



**ASC486 Ver. C**  
**Advanced 486/P24T**  
**Single Board Computer**



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## Introduction

Welcome to the ASC486 ISA 486/P24T Single Board Computer. The ASC486 board is an ISA and PC/104 form factor board, which is equipped with high performance Intel 80486/P24T based CPU, designed for the system manufacturers, integrators, or VARs that want to provide all the performance, reliability, and quality at a reasonable price.

The ASC486 is a high performance AT bus architecture board. The 80486/P24T microprocessor used on this board is the most powerful CPU available today. This board takes full advantage of the 486's/P24T's capabilities to provide the processing speed you need for even the most demanding applications.

The most outstanding feature in the ASC486 is built-in PC/104 expansion bus. Based on the PC/104 bus, you could easily install over thousands of PC/104 modules from hundreds' vendors in the world. The ASC486 has external power connector that could let it to connect with power supply directly. It is more suitable for your standalone applications.

Accepting 8 SIMM modules, the ASC486 provides on-board memory capability up to 128MB. An on-board Dallas RTC DS12887(with 128B) with a projected life of ten years maintains setup data. Connectors are also provided for external reset, speaker, key lock, and keyboard.

A super AT I/O chip UM82C863F is used in the ASC486 board. It has a flexible configuration that is controlled by jumper

settings or software programming, and the device's support functions can be easily enabled or disabled.

ASC486 uses the ALI chipset, M1429 and M1431, which are 100% ISA compatible chip set.

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### **Features**

The ASC486 486/P24T Advanced Single Board Computer provides the following advanced features:

- PC/104 expansion bus compatible
- Multi-CPU capability M6/M7/486SX/DX/DX2/P24T
- Fully PC/AT compatible with 7 DMA channels
- Fully PC/AT compatible with 16 interrupt levels
- 8 SIMM sockets for up to 128 MB RAM
- Up to 1MB Cache Memory
- On-board Dallas RTC DS12887 with 128B of COMS SRAM
- Up to two embedded IDE Drive interface
- Up to two floppy drives, the drive types can be 360KB, 720KB, 1.2MB, or 1.44MB
- Two RS-232 serial ports interface
- Bi-directional parallel ports
- Dimension: 4.75"(W) x 13.25(L) x 0.7"(H), standard AT form factor
- Power Requirement: +5V +-5% @ 3A(est.), Power requirement will vary with configuration
- Operating temperature : 0 degree ~ 60 degree C

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## 1.1 What You Have

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

- ASC486 Advanced Single Board Computer
- Printer Cable
- FDD/HDD Cable
- 6-pin Mini-Din to 5-pin Din Keyboard Adapter Cable
- PC/104 Mounting Kit

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 ASC486. At first, the layout of ASC486 is shown, and all the connectors on the ASC486 board will be described. The unpacking information that you should be careful is described. The jumpers and switches setting for the ASC486's configuration, such as CPU speed, CPU type, and external cache SRAM, is also included.

