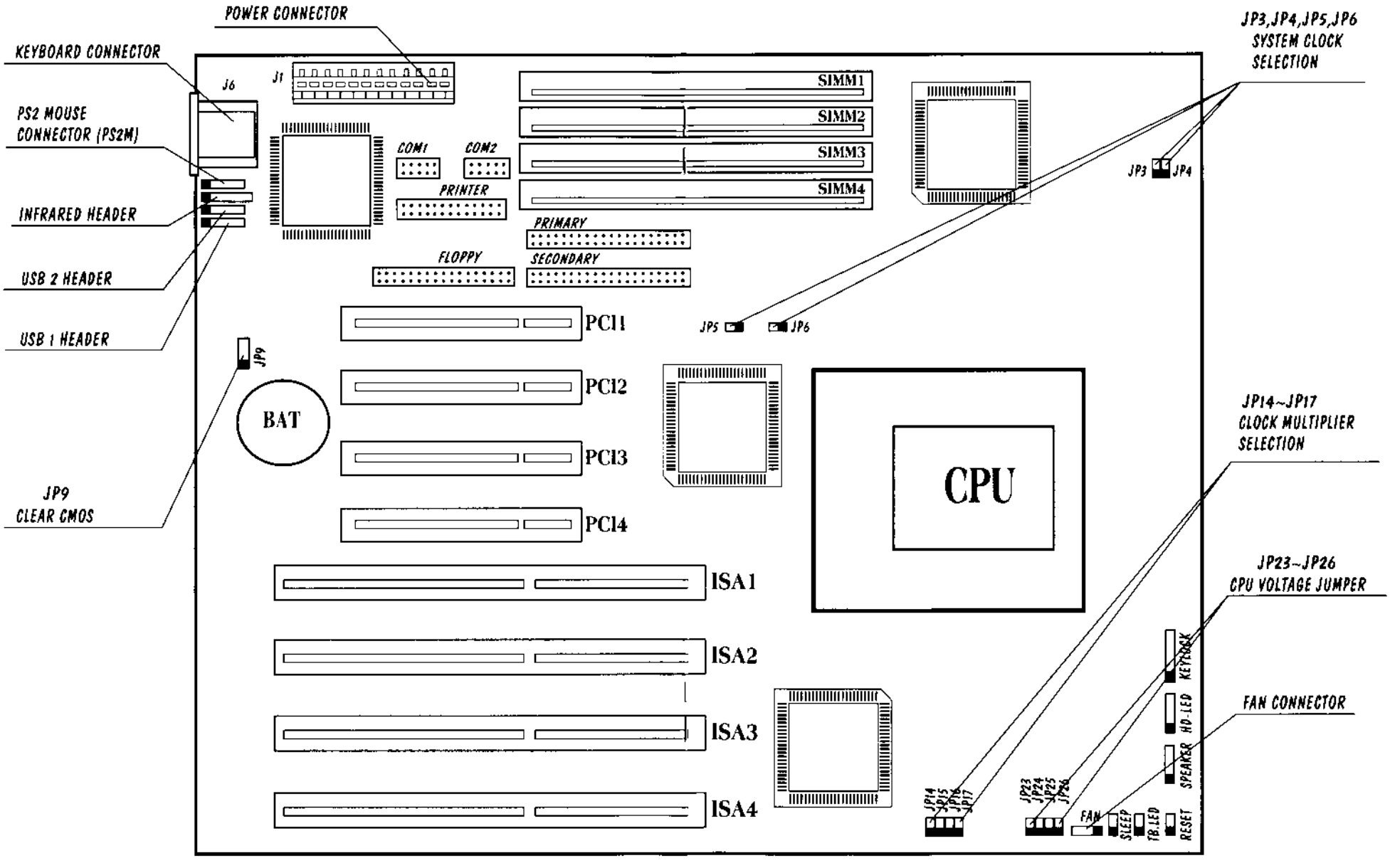
PENTIUM® PRO
P6I440FX
Commander

User Manual

PC Main Board


POWER CONNECTOR
KEYBOARD CONNECTOR
PS2 MOUSE CONNECTOR (PS2M)
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USB 2 HEADER
USB 1 HEADER
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J1
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Quick Jumper Setting

Install CPU

JP3, JP4, JP5 and JP6 are used for System Clock setting.
JP14, JP15, JP16 and JP17 are used for CPU multiple clock setting.
(Please refer to page 2-1 ~ page 2-5 in detail informations.)

CPU FREQUENCY	JP3	JP4	JP5	JP6	JP14	JP15	JP16	JP17
Pentium Pro@ 150MHz	Close	Open	Close	Open	Open	Close	Close	Close
Pentium Pro@ 166MHz	Open	Close	Open	Close	Open	Close	Close	Close
Pentium Pro@ 180MHz	Close	Open	Close	Open	Close	Close	Open	Close
Pentium Pro@ 200MHz	Open	Close	Open	Close	Close	Close	Open	Close

Select CPU Type & Voltage

JP23, JP24, JP25 and JP26 are used to select your CPU voltage.
(Please refer to page 2-4)

1. Automatic Voltage Setting (Default Setting)
At present, the processors marked "Pentium Pro" all support VID (Voltage ID), so the main board can automatically regulate voltage without using jumpers setting.

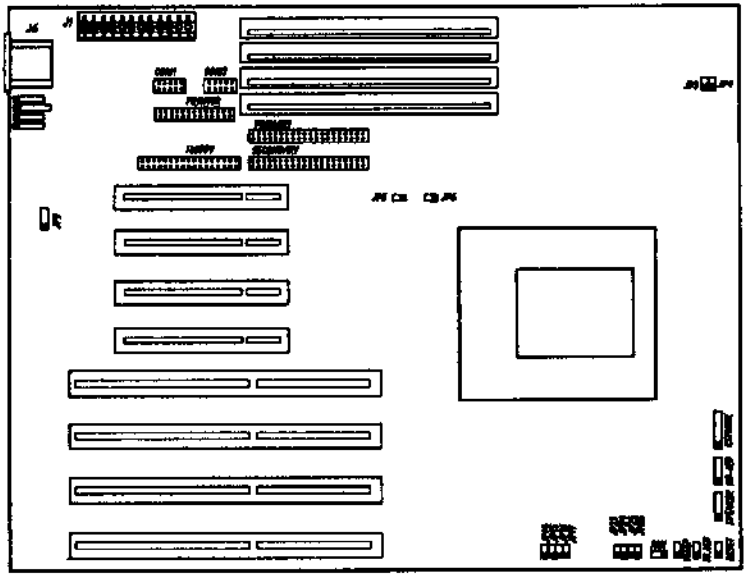
2. Manual Voltage Setting
If using an older processor without "Pentium Pro" marking which does not support VID, you must manually set JP23~JP26 for different CPU core voltage as follows:

Voltage	JP23	JP24	JP25	JP26
3.5V	Close	Close	Close	Close
3.4V	Close	Close	Close	Open
3.3V	Close	Close	Open	Close
3.2V	Close	Close	Open	Open
3.1V	Close	Open	Close	Close
3.0V	Close	Open	Close	Open
2.9V	Close	Open	Open	Close
2.8V	Close	Open	Open	Open
2.7V	Open	Close	Close	Close
2.6V	Open	Close	Close	Open
2.5V	Open	Close	Open	Close
2.4V	Open	Close	Open	Open
2.3V	Open	Open	Close	Close
2.2V	Open	Open	Close	Open
2.1V	Open	Open	Open	Close

Clear CMOS

	CLEAR CMOS	NORMAL
JP9	1-2 (Close once)	2-3

On Board Jumpers and Connectors Illustration



Chapter 1
Introduction

Overview

P6I440FX Commander green main board provides a highly integrated solution for fully compatible, high performance PC/AT platforms, and supports Intel Pentium® Pro processor. Flexible main memory size can be installed from 8MB up to 256MB DRAMs, so as to give full play to the advantages of the Intel Pentium® Pro processor CPU. The main board offers a wide range of interface to support integrated on-board IDE and on-board I/O function.

