310M Motherboard User's Manual

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Motherboard
User's Manual

Easy to read. Easy to use.

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September, 1992

Table of Contents

How to Use This Guide

This guide provides information that will help you configure and install the 310M motherboard easily and efficiently.

- Chapter 1, **Introduction**, acquaints you with the special features of the 310M motherboard.
- Chapter 2, **Motherboard Description**, describes key components and their locations on the motherboard.
- Chapter 3, **Hardware Configuration**, shows you how to configure memory and set the motherboard's jumpers. Instructions for installing memory and a math coprocessor are also given.
- Chapter 4, **BIOS Setup**, explains how to run the motherboard's BIOS setup program.

Power Supply Requirements

Your system requires a clean, steady power supply for reliable performance. For the high frequency CPU on the 310M motherboard, the quality of the power supply is even more important. Most power supplies on the market meet the standards required by the motherboard's CPU. However, to be certain of the best performance, make sure your power supply provides a minimum of 200W and +5V voltage range of 4.85 volts minimum to 5.25 volts maximum.

If your area has noisy power transmission, use a line noise filter between the power source and your computer.

Static Electricity Precautions

Before you handle the motherboard or any other system component, you must discharge static electricity by grounding yourself. Observing the precautions below will protect your equipment from static discharge:

- Keep the motherboard and other system components in their anti-static packaging until you are ready to install them.
- Ground yourself before you remove any system component from its protective anti-static packaging. You can ground yourself by grasping the expansion slot covers or other unpainted portions of the computer chassis.
- Ground yourself frequently while working so that you discharge any static electric charge that may build up in your body. Another option is to use a grounding strap.
- Avoid touching the components on the motherboard. Handle the motherboard and other system components by the edges.

Chapter 1: Introduction

The 310M motherboard is a highly integrated, 386 system board that features one of several advanced microprocessors running at 33 MHz or 40 MHz clock speed. The motherboard can be configured with either the Intel 386DX–33, the AMD 386DX-33/40, the AMD 386DXL-33/40, or the Cyrix 486DLC–33/40. This board is ideal for building systems that meet the requirements of current and future software applications, GUIs, and operating systems.

The motherboard features 64KB, 128KB, or 256KB of external cache memory with direct-mapped and write-back caching algorithms. The CPU accesses cache memory very quickly, significantly improving the speed of your programs.

The 310M is compatible with MS-DOS, OS/2, Xenix 386, Unix, MS Windows 3.0, Novell Netware, and all of the thousands of IBM personal computer applications.

Benchmark Test Performance

CPU Type	Power Meter V1.5	Landmark V1.14	Norton SI V4.0
40MHz (DX)	9.623 MIPS	65.7 MHz	48.5
33MHz (DX)	8.003MIPS	54.8 MHz	40.5
33MHz (DLC)	11.497 MIPS	89.0 MHz	71.5
40MHz (DLC)	13.675 MIPS	106.7 MHz	84.5

Features

The advanced features of the 310M motherboard include:

- Support for the following CPUs:
  - — Intel 386DX–33
  - — AMD 386DX-33/40 or 386DXL-33/40
  - — Cyrix 486DLC-33/40
- Socket support for Weitek 3167 or 80387 running in synchronous mode
- Memory configurations from 1Mbyte to 32Mbytes with combinations of 256K, 1M, and 4M SIMM modules
- Hidden DRAM refresh to boost system performance,
- Support for 256K/384K relocation to the top of DRAM memory
- Support for C0000-FFFFF shadow RAM function
- Support for 64K, 128K, or 256K direct–mapped with write–back cache memory
- System and video BIOS can be cacheable or non-cacheable
- Six 16-bit ISA slots and one 8-bit slots
- 4-layer 2/3 Baby AT size, 220mm x 258mm (8.66-inches x 10.3-inches)

Cache Overview

The cache features of the 310M motherboard include support for 64K, 128K or 256K cache with direct-mapped and write-back caching algorithms.

The cache capabilities of the 310M motherboard significantly improve the performance of your software applications. Cache works by copying your most recent data and placing it in an area of high speed memory called SRAM. Cache SRAM is positioned between main memory DRAM and the CPU. Data is transferred from DRAM to SRAM and then from SRAM to the CPU. The CPU can access data in and out of the SRAM at a very high speed, allowing your applications to run much faster.

One or two chips on the 310M motherboard serve as Tag RAM for the system's cache. Tag RAM acts as a directory of addresses for the data stored in Cache RAM. The CPU first checks Tag RAM to see if the requested data is stored in cache. If the data addresses are not present, then the CPU must go to main memory to search.

The 310M motherboard is configured to support 8 SRAM chips of either 8K or 32K capacity. This gives you the option of either a 64K (8K8 x 8), 128K (32K8 x 4) or 256K (32K8 x 8) cache size. Refer to the cache configuration section in Chapter 3.

Unpacking

The 310M Motherboard comes packed in a sturdy cardboard shipping carton. The carton contains:

- The 310M Motherboard
- This User's Guide

Note: Do not remove the motherboard from its original packing until you are ready to install it.

The motherboard is easily damaged by static electricity. You should observe the following precautions while unpacking and installing the motherboard.

1. Before you handle the motherboard, ground yourself by grasping an unpainted area of the system's metal chassis. Doing so discharges any static charge you may have accumulated in your body.
2. Remove the motherboard from its anti-static wrapping and place it on a grounded surface, component side up.
3. Check the motherboard for damage. If any integrated circuit appears loose, press carefully to seat it firmly in its socket.

Do not apply power if the motherboard appears damaged. If there is damage to the board, or items are missing from the carton, contact your dealer immediately.

Chapter 2: Motherboard Description

This chapter gives a brief description of key components on the motherboard.

Motherboard Components

Refer to Figure 2–1 on the following page to locate the components described below.

1 System Microprocessor

This socket on the motherboard contains either an Intel 386DX, an AMD 386DXL, or a Cyrix 486DLC microprocessor. The high-performance 32-bit CPU runs at 33MHz or 40MHz.

2 System Microprocessor (QFP)

This 386QFP socket is available for installing an AMD 386DX microprocessor. The advanced 32-bit CPU runs at 33MHz or 40MHz.

3 Math coprocessor Socket

This socket lets you add an optional 80387 or Weitek 3167 coprocessor. Adding a numeric coprocessor to the motherboard increases the speed of calculation intensive applications such as spreadsheets, databases, and graphics programs.

