

PI-6489V/N series
Embedded STPC ELITE 5x86DX-133
Half Size CPU Card with on-board
SDRAM,LAN/CRT VGA&LCD interface
and
IDE CF Slot / DiskOnChip Socket

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F.2 DMA channel assignments

Channel	Function
0	Available
1	Available
2	Floppy disk (8-bit transfer)
3	Available (Parallel Port)
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

F.3 IRQ mapping chart

IRQ no.	Device used
0	Interval timer
1	Keyboard
2	Interrupt from Controller 2
3	COM2
4	COM1
5	Reserved
6	FDD
7	LPT1
8	RTC
9	Software Redirected to INT 0AH (IRQ2)
10	Reserved
11	Reserved
12	PS/2 mouse
13	Co-processor
14	Primary IDE
15	Secondary IDE

F.1 System I/O ports

Addr. range (Hex)	Device
000-01F	DMA controller
020-021	Interrupt controller 1, master
040-05F	8254 timer
060-06F	8042 (keyboard controller)
070-07F	Real-time clock, (NMI) mask
080-09F	DMA page register,
0A0-0BF	Interrupt controller 2
0C0-0DF	DMA controller
0F0	Clear math co-processor
0F1	Reset math co-processor
0F8-0FF	Math co-processor
100	SSD bank register
143	Set Watchdog time value
1F0-1F8	Fixed disk
200-207	Reserved (Game I/O)
278-27F	Reserved
2E8-2EF	Serial port 4
2F8-2FF	Serial port 2
300-31F	Prototype card
320	Ethernet controller(PI-6489VN)
360-36F	Reserved
378-37F	Parallel printer port 1 (LPT 2)
380-38F	SDLC, bisynchronous 2
3A0-3AF	Bisynchronous 1
3B0-3BF	Monochrome display and LPT1
3C0-3CF	Reserved
3D0-3DF	Color/graphics monitor adapter
3E8-3EF	Serial port 3
3F0-3F7	Diskette controller
3F8-3FF	Serial port 1
443	Watchdog timer enabled
543	Watchdog timeout value REG.
500	SSD control register

Chapter 1

Hardware installation

1.1 Introductions

The PI-6489V is a full-function Half size CPU Card which integrates the CRT VGA/LCD panel, CompactFlash, LAN(PI-6489VN Only) and other enhanced I/O interfaces on a CPU Card. This Card uses an embedded SGS-THOMSON STPC EILTE Pentium performance x86DX-133 low power CPU and embedded 32MB SDRAM on board.

The PI-6489V offers power management to minimize power consumption. It complies with the "Green Function" standard and supports three power saving features: doze, sleep, and suspended mode.

Its high performance VGA display supports both CRT and TFT/STN/EL/Mono LCD displays with 1MB Display Memory up to 2MB and Resolutions up to 1024x768@16bpp.

The PI-6489V/N also offers several industrial features such as a 255-level watchdog timer with jumperless setup, supports M-systems DiskOnChip Flash Disk,IDE CompactFlash Slot and PC/104 connection for additional functions with CPU Card.

1.2 Packing list

- One PI-6489V/N All-in-one single board computer
- One Quick Installation Guide
- One CD-ROM for manual (in PDF format), drivers and utility
- One IDE flat cable
- One floppy flat cable
- One parallel port & serial port adapter
- One PS/2 keyboard adapter

Appendix F

System configuration

● (AH) = 06h Read User define status from CMOS RAM

- (AL) = 1 - Read User Define 1 Status
- = 2 - Read User Define 2 Status
- = 3 - Read User Define 3 Status

On Return: AL = 0 - Enabled
= 1 - Disabled

1.3 Specifications

■ System Chipset :

The STPC ELITE chipset integrates a fully static x86DX-133MHz low power processor, fully compatible with standard 5x86 processors, and combine it with powerful chipset to PC compatible subsystem. The performance of this device is comparable with the performance of a typical P5 generation system.

■ System Memory: On-board 32MB SDRAM(up to 64MB)

■ Bus interface: PC/AT ISA bus

■ Multi I/O : Winbond W83977F

■ System BIOS: Award PnP BIOS with VGA BIOS in a single 256KB FLASH ROM (Year 2000 Compliant BIOS)

■ Plug and Play: Dual interrupt and DMA signal steering with plug and play control.

■ Display:

- ◆ Chips 65550 HiQVideo Accelerator with integrated memory. support CRT/TFT/STN/EL/Mono LCD, Resolutions up to 1024x768@16bpp
- ◆ 1 MB display memory on board(up to 2MB).
- ◆ DB-15 VGA connector and 44 x 2 pin header general purpose flat panel display connector

■ LAN: RTL8139C PCI local bus single-chip Fast Ethernet controller and RJ-45 connector. supports 10 Mb/s and 100 Mb/s N-way Auto-negotiation operation (LAN for PI-6489VN only)

■ Floppy Disk Drive Interface: Supports Up to two Floppy Disk Drives,5.25"(360KB or 1.2MB) and/or 3.5"(720KB or 1.44MB/2.88MB)

■ IDE Hard Disk Drive Interface: One Channel PCI EIDE

■ CompactFlash Slot: One Fully IDE CompactFlash Type I/II Compatibility Slot and Support +5VDC or +3.3VDC IDE CompactFlash Card. (only)

■ Serial Ports:

- ◆ One RS-232C and One RS-232/422/485 serial Ports.
- ◆ Auto direction flow control on RS-485
- ◆ Overvoltage protection for RS-422/485 up to 25kV
- ◆ All with 16C550 UART And 16 byte FIFOs

■ Printer Port: One SPP/ECP/EPP Bi-direction Parallel Port.