The current Green function is divided into three phases : Doze, Standby and Suspend.

Key Features

CPU
- Supports Intel Pentium® Pro processors at 150/166/180/200MHz
- Supports 60MHz/66MHz Bus speed
- CPU core frequency = System Clock x2, x2.5, x3, x3.5 or x4
- On board Voltage Regulator with VID (Voltage ID), and CPU Core supply voltage can be adjusted from 2.1V to 3.5V by a set of jumpers or automatically selected by CPU VID

Chipset
- Intel® 440FX chipset

System memory
- Supports 4x72pin SIMM modules
- 64-bit data path for flexible memory size expanded from 8MB up to 256MB DRAMs on board
- Supports Fast Page mode DRAM(High speed), EDO DRAM and Burst EDO
- Supports memory Parity checking and ECC (Error Checking and Correction) function

On-board IDE	–	Supports two PCI PIO and Bus Master IDE port.
	–	Supports up to Mode 4 Timing
	–	Supports transfer rate up to 22 MByte/s
	–	Supports 2 Fast IDE interfaces for up to 4 IDE devices including IDE hard disks and CD ROMs
Green function	–	Supports 3 Green modes: Doze, Standby and Suspend
On-board I/O	–	Use NS Plug & Play I/O chip NS PC87306
	–	One floppy port supports up to two 3.5" or 5.25" floppy drives 360K/720K/1.2M/1.44M/ 2.88M format
	–	All I/O ports can be enabled/disabled by BIOS setup
	–	Two high speed 16550 compatible UARTs (COM1/COM2/COM3/COM4 selectable) with 16-byte send/receive FIFOs and support MIDI mode
	–	One enabled parallel port at I/O address 378H/278H/3BCH with additional bi-direction I/O capability and multi-mode selection (SPP/EPP/ECP) (IEEE1284 compliant)
	–	Provides protection circuit to prevent damage to the parallel port when a connected printer is powered up or operated at a higher voltage
	–	Supports PS/2 mouse and PS/2 keyboard
	–	On-board two USB Header
	–	Provides Infrared interface
BIOS	–	Licensed advanced AWARD BIOS. Supports Flash ROM BIOS, Plug and Play ready. Built-in NCR®53C810 and Adaptec® 7850 SCSI BIOS
Expansion slots	–	4 x ISA slots and 4 x PCI slots
Board size	–	220mm x 330mm

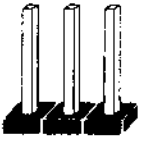
Hardware Settings

There are some hardware settings on the board. They specify configuration options for various features. The settings are made using something called a 'jumper'. Jumpers on the system board provide information to your operation about installed options and system settings. A jumper is a set of two or more metal pins in a plastic base attached to the mainboard. A plastic jumper 'cap' with a metal plate inside fits over two pins to create an electrical contact between them. The contact establishes a hardware settings such as installing the CPU, selecting cache size.

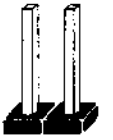
Note: When you open a jumper, leave the plastic jumper cap attached to one of the pins so you don't lose it.

Jumpers and Caps

Jumper cap



3-pin jumper



2-pin jumper

Graphic symbol

To rapidly give user a effective and direct way to set jumpers for your system, there are some diagrams used in the following chapters. All kind of jumper setting modes are simplified as the following relevant graphic symbols:

Opened all pins of a jumper symbolizes as:

closed pin-1 and pin-2 of a jumper symbolizes as:

closed pin-2 and pin-3 of a jumper symbolizes as:

Jumper closed symbolizes as:

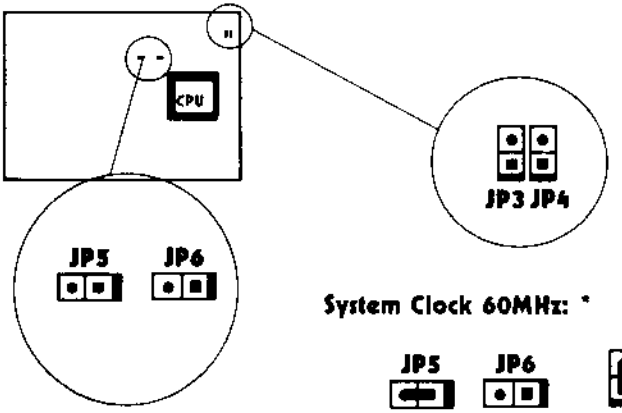
Jumper opened symbolizes as:

Chapter 2
Jumper Configuration

The main board offers a set of jumper settings to facilitate clock frequency adjustment and some important selections.

System Clock Selection

In this P6I440FX Commander main board, there are two selections of SC (System Clock). User has to set a group of jumpers as the following illustration to determine which System Clock used.



System Clock 60MHz: *

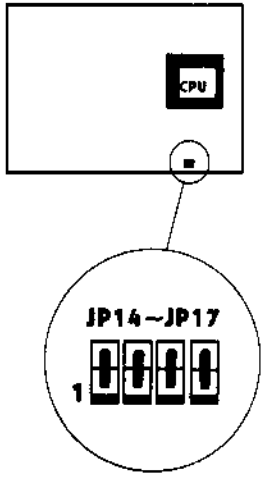
System Clock 66MHz:

"*" : Represents for the default jumper settings.

Clock Multiplier Selection

For the Intel Pentium® Pro CPU clock multiplier, jumper settings are shown as below:

Note: SC -- System Clock.



