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UNPACKING INFORMATION

Before unpacking this CPU board, make sure the environment you've selected has everything needed to avoid any damage to it.

- *A static free, flat, hard surface*
- *Clearance from other electrical applicances*
- *Free air circulation*
- *Grounded power sources*

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CHAPTER 1

INTRODUCTION

This high performance 80386SX based, PC-AT compatible motherboard is designed to be the central CPU board for building an advanced workstation/file server/PC or upgrading an existing PC-AT system.

The 80386SX Microprocessor is a 32-bit CPU with a 16-bit external data bus and a 24-bit external address bus. It provides the performance benefits of a 32-bit programming architecture with the cost savings associated with 16-bit hardware systems. The 80386SX is object-code compatible with 80386, 80286, 8086, 8088. That means the 80386SX not only can run 32-bit application, like UNIX, but also applications for all 80X86 family members.

FEATURES:

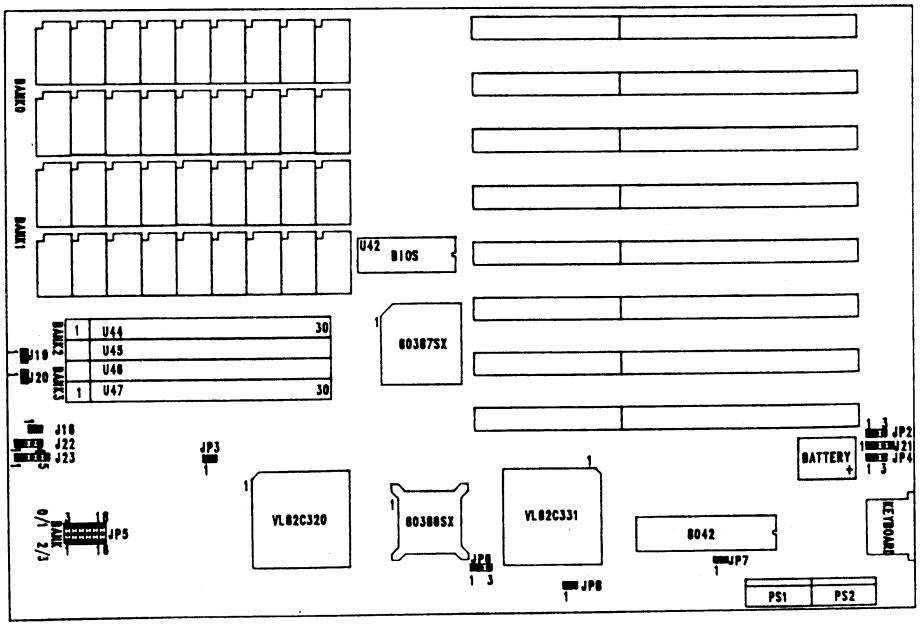
- INTEL 80386SX Microprocessor
- Up to 16Mbytes DRAM memory support
- System BIOS and adaptor ROMs Shadowing
- Single chip ROM BIOS with Setup utility
- Hardware and software turbo speed switching
- Intel 80387SX support
- On board rechargeable battery backup
- XT/AT power supply support
- Eight 16-bit AT I/O slots
- Four-layer Mini-AT size board
- AT compatible system support
    * 7 channel DMA
    * 16 level Interrupt
    * 3 programmable timers
    * Real-Time clock
    * CMOS RAM to maintain system configuration

CHAPTER 2

HARDWARE CONFIGURATION

The first stage in installing and preparing the board for use is to install system memory and configure the various connectors and jumpers on the board. If the board has already been installed in a case then this section can be skipped unless you wish to make any change in the system hardware configuration.

Figure below shows the layout of the board.



2.1 MEMORY CONFIGURATION

2.1.1. DRAM BANK CONFIGURATION

This CPU board supports 4 memory banks (Bank0-3) on board. The board provides flexibility in configurations for DRAM memory. Any brand of standard 100ns or faster 256K, 1M or 4M page mode DIP DRAMs can be installed on Bank0-1 and 256Kx9, 1Mx9 or 4Mx9 SIP memory modules can be installed on Bank2-3. The memory banks can be populated in three different orders:

1) **Bank0->Bank1->Bank2->Bank3**. Bank0 is the first bank. JP5 uses the default setting (ie, jumpers on the 1,4,7,10,13,16 side). Possible memory configurations are shown in the following table.

2) **Bank2->Bank3->Bank0->Bank1**. In this case, Bank2 and Bank3 both must be populated at the same time. Some memory configurations in the following table are not supported. If the memory count during the system boot-time does not match the memory size of the good DRAM memory chips or memory modules installed on board, that means this particular memory configuration is not supported. JP5 setting is not required to be changed, it still uses the default setting (ie, jumpers on the 1, 4, 7, 10, 13, 16 side). The BIOS will autodetect the starting first two memory banks, Bank2 and Bank3.

3) **Bank2->Bank3**. JP5 must be set on the 3, 6, 9, 12, 15, 18 side. In this case, DIP DRAM Bank0 and Bank1 can not be used, only two SIP memory banks are supported. Two SIP memory banks are not required to be populated at the same time. Bank2 now becomes Bank0 is the first bank. Bank3 now becomes Bank1 is the second bank.

1st BANK	2nd BANK	3rd BANK	4th BANK	Memory Size
256K				0.5MB
256K	256K			1.0MB
256K	256K	256K		1.5MB
256K	256K	256K	256K	2.0MB

1st BANK	2nd BANK	3rd BANK	4th BANK	Memory Size
1M				2.0MB
256K	1M			2.5MB
256K	256K	1M		3.0MB
1M	1M			4.0MB
1M	1M	256K		4.5MB
256K	256K	1M	1M	5.0MB
1M	1M	1M		6.0MB
1M	1M	1M	1M	8.0MB
4M				8.0MB
256K	4M			8.5MB
256K	256K	4M		9.0MB
1M	4M			10.0MB
1M	1M	4M		12.0MB
4M	4M			16.0MB

2.1.2 INSTALLING DIP DRAMS/SIP MEMORY MODULES

DIP DRAMs can be installed in the increment of 18 pieces starting from **Bank0(U1-U9,U12-U20)** to **Bank1(U23-U31,U33-U41)**. SIP memory modules can be installed in the increment of 2 modules starting from **Bank2(U44-U45)** to **Bank3(U46-U47)**. When installing the SIP memory modules, make sure pin-1 is pointing toward the bottom side of the motherboard(or toward the speaker connector) and pin-30 is poniting toward the top side of the motherboard(or toward the keyboard connector).

2.2 MATH COPROCESSOR

The system board supports an optional INTEL 80387SX coprocessor for high speed floating-point arithmetic operations. The coprocessor operates in parallel with the 80386SX by executing the numeric instructions while allowing the 80386SX to carry on with its own activities.The intel 80387SX basically extends the 80386SX architecture with floating point, extended integer and BCD data formats. However, application programs must be written to take advantage of 80387SX's features in order to achieve performance enhancement; merely adding the coprocessor does not necessarily guarantee any benefits.

