Technical Reference

MB-P202
11-Slot Dual Pentium® II
Motherboard with Intel 440 FX Chipset

CSS LABORATORIES, INC.

1641 McGaw Avenue
Irvine, California 92614

P/N MB-P202-DOC Revision 1, February 1998

Features

- 10 slots: 5 ISA, 4 PCI slot and 1 shared PCI/ISA slots
- Two processor slots for single and dual Pentium II capabilities
- Intel Pentium® II processor, single or dual, upgradeable through 233, 266 MHz, 300 MHz and 333 MHz
- Intel 440FX chipset
- System memory upgradeable from 32 MB to 1 GB using ‘x 64’ or ‘x 72’ DIMM
- Processor-facilitated ECC memory with ‘x 72’ DIMM
- Processor available with either 256 KB or 512 KB cache
- PCI 2.1 compliant PCI/ISA bus architectures
- BIOS-facilitated timers for *Doze*, *Catnap* and *Suspend Modes*
- Standard PS/2 keyboard connector
- On-board E-IDE controller separate master/slave IDE mode support for up to 4 IDE drives and 2 floppy drives
- On-board I/O supporting 2 serial ports and 1 parallel port
- On-board Universal Serial Bus (USB) controller with 2 USB ports
- On-board PS/2 mouse/keyboard port

FCC Standards

The FCC (Federal Communications Commission) restricts the amount of radiation and radio frequency emissions coming from computing equipment.

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

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CSS Labs is not responsible for any radio or television interference caused by unauthorized modifications to this equipment. Operation with non-certified peripherals is likely to result in interference to radio and TV reception.

To ensure compliance to FCC non-interference regulations, peripherals attached to this device require shielded I/O cables.

NOTICE: The use of a non-shielded I/O cable with this device is in violation of U.S. Federal law and will not allow the device to meet the maximum emission limits.

CAUTION: Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.

Note: If you have purchased the miniature tower system, please note the following...

WARNING: The system is to be installed on desk or table tops only. The unit will become unstable if operated as a floor standing unit and unintentional force is applied to the top of the unit.

Turn the unit off and unplug the power cord before you open the cover to install any cards or peripheral devices.

WARNING

CAUTION: THERE IS A DANGER OF EXPLOSION IF THE BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

ATTENTION:IL Y A DANGER D'EXPLOSION S'IL Y A REMPLACEMENT INCORRECT DE LA BATTERRIE. REMPLACER UNIQUEMENT AVEC UNE BATTERI DU MEME TYPE OU D'UN TYPE RECOMMENDE PAR LE CONSTRUCTEUR. ETTERAU REBUT LES BATTERRIES USAGEES CONFORMEMANT AUX INSTRUCTIONS DU FABRICATANT.

NOTICE

The information within this manual is subject to change without notice.

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Overview

This document describes the technical features of the motherboard. The topics include:

- **The Microprocessor** - description of the features of the Pentium II microprocessor
- **Motherboard** - illustration and brief description of the motherboard and the dual purpose expansion slot
- **Connectors** - description of connector locations andfunctions on the motherboard
- **Jumpers** - detailed description of the jumpers used to configure the motherboard
- **System Memory** - detailed description of system memory and how to add memory
- **System Memory Map** - listing of traditional address assignments for system memory
- **Configuration Utilities** - description and instructions for using the utility to configure the board's BIOS

The Microprocessor

The Pentium II microprocessor contains all the features of the Pentium, Pentium Pro and 80486 processors, and is 100% compatible with 8086/88, 80286, and 80386 DX and SX microprocessors. In addition, the Pentium II features:

- Dual Independent Bus Architecture allowing access to data from either bus simultaneously or in parallel
- Dynamic Execution with Multiple Branch Prediction, Data Flow Analysis and Speculative Execution
- Intel MMX multimedia technology

It is available in a variety of speeds, from 233 MHz through 333 MHz.

For additional information, contact your authorized CSS Laboratories representative; or visit Intel's web site at *intel.com*.

The Motherboard

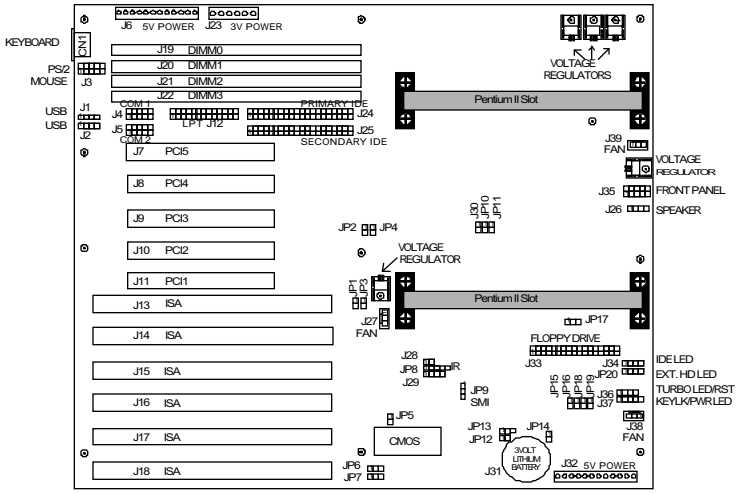

Figure 1: The Motherboard

Cache Memory

The processor comes with 32 KB of L1 cache, and 512 KB of internal L2 cache.

Expansion Slots

There are a total of eleven expansion slots on the motherboard: five ISA slots, four PCI slots; 1 ISA and 1PCI which are shared.

Voltage Regulators

The board comes with a total of 5 voltage regulators, making the board compatible with the full line of processors.

