

PI-6487V
All-In-One STPC Client x86
CPU card with on-board
VGA interface and Flash disk

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1. Introductions

1.1 Overview

The PI-6487V comes equipped with SGS-THOMSON ST PC Client Pentium performance x86 CPU , it offer an 64-bit DRAM-controller, standard chipset functions (such as interrupt, DMA,counter/timer..etc), ISA bus controller. The PI-6487V also includes a high speed 64-bit VGA controller with 135 MHz RAMDAC that allows connection of a CRT monitor

In addition, the PI-6487V has one PS/2 mouse port, two serial ports, a bi-direction high-speed parallel port, an PCI-bus hard disk drive interface and a floppy disk controller

Built-in 1.7MB Flash disk without installing any additional Flash Devices. In addition, the PI-6487V also has two onboard sockets can accept up to two DiskOnChp disk

The watchdog timer ensures that the CPU will be reset, if it stops due to a program or EMI problem, allowing the PI-6487V to be used in stand-alone systems or unmanned environments.

With its industrial grade reliability, The PI-6487V can withstand continuous operation in harsh industrial environments under 60C(140F) temperatures.

This card is specially designed as a compact all-in-one CPU card which incorporates single voltage power supply(+5V). This six layer CPU card turns any system into a 16-bit Pentium performance computer.

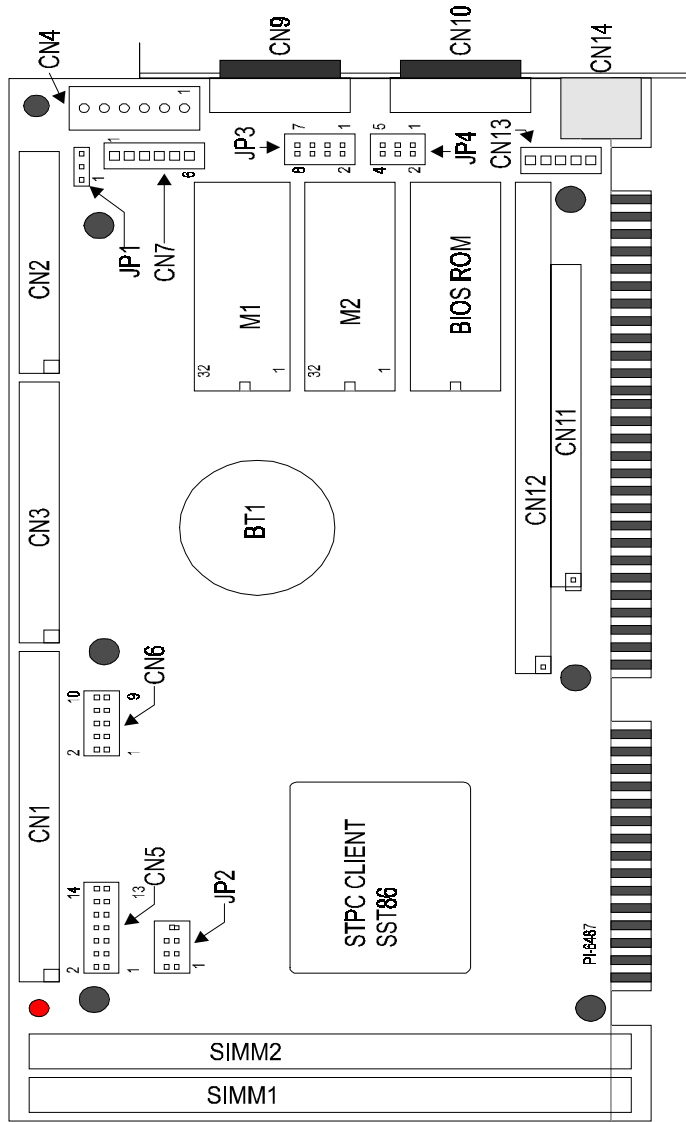
1.2 Packing list

- One half size CPU card
- One FDD cable (34-pin),one HDD cable (40-pin)
- One parallel port adapter (26-pin) kit
- One 5-pin DIN to 6 pin mini-DIN keyboard adapter
- One 3.5" utility diskette

