

Introduction

The PCM-4860 is an all-in-one single board computer that provides a compact, complete, high-performance, PC/AT compatible system. It was specifically designed for industrial and high-end commercial embedded applications, and provides all the standard SBC (Single Board Computer) functions as well as features usually found on expansion cards. All these functions are built in a small form factor of 5.75" by 8" (just as big as your 5.25" floppy drive!).

The PCM-4860 comes equipped with a 486 CPU. It features two 72-pin DRAM SIMM sockets, an IDE hard disk controller, a floppy disk controller, two serial ports, a bi-directional parallel port, PS/2 mouse interface, watchdog timer and keyboard connector.

The PCM-4860 also features an on-board VGA display controller that supports CRTs and flat-panel LCDs. To strengthen its communication capabilities with other devices, and enable inclusion in a LAN environment, the PCM-4860 also contains a 16-bit Ethernet interface.

Another special feature is an on-board Solid State Disk (SSD). The SSD can emulate a floppy drive. This makes automatic boot without an external drive possible. The SSD is much more reliable than its mechanical counterpart, especially in hostile environments. Being solid-state its access time is much faster. It is also easier to protect your on-board SSD from tampering.

To meet the rapidly increasing demand for the embedded industrial PC/104 standard, PC/104 expansion connectors are also on-board. Up to six PC/104 modules can be piggybacked onto the PCM-4860.

The PCM-4860's highly compact form, numerous features and expandability make it an ideal cost/performance solution for high-end commercial and industrial applications where size, power consumption and reliability are critical factors.

Specifications

Standard SBC functions

- **CPU:** 80486SX-25/33 MHz, 80486DX-25/33 MHz, 80486DX2-66 MHz
- **Bus interface:** ISA (PC/AT) bus
- **Data bus:** 32 bit
- **Processing ability:** 32 bit
- **Chipset:** VIA VL82C486A
- **RAM memory:** 1 MB to 32 MB. Accepts 1, 4, 8 or 16 MB SIMMs (for 1, 2, 4, 8, 16 and 32 MB configuration)
- **IDE hard disk drive interface:** Supports up to two IDE (AT bus) hard disk drives (enabled/disabled)
- **CMOS backup:** CMOS data backup in DS12885Q, avoiding data loss
- **Floppy disk drive interface:** Supports up to two floppy disk drives, 5¼" (360 KB and 1.2 MB) and/or 3½" (720 KB, 1.44 MB and 2.88 MB) (BIOS enabled/disabled)
- **Bi-directional parallel port:** Configurable to LPT1, LPT2, LPT3 or disabled.
- **Serial ports:** One serial RS-232 port and one serial RS-232/RS-422/RS-485 port, jumper selectable. Both with 16C550 UARTs (or compatible) with 16-byte FIFO buffer. Supports speeds up to 115 Kbps. Ports can be individually configured as COM1, COM2, COM3, COM4 or disabled
- **Real-time clock/calendar:** Uses DS-12885Q RTC chip and quartz oscillator, powered by a lithium battery for 10 years of data retention

- **Watchdog timer:** Can generate a system reset or IRQ15. Software enabled/disabled. The timer interval is 1.6 sec. Your program uses I/O ports hex 043 and 443 to control the watchdog timer
 - **DMA controllers:** 2 x 87C37A
 - **DMA channels:** 7
 - **Interrupt controllers:** 2 x 87C59A
 - **Interrupt levels:** 15
 - **Keyboard/mouse connector:** An 8-pin Connector supports standard PC/AT keyboards and PS/2 mouse
 - **Bus speed:** 8 MHz
 - **Max. power requirements:**
+ 5 V @ 2 A
 - **Power supply voltage:**
+5 V (4.75 V to 5.25 V)
 - **Operating temperature:**
32 to 140°F (0 to 60°C)
 - **Board size:** 8.0" (L) x 5.75" (W)
(203 mm x 146 mm)
 - **Board weight:** 11 oz. (0.31 Kg)
 - **EMI:** Pending
- PC/104 Bus expansion**
- **PC/104 connector:** 16-bit PC/104 connector for expansion modules.
 - **Driving capacity** for six PC/104 modules

Ethernet Controller functions

- **Ethernet controller:** 16-bit, Novell 2000 NE compatible with network boot support
- 10Base-T on-board, 10BASE-2 and 10Base-5 (AUI) optional

Flat-panel/CRT VGA controller functions

- **Flat-panel/CRT VGA controller:**
Supports LCD, EL, CRT and gas plasma flat-panel displays
- High-resolution display up to 1024 x 768 (16 colors), 640 x 480 and 800 x 600 (256 colors)
- 512 KB DRAM for high-speed memory access

Solid state Disk functions

- Three 32-pin sockets for on-board Flash/RAM/ROM SSD
- Supports EPROM, EEPROM and Flash memory
- Up to 1.5 MB memory capacity
- Utility software included

