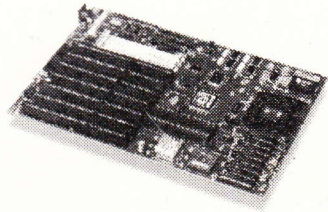


**COBALT-AT**

**486 BLUE LIGHTNING**

**SYSTEM BOARD**

Reference Manual



**IBM**



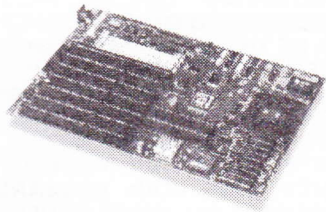
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**COBALT-AT**

**486 BLUE LIGHTNING**

**SYSTEM BOARD**

Reference Manual



**IBM**

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## Introduction

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Congratulations on your purchase of the IBM Cobalt-AT 486BL System Board -- part of the family of high-performance personal computer products from IBM.

## Features

The Cobalt-AT 486BL System Board includes the following features:

- **IBM® Blue Lightning microprocessor** double clocked (66MHz) or triple clocked (75MHz) with 16KB internal cache.
- On-board 256K/512K write-back secondary cache.
- **Manufactured to the highest standards of excellence by IBM.**
- Supports up to 64MB of main memory on-board.
- **Intel® OverDrive compatible ZIF socket** for upgrading to Intel® DX, DX2, or Pentium™ Technology (P24T) processors.
- Two VESA compatible local upgrading bus slots with bus mastering capability.
- Seven 16-bit ISA Expansion slots.
- On-board local-bus IDE controller supports two IDE hard disk drives.
- On-board Floppy-disk controller supports two floppy drives of 360KB, 720KB, 1.2MB, 1.44MB, or 2.88MB density.
- Two high speed NS16C550 compatible serial ports with 16-byte send/receive FIFOs.
- One parallel port with Bi-direction and ECP (Extended Capabilities Port).
- Supports both hardware, and software turbo switching.
- Compact Baby-AT footprint - 8.66" x 13.0 "inches.
- **IBM 3-year warranty.**



## About This Manual

This manual has been written as a general reference guide for installing the Cobalt-AT 486BL System Board. Please be aware that the information herein assumes that the installer has sufficient knowledge of computer terms and of installation/assembly of personal computer systems. If you have any questions regarding the use of this manual, or about the installation of your Cobalt-AT 486BL System Board, please contact your dealer immediately.

This manual is organized as follows:

- Chapter 1 describes the setup and installation of the Cobalt-AT 486BL System Board and the Local-Bus IDE Driver.
- Chapter 2 describes how to install DRAM and optional features such as VL-Bus Adapters, the 512KB Cache Upgrade, the Math Co-processor Option, and the Pentium™ OverDrive Option.
- Chapter 3 describes how to run the AMI BIOS® Setup utility.
- Chapter 4 describes how to run the MR BIOS® Setup utility.
- Appendix A lists the default jumper settings for the Cobalt-AT 486BL System Board.
- Appendix B lists the factory recommended CMOS settings for the system BIOS.

## Checklist

The Cobalt-AT 486BL System Board package should include the following items:

- 1 - Cobalt-AT 486BL System Board
- 1 - Cobalt-AT 486BL System Board Reference Manual
- 1 - 25 pin Serial Ribbon Cable
- 1 - 9 pin Serial Ribbon Cable
- 1 - Parallel Ribbon Cable
- 1 - Floppy Drive Ribbon Cable
- 1 - IDE Drive Ribbon Cable
- 1 - Local-Bus IDE Driver Diskette

If you suspect that items are damaged or missing from your package, make sure to contact your dealer immediately to have the items repaired or replaced.

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## Hardware Setup

---

### Overview

**CAUTION!** The procedures described are meant as general guidelines for the experienced installer. Contact your dealer if you are unsure about the installation, or if you need more detailed information about any portion of the installation.

The installation of your Cobalt-AT 486BL System Board consists of 6 basic steps (Your installation may vary, depending on your system configuration):

1. Configure the System Board.
2. Install the System Board into your computer chassis.
3. Connect the internal cables to your System Board.
4. Connect the monitor, keyboard, and other external peripherals.
5. Run BIOS Setup to your configuration in the System Board's memory.
6. Install the Local-Bus IDE Driver.

**NOTE:** For boards using AMI BIOS® see Chapter 3, for boards using MR BIOS® see Chapter 4.

**WARNING!** The Pentium™ processor requires ventilation of at least 40lpm within the chassis.

This chapter discusses the hardware installation portion of setting up your system (Steps 1 thru 4). It also contains a diagram of the System Board (see Figure 1-1 System Board Layout, next page) for reference purposes. To run software setup see Chapter 3 for AMI BIOS® or Chapter 4 for MR BIOS® (Step 5).

# System Board Layout

Familiarize yourself with the components of the Cobalt-AT 486BL System Board.