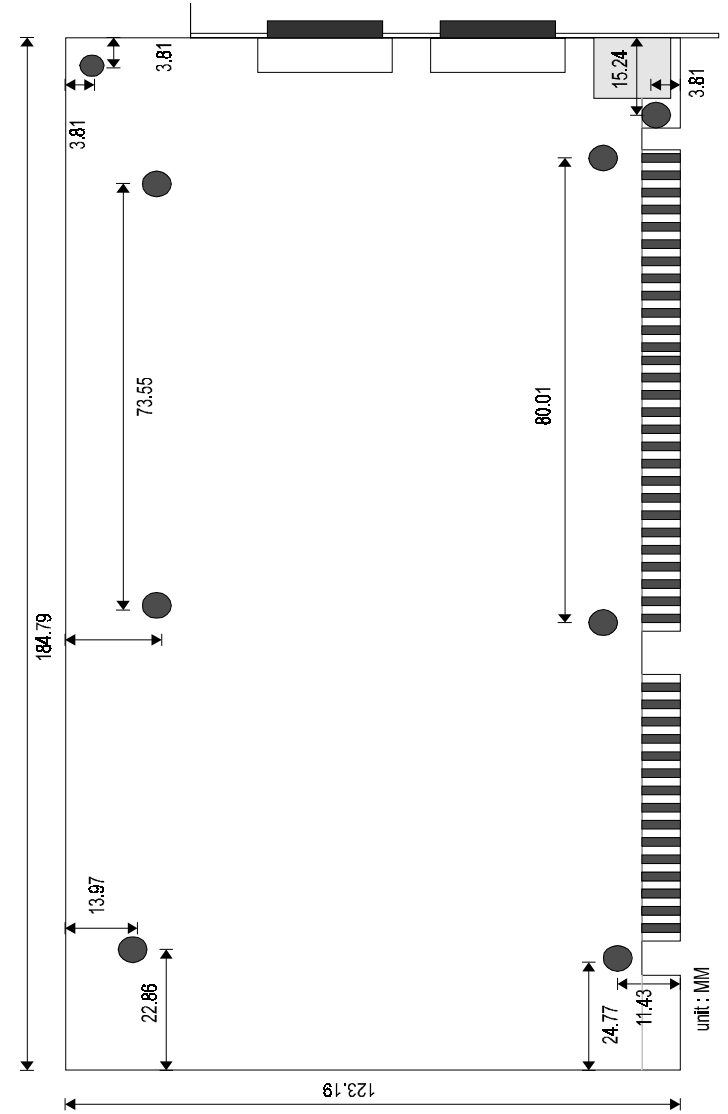
1.3 Features

- Fully IBM PC/AT compatible
- On-board 66/75/120/133 MHz ST PC Client ST86 processor
- Internal 8K bytes unified write-back cache
- On-board CRT SVGA controller up to 1280x1024 resolution
- 64-bit DRAM controller for both graphics (up to 4MB) and system memory
- Two 72-pin SIMM sockets up to 64MB (FP or EDO)
- On-board PCI-bus enhanced IDE hard disk controller
- On-board floppy disk drive controller
- Two 16550 compatible RS-232C serial ports
- One SPP/ECP/EPP parallel port
- On-board Dynamic-Sector-Write 1.7MB flash disk, 100,000 time write time
- Provide two DiskOnChip sockets
- Windows 95/98 complaint
- Provide PS/2 mouse connector
- 16 level watch dog timer with 1-160 seconds time out period
- 16-bit PC/104 piggiback connectors
- Provide external power connector (P8)

1.4 PCB layout



1.5 P.C.B dimension



2. Hardware description

2.1 Chipset

■ System Chipset :

The STPC86 chipset integrates a fully static x86 processor, fully compatible with standard x86 processors, and combine it with powerful chipset, graphics and video pipelines to provide a single consumer oriented PC compatible subsystem. The performance of this device is comparable with the performance of a typical P5 generation system.

The SST86 includes a powerful x86 processor core along with a 64-bit DRAM controller, advanced 64-bit accelerated graphics and video controller, a high speed PCI chip set functions

Graphics functions are controlled through the on-chip graphic engine in the ST PC Client and the monitor (or TV)display is produced through 2D graphics display engine. The graphics resolution supported is a maximum of 1280x1024 at 75 Hz refresh rate and is VGA and SVGA compatible

■ System memory

There are two 64-bit memory banks on the board. Consists of two 72-pin SIMM socket which are designed to accommodate 2MB, 4MB, 8MB, 16MB, 32MB DRAM module providing the user with up to 64MB of paged main memory on the card.

■ Enhanced IDE features

The IDE specification has been updated to increase its capabilities and provided performance. Together these are referred to as "Enhanced IDE". The Enhanced IDE features comprise the followings:

1. Support for IDE hard disk drives larger than the former 528MB limit imposed by various technical factors.
2. Support for IDE devices other than hard disk drives, including IDE Tape backup and CD-ROM drives.
3. Support for faster data transfer rates, particularly with IDE controllers that have a VESA local bus interface.
4. BIOS setup will display all possible modes that include NORMAL, LBA & LARGE.

