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1. Introduction

1.1 Preface

The S1461/3/6 is an Intel Triton chipset based Pentium PC/AT mainboard. With support for 75 thru 166MHz CPU, PCI local bus, and ISA bus, it can be used in the fastest PC/AT systems. The S1461 and S1463 use standard SRAM and the S1466 comes with synchronous pipeline burst-mode SRAM for better system performance. Both boards can support either 256KB or 512KB of cache.

1.2 Key Features

* Pentium based PC/AT compatible mainboard with Intel Triton chipset
* 4 Master/Slave PCI Bus slots, 4 ISA Bus slots
* 3 Master/Slave PCI Bus slots, 5 ISA Bus slots for S1463
* Supports Pentium Processors (75 thru 166 MHz).
* Supports true 64 bit CACHE and DRAM access mode.
* Supports ZIF Socket 7.
* Supports 256/512KB 2nd level cache memory, either synchronous or standard SRAM.
* CPU WRITE-BACK cache operation.
* On board EIDE PCI controller.
  Supports PIO Mode 0,1,2,3,4 and Bus Master mode 1,2 operations.
* Supports up to 128 MB Fast Page Mode or EDO DRAM memory on board.
* Support for Advanced Power Management
* System/Video BIOS uses cachable shadow RAM to improve performance.
* Licensed AWARD BIOS or AMI BIOS.
* Flash BIOS support
* Mini-Baby AT form factor, 4 layer PCB.
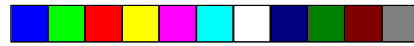
1.3 Hardware Specifications

* CPU   -3.3V Pentium 75 thru 166 MHz CPU
                                    -Pentium Overdrive Processor (Socket 7)
* Coprocessor   -Included in Pentium CPU.
* Speed   -50/60/66 MHz System Bus and 25/30/33 MHz
                                    PCI Bus speed.
                                    -7.5/8.33 MHz ISA Bus speed.
                                    -H/W and S/W speed switchable function (Cache
                                    or non Cache).
* DRAM Memory   -2 double banks of 72 pin SIMM Module DRAM.
                                    -2MB to 128 MB DRAM size.
                                    -Supports Fast Page DRAM access mode.
                                    -Supports EDO (Extended Data Out) DRAMs
                                    (also known as Hyper Page mode).
* Cache Memory   -16 KB cache memory included in Pentium.
                                    -256/512 KB on board 2nd level cache memory.
                                    -Support Pentium BURST read/write mode on
                                    2nd level cache memory access.
                                    -Supports either synchronous or standard
                                    SRAM.
*EIDE Controller   -Primary and secondary PCI EIDE channels on
                                    board for support of up to four EIDE
                                    Mode 0 through Mode 4 drives.
* Shadow RAM   -Main BIOS function.
                                    -Video BIOS shadow function programmable.
                                    -Shadow RAM caching function programmable.
* I/O Bus Slots   -4 Master/Slave PCI-Bus.
                                    -4 ISA Bus.
* Dimensions   -Mini-Baby AT size.

1.4 Software Specifications

* BIOS   -Licensed AWARD BIOS or AMI BIOS.
                                    -AT CMOS Setup, BIOS/CHIPSET Setup, and
                                    hard disk utility included.
* O.S.   -Operates with MS-DOS, Windows, Windows
                                    NT, OS/2, Novell, and SCO Unix.
* Utilities   -Flash EPROM utility

1.5 Environment

Ambient Temperature	0 to +50 C (operating)
Relative Humidity	0 to +85% (operating)
Altitude	0 to 10,000 feet (operating)
Vibration	0 to 1,000 Hz
Voltage	4.9 to 5.2 V

2. Board Installation

2.1 Unpacking

The mainboard package should contain the following:
* S1461/3/6 Mainboard
* Two IDE 40 pin cables
* User's Manual

The mainboard contains sensitive electric components which can be easily damaged by static electricity, so the mainboard should be left in its original packaging until it is ready to be installed.

Unpacking and installation should be done on a grounded anti-static mat. The operator should be wearing an anti-static wristband, grounded at the same point as the anti-static mat.

Inspect the main board carton for obvious damage. Shipping and handling may cause damage to your board. Be sure there are no shipping and handling damage on the board before proceeding.

After opening the mainboard carton, extract the system board and place it only on a grounded anti-static surface, component side up. Again inspect the board for damages. Press down on all of the socket IC's to make sure that they are properly seated. Do this only with the board placed on an anti-static mat.

DO NOT APPLY POWER TO THE BOARD IF IT HAS BEEN DAMAGED!

2.2 Installation

You are now ready to install your mainboard. The mounting hole pattern of the S1461/S1463/S1466 matches the IBM-AT system board spec. It is assumed that the chassis is designed for a standard IBM XT/AT mainboard.

Place the chassis on the anti-static mat and remove the cover. Remove the plastic clips, nylon stand-offs and screws for mounting the system board, and keep them separate.

3. On Board Resource Setting
Figure 3.1 S1466 Board Layout Rev 03

Keyboard CON

KB CTR

J10

J7
J8
J9

1

BIOS AMI/AWARD

RTC

PWR CON. 5V

J13   1   1   1

PCI Slot 4   PCI Slot 3   PCI Slot 2   PCI Slot 1

ISA Slot 4   ISA Slot 3   ISA Slot 2   ISA Slot 1

Primary IDE   Secondary IDE

Bank 0   Bank 0   Bank 1   Bank 1

82437FX

Pin1

82438FX   82438FX

82371FB

J18
J19

J27

J28
J29
J30
J31

J73   J72

J22
J24
J14

Synchronous SRAM

J1   1

Socket 7 A

P54C

J74   J71   J70   J23   J15

Heat Sink

J26   J21   J16

J25   J20   J17

PCB Rev 03

J18	J19	J14	J15	CPU Speed
On	On	Off	Off	75 MHz
On	Off	Off	Off	90 MHz
Off	On	Off	Off	100 MHz
On	Off	On	Off	120 MHz
Off	On	On	Off	133 MHz
On	Off	On	On	150 MHz
On	On	Off	On	150 MHz
Off	On	On	On	166 MHz

J1	J23	J22	Cache Size
2-3	On	Off	256KB
1-2	Off	On	512KB

J25: Keylock   J21: Turbo LED
J20: IDE LED   J16: Turbo Switch
J17: Reset   J26: Speaker

* The following jumpers must be left at the default positions.

J30:Closed   J9:1-2   J74:Closed
J7:1-2   J13: 2-3   J71:Closed
J8:1-2   J73:Closed *All other jumpers are reserved.

3.2 Quick Reference For Jumpers & Connectors (S1466 rev 03)
(refer Fig. 3.1)

* : 5V Power Connector

1	Power Good Signal
2,10,11,12	VCC (+5V)
3	+12V
4	-12V
5,6,7,8	GND
9	-5V

* J17: Reset Connector

    "Open" for normal operation
    "Closed" for hardware reset

* J1,J23,J22: L2 Cache Size Selection

Cache Size:	J1	J23	J22
256kb	2-3	On	Off
512kb	1-2	Off	On

* J25: Power LED and Keylock Connector

1	LED anode (+)
2	NC
3	LED cathode (-)
4	Keylock
5	GND

* J26: Speaker Connector

1	Data Out
2	NC
3	GND
4	+5 VDC

* J16: Turbo Switch Connector

    Harware turbo switch is not supported.
    Use <Ctrl> +<Alt>+<-> for non-turbo mode.
    Use <Ctrl>+<Alt>+<+> for turbo mode.

* J21: Turbo LED Connector

1		LED cathode (-)
2		LED anode (+)

* J18, J19,J15,J14: System Speed Selection

J18	J19	J14	J15	CPU Speed
Off	On	On	On	166MHz Pentium
On	Off	On	On	150MHz Pentium
On	On	Off	On	150MHz Pentium
Off	On	On	Off	133MHz Pentium
On	Off	On	Off	120MHz Pentium
Off	On	Off	Off	100MHz Pentium
On	Off	Off	Off	90MHz Pentium
On	On	Off	Off	75MHz Pentium

* J14 & J15:CPU Clock Multiplier

J14	J15	CPU Mode
Off	Off	CPU x 1.5(75,90 & 100MHz)
On	Off	CPU x 2 (120 & 133MHz)
On	On	CPU x 2.5(150 & 166MHz)
Off	On	CPU x 3 (150MHz)

*J10: Reset CMOS and clear Password

OFF:Normal Operation
ON: Clears Password and resets CMOS to default.

*J20:On Board IDE LED
Used to show on board IDE drive activity.
Only pins 1 and 2 are used.

3.3 On Board Resource Setting
S1466 Board Layout Rev 02

J18	J19	J14	J15	CPU Speed
On	On	Off	Off	75 MHz
On	Off	Off	Off	90 MHz
Off	On	Off	Off	100 MHz
On	Off	On	Off	120 MHz
Off	On	On	Off	133 MHz
On	Off	On	On	150 MHz
On	On	Off	On	150 MHz
Off	On	On	On	166 MHz

J1	J23	J22	Cache Size
2-3	On	Off	256KB
1-2	Off	On	512KB

J25: Keylock   J21: Turbo LED
J20: IDE LED   J16: Turbo Switch
J17: Reset   J26: Speaker

* The following jumpers must be left at the default positions.
J30:Closed   J9:1-2
J7:1-2   J13: 2-3   *All other jumpers are reserved.
J8:1-2

3.4 Quick Reference For Jumpers & Connectors (S1466 rev 02)

* : 5V Power Connector

1	Power Good Signal
2,10,11,12	VCC (+5V)
3	+12V
4	-12V
5,6,7,8	GND
9	-5V

* J17: Reset Connector

"Open" for normal operation
"Closed" for hardware reset

* J1,J23,J22: L2 Cache Size Selection

Cache Size:	J1	J23	J22
256kb	2-3	On	Off
512kb	1-2	Off	On

* J25: Power LED and Keylock Connector

1	LED anode (+)
2	NC
3	LED cathode (-)
4	Keylock
5	GND

* J26: Speaker Connector

1	Data Out
2	NC
3	GND
4	+5 VDC

* J16: Turbo Switch Connector

Harware turbo switch is not supported.
Use <Ctrl> +<Alt>+<-> for non-turbo mode.
Use <Ctrl>+<Alt>+<+> for turbo mode.

