MB800

Pentium 4 Intel 845G
Industrial Motherboard

USER'S MANUAL

Version 1.0

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Introduction

Product Description

The world's first Pentium 4 industrial motherboard, MB800, is based on the Intel 845G chipset. It packs the key features of the 845G chipset, including 533MHz processor side bus and integrated LAN and graphics. The 845G chipset includes Intel's new ICH4 I/O control hub that supports USB 2.0 with peak transfer rate of up to 480Mbps.

The AGP4X integrated graphics supports interface such as TV out, LVDS and CRT. It can have up to DVMT 64MB shared memory. One-channel and dual-channel digital display are supported with resolutions of up to 1600x1200 and 2048x1536 @ 60Hz respectively.

The MB800 motherboard supports Pentium 4 processors of up to 2.6GHz+ and comes optionally with a secondary LAN that supports either up to 1000Mb/s (Gigabit LAN) or 100Mb/s data transfer rate. Two DDR slots on board support up to 2GB of DDR200/266 non-ECC DDR SDRAM modules. Hardware monitoring is available with the Winbond W83627HF chipset on board.

Other special features of the board includes 256-level watchdog timer, DiskOnChip socket, digital I/O (4 in / 4 out) and PCI to ISA bridge. Measuring 305mm by 244mm, MB800 also has an AGP slot, three PCI slots, three ISA slots and a MicroPCI socket. With ISA slots on board and a long life cycle, MB800 is the powerful platform of choice for industrial applications.

Checklist

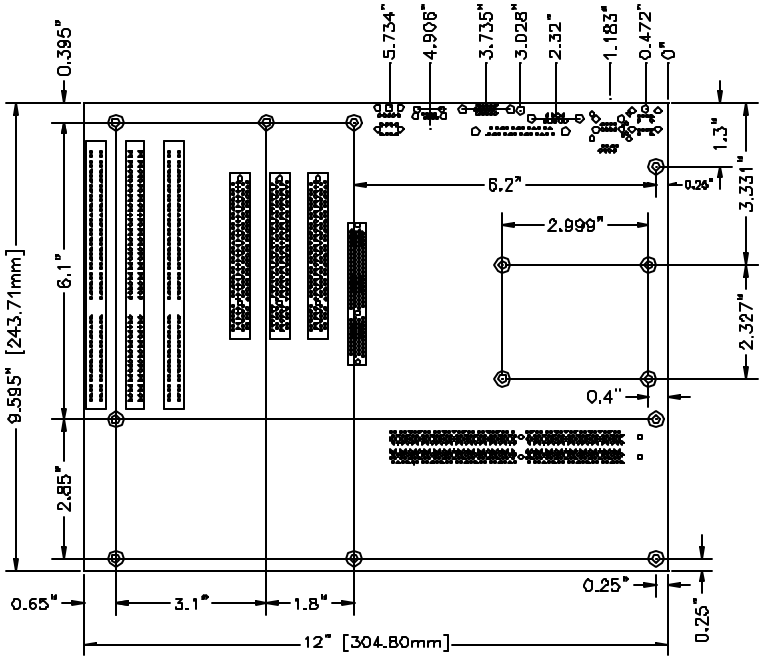
Your MB800 package should include the items listed below.

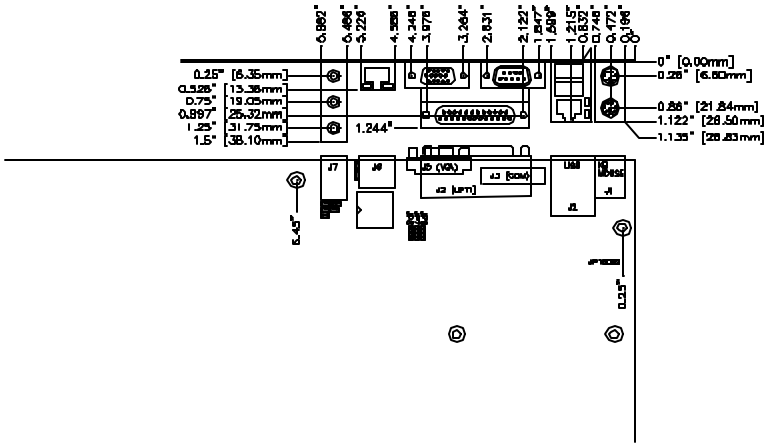
- The MB800 Industrial motherboard
- This User's Manual
- 1 IDE Ribbon Cable
- 1 Floppy Ribbon Cable
- 1 Bracket for 1 Serial Port
- 1 Bracket for 2 Serial Ports
  - 1 CD containing the following:
  - Chipset Drivers
  - Flash Memory Utility

