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Authorized Distributor, Integrator, and Value-Added Reseller

PCA-6144S

Half-size 486 All-in-one
CPU Card with
Flash/RAM/ROM disk

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A Message to the Customer....

Advantech Customer Services

Each and every Advantech product is built to the most exacting specifications to ensure reliable performance in the unusual and demanding conditions typical of industrial environments. Whether your new Advantech equipment is destined for the laboratory or the factory floor, you can be assured that it will provide the reliability and ease of operation for which the name Advantech has come to be known.

Your satisfaction is our number one concern. Here is a guide to Advantech's customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

Technical Support

We want you to get the maximum performance from your products. If you run into technical difficulties, we are here to help. But please consult this manual first.

If you still can't find the answer, gather all the information or questions that apply to your problem and, with the product close at hand, call your dealer. Our dealers are trained and ready to give you the support you need to get the most from your Advantech products. In fact, most problems reported are minor and are able to be easily solved over the phone.

In addition, free technical support is available from Advantech engineers every business day. We are always ready to give advice on application requirements or specific information on the installation and operation of any of our products.

Product warranty

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for one year from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability as a consequence of such events under the terms of this Warranty.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair and replacement service. If an Advantech product ever does prove defective, it will be repaired at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered (e.g. type of PC, CPU speed, Advantech products used, other hardware and software used etc.). Note anything abnormal and list any on-screen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product and any other information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return material authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a completely filled-out Repair and Replacement Order Card and a photocopy of a dated proof of purchase (such as your sales receipt) in a shippable container. A product returned without dated proof of purchase is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Packing list

Before you begin installing your card, please make sure that the following materials have been shipped:

- 1 PCA-6144S CPU card
- 1 PCA-6144S User's Manual
- 1 6-pin mini-DIN keyboard & PS/2 mouse adapter
- 1 Hard disk drive (IDE) interface cable (40 pin)
- 1 Floppy disk drive interface cable (34 pin)
- 1 Parallel port adapter (26 pin) kit
- 1 Utility disk with system BIOS and SSD Setup Utility
- 1 Jumper package

If any of these items are missing or damaged, contact your distributor or sales representative immediately.

Contents

CHAPTER 1

Hardware Configuration

This chapter gives background information on the PCA-6144S. It then shows you how to configure the card to match your application and prepare it for installation into your PC.

Sections include:

- Card specifications
- Board layout
- Safety precautions
- Jumper settings

Introduction

The PCA-6144S is a halfl-size CPU card which allows the use of a SSD and other enhanced I/O interfaces. This card uses an 80486 series DX, DX2, DX4 or 5x86 CPU and accommodates up to 64 MB DRAM. It also provides a secondary level 128 KB cache RAM.

The PCA-6144S offers power management features to minimize power consumption. It complies with the "Green Function" standard and supports three power saving features: doze, sleep, and suspended mode.

The PCA-6144S also offers several industrial features such as a 63-level watchdog timer with jumperless setup, a 1.44 MB Flash/ROM disk, and a face-up PC/104 connection for additional functions with PC/104 modules.

The PCA-6144S is a highly reliable CPU card perfect for IPC applications or machine control.

Specifications

System

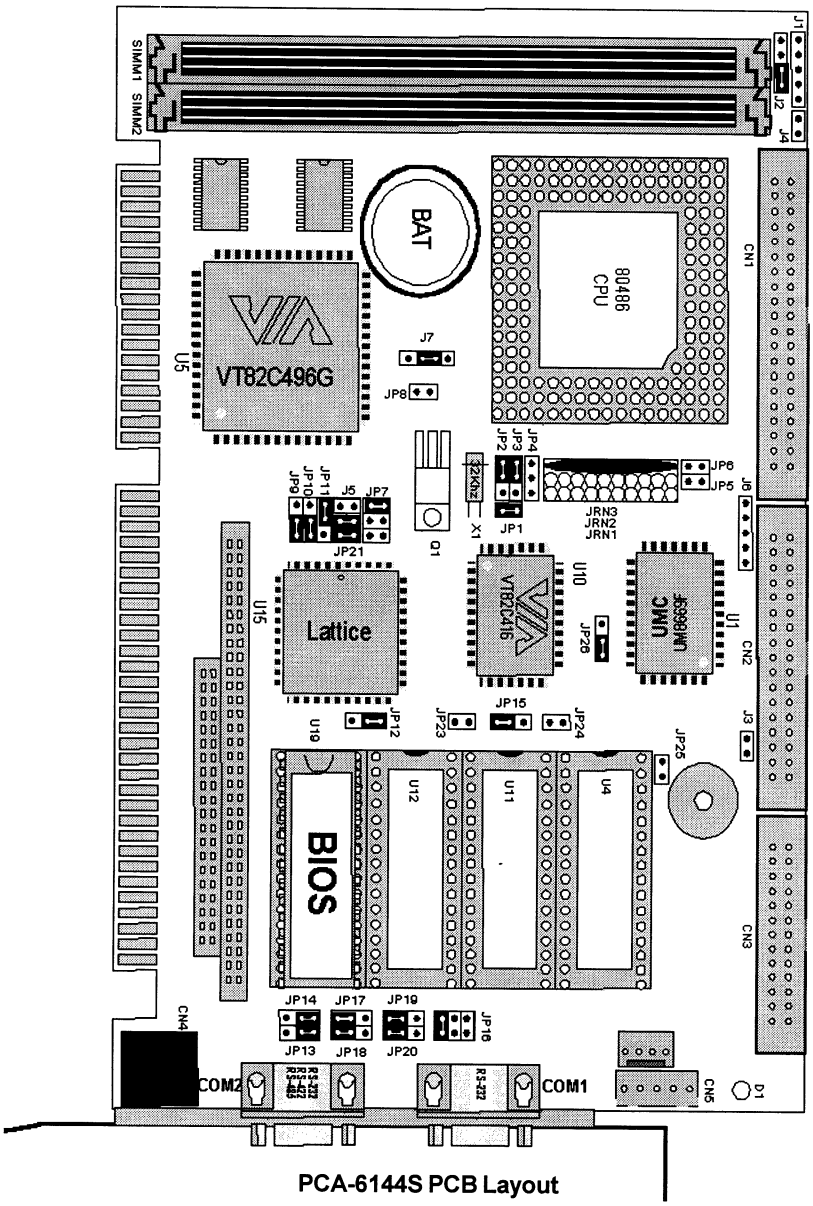
- **CPU:**
  Intel 80486DX/DX2/DX4 series
  AMD 80486DX2/DX4 series, 5x86
  Cyrix 80486DX2/DX4 series, 5x86
- **BIOS:** AWARD Flash BIOS, supports plug & play
- **Chipset:** VIA VT82C496G
- **Secondary level cache:** 128 KB
- **Green function:** Supports power management option via BIOS, activated by keyboard or mouse activity. Supports doze, sleep, and suspended mode. APM 1.1 compliant
- **RAM:** 1 MB to 64 MB, two 72-pin SIMM socket, accepts 1, 2, 4, 8, 16, and 32 MB SIMMs

- **EIDE interface:** Supports up to two IDE devices. BIOS supports larger than 528 MB HDD and up to 8.4 GB. 32-bit host data transfer, PIO Mode 3 transfer capabilities (>10 MB/sec)
- **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)
- **Parallel port:** One enhanced parallel port, supports SPP/EPP/ ECP parallel mode
- **Serial ports:** Two 16C550 UARTs, one RS-232, one RS-232/422/ 485 interface
- **Watchdog timer:** 63-level timer interval, jumperless setup, generates system reset or IRQ15
- **Flash/RAM/ROM disk:** 1.44 MB solid state disk, MS-DOS compatible, using Flash/ROM, SRAM and ROM device
- **Keyboard/ PS/2 mouse connector:** A 6-pin mini DIN connector is located on the mounting bracket for easy connection of a keyboard or a PS/2 mouse. An on-board keyboard 5-pin male keyboard header connector is also available.
- **I/O bus expansion:** PC/104 connector with face-up installation

Mechanical and environmental

- **Power supply:** +5 V, @3.5 A
- **Operating temperature:** 32 to 140°F (0 to 60°C)
- **Board size:** 185mm x 122mm

Board layout



PCA-6144S PCB Layout

Jumpers and connectors

Connectors on the board link it to external devices such as hard disk drives, a keyboard, or floppy drives. 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 2 gives instructions for connecting external devices to your card.

