

**PSC-586VGA**  
**ISA/PCI Pentium™/ VGA**  
**Single Board Computer**

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# 1

## Introduction

Welcome to the PSC-586VGA ISA/PCI Pentium w/VGA Single Board Computer. The PSC-586VGA board is an ISA/PCI form factor board, which comes equipped with high performance Pentium CPU and advanced high performance multi-mode I/O, designed for the system manufacturers, integrators, or VARs that want to provide all the performance, reliability, and quality at a reasonable price.

An advanced high performance super AT I/O chip SMC FDC37C665 or ALI M5113 is used in the PSC-586VGA board. Both on-chip UARTs are compatible with the NS16C550. The parallel port and IDE interface are compatible with IBM PC/AT and XT architecture's. The FDC37C665 or M5113 incorporates sophisticated power control circuitry(PCC). The PCC supports multiple low power down modes.

The on board VGA controller is Cirrus CL-GD54M30 graphics accelerator. The VGA controller based on the internal PCI bus to get the most high performance. User will not need extra VGA card to release one PCI slot for other application.

In addition, the PSC-586VGA provides four 72-pin SIMM sockets for its on-board DRAM. The 72-pin accepts 1MB, 2MB, 4MB, 8MB, 16MB, and 32MB SIMM. So, the total on-board memory can be configured from 2MB to 128MB.

PSC-586VGA uses the ALI chipset, M1511/M1512/M1513, which are 100% ISA/PCI compatible chipset.

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## 1.1 Specifications :

The PSC-586VGA ISA/PCI Pentium w/ VGA Single Board Computer provides the following specification:

- **CPU** : Pentium 75-166Mhz
- **Bus** : ISA bus and PCI 32-bit local bus
- **DMA channels** : 7
- **Interrupt levels** : 15
- **Chipset** : M1511/M1512/M1513
- **Real-time clock/calendar** : DS-12887 chip and quartz oscillator, 128B CMOS memory, powered by lithium battery for over 10 years of data retention.
- **RAM memory** : 2MB to 128MB,EDO and standard DRAM supported
- **Second Cache memory** : 256KB/512KB/1MB Pipelined Burst and  
Standard Cache RAM Module
- **E-IDE hard disk drive interface** : up to four PCI Ehnace IDE hard drives.
- **Floppy disk drive interface** : two 2.88 MB, 1.44MB, 1.2MB, 720KB, or 360KB floppy disk drives.
- **Two high speed Series ports** : NS16C550 compatible UARTs
- **Bi-directional Parallel Port**
- **VGA Controller - GD54M30** :  
Bus : PCI bus  
Resolution : 1024x768 - 16 color(512KB VRAM)  
256 color(1MB VRAM)  
1280x1024 - 16 color(1MB VRAM)  
Feature Connector : 26-pin header on board

- **Watch-dog timer** : can be set by 1,2,10,20,110 or 220 seconds period. Reset or NMI was generated when CPU did not periodically trigger the timer. Your program use hex 043 and 443 to control the watch-dog and generate a system reset.
- **Keyboard connector**
- **Mouse** : PS/2 Mouse Port on-board.
- **Power Consumption** : +5V @ 4.2A ( Pentium-100,16MB EDO RAM)  
±12V @ 15mA ( for RS-232 only)
- **Operating Temperature** : 0° ~ 60° C ( CPU needs Cooler)

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## 1.2 What You Have

In addition to this *User's Manual*, the PSC-586VGA package includes the following items:

- PSC-586VGA ISA/PCI Pentium w/ VGA Single Board Computer
- RS-232/Printer Cable
- FDD/HDD Cable
- VGA utility diskette
- 6-pin Mini-Din to 5-pin Din Keyboard Adapter Cable

If any of these items is missing or damaged, contact the dealer from whom you purchased the product. Save the shipping materials and carton in case you want to ship or store the product in the future.