* J21: Turbo LED Connector

1	LED cathode (-)
2	LED anode (+)

* J18, J19,J15,J14: System Speed Selection

J18	J19	J14	J15	CPU Speed
Off	On	On	On	166MHz Pentium
On	Off	On	On	150MHz Pentium
On	On	Off	On	150MHz Pentium
Off	On	On	Off	133MHz Pentium
On	Off	On	Off	120MHz Pentium
Off	On	Off	Off	100MHz Pentium
On	On	Off	Off	75MHz Pentium

* J14 & J15:CPU Clock Multiplier

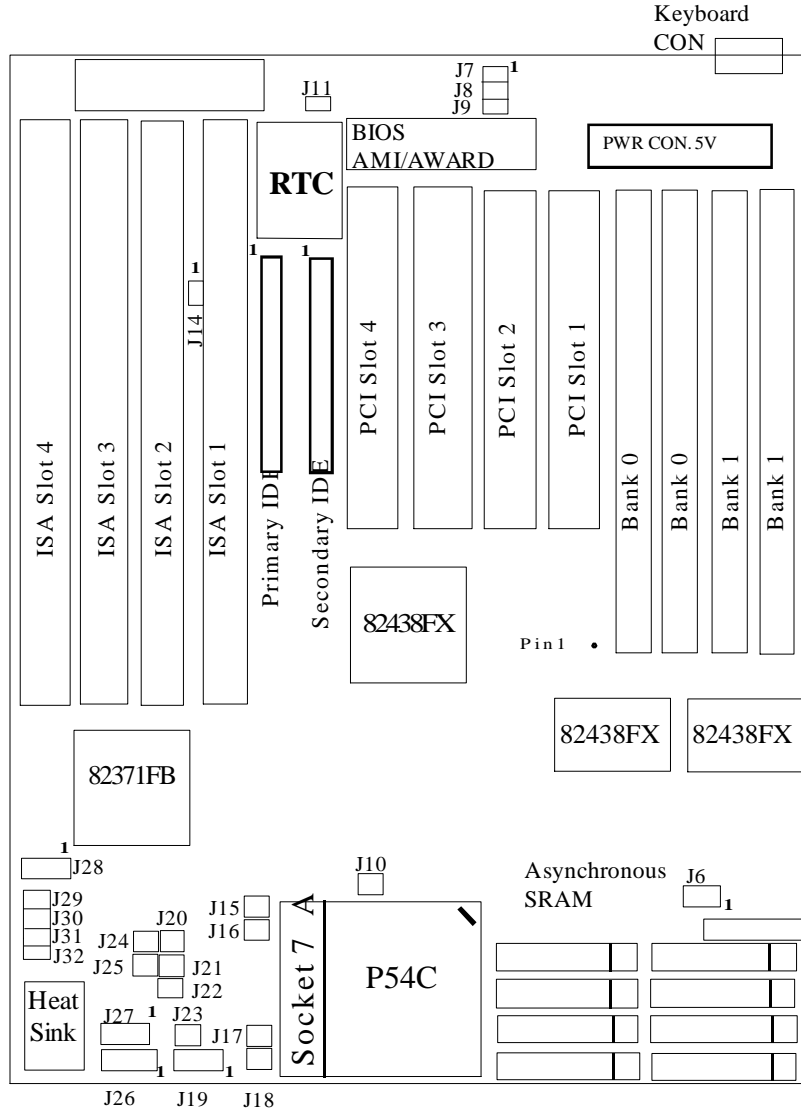| J14	J15	CPU Mode
Off	Off	CPU x 1.5(75,90 & 100MHz)
On	Off	CPU x 2 (120 & 133MHz)
On	On	CPU x 2.5(150 & 166MHz)
Off	On	CPU x 3 (150MHz)

*J10: Rset CMOS and clear Password

OFF:Normal Operation
ON: Clears Password and resets CMOS to default.

*J20:On Board IDE LED
Used to show on board IDE drive activity.
Only pins 1 and 2 are used.

Figure 3.5 S1461 Board Layout

Keyboard CON

J7 1
J8
J9
J11

BIOS AMI/AWARD

PWR CON. 5V

RTC

J14 1

1 Primary IDE   1 Secondary IDE

PCI Slot 4

PCI Slot 3

PCI Slot 2

PCI Slot 1

ISA Slot 4

ISA Slot 3

ISA Slot 2

ISA Slot 1

Bank 0

Bank 0

Bank 1

Bank 1

82438FX

Pin 1

82438FX   82438FX

82371FB

1 J28

J29
J30
J31
J32

J24
J25

J20
J15
J16

J21
J22

Heat Sink

J27 1 J23

J17

Socket 7 A

J10

P54C

Asynchronous SRAM

J6 1

J26   J19   J18

J15	J16	J20	J24	CPU Speed
On	On	Off	Off	75 MHz
Off	On	Off	Off	90 MHz
On	Off	Off	Off	100 MHz
Off	On	On	Off	120 MHz
On	Off	On	Off	133 MHz
On	Off	Off	On	150 MHz
Off	On	On	On	150 MHz
On	Off	On	On	166 MHz

J6	J22	J21	Cache Size
2-3	On	Off	256KB
1-2	Off	On	512KB

J26: Keylock   J23: Turbo LED
J19: IDE LED   J17: Turbo Switch
J18: Reset   J27: Speaker

* The following jumpers must be left at the default positions.
J10:Closed   J7: 1-2   J9: 1-2
J31:Closed   J8: 1-2   J14: 2-3   *All other jumpers are reserved.

3.6 Quick Reference For Jumpers & Connectors (S1461)

* : 5V Power Connector

1	Power Good Signal
2,10,11,12	VCC (+5V)
3	+12V
4	-12V
5,6,7,8	GND
9	-5V

* J18: Reset Connector

"Open" for normal operation
"Closed" for hardware reset

* J6,J22,J21: L2 Cache Size Selection

Cache Size:	J6	J22	J21
256KB	2-3	On	Off
512KB	1-2	Off	On

* J26: Power LED and Keylock Connector

1	LED anode (+)
2	NC
3	LED cathode (-)
4	Keylock
5	GND

* J27: Speaker Connector

1	Data Out
2	NC
3	GND
4	+5 VDC

* J17: Turbo Switch Connector

Harware turbo switch is not supported.
Use <Ctrl> +<Alt>+<-> for non-turbo mode.
Use <Ctrl>+<Alt>+<+> for turbo mode.
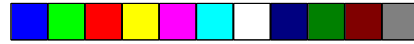
* J23: Turbo LED Connector

1	LED cathode (-)
2	LED anode (+)

* J15, J16,J20: System Speed Selection

J15	J16	J20	J24	CPU Speed
On	Off	On	On	166MHz Pentium
Off	On	On	On	150MHz Pentium
On	On	Off	On	150MHz Pentium
On	Off	On	Off	133MHz Pentium
Off	On	On	Off	120MHz Pentium
On	Off	Off	Off	100MHz Pentium
Off	On	Off	Off	90MHz Pentium
On	On	Off	Off	75MHz Pentium.

* J20 & J24:CPU Clock Multiplier

J20	J24	CPU Mode
Off	Off	CPU x 1.5(75,90 & 100MHz)
On	Off	CPU x 2 (120 & 133MHz)
On	On	CPU x 2.5(150 & 166MHz)
Off	On	CPU x 3 (150MHz)

* J11:Reset CMOS and clear Password

Used to reset CMOS and clear BIOS Password.

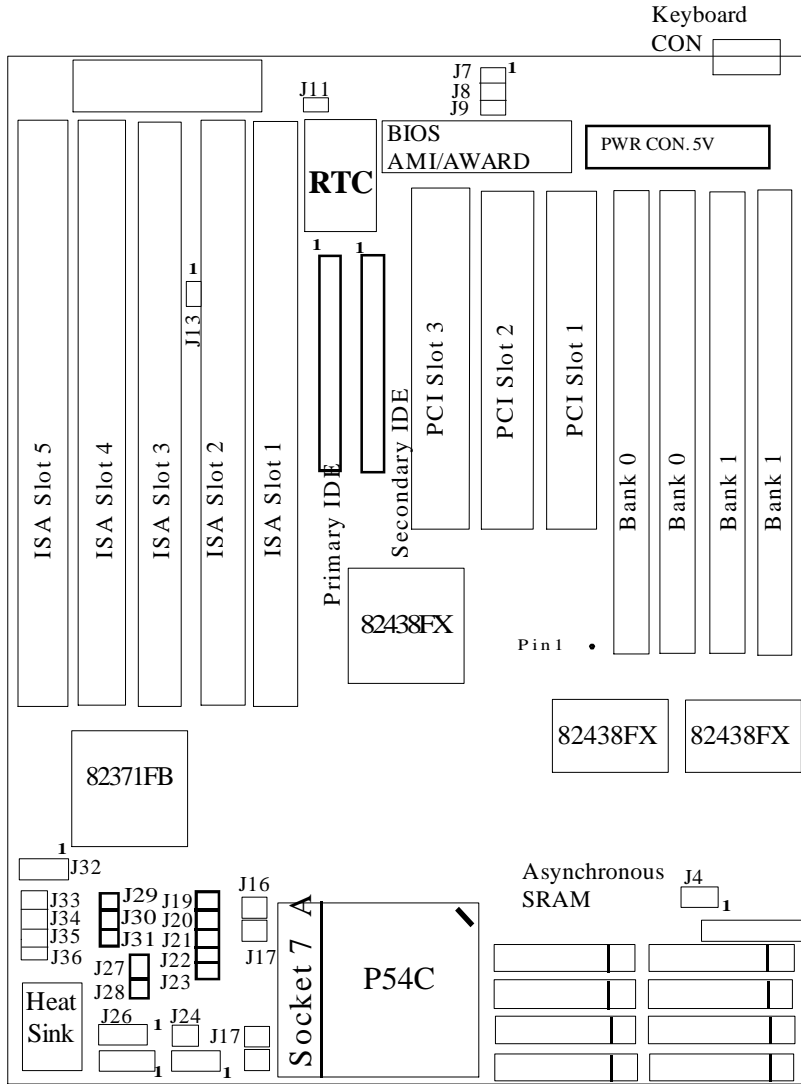OFF:Normal Operation
ON: Clears Password and resets CMOS to default.

*J19:On Board IDE LED
Used to show on board IDE drive activity.
Only pins 1 and 2 are used.

Figure 3.7 S1463 Board Layout Rev02

Keyboard CON

J7
J8
J9
1

J11

BIOS AMI/AWARD

PWR CON. 5V

RTC

J13 1

1   1

ISA Slot 5
ISA Slot 4
ISA Slot 3
ISA Slot 2
ISA Slot 1

Primary IDE
Secondary IDE

PCI Slot 3
PCI Slot 2
PCI Slot 1

Bank 0
Bank 0
Bank 1
Bank 1

82438FX

Pin 1

82438FX   82438FX

82371FB

1 J32

J33
J34
J35
J36

J29 J19
J30 J20
J31 J21
J27   J22
J28   J23

J26 1 J24

J16
J17

Heat Sink

Socket 7 A

P54C

Asynchronous SRAM

J4 1

J17 1

J25   J18   J15

J14: Reset   J25: Keylock
J15: Turbo-Switch   J26: Speaker
J18: IDE LED
J24: Turbo-LED

J4	J20	J21	Cache Size
2-3	Off	On	256KB
1-2	On	Off	512KB

J16	J17	J19	J23	CPU Speed
On	On	Off	Off	75MHz
Off	On	Off	Off	90MHz
On	Off	Off	Off	100MHz
Off	On	On	Off	120MHz
On	Off	On	Off	133MHz
Off	On	On	On	150MHz
On	On	Off	On	166MHz

Default settings

J7: pins 1-2   J27:1-2
J8: pins 1-2   J28:1-2
J9: pins 1-2
J13: pins 2-3
J34: On
*All other jumpers are reserved.

