AP-370AF Series

PICMG Single Board Computer with VGA/LCD//LAN/SCSI for Intel® Socket 370 Pentium® III "Coppermine" and Celeron™ Processor

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LEI-UM-AP-370AF
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The AP-370AF Series PICMG Single Board Computer (SBC) is based on the proven Intel[i] 440BX chipset. The SBC supports Socket-370 Intel[i] Pentium III "Coppermine™" and Celeron™ processors. It accommodates up to 768MB SDRAM for demanding applications. Its 6-layer printed circuit board combining with noise-tolerant and low power consumption CMOS technology enables AP-370AF Series to withstand any harsh industrial environments very well.

The AP-370AF Series offers several models with different level of functionality to suite your needs. The top-of-the-line **AP-370AF** has all the on-board functions, including an Ultra-2 SCSI for high performance subsystems, a graphics controller for CRT/LCD display with resolution up to 1280 x 1024 x 16 bit, and a 10 Base-T/100 Base-TX Ethernet controller for networking applications. The **AP-370BF** has all the AF's function except for the SCSI controller. The **AP-370CF** has no SCSI or 10/100Base-T controller. The deluxe **AP-370DF** has all the standard functions listed below, but no added extras.

Every AP-370AF Series SBC comes with Genesys 518SM hardware monitoring that monitors system and CPU temperature, system voltages, and CPU and chassis fan speeds to prevent unexpected system failures by warning the user of adverse conditions. The power management feature provides power savings by slowing down the CPU clock, turning off the monitor screen and stopping the HDD spindle motor to conserve energy.

Other standard features include two serial ports (one RS-232 and one RS-232/422/485 selectable), one multi-mode (ECP/EPP/SPP) parallel port, one floppy drive controller, and one PS/2 keyboard / mouse interface. The built-in PCI Enhanced IDE controller supports up to four IDE devices in both PIO and bus master modes.

Whether you keep it simple with AP-370DF or pack in all the options with AP-370AF, these SBCs provide you great feature-performance-size ratio to help you achieve your objective and maximize your investment.

1.1 SPECIFICATION

❑	Processor	:	Intel Pentium III / Celeron Processor in Socket 370
❑	Chipset	:	Intel 440BX chipset,C&T69000 (69030), Adaptec AIC-7890, Intel 82559 and Winbond 83977EF I/O chipset
❑	System Memory	:	Three 168-pin DIMM sockets, support up to 768MB SDRAM
❑	BIOS	:	Award licensed BIOS (2M bit Flash ROM)
❑	Flash Memory Disk	:	Reserved socket for DiskOnChip from M-System, support up to 144MB flash memory disk
❑	LCD / VGA Controller	:	C&T 69000 (69030) chip, embedded 2 (4MB) SDRAM display memory, resolution up to 1280 x 1024 x 16 (24) bit, with VGA and 50-pin LCD connectors
❑	Ultra-2 SCSI Controller	:	On-board Adaptec AIC-7890 Ultra-2 SCSI chip
❑	Ethernet Controller	:	Intel 82559 chip, support 10/100M Base-T, on-board RJ-45 connector, wake-on-LAN supported via ATX power supply
❑	IDE Drive Interface	:	Two PCI IDE ports that support up to four IDE devices and Ultra DMA-33
❑	Floppy Drive Interface	:	One FDD port, support up to two floppy devices
❑	Serial Port	:	Two COM ports, one RS-232 and one RS-232/422/485
❑	Parallel Port	:	One multi-mode parallel port (SPP / EPP / ECP)
❑	Bus Interface	:	PCI / ISA bus (PICMG 2.0)
❑	RTC Battery	:	Internal RTC with Li battery
❑	Mouse & Keyboard Connector	:	6-pin mini-DIN PS/2 keyboard / mouse connector and one 5-pin keyboard header
❑	Watchdog Timer	:	Software 16-level time-out intervals
❑	Digital I/O	:	4-bit digital I/O header
❑	Universal Serial Bus	:	Support 2 USB header
❑	IR Interface	:	Support IrDA header
❑	Health Monitoring	:	On-board Genesys 518SM Monitoring IC
❑	Operating Temperature	:	$0^{o}C \sim 60^{o}C$
❑	Storage Temperature	:	$-20\,^{o}C \sim 70\,^{o}C$
❑	Humidity	:	5% ~ 95% RH, non-condensing
❑	Dimensions	:	338.5 x 122 mm (13 1/4" x 4 5/6") +/-0.5mm
❑	EMI / EMS	:	EN 50081-1/1994>EN 55022/1997>EN 61000-3-2/1995>EN 61000-3-3/1995, EN 50082-1/1994>IEC 1000-4-2/1995, IEC 1000-4-3/1995, IEC 1000-4-4/1995

1.2 PACKING CHECK LIST

Before you begin to install your card, please make sure that you received the following materials as listed below:

Item	Qty	Remark
Single Board Computer/CPU Card	1 pcs	AP-370AF Series SBC
Keyboard and Mouse Y-cable	1 pcs	6-pinmale Mini-Din to 5-pin Din/ 6-pin Mini-Din
LPT cable	1 pcs	26-pin standard header to 25-pin female D-Sub
Hard Disk / FDD Cable	1 pcs	40-pin to 40-pin standard header flat ribbon cable 34-pin to 34-pin standard header flat ribbon cable
CD-ROM	1 pcs	Drivers
Keyboard adapter cable	1 pcs	5-pin female connector to 5-pin female connector
ATX Feature Cable	1 pcs	4-pin to 4-pin
User's manual	1 pcs	AP-370AF Series

● Ordering Information

Model \ Function	VGA / LCD	LAN	SCSI	Note
AP-370AF	2MB	●	●	
AP-370BF	2MB	●		
AP-370CF	2MB			
AP-370DF				
AP-370EF		●		Min. 200 pcs
AP-370GF	4MB	●	●	Min. 200 pcs
AP-370HF	4MB	●		Min. 200 pcs
AP-370IF	4MB			Min. 200 pcs
SCSI Cable				5-port internal SCSI Cable

CHAPTER 2.

