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PCA-6153

Half-size Pentium® CPU Card
with VGA Controller

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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. Please consult this manual before contacting technical support personnel.

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 persons other than authorized Advantech repair personnel, 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-6153 CPU card
- 1 6-pin mini-DIN keyboard & PS/2 mouse adapter
- 1 Hard disk drive (IDE) interface cables (44 pin—40 pin—40 pin)
- 1 Parallel/1 Serial port cable adapter
- 1 Floppy disk drive interface cable (34 pin)
- 2 VGA driver utility disks
- 1 system utility disk

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

Contents

Chapter 1: Hardware Configuration 1

Introduction 2
Features 3
Specifications 4
Standard SBC functions 4
PCI SVGA interface 5
Mechanical and environmental 5
Board Layout: Dimensions 6
Board Layout: Jumper Locations 7
Board Layout: Connector Locations 8
Jumpers and Connectors 9
Safety Precautions 10
Jumper Settings 11
How to set jumpers 11
Jumper Settings 12
Installing DRAM (SIMMs) 13
Memory sizes 13

Chapter 2: Connecting Peripherals 15

Keyboard lock / Power LED (CN1) 17
PC/104 connectors (CN2 and CN3) 18
Enhanced IDE connectors (CN4) 20
Flat panel display connector (CN5) 21
Power connectors (CN6, CN8, CN15) 22
Fan power supply connector (CN6) 22
Peripheral power connector, -5 V, -12 V (CN8) 22
Main power connector, +5 V, +12 V (CN15) 22
Parallel port connector (CN7) 23
Floppy disk drive connector (CN9) 24
Serial ports (CN10, CN17) 25
RS-232 connection (COM1) 25
RS-232/422/485 connection (COM2) 26
Keyboard & PS/2 mouse connectors (CN11, CN18) 27
Front panel connectors (CN12, CN13, CN14) 28
LED interface (CN12) 28
Reset switch (CN13) 28
Speaker (CN14) 28
VGA display connector (CN16) 29

Chapter 3: Award BIOS Setup 31

AWARD BIOS Setup 32
Entering setup 32
Standard CMOS setup 33
BIOS features setup 34
CHIPSET features setup 38
Power management setup 39
PCI configuration setup 40
Load BIOS defaults 40
Load setup defaults 40
Integrated Peripherals 41
IDE HDD Block Mode 41
IDE HDD auto detection 42
Save & Exit setup 42
Exit without saving 42

Chapter 4: Sotftware Configuration 43
Introduction 44
Utility disk 44
VGA display software configuration 45
Connections for four standard LCDs 47
Connections to Sharp LM64183P, LM64P89 (640 x 480 DSTN MONO LCD) 47
Connections to PLANAR EL (640 x 480 AD4 EL) 48
Connections to Toshiba LTM10C042 (640 x 480 TFT Color LCD) 49
Connections to Sharp LM64C142 (640 x 480 DSTN Color LCD) 50
Chapter 5 : PCI SVGA Setup 51
Before you begin 52
Installation 53
Simultaneous display mode 53
Sleep mode 53
Driver installation 54
Windows setup 54
DOS Setup 56
Windows 95 Drivers Setup Procedure 58
Windows NT Drivers Setup Procedure 58
OS/2 Drivers Setup Procedure 59
Preliminary Steps 59
Installing from Diskette 59
Selecting Monitor Type 60
Selecting Screen Resolution/Refresh Rate 61
Installation Notes 62
Appendix A: Programming theWatchdog Timer ... 63
Programming the Watchdog Timer 64
Appendix B: System I/O Ports Addresses 65
System I/O Ports Addresses 66

CHAPTER 1

Hardware Configuration

This chapter gives background information on the PCA-6153. 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)

Introduction

The PCA-6153 is a half-size single board Pentium processor based computer which can release the Pentium processor's full potential and provide unprecedented performance compared to current 64-bit processor boards. The PCM-6153 offers all the functions of an industrial computer on a single board. For maximum performance, the PCA-6153 is also equipped with a 512 KB pipeline burst SRAM 2nd level cache memory.

On-board features include one RS-232 port, one RS-232/422/485 port, one multimode parallel (SPP/EPP/ECP) port, a floppy drive controller and a keyboard and PS/2 mouse interface. The built-in high speed PCI IDE controller supports both PIO and bus master modes. Up to two IDE devices can be connected, including large hard disks, CD-ROM drives, tape backup drives and other IDE devices.

The PCA-6153 includes power management features. It complies with the "Green Function" standard and supports three types of power saving features: Doze mode, Standby mode and Suspend mode. A watchdog timer can automatically reset the system or generate an interrupt should the system stop due to a program bug or electromagnetic interference (EMI).

Features

- Accepts Intel Pentium® 75 ~ 200 MHz, P55C, AMD K5, and Cyrix 6x86 processors.
- On-board 512 KB pipeline burst SRAM cache memory
- Bus-master PCI IDE controller supports two IDE devices (large hard disk, CD-ROM, tape backup, etc.)
- Supports up to 64 MB EDO/FP DRAM
- One enhanced multimode SPP/EPP/ECP parallel port
- 63-level watchdog timer, jumperless with run-time setup
- Green function: supports doze/standby/suspend modes. APM 1.1 compliant
- Microsoft Windows 3.1, Windows 95 and Windows NT
- Printer power-on damage protection
- One RS-232, one RS-232/422/485 interface
- PC/104 connector supports face-up installation
- On-board PCI SVGA supports CRT and LCD display

Specifications

Standard SBC functions

- **CPU**: Intel Pentium 75/90/100/120/133/150/166/200 MHz and P55C, AMD K5, Cyrix 6x86
- **BIOS**: Award 128 KB Flash memory; supports Plug and Play
- **Chipset**: SiS 5571
- **Green function**: Features power management via the BIOS, activated by mouse or keyboard activity. Supports doze, sleep, standby and suspend modes. APM 1.1 compliant
- **2nd level cache**: 512 KB pipeline burst SRAM
- **RAM**: Two 72-pin SIMM sockets. Supports 32-bit Normal or EDO DRAM with memory capacity from 2 MB to 64 MB
- **Enhanced IDE interface**: Handles up to two IDE large HDDs or other IDE devices. Supports PIO mode 4 and DMA bus-master mode
- **Floppy disk drive interface**: Supports up to two floppy disk drives: 3½" (720 KB or 1.44 MB) and/or 5¼" (360 KB or 1.2 MB)
- **Parallel port**: One parallel port configured to LPT1, LPT2, LPT3 or disabled. Supports multimode parallel (SPP/EPP/ECP) port
- **Serial ports**: One RS-232, one RS-232/422/485 interface
- **Watchdog timer**: Can generate a system reset or IRQ 15. Software enabled/disabled. Time interval is from 1 to 63 seconds, jumperless with run-time setup
- **Keyboard and PS/2 mouse connector**: A 6-pin mini-DIN connector is located on the mounting bracket for easy connection to a keyboard or PS/2 mouse. An on-board keyboard pin header connector is also available.
- **PC/104 expansion**: 104-pin, 16-bit PC/104 module connector
- **I/O bus expansion**: ISA bus edge (golden finger) connector