Locating components

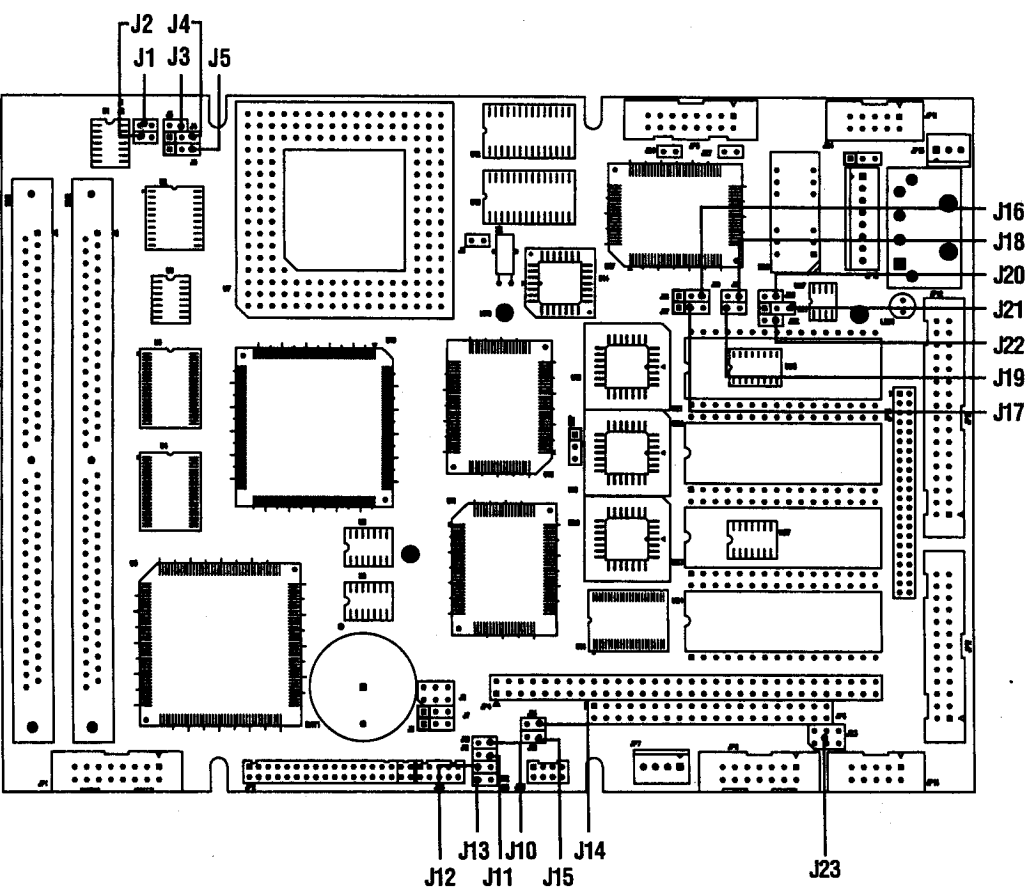
This section identifies the location of the card's major components. It also includes a function list for each of the card's jumpers. The figure on page 7 gives an overall view of the card.

Jumpers and connectors

Connectors on the board link it to external devices such as hard disk drives, a keyboard or PC/104 modules. In addition, the board has a number of jumpers which you use to configure it for your application.

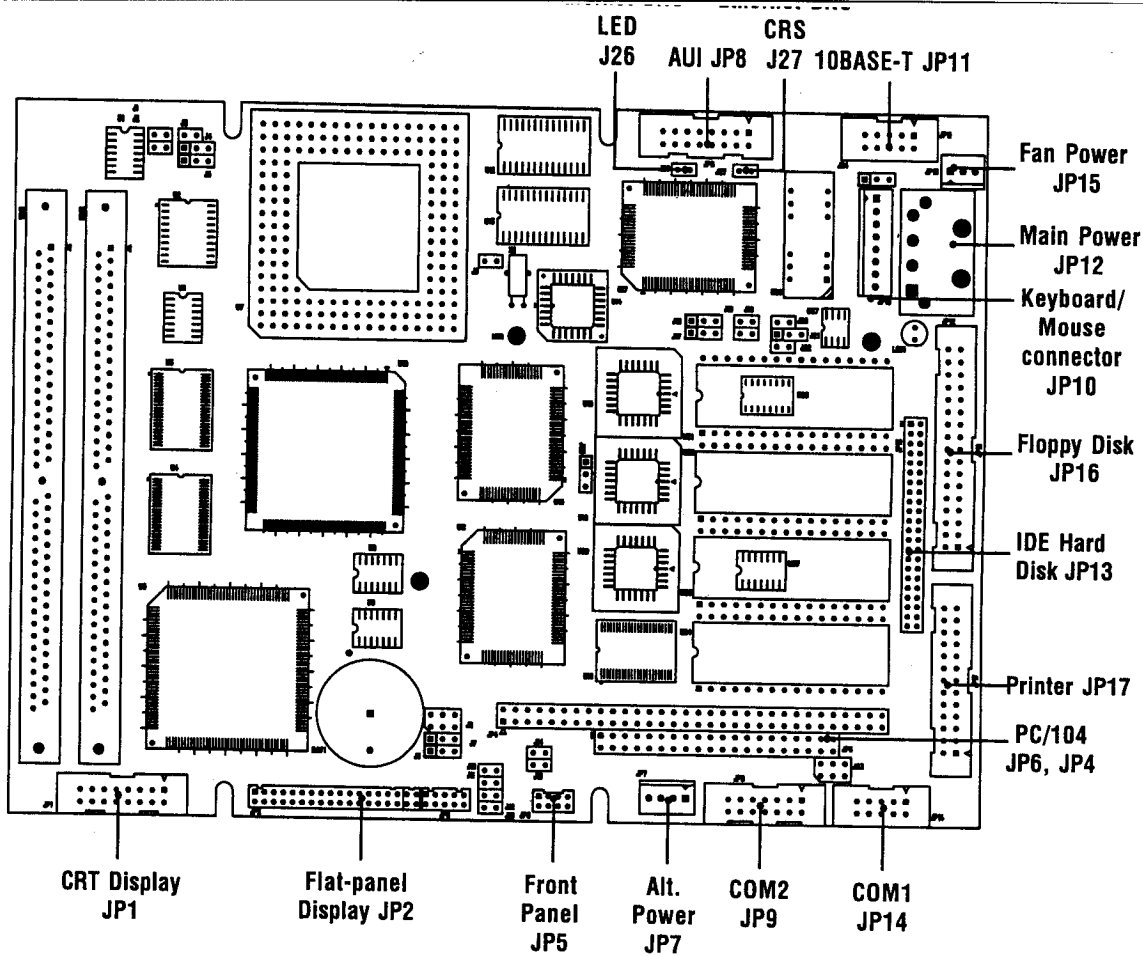
The table below lists the function of each of the board jumpers and connectors. Later sections in this chapter give instructions on setting jumpers and detailed information on each jumper setting. Chapter 3 gives instructions for connecting external devices to your card. Pin assignments for each connector appear in Appendix C.