2.3 SYSTEM ROM BIOS

All microcomputer systems use a Basic-Input-Output-system (BIOS) which has been permanently burned in a Read-Only-Memory (ROM) chip and functions as the basic point of communication between the system motherboard and the rest of the computer.

The BIOS of this CPU board provides the equivalent functions available on IBM's AT BIOS and consists of the following functional modules:

(1) Power-On-Self-Test(POST) and hardware initialization

(2) Low level hardware control routines and services to hide the unnecessary hardware intricacies from the application program

(3) Built-in SETUP utility for system configuration

2.3.1 BIOS SHADOW

Explanation of the term "shadow RAM": The system BIOS, V/EGA ROM, and a variety of other programming is stored in ROMs.
Two important properties of ROMs which lend them to this use are:

(1) the data is protected, it cannot be changed by mistake, and

(2) the data is retained when the power is shut off.

A notable deficiency in ROM technology is its speed - ROM access time is typically two to three times slower than normal memory (RAM) access. To further exaggerate this difference, ROM data is generally accessible only in 8-bit quantities, whereas general purpose memory can be read in 16-bit or 32-bit quantities (286/386 respectively). A simple-minded scheme to improve the access speed is to copy data from slow ROMs to fast RAM, and thereafter using the RAM image instead of the ROM. When RAM is dedicated to this purpose, it is called "shadow RAM".

2.4 POWER SUPPLY

A clean steady power source is necessary to get reliable performance from your system. With the high clock speed of the CPU, the quality of the power supply becomes even more important.

Most power supplies on the market meet the standard required by the CPU, however some have been found to be out of the specifications. To be certain of the highest performance reached by your system, be sure your power supply provides a voltage range of 5.25 volts maximum to 4.95 volts minimum.

Power supply inside XT-class microcomputer, even some power supply for AT-class microcomputer, does not generate a power good signal when you turn on the power supply. Most of AT-motherboard need power good signal to initiate. This SX motherboard includes a circuitry that will generate the powergood signal on board itself and boot up the system. In other word, this motherboard will work with both kinds of power supply, XT or AT, on the market.

2.5 CONNECTOR PORTS

2.5.1 Reset Switch Connector (J16)

This is a 2-pin header which should be connected to a momentary-on push-button switch located on the front-panel. The reset switch provides a full system 'reset' much like turning off the power and then turning it back on again. The pin assignments are defined as follows:

PIN No.	FUNCTION
1	Reset
2	Ground

2.5.2 CPU Speed Switch Connector (J19)

This is a 2-pin header which provides connection to a push-on push-off switch mounted on the front-panel.

Switch position	System Speed
* OFF	High Speed
ON	Low Speed

* Manufacturer's recommended setting

2.5.3 Turbo LED Connector (J20)

This is a 2-pin header which provides connection to a system operating speed indicator LED light mounted on the front-panel. When the system running at turbo speed, the LED light will be lit on.

The pin assignmemts are defined as follows:

PIN No.	FUNCTION
1	LED Power
2	Ground

2.5.4 External Battery Pack Connector (J21)

The system configuration and real-time clock information are stored in the CMOS RAM integrated in VL82C331. When you turn on your computer, the CMOS RAM will provide correct system configuration data to your system so the computer can recognize the microprocessor, DRAM and periphreals and function properly and correctly.

A power source is needed for the CMOS RAM to keep all the correct configuration information, time and date when the system is turn off. Therefore, a battery is required for this backup function. Two options are avilable for this backup function and JP2 need to be configured correctly.

(1) **On Board Rechargeable Battery (Manufacturer installed):**
A 3.6-Volt rechargeable battery(BT1) is mounted on board to provide the backup power for 82C331. Each time you turn on your computer, the battery is recharged by the power supply automatically. JP2 Pin-1 and Pin-2 must be connected to use this on-board rechargeable battery.

(2) External Battery Pack (J21):
An external 6-volt battery pack can be connected to J21 to provide the backup power for 82C331. JP2 Pin-2 and Pin-3 must be connected to use this external battery pack. The pin assignmemts are defined as follows:

PIN No.	FUNCTION
1	DC from Battery ("+")
2	Not Used
3	Ground
4	Ground ("-")

2.5.5 Speaker Connector (J22)

This is a 4-pin keyed header which should be connected to a 2-inch, 8-ohm speaker. Connect the speaker between pin-1 and pin-4. The pin assignments are defined as follows:

PIN No.	FUNCTION
1	Speaker data output
2	Key (pin removed)
3	Ground
4	+5V (VCC)

2.5.6 Power-On LED and Keylock Connector (J23)

This is a 5-pin keyed header which provides connection to a front-panel power-on LED and a security keylock. The pin assignments are defined as follows:

PIN No.	FUNCTION
1	Power-On LED
2	Key (pin removed)
3	Ground
4	Keyswitch
5	Ground

2.5.7 Keyboard Connector (J24)

This is a 5-pin DIN-socket which accepts any standard AT-compatible keyboard. The pin asignmemts are defined as follows:

PIN No.	FUNCTION
1	Keyboard Clock
2	Keyboard Data
3	Spare
4	Ground
5	+5V (VCC)

2.5.8 Power Supply Connectors (PS1, PS2)

The board draws its power source from an external power supply unit through the power supply connectors. These are two 6-pin male connector which connects to the power supply's two 6-pin female connectors.

PS2		PS1	
PIN No.	FUNCTION	PIN No.	FUNCTION
1	Power Good	1	Ground
2	+5V	2	Ground
3	+12V	3	-5V
4	-12V	4	+5V
5	Ground	5	+5V
6	Ground	6	+5V

2.5.9 I/O Expansion Connectors

There are eight expansion slots provided on the motherboard for system expansion purposes, multifunction I/O cards, modem cards, bus mouse cards, network adapters and industrial control peripheral cards, etc. All eight expansion slots are AT-type 16-bit connectors which are capable of accepting both XT 8-bit and AT 16-bit cards.

The bus speed is programmable through BIOS SETUP. Refer to chapter three for correct BIOS SETUP procedure. The signal and power supply assignments are identical to the IBM PC-AT's I/O channel. APPENDIX A contains a list of signal definitions of the I/O channel.

2.6 JUMPERS

These are jumpers that are used to set system configurations. They can either enable or disable a feature or toggle between two modes.

2.6.1 Battery Type Select Jumper (JP2)

Jumper position	Battery Type
* 1-2 connected	On Board Rechargeable Battery
2-3 connected	External Battery Pack

2.6.2 Pipeline Mode Jumper (JP3)

Jumper position	Pipeline mode
* ON	Enable
OFF	Disable

2.6.3 CMOS RAM Discharge Jumper (JP4)

See APPENDIX C "SYSTEM STUCK SAVER"

2.6.4 CPU Ready Select Jumper (JP6)

Jumper position	Ready Input
* 1-2 connected	1WS NPX ready from 82C320
2-3 connected	Use NPX generated ready

2.6.5 Password Security Feature Jumper (JP7)

Jumper position	Password Security Feature
* ON	Enable
OFF	Disable

Note: Most BIOS implementations use this jumper to indicate the primary video display type, but this BIOS autodetects the video display type without setting any jumper.