Specifications

CPU Socket	Socket 478
CPU	Intel Pentium 4, 1.70 GHz ~ 2.60 GHz+
CPU PSB (Processor Side Bus)	400MHz (100MHz x4), / 533MHz (133MHz x4)
Chipset	Intel 845G Chipset
L2 Cache	128K/256K/512K, CPU integrated
BIOS	Award BIOS, ACPI supported
System Memory	Two DDR slots Support up to 2GB DDR200/266 non-ECC DDR SDRAM
Onboard VGA	Intel 845G chipset integrated, AGP 4X Supports TMDS, LVDS, CRT & TV-out interface Supports DVMT 64MB shared memory Supports Dual channel DVO port CRT Monitor: up to 2048x1536 @60Hz Supports one-channel digital display, 1600x1200 @60 Supports dual-channel digital display, 2048x1536 @60
Primary LAN	ICH4 integrated Ethernet, 10/ 100Base-TX
Secondary LAN (option)	Intel 82540EM (10/100/100Mb) / 82551QM (10/100Mb)
Audio	ICH4 integrated audio with AC97 Codec Audio connectors on board
LPC I/O	Winbond 83627HF supports IrDA x 1, Parallel x 1, COM1 (RS232), COM2 (RS232/422/485), FDC up to 2.88MB (3 Mode support) Hardware Monitor
IDE Interface	Built in ICH4; Two enhanced IDE supports 4 IDE devices including UDMA33/66/100, PIO mode 4 and bus master
FDD Interface	Supports up to two floppy disk drives: 3.5" and/or 5.25" drives; 3 Mode support
Parallel Port	One parallel port supports SPP/EPP/ECP
Serial Ports	One RS-232/422/485 and three RS-232 ports COM3 and COM4 supported by Winbond 83877
Watchdog Timer	Generates system reset; 256 levels
SSD Interface	Supports 2MB~144MB M-Systems DiskOnChip flash disk
H/W Monitoring	Built in Winbond W83627HF; monitors system/CPU temperature and voltage status
USB	USB 1.1 and 2.0 compliant Supports 4 USB ports
IrDA	Pin header
Keyboard and Mouse	PS/2 type keyboard and mouse connectors
Digital I/O	4 in / 4 out
Expansion Slots	1 AGP, 3 PCI, 3 ISA, 1 MicroPCI
PCI to ISA Bridge	Winbond 83628, Winbond 83629
Power Connector	ATX 12V power connector (J10, J12 connectors)
Form Factor	ATX Motherboard
Dimensions	305mm x 244mm (12" x 9.6")

Board Dimensions





Installations

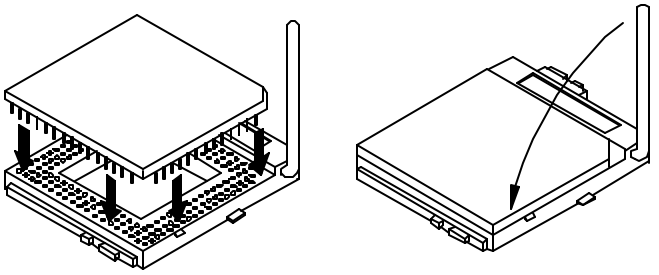
This section provides information on how to use the jumpers and connectors on the MB800 in order to set up a workable system. The topics covered are:

Installing the CPU 6
ATX Power Installation 7
MicroPCI Daughter Card Installation 7
Installing the Memory 8
Setting the Jumpers 9
Connectors on MB800 13

Installing the CPU

The MB800 motherboard supports a Socket 478 processor socket for Intel Pentium 4 processors.

