D.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

D.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	Ethernet (For PC-486VN)

PC-486V/N series
All-In-One 80486DX-133
PC/104 CPU Module with on-board
VGA/LAN/TFT LCD interface
and
General Purpose I/O channels

D.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
101	General Purpose I/O (GPIO)
143	Watchdog time
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(PC-486VN)
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
500	SSD control register

Appendix D
System configuration

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C.9   Ethernet connector (CN6)   - For PC-486VN

This connector supports Ethernet 10Mbps network data transfer rate operation.

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

C.6   Power Input Connector (CN12)

pin	signal
1	+5VDC
2	GND

C.7   Extended PS/2 Mouse connector (CN16)

pin	Signal
1	MS_Data
2	nc
3	GND
4	+5V/DC
5	MS_CLK
6	nc

C.8   Keyboard connector (CN15)

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

Chapter 1
Hardware installation

1.1 Introductions

The PC-486V/N is a full-function PC/104 CPU Module which integrates the VGA LCD panel, GPIO(PC-486V),Ethernet (PC-486VN) and other enhanced I/O interfaces on a PC/104 CPU Module. This Module uses an embedded ACC Maple 486DX –133MHz low power CPU and embedded 4MB EDO RAM on board

The PC-486V/N 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 panel displays with a display memory of up to 1 MB and a resolution of up to 1024x768. The VGA controller is a ISA bus TOPRO TP6508IQ, which comes equipped with a windows accelerator.

The PC-486V/N also offers several industrial features such as a 255-level watchdog timer with jumperless setup, supports M-systems DiskOnChip Flash Disk and PC/104 connection for additional functions with PC/104 modules.

C.5 COM port connector (CN11,CN10)

C.5.1 COM1 RS-232 (CN11)

```
 2  4     10
 o o o o o
 o o o o o
 1  3     9
```
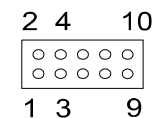
Pin	Signal	Pin	Signal
1	DCD	2	DSR
3	RX	4	RTS
5	TX	6	CTS
7	DTR	8	RI
9	GND	10	NC

C.5.2 COM2 RS-232/RS-485 (CN10)

```
 2  4     10
 o o o o o
 o o o o o
 1  3     9
```
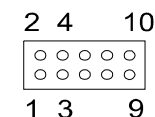
Pin	RS-232	RS-485	Pin	RS-232
1	DCD	DATA-	2	DSR
3	RX	DATA+	4	RTS
5	TX		6	CTS
7	DTR		8	RI
9	GND	GND	10	NC

* Terminator Resistor (R47) for RS-485

* Ref. page-12 JP2 for RS-232/RS-485 settting

C.4   Ext. LCD display connector (CN2)

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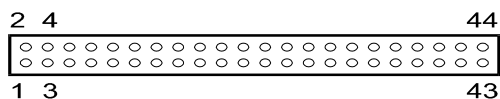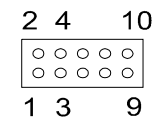
Pin	Signal	Pin	Signal
1	+12VDC	2	+12VDC
3	GND	4	GND
5	+5VDC	6	+5VDC
7	ENAVEE	8	ENAVDD
9	P0	10	P1
11	P2	12	P3
13	P4	14	P5
15	P6	16	P7
17	P8	18	P9
19	P10	20	P11
21	P12	22	P13
23	P14	24	P15
25	P16	26	P17
27	P18	28	P19
29	P20	30	P21
31	P22	32	P23
33	GND	34	GND
35	SHF_CLK	36	VSYNC (FLM)
37	M (ACD_CLK)	38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

1.2   Specifications

■ **CPU:** ACC Maple 80486DX-133MHz low power CPU

■ **Bus interface:** PC/104 ISA bus

■ **Chipset:**
System   : ACC Maple
Multi I/O   : Build-in ACC Maple
LAN   : RTL8019C(For PC-486VN)
VGA   : TOPRO TP6508IQ

■ **System BIOS:** AMI PnP BIOS with VGA BIOS in a single FLASH ROM(Year 2000 Compliant BIOS)

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

■ **System Memory:** On-board 4MB EDO DRAM

■ **Display:**

 . TOPRO TP6508IQ Accelerator with 1MB memory. support TFT/STN/EL/Mono LCD, Resolutions up to 1024x768@16bpp