2 x SC

2.5 x SC

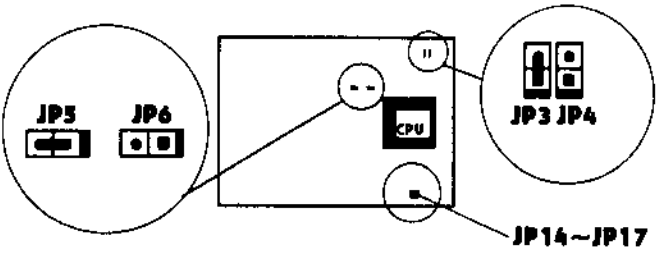
3 x SC *

3.5 x SC

4 x SC

CPU Frequency Selection

According to CPU's specification, set system clock and clock multiplier carefully. The following illustration lists the jumper settings for the Pentium® Pro CPUs:



Pentium® Pro @ 150MHz = 2.5 x 60MHz :

Pentium® Pro @ 166MHz=2.5 x 66MHz :

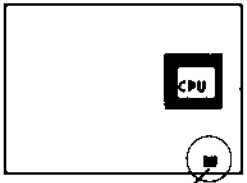
* Pentium® Pro @ 180MHz=3 x 60MHz :

Pentium® Pro @ 200MHz=3 x 66MHz :

CPU Voltage Selection

To provide a wide scope voltage for all kinds of Pentium® Pro processor CPUs. On this board there is a VRM transforms 5V power supply into 2.1V~ 3.5V CPU core voltage. A set of Jumpers, JP23~JP26, give two ways to set your CPU core voltage:

*** 1. Automatic Voltage Setting**



JP23~JP26

JP23~JP26

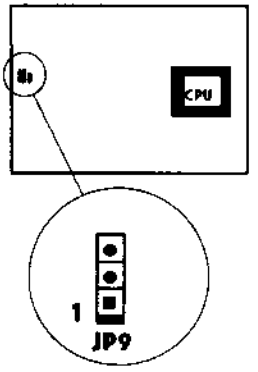
2. Manual Voltage Setting

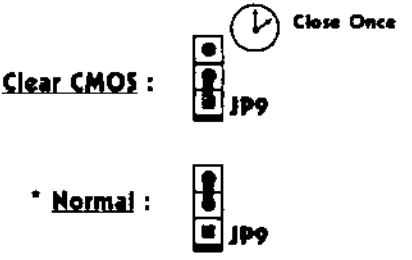
Different CPU core voltage have different JP23~JP26 settings, the following table lists all kinds of jumper settings:

Voltage	JP23	JP24	JP25	JP26
3.5V	close	close	close	close
3.4V	close	close	close	open
3.3V	close	close	open	close
3.2V	close	close	open	open
3.1V	close	open	close	close
3.0V	close	open	close	open
2.9V	close	open	open	close
2.8V	close	open	open	open
2.7V	open	close	close	close
2.6V	open	close	close	open
2.5V	open	close	open	close
2.4V	open	close	open	open
2.3V	open	open	close	close
2.2V	open	open	close	open
2.1V	open	open	open	close

Note: At present, it is recommended to use Automatic Voltage Setting for Pentium® Pro CPUs, except for an older processor without "Pentium Pro" marking which does not support VID.

Clear CMOS





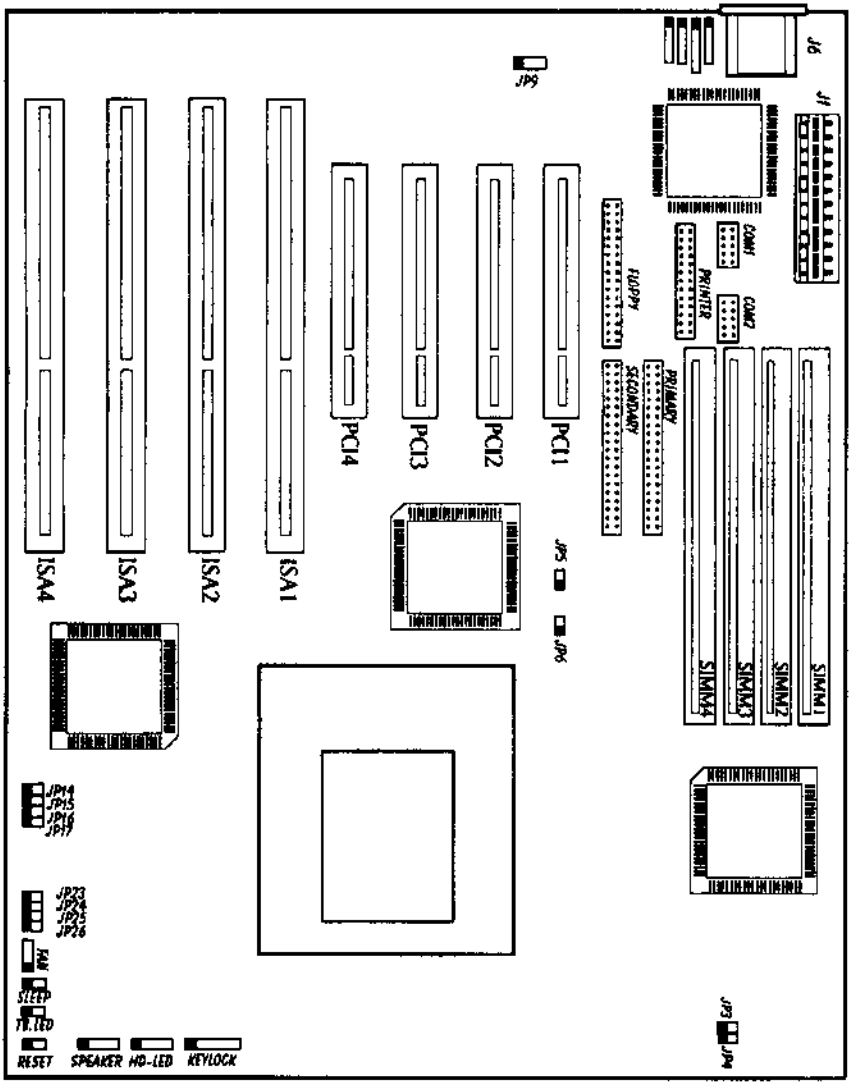
Memory Configuration

The P6I440FX Commander main board supports single-bank 72Pin SIMMs or double-bank 72Pin SIMMs, provides a flexible size from 8MB up to 256MB main memory. The DRAM SIMMs can be installed into either/both SIMM1 & 2 or/and SIMM3 & 4. Please do not plug in two different brands of SIMMs on a bank simultaneously.

RAM SIZE	SIMM1	SIMM2	SIMM3	SIMM4
8 MB	4 MB x 1	4 MB x 1	---	---
16 MB	4 MB x 1	4 MB x 1	4 MB x 1	4 MB x 1
16 MB	8 MB x 1	8 MB x 1	---	---
24 MB	8 MB x 1	8 MB x 1	4 MB x 1	4 MB x 1
32 MB	8 MB x 1	8 MB x 1	8 MB x 1	8 MB x 1
32 MB	16 MB x 1	16 MB x 1	---	---
40 MB	16 MB x 1	16 MB x 1	4 MB x 1	4 MB x 1
48 MB	16 MB x 1	16 MB x 1	8 MB x 1	8 MB x 1
64 MB	16 MB x 1	16 MB x 1	16 MB x 1	16MB x 1
64 MB	32 MB x 1	32 MB x 1	---	---
72 MB	32 MB x 1	32 MB x 1	4 MB x 1	4 MB x 1
80 MB	32 MB x 1	32 MB x 1	8 MB x 1	8 MB x 1
96 MB	32 MB x 1	32 MB x 1	16 MB x 1	16 MB x 1
128 MB	32 MB x 1	32 MB x 1	32 MB x 1	32 MB x 1
128 MB	64 MB x 1	64 MB x 1	---	---
256 MB	64 MB x 1	64 MB x 1	64 MB x 1	64 MB x 1

Note: Bank 0: SIMM 1, SIMM 2; Bank 1: SIMM 3, SIMM 4.