Safety precautions

Follow these simple precautions to protect yourself from hard and your PC from damage:

Warning! *Always completely disconnect the power cord from your chassis whenever you are working on it. Do not make connections while the power is on, sensitive electronic components can be damaged by the sudden rush of power. Only experienced electronics personnel should open the PC chassis.*

Caution! *Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis.*

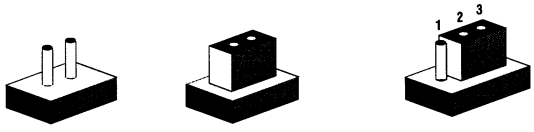
Jumper settings

This section tells how to set the jumpers to configure your card. It gives the card default configuration and your options for each jumper. After you set the jumpers and install the card, you will also need to run the BIOS Setup program (discussed in Chapter 3) to configure the serial port addresses, floppy/hard disk drive types and system operating parameters. Connections, such as hard disk cables, appear in Chapter 2.

For the locations of each jumper, see the board layout diagram depicted earlier in this chapter.

How to set 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 connect either pins 1 and 2 or 2 and 3.

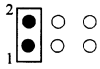
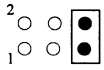


Open Closed Closed 2-3

You may find pair of needle-nose pliers useful for setting the 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.

CPU Jumper Settings

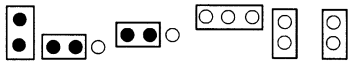
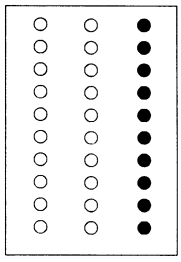
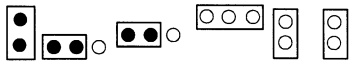
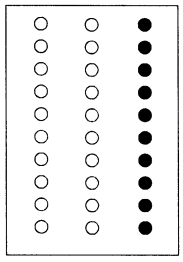
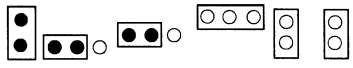
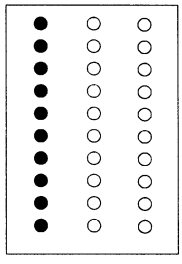
Voltage	5V	3.3V	3.45V	3.6V
JP7				
JP8				

Frequency	25M	33M	40M
JP9			
JP10			
JP11			

CPU type select

In order for the system to function properly, the jumpers must be set to accommodate the CPU installed on the CPU card.

CPU type select

CPU Type	Volt.	Freq.	JP1	JP2	JP3	JP4	JP5	JP6	JRN1	JRN2	JRN3
Cyrix 5x86-100	3.45V*	33M*									
Cyrix 5x86-120	3.3V*	40M*									
AMD DX2-66 (NV8T) AMD DX4-100 (NV8T)	3.3V*	33M*									

*Please refer to jumper settings in chapter 1, page 7

CPU type select

CPU Type	Volt.	Freq.	JP1	JP2	JP3	JP4	JP5	JP6	JRN1	JRN2	JRN3
AMD DX4-100 (SV8B) Intel DX4-100 SGS DX4-100	3.3V*	33M*									
AMD 5x86-133											
AMD DX4-120	3.3V*	40M*									
Intel DX-33 Intel DX2-66	5V*	33M*									

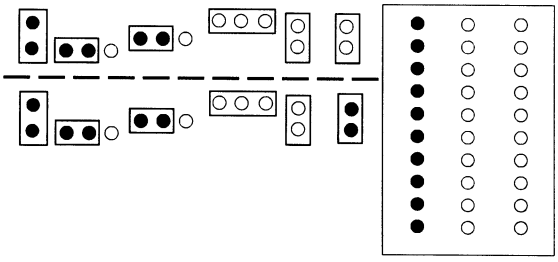
*Please refer to jumper settings in chapter 1, page 7

CPU type select

CPU Type	Volt.	Freq.	JP1	JP2	JP3	JP4	JP5	JP6	JRN1	JRN2	JRN3
Intel DX2-50	5V*	25M*									
Intel DX4-75 (P24D)											
Cyrix DX2-66 SGS DX2-66	5V*	33M*									
Cyrix DX2-80V	3.6V*	40M*									
Cyrix DX4-100 TI DX2-66	3.45V*	33M*									

*Please refer to jumper settings in chapter 1, page 7

CPU type select

CPU Type	Volt.	Freq.	JP1	JP2	JP3	JP4	JP5	JP6	JRN1	JRN2	JRN3
AMD DX-40	5V*	40M*									
AMD DX2-80											

*Please refer to jumper settings in chapter 1, page 7

IRQ12 setting (JP12)

	PS2 Mouse (default)	IRQ12
JP12		

Watchdog timer (JP15)

Watchdog timer system reset/IRQ15 select (JP15)		
	IRQ15	Reset (default)
JP15		

COM2 settings for RS-232/422/485 (JP16)

COM2 settings for RS-232/422/485			
	RS-232	RS-422	RS-485
JP16			
	(default)		

COM2 settings for RS-232/422/485 (JP17-JP20)

COM2 settings for RS-232/422/485			
	RS-232	RS-422	RS-485
JP17			
JP18			

COM2 settings for RS-232/422/485			
	RS-232	**RS-422**	**RS-485**
JP19			
JP20			

CMOS backup select

	Clean CMOS	**Battery Backup (default)**
JP26		

SSD Device Select [JP23(U4), JP24(U11), JP25(U12)]

	JP23 (U4)	**JP24 (U11)**	**JP25 (U12)**
Flash	open	open	open
ROM	open	open	open
SRAM	closed	closed	closed

SSD I/O address select (JP21)

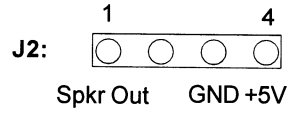
	JP21
disabled	
210H	
220H	
230H	

External speaker (J2)

The CPU has its own buzzer. You can also connect to the external speaker on your computer chassis. Pin assignments for J2 are as follows:

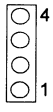
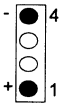
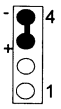
External speaker (J2)

Pin	Function
1	Speaker out
2	No connection
3	GND
4	+5 VDC



BATTERY select (J7)

Battery Installation Setup (J7)

	None	Internal (default)	4 pin ext.	2 pin ext.
Pin 4 GND Pin 3 Power Pin 2 Internal Battery Pin 1 Power				

This battery is provided for the RTC and SSD

MINI DIN function select (JP13, JP14)

	JP13	JP14
Both PS/2 Keyboard and Mouse		
PS/2 Mouse only		

CHAPTER 2

Connecting peripherals

This chapter tells how to connect peripherals, switches and indicators to the PCA-6144S board. You can access most of the connectors from the top of the board while it is installed in the chassis. If you have a number of cards installed, or your chassis is very tight, you may need to partially remove the card to make all the connections.

PCA-6144S Jumpers and Connectors List

The following table lists the jumpers and connectors on the PCA-6144S.

PCA-6144S Jumpers and Connectors

Number	Function	Default
JRN1	CPU select	
JRN2	CPU select	
JRN3	CPU select	default
JP1	CPU select	close
JP2	CPU select	1-2
JP3	CPU seletct	1-2
JP4	CPU select	
JP5	CPU select	
JP6	CPU select	
JP7	CPU voltage select	1-2
JP8	CPU voltage select	
JP9	CPU frequency select	2-3
JP10	CPU frequency select	2-3
JP11	CPU frequency select	1-2
JP12	Reserved	1-2
JP13	CN4 function select	1-2
JP14	CN4 function select	1-2
JP15	Watchdog function select	2-3
JP16	COM2 function select	3-6
JP17	COM2 function select	2-3
JP18	COM2 function select	2-3
JP19	COM2 function select	2-3
JP20	COM2 function select	2-3
JP21	SSD I/O address select	close
JP22	SSD I/O address select	close
JP23	SSD memory select	
JP24	SSD memory select	
JP25	SSD memory select	
JP26	CMOS data erase	2-3
J1	Power LED and Keylock	
J2	External speaker connector	3-4

Number	Function	Default
J3	Reset switch	
J4	HDD LED	
J5	Battery low LED	
J6	IR connector	
J7	Battery connector	2-3
CN1	Enhanced IDE connector	
CN2	FDC connector	
CN3	Parallel port connector	
CN4	Keyboard/mouse PS/2 DIN connector	
CN5	Keyboard connector	
CN6	SBC power connector	
CN7	PC/104 connector	
CN8	PC/104 connector	
COM1	Serial port 1	
COM2	Serial port 2	

The following sections tell how to make each connection. In most cases, you will simply need to connect a standard cable.