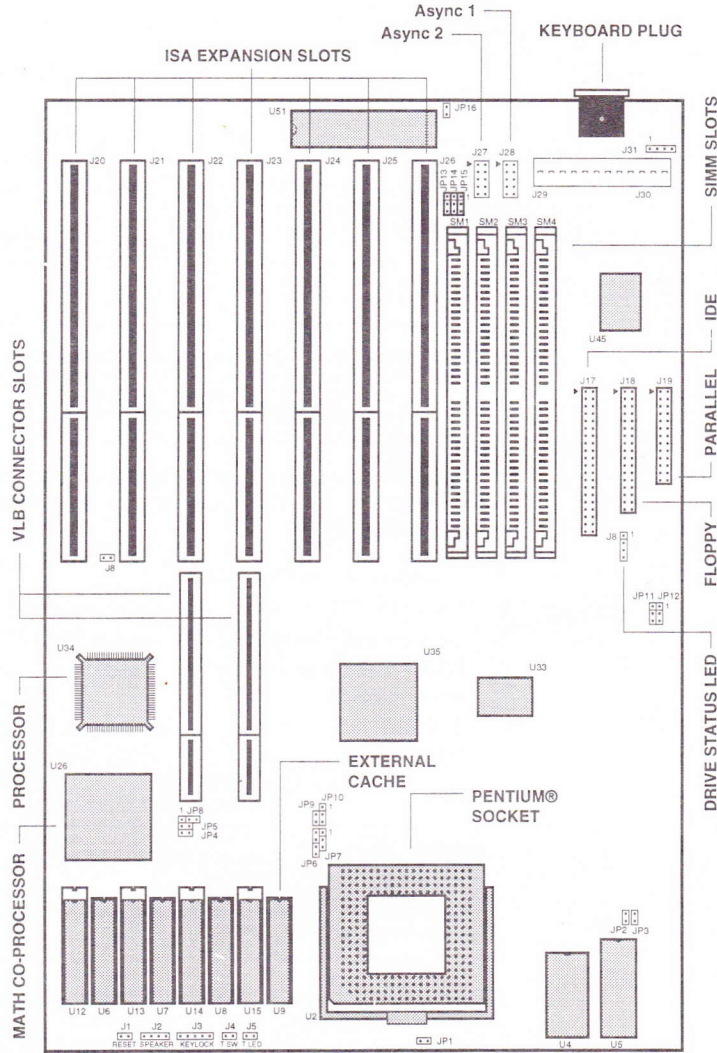


Figure 1-1 System Board Layout

## Configuring the System Board

Appendix A lists all jumper settings for the Cobalt-AT System Board. The user should not alter any settings unless there are known address or interrupt conflicts. We do not recommend changing ANY jumper settings unless the user is an experienced installer -- misuse of jumper settings can result in System Board failure and/or loss of warranty.

The table below lists the default I/O settings for the Cobalt-AT 486BL System Board. If these settings are correct, proceed to the next step on installing the System Board.

**NOTE:** If you are upgrading the external cache, adding a math co-processor, or installing the Pentium™ upgrade, refer to the appropriate section in Chapter 2 and perform the installation before proceeding to the next section.

### DEFAULT I/O SETTINGS

<b>Async 1</b>	COM1
<b>Async 2</b>	COM2
<b>Parallel</b>	LPT1
<b>On-Board Floppy controller</b>	Enabled
<b>On-Board Local-Bus IDE Cntrl</b>	Enabled

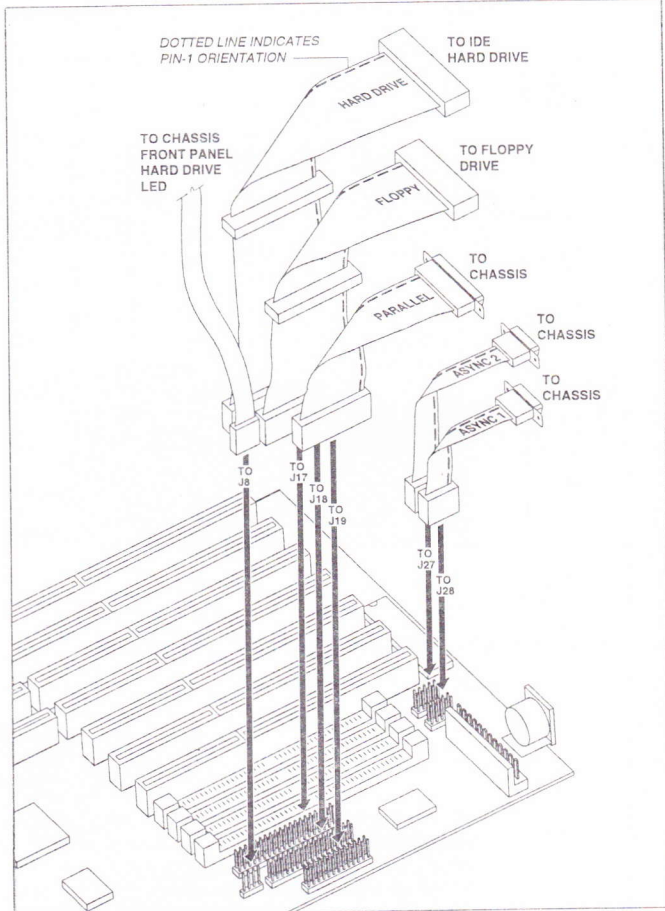
## Installing the System Board

**CAUTION!** Make sure to observe precautions for handling static sensitive devices. Static electricity can harm components on your Cobalt-AT 486BL System Board and cause system failure.

Follow the instructions for your particular chassis in order to install the Cobalt-AT 486BL System Board. Make sure your chassis power supply can generate adequate power for your system board and peripherals. For safety purposes, IBM recommends using only chassis which employ UL Listed power supplies.

### Connecting Internal Cables

Figure 1-2 describes the internal cable connections that must be made after installing your System Board in its chassis. Make sure all cables are seated firmly and securely before proceeding to the next step.



**Figure 1-2** Cable Connections

Your internal peripherals, such as hard drives, floppy drives, and bus adapters should be installed at this point. Refer to the installation procedure for each device for installation instructions.

## Connecting External Peripherals

Connect your monitor, keyboard, mouse, AC power cord, and other external devices to your chassis before powering on the system.

## Running BIOS Setup

Chapter 3 and Chapter 4 describe the use of BIOS Setup in configuring your system. Use Chapter 3 if your system uses AMI BIOS®; use Chapter 4 if your system uses MR BIOS®. After running Setup, you can proceed with installation of system and application software.

## Installing the Local-Bus IDE Driver

An installation program is provided for installing the DOS driver and the Windows 3.1 driver for Local Bus IDE. It will modify the CONFIG.SYS file in your root directory and the SYSTEM.INI file in the Windows directory. (The driver is for optimizing the IDE interface and improving the performance.) To begin, insert the driver diskette into drive A and type:

INSTALL

at the A:> prompt.

**CAUTION!** Be sure to back up the existing data on your hard drive as a precaution.

During the installation process you will be prompted by the following questions :

1. Do you want to install the ADI2 DOS driver?  
If you choose to install, the program will copy the driver to your root directory. If not, the program will terminate.
2. Do you want to install the ADI2 Windows 3.1 driver?  
If you choose to install, the program will copy the driver to your Windows' SYSTEM sub-directory.

3. Do you want to update your CONFIG.SYS?

If you choose to update CONFIG.SYS, the program will add the following line in the CONFIG.SYS file:

```
Device=C:\ADI2C1xx.SYS
```

This will allow the operating system to load the driver every time the system boots up. If you choose not to update CONFIG.SYS, it will create the file CONFIG.ADI for your later use.

4. Do you want to update your Windows 3.1 SYSTEM.INI file?

If you choose to update SYSTEM.INI, the program will add the following line in the [386Enh] section of the SYSTEM.INI file:

```
Device=ADI2W1xx.386
```

This will allow Windows to load the driver every time Windows runs the driver. If you do not want to update SYSTEM.INI, it will create the file SYSTEM.ADI for your later use.

**NOTE:** If you are a Windows user and have already installed the DOS driver, you must also install the Windows driver before using Windows.