Motherboard Layout

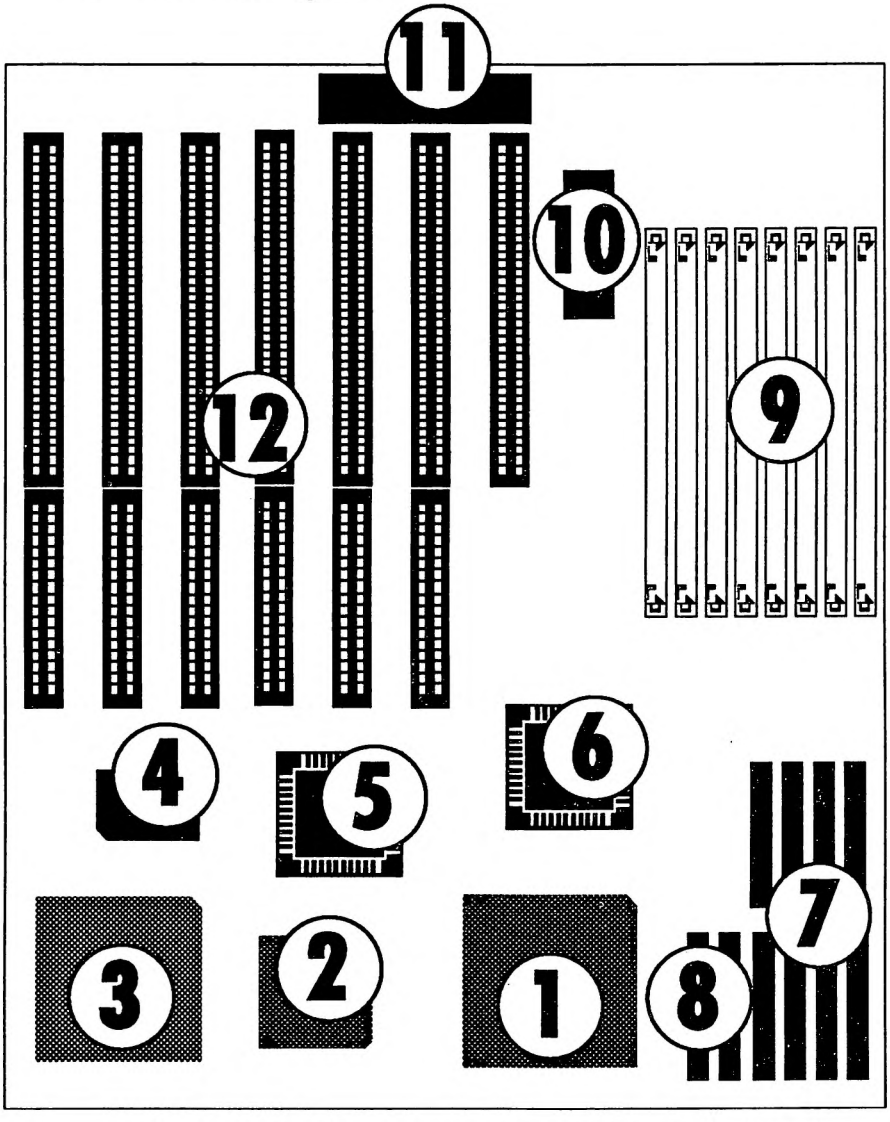


Figure 2–1. Components of the 310M Motherboard

4 82C206 Integrated Peripherals Controller (IPC)

The 82C206 IPC is a universal standard chip that supports all peripheral functions required on an AT-compatible machine.

5 UMC 82C482A Integrated System Controller

The UMC 82C482A ISC contains AT bus control logic, data bus conversion logic, CPU reset logic, clock generation for the CPU, keyboard timer, DMA/refresh logic and peripheral interface logic.

6 UMC 82C481B Integrated Memory Controller

The UMC 82C481A IMC contains a sophisticated direct-mapped cache controller with write-back operation and a fast page mode DRAM controller.

7 Cache SRAM

The on-board cache memory consists of eight SRAM (Static Random Access Memory) chips that hold cached code and data.

8 Cache TAG RAM

The on-board tag SRAM consists of one or two chips that register the addresses of code and data contained in Cache SRAM.

9 Main Memory

8 SIMM (Single In-line Memory Module) sockets in banks 0 and 1 are provided for 256K, 1MB, and 4MB SIMM modules. Possible memory sizes are: 1MB, 2MB, 4MB, 5MB, 8MB, 16MB, 20MB, and 32MB.

10 System BIOS

The AMI BIOS is included on this single 64K ROM chip. The BIOS lets you control the motherboard's microprocessor speed, shadow RAM and cache functions from the keyboard.

11 Keyboard Controller

The 8042 is a single chip keyboard interface controller.

12 Expansion Slots

Six standard 16-bit expansion slots are provided on the motherboard. The motherboard also offers one 8-bit expansion slot.

Chapter 3: Hardware Configuration

This chapter explains how to configure the motherboard's hardware. Before you install the motherboard into the system chassis, you may find it convenient to first set the jumpers that configure the system's clock speed and cache size. Next, install the board's memory modules, and an optional numeric coprocessor. After you have inserted the motherboard into the system chassis, attach system peripherals and the control panel to the motherboard's connectors.

Refer to this chapter whenever you upgrade or reconfigure your system.

Power Precautions

Before you begin configuration, make sure you are working with an unplugged motherboard. Many components are powered by low-voltage current, but there still may be a dangerous electric current coming from the leads and power supply. You should take the following precautions:

- Turn off power to the motherboard, and unplug the power cord before you begin.
- Unplug all cables that connect the motherboard to any external devices.