2.6.6 Bus Driving Capability Jumper (JP8)

Jumper position	Sink Current
* ON	24mA
OFF	12mA

2.6.7 SIP DRAM Bank Select Jumper (JP5)

Jumpers position	Function
* 1-2 connected	U44 and U45 = Bank 2,
* 4-5 connected	U46 and U47 = Bank 3
* 7-8 connected	
* 10-11 connected	
* 13-14 connected	
* 16-17 connected	
2-3 connected	U44 and U45 = Bank 0,
5-6 connected	U46 and U47 = Bank 1
8-9 connected	(In this configuration, DIP DRAMs can not be used)
11-12 connected	
14-15 connected	
17-18 connected	

* Manufacturer's recommended settings

2.6.8 JUMPERS NOT USED

JP1 and J13 are not used, please ignore them.

CHAPTER 3

SYSTEM SETUP AND CONFIGURATION

A setup utility is incorporated into the system BIOS. It allows the user to view the system configuration, and to select a variety of powerup/runtime options.

Entrance to Setup can occur in three ways:
- A configuration change detected during POST (Power-On-Self-Test) forces entrance, or
- **<ESC>** is pressed during cold-boot, or
- **<CTRL> <ALT> <ESC>** is pressed to warm-boot into Setup.

There are 12 utilities contained in Setup, each accessible in a separate, dedicated Edit Page. As the cursor is moved horizontally across the Menu Line, new Edit Pages appear in the Edit Window which correspond to that menu entry. A list of the utilities is shown here, and full descriptions are given in the remainder of this chapter.

(1) SUMMARY.....Hardware/feature config is summmarized

(2) CLOCK.....Time,Date,and Daylight Savings config

(3) VIDEO.....Video configuration

(4) FLOPPY.....Floppy Disk subsystem configuration

(5) FIXED.....Fixed Disk subsystem config and format

(6) BOOT-SEQ.....Boot Sequence configuration

(7) KEYBOARD.....Powerup Numlock and Typematic configuration

(8) FIRST-AID.....Quick remedy for software compatibility

(9) SPEED.....Boot-time CPU speed configuration

(10) SHADOW.....Shadow RAM config and adaptor ROM display

(11) CHIPSET.....Chipset special functions configuration

(12) SECURITY.....Password Security configuration

The followings explain the meanings of the keystrokes used throughout the Setup Utility:

<F10> to record and exit:
Press <F10> to record the new configuration to CMOS, and terminate the Setup session. The system will proceed to boot-up.

<HOME>, <END>, <LEFT ARROW>, <RIGHT ARROW> to move cursor:
The Menu-cursor can be moved respectively to the first entry, last entry, or next leftward/rightward entry.

<ENTER> to select:
The Menu-cursor currently illuminates an entry, such as CLOCK, VIDEO, FLOPPY, etc., and the Edit-Window currently shows the configuration related to that Menu entry. Press <ENTER> to commence editing that Edit Page. The cursor will move from the Menu-Line into the Edit-Page, upon the first editable field. Note: <PgDn> key can be used instead of <ENTER> in this context.

<ESC> for MENU:
The cursor is currently in the Edit-Window. <ESC> or <PgUp> returns it to the Menu-Line. Note: the newly edited configuration is not yet recorded to CMOS. See <F10> key description above.

<UP/DOWN/LEFT/RIGHT ARROWS> moves cursor:
The cursor is currently illuminating a field within an Edit-Page. It may be moved to another field via these cursor keys.

<ENTER> to Edit:
The cursor is currently illuminating a field within an Edit-Page. This particular field can be edited by keying-in numbers or letters. To invoke the editor, press <ENTER>. The field remains illuminated, and a small blinking underline (hardware cursor) will appear under the leftmost editable character in that field. In general, <Left Arrow>, <Right Arrow>, <Space>, <BackSpace>, and AlphaNumerics are accepted in edit mode. <ESC> will restore the field to its pre-edit state and the blinking underline will disappear. <ENTER> will finalize the edit and the blinking underline will disappear. All "edit-mode" keystrokes are prompted.

<+>,<->, <SPACEBAR>,<BackSpace> to change or scroll choices:
The cursor is currently illuminating a field within the Edit-Page which may be changed. <SpaceBar> and <+> make visible (select) other available options. The options are rolled through a list in the forward direction. <BackSpace> and <-> roll the options in reverse order.

A few special-case prompts also exist. Generally, they specify a range of numbers or a particular set of AlphaNumeric characters that will be accepted in the field. For example, the CLOCK Time-Of-Day subfield accepts Alphabetic "a" and "p" to indicate am and pm.

The SECURITY utility requires pressing <ENTER> after selecting a new configuration. This additional step is not consistent with behavior of the other utilities, but is necessary so that a new password can be prompted when appropriate, and so the current password is not dismissed should the user simply scroll through available options.

Due to the severity of consequences, the LOW-LEVEL-FORMAT field column within the FIXED disk configuration utility cannot be accessed until **<CTRL> <F>** is pressed. Pressing <ESC> while the cursor is in that column will move it safely to a non-Format column on the screen. While the format is in progress, <ESC> will immediately terminate (abort) the process.

3.1 SUMMARY UTILITY PAGE

This Page serves as both a summary utility and as the signon screen of the Setup utility. Most every charactiristic of the computer can be viewed here, but editing the fields is not permitted from this Page. (Should a configuration change be desired, select the desired utility by moving the Menu cursor). An example of the Summary window is shown in Figure 3.1.

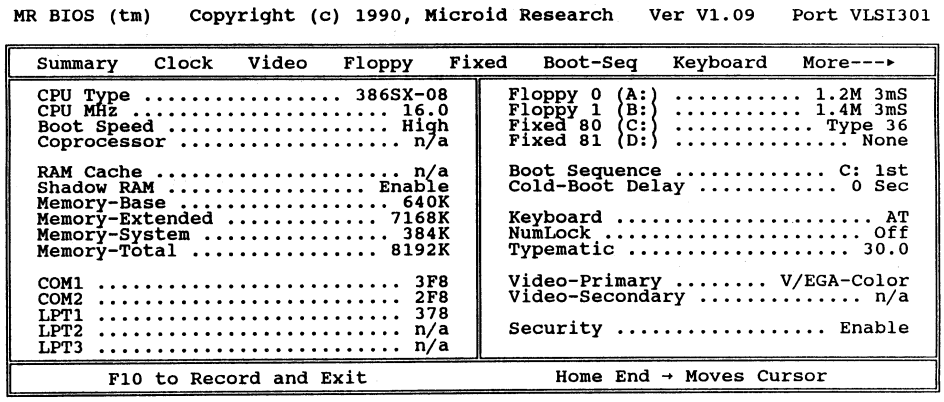


Figure 3.1

3.2 CLOCK CONFIGURATION UTILITY

The battery backed Real-Time-Clock (RTC) time, date, and daylight savings feature are programmed through this utility. The RTC has a built-in capability to automatically adjust the time on the two daylight savings days of the year (*). If this is desired, set the field to "Enable". Otherwise, set the field to "Disable". Note that in general, nothing will be immediately observable by setting the field to either state.
Eg, Daylight Savings ..... Enable
Daylight Savings ..... Disable

NOTE:
Changing the setting of any one field at 11:59:59 pm may permit unexpected roll-over of another field, and especially unintended results may occur during daylight-savings transition periods. An example of the Clock window is shown in Figure 3.2.

