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PCA-6145B

Half-size 486 All-in-one
CPU Card with
Panel/CRT and Ethernet Interface

PCA-6145L

Half-size 486 All-in-one
CPU Card with
Panel/CRT Interface

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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.

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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.

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Packing list

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

- 1 PCA-6145B/6145L CPU card
- 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) and COM2 adapter (9 pin) kit
- 1 Utility disk with system VGA BIOS, utility with Win.95 driver & LAN driver
- 1 Utility disk with SVGA program and driver for Windows

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

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Contents

Chapter 1 Hardware Configuration 1

Introduction 2
Specifications 2
Board layout 5
Jumpers settings 8
Jumper settings 8
How to set jumpers 8
CPU type select 9
Watchdog timer (JP29) 12
COM2 setting for RS-232/422/485 (JP35~39) 12
Battery backup select 12
PS/2 mouse setting 13
LCD type control 13

Chapter 2 Connecting peripherals 15

Enhanced IDE connectors (CN1) 17
VGA interface connection (CN2) 17
Floppy drive connector (CN3) 18
Parallel port connector (CN4) 18
Keyboard & PS/2 mouse connectors (J5) 19
Reset switch (JP30) 19
Hard disk drive LED (JP3) 19
VGA display connector (J2) 19
Serial Ports 19
RS-232 connection (COM1) 20
RS-232/422/485 connections (COM2) 21
Power connectors (J1) 22

Chapter 3 AWARD BIOS SETUP 23

AWARD BIOS Setup 24

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Entering setup 24
Standard CMOS setup 25
BIOS features setup 26
CHIPSET features setup 30
Power management setup 31
Load BIOS defaults 32
Load setup defaults 32
Password setting 32
IDE HDD auto detection 32
Save & Exit setup 32
Exit without saving 32

Chapter 4 VGA Display & Ethernet Software/ Hardware Configuration 33

Introduction 34
PCA-6145 Utility Disk 34
VGA Win 95 Driver Support 36
Ethernet Driver Support 38

Chapter 5 SVGA Setup 39

Simultaneous display mode 40
Sleep mode 40
Software support 41
Driver installation 42
Windows setup 43
DOS setup 44
AutoCAD R12 46
Lotus 1-2-3 and Lotus symphony 48
VESA 50
Word 51
Word Perfect 52

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Appendix A Programming the Watchdog Timer 55

Appendix B Upgrading 57

Installing PC/104 module (CN5, CN6) 58

Installing DRAM (SIMMs) 60

Appendix C Detailed System Information 61

Appendix D POST LEDs 71

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CHAPTER 1

Hardware Configuration

This chapter gives background information on the PCA-6145B/6145L. 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
- Installing DRAM (SIMMs)

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Introduction

The PCA-6145B/6145L is a full-function CPU card which integrates the VGA LCD panel, Ethernet and other enhanced I/O interfaces on a half-size CPU card. This card uses a 80486 DX, DX2, DX4 CPU or 5x86 series and can have up to 32 MB DRAM and EDO RAM. It also provides an optional 128 KB cache RAM.

The PCA-6145B/6145L offers power management to minimize power consumption. It complies with the "Green Function" standard and supports three power saving features: doze, sleep, and suspended mode.

Its high performance VGA display supports both CRT and panel displays with a display memory of up to 1 MB and a resolution of up to 640x480 with 1.6 million colors. The VGA controller is a VL bus C&T 65545, which comes equipped with a windows accelerator.

The PCA-6145B/6145L also offers several industrial features such as a 63-level watchdog timer with jumperless setup, supports M-systems DiskOnChip Flash Disk (refer to M-systems Data base and a face-up PC/104 connection for additional functions with PC/104 modules.

Specifications

System

- **CPU:**
  Intel 80486DX/DX2/DX4 series
  AMD 80486DX2/DX4 series, 5x86-133
  Cyrix 80486DX2/DX4 series, 5x86-100/120
- **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

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- **RAM:** 1 MB to 32 MB, one 72-pin SIMM socket, accepts 1, 2, 4, 8, 16, and 32 MB SIMMs and EDO RAM
- **EIDE interface:** Supports up to two IDE devices. BIOS supports up to 8.4 GB HDD. 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 EPP/ECP parallel mode
- **Serial ports:** Two 16C550 UARTs, one RS-232, one RS-232/422/485 interface
- **Watchdog timer:** 63-level timer interval, with jumperless setup, generates system reset or IRQ15
- **Keyboard/mouse connector:** Mini DIN connector for keyboard and PS/2 mouse, 5-pin male keyboard connector is also available
- **I/O bus expansion:** PC/104 connector with face-up installation
- **SSD:** Supports M-systems DiskOnChip flash disk
- **Flash Backup:** CMOS Data

Ethernet controller functions (PCA-6145B only)

- **Controller:** UMC UM9008, built-in 8k x 16 SRAM
- I/O address switchless setting
- Software compatible with NE-1000 and NE-2000
- Loopback capability for diagnostics
- **Connector:** RJ-45
- **Boot ROM:** Built-in system BIOS (optional)

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Local bus VGA functions

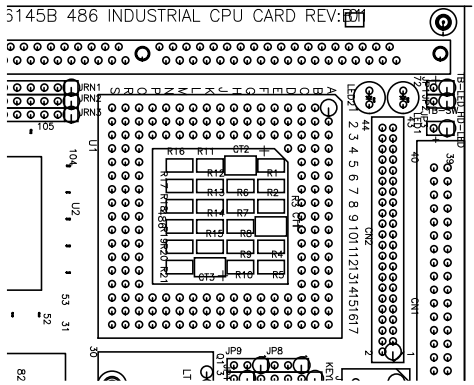
- **Controller:** VL-bus C&T 65545 VGA controller with Windows accelerator
- **Display memory:** 1 MB on-board DRAM
- **Display resolution:**
  Supports resolutions up to 1280 x 1024
  - Non-interlaced CRT display up to 1024 x 768 with 256 colors
  - Flat panel display up to 640 x 480 resolution
  - Support True-color and Hi-color display capability
- **Display output:** DB-15 VGA connector, 22 x 2 pin header general purpose flat panel display connector
- **Display BIOS:** Default CRT/Toshiba TFT panel BIOS, Flash BIOS can be easily updated

Mechanical and environmental

- **Board size:** 185 mm x 122 mm
- **Max. power requirements**: +5 V, 3.5 A
- **Power supply voltage**: +5 V (4.75 V to 5.25 V)
- **Operating temperature**: 32 to 140°F (0 to 60°C)
- **Storage temperature:** -40 to +176°F (-40 to +80°C)
- **Humidity:** 5 to 95%, non-condensing
- **Board size**: 7.3" (L) x 4.8" (W) (185 mm x 122 mm)
- **Board weight**: 1.2 lb. (0.5 kg)

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Board layout



PCA-6145B/PCA-6145L PCB Layout

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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.