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### 2.1 ASC486's Layout

< reference next page >

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## 2.2 Unpacking

Your ASC486 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.**

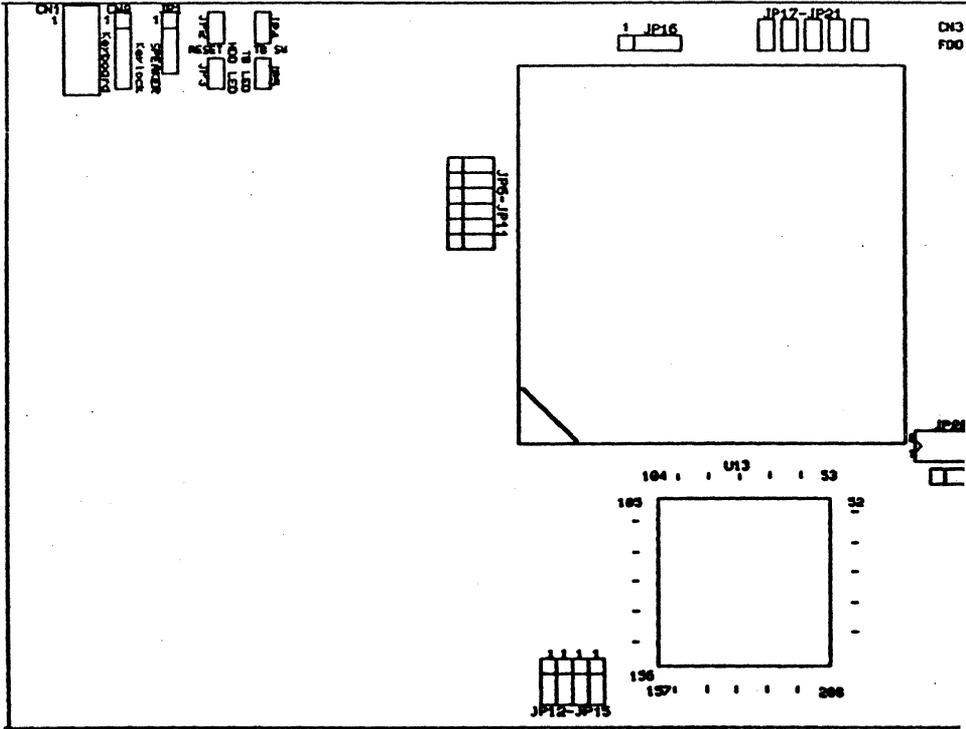
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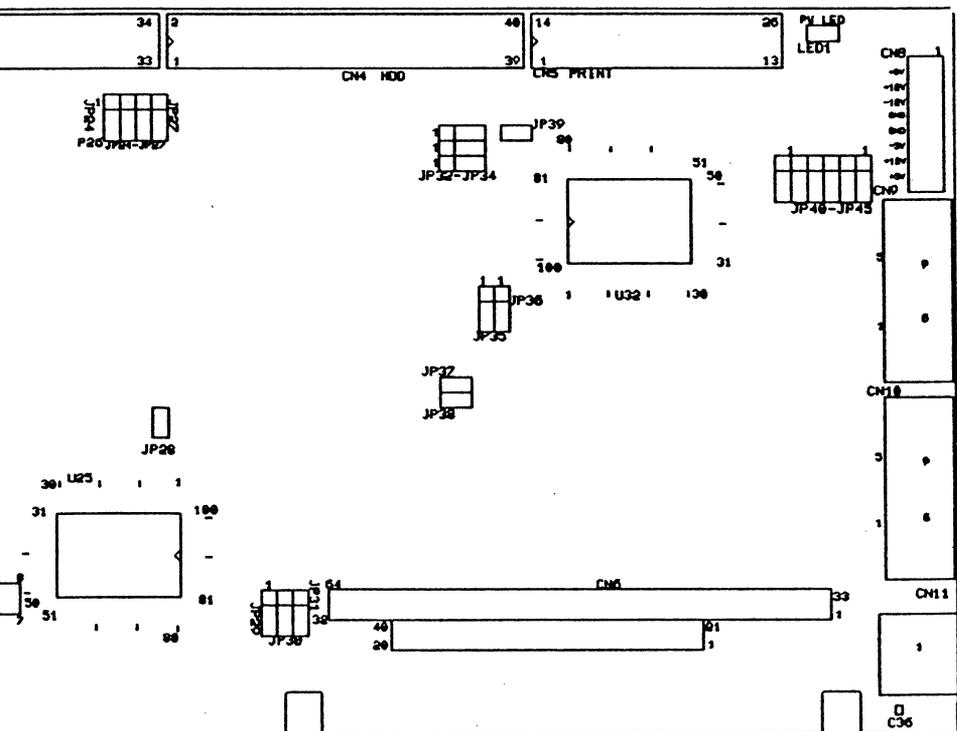
You are now ready to install your ASC486 Single Board Computer.

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## 2.3 Jumper and Connector Description

You can change the ASC486'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.

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## 2.4 External Power Connector

The ASC486 has an on-board external power connector CN8.

### • CN8: EXTERNAL POWER CONNECTOR

PIN NO.	DESCRIPTION
1	+5V
2	+12V
3	-12v
4	GROUND
5	GROUND
6	-5V
7	+12V
8	+5V

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## 2.5 Parallel Port Interface

The on-board parallel port is CN5. This port can be set I/O address to 378H~37FH or 278H~27FH by jumper JP33. Also, the port's interrupt can be set to IRQ7 or IRQ5 by jumper JP31.

The ASC486 allows installation of up to three parallel ports. These three ports are called: LPT1, LPT2, and LPT3. The printer port on the Monochrome/Printer Adapter that is addressed at 3BCH~3BEH will be LPT1 when it is installed. Then the port's address 378H~37FH will be LPT2, and 278H~27FH will be LPT3. If the Monochrome/Printer Adapter is used instead of Color/Graphic Adapter, then the 378H~37FH will be LPT1, and 278H~27FH will be LPT2.