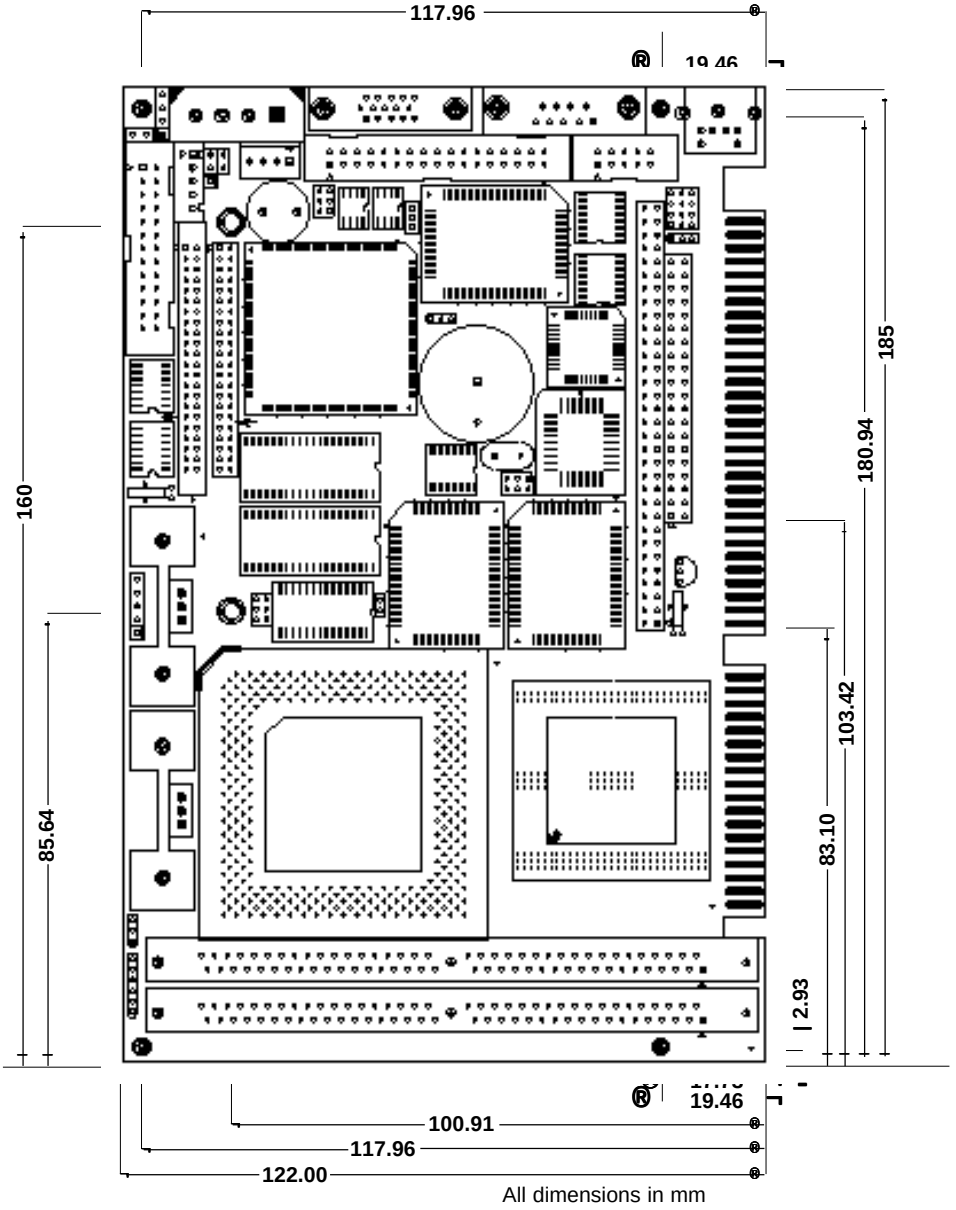
PCI SVGA interface

- **Controller**: C&T 65545/48/50 VGA (default=65550)
- **Display memory**: 1 MB on-board DRAM
- **Display resolution**:
  - supports panel resolutions up to 1024 x 768
  - supports non-interlaced CRT monitors, 1280 x 1024 with 16 colors

Mechanical and environmental

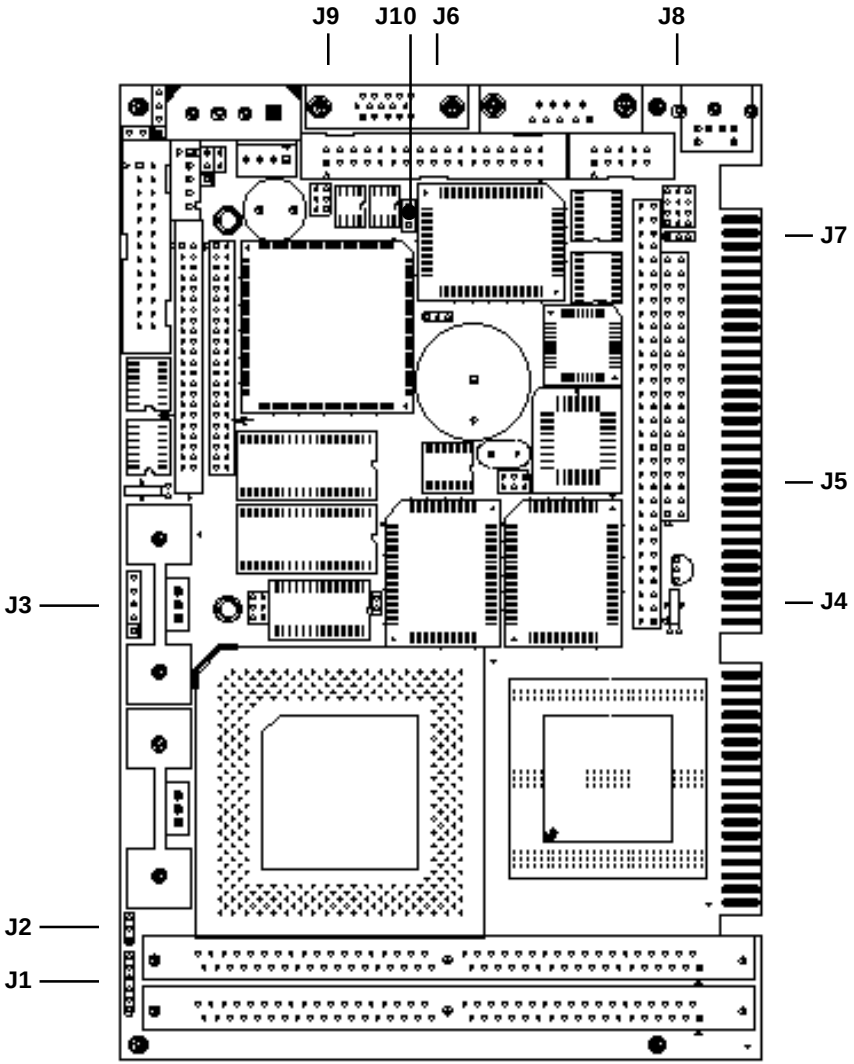
- **Board size:** 185 mm x 122 mm
- **Max. power requirements**: +5 V (4.75 to 5.25 V) @ 5.5 A
- **Operating temperature**: 0 to 60° C (32 to 140° F)
- **Board weight**: 0.5 kg (1.2 lb.)

