PI-6582V

**All-In-One Pentium
CPU card with on-board
VGA/TFTLCD interface
and
Flash/SRAM disk**

Copy Right Notice

The information in this manual is subject to change without prior notice in order t o improve reliability ,design and function and dosed not represent a commitment on the part of the manufacturer. No part of this manual may be reproduced, copied, or transmitted in any form without the prior written permission of manufacturer.

Acknowledgment

Products mentioned in this manual are mentioned for identification purpose only. Products manes appearing in this manual may or may not be registered trademarks or copyright of their respective companies

Printed Mar. 1999

Table Of Contents

1. Introductions

1.1   Description

Welcome to the PI-6582V Pentium™ with VGATFT/LCD interface Single Board Computer. The PI-6582V board is an ISA form factor board, which comes equipped with high performance Pentium P54C,P55C(MMX),AMD K5,K6,K6-2,Cyrix 6x86/L CPUs and advanced high performance multi-mode I/O, designed for the system manufacturers, integrators, or VARs that want to provide all the performance, reliability, and quality at a reasonable price.

This board built-in 1.7MB Flash disk and one extended disk socket that can accept SRAM/Flash device or DiskOnChip™(DOC) Flash Disk for embedded application. User can use any DOS command without any extra software utility. The DOC currently is available from 2MB to 72MB.

An advanced high performance super AT I/O chip – SMC37C669F is used in the PI-6582V board. Both on-chip UARTs are compatible with the NS16C550. The parallel port and PCI bus Ultra DMA-33 Enhance IDE interface are compatible with IBM PC/AT and XT architecture's.

In addition, the PI-6582V provides two 72-pin SIMM sockets for its on-board DRAM. The RAM module accepts 1MB, 2MB, 4MB, 8MB, 16MB, 32MB,and 64MB. So the total on-board memory can be configured from 2MB to 128MB.

PI-6582V uses the advanced C&T 65550 VGA/LCD/TFT chipset that is 100% ISA/PCI compatible chipset with PCI 2.1 standard.

1.2　Specifications :

The PI-6582V Pentium with VGA/TFT/LCD Single Board Computer provides the following specification:

- **CPU** :Pentium™/MMX up to 233/266Mhz,
    AMD K5/K6 processor,
    Cyrix 6x86MX processor

- **CPU voltage**: 3.5V/3.3V/2.8V/2.2V (jumper selectable)

- **System Clock**: 50/55/60/66.6/75/83.3 MHz (jumper selectable)

- **Bus** :ISA bus and PCI 32-bit local bus, PCI 2.1 standard

- **DMA channels** :7

- **Interrupt levels** :15

- **Chipset** : ALI-M1543/M1531

- **VGA**   : Built-in the C&T 65550 Chipset

- **Resolution**: 1280x1024,256 color,75Hz
    1024x768, 64K color,75Hz
    800x600,full color,90Hz

- **Real-time clock/calendar** : ALI-M1543/M1531built-in

- **RAM memory** : 2MB to 128MB,EDO and FPM DRAM supported

- **Second Cache memory** : L2 512KB pipelined burst SRAM

- **Ultra DMA/33 IDE Interface** :
    up to two PCI Enhance IDE hard drives. The Ultra DMA/33 IDE can handle data transfer up to 33MB/s. The best of all is that is new technology is compatible with existing ATA-2 IDE specifications. So there is no need to do any change for customer's current accessory.

- **Floppy disk drive interface** :
    Two 2.88 MB, 1.44MB, 1.2MB, 720KB, or 360KB floppy disk drives.

- **Plug and Play :**
    Dual interrupt and DMA signal steering with plug and play control. MS Windows 95/98/NT and plug play BIOS compliant

- **Two high speed Series ports** : NS16C550 compatible UARTs

- **Standard/EPP/ECP Parallel Port**

- **USB port** : Support two USB ports for future expansion

- **VGA Display**:
    Built-in PCI-Bus VGA controller (C&T 65550)
    Panel support TFT,STN,EL,Mono LCD
    High performance Flat Panel/CRT GUI accelerator
    64 bit graphic engine
    up to 1024x768 256 colors
    On-board 1MB display memory

- **Watch-dog timer** :
    Software programmable watchdog timer
    16 level timeout intervals range from 1 to 160 sec (+/- 15%)

- **Solid state Disk:**
    On board 1.7MB Flash disk
    Supports one extended 32-pin socket which can accept up to 512KB SRAM/Flash device
    Accept DiskOnChip™ flash disk

- **Mouse** : PS/2 Mouse Port on-board.

- **PC-104 connector:** 16 bit PC/104 connector for expansion modules

- **Power Consumption** : +5V @ 4.6A
    (Pentium/MMX-200,16MB EDO RAM) +12V @ 70mA, -12V @ 20 mA

- **Operating Temperature** : 0° ~ 55° C (CPU needs Cooler)

1.3　What You Have

In addition to this *User's Manual*, the PI-6582V package includes the following items:

- PI-6582V Pentium with VGA Single Board Computer

- RS-232/Printer Cable

- FDD/HDD Cable

- 6-pin Mini-Din to 5-pin Din Keyboard Adapter Cable

If any of these items is missing or damaged, contact the dealer from whom you purhased the product. Save the shipping materials and carton in case you want to ship or store the product in the future.

1.4　Installation

This chapter describes how to install the PI-6582V. At first, the layout of PI-6582V is shown, and the unpacking information that you should be careful is described. The jumpers and switches setting for the PI-6582V's configuration, such as CPU type selection, system clock setting, and watch dog timer, are also included.

1.5   P.C.B layout
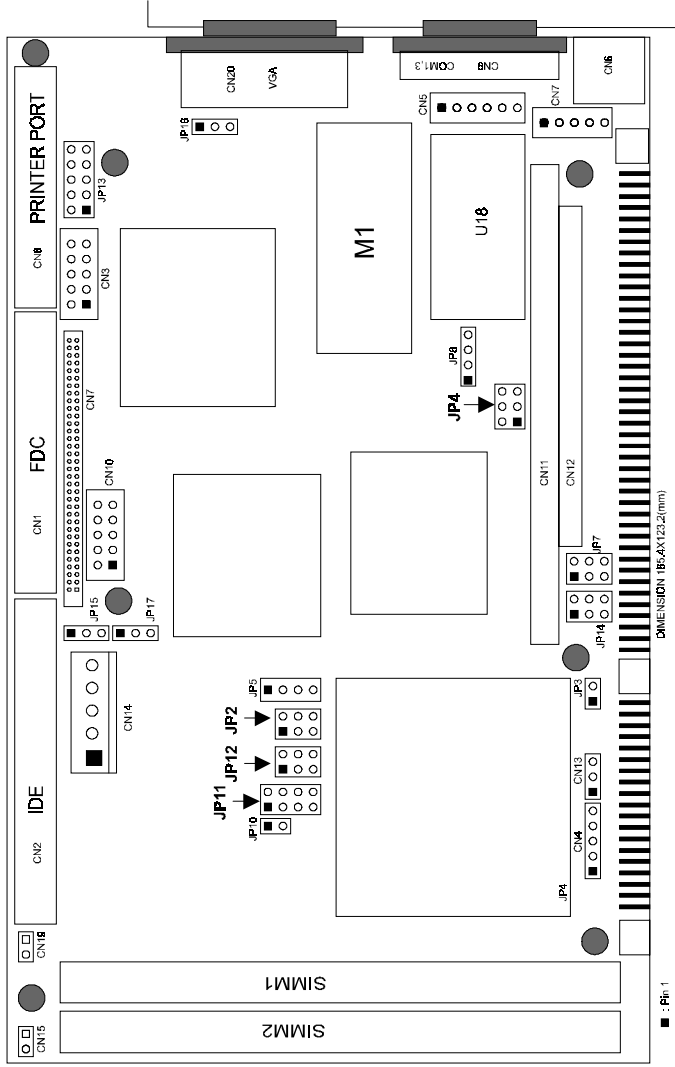
1.6   P.C.B dimension
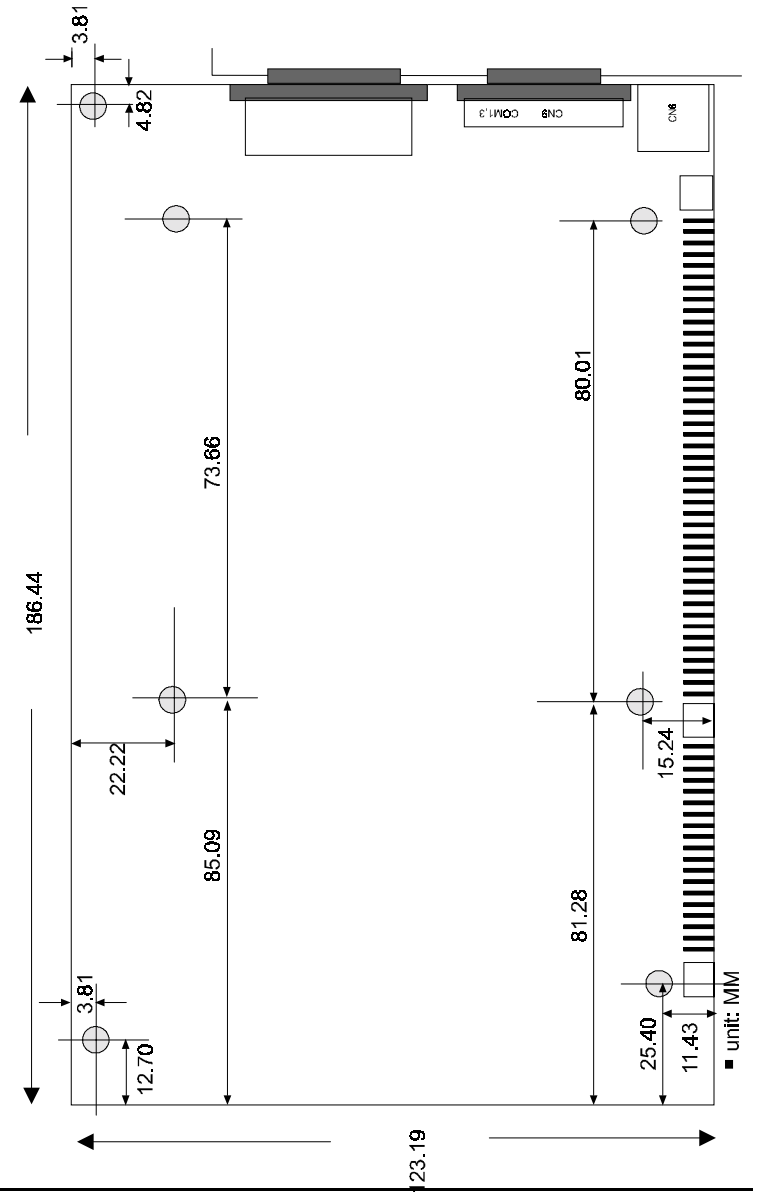
2. Installations