JUMPER SETTINGS AND CONNECTORS

The figure below shows the jumpers and connectors location on the AP-370AF:

2.1 BOARD OUTLINE OF AP-370AF
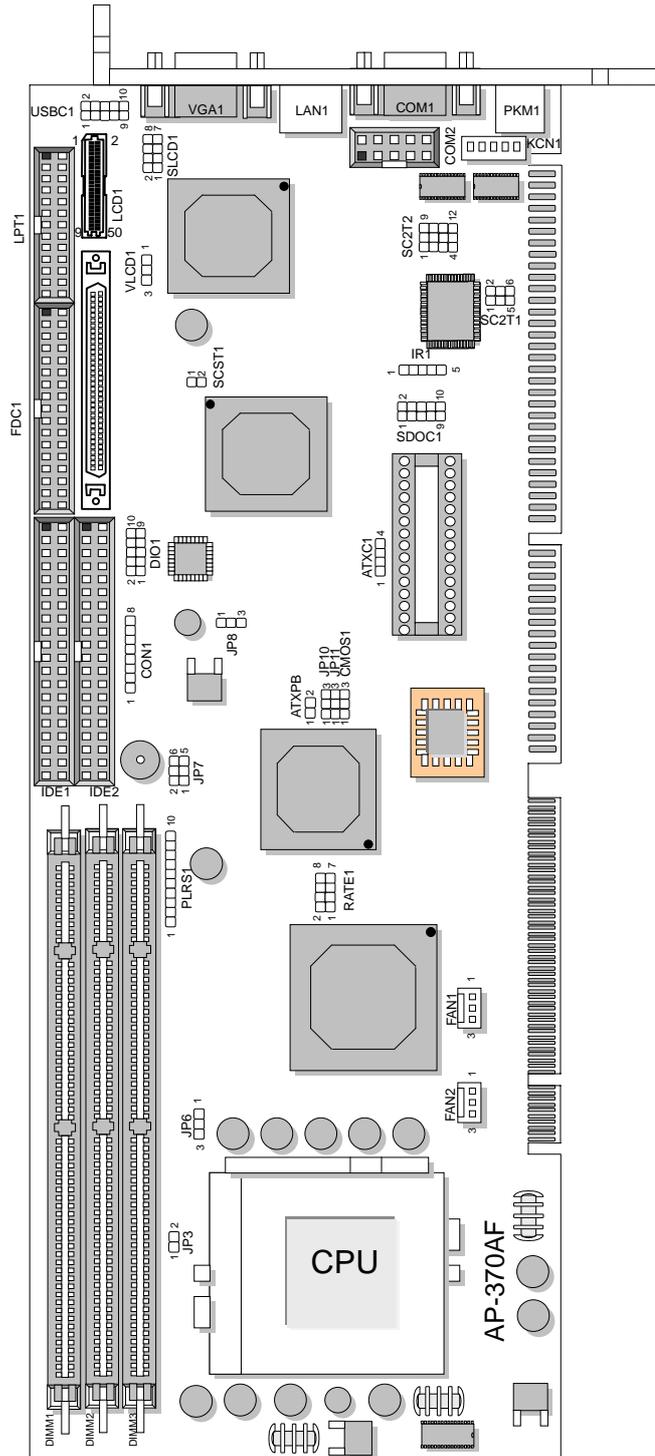
2.2 JUMPER SETTING OVERVIEW

In order to select the operation modes of your system, configure and set the jumpers on your single board computer to match the need of your application. To set a jumper, a black plastic cap containing metal contacts is placed over the jumper pins as designated by the required configuration as listed in this section. A jumper is said to be " on " or " 1-2 " when the black cap has been placed on two of its pins, as show in the figure below:

A pair of needle-nose pliers is recommended when working with jumpers. If you have any doubts about the best hardware configuration for your application, contact your local sales representative before you make any changes. In general, you simply need a standard cable to make most connections.
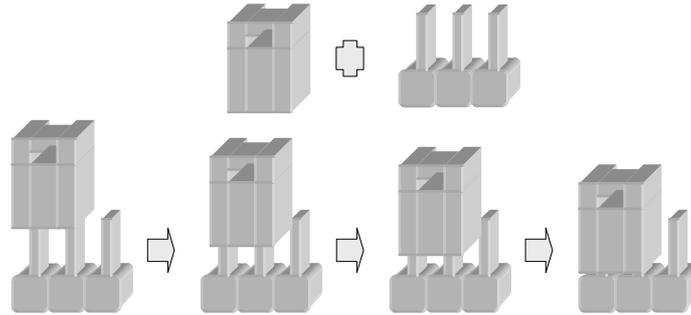
2.3 INSTALLING THE DIMM MODULE

A DIMM module simply snaps into a socket on the system board. Pin1 of the DIMM module must correspond with Pin1 of the socket.
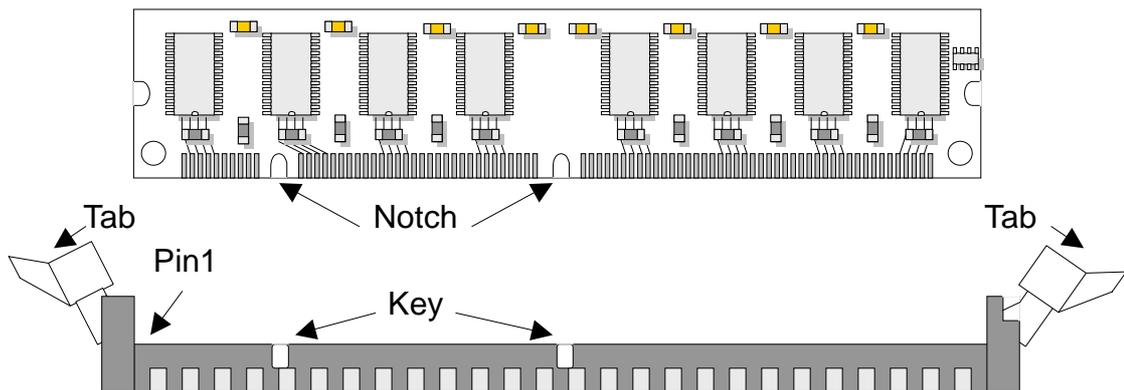
1. Position the DIMM above the socket with the "notch" in the module aligned with the "key" on the socket.
2. Seat the module at a 90 angle into the bank. Make sure it is completely seated. Push down the module until handles of the socket lock up-right and up-left notches.