Board Layout: Dimensions

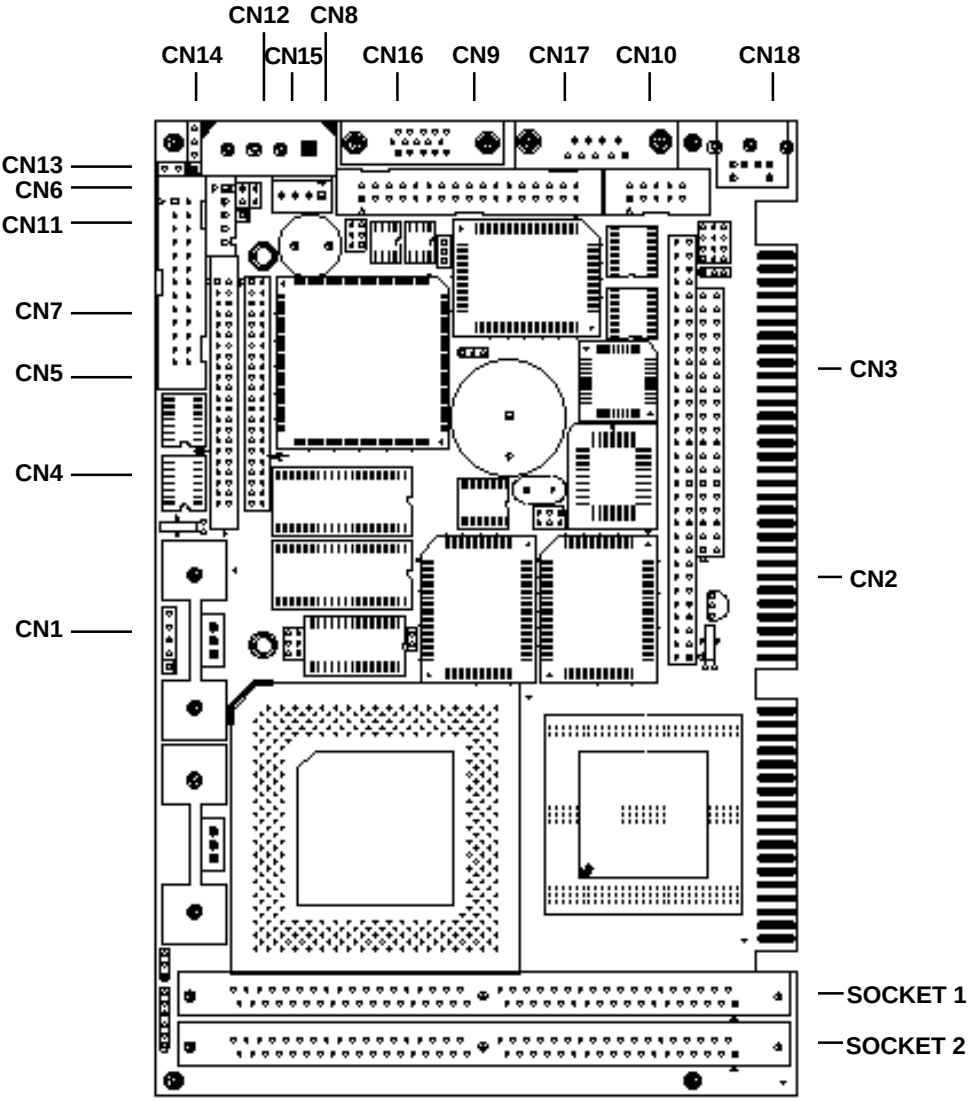


All dimensions in mm

Board Layout: Jumper Locations



Board Layout: Connector Locations



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 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-6153 Jumpers

Number	Function
J1	Chipset optimal timing settings
J2	CPU working voltage setting
J3	CPU clock ratio setting (pins 3-4, 5-6) Enable P55CT (pins 1-2), P55CT f ratio = 1(pins 7-8)
J4	Cache mode setting
J5	CPU/PCI clock setting
J6	CMOS setup
J7	Watchdog timer control
J8	RS-232/RS-422/RS-485 pin out select
J9	RS-232/RS-422/RS-485 select
J10	LCD voltage selector

PCA-6153 Connectors

Number	Function
CN1	Keyboad lock/ Power LED
CN2	PC/104 connector
CN3	PC/104 connector
CN4	Enhanced IDE connector
CN5	Flat panel connector
CN6	Fan power
CN7	Parallel port connector (printer)
CN8	Peripheral power input connector
CN9	Floppy disk drive connector
CN10	COM2 connector
CN11	Auxiliary keyboard connector
CN12	Hard drive activity LED connector
CN13	Reset connector
CN14	Speaker out connector
CN15	Main power connector
CN16	VGA connector
CN17	COM1 connector
CN18	Keyboard and PS/2 mouse connector

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.

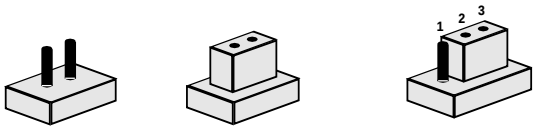
Jumper Settings

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.

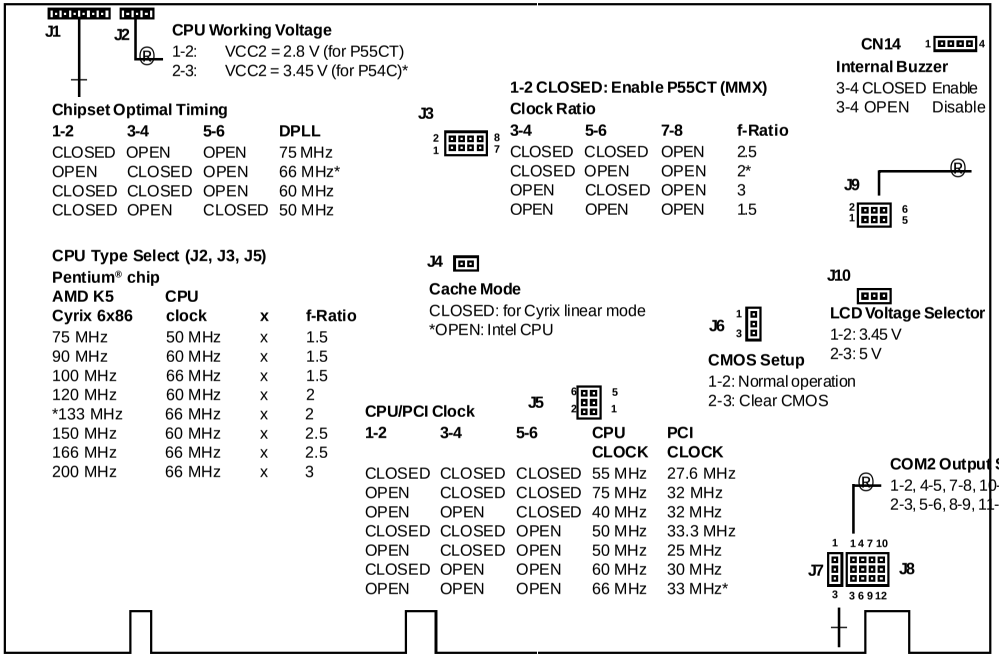


Open **Closed** **Closed 2-3**

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.