2.1 CPU installation

There are four jumpers are used for CPU installation
■ JP4CPU external frequency selector

External frequency	PCI bus	JP4 short pins
50MHz	25MHz	1-2, 3-4, 5-6
55 MHz	27.5 MHz	1-2, 5-6
60 MHz	30 MHz	3-4, 5-6
66.6 MHz	33.3 MHz	1-2, 3-4
75 MHz	37.5 MHz	5-6

■ JP11/12 CPU voltage selector

JP11		JP12		Vio	Vcore
Short	open	short	open		
5-6, 7-8	1-2, 3-4	3-4	1-2, 5-6	3.3V	3.3V
1-2, 3-4	5-6, 7-8	1-2	3,4 5,6	3.3V	2.8V
1-2, 3-4	5-6, 7-8	5-6	1-2, 3-4	3.3V	3.5V
1-2, 3-4	5-6, 7-8	None	1-2, 3,4, 5-6	3.3V	2.2V

■ Pentium CPU installation

CPU type	Bus/core freq. ratio JP2	External clock JP4	Vio JP11	Vcore JP12
Pentium P54C-90				
Pentium P54C-100				
Pentium P54C-120				
Pentium P54C-133				
Pentium P54C-150				
Pentium P54C-166				
Pentium P54C-200				
Pentium P55C-150				
Pentium P55C-166				
Pentium P55C-200				
Pentium P55C-233				

■ AMD CPU installation

CPU type	Internal Clock JP2	External clock JP4	Vio JP11	Vcore JP12
AMD K5-100				
AMD K5-133				
AMD K5-150				
AMD K5-166				
AMD K5-200				
AMD K6-166				
AMD K6-200				
AMD K6-233				
AMD K6/2-300				
AMD K6/2-333				

■ Cyrix CPU installation

CPU type	Internal Clock JP2	External clock JP4	Vio JP11	Vcore JP12
Cyrix 6X86 P120+(100MHz)				
Cyrix 6X86 P133+(110MHz)				
Cyrix 6X86 P150+(120MHz)				
Cyrix 6X86 P166+(133MHz)				
Cyrix 6X86 P200+(150MHz)				
Cyrix 6X86L P120+(100MHz)				
Cyrix 6X86L P133+(110MHz)				
Cyrix 6X86L P150+(120MHz)				
Cyrix 6X86L P166+(133MHz)				
Cyrix 6X86L P200+(150MHz)				
Cyrix 6X86MX PR166+(150MHz)				

Cyrix 6X86MX PR200+(166MHz)				
CyrixMX PR233+(200MHz)				
CyrixMX PR266+(233MHz)				

2.2   Memory installation

The PI-6582V industrial CPU card supports two 72-pin SIMM sockets for a maximum total memory of 128MB. The DRAMs for SIMM sockets can be 4MB,8MB,16MB, and 64MB in EDO and FPM types

The following should be noted when populating the SIMM sockets

Memory configuration	
SIMM1, SIMM2	Total memory
4MB×2	8MB
8MB×2	16MB
16MB×2	32MB
32MB×2	64MB
64MB×2	128MB

3. Jumpers on the PI-6582V

3.1   Battery backup for CMOS RAM and SRAM disk (JP8)
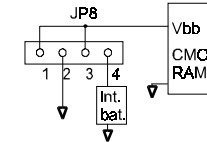
Block diagram of battery backup circuit

JP8	Function
	Using internal battery
	Clear CMOS RAM
	Using external battery

3.2   Jumper for Ring/Vcc selection for pin-9 of COM ports (JP7)

The signal of pin-9 of COM ports are jumper selectable to "RING" or Vcc

Pin 9 of COM port	JP7	Signal
COM 1,3		Ring
		+5Vdc
COM 2,4		Ring
		+5Vdc

3.3 VGA Flat panel SHF_CLK signal setting (JP15)

JP15	Singal
	SHF_CLK inverted
	Normal

3.4 On-board Flash/RAM disk enable/disable (JP13 pin5-6)

Flash/RAM disk	JP13 pin 5-6
Enable	
Disable	

3.5 Flash/RAM disk & watchdog Base port settings (JP13 pin1-2)

I/O Base port	JP13 pin1-2
536H - 537H	
636H - 637H	

3.6 Device setting on the extended socket (M1) (JP13 pin7-8)

Device type	JP13 pin7-8
FLASH	
SRAM	
DiskOnChip	

3.7 DiskOnChip enable/disable setting (JP13 pin9-10)
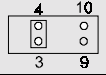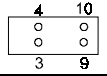
DiskOnChip	JP13 pin9-10
Enable	
Disable	

Note: 1. The socket called "M1" can accept normal memory device (such as SST, ATMEL Flash or SRAM) or DiskOnChip Flash chip by setting jumper JP13 pin 9-10

3.8 On-board Flash/RAM disk address setting (JP13 pin 3-4)

On board flash disk Memory address	JP13 pin3-4
D0000H-D5FFFH	
D8000H-DDFFFH	

3.9 DiskOnChip Memory address (JP13 pin 3-4)

DiskOnChip Memory address	JP13 pin 3-4
D6000H-D7FFFH	
DE000H-DFFFFH	

3.10 Watch dog timer setting (JP14)

The on board watch dog timer can be enabled/disabled by setting jumper JP14 pin 1-2

Watch dog timer	JP14 pin 1-2
Enable	
Disable	

3.11 Watch dog timer time base settings

There are two time bases for watch dog timer 1 sec or 10 sec by setting jumper JP14 pin 3-4,5-6

Watch dog time base	JP14 pin 3-4 , 5-6
1 sec	
10 sec	

4. Pin assignments of connectors

4.1 External power connector (CN14)

Pin No.	Signal
1	N.C
2	+5V DC
3	+12V DC
4	-12V DC
5,6	GND

4.2 USB (Universal Serial Bus) connector (CN3)

■ USB Port 0

Pin No.	Signal
1	+5V
2	USB-
3	USB+
4	GND
5	GND

■ USB Port 1

Pin No.	Signal
6	+5V
7	USB-
8	USB+
9	GND
10	GND

4.3 Hardware reset connector (CN15)

Pin No.	signal
1	Reset input
2	GND

4.4 Keyboard lock connector (CN4)

Pin No.	Signal
1	Power L.E.D
2	N.C
3	GND
4	Key lock
5	GND

4.5 CPU cooling fan power connector (CN13)

Pin No.	Signal
1	GND
2	+!2V DC
3	GND

4.6 PS/2 mouse connector (CN5)

Pin No.	Signal
1	MS_data
2	N.C
3	GND
4	+5V DC
5	MS_clk
6	N.C

4.7 Keyboard connector (CN6)

Pin No.	Signal
1	KB_data
2	N.C
3	GND
4	+5V DC
5	KB_clk
6	GND

4.8 Extended keyboard connector (CN7)

Pin No.	Signal
1	KB_clk
2	KB_data
3	N.C
4	GND
5	+5V DC

4.9 External speaker connector (JP5)

Pin No.	Signal
1	+5V DC
2,3,4,5	Speaker out

4.10 Hard Disk LED (CN19)

Pin No.	Signal
1	LED +
2	LED -

4.11 Floppy disk connector (CN1)

Pin No.	Description
1 -33 (odd)	Ground
2	High density
4,6	Unused
8	Index
10	Motor enable A
12	Driver select B
14	Driver select A
16	Motor enable B
18	Direction
20	Step pulse
22	Write data
24	Wite enable
26	Track 0
28	write protect
30	Read data
32	Select head
34	Disk change

4.12 Hard disk connector (CN2)

Pin No.	Description	Pin No.	Description
1	-RST	2	Ground
3	D7	4	D8
5	D6	6	D9
7	D5	8	D10
9	D4	10	D11
11	D3	12	D12
13	D2	14	D13
15	D1	16	D14
17	D0	18	D15
-19	GND	20	N.C
21	N.C	22	GND
23	IOW	24	GND
25	IOR	26	GND
27	IORDY	28	BALE
29	N.C.	30	GND
31	IRQ	32	IO16
33	A1	34	N.C.
35	A0	36	A2 CS0
37	CS0	38	CS1
39	-ACT	40	GND

4.13 Parallel port connector (CN8)

Pin No.	Description	Pin No.	Description
1	-STROBE	2	DATA0
3	DATA1	4	DATA2
5	DATA3	6	DATA4
7	DATA5	8	DATA6
9	DATA7	10	ACK
11	BUSY	12	EMPTY
13	SELECT	14	Auto FEED
15	ERROR	16	INIT
17	INPUT	18	GND
19	GND	20	GND
21	GND	22	GND
23	GND	24	GND
25	GND	26	GND

4.14 COM port connectors

"CN20 " connectors has two functions. It acts as COM2/4 port connector for PI-6582: and acts as VGA output connector For PI-6582V

■ COM[1,3] port (CN9)

COM[1,3]	Signal
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI (or Vcc)