■ On-board 1.7MB flash disk (PI-6487V only)

PI-6487V provides on-board 1.7MB Flash disk that can be directly read/written under DOS prompt as regular floppy disk

■ DickOnChip

In addition, the PI-6487V also provides two 32-pin sockets which can accept up to two DiskOnChip™ flash disks

■ RS-232C serial Port

There are two full function UARTs which are full compatible with NS16C550 and has 16 bytes FIFOs Send/Receive registers. The data rates are independently programmable from 115.2K baud down to 50 baud.

■ SVGA display

On-board 64-bit CRT VGA controller run at core clock frequency. The graphics functions are controlled through the on-chip graphics engine in the ST PC Client .The graphics resolution supported is a maximum of 1280x1024 at 75Hz refresh rate and is VGA/SVGA compatible. The frame buffer can occupy a space anywhere in the first four Mbytes of physical main memory.

■ Watch dog timer

On-board watch dog timer provide 16 level from 1 to 160 seconds when the timer counts to preset value, and it sets a flag and optionally asserts RESET signal



3. Jumper settings on the PI-6487V

3.1 DRAM installation




For 64-bit DRAM bus. It needs to insert two 72-pin DRAM module into the SIMM1 and SIMM2

System memory size	SIMM1	SIMM2
4MB	2MB	2MB
8MB	4MB	4MB
16MB	8MB	8MB
32MB	16MB	16MB
64MB	32MB	32MB



3.2 Battery backup for CMOS RAM and SRAM disk (JP1)

JP1	Function
	Internal battery
	Clear CMOS RAM

3.3 Watch Dog settings (JP2)





JP2	Watch dog Function	Time Base
	Enable	1 sec
	Enable	10 sec
	Disable	Free

3.4 Base port settings of on-board Flash disk (JP3 pin3-4)








I/O Base port	JP3 pin3-4
136H and 536H	
236H and 636H	

3.5 Jumper for selecting Ring or Vcc of pin-9 of COM ports (JP4)

The signal of pin-9 of each COM port can be set to "RING" or Vcc by jumper called "JP4"

Pin 9 of COM port	JP4	Signal
COM 1,3 (CN10)		Ring
		+5Vdc
COM 2,4 (CN6)		Ring
		+5Vdc

3.6 Flash disk jumper settings (JP3)

Configurations of Flash/ROM disk	Memory address	JP3
On-board 1.7MB + Flash On the M1, and M2	D0000H-D5FFF H	
	D6000H-DBFFF H	
Using DiskOnChips (M1,M2) only	D6000H-D9FFF H	
	DC000H-DFFFF H	
On-board 1.7MB & DiskOnChips on M1,M2 simultaneously	D0000H-D9FFF H	
	D6000H-DFFFF H	
Disable Flash disk	Free	

4. Pin assignments of connectors

4.1 External power connector (CN4)

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

4.2 Keyboard connector (CN14 and CN13)

Pin No.	Signal
1	Clock
2	Data
3	NC
4	GND
5	+5Vdc

4.3 Power L.E.D and Keyboard Lock (CN5 pin6,8,10,12,14)

Pin No.	Signal
6	Power L.E.D
8	N.C
10	GND
12	Key lock
14	GND

4.4 Hardware reset connector (CN5 pin1,2)

Pin No.	signal
1	Reset input
2	GND

4.5 CPU cooling fan power connector (CN8)

Pin No.	Signal
1	GND
2	+12V DC
3	GND

4.6 PS/2 mouse connector (CN7)

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

4.7 External speaker connector (CN5 pin 7,9,11,13)

Pin No.	Signal
7	+5V DC
9,11,13	Speaker out

4.8 Hard Disk LED (CN5 pin 3,4)

Pin No.	Signal
3	LED -
4	LED+

4.9 Hard disk connector (CN1)

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

4.10 Floppy disk connector (CN9)

Pin No.	Description	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	Write enable
26	Track 0	28	write protect
30	Read data	32	Select head
34	Disk change		

4.11 Parallel port connector (CN2)

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

4.12 COM port connectors

■ COM[1,3] port (CN10)

Pin No.	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 (CN6)

Pin No.	Signal
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI (or Vcc)

4.13 VGA CRT monitor connector: CN9

pin No.(CN9)	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	Ground
11	N.C
12	Monitor ID bit
13	HSYNC
14	VSYNC
15	N.C

4.14 PC-104 ISA bus connectors

CN12	Name	CN12	Name	CN12	Name	CN12	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

CN11	Name	CN11	Name	CN11	Name	CN11	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 Flash disk

5.1 About Flash disk

The PI-6487V provides on-board 1.7MB flash ROM disk and two disk sockets (M1,M2) that can accept SST, and ATMEL Flash ROM series, or DiskOnChip flash devices