# 2

## Installation

This chapter describes how to install the PSC-586VGA. At first, the layout of PSC-586VGA is shown, and the unpacking information that you should be careful is described. The jumpers and switches setting for the PSC-586VGA's configuration, such as CPU type selection, system clock setting, and watch dog timer, are also included.

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### 2.1 PSC-586VGA's Layout

< reference next page >

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## 2.2 Unpacking

Your PSC-586VGA Single Board Computer contains sensitive electronic components that can be easily damaged by static electricity.

In this section, we describe the precautions you should take while unpacking, as well as during installation. It is very important that the instructions be followed correctly, to avoid static damage, and to successfully install the board.

The system board should be done on a grounded anti-static mat. The operator should be wearing an anti-static wristband, grounded at the same point as the anti-static mat.

Inspect the cardboard carton for obvious damage. Shipping and handling may cause damage to your board. Be sure there are no shipping and handling damages on the board before processing.

After opening the cardboard carton, exact the system board and place it only on a grounded anti-static surface component side up.

Again inspect the board for damage. Press down on all the socketed IC's to make sure that they are properly seated. Do this only with the board place on a firm flat surface.

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**Note : DO NOT APPLY POWER TO THE BOARD IF IT HAS BEEN DAMAGED.**

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You are now ready to install your PSC-586VGA Single Board Computer.

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## 2.3 Jumper Description

You can change the PSC-586VGA's configuration by setting jumper switches on the board. The board's jumpers are preset at the factory. Under normal circumstances, you should not need to change the jumper settings.

A jumper switch is **closed** (sometimes referred to as shorted with the plastic cap inserted over two pins of the jumper). A jumper is **open** with the plastic cap inserted over one or no pin(s) of the jumper. Figure 2.2 below shows different jumper settings which will be used in this chapter.

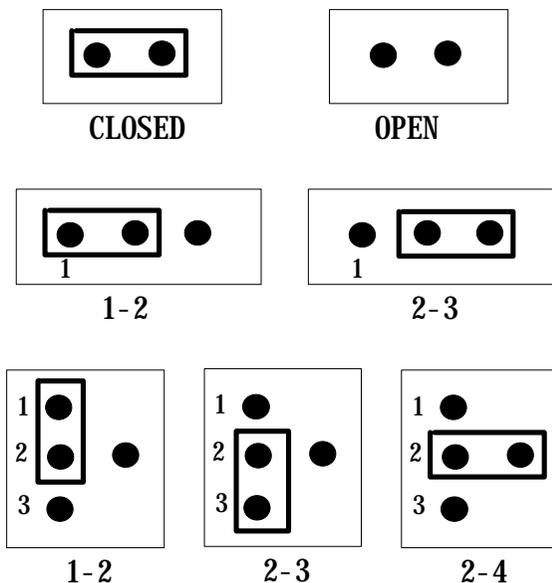


Figure 2.2

---

## 2.4 Setting the CPU of PSC-586VGA

- CPU Clock Setting :

CPU Clock/Operation	JP6	JP8	JP10 1-2	JP10 3-4
50Mhz/ - 75	OPEN	OPEN	CLOSE	CLOSE
* 60Mhz/ - 90	OPEN	OPEN	CLOSE	OPEN
66Mhz/ -100	OPEN	OPEN	OPEN	CLOSE
60Mhz/ -120	CLOSE	OPEN	CLOSE	OPEN
66Mhz/ -133	CLOSE	OPEN	OPEN	CLOSE
60Mhz/ -150	CLOSE	CLOSE	CLOSE	OPEN
66Mhz/ -166	CLOSE	CLOSE	OPEN	CLOSE

(\*) : default setting

- CPU Voltage Selection - 2.5V, 2.9V, 3.3V, or 3.45V

Please note the 2.5V/2.9V is designed for the future dual supply CPU operation. The dual supply CPU requires 2.5V for CPU core logic and 3.3V for I/O.