(*) On the last Sunday in April, the time increments from 1:59:59 am to 3:00:00 am. On the last Sunday in October, when the time first reaches 1:59:59 am, it is rolled-back to 1:00:00 am.

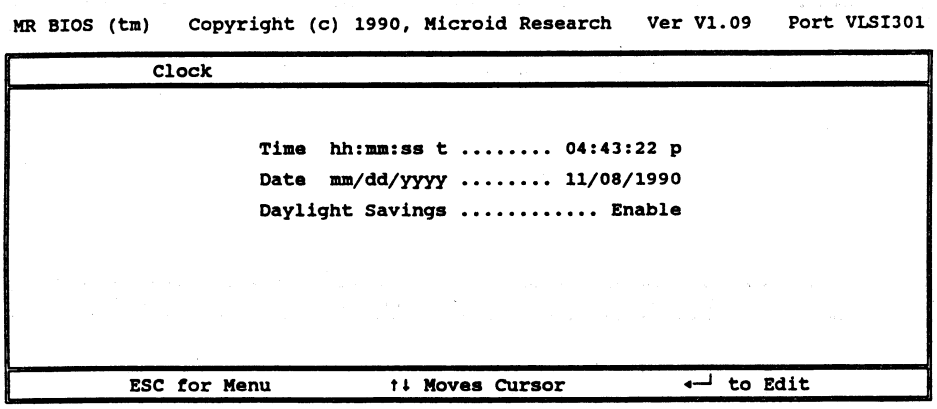


Figure 3.2

3.3 VIDEO CONFIGURATION UTILITY

The primary video adaptor is declared through this utility. A "primary" adaptor is defined to be the video card which will be recognized by an operating system (such as DOS) when it receives control of the system after a powerup or warm-boot. If there are two video cards present, the "other" one becomes (by default) the "secondary" video adaptor. The secondary adaptor is placed into a standby state, waiting to be activated by specialized software which knows of its existence.

Most BIOS inplementations require certain "jumpers" be set on the motherboard to indicate the primary video adaptor. This BIOS executes an autodetect algorithm to accomplish this same thing, eliminating the need to set jumpers. An example of the Video window is shown in Figure 3.3.

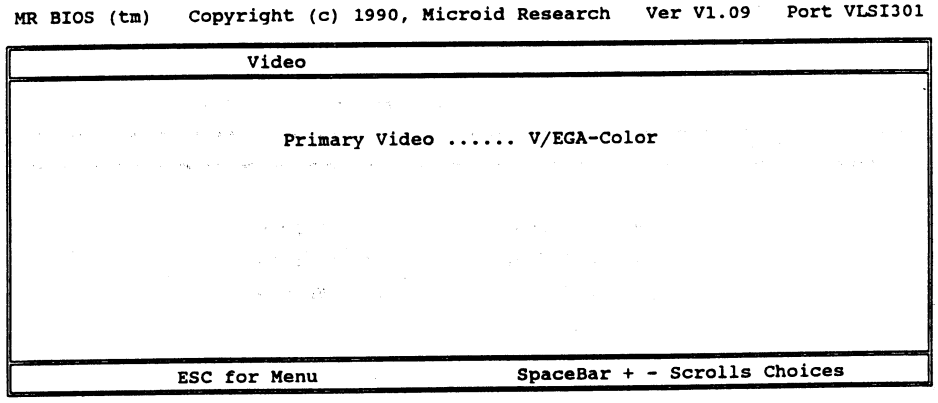


Figure 3.3

3.4 FLOPPY DISK CONFIGURATION UTILITY

This utility configures the floppy drive subsystem, drives A: and B:. The BIOS must be informed of the types of floppy drives in the system. The choices include two 5.25 inch drive types: **360K** and **1.2M** drives, and two 3.5 inch drives types: **720K** and **1.4M** drives. If a drive is not connected to either the A: or B: card connector, then "none" should be selected for that drive. Otherwise, an error message will be generated each time the computer is booted. An example of the Floppy window is shown in Figure 3.4.

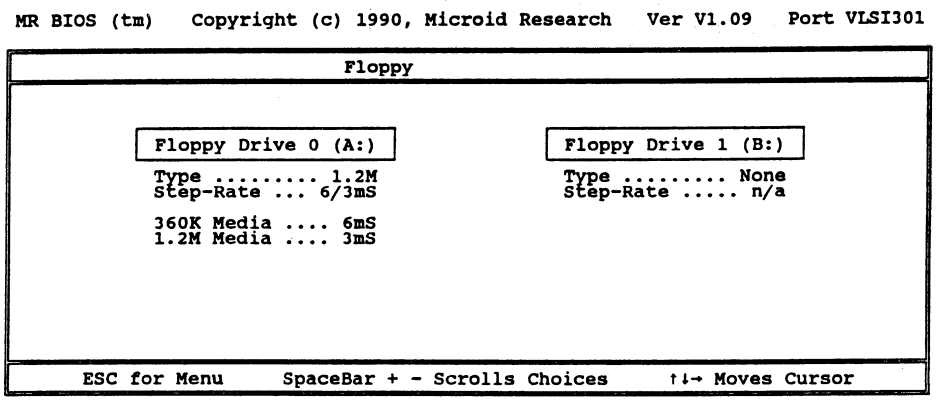


Figure 3.4

Although two step rates (slow/fast) are programmable with each drive type, there is rarely need to select the slow (numerically higher) speed. The main exception is with older "copy protected" programs, which measured the time taken to read data from the diskette. And very few copy-protection schemes actually measure the track-to-track time. In general, use the faster (numerically lower) steprate.

A **"media-change-line"** field is also displayed with each drive type, but is only programmable in the 720K case. This "media-change-line" is an electrical signal produced by a mechanical switch in the disk drive. It is activated when a disk is inserted. (You can feel the spring-loaded switch actuate when inserting a disk in a 1.2M drive). Operating systems like DOS check this signal each time the disk is accessed, saving the time required to re-read the disk directory into memory if the switch is not tripped.

Follow these steps to determine which type of 720K drive you have: Configure the system for Change-Line present (ie, select "Yes"), and exit the Setup Utility. Insert a (non-blank) disk into the drive, and type DIR to see that directory. Remove the disk, and insert a different one known to have a different directory. Type DIR again, and examine the new directory. If this drive lacks the Change-Line, then the latter directory display will (incorrectly) be identical to the original disk's. In such a case, invoke the Setup-Utility again and correct the Change-Line field to "No". NOTE: If a 720K drive is improperly configured to indicate "No" Change-Line when it is in fact present, the drive will operate correctly, but with diminished performance.