Jumper Settings



*** denotes default setting**

Installing DRAM (SIMMs)

On the left end of the card (away from the mounting bracket) are the two SIMM (Single In-line Memory Module) sockets that hold the card's DRAM memory. See the board layout diagram depicted earlier in this chapter.

You can use anywhere from 2 MB to 64 MB of DRAM with your PCA-6153. The card provides two 72-pin SIMM sockets that accept from 1 to 32 MB each. The sockets (numbered 1 and 2) are arranged into two banks.

Memory sizes

The board accepts 1, 2, 4, 8, 16 and 32 MB 72-pin SIMMS. The following table lists some of the different memory configurations for the PCA-6153 card:

SIMM1	SIMM2	TOTAL
1 MB	1 MB	2 MB
2 MB	2 MB	4 MB
4 MB	4 MB	8 MB
8 MB	8 MB	16 MB
16 MB	16 MB	32 MB
32 MB	32 MB	64 MB

DRAM access time £ 60 nsec

CHAPTER 2

Connecting Peripherals

This chapter tells how to connect peripherals, switches and indicators to the PCA-6153 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 if it is otherwise difficult to access the card, you may need to partially remove the card to make all the connections.

The following table lists the connectors on the PCA-6153.

PCA-6153 Connectors	
Number	**Function**
CN1	Keyboard lock/ Power LED
CN2	PC/104 connector
CN3	PC/104 connector
CN4	Enhanced IDE connector
CN5	Flat panel connector
CN6	Fan power
CN7	Parallel port connector (Printer)
CN8	Peripheral power input connector
CN9	Floppy disk drive connector
CN10	COM2 connector
CN11	Auxiliary keyboard connector
CN12	Hard drive activity LED connector
CN13	Reset connector
CN14	Speaker out connector
CN15	Main power connector
CN16	VGA connector
CN17	COM1 connector
CN18	Keyboard and PS/2 mouse connector

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.*

Keyboard lock / Power LED (CN1)

You can use a LED to indicate when the CPU card is on. Pin 1 on CN1 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 CN1.

Keyboard lock / Power LED (CN1)

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

PC/104 connectors (CN2 and CN3)

The PCA-6153 card's PC/104 connector lets you attach PC/104 expansion 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-3520 Flat panel / CRT VGA module
- PCM-3810 Solid State Disk (SSD) module
- PCM-3820 High density SSD modules
- PCM-3610 Isolated RS-232/422/485 module
- PCM-3640 4-port RS-232 module
- PCM-3290 GPS module
- PCM-3660 Ethernet module
- PCM-3718 30 kHz A/D module
- PCM-3742 48-channel Digital Input/Output (DIO) module

PC/104 modules are available from many manufacturers, and the PC/104 form factor is being developed as an extension to the ISA-bus standard.

A PC/104 breadboard module (PCM-3910) is available if you wish to make your own PC/104 module. For further information, contact your Advantech distributor or sales representative.

PCA-6153 PC/104 connectors (CN2, CN3)

Pin Number	Signal (CN2) Row A	Row B	Signal (CN3) Row C	Row D
1	IOCHCHK*	0V	GND	GND
2	SD7	RESETDRV	SBHE*	MEMCS16*
3	SD6	+5V	LA23	IOCS16*
4	SD5	IRQ9	LA22	IRQ10
5	SD4	-5V	LA21	IRQ11
6	SD3	DRQ2	LA20	IRQ12
7	SD2	-12V	LA19	IRQ15
8	SD1	ENDXFR*	LA18	IRQ14
9	SD0	+12 V	LA17	DACK0*
10	IOCHRDY	N/C	MEMR*	DRQ0
11	AEN	SMEMW*	MEMW*	DACK5*
12	SA19	SMEMR*	SD8	DRQ5
13	SA18	IOW*	SD9	DACK6*
14	SA17	IOR*	SD10	DRQ6
15	SA16	DACK3*	SD11	DACK7*
16	SA15	DRQ3	SD12	DRQ7
17	SA14	DACK1*	SD13	+5V
18	SA13	DRQ1	SD14	MASTER*
19	SA12	REFRESH*	SD15	GND
20	SA11	SYSCLK	N/C	GND
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	GND	—	—
32	GND	GND	—	—

*active low

Enhanced IDE connectors (CN4)

You can attach two IDE (Integrated Device Electronics) drives to the PCA-6153's internal controller. The PCA-6153 CPU card has an EIDE connector, CN4.

Wire number 1 on the cable is red or blue, the other wires are gray. Connect one end to connector CN4 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 CN4.

HDD connector (CN4)

Pin	Signal	Pin	Signal
1	IDE reset*	2	GND
3	Data 7	4	Data 8
5	Data 6	6	Data 9
7	Data 5	8	Data 10
9	Data 4	10	Data 11
11	Data 3	12	Data 12
13	Data 2	14	Data 13
15	Data 1	16	Data 14
17	Data 0	18	Data 15
19	GND	20	N/C
21	HDDQ0	22	GND
23	IOW*	24	GND
25	IOR*	26	GND
27	IO channel ready	28	N/C
29	HDACK0	30	GND
31	IRQ14	32	N/C
33	ADDR 1	34	N/C
35	ADDR 0	36	ADDR 2
37	HDD select 0*	38	HDD select 1*
39	IDE activity	40	M=GND
41	V_{cc}	42	M=V_{cc}
43	GND	44	N/C

* = Active low

Flat panel display connector (CN5)

CN5 consists of a 44-pin, dual in-line header. Power flow (+12 V) depends on the supply connected to the board.

The PCA-6153 provides a bias control signal on CN5 which can be used to control the LCD bias voltage. It is recommended that the LCD bias voltage not be applied to the panel until the logic supply voltage (+5 V) and panel video signals are stable. Under normal operation, the control signal (ENAVEE) is active high. When the PCM-6153 board's power is applied, the control signal is low until just after the relevant flat panel signals are present.

Configuration of the LCD type is done via the software utility. You do not have to set any jumpers. Refer to chapter 4 for the software setup details. Chapter 4 also provides information on connecting the following LCDs: Sharp LM64183P/LM64P89, Toshiba LTM10C042, Sharp 64C142, and Planar EL display.