## Installing DRAM and Optional Features

---

### Installing DRAM

The Cobalt-AT 486BL System Board accommodates four 36-bit SIMM modules. DRAM Speed must be 80ns or faster and must support fast-page mode. 70ns memory is recommended when the double clocked, 66 MHz Blue Lightning processor is used. Use 256Kx36, 1Mx36, or 4Mx36, single density SIMM modules. TABLE 2-1, on the following page, shows all possible memory configurations.

## DRAM Configurations

SM1	SM2	SM3	SM4	TOTAL
256K x 36	-	-	-	1MB
256K x 36	256K X 36	-	-	2MB
256K x 36	256K x 36	256K x 36	-	3MB
1M x 36	-	-	-	4MB
256K x 36	1M x 36	-	-	5MB
1M x 36	1M x 36	-	-	8MB
1M x 36	1M x 36	1M x 36	-	12MB
256K x 36	1M x 36	1M x 36	1M x 36	13MB
1M x 36	1M x 36	1M x 36	1M x 36	16MB
4M x 36	-	-	-	16MB
256K x 36	256K x 36	4M x 36	-	18MB
1M x 36	4M x 36	-	-	20MB
4M x 36	1M x 36	-	-	20MB
1M x 36	1M x 36	4M x 36	1M x 36	28MB
1M x 36	4M x 36	1M x 36	1M x 36	28MB
4M x 36	1M x 36	1M x 36	1M x 36	28MB
4M x 36	4M x 36	-	-	32MB
1M x 36	1M x 36	4M x 36	4M x 36	40MB
1M x 36	4M x 36	4M x 36	1M x 36	40MB
4M x 36	1M x 36	4M x 36	1M x 36	40MB
4M x 36	4M x 36	1M x 36	1M x 36	40MB
4M x 36	4M x 36	4M x 36	-	48MB
1M x 36	4M x 36	4M x 36	4M x 36	52MB
4M x 36	1M x 36	4M x 36	4M x 36	52MB
4M x 36	4M x 36	4M x 36	1M x 36	52MB
4M x 36	4M x 36	4M x 36	4M x 36	64MB

Table 2-1 DRAM Configurations

## VL-Bus Adapters

The Cobalt-AT 486BL System Board features two 32-bit Local-Bus slots that support the VESA Local-Bus standard. They provide a direct pathway to your CPU, allowing speedier performance using Local-Bus compliant peripherals.

**IMPORTANT!** DO NOT ATTEMPT TO INSTALL NON-VESA COMPLIANT LOCAL-BUS ADAPTERS INTO THE COBALT-AT 486BL SYSTEM BOARD. DOING SO CAN RESULT IN SYSTEM FAILURE.

### VL-Bus Adapter Installation Procedure

1. Locate a free Local-Bus slot on the system board. Local-Bus adapters require the use of a corresponding ISA connector. You must move any adapter that is currently occupying the ISA slot that corresponds to the Local-Bus slot that you wish to use.
2. Remove the appropriate expansion slot cover plate on the chassis.
3. Insert the gold-edged connectors of the VL-Bus adapter board completely into both the ISA and Local-Bus slots. Make sure the adapter is well seated in the connectors. Secure the adapter to the chassis with a slot cover screw.
4. The system should automatically recognize the added adapter. If you have added a Local-Bus video adapter and wish to use the extended video modes, you may have to install additional drivers corresponding to the programs and environments used.

## Cache Upgrade

The Cobalt-AT 486BL System Board supports either 256KB or 512KB of external static RAM cache. If you have not installed chip level components before, IBM strongly recommends having an authorized installer upgrade your system board.

**WARNING!** OBSERVE PRECAUTIONS FOR STATIC SENSITIVE COMPONENTS! -The system board and its components are static sensitive. IMPROPER INSTALLATION OF THE CACHE UPGRADE MAY VOID SYSTEM BOARD WARRANTY! Consult your dealer if you need assistance.

### Cache Upgrade Installation Procedure

To upgrade your systems cache from 256KB to 512KB :

1. Make sure system power is OFF.
2. Using an IC puller, carefully remove the SRAM chips from their sockets (U6, U7, U8, U9, U12, U13, U14, U15).
3. Fill sockets U12, U13, U14, and U15 with 128KB x 8 20ns SRAM (300 mil DIP).
4. Set jumper JP10 to positions 2-3.

## The Math Co-processor Option

The Cobalt-AT 486BL System Board supports Intel® 80387DX and compatible math co-processors.

**WARNING!** OBSERVE PRECAUTIONS FOR STATIC SENSITIVE COMPONENTS! -The system board and its components are static sensitive. IMPROPER INSTALLATION OF THE MATH CO-PROCESSOR OPTION MAY VOID SYSTEM BOARD WARRANTY! Consult your dealer if you need assistance.

### Math Co-processor Installation Procedure

1. Make sure system power is OFF.
2. Locate the co-processor socket at position U26 on the system board.
3. Unpack the math co-processor and orient pin-1 to match pin-1 on the system board socket.
4. Carefully insert the co-processor into the socket. Press firmly to make sure that it is correctly seated in the socket. DO NOT USE EXCESSIVE FORCE WHILE INSERTING THE CO-PROCESSOR.
5. The system BIOS will automatically recognize the math co-processor at startup.

## Pentium™ OverDrive Option

**WARNING!** OBSERVE PRECAUTIONS FOR STATIC SENSITIVE COMPONENTS -- Irreparable damage can result from mishandling of static sensitive devices such as the Cobalt-AT 486BL System Board and the Pentium™ processor. Consult your dealer for assistance if you are not familiar with handling and installing these devices.

The Cobalt-AT 486BL System Board includes a "Zero Insertion Force" (ZIF) socket for Intel® P24T Pentium™ Technology OverDrive processors as they become available.

1. Make sure system power is OFF.
2. Remove the co-processor (if installed) at position U26 on the system board. THE PENTIUM™ PROCESSOR WILL NOT OPERATE CORRECTLY IF A MATH CO-PROCESSOR IS INSTALLED.
3. Locate the ZIF socket at position U2 on the Cobalt-AT 486BL System Board.
4. Lift the latch that locks the processor in place (see Figure 2-1).
5. Insert the Pentium™ processor in the socket -- MAKE SURE TO MATCH PIN-1 ON THE PROCESSOR WITH PIN-1 OF THE ZIF SOCKET (see Figure 2-1).
6. Lock the processor in place by closing the latch -- you will hear a "click" when the latch locks into place (see Figure 2-1).