2.4 JUMPER LOCATION FOR AP-370AF
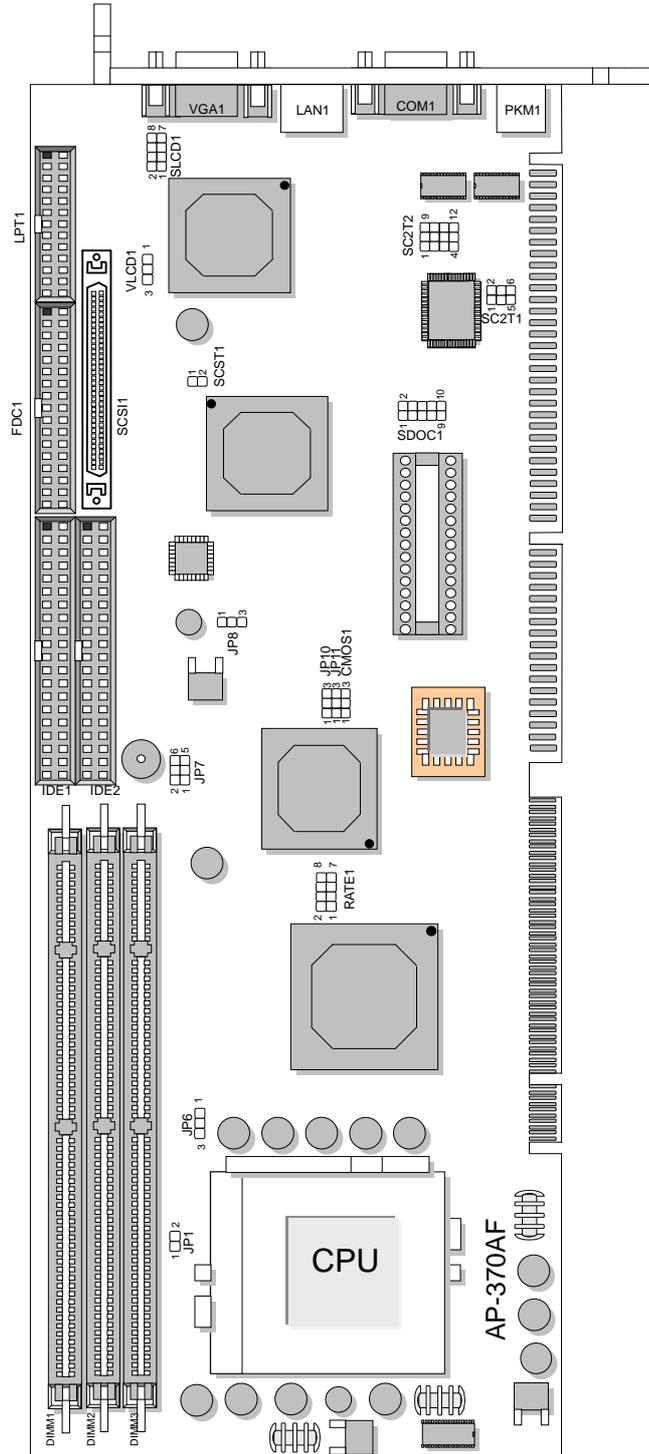
2.5 JUMPER SETTINGS SUMMARY FOR AP-370AF

LOCATION	FUNCTION
RATE1	Select Internal CPU Clock Ratio
SLCD1	Select Panel Type
VLCD1	Select Panel Voltage
SCST1	Select SCSI Terminator
SDOC1	Select DiskOnChip Address
SC2T1 / SC2T2	Select COM2 Type
CMOS1	Clear CMOS Data
JP1, JP7, JP8	Factory Setting
JP10, JP11	ISP GAL Programming (Factory Setting)

● **RATE1: Select Internal CPU Clock Ratio**

Clock Ratio	RATE1
1.5X	3-4
2.0X	OFF
2.5X	1-2,3-4,7-8
3.0X	1-2,5-6,7-8
3.5X	1-2,7-8
4.0X	3-4,5-6,7-8
4.5X	3-4,7-8
5.0X	5-6,7-8 (Default)
5.5X	7-8
6.0X	1-2,3-4,5-6
6.5X	1-2,3-4
7.0X	1-2,5-6
7.5X	1-2
8.0X	3-4,5-6
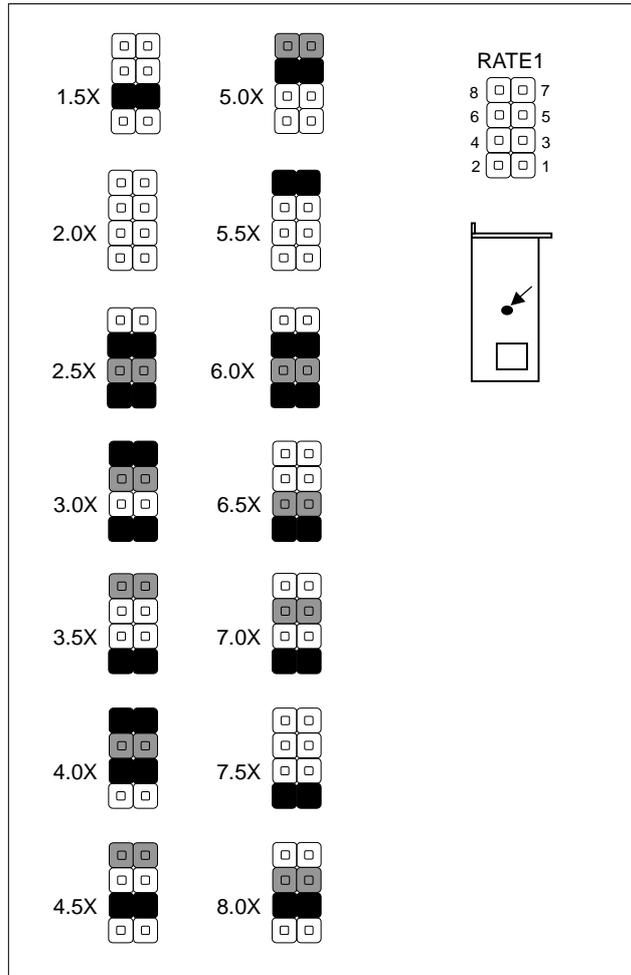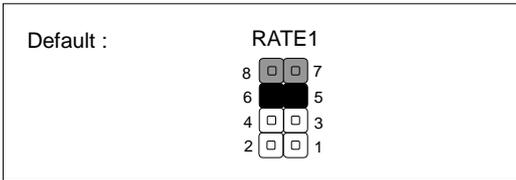
Default :
RATE1