 . Panel data bus : 24bit

 . Display output: DB-15 VGA connector, 44 x 2 pin header general purpose flat panel display connector

■ **LAN:** ISA bus single-chip Ethernet controller and RJ-45 connector. supports 10 Mb/s N-way Auto-negotiation operation (PC-486VN 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 port and up to two Enhanced IDE devices of PIO mode 4

■ **Serial Ports:** One RS-232C and one RS-232/485 serial Ports. 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 50 words EEPROM register for user

■ **Real-time clock/calendar:** Lithium battery with 10 year data retention

■ **General Purpose I/O interface:** 16-channels (8-in/8-out) GPIO connector

■ **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/1.20A(max)

■ **Operating Temperature:** 32 to 140F(0 to 60C).

■ **Operating Temperature:** 0 ~ 60° C (32 ~ 140° F)

■ **Dimensions:** 96(L) x 90(W)mm

C.3   CRT display connector (CN1)

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

C.2 IDE hard disk connector (CN7)
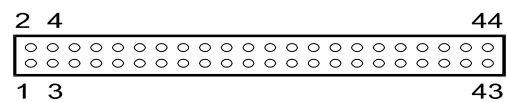
Pin	Signal	Pin	Signal
1	-RST	2	Ground
3	D7	4	D8
5	D6	6	D9
7	D5	8	D10
9	D4	10	D11
11	D3	12	D12
13	D2	14	D13
15	D1	16	D14
17	D0	18	D15
19	GND	20	N.C
21	N.C	22	GND
23	IOW	24	GND
25	IOR	26	GND
27	IORDY	28	BALE
29	N.C.	30	GND
31	IRQ	32	IO16
33	A1	34	N.C.
35	A0	36	A2 CS0
37	CS0	38	CS1
39	-LED	40	GND
41	+5VDC	42	+5VDC
43	GND	44	NC

Chapter 2
Jumper settings

2.1 Locating jumpers
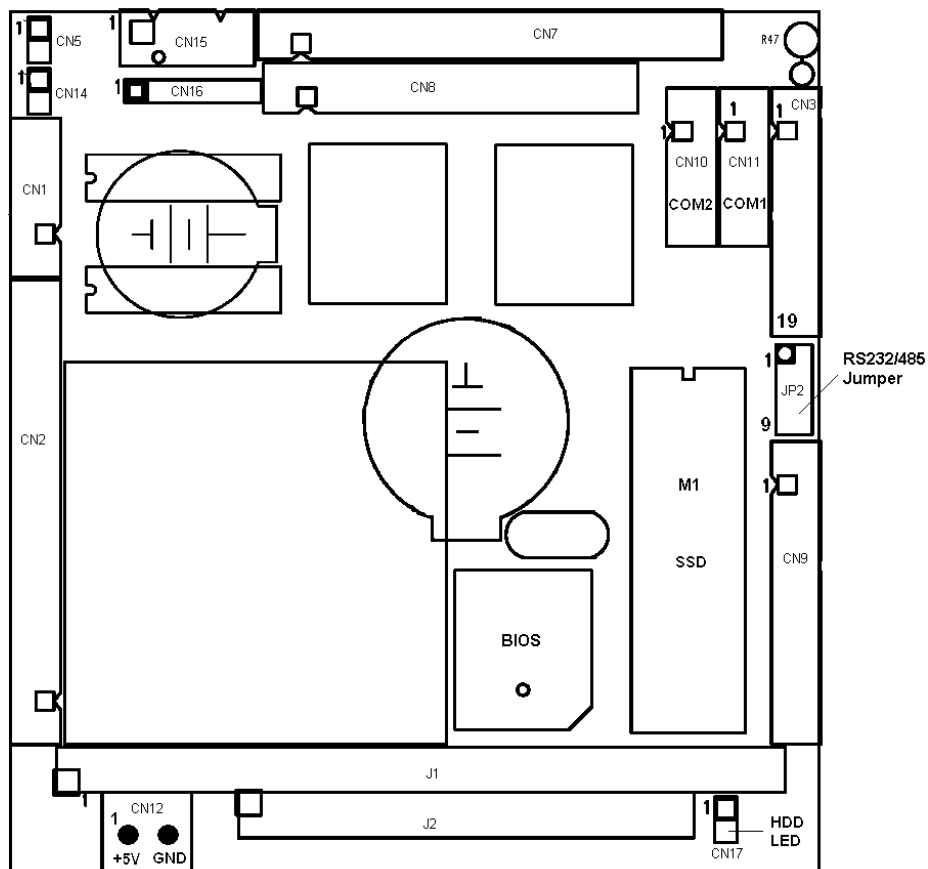
C.1 Floppy drive connector (CN8)
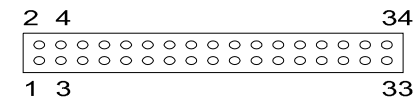
Pin	Signal	Pin	Signal
1	GND	2	DENSITY SELECT*
3	GND	4	N/C
5	GND	6	DRIVE TYPE
7	GND	8	INDEX*
9	GND	10	MOTOR 0*
11	GND	12	DRIVE SELECT 1*
13	GND	14	DRIVE SELECT 0*
15	GND	16	MOTOR 1*
17	GND	18	DIRECTION*
19	GND	20	STEP*
21	GND	22	WRITE DATA*
23	GND	24	WRITE GATE*
25	GND	26	TRACK 0*
27	GND	28	WRITE PROTECT*
29	GND	30	READ DATA*
31	GND	32	HEAD SELECT*
33	GND	34	DISK CHANGE*