Safety Precautions

Warning! *Always completely disconnect the power cord from your chassis whenever you are working on it. Do not make connections while the power is on. Sensitive electronic components can be damaged by the sudden rush of power. Only experienced electronics personnel should open the PC chassis.*

Caution! *Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis.*

IDE connectors (CN1)

You can attach two IDE (Integrated Device Electronics) drives to the PCA-6144S's internal controller. The PCA-6144S CPU card has an EIDE connector, CN1.

Wire number 1 on the cable is red or blue, the other wires are gray. Connect one end to connector CN1 on the CPU card. Make sure that the red (or blue) wire corresponds to pin 1 on the connector (on the right side). See Chapter 1 for help finding the connector.

Unlike floppy drives, IDE hard drives can connect in either position on the cable. If you install two drives, you will need to set one as the master and one as the slave. You do this by setting the jumpers on the drives. If you use just one drive, you should set it as the master. See the documentation that came with your drive for more information.

Connect the first hard drive to the other end of the cable. Wire 1 on the cable should also connect to pin 1 on the hard drive connector, which is labeled on the drive circuit board. Check the documentation that came with the drive for more information.

Connect the second drive as described above on CN1.

Floppy drive connector (CN2)

You can attach up to two floppy disk drives to the PCA-6144S'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.

The card comes with a 34-pin daisy-chain drive connector cable. On one end of the cable is a 34-pin flat-cable connector. On the other end are two sets of floppy disk drive connectors. Each set consists of a 34-pin flat-cable connector (usually used for 3.5" drives) and a printed-circuit-board connector (usually used for 5.25" drives). You can use only one connector in each set. The set on the end (after the twist in the cable) connects to the A: floppy. The set in the middle connects to the B: floppy.

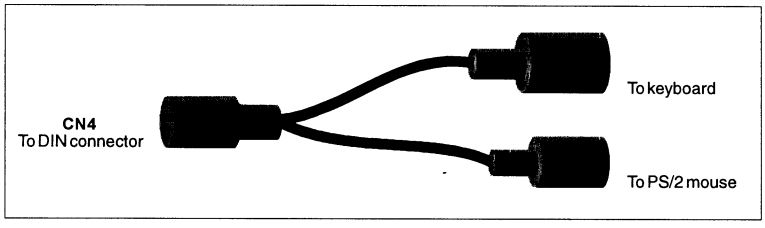
Parallel port connector (CN3)

The parallel port is normally used to connect the CPU card to a printer. The PCA-6144S includes an on-board parallel port, accessed through a 26-pin flat-cable connector, CN3. The card comes with an adapter cable which lets you use a traditional DB-25 connector. The cable has a 26-pin connector on one end and a DB-25 connector on the other, mounted on a retaining bracket. The bracket installs at the end of an empty slot in your chassis, giving you access to the connector.

To install the bracket, find an empty slot in your chassis. Unscrew the plate that covers the end of the slot. Screw in the bracket in place of the plate. Next, attach the flat-cable connector to CN3 on the CPU card. Wire 1 of the cable is red or blue, and the other wires are gray. Make sure that wire 1 corresponds to pin 1 of CN3. Pin 1 is on the right side of CN3.

Keyboard & PS/2 mouse connectors (CN4)

CN4, the card's keyboard connector, is a 6-pin mini-DIN connector on the card mounting bracket. The PCA-6144S also comes with an adapter to convert to a standard DIN connector and to a PS/2 mouse connector.

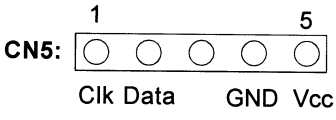


The PCA-6144S provides a second connector designed for external keyboard input (CN4). To locate CN4 please see the board layout on page 4 of chapter 1.

Keyboard pin-header connector (CN5)

The 5-pin connector CN5 supports passive backplane keyboard applications. The pin assignments are as follows:

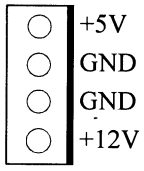
Pin	Function
1	KB clock
2	KB data
3	NC
4	GND
5	+5Vcc



Power connectors (CN6)

If you prefer not to acquire power through PCA-6144S's back-plane via the gold H-connectors, J1 also provides power input connectors for +5 V and ±12 V.

Warning! *Before making the connection, make sure the voltage is absolutely correct and matched with the right connector.*



CN6

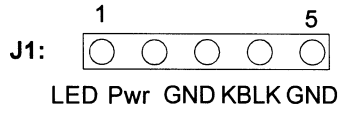
Power LED and Keylock (J1)

You can use a LED to indicate when the CPU card is on. Pin 1 of J1 supplies the LED's power, and Pin 3 is the ground.

You can use a switch (or a lock) to disable the keyboard so the PC will not respond to any input. This is useful if you do not want anyone to change or stop running a program. Connect the switch between Pins 4 and 5 of J1.

Power LED and keylock (J1)

Pin	Function
1	LED power (+5V)
2	NC
3	GND
4	Keyboard lock
5	GND



External speaker (J2)

The CPU has its own buzzer. You can also connect to the external speaker on your computer chassis. Pin assignments for J2 are as follows:

External speaker (J2)

Pin	Function
1	+5V Vcc
2	No connection
3	Internal buzzer
4	Speaker out

Reset switch (J3)

You can connect an external switch to easily reset your computer. This switch restarts your computer as if you had turned off the power, then turned it back on. Install the switch so that it closes the two pins of J3.

Hard disk drive LED (J4)

You can connect an LED to connector J4 to indicate when the HDD is active. Marks on the Board layout (chapter 1, p. 4) indicate LED polarity.

Battery low LED (J5)

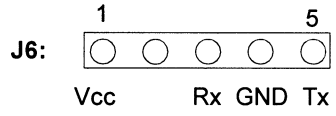
You can connect an LED to connector J5 to indicate when low battery status occurs. Marks on the Board layout (chapter 1, p. 4) indicate LED polarity.

Infrared Tx/Rx header (J6)

This connector supports the optional wireless transmitting and receiving infrared module. This module mounts onto a small opening on system cases that support this feature. You must also configure the setting through BIOS setup to select whether UART2 is directed for use with COM2 or IrDA.

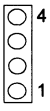
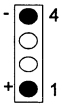
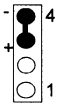
IrDA Tx/Rx header (J6)

Pin	Function
1	Vcc
2	No Connection
3	Rx
4	GND
5	Tx



Battery select (J7)

Battery Installation Setup (J7)

	None	Internal (default)	4 pin ext.	2 pin ext.
Pin 4 GND Pin 3 Power Pin 2 Internal Battery Pin 1 Power				

Serial ports (COM1, COM2)

The PCA-6144S offers two serial ports: COM1 in RS-232, COM2 in RS-232/422/485. These ports let you connect to serial devices (a mouse, printers, etc.) or a communication network.

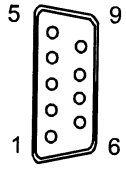
You can select the address for each port (3F8H [COM1], 2F8H [COM2] or 2E8H) or disable it, using the BIOS Advanced Setup program, covered in Chapter 3.

The card mounting bracket holds the serial port connector for the one port, and the parallel port and serial port adapter kit (supplied with the card) holds the connector for the other port. This lets you connect and disconnect cables after you install the card. The DB-9 connector on the bottom of the bracket is the first RS-232 port, COM1. The DB-9 connector on the adapter kit is the second serial port, COM2.

RS-232 connection (COM1)

Different devices implement the RS-232 standard in different ways. If you are having problems with a serial device, be sure to check the pin assignments for the connector. The following table shows the pin assignments for the cards's RS-232 port:

RS-232 connector pin assignments (COM1)	
Pin	**RS-232**
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

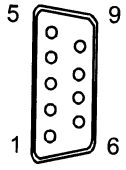


COM1

RS-232/422/485 connection (COM2)

COM2 is an RS-232/422/485 serial port. The following table shows the pin assignments for COM2.