The Socket 478 processor socket comes with a lever to secure the processor. Raise this lever to about a 90° angle to allow the insertion of 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, return the lever to the lock position. 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.*

ATX Power Installation

Power is provided to the MB800 motherboard with the J10 standard ATX power supply connector and J12 ATX 12V power connector. These two power connectors should be utilized for the motherboard to function.

MicroPCI Daughter Card Installation

To insert the MicroPCI daughter cards, position it at 30° to the PCB and gently push it into the MicroPCI connector (See Figure 1 below). The card will not fit when inserted at an angle of 45° or 15°. Once inserted, slowly press the card towards the PCB until it locks on both sides to the clips of the connector. Screw the card to the PCB to secure the installation. To remove the MicroPCI card, pull the ' clips' sideways as shown in Figure 2 below.

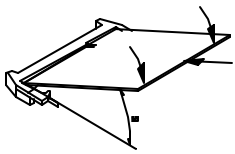


Figure 1.

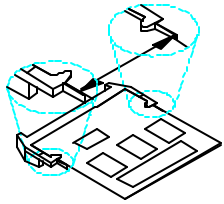


Figure 2.

Installing the Memory

The MB800 motherboard supports two DDR memory sockets for a maximum total memory of 2GB in DDR memory type. The memory module capacities supported are 64MB, 128MB, 256MB, 512MB and 1GB. The following table lists the supported DDR DIMM configurations. Intel 845G supports configurations defined in the JEDEC DDR DIMM specification only (A,B,C). Non-JEDEC standard DIMMs such as double-sided x16 DDR SDRAM DIMMs are not supported.

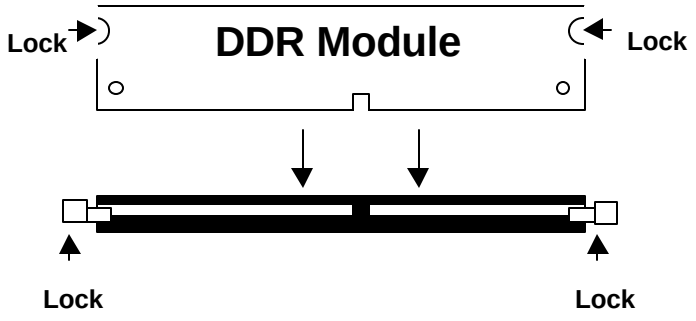
Supported DDR DIMM Configurations.

Density	64 Mbit		128Mbit		256Mbit		512Mbit	
Device Width	X8	X16	X8	X16	X8	X16	X8	X16
Single/ Double	SS/DS	SS/DS	SS/DS	SS/DS	SS/DS	SS/DS	SS/DS	SS/DS
184-pin DDR	64/128MB	32MB/NA	128/256MB	64MB/NA	256/512MB	128MB/NA	512/1024M	256MB/NA

Installing and Removing Memory Modules

To install the DDR modules, locate the memory slot on the motherboard 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 MB800 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 MB800 and their respective functions.

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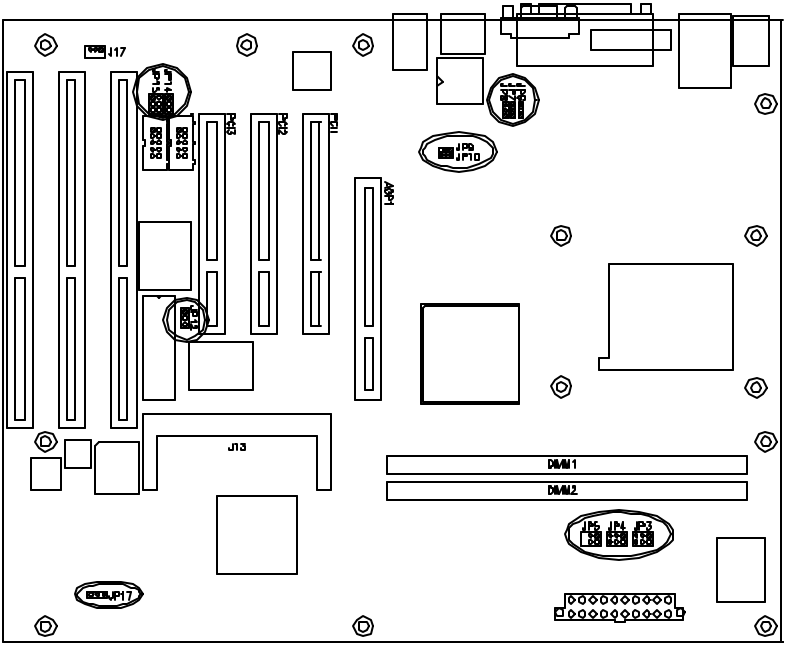
JP3, JP4, JP5: RS232/422/485 (COM2) Selection 11
JP6, JP7, JP8, JP9, JP10: CRT VGA Signal Select 11
JP12: DiskOnChip Address Select 11
JP14: Gigabit LAN Enable/Disable 12
JP15: COM4 RI/Voltage Selection 12
JP17: Clear CMOS Contents 12