Motherboard Connectors

Description	Connector
J26	Speaker connector
J36	Turbo LED/Reset
J34	IDE hard drive LED
JP20	Extra IDE hard drive LED
JP35	CSS Front panel connector
CN1	Keyboard connector
J3	PS/2 mouse connector
JP37	Power LED/keylock
J24	Primary IDE connector
J25	Secondary IDE connector
J12	Parallel port
J4	Serial port 1 (COM1)
J5	Serial port 2 (COM2)
J33	Floppy drive connector
J6, J32	5V power connector, aux.connector
J23	3 volt power supply connector
J1, J2	Universal serial bus connectors
J31	On-board CMOS battery connector
J29	External CMOS battery connector
J38, J39, J27	Processor fan connectors
JP8	Infrared device connector

Speaker J26

J26 connects the computer's speaker to the motherboard.

Pin	Assignment	Pin	Assignment
1	Speaker	3	Gnd
2	Not used	4	VCC

Turbo LED/Reset JP36

The reset button on the front panel lets you perform a "cold boot", without turning the system off.

Pin	Assignment	Pin	Assignment
1	Reset	3	TB LED signal
2	Not used	4	TB LED power

IDE Hard Drive LED J34; Extra IDE LED JP20

J34 or JP20 connects a hard drive access LED to the front panel. It lights when the drive is accessed.

Pin	Assignment
1	VCC
2	HDD Act (-)
3	HDD Act (-)
4	VCC

Front Panel Connector JP35

This 10-pin connector interfaces between the system board and the control panel on the front of the system case.

Pin	Assignment	Pin	Assignment
1	Ground	6	Ground
2	Power LED	7	Green LED
3	IDE Power LED	8	Keylock
4	Not used	9	Power
5	IDE LED	10	Reset

Keyboard Connector CN1

Keyboard plugs are keyed for proper installation.

Pin	Assignment	Pin	Assignment
1	Clock	4	Ground
2	Data	5	+5 Vdc
3	Not used		

PS/2 Mouse Connector J3

This 10-pin connector is use for a PS/2 mouse.

Pin	Assignment	Pin	Assignment
1	Mouse clock	6	VCC
2	Not used	7	Not used
3	Keyboard clock	8	Mouse data
4	Not used	9	Not used
5	Not used	10	Ground

Power LED/Keylock LED Connector JP37

JP37 is a 5-pin connector used to attach the motherboard to the front panel's keylock LED and power indicator LED.

Pin	Assignment	Pin	Assignment
1	Power LED	4	Keylock
2	Not used	5	Ground
3	Ground		

Primary IDE J24

J24 connects the primary on-board PCI E-IDE hard drive. Pin 1 is marked. When connecting your E-IDE, orient pin 1 of the cable ribbon with pin 1 of J24.

Secondary IDE J25

J25 connects the secondary on-board PCI IDE controller. Pin 1 is marked. When connecting your IDE, orient pin 1 of the cable ribbon with pin 1 of J25.

Parallel Port J12

J12 provides the connection for the motherboard's parallel port.

Serial Port 1 (COM1) J4

J4 provides the connection for the motherboard's serial port 1 (COM 1).

Serial Port 2 (COM2) J5

J5 provides the connection for the motherboard's serial port 2 (COM 2).

Floppy Drive Connector J33

J33 connects the floppy drive to the controller provided on the motherboard.

5 Volt Power Supply Connector J6; Auxiliary 5 Volt Power Connector J32

Pin	Assignment	Pin	Assignment
1	Power good	7	Ground
2	+5 Vdc	8	Ground
3	+12 Vdc	9	-5 Vdc
4	-12 Vdc	10	Not used
5	Ground	11	+5 Vdc
6	Ground	12	+5 Vdc

The power connectors attach the motherboard to the main power supply through the board's 5 volt regulator.

When connecting the power supply, always orient the plugs so that the black wires on each sit side-by-side.

3 Volt Power Supply Connector J23

Pin	Assignment	Pin	Assignment
1	Ground	4	+3.3 Vdc
2	Ground	5	+3.3 Vdc
3	Ground	6	+3.3 Vdc

Universal Serial Bus Connectors J1, J2

The motherboard provides two 4-pin universal serial bus (USB) connectors.

Pin	Assignment
1	VCC
2	Data -
3	Data +
4	Ground

Fan Connectors J38, JP39, J27

The processor fan provides extra cooling for the powerful new Pentium Pro processors.

Pin	Assignment
1	12 volt
2	Ground

Infrared Connector JP7

JP7 connects to an optional infrared add-in controller. Infrared controllers can act as ports for a number of peripheral devices including mouse, printer and keyboard.

Pin	Assignment
1	Transmitting
2	Receive 1
3	Receive 2
4	Ground

Motherboard Jumpers

The motherboard's jumpers are pre-configured at the factory. Read the following section carefully, before configuring your system. The motherboard has the following jumpers:

Jumper	Description
JP1, JP3	Processor bus clock speed
JP10, JP11	Processor bus frequency
JP15, JP16 JP18, JP19	Processor speed ratio
JP6, JP7	Flash BIOS enable
JP5	Super I/O Address Selector
J28	CMOS battery selector
JP13	ISA bus speed
JP2	Manual EXTSMI
JP9	BIOS controlled EXTSMI
J30	Clock voltage selector
JP14	Test jumper (default OUT)

Processor Bus Clock Speed JP1, JP3

Pentium II processors are designed with one of two bus clock speeds. The bus clock speed is always a fraction of the processor's internal speed. The table on page 13 will help you determine the correct setting for your system.

Bus Clock Speed	JP1	JP3
60 MHz	OUT	IN
66 MHz	IN	OUT

Processor Bus Frequency JP10, JP11

JP10 and JP11 matches the processor bus frequency with the processor's speed. The table below illustrates the settings.

Bus Frequency	JP10	JP11
60 MHz	OUT	IN
66 MHz	IN	OUT

Processor Speed Ratio JP15, JP16, JP18, JP19

The Pentium II uses a clock multiplier to run faster than the processor bus. The jumpers match the installed processor's speed with the motherboard's defined processor speed. The table below will help you determine the correct setting.