■ COM[2,4] port

1. For **PI-6582 :**   The COM[2,4] port is connected to both CN20(9-pin D-type connector) and CN3(10-pin FRC connector)

2. For **PI-6582V :**   The COM[2,4] port is connected to CN3(10-pin FRC connector) only

COM[2,4]	Signal
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI (or Vcc)

4.15 VGA CRT monitor connector: CN20 (PI-6582V only)

Pin No.	Signal
1	RED
2	GREEN
3	BLUE
4	N.C
5	GROUND
6	R/G/B return GND
7	R/G/B return GND
8	R/G/B return GND
9	N.C
10	GND
11	N.C
12	N.C
13	HSYNC
14	VSYNC
15	N.C

4.16 Flat panel output connector

Pin No.	Function	Pin No.	Function
1	GND	2	GND
3	SHF_CLK	4	M
5	HSYNC(LP)	6	VSYNC (FLM)
7	P0	8	P1*
9	P2	10	P3
11	P4	12	P5
13	P6	14	P7
15	P8	16	P9
17	P10	18	P11
19	P12	20	P13
21	P14	22	P15
23	P16	24	P17
25	P18	26	P19
27	P20	28	P21
29	P22	30	P23
31	GND	32	GND
33	+5V	34	+5V
35	+5V	36	ENABKL*
37	ENAVEE	38	+12V
39	+12V	40	KBD_CLK
41	KBD_DATA	42	GND
43	RX (COM2)	44	TX (COM2)*

Tx = RS-232 COM[2,4] Transmitter, Rx = RS-232 COM[2,4] Receiver
KBD_CLK = Keyboard Clock signal, KBD_DAT = Keyboard data signal
640x480 and 800x600 modes can be run in simultaneous display with CRT

4.17 PC-104 ISA bus connectors

■ XT- bus

CN6	Name	CN6	Name	CN6	Name	CN6	Name
A1	-IOCHK	A17	SA14	B1	GND	B17	-DACK1
A2	SD7	A18	SA13	B2	RESET	B18	DRQ1
A3	SD6	A19	SA12	B3	VCC	B19	-REFSH
A4	SD5	A20	SA11	B4	IRQ9	B20	SCLK
A5	SD4	A21	SA10	B5	-5V	B21	IRQ7
A6	SD3	A22	SA9	B6	DRQ2	B22	IRQ6
A7	SD2	A23	SA8	B7	-12V	B23	IRQ5
A8	SD1	A24	SA7	B8	-WS0	B24	IRQ4
A9	SD0	A25	SA6	B9	+12V	B25	IRQ3
A10	IORDY	A26	SA5	B10	NC	B26	-DACK2
A11	BAEN	A27	SA4	B11	-SMWR	B27	TC
A12	SA19	A28	SA3	B12	-SMRD	B28	BALE
A13	SA18	A29	SA2	B13	-IOW	B29	VCC
A14	SA17	A30	SA1	B14	-IOR	B30	OSC
A15	SA16	A31	SA0	B15	-DACK3	B31	GND
A16	SA15	A32	GND	B16	-DRQ3	B32	GND

■ AT D bus

CN5	Name	CN5	Name	CN5	Name	CN5	Name
D1	GND	D11	-DACK5	C1	GND	C11	-MWR
D2	-MCS16	D12	DRQ5	C2	-SBHE	C12	SD8
D3	-IOCS16	D13	-DACK6	C3	SA23	C13	SD9
D4	IRQ10	D14	DRQ6	C4	SA22	C14	S10
D5	IRQ11	D15	-DACK7	C5	SA21	C15	SD11
D6	IRQ12	D16	DRQ7	C6	SA20	C16	SD12
D7	IRQ13	D17	VCC	C7	SA19	C17	SD13
D8	IRQ14	D18	MASTR	C8	SA18	C18	SD14
D9	DACK0	D19	GND	C9	SA17	C19	SD15
D10	DRQ0	D20	GND	C10	-MRD	C20	NC

5. How to use on board Flash disk

5.1 About solid state disk

The PI-6582 provides on-board 1.7MB flash ROM disk and one extended solid state disk sockets (M1) which can accept EPROM/SRAM/FLASH. And also **DiskOnChip™** device

The PI-6582 solid state disk occupies two system memory sections.

Section 1   :the last 12K bytes at higher memory address for solid state
           disk BIOS parameter buffer

Section 2   :Disk bank(32K) at D000:0000-D000:7FFFH or D800:0000-D800:7FFFH
           (16K disk BIOS+16K disk bank)

SYSTEM MEMORY MAPPING
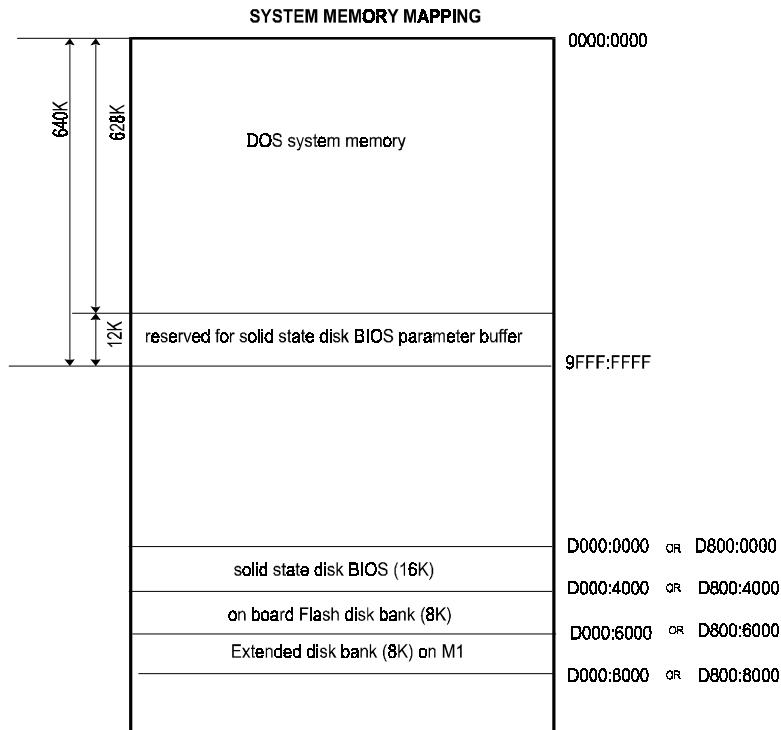
5.2 On board Flash disk hardware settings

There is a jumper called "JP13" should be set properly before using ROM/RAM disk. (refer to chapter 2)

- JP13 pin 1-2 is used to set base port of disk
- JP13 pin 5-6 and pin 9-10 are used to enable or disable disk
- JP13 pin 3-4 is used to set the memory address occupied by disk
- JP13 pin 7-8 is used to set device type inserted on the socket "M1"

5.3 Solid state disk Setup

The solid state disk SETUP configures the solid state disk information that is stored in EEPROM. The solid state disk has a window Setup interface that is recognizable to anyone.

This setup function is available for on-board 1.7MB Flash and extended disk (M1 socket) configuration

As Award BIOS POST executes, the following appears:

.

.

.WAIT……..

    Hit <F10> to Run Advanced Solid state disk SETUP

At this time, Hit <F10> to run Solid state disk SETUP. A SETUP window shows up on the screen.

.

All-in-one 80386SX CPU Card ROM/RAM Disk SetUp Vx.x	
Primary disk drive	:A
Secondary disk drive	None
System boot sequence	:Flash disk
COM port for remote Flash PGM	:COM1
Auto detect and boot from Disk A:	:Disabled

    PgUp/PgDn:Select   -   Esc:No save   -   F7:Save

Where

■   Primary disk drive

The on board 1.7MB flash disk can emulate disk drive A:,B:,C:,D: or disabled.

A	=	Drive A:
B	=	Drive B:
C	=	Drive C:
D	=	Drive D:
Disabled:	=	Disable solid state disk

■   Secondary disk drive

There are two configurations for extended device on the extended socket called M1. The device can be configured into primary or to secondary drive as shown below

None	=	Combine device into on board 1.7MB flash disk
M1	=	Be a secondary disk alone

■   System Boot Up Sequence

The system may boot up from two following sequences as:

CMOS SETUP	=	Boot up according to CMOS Setup sequence
ROM Disk	=	Boot up from solid state disk, if DOS files existed in the Primary disk

■   COM Port for Remote Flash PGM

If you are going to remotely access the 1.7MB Flash disk or extended disk on M1 socket with utility called "RDISK.EXE" . You should select which communication port be connected to communicate with host system.

COM1	=	COM1 port (3F8H) IRQ4
COM2	=	COM2 port (2F8H) IRQ3
Disabled	=	No remote Access required

■   Auto detect and boot from Disk A:

Enabled	=	If system files(IO.SYS, SMDOS.SYS) existed in Floppy disk A:, the system will automatically boot form disk A:.
Disabled	=	Normal boot sequence

■   Selects and save SETUP

PgDn	=	Moves reverse bar down
Esc	=	Quit without saving SETUP
F7	=	Quit and saves current SETUP to EEPROM

5.4   Using on board 1.7MB Flash disk

The on-board 1.7MB flash disk provides you an easy way to build a *mechanical diskless system* without any additional disk devices. You can directly read/write this Flash disk at DOS prompt such as (COPY, DEL, FORMAT, ..etc).

The following procedures show you how to use this Flash disk

1. Setting JP13 properly before turn on system

2. Boot system form normal CMOS setup sequence

3. Format on-board 1.7MB Flash disk at DOS prompt as:
   C>format   <Flash disk drive name> /S

4. Create "AUOTOEXEC.BAT" file in the flash disk

5. Copy "DISKSWAP.EXE" file into flash disk

6. Modifies "AUTOEXEC.BAT" file to have "DISKSWAP.EXE" at first line

7. Copy your application files into Flash disk by using "COPY" command

8. Reboot system and then modify the ROM/RAM disk setup to set "Boot Sequence" to "ROM Disk" and press F7 to save

9. The system will boot DOS from Flash disk

5.5   How to install Flash or SRAM device on socket M1

■   Jumper setting for extended disk on the socket M1

See jumper settings of chapter 3 before installing device

■   Acceptable device on the socket M1

The extended socket "M1" ca n accept many types of Volatile memory devices, including Flash, SRAM as shown followings

SRAM	:SONY CXK581000/584000 or equivalents
ATMEL Flash	:29C010, 29C040, 29C040A
SST Flash	:29EE010, 28SF040

Note: 1. ATMEL 29Cxxx and SST 29EE101, 28SF040 Flash ROMs are all operated as static RAM device on the solid state disk, but no battery backup required and program cycle are limited to 100,000 to 500,000 times.