* low active

C.4 Hardware reset switch connector (CN5)

Pin	Function
1	Reset SW-
2	Reset SW+

C.5 Parallel port connector (CN9)

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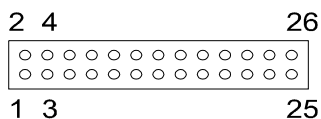
Pin	Signal	Pin	Signal
1	STROBE*	2	AUTOFD*
3	D0	4	ERR
5	D1	6	INIT*
7	D2	8	SLCTINI*
9	D3	10	GND
11	D4	12	GND
13	D5	14	GND
15	D6	16	GND
17	D7	18	GND
19	ACK*	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	N/C

2.2 Jumper

The PC-486V/N has a number of jumper that allow you to configure your system to suit your application. The table below lists thefunction of each of the board's jumper:

Label	Function	page
JP2	COM2 RS-422/RS-485 setting	12

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:



Open   Closed   Closed 2-3

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 COM2 settings for RS-232/485 (JP2)

JP2	COM2 function
(diagram)	RS-232C (default)
(diagram)	RS-485
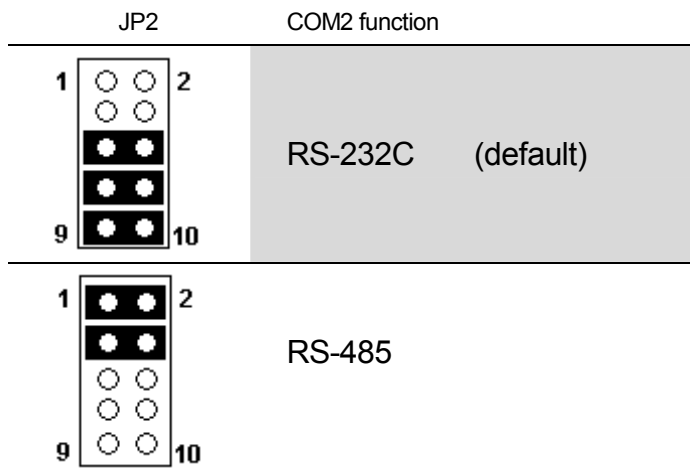
C.1 Ext. Speaker Connector (CN14)

Pin	Function
1	+5V DC
2	Speaker Data

C.2 HDD LED Connector (CN17)

Pin	Function
1	LED-
2	LED+

C.3 General Purpose I/O Port connector (CN3) - For PC-486V

(The I/O port arddress of the GPIO is fixed to **hex 101**)