Processor Speed Ratio	JP15	JP16	JP18	JP19
2x	IN	IN	IN	IN
2.5x	OUT	IN	IN	IN
3x	IN	OUT	IN	IN
3.5x	OUT	OUT	IN	IN
4x	IN	IN	OUT	IN
4.5x	OUT	IN	OUT	IN
5x	IN	OUT	OUT	IN

The following table matches processor speed, processor clock and the motherboard's processor bus speed.

Processor Type/Speed	Clock Ratio	Processor Bus Speed
266 MHz	4x	66 MHz
300 MHz	4.5x	66 MHz
333 MHz	5x	66 MHz

Flash BIOS Enable JP6, JP7

JP6 and JP7 let you use flash BIOS, loading the latest 1 Mbit or 2 Mbit version of BIOS. Be careful to return the settings to their default values after you have loaded the flash BIOS.

Flash BIOS Enable	JP6	JP7
Non-Flash	1-2	2-3
1 Mbit Flash (default)	1-2	1-2
2 Mbit Flash	2-3	2-3

Super I/O Address Selector JP5

JP5 lets you select a different address within the BIOS for the on-board Super I/O. Choosing an address other than the default allows a technician to perform certain tests on the motherboard.

BIOS Type	JP5
Default Address	IN
Test Address	OUT

ISA Bus Speed JP13

The ISA bus uses the processor's oscillator to set its speed. This jumper is set at the factory to the correct value.

ISA Bus Speed	JP13
Divide by 3	1-2
Divide by 4 (default)	2-3

Manual EXTSMI JP2

The manual external system management interrupt (SMI) jumper allows a technician to force the system into sleep mode. This procedure is sometimes used in specific system testing.

Manual EXTSMI	JP2
Forced Sleep	IN
Normal (default)	OUT

BIOS Controlled EXTSMI JP9

The BIOS EXTSMI option system management interrupt (SMI) jumper allows a technician to select the BIOS SMI control, or to select the chipset SMI control and to use the motherboard's chipset to control the SMI. Using the chipset for SMI is sometimes used in specific system testing.

BIOS SMI	JP9
Chipset controlled	1-2
BIOS controlled (default)	2-3

Clock Voltage Selector J30

The Pentium II processor uses a 2.5 volt clock, unlike the Pentium Pro, which uses a 3 volt clock. This jumper is set at the factory to the correct value.

Clock Voltage	JP30
2.5 volt (default)	IN
3 volt	OUT

System Memory

The motherboard uses DIMM memory. DIMM is available in 64-pin or 72-pin, where the 72-pin DIMM provides error correcting code (ECC).

There are a total of four banks available for memory upgrades. The board supports DIMM in the following combinations:

1M x 64/72 = 8 MB/bank	8M x 64/72 = 64 MB/bank
2M x 64/72 = 16 MB/bank	16M x 64/72 = 128 MB/bank
4M x 64/72 = 32 MB/bank	32M x 64/72 = 256 MB/bank

Installing and Removing DIMM

Read these instructions completely before installing or removing DIMMs. The DIMM is held by plastic press-clips on both sides of the slot.

Installing DIMM

1) Hold the DIMM so that the gold tab is pointing toward the slot. The DIMM is keyed so that it will only snap into the slot when positioned correctly.

2) Press one end of the DIMM until it inserts and its press-clip snaps into place.

3) Press the other end of the DIMM until it inserts and its press-clip snaps into place.

Removing DIMM

1) Pull both press-clips simultaneously, until the DIMM pops up from its slot.

System Memory Configuration

RAM	Bank 0	Bank 1	Bank 2	Bank 3
8 MB	1M x 64/72			
16 MB	1M x 64/72	1M x 64/72		
16 MB	2M x 64/72			
24 MB	1M x 64/72	1M x 64/72	1M x 64/72	
24 MB	1M x 64/72	2M x 64/72		
32 MB	1M x 64/72	1M x 64/72	1M x 64/72	1M x 64/72
32 MB	2M x 64/72	2M x 64/72		
32 MB	4M x 64/72			
32 MB	2M x 64/72	1M x 64/72	1M x 64/72	
32 MB	2M x 64/72	2M x 64/72		
40 MB	1M x 64/72	2M x 64/72	2M x 64/72	
40 MB	1M x 64/72	4M x 64/72		
40 MB	2M x 64/72	1M x 64/72	1M x 64/72	1M x 64/72
48 MB	4M x 64/72	1M x 64/72	1M x 64/72	
48 MB	2M x 64/72	2M x 64/72	2M x 64/72	
48 MB	2M x 64/72	4M x 64/72		
48 MB	4M x 64/72	1M x 64/72	1M x 64/72	
48 MB	4M x 64/72	2M x 64/72		
56 MB	1M x 64/72	2M x 64/72	2M x 64/72	2M x 64/72
56 MB	4M x 64/72	1M x 64/72	1M x 64/72	1M x 64/72
64 MB	2M x 64/72	2M x 64/72	2M x 64/72	2M x 64/72
64 MB	8M x 64/72			
64 MB	4M x 64/72	4M x 64/72		
64 MB	4M x 64/72	2M x 64/72	2M x 64/72	
64 MB	4M x 64/72	4M x 64/72		
72 MB	8M x 64/72	1M x 64/72		
72 MB	1M x 64/72	4M x 64/72	4M x 64/72	
80 MB	2M x 64/72	8M x 64/72		
80 MB	2M x 64/72	4M x 64/72	4M x 64/72	
80 MB	4M x 64/72	2M x 64/72	2M x 64/72	2M x 64/72
80 MB	8M x 64/72	1M x 64/72	1M x 64/72	