There are three flash disk configurations of PI-6487V

1. On-board 1.7MB + Flash ROMs on the M1, and M2 (PI-6487V only)
2. DiskOnChip flash only
3. On-board 1.7MB+ DiskOnChip flash (PI-6487V only)

5.2 Install on-board 1.7MB Flash disk + Flash ROMs on the M1, and M2

1. Setting jumper JP3 properly (see 3.6)
2. Inserts SST or ATMEL flash ROM(s) into M1, M2 sockets, if necessary
3. Press "F10" at system POST to configure Flash Disk SETUP (see 5.5)
4. Boot system form normal CMOS setup sequence
5. Format on-board Flash disk at DOS prompt as:


```
C>format <Flash disk drive name> /S
(Disk size=1.7MB+Flash on the M1,M2 sockets)
```
6. Create "AUOTOEXEC.BAT" file in the flash disk
7. Copy "DISKSWAP.EXE" file into flash disk
8. Modifies "AUTOEXEC.BAT" file to have "DISKSWAP.EXE" at first line
9. Copy your application files into Flash disk by using "COPY" command
10. Press "F10" to enter Flash disk SETUP and change 'System boot sequence' item to "Flash disk" mode and press F7 to save
11. The system will boot DOS from Flash disk

5.3 Installing DiskOnChip only

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

1. Disable on-board 1.7MB Flash disk by setting jumper JP3 properly (see 3.6)
2. Insert DiskOnChip Flash device(s) into M1, or M2, or both

3. Boot system form normal CMOS setup sequence
4. Format DiskOnChip flash disk at DOS prompt as:


```
C>format D: /S      (if one active hard disk existed)
Or
C>format E: /S      (if two hard active disk existed)
```
5. Copy your application files into DiskOnChip Flash disk by using "COPY" command
6. Reboot system and then modify System BIOS SETUP to have Hard Disk(s) not installed
7. The system will boot DOS from Flash disk

5.4 Installing on-board 1.7MB and diskOnChip simultaneously

1. Enable on-board 1.7MB flash disk by setting jumper JP3 properly (see 3.6)
2. Insert DiskOnChip Flash device(s) into M1, or M2, or both
3. Press "F10" at system POST to configure Flash Disk SETUP (see 5.5)
4. Boot system form normal CMOS setup sequence
5. Format on-board 1.7MB Flash disk at DOS prompt as:


```
C>format <Flash disk drive name> /S
```
6. Create "AUOTOEXEC.BAT" file in the flash disk
7. Copy "DISKSWAP.EXE" file into flash disk
8. Modifies "AUTOEXEC.BAT" file to have "DISKSWAP.EXE" at first line
9. Copy your application files into Flash disk by using "COPY" command
10. Format DiskOnChip Flash disk at DOS prompt as:


```
C>format <DiskOnChip drive name> /S
```
11. Reboot system and then modify the Flash disk setup to set "Boot Sequence" to "Flash disk" to boot up from Flash disk or to "CMOS setup" to boot up from DiskOnChip

5.5 On-board Flash disk setup

This **SETUP** is used to configure the On-board Flash disk. As AMIBIOS POST executes, the following appears:

```
American   Release: 04/01/99
Megatrends AMIBIOS ©1999 American Megatrends Inc.,
STPC ,xxMHz
Checkinh NVRAM.. Update OK!
```

```
..WAIT.....
```

```
.....
```

```
Hit <F10> to Run Advanced Flash disk SETUP
```

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

STPC Client x86 CPU Card Flash Disk SetUp Vx.x	
Flash disk drive	:A
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

■ Flash disk drive

The flash disk can emulate disk drive A:,B:,C:,D: or disabled.

A=Drive A:

B=Drive B:

C=Drive C:

D=Drive D:

Disable:Disable

■ System Boot Up Sequence

The system may boot up from two following sequences as:

CMOS SETUP=Boot up according to CMOS Setup sequence

Flash disk=Boot up from on-board Flash disk, if DOS files existed

■ COM Port for Remote Flash PGM

If you are going to remotely access the flash disk with utility called "RDISK.EXE" . You should select which communication port is connected to communicate with host system.