RS-232/422/485 connector pin assignments	
Pin	**RS-232/422/485 (COM2)**
1	TX - or send data - (DTE)
2	TX + or send data + (DTE)
3	RX + or receive data + (DTE)
4	RX - or receive data - (DTE)
5	GND
6	DSR
7	RTS
8	CTS
9	RI



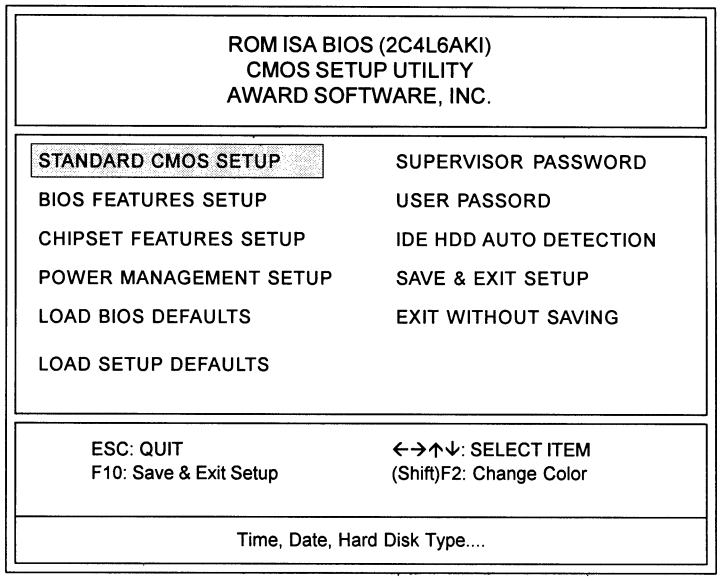
COM2

CHAPTER 3

AWARD BIOS SETUP

This chapter describes how to set the card's BIOS configuration data.

AWARD BIOS Setup



Setup program initial screen

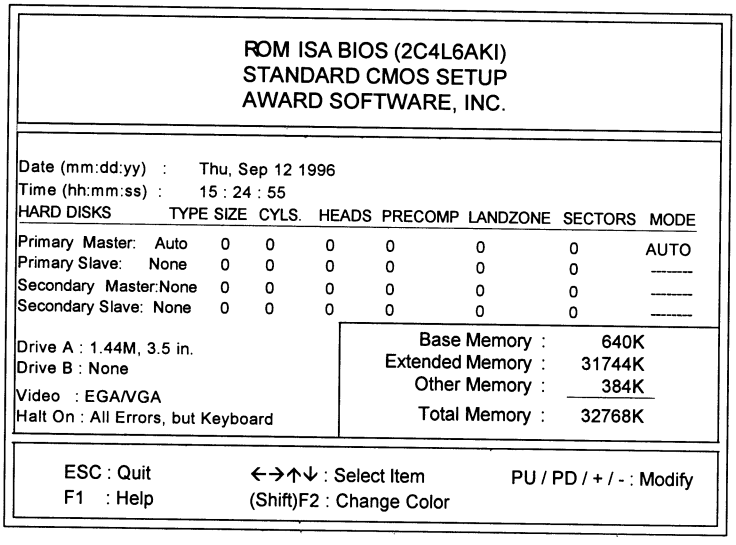
Award's BIOS ROM has a built-in Setup program that allows users to modify the basic system configuration. This type of information is stored in battery-backed RAM so that it retains the Setup information when the power is turned off.

Entering setup

Turning on the computer and pressing <DEL> immediately will allow you to enter Setup.

Standard CMOS setup

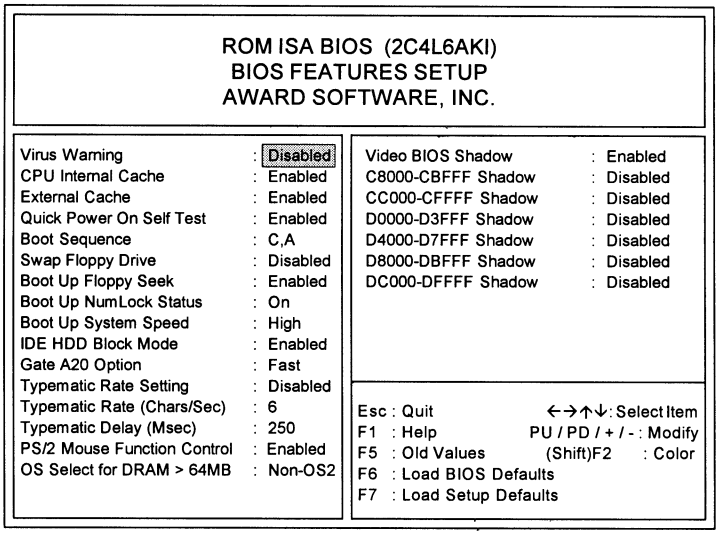
Choose the "STANDARD CMOS SETUP" option from the INITIAL SETUP SCREEN Menu, and the screen below is displayed. This standard Setup Menu allows users to configure system components such as date, time, hard disk drive, floppy drive, display, and memory.



CMOS setup screen

BIOS features setup

By choosing the "BIOS FEATURES SETUP" option from the CMOS SETUP screen menu, the following screen is displayed. This sample scree contains the manufacturer's default values for the PCA-6144S.



Virus Warning

During and after the system boots up, any attempt to write to the boot sector or partition table of the hard disk drive will halt the system. In this case, if Virus Warning is enabled, the following error message will automatically appear:

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

You can run the anti-virus program to locate the problem.

If Virus Warning is Disabled, no warning message will appear if anything attempts to access the boot sector or hard disk partition.

CPU Internal Cache/External Cache
Depending on the CPU/chipset design, these options can speed up memory access when enabled.

Quick Power On Self Test
This option speeds up the Power-On Self Test (POST) conducted as soon as the computer is turned on. When enabled, BIOS shortens or skips some of the items during the test. When disabled, normal POST procedures assumes.

Boot Sequence
This function determines the sequence in which the computer will search the drives for the disk operating system (i.e. DOS). The default value is "C, A".

C,A	System will first search the hard drive, then the floppy drive.
A,C	System will first search the floppy drive, then the hard drive.

Boot Up Floppy Seek
During POST, BIOS will determine if the floppy disk drive installed is 40 or 80 tracks. 360 KB type is 40 tracks while 720 KB, 1.2 MB, and 1.44 MB are all 80 tracks.

Enabled	BIOS searches the floppy drive to determine if it is 40 or 80 tracks. Note that BIOS cannot differentiate 720 KB, 1.2 MB, and 1.44 MB type drives as they are all 80 tracks.
Disabled	BIOS will not search for the floppy drive type by track number. Note that there will not be any warning message if the drive installed is 360 KB.

Boot Up NumLock Status
The default is "On".

On	Keypad boots up to number keys.
Off	Keypad boots up to arrow keys.

Boot Up System Speed

High	Sets the speed to high
Low	Sets the speed to low

IDE HDD Block Mode

Enabled	Enable IDE HDD Block Mode. BIOS will detect the block size of the HDD and send a block command automatically.
Disabled	Disable IDE HDD Block Mode

Gate A20 option

Normal	The A20 signal is controlled by the keyboard controller or chipset hardware
Fast	Default: Fast. The A20 signal is controlled by Port 92 or chipset specific method.

Typematic Rate setting

The typematic rate determines the characters per second accepted by the computer. Typematic Rate setting enables or disables the typematic rate.

Typematic Rate (Char/Sec)

BIOS accepts the following input values (character/second) for Typematic Rate: 6, 8, 10, 12, 15, 20, 24, 30.

Typematic Delay (msec)

When holding down a key, the Typematic Delay is the time interval between the appearance of the first and second characters. The input values (msec) for this category are: 250, 500, 750, 1000.

Security Option

This setting determines whether the system will boot if the password is denied, while limiting access to Setup.

System	The system will not boot, and access to Setup will be denied if the correct password is not entered at the prompt.
Setup	The system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.

Note: To disable security, select PASSWORD SETTING in the main menu. At this point, you will be asked to enter a password. Simply hit the <ENTER> key to disable security. When security is disabled, the system will boot, and you can enter Setup freely.

OS select for DRAM>64 MB.
This setting is underOS/2 system.