RAM	Bank 0	Bank 1	Bank 2	Bank 3
88 MB	8M x 64/72	1M x 64/72	1M x 64/72	1M x 64/72
96 MB	4M x 64/72	4M x 64/72	4M x 64/72	
96 MB	4M x 64/72	8M x 64/72		
104 MB	1M x 64/72	4M x 64/72	4M x 64/72	4M x 64/72
112 MB	2M x 64/72	4M x 64/72	4M x 64/72	4M x 64/72
128 MB	4M x 64/72	4M x 64/72	4M x 64/72	4M x 64/72
128 MB	8M x 64/72	8M x 64/72		
128 MB	16M x 64/72			
136 MB	16M x 64/72	1M x 64/72		
136 MB	1M x 64/72	8M x 64/72	8M x 64/72	
144 MB	2M x 64/72	16M x 64/72		
144 MB	2M x 64/72	8M x 64/72	8M x 64/72	
144 MB	16M x 64/72	1M x 64/72	1M x 64/72	
152 MB	16M x 64/72	1M x 64/72	1M x 64/72	1M x 64/72
160 MB	16M x 64/72	2M x 64/72	2M x 64/72	
160 MB	16M x 64/72	4M x 64/72		
160 MB	4M x 64/72	8M x 64/72	8M x 64/72	
176 MB	16M x 64/72	2M x 64/72	2M x 64/72	2M x 64/72
192 MB	8M x 64/72	8M x 64/72	8M x 64/72	
192 MB	16M x 64/72	4M x 64/72	4M x 64/72	
192 MB	16M x 64/72	8M x 64/72		
200 MB	1M x 64/72	8M x 64/72	8M x 64/72	8M x 64/72
208 MB	2M x 64/72	8M x 64/72	8M x 64/72	8M x 64/72
224 MB	4M x 64/72	8M x 64/72	8M x 64/72	8M x 64/72
224 MB	16M x 64/7	24M x 64/7	24M x 64/72	4M x 64/72
256 MB	8M x 64/72	8M x 64/72	8M x 64/72	8M x 64/72
256 MB	16M x 64/72	16M x 64/72		
256 MB	32M x 64/72			
256 MB	16M x 64/72	8M x 64/72	8M x 64/72	
256 MB	16M x 64/72	16M x 64/72		
264 MB	32M x 64/72	1M x 64/72		
264 MB	1M x 64/72	16M x 64/72	16M x 64/72	

RAM	Bank 0	Bank 1	Bank 2	Bank 3
272 MB	32M x 64/72	1M x 64/72	1M x 64/72	
272 MB	32M x 64/72	2M x 64/72		
272 MB	2M x 64/72	16M x 64/72	16M x 64/72	
280 MB	32M x 64/72	1M x 64/72	1M x 64/72	1M x 64/72
288 MB	32M x 64/72	4M x 64/72		
288 MB	32M x 64/72	2M x 64/72	2M x 64/72	
288 MB	4M x 64/72	16M x 64/72	16M x 64/72	
304 MB	32M x 64/72	2M x 64/72	2M x 64/72	2M x 64/72
320 MB	32M x 64/72	4M x 64/72	4M x 64/72	
320 MB	16M x 64/72	8M x 64/72	8M x 64/72	8M x 64/72
320 MB	32M x 64/72	8M x 64/72		
352 MB	32M x 64/72	4M x 64/72	4M x 64/72	4M x 64/72
384 MB	16M x 64/72	16M x 64/72	16M x 64/72	
384 MB	16M x 64/72	32M x 64/72		
384 MB	32M x 64/72	8M x 64/72	8M x 64/72	
392 MB	1M x 64/72	16M x 64/72	16M x 64/72	16M x 64/72
400 MB	2M x 64/72	16M x 64/72	16M x 64/72	16M x 64/72
416 MB	4M x 64/72	16M x 64/72	16M x 64/72	16M x 64/72
448 MB	32M x 64/72	8M x 64/72	8M x 64/72	8M x 64/72
512 MB	16M x 64/72	16M x 64/72	16M x 64/72	16M x 64/72
512 MB	32M x 64/72	32M x 64/72		
512 MB	32M x 64/72	16M x 64/72	16M x 64/72	
520 MB	1M x 64/72	32M x 64/72	32M x 64/72	
528 MB	2M x 64/72	32M x 64/72	32M x 64/72	
544 MB	4M x 64/72	32M x 64/72	32M x 64/72	
640 MB	16M x 64/72	32M x 64/72	32M x 64/72	
640 MB	32M x 64/72	16M x 64/72	16M x 64/72	16M x 64/72
768 MB	32M x 64/72	32M x 64/72	32M x 64/72	
776 MB	1M x 64/72	32M x 64/72	32M x 64/72	32M x 64/72
784 MB	2M x 64/72	32M x 64/72	32M x 64/72	32M x 64/72
800 MB	4M x 64/72	32M x 64/72	32M x 64/72	32M x 64/72
896 MB	16M x 64/72	32M x 64/72	32M x 64/72	32M x 64/72
1 GB	32M x 64/72	32M x 64/72	32M x 64/72	32M x 64/72

System Memory Map

Address (hex)	Size	Function
0H to 7FFF	512 KB	Base Memory
90000H to 9FBFF	127 KB	Extended base memory enabled in Setup
9FC00 to 9FFFF	1 KB	Extended BIOS data
A0000 to AFFFF	64 KB	VGA display memory (not on ISA bus)
B0000 to B7FFF	32 KB	VGA display memory (not on ISA bus)
C0000 to C7FFF	32 KB	Optional VGA BIOS (enabled through setup, if disabled, available to ISA bus)
C8000 to DFFFF	96 KB	Available high DOS memory, to ISA bus
E0000 to E7FFF	32 KB	Cirrus Logic 5424 video BIOS
ED000 to EDFFF	4 KB	User Flash area (available as high DOS memory if no user information here)
EE000 to EFFFF	8 KB	Flash boot block (available as high DOS memory)
F0000 to FFFFF	64 KB	Reserved for Phoenix BIOS ROM
100000 to FDFFF	15232 KB	Extended memory
FE0000 to FFFFFF	128 MN	System and video BIOS copy
1000000 to 2800000	20480 KB	Extended memory

System Interrupts

The processor has two controllers, supplying 16 IRQs. Below are assignments in decreasing priority.