Parallel port can also be enable or disable by jumper JP43.

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## 8 • Installation

• **JP33 : Printer Port I/O Address Setting**

<b>JP33</b>	<b>DESCRIPTION</b>
1-2	378H~37FH ( Default)
2-3	278H~27FH

• **JP31 : Printer Port Interrupt Setting**

<b>JP31</b>	<b>DESCRIPTION</b>
1-2	IRQ7 (Default)
2-3	IRQ5

• **JP43 : Printer Port Setting**

<b>JP43</b>	<b>DESCRIPTION</b>
1-2	ENABLE
2-3	DISABLE

• **JP39 : Parallel Data Bus Input/Output Control**

<b>JP39</b>	<b>DESCRIPTION</b>
OPEN	PARALLEL DATA BUS INPUT ENABLE
CLOSE	PARALLEL DATA BUS INPUT DISABLE, OUTPUT ENABLE (DEFAULT)

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Note : If JP39 sets to close, then the input signal from external parallel interface device will destroy the UM82C863F multiple Input/Output chip.

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• **CN5 : 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	IOW#	24	GROUND
25	GROUND		

## 2.6 Serial Port Interface

There are two on-board RS-232 serial ports interface, CN9(ACE0) and CN10(ACE1). The serial ports can be configured as COM1, COM2, COM3, and COM4 by jumper JP41 and JP44. These ports can also be enable or disable by jumper JP42 and JP45. The interrupt of these ports can be set by jumper JP29 and JP30.

• **JP41&JP44 : Serial Port I/O Address Setting**

JUMPER	SETTING	DESCRIPTION
<b>JP41</b>	1-2	ACE0 I/O ADDRESS 3F8H~3FF (Default)
	2-3	ACE0 I/O ADDRESS 3E8H~3EFH
<b>JP44</b>	1-2	ACE1 I/O ADDRESS 2F8H~2FFH (Default)
	2-3	ACE1 I/O ADDRESS 2E8H~2EFH

• **JP29&JP30 : Serial Port Interrupt Setting**

JUMPER	SETTING	DESCRIPTION
JP29	1-2	ACE0 INTERRUPT SET TO IRQ4 (Default)
	2-3	ACE0 INTERRUPT SET TO IRQ3
JP30	1-2	ACE1 INTERRUPT SET TO IRQ3 (Default)
	2-3	ACE1 INTERRUPT SET TO IRQ4

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Note: DO NOT use the same IRQ for ACE0 and ACE1

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• **JP42&JP45 : Serial Port Setting**

JUMPER	SETTING	DESCRIPTION
JP42	1-2	ENABLE ACE0 ( Default)
	2-3	DISABLE ACE0
JP45	1-2	ENABLE ACE1 ( Default)
	2-3	DISABLE ACE1

• **CN9&CN10 : Serial Port Connector  
(CN9=ACE0 & CN10=ACE1)**

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

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## 2.7 IDE Host Adapter Interface

A 40-pin header type connector, CN4, is to interface with up to two embedded drives. This interface can be enable or disable by JP32.

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Note: If you want to have another hard disk controller to work with this board, i.e., a ST-506/412 Disk controller, make sure to disable the on-board IDE interface. The IDE interface uses the same port address as the ST-506/412 controller. The system will fail to recognize any hard drive if the external control card and on-board interface are enable at the same time.

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• **JP3: HDD LED connector**

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

• **JP32: HDD Controller Setting**

JP32	DESCRIPTION
1-2	ENABLE IDE HDC
2-3	DISABLE IDE HDC

• **JP40: Reverse Jumper For Special Designed XT IDE Interface**

JP40	DESCRIPTION
1-2	XT HDC
2-3	NOT XT HDC (DEFAULT)

• **CN4: 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

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## 2.8 Floppy Disk Controller(FDC)

The ASC486 provides a 34-pin header type connector, CN3, for supporting up to two floppy drivers. The floppy drives may be any one of the following types: 5.25" 360K/1.2MB and 3.5" 720K/1.44MB. The on-board Floppy Disk controller can be enable or disable by JP34.

### • JP34 : FLOPPY DISK CONNECTOR SETTING

JP34	DESCRIPTION
1-2	ENABLE FDC
2-3	DISABLE FDC

• **CN3 : FDC CONNECTOR**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	2	REDUCE WRITE CURRENT#
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#

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## 2.9 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.