■ Solid state disk: One expended 32-pin Sockets for M-Systems DiskOnChip

- **EEPROM** : Provide 255 words(16 bit) EEPROM register for user
- **Real-time clock/calendar**: Lithium battery with 10 year data retention
- **Watch Dog timer**: The watch dog timer range from 0 to 254 sec
- **I/O bus expansion**: PC/104 ISA Bus connector
- **Power Supply Voltage**: + 5VDC
- **Power Consumption**: +5VDC/1.8A (max)
- **Operating Temperature**: 32 to 140F (0 to 60C).
- **Dimensions**: 340(L) x 123(W)mm

E.1 How to use this driver

The PI-6489V/N driver is Called by software interrupts INT 6Fh, 7Fh, 8Fh, 9Fh, AFh, BFh, CFh, DFh or EFh and selected by Award BIOS setup "[Advanced Chipset->Function Call Entry:](#)" [Ref. D.6.4]

● (AH) = 01h Read & Write data from/to EEPROM

- (AL) = 00h - Read data from EEPROM
(DX) - Address (00h to EFh)

On Return: (AX) - Data

- (AL) = 01h - Write data to EEPROM
(DX) - Address (00h to EFh)
(BX) - Data

On Return: none

● (AH) = 04h PassWord

- (AL) = 00h - Set PassWord
(DX,BX) - Password

On Return: none

- (AL) = 01h - Verify Password
(If Error 5 times then auto clear Password)
(DX,BX) - Password