Jumpers, Connectors, and Memory Bank Locations

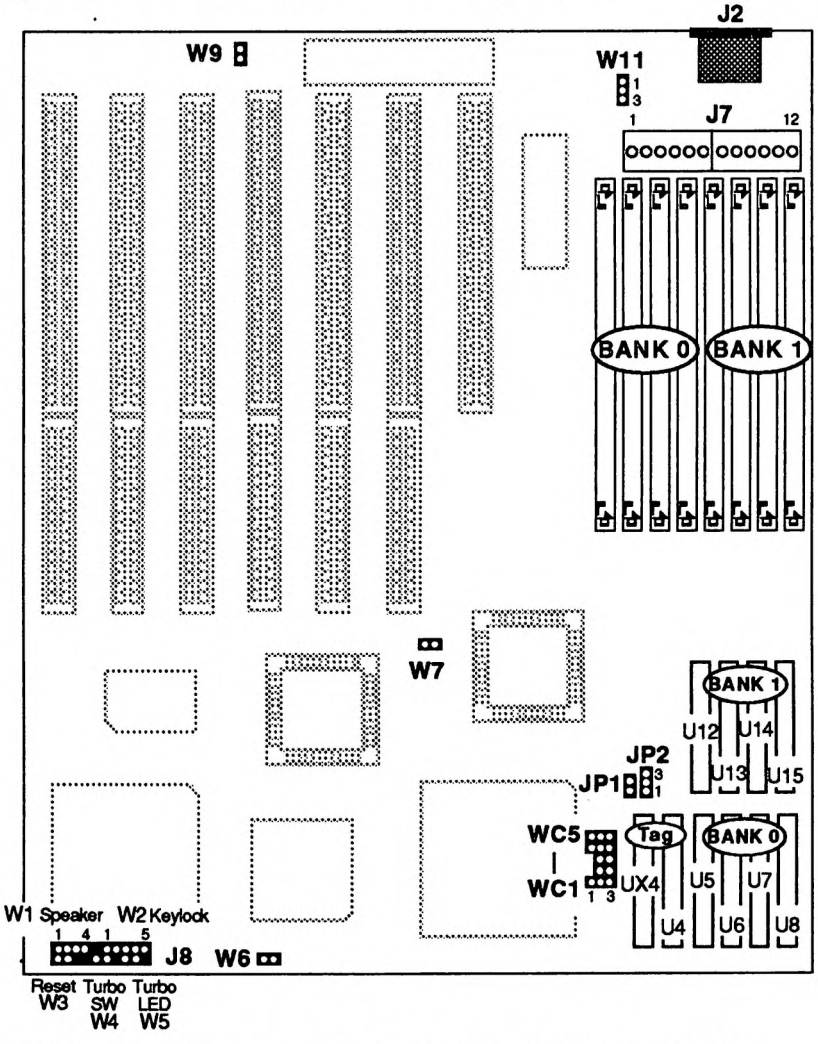


Figure 3–1. Jumpers, Connectors, and Memory Banks

Setting Jumpers

You configure some hardware options on the motherboard by setting jumper switches. Jumper switches are rows of small pins on the motherboard that are set by using a jumper cap.

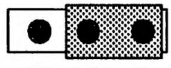
Set a jumper switch as follows:

- *Close* a jumper switch by inserting the plastic jumper cap over two pins of the jumper.
- *Open* a jumper switch by removing the jumper cap.

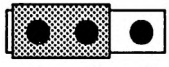
Note: When you open a jumper, attach the plastic jumper cap to one of the pins so you won't lose it.

Symbols:

For setting three-pin jumpers, the symbols below are used:

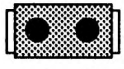


Pins 1 and 2 are Closed with a jumper cap.

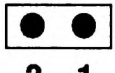


Pins 2 and 3 are Closed with a jumper cap.

For setting 2-pin jumpers, the following symbols are used:



The jumper is Closed when the jumper cap is placed over the two pins of the jumper.



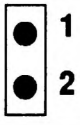
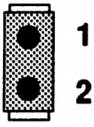
The jumper is Open when the jumper cap is removed from the jumper.

W9: Display Type Selector

Set jumper W9 to configure the motherboard for use with either a color or monochrome monitor. Refer to Figure 3-1 for the location of jumper W9.

Setting the Display Type Selector

Set jumper W9 as in the table below.

Monitor Type	W9
Monochrome (Default)	
Color	

W11: CMOS Clear Jumper

When set to Normal operation, jumper W11 allows the motherboard to retain your BIOS settings in CMOS memory. Clearing the CMOS memory erases the current BIOS settings.

Setting the CMOS Clear Jumper.

Set jumper W11 as in the table below.

Monitor Type	W11
Clear CMOS Data	
Normal Operation (Default)	

WC1~WC5, JP1, JP2: Cache Size Selection

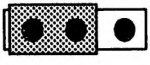
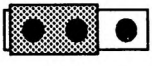
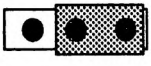
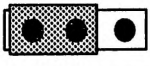
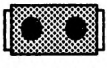
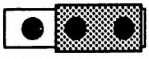
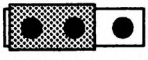
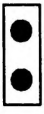
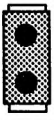
Select cache size by setting jumpers WC1~WC5 and JP1~JP2. These jumpers let the motherboard recognize a cache configuration of 64KB, 128KB, or 256KB. Refer to Figure 3-1 for the location of the jumpers.

The 310M motherboard is available with 64KB, 128KB, or 256KB cache memory on-board. See Figure 2–1 for the locations of cache and tag memory. For cache data memory, the motherboard supports eight 8K x 8-bit SRAM chips (64KB cache size), four 32K x 8-bit SRAM chips (128KB cache size), or eight 32K x 8-bit SRAM chips (256KB cache size). Tag memory uses one 8K x 8-bit SRAM chip for 64KB or 128KB cache size; and two 8K x 8-bit SRAM chips or one 32K x 8-bit SRAM chip for 256KB cache size.

CACHE	BANK 0 (U5~U8)	BANK 1 (U12~U15)	TAG (U4, UX4)
64K	8k8 x 4	8k8 x 4	8k8 x 1 / U4
128K	32k8 x 4	—	8k8 x 1 / U4
256K	32k8 x 4	32k8 x 4	8k8 x 2 / U4, UX4 or 32K x 1 / U4

Setting the Cache Jumpers

Set the cache jumpers as in the table below.

Jumper	64K	128K	256K/ (U4:32K8)	256K/ (U4, UX4: 8K8)
WC5				
WC4				
WC3				
WC2				
WC1	 1 2 3	 1 2 3	 1 2 3	 1 2 3
JP1	 2 1	 2 1	 2 1	 2 1
JP2	 3 2 1	 3 2 1	 3 2 1	 3 2 1

Memory Configuration

The 310M motherboard lets you increase the system's main memory via on-board SIMM (Single In-line Memory Modules) sockets. The motherboard supports two banks of 256K, 1M and 4M fast-page-mode DRAM modules. The motherboard requires DRAM with at least 80ns RAS* access time.

On-board memory is located in two banks: Bank 0 and Bank 1. See Figure 3-1. Four SIMM sockets are provided in each bank. You can install either a 256K, a 1M or a 4M SIMM in each socket. The sockets in each bank must be completely filled and all SIMM modules in a bank must be of the same capacity.

The 310M motherboard supports the following configurations:

Bank 0	Bank 1	Memory Size
256K	—	1 MB
256K	256K	2 MB
1M	—	4 MB
256K	1M	5 MB
1M	1M	8 MB
4M	—	16 MB
1M	4M	20 MB
4M	4M	32 MB

Table 3–1. On-board Memory Configurations

Installing SIMM

Before installing SIMM, review this manual's section on Static Electricity Precautions. Install SIMM as follows:

1. Remove the SIMM from its anti-static packaging.
2. Hold the SIMM so that the chips are toward you and the edge connector is pointed toward the motherboard.
3. Gently insert the module's connectors into the socket at a 60-degree angle and wiggle it slightly so that it is firmly in place.
4. Move the module slowly to a vertical position until the locking tabs snap into place.