PCM-4860 Jumpers		
Number	Function	Page
J1	CPU frequency selection	12
J2	CPU frequency selection	12
J3	CPU type selection	13
J4	CPU type selection	13
J5	CPU type selection	13
J10	SSD memory address selection	16
J11	SSD memory address selection	16
J12	SSD I/O address selection	17
J13	SSD I/O address selection	17
J14	SSD drive emulated	18
J15	SSD drive emulated	18
J16	Parallel port IRQ selection	13
J17	SSD Flash/ROM device selection	18
J18	Watchdog timer enable/disable	22
J19	Watchdog timer invokes IRQ 15	23
J21	SSD 1 MB/4 MB ROM device selection	18
J22	Watchdog timer invokes system reset	23
J23	COM2 RS-232/RS-422/RS-485 selection	14



PCM-4860 Jumpers

PCM-4860 Connectors



PCM-4860 Connectors

Number	Function	Page
JP1	CRT display connector	39
JP2	Flat panel display connector	39
JP4	PC/104 ISA-bus expansion	40
JP5	Front panel connector	36
JP6	PC/104 ISA-bus expansion	40
JP7	Secondary power connector (-5 V, -12 V)	37
JP8	10BASE-2/10BASE-5 AUI connector	40
JP9	RS-232/RS-422/RS-485 serial port	38
JP10	Keyboard and mouse connector	36
JP11	10BASE-T connector	40
JP12	Main power connector (+5 V, +12 V)	37
JP13	IDE connector	35
JP14	RS-232 serial port	37
JP15	CPU fan power connector	37
JP16	Floppy connector	34
JP17	Printer/parallel port connector	36
J26	Ethernet BNC LED	
J27	Ethernet CRS LED	

SIMM memory modules

On the left end of the card are the two 72-pin SIMM (Single In-line Memory Module) sockets which hold the card's DRAM memory. Install them as described in Appendix B.

Flash/ROM disk

At the right of the card are three 32-pin sockets which hold the memory chips for the card's Flash/ROM disk. Instructions for installing memory chips appear in Appendix B.

SBC configuration

This section will explain the function and configuration of the jumpers necessary for the operation of the PCM-4860. Separate sections will discuss the configuration of the display controller, SSD and Ethernet controller. Jumpers relevant to SBC configuration are:

PCM-4860 SBC jumpers		
Number	Function	Page
J1	CPU frequency selection	12
J2	CPU frequency selection	12
J3	CPU type selection	13
J4	CPU type selection	13
J5	CPU type selection	13
J16	Parallel port IRQ selection	13
J18	Watchdog timer enable/disable	22
J19	Watchdog timer invokes IRQ 15	23
J22	Watchdog timer invokes system reset	23
J23	COM2 RS-232/RS-422/RS-485 selection	14

CPU clock speed (J1, J2)

This board is fitted with a special IC which allows the user to choose the CPU frequency. This is done by setting the clock generator jumper (J1, J2). If you change the processor in the future you must ensure that the jumpers are configured for the correct CPU clock speed. Do this prior to installing and applying power to the CPU board. Clock speeds for the PCM-4860 are 25, 33 or 66 MHz and can be selected as shown below:

33.3 MHz (default)



PCM-4860 CPU frequency selection

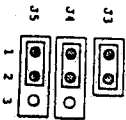
CPU Frequency	J1	J2
25 MHz	O	O
* 33 MHz	●	●
66 MHz	●	O

O = Open ● = Closed * = Default

CPU type selection (J3, J4, J5)

This card supports three different types of CPU, the 80486SX, 486DX and 486DX2. Setting the card for the right CPU involves configuring the CPU type selection jumpers (J3, 4, 5). These consist of one two-pin jumper (J3) and two three-pin jumpers (J4, 5) as shown below:

486DX (default)



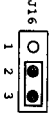
PCM-4860 CPU type			
CPU type	J3	J4	J5
* 486DX/DX2	●	1-2	1-2
486SX	O	2-3	2-3

O = Open ● = Closed * = Default

Parallel port IRQ selection (J16)

The PCM-4860 supports one parallel port. The port is designated as LPT1 and can be disabled or changed to LPT2 or LPT3 in the system BIOS setup. The PCM-4860 is configured as IRQ7 (IRQ5 optional) via a two-pin jumper (J16) as shown below:

IRQ7 (default)

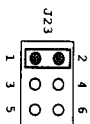


PCM-4860 Parallel port IRQ		
IRQ	1-2	2-3
IRQ5	●	○
* IRQ7	○	●
○ = Open	● = Closed	* = Default

COM2 RS-232/RS-422/RS-485 selection (J23)

The PCM-4860 supports two serial ports, a primary (COM1) and a secondary (COM2) port. The primary port operates in RS-232 mode only, the secondary port can be configured to operate in RS-232, RS-422 or RS-485 mode. This is done via a six-pin jumper (J23) as shown below.