Jumper Locations on MB800



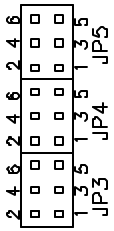
Jumper.....Page No.
JP3, JP4, JP5: RS232/422/485 (COM2) Selection 11
JP6, JP7, JP8, JP9, JP10: CRT VGA Signal Select 11
JP12: DiskOnChip Address Select.....11
JP14: Gigabit LAN Enable/Disable.....12
JP15: COM4 RI/Voltage Selection.....12
JP17: Clear CMOS Contents 12

Configuring the CPU Frequency

The MB800 motherboard does not provide DIP switches to configure the processor speed (CPU frequency). The CPU frequency and processor side bus of the processor can be automatically detected by the motherboard.

JP3, JP4, JP5: RS232/422/485 (COM2) Selection

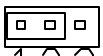
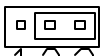
COM1 is fixed for RS-232 use only.
COM2 is selectable for RS232, RS-422 and RS-485.
The following table describes the jumper settings for COM2 selection.



COM2 Function	RS-232	RS-422	RS-485
Jumper Setting (pin closed)	JP3: 1-2 JP4: 3-5 & 4-6 JP5: 3-5 & 4-6	JP3: 3-4 JP4: 1-3 & 2-4 JP5: 1-3 & 2-4	JP3: 5-6 JP4: 1-3 & 2-4 JP5: 1-3 & 2-4

JP6, JP7, JP8, JP9, JP10: CRT VGA Signal Select

Use JP6, JP7, JP8, JP9, and JP10 to select the CRT VGA signal, either from the on board VGA or from an optional MicroPCI VGA.

JP6/7/8/9/10	Function
	On Board VGA
	MicroPCI VGA

JP12: DiskOnChip Address Select

JP12	Address
	D0000-D7FFF
	D8000-DFFFF (default)

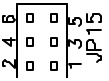
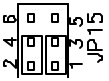
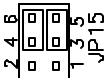
JP14: Gigabit LAN Enable/Disable

If your motherboard comes with the Gigabit LAN functionality, you can use this jumper to enable or disable it.

JP14	Setting	Function
	Pin 1-2 Short/Closed	Enable
	Pin 2-3 Short/Closed	Disable

JP15: COM4 RI/Voltage Selection

The following table describes the jumper settings for COM2 selection.

COM4 Function	RI	5V	12V
Jumper Setting			

JP17: Clear CMOS Contents

Use JP17, a 3-pin header, to clear the CMOS contents. *Note that the ATX-power connector should be disconnected from the motherboard before clearing CMOS.*

JP17	Setting	Function
	Pin 1-2 Short/Closed	Normal
	Pin 2-3 Short/Closed	Clear CMOS

Connectors on MB800

The connectors on MB800 allows you to connect external devices such as keyboard, floppy disk drives, hard disk drives, printers, etc. The following table lists the connectors on MB800 and their respective functions.