On Return: (AX) = 0 - Valid
= FFFFh - Invalid

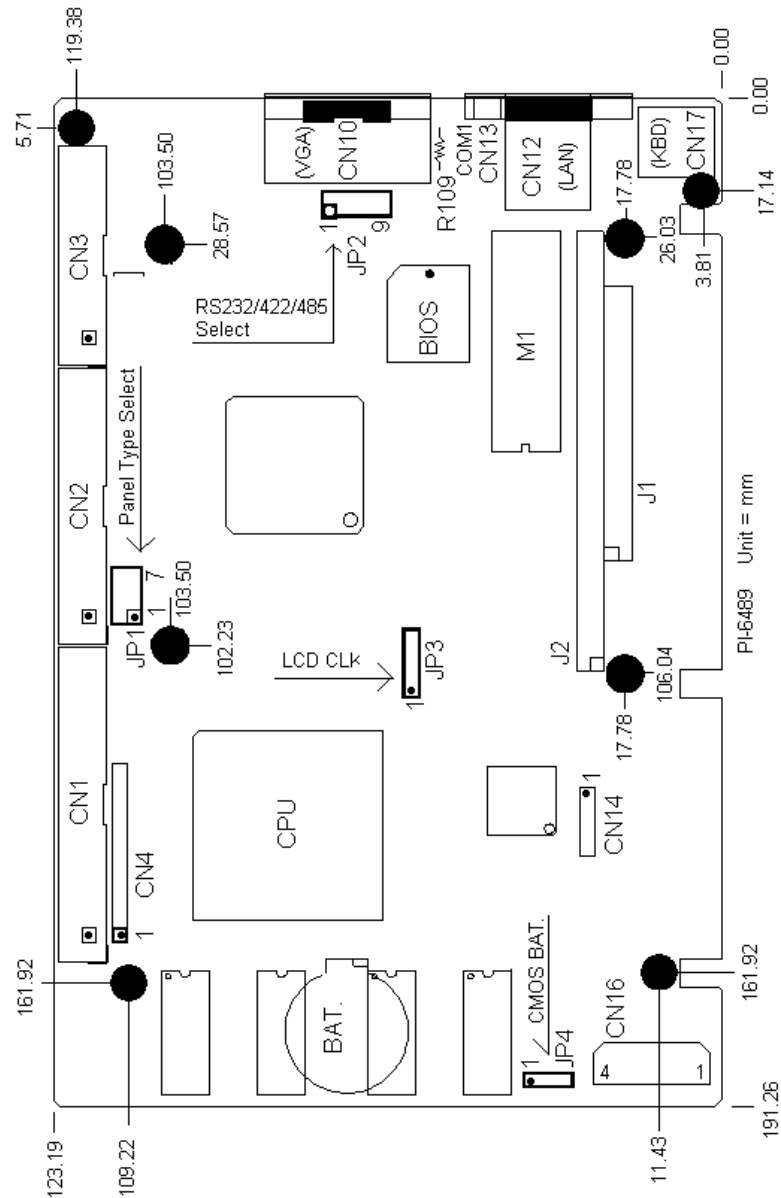
Appendix E

Programer's Reference

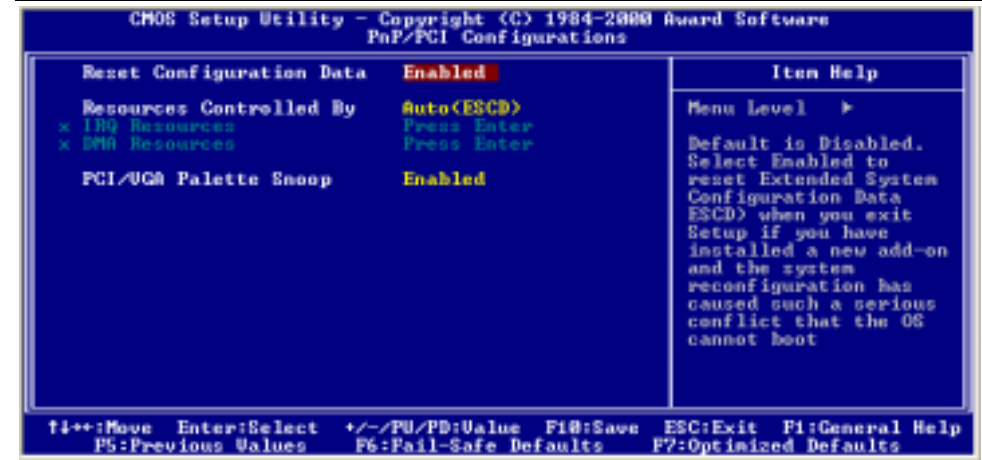
Chapter 2

Jumper settings

2.1 Locating jumpers



D.9 PnP/PCI Configuration Setup



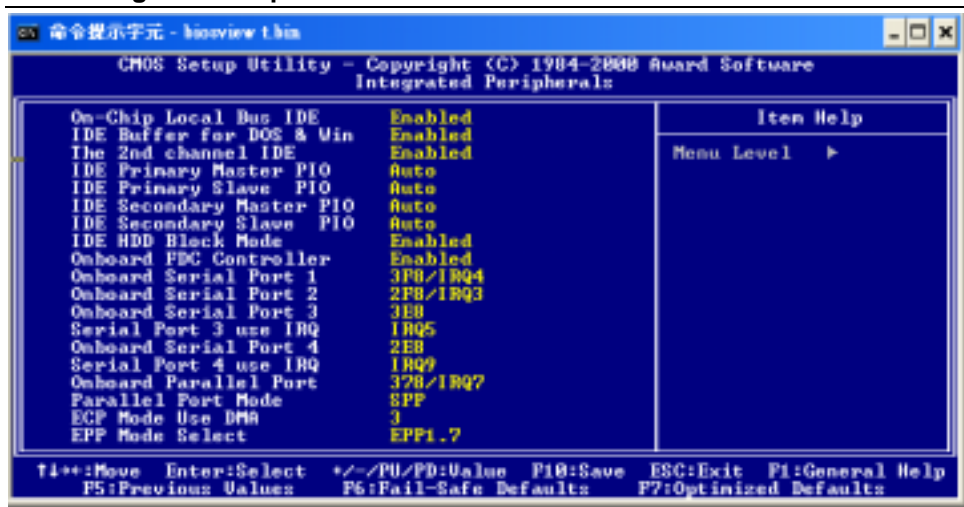
D.10 Load Optimized Defaults

When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

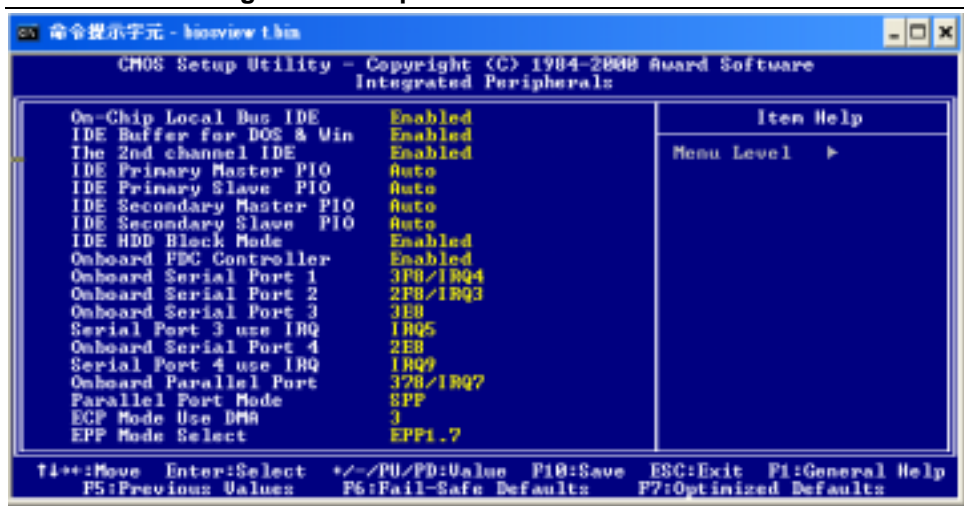
Load Optimized Defaults (Y/N) ? **N**

Pressing 'Y' loads the default values that are factory settings for optimal performance system operations.

D.7 Integrated Peripherals



D.8 Power Management Setup



2.2 Jumper Setting

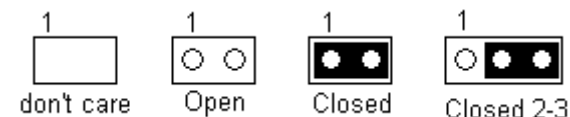
The PI-6489V/N has a number of jumper that allow you to configure your system to suit your application. The table below lists the function of each of the board's jumper:

Label	Function	
JP1	Panel Type Select	Ref. 2.3.1
JP2	COM2 RS-232/422/485 selection	Ref. 2.3.2
JP3	Flat Panel SHF_CLK Setting	Ref. 2.3.3
JP4	CMOS RAM Battery Set	Ref. 2.3.4

2.3 Setting jumpers

You configure your card to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To <close> a jumper you connect the pins with the clip. To <open> a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2, and 3. In this case you would connect either pins 1 and 2 or 2 and 3.

The jumper settings are schematically depicted in this manual as follows:



A pair of needle-nose pliers may be helpful when working with jumpers.

If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

The Jumper settings with background color are factory default

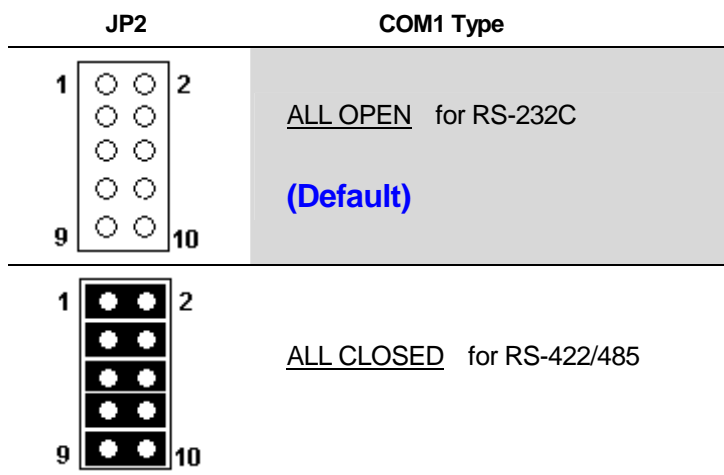
2.3.1 Panel Type Select (JP1)

P1-2.	P3-4	P5-6.	P7-8	Panel Type
ON	ON	ON	ON	1024x768 STN Color
ON	ON	ON	OFF	1280x1024 TFT Color
ON	ON	OFF	ON	640x480 STN color
ON	ON	OFF	OFF	800x600 STN Color
*ON	*OFF	*ON	*ON	640x480 Sharp TFT Color
ON	OFF	ON	OFF	640x480 18bit TFT Color
ON	OFF	OFF	ON	1024x768 TFT Color
ON	OFF	OFF	OFF	800x600 TFT Color

[Ref. Page 27](#)

2.3.2 COM2 RS-232/RS-422/RS-485 Selection (JP2)

The COM2 port can be selected as RS-232, RS-422 or RS-485 by setting JP2. The following chart shows the jumper setting. ([Ref. P.22](#))



D.6.7 User Define 2

This item is reserved for user define and read from CMOS RAM address 5Eh (bit-2)

Enabled	CMOS RAM Address 5Eh (bit-2) = 0
Disabled	CMOS RAM Address 5Eh (bit-2) = 1

D.6.8 User Define 3

This item is reserved for user define and read from CMOS RAM address 5Eh (bit-3)

Enabled	CMOS RAM Address 5Eh (bit-3) = 0
Disabled	CMOS RAM Address 5Eh (bit-3) = 1

D.6.9 CPU Internal Cache

This categorie speed up memory access. However, it depends on CPU. The default value is enable.

Enabled	Enable cache
Disabled	Disable cache

D.6.3 ISA Clock

This item allows you to select the ISA clock type.