The Watch-Dog Timer time-out period can be set 0.5, 1.0, 2.5 and 5 sec by jumper JP36 and JP37.

• **JP35: Watch-Dog Timer Setting**

JP35	DESCRIPTION
1-2	RESET WHEN WDT TIME-OUT
2-3	ACTIVATE NMI TO CPU WHEN WDT TIME-OUT
X	DISABLE WDT

• **JP37& JP36 : WDT TIME-OUT PERIOD**

PERIOD	JP37	JP36
500ms	CLOSE	1-2
1 sec	OPEN	1-2
2.5 sec	CLOSE	2-3
5 sec	OPEN	2-3

• **JP28: Custom Request For RTC Clear Function**

JP28	DESCRIPTION
OPEN	NO RTC CLEAR FUNCTION (DEFAULT)
CLOSE	RTC CLEAR, HAVE TO BUILD-IN DALLAS 12887A CHIP

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Note : If 12887A is built-in and JP28 is closed, then the CMOS data in 12887A will be clear . After clearing the data, you have to open the JP28 for normal operation.

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## 2.10 Display Mode

• **JP38 : DISPLAY MODE SETTING**

JP38	DESCRIPTION
CLOSE	COLOR DISPLAY (CGA)
OPEN	MONOCHROME DISPLAY (MDA, MGA, HGC)

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## 2.11 Keyboard Connector

There are two keyboard connectors- CN1 is a 5-pin head type and CN11 is a Mini-Din type.

- **CN1 & CN11 : KEYBOARD CONNECTORS**

CN1	CN11	DESCRIPTION
1	5	KEYBOARD LOCK
2	1	KEYBOARD DATA
3	2	N/C
4	3	GROUND
5	4	+5V

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## 2.12 Power LED and KeyLock

- **CN2 : POWER LED & KEYLOCK**

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

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## 2.13 Speaker

- **JP1 : SPEAKER**

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

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## 2.14 External Reset Connector

- **JP2 : RESET BUTTON**

PIN NO.	DESCRIPTION
1	EXTERNAL RESET
2	GROUND

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## 2.15 Turbo Mode

- **JP4 : TURBO SWITCH**

PIN NO.	DESCRIPTION
1	PULL HIGH
2	TURBO SIGNAL(NORMAL PULL LOW)

- **JP5 : TURBO LED**

PIN NO.	DESCRIPTION
1	TURBO LED ANODE(+)
2	TURBO LED CATHODE(-)

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## 2.16 Upgrade the CPU

If you want to upgrade the CPU, you must do three things:

1. Set the jumpers for CPU type.
2. Adjust the jumpers setting for CPU speed.
3. Set the jumpers for CPU Clock System.

• **CPU TYPE SETTING:**

CPU TYPE	486SX	487SX	486DX/ DX2	Cx486S	Cx486S2	P24T
JP6	1-2	1-2	1-2	1-2	2-3	2-3
JP7	1-2	1-2	1-2	1-2	1-2	2-3
JP8	1-2	2-3	2-3	1-2	1-2	2-3
JP12	1-2	1-2	1-2	1-2	1-2	2-3
JP13	1-2	1-2	1-2	2-3	1-2	1-2
JP14	1-2	1-2	1-2	2-3	2-3	1-2
JP16	OFF	1-2	2-3	3-4	3-4	1-2
JP17	OPEN	OPEN	OPEN	OPEN	CLOSE	CLOSE
JP18	CLOSE	CLOSE	CLOSE	OPEN	OPEN	CLOSE
JP19	OPEN	OPEN	OPEN	CLOSE	CLOSE	OPEN
JP20	OPEN	OPEN	OPEN	CLOSE	CLOSE	OPEN
JP21	OPEN	CLOSE	CLOSE	OPEN	OPEN	CLOSE

• **CPU CLOCK GENERATOR SPEED SETTING**

There are two CPU clock generators in the ASC486, one is internal RTC using chipset 1429, and another is external RTC using M5425. The jumper JP11 is used to select which RTC used. If external RTC is selected, then CPU clock generator speed is set by JP9 and JP10. Otherwise, the JP23 is used to set the CPU clock generator speed.

. **JP11 : RTC SETTING**

JP11	DESCRIPTION
1-2	INTERNAL RTC
*2-3	EXTERNAL RTC

(\*) : default setting

. **JP9 & JP10 : INTERNAL CPU CLOCK GENERATOR SPEED SETTING**

	JP9	JP10
50MHz	2-3	2-3
66MHz	2-3	1-2
80MHz	1-2	2-3

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Note: The internal RTC is not available yet, so we strongly recommend to use the external RTC.