CPU Voltage	JP3	JP4	JP5
2.5V (P55C)	1-2	7 - 8 9 - 10 11 - 12	2-3
2.9V	1-2	7 - 8 9 - 10 11 - 12	1-2
* 3.3V	1-2	1 - 2 3 - 4 5 - 6	2-3
3.45V	2-3	1 - 2 3 - 4 5 - 6	2-3

(\*) : default setting

- CPU type setting (reserved) :

CPU Type	JP7
*P54C/K5	OPEN
M1	CLOSE

(\*) : default setting

---

## 2.5 Upgrade the External Cache

The PSC-586VGA designed pipelined burst Cache RAM slot to accept 256KB,512KB,1MB Cache RAM module. The slot is U3. When you install the Cache RAM module, please try to test it before you buy it. Because some Cache RAM module's quality and performance is no good,will possible have compatible problem. And please set the cache RAM module to Async. or Sync. jumper setting correctly.

Cache Type	JP1	JP2
Async. Cache	1-2	OPEN
* Sync. Cache	2-3	CLOSE

(\*) default setting

---

## 2.6 System Memory DRAM(EDO RAM supported)

There are four 72-pin SIMM sockets to accept 1MB,2MB,4MB,8MB,16MB,or 32MB memory modules. The total capacity is from 2MB to 128MB. Customers have to install **at least 2pcs RAM module on board**, SIMM Socket 1,2 or 3,4. From left side to right side,the SIMM sockets are **SIMM 1, SIMM 3,SIMM 2,SIMM 4**.

---

## 2.7 Watch-Dog Timer

The Watch-Dog Timer is enabled by reading port 443H. It should be triggered before the time-out period ends, otherwise it will assume the program operation is abnormal and will issue a reset signal to start again, or activate NMI to CPU. The Watch-Dog Timer is disable by reading port 043H.

- **JP13 : Watch-Dog Active Type Setting**

JP13	DESCRIPTION
* 1-2	RESET WHEN WDT TIME-OUT

2-3	ACTIVATE NMI TO CPU WHEN WDT TIME-OUT
OPEN	DISABLE WDT

(\*): default setting

• **JP16: WDT Time-Out Period**

PERIOD	1-2	3-4	5-6	7-8
1 sec.	OPEN	OPEN	CLOSE	OPEN
2 sec.	OPEN	OPEN	CLOSE	CLOSE
<b>*10 sec.</b>	<b>OPEN</b>	<b>CLOSE</b>	<b>OPEN</b>	<b>OPEN</b>
20 sec.	OPEN	CLOSE	OPEN	CLOSE
110 sec.	CLOSE	OPEN	OPEN	OPEN
220 sec.	CLOSE	OPEN	OPEN	CLOSE

(\*) : default setting

## 2.8 FDC37C665/ALI M5113 Multi-I/O Chip

The PSC-586VGA equipped with super multi-I/O chip SMC FDC37C665 or ALI M5113, you can select JP14 or JP15 to enable or disable the multi-I/O Chipset.

• **JP14/JP15 : Multi-I/O Chipset Setting**

Enable/Disable MIO	JP14	JP15
<b>* Enable FDC37C665</b>	OPEN	OPEN
<b>Disable FDC37C665</b>	CLOSE	OPEN
<b>* Enable M5113</b>	OPEN	1-2
<b>Disable M5113</b>	CLOSE	2-3

(\*) : default setting

## 2.9 PCI VGA Controller

The PSC-586VGA have built-in Cirrus GD54M30 PCI VGA Controller. If you want to use the external VGA Card,PCI or ISA bus,the BIOS will automatic disable the on board VGA controller and to use the external one.

To get more VGA drivers information,please refer the Cirrus Internet address : **WWW.CIRRUS.COM**

Or BBS at Taiwan : Cirrus - 886 2 7185173  
- 886 2 5147675

# 3

## Connection

This chapter describes how to connect peripherals, switches and indicators to the PSC-586VGA board.