14.3MHz / 2	System clock type
PCI CLK / 4	PCI clock type

D.6.4 Function Call Entry

This item allows you to select the Software Interrupt Number for GPIO,EEPROM of Driver Function Call Entry. [[Ref. Appendix E](#)]

INT.	No.
INT	6Fh
INT	7Fh
INT	8Fh,
INT	9Fh
INT	AFh
INT	BFh
INT	CFh
INT	DFh
INT	EFh

D.6.5 Solid State Disk Address

This item allows you to select The Solid State Disk (**DiskOnChip™**) occupies system memory area



Address
CE000h - CFFFFh
D0000h - D1FFFh
DE000h - DFFFFh
E0000h - E1FFFh

D.6.6 User Define 1

This item is reserved for user define and read from CMOS RAM address 5Eh (bit-1)



Enabled	CMOS RAM Address 5Eh (bit-1) = 0
Disabled	CMOS RAM Address 5Eh (bit-1) = 1

2.3.3 LCD Panel Shift-Clock setting (JP3)

JP3	Function (ref. 3.10)
 1	Normal (DEFAULT)
 1	SHF_CLK inverted (For EL Panel)

[Ref. P.21](#)

2.3.4 CMOS RAM Data Backup Battery (JP4)

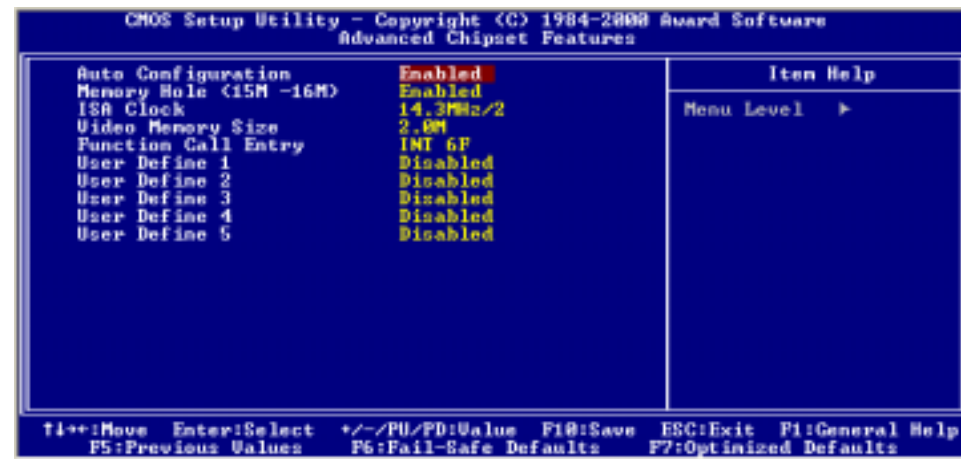
JP4	Function
 1	Normal (DEFAULT)
 1	Clear CMOS RAM

Chapter 3

Connecting Peripherals

D.6 Advanced Chipset Features Setup

This section allows you to configure the system based on the specific features of the installed chipset. This chipset manages bus speeds and access to system memory resources, such as DRAM and the external cache. It also coordinates communications between the conventional ISA bus and the PCI bus. It must be stated that these items should never need to be altered. The default settings have been chosen because they provide the best operating conditions for your system. The only time you might consider making any changes would be if you discovered that data was being lost while using your system.



D.6.1 Auto Configuration

Pre-defined 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.

D.6.2 Memory Hole At 15M-16M

In order to improve performance, certain space in memory can be reserved for ISA cards. This memory must be mapped into the memory space below 16 MB.

Enabled	Memory hole supported.
Disabled	Memory hole not supported.

D.5.3 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.

D.5.4 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.

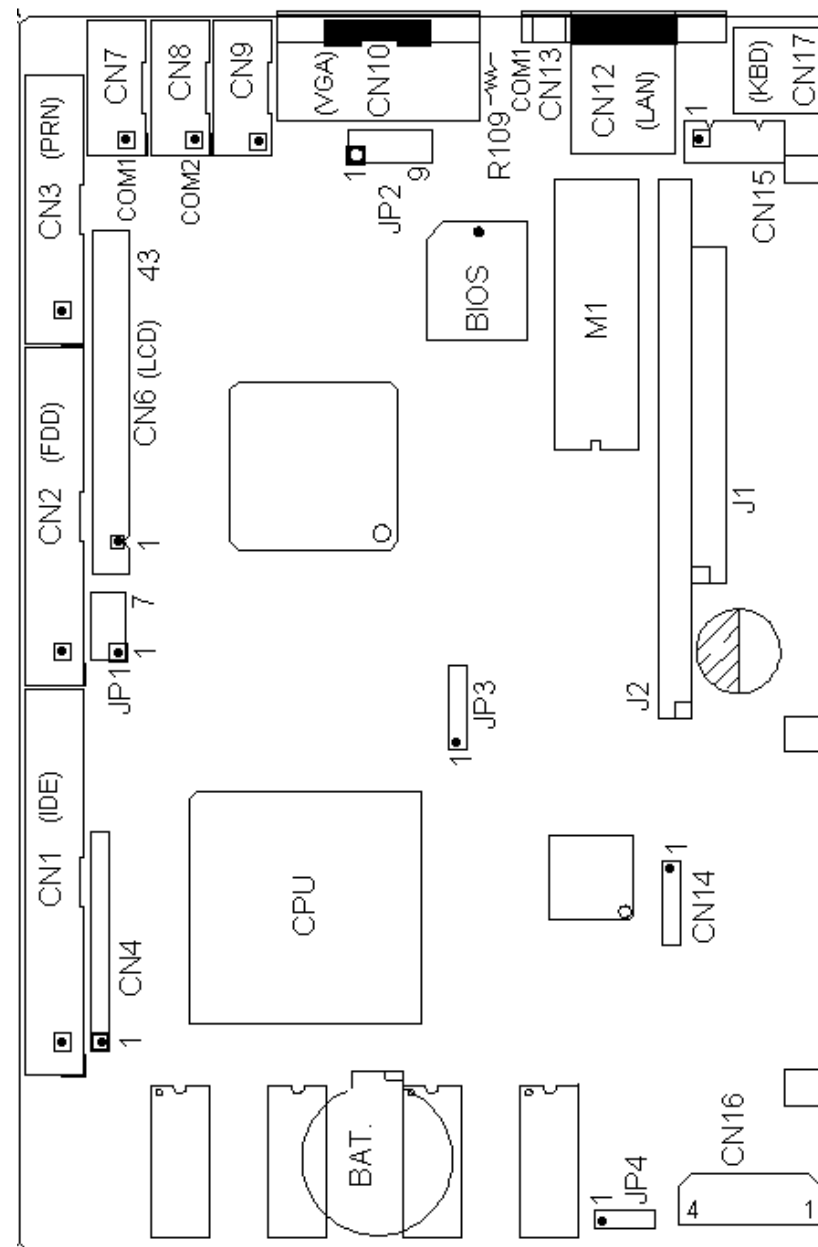
Enabled	Video shadow is enabled
Disabled	Video shadow is disabled