FIGURE 2-1 Installing The Pentium™ Processor

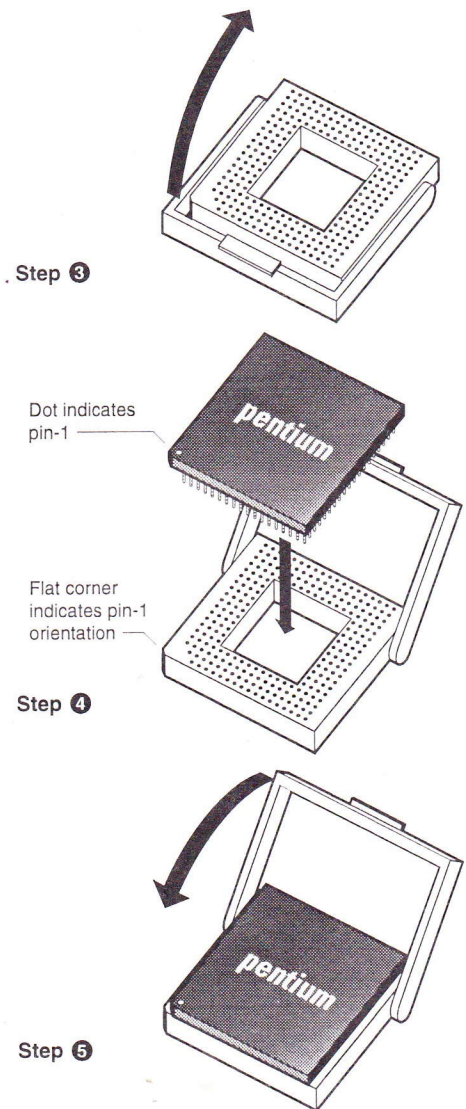


Figure 2-1 Installing The Pentium™ Processor

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## AMI BIOS® Setup

---

### Introduction

**NOTE:** This chapter pertains to system boards using AMI BIOS® only. If your board uses the MR BIOS®, refer to Chapter 4 for the MR BIOS® setup procedures.

A record of system BIOS parameters (such as amount of memory, disk drives, video displays, and numeric co-processors) is stored in CMOS RAM. When the computer is turned off, a backup battery provides power to the CMOS RAM, thereby retaining the system configuration.

Each time the system is powered-on, it is configured with these BIOS values, unless CMOS RAM has been corrupted. The CMOS Setup resides in the ROM BIOS and is available each time the computer is turned on.

If, for some reason, CMOS RAM is corrupted, the system is configured with the default values stored in the ROM file. There are two sets of BIOS values stored in the ROM file: The BIOS Setup default values and the Power-On default values (See this section for more detailed information on BIOS defaults).

**NOTE:** After running Setup for the first time, it is only necessary to execute the configuration program again if:

- You have changed the hardware configuration (i.e. added memory, added or moved adapter boards, etc.).
- You have determined that your system backup battery has failed and have replaced it.
- Or the system itself has detected an error while booting up and requires you to re-configure CMOS RAM.

Users are not encouraged to run this program unless they are familiar with them. IMPROPER USE OF THIS PROGRAM CAN RESULT IN SYSTEM FAILURE.

## Running Setup

When the system power is switched on, the computer performs a series of device initializations and diagnostics tests called POST (Power-On-Self-Test). During this process, the system will allow you to interrupt the process and run Setup by pressing the <Del> key. When POST has completed, the following message appears:

Press the <DEL> key to enter the Setup program.

**Key Use - Setup**

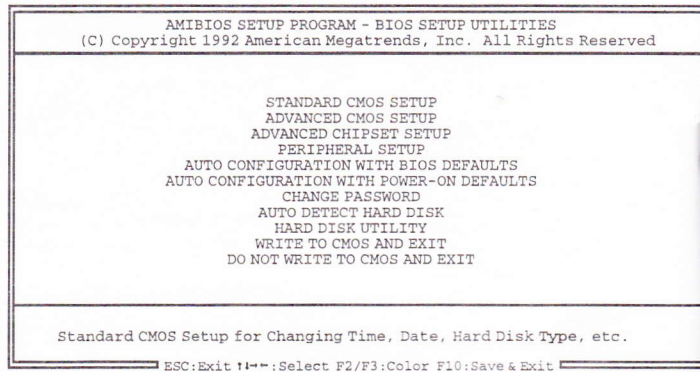
The table below describes special keys used to perform certain functions in the Setup program:

Keystroke	Action
<Esc>	Returns to previous screen.
Arrow keys	Move the cursor from one option to the next.
<PgUp> and <PgDn>; <Ctrl><PgUp> <Ctrl><PgDn>	Modify the default value of the options for the Highlighted parameter. If there are fewer than 10 options, <Ctrl> <PgUp> and <Ctrl> <PgDn> operate like <PgUp> and <PgDn>. <Ctrl> can also be used to increment a setting.
<F1>	Displays Help.
<F2>	Change background colors.
<F3>	Change foreground colors.
<F5>	Restores the values resident when the current Setup session began. These values are taken from CMOS RAM if CMOS RAM was uncorrupted at the start of the session. Otherwise they will be the BIOS Setup default values.
<F6>	Loads all features in the Advanced CMOS Setup/Advanced Chip Set Setup with the BIOS Setup defaults.
<F7>	Loads all features in the Advanced CMOS Setup/Advanced Chip Set Setup with the Power-On defaults.
<F10>	Saves all changes made to Setup and continues the boot process.

**Table 3-1** Key Use - Setup

### Main Menu Setup Options

Below is the Setup Main Menu:



Setup is divided into ten menu options:

- **Standard CMOS Setup**
- **Advanced CMOS Setup**
- **Advanced Chipset Setup**
- **Peripheral Setup**
- **Auto Configuration with BIOS defaults**
- **Auto Configuration with Power-On defaults**
- **Change Password**
- **Auto Detect Hard Disk**
- **Hard Disk Utility**
- **Write to CMOS and exit**
- **Do Not Write to CMOS and exit**

The next pages describe the function of each of the ten menu options.

**Standard CMOS Setup**

This option permits the user to configure and set system components such as time and date floppy drives, hard disk drives, monitor type, and keyboard. These options are discussed in next section of this chapter.

**Advanced CMOS Setup**

This option configures more advanced parts of memory configuration, peripheral support, and power management support. These parameters have already been optimized for your system -- improper use of this utility could result in system failure. Consult your dealer before attempting to use this option.

**Advanced Chipset Setup**

This option configures BIOS chipset-specific features. These parameters have already been optimized for your system -- improper use of this utility could result in system failure. Consult your dealer before attempting to use this option.