On Board Jumpers and Connectors illustration

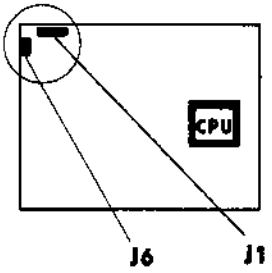


Chapter 3
Connector Configuration

This section lists all connector pin assignments and port descriptions on the main board. The situations of the connectors and ports are illustrated in the following figures. Before inserting these connectors, please pay attention to their directions.

Power Connector (J1)

PIN NUMBER	FUNCTION
1	POWER GOOD
2	+5V
3	+12V
4	-12V
5	GND
6	GND
7	GND
8	GND
9	-5V
10	+5V
11	+5V
12	+5V

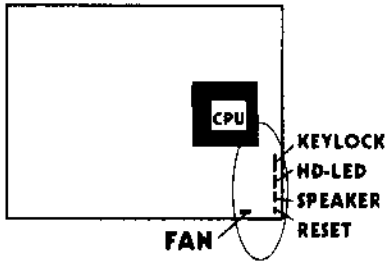


Keyboard Connector (J6)

PIN NUMBER	FUNCTION
1	CLOCK
2	DATA
3	NC
4	GND
5	+5V

Hard Disk LED (HD-LED)

PIN NUMBER	FUNCTION
1	LED Anode
2	LED Cathode
3	LED Cathode
4	LED Anode



Keylock Connector (KEYLOCK)

PIN NUMBER	FUNCTION
1	VCC
2	NC
3	GND
4	KEYLOCK
5	GND

Speaker Connector (SPEAKER)

PIN NUMBER	FUNCTION
1	SPKDATA
2	GND
3	GND
4	VCC

Reset Switch (RESET)

SETTING	FUNCTION
Close Once	Reset The System
Open	Normal

Fan Connector (FAN)

SETTING	FUNCTION
1	GND
2	+12V
3	GND

Infrared Header (IR)

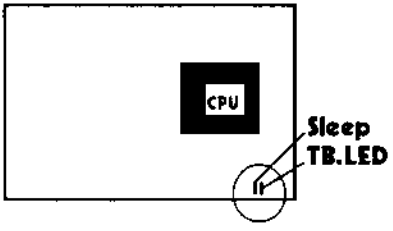
PIN NUMBER	FUNCTION
1	VCC
2	NC
3	IRRX
4	GND
5	IRTX
6	VCC

Turbo LED (TB.LED)

PIN NUMBER	FUNCTION
1	LED Anode
2	LED Cathode

PS2 Mouse Connector (PS2M)

PIN NUMBER	FUNCTION
1	DATA
2	CLOCK
3	GND
4	NC
5	+5V



Sleep Connector (SLEEP)

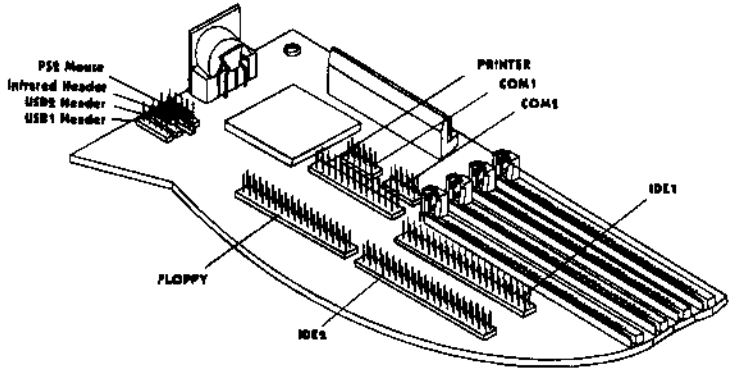
SETTING	FUNCTION
Close Once	Hardware Green
Open	Normal

USB Header (USB1/USB2)

PIN NUMBER	FUNCTION
1	+5V
2	NC
3	DATA -
4	DATA +
5	GND

I/O Port Description

CONNECTOR	FUNCTION
IDE 1	Primary IDE Port
IDE 2	Secondary IDE Port
FLOPPY	Floppy Drive Port
PRINTER	Parallel Port
UART 1	COM1/COM2/COM3/COM4
UART 2	COM2/COM3/COM4/COM1



Part of P6I440FX Main Board

Chapter 4
AWARD BIOS Description

Entering Setup

Power on the computer and press <Del> immediately will allow you to 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> + <Esc> keys.

Press <DEL> to enter SETUP

Once you enter Award BIOS CMOS Setup Utility, the Main Menu (Figure 1) will be appeared on the screen. The Main Menu allows you to select from twelve setup functions and two exit choices. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu.

ROM PCI/ISA BIOS (2A69HQ19)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

STANDARD CMOS SETUP	INTEGRATED PERIPHERALS
BIOS FEATURES SETUP	SUPERVISOR PASSWORD
CHIPSET FEATURES SETUP	USER PASSWORD
POWER MANAGEMENT SETUP	IDE HDD AUTO DETECTION
PNP/PCI CONFIGURATION SETUP	HDD LOW LEVEL FORMAT
LOAD BIOS DEFAULTS	SAVE & EXIT SETUP
LOAD SETUP DEFAULTS	EXIT WITHOUT SAVING

Esc : Quit	↑↓→← : Select Item
F10 : Save & Exit Setup	(Shift) F2 : Change Color

Time, Date, Hard Disk Type...

Figure 1 Main Menu

Standard CMOS Setup

Use the arrow keys to highlight the item, then use the <PgUp> or <PgDn> keys to select the value you want in each item.

Date (mm:dd:yy) : Thu, May 14 1996
Time (hh:mm:ss) : 00:00:00

HARD DISKS	TYPE	SIZE	CYLS	HEAD	PRECOMP	LANDZ	SECTOR	MODE
Primary Master	: Auto	0	0	0	0	0	0	AUTO
Primary Slave	: Auto	0	0	0	0	0	0	AUTO
Secondary Master	: Auto	0	0	0	0	0	0	AUTO
Secondary Slave	: Auto	0	0	0	0	0	0	AUTO

Drive A	: 1.44M, 3.5 in.	Base Memory : 640K
Drive B	: None	Extended Memory : 7168K
Video	: EGA/VGA	Other Memory : 384K
Halt On	: All Errors	Total Memory : 8192K

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

Figure 2 Standard CMOS Setup Menu

Hard Disk
Primary Master/Primary Slave/Secondary Master/Secondary Slave

The categories identify the types of 2 channels that have been installed in the computer. There are 45 predefined types and 4 user definable types are used for Enhanced IDE BIOS. Type 1 to Type 45 are predefined. Type "User" is user-definable. If your hard disk drive type is not matched with drive table or listed in it, you can use Type "User" to define your own drive type manually.