3.5 FIXED DISK CONFIGURATION/LOW LEVEL FORMAT UTILITY

This utility configures the fixed disk subsystem, drives C: and D:. Up to **47** drive tables/types can be defined within the BIOS in a compatible fashion, and the first 23 drive types (1-23) are standardized throughout the industry. The remaining 24 drive types/tables are BIOS implementation dependent, of course chosen in an attempt to service the widest variety of drive types. An example of the Fixed window is shown in Figure 3.5.

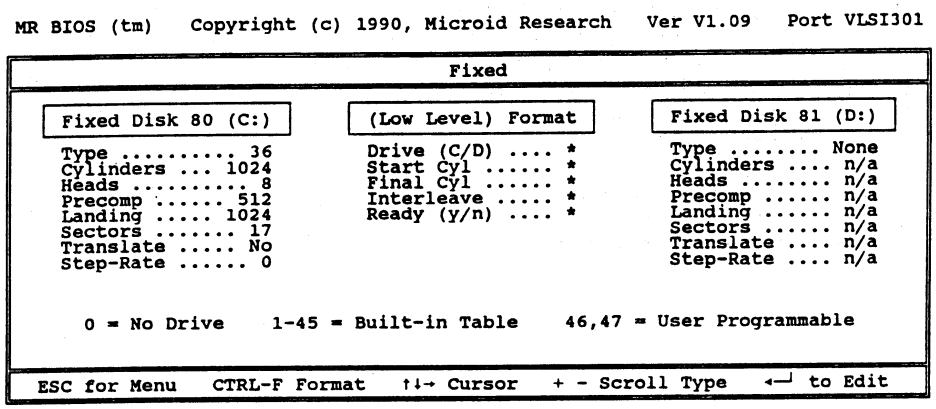


Figure 3.5

Larger capacity drives with higher track density are becoming increasingly available, but the standard BIOS interface limits support to 1024 tracks. The standard BIOS interface cannot take advantage of these new technologies. It is possible through translation schemes, however, to support drives with capacity in excess of a GigaByte.

This BIOS provides such a **Translation Mode** to surpass this 1024 (1K) cylinder limitation. Up to 16384 (16K) cylinders can be addressed via the Translation Mode... but MOST STATE OF THE ART DRIVE CONTROLLER CARDS SUPPORT ONLY 4K CYLINDERS to date. Many older cards only support 2K cylinders.

The Translation Mode implementation is designed to be compatible both with programs which exclusively use the BIOS interface, and programs which interpret the drive tables and run the drives directly. If Translate Mode is not selected (ie, the field is set to "No"), then only the first 1024 cylinders will be accessible through the BIOS interface.

The large drive support is complemented by a built-in **Low-Level-Format** utility. Be very careful when using this utility. As with all format programs, the data currently on the drive will be forever lost.

Most typical uses of the format utility will involve formatting the entire disk, but it is not required here. A range of cylinders may be specified as the target of the operation, and the sequence may be in increasing or decreasing order. Also, the "interleave" is selectable. In general, select an interleave of "3" (default) unless your drive card has 8K or more RAM on board, or specifically claims to be a "1:1" card. In that case, select an interleave of "1".

SCSI and ESDI hard disk drives usually have special BIOS build on SCSI, ESDI controller card. They may have different procedures to setup hard disk drive type, please refer to the hard drive manual for correct drive type.

3.6 BOOT SEQUENCE CONFIGURATION UTILITY

The order in which the disks are searched for a "boot sector" is configurable via this utility. This BIOS supports a programmable boot order. In addition to the usual "A: first, then C:" sequence, the order may be reversed so that drive C: is accessed first. This promotes a swifter boot process, and eliminates the annoyance of having to remove a floppy from drive A: prior to booting.

A special "hot-key" warm-boot sequence **<CTRL> <ALT> <ENTER>** is available to override the default sequence established here in this utility.The effect is identical to **<CTRL> <ALT> <DEL>**, except a prompt appears on the screen asking which drive should be booted. In most circumstances, we suggest setting the default boot sequence to "C: 1st", and when the rare occasion arises requiring a floppy boot, use <CTRL> <ALT> <ENTER> to override to drive A:. Note that drives B: and D: may also be specified at the prompt, but this is incompatible with current DOS revisions.

During cold-boot (powerup or pushbutton reset), the Screen-Prompted boot can be invoked by pressing <ENTER> during the memory test.The default boot sequence may also be set to Screen-Prompt, in which case booting always requires explicit selection of the boot drive. Cold-Boot delay can be programmed up to 30 seconds delay, the default value is none. An example of the Boot-Seq window is shown in Figure 3.6.

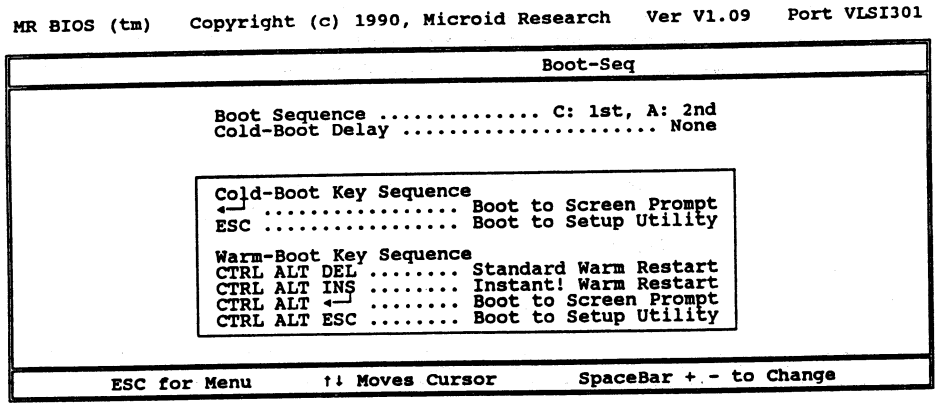


Figure 3.6

3.7 KEYBOARD CONFIGURATION UTILITY

This utility is used to configure the boot-time **Numlock** state and the keyboard Typematic rate. Through this utility, the boot-time default state of NumLock can be set to individual preference. Select "Disable" or "Enable" accordingly.

When a key is held pressed on the keyboard for some period of time, that keystroke will begin repeating at a predefined rate. The initial delay is by default 0.5 seconds, and the repeat rate defaults to 10 characters per second. This "typematic" feature is a function of the keyboard, and is not produced by the system BIOS.

This BIOS can be configured to issue override typematic parameters to the keyboard at boot-time. Both the Delay and Rate parameters can be selected, per personal preference. To accomplish this, "Enable" the "**Typematic Override**" field, and select the Delay and Rate in the other fields. We suggest a Delay of 0.5 seconds, and a Repeat Rate of 30.0 cps.

Should it happen that the keyboard fails to function properly when overriding the default typematic state, then "Disable" the "Typematic Override" field. The Delay and Rate fields will display "Default" in response to this selection. When configured this way, no typematic parameters will be issued to the keyboard at boot-time. An example of the Keyboard window is shown in Figure 3.7.