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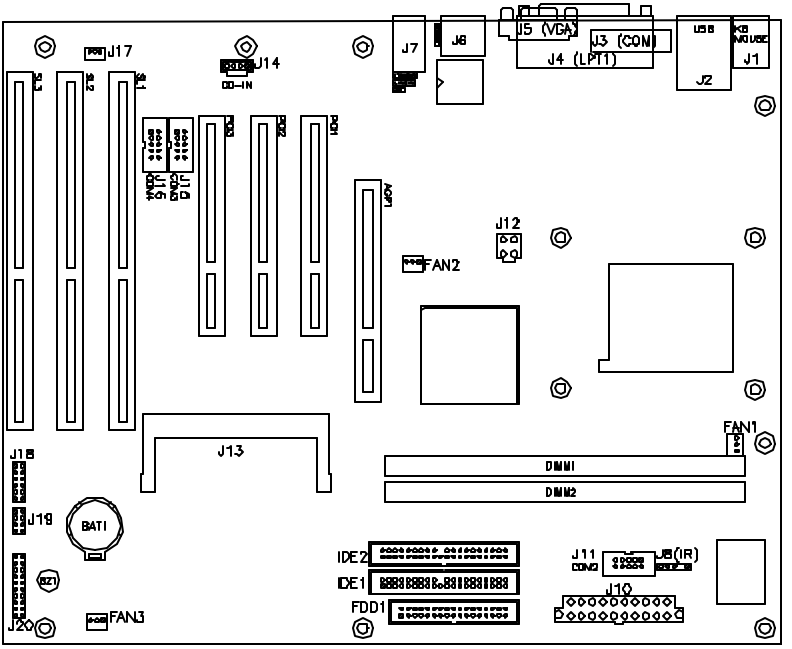
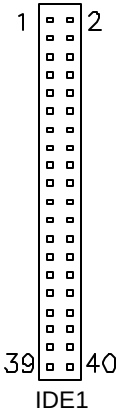
J5: VGA CRT Connector 20
J6: Gigabit LAN RJ45 Connector 20
J7: Line Out, Line In, Mic Connector 21
J8: IrDA Connector 21
J10: ATX Power Supply Connector 21
J12: ATX 12V Power Connector 21
J13: MicroPCI Socket Connector 22
J14: CD-In Audio Connector 22
J17: Wake on LAN Connector 22
J18: Digital I/O Connector (4 in, 4 out) 22
J19: USB Connector 23
J20: System Function Connector 23

Connector Locations on MB800



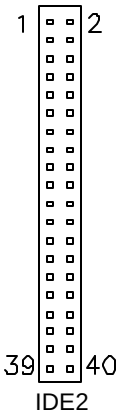
IDE1, IDE2: EIDE Connectors
FDD1: Floppy Drive Connector
FAN1: CPU Fan Power Connector
FAN2: System Fan Power Connector
FAN3: Chassis Fan Power Connector
J1: PS/2 Keyboard and PS/2 Mouse Connectors
J2: USB and LAN1 RJ45 Connectors
J3, J11, J15, J16: Serial Ports
J4: Parallel Port Connector
J5: VGA CRT Connector
J6: Gigabit LAN RJ45 Connector
J7: Line Out, Line In, Mic Connector
J8: IrDA Connector
J10: ATX Power Supply Connector
J12: ATX 12V Power Connector
J13: MicroPCI Socket Connector
J14: CD-In Audio Connector
J17: Wake on LAN Connector
J18: Digital I/O Connector (4 in, 4 out)
J19: USB Connector
J20: System Function Connector

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

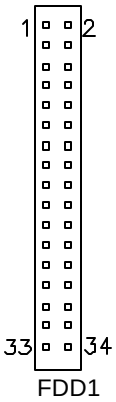


IDE2: Secondary IDE Connector

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	Protect pin
DRQ1	21	22	Ground
Host IOW	23	24	Ground
Host IOR	25	26	Ground
IOCHRDY	27	28	Host ALE
DACK1	29	30	Ground
IRQ15	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

FDD1: Floppy Drive Connector

FDD1 is a 34-pin header and will support up to 2.88MB floppy drives.