RS-232 (default)



PCM-4860 Mode selection			
Mode	1-2	3-4	5-6
* RS-232	●	○	○
RS-422	○	●	○
RS-485	○	○	●
○ = Open	● = Closed	* = Default	

The IRQ and address range for both ports are fixed. However if you wish to disable the port or change these parameters later you can do this in the system BIOS setup. The table below shows the settings for the PCM-4860's ports.

PCM-4860 Serial port default settings			
Port	Address Range	Interrupt	Default
COM1	2E8-3F8	IRQ4	3F8
COM2	2E8-3F8	IRQ3	2F8

Solid State Disk Configuration

This section will explain the function and configuration of the jumpers necessary for the operation of the PCM-4860's solid state disk (SSD). The SSD is optional and can be utilized by inserting memory devices onto the board. Jumpers relevant to SSD configuration are:

PCM-4860 SSD Jumpers		
Number	Function	Page
J10	SSD memory address selection	16
J11	SSD memory address selection	16
J12	SSD I/O address selection	17
J13	SSD I/O address selection	17
J14	SSD drive emulated	18
J15	SSD drive emulated	18
J17	SSD Flash/ROM device selection	18
J21	SSD 1 MB/4 MB ROM device selection	18

The PCM-4860 features an internal Flash/ROM disk drive. This drive emulates a floppy disk drive by using solid-state memory chips (Flash or EPROM) to store programs and data instead of the magnetic particles on the mechanical drive's disk. The Flash/ROM disk offers much faster access times than a floppy or hard disk and greatly increased reliability in harsh environments.

The Flash/ROM disk works by modifying the BIOS INT-13 disk I/O routine on boot-up. The routine then translates read and write commands to the disk so that they will correctly access the memory chips. You don't need any special drivers. You simply set the drive to act as a DOS drive (e.g. A: or C:) and use standard DOS commands (COPY, DIR, etc.) to manipulate your data.

Before you use the Flash/ROM disk, you will need to enable it with the BIOS Chipset Features Setup Program as detailed in Chapter 4.

Memory devices

The Flash/ROM disk supports the following memory devices, or their equivalents:

- 27C010 128 KB x 8 EPROM
- 27C040 512 KB x 8 EPROM
- 28F010 128 KB x 8 +12 V Flash Memory (AMD/INTEL)
- 29C010 128 KB x 8 +5 V Flash Memory (ATMEL only)
- 29C040 512 KB x 8 +5 V Flash Memory (ATMEL only)

If you use EPROM, files on the disk are read only. You will need an external programmer to load your program and data files on the EPROMs.

If you use +5 V Flash memories (29C010) for the solid state disk, you can read or write data just like a floppy disk; you need not use an external programmer. If you use +12 V Flash memories (28F010) you will still need an external programmer to write data.

Before you activate the Flash/ROM drive (using the BIOS Chipset Features Setup program), you will need to set the drive's I/O and memory addresses to avoid conflicts with other plug-in cards. You will also need to set the DOS drive designation to be used by the Flash/ROM drive. The following jumpers sets the configuration of the SSD as described in the following sections:

Memory address selection (J10, J11)

The SSD occupies a 8 Kbyte window in the upper memory address range of D6000 to D7FFF. You should ensure this does not conflict with any other device's memory address. Jumpers J10 and J11 control the Flash/ROM disk's memory address. If you select "Disabled", the disk will not function.

D6000 to D7FFF (default)



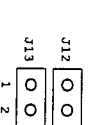
PCM-4860 SSD memory address		
Memory address (HEX)	J10	J11
Disabled	<input type="radio"/>	<input type="radio"/>
DE000 to DFFFF	<input type="radio"/>	<input checked="" type="radio"/>
* D6000 to D7FFF	<input checked="" type="radio"/>	<input type="radio"/>

☐ = Open ☒ = Closed * = Default

These addresses might conflict with the ROM BIOS on some of your other boards (i.e. PC/104 modules). Read the manuals for these modules to ensure there is no memory conflict.

I/O address selection (J12, J13)

Jumpers J12 and J13 control the disk's I/O address. The default is set to 2C0~2C4 but should be set as to not conflict with the I/O address of other devices. J12 and J13 are set as shown below:



2C0~2C4 (default)

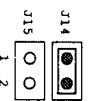
PCM-4860 SSD I/O address		
I/O address (HEX)	J12	J13
* 2C0-2C4	<input type="radio"/>	<input type="radio"/>
240-244	<input type="radio"/>	<input checked="" type="radio"/>
280-284	<input checked="" type="radio"/>	<input type="radio"/>
200-204	<input checked="" type="radio"/>	<input checked="" type="radio"/>

☐ = Open ☒ = Closed * = Default

Drive emulated (J14, J15)

Jumpers J14 and J15 control the DOS drive emulated by the Flash/ROM disk as 1st, 2nd, 3rd or 4th as shown below:

3rd Drive (default)



PCM-4860 SSD drive designation

Drive	J14	J15
1st	●	●
2nd	○	●
* 3rd	●	○
4th	○	○

○ = Open ● = Closed * = Default

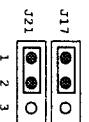
The actual drive letter assigned by DOS to the Flash/ROM disk depends on the floppy or hard disks installed in the system and the DOS version.

SSD device and size selection (J17, J21)

The size of the emulated drive depends on the size and number of the chips you install. For example, if you install three 512 KB chips, you will have 3 x 512 KB = 1.5 MB, equivalent to a 1.44 MB floppy. The following table shows the memory chips you will need to emulate 360 KB, 720 KB, 1.2 KB and 1.44 floppy drives

You will need to set jumpers J17 and J21 to match the type (Flash or ROM) and size (128 KB or 512 KB) of the devices you use. All the devices must be the same type and size.