● **SLCD1 : Select Panel Type**

Panel Type	SLCD1
1024x768 Dual Scan STN	1-2,3-4,5-6,7-8
1280x1024 TFT	3-4,5-6,7-8
640x480 Dual Scan STN	1-2,5-6,7-8
800x600 Dual Scan STN	5-6,7-8
640x480 Sharp TFT	1-2,3-4,7-8
640x480 18-bit TFT	3-4,7-8 (Default)
1024x768 TFT	1-2,7-8
800x600 TFT	7-8
800x600 TFT	1-2,3-4,5-6
800x600 TFT	3-4,5-6
800x600 Dual Scan STN	1-2,5-6
800x600 Dual Scan STN	5-6
1024x768 TFT	1-2,3-4
1280x1024 Dual Scan STN	3-4
1024x600 Dual Scan STN	1-2
1024x600 TFT	OFF
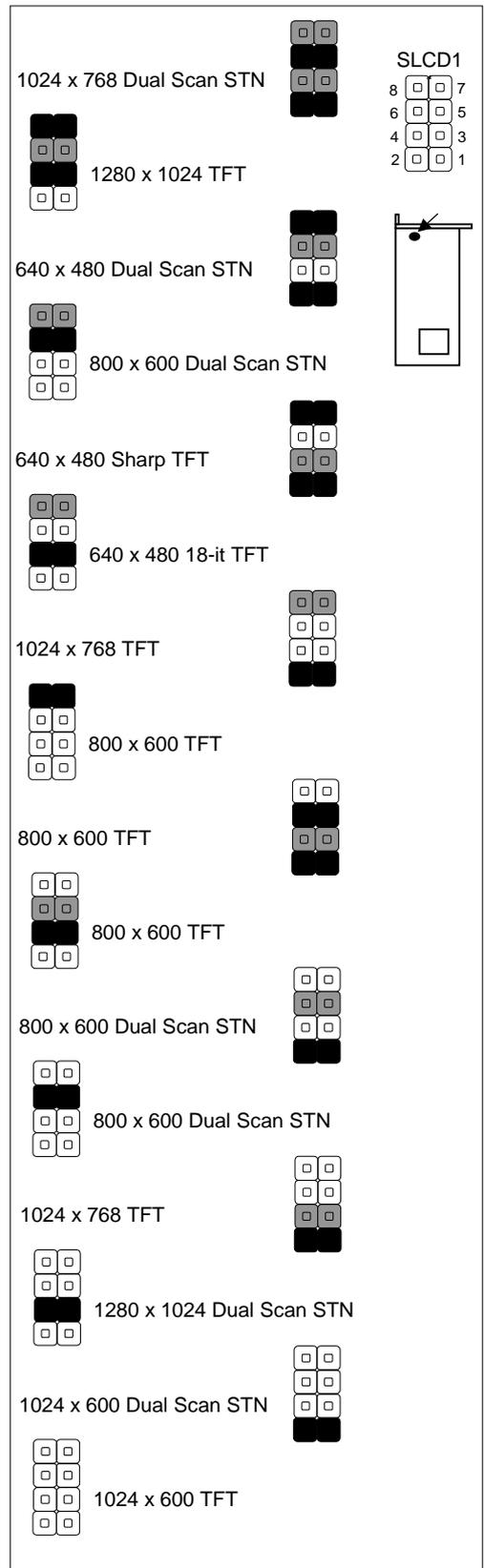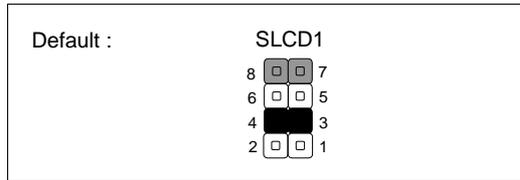
Default :   SLCD1

● **VLCD1 : Select LCD Panel Voltage**

Panel Voltage	VLCD1
5.0V	1-2
3.3V	2-3(Default)

Default :

VLCD1

5.0V

3.3V

VLCD1 3 1
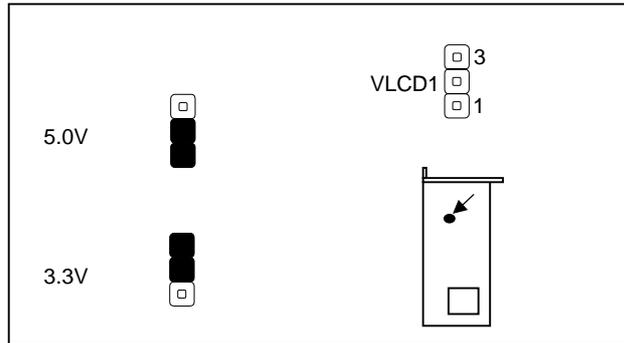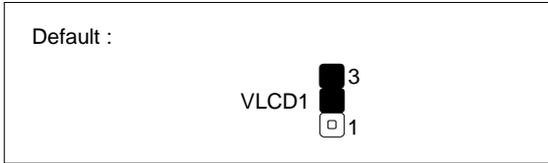
● **SCST1 : Select SCSI Terminator**

Function	SCST1
Disable Terminator	ON
Normal & Control by BIOS (Default)	OFF

Default :

SCST1
1 2

Disable Terminator

Normal & Control by BIOS

SCST1
1 2
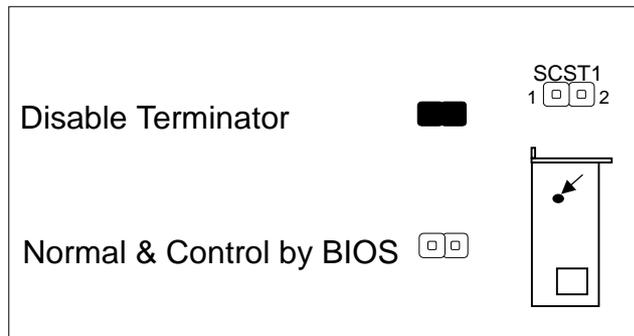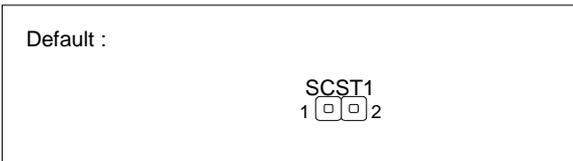
● **SDOC1 : Select DiskOnChip (Flash Disk) Address**

Flash Disk Address	SDOC1
CC00~CDFFH	1-2,9-10
D000~D1FFH	3-4,7-8
D400~D5FFH	3-4,9-10
D800~D9FFH	5-6,7-8
DC00~DDFFH	5-6,9-10
OFF (Default)	2-4,8-10

CC00~CDFFH

D000~D1FFH

D400~D5FFH

D800~D9FFH

DC00~DDFFH

SDOC1
2   10
1   9

Default :