2. If SRAM is installed, Jumper JP13 pin 7-8 should be shorted to backup SRAM data

■   Setting drive of extended disk

You have two way to use extended device on the socket M1

1. Combines into on board 1.7MB Flash disk in primary disk

2. Be a secondary disk alone

■   Format before usgae

If device (Flash or SRAM) is first time installed into extended socket (labeled M1) and combined into primary disk. The "FORMAT" process is necessary before usage.

C> FORMAT <Primary disk name>/S

The primary disk size=1.7MB + size of device on the socket M1

If device (Flash or SRAM) is first time installed into extended socket (labeled M1) and set to be secondary disk alone. The "FORMAT" process is necessary before usage.

C> FORMAT <Secondary disk name>

The primary disk size=1.7MB

Secondary disk size= size of device on the socket M1

5.6   Flash disk installation examples

■   Example 1: Assume to use on board 1.7MB Flash disk and 128KB SRAM on the socket M1, and Primary disk is B"

Step 1 :Press "F10" at BIOS POST to run ROM/RAM disk setup

Step 2 :Set "Primary disk drive" to B, and "Secondary disk drive" to None (Primary disk drive=on board 1.7MB+128KB SRAM)

All-in-one 80386SX CPU Card ROM/RAM Disk SetUp Vx.x	
Primary disk drive	:B
Secondary disk drive	None
System boot sequence	: CMOS setup
COM port for remote Flash PGM	:COM1
Auto detect and boot from Disk A:	:Disabled

Step 3 :Set "Boot sequence" to CMOS setup

Step 4 :Press "F7" to save setup value and exit

Step 5 :Format B:/S (Primary disk drive) at DOS prompt

The total capacity of disk B: is 1700KB +128KB=1828KB

Step 6 :Creat "Autoexec.bat" file in disk B:, and modify the first line in "autoexec.bat" file to have "@ Diskswap.exe" command

Step 7 :Copy "**DISKSWAP.EXE**" file to disk B: from provided utility diskette

Step 8 :reboot your system and press "F10" again and modify "Boot sequence" to ROM disk

Note:

The file called "**Diskswap.exe**" in the provided diskette is used to swap the disk drive name when system boots from ROM/RAM disk

■   Example 2: Assume to use on board 1.7MB Flash disk as disk A: (Primary disk) ,
                and 512KB ATMEL Flash on the socket M1 as Disk B (Secondary disk)

Step 1 :Press "F10" at BIOS POST to run ROM/RAM disk setup

Step 2 :Set "Primary disk drive" to A, and "Secondary disk drive" to M1
         (Primary disk drive=on board 1.7MB)
         (Secondary disk drive=512KB Flash)

All-in-one 80386SX CPU Card ROM/RAM Disk SetUp Vx.x	
Primary disk drive	:A
Secondary disk drive	M1
System boot sequence	:CMOS setup
COM port for remote Flash PGM	:COM1
Auto detect and boot from Disk A:	:Disabled

Step 3 :Set "Boot sequence" to CMOS setup

Step 4 :Press "F7" to save setup value and exit

Step 5 :Format A: and B: at DOS prompt
      C>Format A:/S   (format Primary disk with system files)

      C>format B: (format Secondary disk)

Step 6 :Creat "Autoexec.bat" file in disk A:, and modify the first line in
       "autoexec.bat" file to have "@ Diskswap.exe" command

Step 7 :Copy "DISKSWAP.EXE" file to disk A: from provided utility diskette
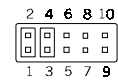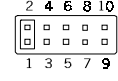
Step 8 :reboot your system and press "F10" again and modify "Boot
       sequence" to ROM disk

6.   How to use DiskOnChip Flash disk
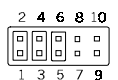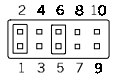
The DiskOnChip™ Flash disk chip is produced by M-Systems. The DiskOnChip™ Flash disk occupies only 8KB system memory address, and can completely emulate a disk in PC system

The PI-6582V card allows the user to install this device on the socket called M1. A jumper called JP13 pin 9-10 and pin 3-4 are used to enable or disable DiskOnChip™ Flash disk

6.1   Using DiskOnChip only

JP13 pin 9-10	DiskOnChip Memory address
2 4 6 8 10 1 3 5 7 9	D6000H-D7FFFH
2 4 6 8 10 1 3 5 7 9	DE000H-DFFFFH

6.2   Using DiskOnChip and on-board 1.7MB Flash disk simultaneously

JP13 pin 9-10	Memory address	
	On-board Flash disk	DiskOnChip
2 4 6 8 10 1 3 5 7 9	D0000H-D5FFFH	D6000H-D7FFFH
2 4 6 8 10 1 3 5 7 9	D8000H-DDFFFH	DE000H-DFFFFH

7. On board Flash/RAM disk BIOS function calls

The on-board Flash/RAM disk BIOS provides you the flexible functions that you can directly access the on-board memory device(s) without using file handler of DOS.

7.1 Function Call Entry:INT 83H

Entry:	AH=1	;Get Device type and size
	DL=Device No.	
	=0 "M1" socket	
Exit:	AH =Device Type	=10H SRAM
		=20H EPROM
		=CxH SST Flash ROM
		=DxH ATMEL Flash ROM
	CX =size (KB)	

Entry:	AH=2	;Read Sectors From Memory
	DL=Device No.	;device
	CX=Sector No.	
	AL=Sectors	
Exit:	ES:BX= Destination buffer pointer	

Entry:	AH =3	;Writes One Sector to memory ;device
	DL =Device No.	;(0,1,2)
	CX=Sector No.	;(0,1,2,……)
	AL=Sectors.	;(1,2,……..)
Exit:	ES:BX= Soruce buffer pointer	
	Carry =1	; data writing error
	Carry =0	;completed

Entry	AH =4	;Reads One Byte From EEPROM
	BX=EEPROM address	;(0-499)
Exit	AL=Data be read out	

Entry:	AH =5	;Writes One Byte to EEPROM
	AL =Data be written	
	BX =EEPROM addr.	
Exit:	Carry=1	;Data writing error
	Carry=0	;completed

7.2 Example written with C language:

```
#include "io.h"
#include "stdlib.h"
#include "conio.h"
#include "dos.h"
char sector_buffer[512];
main()
{
clrscr();
  if (check_funcall()==-1)          /* Check existence of Function call Entry */
    {
      printf ("Flash/RAM disk Function call not existed \n\r ");
      exit(0);
    }
  printf ("Flash/RAM disk Function call ready..\n\r ");
  read_devsec(2,0,1,sector_buffer);
  write_devsec(2,0,1,sector_buffer);
}
```

```
/*************************************************/
/*      Function Calls of Flash/RAM disk    */
/*************************************************/
int check_funcall()
/*   Check existence of Flash/RAM disk function call entry */

{
unsigned far *Int83_Ptr=0x0000020c; /* Points to INT 83H vector */
unsigned far *idptr;
idptr=MK_FP(*(Int83_Ptr),0);        /* Get Function call Parameter */
 if (*(idptr)!=0x5678)               /* Check Function call ID code */
    return(-1);                      /* Function call entry not existed */
 else
    return(1);                       /* Function call entry available */
}
read_devsec(int device_no,int sector_no,int sectors,char *buffer_ptr)
/* Directly read sectors from Flash/RAM disk function call entry
  where
  Entry  int device_no :device No. (0.....)
         int sector_no :start sector No. (0....)
         int sectors    :sectors be read    (1....)
         int buffer_ptr :data buffer pointer
  Exit    Datas in buffer_ptr                    */

{
 union REGS xr;
 struct SREGS sr;

 xr.h.ah=2;                          /* Function call no in AH */
 xr.h.dl=device_no&0xff;             /* Device No. in DL */
 xr.x.cx=sector_no;                  /* Sector No. in CX */
```

```
 xr.h.al=sectors;                    /* Sectors in AL */
 xr.x.bx=FP_OFF(buffer_ptr);         /* Offset of Buffer pointer in BX */
 sr.es=FP_SEG(buffer_ptr);           /* Segment of Buffer pointer in ES */
 int86x(0x83,&xr,&xr,&sr);           /* Call function */

}

write_devsec(int device_no,int sector_no,int sectors,char *buffer_ptr)

/* Directly write sectors of device through function call entry

where
Entry    int device_no :device No. (0.....)
         int sector_no :start sector No. (0....)
         int sectors    :sectors be written   (1....)
         int buffer_ptr :data buffer pointer
Exit      None              */

{
 union REGS xr;
 struct SREGS sr;
 xr.h.ah=3;                          /* Function call no in AH */
 xr.h.dl=device_no&0xff;             /* Device No. in DL */
 xr.x.cx=sector_no;                  /* Sector No. in CX */
 xr.h.al=sectors;                    /* Sectors in AL */
 xr.x.bx=FP_OFF(buffer_ptr);         /* Offset of Buffer pointer in BX */
 sr.es=FP_SEG(buffer_ptr);           /* Segment of Buffer pointer in ES */
 int86x(0x83,&xr,&xr,&sr);           /* Call function */
}      End
```

8. How to use watch dog timer

The PI-6582V is equipped with a watch-dog timer that resets the system if processing comes to a standstill, Typically caused by electromagnetic interference (EMI) or software bugs. This features ensures continued operation in industrial stand-alone and unmanned applications. The watch-dog timer is a circuit that should be refreshed periodically. if it is not refreshed within a certain time, the watch-dog timer will automatically reset the system, generate interrupts or MNI. This prevents a system from hanging indefinitely.