IRQ	Function
NMI	Parity error
IRQ0	Reserved, interval timer
IRQ1	Reserved, keyboard buffer full
IRQ2	Reserve, cascade interrupt from slave PIC
IRQ3	Onboard serial port 2
IRQ4	Onboard sreial port 1
IRQ5	User available
IRQ6	Onboard floppy controller
IRQ7	Onboard parallel port
IRQ8	Real-time clock (RTC)
IRQ9	User available
IRQ10	User available
IRQ11	User available
IRQ12	Onboard mouse port if enabled, else user available
IRQ13	Reserved, math coprocessor
IRQ14	Onboard IDE hard disk controller
IRQ15	User available

Note: IRQ9, IRQ10, IRQ11, IRQ12, IRQ15, IRQ3, IRQ4, IRQ5 and IRQ7 can be redirected to PCI add-in boards.

The PCI standard has a 4-IRQ limitation. Some PCI add-in boards do not require IRQs. Some can share an IRQ with another board of the same model and manufacture. Check the add-in board's documentation for IRQ information.

Direct Memory Access

The system supports seven DMA channels:

Controller 1	Controller 2
Channel 0 - Spare	Channel 4 - Cascade for Controller 1
Channel 1 - SDLC	Channel 5 - Spare
Channel 2 - Diskette	Channel 6 - Spare
Channel 3 - Spare	Channel 7 - Spare

The first DMA controller holds channels 0 through 3. These channels support 8-bit data transfers between 8-bit I/O adapters and 8- or 16-bit system memory. Each channel can transfer data in 4 KB blocks.

The second DMA controller holds channels 4 through 7. Channel 4 cascades channels 0 through 3 to the microprocessor. Channel 5, 6 and 7 support 16-bit data transfers between 16-bit I/O adapters and 16-bit system memory. These DMA channels can transfer data throughout the 16 MB system-address space in 128 KB blocks.

Channel 5, 6 and 7 cannot transfer data on odd byte boundaries.

The I/O Address Map

Address (hex)	Function
0EC	Index for VLSI chipsets 82C480 and 82C113
0ED	Data for VLSI chipset 82C480 and 82C113
061	AT-compatible configuraton port
078	System configuration port
079	BIOS independent timer (BIT)
1F0-1F7	IDE (SMC37C651)
278-27F	Parallel port 2
2F8-2FF	Serial port 2
378-37F	Parallel port 1
3B0-3DF	Video controller
3F0-3F7	Floppy disk controller
3F8-3FF	Serial port 1
46E8	Video controller

Configuration Utilities

Overview

BIOS Setup is a utility that defines and stores the configuration of the machine. When the system "boots", the machine's configuration loads into memory. Drives, video adapter, memory and keyboard are described to the system.

The program is built into the CMOS chip on the motherboard. To start the program, press the <Delete> key while the system is booting. The Utilities menu displays:

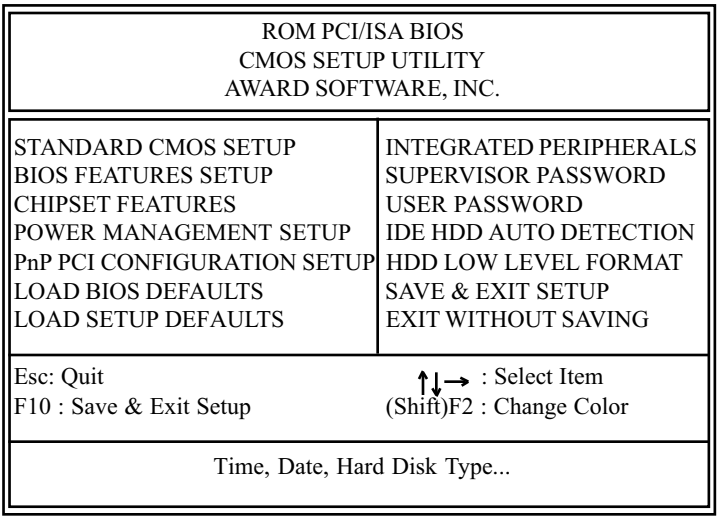

Figure 2: The Main Menu

If you discover after making and saving system changes that you have made a mistake, the BIOS lets you override the settings. Simply press <Insert> when you restart the computer.

The following table gives a brief description of the Main Menu options.

Selection	Description
Standard CMOS	SetupStandard options for the computer.
BIOS Features Setup	Enhanced BIOS options.
Chipset FeaturesSetup	Options for the motherboard's chipset.
Power Management Setup	Advanced Power Management (APM) options.
PnP/PCIConfiguration	Plug and Play standard and PCI Local Bus configuration options.
Integrated Peripherals	I/O subsystems that depend on integrated peripherals controller on the motherboard.
Supervisor/User Password	Change, set or disable a password. Only the supervisor password accesses Setup.
IDE HDD Auto Detection	Automatically detect and configure IDE hard disk parameters.
HDD Low Level Format	CSS strongly recommends you do not low-level format your hard drive. This may overwrite the bad-track table.
Load BIOS Defaults	BIOS defaults are factory settings for the most stable, minimal-performance.
Load Setup Defaults	Setup defaults are factory settings for optimal-performance operations.
Save & Exit Setup	Save settings in CMOS and exit the program.
Exit Without Save	Abandon all changes and exit the program.

CMOS Setup Utility

This utility allows you to record your system setup.