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**. JP23 : EXTERNAL CPU CLOCK GENERATOR SPEED SETTING**

JP23	1-2	3-4	5-6	7-8
25MHz	OPEN	OPEN	OPEN	CLOSE
40MHz	CLOSE	CLOSE	OPEN	OPEN
33.3MHz	CLOSE	OPEN	OPEN	OPEN
50MHz	OPEN	CLOSE	OPEN	OPEN
50MHz	OPEN	OPEN	CLOSE	CLOSE
66.6MHz	CLOSE	OPEN	CLOSE	OPEN
*66.6MHz	OPEN	CLOSE	CLOSE	OPEN
80MHz	CLOSE	CLOSE	CLOSE	OPEN

(\*): default setting

**• CPU CLOCK SYSTEM SETTING:**

There are two CPU Clock Systems can be selected : double frequency (2X ) or single frequency (1X). The different Clock System is set by JP15 and JP46. The relationships of CPU's frequency and Clock Generator frequency can be explained as the following formula:

<b>Double Frequency System : Clock Generator's Speed = 2 X CPU SPEED</b>
<b>Single Frequency System : Clock Generator's Speed = 1 X CPU SPEED</b>

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Note: To get more accurate execution clock, we strongly recommend to use double frequency system.

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	JP15	JP46
*Double Frequency system	1-2	1-2
Single Frequency system	2-3	2-3

(\*) : default setting

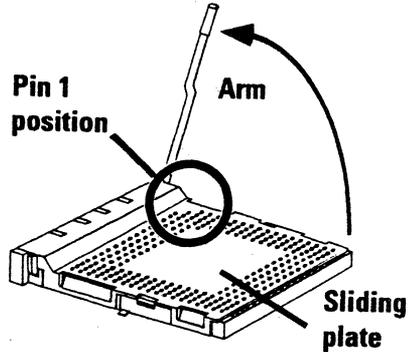
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Note : The jumper setting of 486DX-33 and 486DX2-66 are the same. Also, 486DX-25 and 486DX2-50 have the same jumper setting.

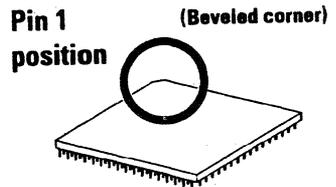
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## 2.17 Installing CPU chip in ZIF socket

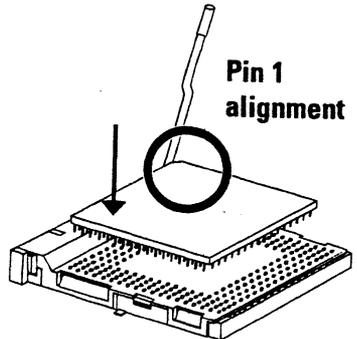
1. Make sure the ZIF socket arm is up in the "open position". The Pin1 corner is at the arm corner.



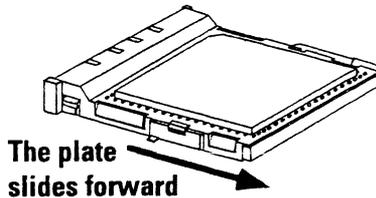
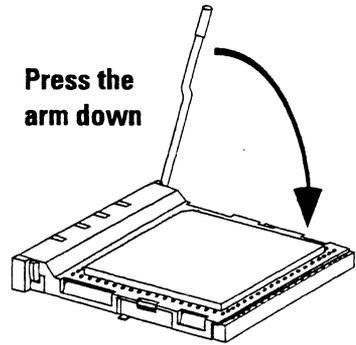
2. Align the CPU so its Pin1 corner is at the Pin 1 corner of the ZIF socket and the pins on the bottom are aligned with the holes in the socket.



3. Place the CPU in the socket. It should insert very easily. If it doesn't, pull the arm up more.



**4. Press the arm downwards.** The top plate will slide in that direction. You will feel some resistance about half-way down as the pressure starts to secure the CPU in the socket. This is normal and won't damage the CPU. When the CPU is installed, the arm should snap into place at the side of the socket.



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**Note:** When you use 486DX2-50/66 or 486DX-50 CPU, we strongly recommend you to add CPU cooler. Otherwise, the system may be not reliable.