The watchdog timer can be programmed in 16 level form 1 to 166 seconds. The "RESET" signal wil be generated from watchdog timer, When timer out reaches

8.1 Watch dog timer settings

■ Enable Watch dog timer (JP14 pin 1-2)

The on board watch dog timer can be enabled/disabled by setting jumper JP14 pin 1-2

Watch dog timer	JP14 pin 1-2
Enable	

■ Watch dog timer time base settings

There are two time bases for watch dog timer 1 sec or 10 sec by setting jumper JP14 pin 3-4,5-6

Watch dog time base	JP14 pin 3-4 , 5-6
1 sec	
10 sec	

■ Watch dog timer contrl port

The on board watch dog timer uses one I/O port address 536H or 636H depends on the settings of Jumper "JP13" (see chapter 3)

Port address	direction	function
536H or 636H	output	Write time out value to watch dog timer
	input	Refresh watch dog timer

■ Time out period table (written with 536H or 636H port)

Initial value	Time out period	
	Time base =1 sec	Time base=10 sec
0	Disable	disable
1FH	1 sec	10 sec
1EH	2 sec	20 sec
1DH	3 sec	30 sec
1CH	4 sec	40 sec
1BH	5 sec	50 sec
1AH	6 sec	60 sec
19H	7 sec	70 sec
18H	8 sec	80 sec
17H	9 sec	90 sec
16H	10 sec	100 sec
15H	11 sec	110 sec
14H	12 sec	120 sec
13H	13 sec	130 sec
12H	14 sec	140 sec
11H	15 sec	150 sec
10H	16 sec	160 sec

8.2 Example program source list

■ Example program written with assembly language(WDDEMO.ASM in diskette)

```
; Assume set Time base to 1 sec and base port to 536H

;Initial watch dog timer to have 15 sec time out period
mov    dx,536H            ;Points to watch dog timer base port
mov    al,11h             ;Loads time out value
out    dx,al             ;write time out value to time out counter
;user's application section
..
..
mov    dx,536H            ;Points to watch dog timer base port
in     dx,al             ;refresh watch dog timer counter
;user's application section
..
..
; disable watch dog timer
mov    dx,536H            ;Points to watch dog timer base port
mov    al,0h             ;Loads time out value=0
out    dx,al             ; disable watch dog timer
ret                      ;exit
```

■ Example program written with C language (WDDEMO.C in diskette)

```
#include <dos.h>
#include <time.h>
#include <stdio.h>
#include "wdogdrv.h"
```

```
/* ---------------Example program-1 of watch dog timer --------------------*/
/* This example program show you how to generate RESET signal when */
/* the time counter reaches the setting value */
/* ------------------------------------------------------------------------*/
void main ( )
 {
  Long Start_time,Cur_time;
  Int time_value,key=0;
  Int signal=RESET;
  printf ("\n\r======= Watch Dog Timer Demostration ============="
  "\n\r Example 1: Generates RESET signal when the watch dog timer"
  "\n\rreaches the preset value\n\r" );
  printf ("\n\r Time out Value (hex)=");
  scanf ("%H",&time_value);
  Outportb(0x536H,time_value);              /* Preset watch dog time value */
  time (&Start_time);                       /* Get start time */
  printf ("\n\r Press any key to trigger or [ESC] to terminate>\n\r\n\r" );
  while (key!=0x1b)
{
while (kbhit()==0)
  {
  time (&Cur_time);                          /* Get current time */
  printf ("\r Remainded time :%3d sec. ",time_value-(int)(Cur_time-Start_time));
  }
  if ((key=getch())!=0x1b)
  {
Inportb(0x536H;                              /* Trigger watch dog timer once*/
time (&Start_time);                          /* Get start time */
  } }
  Outportb(0x536h,0); }                       /* Disable Watch dog timer */
```

9. VGA driver installation

This chapter provides information on how to install VGA drivers that come in the floppy diskette with your PI-6582V card. Please note that there must be relevant software installed in your system before you could proceed to install the VGA drivers.

9.1 Installing the drivers for Windows 95

The following section describes the normal display driver installation procedures for Windows 95. Use the following procedures when installing the display drivers for Windows 95

1. Click Start, then Settings, then Control Panel
2. Double click on "Display"
3. Select the "Settings" page, click the "Change Display Type button.
4. Click the "Change" botton and press "OK"
5. Click the "Have Disk" button and press "OK"
6. Specify the path to the new driver and press <ENTER>:
7. Example: Insert the drivers disk in the A: floppy disk, and enter a:\win95
8. The "Select Device" dialog box will appear. Select the adapter that corresponds to the one you installed in your machine and click OK.
9. Windows 95 will copy the display drivers to the proper directories on your system
10. Continue choosing "Close" until asked to restart your machine from the "System Settings change" dialog box
11. After the system has restarted, you can go back into Display applet and select alternate screen resolution and color depths

9.2 Installing the drivers for Windows NT 3.5X

The following section describes the VGA driver instllation procedures for Windows NT 3.5X

1. Run Windows NT Setup from Main Group
2. Choose Option from the menu (Alt-O)
3. Select change System Setting (Alt-C)
4. Choose "Other" under the Display section
5. Insert display driver disk in appropriate floppy drive
6. Type the destination as "A:\NT35x"

9.3 Installing the drivers for Windows NT 4.0

Once you are in the Windows NT 4.0 environment, follow the procedures below to install the VGA drivers in the diskette that comes with your CPU card

1. Click the Start button, then go to Settings and click on Control Panel
2. Click on the Display icon to start the Display Properties window
3. Click on the Settings tab, and then click on Display Type
4. In the Change Display window, click on Have Disk. Follow the directions on the screen to supply the directory where the Windows NT driver files are located. Then select OK, or press ENTER.
5. Select Chips Video Accelerator from Display list provided, then click OK or press ENTER
6. You will then see a warning panel about Third Party Drivers. Click on Yes to finish the installation
7. Once the installation is completed, the system must be shut down and restarted for the new drivers to take effect
8. When the system has restarted, the default graphic mode (usually 640x480x256 color) has been automatically selected. Click the Start button, then go to Setting and click on Control Panel. Click on the Display icon to start the Display Properties window. Click on the Setting tab. A new screen setting can be selected using either of the following methods:

   A. Use the slide-bar in the Desktop Area to select new setting.
   B. Click on List All Modes. From the list provides, select a new setting, then click OK or press ENTER
   C. Click on Test to test the newly selected graphics mode. Follow the instructions given on the screen. A test screen should appear, followed by the Testing Mode window. Click on Yes to continue. Click on Apply to switch to the new graphics mode. Graphics modes are changed dynamically on NT 4.0, so you do not need to shut down and restart for the new screen settings to work

10.IDE Driver installation

This chapter provides information on how to install IDE hard disk drivers that come in the floppy diskette with your PI-6582V card. Please note that there must be relevant software installed in your system before you could proceed to install the IDE hard disk drivers.

10.1 Installing the drivers for DOS and Window 3.1

■   NOTES ABOUT INSTALL PROCEDURE

Please type   INSTALL

from install diskette to install driver for ALi Master IDE controller.

■   NOTES ABOUT SETUP.EXE

After successful installation, you can run SETUP.EXE (from where you just install it) to re-configure driver if something need to be changed. This utility can configure ALi IDE driver for DOS and Windows.

Please type   SETUP   to configure driver option.

■   ALIHDD.SYS Command Line Definition

This device driver is used for ALi local bus IDE chip.The hard disk drive performance will be tuned in the optimal condition by this driver. SETUP will add this driver in CONFIG.SYS in the following way

DEVICE=[DRIVE:]|\DIRECTORY]\ALIHDD.SYS [/Sxx] [/IOW:xxxx] [/LBA:xxxx][/Ixx] [/BKM:xxxx]

Please use SETUP.EXE to re-configure these parameters rather than modify CONFIG.SYS directly.

If some hardware configuration are changed, SETUP.EXE must be run and "AUTO DETECT" function must executed to update the driver's parameters.

1. /Sxx   Specify the Local Bus Speed.

Please specify your PCI local bus speed of system. The valid value must be 20MHz - 50 MHz. Assign this parameter for driver to adjust the best performance for your harddisk drives. The default will be 50MHz without assignment.

For example: use /S33 when your PCI local bus speed is 33Mhz

2. /PIO:xxxx   Specify the PIO mode for your hard disk drive.

Add this parameter if you want to assign fixed PIO mode to some hard disk drive. Default will be AUTO if no /PIO:xxxx assigned. Here 'AUTO' means ALIHDD.SYS

---

will identify your hard disk and select PIO mode timing according to hard disk drive supported PIO mode.

3. /PIO:abcd

d: Secondary channel slave drive use PIO Mode x

c: Secondary channel master drive use PIO Mode x

b: Primary channel slave drive use PIO Mode x

a: Primary channel master drive use PIO Mode x

For example: /PIO:12AA

will use PIO mode 1 for primary master drive, PIO mode 2 for primary slave drive, AUTO detect PIO mode for secondary master and slave   drives.

If some harddisk fails to be tuned by this device driver (not stable), try to add this parameter. This will happen when the harddisk drive does not support PIO mode 3 or above.

For example, we will AUTO tune Quantum ProDrive LPS 240A hard disk to mode 2 timing because this drive reports itself supports PIO mode 2. But we find it is unstable when using mode 2 timing. In this case, you can add /PIO:xxxx to adjust the timing to mode 1 for this Quantum drive.

4. /Ixx   Specify the secondary IDE control IRQ.

When one or two harddisk is equipped at secondary IDE connector, please assign this parameter for driver to recognize these hard disks. The valid parameter is

/I14   - Secondary IDE control IRQ14

or

/I15   - Secondary IDE control IRQ15

5. /BKM:xxxx   Enable Block mode for hard disk drives

/BKM:abcd

d: Secondary channel slave drive use block mode?

c: Secondary channel master drive use block mode?

b: Primary channel slave drive use block mode?

a: Primary channel master drive use block mode?