PCA-6145B/PCA-6145L Jumpers

Number	Function
JP1	Turbo LED
JP2	Turbo Switch
JP3	HDD LED
JP4	Clock select
JP5	Clock select
JP6	Clock select
JP7	CPU type select
JP8	CPU type select
JP9	Battery backup
JP11	CPU type select
JP13	CPU type select
JP14	Voltage selection
JP15	PS/2 mouse set
JP20, JP21	CPU type select
JP22-JP24	S.S.D. Function set
JP28	LCD Control
JP29	Watchdog timer
JP30	Rest switch
JP35-JP39	COM2 select

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PCA-6145B/PCA-6145L Connectors

Number	Function
CN1	Enhanced IDE connector
CN2	LCD connector
CN3	FDD connector
CN4	Parallel port connector
COM1	Serial port 1 connector
COM2	Serial port 2 connector
J1	SBC power connector
J2	VGA connector
J3	Ethernet connector
J4	External Keyboard connector
J5	Keyboard connector
J6	Keyboard lock
J7	Speaker

Safety precautions

Follow these simple precautions to protect yourself from harm and your PC from damage.

1. To avoid electric shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
2. Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.
3. Always ground yourself to remove any static charge before you touch your CPU card. Be particularly careful not to touch the chip connectors. Modern integrated electronic devices, especially CPUs and memory chips, are extremely sensitive to static electric discharges and fields. Keep the card in its antistatic packaging when it is not installed in the PC, and place it on a static dissipative mat when you are working with it. Wear a grounding wrist strap for continuous protection.

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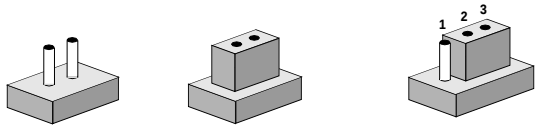
Jumper settings

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.

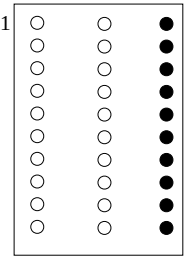
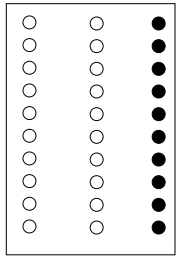
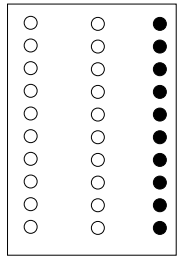
If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

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CPU type select

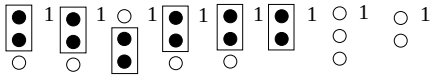
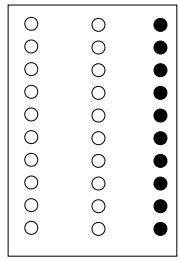
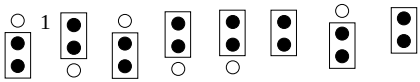
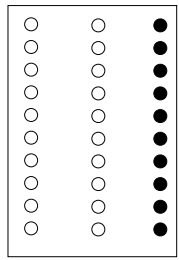
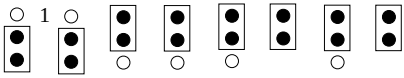
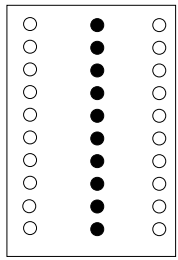
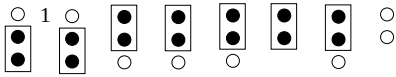
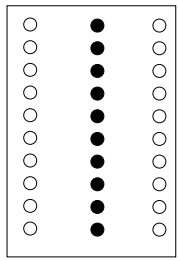
In order for the system to function properly, the jumpers must be set to accommodate the CPU installed on the CPU card.

CPU type select

CPU Type	JP4	JP5	JP6	JP7	JP8	JP11	JP13	JP14	JRN1	JRN2	JRN3
Intel DX-33(5V) DX2-66											
Intel P24D DX4-100 (5V)											
SGS DX4-100 AMD 5x86-133 Intel DX4-100 AMD DX4-100 (SV8B) Cyrix 5x86-100 (3.3V)											

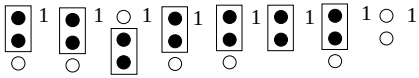
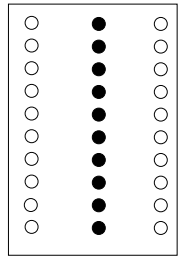
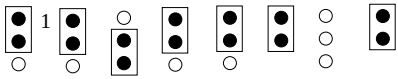
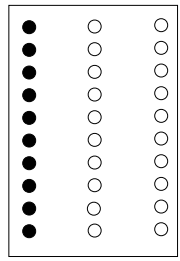
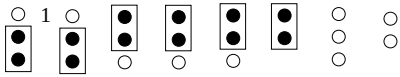
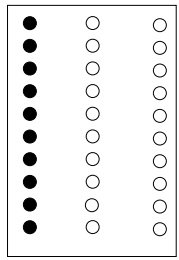
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CPU type select

CPU Type	JP4	JP5	JP6	JP7	JP8	JP11	JP13	JP14	JRN1	JRN2	JRN3
Cyrix 5x86-120 AMD DX4-120 (3.3V)(SV8B)											
Intel P24D DX4-75 (5V)											
Cyrix DX2-66 SGS DX2-66 (5V)											
TI DX2-66 (3.3V)											

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CPU type select

CPU Type	JP4	JP5	JP6	JP7	JP8	JP11	JP13	JP14	JRN1	JRN2	JRN3
Cyrix DX2-80 TI DX2-80 (3.3V)											
AMD DX-40 DX2-80(5V)											
AMD DX4-100 (NV8T) (3.3 V)											

Note: 1. AMD 5X86-133 JP20 **ON** other **OFF**
2. AMD DX2-80 JP21 **ON** other **OFF**

Default setting: Intel DX4-100

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Watchdog timer (JP29)

Watchdog timer system reset/IRQ15 select (JP29)

	Reset (default)	IRQ15
JP29		

COM2 settings for RS-232/422/485 (JP35~39)

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

	RS-232 (default)	RS-422	RS-485
JP35			
JP36			
JP37			
JP38			
JP39			

Battery backup select

	Battery Backup (default)
JP9	

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PS/2 mouse setting

	PS2 Mouse (default)
JP15	

LCD type control

	LCD (default)	EL
JP28		

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CHAPTER 2

Connecting peripherals

This chapter tells how to connect peripherals, switches and indicators to the PCA-6145B/PCA-6145L 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.

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The following table lists the connectors on the PCA-6145B/PCA-6145L.

Connectors

Label	Component
CN1	IDE connector
CN2	LCD connector
CN3	FDD connector
CN4	Parallel port connector
CN5,CN6	PC 104 connector
JP30	Reset Switch
LED1	Power LED
LED2	Ethernet LED

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

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.*



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Enhanced IDE connectors (CN1)

You can attach two IDE (Integrated Device Electronics) drives to the PCA-6145B/PCA-6145L's internal controller. The PCA-6145B/PCA-6145L 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.

LCD interface connection (CN2)

LCD display connector (CN2)

CN2 consists of a 44-pin, dual-in-line header. Power supplies (+12V) present on CN2 depend on the supply connected to the board.

The PCA-6145B/PCA-6145L provides a bias control signal on CN2 which can be used to control the LCD bias voltage. It is recommended that the LCD bias voltage (+5V) and panel video signals are stable. Under normal operation, the control signal (ENAVEE) is active high. When the PCA-6145B/PCA-6145L's power is applied, the control signal is low until just after the relevant flat panel signal is present.

Configuration of the VGA interface is done completely via the software utility. You don't have to set any jumpers. Refer to Chapter 4 for software setup details.