COM1=COM1 port (3F8H) IRQ4

COM2=COM2 port (2F8H) IRQ3

Disable=No remote Access required

■ Auto detect and boot from Disk A:

Enable= The system will automatically boot form disk A: If system files (IO. SYS, SMDOS.SYS) existed

Disable=Normal boot sequence

■ Selects and save SETUP

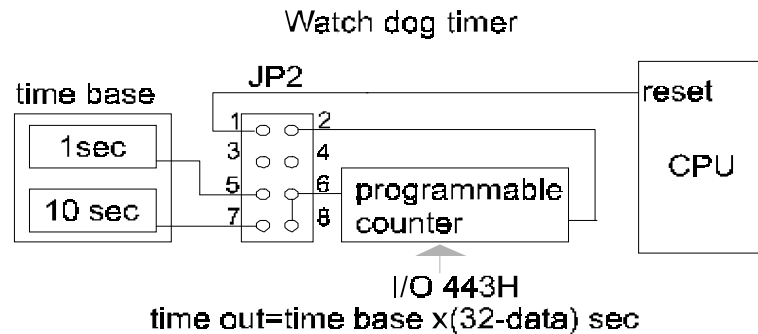
PgDn=Moves reverse bar down

Esc=Quit without saving SETUP

F7=Quit and saves current SETUP to EEPROM

6. How to use watch dog timer

The PI-6487V 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 feature ensures continued operation in industrial stand-alone and unmanned applications. The watchdog timer can be programmed in 16 level form 1 to 160 seconds. The "RESET" signal will be generated from watchdog timer, When timer out reaches



One fixed I/O port (443H) is used to control on-board watch dog timer

6.1 Watch dog timer settings(JP2 pin 1,2)

The on-board watch dog timer can be enabled/disabled by setting jumper JP2

Watch dog timer	JP2	Time base
Enable		1sec
Enable		10 sec
Disable		Stopped

Time out = time base x (32 - data) sec

6.2 Example program

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

Assume set Time base to 1 sec

```

;Initial watch dog timer to have 15 sec time out period
mov  dx, 443H      ;Points to watch dog timer base port
mov  al, 17        ;time out=1x(32-17) sec=15 sec
out  dx,al         ;write time out value to time out counter
;user's application section
mov  dx,443H      ;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,443H      ;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)

Assume set Time base to 1 sec