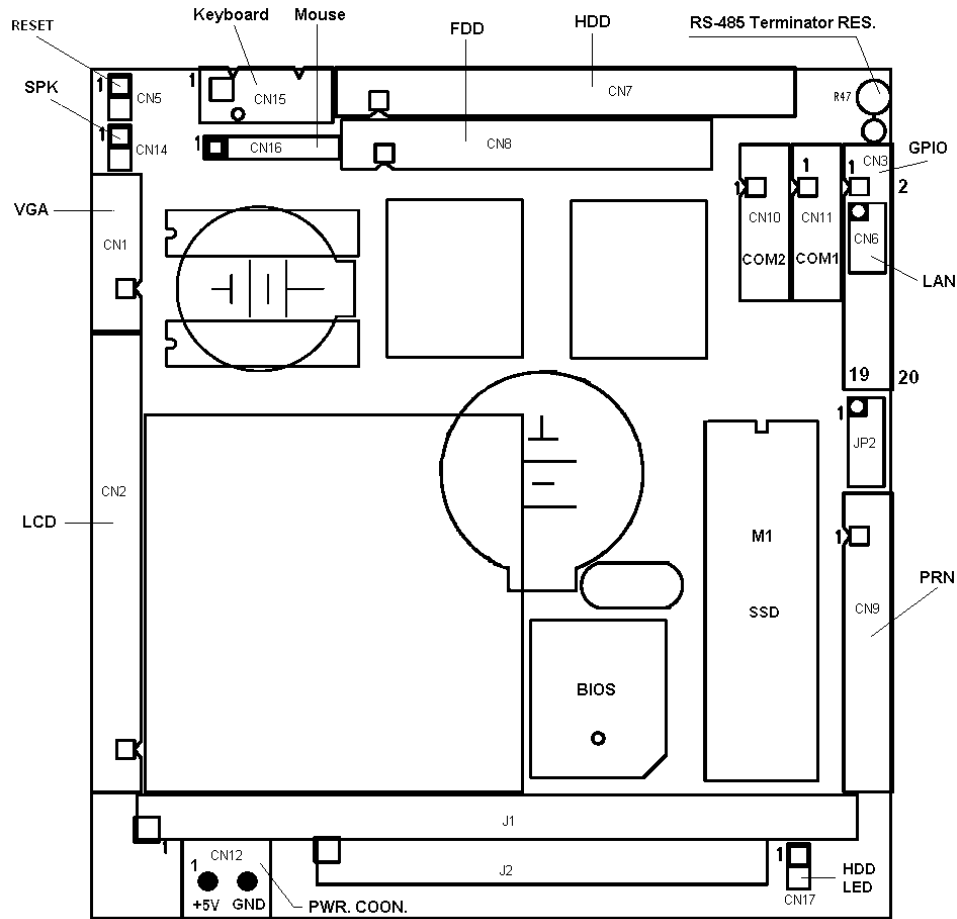| Pin NO.	Function	Pin NO.	Function
1	GND	2	+5VDC
3	GPI0	4	GPO0
5	GPI1	6	GPO1
7	GPI2	8	GPO2
9	GPI3	10	GPO3
11	GPI4	12	GPO4
13	GPI5	14	GPO5
15	GPI6	16	GPO6
17	GPI7	18	GPO7
19	+5VDC	20	GND

CN3
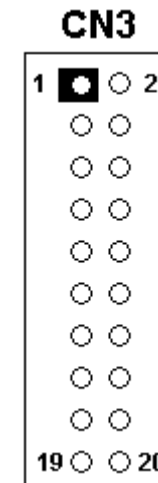
Appendix C
**Pin assignment of
connectors**

Chapter 3
Connecting Peripherals

3.1 Locating Connectors

The following steps show how to program the watchdog timer

1. Press "F10" function key at Power-On and Seting watchdog time out value
2. you must write a program which reads I/O port address 443 (hex) to enable watch-dog timer. After enabled, your program must refresh the watchdog dimer byreading the I/O port 443 (hex) again perodically.
3. Read I/O port address 43 (hex) to Disabled watch-dog timer.