3.8 Quick Reference For Jumpers & Connectors (S1463)

* : 5V Power Connector

1	Power Good Signal
2,10,11,12	VCC (+5V)
3	+12V
4	-12V
5,6,7,8	GND
9	-5V

* J14: Reset Connector

"Open" for normal operation
"Closed" for hardware reset

* J4,J20,J21: L2 Cache Size Selection

Cache Size:	J4	J20	J21
256KB	2-3	Off	On
512KB	1-2	On	Off

* J25: Power LED and Keylock Connector

1	LED anode (+)
2	NC
3	LED cathode (-)
4	Keylock
5	GND

* J26: Speaker Connector

1	Data Out
2	NC
3	GND
4	+5 VDC

* J15: Turbo Switch Connector

Harware turbo switch is not supported.
Use <Ctrl> +<Alt>+<-> for non-turbo mode.
Use <Ctrl>+<Alt>+<+> for turbo mode.

* J24: Turbo LED Connector

1		LED cathode (-)
2		LED anode (+)

* J16, J17,J19,27,28,23,34: System Speed Selection

J16	J17	J19	J23	CPU Speed
On	On	Off	Off	75MHz
Off	On	Off	Off	90MHz
On	Off	Off	Off	100MHz
Off	On	On	Off	120MHz
On	Off	On	Off	133MHz
On	On	Off	On	150MHz
Off	On	On	On	150MHz
On	Off	On	On	166MHz

* J11:Reset CMOS and clear Password

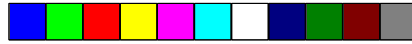Used to reset CMOS and clear BIOS Password.

OFF:Normal Operation
ON: Clears Password and resets CMOS to default.

*J18:On Board IDE LED
Used to show on board IDE drive activity.
Only pins 1 and 2 are used.

3.9 DRAM Installation

The mainboard can be installed with 1/2/4/8/16/32 MB 72 pin 60 or 70 ns Fast Page or EDO (Extended Data Out)DRAM SIMM modules. The DRAM memory system consists of 2 banks (0-1). Each bank requires 2 SIMM modules to achieve 64 bit bus transfer and proper operation. The total memory size can be from 4MB to 128MB. Various DRAM configurations are shown on the following table.

Bank 0	Bank1	Total
512kb x 32	None	4mb
512kb x 32	512kb x 32	8mb
1mb x 32	None	8mb
1mb x 32	512kb x 32	12mb
1mb x 32	1mb x 32	16mb
2mb x 32	None	16mb
2mb x 32	1mb x 32	24mb
2mb x 32	2mb x 32	32mb
4mb x 32	None	32mb
4mb x 32	1mb x 32	40mb
4mb x 32	2mb x 32	48mb
4mb x 32	4mb x 32	64mb
8mb x 32	None	64mb
8mb x 32	1mb x 32	72mb
8mb x 32	2mb x 32	80mb
8mb x 32	4mb x 32	96mb
8mb x 32	8mb x 32	128mb

Each bank may use either 1-sided or 2-sided SIMMs. All SIMMs must be Fast Page Mode DRAM or EDO DRAMs with speeds less than or equal to 70ns. Parity or Non-Parity SIMMS can be used. SIMM modules must be installed in pairs.

Refer to Fig. 3.2 for DRAM installation location. Pin-1 of the SIMM module must match the Pin-1 of SIMM socket.
Insert the DRAM SIMM module into the socket at a 45 degree angle. If the SIMM module is inserted on the wrong side, it can not be plugged into the socket. After insertion, press the SIMM module in a vertical direction until both left and right metal holders latch.
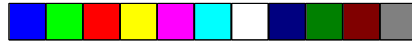
3.10 CPU Installation

Several types of CPUs (75 thru 166 MHz) can be used on S1461/3/6. Please refer to the previous pages for the correct CPU jumper settings for your board.

* The CPU is a sensitive electronic component and it can be easily
  damaged by static electricity. Do not touch the CPU pins with your
  fingers.
* When installing the CPU into the socket, match the CPU pins to the
  socket pins.
* Before the CPU is installed, the mainboard must be placed on a flat
  plane in order to avoid being broken by the pressure of CPU insertion.
* **A cooling fan and heat sink assembly is required to protect the
  CPU from being damaged.**

1. Make sure the ZIF socket lever is up. To raise the lever, pull it out
    to the side a little and raise it as far as it will go. The top plate will
    slide back.
2. Align the CPU and socket Pin 1 corners. The pins on the bottom
    should align with the rows of holes in the socket.
3. Insert the CPU in the socket. It should insert easily. If it does
    not, adjust the position of the lever a little.
4. Press the lever down. The top plate will slide foward. You will
    feel some resistance as the pressure starts to secure the CPU in
    the socket. This is normal and will not damage the CPU.
    When the CPU is installed, the lever should snap into place at the
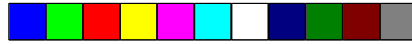   side of the socket.

3.11 Understanding The Different Clock Speeds

When rating Pentium CPU clock speeds, remember it is determind by their internal frequency. The following chart shows the different CPU, mainboard and PCI frequencies. As you may notice, all the Intel Pentium CPUs use an internal clock multiplier(x3, x2.5, x2 or x1.5 Motherboard speed).

Pentium Internal Clock	Mainboard Clock	PCI Bus Clock
75 MHz	50 MHz	25 MHz
90 MHz	60 MHz	30 MHz
100 MHz	66.67 MHz	33 MHz
120 MHz	60 MHz	30 MHz
133 MHz	66.67MHz	33 MHz
150 MHz	60 or 50 MHz	30 or 25 MHz
166 MHz	66.67 MHz	33 MHz

In the table above, the 50, 60 and 66.67 MHz figures are oscillator speeds that establish the external clock speed. The PCI Bus clock speed is fixed at one half of the mainboard clock speed. The 150MHz Pentium when set for 2.5x mode will achieve a 30MHz PCI bus speed but if it is set for 3x mode you will get a slower 25MHz PCI bus speed.

3.12 Upgrading Cache Memory

The S1461/3 main board comes standard with a 256KB 2nd level cache. It uses 8pcs of 32K*8 SRAM's You can upgrade the cache to 512KB with 64K * 8 SRAM to improve system performance.
NOTICE: The 64K*8 SRAM chip is longer in length than the 32K*8 chip. Do not insert the 32 K*8 SRAM chip into the top four pin holes of the socket, it could cause serious damage to your SRAM chips. Refer to the diagram below.

All SRAM chips must be 15ns (nanoseconds) or faster. The chart below shows the chips you need for each configuration.

S1461	J22	J21	J6	SRAM	Chip type and	Pin
S1463	J21	J20	J4	Size	Qty needed	configuration
	On	Off	2-3	256KB	Eight 32K*8	28 pin/chip
	Off	On	1-2	512KB	Eight 64K*8	32 pin/chip

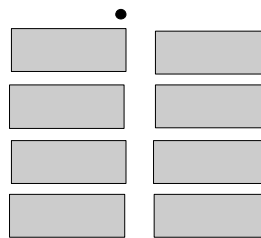* All the standard SRAMs must have 3.3V output. Please contact the *MANUFACTURER* if upgrades for the SRAMs are needed.

<u>Installation of 2nd Level Cache Memory</u>
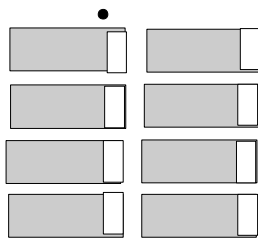
256 KB Cache
Use 32K*8 SRAM's

512 KB Cache
Use 64K*8 SRAM's

For the S1466, the synchronous SRAM can be upgraded only in boards that use sockets. A special tool is required to unplug SRAM chips from the PLCC sockets.

The table below shows the configuration sizes of the SRAM:
(All SRAM must be 10ns or faster)

SRAM Cache Size	Chip Type and Qty	J1	J23	J22
256KB	Four 32K*18	2-3	On	Off
512KB	Four 64K*18	1-2	Off	On

3.13 CMOS RTC

CMOS RTC includes an internal battery and Real Time Clock circuit. It provides the date and the time for the system. Normally the life span of a RTC internal battery is 10 years. When replacing, you should use the same model.

3.14 Speaker Connector Installation

S1461/3/6 provides a 4-Pin header J26(S1463/6) or J27(S1461) to connect the speaker. The polarity can go either way.

3.15 Turbo Switch

The front panel on your case may have a turbo switch to control system speed when slower program execution is required for software developed in the old XT days.

Because the Pentium CPU cannot slow its clock speed on the fly, the S1461/3/6 uses a simulation method to implement TURBO switching. The jumper marked J16(S1466), J15(S1463) or J17(S1461) on the mainboard should be connected to the TURBO switch on the case panel.
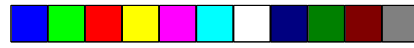
3.16 Turbo LED Connector Installation

The TURBO LED on the front case panel can indicate the current speed status of the system. The TURBO LED connector should be installed to J21 for the S1466, J24 for the S1463 or J23 for the S1461 in the correct direction

3.17 Hardware Reset Switch Connector Installation

The RESET switch on your cases' display panel provides users with the HARDWARE RESET functinon which is almost the same as power on/off. The system will do a cold start after the RESET switch is pushed by the user. The RESET switch is a 2 pin connector and should be installed on jumper J17 for the S1466, J14 for the S1463 or J18 for the S1461.

3.18 Flash EPROM-Jumper J7, J8 and J9

The S1461/3/6 uses flash memory to store BIOS programs. It can be updated as new versions of the BIOS becomes available. The flash utility will guide you through the process step by step.

J7, J8 and J9 determines which type of EPROM is used. These jumpers have been set to match the on board BIOS chip. The factory default for the S1461/3/6 is on pins 1-2 for J7 and 1-2 for J8 and J9 . Depending on the type of EPROM used, some boards will have J7 on pins 2-3.

Refer to chapter 5 for Flash EPROM upgrade procedures.

3.19 Hardware CMOS & Password Reset
(The following steps are valid provided the board has a DS12887A RTC)
If you have been locked out of your system because you forgot your password or set the CMOS incorrectly, follow the instructions below.
a. Power off the system
b. Short jumper J10 for the S1466 or J11 for the S1461and S1463.
d. Wait for 15 seconds then remove the jumper from J10(S1466) or J11(S1461,S1463) then power on the system again.
By doing the above procedures, your password will be erased and the CMOS will be reset to the BIOS default.

3.20 Peripheral Device Installation

After all the jumpers on the mainboard have been set, the it can be mounted into the case. Then proceede in installing the I/O controller, display controller, and any other peripheral devices.

If a PCI-Bus interface card is to be installed in the system, any one of the four PCI-Bus slots can support either a Master or a Slave device.

After installing the peripheral controller, the user should check everything again, and prepare to power-on the system.

3.21 Turbo / Non-Turbo hotkeys

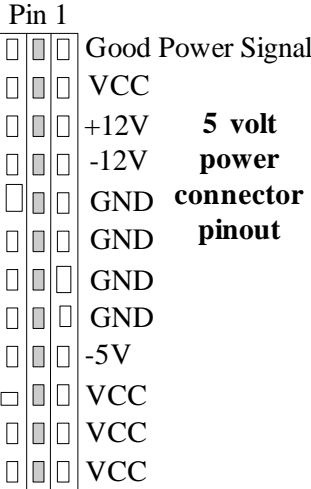press <Ctrl> + <Alt> + <-> : turn off turbo function.
press <Ctrl> + <Alt> + <+> : turn on turbo function.