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Floppy drive connector (CN3)

You can attach up to two floppy disk drives to the PCA-6145B/ PCA-6145L'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 (CN4)

The parallel port is normally used to connect the CPU card to a printer. The PCA-6145B/PCA-6145L includes an on-board parallel port, accessed through a 26-pin flat-cable connector, CN4. 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 CN4 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 CN4. Pin 1 is on the right side of CN4.

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Keyboard & PS/2 mouse connectors (J5)

The PCA-6145B/PCA-6145L board provides a keyboard connector. A 6-pin mini-DIN connector (J5) on the card mounting bracket supports single-board computer applications. The card comes with an adapter to convert from the 6-pin mini-DIN connector to a standard DIN connector and to a PS/2 mouse connector.

Reset switch (JP30)

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 JP30.

Hard disk drive LED (JP3)

You can connect a LED to connector JP3 to indicate when the HDD is active. Marks on the circuit board indicate LED polarity.

VGA display connector (J2)

The PCA-6145B/PCA-6145L provides a VGA controller for high resolution VGA interface. J2 is a DB-15 connector for VGA monitor input.

Serial Ports

The PCA-6145B/PCA-6145L 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 3E8H, [COM3] or 2E8 [COM4]) 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

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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.

Serial port connections (COM1, COM2)

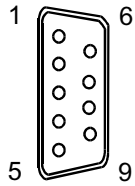
Connector	Address
COM1	RS-232
COM2	RS-232/422/485

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 card's RS-232 port:

RS-232 connector pin assignments

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



COM1

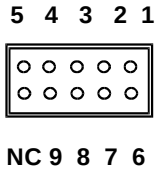
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RS-232/422/485 connection (COM2)

COM2 is an RS-232/422/485 serial port. The specific port type is determined by jumper settings JP35 - JP39, as detailed in Chapter 1. The following table shows the pin assignments for COM2.

RS-232/485 connector pin assignments

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



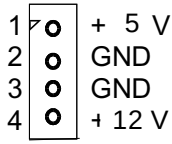
COM 2

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Power connectors J1

If you prefer not to acquire power through PCA-6145B/PCA-6145L's backplane via the gold H-connectors, J1 also provide 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.*



J1

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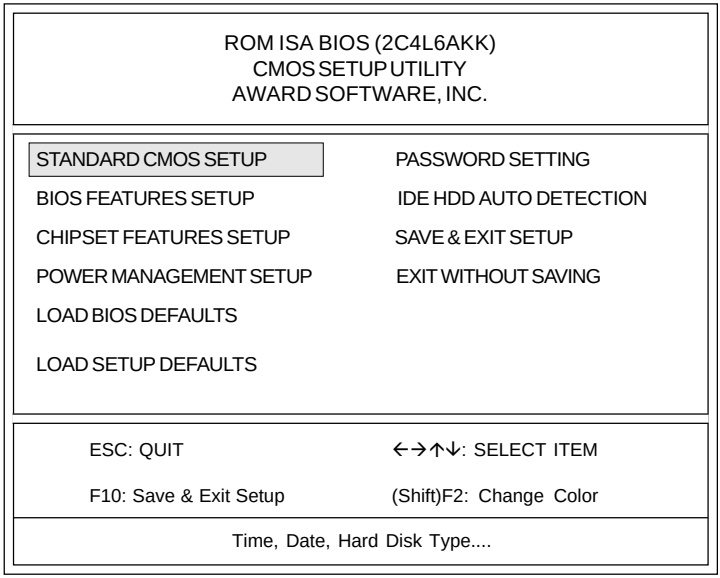
CHAPTER 3

AWARD BIOS SETUP

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

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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.

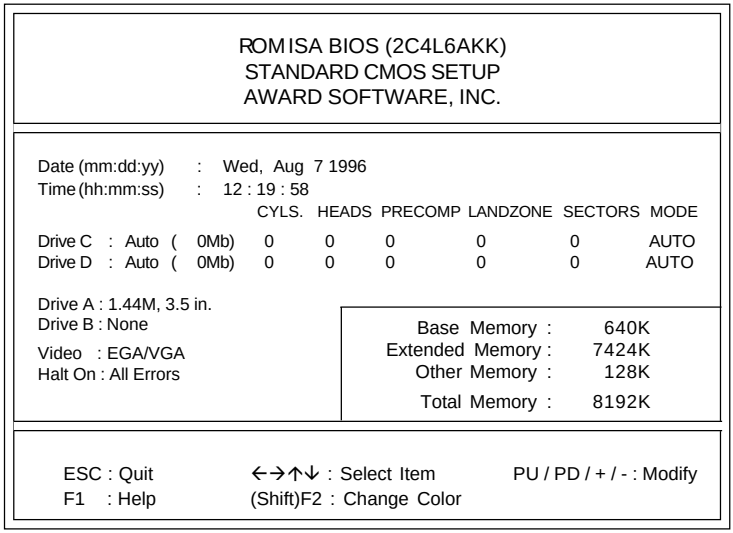
Entering setup

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

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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.

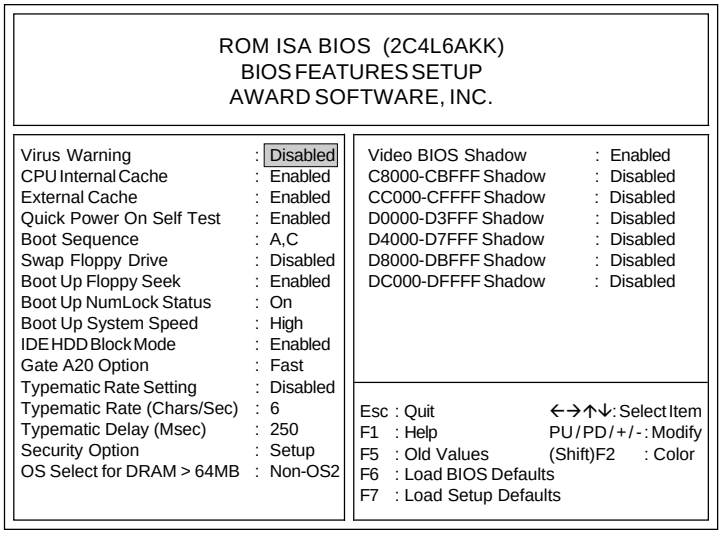


CMOS setup screen

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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-6145B/PCA-6145L.



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.

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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 "A, C".

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.

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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.

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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.

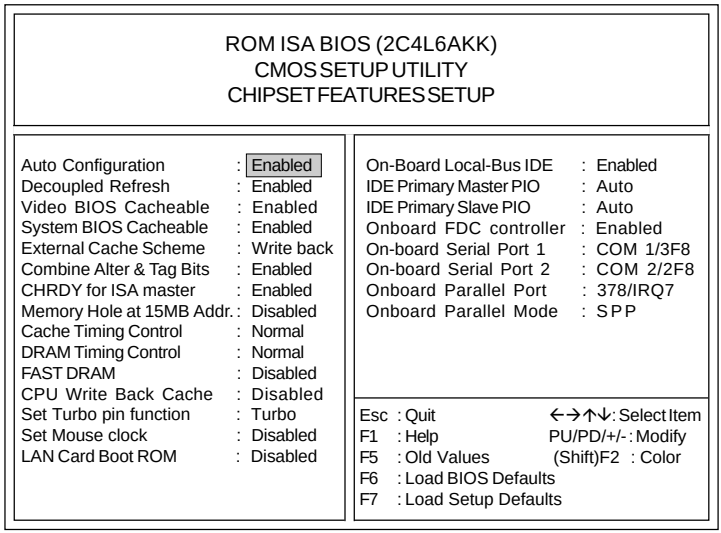
C8000 - CFFFF Shadow/DC000-DFFFF Shadow
These determine whether optional ROM will be copied to RAM in blocks of 16 KB.