I/O Address	Function
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 BASIC:

```
10 REM Watchdog timer example program
20 x=INP (&H443)    REM enable and start watchdog timer
30 GOSUB 1000       REM Your application task #1
40 X=INP (&H443)    REM refresh the watchdog timer
50 GOSUB 2000       REM Your application task #2
60 X=INP (&H443)    REM refresh the watchdog timer
70 X=INP (&H43)     REM Disable the watchdog timer
80 END
1000                REM Subroutine #1, you application task
.
.
1070 RETURN
2000                REM Subroutine #2, you application task
.
..
2090 RETURN
```

Appendix B
Programming Watch dog timer

3.2 Connectors

On-board connectors link the PC-486V/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
CN7	Hard disk connector	16
CN8	Floppy disk connector	16
CN9	Parellel port connector	16
CN15	Keyboard connector	18
CN16	PS/2 mouse connector	18
CN3	General Purpose I/O connector (PC-486V)	18
CN14	Speaker connector	17
CN17	Hard disk LED	17
CN5	Hardware Reset Switch	17
CN11	COM1 (RS-232) connector	17
CN10	COM2 (RS-232/RS-485) connector	17
CN1	CRT VGA Display connecotr	18
CN2	Flat panel Display Connector	17
CN12	External Power Input connector	18
CN6	Ethernet connector (PC-486VN)	18

3.3 IDE Hard Drive Connector (CN7)

You can attach one or two Enhanced Integrated Device Electronics hard disk drives to the PC-486V/N's internal controller. This advanced IDE controller supports faster data transfer, PIO mode 3, mode 4.

Connect one end of the cable to CN7. 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).

Plug the other end of the cable to the Enhanced IDE hard drive, with pin 1 on the cable corresponding to pin 1 on the hard drive. (See your hard drive's documentation for the location of the connector.

3.4 Floppy drive connector (CN8)

You can attach up to two floppy drives to the PC-486V/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 CN8. 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.

If you are connecting a 3½" floppy drive, you may have trouble determining which pin is pin number one. Look for a number printed on the circuit board indicating pin number one. In addition, the connector on the floppy drive connector may have a slot. When the slot is up, pin number one should be on the right. Check the documentation that came with the drive for more information. If you desire, connect the B: drive to the connectors in the middle of the cable as described above.

3.5 Parallel port connector (CN9)

Normally, the parallel port is used to connect the card to a printer. The PC-486V/N includes a multi-mode (ECP/EPP/SPP) parallel port, accessed through CN9, 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.

A.3 How to use EEPROM

The PC-486V/N provide a 93C46 EEPROM for backup system configures and reserved 50 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   (0 - 31h)

Exi t:    AX       - data (16bits)
```

```
Write data to EEPROM

Entry :   AH  = 1  -  Write EEPROM
          DL       -  Address   (0 - 31h)
          BX       -  data (16bits)