If you select Type "Auto", that means the system can autodetect your hard disk when boot up. If you select Type "User", related information is asked to be entered to the following items. Enter the information directly from the keyboard and press <Enter>:

CYLS	number of cylinders	HEAD	number of heads
PRECOMP	write precom	LANDZ	landing zone
SECTOR	number of sectors	MODE	HDD access mode

Video

You have two ways to boot up the system:
1. When VGA used as primary and monochrome used as secondary, the selection of the video type is "VGA Mode".
2. When monochrome used as primary and VGA used as secondary, the selection of the video type is "Monochrome Mode".

EGA/VGA	Enhanced Graphics Adapter/Video Graphic Array. For EGA, VGA, SEGA, SVGA, or PGA monitor adapters.
CGA 40	Color Graphic Adapter, power up in 40 column mode.
CGA 80	Color Graphic Adapter, power up in 80 column mode.
MONO	Monochrome adapter, includes high resolution monochrome adapters.

Error Halt

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

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

Memory

The category is display-only which 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.
Extended Memory	The BIOS determines how much extended memory is presented during the POST.
Other Memory	This is memory that can be used for different applications. Most use for this area is Shadow RAM.
Total Memory	The system total memory is the sum of above memory.

BIOS Features Setup

ROM PCI/ISA BIOS (2A69IQI9)
BIOS FEATURES SETUP
AWARD SOFTWARE, INC.

Virus Warning	: Disabled	Video BIOS Shadow	: Enabled
CPU L1 Internal Cache	: Enabled	C8000~CBFFF Shadow	: Disabled
CPU L2 Internal Cache	: Enabled	CC000~CFFFF Shadow	: Disabled
Quick Power On Self Test	: Enabled	D0000~D3FFF Shadow	: Disabled
Boot Sequence	: A, C	D4000~D7FFF Shadow	: Disabled
Swap Floppy Drive	: Disabled	D8000~DBFFF Shadow	: Disabled
Boot Up Floppy Seek	: Disabled	DC000~DFFFF Shadow	: Disabled
Boot Up Numlock Status	: On		
Boot Up System Speed	: High		
Gate A20 Option	: Fast		
Typematic Rate Setting	: Disabled		
Typematic Rate (Chars/Sec)	: 6		
Typematic Delay (Msec)	: 250		
Security Option	: Setup	ESC: Quit	↑↓→← : Select Item
PCI/VGA Palette Snoop	: Disabled	F1 : Help	PU/PD/+/- : Modify
OS Select For DRAM>64MB	: Non-OS2	F5 : Old Values	(Shift) F2 : Color
		F6 : Load BIOS Default	
		F7 : Load Setup Default	

Figure 3 BIOS Features Setup Menu

The following pages tell you the options of each item and describe the meaning of each option.

Item	Option	Description
Virus Warning	*Enabled*	Activates automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector or hard disk partition table.
	Disabled	No warning message to appear when anything attempts to access the boot sector or hard disk partition table.
		Note: This function is available only for DOS and other OSes that do not trap INT13.
CPU L1/L2 Internal Cache	*Enabled*	Enable CPU internal Level1/Level2 cache.
	Disabled	Disable CPU internal Level1/Level2 cache.
Quick Power On Self Test	*Enabled*	Enable quick POST. BIOS will shorten or skip some check items during POST to speed up POST after you power on the computer.
	Disabled	Normal POST.
Boot Sequence	*C,A*	The system will firstly search for hard disk drive then floppy disk drive.
	A,C	The system will firstly search for floppy disk drive then hard disk drive.
Swap Floppy Drive	*Enabled*	It will exchange the assignment of A & B floppy drives.
	Disabled	The assignment of A & B floppy drives are normal.
Boot Up Floppy Seek	*Enabled*	BIOS searches for floppy disk drive to determine if drive is ready for diskette read/write during booting.
	Disabled	skip drive seeking to speed up system booting.
Boot Up Numlock Status	*On*	Keypad is used as number keys.
	Off	Keypad is used as arrow keys.
Boot Up System Speed	*High*	Set the system speed to high at immediately after power up.
	Low	Set the system speed to low.

Gate A20 Option	*Normal*	The A20 signal is controlled by keyboard controller or chipset hardware.
	Fast	It is default. The A20 signal is controlled by Port 92 or chipset specific method.
Typematic Rate Setting	*Enabled*	Enable typematic rate and typematic delay programming.
	Disabled	Disable typematic rate and typematic delay programming. The system BIOS will use default value of these two items.
Typematic Rate (Chars/Sec)	*6 ~ 30*	Set the speed of the typematic rate (characters per second).
Typematic Delay (Msec)	*250~1000*	Set the time of the typematic delay.
Security Option	*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 correct password is not entered at the prompt.
		Note: To disable security, select Password Setting (refer to page 4-16) at Main Menu and then you will be asked to enter password. Do not type anything and just press <Enter>, it will disable security. Once the security is disabled, the system will boot and you can enter Setup freely.
PCI/VGA Palette Snoop	*Enabled*	Enable PCI/VGA palette snoop.
	Disabled	Disable PCI/VGA palette snoop.
OS Select For DRAM>64MB	*Non-OS2*	If your operating system is not OS/2, please select this item.
	OS2	If system DRAM is more than 64MB and operating system is OS/2, please select this item.
Video BIOS Shadow	*Enabled*	Video BIOS will be copied to RAM. Video Shadow will increase the video speed.
	Disabled	Video shadow is disabled.
C8000~CBFFF Shadow ... DC000~DFFFF Shadow:		
	Enabled	Option shadow is enabled. Optional ROM will be copied to RAM by 16K bytes per unit.
	Disabled	The shadow function is disabled.

Chipset Features Setup

ROM PCI/ISA BIOS (2A69HQ19)
CHIPSET FEATURES SETUP
AWARD SOFTWARE, INC.

Auto Configuration	: Enabled	8 Bit I/O Recovery Time	: 1
		16 Bit I/O Recovery Time	: 1
DRAM Speed Selection	: 60ns	Memory Hole At 15M-16M	: Disabled
DRAM RAS# Precharge Time	: 3	DRAM Fast Leadoff	: Disabled
MA Additional Wait State	: Disabled		
RAS# To CAS# Delay	: Disabled		
DRAM Read Burst (B/E/F)	: x3/4/4		
DRAM Write Burst (B/E/F)	: x4/4/4		
ISA Bus Clock	: PCICLK/4		
DRAM Refresh Queue	: Enabled		
DRAM RAS Only Refresh	: Disabled		
DRAM ECC/PARITY Select	: Disabled		
Fast Dram Refresh	: Disabled		
Read-Around-Write	: Enabled		
PCI Burst Write Combine	: Disabled		
PCI-To-DRAM Pipeline	: Enabled	ESC: Quit	↑↓→← : Select Item
CPU-To-PCI Write Post	: Enabled	F1 : Help	PU/PD/+/- : Modify
CPU-To-PCI IDE Posting	: Enabled	F5 : Old Values	(Shift)F2 : Color
System BIOS Cacheable	: Disabled	F6 : Load BIOS Default	
Video RAM Cacheable	: Disabled	F7 : Load Setup Default	

Figure 4 Chipset Features Setup Menu

The following pages tell you the option of each item and describe the meanings of each option.