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## 2.18 Update the External Cache

- **Various SRAM configurations:**

SIZE	SRAM	BANK	JP22	JP24	JP25	JP26	JP27
32KB	8Kx8	0	OPEN	OPEN	OPEN	2-3	1-2
64KB	8Kx8	0,1	9-10	OPEN	OPEN	1-2	1-2
128KB	32Kx8	0	7-8, 9-10	OPEN	2-3	1-2	2-3
256KB	32Kx8	0,1	5-6,7-8, 9-10,	OPEN	1-2	1-2	2-3
512KB	128Kx8	0	3-4,5-6 7-8, 9-10,	2-3	1-2	1-2	2-3
1MB	128Kx8	0,1	1-2,3-4, 5-6, 7-8, 9-10	1-2	1-2	1-2	2-3

Bank 0 : U23 ~ U20 , Bank 1 : U30 ~ U27 , Tag RAM = U24;  
SRAM Speed = less than 20ns ,  
Tag RAM Speed = less than 15ns;

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## 2.19 System Memory DRAM

The system DRAM on board is divided into two banks, Bank 0 and 1. Each bank has four sockets for SIMM( Single-In-Line-Memory Module). Each socket can accept either a 256KB, 1MB, 4MB, or 16MB module. This means each bank can have 1MB, 4MB, 16MB, or 64MB of memory installed. A bank must be completely filled in order to work properly so the minimum possible amount of memory allowable is 1MB.

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Note : The banks have to be used in sequence and within a bank you must use only one size of SIMM module. See the following table for a possible combination.

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DRAM SIZE	Bank 0	Bank 1
1MB	256Kx9X4pcs	
2MB	256Kx9X4pcs	256Kx9X4pcs
4MB	1Mx9x4pcs	
8MB	1Mx9x4pcs	1Mx9x4pcs
20MB	1Mx9x4pcs	4Mx9x4pcs
16MB	4Mx9x4pcs	
32MB	4Mx9x4pcs	4Mx9x4pcs
64MB	16Mx9x4pcs	
128MB	16Mx9x4pcs	16Mx9x4pcs

Bank 0 : U8 ~ U5; Bank1: U4 ~ U1

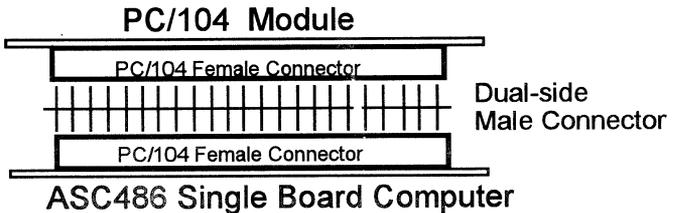
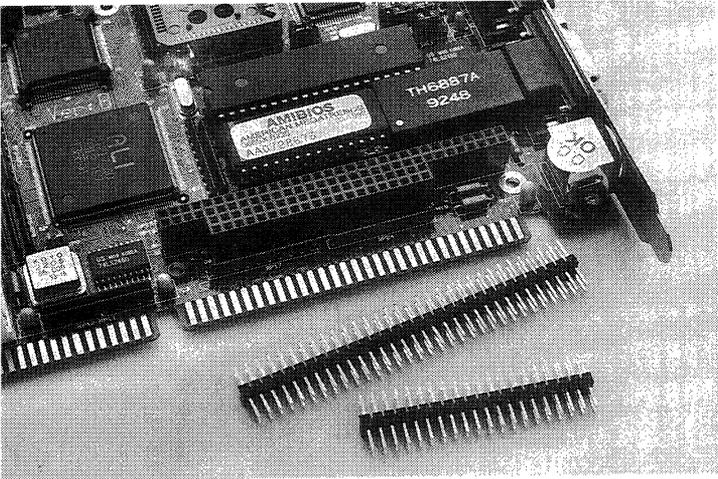
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## 2.20 PC/104 Installation Guide

There are two steps to install the PC/104 module on ASC486 Advanced Single Board Computer.