For example: /BKM:YYNN

will use block mode for primary master and primary slave drives, and not use block mode for secondary master and slave drives.

6. /LBA:xxxx   Enable the Large Capacity Feature(LBA) support for harddisk drives

    /LBA:abcd

        d: Secondary channel slave drive use LBA Mode?

        c: Secondary channel master drive use LBA Mode?

        b: Primary channel slave drive use LBA Mode?

        a: Primary channel master drive use LBA Mode?

For example: /LBA:NNYN

        will tryto use LBA mode   for secondary master drive, and not use LBA mode for secondary slave drive.

The primary channel LBA feature will be determined by your system BIOS. The secondary channel LBA feature will depend on your option. If /Ixx is assigned and BIOS can not handle secondary channel , the secondary channel LBA feature will be determined by whether /LBA:xxxx is assigned or not. Apparently, If /Ixx is assigned and BIOS can handle secondary channel, the secondary channel LBA feature is determined by BIOS.

When to add /LBA:xxxx option? When harddisk drive capacity is greater than 528MB and drive supports LBA mode, use /LBA:xxxx to enable device driver to utilize the full capacity of the harddisk drive. The device driver will still use CHS mode to access the hard disk drive which its capacity is smaller than 528MB or itself does not support LBA mode.

7. /DRIVE:xxxx

    /DRIVE:abcd

        d: What kind of secondary channel slave drive is?

        c: What kind of secondary channel master drive is?

        b: What kind of primary channel slave drive is?

        a: What kind of primary channel master drive is?

    where a,b,c,d is

        H for   Hard disk.

        C for   CD-ROM.

        N for   NONE.

Note:

1. The primary channel IDE drives type and LBA feature should be correctly set by system BIOS. (Please refer to the system BIOS SETUP)

2. There is a limitation of the IDE drives connected to secondary channel. The IDE drive which does not support identify command or its format is not the same with its identify information can not be connected to secondary channel. That means if this drive can not be AUTO detect type by SYSTEM BIOS when it is connected to primary channel, then it can not be correctly identified by ALIHDD.SYS when it is connected to secondary channel.

3. Due to the lack of SPEC issue, this driver does not support "Large" mode. Most of the hard drives that larger than 528 MB support LBA mode, please choose LBA mode rather than "Large" mode in BIOS setting.

10.2 Installing the drivers forNetWare 386 v3.1x, v4.x

Use the NetWare 386 v3.11 file "SERVER.EXE" to start the installation process. You will be prompted for a file server name and an IPX internal netwaork number. Consult the "NetWare 386 User's Manual" for this information.

Installing ALi NetWare driver requires use the "LOAD" console command.

For a complete explanation of "LOAD", see the "NetWare System Administration" manual.

■ For NetWare 3.1x :

    :LOAD [path]ALI312.DSK [parameters]

■ For NetWare 4.x :

    :LOAD [path]ALI4X.DSK [parameters]

Warning!!!

It's improper to switch IDE driver for NetWare server. Please load Ali driver during installation and keep on using it. If you use other driver and than switch to ALi driver, the data in hard disk will not be guaranteed to be correct, and vice versa.

10.3 Installing the drivers for SCO UNIX 5.0.0

- install :

  # mkdir /alihdd

  # doscp a:/sco-unix/alihdd.tar /alihdd

  # cd /alihdd

  # tar xf - < alihdd.tar

  # ./istl.alihdd

  when you see :

  A new kernel must be built and rebooted.

  Would you like to relink at this time?"

  Press   y

  # reboot

- uninstall:+

  # cd /alihdd

  # ./rm.alihdd

  when you see :

  A new kernel must be built and rebooted.

  Would you like to relink at this time?"

  Press   y

  # reboot

10.4 installing drivers for Window 95/98?

One of the two methods listed below can be used to install driver:

- Use INSTALL.BAT under Windows 95 environment.

OR

- Use the following sequence step by step:

1. Popup 'Control Panel' and open 'Add New Hardware'. Choice 'Next'.

2. Switch to 'No' - don't let Windows to search for your new hardware, and click 'Next'.

3. Select 'Hard disk controller' and click 'Next'.

4. Click the button 'Have Disk' (or press Alt+H).

5. Make sure the install disk is in drive A(or drive B), and then click 'OK'. A 'Select Device' dialog box will be popup.

6. Select the device that you wish to install and click 'Next'.

7. After this install procedure is complete, you may need to restart the computer.

Attention :

1. When the Win95 install the software for primary and secondary channel for IDE driver, please DO NOT RESTART COMPUTER after Win95 just finish primary channel. Let Win95 continue to install software for secondary channel. After secondary channel is finished, the RESTART COMPUTER to let new installed IDE driver to take effect.

2. DOS CD-ROM and IDE drivers will conflict with ALi bus master driver in Win95. Please remove "mscdex" command line from autoexec.bat and remove the specification "device=Your DOS CD-ROM and/or IDE driver" from config.sys.

3. Sometimes, the ALi IDE controller has already been installed with the standard driver provided by Microsoft. In order to use ALi IDE controller with the driver we provided, it is necessary to remove the standard driver from "Control Panel/System/Device Manager".

4. This version support Ultra-33 feature.

10.5 Installing drivers for Window NT 4.0

1. From the Control Panel menu, double click the SCSI Adapters icon.

2. When the SCSI Adapters dialog box appears, click [Drivers] in the upper menu . Pick the [Add...] button.

3. Click [Have Disk...] in the Install Driver dialog box.

4. Insert the IDE Driver installation diskette for Windows NT4.0 into floppy drive. Key in the correct dirve and path, then click [OK].

5. "ALi Bus Master IDE Controller" will present in the Install Driver dialog box. Please click [OK] again.

6. When the dialog box asks you " Do you want to restart your computer now?" select [Yes]. System will reboot.

7. When the system brings up again, repeat procedure 1.

8. When the SCSI Adapters dialog box appears, select the driver which you do not want, click [Remove].

9. Shutdown and reboot system, installation is complete.

11.CMOS setup

11.1 Main Menu

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

STANDARD CMOS SETUP	INTEGRATED PERIPHERALS
BIOS FEATURES SETUP	PASSWORD SETTING
CHIPSET FEATURES SETUP	IDE HDD AUTO DETECTION
POWER MANAGEMENT SETUP	SAVE & EXIT SETUP
PNP/PCI CONFIGURATION	EXIT WITHOUT SAVING
LOAD BIOS DEFAULTS	
LOAD SETUP DEFAULTS	
ESC: Quit	↑↓→←:Select item
F10:Save & Exit	(Shift) F2:Change Color
Time,Date,Hard disk Type	

- ■ Standard CMOS Setup

  This setup page includes all the items in a standard, AT-compatible BIOS

- ■ BIOS Features Setup

  This setup page includes all the items of Award special enhanced features

- ■ Chipset Features Setup

  This setup page includes all the items of chipset special features.

- ■ Power Management Setup

  This entry only appears if your system supports Power Management, "Green PC", standards PNP / PCI Configuration Setup. This entry appears if your system supports PNP / PCI.

■ Load BIOS Defaults

The BIOS defaults have been set by the manufacturer and represent settings which provide the minimum requirements for your system to operate.

■ Load Setup Defaults

The chipset defaults are settings which provide for maximum system performance. While Award has designed the custom BIOS to maximize performance, the manufacturer has the right to change these defaults to meet their needs.

■ Password setting

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

■ Integrated Peripherals

This section page includes all the items of IDE hard drive and Programmed Input / Output features.".

■ IDE HDD Auto Detection

Automatically detect and configure hard disk parameters. The Award BIOS includes this ability in the event you are uncertain of your hard disk's parameters. See also Section 2, "Standard CMOS Setup".

■ Save & Exit Setup

Save CMOS value changes to CMOS and exit setup.

■ Exit Without Save

Abandon all CMOS value changes and exit setup.

11.2 Standard CMOS Setup

The items in Standard CMOS Setup Menu are divided into 10 categories. Each category includes no, one or more than one setup items. Use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.

■ Date

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

day	The day, from Sun to Sat, determined by the BIOS and is display-only
date	The date, from 1 to 31 (or the maximum allowed in the month)
month	The month, Jan through Dec.
year	The year, from 1900 through 2099

■ Time

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

■ 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 for Enhanced IDE BIOS. Type 1 to Type 45 are predefined. Type user is user-definable.

Press PgUp or PgDn to select a numbered hard disk type or type the 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 drive type is not matched or listed, you can use Type "User" to define your own drive type manually.

If you select Type "User", you will need to know the information listed below. Enter the information directly from the keyboard and press <Enter>. This information should be included in the documentation from your hard disk vendor or the system manufacturer.

If the controller of HDD interface is ESDI, the selection shall be "Type 1".

If the controller of HDD interface is SCSI, the selection shall be "None".

If you select Type "Auto", BIOS will Auto-Detect the HDD & CD-ROM Drive at the POST stage and showing the IDE for HDD & CD-ROM Drive.

TYPE	drive type
CYLS.	number of cylinders
HEADS	number of heads
PRECOMP	write precom
LANDZONE	landing zone
SECTORS	number of sectors
MODE	mode type

If a hard disk has not been installed select NONE and press <Enter>.

■ Drive A Type / Drive B Type

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

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

■ Video

The category selects the type of video adapter used for the primary system monitor. Although secondary monitors are supported, you do not have to select the type in Setup.

EGA/VGA	Enhanced Graphics Adapter/Video Graphics Array. For EGA, VGA, SEGA, 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 high resolution monochrome adapters

■ Halt On

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; it will stop for all other errors.
All, But Diskette	The system boot will not stop for a disk error; 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 display-only which is determined by POST (Power On Self Test) of the BIOS.

11.3 BIOS Features Setup

This section allows you to configure your system for basic operation. You have the opportunity to select the system's default speed, boot-up sequence, keyboard operation, shadowing and security.