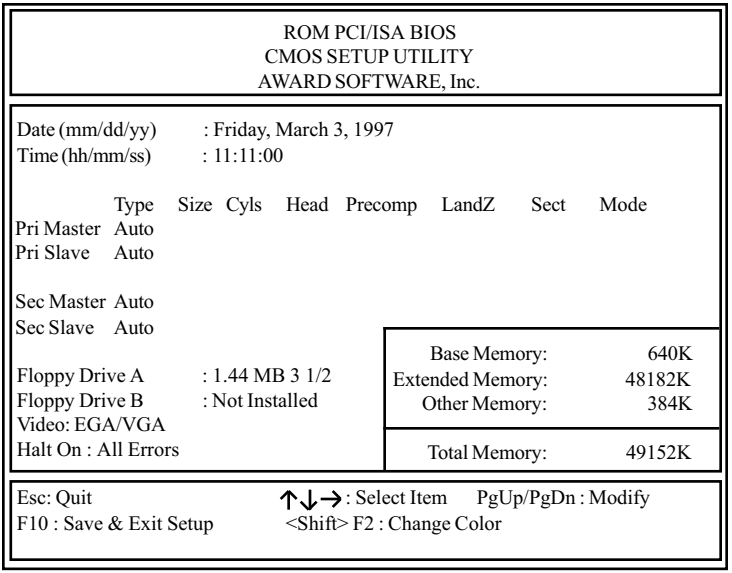

Figure 3: The Standard Setup Menu

The values represented in this table are used as an example, and may not match your BIOS settings.

The Setup Procedure

To start Setup, highlight STANDARD CMOS SETUP on the Main Menu, and press <ENTER>. The current system configuration stored in CMOS is displayed. The screen image displayed in figure X is an example, and may differ slightly from your display.

The current cursor position is highlighted. The following list shows how to move the cursor around the screen and make selections:

Key	Action
Left and right arrows	Moves the cursor left to right and right to left.
Up and down arrows	Moves cursor up and down, and from field to field.
<Enter>	Selects the setting and moves cursor to next field.
<F10>	Saves the settings and exits Setup.
<Esc>	Exit to main screen from submenu.
<F1>	Help.

In order to use the <PgUp> and <PgDn> keys on the numeric key pad, you must turn the <NumLock> off.

Alter only the items that need to be changed or reset. If a highlighted option is correct, skip the corresponding step.

1) Start by entering the current date in the following format: mm/dd/yy. March 3, 1991 would be entered as 03/03/91. Press <Enter> to continue.

2) Enter the current time using the military style: hh:mm:ss. 4:11 p.m. is entered as 16:11:00. Press <Enter> to continue.

3) Use the <PgUp> and <PgDn> keys to toggle between the floppy drive types. The supported drive types are:

5.25"	- 360 KB	3.5”	- 720 KB
	- 1.2 MB		- 1.44 MB
			- 2.88 MB

After you find your floppy drive type, press the <Enter> key. Repeat this procedure for Floppy drive B:, or press <Enter> again to skip to the next step.

4) Use the <PgUp> and <PgDn> keys to toggle between the different hard drive types.

The lower right hand side of the Setup menu displays information about your system board:

Base Memory Size	The amount of base (conventional) memory, 0 to 640 KB.
Extended Memory Size	The amount of expansion memory extended beyond base memory.
Other Memory	Any other type of memory, usually the memory above base and below 1 MB.

When you have made all the necessary changes, verify that the settings are correct. Press the <Esc> key. The screen displays the following:

Write data into CMOS and exit (Y/N)? Y

Type “Y” or “N”, and press <Enter>. Entering “N” will send you back to the Setup menu, where you can make additional changes. Entering “Y” causes the system to accept the changes. The screen clears and the system reboots.

BIOS Features Setup

The BIOS Features Setup allows you to fine tune some of the BIOS's special features. It is configured for your system at the factory.

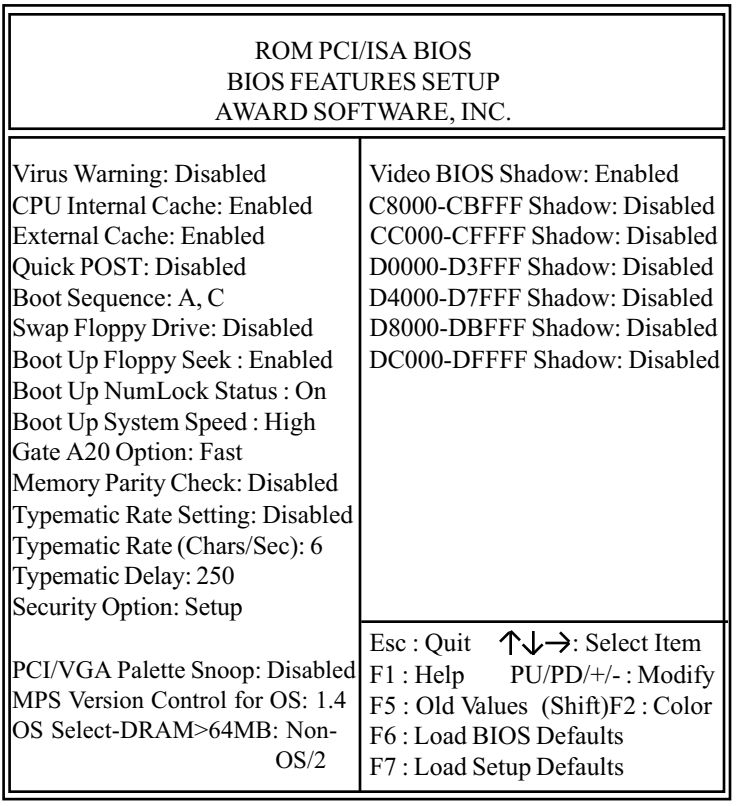

Figure 4: BIOS Features Setup

The values represented in this table are used as an example, and may not match your BIOS settings.

Chipset Features Setup

This option allows you to alter some of the technical features associated with the chipset. These values are optimized and set at the factory. The settings need only be changed if you are reconfiguring the system.