1. Plug the **Dual Side Male Connector** into the ASC486's PC/104 female connector.

2. Plug the PC/104 module's female connector into the ASC486's male connector.



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## 2.21 PC/104 Connection Bus

### CN6/CN7 PC/104 Bus signal Assignments

<u>Pin Number</u>	<u>J1/P1 Row A</u>	<u>J1/P1 Row B</u>	<u>J2/P2 Row C</u>	<u>J2/P2 Row D</u>
0	--	--	0V	0V
1	IOCHCHK*	0V	SBHE*	MEMCS16*
2	SD7	RESETDRV	LA23	IOCS16*
3	SD6	+5V	LA22	IRQ10
4	SD5	IRQ9	LA21	IRQ11
5	SD4	-5V	LA20	IRQ12
6	SD3	DRQ2	LA19	IRQ15
7	SD2	-12V	LA18	IRQ14
8	SD1	ENDXFR*	LA17	DACK0*
9	SD0	+12V	MEMR*	DRQ0
10	IOCHRDY	(KEY)	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	+5V
17	SA14	DACK1*	SD14	MASTER*
18	SA13	DRQ1	SD15	0V
19	SA12	REFRESH*	(KEY)	0V
20	SA11	SYSCLK	--	--
21	SA10	IRQ7	--	--
22	SA9	IRQ6	--	--
23	SA8	IRQ5	--	--
24	SA7	IRQ4	--	--
25	SA6	IRQ3	--	--
26	SA5	DACK2*	--	--
27	SA4	TC	--	--
28	SA3	BALE	--	--
29	SA2	+5V	--	--
30	SA1	OSC	--	--
31	SA0	0V	--	--
32	0V	0V	--	--

#### NOTES:

1. Rows C and D are not used on 8-bit modules.
2. P2 has two connector options with differing physical pinout orientation.
3. B10 and C19 are key locations.
4. Signal timing and function are as specified in P996.
5. Signal source/sink current differ from P996 values.

# Appendix A. UM82C863F Software Switch Description

## Configuration Register Definition

### (1). CR0( I/O 109H, Read/Write)

Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7
FEN	S0EN	S1EN	PEN	HEN	GEN	R	R

CR0<0> = 1 FDC enable

= 0 FDC disable

CR0<1> = 1 Serial Port 0 enable

= 0 Serial Port 0 disable

CR0<2> = 1 Serial Port 1 enable

= 0 Serial Port 1 disable

CR0<3> = 1 Parallel Port enable

= 0 Parallel Port disable

CR0<4> = 1 IDE enable

= 0 IDE disable

CR0<5> = 1 Game Port enable

= 0 Game Port disable

CR0<6> = Reserved

CR0<7> = Reserved

- \* Each block function can be individually disabled. While disabled, a block is isolated from the system, i.e., the block's input pins are disabled and output pins are tristate.
- \* If CR0 = 00H, the entire chip, including the clock input, is disabled.
- \* The game port is not available.

## (2). CR1( I/O 109H, Read/Write)

Bit0	Bit1	Bit2	Bit3	Bit4	Bit5	Bit6	Bit7
Fport	S0port	S1port	Pport	Hport	HDC	Pmode	TEST

- CR1<0> = 1 FDC Port Select 3F1 - 3F7  
= 0 FDC Port Select 371 - 377
- CR1<1> = 1 Serial Port 0 Port Select 3F8 - 3FF(COM1)  
= 0 Serial Port 0 Port Select 3E8 - 3EF(COM3)
- CR1<2> = 1 Serial Port 1 Port Select 2F8 - 2FF(COM2)  
= 0 Serial Port 1 Port Select 2E8 - 2EF(COM4)
- CR1<3> = 1 Parallel Port Select 378 - 37F  
= 0 Parallel Port Select 278 - 27F
- CR1<4> = 1 IDE Port Select 1F0 - 1F7  
= 0 IDE Port Select 170 - 177
- CR1<5> = 1 System has no IDE hard disk or other hard disk  
= 0 System has IDE hard disk or other hard disk
- CR1<6> = 1 AT mode parallel port(default)  
= 0 PS/2 compatible parallel port
- CR1<7> = 1 Normal mode  
= 0 Test mode

### Configuration Register

- \* INDEX PORT -- I/O 108H
- \* INDEX VALUE -- AAH(ENTER)
- \* INDEX VALUE -- 55H(LEAVE)
- \* INDEX VALUE -- COH(select CR0 register)
- \* INDEX VALUE -- C1H(select CR1 register)
- \* INDEX PORT -- I/O 109H

# Appendix B. UM82C863F's Example Programs

## Program for Selecting Software Switch Functions (Example)

```
code segment
  assume cs:code
  org 100h
start:
  cli
;Programming CR0 Register Set
```

```
  mov dx, 108h      ;Index Port 108H
  mov al, 0aah     ;Write Index Entry Valid
  out dx, al
  jmp $+2          ;I/O Delay
  jmp $+2          ;
  mov al, 0c0h     ;Select CR0
  out dx, al
  jmp $+2          ;I/O Delay
  jmp $+2          ;
  inc dx           ;I/O PORT 109H
  mov al, 11111110b
  out dx, al
  jmp $+2
  jmp $+2
  dec dx
```