D.5.5 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

3.1 Locating Connectors



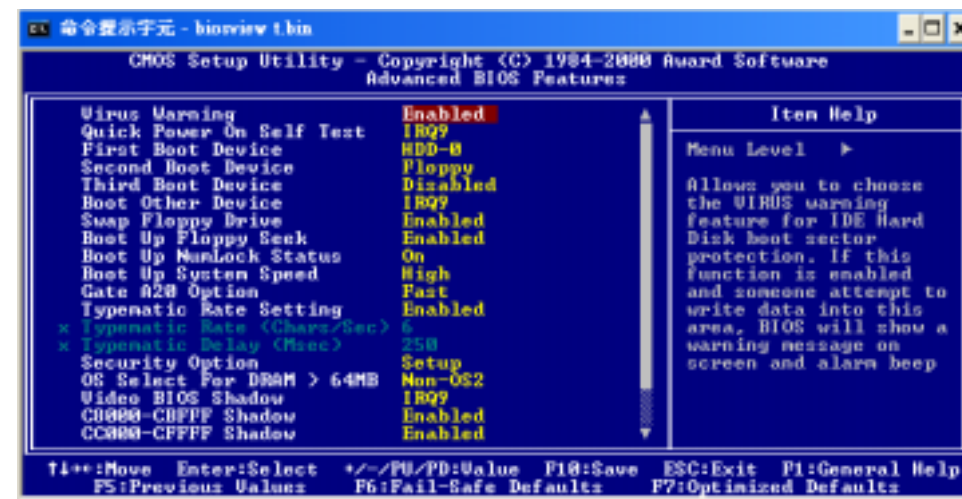
3.2 Connectors Summary

On-module connectors link the PI-6489V/N to external devices such as hard disk drives, a keyboard, or floppy drives. The table below lists the function of each of the board's connectors:

Label	Function	Page
CN1	Hard disk connector	17
CN2	FDD connector	18
CN3	Parallel port connector	19
CN4	Hardware Reset Connector (pin 1,2)	19
CN4	Power LED Connector (pin 3,4,5,6,7)	20
CN4	IDE LED Connector (pin 8,9)	20
CN4	Ext. Speaker Connector (pin 10,11,12,13)	20
CN6	Flat panel display Connector	21
CN7	COM1 10-pin header connector	22
CN8	COM2 10-pin header connector	22
CN9	Ext. 10-pin header CRT Display connector	23
CN10	CRT VGA Display connector	23
CN11	COM2 D-type connector (For PI-6489)	23
CN12	RJ-45 Ethernet connector (For PI-6489VN)	24
CN13	COM1 D-type connector (For PI-6489V/N)	22
CN14	CPLD connector	24
CN15	Ext. Keyboard connector	24
CN16	+12V/+5V External Power Input connector	25
CN17	PS2 Keyboard & mouse connector	25
CN18	IDE CompactFlash Slot (option)	26

D.5 Advanced BIOS Features

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.



D.5.1 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

D.5.2 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

D.4 Standard CMOS Features

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.



D.4.1 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.

3.3 IDE Hard Drive Connector (CN1)

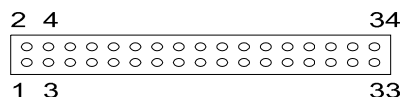
Connect one end of the cable to CN1. Make sure that the red (or blue) wire corresponds to pin 1 on the connector, which is labeled on the board (on the right side).

Pin	Signal	Pin	Signal
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	IRDY	28	GND
29	N.C.	30	GND
31	IRQ	32	N.C.
33	A1	34	N.C.
35	A0	36	A2 CS0
37	CS0	38	CS1
39	-LED	40	GND

3.4 Floppy drive connector (CN2)

You can attach up to two floppy drives to the PI-6489V/N's on-board controller. You can use any combination of 5.25" (360 KB and 1.2 MB) and/or 3.5" (720 KB, 1.44 MB, and 2.88 MB) drives.

1. Plug the 34-pin flat-cable connector into CN2. Make sure that the red wire corresponds to pin one on the connector.
2. Attach the appropriate connector on the other end of the cable to the floppy drive(s). You can use only one connector in the set. The set on the end (after the twist in the cable) connects to the A: drive. The set in the middle connects to the B: drive.



Pin	Signal	Pin	Signal
1	GND	2	DENSITY SELECT*
3	GND	4	N/C
5	GND	6	DRIVE TYPE
7	GND	8	INDEX*
9	GND	10	MOTOR 0*
11	GND	12	DRIVE SELECT 1*
13	GND	14	DRIVE SELECT 0*
15	GND	16	MOTOR 1*
17	GND	18	DIRECTION*
19	GND	20	STEP*
21	GND	22	WRITE DATA*
23	GND	24	WRITE GATE*
25	GND	26	TRACK 0*
27	GND	28	WRITE PROTECT*
29	GND	30	READ DATA*
31	GND	32	HEAD SELECT*
33	GND	34	DISK CHANGE*

* low active

D.3.6 Power Management Setup

This entry only appears if your system supports Power Management, "Green PC", standards.

D.3.7 PNP / PCI Configuration

This entry appears if your system supports PNP / PCI. See Section 7 for details.

D.3.8 Load Optimized 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.

D.3.9 Save & Exit Setup

Save CMOS value changes to CMOS and exit setup.

D.3.10 Exit Without Save

Abandon all CMOS value changes and exit setup.

D.3 Main Menu

Once you enter the System 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.



D.3.1 Setup Items

The main menu includes the following main setup categories. Recall that some systems may not include all entries.

D.3.2 Standard CMOS Features

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

D.3.3 Advanced BIOS Features

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

D.3.4 Advanced Chipset Features Setup

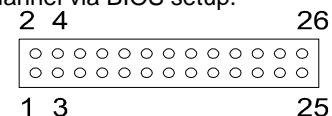
This setup page includes all the items of chipset special features. See Section C.6 for details.