■   Virus Warning

When this item is enabled, the Award BIOS will monitor the boot sector and partition table of the hard disk drive for any attempt at modification. If an attempt is made, the BIOS will halt the system and the following error message will appear. Afterwards, if necessary, you will be able to run an anti-virus program to locate and remove the problem before any damage is done.

! WARNING !
Disk boot sector is to be modified
Type "Y" to accept write or "N" to abort write
Award Software, Inc.

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 will appear when anything attempts to access the boot sector or hard disk partition table.

NOTE: Many disk diagnostic programs which attempt to access the boot sector table can cause the above warning message. If you will be running such a program, we recommend that you first disable Virus Protection beforehand.

■   CPU Internal Cache/External Cache

These two categories speed up memory access. However, it depends on CPU/chipset design. The default value is en able.

Enabled	Enable cache
Disabled	Disable cache

■   Quick Power On Self Test

This category speeds up Power On Self Test (POST) after you power up the computer. If it is set to Enable, BIOS will shorten or skip some check items during POST.

Enabled	Enable quick POST
Disabled	Normal POST

■   Boot Sequence

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

C,A	System will first search for hard disk drive then floppy disk drive.
A,C	System will first search for floppy disk drive then hard disk drive.
CDROM, C, A	System will first search for CDROM drive, then hard disk drive and the next is floppy disk drive.
C, CDROM, A	System will first search for hard disk drive , then CDROM drive, and the next is floppy disk drive.

■ Swap Floppy Drive

This item allows you to determine whether enable the swap floppy drive or not.
The choice: Enabled/Disabled.

■ Boot Up Floppy Seek

During POST, BIOS will determine if the floppy disk drive installed is 40 or 80 tracks. 360K type is 40 tracks while 760K, 1.2M and 1.44M are all 80 tracks.

Enabled	BIOS searches for floppy disk drive to determine if it is 40 or 80 tracks. Note that BIOS can not 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 message if the drive installed is 360K.

■ Boot Up NumLock Status

This allows you to determine the default state of the numeric keypad. By default, the system boots up with NumLock on.

On	Keypad is number keys
Off	Keypad is arrow keys

■ Boot Up System Speed

Selects the default system speed -- the normal operating speed at power up.

High	Set the speed to high
Low	Set the speed to low

■ Gate A20 Option

This entry allows you to select how the gate A20 is handled. The gate A20 is a device used to address memory above 1 Mbytes. Initially, the gate A20 was handled via a pin on the keyboard. Today, while keyboards still provide this support, it is more common, and much faster, for the system chipset to provide support for gate A20.

Normal	keyboard
Fast	chipset

■ Typematic Rate Setting

This determines if the typematic rate is to be used. When disabled, continually holding down a key on your keyboard will generate only one instance. In other words, the BIOS will only report that the key is down. When the typematic rate is enabled, the BIOS will report as before, but it will then wait a moment, and, if the key is still down, it will begin the report that the key has been depressed repeatedly. For example, you would use such a feature to accelerate cursor movements with the arrow keys.

Enabled	Enable typematic rate
Disabled	Disable typematic rate

■ Typematic Rate (Chars/Sec)

When the typematic rate is enabled, this selection allows you select the rate at which the keys are accelerated.

6	6 characters per second
8	8 characters per second
10	10 characters per second
12	12 characters per second
15	15 characters per second
20	20 characters per second
24	24 characters per second
30	30 characters per second

■ Typematic Delay (Msec)

When the typematic rate is enabled, this selection allows you to select the delay between when the key was first depressed and when the acceleration begins.

250	250 msec
500	500 msec
750	750 msec
1000	1000 msec

■ Security Option

This category allows you to limit access to the system and Setup, or just to 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 correct password is not entered at the prompt. |

Note: To disable security, select PASSWORD SETTING 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

It determines whether the MPEG ISA/VESA VGA Cards can work with PCI/VGA or not.

| Enabled | When PCI/VGA working with MPEG ISA/VESA VGA Card. |
| Disabled | When PCI/VGA not working with MPEG ISA/VESA VGA Card. |

■ OS Select for DRAM > 64

This item allows you to access the memory that over 64MB in OS/2.
The choice: Non-OS2, OS2.

■ Video BIOS Shadow

Determines whether video BIOS will be copied to RAM. However, it is optional depending on chipset design. Video Shadow will increase the video speed.

| Enabled | Video shadow is enabled |
| Disabled | Video shadow is disabled |

■ C8000 - CBFFF Shadow/DC000 - DFFFF Shadow

These categories determine whether option ROMs will be copied to RAM. An example of such option ROM would be support of on-board SCSI.

| Enabled | Optional shadow is enabled |
| Disabled | Optional shadow is disabled |

11.4 Chipset Features Setup

■ Auto Configuration

This item allows you select pre-determined optimal values for DRAM, cache, timing according to CPU type & system clock.

The Choice: Enabled, Disabled.

Note: When this item is enabled, the pre-defined items will become SHOW-ONLY.

■ AT Bus Clock

You can set the speed of the AT bus in terms of a fraction of the CPU clock speed (PCLK2), or at the fixed speed of 7.16 MHz.

The Choice: 7.16 MHz, CLK2/2, CLK2/3, CLK2/4, CLK2/5, and CLK2/6

DRAM Writes WS

The value in this field depends on write wait state parameters of the installed memory chips (DRAM).

The Choice: X-2-2-2, X-3-3-3.

■ Page Mode Read WS

The value in this field depends on read wait state parameters of the installed memory chips (DRAM).

The Choice: X-4-4-4, X-3-3-3.

■ RAS Precharge Period

This option allows you to determine the number of CPU clocks allocated for the **R**ow **A**ddress **S**trobe to accumulate its charge before the DRAM is refreshed. If insufficient time is allowed, refresh may be incomplete and data lost.

The choice: 3T, 4T

■ RAS-To-CAS Delay Time

This setup item allows you to determine the timing of the transition from Row Address Strobe (RAS) to Column Address Strobe (CAS).

The Choice: 2T, 3T

■ EDO Read WS

This sets the timing for burst mode reads from EDO RAM. Burst read requests are generated by the CPU in four separate parts. The first part provides the location within the DRAM where the read is to take place while the remaining three parts provide the actual data. The lower the timing numbers, the faster the system will address memory.

The Choice: X-2-2-2, X-3-3-3.

■ DRAM Speculative Read

When the 'Speculative Read' is enabled, the controller will issue the read command slightly before it has finished determining the address.

The Choice: Enabled, Disabled.

■ Pipelined Function

When Enabled, the controller signals the CPU for a new memory address before all data transfers for the current cycles are complete, resulting in faster performance

The Choice : Enabled, Disabled

■ DRAM Refresh Period (us)

This sets the number of DRAM allowed be refreshed by chipset.

The Choice :15,30, 60 ,120, 256 (us)

■ DRAM Data Integrity Mode

Select *Parity* or *ECC* (error-correcting code), according to the type of installed DRAM.

The Choice: Disabled, ECC, Parity.

■ Memory Hole At 15-16M

You can reserve this area of system memory for ISA adapter ROM. When this area is reserved, it cannot be cached.

The choice : Enabled, Disabled.

■ Primary Frame Buffer

Select a size for the PCI frame buffer. The size of the buffer should not impinge on local memory.

The choice : Disabled, 2MB 4MB, 8MB, 16MB.

■ VGA Frame Buffer

When *Enabled*, a fixed VGA frame buffer from A000h to BFFFh and a CPU-to-PCI write buffer are implemented.

The choice: Enabled , Disabled.

■ Data Merge

This field controls the word-merge feature for frame buffer cycles. When Enabled, this controller checks the eight CPU Byte Enable signals to determine if data words read from the PCI bus by the CPU can be merged.

The choice: Enabled , Disabled.

■ Fast Back-To-Back

When this is enabled, the chipset will insert one extra clock to the turn-around of back-to-back DRAM cycles.

The Choice: Enabled, Disabled.

■ Passive Release

When Enabled, CPU to PCI bus accesses is allowed during passive release. Otherwise, the arbiter only accepts another PCI master access to local DRAM

The Choice : Enabled, Disabled

■ ISA Line Buffer

The PCI to ISA Bridge has an 8-byte bi-directional line buffer for ISA or DMA bus master memory reads from or writes to the PCI bus. When *Enabled,* an ISA or DMA bus master can prefetch two double words to the line buffer for a read cycle.

The choice : Enabled, Disabled

■ Delay Transaction

The chipset has an embedded 32-bit posted write buffer to support delay transactions cycles. Select *Enabled* to support compliance with PCI specification version 2.1.

The choice: Enabled, Disabled.

11.5 Power Management Setup

■ Power management

This category allows you to select the type (or degree) of power saving and is directly related to the following modes:

1. HDD Power Down
2. Doze Mode
3. Standby Mode
4. Suspend Mode

The Choice : Enabled, Disabled

■ PM Control by APM

When yes, an Advanced Power Management device will be activated to enhance the Max. Power Saving mode and stop the CPU internal clock. If Advance Power Management (APM) is installed on your system, selecting Yes gives better power savings.

The Choice : Yes, No

■ MODEM Use IRQ

This determines the IRQ in which the MODEM can use.

The choices: 3, 4, 5, 7, 9, 10, 11, NA.

■ Video Off Option

When enabled, this feature allows the VGA adapter to operate in a power saving mode.

Always On	Monitor will remain on during power saving modes.
Suspend--> Off	Monitor blanked when the systems enters the Suspend mode.
Susp,Stby--> Off	Monitor blanked when the system enters either Suspend or Standby modes.
All Modes --> Off	Monitor blanked when the system enters any power saving mode.

■ Video Off Method

This determines the manner in which the monitor is blanked.

V/H SYNC+Blank	This selection will cause the system to turn off the vertical and horizontal synchronization ports and write blanks to the video buffer.
Blank Screen	This option only writes blanks to the video buffer.
DPMS	Select this option if your monitor supports the Display Power Management Signaling (DPMS) standard of the Video Electronics Standards to select video power management values.