EPROM 1.44 MB (default)



The following table shows the size and number of devices you will need for each size emulated disk. It also shows the corresponding settings of jumpers J17 (Flash/ROM) and J21 (size 128 KB/512 KB).

PCM-4860 SSD device type and selection						
J17	J21	Device	360KB	720KB	1.2MB	1.44MB
* 1-2	1-2	ROM	512KBx1	512KBx2	512KBx3	512KBx3
1-2	2-3	ROM	128KBx3	—	—	—
2-3	2-3	Flash	128KBx3	—	—	—
2-3	1-2	Flash	512KBx1	512KBx2	512KBx3	512KBx3

DOS 5.0

Floppy disks

The Flash/ROM disk will replace the corresponding floppy disk. For example, if you have a single floppy disk (drive A:) and assign the Flash/ROM disk to be the 1st drive (both J14 and J15 closed), any drive operations directed at drive A: will go to the Flash/ROM disk. You will not be able to access the floppy drive.

Hard disks

The Flash/ROM disk will not replace corresponding hard disks. Instead, DOS will assign the Flash/ROM disk to the next free drive designation. For example, if you have a single hard disk (drive C:) and assign the Flash/ROM disk to be the 3rd drive (J14 closed, J15 open), the Flash/ROM drive will become drive D:. If you have two hard disks, the Flash/ROM drive will become drive E:.

DOS 3.3

Floppy disks

The Flash/ROM disk will replace the corresponding floppy disk. For example, if you have a single floppy disk (drive A:) and assign the Flash/ROM disk to be the 1st drive (both J14 and J15 closed), any drive operations directed at drive A: will go to the Flash/ROM disk. You will not be able to access the floppy drive.

Hard disks

The Flash/ROM disk will take the drive letter of the hard disk and DOS will assign the hard disk to the next available drive letter. For example, if you have a single hard disk (drive C:) and assign the Flash/ROM disk to be the 3rd drive (J14 closed, J15 open), the Flash/ROM drive will become drive C: and the hard disk will become drive D:. If you have two hard disks, the Flash/ROM drive will become drive C:, the first hard disk will become drive D: and the second hard disk will become drive E:.

Example

Before installing Flash/ROM disk

A	B	C
DOS 5.0	FDD	FDD HDD
DOS 3.3	FDD	FDD HDD

After installing Flash/ROM disk

A	B	C	D
DOS 5.0	FDD	FDD HDD	Flash/ROM
DOS 3.3	FDD	FDD Flash/ROM	HDD

Booting from the Flash/ROM disk

If you wish to have the system boot from the Flash/ROM disk, simply set both J14 and J15 closed to select the 1st FDD. Copy your application files to the disk along with the standard system files required to boot (command.com, io.sys, autoexec.bat, etc). The next time you start the system, it will boot from the solid state disk.

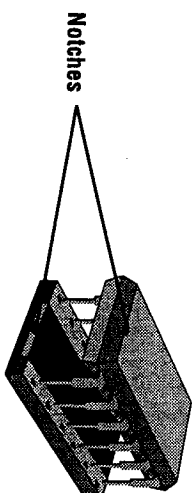
Inserting memory devices

After you've set all the jumpers on the PCM-4860, insert the appropriate memory devices into the card's sockets. Remember that you will need to program EPROMs before you insert them.

1. Make sure that the pins of the memory chips are perpendicular to the case and both rows are parallel to each other. Often the chips

come with the pins spread out slightly. Place the chip on a table top and carefully bend each line of pins together until they point directly down.

2. Insert each chip. Align the chips so their pins are perpendicular to the connector and the semicircular notch on the end of the chip matches the notch on the end of the socket. There will probably be a gap between the chip body and the socket when it is fully seated – **Do not push too hard!**.



Using a memory manager (EMM386.EXE)

If you are using an extended or expanded memory manager (such as EMM386 or QEMM386), you will need to configure it to avoid the addresses used by the Flash/ROM disk (set by jumpers J10 and J11). Otherwise, the memory manager will attempt to use these addresses, causing unreliable operation.

For example, the line in your CONFIG.SYS file that invokes EMM386, the DOS memory manager, might be the following:

```
DEVICE=EMM386.SYS X=D600-D7FF
```

This excludes a 8 KB range for the card from D6000 to D7FFF (the default addresses).

If you are using expanded memory, you will need to make sure that the memory manager is not putting the page frame in the disk's addresses. For example,

```
DEVICE=EMM386.EXE X=D600-D7FF FRAME = D800
```

You should also make sure that the disk's memory address is not shadowed in the BIOS.

VGA Display Configuration

The PCM-4860's on-board VGA interface supports a wide range of popular LCD, EL, gas plasma flat-panel displays and traditional analog CRT monitors. Configuration of the VGA interface is done completely via the software utility, you don't have to set any jumpers. Refer to chapter 2 for software setup details.

Ethernet Configuration

The PCM-4860 is equipped with a high performance 16-bit Ethernet Interface which is fully compliant with IEEE 802.3 10 Mbps CSMA/CD standards. This card is supported by all major network operating systems and is 100% Novell NE2000 compatible. As with the VGA interface, configuration is very simple and is via the software utility. See chapter 2 for software setup.