### 3.1 Floppy Disk Drive Connector

PSC-586VGA board equipped with a 34-pin daisy-chain driver connector cable.

#### • CN8 : FDC CONNECTOR

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	2	REDUCE WRITE
3	GROUND	4	N/C
5	GROUND	6	N/C
7	GROUND	8	INDEX#
9	GROUND	10	MOTOR ENABLE A#
11	GROUND	12	DRIVE SELECT B#
13	GROUND	14	DRIVE SELECT A#
15	GROUND	16	MOTOR ENABLE B#
17	GROUND	18	DIRECTION#
19	GROUND	20	STEP#
21	GROUND	22	WRITE DATA#
23	GROUND	24	WRITE GATE#
25	GROUND	26	TRACK 0#
27	GROUND	28	WRITE PROTECT#
29	GROUND	30	READ DATA#
31	GROUND	32	SIDE 1 SELECT#
33	GROUND	34	DISK CHANGE#

---

## 3.2 PCI E-IDE Disk Drive Connector

You can attach four IDE( Integrated Device Electronics) hard disk drives to the PSC-586VGA IDE controller.

**CN7(IDE 1) : Primary IDE Connector**

**CN6(IDE 2) : Secondary IDE Connector**

**• CN6/CN7: IDE Interface Connector**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RESET#	2	GROUND
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	GROUND	20	N/C
21	N/C	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	N/C	28	BALE - DEFAULT
29	N/C	30	GROUND - DEFAULT
31	INTERRUPT	32	IOCS16#-DEFAULT
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND

---

### 3.3 Parallel Port

This port is usually connected to a printer, The PSC-586VGA includes an on-board parallel port, accessed through a 26-pin flat-cable connector CN10.

• **CN10 : Parallel Port Connector**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
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	PRINTER SELECT	14	AUTO FORM FEED #
15	ERROR#	16	INITIALIZE
17	PRINTER SELECT LN#	18	GROUND
19	GROUND	20	GROUND
21	GROUND	22	GROUND
23	GROUND	24	GROUND
25	GROUND		

---

### 3.4 Serial Ports

The PSC-586VGA offers two high speed NS16C550 compatible UARTs with Read/Receive 16 byte FIFO serial ports.

• **CN14 : Serial Port DB-9 Connector( ACE0 )**

PIN NO.	DESCRIPTION
1	DATA CARRIER DETECT (DCD)
2	RECEIVE DATA (RXD)
3	TRANSMIT DATA (TXD)
4	DATA TERMINAL READY (DTR)
5	GROUND (GND)
6	DATA SET READY (DSR)
7	REQUEST TO SEND (RTS)
8	CLEAR TO SEND (CTS)
9	RING INDICATOR (RI)

• **CN13 : Serial Port 10-pin Header( ACE1)**

Pin No.	Description	Pin No.	Description
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTX
7	DTR	8	RI
9	GND	10	NC

---

### 3.5 Keyboard Connector

The PSC-586VGA provides two keyboard connectors.

• **CN5 : 5-pin Header Keyboard Connector**

PIN NO.	DESCRIPTION
1	KEYBOARD CLOCK
2	KEYBOARD DATA
3	N/C
4	GROUND
5	+5V

• **CN15 : 6-pin Mini-DIN Keyboard Connector**

PIN NO.	DESCRIPTION
1	KEYBOARD DATA
2	N/C
3	GROUND
4	+5V
5	KEYBOARD CLOCK
6	N/C

---

### 3.6 External Switches and Indicators

There are many external switches and indicators for monitoring and controlling your CPU board.

- **CN1 : POWER LED & KEYLOCK**

PIN NO.	DESCRIPTION
1	POWER LED ANODE
2	KEY
3	GROUND
4	KEYLOCK
5	GROUND

- **CN3 : RESET BUTTON**

PIN NO.	DESCRIPTION
1	EXTERNAL RESET
2	GROUND

- **CN4 : IDE LED connector**

PIN-NO	DESCRIPTION
1	+5V
2	HDD ACTIVE#

---

### 3.7 External Speaker

The PSC-586VGA has its own buzzer, you also can connect to the external speaker through the connector CN2.