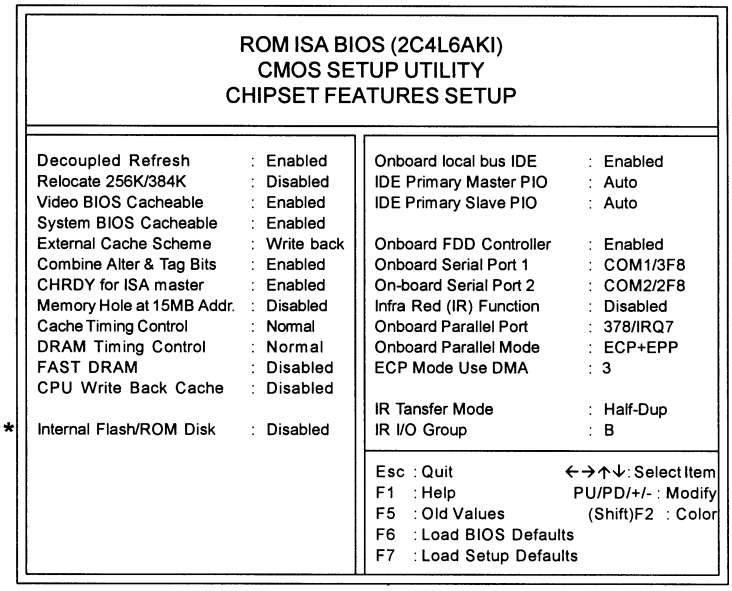
Video BIOS Shadow
This determines whether video BIOS will be copied to RAM, which is optional according to the chipset design. When enabled, Video Shadow increases the video speed.

C8000 - CFFFF Shadow/DC000-DFFFF Shadow
These determine whether optional ROM will be copied to RAM in blocks of 16 KB.

Enabled	Optional shadow is enabled
Disabled	Optional shadow is disabled

CHIPSET features setup

By choosing the "CHIPSET FEATURES SETUP" option from the CMOS SETUP screen menu, the following screen is displayed. This sample screen contains the manufacturer's default values for the PCA-6144S board.



* Internal Flash/ROM Disk

Disable	cannot use
Enable	can use internal SSD

When internal RAM/ROM disk is disabled, the C8000h memory segment can be used.

Video BIOS Cacheable

As with caching the System BIOS above, enabling the Video BIOS cache will cause access to video BIOS addressed at C0000H to C7FFFH to be cached, if the cache controller is also enabled.

Enabled	Video BIOS access cached
Disabled	Video BIOS access not cached

Disabled is the default.

System BIOS Cacheable

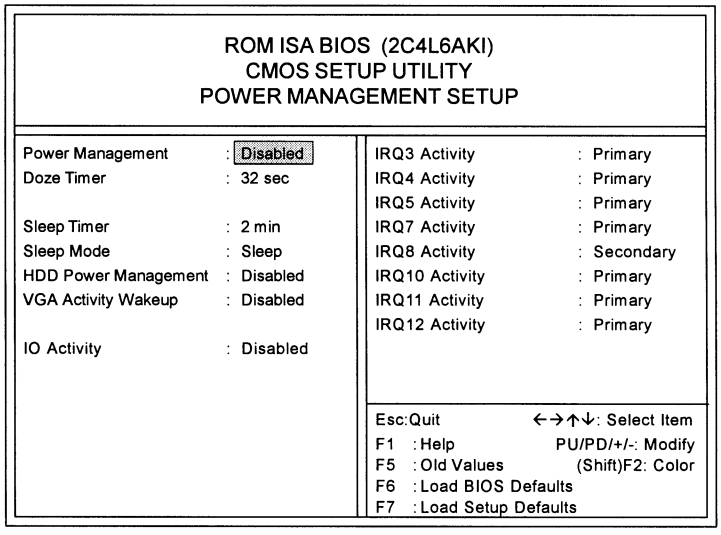
When enabled, accesses to the system BIOS ROM addressed at F0000H-FFFFFH are cached, provided that the cache controller is enabled.

Enabled	BIOS access cached
Disabled	BIOS access not cached

Disabled is the default.

Power management setup

The power management setup controls the CPU board's "green" features. The following screen shows the manufacturer's default.



Power Management

This option allows you to determine if the values in power management are disabled, user-defined, or predefined. This category determines the system's power consumption after selecting the following items. Default value is disable. The following pages tell you the options of each item and describe the meanings of each option.

Power Management

Item	Options	Descriptions
Power Management	1. Disable	Global power management will be disabled
	2. User Define	Users can configure their own power management
	3. Min Saving	Pre-defined timer values are used such that all timers are at their MAX value
	4. Max Saving	Pre-defined timer values are used such that all timers are at their MIN value

Doze Mode

Item	Options	Descriptions
Doze Mode	Disable	System will never enter DOZE mode
	8 sec 32 sec 2 min 8 min 16 min	Defines the continuous idle time before the system entering DOZE mode.*
		Note: Normally, STANDBY mode puts the system into low speed or 8 MHz.

Standby Mode

Item	Options	Descriptions
Standby Mode	Disable	System will never enter STANDBY mode
	8 sec 32 sec 2 min 8 min 16 min	Defines the continuous idle time before the system enters STANDBY mode.**
		Note: Normally, STANDBY mode puts the system into low speed or 8 MHz.

Suspend Mode

Item	Options	Descriptions
Suspend Mode	Disable	System will never enter SUSPEND mode
	8 sec 32 sec 2 min 8 min 16 min	Defines the continuous idle time before the system enters SUSPEND mode.***
		Note: Normally, STANDBY mode puts the system into low speed or 8 MHz.

Important Notice

The status of the following items will affect **Doze Mode**, **Standby Mode** and **Suspend Mode**: PCI Master Activity, COM Ports Activity, LPT Ports Activity, HDD Ports Activity, DMA Ports Activity, VGA Activity, IRQ3 (COM2), IRQ4 (COM1), IRQ5 (LPT2), IRQ6 (Floppy Disk), IRQ7 (LPT1), IRQ8 (RTC Alarm), IRQ9 (IRQ2 Redir), IRQ10 (Reserved), IRQ11 (Reserved), IRQ12 (PS/2 Mouse), IRQ13 (Coprocessor), IRQ14 (Hard Disk), and IRQ15 (Reserved)

* If any of the above items are enabled and active, the DOZE timer will be reloaded.

** If any of the above items are enabled or active, the STANDBY timer will be reloaded.

*** If any of the above items are enabled or active, the SUSPEND timer will be reloaded.

HDD Power Management

You can choose to turn the HDD off after a one of the time interval listed, or when the system is in Suspend mode. If in a power saving mode, any access to the HDD will wake it up.

Note: HDD will not power down if the Power Management option is disabled.

IRQ Activity

IRQ can be set independently. Activity on any enabled IRQ will wake up the system.

Load BIOS defaults

"LOAD BIOS DEFAULTS" indicates the most appropriate values for the system parameters for minimum performance. These default values are loaded automatically if the stored record created by the Setup program becomes corrupted (and therefore unusable).

Load setup defaults

"LOAD SETUP DEFAULTS" loads the values required by the system for maximum performance.

Password setting

To change, confirm, or disable the password, choose the "PASSWORD SETTING" option form the Setup main menu and press [Enter]. The password can be at most 8 characters long.

Remember, to enable this feature. You must first select the Security Option in the BIOS FEATURES SETUP to be either "Setup" or "System."

IDE HDD auto detection

"IDE HDD AUTO DETECTION" automatically self-detect for the correct hard disk type.

Save & Exit setup

If you select this and press the [Enter] key, the values entered in the setup utilities will be recorded in the CMOS memory of the chipset. The microprocessor will check this every time you turn your system on and compare this to what it finds as it checks the system. This record is required for the system to operate.

Exit without saving

Selecting this option and pressing the [Enter] key lets you exit the Setup program without recording any new values or changing old ones.

APPENDIX A

Flash/RAM/ROM Solid State Disk

The PCA-6144S features an internal Flash/RAM/ROM disk drive. This drive emulates a floppy disk drive by using solid-state memory chips (Flash, RAM or ROM) to store programs and data instead of the magnetic particles on the mechanical drive's disk. The Flash/RAM/ROM disk offers much faster access times than a floppy or hard disk and greatly increases reliability in harsh environments.

The Flash/RAM/ROM disk works by modifying the BIOS INT-13 disk I/O routine on boot-up. The operating system must be DOS v. 5.0 or greater. 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:, B:, C: or D: - 1st, 2nd, 3rd or 4th floppy disks) and use standard DOS commands (COPY, DIR, etc.) to manipulate your data.

Before you use the Flash/RAM/ROM disk, you will need to enable it with the BIOS Advanced Setup Program, discussed in Chapter 3.