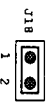
Watchdog Timer Configuration

An on-board watchdog timer reduces the chance of disruptions which EMP (electro-magnetic pulse) interference can cause. This is an invaluable protective device for stand-alone or unmanned applications. Setting up the watchdog involves two jumpers and running the software to control it (refer to Appendix A). The two jumpers are:

Watchdog timer – enabled/disable (J18)

You can enable or disable the watchdog timer by reading the card's I/O ports with your program. Read address 443 hex to enable and refresh the watchdog or address 043 to disable the watchdog. For information on programming the watchdog timer see Appendix A. Configure the watchdog timer to be enabled or disabled via a two-pin jumper (J18) as shown below:

Enabled (default)



PCM-4860 Watchdog timer

Watchdog timer J18

* Enabled



Disabled

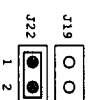


O = Open ● = Closed * = Default

Watchdog timer – system reset/IRQ15 (J19, J22)

When the watchdog timer activates (CPU processing has come to a halt), it can reset the system or generate an interrupt on IRQ15. This can be set via two two-pin jumpers (J19, J22) as shown below:

System reset (Default)



PCM-4860 Watchdog timer

Watchdog timer J19 J22

IRQ15 ● O

* System reset O ●

O = Open ● = Closed * = Default

For information on programming the watchdog timer see Appendix A.

1. Check card default settings

We set the card's jumpers at the factory for the most popular configuration. If this configuration matches your needs, you can skip to step 3. The default configuration is as follows:

SBC defaults

- CPU frequency: 33 MHz (J1, J2)
- CPU type: 486DX (J3, J4, J5)
- Parallel port IRQ: IRQ7 (J16)
- COM2 port RS-232/422/485: RS-232 (J23)
- Watchdog timer enabled/disabled: Enabled (J18)
- Watchdog invokes IRQ15/system reset: System reset (J19, J22)

SSD defaults

- SSD memory address: D6000~D7FFF (J10, J11)
- SSD I/O address: 2C0~2C4 (J12, J13)
- SSD drive designation: 3rd (J14, J15)
- SSD device/size: EPROM/512Kx3/1.44 MB (J17, J21)

2. Set jumpers

This section gives a quick description of each card configuration setting. If you need more information, just check the appropriate page references. Check the figure on page 7 for the location of jumpers or connectors.

CPU frequency J1, J2 — page 12

Sets the PCM-4860's system clock frequency:

PCM-4860 CPU frequency selection		
CPU Frequency	J1	J2
25 MHz	<input type="radio"/>	<input type="radio"/>
* 33 MHz	<input checked="" type="radio"/>	<input checked="" type="radio"/>
66 MHz	<input checked="" type="radio"/>	<input type="radio"/>
O = Open ● = Closed * = Default		

CPU type J3, J4, J5 — page 13

Sets the boards configuration to correct CPU type:

PCM-4860 CPU type			
CPU type	J3	J4	J5
* 486DX/DX2	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
486SX	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
O = Open ● = Closed * = Default			

Parallel port J16 — page 13

Sets the IRQ for the parallel port:

PCM-4860 Parallel port IRQ		
IRQ	1-2	2-3
IRQ5	<input checked="" type="radio"/>	<input type="radio"/>
* IRQ7	<input type="radio"/>	<input checked="" type="radio"/>
O = Open ● = Closed * = Default		

COM2 port RS-232/422/485 selection J23 — page 14

Selects the mode of operation for the serial port (COM2):

PCM-4860 Mode selection				
Mode	1-2	3-4	5-6	
* RS-232	●	○	○	
RS-422	○	○	●	○
RS-485	○	○	○	●
○ = Open	● = Closed	* = Default		

Watchdog timer enable/disable J18 — page 22

Enables or disables the cards watchdog timer:

PCM-4860 Watchdog timer	
Watchdog timer	J18
* Enabled	●
Disabled	○
○ = Open	● = Closed
	* = Default

Watchdog invokes IRQ15/system reset: IRQ15 J19, J22 — page 23

Sets the watchdog timer to produce a system reset or an IRQ15:

PCM-4860 Watchdog timer			
Watchdog timer	J19	J22	
IRQ15	●	○	
* System reset	○	●	
○ = Open	● = Closed	* = Default	

SSD memory address: D6000 ~ D7FFF J10, J11 — page 16

Sets the memory address for the solid state disk:

PCM-4860 SSD memory address			
Memory address (HEX)	J10	J11	
Disabled	○	○	○
DE000 to DFFFF	○	○	●
* D6000 to D7FFF	●	○	○
CE000 to CFFFF	●	●	●
○ = Open	● = Closed	* = Default	

SSD I/O address: 2C0 ~ 2C4 J12, J13 — page 17

Sets the I/O address for the solid state disk:

PCM-4860 SSD I/O address			
I/O address (HEX)	J12	J13	
* 2C0-2C4	○	○	○
240-244	○	○	●
280-284	●	○	○
200-204	●	●	●
○ = Open	● = Closed	* = Default	

SSD drive designation: 3rd J14, J15 — page 18

Sets the drive designation for the solid state disk:

PCM-4860 SSD drive designation		
Drive	J14	J15
1st	●	●
2nd	○	●
* 3rd	●	○
4th	○	○
○ = Open	● = Closed	* = Default

SSD device/size:

EPR0M/512Kx3/1.44 MB J17, J21 — page 18

Sets the solid state disk's device type, memory type and emulated drive size:

PCM-4860 SSD device type and selection						
J17	J21	Device	360KB	720KB	1.2MB	1.44MB
* 1-2	1-2	ROM	512KBx1	512KBx2	512KBx3	512KBx3
1-2	2-3	ROM	128KBx3	—	—	—
2-3	2-3	EPROM	128KBx3	—	—	—
2-3	1-2	EPROM	512KBx1	512KBx2	512KBx3	512KBx3

3. Install CPU

If your CPU was not installed, install it. See Appendix B.