- **CN2 : Speaker Connector**

PIN NO.	DESCRIPTION
1	SPEAKER SIGNAL
2	NC
3	GROUND
4	+5V

---

### 3.8 PS/2 Mouse 6-pin Mini-DIN Connector

- **CN12 : PS/2 Mouse Connector**

PIN NO.	DESCRIPTION
1	MS DATA
2	NC
3	GROUND
4	+5V
5	KBT1
6	NC

---

### 3.9 VGA Connector

The PSC-586VGA built-in 15pin VGA connector directly to your CRT monitor and a 26-pin header Feature Connector for any speical application,for example to drive EL flat panel.

#### • CN11 : 15-pin Female VGA Connector

1	RED	2	GREEN
3	BLUE	4	NC
5	GROUND	6	GROUND
7	GROUND	8	GROUND
9	NC	10	GROUND
11	NC	12	NC
13	HSYNC	14	VSYNC
15	NC		

#### • CN9 : 13x2 26-pin Video Feature Connector

1	Ground	14	PD0
2	Ground	15	PD1
3	Ground	16	PD2
4	Select Internal Video	17	PD3
5	Select Internal Sync	18	PD4
6	Select Internal Dot Clock	19	PD5
7	Not Used	20	PD6
8	Ground	21	PD7
9	Ground	22	DAC Clock
10	Ground	23	DAC Blanking
11	Ground	24	Horizontal Sync
12	Not Used	25	Vertical Sync
13	Not Used	26	Ground

# 4

## AMI BIOS Setup

The PSC-586VGA uses the AMI PCI/ISA BIOS for system configuration. The AMI BIOS setup program is designed to provide maximum flexibility in configuring the system by offering various options which may be selected for end-user requirements. This chapter is written to assist you in the proper usage of these features.

---

### 4.1 Getting Start

When power on the system, the BIOS will enter the Power-On-Self-Test routines. These routines will be executed for system test and initialization and system configuration verification. After the POST routines are completed, the following message appears :

**" Hit DEL if you want to run SETUP"**

To access AMI PCI/ISA BIOS Setup program, press <Del> key. The following screen will be displayed at this time.

---

## 4.2 Standard Setup

The Standard Setup is used for basic hardware system configuration. The main function is for Date/Time setting and Floppy/Hard Disk Drive setting. Please refer the following screen for this setup.

**Mode Setting for >528MB IDE HDD**

When the IDE hard disk drive you are using is larger than 528MB, please set the HDD mode to **LBA** mode. Please use the IDE Setup Utility in BIOS SETUP to install the HDD correctly.

---

### **4.3 Advanced Setup**

This advanced setup is designed for customer's tuning best performance of the PSC-586VGA board. As for normal operation customers don't have to change any default setting. The default setting is pre-set for most reliable operation. Please refer the following screen for the Advanced Setup.



**System Keyboard :**

**Absent/Present** - Will check or not check the keyboard exist when power on system.

**Primary Display :**

**Absent** - Will not check display card when power on system.

**VGA/EGA,CGA40x25,CGA80x25,or Mono** - Options for different display device.

**Mouse Support :**

**Enable/Disable** - Turn on the PS/2 mouse function.

When use the PS/2 mouse will use the IRQ12.

**Video Shadow C000,32K:**

**Enable** - Will increase the video speed.

**Shadow C800-CFFFF,D000-D7FFF,& D800-DFFFF :**

When the installed add-on card's ROM address is as above address,you could enable the shadow to get higher operation performance.When you enable the shadow function,it will also reduce the memory available by between 640KB and 1024KB.