**Peripheral Setup**

This option allows configuration of system features related to the on-board peripheral controller such as floppy/IDE Controllers and I/O Ports.

When the programming option line of the Peripheral Setup screen is set to AUTO, the BIOS automatically detects all adapter cards in the system and configures the on-board ports accordingly. This is the default setting. All other Peripheral Setup options are ignored if the AUTO programming option is used.

Use the MANUAL option only if you need to disable any of the drive controllers or ports.

**Auto Configuration with BIOS defaults**

This option uses default system values. The BIOS default values are the best-case values that should optimize system performance. If CMOS RAM is corrupted, the BIOS defaults will automatically be loaded.

To use the BIOS defaults, type <Y> and press <Enter>. The following message will appear:

Default values loaded. Press any key to continue.

**Auto Configuration with Power-On defaults**

This option uses default Power-On values. Power-On values are worst-case values for system performance, but are the most stable values that can be chosen. Use this as a diagnostic aid if the system is behaving erratically.

Type <Y> and press <Enter> to use the Power-On defaults. The following message will appear:

Default values loaded. Press any key to continue.

**Change Password**

A password can be stored in CMOS through the Advanced CMOS Setup option. Improper use of this option can result in system failure and system lockout. Consult your dealer if you need to run this setup option.

**Auto Detect Hard Disk**

This option automatically detects the hard disk type in your system. Pressing <Y> will accept the detected hard disk parameters and update the information in the standard CMOS Setup Screen. Pressing <N> will ignore the information.

**Hard Disk Utility**

This option allows low-level formatting of MFM hard disk drives. MFM hard disks were the predominant format in the past. They are not used in many computer systems sold today. If you are attempting to install a MFM hard disk in your system, you will need a compatible MFM hard disk controller as well. If you have not installed MFM hard drives before, consult your dealer for more information on how to use this setup option.

**Write to CMOS and exit**

The features selected and configured in the Standard CMOS Setup, Advanced CMOS Setup, Advanced Chipset Setup, and the Change Password option are stored in CMOS RAM when this option is selected. A CMOS RAM checksum is calculated and written to CMOS RAM. Control is then passed to the ROM BIOS.

Press <N> and <Enter> to return to the Main Menu. Press <Y> and <Enter> to save the system parameters and continue the boot process. The BIOS either reboots the system (if any new settings change the memory map) or continues the boot process.

**Do Not Write to CMOS and exit**

This option passes control to the BIOS without writing any changes to CMOS RAM.

Press <N> and <Enter> to return to the Main Menu. Press <Y> and <Enter> to continue the boot process without saving any altered system parameters.

## Standard CMOS Setup

**NOTE:** Procedures for the Advanced CMOS Setup, Advanced Chipset Setup, Power Management BIOS Setup, Peripheral Setup, Change Password, and Hard Disk Utility have been excluded because improper use of these options can result in system failure. The user should check with their dealer before attempting to use these options.

This is the first option on the Setup main menu. Use the arrow keys to select **Standard CMOS Setup**, then press <Enter>. The following screen appears:

```

AMIBIOS SETUP PROGRAM - STANDARD CMOS SETUP
(C)1992 American Megatrends, Inc. All Rights Reserved

Date (mn/date/year): Fri, Jan 04 1992      Base memory : 640 KB
Time (hour/min/sec): 09 : 38 : 09          Ext. memory : 2816 KB
                                           Cyln Head WPCom LZone Sect Size
Hard disk C: type : 40                     820 6 820 820 17 40 MB
Hard disk D: type : Not Installed
Floppy drive A: : 1.2 MB. 5 1/4
Floppy drive B: : 1.4 MB. 3 1/2
Primary display : VGA/PGA/EGA
Keyboard : Installed
    
```

Sun	Mon	Tue	Wed	Thu	Fri	Sat
30	31	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2
3	4	5	6	7	8	9

```

Month : Jan, Feb, ..., Dec
Date : 01, 02, 03, ..., 31
Year : 1901, 1902, ..., 2099
    
```

ESC:Exit F1:Select F2/F3:Color F4/F5:Modify

Standard CMOS Setup Screen

Standard CMOS Setup is used to configure the following features:

**Date:** month, date, and year. Ranges for each value are shown in the lower left hand corner of the screen. Move the cursor to the Date field with the arrow keys and set the date using the <PgUp> and <PgDn> keys to change values.

**Time:** hour, minute, and second. Uses 24 hour clock format. For PM numbers, add 12 to the hour (4:30PM is 16:30:00). Move the cursor to the Time field with the arrow keys and set the time using the <PgUp> and <PgDn> keys to change values.

**Floppy Drives A: and B:** Supports 720KB, 1.44MB, and 2.88MB 3.5 inch drives; 360KB, and 1.2MB 5.25 inch drives. Move the cursor to either field with the arrow keys and set the appropriate floppy drive type using the <PgUp> and <PgDn> keys to toggle between supported formats. Use **Not Installed** for diskless workstations.

**Hard Disk C: and D:** Hard disk types from 1 to 46 are industry standard. Type 47 is user-definable and can be used for both drive C: and D:. If type 47 is selected, user must enter the hard drive parameters from the keyboard.

Move the cursor to the appropriate hard disk field with the arrow keys and set the drive type using the <PgUp> and <PgDn> keys to change values, or simply type in the selected drive type number.

Type 47 can be used for both hard disks C: and D:. The parameters for type 47 under hard disk C: and hard disk D: can be different, which allows two different user-definable hard disk drives in the system. **Not Installed** can be used for diskless workstations and SCSI based hard disks.



**Hard Disk Configuration**

Hard disk drive types are identified by the following parameters:

Parameter	Description
Type	The number designation for a drive with certain identification parameters.
Cylinders	The number of cylinders in the disk drive.
Heads	The number of heads.
Write Precompensation	The size of a sector gets progressively smaller as the track diameter diminishes. Yet each sector must still hold 512 bytes. Write precompensation circuitry on the hard disk compensates for the physical difference in sector size by boosting the write current for sectors on inner tracks. This parameter is the track number where write precompensation begins.
Landing Zone	This number is the cylinder location where the heads will normally park when the system is shut down.
Sectors	The number of sectors per track. Hard drives that use MFM have 17 sectors per track. RLL drives have 26 sectors per track. RLL and ESDI drives have 34 sectors per track. SCSI and IDE drives may have even more sectors per track.
Capacity	The formatted capacity of the drive based on the following formula:  (Number of heads) X (Number of cylinders) X (Number of sectors per cylinder) X (512 bytes per sector)