Enabled	Optional shadow is enabled
Disabled	Optional shadow is disabled

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CHIPSET features setup

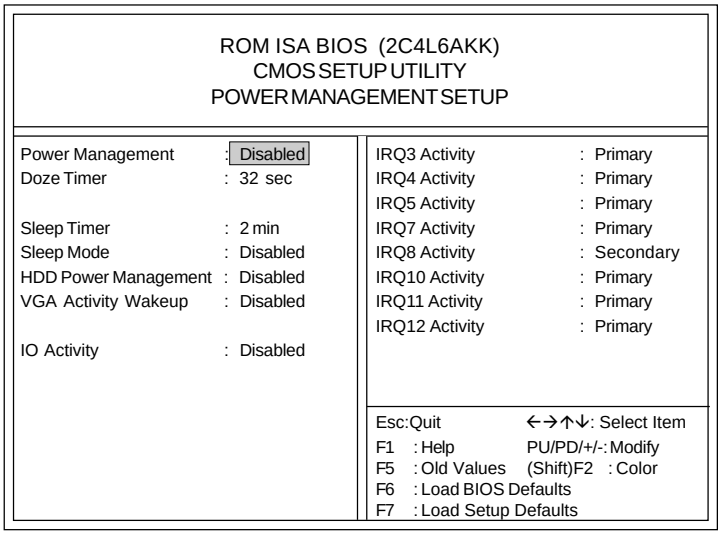
By choosing the "CHIPSET FEATURES SETUP" option from the CMOS SETUP screen menu, the following screen is displayed. This sample screen contains the manufacturer's default values for the PCA-6145 board.



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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.

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.

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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.

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CHAPTER 4

VGA Display & Ethernet Software/Hardware Configuration

This chapter details the software configuration information. It shows you how to configure the board to match your application requirements. AWARD System BIOS is covered in Chapter 4.

Sections include:

- LCD display configuration
- Connections for two standard LCDs
- Ethernet interface configuration

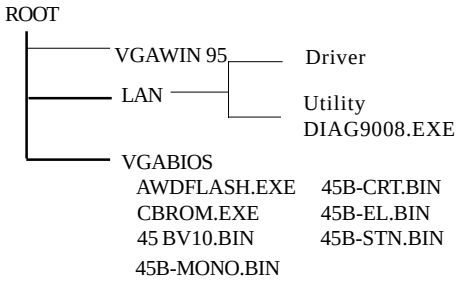
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Introduction

The PCA-6145B/PCA-6145L system BIOS and custom drivers are located in a 128 Kbyte, 32-pin (JEDEC spec.) Flash ROM device, designated U11. A single Flash chip holds the system BIOS, VGA BIOS, and Back-up CMOS Data. The display can be configured via software. This method minimizes the number of chips and eases configuration. You can change the display BIOS simply by reprogramming the Flash chip.

PCA-6145B/PCA-6145L Utility Disk

The PCA-6145B/PCA-6145L is supplied with a software utility disk that holds the necessary file for setting up the VGA display and Ethernet and Win 95 controller. The disk's directory and file structure is as follows:



DIAG9008.EXE
This program is the UMC9008 Ethernet controller AUTO-Scan/ Setup/Diagnostic function.

45B-CRT.BIN
Supports CRT only.

45 BV10.BIN(default)
Supports 640 x 480 color TFT
(Sharp LQ9D011, Toshiba LTM09C015A/016)

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45B-STN.BIN (512KB VRAM)
Support 640 x 480 color STN DD 8/16-bit displays (Sharp LM64C142)

Note: This BIOS does not support simultaneous CRT and flat panel display with 512KB VRAM.

45B-MONO.BIN
Supports 640 x 480 dual scan monochrome displays (Sharp LM64P8X/837)

45B-EL.BIN
Supports 640 x 480 EL displays (PLANAR EL640480-A Series)

CBROM.EXE
This program allows you to combine your own VGA BIOS with the System BIOS.

VGA Display Software Configuration

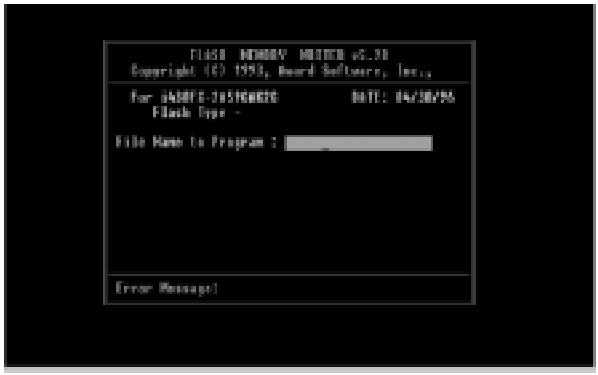
The PCA-6145B/PCA-6145L's on-board VGA interface supports a wide range of popular LCD, EL, gas plasma flat panel displays and traditional analog CRT monitors. The interface can drive CRT displays with resolutions up to 1024 x 768 in 256 colors. It is also capable of driving color panel displays with resolutions of 640 x 480 in 64K colors. The VGA interface is configured completely via the software utility, so you don't have to set any jumpers. Configure the VGA display as follows:

1. Apply power to the PCA-6145B/PCA-6145L with a color TFT display attached. This is the default setting for the PCA-6145B/ PCA-6145L. Ensure that the AWDFLASH.EXE and *.BIN files are located in the working drive.

NOTE: Ensure that you do not run AWDFLASH.EXE while your system is operating in EMM386 mode.

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2. At the prompt, type AWDFLASH.EXE and press <Enter>. The VGA configuration program will then display the following:



VGA Setup screen

3. At the prompt, type in the BIN file which supports your display. When you are sure that you have entered the file name correctly press <Enter>. The screen will ask “Do you want to save?” If you wish to continue press Y. If you change your mind or have made a mistake press N to abort and end the setup procedure.
4. If you decide to continue, the program will create a BIOS.OLD file which contains the existing BIOS configuration. The prompt will then ask “Are you sure you want to save new configuration?” Press Y if you want the new file to be written into the BIOS. Press N to exit the program.

The new VGA configuration will then write to the ROM BIOS chip. This configuration will remain the same until you run the AWDFLASH.EXE program and change the settings.

VGA Win 95 Driver Support

These drivers are designed to work with Microsoft Windows 95. You may install these drivers through Windows 95.