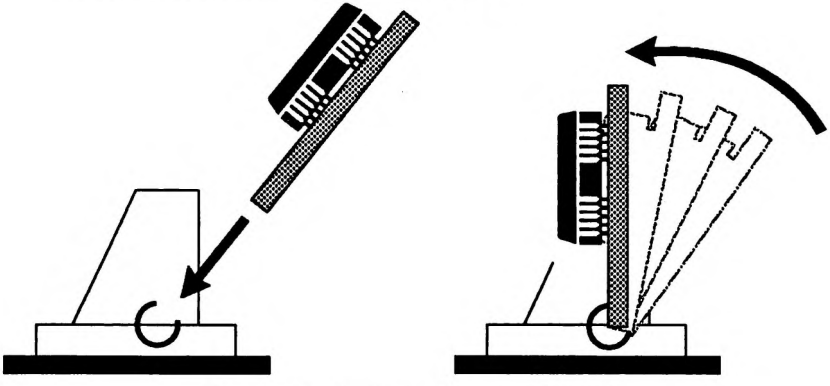


Figure 3-2. Installing a SIMM

5. Repeat steps 2 ~ 5 until the bank's sockets are full.
6. Once you install memory, run the Setup program to let the system know how much memory you have installed.

Numeric Coprocessor Installation

The 310M motherboard supports both the Intel 80387 and the Weitek 3167 numeric coprocessors. Refer to Figure 2-1 for the location of the coprocessor socket.

Installing the Intel 80387 Coprocessor

Install the 80387 coprocessor as follows:

1. Review the section on Static Electricity Precautions and make sure that power to the motherboard is off.
2. Align the notched corner of the 80387 chip to the notched corner of the socket. The chip's notched corner also has a dot.

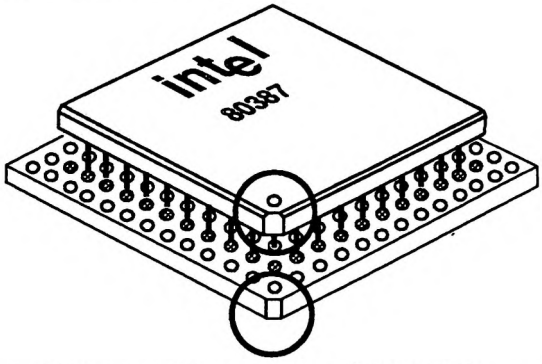


Figure 3-3. Installing the Intel 80387 Coprocessor

3. Match the pins of the 80387 with the second row of socket holes — a row of empty socket holes appears around the chip.
4. Press the chip gently into the socket. Set the coprocessor jumpers W6, W7 to Enable the 387 coprocessor. See page 3-12.

Installing a Weitek 3167 Coprocessor

Install a Weitek 3167 coprocessor as follows:

1. Review this manual's section on static electricity precautions and make sure that power to the motherboard is off.

2. Hold the coprocessor so that the corner of the chip marked by a round dot corresponds to the notched corner of the socket. There is also an extra pin on the inside of the corner with the round dot.

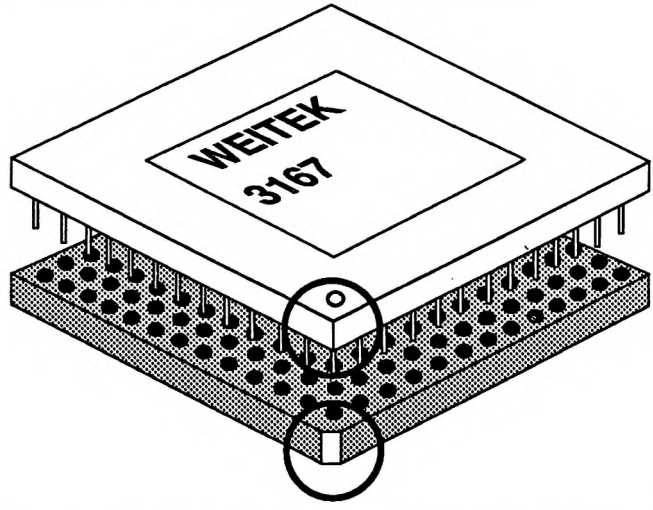


Figure 3-4. Installing a Weitek 3167 Coprocessor

3. Align the individual pins with the holes in the socket.

4. Press the chip carefully into the socket, and then run the Setup program. Set the coprocessor jumpers **W6, W7** to Enable the Weitek 3167 coprocessor. See page 3-12. In ADVANCED CMOS SETUP, set **Weitek Processor** to "Present." See page 4-6.

W6, W7: Coprocessor Jumpers

Set jumpers W6 and W7 to configure the motherboard for use with either the 387 coprocessor or the Weitek 3167 coprocessor. Refer to Figure 3-1 for the locations of jumper W6 and W7.

Setting the Coprocessor Jumpers

Set jumpers W6 and W7 as in the table below.

Coprocessor Setting	W6	W7
387 Enable		
Weitek 3167 Enable or 387 Disable		

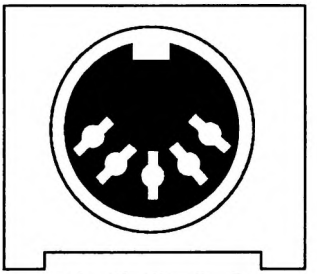
Connectors

Attach the 310M motherboard to system components via connectors on the motherboard. There are connectors for the keyboard, power supply, speaker, and various control panel switches and indicators. Refer to Figure 3-1 for connector locations and connector pin positions.

J2 - Keyboard Connector

A five-pin female DIN keyboard connector is located at the rear of the board (J2). Plug the keyboard jack into this connector.

Pin	Description
1	Keyboard Clock
2	Keyboard Data
3	Spare
4	Ground
5	+5V DC



J7 - Power Supply Connector

The power supply connector has two six-pin male header connectors (J7). Plug the dual connectors from the power directly onto the board connector.

Pin	Description	Pin	Description
1	Power Good	7	Ground
2	+5V DC	8	Ground
3	+12V DC	9	–5V DC
4	–12V DC	10	+5V DC
5	Ground	11	+5V DC
6	Ground	12	+5V DC

J8 - Case Devices Connector

J8 is a single 14-pin connector that connects various case-mounted devices to the motherboard as in the diagram below.