**Table 3-2** Hard Drive Configurations

The following table describes the default hard drive parameters settings for each drive type:

Type	No. of Cyls.	No. of Hds.	Write Precomp	Landing Zone	Number of Sectors	Capacity
1	306	4	128	305	17	10 MB
2	615	4	300	615	17	20 MB
3	615	6	300	615	17	31 MB
4	940	8	512	940	17	62 MB
5	940	6	512	940	17	47 MB
6	615	4	65535	615	17	20 MB
7	462	8	256	511	17	31 MB
8	733	5	65535	733	17	30 MB
9	900	15	65535	901	17	112 MB
10	820	3	65535	820	17	20 MB
11	855	5	65535	855	17	35 MB
12	855	7	65535	855	17	50 MB
13	306	8	128	319	17	20 MB
14	733	7	65535	733	17	43 MB
16	612	4	0	663	17	20 MB
17	977	5	300	977	17	41 MB
18	977	7	65535	977	17	57 MB
19	1024	7	512	1023	17	60 MB
20	733	5	300	732	17	30 MB
21	733	7	300	732	17	43 MB
22	733	5	300	733	17	30 MB
23	306	4	0	336	17	10 MB
24	925	7	0	925	17	54 MB
25	925	9	65535	925	17	69 MB
26	754	7	754	754	17	44 MB
27	754	11	65535	754	17	69 MB
28	699	7	256	699	17	41 MB
29	823	10	65535	823	17	68 MB
30	918	7	918	918	17	53 MB
31	1024	11	65535	1024	17	94 MB
32	1024	15	65535	1024	17	128 MB
33	1024	5	1024	1024	17	43 MB
34	612	2	128	612	17	10 MB

**Table 3-3** Default Hard Drive Parameters Settings

Type	No. of Cyls.	No. of Hds.	Write Precomp	Landing Zone	Number of Sectors	Capacity
35	1024	9	65535	1024	17	77 MB
36	1024	8	512	1024	17	68 MB
37	615	8	128	615	17	41 MB
38	987	3	987	987	17	25 MB
39	987	7	987	987	17	57 MB
40	820	6	820	820	17	41 MB
41	977	5	977	977	17	41 MB
42	981	5	981	981	17	41 MB
43	830	7	512	830	17	48 MB
44	830	10	65535	830	17	69 MB
45	917	15	65535	918	17	114 MB
46	1224	15	65535	1223	17	152 MB

**Table 3-3** Default Hard Drive Parameters Settings (cont'd)

**Video Display:** Supports Monochrome, Color 40x25, VGA/CGA/EGA, and Color 80x25. Move the cursor to the Video Display field with the arrow keys and set the appropriate type using the <PgUp> and <PgDn> keys to toggle between supported values. Use **Not Installed** for file servers without video displays.

**Keyboard:** User can choose **Installed** or **Not Installed**. If **Not Installed** is selected, the BIOS does not test for the presence of a keyboard in the system, permitting keyboardless systems, such as workstations, to be configured. Move the cursor to the Keyboard field with the arrow keys and select the appropriate value using the <PgUp> and <PgDn> keys.

**Memory Display:** The memory display cannot be configured by the user. The System BIOS automatically detects all installed system memory. Memory is reported in 64KB increments. BIOS will report up to 640KB of Base Memory and 65,472KB of Extended Memory.  
Overview

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## MR BIOS® Setup

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### Introduction

**NOTE:** This chapter pertains to system boards using MR BIOS® only. If your board uses the AMI BIOS®, refer to Chapter 3 for the AMI BIOS® setup procedures.

The custom features and hardware options in your PC/AT compatible computer are on-site selectable for maximum flexibility. You will need to configure these options through the built-in Setup Utility prior to using your computer for the first time.

#### Invoking Setup Utility

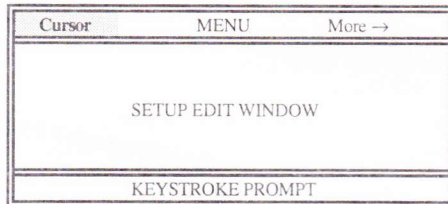
A procedure called Power-On-Self-Test (POST) is conducted each time the computer is booted. If the system status noted during POST cannot be reconciled with the Setup configuration stored in CMOS, the Setup Utility will be invoked automatically. Under normal conditions, Setup can be manually invoked through the keyboard:

- Press <Esc> during power-on memory test
- Press <Ctrl+Alt+Esc> during runtime

While the memory size is scrolling on the CRT during cold-boot, you can press <Esc> to enter Setup. Analogous to the three key <Ctrl+Alt+Del> sequence that causes a system warm-boot, you can abort a current program and enter Setup by pressing <Ctrl+Alt+Esc>.

### Exiting Setup Utility

To exit Setup (and boot the computer), press <F10>. All configuration changes edited in the various Setup screens are recorded into CMOS memory at this time. Be aware that nothing is recorded until then. Therefore, if you re-boot the computer or turn off the power (instead of pressing <F10>), these changes will be lost and the original configuration will remain unaltered. If you want to exit without storing any changes, then either (1) press <Ctrl+Alt+Del>, or (2) turn off the power.



### Within Setup Utility

The Setup Utility screen is comprised of three sections, shown in the figure above. The top line contains a **menu** which lists individual configuration utilities. The central part of the screen contains the **edit window** where an individual utility is viewed and edited. The bottom line is a dynamic **keystroke prompt** which indicates currently valid keystrokes.

A reverse-video **cursor** is always present, either on the menu line or in the edit window. It directs your attention to the currently active field. Although several keys can be used to maneuver the cursor, the arrow keys are generally used. As the cursor is moved across the menu from entry to entry, the edit window is updated to reveal each corresponding utility. When the cursor rests on an entry that you want to configure, move it downward into the edit window and begin editing the fields. The choices in the fields can generally be scrolled with the <Space> key, while a few fields require alpha-numeric entry. Press <PgUp> when you are done, and the cursor will return to the menu.

The following keys are available while the cursor is on the menu:

Keystroke	Action
<Right Arrow>, <Left Arrow>	right and left movement
<Space>, <BackSpace>	Move the cursor from one option to the next.
<Tab>, <Shift-Tab>	right and left movement
<Home>, <End>	leftmost and rightmost entry
<Down Arrow>, <Enter>, <PgDn>	move down into edit window
<F10>	record and exit Setup

**Table 4-1** Menu Keystroke Table

These keys are generally available within the edit window:

Keystroke	Action
Arrows	up, down, left, right movement
<Space>, <BackSpace>	scroll choices in field
<Plus>, <Minus>	scroll choices in field
Alpha-Numeric	letters and numbers
<Enter>, (<Esc>)	begin/end (abort) mode or A/N entry
<Esc>, <PgUp>	exit edit window, back up to menu

**Table 4-2** Edit Window Keystroke Table

## Overview of Screens

The following are examples of each screen in the MR BIOS® Setup.