SDOC1
2   10
1   9
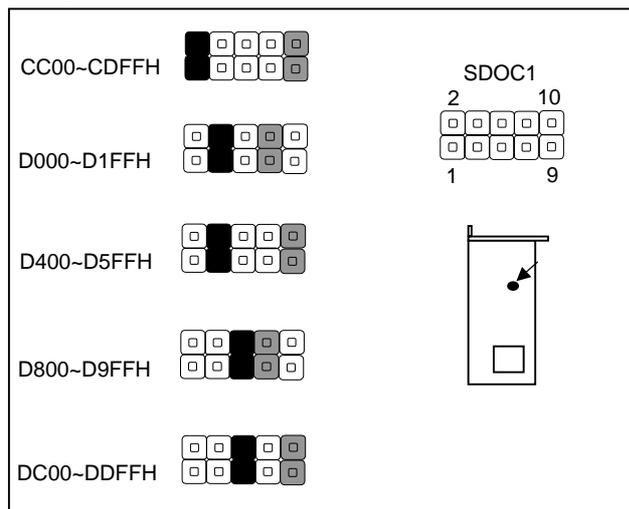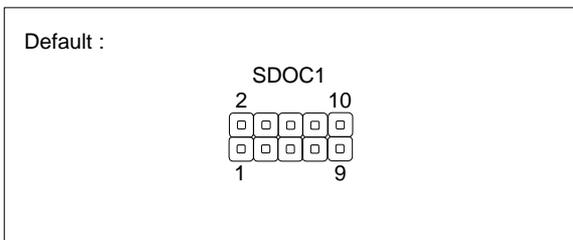
● **SC2T1 / SC2T2 : Select COM2 Type**

COM2 Type	SC2T1	SC2T2
RS-232 (Default)	1-2	1-5,2-6,3-7,4-8
RS-422	3-4	5-9,6-10,7-11,8-12
RS-485	5-6	5-9,6-10,7-11,8-12
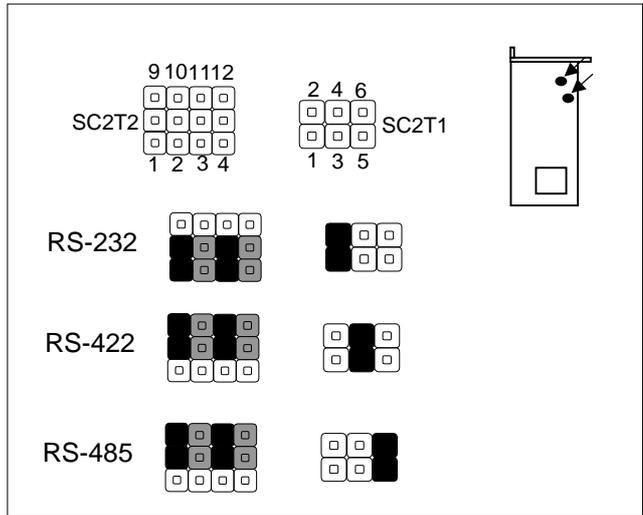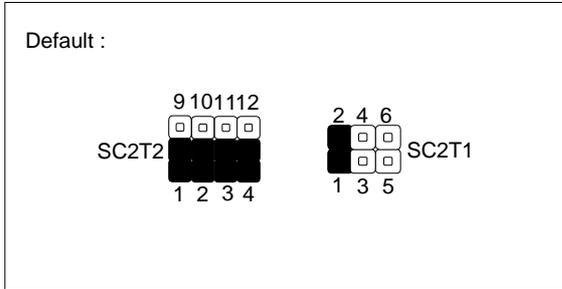
● **CMOS1 : Clear CMOS Data**

Description	CMOS1
Normal (Default)	1-2
Clear CMOS	2-3
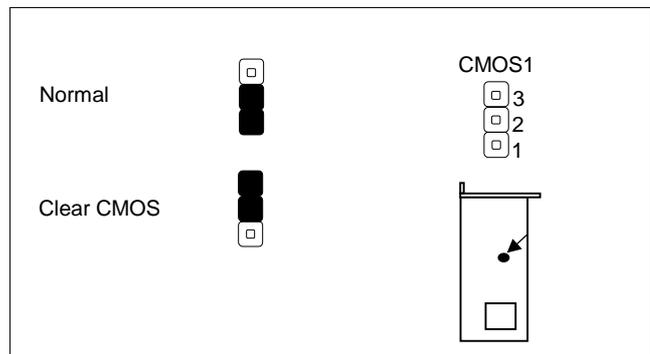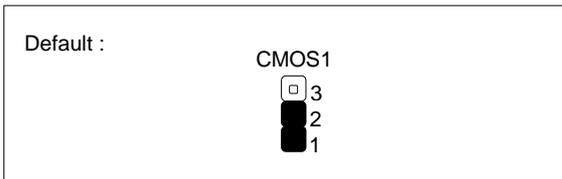
● **JP1: Default (ON)**
● **JP7: Default (1-3, 2-4)**
● **JP8: Default (1-2)**

Note : Do not attempt to change the default setting of JP1, JP7 and JP8 unless the manufacturer would like to change the specification.

● **JP10, JP11: ISP GAL Programming (Factory Setting)**

Function	JP10	JP11
Programming	2-3	2-3
Normal (Default)	1-2	1-2
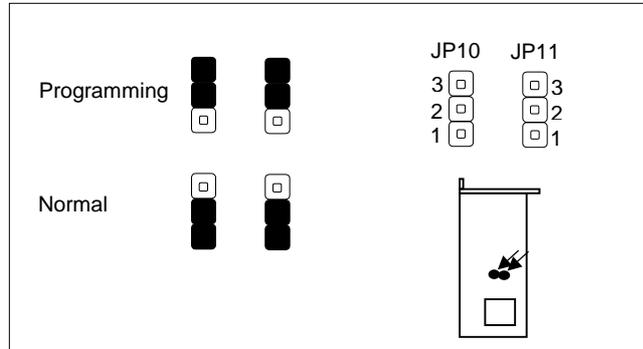
2.6 I/O CONNECTOR LOCATION FOR AP-370AF
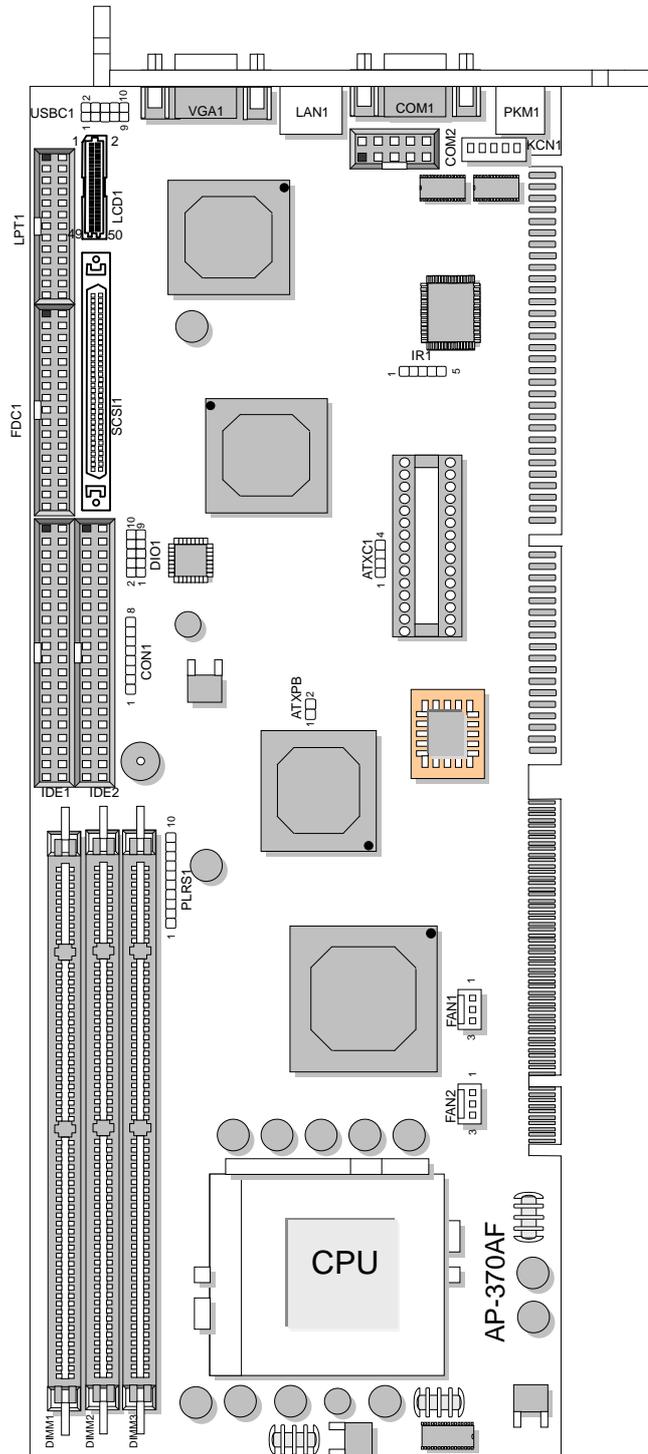
2.7 I/O CONNECTOR SUMMARY OF AP-370AF