3.22 Connecting the Power Supply

The system power supply connectors on the mainboard is for a 5 volt power supply. Incorrect installation of the power supply could result in serious damage to the system board and connected peripherals.

Pin 1

Good Power Signal	
VCC	
+12V	**5 volt**
-12V	**power**
GND	**connector**
GND	**pinout**
GND	
GND	
-5V	
VCC	
VCC	
VCC	

To connect the leads from either voltage power supply, you should first make sure the power supply is unplugged. Most power supplies have two leads. Each lead has six wires, two of which are black.
**Orient the connectors so the black wires are in the middle of the 5V power supply.**
Caution: Some power supplies also include "3V" connectors. The connection wires normally have two colors with 3 black wires on one side. Please be very careful not to use the wrong connector.

Align the plastic guide pins on the lead cables to their receptacles on the mainboard. You may need to hold the lead at an angle to line it up.Once you have the guide pins aligned, press the lead connector so that the plastic clips on the lead snap into place and secure the lead to the connector.

Connecting 5V power supply
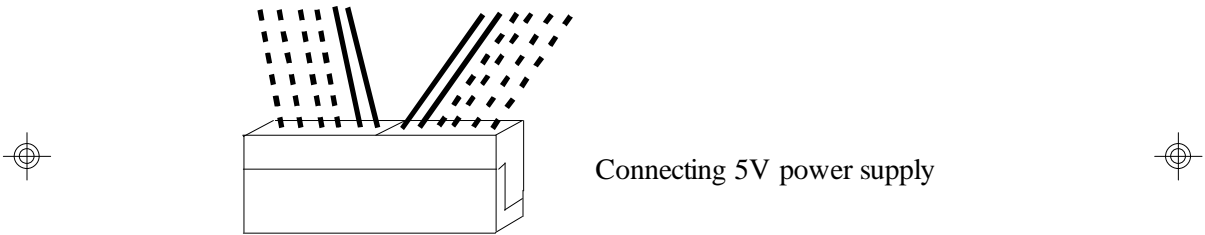
4. BIOS Configuration

Award's BIOS has a built in setup program that allows the user to modify the basic system configuration. This type of information is stored in the battery-backed CMOS SRAM. **Entering incorrect information or forgetting your password can lock you out of your system.(refer to 3.15 for resetting of CMOS)**

4.1. Entering Setup

Power ON the computer and press <Del> immediately and you will enter Setup. The other way to enter setup is to power on the computer, when the below message appears briefly at the bottom of the screen during the post (Power On Self Test), press <Del> key or simultaneously press <Ctrl>, <Alt>, and <Esc> keys.

> * TO ENTER SETUP BEFORE BOOT PRESS CTRL-ALT-ESC OR DEL KEY

If the message disappears before you respond and you wish to enter Setup, restart the system by turning it OFF then ON or by pressing "Reset" on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt>, and <Del> keys. If you do not press the keys at the correct time, the system will not boot and an error message will appear on the screen.You will be asked to,

> * PRESS F1 TO CONTINUE, CTRL-ALT-ESC OR DEL TO ENTER SETUP.

Figure 4.1 will appear on the sceen. The Main Menu allows you to select from the 8 setup functions and 2 exit choices. Use the arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

* Unless necessary, do not use Non-Turbo Mode. (Always keep system in turbo mode)

4.2. Control Keys

PgUp key	Increases the numeric value or make changes
PgDn key	Decreases the numeric value or make changes
F1 key	General help, only for Status Page Setup menu and Option Page Setup Menu
F2 key	Change color from a total of 16 colors
F3 key	Calendar, only for Status Page Setup Menu
F4 key	Reserved
F5 key	Restore the previous CMOS value, only for Option Page Setup Menu
F6 key	Load defaults
F8 key	Reserved
F9 key	Reserved
F10 key	Save all CMOS changes, only for Main Menu

4.3. Getting Help

4.3.1. Main Menu

The on-line description of the highlighted setup function is displayed at the bottom of the screen.

4.3.2. Setup Page menu/Option Page Setup Menu

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted items. To exit the Help Window, press <Esc>.

4.4. The Main Menu

Once you enter the Award BIOS CMOS Setup Utility, the Main Menu (Figure 4.1) will appear on the screen. The Main Menu allows you to select from the eight setup functions and 2 exit choices. Use the arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

Figure 4.1: Main Menu

ROM ISA BIOS (2A59CT51)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

STANDARD CMOS SETUP	LOAD SETUP DEFAULTS
BIOS FEATURED SETUP	PASSWORD SETTING
CHIPSET FEATURES SETUP	IDE HDD AUTO DETECTION
POWER MANAGEMENT	SAVE & EXIT SETUP
PCI SLOT CONFIGURATION	EXIT WITHOUT SAVING
LOAD BIOS DEFAULTS	

ESC : Save & Exit Setup
F10 : Quit

↑ ↓ → ←   :Select Item
(Shift)F2   :Change Color

Time, Date, Hard Disk Type,.....
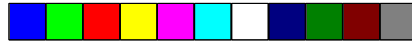
* Standard CMOS setup

This setup page includes all the items in a standard compatible BIOS.

BIOS features setup

This setup page includes all of the enhanced features of Award's BIOS.

* Chipset features setup

This setup page includes all the items of the Intel Triton chipset features.

* **Power Management Setup**

Change, set, or disable system power management options

* PCI slot configuration

This setup page allows you to modify the configuration of PCI slot paramters.

* Load setup defaults

BIOS defaults indicate the most appropriate values of each system parameter for your system.

* Password setting

Change, set, or disable password. It allows you to limit access to the system and Setup.

* IDE HDD auto detection
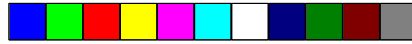
Automatically configure hard disk parameters.

* Save and exit setup

Save changes to CMOS and exit setup

* Exit without saving

Abandon all CMOS changes and exit setup.

4.5. Standard CMOS Setup Menu

The items in Standard CMOS Setup Menu (Figure 4.2) are divided into 9 categories. Each category includes one or more setup items. Use the arrows to highlight the item and use the <PgUp> or <PgDn> keys to select the value you want for each item.

Figure 4.2: Standard CMOS Setup Menu

```
                    ROM ISA BIOS (2A59CT51)
                    STANDARD CMOS SETUP
                    AWARD SOFTWARE, INC.

   Date (mm:dd:yy) : Tue, Dec 7 1995
   Time (hh:mm:ss) : 18 : 01 : 38
                    Type  Size  CYLS. HEADS. PRECOMP. LANDZONE SECTORS
   Primary Master :   none  0mb   0     0       0        0        0
   Primary Slave:     none  0mb   0     0       0        0        0
   Secondary Master:  none  0mb   0     0       0        0        0
   Secondary Slave:   none  0mb   0     0       0        0        0
   Drive A : 1.44 M, 3.5 in.
   Drive B : 1.2 M, 5.25 in.             Base Memory:      640 K
                                         Extended Memory:  7168 K
                                         Expanded Memory:  0 K
   Video   : EGA/VGA                     Other Memory:     384 K

   Halt On : All errors
                                         Total Memory:     8192 K

  ESC:  Quit            ↑ → ↓ ←   : Select Item   PU/PD/+/-:   Modify
  F1:   Help          (Shift)F2: Change Color       F3: Toggle Calendar
```

* Date

  The date format is <month>, <day>, <year>. Press <F3> to show the calendar.

* Time

  The time format is <hours>, <minutes>, <seconds>. The time is calculated based on the 24-hour military-time clock. For example 1 p.m. is 13:00:00.

Day	The day, from Sun to Sat, Determined by the BIOS date, month and year entries.
Date	The date, from 1 to 31 (or maximum allowed in a month)
Month	The month, Jan to Dec.
Year	The year, from 1900 to 2099

* Primary/Secondary Drive   type

  This category identifies the types of hard disk drives that have been installed in the computer. There are 46 predefined types and a user definable type.

Press PgUp or PgDn to select a numbered hard disk type or type a number and press <Enter>. Note that the specifications of your drive must match with the drive table. The hard disk will not work properly if you enter improper information for this category. If your hard disk type is not listed, you can Type User to define your own drive manually.

If you select Type User, you will be asked to enter the following info. Enter the paramters directly from the keyboard and press <Enter>. The hard disk information should be provided in the documentation from the hard disk vendor or the system manufacturer.

| CYLS	number of cylinders
HEADS	number of heads
PRECOMP	written precom
LANDZONE	landing zone
SECTORS	number of sectors

If a hard disk has not been installed or you have a CD-ROM/Tape drive connected to an IDE channel, select NONE and press <Enter>.

*   Drive A type/Drive B type

  This category identifies the types of floppy disk drive A or B, that have been installed in your computer.

None	No floppy drive installed
360K, 5.25 in.	5-1/4 inch PC-type standard drive; 360 kilobyte capacity
1.2M,5.25 in.	5-1/4 inch AT-type high-density drive; 1.2 megabyte capacity
720K, 3.5 in.	3-1/2 inch double-sided drive; 720 kilobyte capacity
1.44M, 3.5 in.	3-1/2 inch double-sided drive; 1.44 megabyte capacity
2.88M, 3.5 in.	3-1/2 inch double-sided drive; 2.88 megabyte capacity
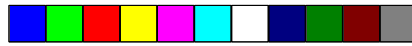
* Video

   This category detects the type of graphics adapter used for the primary display system. It must match your video display card and monitor. Although secondary monitors are supported, you do not have to select that type in setup.

EGA/VGA	Enhanced Graphics Adapter/Video Graphics Array. For VGA,SVGA, or PGA monitor adapters.
CGA 40	Color Graphics Adapter, power up in 40 column mode.
CGA 80	Color Graphics Adapter, power up in 80 column mode.
Mono	Monochrome adapter, includes hi-res monochrome.

* Halt On

   The category determines whether the computer will stop if an error is detected during power up.

No errors	Whenever the BIOS has detected a non-fatal error, the system will be stopped and you will be promted.
All errors	The system boot will not be stopped for any errors that are detected.
All, but Keyboard	The system boot will not stop for a keyboard error;it will stop for all other errors.
All, but Diskette	The system boot will not stop for disk errors; it will stop for all other errors.
All, but Disk/Key	The system boot will not stop for a keyboard or disk error; it will stop for all other errors.

* Memory

   The category is for display-only and it is determined by POST Power On Self Test of the BIOS.

   Base Memory

          The POST of the BIOS will determine the amount of base (or conventional) memory installed in the system. The value of the base memory is typically 640K.

   Extended Memory

          The BIOS determines how much extended memory is present during the POST. This is the amount of memory located above 1MB in the CPU's memory address map.

Expanded Memory

Expanded Memory (EMS) defines a 64 K page frame in the area between 640K and 1Mb containing four 16K pages that are windows into the EMS memory. Programs issue requests to the EMS manager to switch the page to any part of EMS memory. Extended memory can be converted to emulate EMS by useing a memory manager such as EMM386 that ships with Windows and DOS.