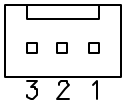


FDD1

Signal Name	Pin #	Pin #	Signal Name
Ground	1	2	RM/LC
Ground	3	4	No connect
Ground	5	6	No connect
Ground	7	8	Index
Ground	9	10	Motor enable 0
Ground	11	12	Drive select 1
Ground	13	14	Drive select 0
Ground	15	16	Motor enable 1
Ground	17	18	Direction
Ground	19	20	Step
Ground	21	22	Write data
Ground	23	24	Write gate
Ground	25	26	Track 00
Ground	27	28	Write protect
Ground	29	30	Read data
Ground	31	32	Side 1 select
Ground	33	34	Diskette change

FAN1: CPU Fan Power Connector

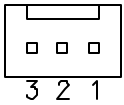
FAN1 is a 3-pin header for the CPU fan. The fan must be a 12V fan.



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

FAN2: System Fan Power Connector

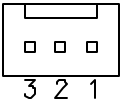
FAN2 is a 3-pin header for the system fan. The fan must be a 12V fan.



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

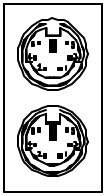
FAN3: Chassis Fan Power Connector

FAN3 is a 3-pin header for a 12V fan.



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

J1: PS/2 Keyboard and PS/2 Mouse Connectors

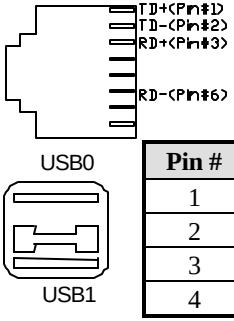


Below are the pin-out assignments of the connectors.

Signal Name	Keyboard	Mouse	Signal Name
Keyboard data	1	1	Mouse data
N.C.	2	2	N.C.
GND	3	3	GND
5V	4	4	5V
Keyboard clock	5	5	Mouse clock
N.C.	6	6	N.C.

J2: USB and LAN1 RJ45 Connectors

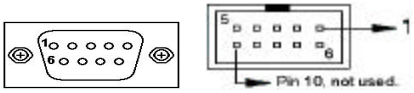
J2 consists of an RJ-45 connector (top) and two stacked USB ports. Refer to the section below for their respective pin assignments.



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

J3, J11, J15, J16: Serial Ports

J3 (COM1) is a DB-9 connector, while J11 (COM2), J15 (COM3) and J16 (COM4). Refer to the table below for their pin assignments.



COM1 COM2/COM3/COM4

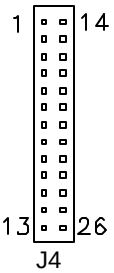
Signal Name	Pin #	Pin #	Signal Name
DCD, Data carrier detect	1	6	DSR, Data set ready
RXD, Receive data	2	7	RTS, Request to send
TXD, Transmit data	3	8	CTS, Clear to send
DTR, Data terminal ready	4	9	RI, Ring indicator
GND, ground	5	10	Not Used

J11 (COM2) is jumper selectable for RS-232, RS-422 and RS-485.

Pin #	Signal Name		
	RS-232	**R2-422**	**RS-485**
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	DTR	RX-	NC
5	Ground	Ground	Ground
6	DSR	RTS-	NC
7	RTS	RTS+	NC
8	CTS	CTS+	NC
9	RI	CTS-	NC
10	NC	NC	NC

J4: Parallel Port Connector

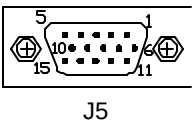
The following table describes the pin out assignments of this connector.



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

J5: VGA CRT Connector

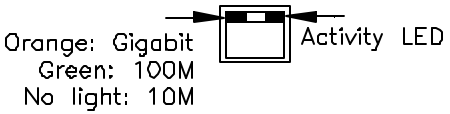
The pin assignments of the J5 VGA CRT connector are as follows:



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		

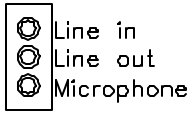
J6: Gigabit LAN RJ45 Connector

J6 is the Gigabit LAN RJ45 connector.



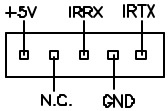
J7: Line Out, Line In, Mic Connector

The figure below shows the location of Line Out, Line In and Mic connectors on J7.



J8: IrDA Connector

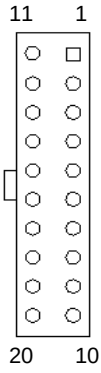
J8 is used for an optional IrDA connector for wireless communication.