Memory devices

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

- 28F010 128 KB x 8 (+12 V) Flash Memory (AMD/INTEL)
- CXK581000P 128K x 8 SRAM (Sony)
- CXK584000P 512K x 8 SRAM (Sony)
- 27C010 128 KB x 8 EPROM
- 27C040 512 KB x 8 EPROM
- AT29C010/A 128 KB x 8 (+ 5 V) Flash Memory (ATMEL only)
- AT29C040/A 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 (AT29C010/A or AT29C040/A)

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.

Drive capacity

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 = 1.536 MB, equivalent to a 1.44 MB floppy. If you install three 128 KB chips, you will have 3 x 128 KB = 384 KB, equivalent to a 360K floppy.

Drive configuration

Before you activate the Flash/RAM/ROM drive (using the BIOS Advanced 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/RAM/ROM drive. You can press <Alt> - <S> to enter SSD setup mode when you see the message.

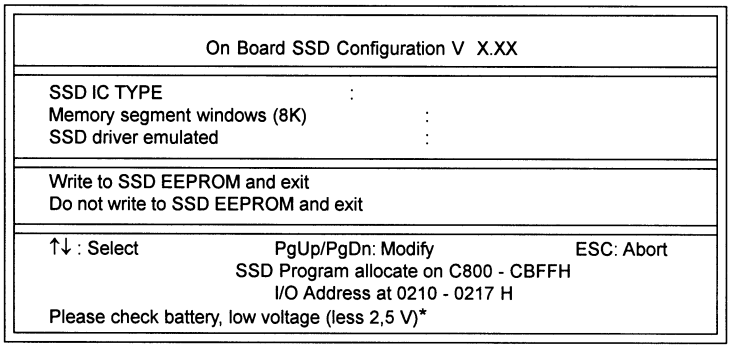
```
Internal Solid-State Disk BIOS  Rev X.XX

"SSD assign to _: Hit <Alt-S>, if you want
to setup SSD..."
```

You will need to set jumpers J17 and J18 to match the I/O. All the devices must be the same type and size.

I/O address selection

JP21	I/O address (HEX)
	Disabled (default)
	210-217
	220-227
	230-237



*This sentence will be shown when the battery voltage is low.

SSD IC Type		
SRAM 128K	CXK581000P	
EPROM 128K	27C010	
FLASH 128K	AT29C010/A	(default)
SRAM 512K	CXK584000P	
EPROM 512K	27C040	
FLASH 512K	AT29C040/A	

Memory segment windows (8K)	
CE00-CFFF	
D000-D1FF	(default)
D400-D5FF	
D800-D9FF	
DC00-DDFF	
E000-E1FF	

Drive emulated

Control the DOS drive emulated by the Flash/RAM/ROM disk: 1st, 2nd, 3rd or 4th.

SSD Driver Emulated	
1st	
2nd	
3rd	(default)
4th	

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

Drive Selection

Floppy disks
The Flash/RAM/ROM disk will "replace" the corresponding floppy disk. For example, if you have a single floppy disk (drive A:) and assign the Flash/RAM/ROM disk to be the 1st drive, any drive operations directed at drive A: will go to the Flash/RAM/ROM disk.

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

Example 1
You install the Flash/RAM/ROM disk as the first drive.

Before installing Flash/RAM/ROM disk

A	B	C
FDD	FDD	HDD

After installing Flash/RAM/ROM disk

A	B	C
Flash/RAM/ROM	FDD	HDD

*A floppy will be replaced by SSD

Example 2
You (try to) install the Flash/RAM/ROM disk as the third drive:

Before installing Flash/RAM/ROM disk

A	B	C
FDD	FDD	HDD

After installing Flash/RAM/ROM disk

A	B	C	D
FDD	FDD	HDD	Flash/RAM/ROM

Formatting the Solid State Disk

If you use Flash memory or SRAM, it is advisable to format the Flash/SRAM disk before copying files to it. The DOS command is as follows:

```
FORMAT drv: /u ...
```

where drv = solid state disk drive A, B, C etc.

Sometimes, it is better to assign the sectors and tracks when formatting SSD. For the different disk size, please use different assignment, for example:

```
Format drv:/u/n:9/t:40    (for 360 K disk)
Format drv:/u/n:18/t:80   (for 1.44 M disk)
```

where drv = solid state disk drive (A, B, or C, etc.)

After formatting, please read the message on the screen carfefully. DOS will inform you how much disk space is available, the total disk space, and the bad sectors, etc. If the disk size dow not match your assignment, please check the SSD setup again.

If you need a bootable disk, you should do the system transfter by typing:

```
SYS drv:
```

or use Format command and /S parameters.

Booting from the Flash/RAM/ROM disk

If you wish to have the system boot from the Flash/RAM/ROM disk, simply set driver emulated number for the 1st FDD. Copy your application files to the disk along with the standard system files required to boot (command.com, io.sys, msdos.sys, 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 and switches on the PCA-6144S, 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. Many times 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!
3. When installing less than three memory devices, you must first fill ROM-1SSD.

SRAM battery source (JP23, JP24, JP25)

If you install three SRAM chips, you must close jumpers JP23, JP24 and set JP25. This setting will support SRAM power from the battery that is used to retain the SRAM data when the PC's power is turned off.

The battery should be disconnected when using non-volatile memory devices such as Flash memories or EPROMs. You can use 3 V or 3.6 V Lithium battery 2 pin or 4 pin connectors for SRAM data retention power.

Note: Factory setting is "none battery" to save energy of the on-board internal Lithium battery.

File copy utility

The utility program MAKEROM.EXE, included on the card's utility disk, splits the files on a diskette into a series of binary files. You can then use an external programmer to copy the files to EPROM or +12 V Flash memory chips.

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/RAM/ROM disk (SSD Data memory segment). 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 = D000 - D1FF
```

This excludes an 8 KB range for the card from D0000 to D1FFF (the default addresses).

You should also make sure that the disk's memory address is not shadowed in the BIOS. SSD program will occupy C8000 - CBFFF when BIOS SSD setting is enabled.

Appendix B

Programming the Watch-dog Timer

The PCA-6144S is equipped with a watchdog timer that resets the CPU or generates an interrupt if processing comes to a standstill for whatever reason. This feature ensures system reliability in industrial stand-alone and unmanned environments.

Programming the watchdog timer

If you decide to program the watchdog timer, you must write data to I/O port 443 (hex). The output data is a value timer. You can write from 01 (hex) to 3F (hex), and the related timer is 1 sec. to 63 sec.

After data entry, your program must refresh the watchdog timer by rewriting the I/O port 443 (hex) while simultaneously setting it. When you want to disable the watchdog timer, your program should read I/O port 043 (hex).

The following procedure is a program for the watchdog timer:

```
Step 1    Out 443h data REM Start and reset the
          watchdog timer.