CONNECTOR	FUNCTION
PLRS1	Power LED, Reset, Speaker Connector
FAN1 / FAN2	FAN Connectors
KCN1	5 Pin Keyboard Cable Connector
COM1	RS-232 Serial Port #1 Connector (D-Sub)
COM2	Serial Port #2 Connector (Header)
VGA1	VGA Connector
DIO1	Digital Input / Output Port
IR1	Alternate IrDA
USBC1	USB Port #1 & #2 Connector (Header)
LCD1	LCD Panel Connector
PKM1	PS/2 Keyboard & Mouse Connector (Mini-DIN)
LAN1	LAN Connector
CON1	Program ISP GAL Connector (Factory)
LPT1	Parallel Port Connector
SCSI1	SCSI Ultra2 Connector
ATXPB	ATX Power On / Off (Header)
ATXC1	ATX Feature Connector (Header)
FDC1	Floppy Interface Connector
IDE1	Primary IDE Connector
IDE2	Secondary IDE Connector

2.8 I/O CONNECTORS DESCRIPTION

● **PLRS1: Power LED, Reset, Speaker Connector**

PIN NO.	DESCRIPTION
1	Power LED +
2	GND
3	HDD LED +
4	HDD LED -
5	RESET SW +
6	RESET SW – (GND)
7	External Speaker -
8	Internal Buzzer -
9	NC
10	External Speaker +

Default :

7-8 (ON)

Internal Buzzer

● **FAN1 : System FAN Connector**

PIN NO.	DESCRIPTION
1	Ground
2	+12V
3	FAN Status Signal

● **FAN2 : CPU FAN Connector**

PIN NO.	DESCRIPTION
1	Ground
2	+12V
3	FAN Status Signal

- **KCN1 : 5 Pin Keyboard Cable Connector**

PIN NO.	DESCRIPTION
1	Keyboard Clock
2	Keyboard Data
3	NC
4	Ground
5	+5V

KCN1
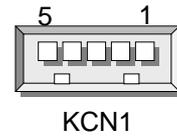
- **COM1 : RS-232 Serial Port #1 Connector (D-Sub)**

PIN NO.	DESCRIPTION
1	Data Carrier Detect (DCDA #)
2	Receive Data (RXDA)
3	Transmit Data (TXDA)
4	Data Terminal Ready (DTRA #)
5	Ground (GND)
6	Data Set Ready (DSRA #)
7	Request To Send (RTSA #)
8	Clear To Send (CTSA #)
9	Ring Indicator (RIA #)

COM1
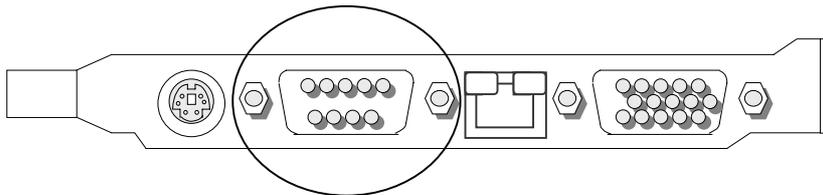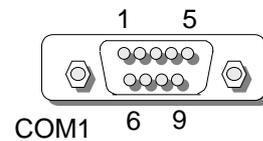
- **COM2 : Serial Port #2 Connector (Header)**

PIN NO.	DESCRIPTION		
	RS-232	RS-422	RS-485
1	Data Carrier Detect (DCDB #)	Transmit Data– (TXD-)	Data -
2	Receive Data (RXDB)	Transmit Data+ (TXD+)	Data +
3	Transmit Data (TXDB)	Receive Data+ (RXD+)	NC
4	Data Terminal Ready (DTRB #)	Receive Data- (RXD-)	NC
5	Ground	NC	NC
6	Data Set Ready (DSRB #)	NC	NC
7	Request To Send (RTSB #)	NC	NC
8	Clear To Send (CTSB #)	NC	NC
9	Ring Indicator (RIB #)	NC	NC
10	NC	NC	NC

COM2
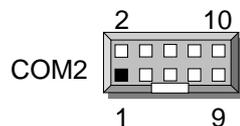
- **VGA1 : VGA Connector**

PIN NO.	DESCRIPTION
1	Red Color Signal
2	Green Color Signal
3	Blue Color Signal
4	NC
5	Ground
6	Ground
7	Ground
8	Ground
9	NC
10	Ground
11	NC
12	DDC-DATA
13	H-Sync.
14	V-Sync.
15	DDC-CLK