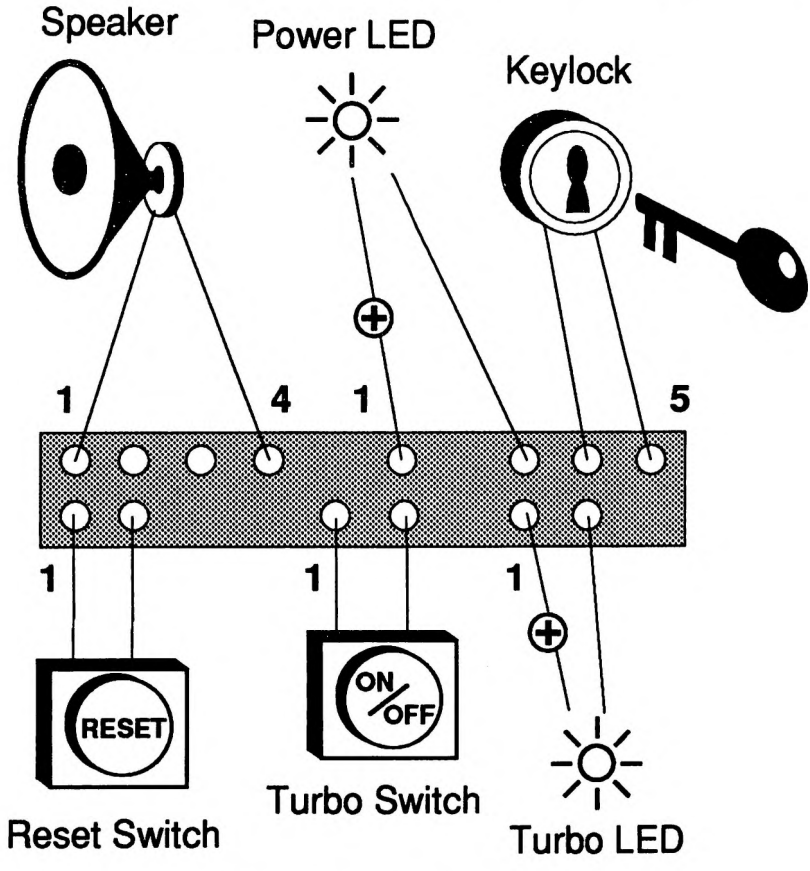


Figure 3-5. Jumper J8 - Case Devices Connector

W1: Speaker Connection

Attach the system speaker to J8 as in Figure 3-5.

Pin	Description
1	Speaker Out
2	Not Used
3	Ground
4	+5V

W2: Keylock and Power LED Connection

Connect the keylock and power LED connector to J8 as in Figure 3-5. If the front panel of your case provides a keylock, you can enable and disable the keyboard for added security.

Pin	Description
1	Power LED+
2	Not Used
3	Ground
4	Keylock
5	Ground

W3: Reset Switch Connection

Attach the Reset switch to J8 as in Figure 3-5. The Reset switch restarts the system.

Setting	Description
Short	Reset
Open	Normal

W4: Turbo Switch Connection

Attach the Turbo switch on the front of the system case to J8 as in Figure 3-5. This switch alternates the motherboard between turbo and normal speed operation.

Setting	Description
Short	Normal
Open	Turbo

The motherboard also lets you switch speeds using the following keyboard commands:

Turbo Speed: CTRL - ALT - SHIFT - "+"

Normal Speed: CTRL - ALT - SHIFT - "–"

W5 Turbo LED Connection

Connect the Turbo LED on the system case control panel to J8 as shown in Figure 3-5. If the system board select is in Turbo mode, this indicator will light during turbo speed operation.

Pin	Description
1	+, Anode
2	–, Cathode

Chapter 4: BIOS Setup

Once you have configured the motherboard, and have assembled the components, you can turn on the completed system. At this point, run the software setup to make sure your system information is correct.

Software setup is accomplished via Basic Input-Output System (BIOS) programming. You setup the BIOS program to tell the operating system what devices are connected to the motherboard.

BIOS setup is also called CMOS setup You need to run the BIOS setup if hardware is not identical with information contained in the CMOS RAM, or if the CMOS RAM has lost power.

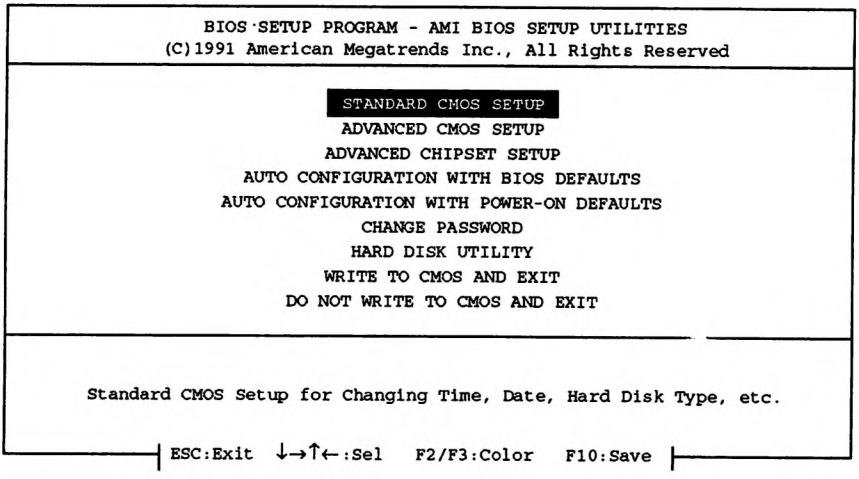
AMI BIOS Setup

The BIOS setup program provided with the motherboard is the AMI BIOS from American Megatrends Inc. Enter the AMI Setup program's Main Menu as follows:

1. Turn on or reboot the system. After a series of diagnostic checks, the following message appears:

   "Hit <DEL> if you want to run SETUP"

2. Press the <DEL> key to enter the AMI BIOS setup program and the following screen appears:



3. Choose an option and press <Enter>. Modify the system parameters to reflect the options installed in the system. (See the following sections for more information.)

A warning message appears each time one of the first three options, (Standard CMOS Setup, Advanced CMOS Setup, and Advanced Chipset Setup) is selected, before any changes are allowed to any of the setup parameters.

```
BIOS SETUP PROGRAM - WARNING INFORMATION
(C)1991 American Megatrends Inc., All Rights Reserved

        Improper Use of Setup may Cause Problems !!

If System Hangs, Reboot System and Enter Setup by Pressing the <ESC> key

        Do any of the following after Entering Setup
            (i)   Alter Options to make System Work
            (ii)  Load BIOS Setup Defaults
            (iii) Load Power-On Defaults

        Hit <ESC> to Stop now, Any other Key to Continue
```

4. Press <ESC> at anytime to return to the Main Menu.

5. In the Main Menu, choose "WRITE TO CMOS AND EXIT" to save your changes and reboot the system. Choosing "DO NOT WRITE TO CMOS AND EXIT" ignores your changes and exits the program.