---

## **4.4 Chipset Setup**

This setup functions are almostly working for ChipSet(ALI M1511/M1512/M1513). These options are used to change the ChipSet's registers. Please carefully change any default setting ,otherwise the system could be running un-stable.

**AT Bus Clock :**

**7.16Mhz :** The default setting will be fixed at 7.16Mhz bus clock even installed different speed CPU.

**CLK/4,5,6,8,10,12 :** CPU clock(50MHz,60MHz,or 66Mhz,

dependent on different CPU speed) divides 4,5,6,8,10,or 12 to get the AT Bus Clock.

**Parity error check for chipset :**

**Enable/Disalbe :** BIOS check the DRAM parity or not.

Usually the DRAM module did not have parity function now.

---

## **4.5 Peripheral Setup**

This setup is almost working for Multi-I/O Chip(ALI M5113 or SMC37C665). These options are used to change the ChipSet's registers. Please carefully change any default setting to meet your application need perfectly.

### **Programming Mode :**

**Auto** - Setting the following ports on default value

OnBoard FDC : Enable

OnChip IDE : Enable

Serial Port1 : 3F8H

Serial Port2 : 2F8H

Parallel Port : 378H

**Manual** - customers choose the following ports' optional setting.

OnBoard FDC : Enable/Disable

OnChip IDE : Enable/Disable

Serial Port1 : Disable/3F8H/3E8H/2E8H

Serial Port2 : Disable/2F8H/3E8H/2E8H

Parallel Port : Disable/3BCH/378H/278H

---

## **4.6 Power Management Setup**

Power Management Setup help user handles the PSC-586VGA board's "green" function. The features could shut down the video display and hard disk to save energy for example. The power management setup screen is as following,

## Appendix A. Watch-Dog Timer

The Watch-Dog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that caused the CPU to crash. This condition may have occurred by external EMI or a software bug. When the CPU stops working correctly, hardware on the board will either perform a hardware reset (cold boot) or a non-maskable interrupt (NMI) to bring the system back to a known state.

The Watch-Dog Timer is controlled by two I/O ports.

443 (hex)	Read	Enable the refresh the Watch-Dog Timer.
043 (hex)	Read	Disable the Watch-Dog Timer.

To enable the Watch-Dog Timer, a read from I/O port 443H must be performed. This will enable and activate the countdown timer which will eventually time out and either reset the CPU or cause an NMI depending on the setting of JP13. To ensure that this reset condition does not occur, the Watch-Dog Timer must be periodically refreshed by reading the same I/O port 443H. This must be done within the time out period that is selected by jumper group JP16.

A tolerance of at least 30% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can

be very time consuming. Therefore if the time out period has been set to 10 seconds, the I/O port 443H must be read within 7 seconds.

---

Note: when exiting a program it is necessary to disable the Watch-Dog Timer, otherwise the system will reset.

---

```

10     REM EXAMPLE PROGRAM
11     REM WATCH-DOG TIMER == WDT
20     GOSUB 5000 REM ENABLE AND REFRESH THE WDT
30     GOSUB 1000 REM TASK 1, 2 SECS
40     GOSUB 5000 REFRESH THE WDT
50     GOSUB 2000 REM TASK 2, 3 SECS
60     GOSUB 6000 REM DISABLE THE WDT
70     GOSUB 3000 REM TASK 3, 5 SECS
80     GOSUB 5000 REM ENABLE AND REFRESH THE WDT
90     GOTO 30

1000    REM SUBROUTINE #1
        2 SECONDS TO COMPLETE
1070    RETURN

2000    REM SUBROUTINE #2
        3 SECONDS TO COMPLETE
2070    RETURN

5000    REM SUBROUTINE TO ENABLE AND RESET WDT
5010    X = INP( &H443) REM ENABLE AND REFRESH TIMER
5020    RETURN

6000    REM SUBROUTINE TO DISABLE THE WDT
6010    X = INP( &H43) REM RESET WDT
6020    RETURN

```