VGA1
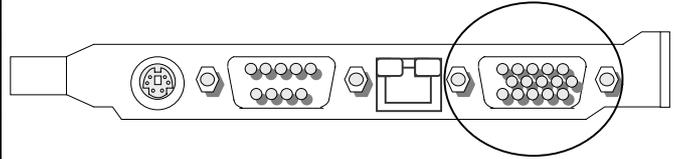
- **DIO1 : 4 bit Digital I/O Connector**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	In 0	2	Out 0
3	In 1	4	Out 1
5	In 2	6	Out 2
7	In 3	8	Out 3
9	GND	10	GND

DIO1
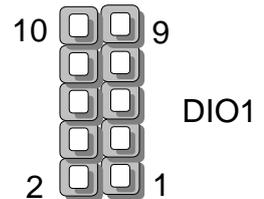
- **IR1 : Alternate IrDA**

PIN NO.	DESCRIPTION
1	VCC
2	NC
3	IRRX
4	GND
5	IRTX

IR1

- **USBC1 : USB Port#1 & #2 Connector**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	USB Port#1 V_{CC}	2	USB Port#2 V_{CC}
3	USB D0-	4	USB D1-
5	USB D0+	6	USB D1+
7	Ground	8	Ground
9	USB Port#1 Ground	10	USB Port#2 Ground

USBC1
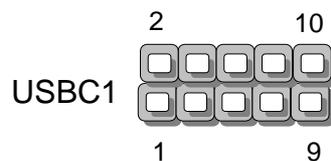
● **LCD1 : LCD Panel Connector**

PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	VCC	2	VCC
3	LP	4	FLM
5	M/DE	6	ENABKL
7	ENAVEE	8	ENAVDD
9	SHFCLK	10	+12V
11	GND	12	GND
13	P0	14	P1
15	P2	16	P3
17	P4	18	P5
19	P6	20	P7
21	P8	22	P9
23	P10	24	P11
25	P12	26	P13
27	P14	28	P15
29	GND	30	P16
31	P17	32	P18
33	P19	34	P20
35	P21	36	P22
37	P23	38	GND
39	P24	40	P25
41	P26	42	P27
43	P28	44	P29
45	P30	46	P31
47	P32	48	P33
49	P34	50	P35

LCD1
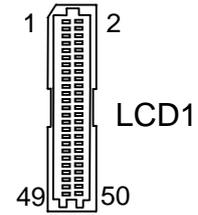
● **PKM1 : PS/2 Keyboard & Mouse Connector (Mini Din)**

PIN NO.	DESCRIPTION
1	PS/2 Keyboard Data
2	PS/2 Mouse Data
3	Ground
4	VCC
5	PS/2 Keyboard Clock
6	PS/2 Mouse Clock
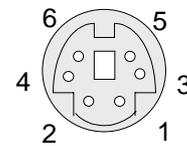
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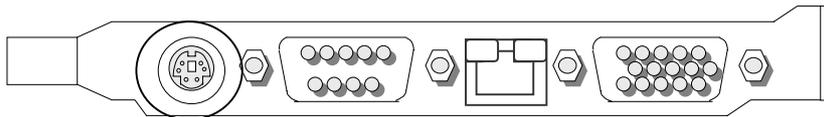
● **LAN1 : LAN Connector**

PIN NO.	SIGNAL
1	TX+
2	TX-
3	RX+
4	T45
5	T45
6	RX-
7	T78
8	T78
9	LINK LED - (UP)
10	LINK LED +
11	LINK LED - (DOWN)
12	ACTIVE LED +
13	LGND
14	LGND

14   1
LAN1
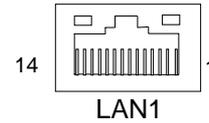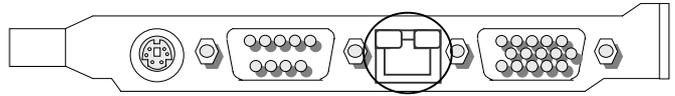
● **CON1 : Program ISP GAL Connector (Factory only)**

PIN NO.	DESCRIPTION
1	VCC
2	SDO
3	SDI
4	ISP
5	NC
6	MODE
7	Ground
8	SCLK

CON1

8

1
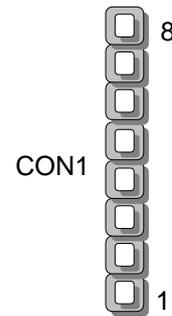
● **LPT1: Parallel Port Connector**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Strobe #	2	Auto Form Feed #
3	Data 0	4	Error #
5	Data 1	6	Initialize #
7	Data 2	8	Printer Select IN #
9	Data 3	10	Ground
11	Data 4	12	Ground
13	Data 5	14	Ground
15	Data 6	16	Ground
17	Data 7	18	Ground
19	Acknowledge #	20	Ground
21	Busy	22	Ground
23	Paper Empty	24	Ground
25	Printer Select	26	NC

1   2
LPT1
25   26
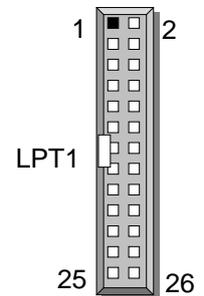
- **SCSI1 : SCSI Ultra2 Connector**

PIN NO.	SIGNAL	PIN NO.	SIGNAL
1	LVDP12	35	LVDM12
2	LVDP13	36	LVDM13
3	LVDP14	37	LVDM14
4	LVDP15	38	LVDM15
5	LVDPHP	39	LVDPHM
6	LVDP 0	40	LVDM 0
7	LVDP1	41	LVDM1
8	LVDP2	42	LVDM2
9	LVDP3	43	LVDM3
10	LVDP4	44	LVDM4
11	LVDP5	45	LVDM5
12	LVDP6	46	LVDM6
13	LVDP7	47	LVDM7
14	LVDPLP	48	LVDPLM
15	GND	49	GND
16	DIFSNS	50	NC
17	LVTPWR	51	LVTPWR
18	LVTPWR	52	LVTPWR
19	NC	53	NC
20	GND	54	GND
21	LVATNP	55	LVATNM
22	GND	56	GND
23	LVBSYP	57	LVBSYM
24	LVACKP	58	LVACKM
25	LVRSTP	59	LVRSTM
26	LVMSGP	60	LVMSGM
27	LVSELP	61	LVSELM
28	LVCDP	62	LVCDM
29	LVREQP	63	LVREQM
30	LVIOP	64	LVIOM
31	LVDP8	65	LVDM8
32	LVDP9	66	LVDM9
33	LVDP10	67	LVDM10
34	LVDP11	68	LVDM11

68 34

SCSI1

35 1
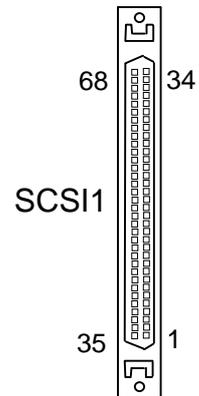
● **ATXPB: ATX Power On / Off (Header)**

PIN NO.	DESCRIPTION
1	PANSW
2	GND

ATXPB 2 1

● **ATXC1: ATX Feature Connector**

PIN NO.	DESCRIPTION
1	GND
2	STAND BY 5V
3	GND
4	PSON

ATXC1 4 1

Note: To have ATX features of ATX switch and Wake-On-LAN, you need to wire pins of J1 via ATX power connector through backplane by using ATX feature cable. (ATX momentary switch connected to JP1, push the button once will switch the system between ON and SOFT OFF controls the system power.