The following four modes are Green PC power saving functions which are only user configurable when *User Defined* Power Management has been selected. See above for available selections.

■   HDD Power Down

When enabled and after the set time of system inactivity, the hard disk drive will be powered down while all other devices remain active.

The Choice : Enabled, Disabled

■   Doze Mode

When enabled and after the set time of system inactivity, the CPU clock will run at slower speed while all other devices still operate at full speed.

The Choice : Enabled, Disabled

■   Standby Mode

When enabled and after the set time of system inactivity, the fixed disk drive and the video would be shut off while all other devices still operate at full speed.

The Choice : Enabled, Disabled

■   Suspend Mode

When enabled and after the set time of system inactivity, all devices except the CPU will be shut off.

The Choice : Enabled, Disabled

An event occurring on each device listed below restarts the global time for Standby mode.
■   Primary HDD   The Choice : Enabled, Disabled
■   Floppy Disk   The Choice : Enabled, Disabled
■   Serial Port   The Choice : Enabled, Disabled
■   Keyboard   The Choice : Enabled, Disabled
■   Parallel Port   The Choice : Enabled, Disabled

■   Power Button

This item allows you to select the function of power button.

The choice: Disabled, Green Mode, Power Off.

■   DOCK I/O SMI

This item allows you to enable or disable the function of DOCK I/O SMI.

The choice: Enabled, Disabled.

11.6 PNP/PCI Configuration

■   PNP OS Installed

This item allows you to determine install PnP OS or not.

The choice: Yes, No.

■   Resource controlled by

The Award Plug and Play BIOS has the capacity to automatically configure all of the boot and Plug and Play compatible devices. However, this capability means absolutely nothing unless you are using a Plug and Play operating system such as Windows®95.

The choice: Auto, Manual.

■   Reset Configuration Data

Normally, you leave this field Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the operating system can not boot.

The choice: Enabled, Disabled .

■   PCI IRQ Activated by

This sets the method by which the PCI bus recognizes that an IRQ service is being requested by a device. Under all circumstances, you should retain the default configuration unless advised otherwise by your system's manufacturer.

The choice: Level, Edge.

■ PCI IDE IRQ Map to

This allows you to configure your system to the type of IDE disk controller in use. By default, Setup assumes that your controller is an ISA (Industry Standard Architecture) device rather than a PCI controller. The more apparent difference is the type of slot being used.

If you have equipped your system with a PCI controller, changing this allows you to specify which slot has the controller and which PCI interrupt (A, B,C or D) is associated with the connected hard drives.

Remember that this setting refers to the hard disk drive itself, rather than individual partitions. Since each IDE controller supports two separate hard drives, you can select the INT# for each. Again, you will note that the primary has a lower interrupt than the secondary as described in "*Slot x Using INT#*" above.

Selecting "*PCI Auto*" allows the system to automatically determine how your IDE disk system is configured.

11.7 Load BIOS defaults

This option allows you to load the troubleshooting default values permanently stored in the BIOS ROM. These default settings are non-optional and disable all high-performance features

11.8 Load SETUP defaults

This option allows you to load the default values to your system configuration .These default settings are optional and enable all high-performance features

11.9 Integrated Peripherals

■ On-Chip Primary IDE

The chipset contains a PCI IDE interface with support for two IDE channels. Select Enabled to activate the primary IDE interface. Select Disabled to deactivate this interface

The choice: Enabled, Disabled.

■ IDE Primary Master PIO

ThIS IDE PIO (Programmed Input/Output) field lets you set a PIO mode (0-4) for Primary master IDE device that the onboard IDE interface supports. Modes 0 through 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode.

The choice: Auto, Mode 0, Mode 1, Mode 2, Mode 3, Mode 4.

■ IDE Primary Slave PIO

ThIS IDE PIO (Programmed Input/Output) field lets you set a PIO mode (0-4) for Primary slave IDE device that the onboard IDE interface supports. Modes 0 through 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode.

The choice: Auto, Mode 0, Mode 1, Mode 2, Mode 3, Mode 4.

■ IDE Primary Master UDMA

Ultra DMA/33 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If your hard drive and your system software both support Ultra DMA/33, select Auto to enable BIOS support.

The Choice: Auto, Mode 0, Mode 1, Mode 2.

■ IDE Primary Master UDMA

Ultra DMA/33 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If your hard drive and your system software both support Ultra DMA/33, select Auto to enable BIOS support.

The Choice: Auto, Mode 0, Mode 1, Mode 2.

■ IDE HDD Block Mode

Block mode is also called block transfer, multiple commands, or multiple sector read/write. If your IDE hard drive supports block mode (most new drives do), select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support.

The Choice: Enabled, Disable.

■ On-Chip USB Controller

Select Enabled if your system contains a Universal Serial Bus (USB) controller.

The choice: Enabled, Disabled.

■ USB Keyboard Support

Select Enabled if your system contains a Universal Serial Bus (USB) controller and you have a USB keyboard.

The choice: Enabled, Disabled.

■ Onboard FDC Controller

Select Enabled if your system has a floppy disk controller (FDC) installed on the system board and you wish to use it. If you install and-in FDC or the system has no floppy drive, select Disabled in this field.

The choice: Enabled, Disabled.

■ Onboard Serial Port 1

This item allows you to determine access onboard serial port controller with which I/O address.

The choice: 3F8/IRQ4, 2E8/IRQ3, 3E8/IRQ4, 2F8/IRQ3, Disabled, Auto.

■ Onboard Serial Port 2

This item allows you to determine access onboard serial port controller with which I/O address.

The choice: 3F8/IRQ4, 2E8/IRQ3, 3E8/IRQ4, 2F8/IRQ3, Disabled, Auto.

■ Onboard Parallel Port

This item allows you to determine access onboard parallel port controller with which I/O address.

The choice: 378H/IRQ7, 278H/IRQ5, 3BC/IRQ7, Disabled.

■ Parallel Port Mode

Select an operating mode for the onboard parallel (printer) port. Select Normal unless your hardware and software require one of the other modes offered in this field.

The choice: PS/2, EPP1.9, ECP, ECPEPP1.9, SPP, EPP1.7.

11.10 Password Setting

You can set either supervisor or user password, or both of them. The differences between are:

supervisor password : can enter and change the options of the setup
menus.

user password   : just can only enter but do not have the right to
change the options of the setup menus.

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 in length, 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 a password, just press <Enter> when you are prompted to enter the password. A message will confirm the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

PASSWORD DISABLED.

When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

Additionally, when a password is enabled, you can also require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of your computer.

You determine when the password is required within the BIOS Features Setup Menu and its Security option (see Section 3). If the Security option is set to "System", the password will be required both at boot and at entry to Setup. If set to "Setup", prompting only occurs when trying to enter Setup.

11.11 IDE HDD Auto Detection

Automatically detect and configure hard disk parameters. The Award BIOS includes this ability in the event you are uncertain of your hard disk's parameters

11.12 Save & Exit Setup

Save CMOS value changes to CMOS and exit setup.

11.13 Exit Without Save

Abandon all CMOS value changes and exit setup.

12.About RDISK.EXE utility

The RDISK.EXE program is a comprehensive driver which can help you to directly access the solid state disk in the remote system with RS-232 or RS-422 serial ports.

When RDISK.EXE be executed, it will be keep resident in host memory and redirects DOS disk I/O to remote system.

After RDISK.EXE executed at DOS prompt. The solid state disk(s) in the remote system are logged into the host system as local disk drive(s) (A:,B:) or (A: and B:),and all DOS commands are available for remote disk(s) such as COPY, DEL, FORMAT, MD....etc

The following procedures show you how to install RDISK.EXE program

1. Enter your host computer **system BIOS SETUP** menu and configure your host Floppy disks to have following configuration
    Floppy disk A: 1.44MB or 1.2MB
    Floppy disk B: 1.44MB or 1.2MB

2. Reboot your host system

3. Connects a RS-232 cable between the HOST and REMOTE systems
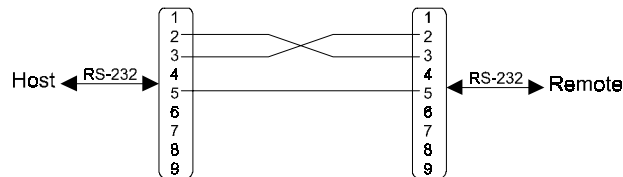
4. Turn-on your remote system

5. Press "F10" key to run ROM/RAM disk SETUP. and

6. Set "Primary ROM/RAM disk " to A:,B:,C:,or D:

7. Enable "COM Port for Remote Flash PGM:" to COM1 or COM2

8. Press "F7" to save SETUP values

9. Type RDISK <Enter> at DOS prompt of host system

10. The following message shows up on the screen

        ==========   RDISK configurations   =============
        Primary Disk   = A:(local)
        Secondary Disk= No used
        COM port   = COM1
        Baud Rate   = 57600

        ===
        Reboot or turn-on remote system
        Type Rdisk /? for Helps
        Press [ESC] to abort
        Connecting (|) _

11. At this time, the RDISK are attempting link to remote system

12. Reboot your remote system

    "Connecting (-) ...." message will show up after connecting completed

13. RDISK now returns to DOS prompt and remote solid state disk(s) are ready to be accessed

14. Format remote disk(s): (if disk in the remote system is unformatted)
    Type one of the following commands to format remote solid state disk(s) which are installed at first time

    C>FORMAT [remote disk drive] /T:16/N:32   for 512KB Flash disk
    C>FORMAT [remote disk drive] /T:32/N:32   for 1.0MB Flash disk
    C>FORMAT [remote disk drive] /T:48/N:32   for 1.5MB Flash disk

15. The disk(s) in the remote are already to be accessed by the host system

16. Type " RDISK /R " at DOS prompt can release this TSR driver from host system

17. Type " RDISK /? " at DOS prompt will show more information about RDISK