Item	Option	Description
Auto Configuration	*Enabled*	Automatically configure DRAM Timing affected by "DRAM Speed Selection" item and ISA Bus frequency.
	Disabled	Manually configure.

		Note: It is recommended to choose "Enabled" option for common users.
DRAM Speed Selection	*60ns, 70ns*	This item is of selected DRAM read/ write timing. You must ensure that your SIMMs is as fast as 60ns, otherwise you have to select 70ns.
DRAM RAS# Precharge Time	*3*	DRAM RAS# Precharge time = 3x system clocks.
	4	DRAM RAS# Precharge time = 4x system clocks.
MA Additional Wait State	*Enabled*	One additional wait state is inserted before the assertion of the first MA and CAS#/RAS# during DRAM read or write leadoff cycles. This affects page hit, row miss and page miss cases.
	Disabled	Without additional wait state.
RAS# To CAS# Delay	*Enabled*	Add a delay time between the assertion of RAS# and CAS#.
	Disabled	Without additional delay time.
DRAM Read Burst (B/E/F)	*x1/2/3, x2/2/3, x2/3/4, x3/4/4*	The DRAM read burst timing depends on the type of DRAM on a per-row basis. Slower rates may be required to support slower memories.
DRAM Write Burst (B/E/F)	*x2/2/3, x3/3/3, x3/3/4, x4/4/4*	The DRAM write burst timing depends on the type of DRAM on a per-row basis. Slower rates may be required to support slower memories.
ISA Bus Clock	*PCICLK/3*	Sets ISA Bus clock to PCICLK/3.
	PCICLK/4	Sets ISA Bus clock to PCICLK/4.
		Note: PCICLK = System Clock/2.
DRAM Refresh Queue	*Enabled*	The internal DRAM refresh queue is enabled.
	Disabled	The refresh queue is disabled and all refreshes are priority requests.
DRAM RAS Only Refresh	*Enabled*	Defines DRAM Refresh type as RAS-Only Refresh.
	Disabled	Defines DRAM Refresh type as CAS-before-RAS.
DRAM ECC/PARITY Select	*ECC*	Provide ECC (Error Checking and Correction) function.

	Parity	Provide DRAM Parity generation and checking.
	Disabled	Disable ECC/PARITY function.
Fast Dram Refresh	*Enabled*	Defines DRAM refresh rate as fast refresh mode.
	Disabled	Defines DRAM refresh rate as normal refresh mode.
PCI Burst Write Combine	*Enabled*	Enables PCI burst write combining.
	Disabled	Disables PCI burst write combining.
PCI-To-DRAM Pipeline	*Enabled*	Provides from PCI to DRAM pipeline operating.
	Disabled	Disable PCI to DRAM pipeline operating.
CPU-To-PCI Write Post	*Enabled*	Enables CPU to PCI write post.
	Disabled	Disables CPU to PCI write post.
System BIOS Cacheable	*Enabled*	Besides conventional memory, the system BIOS area is also cacheable.
	Disabled	The system BIOS area is not cacheable.
Video RAM Cacheable	*Enabled*	Besides conventional memory, video RAM area is also cacheable.
	Disabled	Video RAM area is not cacheable.
8 Bit I/O Recovery Time	*1~8*	Defines the ISA Bus 8 bit I/O operating recovery time.
	NA	8 bit I/O recovery time is not exist.
16 Bit I/O Recovery Time	*1~4*	Defines the ISA Bus 16 bit I/O operating recovery time.
	NA	16 bit I/O recovery time is not exist.
Memory Hole At 15M~16M	*Enabled*	Memory Hole at 15~16M is reserved for expanded PCI card.
	Disabled	Do not set this memory hole.

Power Management Setup

ROM PCI/ISA BIOS (2A69HQ19)
POWER MANAGEMENT SETUP
AWARD SOFTWARE, INC.

Power Management	: Disable	** Wake up Events In Suspend **	
PM Control by APM	: Yes	IRQ3 (COM2)	: ON
Video Off Method	: V/H SYNC	IRQ4 (COM1)	: ON
	+ Blank	IRQ5 (LPT 2)	: OFF
MODEM Use IRQ	: NA	IRQ6 (Floppy Disk)	: OFF
Doze Mode	: Disabled	IRQ7 (LPT1)	: OFF
Standby Mode	: Disabled	IRQ8 (RTC Alarm)	: OFF
Suspend Mode	: Disabled	IRQ9 (IRQ2 Redir)	: OFF
HDD Power Down	: Disabled	IRQ10 (Reserved)	: OFF
		IRQ11 (Reserved)	: OFF
** Wake up Events In Doze & Standby **		IRQ12 (PS/2 Mouse)	: ON
IRQ3 (Wake-Up Event)	: ON	IRQ13 (Coprocessor)	: OFF
IRQ4 (Wake-Up Event)	: ON	IRQ14 (Hard Disk)	: OFF
IRQ8 (Wake-Up Event)	: ON	IRQ15 (Reserved)	: OFF
IRQ12 (Wake-Up Event)	: ON	ESC: Quit	↑↓→← : Select Item
		F1 : Help	PU/PD/+/- : Modify
		F5 : Old Values	(Shift)F2 : Color
		F6 : Load BIOS Default	
		F7 : Load Setup Default	

Figure 5 Power Management Setup Menu

The following pages tell you the options of each item and describe the meanings of each option.

Item	Option	Description
Power Management	*Disabled*	Global Power Management (PM) will be disabled.
PM Control by APM	*No*	System BIOS will ignore APM when Power Management is enabled.
	Yes	System BIOS will wait for APM's prompt before it enter any PM mode e.g. Standby or Suspend.

Note: If APM is installed, and if there is a task running, even the timer is time out, the APM will not prompt the BIOS to put the system into any power saving mode. But if APM is not installed, this option has no effect.

Video Off Method	*Blank Screen*	The system BIOS will only blank off the screen when disabling video.
	V/H SYNC +Blank	In addition to Blank Screen, BIOS will also turn off the V-SYNC & H-SYNC signals from VGA cards to monitor.
	DPMS	This function is enabled only for the VGA card supporting DPMS.
		Note: Green monitors detect the V/H -SYNC signals to turn off its electron gun.
MODEM Use IRQ	*3, 4, 5, 7, 9, 10, 11*	Wake-up event specially for Modem.
	NA	Disabled this feature.
Doze Mode	*Disabled*	The system will never enter Doze mode.
	1Min ~ 1Hr	Defines the continuous idle time before the system entering Doze mode. If any item defined in *"Wake Up Events In Doze & Suspend"* is On and activated, the system will be waken up.
Standby Mode	*Disabled*	The system will never enter Standby mode.
	1Min ~ 1Hr	Defines the continuous idle time before the system entering Standby mode. If any item defined in *"Wake Up Events In Doze & Suspend"* is On and activated, the system will be waken up.
Suspend Mode	*Disabled*	The system will never enter Suspend mode.
	1Min ~ 1Hr	Defines the continuous idle time before the system entering Suspend mode. If any item defined in *"Wake up Events In Suspend"* is On and activated, the system will be waken up.
HDD Power Down	*Disabled*	HDD's motor will not be off.
	1 ~ 15Min	Defines the continuous HDD idle time before the HDD entering power saving mode (motor off).