D.3.5 Integrated Peripherals

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

3.5 Parallel port connector (CN3)

Normally, the parallel port is used to connect the card to a printer. The PI-6489V/N includes a multi-mode (ECP/EPP/SPP) parallel port, accessed through CN3, a 26-pin flat-cable connector. You will need an adapter cable if you use a traditional DB-25 connector. The adapter cable has a 26-pin connector on one end and a DB-25 connector on the other. The parallel port is designated as LPT1 and can be disabled or changed to LPT2 or LPT3 in the system BIOS setup. The parallel port interrupt channel is designated to be IRQ7. You can select ECP/EPP DMA channel via BIOS setup.



Pin	Signal	Pin	Signal
1	STROBE	2	AUTOFD*
3	D0	4	ERR
5	D1	6	INIT*
7	D2	8	SLCTINI*
9	D3	10	GND
11	D4	12	GND
13	D5	14	GND
15	D6	16	GND
17	D7	18	GND
19	ACK*	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	N/C

3.6 Hardware reset switch (CN4 pin[1,2])

The hardware reset switch button is an active low signal (24 mA sink rate).

Pin	Function
1	Reset SW -
2	Reset SW +

3.7 Power LED (CN4 pin[3~7])

The Power LED indicator for system power is an active low signal (24 mA sink rate).

pin	Signal
3	Power LED+
4	nc
5	GND
6	KBD INH.
7	GND

3.8 Hard disk LED (CN4 pin[8,9])

The hard disk LED indicator for hard disk access is an active low signal (24 mA sink rate).

Pin	Function
8	IDE LED +
9	IDE LED -

3.9 Speaker Connector (CN4 pin[10~13])

The PI-6489V/N can drive an 8 Ω speaker at 0.5 watts. Make sure that alternatives to this specification do not overload the card.

pin	Signal
10	+5V
11	GND
12	GND
13	Speaker Data.

D.1 Starting Setup

The Award BIOS is immediately activated when you first power on the computer. The BIOS reads the system information contained in the CMOS and begins the process of checking out the system and configuring it. When it finishes, the BIOS will seek an operating system on one of the disks and then launch and turn control over to the operating system.

While the BIOS is in control, the Setup program can be activated in one of two ways:

1. By pressing immediately after switching the system on, or
2. by pressing the key when the following message appears briefly at the bottom of the screen during the POST (Power On Self Test).

Press DEL to enter SETUP.

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

PRESS F1 TO CONTINUE, DEL TO ENTER SETUP

D.2 In Case of Problems

If, after making and saving system changes with Setup, you discover that your computer no longer is able to boot, the Award BIOS supports an override to the CMOS settings which resets your system to its defaults.

The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both Award and your systems manufacturer to provide the absolute maximum performance and reliability. Even a seemingly small change to the chipset setup has the potential for causing you to use the override.

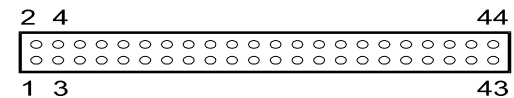
Appendix D

Award BIOS Setup

3.10 Flat panel display connector (CN6)

CN6 is a 44-pin connector which can support a 24-bit TFT LCD.

It is recommended that the LCD bias voltage not be applied to the panel until the logic supply voltage (+5 V or +3.3 V) and panel video signals are stable. (Ref. P.13 JP3)

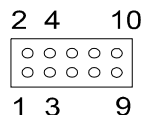


1	GND	2	GND
3	SHF_CLK	4	M
5	LP (HSYNC)	6	VSYNC
7	P0	8	P1
9	P2	10	P3
11	P4	12	P5
13	P6	14	P7
15	P8	16	P9
17	P10	18	P11
19	P12	20	P13
21	P14	22	P15
23	P16	24	P17
25	P18	26	P19
27	P20	28	P21
29	P22	30	P23
31	GND	32	GND
33	5V	34	+5V
35	5V	36	ENABLK
37	ENAVEE	38	+12V
39	+12V	40	ENAVDD
41	FLM	42	GND
43	+3.3V	44	+3.3V

3.11 Serial port connectors (CN13,CN7,CN8)

■ **COM-1 RS-232 Connector (CN13,CN7)**

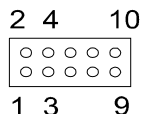
- **CN13** D-type connector is for PI-6489V/N
- **CN7** Ext. Cable to D-type Connector



CN7 Pin	RS-232	CN7 Pin	RS-232
1	DCD	2	DSR
3	RX	4	RTS
5	TX	6	CTS
7	DTR	8	RI
9	GND	10	NC

■ **COM-2 RS-232/422/485 Connector (CN8)**

- **CN8** Ext. Cable to D-type Connector
- Auto direction flow control on RS-485
- Terminator Resistor (**R109**) for RS-422/485
- **JP2** ALL Short for RS-422/RS-485 otherwise ALL OPEN [\[Ref. 12\]](#)



Pin No	RS-232	RS-422	RS-485	Pin No	RS-232	RS-422	RS-485
1	DCD	TX -	DATA -	2	DSR	RX -	
3	RX	TX +	DATA +	4	RTS		
5	TX			6	CTS	RX +	
7	DTR			8	RI		
9	GND			10	NC		

The following steps show how to program the watchdog timer

67. you must write a program which write I/O port address 143(hex) to write timeout value(0-255 sec) to Watchdog REG. and reads I/O port address 443 (hex) to enable watch-dog timer. After enabled, your program must refresh the watchdog timer by reading the I/O port 443 (hex) again periodically.
68. Read I/O port address 43 (hex) to Disabled watch-dog timer..

I/O Address	Function
143H I/O write	Set watchdog timeout value
443H I/O read	Enable watchdog and start to count
443H I/O read	Refresh Cycle
43H I/O read	Disable watchdog

The following example shows how you might program the watchdog timer in ASM:

Example-A:

```

Mov  al,5           ; Set timeout Value(5 sec)
Out  143h,al       ; Set to Timer REG.
In   al,443h       ; Enable Watchdog and start to count
.....            ; do user program
In   al,443h       ; refresh cycle
In   al,43h        ; Disable watchdog timer
    
```

Example-B:

```

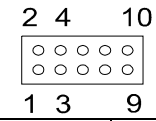
Mov  al,8           ; Set timeout Value(8 sec)
Out  143h,al       ; Write to Timer REG.
In   al,443h       ; Enable Watchdog and start to count
.....            ; do user program
In   al,443h       ; refresh cycle
In   al,43h        ; Disable watchdog timer
    
```

Appendix C

Programming Watch dog timer

3.12 Ext. 10-pin header CRT display connector (CN9)

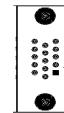
CN10 is a 10-pin header used for conventional CRT displays.