Power connectors (CN6, CN8, CN15)

Fan power supply connector (CN6)

Provides power supply to optional CPU cooling fan. Only present when +5 V and +12 V power is supplied to the board.

Fan power connector (CN6)

Pin	Signal
1	+5 V
2	GND
3	+12 V

Peripheral power connector, -5 V, -12 V (CN8)

Supplies secondary power to devices that require -5 V and -12 V

Peripheral power connector (CN8)

Pin	Signal
1	GND
2	-5 V
3	GND
4	-12 V

Main power connector, +5 V, +12 V (CN15)

Supplies main power to the PCA-6153 (+5 V) and devices that require +12 V

Main power connector (CN15)

Pin	Signal
1	+12 V
2	GND
3	GND
4	+5 V

Parallel port connector (CN7)

The parallel port is normally used to connect the CPU card to a printer. The PCA-6153 includes an on-board parallel port, accessed through a 26-pin flat-cable connector, CN7. 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 CN7 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 CN7.

Parallel/printer connector (CN7)

Pin	Signal
1	STROBE*
2	Data0
3	Data1
4	Data2
5	Data3
6	Data4
7	Data5
8	Data6
9	Data7
10	Acknowledge*
11	Busy
12	Paper empty
13	Select
14	Auto feed*
15	Error*
16	Initialize printer*
17	Select input*
18-25	Ground

*active low

Floppy disk drive connector (CN9)

You can attach up to two floppy disk drives to the PCA-6153's on-board controller. You can use any combination of 5.25" (360 KB/1.2 MB) and/or 3.5" (720 KB/1.44/2.88 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.

FDD connector (CN8)

Pin	Signal
1-33 (odd)	Ground
2	High density*
4, 6	Unused
8	Index*
10	Motor enable A*
12	Drive select B*
14	Drive 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*

* active low

Serial ports (CN10, CN17)

The PCA-6153 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 (For example, 3F8H [COM1], 2F8H [COM2]) 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.

Serial port connections (COM1, COM2)

Connector	Function
COM1: CN17	RS-232
COM2: CN10	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 (CN17)

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

RS-232/422/485 connection (COM2)

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

RS-232/422/485 connector pin assignments (CN10)

Pin	**RS-232**	**RS-422**	**RS-485**
1	DCD	TX - or DATA -	DATA-
2	DSR		
3	RX	TX + or DATA +	DATA+
4	RTS		
5	TX	RX +	
6	CTS		
7	DTR	RX -	
8	RI		
9	GND	GND	
10	NC	NC	

Keyboard & PS/2 mouse connectors (CN11, CN18)

The PCA-6153 board provides a keyboard connector. A 6-pin mini-DIN connector (CN18) 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 PS/2 mouse connector.

Keyboard connectors pin assignment (CN11, CN18)

CN11	CN18	Signal
1	5	Clock
2	1	Data
3 (NC)	2	PS/2 data
4	3	GND
5	4	+ 5 V
	6	PS/2 clock

Front panel connectors (CN12, CN13, CN14)

You may wish to connect external switches to monitor and control the PCA-6153. These features are completely optional; install them only if you need them. The front panel connector can support an HDD activity LED, reset switch and a speaker.

LED interface (CN12)

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

Reset switch (CN13)

If you install a reset switch, it should be an open single pole switch. Pressing the button will reset the computer. The switch should be rated for 10 mA, 5 V.

Speaker (CN14)

The PCA-6153 can drive an 8 W speaker at 0.5 watts. CN14 pins 1, 4 ensure that alternatives to this specification do not overload the card.

Speaker connector (CN14)

Pin	Signal
1	Vcc
2	N/C
3	On-board buzzer
4	External speaker

VGA display connector (CN16)

The PCA-6153 provides a VGA controller for high resolution VGA interface. CN16 is a DB-15 connector for VGA monitor input.

VGA display connector (CN16)

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		

CHAPTER 3

Award BIOS Setup

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

AWARD BIOS Setup

ROM PCI/ISA BIOS (2A5IHAK9)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

STANDARD CMOS SETUP	**INTEGRATED PERIPHERALS**
BIOS FEATURES SETUP	**USER PASSWORD**
CHIPSET FEATURES SETUP	**IDE HDD AUTO DETECTION**
POWER MANAGEMENT SETUP	**SAVE & EXIT SETUP**
PNP/PCI CONFIGURATION	**EXIT WITHOUT SAVING**
LOAD BIOS DEFAULTS	
LOAD SETUP DEFAULTS	
ESC: Quit **F10: Save & Exit Setup**	- ¯ ® ¬: **Select Item** **<Shift> F2: Change Color**
Time, Date, Hard Disk Type...	

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.

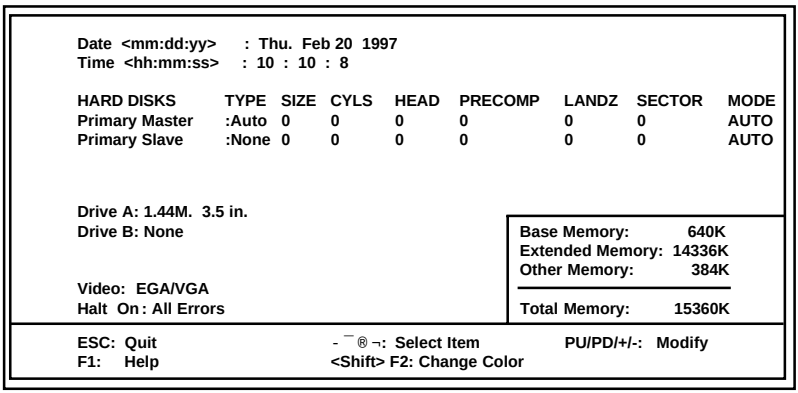
Entering setup

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.

ROM PCI/ISA BIOS (2A5IHAK9)
STANDARD CMOS SETUP
AWARD SOFTWARE, INC.



CMOS setup screen

BIOS features setup

The “BIOS FEATURES SETUP” screen appears when this item is selected from the CMOS SETUP UTILITY Menu. It allows the user to configure the PCA-6153 according to their particular requirements.

Below are some major items that are provided in the BIOS FEATURES SETUP screen:



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, a warning message will be displayed. You can run an 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 are followed.

Boot Sequence

This function determines the sequence in which the computer will search the drives for the disk operating system (i.e. DOS).

A,C	System will first search the FDD, then the HDD.
C,A	System will first search the HDD, then the FDD.
C, CDROM, A	System will search the HDD, CDROM, then the FDD.
CDROM, C, A	System will search the CDROM, HDD, then the FDD.
C only	System will only search the HDD.

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

Gate A20 option

Normal	The A20 signal is controlled by the keyboard controller or chipset hardware
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 allows users to restrict access to BIOS Setup. A user-defined password limits access according to the options listed below.

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

Note: To disable security, enter BIOS setup and 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. After saving the new configuration, security is disabled. In the future the system will boot, and you can enter Setup freely.