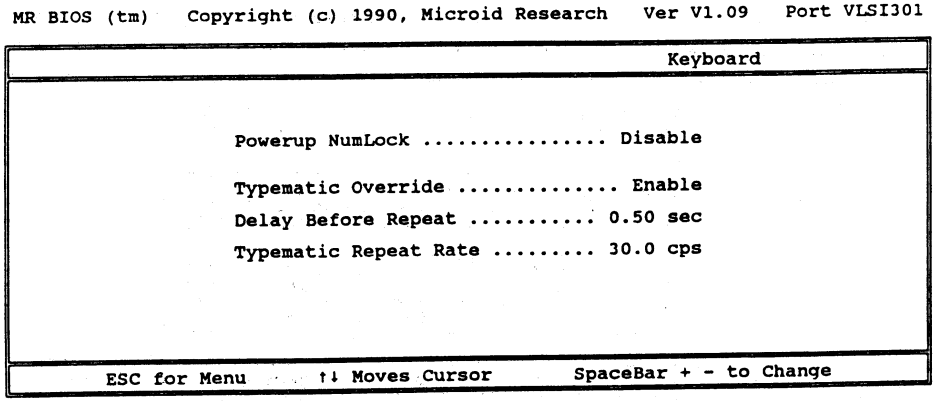


Figure 3.7

3.8 FIRST-AID CONFIGURATION UTILITY

Certain PC design advances may reveal/cause difficulties with existing software. These special options may correct/enhance system operation. An example of the First-Aid window is shown in Figure 3.8.

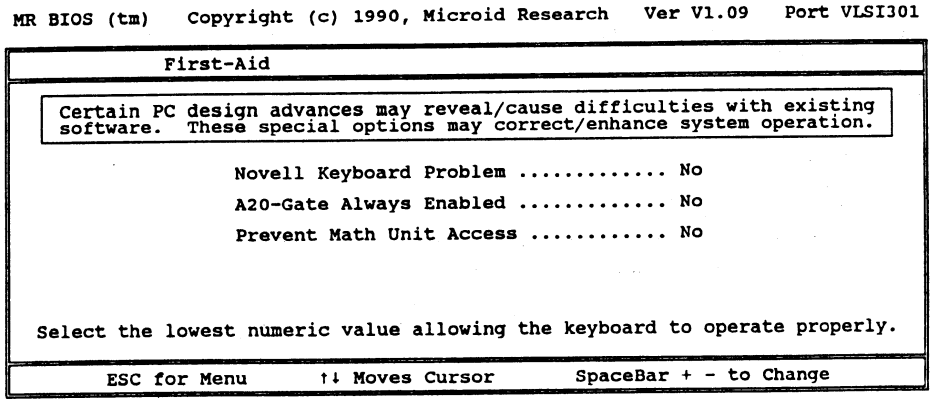


Figure 3.8

3.9 SPEED CONFIGURATION UTILITY

This utility allows the boot-time speed of the system to be selected, either high-speed or low-speed. It is very unusual to configure the system to boot the computer into the slow-speed state, since the only effect is degraded performance.

Two instances where it may be necessary are: An add-on card or other hardware device malfunctions when running at full speed, or, a software program that is always used fails at full speed. In general, set the default system speed to "High".

A convenient method is available to change system speed "on the fly", without affecting the boot-time default speed. The hot-key sequences **<CTRL> <ALT> <+>** and **<CTRL> <ALT> <->** set the speed to high and low, respectively. An example of the Speed window is shown in Figure 3.9.

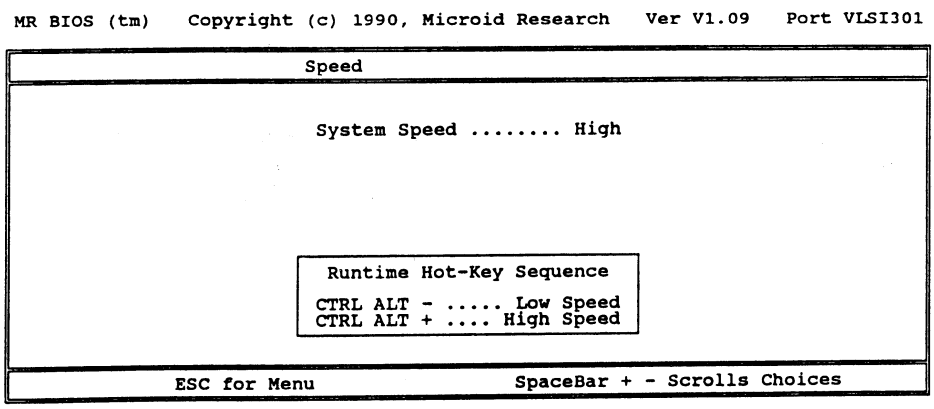


Figure 3.9

3.10 SHADOW RAM CONFIGURATION UTILITY

This utility performs two functions. Its main purpose is to allow the boot-time state of the shadow RAM to be configured. It also provides a means to view the ROMs found in the 640K-1Meg, which is useful for users of EMS drivers and Virtual-86 programs.

In nearly all cases, the shadowed regions should be configured as "**Write-Protected**". This will prevent the shadowed data from becoming corrupted should a programming error write data into that region. Although very unusual, several board products are known to possess Read/Write memory embedded in the same region as the ROM. Such "ROMs", if shadowed, must be configured "**Read/Write**" to function correctly.

The entire 384K ROM space is subdivided into ten regions, depicted by the ten fields shown on the screen. The Video and Adaptor ROM region is comprised of eight equal 16K segments, and the System and BIOS ROM region is divided into two 64K segments. ROMs of varying capacities may be present in the computer, and a single one may (and often does) extend beyond a 16K segment boundary.

Also, a single ROM might not be aligned on a 16K boundary, and consequently resides in two adjacent segments even though it is smaller than 16K. When this is the case, enabling shadow in one region will automatically cause other regions to become shadowed. The screen will be updated accordingly. A similar situation exists with the "Read/Write" vs "Write-Protect" attribute assignment.

This utility scans the entire 384K ROM space, and assigns a number to each ROM found (beginning with ROM #1). Each of the ten fields on the screen show the ROM #n found in the respective segment. If a single ROM spans two or more (adjacent) 16K segments, each associated field will display the identical ROM #n.

Note that when all fields are set to non-shadowed, they will either display "**Vacant**" (no ROM present there), or they will show the "**ROM #n**" residing at that location. Users of EMS drivers and Virtual-86 programs will find this especially convenient when trying to identify free space for "page-frames" or for increasing the base memory space.

An example of the Speed window is shown in Figure 3.10.