```
#include <dos.h>
#include <time.h>
#include <stdio.h>
/* -----Example program-1 of watch dog timer -----*/
void main ()
{
    Long Start_time, Cur_time;
    Int time_value, key=0, time_base=1;
    Int signal=RESET;
    printf ("\n\r===== Watch Dog Timer Demonstration =====")
    printf ("\n\r Time out Value (sec)=");
    scanf ("%d", &time_value);
    Outportb(0x436, 32-(time_value/time_base));          /* 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 Remained time :%3d sec. ", time_value-(int)(Cur_time-Start_time));
    }
    if ((key=getch())!=0x1b)
    {
    Inportb(0x443);                                    /* Trigger watch dog timer once*/
    time (&Start_time);                                /* Get start time */
    }
    }
    Outportb(0x443, 0);                                /* Disable Watch dog timer */
}
```

7. VGA driver installation

This chapter provides information on how to install VGA drivers that come in the floppy diskette with your PI-6487V card.

7.1 Contents in this diskette

- Standard Windows 95 driver :
 - UMA.DRV
 - UMAVDD.VXD
 - MAGICVXD.VXD
- Direct Draw driver :
 - UMADD.DLL
- MCI driver :
 - UMAMCI.DRV
 - UMAMCI32.DLL
- Control panel sheet page :
 - UMACPLX.DLL
 - UMACPLX.VXD
- Installation file :
 - UMA.INF

7.2 Driver features

1. Standard driver
2. Graphics modes support

640x480	16 colors using standard VGA Windows 95 driver(no hardware accelerations)
800x600	16 colors using standard VGA Windows 95 driver(no hardware accelerations)
640x480	256, 64K or 16M colors with full hardware accelerations
800x600	256, 64K or 16M colors with full hardware accelerations
1024x768	256 or 64K with full hardware accelerations

Before use a graphic mode, you must be sure to :

- Have enough frame buffer memory
- Disable TV output, if use 800x600 or 1024x768 resolution

7.3 How to install this driver in Windows 95/98

1. Select Display icon in Control Panel
2. Select Advanced Properties button in Settings sheet page
3. Select Change button in Adapter sheet page
4. Press Have disk... button and insert driver disk

Warning :

Direct Draw 5.0 must be installed before use MCI driver or Direct Draw VPE functions (not necessary with Windows 98).

Windows 95 can't automatically detect the internal STPC VGA because this hardware is not a PCI or ISA adapter. If an other graphic driver is active on the system (after using an external VGA or using an hard disk from an other computer), Windows 95 display this message at startup : 'Your display adapter is not configured properly'. Press OK and let Windows proceed automatic hardware detection. Windows will find a standard VGA board and install the corresponding driver. Then, you can install STPC driver. ***Don't try to install STPC driver before Windows automatic detection.***

If Windows 95 startup display a message concerning conflict with display driver, suppress all the display adapters in Device Manager (Control Panel - System) and restart. Then, you'll have 'Your display adapter is not configured properly' message.

7.4 Virtual desktop management

■ To change virtual desktop size :

1. Select Display icon in control panel
2. Select UMA Config. sheet page (With Windows 98, select Advanced... in Settings sheet page). Change 'Limit screen to' parameter to use virtual desktop. If current resolution is larger than 'Limit screen to' parameter, driver use virtual desktop.

■ example :

Screen resolution = 1024x768 (Display - Settings) and limit screen to = 800x600

Windows 95 display a 1024x768 virtual desktop with a 800x600 physical resolution.

Use 'Borders' parameters to add black borders around virtual desktop.

7.5 Install Direct X 5.0

1. copy Direct X 5.0 DDRAW.DLL and DDRAW16.DLL in Windows\System directory (not necessary with Windows 98)
2. start MPLAYER.EXE from Windows directory
3. Select 'Video Input Port' in 'Device' menu
4. Select 'Properties' in 'Device' menu to change the config : CCIR656, CCIR601 or BROOKTREE with PAL or NTSC.

7.6 Known bugs

1. Problems in Direct Draw standard functions. Active Movie display wrong images when displaying video (MPEG, AVI... files).
2. Refresh rate management doesn't work.
3. 1280x1024 graphic mode displaying problems : too high refresh rate.

7.7 Problems

■ Windows 95 display this message at startup : 'Your display adapter is not configured properly'

Press OK and let Windows 95 proceed hardware automatic detection. Windows 95 will install standard VGA driver. Then, install STPC driver.

■ At startup, Windows 95 display a message concerning conflict with Display Adapter

4. Start Control Panel - System Icon.
5. Suppress all display adapter in Device Manager.
6. Restart the computer.

■ Windows 95 crash at startup

Enter BIOS to verify frame buffer size (chipset setup)

■ Windows screen is not stable or mouse cursor is not correct

If using 800x600 or 1024x768 graphic mode, enter BIOS to verify TV output is disable (chipset setup)

■ Top or bottom part of the screen is not displayed

enter BIOS to verify TV output is disable (chipset setup). If you want use TV output, add black borders in screen part of UMA Config sheet page (Control Panel - Display icon)