ROM PCI/ISA BIOS
CHIPSET FEATURES SETUP
AWARD SOFTWARE, INC.

Auto Configuration : Enabled DRAM Speed Selection : 60 ns DRAM RAS# Precharge Time : 3 MA Additional Wait State: Disabled Fast RAS# to CAS# Delay : 3 DRAM Read Burst B/E/F: x2/2/3 DRAM Write Burst B/E/F : x2/2/3 ISA Bus Clock : PCICLK4 DRAM Refresh Queue: Enabled DRAM RAS Only Refresh: Enabled Single Bit Error Report: Enabled Fast DRAM Refresh: Disabled Read-Around Write: Enabled PCI Burst Write Combine: Enabled PCI-To-DRAM Pipeline: Enabled CPU-To_PCI Write Post: Enabled CPI-To-PCI IDE Posting: Enabled System BIOS Cacheable: Enabled Video RAM Cacheable: Enabled	Memory Parity/ECC Check : Auto Single Bit Error Report : Enable L2 Cache Cacheable Size : 64MB Chipset NA# Asserted : Enabled Pipeline Cache Timing : Faster 8-Bit I/O Recovery Time: 1 16-Bit I/O Recovery Time: 1 Memory Hole At 15M-16M: Disabled DRAM Fast Lead-Off: Disabled Esc : Quit ↑↓→ : Select Item F1 : Help PU/PD/+/- : Modify F5 : Old Values (Shift)F2 : Color F6 : Load BIOS Defaults F7 : Load Setup Defaults

Figure 5: BIOS Features Setup

The values represented in this table are used as an example, and may not match your BIOS settings.

Power Management Setup

This program lets you set the values for the components of your “Green PC”. The default values are set at the factory.

ROM PCI/ISA BIOS
POWER MANAGEMENT SETUP
AWARD SOFTWARE, INC.

Power Management : Max Savings	IRQ3 (COM2) : OFF
PM Control by APM : Yes	IRQ4 (COM1) : ON
Video Off Method :V/H Sync&Blank	IRQ5 (LPT2) : OFF
Modem Use IRQ : 3	IRQ6 (Floppy Disk) : ON
	IRQ7 (LPT1) : OFF
Doze Mode : 1 minute	IRQ8 (RTC Alarm) : ON
Standby Mode : 1 minute	IRQ9 (IRQ8 Redir) : OFF
Suspend Mode : 1 minute	IRQ10 (Reserved) : OFF
HDD Power Down Mode: 1 minute	IRQ11 (Reserved) : OFF
	IRQ12 (PS/2 Mouse) : OFF
Wake Up Events In Doze&Standby	IRQ13 (Coprocessor) : OFF
IRQ3 Wakeup Event: OFF	IRQ14 (Hard Disk) : ON
IRQ4 Wakeup Event: ON	IRQ15 (Reserved) : OFF
IRQ8 Wakeup Event: OFF	
IRQ12 Wakeup Event: OFF	

Esc : Quit ↑↓→: Select Item
F1 : Help PU/PD/+/- : Modify
F5 : Old Values (Shift)F2 : Color
F6 : Load BIOS Defaults
F7 : Load Setup Defaults

Figure 6: Power Management Setup

The following pages provide descriptive overviews of each option in the Power Management Setup.

Power Management

This option lets you select the type or degree of power saving for Doze, Standby and Suspend modes. See PM Timers for a brief description of both.

Max Saving: Maximum power savings (SL processors only).

User Defined: Set each mode individually. Select time-out periods in PM Timers section.

Min Savings: Minimum savings. Inactivity period is 1 hour. in each mode, except hard drive.

PM Controlby APM

If Advanced Power Management APM) isinstalled, selecting Yes gives better power savings.

Video Off Method Determines the manner in which the monitor is blanked.

V/H SYNC+Blank: System turns off vertical and horizontal synchronization ports and writes blanks to the video buffer.

DPMS Support: Select this option if your monitor supports the Display Power Management Signaling (DPMS) standard. Use the software supplied with the video subsystem to select video power management values.

Blank Screen: System only writes blanks to the video buffer.

MODEM Use IRQs

Names the interrupt request (IRQ) line assigned to the modem, if any, on your system. Activity on the selected IRQ always awakens the system.

PM Timers

The following are Green PC power saving functions. They are user-configurable only during User Defined Power Management mode.

Doze Mode: After the selected period of inactivity, 1 minute to 1 hour, the processor clock runs at slower speed while all other devices continue to operate at full speed.

Standby Mode: After the selected period of inactivity, 1 minute to 1 hour, the fixed disk and video shut off while all other devices continue to operate at full speed.

Suspend Mode: After the selected period of system inactivity, 1 minute to 1 hour, all devices except the processor shut off.

HDD Power Down: After the selected period of drive inactivity, 1 to 15 minutes, the hard disk drive powers down while all other devices remain active.

Wake Up Events

You can turn on or off monitoring of four commonly used interrupt requests so they do not awaken the system from, or reset activity timers for Doze and Standby modes.

For example, if you have a modem on IRQ3, you can turn on IRQ3 as a wake-up event, so that an interrupt from the modem can wake up the system.

Or you may want to turn off IRQ12, the PS/2 mouse, as a wake-up event, so accidently brushing the mouse does not awaken the system. The default wake-up event is keyboard activity.

Power Down and Resume Events

You can disable monitoring of common IRQs so they do not awaken the system from, or reset activity timers for Suspend mode.

IRQ3 - COM2	IRQ10 - Reserved
IRQ4 - COM1	IRQ11 - Reserved
IRQ5 - LPT2	IRQ12 - PS2/Mouse
IRQ6 - Floppy	IRQ13 - Coprocessor
IRQ7 - LPT1	IRQ14 - Hard disk
IRQ8 - RTC	IRQ15 - Reserved
IRQ9 - IRQ2 redir.	

Power Management Setup allows you to take advantage of Microsoft's DOS 6.2™ Advanced Power Management (APM) program.