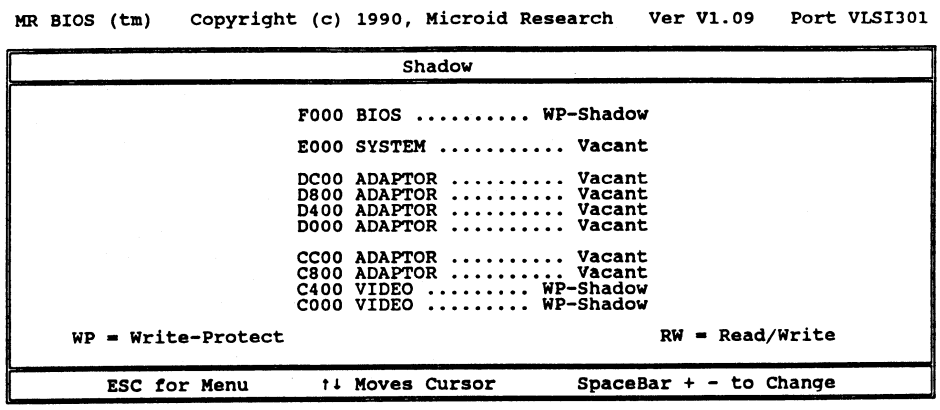

MR BIOS (tm) Copyright (c) 1990, Microid Research Ver V1.09 Port VLSI301
Shadow
F000 BIOS ..... WP-Shadow
E000 SYSTEM ..... Vacant
DC00 ADAPTOR ..... Vacant
D800 ADAPTOR ..... Vacant
D400 ADAPTOR ..... Vacant
D000 ADAPTOR ..... Vacant
CC00 ADAPTOR ..... Vacant
C800 ADAPTOR ..... Vacant
C400 VIDEO ..... WP-Shadow
C000 VIDEO ..... WP-Shadow
WP = Write-Protect
RW = Read/Write
ESC for Menu
↑↓ Moves Cursor
SpaceBar + - to Change

Figure 3.10

3.11 CHIPSET CONFIGURATION UTILITY

This utility is used to select special functions such as DRAM type, Page mode, Interleave and Bus speed. The default setting is indicated by an "*" sign. The followings show the few functions can be changed only by a trained technician. The rest should use the default setting. If for any reason the system lockup, please refer to APPENDIX C SYSTEM STUCK SAVER.

DRAM Type: 60ns, 70ns, 80ns, **(100ns)**, 120ns
Page Mode: No, **(Yes)**
Interleave: Word, **(Block)**
Bus Speed: XTAL, 4.0 MHz, 5.3 MHz, **(8.0 MHz)**, 16.0 MHz

(Manufacturer's recommended settings)

An example of the Chipset window included the manufacturer's recommended settings is shown in Figure 3.11.

```
MR BIOS (tm)   Copyright (c) 1990, Microid Research   Ver V1.09   Port VLSI301

                                   Chipset

 DRAM PARAMETERS              REFRESH OPTIONS              DMA TIMING
 DRAM Type ..... 100nS        *Method ........ Normal      *DMA Clock .... SYSCLK/2
 Page Mode ..... Yes          *DRAM Rate ..... 15uS        *Waits 8-Bit ......... 3
 Interleave .... Block        *AT-Bus Rate ..... 15uS      *Waits 16-Bit ........ 3
                                                           *XIOR to DMAMEMR ..... 1
 DRAM TIMING (CLK2s)          AT-BUS TIMING
*RAS Precharge ..... 3        *Bus Speed .... 8.0 MHz
*RA-Setup ......... +1        *ROM Waits ..... 3
*RA-Hold ......... 0.5        *CMDLY 8-Bit ..... 1
*RAS Active ....... 4         *CMDLY 16-Bit ..... 1
*↓RAS to ↓CAS ..... 2         *Waits 8-Bit ..... 5
*CAS Precharge ..... 2        *Waits 16-Bit ..... 1
*↓CAS Delay (WR) ... 3
*CAS Active (WR) ... 2
*CAS Active (RD) ... 2                                                * Default

     ESC for Menu      SpaceBar + - Scrolls Choices      ↑↓→ Moves Cursor
```

Figure 3.11

3.12 SECURITY CONFIGURATION UTILITY

This utility is used to enable or disable Password Security. Note that a jumper (JP7) on the motherboard is a master override for this Security feature. "OFF" position unconditionally disables the feature. "ON" position must be selected before this utility will permit enabling the Password Entry mode.

To prevent uninteded (or mischievous) enabling of the Password Entry feature in installations where it is unused, be certain to set the jumper (JP7) to "OFF" prior to bolting down the lid on the computer.

The Setup-Utility is also password protected when Security is active. When entering the Setup-Utility via <CTRL> <ALT> <ESC>, the SUMMARY page will be displayed as usual, but the user will be prompted to press "F10 to Exit", or "ENTER for Security Clearance". That is, the user must leave, or enter the correct password. The configurations cannot be modified until the password is correctly typed.

As is the case during powerup, three failed attempts to supply the correct password results in an alarm being sounded and the system halting.

When enabling the Security feature (ie, a transition from "Disable" to "Enable"), a second field will appear on the screen prompting entry of a password. A password consisting of zero to ten characters, followed by <ENTER>, must be typed in. Asterisks are echoed to the screen (instead of the character typed), and the only keystroke available for editing is <BackSpace>. Thus, the password cannot be viewed. Not even by the person who creates it.

Upon completing the password (ie, after <ENTER> is pressed), a prompt will appear requiring the same password again be entered. This step ensures that no typographical errors exist in the original password. The entire process will reloop if the latter entry does not match the initial password.

All keystrokes normally recognized by BIOS are available for use in the password. That is, <F1>, <ALT> <F1>, <SHIFT> <F1> are all valid and considered different. Also, Alphabetic characters are case-sensitive, which means for example that "a" and "A" are distinguished from one another.

Once the password has been defined, it may subsequently be changed using this utility. To accomplish this, toggle the "Security" field entry from "Enable" to "Change Code", and press <ENTER>. The resulting steps are identical to initially installing the password.

The password entry feature may also be set to "Disable", which turns off Security. Be aware that this configuration allows anyone who invokes the Setup-Utility to re-Enable the Security feature with their own password. It could happen, for example, that a curious but otherwise unfamiliar user accidentally sets a new password. The situation may not be discovered until too late, when the computer cannot be powered up because the correct password is unknown.

It is therefore STRONGLY ADVISED that if this Security feature is going to be left disabled, then the Master-Override jumper (JP7) be set to "OFF" (Master-Disable). An example of the Security window is shown in Figure 3.12.

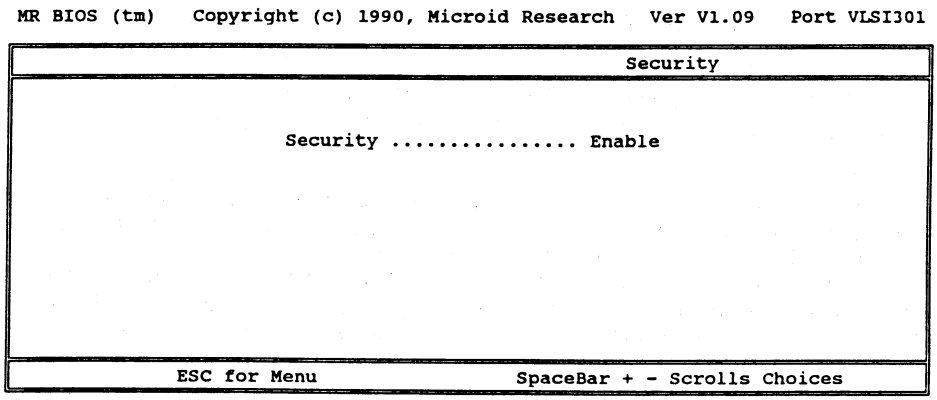


Figure 3.12

Usually, the motherboard has already been fine tuned to reach its highest performance before it is shipped. Improper setup or change by the user may cause the system malfunction and lockup. Please read this manual carefully before making any changes. If you still have question about this setup utility, please contact your supplier for detail information or call the manufacturer for a technical support.