If you have lost or forgotten your password, the following steps can be used to restore default CMOS settings:

1. Power off your system.
2. Set jumper J6 to pins 2-3 for at least 3 seconds to clear CMOS data.
3. Return jumper J6 to its original position (pins 1-2).
4. Power on your system and you will see the message "CMOS checksum error- Defaults loaded".
5. Press [Del] to enter CMOS. Modify the settings as desired, save and exit.

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 INITIAL SETUP SCREEN Menu, the screen below is displayed. This sample screen contains the manufacturer's default values for the PCA-6153**.**

ROM PCI/ISA BIOS (2A5IFAK9)
CHIPSET FEATURES SETUP
AWARD SOFTWARE, INC.

Auto Configuration	**: Enabled**	**ISA Bus Clock Frequency**	**: PCICLK/4**
		System BIOS Cacheable	**: Enabled**
		Video BIOS Cacheable	**: Enabled**
L2 (WB) Tag Bit Length	**: 8 bits**	**Memory Hole 15M-16M**	**: Disabled**
SRAM Back to Back	**: Enabled**		
NA# Enable	**: Enabled**		
DRAM RD Leadoff Time	**: 5T**		
Refresh Cycle Time (us)	**: 15.6**		
RAS Pulse Width Refresh	**: 6T**		
RAS Precharge Time	**: 4T**		
RAS to CAS Delay	**: 4T**		
CAS# Pulse Width (FP)	**: 2T**		
CAS# Pulse Width (EDO)	**: 2T**		
RAMW# Assertion Timing	**: Normal**		
EDO Back-to-back timing	**: 3T**		
SDRAM WR Retire Rate	**: x-2-2-2**		
Enahanced Memory Write	**: Disabled**	**Esc : Quit**	**- ¯ ® ¬: Select Item**
Read Prefetch Memory RD	**: Enabled**	**F1 : Help**	**PU/PD/+/- : Modify**
CPU to PCI Post Write	**: 3T**	**F5 : Old Values**	**<Shift>F2 : Color**
CPU to PCI Burst Mem. WR	**: Disabled**	**F6 : Load BIOS Defaults**	
		F7 : Load Setup Defaults	

CHIPSET features setup

Note 1: The default values of DRAM timing will be changed under different CPU configurations.

Power management setup

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

ROM PCI/ISA BIOS (2A5IFAK9)
POWER MANAGEMENT SETUP
AWARD SOFTWARE, INC.

Power Management	: Disabled	IRQ3 (COM2)	: Enable
PM Control by APM	: Yes	IRQ4 (COM1)	: Enable
Video Off Option	: Susp ® Off	IRQ5 (LPT2)	: Enable
Switch Function	: Break/Wake	IRQ6 (Floppy Disk)	: Enable
Doze Speed (div by)	: 2	IRQ7 (LPT1)	: Enable
Stdby Speed (div by)	: 3	IRQ8 (RTC Alarm)	: Disable
Modem Use IRQ	: 3	IRQ9 (IRQ2 Redir)	: Enable
PM Timers		IRQ10 (Reserved)	: Enable
HDD Off After	: Disable	IRQ11 (Reserved)	: Enable
Doze Mode	: Disable	IRQ12 (PS/2 Mouse)	: Enable
Standby Mode	: Disable	IRQ13 (Coprocessor)	: Enable
Suspend Mode	: Disable	IRQ14 (Hard Disk)	: Enable
PM Events		IRQ15 (Reserved)	: Enable
COM Ports Activity	: Enable		
LPT Ports Activity	: Enable	Esc : Quit	- ¯ ® ¬: Select Item
HDD Ports Activity	: Enable	F1 : Help	PU/PD/+/- : Modify
VGA Activity	: Disabled	F5 : Old Values	<Shift>F2 : Color
		F6 : Load BIOS Defaults	
		F7 : Load Setup Defaults	

Power management

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.

PCI configuration setup

ROM PCI/ISA BIOS (2A5IFAK9)
PNP/PCI CONFIGURATION
AWARD SOFTWARE, INC.

Resources Controlled By	: Manual	PCI IRQ Activated By	: Level
Reset Config. Data	: Disabled	PCI IDE 2nd Channel	: Enabled
IRQ-3 assigned to	: Legacy ISA	PCI IDE IRQ Map To	: PCI-AUTO
IRQ-4 assigned to	: Legacy ISA	Primary IDE INT#	: A
IRQ-5 assigned to	: PCI/ISA PnP	Secondary IDE INT#	: B
IRQ-7 assigned to	: Legacy ISA		
IRQ-9 assigned to	: PCI/ISA PnP		
IRQ-10 assigned to	: PCI/ISA PnP		
IRQ-11 assigned to	: PCI/ISA PnP		
IRQ-12 assigned to	: PCI/ISA PnP		
IRQ-14 assigned to	: Legacy ISA		
IRQ-15 assigned to	: Legacy ISA		
DMA-0 assigned to	: PCI/ISA PnP		
DMA-1 assigned to	: PCI/ISA PnP		
DMA-3 assigned to	: PCI/ISA PnP	Esc : Quit	- ¯ ® ¬: Select Item
DMA-5 assigned to	: PCI/ISA PnP	F1 : Help	PU/PD/+/- : Modify
DMA-6 assigned to	: PCI/ISA PnP	F5 : Old Values	<Shift>F2 : Color
DMA-7 assigned to	: PCI/ISA PnP	F6 : Load BIOS Defaults	
		F7 : Load Setup Default	

PCI configuration

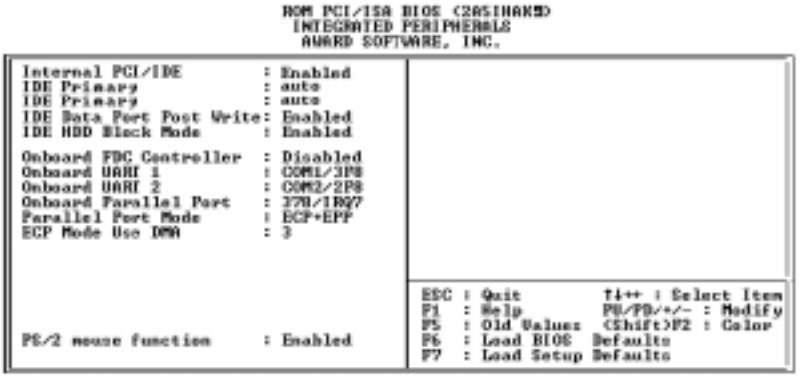
Load BIOS defaults

“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.

Integrated Peripherals



Integrated Peripherals

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

Note 1: If you enable the IDE HDD block mode, the enhanced IDE drive will be enabled

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.

CHAPTER 4

Software Configuration

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

Sections include:

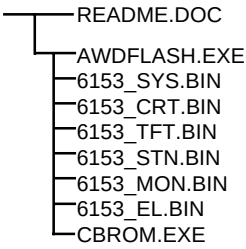
- LCD display configuration
- Connections for four standard LCDs

Introduction

The PCA-6153 system BIOS and custom drivers are located in a 128 Kbyte, 32-pin Flash ROM device, designated U11. A single Flash chip holds the system BIOS, and VGA BIOS. The display type 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.