4. Install memory

If your memory was not installed, install it. See Appendix B.

5. Install card

Install the card into your system in a manner appropriate to your system.

Please observe the following precautions:

Warning! Disconnect all power from the chassis before you install the PCM-4860. Follow the power-down procedure outlined in the manual for your chassis. Unplug the power cord from the wall, don't just turn off the power switch.

Caution! The PCM-4860's components are very sensitive to static electric charges. Use a grounding wrist strap to discharge all static electricity before you touch any components. Place all components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

6. Connect peripherals

Connect the following external devices. See the figure on page 7 for help finding connectors. The page number after each connector references the detailed description in the text. Details for the more complicated connections appear on the following pages. Other connector pin assignments appear in Appendix C.

PCM-4860 Connectors		
Number	Function	Page
JP1	CRT display connector	39
JP2	Flat panel display connector	39
JP4	PC/104 ISA-bus expansion	40
JP5	Front panel connector	36
JP6	PC/104 ISA-bus expansion	40
JP7	Secondary power connector (-5 V, -12 V)	37
JP8	10BASE-2/10BASE-5 AUI connector	40
JP9	RS-232/RS-422/RS-485 serial port	38
JP10	Keyboard and mouse connector	36
JP11	10BASE-T connector	40
JP12	Main power connector (+5 V, +12 V)	37
JP13	IDE connector	35
JP14	RS-232 serial port	37
JP15	CPU fan power connector	37
JP16	Floppy connector	34
JP17	Printer/parallel port connector	36
J26	Ethernet BNC LED	-
J27	Ethernet CRS LED	-

7. Set up the system BIOS

Apply power and setup the System BIOS as detailed in Chapter 4.

8. Set up the VGA and Ethernet BIOS

Setup the VGA and Ethernet BIOS if your system is to operate differently from the default settings. Refer to Chapter 2.

This will make the new CPU slide in MUCH easier and reduce the chance of bending pins or causing other damage. Next, carefully align the CPU so it is parallel to the socket and the notch on the corner of the CPU matches with the notch on the inside of the socket. Carefully slide in the CPU. There will probably be a gap between the CPU and the connector when it is fully seated – Do not push too hard!

4. Switch jumpers J1, J2 (CPU speed) and J3, J4, J5 (CPU type selection) to match the new CPU's according to the following table:

PCM-4860 CPU and frequency selection					
CPU type	J1	J2	J3	J4	J5
SX-25	O	O	O	2-3	2-3
SX-33	●	●	O	2-3	2-3
DX-25	O	O	●	1-2	1-2
* DX-33/DX2-66	●	●	●	1-2	1-2
DX2-50	O	O	●	1-2	1-2
O = Open	● = Closed	* = Default			

Installing PC/104 modules

The PCM-4860's PC/104 connector gives you the flexibility to attach PC/104 expansion modules. These modules perform the functions of traditional plug-in expansion cards, but save space and valuable slots. Modules include:

- PCM-3110 PCMCIA Module
- PCM-3111 Secondary PCMCIA Module
- PCM-3610 Isolated RS-232 and RS-422/485 Module
- PCM-3640 Four port RS-232 Module
- PCM-3718 30 KHz A/D Module
- PCM-3724 48-channel DIO Module
- PCM-3910 Breadboard Module

To install these modules on the PCM-4860 is a quick and simple operation. The following steps show how to mount the PC/104 modules:

- Step 1 Remove the PCM-4860 from your system or make it accessible, paying particular attention to the safety instructions already mentioned above.
- Step 2 Make any jumper or link changes required to the PCM-4860 now. Once the PC/104 module is mounted you may have difficulty in accessing these.
- Step 3 Mount the PC/104 module onto the PCM-4860. Do this by pressing the module firmly but carefully onto the mounting connectors.
- Step 4 Secure the PC/104 module onto the PCM-4860 using the four mounting spacers and screws.

CRT display connector (JP1)

PCM-4860 Display connector	
Pin	Signal
1	RED
2	N/C
3	GREEN
4	SIGNAL GND
5	BLUE
6	N/C
7	N/C
8	N/C
9	SIGNAL GND
10	H-SYNC
11	CHASSIS GND
12	V-SYNC
13	CHASSIS GND
14	N/C
15	CHASSIS GND
16	N/C

Flat-panel display connector (JP2)

PCM-4860 Flat-panel display connector		
Pin	Signal	Pin
1	FLM	2
3	LP	4
5	ENABKL	6
7	P10	8
9	P11	10
11	P12	12
13	P13	14
15	P8	16
17	P7	18
19	P6	20
21	P5	22

Pin	Signal	Pin	Signal
23	P3	24	SIGNAL GND
25	P2	26	SIGNAL GND
27	P1	28	SIGNAL GND
29	P0	30	SIGNAL GND
31	SHFCLK	32	SIGNAL GND
33	P4	34	P14
35	P15	36	P9
37	ENAVEE	38	SIGNAL GND
39	+12 V	40	+12 V
41	-12 V	42	SIGNAL GND
43	VCC	44	SIGNAL GND

Front panel connector pin assignments for supported displays

PCM-4860 Front panel connector			
PCM-4860 JP2		Toshiba LTM09C015A	
Pin #	Function	Pin #	Function
29	P0	-	-
27	P1	-	-
25	P2	-	-
23	P3	-	-
33	P4	-	-
21	P5	-	-
19	P6	-	-
17	P7	-	-
15	P8	-	-
36	P9	-	-
7	P10	-	-
9	P11	-	-
11	P12	-	-
13	P13	-	-
34	P14	-	-
35	P15	-	-