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Ethernet Software Configuration

The PCA-6145B's on-board Ethernet interface supports all major network operating systems. I/O addresses and interrupts are easily configured via the DIAG 9008.EXE program. To execute the configuration, to view the current configuration, or to run diagnostics, do the following:

1. Power the PCA-6145B on. Ensure that the DIAG 9008.EXE file is located in the working drive.
2. At the prompt type DIAG 9008.EXE and press <Enter>. The Ethernet configuration program will then be displayed.
3. This simple screen shows all the available options for the Ethernet interface. Just highlight the option you wish to change by using the Up and Down keys. To change a selected item, press <Enter>, and a screen will appear with the available options. Highlight your option and press <Enter>. Each highlighted option has a helpful message guide displayed at the bottom of the screen for additional information.
4. After you have made your selections and are certain it is the configuration that you want, press ESC. A prompt will appear asking if you want to save the configuration. Press Y if you want to save.

The Ethernet Setup Menu also offers three very useful diagnostic functions. These are:

1. Run EEPROM test
2. Run Diagnostics on Board
3. Run Diagnostics on Network

Each option has its own display screen which shows the format and result of any diagnostic tests undertaken.

Note: Ethernet cannot use IRQ12. Because IRQ12 is assigned to PS/2 Mouse.

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Ethernet Driver Support

These drivers are designed to work in a workstation environment under Windows NT, Win 95, or DOS operating system. You may install these drivers for your application.

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CHAPTER 5

SVGA Setup

The PCA-6145B/PCA-6145L features an on-board flat panel/VGA interface. This chapter provides instructions for installing and operating the software drivers on the included display driver diskette.

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Simultaneous display mode

The 65545 VGA BIOS supports monochrome LCD, EL, color TFT and STN LCD flat panel displays. It also supports interlaced and non-interlaced analog monitors (VGA color and VGA monochrome) in high-resolution modes while maintaining complete IBM VGA compatibility. Digital monitors (i.e. MDA, CGA, and EGA) are NOT supported. Multiple frequency (multi-sync) monitors are supported as analog monitors.

Both CRT and panel displays can be used simultaneously. The PCA-6145B/PCA-6145L can be set in one of three configurations: on a CRT, on a flat panel display, or on both simultaneously. The system is initially set to simultaneous display mode. In the utility diskette, there are three .COM files which can be used to select the display. Simply type the filename at the DOS prompt:

CT.COM Enables CRT display only

FP.COM Enables panel display only

SM.COM Enables both displays at the same time.

Sleep mode

The display driver diskette contains two files that support sleep mode. Simply type the filename at the DOS prompt:

ON.COM switches to normal display mode.

OFF.COM switches to sleep mode.

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Software support

The drivers support the following applications using the filenames and resolutions listed:

Application	Filename	Resolution	Colors
Windows 3.1	LINEAR4.DRV	640x480	16
		800x600	16
		1024x768	16
	LINEAR8.DRV	640x480	256
		800x600	256
		1024x768	256
	LINEAR16.DRV	640x480	64K
	LINEAR24.DRV	640x480	16M
AutoCAD R12	RCTURBOC.EXP	640x480	16
		800x600	16
		1024x768	16
		640x480	256
		800x600	256
		1024x768	256
		640x480	32K
		640x480	64K
		640x480	16M
Lotus 1-2-3 2.0 and Lotus Symphony 1.0,1.1			
	V132X25.DRV	132x25 (Text)	16
	V132X50.DRV	132x50 (Text)	16
VESA 1.2	VESA.COM	800x600	16
		1024x768	16
		640x400	256
		640x480	256
		800x600	256
		1024x768	256
		640x480	32K
		640x480	64K

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Word 5.0	VGA600.VID	800x600	16
	VGA768.VID	1024x768	16
Word 5.5	VGA55600.VID	800x600	16
	VGA55768.VID	1024x768	16
WordPerfect 5.0	CHIPS600.WPD	800x600	16
	CHIPS768.WPD	1024x768	16
WordPerfect 5.1	VGA600.VRS	800x600	16
	VGA768.VRS	1024x768	16

Driver installation

Necessary prerequisites

The instructions in this manual assume that you understand elementary concepts of MS-DOS and the IBM Personal Computer. Before you attempt to install any driver or utility you should: know how to copy files from a floppy disk to a directory on the hard disk, understand the MS-DOS directory structure, and know how to format a floppy disk. If you are uncertain about any of these concepts, please refer to the DOS or Windows user reference guides for more information before you proceed with the installation.

Before you begin

Before you begin installing software drivers, you should make a backup copy of the display driver diskette and store the original in a safe place. The display driver diskette contains drivers for several versions of certain applications. You must install the correct version in order for the driver to work properly so make sure you know which version of the application you have.

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Windows setup

These drivers are designed to work with Microsoft Windows 3.1. You may install these drivers through Windows or in DOS.

Step 1: Install Windows as you normally would for a VGA display. Run Windows to make sure that it is working correctly.

Step 2: Place the display driver diskette in drive A. In Windows Program Manager, choose ***File*** from the Options Menu. Then from the pull-down menu, choose ***Run . . . .*** At the command line prompt, type **A:\WINSETUP**. Press the <ENTER> key or click ***OK*** to begin the installation. At this point the setup program locates the directory where Windows is installed. For proper operation, the drivers must be installed in the Windows subdirectory. Press <ENTER> to complete the installation. Once completed, the Display Driver Control Panel appears on the screen. This Control Panel allows you to select and load the installed drivers.

Another method of installing these drivers is through the File Manager. Click on ***Drive A:***. Then double-click on ***WINSETUP.EXE*** to begin installation.

Changing Display Drivers in Windows

To change display drivers in Windows, select the ***Windows Setup*** icon from the Main window. You will be shown the current setup configuration. Select ***Change System Settings*** from the Option menu. Click on the arrow at the end of the Display line. You will be shown a list of display drivers. Click on the driver you want. Then click on the ***OK*** button. Follow the directions to complete the setup.

Changing Color Schemes

After you change display drivers, you may notice that the color scheme used by Windows looks strange. This is because different drivers have different default colors. To change the color scheme, select the ***Control Panel*** from the Main window. Select the ***Color*** icon. You will be shown the current color scheme. Choose a new color scheme and click the ***OK*** button.

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DOS Setup

Step 1: Install Windows as you normally would for a VGA display. Run Windows to make sure that it is working correctly. Then exit Windows.

Step 2: Place the display driver diskette in drive A. Type **A:** <ENTER> to make this the default drive. Type **SETUP** <ENTER> to run the driver SETUP program. Press any key to get to the applications list. Using the arrow keys, select ***Windows Version 3.1*** and press the <ENTER> key. Press the <ENTER> key to select ***All Resolutions***, and then press <END> to begin the installation. At this point you will be asked for the path to your Windows System directory (default C:\WINDOWS). When the installation is complete, press any key to continue. Press <ESC> followed by Y to exit to DOS.

Step 3: Change to the directory where you installed Windows (usually C:\WINDOWS).

Step 4: Type **SETUP** <ENTER> to run the Windows Setup program. It will show the current Windows configuration. Use the up arrow key to move to the Display line and press <ENTER>. A list of display drivers will be shown. Use the arrow keys to select one of the drivers starting with an asterisk (*) and press <ENTER>.

Step 5: Follow the directions on the screen to complete the setup. In most cases, you may press <ENTER> to accept the suggested option. When Setup is done, it will return to DOS. Type **WIN** <ENTER> to start Windows with the new display driver.