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

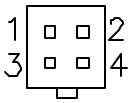
J10: ATX Power Supply Connector

J10 is a 20-pin ATX power supply connector. Refer to the following table for the pin out assignments.



Signal Name	Pin #	Pin #	Signal Name
3.3V	11	1	3.3V
-12V	12	2	3.3V
Ground	13	3	Ground
PS-ON	14	4	+5V
Ground	15	5	Ground
Ground	16	6	+5V
Ground	17	7	Ground
-5V	18	8	Power good
+5V	19	9	5VSB
+5V	20	10	+12V

J12: ATX 12V Power Connector

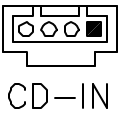


Pin #	Signal Name
1	Ground
2	Ground
3	+12V
4	+12V

J13: MicroPCI Socket Connector

The MicroPCI socket connector supports MicroPCI card with various functions such as VGA, LAN, IEEE1394, SCSI and combo functions.

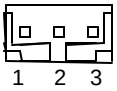
J14: CD-In Audio Connector



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

J17: Wake on LAN Connector

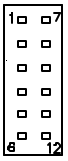
J17 is a 3-pin header for the Wake on LAN function that will function properly only with an ATX power supply with 5VSB that has 1A.



Pin #	Signal Name
1	+5VSB
2	Ground
3	Wake on LAN

J18: Digital I/O Connector (4 in, 4 out)

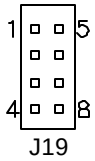
This 12-pin Digital I/O connector supports TTL levels and is used to control external devices requiring ON/OFF circuitry.



Signal Name	Pin #	Pin #	Signal Name
IN0	1	7	+5V
IN1	2	8	OUT0
IN2	3	9	Ground
IN3	4	10	OUT1
GROUND	5	11	+12V
OUT2	6	12	OUT3

J19: USB Connector

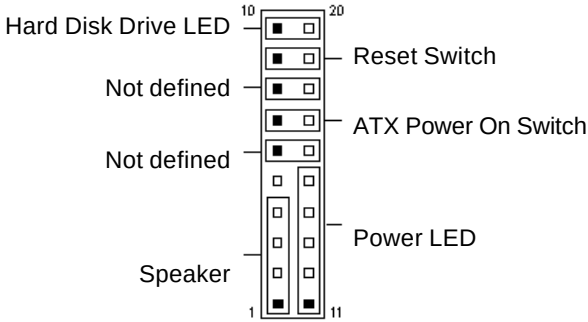
J19 connector will support the 3rd and 4th USB ports.



Signal Name	Pin	Pin	Signal Name
Vcc	1	5	Ground
USB2-	2	6	USB3+
USB2+	3	7	USB3-
Ground	4	8	Vcc

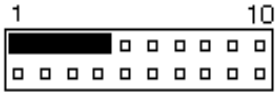
J20: System Function Connector

J20 provides connectors for system indicators that provide light indication of the computer activities and switches to change the computer status. J20 is a 20-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.

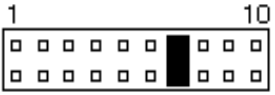


Pin #	Signal Name
1	Speaker out
2	No connect
3	Ground
4	+5V

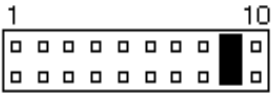
Power LED: Pins 11 - 15
The power LED indicates the status of the main power switch.

Pin #	Signal Name
11	Power LED
12	No connect
13	Ground
14	No connect
15	Ground

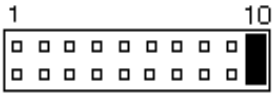
ATX Power ON Switch: Pins 7 and 17
This 2-pin connector is an "ATX Power Supply On/Off Switch" on the system that connects to the power switch on the case. When pressed, the power switch will force the system to power on. When pressed again, it will force the system to power off.



Reset Switch: Pins 9 and 19
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.



Hard Disk Drive LED Connector: Pins 10 and 20
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
10	HDD Active
20	5V

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, 2Eh
            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, 2Eh
            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, 2Eh
            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, 2Eh
            out  dx, al
            inc  dx
            in    al, dx
            ret
Read_Reg    Endp
;[]================================================
```

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