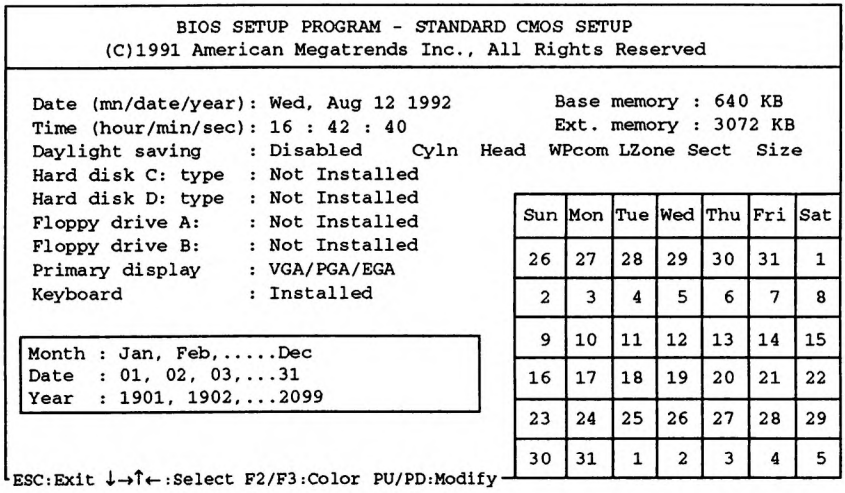
Main Menu Options

The Main Menu options of the AMI BIOS are described below.

STANDARD CMOS SETUP

Run the Standard CMOS Setup as follows.

1. Choose "STANDARD CMOS SETUP" from the Main Menu and a screen with a list of items appears.



2. Use the arrow keys to move between items and to select values. Modify the selected fields using the PgUp/PgDn keys. Some fields let you enter numeric values directly.

Date (mn/date/year) Type the current date

Time (hour:min:sec) Type the current time

Daylight saving	Choose Enabled or Disabled	
Hard disk C & D	Choose from the standard hard disk types 1 to 46. Type 47 is user definable. If a hard disk is not installed choose "Not installed."	
Floppy drive A & B	Choose	360KB / 5 1/4" 1.2MB / 5 1/4" 720KB /3 1/2" 1.4M /3 1/2" or Not installed
Primary display	Choose	Monochrome, Color 40x25, VGA or EGA, Color 80x25, or Not installed
Keyboard	Choose Installed or Not installed	

3. After you have finished with the Standard CMOS Setup program, press the <ESC> key. The following appears:

   "Write to CMOS and Exit (Y/N)?"

4. Typing "N" and <Enter> returns you to the Main Menu. Typing "Y" and <Enter> saves the system parameters and the system reboots.

ADVANCED CMOS SETUP

Run the Advanced CMOS Setup as follows.

1. Choose "ADVANCED CMOS SETUP" from the Main Menu and a screen with a list of items appears.

```
                BIOS SETUP PROGRAM - ADVANCED CMOS SETUP
          (C)1991 American Megatrends Inc., All Rights Reserved

Typematic Rate Programming : Disabled   Adaptor ROM Shadow DC00,16K: Disabled
Typematic Rate Delay (msec): 500        Adaptor ROM Shadow E000,64K: Disabled
Typematic Rate (Chars/Sec) : 15         System  ROM Shadow F000,64K: Enabled
Above 1MB Memory Test      : Disabled
Memory Test Tick Sound     : Enabled
Hard Disk Type 47 RAM Area : 0:300
Weitek Processor           : Disabled
System Boot Up Sequence    : C:, A:
Cache Memory               : Both
Gate A20 Emulation         : Both
Password Checking Option   : Setup
Video   ROM Shadow C000,16K: Enabled
Video   ROM Shadow C400,16K: Enabled
Adaptor ROM Shadow C800,16K: Disabled
Adaptor ROM Shadow CC00,16K: Disabled
Adaptor ROM Shadow D000,16K: Disabled
Adaptor ROM Shadow D400,16K: Disabled
Adaptor ROM Shadow D800,16K: Disabled

ESC:Exit ↓→↑←:Sel  (Ctrl)Pu/Pd:Modify  F1:Help  F2/F3:Color
F5:Old Values  F6:BIOS Setup Defaults  F7:Power-On Defaults
```

2. Use the arrow keys to move between items and to select values. Modify the selected fields using the PgUp/PgDn keys. An explanation of the <F> keys follows:

   <F1>: "Help" gives options available for each item.

   <F2/F3>: Change color.

<F5>: Get the old values. These values are the values with which the user started the current session. If the CMOS was good, then the old values are either the CMOS values or the BIOS Setup default values.

<F6>: Load all options in the Advanced CMOS Setup / Advanced Chipset Setup with the BIOS Setup default values.

<F7>: Load all options in the Advanced CMOS Setup / Advanced Chipset Setup with the Power-On default values.

A short description of the screen items follows:

Typematic Rate Programming Choose Enabled or Disabled. Enable this option to adjust the keystroke repeat rate. Adjust the rate via Typematic Rate Delay and Typematic Rate.

Typematic Rate Delay Choose the delay between holding down a key and when the character begins repeating.

Typematic Rate Choose the rate a character keeps repeating.

Above 1 MB Memory Test Choose Enabled or Disabled. Enable this option to invoke the POST memory routines on the RAM above 1MB. Disable and BIOS only checks the first 1MB of RAM.

Memory Test Tick Sound	Choose Enabled or Disabled. Enable this option to turn on the "ticking" sound during the memory test. Disable to turn off this sound.
Hard Disk Type 47 Data Area	The choice "0:300" is recommended for most cases. However, if the system is involved with Novell Netware, choose "DOS 1KB" to avoid conflicts with DOS. (Novell uses 0:300 for operation system programming.)
Weitek Processor	Choose Enabled or Disabled. Enable this option when using the Weitek 3167 coprocessor.
System Boot Up Sequence	The AMI BIOS first attempts to boot from drive A: and then, if unsuccessful, from hard disk C:. You can reverse this sequence with this option.
Cache Memory	Choose Disabled, Internal, or Both. For external cache, choose "Both." For the Cyrix 486DLC CPU, this enables both external and internal cache. Choose "Internal" for internal cache only when using the 486DLC. When there is no external cache system, or to slow down system performance, choose "Disabled."
Gate A20 Emulation	Choose Disabled, Chipset, Fast, or Both. "Both" is the default option.

Password Checking Option

Choose Setup, or Always. Use this feature to prevent unauthorized system boot-up or unauthorized use of BIOS Setup. Note that if there is no password set, the system will not check the password for either choice. See page 4-17.

"Always"– Each time the system is booted the password prompt appears.

"Setup"– Password prompt appears if you try to enter the Setup program.

Video or Adaptor ROM Shadow

ROM shadow copies BIOS code from slower ROM to faster RAM. BIOS can then execute from RAM. These 16K segments can be shadowed from ROM to RAM. BIOS is shadowed in a 16K segment if it is enabled and has BIOS present.

System ROM Shadow

If enabled and BIOS is present in this segment, then the system BIOS (64K) is shadowed.

3. After you have finished with the Advance CMOS Setup program, press the <ESC> key. The following appears:

   "Write to CMOS and Exit (Y/N)?"

