has restarted, the system will be able to find some devices. Restart your computer when prompted.

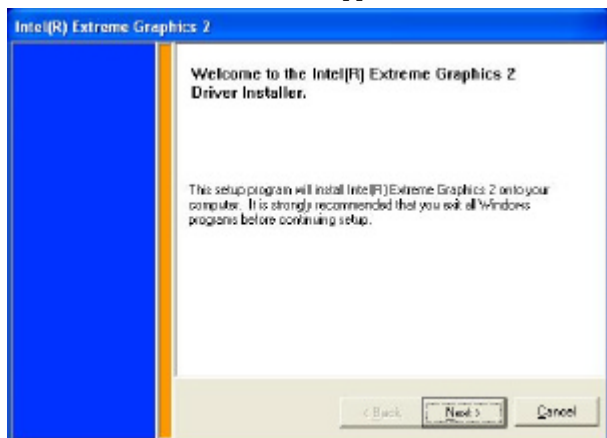
VGA Drivers Installation

To install the VGA drivers, follow the steps below to proceed with the installation.

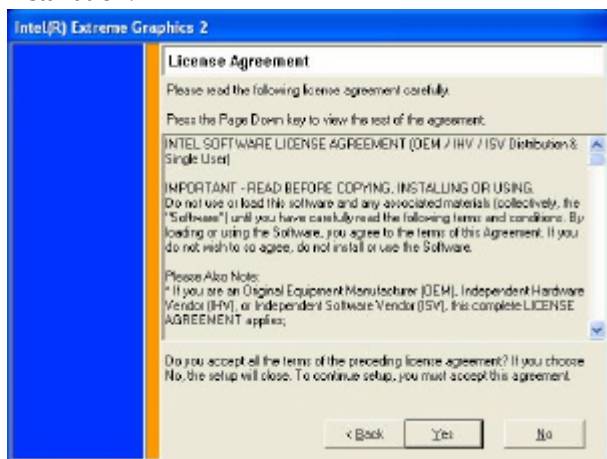
1. Insert the CD that comes with the motherboard. Click **Intel Chipsets** and then **Intel(R) 855GME Chipset Drivers**.
2. Click **Intel(R) 855GME Chipset Family Graphics Driver**.



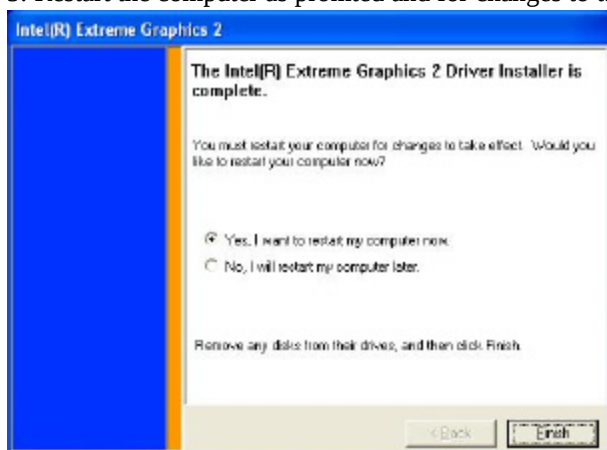
3. When the Welcome screen appears, click **Next** to continue.



4. Click **Yes** to agree with the license agreement and continue the installation.



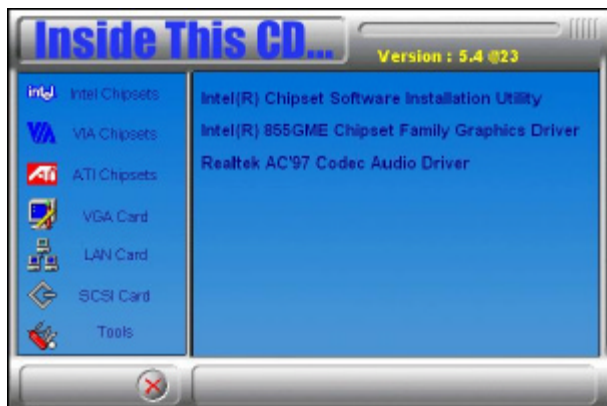
5. Restart the computer as prompted and for changes to take effect.



AC97 Codec Audio Driver Installation

Follow the steps below to install the Realtek AC97 Codec Audio Drivers.

1. Insert the CD that comes with the motherboard. Click **Intel Chipsets** and then **Intel(R) 855GME Chipset Drivers**.
2. Click **Realtek AC'97 Codec Audio Driver**.

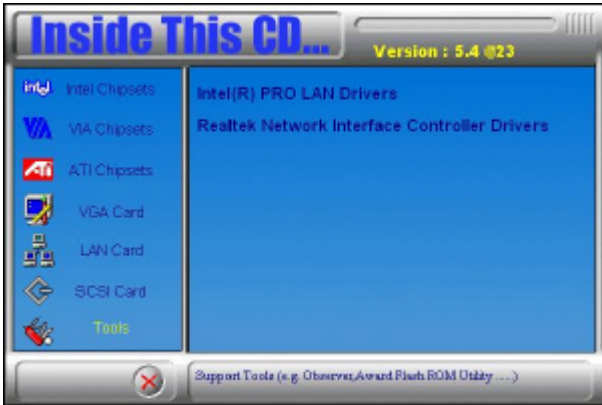


3. Click **Finish** to restart the computer and for changes to take effect. .

Intel PRO LAN Drivers Installation

Follow the steps below to complete the installation of the Intel PRO LAN drivers.

1. Insert the CD that comes with the motherboard. Click **LAN Card** and then **Intel(R) PRO LAN Drivers**.



2. Click **Install Base Software** to continue.



3. When prompted, please to restart the computer for new settings to take effect.

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Appendix

A. 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
000h - 01Fh	DMA Controller #1
020h - 03Fh	Interrupt Controller #1
040h - 05Fh	Timer
060h - 06Fh	Keyboard Controller
070h - 07Fh	Real Time Clock, NMI
080h - 09Fh	DMA Page Register
0A0h - 0BFh	Interrupt Controller #2
0C0h - 0DFh	DMA Controller #2
0F0h	Clear Math Coprocessor Busy Signal
0F1h	Reset Math Coprocessor
1F0h - 1F7h	IDE Interface
278h - 27Fh	Parallel Port #2(LPT2)
2F8h - 2FFh	Serial Port #2(COM2)
2B0h - 2DFh	Graphics adapter Controller
378h - 3FFh	Parallel Port #1(LPT1)
360h - 36Fh	Network Ports
3B0h - 3BFh	Monochrome & Printer adapter
3C0h - 3CFh	EGA adapter
3D0h - 3DFh	CGA adapter
3F0h - 3F7h	Floppy Disk Controller
3F8h - 3FFh	Serial Port #1(COM1)

B. 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
IRQ0	System Timer Output
IRQ1	Keyboard
IRQ2	Interrupt Cascade
IRQ3	Serial Port #2
IRQ4	Serial Port #1
IRQ5	Reserved
IRQ6	Floppy Disk Controller
IRQ7	Parallel Port #1
IRQ8	Real Time Clock
IRQ9	Reserved
IRQ10	Reserved
IRQ11	Reserved
IRQ12	PS/2 Mouse
IRQ13	80287
IRQ14	Primary IDE
IRQ15	Secondary IDE