Exi t:    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)
```

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 PC-486V/N module allows the user to install this device on the socket called M1.

3.6　Keyboard connector (CN15)

The PC-486V/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 PC-486V/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.

3.7　PS/2 mouse connector (CN16)

The PC-486V/N board also provides PS/2 mouse connectors CN16, which can be connected to outside world with convert cable.

3.8　General Purpose I/O Connector (CN3)

The Module(**PC-486V Only)** provide 16-channels (8-in/8-out) general purpose I/O Port(GPIO). All I/O signals confirm to LS-TTL levels and support Pull-Up resistore(10K Ω) for each channel

(The I/O port arddress of theGPIO is fixed to **hex 101**)

3.9　Speaker Connector (CN14)

The PC-486V/N can drive an 8 Ω speaker at 0.5 watts. Make sure that alternatives to this specification do not overload the card.

3.10　Hard disk LED (CN17)

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

3.11　Hardware reset switch (CN5)

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

3.12　COM-port connectors(CN11, CN10)

The PC-486V/N are supported two 16C550 compatible UARTs with 16 byte FIFOs

■　For COM1 RS-232　　　　　(CN11)

■　For COM2 RS-232/RS-485　　(CN10)

■　The IRQ and the address range for COM ports is fixed. However, if you wish to disable the port or change these parameters later you can do this in the system BIOS setup.

3.13 VGA interface connectors (CN1,CN2)

The PI-6488VN's PCI SVGA interface can drive conventional CRT displays and is capable of driving a wide range of flat panel displays, including electroluminescent (EL), gas plasma, passive LCD and active LCD displays. The board has two connectors to support these displays, one for standard CRT VGA monitors and one for flat panel displays.

3.13.1 CRT display connector (CN1)

CN1 is a 10-pin header used for conventional CRT displays. A simple one-to-one adapter can be used to match CN1 to a standard 15-pin D-SUB connector commonly used for VGA.

Pin assignments for CRT display connector CN1 are detailed in Appendix C.3

3.13.2 Flat panel display connector (CN2)

CN2 is a 44-pin connector which can support a 24-bit TFT LCD. It is TOPRO product no. TP6508IQ.

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

Pin assignments for connector CN2 are detailed in Appendix C.4

3.14 External power input connector (CN12)

The connector CN12 is two pins +5VDC power input connector

3.15 Ethernet 10Base-T connector (CN6)

The Module(**PC-486VN Only)** is equipped with a high performance ISA-bus Ethernet interface(PC-486VN only) which is fully compliant with IEEE 802.3U 10Mbps CSMA/CD standards. It is supported by all major network operating systems.

A.1 About solid state disk

The PC-486V/N provides one extended solid state disk sockets (M1) which can accept **DiskOnChip™** device

Disk bank (8K) at D000:0000-D000:1FFFH, DE00:0000-DE00:1FFFH or E000:0000-E000:1FFFH.

Solid state disk Setup
The **DiskOnChip™** SETUP configures the solid state disk Bank address that is stored in EEPROM.

As AMI 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.

.

PC/104 CPU Module SetUp	Ver. 1.02
EEPROM R/W Interrupts Number	Disabled
Watchdog time out	Disabled
RS-485 Auto flow control	Disabled
Reserved	Disabled
SSD Device Type	DiskOnChip
SSD Address	E0000H
Up/Down: Select	PgUp/PgDn: Set
F8:Load Default SetUp F7:Save	Esc:No save

Appendix A
Flash Disk Setup & EEPROM R/W

Chapter 4
VGA BIOS Setup

4.1   Introduction

The PC-486V/N has an on-board flat panel/VGA interface. The specifications and features are described as follows:

4.1.1   Chipset

The PC-486V/N uses a TOPRO TP6508IQ chipset for its SVGA controller. It supports many popular LCD, EL, and gas plasma flat panel displays and conventional analog CRT monitors. The TP6508IQ 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 256 colors.

4.1.3   Display types

CRT and panel displays can be used simultaneously. The PC-486V/N 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.

4.1.4   Flat Panel BIOS and Utility

Below is a list of optional Flat Panel SVGA BIOS. The VGA BIOS is combined with the system BIOS in a single. To change to another BIOS please contact your local dealer.

DSTN.dat - Data file for Color DSTN640*480
Example :   (1) Sanyo LCM-5331-22NTK
            (2) SHARP LM64C35P

MLCD.dat - Data File for MONO DSTN640*480
Example :   (1) OPTREX DMF_50260NFU-FW-8
            (2) HITACHI LMG5160XUFC
            (3) CASIO MD650TS00-01
            (4) HOSIDEN HLM6667

TFT_S1.dat - Data File for TFT640*480-Sync (16 BIT)
TFT_S2.dat - Data File for TFT640*480-Sync (18/24 BIT)
Example : (1) HITACHI TX26D60/TX24D55
          (2) TOSHIBA LTM09C015A
          (3) SHARP LQ10D321

TFT_LP1.dat - Data File For TFT640*480-LP (16 BIT)
TFT_LP2.dat - Data File For TFT640*480-LP (18/24 BIT)
Example : (1) Toshiba LTM09c015A)

TFT86_S1.dat - Data File for TFT800*600_sync (16 BIT)
TFT86_S2.dat Data File for TFT800*600_sync (18/24 BIT)
Example : (1) NEC NL8060AC26-05
          (2) NEC NL8060AC26-04
          (3) NEC NL8060BC31-02

EL.dat - Data File for EL640*480
Example : (1) PLANAR EL640.480-A

PLASMA.dat - Data File for PLASMA640*480
Example : (1) PANASONIC S817

CRT/Flat Panel Mode
All the above BIOS support either CRT only, Flat Panel only or CRT/Flat Panel simultaneously. To set the mode a Panel Switching Utility is used USAGE:

At DOS prompt type >SW508 then Screen will show
   1. CRT Only
   2. Panel Only
   3. CRT/Panel Simutaneous