Other Memory

This refers to memory located in the 640K to 1024K ad dress space. This memory can be used for different applications. DOS uses this area to load device drivers to keep as much conventional memory free for application programs as possible.
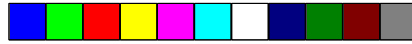
4.6. BIOS FEATURES SETUP

ROM ISA BIOS
BIOS FEATURES SETUP
AWARD SOFTWARE, INC.

```
Virus Warning             :Enabled      Video BIOS Shadow       :Enabled
CPU Internal Cache        :Enabled      C8000-CBFFF  Shadow     :Disabled
External Cache            :Enabled      CC000-CFFFF  Shadow     :Disabled
Boot Sequence             :A,C          D0000-D3FFF  Shadow     :Disabled
Swap Floppy Drive         :Disabled     D4000-D7FFF  Shadow     :Disabled
Boot Up Floppy Seek       :Enabled      D8000-DBFFF  Shadow     :Disabled
Boot Up NumLock Status    :On           DC000-DFFFF  Shadow     :Disabled
Memory Parity Check       :Enabled
Gate A20 Option           :Fast
Typematic Rate Setting    :Disabled
Typematic Rate (Chars/sec) :6           ESC :Quit ↑↓ → ←  :Select Item
Typematic Delay (msec)    :250
Security Option           :Setup        F1    :Help      PU/PD/+/- :Modify
                                        F5    :Old Values  (Shift)F2  :Color
                                        F6    :Load BIOS Defaults
                                        F7    :Load Setup Defaults
```

* **Virus warning**

This category flashes on screen. During and after the system boot up, any attempt to write to the boot sector or the partition table of the hard disk drive will halt the system and the following error message will appear. In the meantime, you can run an anti-virus program to locate the problem. Default value is Enabled.

Enabled	Activate automatically when the system boots up causing a warning message to appear when anything attemps to access the boot sector or hard disk partition table.
Disabled	No warning message to appear when anything attemps to access the boot sector or hard disk partition table.

* **CPU Internal Cache/External Cache**

These two categories speed up the memory access. However, it depends on the CPU/Chipset design. Default value is Enabled.

Enabled	Enables the cache
Disabled	Disables the cache

* **Boot Sequence**

This category determines which drive the computer searches first for the disk operating system (i.e. DOS). Default value is A,C.

A,C	System will first search for floppy disk drive then hard disk drive.
C,A	System will first search for hard disk drive then floppy disk drive

* **Swap Floppy Drive**

Default value is Disabled

Enabled	Floppy A & B will be swapped under DOS
Disable	Floppy A & B will be normal definition.

* Boot Up Floppy Seek

During POST, the BIOS will determine if the floppy disk drive installed is 40 or 80 tracks. 360K type is 40 tracks while 720K, 1.2M and 1.44M are all 80 tracks. Default value is Enabled

Enabled	BIOS searches for floppy disk drive to determind if it is 40 or 80 tracks. Note that the BIOS cannot tell from 720k, 1.2M or 1.44M drive type as they are all 80 tracks
Disabled	BIOS will not search for the type of floppy disk drive by track number. Note that there will not be any warning messages if the drive installed is 360K

* Boot Up NumLock Status

Default value is On

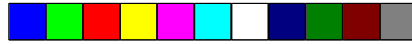| On	Keypad is number keys
Off	Keypad is arrow keys

* Memory Parity Check

The default value is disabled

* Gate A20 Option

Gate A20 controls the ability to access memory addresses above 1 MB by enabling (Fast) or disabling (Normal) access to the processor. Default value is Fast

* Typematic Rate Setting, Typematic Rate (char/sec), and Typematic Delay.

Typematic Rate Setting enables or disables the following two options. TheTypematic Rate (6, 8, 10, 12, 15, 20, 24, or 30 characters per second) and Typematic Rate Delay (250, 500, 750, or 1000 milliseconds) control the speed at which the keystroke is repeated. The selected character is displayed when a key is held down after a delay set by the Typematic Rate Delay. It then repeats at a rate set by the Typematic Rate.

* Security Option

This category allows you to limit access to the system setup, or just
setup. Default value is Setup

System	The system will not boot and access to Setup will be denied if the correct password is not entered at the prompt
Setup	The system will boot, but access to setup will be denied if the password is not entered at the prompt

* Video BIOS Shadow

It determines whether Video BIOS will be copied to RAM, however, it
is an optional chipset design. Default is Enabled.

4.7 Chipset Features Setup

This screen controls the settings for the board's chip set. The controls for
this screen are the same as the previous screen.

The Chipset Features Screen

```
                         ROM ISA BIOS
                      CHIPSET SETUP UTILITY
                      AWARD SOFTWARE, INC.

 ┌─────────────────────────────────────────┬──────────────────────────────────────┐
 │ DRAM RAS# Precharge Time :4              │ PCI Concurrency          :Disabled   │
 │ DRAM R/W Leadoff Timing  :8/6            │ PCI Streaming            :Disabled   │
 │ DRAM RAS to CAS Delay    :3              │ PCI Bursting             :Enabled    │
 │ DRAM Read Burst Timing   :x2222          │                                      │
 │ DRAM Write Burst Timing  :x3333          │                                      │
 │                                          │                                      │
 │ System BIOS Cacheable    :Enabled        │                                      │
 │ Video BIOS Cacheable     :Enabled        │                                      │
 │ 8 bit I/O Recovery Time  :8              │                                      │
 │ 16 bit I/O Recovery Time :4              ├──────────────────────────────────────┤
 │ Memory Hole at 15M/16M   :Disabled       │ ESC :Quit      ↑ ↓ → ← :Select Item  │
 │ IDE Block Mode           :Disabled       │                                      │
 │ IDE Primary Master PIO   :Auto           │ F1   :Help       PU/PD/+/- :Modify    │
 │ IDE Primary Slave PIO    :Auto           │ F5   :Old Values  (Shift)F2  :Color   │
 │ IDE Secondary Master PIO :Auto           │ F6   :Load BIOS Defaults              │
 │ IDE Secondary Slave PIO  :Auto           │ F7   :Load Setup Defaults             │
 │ On-Chip Primary PCI IDE  :Enabled        │                                      │
 │ On-Chip Secondary PCI IDE :Enabled       │                                      │
 │ PCI Slot IDE 2nd Channel :Enabled        │                                      │
 └─────────────────────────────────────────┴──────────────────────────────────────┘
```
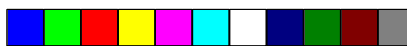
* **DRAM RAS# Precharge Time:**
  This can be set to either 3 or 4. Default value is 4.
* DRAM R/W Leadoff Timing
  This option depends on the systems DRAM speed. Use 7/5 for 60ns
  and 8/6 for 70ns DRAM. Default is 8/6.
* DRAM RAS to CAS Delay
  This can be set to 2 or 3. The recommended setting is 3. Default is 3.
* DRAM Read Burst Timing
  This option depends on the systems DRAM speed. Use x2222 for 60ns
  DRAM and x3333 for 70ns DRAM.
* DRAM Write Burst Timing
  This option depends on the systems DRAM speed. Use x3333 for 60ns
  DRAMs and x4444 for 70ns DRAMs.
* System and Video Cacheable
  This option lets you "Enable" or "Disable" caching for the video and sys
  tem BIOS regions. Default is disabled. Enable for best performance
* Memory Hole at 15M/16M
  There are two options "Disabled", and "Enabled". Default is disabled.
* IDE Block Mode
  This option lets you enable or disable the IDE Block Mode transfer. This
  option is dependent on your IDE hard drive. Default value is Disabled.
* IDE Primary/Secondary Master/Slave PIO
  This option lets you select PIO modes for your IDE drives.The default
  is Auto and will let the system select the correct PIO mode.
* On-Chip Primary/Secondary PCI IDE
  This option enables or disables the on board IDE Channels. Default
  value is Enabled.
* **PCI Concurrency**
  This option Enables or Disables PCI Concurrency.
  Default value is Disabled.
* PCI Streaming
  This option Enables or Disables PCI Streaming.
  Default value is Disabled.
* PCI Bursting
  This option Enables or Disables PCI Bursting. Default value is enabled.

4.7.1   Power Management Setup

Power Management	:Disabled	IRQ3 (Com2)	:Off
PM Control By APM	:No	IRQ4 (Com1)	:Off
Video Off Method	:Blank Screen	IRQ5 (LPT2)	:Off
		IRQ6 (Floppy Disk)	:Off
Doze Mode	:Disabled	IRQ7 (LPT1)	:Off
Standby Mode	:Disabled	IRQ8 (RTC Timer)	:Off
Suspend Mode	:Disabled	IRQ9 (IRQ2 Redir)	:Off
HDD Power Down	:Disabled	IRQ10 (Reserved)	:Off
		IRQ11 (Reserved)	:Off
IRQ3 (Wake-Up Event)	:Off	IRQ12 (PS/2 Mouse)	:Off
IRQ4 (Wake-Up Event)	:Off	IRQ13 (Coprocessor)	:Off
IRQ8 (Wake-Up Event)	:Off	IRQ14 (Hard Disk)	:Off
IRQ12 (Wake-Up Event)	:Off	IRQ15 (Reserved)	:Off
Power Down Activities			
Com Ports Accessed	:Off		
LPT Ports Accessed	:Off		
Drive Ports Accessed	:Off		

Power Management
Options are disabled, user defined, Min saving, and Max saving.

PM Control by APM
Options are "Yes" and "No". When set for "No", system BIOS will ignore
APM when power managing the system. If set on "Yes" the system
BIOS will wait for APM's prompt before it enters any PM mode, e.g.
Doze, Standby or Suspend.

Video Off Method
The "Blank Screen" option will let the system BIOS blanks the screen
when disabling video. V/H SYNC+Blank will let the BIOS turn off the
V-SYNC and H-SYNC signals from the VGA card to the monitor.

Doze Mode

Defines the continous idle time before the system enters Doze mode.

Standby Mode

Defines the continous idle time before the system enters Standby mode.

Power Down Activities

Defines the the activities that can cause the PM timers to reload. (Breaking out of PM Mode)
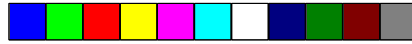
4.8 PCI Slot Configuration

ROM ISA BIOS
PCI SLOT CONFIGURATION
AWARD SOFTWARE, INC.

```
Slot1 Using INT# :      AUTO
Slot2 Using INT#:       AUTO
Slot3 Using INT#:       AUTO
Slot4 Using INT#:       AUTO
1st Available IRQ#:     10
2nd Available IRQ#:     11
3rd Available IRQ#      12
4th Available IRQ#       9
PCI IRQ Actived By:     Level
PCI  IDE IRQ Map To:  Auto
Primary IDE INT#:       A
Secondary IDE INT#:     B
```

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

* PCI Slot 1/Slot 2/Slot 3/slot 4 INT#
   * For Default Setting.