Pin	Signal	Pin	Signal
1	RED	2	GND
3	GREEN	4	GND
5	BLUE	6	GND
7	HSYNC	8	GND
9	VSYNC	10	nc

3.13 CRT display connector (CN10)

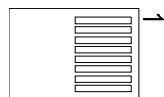
Pin	Signal
1	RED
2	GREEN
3	BLUE
4	N.C
5	GROUND
6	R/G/B return GND
7	R/G/B return GND
8	R/G/B return GND
9	N.C
10	GND
11	N.C
12	N.C
13	HSYNC
14	VSYNC
15	N.C



3.14 RJ-45(LAN) connector (CN12)

This connector (For PI-6489VN) supports Ethernet 10Mbps/100Mbps network data transfer rate operation, with built-in Tx-link LED indicators for monitoring network communication.

pin	signal
1	TX+
2	TX-
3	RX+
4	COMM
5	COMM
6	COMM
7	RX-
8	RX-



3.15 CPLD Connector (CN14)

pin	Signal
1	TCK
2	TMS
3	GND
4	+5VDC
5	TDO
6	TDI

3.16 Extended Keyboard Connector (CN15)

pin	Signal
1	KB_Data
2	KB_CLK
3	NC
4	GND
5	+5V/DC

B.1 How to use EEPROM

The PI-6489V/N provide a 93C66 EEPROM for backup system configures and reserved 240 words for user R/W through the interrupt vector by press <F10> at power-on to select EEPROM R/W interrupt vector number.

Read data from EEPROM

Entry : AH = 0 - Read EEPROM
 DL - Address (10h - FFh)
 Exit : AX - data (16bits)

Write data to EEPROM

Entry : AH = 1 - Write EEPROM
 DL - Address (10h - F0h)
 BX - data (16bits)
 Exit : none

Example: EEPROM R/W interrupt vector number is 6Fh

; Write data to EEPROM

```
Mov ah,1 ; Write data function number
Mov dl,20h ; Address
Mov bx,3A2Bh ; data
Int 6Fh ; Write data to EEPROM
```

; Read data from EEPROM

```
Mov ah,0 ; Read data function number
Mov dl,20h ; Address
Int 6Fh ; Read data from EEPROM (data saved in AX)
```


Appendix B

Programming EEPROM

3.17 Power Input Connector (CN16)

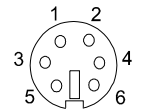
pin	Signal
1	+12VDC
2	GND
3	GND
4	+5V/DC

3.18 Keyboard & PS/2 mouse connector (CN17)

The PI-6489V/N module provides a keyboard connector. The standard PC/AT BIOS will report an error or fail during power-on self-test (POST) after a reset if the keyboard is not present. The PI-6489V/N's BIOS standard setup menu allows you to select "All, But Keyboard" under the <Halt On> selection. This allows no-keyboard operation in embedded system applications without the system halting under POST.

The PI-6489V/N module also provides PS/2 mouse connectors, which can be connected to outside world with convert cable.

pin	Signal
1	KBD_ Data
2	MS_Data
3	GND
4	+5VDC
5	KBD_CLK
6	MS_CLK



3.19 CompactFlash Slot (CN18)

The PI-6489V/N is equipped with a CompactFlash type I/II Slot on the solder side, which supports at the secondary master IDE interface CompactFlash card and on-board +5VDC to +3.3VDV regulator. (option)

Pin	Signal	Pin	Signal
1	Ground	2	D3
3	D4	4	D5
5	D6	6	D7
7	-CE	8	Ground
9	Ground	10	Ground
11	Ground	12	Ground
13	VCC	14	Ground
15	Ground	16	Ground
17	Ground	18	A2
19	A1	20	A0
21	D0	22	D1
23	D2	24	-IOCS16
25		26	GND
27	D11	28	D12
29	D13	30	D14
31	D15	32	-CE2
33	3.3_GND	34	-IORD
35	-IOWR	36	-WE
37	IRQ	38	-CSEL
39		40	
41	-RESET	42	-IORDY
43		44	VCC
45	-DASP	46	
47	D8	48	D9
49	D10	50	Ground

A.1 About solid state disk

The PI-6489V/N provides one extended solid state disk sockets (**M1**) which can accept M-System **DiskOnChip™** device

The **DiskOnChip™** disk occupies 8KB system memory space at CE000h-CFFFFh, D0000h-D1FFFh, DE000h-DFFFFh or E0000h-E1FFFh depends on the setting of Award BIOS Setup "[Advanced Chipset->Solid State Disk Address:](#)"

A.2 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-6489V/N module allows the user to install this device on the socket called **M1**.

Appendix A

M-System DiskOnChip& Flash Disk Setup

Chapter 4

VGA BIOS Setup

4.1 Introduction

The PI-6489V/N has an on-board PCI flat panel/VGA interface. The specifications and features are described as follows:

4.1.1 Chipset

The PI-6489V/N uses a C&T 65550 chipset for its PCI/SVGA controller. It supports many popular LCD, EL, and gas plasma flat panel displays and conventional analog CRT monitors. The 65550 VGA BIOS supports monochrome LCD, EL, color TFT and STN LCD flat panel displays. In addition, it also supports interlaced and non-interlaced analog monitors (color and monochrome VGA) in high-resolution modes while maintaining complete IBM VGA compatibility. Digital monitors (i.e. MDA, CGA, and EGA) are NOT supported. Multiple frequency (multisync) monitors are handled as if they were analog monitors.

4.1.2 Display memory

With 1 MB display memory on board, the VGA controller can drive CRT displays or color panel displays with resolutions up to 1024 x 768 at 16.8 M colors.

4.1.3 Display types

CRT and panel displays can be used simultaneously. The PI-6489VN can be set in one of three configurations: on a CRT, on a flat panel display, or on both simultaneously. The system is initially set to simultaneous display mode. The BIOS setup can be used to configure the display. In BIOS, select "Integrated Peripherals", then "Boot-up display type." You can then choose one of the following modes: "CRT only", "Panel only", or "Simultaneous."