4. Typing "N" and <Enter> returns you to the Main Menu. Typing "Y" and <Enter> saves the system parameters and the system reboots.

ADVANCED CHIPSET SETUP

The Advanced Chipset Setup option is used to change the values of the chipset registers. These registers control most of the system options in the computer.

Run the Advanced Chipset Setup as follows.

1. Choose "ADVANCED CHIPSET SETUP" from the Main Menu and a screen with a list of items appears.

```
        BIOS SETUP PROGRAM - ADVANCED CHIPSET SETUP
   (C)1991 American Megatrends Inc., All Rights Reserved

Memory Remapping            : Enabled
Memory above 16MB Cacheable: No
C0000-C3FFF,16K Cacheable   : Yes
C4000-C7FFF,16K Cacheable   : Yes
C8000-CBFFF,16K Cacheable   : No
CC000-CFFFF,16K Cacheable   : No
D0000-D3FFF,16K Cacheable   : No
D4000-D7FFF,16K Cacheable   : No
D8000-DBFFF,16K Cacheable   : No
DC000-DFFFF,16K Cacheable   : No
E0000-EFFFF,64K Cacheable   : No
F0000-FFFFF,64K Cacheable   : Yes
Non-Cacheable Block1 Enable: Disabled
Non-Cacheable Block-1 Size : 1MB
Non-Cacheable Block-1 Base : 0KB
Non-Cacheable Block2 Enable: Disabled
Non-Cacheable Block-2 Size : 16MB
Non-Cacheable Block-2 Base : 0KB

ESC:Exit ↓→↑←:Sel  (Ctrl)Pu/Pd:Modify  F1:Help  F2/F3:Color
F5:Old Values  F6:BIOS Setup Defaults  F7:Power-On Defaults
```

2. Use the arrow keys to move between items and to select values. Modify the selected fields using the PgUp/PgDn keys. An explanation of the <F> keys follows:

<F1>: "Help" gives options available for each item.

<F2/F3>: Change color

<F5> : Get the old values. These values are the values with which the user started the current session. If the CMOS was good, then the old values are either the CMOS values or the BIOS Setup default values.

<F6>: Load all options in the Advanced CMOS Setup / Advanced Chipset Setup with the BIOS Setup default values.

<F7>: Load all options in the Advanced CMOS Setup / Advanced Chipset Setup with the Power-On default values.

A short description of the screen items follows:

Memory Remapping	Choose Enabled or Disabled. This option adds 256K or 384K memory to the top of memory when enabled. The remapped memory size is related closely to the shadow RAM function.
Memory above 16MB Cacheable	Choose Yes or No. If you install 64K cache choose No.
C0000-C3FFF, 16K Cacheable	Choose Yes or No. This option affects the video subsystem performance. "Yes" is recommended if you use EGA or above.

C4000-C7FFF, 16K Cacheable	Choose Yes or No. This option affects the video subsystem performance. "Yes" is recommended if you use EGA or above.
C8000-CBFFF, 16K Cacheable	Choose Yes or No.
CC000-CFFFF, 16K Cacheable	Choose Yes or No.
D0000-D3FFF, 16K Cacheable	Choose Yes or No.
D4000-D7FFF, 16K Cacheable	Choose Yes or No.
D8000-DBFFF, 16K Cacheable	Choose Yes or No.
DC000-DFFFF, 16K Cacheable	Choose Yes or No.
E0000-EFFFF, 64K Cacheable	Choose Yes or No.
F0000-FFFFF, 64K Cacheable	Choose Yes or No. This option affects BIOS access efficiency and "Yes" is the recommended setting.
Non-Cacheable Block–1 Enable	Choose Enabled or Disabled. Default is Disabled.

Non-Cacheable Block–1 Size	Choose the block size.
Non-Cacheable Block–1 Base	Choose Enabled or Disabled. This sets the start address for the first non-cacheable block.
Non-Cacheable Block–2 Enable	Choose Enabled or Disabled. Default is Disabled.
Non-Cacheable Block–2 Size	Choose the block size.
Non-Cacheable Block–2 Base	Choose Enabled or Disabled. This sets the start address for the first non-cacheable block.

3. After you have finished with the Advance Chipset Setup, press the <ESC> key. The following appears:

   "Write to CMOS and Exit (Y/N)?"

4. Type "N" and <Enter> to return to Main Menu. Type "Y" and <Enter> to save the parameters and reboot the system.

AUTO CONFIGURATION W/ BIOS DEFAULTS

This Main Menu item loads the default system values. If the CMOS is corrupted the defaults are loaded automatically. Choose this item and the following message appears:

"Load BIOS Setup Default Values from ROM Table (Y/N)? N"

To use the BIOS defaults, change the prompt to "Y" and press <Enter>. The following message appears:

"Default values loaded. Press any key to continue."

AUTO CONFIGURATION W/ POWER-ON DEFAULTS

This Main Menu item uses the default Power-On values. Use this option as a diagnostic aid if your system behaves erratically. Choose this item and the following message appears:

"Load Power-On Default Values (Y/N)? N"

To use the Power-On defaults, change the prompt to "Y" and press <Enter>. The following message appears:

"Default values loaded. Press any key to continue."

CHANGE PASSWORD

This Main Menu item lets you configure the system so that a password is required every time the system boots or an attempt is made to enter the Setup program.

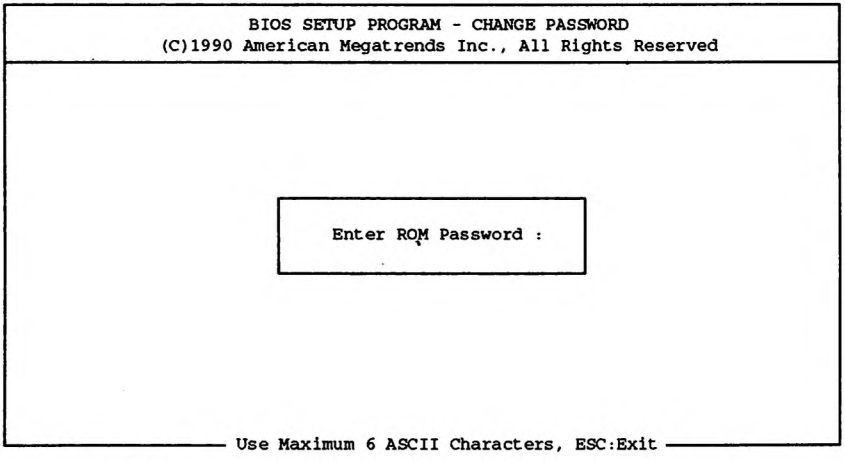
The password cannot be longer than 6 characters. There is no default password.

Change the password as follows:

1. Choose "Change Password" in the Main Menu and press <Enter>. The following message appears:

   "Enter ROM Password:"

2. The first time you run this option, type in a password and press <Enter>. The screen does not display the characters entered.