The values represented in this table are used as an example, and may not match your BIOS settings. To take advantage of this feature,

- Make sure DOS 6.2 is installed on your system
- Select YES for PM Control by APM in the menu above
- Enable the DOS Power program
- Enable the Power program in Windows 3.1™, if installed

DOS 6.2TM Advanced Power Program

To use the program, follow these simple steps.

1) Open your CONFIG.SYS file by using a text editor, such as MS-DOS Editor. To open your CONFIG.SYS file using MS-DOS Editor, type the following at the command prompt: edit c:\config.sys

2) At the end of the CONFIG.SYS file, add a device command specifying the location of the POWER.EXE file. This example specifies the POWER.EXE file is located in the C: drive DOS directory, and that the default setting should be used: device=c:\dos\power.exe

3) Save the changes to your CONFIG.SYS file, and quit the text editor.

4) Restart the computer. Press <CTRL> <ALT> <DEL>.

MS-DOS 6.2 User's Guide also provides instructions. For more information, type "help power", at the DOS prompt.

Windows 3.1™ Advanced Power Management

Use the Windows Setup program to select the MS-DOS with APM option.

1) Start the Windows Setup program by changing to the Windows root directory and typing Setup: cd windows setup.

2) At the Windows Setup menu, edit the Computer field. Use the arrow key to highlight the field, and press <Enter>.

3) From the Computer screen, select MS-DOS with APM and press <Enter>. Use the arrow key to scroll through the selection menu.

4) Accept the change and exit the Setup program. Restart your computer by pressing <CTRL> <ALT> <DEL>.

Windows 95™ Advanced Power Management

1) Enable the APM option in BIOS Setup before installing Windows 95.

2) The APM is automatically installed during Windows 95 setup.

3) An APM icon appears in the Control Panel window, indicating a successful installation.

PnP/PCI Configuration Setup

These settings are pre-set at the factory and should be altered with care.

The values represented in this table are used as an example, and may not match your BIOS settings.

ROM PCI/ISA BIOS
PnP/PCI CONFIGURATION SETUP
AWARD SOFTWARE, INC.

Resources Controlled By: Manual	PCI IRQ Activated By : Level
Reset Configuration Data: Disabled	PCI IDE IRQ Map To : PCI-AUTO
IRQ-3 Assigned to : Legacy ISA	Primary IDE INT# : A
IRQ-4 Assigned to : Legacy ISA	Secondary IDE INT# : B
IRQ-5 Assigned to : PCI/ISA PnP	
IRQ-7 Assigned to : PCI/ISA PnP	
IRQ-9 Assigned to : PCI/ISA PnP	
IRQ-10 Assigned to : PCI/ISA PnP	
IRQ-12 Assigned to : PCI/ISA PnP	
IRQ-14 Assigned to : PCI/ISA PnP	
IRQ-15 Assigned to : PCI/ISA PnP	
DMA-0 Assigned to : PCI/ISA PnP	
DMA-1 Assigned to : PCI/ISA PnP	
DMA-3 Assigned to : PCI/ISA PnP	
DMA-5 Assigned to : PCI/ISA PnP	
DMA-6 Assigned to : PCI/ISA PnP	Esc : Quit ↑↓→: Select Item
DMA-7 Assigned to : PCI/ISA PnP	F1 : Help PU/PD/+/- : Modify
	F5 : Old Values (Shift)F2 : Color
	F6 : Load BIOS Defaults
	F7 : Load Setup Defaults

Figure 7: Plug and Play/PCI Setup

Integrated Peripherals Configuration Setup

This program lets you setup the components that are integrated onto the motherboard. These features include the E-IDE controller and drives, universal serial bus (USB) controller, floppy controller, serial ports and parallel port.

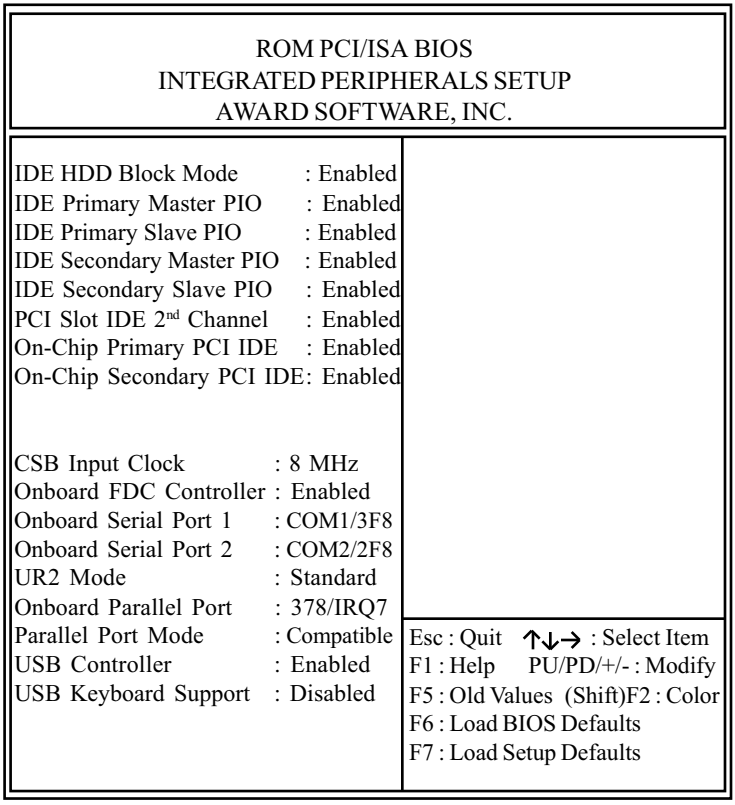

Figure 8: Integrated Peripherals Configuration Setup

The settings are pre-set at the factory and should be altered with care. The values represented in this table are used as an example, and may not match your BIOS settings.