4.1.4 Dual/simultaneous display

The PI-6489V/Ns is capable of providing multiple views and simultaneous display with mixed video and graphics on a flat panel and CRT. To set up dual display under Windows 98, follow these steps:

1. Select "Windows98", "Control panel", "Display", "Settings".
2. Select "1" for current display, or "2" for second display.
3. Enable "Extend my Windows desktop onto this monitor".
4. Click "OK".

48. Click the "My Computer" icon in the Main Program Group.
49. Click the "Control Panel" icon from My Computer window.
50. Click the "Network" icon from the Control Panel window.
51. Select "32-Bit PCI Fast Ethernet Adapter" item from "Network" dialog box, then click "Properties" button.
52. Click "Advanced" button from "32-Bit PCI Fast Ethernet Adapter Properties" dialog box.
53. Select the Line Speed/Duplex Mode (Auto,100 full,100 half,10 full,10half) from "Value" item, then click OK button in the "32-Bit PCI Fast Ethernet Adapter Properties" dialog box.
54. Click OK button from "Network" dialog box.
55. Restart your computer to take effect the new configuration.

5.2.3 Installation for Windows NT

56. Click the "Start" command button, select the "Settings" icon to display an option list under it.
57. Click the "Control Panel" icon.
58. Double-click the "Network" icon.
59. Select the "Adapters" item, then click the "Add..." button in the "Network" dialog box.
60. Click the "Have Disk..." button in the "Select Network Adapter" dialog box.
61. Insert the CD-ROM. Enter the full pathname D:\LAN\OEMSETNT.INF
62. Select "32-Bit PCI Fast Ethernet Adapter" and then click the OK button in the "Select OEM Option" dialog box.
63. Select the Line Speed value (AUTO,100full,100half,10full, 10half) and then click the OK button in the "Select Line Speed" dialog box.
64. To complete network installation, remember to bind the adapter to the transport drivers by choosing the "Bindings" button from the "Network" dialog box.
65. Click the "Close" button in the "Network" dialog box.
66. Restart your computer to initialize the network function.

5.2.4 Installation for Windows 2000

Microsoft had put the RTL8139A/B/C chip driver in the Windows 2000 system. Please plug 32-Bit PCI Fast Ethernet Adapter into PCI slot. After Win2000 starts up, it can recognize this adapter automatically.

5.1 Introduction

The PI-6489V/N is equipped with a high performance 32-bit Ethernet chipset which is fully compliant with IEEE 802.3 100 Mbps CSMA/CD standards. It is supported by major network operating systems. It is also both 100Base-T and 10Base-T compatible. The medium type can be configured via the RSET8139.exe program included on the utility disk. The Ethernet port provides a standard RJ-45 jack on board.

5.2 Installation of Ethernet driver

Before installing the Ethernet driver, note the procedures below. You must know which operating system you are using in your PI-6489VN, and then refer to the corresponding installation flow chart. Then just follow the steps described in the flow chart. You will quickly and successfully complete the installation, even if you are not familiar with instructions for MS-DOS or Windows.

Note: The windows illustrations in this chapter are examples only. You must follow the flow chart instructions and pay attention to the instructions which then appear on your screen.

5.2.1 Installation for MS-DOS and Windows 3.1

If you want to set up your Ethernet connection under the MS-DOS or Windows 3.1 environment, you should first check your server system model. For example, MS-NT, IBM-LAN server, and so on.

Then choose the correct driver to install in your panel PC.

The installation procedures for various servers can be found on CD-ROM, the correct path being:

5.2.2 Installation for Windows 95/98

39. Turn the PC power ON then boot from Windows 98.
40. Windows 98 will prompt "PCI Ethernet Controller" in "New Hardware Found" dialog box and "Add New Hardware Wizard" dialog box.
41. Click "Next >" button when "Search for the best for your device. "[Recommended]" is on.
42. Insert the Adapter Driver Diskette in your floppy drive.
43. Disable the "Floppy disk drives" check box. Click "Specify a location" and type "D:\LAN\WIN95" or "D:\LAN\WIN98", then click "Next >" button.
44. Windows 98 will prompt "32-Bit PCI Fast Ethernet Adapter" in "Add New Hardware Wizard" dialog box.
45. Click "Next >" button and Windows starts to copy files from Windows 98 CD-ROM to your hard disk.
46. Click "Finish" button from "Add New Hardware Wizard" dialog box.
47. Restart your computer to take effect the network function.

4.2 Installation for Window 98

Complete the following steps to install the SVGA driver. Follow the procedures in the flow chart that apply to the operating system that you are using within your PI-6489V/N.

Important: The following windows illustrations are examples only. You must follow the flow chart instructions and pay attention to the instructions which then appear on your screen.

5. Select "Start" , "Settings" , "Control Panel" , "Display" , "Settings".
6. Press "Advanced Properties".
7. Choose the "Adapter" label.
8. Press the "Change..." button.
9. Select the second item.
10. Press the "Have Disk" button.
11. Insert the disc into the CD-ROM drive.
12. Type " D:\VGA\WIN98 ".
13. The 'Select Device' dialog box will appear. Select 'chips98.inf'
14. Press "OK".
15. Click the "Apply" button.
16. Press "Yes" to reboot.
17. Repeat Step 1 on the previous page of this manual. The "chips" label appears in "Display".
18. Adjust resolution and color.
19. Click "Advanced" for further adjustment.
20. Click "OK" to exit.

4.3 Installation for Windows NT

21. Click the Start button, then go to Settings and click on Control Panel.
22. Click on the Display icon to start the Display Properties window.
23. Click on the Settings tab, and then click on Display Type.
24. In the Change Display Type window, click on Change in Adapter Type. This will bring up the Select Device Window.
25. 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(D:\VGA\WINNT40) are located.
26. Then select OK, or press enter.
27. Select Chips Video Accelerator from Display list provided, then click OK or press enter.
28. You will then see a warning panel about Third Party Drivers. Click on Yes to finish the install.
29. Once the installation is complete, the system must be shut down and restarted for the new drivers to take effect.
30. When the system has restarted, the default graphics mode (usually 640x480x256color) has been automatically selected.
31. Click the Start button, then go to Settings and click on Control Panel.
32. Click on the Display icon to start the Display Properties window.
33. Click on the Settings tab.
34. A new screen setting can be selected using either of the following methods:
35. 1: Use the slide-bar in the Desktop Area to select new setting.
36. 2: Click on List All Modes. From the list provided, select a new setting, then click OK or press enter.
37. 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.
38. Graphics modes are changed dynamically on NT 4.0, so you do not need to shutdown and restart for the new screen settings to work.

Chapter 5

Ethernet driver installation