Step 2    Your application program task #1

Step 3    Out 443h data REM Reset the timer

Step 4    Your application program task #2

Step 5    Out 443h data REM Reset the timer

Step 6    in 043h, REM Disable the watchdog timer


Data Values

01      1 sec.
02      2 sec.
03      3 sec.
04      4 sec.
.
.
.
3F      63 sec.
```

APPENDIX C

Upgrading

This appendix gives instructions for increasing the capabilities of your CPU card. It covers:

- Installing PC/104
- DRAM memory installation (SIMMs)

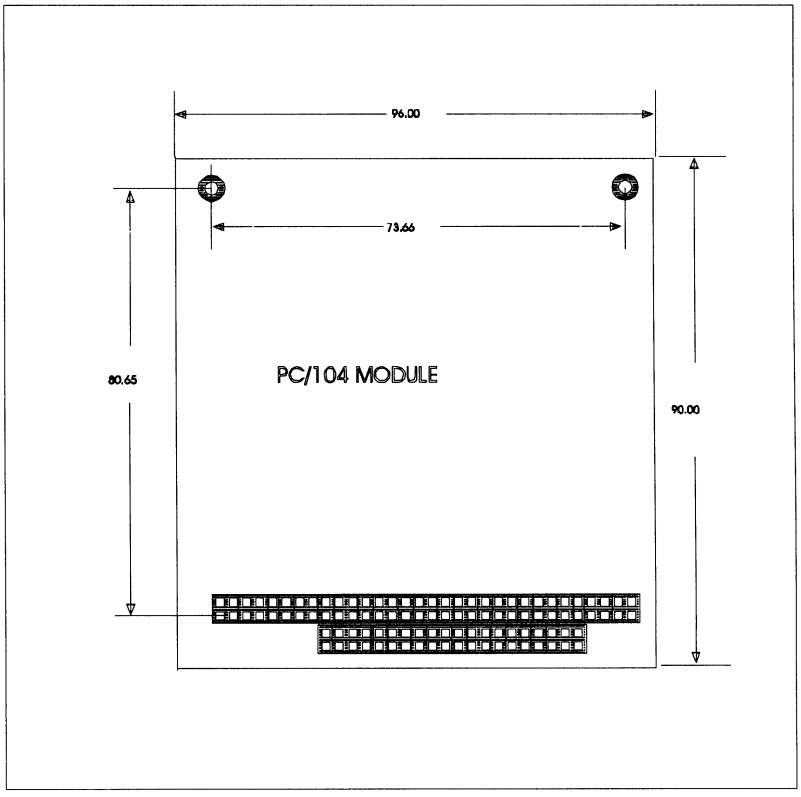
Installing PC/104 modules (CN7, CN8)

The PCA-6144S card's PC/104 connector lets you attach PC/104 modules. These modules perform the functions of traditional plug-in expansion cards, but save space and valuable slots. Advantech modules include:

- PCM-3110 PCMCIA module
- PCM-3718 30 KHz A/D module
- PCM-3724 48-channel DIO module

PC/104 modules are produced by over a dozen manufacturers, and the PC/104 form factor is being advanced as an appendix to the ISA bus standard.

If you want to make your own PC/104 module, the figure on the following page shows module dimensions. A PC/104 breadboard module (PCM-3910) is also available. Pin assignments for the connector appear in Appendix D. For further information, contact your Advantech distributor or sales representative.



PC/104 module dimensions (mm)

Installing DRAM (SIMMs)

You can use anywhere from 1 MB to 64 MB of DRAM with your PCA-6144S. The card provides two 72-pin SIMM (single in-line memory module) socket that accepts from 1 to 32 MB SIMMs. The following table shows the bank assignment for the SIMM socket:

Bank	SIMM socket(s)	Size
0	SIMM0	72-pin
1	SIMM1	72-pin

You can use 256Kx32, 512Kx32, 1Mx32, 2Mx32, 4Mx32 or 8Mx32 DRAM SIMMs.

SIMM Configurations

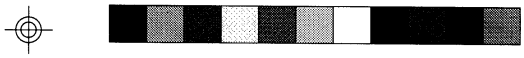
Bank0	Bank1
S32	S32
D32	D32

S32 = single side 32 bit

D32 = double side 32 bit

BANK0	BANK1	TOTAL
1M	--	1MB
1M	1M	2MB
2M	--	2MB
2M	2M	4MB
2M	4M	6MB
2M	16M	18MB
4M	--	4MB
4M	4M	8MB
4M	16M	20MB
8M	--	8MB
16M	--	16MB
16M	16M	32MB
32M	--	32MB
32M	32M	64MB

Supported 36 bit Memory Configurations (single bank)

APPENDIX D

Detailed system information

This appendix contains information of a detailed or specialized nature. It includes:

- Parallel connector pin assignments
- HDD connector pin assignments
- FDD connector pin assignments
- Keyboard connector pin assignments
- RS-232 connections
- PC/104 connector pin assignments
- System I/O port address assignments
- DMA channel assignments
- Interrupt assignments

Parallel/printer connector (CN3)

Pin no.	Signal
1	STROBE
2	DATA 0
3	DATA 1
4	DATA 2
5	DATA 3
6	DATA 4
7	DATA 5
8	DATA 6
9	DATA 7
10	- ACKNOWLEDGE
11	BUSY
12	PAPER EMPTY
13	+ SELECT
14	- AUTO FEED
15	- ERROR
16	- INIT PRINTER
17	- SELECT INPUT
18-25	GROUND

HDD connector (CN1)

Pin no.	Signal	Pin no.	Signal
1	- RST	2	GND
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

Pin no.	Signal	Pin no.	Signal
27	IORDY	28	BALE
29	N.C.	30	GND
31	IRQ	32	-IO CS16
33	A1	34	N.C.
35	A0	36	A2 CS0
37	CSO	38	CS1
39	-ACT	40	GND

FDD connector (CN2)

Pin no.	Signal
1-33 (odd)	GROUND
2	HIGH DENSITY
4, 6	UNUSED
8	INDEX
10	MOTOR ENABLE A
12	DRIVER SELECT B
14	DRIVER SELECT A
16	MOTOR ENABLE B
18	DIRECTION
20	STEP PULSE
22	WRITE DATA
24	WRITE ENABLE
26	TRACK 0
28	WRITE PROTECT
30	READ DATA
32	SELECT HEAD
34	DISK CHANGE

PS/2 Keyboard and Mouse connector pin assignment (CN4)

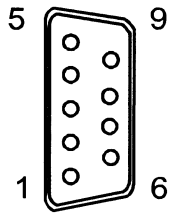
KBD	Mouse	Signal
1	5	CLOCK
2	1	DATA
3 (NC)	2	PS/2 DATA
4	3	GND
5	4	+5 V
	6	PS/2 CLOCK

RS-232 connections (COM1)

Different devices implement the RS-232 standard in different ways. If you are having problems with a serial device, be sure to check the pin assignments for the connector. The following table shows the pin assignments for the card's RS-232 port:

RS-232 connector pin assignment (COM1)

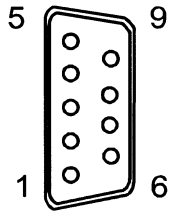
Pin	Signal
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI



COM1

RS-232/422/485 connections (COM2)

RS-232/422/485 connector pin assignments (COM2)	
Pin	**RS-232/422/485 (COM2)**
1	TX - or send data - (DTE)
2	TX + or send data + (DTE)
3	RX + or receive data + (DTE)
4	RX - or receive data - (DTE)
5	GND
6	DSR
7	RTS
8	CTS
9	RI



COM2

PC/104 connector pin assignments

	CN7		CN8	
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)[2]	MEMW*	DACK5*
11	AEN	SMEMW*	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
17	SA14	DACK1*	SD14	MASTER*
18	SA13	DRQ1	SD15	0V
19	SA12	REFRESH*	(KEY)[2]	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	--	--

* **Low active single**

-- **none**

Memory Map (0-1 MB)	system I/O port address assignments
Addr. range (Hex)	**Device**
F0000h - FFFFFh	System BIOS
C8000h - EFFFFh	Unused
C0000h - C7FFFh	VGA BIOS
A0000h - BFFFFh	VGA display memory
00000h - 9FFFFh	Base Memory

DMA channel assignments

Channel	Function
0	Available
1	Available
2	Floppy
3	Available
4	[Cascade]
5	Available
6	Available
7	Available

IRQ interrupt assignments

Interrupt #	Interrupt source
IRQ 00	Timer
IRQ 01	Keyboard
IRQ 02	[CASCADE]
IRQ 03	COM2 (2F8h)
IRQ 04	COM1 (3F8h)
IRQ 05	Available
IRQ 06	Floppy
IRQ 07	LPT1 (378h)
IRQ 08	Clock/Cal
IRQ 09	Available
IRQ 10	Available
IRQ 11	Available
IRQ 12	Reserved
IRQ 13	NPU
IRQ 14	OCCUPIED
IRQ 15	Watchdog/Available

APPENDIX E

POST Code Indicators

This appendix contains detailed information on POST checkpoint codes. The list of POST codes gives the number of each checkpoint for the AWARD BIOS POST.

Code	Name	Description of check-point
01	Processor test 1	Processor status (IFLAGS) verification tests the following processor status flags, carry, zero, sign, BIOS overflow. It will set each of these flags, verify that they are set, then turn each flag off and verify it is off.
02	Processor test 2	Read, write, verify all CPU registers except SS, SP, and BP with data pattern FF and 00.
03	Initialize chips	Disable NMI, PLE, ALE, UEL, SQWV. Disable video, parity checking, DMA. Reset math coprocessor, clear all page registers, CMOS shutdown byte. Initialize timer 0, 1, and 2. Set EISA timer to a known state. Initiallze DMA controllers 0 and 1. Initialize interrupt controllers 0 and 1. Initialize EISA extended registers.
04	Test memory	RAM must be periodically refreshed in order to keep the memory from decaying.
	Refresh toggle	This function assures that the memory refresh function is working properly.
05	Blank video	Keyboard controller initialization. Initialize keyboard.
06	Reserved	
07	Test CMOS interface	Verifies CMOS is working correctly. Checks battery status, detects bad battery.