■ MCI driver : Some glitch appear on the right of video

when using high resolution graphic mode. You must use EDO RAM and verify DRAM type in BIOS Chipset setup

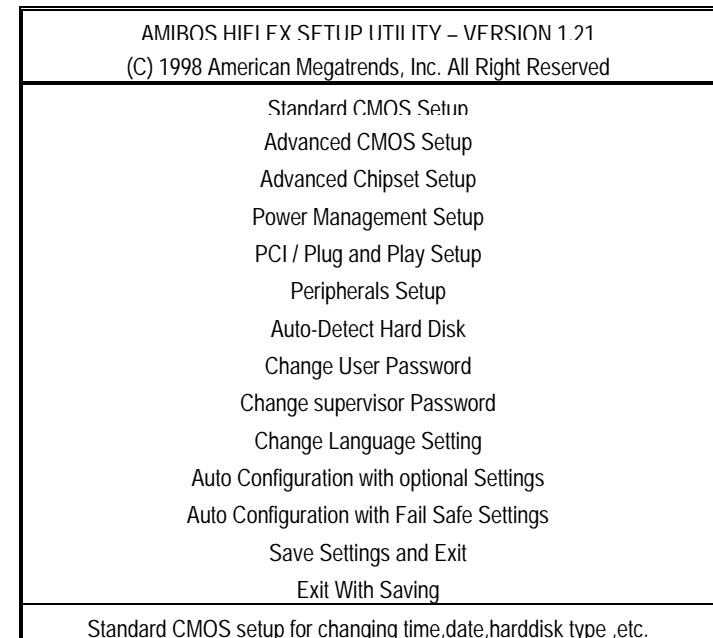
- MCI driver: error message at startup:
'Query Interface IID_IDD Video Port Container Error'

You must install DirectX 5.0

8. CMOS setup

8.1 Main Menu

Once you enter the AMI 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
This setup page includes all the items in a standard, AT-compatible BIOS
- Advanced CMOS Setup
This setup page includes all the items of AMI special enhanced features
- Advanced Chipset 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"

- PCI/Plug and Play Setup

This entry appears if your system supports PNP / PCI.

- Peripheral Setup

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

- Auto-Detect Hard Disk

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

- Change User Password

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

- Change User Password

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

- Change supervisor Password

Change the supervisor password

- Auto Configuration with Optional Settings

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.

- Auto Configuration with Fail Safe Settings

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

8.2 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.

- Pri Master/Pri Slave/Sec Master/Sec 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.

- Floppy Drive A / Floppy Drive B

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

- Root Sector Virus Protection

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.

8.3 Advanced CMOS Setup

- Quick Boot:

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.

- **1st Boot Device**
This category determines which drive to search first for the disk operating system
- **2nd Boot Device**
This category determines which drive to search second for the disk operating system
- **3rd Boot Device**
This category determines which drive to search third for the disk operating system
- **4th Boot Device**
This category determines which drive to search fourth for the disk operating system
- **Try other Boot Device**
This category determines which drive to search, if 1st,2nd,3rd,4th boot devices are all boot failed
- **Floppy Access Control**
Set Floppy disk to be accessed at read-only or read-write mode
- **Hard disk Access Control**
Set hard disk to be accessed at read-only or read-write mode
- **BootUp NumLock Status**
This allows you to determine the default state of the numeric keypad. By default, the system boots up with NumLock on.
- **Floppy Drive Swap**
This item allows you to determine whether enable the swap floppy drive or not.
- **Floppy Drive 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.
- **PS/2 Mouse Support**
Enable or disable PS/2 mouse function
- **System Keyboard**
Select keyboard present or absent
- **Primary Display**
Select display mode of Built-in VGA display
- **Password Check**
Select password entry point (always at boot or CMOS Setup)

- **Boot to OS/2**
This item allows you to boot from OS/2 and access the memory that over 64MB
- **Wait For "F1" if Error**
Whenever the BIOS detects a non-fatal error, the system will be stopped and wait "F1" key pressed
- **Hit 'DEL' Message Display**
Display 'DEL' message on the screen
- **Internal Cache**
Select chipset internal cache to WriteBack/Writethru/disable
- **System BIOS Cacheable**
Determines whether system BIOS will be copied to RAM. However, it is optional depending on chipset design. System BIOS cache will increase the video speed.
- **C0000 – CC00 Shadow/D0000 – DC00 Shadow**
These categories determine whether option ROMs will be copied to RAM.

8.4 Advanced Chipset Setup

- **VGA Frame Buffer Size**
Select video RAM buffer size form 128K to 4096KBytes
- **ISACLK**
Select ISA clock 14MHz/2 or PCICLK/4
- **DRAM Type/Timing**
Select DRAM type and timing (Strapping mode or user Setup mode)
- **GCLK x2**
Select DRAM access timing (auto or Fail-safe)
- **Memory Hole at 15-16M**
Reserve this area of system memory for ISA adapter ROM. When this area is reserved, it can not be cached
- **PCI to host read prefetch**
Enable/disable PCI to host prefetch mode
- **PCI to host write posting**
Enable/disable PCI to host write posting mode

8.5 Power Management Setup

When 'Power management/APM' enabled, 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 'Enable' gives better power savings.

8.6 PCI /Plug and Play Setup

- DMA Channel 0 – 7
Select DMA channels controlled by PnP OS
- IRQ Channel 3 – 15
Select IRQ channels controlled by PnP OS
- Reserved Memory Size
Reserve PnP memory size
- Reserved Memory Address
Reserve PnP memory address map

8.7 Peripheral Setup

- Onboard FDC
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.
- Onboard Serial PortA
This item allows you to determine access onboard serial portA controller with which I/O address.
- Onboard Serial PortB
This item allows you to determine access onboard serial portB controller with which I/O address.
- Onboard Parallel Port