If the system does lockup, for any reason. Please refer to APPENDIX C "**SYSTEM STUCK SAVER**" section.

WARRANTY

LIMITED ONE YEAR WARRANTY

EISA TECH Corp. will repair or exchange any parts or unit free of charge due to manufacturing defects for one year from the date of purchase. If problems with your EISA TECH products occur during the warranty period, contact your dealer first.

PARTS
Defective parts will be exchanged or repaired for one year from the date of original purchase.

LABOR
Mail-in or carry-in service for one year from the date of original purchase.

BIOS
EISA TECH Corp. will exchange any set of BIOS free of charge due to existing incompatibility issues for three months from the date of original purchase.

SERVICE
A copy of invoice or recipe with date of purchase is required before any warranty service will be rendered. Service can be obtained by calling EISA TECH for a Returned Merchandise Authorization Number(RMA). The defective product should then be returned in the original packaging with RMA number prominently displayed on the outside of shipping carton and mailed prepaid or hand carried to EISA TECH. Shipping charge will be applied for all orders that have to be mailed when service is complete.

This warranty covers normal consumer use and does not cover damages incurred in shipping or failure due to alterations, misuse, abuse or improper maintenance.

APPENDIX A

I/O CHANNEL PIN ASSIGNMENTS

8-BIT I/O SLOT - 62 PIN EDGE CONNECTOR

SIGNAL	PIN#	PIN#	SIGNAL
GND	B1	A1	-IOCHECK
+RESET	B2	A2	SD7
+5V	B3	A3	SD6
+IRQ9	B4	A4	SD5
-5V	B5	A5	SD4
+DRQ2	B6	A6	SD3
-12V	B7	A7	SD2
-0WS	B8	A8	SD1
+12V	B9	A9	SD0
GND	B10	A10	+IOCHRDY
-SMEMR	B11	A11	+AEN
-SMEMW	B12	A12	SA19
-IOR	B13	A13	SA18
-IOW	B14	A14	SA17
-DACK3	B15	A15	SA16
+DRQ3	B16	A16	SA15
-DACK1	B17	A17	SA14
+DRQ1	B18	A18	SA13
-REFRESH	B19	A19	SA12
+SYSCLK	B20	A20	SA11
+IRQ7	B21	A21	SA10
+IRQ6	B22	A22	SA9
+IRQ5	B23	A23	SA8
+IRQ4	B24	A24	SA7
+IRQ3	B25	A25	SA6
-DACK2	B26	A26	SA5
+TC	B27	A27	SA4
+ALE	B28	A28	SA3
+5V	B29	A29	SA2
+OSC	B30	A30	SA1
GND	B31	A31	SA0

I/O CHANNEL PIN ASSIGNMENTS

16-BIT I/O SLOT - 36 PIN EDGE CONNECTOR

SIGNAL	PIN#	PIN#	SIGNAL
-MEMCS16	D1	C1	-SBHE
-IOCS16	D2	C2	LA23
+IRQ10	D3	C3	LA22
+IRQ11	D4	C4	LA21
+IRQ12	D5	C5	LA20
+IRQ15	D6	C6	LA19
+IRQ14	D7	C7	LA18
-DACK0	D8	C8	LA17
+DRQ0	D9	C9	-MEMR
-DACK5	D10	C10	+MEMW
+DRQ5	D11	C11	SD8
-DACK6	D12	C12	SD9
+DRQ6	D13	C13	SD10
-DACK7	D14	C14	SD11
+DRQ7	D15	C15	SD12
+5V	D16	C16	SD13
-MASTER	D17	C17	SD14
+GND	D18	C18	SD15

APPENDIX B

HARD DISK DRIVE TYPE

Users can specify up to 47 hard disk types which include 45 pre-defined types and 2 user-programmable types. The default hard disk parameters are defined on the following table. Consult your hard disk manual for detail specifications.

DRIVE TYPE	CYLINDERS	HEADS	WRITE PRECOMP	LANDING ZONE	SECTORS
1	306	4	128	305	17
2	615	4	300	615	17
3	615	6	300	615	17
4	940	8	512	940	17
5	940	6	512	940	17
6	615	4	NONE	615	17
7	462	8	256	511	17
8	733	5	NONE	733	17
9	900	15	NONE	901	17
10	820	3	NONE	820	17
11	855	5	NONE	855	17
12	855	7	NONE	855	17
13	306	8	128	319	17
14	733	7	NONE	733	17
15	RESERVED				
16	612	4	0	663	17

DRIVE TYPE	CYLINDERS	HEADS	WRITE PRECOMP	LANDING ZONE	SECTORS
17	977	5	300	977	17
18	977	7	NONE	977	17
19	1024	7	512	1023	17
20	733	5	300	732	17
21	733	7	300	732	17
22	733	5	300	733	17
23	306	4	0	336	17
24	805	4	NONE	805	26
25	925	9	NONE	925	17
26	776	8	NONE	776	33
27	1024	5	512	1024	17
28	1024	8	NONE	1023	17
29	823	10	NONE	823	17
30	1224	15	NONE	1223	17
31	1024	11	NONE	1024	17
32	1024	15	NONE	1024	17
33	1024	5	NONE	1024	17
34	612	2	128	612	17
35	1024	9	NONE	1024	17
36	1024	8	512	1024	17
37	615	8	128	615	17

DRIVE TYPE	CYLINDERS	HEADS	WRITE PRECOMP	LANDING ZONE	SECTORS
38	823	10	256	823	17
39	809	6	128	809	17
40	820	6	NONE	820	17
41	977	5	NONE	977	17
42	981	5	NONE	981	17
43	823	10	512	823	17
44	830	10	NONE	830	17
45	917	15	NONE	917	17
46	USER PROGRAMMABLE				
47	USER PROGRAMMABLE				

APPENDIX C

SYSTEM STUCK SAVER

1. Turn the system off, then turn it back on. Press the <ESC> key to invoke the Setup Utility. Set the correct setting for each utility. Press <F10> to record the settings and exit to boot up the system.

2. If the above action does not bring the system up. Turn the computer off again, move jumper (JP4) from pin 1-2 to pin 2-3 for 5 seconds and then move the jumper back to pin 1-2. Turn on the system and invoke the Set up utility. Manufacturer only recommends this option to a trained technician. This procedure will erase all the Settings you set previously and back to the default value.

Use manufacturer's recommended settings suggested by this manual to bring the system up and function properly.