Utility disk

The PCA-6153 is supplied with a software utility disk. This disk contains the necessary file for setting up the VGA display. Directories and files on the disk are as follows:



AWDFLASH.EXE
This program allows you to write the VGA BIOS files to the BIOS Flash ROM. The VGA files all come ready formatted for the PCA-6153 with .BIN extensions. See README.DOC. These files support various CRT and flat panel displays. They are custom written and can be made available upon request.

6153_SYS.BIN
This binary file contains the system BIOS.

6153_CRT.BIN
Supports CRT only.

6153_TFT.BIN (default)
Supports 640 x 480 color TFT
(Toshiba LTM10C042).

6153_STN.BIN
Supports 640 x 480 color STN DD 8/16-bit displays
(Sharp LM64C142).

6153_MON.BIN
Supports 640 x 480 dual scan monochrome displays
(Sharp LM64P8X/837, LM64P89).

6153_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 system BIOS (6153_SYS.BIN).

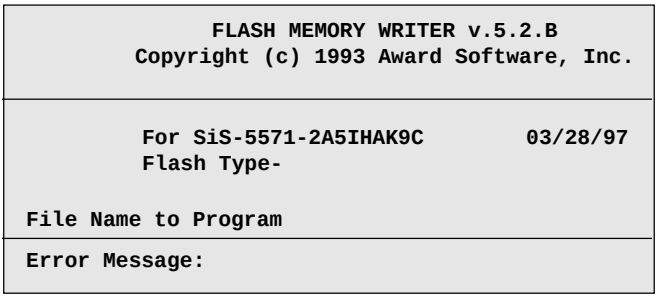
VGA display software configuration

The PCA-6153 on-board VGA/LCD 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 1280 x 1024 in 16 colors. It is also capable of driving color panel displays with resolutions of 1024 x 768. The LCD type is configured completely via the software utility, so you don't have to set any jumpers. Configure the LCD type as follows:

1. Apply power to the PCA-6153 with a color TFT display attached. This is the default setting for the PCA-6153. 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.

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 screen will issue a prompt which will then ask “Are you sure to program (Y/N)?” If you wish to continue, press Y. 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.

Connections for four standard LCDs

Connections to Sharp LM64183P, LM64P89 (640 x 480 DSTN MONO LCD)

LM64P83		PCA-6153 CN5	
Pin	**Pin name**	**Pin**	**Pin name**
CN1-1	S	36	FLM
CN1-2	CP1	38	LP
CN1-3	CP2	35	SHFCLK
CN1-4	DISP	5	+5 V
CN1-5	VDD	6	+5 V
CN1-6	VSS	3	GND
CN1-7	VEE	-	-17 V (external power)*
CN1-8	DU0	12	P3
CN1-9	DU1	11	P2
CN1-10	DU2	10	P1
CN1-11	DU3	9	P0
CN1-12	DL0	16	P7
CN1-13	DL1	15	P6
CN1-14	DL2	14	P5
CN1-15	DL3	13	P4

* LM64183P -17 V
  LM64P89 -20 V

Connections to PLANAR EL (640 x 480 AD4 EL)

PLANAR 640 x 480 AD4		PCA-6153 CN5	
Pin	**Pin name**	**Pin**	**Pin name**
1	GND	3	GND
2	DO	21	P12
3	GND	3	GND
4	D1	22	P13
5	GND	3	GND
6	D2	23	P14
7	NC	—	—
8	D3	24	P15
9	NC	—	—
10	D4	17	P8
11	NC	—	—
12	D5	18	P9
13	NC	—	—
14	D6	19	P10
15	GND	4	GND
16	D7	20	P11
17	GND	4	GND
18	VCLK	42	ASHFCLK
19	GND	4	GND
20	/BLANK	—	—
21	GND	8	GND
22	HS	37	M
23	NC	—	—
24	VS	36	FLM
25	NC	—	—
26	SELFTST	39	GND
27	COLMAP	39	GND
28	ENABLE	—	—
29	RESERVED	—	—
30	/LOWPOW	—	—
31,32	NC	—	—
33	RESERVED	—	—
34	NC	—	—

Connections to Toshiba LTM10C042 (640 x 480 TFT Color LCD)

Toshiba LTM10C042		PCA-6153 CN5	
Pin	**Pin name**	**Pin**	**Pin name**
1	GND	3	GND
2	CLK	35	SHFCLK
3	GND	4	GND
4	R0	27	P18
5	R1	28	P19
6	R2	29	P20
7	GND	8	GND
8	R3	30	P21
9	R4	31	P22
10	R5	32	P23
11	GND	33	GND
12	G0	19	P10
13	G1	20	P11
14	G2	21	P12
15	GND	33	GND
16	G3	22	P13
17	G4	23	P14
18	G5	24	P15
19	GND	34	GND
20	ENAB	37	M
21	GND	34	GND
22	B0	11	P2
23	B1	12	P3
24	B2	13	P4
25	GND	39	GND
26	B3	14	P5
27	B4	15	P6
28	B5	16	P7
29	GND	39	GND
30	VDD	5	+5 V
31	VDD	6	+5 V

Connections to Sharp LM64C142 (640 x 480 DSTN Color LCD)

LM64C142		PCA-6153 CN5	
Pin	**Pin name**	**Pin**	**Pin name**
CN1-1	YD	36	FLM
CN1-2	LP	38	LP
CN1-3	XCX	35	SHFCLK
CN1-4	DISP	5	+5 V
CN1-5	VDD	6	+5 V
CN1-6	VSS	3	GND
CN1-7	VEE	-	+27 V(external power)
CN1-8	DU0	20	P11
CN1-9	DU1	19	P10
CN1-10	DU2	18	P9
CN1-11	DU3	17	P8
CN1-12	DU4	12	P3
CN1-13	DU5	11	P2
CN1-14	DU6	10	P1
CN1-15	DU7	9	P0
CN2-1	VSS	4	GND
CN2-2	DL0	24	P15
CN2-3	DL1	23	P14
CN2-4	DL2	22	P13
CN2-5	DL3	21	P12
CN2-6	DL4	16	P7
CN2-7	DL5	15	P6
CN2-8	DL6	14	P5
CN2-9	DL7	13	P4
CN2-10	VSS	8	GND

CHAPTER 5

PCI SVGA Setup

The PCA-6153 features an on-board PCI flat panel/VGA interface. This chapter provides instructions for installing and operating the software included on the display driver diskette.

Before you begin

To facilitate the installation of the enhanced display device drivers and utility software, you should read the instructions in this chapter carefully. The enhanced display drivers for the PCA-6153 board are located on the software installation diskette. You must install the drivers and utility software by using the supplied SETUP program for DOS drivers

Note: The files on the software installation diskette are compressed. Do not attempt to install the drivers by copying the files manually. You must use the supplied SETUP program to install the drivers.