	Connect to PCI System INT#
PCI Slot1 INTA	INTA
PCI Slot1 INTB	INTB
PCI Slot1 INTC	INTC
PCI Slot1 INTD	INTD
PCI Slot2 INTA	INTB
PCI Slot2 INTB	INTC
PCI Slot2 INTC	INTD
PCI Slot2 INTD	INTA
PCI Slot3 INTA	INTC
PCI Slot3 INTB	INTD
PCI Slot3 INTC	INTA
PCI Slot3 INTD	INTB
PCI Slot4 INTA	INTD
PCI Slot4 INTB	INTA
PCI Slot4 INTC	INTB
PCI Slot4 INTD	INTC

*1st Available IRQ#
*2nd Available IRQ#
*3rd Available IRQ#
*4th Available IRQ#
Select four available IRQs assignments to PCI slots INT

*PCI IRQ Actived By:
Select the PCI IRQ Active scheme either LEVEL or EDGE. Default value is LEVEL.

*PCI IDE IRQ Map To:
Select the IDE IRQ Map to ISA IRQ#.

*Primary IDE INT#
Select the PCI INT# that the Primary IDE controller will use. Default value is A.

*Secondary IDE INT#
Select the PCI INT# that the Secondary IDE controller will use. Default value is B

* If you use FOUR NCR 810/825 SCSI-PCI cards in the system, you need to assign IRQ 10 for the card that is in slot 1. In the same way, assign IRQ 11 for the card in slot 2, assign IRQ12 for the card   in slot 3, and assign IRQ 9 for the card in slot 4. However, no matter which slot the SCSI-PCI card was inserted, you should use INT A to enabled SCSI-PCI card itself. The system will automatically assign those IRQs to INTA, INTB, INTC and INTD.

4.9. LOAD SETUP DEFAULTS

ROM ISA BIOS
CMOS SETUP UTILITY
AWARD SOFTWARE INC.

```
┌─────────────────────────────────────────────────────────────┐
│   STANDARD CMOS SETUP        PASSWORD SETTING                │
│                                                             │
│   BIOS FEATURES SETUP        IDE HDD AUTO DETECTION         │
│                                                             │
│   CHIPSET F ┌──────────────────────────────┐ SETUP          │
│             │  Load Setup Defaults (Y/N)? N │                │
│   PCI SLOT  └──────────────────────────────┘ T SAVING       │
│                                                             │
│   LOAD SETUP DEFAULTS                                        │
├─────────────────────────────────────────────────────────────┤
│ ESC : Save & Exit Setup      ↑ ↓ → ←    :Select Item        │
│ F10 : Quit                  (Shift)F2    :Change Color       │
├─────────────────────────────────────────────────────────────┤
│        Load SETUP Defaults except standard CMOS SETUP        │
└─────────────────────────────────────────────────────────────┘
```
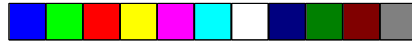
* Load SETUP defaults
 To load SETUP default values to CMOS SRAM, enter "Y". If not,
 enter "N"

* If any problem has occurred, loading the SETUP DEFAULTS is
recommended.

4.10. PASSWORD SETTING

When you select this function, the following message will appear at the
center of the screen to assist you in creating a password.
ENTER PASSWORD

ROM ISA BIOS
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

STANDARD CMOS SETUP	PASSWORD SETTING
BIOS FEATURES SETUP	IDE HDD AUTO DETECTION
CHIPSET FE **Enter Password** T SETUP	
PCI SLOT C UT SAVING	
LOAD SETUP DEFAULTS	

ESC : Save & Exit Setup
F10 : Quit

↑ ↓ → ←   :Select Item
(Shift)F2   :Change Color

Change/Set/Disable Password

Type the password, up to eight characters, and press <Enter>. The password typed now will clear the previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also just press <Esc> to abort the selection and not enter a password.

To disable the password, just press <Enter> when you are prompted to enter a password. A message will confirm that the password has been disabled, the system will boot and you can enter Setup freely.

PASSWORD DISABLED

If you select System at Security Option of BIOS Features Setup Menu, you will be prompted for the password every time the system is rebooted or any time you try to enter setup. If you select Setup at Security Option of BIOS Features Setup Menu, you will be prompted only when you try to enter setup.

4.11. IDE HDD AUTO DETECTION

ROM ISA BIOS
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

		CYLS.	HEAD	PRECOMP	LANZONE	SECTORS
Drive C:	(202 Mb)	989	12	65535	989	35

Do you want to accept this as drive C (Y/N)?

Esc:Skip

Type "Y" to accept the H.D.D parameter reported by BIOS. Type "N" to keep the old H.D.D parameter info.

4.12. SAVE & EXIT SETUP

ROM ISA BIOS
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

STANDARD CMOS SETUP	PASSWORD SETTING
BIOS FEATURES SETUP	IDE HDD AUTO DETECTION
CHIPSET F **Save to CMOS and EXIT (Y/N)? N** T SETUP	
PCI SLOT C UT SAVING	
LOAD SETUP DEFAULTS	

ESC : Save & Exit Setup
F10 : Quit

↑ ↓ → ← :Select Item
(Shift)F2 :Change Color

Time, Date, Hard Disk Type,.....

Type "Y" and you will quit the Setup Utility and save the user setup values to RTC CMOS SRAM. Type "N" to return to Setup Utility.

4.13 KEYBOARD SETTING FUNCTION

After booting the O.S., there are some special functions used by the keyboard as follows:

"CTRL_ALT_DEL"   -Pressing these keys simultaneously will cause the system to WARM START (Soft Reset)

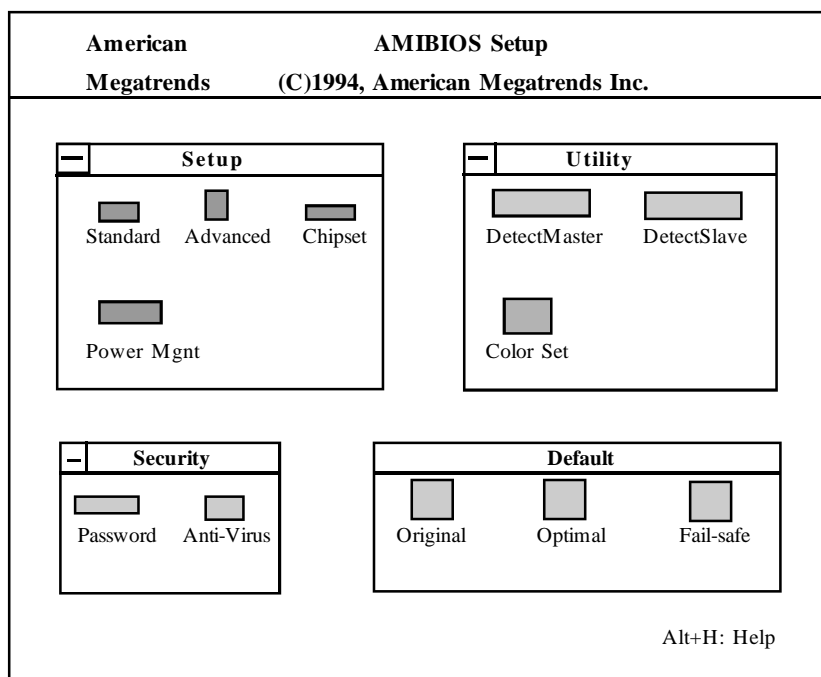"CTRL_ALT_[+]"   -Pressing these keys simultaneously will change the system speed to high speed (Turbo, all cache memory enabled)

5.0 AMI WINBIOS

The AMI WINBIOS is based on a Graphical User Interface that enables
the user to access all of the BIOS setup options with either a mouse or
keyboard. You can enter the BIOS setup by pressing on the "DEL" key
during the memory test/count.

The WINBIOS Setup screen consists of the following option groups:

American	AMIBIOS Setup
Megatrends	(C)1994, American Megatrends Inc.

Setup

Standard   Advanced   Chipset

Power Mgnt

Utility

DetectMaster   DetectSlave

Color Set

Security

Password   Anti-Virus

Default

Original   Optimal   Fail-safe

Alt+H: Help

5.1 Standard Setup Options

Date, Day and Time Configuration
Select the Standard Option, then select the Date and Time Icon. The cur-
rent values for each category are displayed. Use the arrow keys or mouse
to highlight the date or time fields. Use the + or - keys the change the field
values. The system will automatically select the appropriate day of the week.
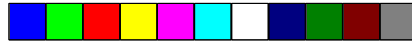
Primary Master
Primary Slave

Select one of these hard disk drive Icons to configure the drive named in the option. WINBIOS supports up to four IDE hard disk drives: the primary master, primary slave, secondary master and secondary slave. If the hard disk drive is an IDE drive, select DETECT PRIMARY or DETECT SLAVE from the Utility Setup Option Section of the WINBIOS Setup Main Menu to have WINBIOS automatically detect the IDE drive parameters and report them to this screen.The SCSI option must be selected if a SCSI Disk Drive installed.

You can also manually enter the hard disk drive parameters. Hard disk type 47 is the user-definable drive type. The drive parameters are: Type, Cylinders, Heads, Write precompensation, Landing Zone, Sectors and Capacity.

Floppy Drive A:
Floppy Drive B:

Move the cursor to these fields via the up and down arrow keys and select the floppy type. The settings are 360 KB 5 1/4 inch, 1.2MB 5 1/4 inch, 720MB 3 1/2 inch, 1.44MB 3 1/2 inch and 2.88MB 3 1/2 inch..
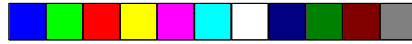
5.2 Advanced Setup

The WINBIOS Setup options described in this section are selected by choosing the Advanced Setup Icon from the WINBIOS Setup Main Menu.

Typematic Rate (Chars/Sec)

Set the rate at which characters on the screen repeat when a key is pressed and held down. The Optimal setting is 30 characters per second. The Fail-Safe default setting is *disabled*.

System Keyboard

Specify if error messages are displayed when a keyboard is not attachted. This option permits you to configure workstations with no keyboards. The Optimal and Fail-Safe default settings are *Present*.

Primary Display

Configures the type of monitor attached to the computer. The Optimal and Fail-Safe default settings are *VGA/EGA*.

Above 1MB Memory Test

When this option is *enabled*, the system will test the entire memory pool during the Power On Self Test(POST). If it is *disabled*, the system will only count the amount of available memory without testing it.

Hit "DEL" Message Display

Enable or *disable* the "HitDELete key" message upon boot up.
The default is *enabled*.

Extended BIOS RAM Area

Specify in this option if the top 1 KB of the system programming area begins at 639K (*DOS 1K*) or at address *0:300*. In most instances *0:300* should be used. The default is *0:300*.

Wait for "F1" if Any Error

Enable this option to display the message "Hit F1 to continue" when the system encounters an error during POST. The default is *Enabled*.

System Boot Up Num Lock

This option lets you turn on or off the num lock for the keyboard during boot up. The default is *ON*.

Floppy Drive Seek at Boot

This option *enables* or *disables* the floppy drive seek during POST.
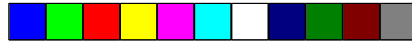The default is *disabled*.

Floppy Drive Swapping at Boot

When *enabled*, the system allows the floppy drives to swap drive letters with each other. The default is *disabled*.