This item allows you to determine access onboard parallel port controller with which I/O address. and operating mode for the onboard parallel (printer)
- Onboard SIP1 PCI 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

8.8 Auto-Detect Hard disks

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

8.9 Change 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.

8.10 Change supervisor password

Can enter and change the options of the setup menus.

8.11 Auto Configuration with Optional Settings

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

8.12 Auto Configuration with Fail Safe Settings

This option allows you to load the troubleshooting default value to your system configuration. These default settings are non-optional and disable all high-performance features

8.13 Saving Settings and Exit

Save CMOS value changes to CMOS and exit setup

8.14 Exit Without Saving

Abandon all CMOS value changes and exit setup

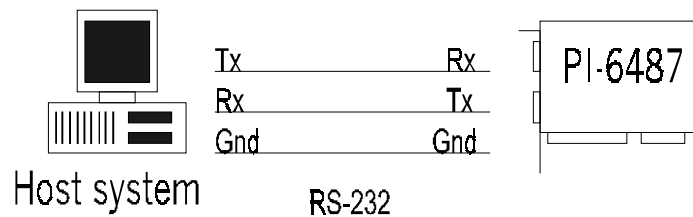
9. About RDISK.EXE utility

The RDISK.EXE program is a comprehensive driver which can help you to directly access the Flash disk in the remote system through 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. The flash disk(s) in the remote system is logged into the host system as local disk drive(s) A: or 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
2. Floppy disk A: 1.44MB or 1.2MB
3. Floppy disk B: 1.44MB or 1.2MB
4. Reboot your host system
5. Connects a RS-232 cable between the HOST and PI-6487V



6. Turn-on your remote system
7. Press "F10" key to run ROM/RAM disk SETUP. and
8. Set "Primary ROM/RAM disk " to A:,B:,C:,or D:
9. Enable "COM Port for Remote Flash PGM:" to COM1 or COM2
10. Press "F7" to save SETUP values
11. Type RDISK <Enter> at DOS prompt of host system

12. 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

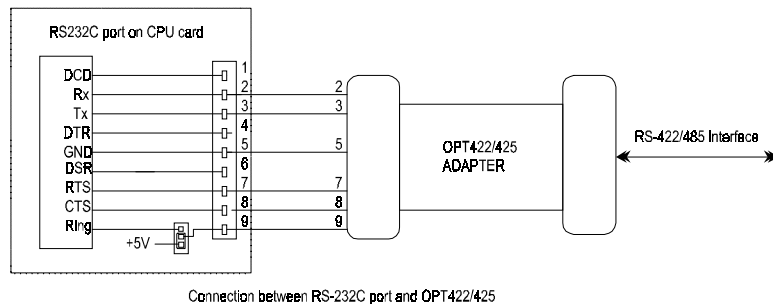
Connecting (l) _

13. At this time, the RDISK are attempting link to remote system
14. Reboot your remote system
"Connecting (-)" message will show up after connecting completed
15. RDISK now returns to DOS and remote solid state disk(s) are ready to be accessed
16. Format remote disk(s): (if flash 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
 - C>FORMAT [remote disk drive] /T:53/N:32 for 1.7MB Flash disk
 - C>FORMAT [remote disk drive] /T:69/N:32 for 1.5MB+512KB Flash disk
17. The disk(s) in the remote are already to be accessed by the host system
18. Type " RDISK /R " at DOS prompt can release this TSR driver from host system
19. Type " RDISK /? " at DOS prompt will show more information about RDISK

10. Converting RS-232 serial port(s) to RS-422/485

The RS-232C serial port(s) on this card can easily be converted to RS-422/485 interface by using OPT422/485 adapter

The OPT425 can convert four RS-232C level signals into RS-422 level (Tx,Rx,RTS,CST), and supplied by +5V through pin-9 of RS-232C connector as shown below.



See chapter 2 to set jumper called JP4 properly before using OPT425 adapter

11. Appendix A: Troubleshooting

Fatal errors are those which will not allow the system to continue the boot-up procedure.

These fatal errors are usually communicated through a series of audible beeps

1 Beep	:Refresh Failure	The memory refresh circuitry of the motherboard is faulty
2 beeps	:Parity Error	A parity error was detected in the base memory (the first block of 64KB) of the system
3 beeps	:Base 64KB Memory Failure	A memory failure occurred within the first 64KB of memory
4 beeps	:Timer Not Operational	Timer #1 on the system board has failed to function properly with the boot up procedure.
5 beeps	:Processor Error	The CPU (Central Processing Unit) on the system board has generated an error
6 beeps	:8042 Gate A20 Failure	This error message means that the BIOS is not able to switch the CPU into protected mode
7 beeps	:Processor Interrupt Error	The CPU on the motherboard has generated an exception interrupt
8 beeps	:Display Memory Error	The system video adapter has generated an error or its memory is faulty
9 beeps	:ROM Checksum Error	The ROM checksum value does not match the value encoded in the
10 beeps	:CMOS register error	The shutdown register for the CMOS memory has failed

12. Appendix B : I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device. There are a total of 1 K port address space available. The following table lists the I/O port addresses used on the Industrial CPU Card.

Address	Device Description
000h - 01Fh	DMA Controller #1
020h - 03Fh	Interrupt controller #1
040h - 05Fh	Timer
060h - 06Fh	Keyboard controller
070h - 07Fh	Real Time Clock. NMI
080h - 09Fh	DMA Page Register
0A0h - 0BFh	Interrupt Controller #2
0C0h - 0DFh	DMA Controller #2
0F0h	Clear Math Coprocessor Busy Signal
0F1h	Reset Math Coprocessor
1F0h - 1F7h	IDE Interface
278h - 27Fh	Parallel Port #2(LPT2)
2F8h - 2FFh	Serial port #2 (COM2)
2B0h - 2DFh	Graphics adapter Controller
378h - 3FFb	Parallel Port # 1 (LPT 1)
360h - 36Fh	Network Ports
3B0h - 3BFh	Monochrome & Printer adapter
3C0h - 3CFh	EGA adapter
3D0h- 3DFh	CGA adapter
3F0h - 3F7h	Floppy Disk Controller
3F8h - 3FFb	serial Port# 1 (COM 1)