Before you begin, it is important to note that most display drivers need to have the relevant software application already installed in the system prior to installing the enhanced display drivers. In addition, many of the installation procedures assume that you are familiar with both the relevant software applications and operating system commands. Review the relevant operating system commands and the pertinent sections of your application software's user's manual before performing the installation.

Installation

Disk 1: Windows 3.1, Windows 95, Windows NT drivers

Disk 2: OS/2 drivers

Simultaneous display mode

The 65550 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-6153 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.

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.

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:\SETUP**. 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 ***SETUP.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.

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

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.

Windows 95 Drivers Setup Procedure

1. Boot system with VGA or SuperVGA driver.
2. Select properties from a menu after right button press.
3. Select display.
4. Select Change Display.
5. Select Change Monitor.
6. Select Change Adapter.
7. Select Have Disk.

Windows NT Drivers Setup Procedure

Step 1

1. Install Windows NT as you normally would for a VGA display.
2. First click the Start button,choose Settings and click on Control Panel.
3. Choose the Display icon and click on the icon.
4. In the Display Properties window, click on the Settings tab.
5. Click on Change Display Type. In the Change Display Type window, click on the Change button under Adapter Type. This will bring up the Select Device window.

Step 2

1. In the Select Device window, click on the Other button. Enter source directory where the Windows NT driver files are located.
2. Press <ENTER> and the name of the Chips and Technologies Video Accelerator driver will appear at the end of Models list box. Scroll to the end of the list box and double click on the driver.
3. Once the installation is complete, the system must be shut down and restarted.

Step 3

1. Upon restarting your computer, select the desired display settings from the Display property dialog box.
2. Click on Test to test the newly selected graphics mode. A color test screen should appear, followed by the Testing Mode window.
3. Click on Yes to continue. The Display Settings Change window will appear.
4. Click on Restart Now for the new settings to take effect.

OS/2 Drivers Setup Procedure

Preliminary Steps

The following steps must be performed before you install the 65550/554 display driver:

1. OS/2 DOS support must be installed.
2. If you previously installed SVGA support, you must reset the system to VGA mode. VGA is the default video mode enabled when OS/2 is installed.

To restore VGA mode, use Selective Install and select VGA for Primary Display. For more information on this procedure, see the section on Changing Display Adapter Support in the OS/2 User's Guide.

Installing from Diskette

To install this driver, do the following steps:

1. Open an OS/2 full screen or window session.
2. Place the 65550 PCI Display Driver Diskette in drive A.
3. At the OS/2 command prompt, type the following commands to copy the files to the OS/2 drive:

Type:

```
A: <ENTER> to make this the default drive.
SETUP A: C: <ENTER>
```

where A: is the floppy disk drive and
C: is the hard disk partition containing \OS2

When the Setup Program is completed, you will need to perform a shutdown and then restart the system in order for changes to take effect.

A log of the information output during the install can be found in <root>:\OS2\INSTALL\DISPLAY.LOG

4. After restarting the system, perform the following steps:

    1. Open the OS/2 System folder.
    2. Open the System Setup folder.
    3. Open the Display Driver Install Object

This step will execute the Display Driver Installation (DSPINSTL) utility program to finish installation of the new drivers.

    4. When the Display Driver Install window appears, select Primary Display and then select OK.
    5. When The Primary Display Driver List window appears, select “Chips and Technologies 65550/554” from the list of adapter types, then select OK to install the video driver.
    6. When the installation is complete, you will need to shutdown and then restart the system for the changes to take effect. Make sure to remove the install diskette before restarting the system.

When the system has restarted, the display driver will be initialized for 640x480x256 Color, 60Hz refresh. To switch to a different video resolution, color depth or refresh rate, follow the steps below.

Selecting Monitor Type

Monitor type is initially set to DEFAULT. This DEFAULT setting may not allow you to select all resolution/refresh combinations that are available for your monitor. The following steps can be performed to select monitor type. This section applies only after installation, or when a different monitor is used.

1. Open the OS/2 System folder.
2. Open the System Setup folder.
3. Open the System object.
4. When the System - Settings notebook appears, select the Screen tab. This will take you to page 2 of the settings.
5. On Screen page 2, select your monitor type from the Display Name list. If your monitor is not listed, select DEFAULT. Return to Screen page 1.

It may be necessary to restart your system to have all refresh rate options available.

Selecting Screen Resolution/Refresh Rate

To switch to a different video resolution, color depth or refresh rate, follow the steps below.

1. Open the OS/2 System folder.
2. Open the System Setup folder.
3. Open the System object.
4. From the selection windows provided, select a new Screen Resolution and Screen refresh rate.

Please note, Refresh rates, other than 60Hz, are only valid when the display is switched to CRT only display mode.

5. Close the System-Settings notebook.
6. Perform a shutdown and restart for the changes to take effect.

Installation Notes

1. During the installation of this driver, DISPLAY.LOG and DSPINSTL.LOG files are created in \OS2\INSTALL directory. These files identify the OS/2 system files that were updated and indicate whether the install was successful. The DISPLAY.LOG file also contains a string which identifies the version of driver that was installed. This information may be important when reporting an installation problem.

2. During installation, DSPINSTL will invoke the SVGA Configuration program SVGA.EXE to determine the hardware configuration, and create the file \OS2\INSTALL\SVGADATA.PMI. If this file is not created, the adapter will not be supported. When this step is done, the display will be blanked, and you may see a series of flashes on the display, and what appears to be a "corrupted" display. This is normal, as the configuration process is doing Video BIOS mode sets to determine which screen resolutions BIOS supports. This configuration information is then used to provide the System-Settings Resolution and Refresh selections.

Appendix A

Programming the Watchdog Timer

The PCA-6153 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 standalone and unmanned environments.

Programming the Watchdog Timer

If you decide to program the watchdog timer, you must create a program which writes I/O port address 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 is an example of a program for the watchdog timer:

Step 1 Out 443h data **REM Start and reset the watchdog timer**
Step 2 Your application task #1
Step 3 Out 443h, data **REM Reset the timer**
Step 4 Your application 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 B

System I/O Ports Addresses

System I/O Ports Addresses

Address	Function
000-01F	DMA controller
020-021	Interrupt controller 1, master
040-05F	8254 timer
060-06F	8042 (keyboard controller)
070-07F	Real-time clock, non-maskable interrupt (NMI)
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
102	VGA
108-109	Super I/O
170-177	Secondary IDE port
1F0-1F7	Primary IDE port
200-207	GAME I/O
278-27F	Parallel printer port (LPT3)
2F8-2FF	Serial port 2
300-31F	Prototype card
360-36F	Reserved
376	Secondary IDE controller
378-37F	Parallel printer port (LPT2)
380-38F	SDLC, bisynchronous 2
3A0-3AF	Bisynchronous 1
3B0-3BB	VGA
3BC-3BF	Parallel printer port (LPT1)
3C0-3DF	VGA
3F0-3F7	Floppy disk controller
3F6	Primary IDE controller
3F8-3FF	Serial port 1

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