Changing Display Drivers in DOS

To change display drivers from DOS, change to the Windows directory and run Setup, repeating steps 4 and 5 from the previous page. Besides the special display drivers marked by an asterisk (*), you should be able to use the following standard drivers:

VGA	640x480, 16 colors
Super VGA	800x600, 16 colors

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Panning Drivers

Special panning drivers are provided to allow high-resolution modes to be displayed on a flat panel or CRT. These drivers will show a section of a larger screen and will automatically pan, or scroll, the screen horizontally and vertically when the mouse reaches the edge of the display.

Linear Acceleration Drivers

A special high-performance linear acceleration driver is provided for 256-color modes. This driver may require special hardware and may not be supported on all systems. It is only available for Windows3.1.

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AutoCAD R12

These drivers are designed to work with Autodesk AutoCAD R12. They conform to the Autodesk Device Interface (ADI) for Rendering drivers and Display drivers. These display list drivers accelerate redraw, pan, and zoom functions.

Driver installation

Step 1: Place the display driver diskette in drive A. Type **A:** <ENTER> to make this the default drive. Type **SETUP** <ENTER> to run the SETUP program. Press any key to get to the applications list. Using the arrow keys, select ***AutoCAD Release 12*** and press <ENTER>. This will display a list of supported driver resolutions. Using the arrow keys and the <ENTER> key, select the resolutions that are appropriate for your monitor. When all of the desired resolutions have been selected, press <END> to begin the installation. At this point you will be asked for a drive and directory to copy the driver files. Enter the drive and directory that contains the installed AutoCAD R12. If the destination directory does not exist you will be asked for confirmation. When the installation is complete, press any key to continue. Press <ESC> followed by Y to exit to DOS.

Step 2: Go to the AutoCAD directory where the new drivers were installed and run the driver installation program by typing **ACAD12 -r** <ENTER>. This program will configure your AutoCAD R12 to use the new display drivers. Select ***TurboDLD Classic***.

Configuring TurboDLD

Select ***Configure Video Display***. In Display Device Configuration choose ***Select Graphics Board/Resolution***. Then choose ***Select Display Graphics Board***. After choosing a graphics board, go to ***Select Display Resolution***. After selecting the display resolution, save the new configuration, and return to the main menu.

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Basic Configuration Menu

This menu allows you to modify:

Number of AutoCAD Command Lines	
Font Size	6x8/8x8/8x14/8x16/12x20/12x24
Dual Screen	Enable/Disable
User Interface Configuration	
Double Click Interval Time	
BP Button	
BP Highlight	Patt Line/Xor Rect/Both
BP Refresh	Enable/Disable
BP Cache	Enable/Disable

Expert Configuration Menu

This menu allows you to modify:

Display List	Enable/Disable
Drawing Cache	Enable/Disable
Use Acad 31 bit space?	Yes/No
Internal Command Echo	Enable/Disable
BP Zoom Mode	Freeze/Float
Regen Mode	Incremental/Fast

If your previously installed driver is not TurboDLD, you will have to reconfigure the RENDER command the first time you use it.

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Lotus 1-2-3 and Lotus Symphony

These drivers are designed to work with Lotus 1-2-3 versions 2.0, 2.01 and 2.2, and with Lotus Symphony versions 1.0 and 1.1.

Driver installation

Step 1: Place the display driver diskette into drive A. Make A the default drive by typing **A:** <ENTER>. Run the SETUP program by typing **SETUP** <ENTER>. Press any key to display a list of supported applications. Use the arrow keys to select ***Lotus/ Symphony,*** and press <ENTER>. A list of supported screen resolutions will be displayed. Use the arrow keys to select the desired screen resolution and press <ENTER>. (Make sure your monitor is able to display the resolution desired) Press <END> to begin the driver installation process. A default drive and directory path will be displayed. Use the backspace key to erase this default and type in the 123 directory. At this point you may be asked to create the target directory if it does not already exist. After the files have been installed, press any key to return to the list of supported applications. Press <ESC> followed by Y to exit to DOS. Copy all the files that were just created in the temporary directory onto a formatted floppy diskette.

Step 2: Go to your 123 directory, and start the installation program. Type the following commands:

C: <ENTER>

INSTALL <ENTER>

Step 3: The Lotus installation program will load and present the installation menu. From this menu, select ***Advanced Options***. From the Advanced Options menu, select ***Add New Drivers To Library***. From the Add New Drivers Menu, select ***Modify Current Driver Set***. From the Modify Driver Set Menu, select ***Text Display***. From the Text Display menu, select one of drivers.

Step 4: After the selection of the appropriate VGA display driver, you will need to exit this menu and return to the Main Lotus Installation Menu. Do this by selecting ***Return To Menu***.

Step 5: At the Main Lotus Installation Menu, select ***Save Changes***.

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Step 6: At this point the Installation Menu will prompt you for the name of your new Lotus configuration file. The Lotus system will prompt you with the default value — 123.SET, but you may want to use a filename that indicates the resolution of its driver. For example, if you installed the 132 column by 25 line driver, you could name this driver 132X25.SET, or if you installed the 80 by 50 driver, you may want to call the file 80X50.SET.

Step 7: The installation of your Lotus 1-2-3 driver is now complete. You will need to exit the Lotus installation program at this point. At the main Lotus Installation Menu, select ***Exit***.

NOTE: If your driver set is not 123.SET, you have to type the filename of your driver set in the command line when you start Lotus 1-2-3. For example, if you named your driver set 132X25.SET, type the following to start Lotus 1-2-3:

123 132X25.SET <ENTER>

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VESA

The Video Electronics Standards Association (VESA) has created a standard for a Super VGA BIOS Extension (VBE). This defines a standard software interface to allow application programs to set and control extended video modes, such as 800x600 graphics, on video adapters from different manufacturers.

The VESA driver adds this Super VGA BIOS Extension to the VGA BIOS. Any application program which supports the VESA standard driver interface can be used with this driver. This VESA driver conforms to the VESA Super VGA Standard #VS891001.

Driver installation

Step 1: Place the display driver diskette into drive A. Make A the default drive by typing **A:** <ENTER>. Run the SETUP program by typing **SETUP** <ENTER>. Press any key to display a list of supported applications. Use the arrow keys to select VESA Driver ***Version 1.2*** and press <ENTER>. Press the <ENTER> key to select ***All Resolutions***, and press <END> to begin the installation. A default drive and directory path will be displayed. Use the backspace key to erase this and type in a directory that is in the directory path (such as C:\BIN or C:\UTILS). After the files have been installed, press any key to return to the list of supported applications. Press <ESC> followed by Y to exit to DOS.

Step 2: To install the VESA driver, type either **VESA** <ENTER> or **VESA +** <ENTER> at the DOS prompt. The optional + command line parameter enables all of the available modes. Make sure that your monitor is capable of displaying these high resolution modes before enabling them.

NOTE: If the video BIOS already supports VBE extended video modes, DO NOT use this driver. Run the VTEST.EXE program to see if the video BIOS supports the VBE modes.

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Word

These drivers are designed to work with Microsoft Word 5.0 and 5.5.

Driver installation

If you have already installed Word on your computer, go to Step 2 to install the new video driver.

Step 1: Install Word as normal.