IRQ3~IRQ12 (Wake-Up Event)	*OFF*	The specified event's activity will not make the system wake up from Doze & Standby mode.
	ON	The specified event's activity will make the system wake up from Doze & Standby mode.
IRQ3 ~ IRQ15	*OFF*	The specified event's activity will not make the system wake up from Suspend mode.
	ON	The specified event's activity will make the system wake up from Suspend mode.

PNP/PCI Configuration Setup

ROM PCI/ISA BIOS (2A69HQ19)
PNP/PCI CONFIGURATION SETUP
AWARD SOFTWARE, INC.

Resources Controlled By	: Manual	PCI IRQ Active By	: Level
Reset Configuration Data	: Disabled	PCI IDE IRQ Map To	: PCI-AUTO
		Primary IDE INT#	: A
IRQ-3 assigned to	: Legacy ISA	Secondary IDE INT#	: B
IRQ-4 assigned to	: Legacy ISA	Use MEM Base Addr	: N/A
IRQ-5 assigned to	: PCI/ISA PnP		
IRQ-7 assigned to	: Legacy ISA		
IRQ-9 assigned to	: PCI/ISA PnP		
IRQ-10 assigned to	: PCI/ISA PnP		
IRQ-11 assigned to	: PCI/ISA PnP		
IRQ-12 assigned to	: PCI/ISA PnP		
IRQ-14 assigned to	: Legacy ISA		
IRQ-15 assigned to	: Legacy ISA		
DMA-0 assigned to	: PCI/ISA PnP		
DMA-1 assigned to	: PCI/ISA PnP		
DMA-3 assigned to	: PCI/ISA PnP	ESC: Quit	↑↓→← : Select Item
DMA-5 assigned to	: PCI/ISA PnP	F1 : Help	PU/PD/+/- : Modify
DMA-6 assigned to	: PCI/ISA PnP	F5 : Old Values	(Shift)F2 : Color
DMA-7 assigned to	: PCI/ISA PnP	F6 : Load BIOS Default	
		F7 : Load Setup Default	

Figure 6 PNP/PCI Configuration Setup Menu

The following pages tell you the options of each item and describe the meaning of each option.

Item	Option	Description
Resources Controlled By	*Manual*	Assigns system resources (IRQ and DMA) manually by user.
	Auto	Assigns system resources (IRQ and DMA) automatically by BIOS.
Reset Configuration Data	*Enabled*	Forces ESCD (devices list in BIOS) update one time, then this item automatically reset to Disabled.
	Disabled	Invalidates this BIOS feature.
IRQ-3 ~ IRQ-15 assigned to	*Legacy ISA*	The specified IRQ-x will be assigned to ISA only.
	PCI/ISA PnP	The specified IRQ-x will be assigned to ISA or PCI.
DMA-0 ~ DMA-7 assigned to	*Legacy ISA*	The specified DMA-x will be assigned to ISA only.
	PCI/ISA PnP	The specified DMA-x will be assigned to ISA or PCI.
PCI IRQ Active By	*Level, Edge*	To tell the chipset that the IRQ signal input is level or edge trigger.
PCI IDE IRQ Map To	*PCI-AUTO*	The BIOS will scan for PCI IDE devices and determine the location of the PCI IDE device.
	PCI-SLOT4~1	The BIOS will scan IRQ14 for primary IDE INT# and IRQ15 for secondary IDE INT# at the specified slot.
	ISA	The BIOS will not assign any IRQs even if PCI IDE card is found. Because some IDE cards connect the IRQ14 & 15 directly from ISA slot through a card.
Primary IDE INT#	*A~D*	To tell which INT# the PCI IDE card is used for its interrupt of 1st IDE channel.
Secondary IDE INT#	*A~D*	To tell which INT# the PCI IDE card is used for its interrupt of 2nd IDE channel.
Used MEM Base Addr	*8~64K*	Claim a memory space occupied by legacy ISA card.
	N/A	Disabled this feature.

Load BIOS Defaults

The BIOS Defaults is conventional and safe setting.

Load Setup Defaults

The Setup Defaults is common and efficient setting.

Integrated Peripherals

ROM PCI/ISA BIOS (2A69HQ19)
INTEGRATED PERIPHERALS
AWARD SOFTWARE, INC.

IDE HDD Block Mode	: Enabled	USB Controller	: Disabled
IDE Primary Master PIO	: Auto		
IDE Primary Slave PIO	: Auto		
IDE Secondary Master PIO	: Auto		
IDE Secondary Slave PIO	: Auto		
On-Chip Primary PCI IDE	: Enabled		
On-Chip Secondary PCI IDE	: Enabled		
PCI Slot IDE 2nd Channel	: Disabled		
Onboard FDC Controller	: Enabled		
Onboard Serial Port 1	: COM1/3F8		
Onboard Serial Port 2	: COM2/2F8		
Onboard Parallel Port	: 378H/IRQ7		
Parallel Port Mode	: Compatible		
		ESC: Quit	↑↓→← : Select Item
InfraRed Duplex Type	: Disabled	F1 : Help	PU/PD/+/- : Modify
		F5 : Old Values	(Shift)F2 : Color
		F6 : Load BIOS Default	
		F7 : Load Setup Default	

Figure 7 Integrated Peripherals Menu

The following pages tell you the options of each item and describe the meaning of each option.

Item	Option	Description
IDE HDD Block Mode	*Enabled*	Allows IDE HDD read/write several sectors one time.
	Disabled	IDE HDD only reads/writes a sector one time.
IDE Primary/ Secondary Master/ Slave PIO	*Mode 0~4*	Defines the IDE primary/secondary master /slave PIO mode.
	Auto	The IDE PIO mode is defined according to auto-detect.
On-chip Primary/ Secondary PCI IDE	*Enabled*	On-chip primary/secondary PCI IDE port is enabled.
	Disabled	On-chip primary/secondary PCI IDE port is disabled.
PCI Slot IDE 2nd Channel	*Enabled*	The second IDE channel on PCI slot is enabled.
	Disable	The second IDE channel on PCI slot is disabled.
Onboard FDC Controller	*Enabled*	Onboard floppy disk is enabled.
	Disabled	Onboard floppy disk is disabled.
Onboard Serial Port 1/2	*COM1/3F8, COM2/2F8, COM3/3E8, COM4/2E8*	Defines onboard serial port address.
	Disabled	Onboard serial port is disabled.
Onboard Parallel Port	*378/IRQ5,*	Defines onboard parallel port address and IRQ channel.
	278/IRQ5, 3BC/IRQ7, 378/IRQ7	
	Disabled	Onboard parallel port is disabled.
InfraRed Duplex Type	*Half, Full, Disabled,*	Defines InfraRed communication mode: half-duplex, or full-duplex, disabled.
USB Controller	*Enabled*	Enabled USB controller.
	Disabled	Disabled USB controller.