Pin #	Function	Pin #	Function	Pin #	Function
31	SHCLK	CN1-1	NCLK	3	CP2
1	FLM	-	-	1	S
2	ACDCLK	CN2-7	ENAB	-	-
3	LP	-	-	2	CP1
4	V _{cc}	CN2-9/10 V _{cc}	4,5	VDD, DISP	
6, 8, 10,					
12, 14,		CN1-2, 4,			
16, 18,		6, 8, 10			
20, 24, GND		12	GND	6	VSS
26, 28,		CN2-2, 4,			
30, 32		6, 8			
37	ENAVEE	-	-	-	-
-	VEESAFE	-	-	7	VEE

PC/104 Connector (JP4)

PCM-4860 PC/104 connector pin assignments

Pin Number	Signal (JP4)	RowA	RowB	Signal (JP6)	RowA	RowB
0	--	--	0V	0V		
1	IOCHCHK	0V	SBHE	MEMCS16		
2	SD7	RESETDRV	LA23	IOCS16		
3	SD6	+5V	LA22	IRQ10		
4	SD5	IRQ9	LA21	IRQ11		
5	SD4	-5V	LA20	IRQ12		
6	SD3	DRQ2	LA19	IRQ15		
7	SD2	-12V	LA18	IRQ14		
8	SD1	ENDXFR	LA17	DACK0		
9	SD0	+12	MEMR	DRQ0		
10	IOCHRDY	(KEY)	MEMW	DACK5		
11	AEN	SMEWM	SD8	DRQ5		
12	SA19	SMEMR	SD9	DACK6		
13	SA18	IOW	SD10	DRQ6		
14	SA17	IOR	SD11	DACK7		
15	SA16	DACK3	SD12	DRQ7		
16	SA15	DRQ3	SD13	85V		

Pin Number	Signal (JP4)	RowA	RowB	Signal (JP6)	RowA	RowB
17	SA14	DACK1	SD14	MASTER		
18	SA13	DRQ1	SD15	0V		
19	SA12	REFRESH	(KEY)	0V		
20	SA11	SYSCLK	--	--		
21	SA10	IRQ7	--	--		
22	SA9	IRQ6	--	--		
23	SA8	IRQ5	--	--		
24	SA7	IRQ4	--	--		
25	SA6	IRQ3	--	--		
26	SA5	DACK2	--	--		
27	SA4	TC	--	--		
28	SA3	BALE	--	--		
29	SA2	+5V	--	--		
30	SA1	OSC	--	--		
31	SA0	0V	--	--		
32	0V	0V	--	--		

Front panel connector (JP5)

PCM-4860 Front panel connector

Pin	Signal
1	LED+ (HARD DISK ACTIVE)
2	LED- (GND)
3	SPEAKER+
4	SPEAKER- (GND)
5	GND
6	WATCHDOG TIMER OUT
7	RESET SWITCH- (GND)
8	RESET SWITCH+

AUI Connector (JP8)

PCM-4860 10BASE-2/5 AUI connector	
Pin	Signal
1	GND
2	CD-
3	CD+
4	Tx-
5	Tx+
6	GND
7	GND
8	Rx-
9	Rx+
10	+12 V
11	GND
12	GND
13	N/C
14	N/C
15	N/C
16	+5 V

RS-232/422/485 Serial port (JP9)

PCM-4860 RS-232/422/485 serial port	
Pin	Signal
1	DCD
2	DSR
3	RxD
4	RTS
5	TxD
6	CTS
7	DTR
8	RI

Pin	Signal
9	GND
10	N/C
11	485 TxD+
12	485 TxD-
13	485 RxD+
14	485 RxD-

Keyboard and mouse connector (JP10)

PCM-4860 Keyboard and mouse connector	
Pin	Signal
1	GND
2	MS V _{cc}
3	MS DATA
4	MS CLOCK
5	GND
6	KB V _{cc}
7	KB DATA
8	KB CLOCK

10BASE-T connector (JP11)

PCM-4860 10BASE-T connector	
Pin	Signal
1	V _{cc}
2	CRS LED
2	RCV+
4	RCV-
5	BNC LED
6	GND
7	N/C
8	GND
9	XMT+
10	XMT-

IDE Connector (JP13)

PCM-4860 IDE Connector		
Pin	Signal	Pin
1	IDE RESET	2
3	DATA 7	4
5	DATA 6	6
7	DATA 5	8
9	DATA 4	10
11	DATA 3	12
13	DATA 2	14
15	DATA 1	16
17	DATA 0	18
19	SIGNAL GND	20
21	N/C	22
23	IO WRITE	24
25	IO READ	26
27	IO CHANNEL READY	28
29	N/C	30
31	IRQ14	32
33	ADDR 1	34
35	ADDR 0	36
37	HARD DISK SELECT 0	38
39	IDE ACTIVE	40
41	VCC	42
43	GND	44

RS-232 Port connector (JP14)

PCM-4860 RS-232 Port connector		
Pin	Signal	
1	DCD	
2	DSR	
3	RxD	
4	RTS	
5	TxD	
6	CTS	
7	DTR	
8	RI	
9	GND	
10	N/C	

Floppy drive connector (JP16)

PCM-4860 Floppy drive connector		
Pin	Signal	
1	GND	2
3	GND	4
5	GND	6
7	GND	8
9	GND	10
11	GND	12
13	GND	14
15	GND	16
17	GND	18
19	GND	20
21	GND	22
23	GND	24
25	GND	26
27	GND	28
29	GND	30
31	GND	32
33	GND	34

Parallel/printer port connector (JP17)

PCM-4860 Floppy drive connector		
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	

APPENDIX



Optional Extras