MR BIOS (r) Copyright (c) 1992, Microid Research Inc. Ver: V1.52-OPTI481

Summary	Clock	Video	Keyboard	Floppy	Fixed-Disk	More →
CPU Type .....			486BL	Floppy 0 .....	1.4M (3+)	
CPU Rev .....			8439	Floppy 1 .....	None	
CPU MHz .....			75.2	Floppy 2 .....	None	
Math Unit .....			80387	Floppy 3 .....	None	
RAM Cache .....			256K	Fixed 80 .....	452.4M (47)	
Shadow RAM .....			Enable	Fixed 81 .....	None	
Memory-Base .....			.640K	Boot Sequence .....	C: 1st	
Memory-Extended .....			7168K	Anti-Virus .....	Disable	
Memory-System .....			384K	Security .....	Disable	
Memory-Total .....			8192K	Keyboard .....	PC/AT	
COM1 .....	3F8		LPT1 .....	Numlock .....	Off	
COM2 .....	2F8		LPT2 .....	Typematic .....	30.0	
COM3 .....	3E8		LPT3 .....	Video-Primary .....	V/EGA-Color	
COM4 .....	2E8		LPT4 .....	Video-Secondary .....	n/a	
F10 to Record and Exit			Home End ←↓→ Moves Cursor			

### Summary Screen

MR BIOS (r) Copyright (c) 1992, Microid Research Inc. Ver: V1.52-OPTI481

Summary	Clock	Keyboard	Floppy	Fixed-Disk	Boot-Seq	More →
Display Format .....						United States
Time hh:mm:ss t .....						11:45:00 p
Date mm/dd/yyyy .....						12/31/1991
Daylight Savings .....						Disable
F10 to Record and Exit			↓ to Select		Home End →↓← Moves Cursor	

### Clock Setup Screen



MR BIOS (r) Copyright (c) 1992, Microid Research Inc. Ver: V1.52-OPTI481

Summary	Clock	Keyboard	Floppy	<b>Fixed-Disk</b>	Boot-Seq	More →
---------	-------	----------	--------	-------------------	----------	--------

Fixed Disk 80 (C:)	(Low Level) Format	Fixed Disk 81 (D:)
Size ..... 452.4M	Drive (C/D) ..... *	Size ..... None
Type ..... 47	Start Cyl ..... *	Type ..... None
Cylinders ..... 1018	Final Cyl ..... *	Cylinders ..... n/a
Heads ..... 14	Interleave ..... *	Heads ..... n/a
Precomp ..... None	Ready (y/n) ..... *	Precomp ..... n/a
Landing ..... 1018		Landing ..... n/a
Sectors ..... 62		Sectors ..... n/a
Translate ..... No		Translate ..... n/a
Xfer-Mode ..... 0		
Anti-Virus ..... No		

F10 to Record and Exit    ↵ to Select    Home End →↵← Moves Cursor

**Fixed Disk Setup Screen**

MR BIOS (r) Copyright (c) 1992, Microid Research Inc. Ver: V1.52-OPTI481

Summary	Clock	Keyboard	Floppy	Fixed-Disk	<b>Boot-Seq</b>	More →
---------	-------	----------	--------	------------	-----------------	--------

Boot Sequence ..... C: 1st, A: 2nd  
 Memory Priming ..... Full Test  
 Cold-Boot Delay ..... None

Cold - Boot Key Sequence	
↵ .....	Boot to Screen Prompt
Esc .....	Boot to Setup Utility
Warm - Boot Key Sequence	
CTRL ALT DEL .....	Standard Warm Restart
CTRL ALT ↵ .....	Boot to Screen Prompt
CTRL ALT ESC .....	Boot to Setup Utility

F10 to Record and Exit    ↵ to Select    Home End →↵← Moves Cursor

**Boot Sequence Setup Screen**

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← More	<b>Security</b>	First-Aid	Speed	Cache	Shadow	DMA	Chipset
Security ..... Disable							
F10 to Record and Exit      ↓ to Select      Home End →← Moves Cursor							

**Security Setup Screen**

MR BIOS (r) Copyright (c) 1992, Microid Research Inc. Ver: V1.52-OPTI481

← More	Security	First-Aid	Speed	Cache	<b>Shadow</b>	DMA	Chipset		
Shadow-RAM Disabled      Vacant = No ROM Found      ROM #n = ROM is Present Shadow-RAM Enabled:      RW = Read-Write      WP = Write Protect Best performance is usually obtained by Shadowing indicated ROMs									
<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> <li>* F000 SYSTEM ..... WP-Shadow</li> <li>* E000 ADAPTER ..... Vacant</li> <li>* DC00 ADAPTER ..... Vacant</li> <li>* D800 ADAPTER ..... Vacant</li> <li>* D400 ADAPTER ..... Vacant</li> <li>* D000 ADAPTER ..... ROM #2</li> <li>* CC00 ADAPTER ..... Vacant</li> <li>* C800 ADAPTER ..... Vacant</li> <li>* C400 VIDEO ..... WP-Shadow</li> <li>* C000 VIDEO ..... WP-Shadow</li> </ul> </td> <td style="width: 50%; vertical-align: top; border: 1px solid black; padding: 5px;">                 F000 UMB User Info                   BIOS FBF6-FFFF                  UTILS FB1A-FBF5                  POST F6C1-FB19                  SETUP F061-F6C0                   AVAIL: F000-FB19             </td> </tr> </table>								<ul style="list-style-type: none"> <li>* F000 SYSTEM ..... WP-Shadow</li> <li>* E000 ADAPTER ..... Vacant</li> <li>* DC00 ADAPTER ..... Vacant</li> <li>* D800 ADAPTER ..... Vacant</li> <li>* D400 ADAPTER ..... Vacant</li> <li>* D000 ADAPTER ..... ROM #2</li> <li>* CC00 ADAPTER ..... Vacant</li> <li>* C800 ADAPTER ..... Vacant</li> <li>* C400 VIDEO ..... WP-Shadow</li> <li>* C000 VIDEO ..... WP-Shadow</li> </ul>	F000 UMB User Info  BIOS FBF6-FFFF UTILS FB1A-FBF5 POST F6C1-FB19 SETUP F061-F6C0  AVAIL: F000-FB19
<ul style="list-style-type: none"> <li>* F000 SYSTEM ..... WP-Shadow</li> <li>* E000 ADAPTER ..... Vacant</li> <li>* DC00 ADAPTER ..... Vacant</li> <li>* D800 ADAPTER ..... Vacant</li> <li>* D400 ADAPTER ..... Vacant</li> <li>* D000 ADAPTER ..... ROM #2</li> <li>* CC00 ADAPTER ..... Vacant</li> <li>* C800 ADAPTER ..... Vacant</li> <li>* C400 VIDEO ..... WP-Shadow</li> <li>* C000 VIDEO ..... WP-Shadow</li> </ul>	F000 UMB User Info  BIOS FBF6-FFFF UTILS FB1A-FBF5 POST F6C1-FB19 SETUP F061-F6C0  AVAIL: F000-FB19								
* Default									
F10 to Record and Exit      ↓ to Select      Home End →← Moves Cursor									