System Boot Up Sequence

This option determines which disk drive the system will attempt to boot from first. The options are "*A: to C*:" or "*C: to A*:".
 The default is "*A: to C*:"

Password Checking

This option enables the password check option everytime the system boots or the user runs WinBIOS Setup. If *Always* is chosen, a user password prompt appears everytime the computer is powered on. If *Setup* is chosen, the password prompt appears if WinBIOS Setup is executed. The default is *Setup*.

Cache Memory

The options are "*Both*"(L1 and L2 enabled), "*Internal*"(L1 enabled and L2 cache is disabled) and *"Disabled"* (Both L1 and L2 cache disabled). The default is "*Both*"

System BIOS Shadow Cacheable

If this option is *enabled*, the F000 segment of the BIOS shadow will be cached. The default is *enabled*.

Video ROM and Adaptor ROM

The video and adaptor ROMs present on the system may either execute out of ROM(*disabled*), RAM(*Shadow*), or execute out of RAM and be cached(*Cache*). The video ROM should be set for *cache* for best performance.The adaptor ROM area should be left *disabled* unless the device in that region can support shadowing (Its ROM being copied to RAM for better performance). The default is *disabled*.
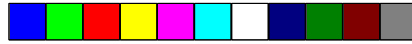
IDE Block Mode

If you know the maximum s/b (Sectors per Burst) of your drive then it can be chosen here. If you are not sure about your drive specs then choose *auto*. The options are *disabled, auto, 2 s/b, 4 s/b, 8 s/b, 16 s/b , 32 s/b* or *64 s/b*. For drives that don't support Block Mode transfers, this option should be *disabled*.

Onboard PCI IDE

You can *enable* or *disable* the onboard PCI controller. If it is set for *auto*, the system will auto-detect for a device attached to the controller. The default is *Auto*.

Onboard PCI IDE Prim. PIO Mode

This option lets you select the PIO Mode for the IDE HDD that is attached to your primary controller. Choices are from *mode 0* thru *mode 4*. If you are not sure which mode your drive supports, use the *Auto option*.

Onboard PCI IDE Sec. PIO Mode

This option lets you select the PIO Mode for the IDE HDD that is attached to your secondary controller. Choices are from *mode 0* thru *mode 4*. If you are not sure which mode your drive supports, use the *Auto* option. The default is *Auto*.

Onboard PCI IDE 32bit Mode

This option *Enables* or *Disables* PCI IDE 32-bit transfer mode. Be aware that not all drives support this mode. The default is *enabled*.

Primary Master LBA Mode
Primary Slave LBA Mode
Secondary Master LBA Mode
Secondary Slave LBA Mode

This option *enables* or *disables* LBA (Logical Block Addressing) support for each of the drives. LBA Mode is an advanced method for accessing data on IDE drives. Data is accessed by block addresses rather than the traditional Cylinder-Header-Sector scheme. LBA Mode also breaks the 528MB size limit imposed by older IDE drives. *Enable* only if your drive can support LBA. The default is *disabled*.

Secondary Ctrl Drives Present

This option specifies the number of IDE drives controlled by the onboard secondary IDE controller. The settings are *None*, *1*(drive), or *2*(drives). The default is *None*.

5.3 Advanced Chipset

Memory Hole

This option lets you create a memory hole for either the *512-640KB* region or the *15-16MB* region. The default is *disabled*.

DRAM Speed

This option should be set according to the speed of the DRAM in the system. The value of this option determines how the DRAM timing should be programmed in the chipset. The options are *60ns* and *70ns*. The default is *60ns*.
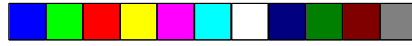
8 bit I/O Recovery Time
16 bit I/O Recovery Time
These options set the 8 bit and 16 bit I/O recovery time in the chipset. I/O devices may not function correctly if two back to back I/O writes occur too close together. These options increase the delay between back to back I/O instructions.
The options for 8 bit are *1,2,3,4,5,6,7,8 Sysclk* or *Disabled*.
The options for 16 bit are *1,2,3,4 Sysclk* or *Disabled*.
The default for both options is *1 Sysclk*.

PCI Burst Mode
This option lets you *enable* or *disable* support for PCI Burst Mode. PCI Burst Mode should be enabled for best performance.
The default is *enabled*.

PCI VGA Palette Snooping
The purpose of this option is to allow multiple VGA devices on different busses in a system to have data written from the CPU to each set of palette registers of every video device (ISA VGA and a PCI VGA).
The options are *enabled* or *disabled*. The default is *enabled*.

IRQx Available to (x= IRQ 3,4,5,7,9,10,11)
These options allow interrupts to be specified as being used by legacy ISA devices or that they are available for PCI/PnP devices.
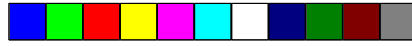The options are *ISA/EISA* or *PCI/PnP*.

PCI IDE Card Selection
PCI Primary IDE INT# Line
PCI Secondary IDE INT# Line
These options indicate the presence and information of an offboard PCI IDE device. The first option indicates the device number of the PCI IDE and the other options indicate how IRQ14 and IRQ15 are routed to the device. The default is *absent*.

5.4 Power Management

Advanced Power Management
This option *enables* or *disables* power management.
The default is *disabled*.

Standby to Suspend Timeout Value
This option indicates the time before standby and suspend power saving modes will occur. The options are from *disabled* thru *255 minutes*.
The default is *disabled.*

IDE Drive Power Down In
This option specifies which mode the IDE drives will power down in.
The options are *disabled, standby* or *suspend*.
The default is *disabled*.

VESA Video Power Down In
This option specifies which mode the video will power down in.
The options are *disabled, standby or suspend*.
The default is *disabled*.

VESA Power Down In
This option specifies the power saving mode for the video.
The options are *standy, suspend* or *off*.
The default is *standby*.

Slow Clock Ratio
This ratio indicates the amount the CPU will be slowed when the CPU enters standby mode. The default is *1:1*.

IRQ x Break Event (x= 0 to 15)
These break events indicate which IRQ events will wake up the system and/or reload the standby and suspend timers. The options are *disabled* and *enabled*. The default is *disabled*.
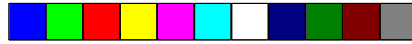
5.5 Utility

Detect Master/Detect Slave
These options, when invoked will enable the CMOS to query the IDE drive firmware for its cylinder, head and sector parameters.

Color Set
This option lets you select the color scheme of the WinBIOS setup screen. The options are *LCD, Army, Pastel* and *Sky*.
The default is *LCD* (Very boring).

5.6 Security

Password
The password feature prohibits unauthorized changes to the system setup accessed via the CMOS setup program. The default password is "AMI".

Anti-Virus
If enabled, this option will protect the boot sector of the hard disk drive. Nothing can be written to the boot sector while this option is enabled. This option should be disabled if you are installing a new operating system that writes to the boot sector. The default is *disabled*.

5.7 Defaults

Original
This option restores the CMOS setup to factory default settings.

Optimal
This option will configure the CMOS setup to its fastest settings.

Fail-Safe
This option will configure the CMOS setup to its most conservative settings.

CMOS Save & Exit
To save the changes made to the CMOS setup, press the ESCape key unitl the "exit CMOS" menu appears, then select your choice.

6.0 Flash Writer Utility

You can upgrade the BIOS of your mainboard by using a "Flash Memory Writer"(FMW) utility. This utility can be downloaded from the factory's BBS(Consult your system vendor for the phone #). The system BIOS is stored on a 'flash' EPROM ROM chip on the mainboard which can be erased and reprogrammed by the FMW. The following three files make up the FMW.

AWDFLASH.EXE   -The Flash Memory Writer utility for
                              Award to Award upgrade.
AMIFLASH.COM   -The Flash Memory Writer utility for
                              AMI to AMI upgrade.

README   -A text file of instructions
*S61AWXX.BIN   -XX-A 2-digit version number.

Flash memory writer records (or 'programs') a new BIOS onto the flash memory chip. You cannot upgrade an Award BIOS to a AMI BIOS or a AMI BIOS to an Award BIOS.

*This file name is subject to change and can have either a "bin" or a "rom" extention.

To reprogram the System BIOS, you must first do the following:

1. Check jumpers J7, J8, and J9.

   For boards that use the 5 Volt Flash chip, J7 will be on pins 1-2 and
   pin 3 will be cut. No jumpers changes are needed to flash a new
   BIOS on these boards.
   If J7 has a pin 3, then the board is using a 12 Volt Flash chip and J7
   needs to be changed to pins 2-3 before flashing to the new BIOS.
   When flashing is completed, put J7 back to pins 1-2. J8 and J9
   should always be on pins 1-2 in either case.

2. Make sure the CPU is running in 'real mode'.

   FMW will not run if the CPU is operating in a protected or
   virtual mode. This means that you can not run it with Windows
   running or with any memory manager software. You must
   disable any memory manager first. The easiest way to do this
   is to:

   a. Boot your system from a bootable floppy disk with no
   CONFIG.SYS or AUTOEXEC.BAT files, and then run Flash
   Memory Writer from a backup copy of your support disk. You
   can make your back-up floppy bootable when you format it, and
   use one disk for both purposes.

   b. If you are using MS-DOS 6.x, you can use the feature that
   allows you to bypass the CONFIG.SYS and AUTOEXEC.BAT
   file. You do this while pressing <F5> while the "Starting MS-
   DOS..." line is on the screen.

   There are other ways to accomplish the same result. The main
   point is to make sure no memory managers are running. If you
   are not sure, try running FMW. If it runs, then you have suc-
   ceeded. If it displays a warning message about the CPU
   mode, you will have to try again.

Once you have satisfied the two requirements mentioned above, you can run FMW. You can copy the contents of the "Flash" directory to your hard drive, or you can run the utility from a backup of the support floppy disk. Make sure the new BIOS file is in the same directory as the FMW utility.

To run FMW, change to the "Flash" directory if you are not already in it. Type "Awdflash" at the DOS command line and press the <Enter> key. The following screen will appear.

6.1 The Flash Memory Writer Utility Screen (Award)

```
FLASH MEMORY WRITER V3.0
Copyright (C) 1993, AWARD Software Inc.,


    For Triton-2A59CT51          Date:4/13/95



 File Name to Program:
Error Message:
```

Type in the whole file name, e.g. A61AW10.BIN and confirm that you want to program the BIOS. The utility will then 'Blank', 'Erase', and then 'Program' the flash memory on the mainboard with the new BIOS file. You should choose "yes" to save the original system BIOS to a floppy diskette before you program the new BIOS. This leaves you with a backup of your original BIOS in case you need to re-install it. This option is highly recommended. If you can not sucessfully program the BIOS file for whatever reason, re-install you original BIOS from the backup file.

Warning: If you do not successfully install a complete BIOS file in the flash memory on the Mainboard, your system may not be able to boot. If this happens, it will require service by your system vendor. Follow the requirements and instructions in this section precisely to aviod inconvenience.