08	Setup low memory	Early chip set initialization memory presence test. OEM chipset routines. Clear low 64 KB of memory. Test first 64 KB memory.
09	Early cache initialization	Cyrix CPU initialization, cache initialization
0A	Setup interrupt vectors	Initialize first 120 vectors in interrupt vector table with SPURIOUS_INT_HDLR and initialize INT 00h-1Fh according to INT_TBL.

Code	Name	Description of check-point
0B	Test CMOS RAM	Test CMOS RAM checksum. If bad or insert key pressed, INT OOh-1Fh according to INT_TBL.
0C	Initialize keyboard	detect type of keyboard controller (optional). Set num_lock status.
0D	Initalize video interface	Detect CPU clock. Read interface CMOS location 14h to find out type of video in use. Detect and initialize video adaptor.
0E	Test video memory	Test video memory, write sign-on message to screen. Set up shadow RAM-enable according to setup.
0F	Test DMA controller 0	BIOS checksum test. Keyboard detection and initialization.
10	Test DMA controller 1	
11	Test DMA page registers	Test DMA page registers.
12-13, 1B, 1E		Reserved
14	Test timer counter 2	Test 8254 timer 0 counter 2.
15	Test 8259-1 mask bits	Verify 8259 channel 1 masked interrupts by alternately turning off and on the interrupt lines.
16	Test 8259-2 mask bits	Verify 8259 channel 2 masked interrupts by alternately turning off and on the interrupt lines.
17	Test 8259-1 mask bits	Turn off interrupts then verify no interrupt mask register is on.
18	Test 8259 interrupt functionality	Force an interrupt and verify the interrupt occurred.
19	Test stuck NMI bits (parity/IO check)	Verify NMI can be cleared.
1A	Display CPU clock	
20	Enable slot 0	Initialize slot 0 (system board).
21-2F	Enable slots 1-15	Initialize slots 1 through 15.
30	Size base and extended memory	Size base memory from 256 KB to 640 KB and extended memory above 1 MB.

Code	Name	Description of check-point
31	Test base and extended memory	Test base memory from 256 KB to 640 KB and extended memory above 1 MB using various patterns. Note: this will be skipped in EISA mode and can be "skipped" with ESC key in EISA mode.
32	Test EISA extended memory	If EISA mode flag is set then test EISA memory found in slot initialization. Note: this will be skipped in ISA mode and can be 'skipped" with ESC key in EISA mode.
33-3B	Reserved	
3C	Setup enabled	
3D	Initialize and install mouse	Detect if mouse is present, initialize mouse, install interrupt vectors.
3E	Set up cache controller	Initialize cache controller.
40	Virus protect	Display virus protect disable or enable.
41	Initialize floppy drive and controller	Initialize floppy disk drive controller and any drives.
42	Initialize hard disk drive and controller	Initialize hard disk drive controller and any drives.
43	Detect & initialize serial and parallel ports	Initialize serial/parallel ports (also game port).
44	Reserved	
45	Detect & initialize math coprocessor	Initialize math coprocessor.
46-47	Reserved	
4E	Manufacturing post loop or display messages	Reboot if manufacturing loop post loop pin is set. Otherwise display and messages (i.e. any non-fatal errors that were detected during post and enter setup).
4F	Security check	Ask for password security (optional).
50	Write CMOS	Write all CMOS values back to RAM and clear screen.

Code	Name	Description of check-point
51	Pre-boot enable	Enable parity checker, enable NMI, enable cache before boot.
52	Initiallze option ROMs	Initialize any option ROMs present from C8000h to EFFFFh. Note: when fscan option is enabled, it will initialize from C8000h to F7FFFh.
53	Initialize time value	Initialize time value in 40h: BIOS area.
60	Set up virus protection	Set up virus protection according to setup.
61	Set boot speed	Set system speed for boot.
62	Set numlock	Set numlock status according to setup.
63	Boot attempt	Set low stack boot via INT 19h.
B0	Spurious	If interrupt occurs in protected mode.
B1	Unclaimed NMI	If unmasked NMI occurs, display "Press F1 to disable NMI, F2 to reboot".
BE	Chipset default initialization	Program chipset registers with power-on BIOS defaults.
BF	Chipset initialization	Program chipset registers with setup values.
C0	Turn off chipset cache	OEM specific-cache control.
C1	Memory presence test	OEM specific test to size onboard memory.
C5	Early shadow	OEM specific early shadow enable for fast boot.
C6	Cache presence test	External cache size detection test.
E1-EF	Setup pages	E1-page 1, E2-page2, etc.
FF	Boot	





Rev.CO

ADVANTECH

研華股份有限公司

MANUAL APPROVAL SHEET

NO. EE-980758

☑合格 APPROVED ☐不合格 REJECTED ☐試用 LIMITED QTY _____PCS

送樣次數 ☑1 ☐2 ☐3

品名規格 Part Description	USER'S NOTE FOR PCA-6144S	Edition
研華料號 Part No.	2 0 0 6 6 1 4 4 0 0	使用機種 PCA-6144S

製造商 廠內印製

尺寸：原稿內容 ☐縮印0.7倍 ☑不縮印 ☐其它_____

原稿封面 ☐縮印0.7倍 ☑不縮印 ☐其它_____

成品：☐210mm（長）×145MM（寬） ☐280mm（長）×213MM（寬）

☐210mm（長）×150MM（寬） ☐其它 Letter

總張數：1 張（不含封、底面）

裝訂：1.☐紅色封面 ☐雙面印刷 2.☐三孔 ☐雙面印刷

☐塑膠捲軸 ☐單面印刷 ☐單面印刷

3.☐灰色封面 ☐雙面印刷 4.☐三孔騎馬釘 ☐雙面印刷

☐塑膠捲軸 ☐單面印刷 ☐單面印刷

5.☐膠裝 ☐雙面印刷 6.☑其它_____

☐單面印刷

材質：成品封面 ☐300磅墾博紙 ☐200磅美術卡紙 ☐200磅銅西卡紙

☐安格紙 ☐銅西卡紙上霧光 ☐其它影印紙

成品內容 ☐雪銅紙 ☐劃刊紙 ☐100磅模造紙 ☐其它_____

注意事項：廠內自行印製裁半

備註：正式交貨時，製造商須多備三份成品做為承認樣品（廠商、品管、工程課存）。

研華股份有限公司 正式承認 87.5.26 工程課

	SIGNATURE	OK/CA/NG	DATE
檢驗者	銘祥	ok	5/19 '98
審核	王國原	ok	5/19 '98
應用工程師	勇銀	ok	5/19 '98
工程課	王淑君	ok	87.5.26

QE 光華

樣品

採購 ☐

廠商 ☐ ☐

品管 ☑ ☐

工程課 ☐ ☐

生管 ✓ ✓

註：1. 以上所記，已經檢驗過、並給予承認。

2. 本單不能代替採購單及其他用途。

3. 如涉及專利及法律之問題，應由送樣廠商負全責。

QD4-046

User's Note

■ **M-system DOC-2000 Quick Installation Guide on PCA-6144S**

1.Turn the Platform Power OFF. Plug the DOC2000 into the 4th socket (labeled U4) counting from the BIOS socket.

2.Set JP23 " Open" (for Flash)

3. Set SSD I/O address (JP21) as 210H, 220H or 230H up to your choice.

4. Power Up the system and Press" Del" key when the system is booting up to enter into the CMOS BIOS to active SSD.

Choose " CHIPSET FEATURE SETUP" and Set " INTERNAL FLASH/ROM Disk" to "ENABLE". Then Exit the

CMOS BIOS. The system will re-boot automatically.

5.Press " ALT"+"S" simultaneously when the system is booting to change " SSD IC Type" to DOC-2000.

Set " SSD Driver emulated" to DOC-2000.

6. Re-Boot the system and then the PCA-6144S can support DOC-2000.

■ **Pin assignment of COM2 RS-232/422/485. Please refer to P.24 and P.59 on the manual.**

PIN	RS-232	RS-422	RS-485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	N/C
4	DTR	RX-	N/C
5	GND	GND	GND
6	DSR	DSR	DSR
7	RTS	RTS	RTS
8	CTS	CTS	CTS
9	RI	RI	RI

P/# 2006614400

User's Note

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1	DCD	TX-	DATA-
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3	TX	RX+	N/C
4	DTR	RX-	N/C
5	GND	GND	GND
6	DSR	DSR	DSR
7	RTS	RTS	RTS
8	CTS	CTS	CTS
9	RI	RI	RI

P/# 2006614400