**Shadow RAM Setup Screen**

## Cobalt-AT 486BL Jumper Settings

<b>JP1</b>	OPEN			Blue Lightning Processor*	Default
	CLOSE			Using Intel 486SX/DX/DX2	
	<b>25MHz</b>	<b>33MHz</b>	<b>40MHz</b>		
<b>JP2</b>	OPEN	OPEN	CLOSE	Clock speed select	<b>Factory setting only- Any changes voids warranty</b>
<b>JP3</b>	OPEN	CLOSE	OPEN		
<b>JP4</b>	OPEN			VL-Bus ID2 = 1 (<=33MHZ)	Default
	CLOSE			VL-Bus ID2 = 0 (>33MHZ)	
<b>JP5</b>	OPEN			VL-Bus ID3 = 1 (<=33MHZ)	Default
	CLOSE			VL-Bus ID3 = 0 (>33MHZ)	
<b>JP6</b>	1-2	3-4		Processor Selection	<b>Default - Any changes voids warranty</b>
<b>JP7</b>	1-2			OverDrive CPU	Default
	2-3			i486DX/DX2 CPU	
<b>JP8</b>	1-2			0ws Local Bus	Default
	2-3			1ws Local Bus	
<b>JP9</b>	OPEN			256KB cache	Default
	CLOSE			512KB cache	
<b>JP10</b>	1-2			256KB cache	Default
	2-3			512KB cache	

\*NOTE: If using any Intel OverDrive processor that is compatible w/OD specs (i.e. P24, P24C, P24T) jumper need not be closed.

## Cobalt-AT 486BL Jumper Settings (continued)

<b>JP11</b>	1-2	VL-Bus IDE - Enable	Default
	2-3	VL-Bus IDE - Disable	
<b>JP12</b>	2-3		Default - <b>Factory Setting Only</b>
<b>JP13 and JP14</b>	1-2	DMA Channel 1	Default - ECP DRQ Select
	2-3	DMA Channel 3	
<b>JP15</b>	1-2	IRQ7	Default - Parallel port IRQ select
	2-3	IRQ5	
<b>JP16</b>			<b>Factory setting only</b>

## Connectors

<b>J1</b>	Reset Switch
<b>J2</b>	Speaker connector
<b>J3</b>	Keylock/Power LED connector
<b>J4</b>	Turbo switch connector
<b>J5</b>	Turbo LED connector
<b>J6-J7</b>	VESA Local bus connector
<b>J8</b>	+12v connector for Fan/heatsink assembly
<b>J9</b>	Hard disk LED connector (VL-bus IDE)
<b>J17</b>	VL-bus IDE hard disk connector
<b>J18</b>	Floppy Disk connector
<b>J19</b>	Parallel port cable connector
<b>J20-J26</b>	16-bit ISA slot
<b>J27</b>	Serial port 2 connector
<b>J28</b>	Serial port 1 connector
<b>J29-J30</b>	Power connector
<b>J31</b>	External battery connector ( <b>Factory option only</b> )
<b>J32</b>	Keyboard connector

## Factory Recommended BIOS Settings (AMI)

Advanced CMOS Setup			
Typematic Rate Programming	:Disabled	Turbo Switch Function	:Enabled
Typematic Rate Delay (msec)	:500	Password Checking Option	:Setup
Typematic Rate (Chars/sec)	:5	Video ROM Shadow C000, 16K	:Enabled
Above 1M Memory Test	:Disabled	Video ROM Shadow C400, 16K	:Enabled
Memory test tick sound	:Enabled	Adapter ROM Shadow C800, 16K	:Disabled
Memory Parity Error Check	:Enabled	Adapter ROM Shadow CC00, 16K	:Disabled
Hit <DEL> Message Display	:Enabled	Adapter ROM Shadow D000, 16K	:Disabled
Hard Disk Type 47 RAM area	:0:300	Adapter ROM Shadow D400, 16K	:Disabled
Wait for <F1> if any error	:Enabled	Adapter ROM Shadow D800, 16K	:Disabled
System Boot Up Num Lock	:On	Adapter ROM Shadow DC00, 16K	:Disabled
Numeric Processor Test	:Enabled	Adapter ROM Shadow E000, 16K	:Disabled
Weitek Processor	:Absent	Adapter ROM Shadow E400, 16K	:Disabled
Floppy Drive Seek at Boot	:Disabled	Adapter ROM Shadow E800, 16K	:Disabled
System Boot Up Sequence	:C, A	Adapter ROM Shadow EC00, 16K	:Disabled
System Boot Up CPU Speed	:High	Adapter ROM Shadow F000, 64K	:Disabled
External Cache Memory	:Enabled	Boot sector Virus Protection	:Disabled
Internal Cache Memory	:Enabled		
Fast Gate A20 Option	:Enabled		

For systems using a 486BL2X-50 or a 486BL3X-75MHz CPU

Advanced Chipset Setup	
Hidden Refresh	:Enabled
Slow Refresh	:Disabled
AT Cycle Wait State	:Disabled
AT cycle between I/O Cycle	:0
AT Bus Auto Selection	:Auto
AT Bus Clock Select	:CLK1/3
Fast Decode Enable	:Disabled
Memory Read Wait State	:0ws
Memory Write Wait State	:0ws
Cache Read Wait State	:2-1-1-1
Cache Write Wait State	:0ws
Non-Cacheable Block-1 Size	:Disabled
Non-Cacheable Block-1 Base	:0KB
Non-Cacheable Block-2 Size	:Disabled
Non-Cacheable Block-2 Base	:0KB
Cacheable RAM Address Range	:64MB
Video BIOS Area Cacheable	:Yes

**Notes**

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