7.0 AT TECHNICAL INFORMATION

7.1 I/O BUS CONNECTOR PIN OUT

7.1.1 ISA SLOT PIN OUT

GND	B01	A01	-I/O CH CHK	-MEMC16	D01	C01	SBHE	
RESET	B02	A02	SD07	-I/OCS16	D02	C02	LA23	
+5V	B03	A03	SD06	IRQ10	D03	C03	LA22	
IRQ9	B04	A04	SD05	IRQ11	D04	C04	LA21	
-5V	B05	A05	SD04	IRQ12	D05	C05	LA20	
DRQ2	B06	A06	SD03	IRQ15	D06	C06	LA19	
-12V	B07	A07	SD02	IRQ14	D07	C07	LA18	
0WS	B08	A08	SD01	-DACK0	D08	C08	LA17	
+12V	B09	A09	SD00	DRQ0	D09	C09	-MEMR	
GND	B10	A10	-I/O CH RDY	-DACK5	D10	C10	-MEMW	
-SMEMW	B11	A11	AEN	DRQ5	D11	C11	SD08	
-SMEMR	B12	A12	SA19	-DACK6	D12	C12	DS09	
-IOW	B13	A13	SA18	DRQ6	D13	C13	DS10	
-IOR	B14	A14	SA17	-DACK7	D14	C14	DS11	
-DACK3	B15	A15	SA16	DRQ7	D15	C15	DS12	
-DRQ3	B16	A16	SA15	+5V	D16	C16	DS13	
DACK1	B17	A17	SA14	-MASTER	D17	C17	DS14	
DRQ1	B18	A18	SA13	GND	D18	C18	DS15	
-REFRESH	B19	A19	SA12					
BCLK	B20	A20	SA11					
IRQ7	B21	A21	SA10					
IRQ6	B22	A22	SA09					
IRQ5	B23	A23	SA08					
IRQ4	B24	A24	SA07					
IRQ3	B25	A25	SA06					
-DACK2	B26	A26	SA05					
T/C	B27	A27	SA04					
BALE	B28	A28	SA003					
+5V	B29	A29	SA02					
OSC	B30	A30	SA01					
GND	B31	A31	SA00					

7.1.2 PCI-BUS SLOT PIN OUT

Signal	Pin A	Pin B	Signal
-12V	A01	B01	NC
NC	A02	B02	+12V
GND	A03	B03	NC
NC	A04	B04	NC
VCC	A05	B05	VCC
VCC	A06	B06	INT#A
INTB#	A07	B07	INT#C
INTD#	A08	B08	VCC
PST#1	A09	B09	NC
NC	A10	B10	VCC
PST#2	A11	B11	NC
GND	A12	B12	GND
GND	A13	B13	GND
NC	A14	B14	NC
GND	A15	B15	RST#
CLK	A16	B16	VCC
GND	A17	B17	GNT#
REQ#	A18	B18	GND
VCC	A19	B19	NC
AD_31	A20	B20	AD_30
AD_29	A21	B21	NC
GND	A22	B22	AD_28
AD_27	A23	B23	AD_26
AD_25	A24	B24	GND
NC	A25	B25	AD_24
CBE#3	A26	B26	IDSEL
AD_23	A27	B27	NC
GND	A28	B28	AD_22
AD_21	A29	B29	AD_20
AD_19	A30	B30	GND
NC	A31	B31	AD_18
AD_17	A32	B32	AD_16
CEB#2	A33	B33	NC
GND	A34	B34	FRAME#
IRDY#	A35	B35	GND
NC	A36	B36	STOP#
DEVSEL#	A37	B37	NC
GND	A38	B38	SDONE
LOCK#	A39	B39	SBO#
PERR#	A40	B40	GND
NC	A41	B41	PAR
SERR#	A42	B42	AD_15
NC	A43	B43	NC
CBE#1	A44	B44	AD_13
AD_14	A45	B45	AD_11
GND	A46	B46	GND
AD_12	A47	B47	AD_09
AD_10	A48	B48	CBE#0
GND	A49	B49	NC
AD_08	A50	B50	AD_06
AS_07	A51	B51	AD_04
NC	A52	B52	GND
AD_05	A53	B53	AD_02
AD_03	A54	B54	AD_00
GND	A55	B55	VCC
AD_01	A56	B56	NC
VCC	A57	B57	VCC
NC	A58	B58	VCC
VCC	A59	B59	
VCC	A60	B60	
	A61	B61	
	A62	B62	
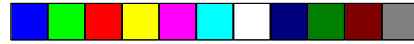
7.2. TIMER & DMA CHANNEL MAP
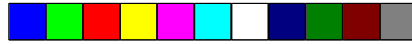
TIMER MAP: TIMER Channel-0 system timer interrupt
           TIMER Channel-1 DRAM REFRESH request
           TIMER Channel-2 SPEAKER tone generator

DMA CHANNELS: DMA Channel-0 Available
           DMA Channel-1 IBM SDLC
           DMA Channel-2 FLOPPY DISK adapter
           DMA Channel-3 Available
           DMA Channel-4 Cascade for DMA controller 1
           DMA Channel-5 Available
           DMA Channel-6 Available
           DMA Channel-7 Available

## 7.3 INTERRUPT MAP

NMI: Parity check error

IRQ (H/W) 0 System TIMER interrupt from TIMER-0
       1 KEYBOARD output buffer full
       2 Cascade for IRQ 9-15
       3 SERIAL port 2
       4 SERIAL port 1
       5 PARALLEL port 2
       6 FLOPPY DISK adapter
       7 PARALLEL port 1
       8 RTC clock
       9 Available
       10 Available
       11 Available
       12 Available
       13 MATH co-processor
       14 HARD DISK adapter
       15 Available

7.4 RTC & CMOS RAM MAP

RTC & CMOS:
|		
00	Seconds	
01	Seconds alarm	
02	Minutes	
03	Minutes alarm	
04	Hours	
05	Hours alarm	
06	Days of the week	
07	Days of the month	
08	Month	
09	Year	
0A	Status register A	
0B	Status register B	
0C	Status register C	
0D	Status register D	
0E	Diagnostic status byte	
0F	Shutdown byte	
10	Floppy DISK drive type byte	
11	Reserved	
12	HARD DISK type byte	
13	Reserved	
14	Equipment byte	
15	Base memory low byte	
16	Base memory high byte	
17	Extension memory low byte	
18	Extension memory high byte	
19-2d	Reserved	
2E-2F	2-byte CMOS RAM checksum	
30	Reserved for extension memory low byte	
31	Reserved for extension memory high byte	
32	DATE CENTURY byte	
33	INFORMATION FLAG	
34-3f	Reserved	
40-7f	Reserved for CHIPSET SETTING DATA	
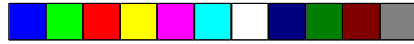
Appendix A: Post Codes

ISA POST codes are typically output to port address 80h (Award BIOS)

POST	Name	OEM specific-Cache control
C0	Turn off Chipset cache	Processor Status (1 FLAGS) verification.
1	Processor Test 1	Test the following processor status flags; carry, zero, sign, overflow. The BIOS will set each of these flags, verify they are set, then turn each flag off and verify it is off
2	Processor Test 2	Read/Write/Verify all CPU reisters except SS,SP, and BP with data patern FF and 00
3	Initialize chips	Disable NMI, PIE, AIE, UEI, SQWV, video, parity checking, DMA. Reset math co-processor. Clear all page registers. Initialize timer 0,1 and 2. Initialize DMA controllers 0 and 1. Initialize interrupt controllers 0 and 1.
4	Test Memory refresh toggle	Assures that memory refresh function is working.
5	Blank Video Initialize Keyboard	Keyboard initialization
6	Reserved	
7	Test CMOS and battery status	Verifies CMOS is working properly, detects a bad battery.
BE	Chipset Default	Programs chipset registers with power on BIOS default
C1	Memory presence test	OEM specific-Test to size on-board memory.
C5	Early shadow	OEM specific-early shadow enable for fast boot
C6	Cache presence test	External cache size detection
8	Setup low memory	Clear low 64K memory. Test first 64K memory.
9	Early cache initialize	Cache initialization
A	Setup Interrupt Vector Table	Initialization first 120 interrupt vectors with SPURIOUS_INT-HDLR and initialize INT 00h-1 Fh accoding to INT_TBL.
B	Test CMOS	Test CMOS RAM Checksum.
C	Initialize keyboard	Detect type of keyboard controller. Set NUM_LOCK status.
D	Intialize video interface	Detect CPU clock. Read CMOS location 14h to find type of video. Detect and initialize video adapter.
E	Test video memory	Test video memory, writer sign-on message to screen. Setup shadow RAM. Enable shadow according to setup.
F	Test DMA controller 0	BIOS checksum test. Keyboard detect and initalization
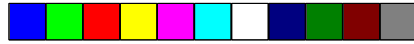
10	Test DMA memory controller 1	Test DMA controller
11	Test DMA Page registers	Test DMA page Registers
12-13	reserved	
14	Test timer counter 2	Test 8254 timer 0 countner 2
15	Test 8259-1 Mask	Verify 8259 channel 1 masked interrupts
16	Test 8259-2 Mask	Verify 8259 channel 2 masked interrupts
17	Test Stuck 8259 interrupt bits	Turn off interrupt then verify nointerrupt mask register is on
18	Test 8259 interrupt functionality	Force interrupt and verify interrupt occured
19	Test Stuck NMI bits	Verify NMI can be cleared
1A	Check clock	Display CPU clock
1B-1F	Reserved	
20	Enable slot 0	Initialize slot 0 (system board)
21-2F	Enable slot 1-15	Initialize slot 1-15
30	Size base and Extended memory	Size base memory form 256K to 640K and Extended memory above 1MB
31	Test base and Extended memory	Test base and Extended memory
32-3B	Reserved	
3C	Setup Enabled	
3D	Initialize and install mouse	Detects if mouse is present, initialize mouse and install interrupt vectors.
3E	Setup cache controller	Initialize cache controller
41	Initialize floppy drive and controller	Initialize floppy disk drive and controller
42	Initialize hard drive and controller	Initialize hard drives
43	detect and initialize serial and parallel ports	Initialize any serial, parallel ports and gameports
44	Reserved	
45	Detect and initialize math co-processor	Initialize math co-processor
46-4D	Reserved	
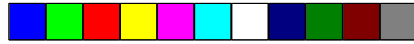
4E	Manufacturing POST loop or display messages	Reboot if manufacturing POST loop pin is set. Otherwise display any messages(i.e. non fatal errors that were detected during POST) and enter setup
4F	Security check	Ask password security (optional)
50	Write CMOS	Write all CMOS values back to RAM and clear screen
51	PRE-boot enable	Enable parity checker, enable NMI and enable cache before boot
52	Initialize Option ROMS's	Initialize any option ROM's present for C8000h to EFFFFh. When FSCAN option is enabled, will initialize from C8000h to F7FFFh.
53	Initialize time value	Initialize time value in 40h: BIOS area
60	Setup Virus Protect	Setup virus protect according to setup
61	Set Boot Speed	Set system speed for boot
62	Setup NumLock	Set up NumLock status according to setup
63	Boot Attempt	Set low stack. Boot via INT 19h
B0	Spurious	If interrupt occurs in protected mode
B1	Unclaimed NMI	If unmasked NMI occurs, display Press F1 to disable NMI or F2 to reboot
E1-EF	Setup Pages	E1-Page 1, E2-Page 2, etc.