Step 2: After you complete the Word installation, place the display driver diskette into drive A. Make A the default drive by typing **A:** <ENTER>. Run the SETUP program by typing **SETUP** <ENTER>. Press any key to display a list of supported applications. Use the arrow keys to select ***Word*** and press <ENTER>. Use the arrow keys to select the desired screen resolution and press <ENTER> (make sure your monitor is able to display the resolution desired). Press <END> to begin the driver installation process. A default drive and directory path will be displayed. Use the backspace key to erase this and type in your Word directory. After the files have been installed, press any key to return to the list of supported applications. Press <ESC> followed by Y to exit to DOS.

Step 3: Copy the driver file for the desired resolution that was just installed to SCREEN.VID.

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WordPerfect

These drivers are designed to work with WordPerfect 5.0 or 5.1. They support 132-column display in editing mode, and high-resolution graphics display in PreView mode.

Driver installation

Step 1: Place the display driver diskette into drive A. Make A the default drive by typing **A:** <ENTER>. Run the SETUP program by typing **SETUP** <ENTER>. Press any key to display a list of supported applications. Use the arrow keys to select ***WordPerfect*** and press <ENTER>. A list of supported screen resolutions will be displayed. Use the arrow keys to select the desired screen resolution and press <ENTER> (make sure your monitor is able to display the resolution desired). Press <END> to begin the driver installation process. A default drive and directory path will be displayed. Use the backspace key to erase this default and type in the WordPerfect directory. At this point you may be asked to create the target directory if it does not already exist. After the files have been installed, press any key to return to the list of supported applications. Press <ESC> followed by Y to exit to DOS.

Step 2: Start WordPerfect, and press <SHIFT>+<F1> to enter the setup menu. Select ***D*** for Display and ***G*** for Graphics Screen Type, and then choose the desired Chips VGA resolution.

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Configuring WordPerfect 5.0 for 132 columns

Follow these instructions to configure WordPerfect 5.0 for 132 column text mode:

Step 1: To use the SETCOL program to set 132 columns and 25 rows, type the following command:

SETCOL 132, 25 <ENTER>

Step 2: Start WordPerfect. The program will detect the number of rows and columns automatically. If for some reason WordPerfect is unable to adapt to 132 columns by 25 rows, start WordPerfect with the following command:

WP /SS=25,132 <ENTER>

Configuring WordPerfect 5.1 for 132 columns

Start WordPerfect and press <SHIFT>+<F1> to enter the setup menu. Select ***D*** for Display and ***T*** for Text Screen Type and then select ***Chips 132 Column Text***.

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Appendix A

Programming the Watchdog Timer

The PCA-6145B/PCA-6145L 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.

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Programming the watchdog timer

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

After date entry, your program must refresh the watchdog dimer by rewriting the I/O port 443 (hex) while simultaneously setting it.

The following program 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, date   REM Reset the timer
Step 4   your application program task #2
Step 5   out 443h, data  REM Reset the timer
   .        .
   .        .
Step  n   in 43h  REM Disable watchdog function

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


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APPENDIX B

Upgrading

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

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

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Installing PC/104 modules (CN5,CN6)

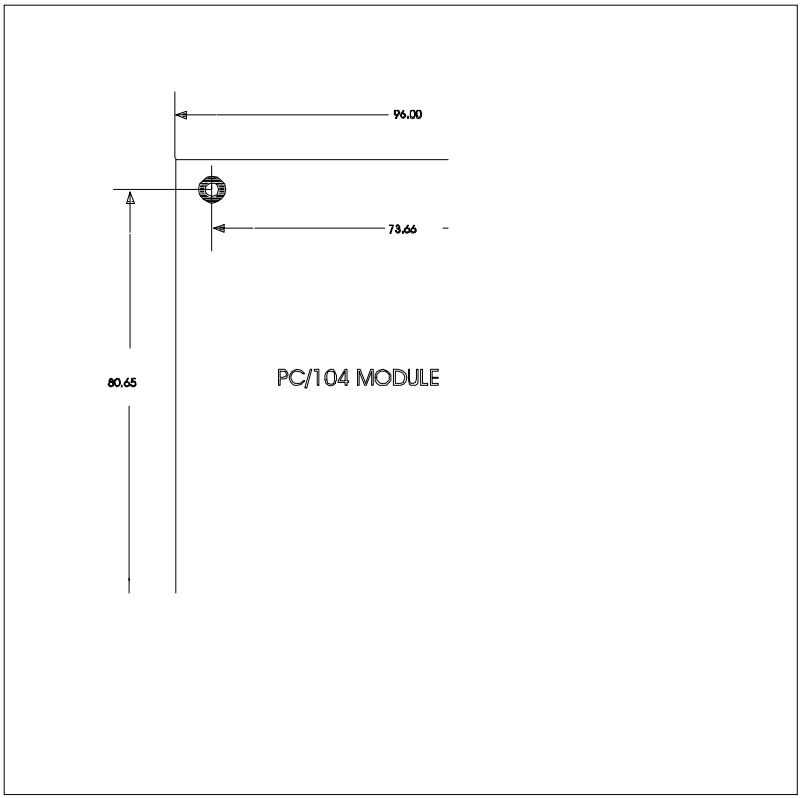
The PCA-6145B/PCA-6145L card's PC/104 connector lets you attach PC/104 modules. These modules perform the functions of traditional plug-in expansion cards, but save space and valuable slots. Advantech modules include:

- 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.

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PC/104 module dimensions (mm)

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Installing DRAM (SIMMs)

You can use anywhere from 1 MB to 32 MB of DRAM with your PCA-6145B/PCA-6145L. The card provides one 72-pin SIMM (single in-line memory module) socket that accepts from 1 to 32 MB DRAM or EDO RAM. The following table shows the bank assignment for the SIMM socket:

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

You can use 256 KBx32, 256 KBx64, 1 MBx32, 1 MBx64, 4 MBx32 or 4 MBx64 DRAM SIMMs.

Memory sizes

The board accepts 1 MB, 2 MB, 4 MB, 8 MB, 16 MB, 32 MB and EDO RAM. The following table lists some of the different memory configurations for the PCA-6145B/PCA-6145L card.

SIMM 1	Total
1 MB	1 MB
2 MB	2MB
4 MB	4 MB
8 MB	8 MB
16 MB	16 MB
32MB	32MB

Supported Memory Configurations

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APPENDIX C

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
- CRT display connector
- Flat panel display connector
- RS-232 connections
- PC/104 connector pin assignments
- System I/O port address assignments
- System information I/O address assignments
- DMA channel assignments
- DMA controller registers
- DMA page addresses
- Interrupt assignments
- Timer channel assignments

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Parallel/printer connector (CN4)

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

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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
37	CSO	38	CS1
39	-ACT	40	GND

FDD connector (CN3)

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

Keyboard connector pin assignment (J4, J5)

J4	J5	Signal
1	5	CLOCK
2	1	DATA
3 (NC)	2	PS/2 DATA
4	3	GND
5	4	+5 V
	6	PS/2 CLOCK

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VGA display connector (J2)

PCA-6145 CRT display connector

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

Flat panel display connector (CN2) mini pin header

PCA-6145 Flat panel display connector

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

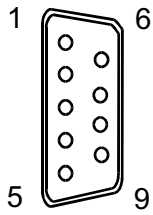
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RS-232 connections (COM1, COM2)

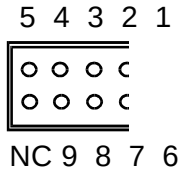
Different devices implement the RS-232 standard in different ways. If you are having problems with a serial device, be sure to check the pin assignments for the connector. The following table shows the pin assignments for the card's RS-232 port:

RS-232 connector pin assignment

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



COM1



COM2

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PC/104 Connector Pin Assignments

	CN5		CN6	
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	OWS*	LA17*	DACK0*
9	SD0	+12	MEMR*	DRQ0*
10	IOCHRDY	NC	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*	NC	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

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System I/O ports

Addr. range (Hex)	Device
000-01F	DMA controller
020-021	Interrupt controller 1, master
022-023	Chipset address
040-05F	8254 timer
043	Watchdog timer disable
060-06F	8042 (keyboard Controller)
070-07F	Real-time clock, non-maskable interrupt (NMI) mask
080-09F	DMA page register,
0A0-0BF	Interrupt controller 2
0C0-0DF	DMA controller
0F0	Clear math co-processor
0F1	Reset math co-processor
0F8-0FF	Math co-processor
1F0-1F8	Fixed disk
200-207	Game I/O
278-27F	Parallel printer port 2 (LPT 3)
2F8-2FF	Serial port 2
300-31F	Prototype card
360-36F	Reserved
378-37F	Parallel printer port 1 (LPT 2)
380-38F	SDLC, bisynchronous 2
3A0-3AF	Bisynchronous 1
3B0-3BF	Monochrome display and printer adapter (LPT 1)
3C0-3CF	Reserved
3D0-3DF	Color/graphics monitor adapter
3F0-3F7	Diskette controller
3F8-3FF	Serial port 1
443	Watchdog timer enable and trigger

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System information I/O addresses

Address	Description
00-0D	* Real-time clock information
00	Second
01	Second alarm
02	Minutes
03	Minute alarm
04	Hours
05	Hours alarm
06	Day of week
07	Date of month
08	Month
09	Year
0A	Status register A
0B	Status register B
0C	Status register C
0D	Status register D
0E	* Diagnostic status byte
0F	* Shutdown status byte
10	Diskette drive type byte, drives A and B
11	Reserved
12	Fixed disk type byte, drives C and D
13	Reserved
14	Equipment byte
15	Low base memory byte
16	High base memory byte
17	Low expansion memory byte
18	High expansion memory byte
19-2D	Reserved
2E-2F	2-byte CMOS checksum
30	* Low expansion memory byte
31	* High expansion memory byte
32	* Date century byte
33	* Information flags (set during power on)
34-3F	Reserved

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DMA channel assignments

Channel	Function
0	Spare (8-bit transfer)
1	SDLC (8-bit transfer)
2	Floppy disk (8-bit transfer)
3	Spare (8-bit transfer)
4	Cascade for DMA controller 1
5	Spare (16-bit transfer)
6	Spare (16-bit transfer)
7	Spare (16-bit transfer)

DMA controller registers

Address	Command code
0C0	CH0 base and current address
0C2	CH0 base and current word count
0C4	CH1 base and current address
0C6	CH1 base and current word count
0C8	CH2 base and current address
0CA	CH2 base and current word count
0CC	CH3 base and current address
0CE	CH3 base and current word count
0D0	Read status register/Write command register
0D2	Write mode register
0D4	Read temporary register/Write command register
0D6	Write mode register
0D8	Clear byte pointer flip-flop
0DA	Read status register/Write command register
0DC	Write mode register
0DE	Write all mask register bus

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DMA Page Addresses

Page register	I/O Address
DMA Channel 0	0087
DMA Channel 1	0083
DMA Channel 2	0081
DMA Channel 3	0082
DMA Channel 5	008B
DMA Channel 6	0089
DMA Channel 7	008A
Refresh	008F

Interrupt assignments

Priority	Interrupt#	Interrupt source
1	NMI	Parity error detected
2	IRQ 0	Interval timer, counter 0 output
3	IRQ 1	Keyboard
-	IRQ 2	Interrupt from controller 2 (cascade)
4	IRQ 8	Real-time clock
5	IRQ 9	Cascaded to INT 0AH (IRQ 2)
6	IRQ 10	Reserved
7	IRQ 11	Reserved
8	IRQ 12	PS/2 mouse
9	IRQ 13	INT from co-processor
10	IRQ 14	Fixed disk controller
11	IRQ 15	Reserved
12	IRQ 3	Serial communication port 2
13	IRQ 4	Serial communication port 1
14	IRQ 5	Parallel port 2
15	IRQ 6	Diskette controller (FDC)
16	IRQ 7	Parallel port 1 (print port)

Timer channel assignments

Channel	Function
0	System timer
2	Refresh request generator
3	Tone generation for speaker

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APPENDIX D

POST LEDs

This appendix lists the codes generated by the POST (Power On Self Test) routines. It also discusses how to read the PCA-6145B/PCA-6145L's POST LED indicators.

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Whenever you start up your system, the CPU card runs a series of programs to test and initialize board hardware. If the routines encounter an error in during the tests, you will either hear a few short beeps or see an error message on the screen. There are two kinds of errors: fatal and non-fatal. The system can usually continue the boot up sequence with non-fatal errors. Non-fatal error messages usually appear on the screen along with the following instructions:

```
press <F1> to RESUME
```

Write down the message and press the F1 key to continue the bootup sequence. The cure for most nonfatal error messages is simply to run the BIOS SETUP program, discussed in Chapter 3.

If the routines encounter a fatal error, they will stop the tests and output a message indicating which test failed. If the fatal error comes before the screen device initializes, the card will indicate the error code through a series of beeps.

You can also determine the number of the test that failed by reading the LED indicators on the top of the PCA-6145B/PCA-6145L board.

Please make a note of any POST error codes before you contact Advantech for technical support.

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POST LEDs

Before the BIOS performs each system test, it writes a check-point code to I/O address 80H. If the test fails, the code will stay in memory. You can read the code and determine which test has failed.

The PCA-6145B/PCA-6145L's POST LED indicators make this process extremely easy. You don't need any special diagnostic tools, you just read the POST code from the LEDs.

The table below shows how to read the LEDs, a series of eight LEDs located in the top left-hand corner of the board.

SELF-TEST INDICATORS

● ● ● ● ● ● ● ●
D7 D6 D5 D4 D3 D2 D1 D0

● : LIGHT OFF

○ : LIGHT ON

● ● ● ● : 0	● ○ ● ● : 4	○ ● ● ● : 8	○ ○ ● ● : C
● ● ● ○ : 1	● ○ ● ○ : 5	○ ● ● ○ : 9	○ ○ ● ○ : D
● ● ○ ● : 2	● ○ ○ ● : 6	○ ● ○ ● : A	○ ○ ○ ● : E
● ● ○ ○ : 3	● ○ ○ ○ : 7	○ ● ○ ○ : B	○ ○ ○ ○ : F

EXAMPLE

● ● ● ○ ○ ● ● ○
D7 D6 D5 D4 D3 D2 D1 D0

1 9

POST checkpoint LED indicators

The following list of POST codes gives the number of each checkpoint for the AWARD BIOS POST. Codes are Copyright AWARD-BIOS CHECK-POINT, (C) 1994 Award Software Inc.

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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 Refresh toggle	RAM must be periodically refreshed in order to keep the memory from decaying. 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.

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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 ality	Force an interrupt and verify the function-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.

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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.

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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	

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