Parallel Port Mode	*Compatible*, *Extended*, *EPP*, *ECP*	Defines the parallel port mode is Standard Parallel Port (SPP), Enhanced Parallel Port (EPP), or Extended Capabilities Port (ECP). Both Compatible mode and Extended mode are SPP mode, and the later has a latchable buffer between I/O data pins and CPU.

Supervisor/User Password

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

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

To disable password, just press <Enter> when you are prompted to enter password. A message will confirm the password being disabled. Once the password is 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 "CMOS Setup".

If you select "Setup" at "Security Option" of "BIOS Features Setup" Menu, you will be prompted only when you try to enter "CMOS Setup".

Supervisor Password has higher priority than ***User Password***. You can use ***Supervisor Password*** when booting system or entering "CMOS Setup" to modify all settings. Also you can use ***User Password*** when booting system or entering "CMOS Setup" but can not modify any setting if ***Supervisor Password*** is enabled.

IDE HDD Auto Detection

The Enhanced IDE features was included in all Award BIOS. Below is a brief description of this features.

ROM PCI/ISA BIOS (2A69HQ19)
IDE HDD AUTO DETECTION
AWARD SOFTWARE, INC.

HARD DISKS TYPE SIZE CYLS HEAD PRECOMP LANDZ SECTOR MODE

Primary Master:

Select Primary Master Option (N = Skip) : N

OPTION	SIZE	CYLS	HEADS	PRECOMP	LANDZONE	SECTORS	MODE
1(Y)	516	1120	16	65535	1119	59	NORMAL
2	516	524	32	0	1119	63	LBA
3	516	560	32	65536	1119	59	LARGE

Note: Some OSes (like SCO-UNIX) must use "NORMAL" for installation

Figure 8 IDE HDD Auto Detection Menu

1. Setup Changes

With auto-detection

- BIOS setup will display all possible modes that is supported by the HDD including NORMAL, LBA and LARGE.
- If HDD does not support LBA modes, no "LBA" option will be shown.
- If number of cylinders is less than or equal to 1024, no "LARGE" option will be shown.
- Users can select a mode which is appropriate for them.

With Standard CMOS Setup

	CYLS	HEADS	PRECOMP	LAND ZONE	SECTOR	MODE
Drive C : User(516MB)	1120	16	65535	1119	59	Normal
Drive D : None(203MB)	684	16	65535	685	38	----------

When HDD type is in "user" type, the "MODE" option will be opened for user to select their own HDD mode.

2. HDD Modes

The Award BIOS supports 3 HDD modes: NORMAL, LBA and LARGE, and Auto detect.

NORMAL

Generic access mode in which neither the BIOS nor the IDE controller will make any transformation during accessing. The maximum number of cylinders, heads and sectors for NORMAL mode are 1024, 16 and 63.

If user set his HDD to NORMAL mode, the maximum accessible HDD size will be 528 Megabytes even though its physical size may be greater than that.

LBA (Logical Block Addressing) mode

A new HDD accessing method to overcome the 528 Megabyte bottleneck. The number of cylinders, heads and sectors shown in setup may not be the number physically contained in the HDD.

During HDD accessing, the IDE controller will transform the logical address described by sector, head and cylinder number into its own physical address inside the HDD. The maximum HDD size supported by LBA mode is 8.4 Gegabytes.

LARGE mode

Some IDE HDDs contain more than 1024 cylinder without LBA support (in some cases, user do not want LBA). The Award BIOS provides another alternative to support these kinds of HDD.

BIOS tricks DOS (or other OS) that the number of cylinders is less than 1024 by dividing it by 2. At the same time, the number of heads is multiplied by 2. A reverse transformation process will be made inside INT13h in order to access the right HDD address.

Auto detect

If using Auto detect, the BIOS will auto detect IDE hard disk mode and set it to one kind of HDD modes.

3. Remark

To support LBA or LARGE mode of HDDs, there must be some software involved. All these software are located in the Award HDD Service Routine (INT 13h). It may be failed to access a HDD with LBA (LARGE) mode selected if you are running under a Operating System which replaces the whole INT 13h.

Hard Disk Low Level Format Utility

This Award Low-Level-Format Utility is designed as a tool to save your time formatting your disk. The Utility automatically looks for the necessary information of the drive you selected. Utility also searches for bad tracks and list them for your reference.
Shown below is the Main Menu after you enter into the Award Low-Level-Format Utility.

Hard Disk Low-Level-Format Utility	NO. CYLS HEAD
SELECT DRIVE BAD TRACK LIST PREFORMAT	
Current select drive is : C DRIVE : C CYLINDER : 0 HEAD : 0	

	SIZE	CYL	HEAD	PRECOMP	LANDZ	SECTORS	MODE
Primary Master	: 40MB	977	5	300	977	17	NORMAL
Primary Slave	: None	0	0	0	0	0	AUTO
Secondary Master	: None	0	0	0	0	0	AUTO
Secondary Slave	: None	0	0	0	0	0	AUTO

Up/Down - Select item Enter - Accept ESC - Exit/Abort

Figure 9 Hard Disk Low Level Format Utility Menu

SELECT DRIVE

Select from installed hard disk drive C or D. List at the bottom of the screen is the drive automatically detected by the utility.

BAD TRACK LIST

Auto scan bad track
The utility will automatically scan bad tracks and list the bad tracks in the window at the right side of the screen.

Add bad track
Directly type in the information of the known bad tracks in the window at the right side of the screen.

Modify bad track
Modify the information of the added bad tracks in the window at the right side of the screen.

Delete bad track
Delete the added bad tracks in the window at the right side of the screen.

Clear bad track table
Clear the whole bad track list in the window at the right side of the screen.

PREFORMAT

Interleave
Select the interleave number of the hard disk drive you wish to perform low level format. You must select from 1 to 8. Check the documentation that came with the drive for the correct interleave number, or select 0 for utility automatic detection.

Auto scan bad track
This allows the utility to scan bad track or not.

Start
Press <Y> to start low level format.

Power-On Boot

If you have made all the changes to CMOS values and the system cannot boot with the CMOS values selected in Setup, restart the system by turning it OFF then ON or press the "RESET" button on the system case.
You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

Appendix
BIOS Upgrade Diskette

You can use this diskette to update your BIOS.

For the most update and additional information about BIOS upgrade, please refer to "README" in the "BIOS Upgrade Diskette".

Warning: Before you update your BIOS, you should look over the "README" file to avoid making mistake.

P/N: 430-01008-803
Manual P6I440FX Commander Ver 3.0