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
R	R	GEN	HEN	PEN	S1EN	S0EN	FEN

### ;Programming CR1 Register Set

```
  mov al, 0aah     ;Write Index Entry Valid
  out dx, al
  jmp $+2          ;I/O Delay
  jmp $+2          ;
  mov al, 0c1h     ;Select CP1
  out dx, al
  jmp $+2          ;I/O Delay
  jmp $+2          ;
  inc dx           ;I/O Port 109H
  mov al, 11011111b
  out dx, al
  jmp $+2
  jmp $+2
```

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Test	Pmode	HDC	Hport	Pport	S1port	S0port	Fport

```
  dec dx           ;Index Port 108H
  mov al, 55h     ;Software Programming End
  out dx, al
  int 20h
Code ends
end Start
```

## Program for Checking State of Software Switch Functions (Example)

Software Valid Status in BX: BL = CR0 Status  
BH = CR1 Status

```
code segment
  assume cs:code
  org 100h
start:
  cli
```

### ;Read CR0 Register Status

```
  mov al,0aah ;Write Index Entry Valid
  mov dx,108h ;Index Port 108H
  out dx,al
  jmp $+2 ;I/O Delay
  jmp $+2
  mov al,0c0h ;Select cr0
  out dx,al
  jmp $+2
  jmp $+2
  inc dx ;I/O Port 109H
  in al,dx ;Read CR0
  mov bl,al
  jmp $+2
  jmp $+2
```

### ;Read CR1 Register Status

```
  dec dx ;Index Port 108H
  mov al,0aah ;Write Index Entry Valid
  out dx,al
  jmp $+2
  jmp $+2
  mov al,0c1h ;Select CR1 for Read
  out dx,al
  inc dx ;Out Port 109H (Read CR1)
  jmp $+2
  jmp $+2
  in al,dx ;Read CR1
  mov bh,al
  int 3h
```

```
Code ends
end Start
```

# Appendix C. AMI BIOS Notice

There are some special notices you should be known, as you use the AMI BIOS SETUP:

## 1. Enter AMI BIOS SETUP

- You can press <DEL> to go into the AMI BIOS SETUP instead

## 2. Standard COMS Setup

- If you do not want to use Keyboard or Monitor with ASC486 board, you have to set "Primary Display" and "Keyboard" to **Not Installed**.
- You should take care the "System Boot Up Sequence" either **C: , A: or A: , C: .**

## 3. Advanced Chipset Setup

- If you want to get higher execution performance, you should set "Auto Config. Setup" to **Disabled**; then change the "DRAM Read/Write Wait State" to **Fast** or **Fastest**. The setting is depend on DRAM's access speed and quality. The default setting of "Auto Config. Setup" is **Enabled**.
- When you only install single bank cache memory( 32KB, 128KB, or 512KB), the "External Cache WB/WT Feature" has to be set to **WT**. **WT** means Write Through; **WB** means Write Back.

## 4. Auto. Detect Hard Disk

- If you select this item, the proper hard disk type will be automatic setting in the Standard COMS Setup.

# Appendix D. 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 JP35. 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 JP36 and JP37.

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 5 seconds, the I/O port 443H must be read within 3.5 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

```

# Product Warranty/Service

Seller warrants that equipment furnished will be free from defects in material and workmanship for a period of one year from the confirmed date of purchase of the original buyer and that upon written notice of any such defect, Seller will, at its option, repair or replace the defective item under the terms of this warranty, subject to the provisions and specific exclusions listed herein.

This warranty shall not apply to equipment that has been previously repaired or altered outside our plant in any way as to, in the judgment of the manufacturer, affect its reliability. Nor will it apply if the equipment has been used in a manner exceeding its specifications or if the serial number has been removed.

Seller does not assume any liability for consequential damages as a result from our products uses, and in any event our liability shall not exceed the original selling price of the equipment.

The equipment warranty shall constitute the sole and exclusive remedy of any Buyer of Seller's equipment and the sole and exclusive liability of the Seller, its successors or assigns, in connection with equipment purchased and in lieu of all other warranties expressed implied or statutory, including, but not limited to, any implied warranty of merchant ability or fitness and all other obligations or liabilities of seller, its successors or assigns.

The equipment must be returned postage-prepaid. Package it securely and insure it. You will be charged for parts and labor if you lack proof of date of purchase, or if the warranty period is expired.



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