3. After you enter the password, the following appears prompting you for the new password:

   "Enter NEW Password:"

4. Enter the new password and the following appears:

   "Re-Enter NEW Password:"

5. Re-enter the new Password. If the password is miskeyed, the following error message appears:

   "ERROR, Press Any Key..."

   If the password is keyed in correctly the following confirmation message appears:

   "NEW Password Installed"

6. Press <ESC> to exit to the Main Menu.

When you next boot the system, after saving the changed values to CMOS, you will be prompted for the password.

If you are not prompted for the password, check that the "Password Checking Option" in the Advanced CMOS Setup is configured for "Always" or "Setup." See the section above on "Advanced CMOS Setup."

When the password prompt appears, key in the new password and press <Enter>. If loose or disconnected batteries corrupt the CMOS, use the default password, <AMI> instead.

Important: Keep a safe record of the new password. If you forget or lose the password, the only way to access the system is to disconnect the CMOS batteries.

HARD DISK UTILITY

This Main Menu item gives you three options for analyzing and formatting a hard disk. The three options are:

- **Hard Disk Format** – performs a "low level" format of the hard disk. Check with the hard drive manufacturer to see if this option is required.
- **Auto Interleave** – determines optimum interleave factor before formatting the hard disk.
- **Media Analysis** - analyzes each track of the hard drive. Marks unusable tracks as "bad" to prevent future data storage on those tracks.

Error messages specific to the Hard Disk Utility options may appear during initialization or operation.

WARNING! ***Performing any one of these options destroys all data on the hard disk. You must back-up the hard disk before performing any of these tests.***

Notes: 1. *System documentation for brand new hard disks usually provides a list of "bad tracks" as well as the optimum interleave factor.*

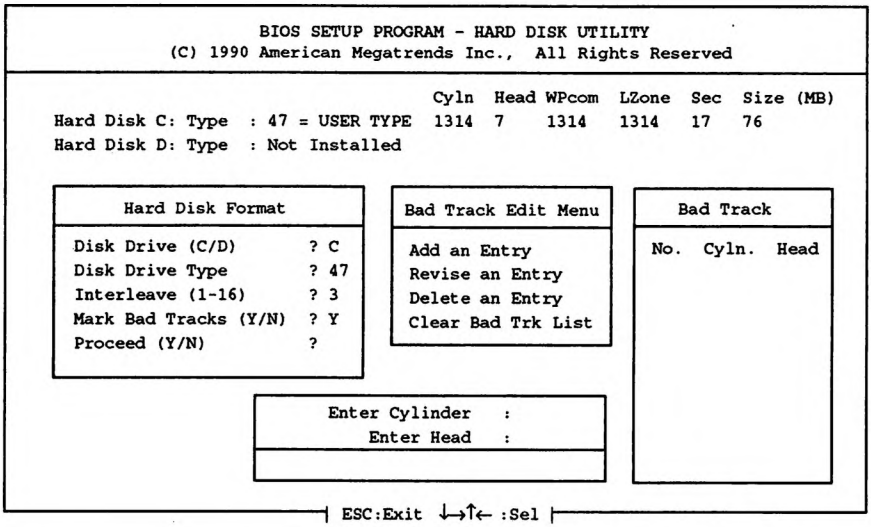
2. *These options are not valid for a SCSI Disk Drive.*

Hard Disk Format

Use this option to format a new hard disk or to reformat a used hard disk that has developed problems due to aging or mishandling.

Run this option as follows:

1. In the Main Menu select "Hard Disk Utility" and press <Enter>.
2. A screen with three options appears, select "Hard Disk Format" and press <Enter>.
3. A screen containing a series of questions appears. You must answer the questions before you can perform the format. Consult your hard disk system documentation when answering questions such as marking bad tracks.



4. After answering the questions, change the Proceed prompt to <Y> and press <Enter>.

5. A WARNING screen with a Continue prompt appears. Once you have changed this prompt to <Y> and pressed <Enter>, all data on the hard disk drive will be irretrievably lost.

Auto Interleave

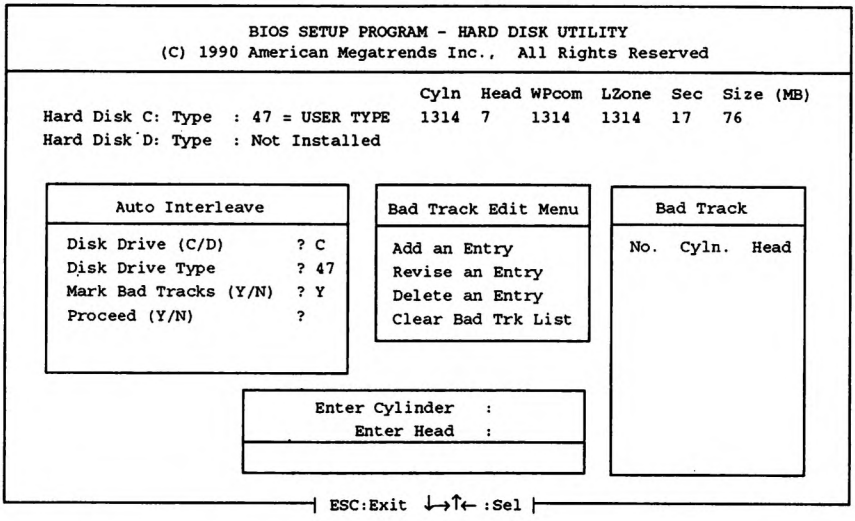
Use this option to calculate the optimum interleave factor.

Run this option as follows:

1. In the Main Menu select "Hard Disk Utility" and press <Enter>.

2. A screen with three options appears, select "Auto Interleave" and press <Enter>.

3. A screen containing a series of questions appears with the cursor positioned on the "Mark Bad Tracks" prompt. Change the prompt to <Y> to mark additional bad tracks.



4. After making the appropriate selections in the Bad Tracks Edit Menu, press <ESC>. The cursor moves to the Proceed prompt.

5. Change the Proceed prompt to <Y> and press <Enter>.

6. A WARNING screen with a Continue prompt appears. Once you have changed this prompt to <Y> and pressed <Enter>, all data on the hard disk drive will be irretrievably lost.

Media Analysis

Use this option to locate all bad tracks on the hard disk and list them in the Bad Track List Box. This option may take several minutes. Run this option as follows:

1. In the Main Menu select "Hard Disk Utility." Press <Enter>.

2. Three options appear. Select "Media Analysis" then <Enter>.

3. Answer the questions on the screen that appears, and then change the Proceed prompt to <Y> and press <Enter>.

4. A WARNING screen with a Continue prompt appears. Once you have changed this prompt to <Y> and pressed <Enter>, all data on the hard disk drive will be irretrievably lost.