● **FDC1 : Floppy Cable Connector (Header)**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Ground	2	Density Select
3	Ground	4	NC
5	Ground	6	NC
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	NC	30	Read Data #
31	Ground	32	Head Side Select #
33	NC	34	Disk Change #

1 2
FDC1
33 34

● **IDE1 : Primary IDE Cable Connector (Header)**

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	NC
21	DMA REQ	22	Ground
23	IOW #	24	Ground
25	IOR #	26	Ground
27	IOCHRDY	28	NC
29	DMA ACK #	30	Ground
31	Interrupt	32	IOCS16 #
33	SA1	34	NC
35	SA0	36	SA2
37	HDC CS0 #	38	HDC CS1 #
39	HDD Active LED #	40	Ground

● **IDE1 : Primary IDE Cable Connector (Header)**
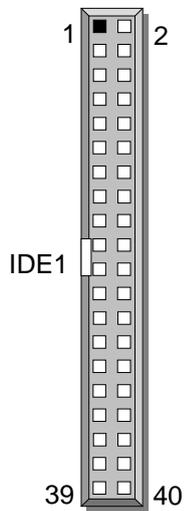
● **IDE2 : Secondary IDE Cable Connector (Header)**

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	NC
21	DMA REQ	22	Ground
23	IOW #	24	Ground
25	IOR #	26	Ground
27	IOCHRDY	28	NC
29	DMA ACK #	30	Ground
31	Interrupt	32	IOCS16 #
33	SA1	34	NC
35	SA0	36	SA2
37	HDC CS0 #	38	HDC CS1 #
39	HDD Active	40	Ground
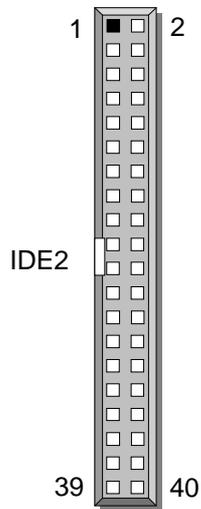
Award's ROM BIOS provides a built-in Setup program that allows user to modify the basic system configuration and settings. The modified data will be stored in a battery-backed CMOS RAM so that these data will be retained even when the power is turned off.   In general, the information saved in the CMOS RAM stay unchanged unless there is configuration change in the system, such as hard drive replacement or new equipment is installed.

3.1   RUNNING AWARD BIOS

The Setup Utility is stored in the BIOS ROM.   When the power of the computer system is turned on, a screen message appears to give you an opportunity to call up the Setup Utility; while the BIOS will enter the Power On Self Test (POST) routines.   The POST routines perform various diagnostic checks while initializing the board hardware.   If the routines encounter an error during the tests, the error will be reported either with a series of short beeps or an error message on the screen display.   There are two kinds of error: fatal or non-fatal.   The system can usually continue the boot up sequence with non-fatal errors.   Non-fatal error messages usually appear on the screen along with the following instructions:

" Press <F1> to RESUME "

Write down the message and press F1 key to continue the boot up sequence.   After the POST routines are completed, the following message appears:

" Press DEL to enter SETUP "

Entering Setup

Turn on the power of the computer system and press <Del> immediately.   If you don't have the chance to respond, reset the system by simultaneously typing the <Ctrl>, <Alt> and <Delete> keys, or by pushing the ' Reset ' button on the system cabinet.   You can also restart by turning the system OFF then ON.

3.2 CMOS SETUP UTILITY

To access the AWARD BIOS SETUP program, press the <DEL> key.   The screen display will appears as:

Main Program Screen

ROM PCI / ISA BIOS (2A69KL7N)	
CMOS SETUP UTILITY	
AWARD SOFTWARE, INC.	
STANDARD CMOS SETUP	INTEGRATED PERIPHERALS
BIOS FEATURES SETUP	SUPERVISOR PASSWORD
CHIPSET FEATURES SETUP	USER PASSWORD
POWER MANAGEMENT SETUP	IDE HDD AUTO DETECTION
PNP / PCI CONFIGURATION	SAVE & EXIT SETUP
LOAD SETUP DEFAULTS	EXIT WITHOUT SAVING
LOAD BIOS DEFAULTS	
ESC : Quit	↑ ↓ → ← : Select Item
F10 : Save & Exit Setup	(Shift) F2 : Change Color
Time, Date, Hard Disk Type....	

This screen provides access to the utility's various functions.

Listed below are explanations of the keys displayed at the bottom of the screen:

<ESC>   **:** Exit the utility.

<↑ ↓ → ←>   **:** Use arrow keys ↑ ↓ → ← to move cursor to your desired selection.

<F10>   **:** Saves all changes made to Setup and exits program.

<Shift> <F2>   **:** Changes background and foreground colors.

3.3 STANDARD CMOS SETUP

When you select the "STANDARD CMOS SETUP" on the main program, the screen display will appears as:

Standard CMOS Setup Screen

```
                    ROM PCI / ISA BIOS(2A69KL7N)
                        STANDARD CMOS SETUP
                        AWARD SOFTWARE, INC.

 Date   (mm : dd : yy) : Mon, Jun 5 2000
 Time   (hh : mm : ss) : 15 :   1 : 56
 HARD DISKS              TYPE   SIZE  CYLS  HEAD  PRECOMP  LANDZ  SECTOR  MODE
 Primary Master         : Auto    0    0     0       0       0       0   AUTO
 Primary Slave          : Auto    0    0     0       0       0       0   AUTO
 Secondary Master       : Auto    0    0     0       0       0       0   AUTO
 Secondary Slave        : Auto    0    0     0       0       0       0   AUTO


 Drive A   : 1.44M, 3.5 in.
 Drive B   : None                   Base Memory      :    640K
                                     Extended Memory  : 785408K
                                     Other Memory     :    384K
 Video      : EGA/VGA                Total Memory :     786432K
 Halt On   : All Errors

 ESC : Quit              ↑ ↓ → ← : Select Item      PU / PD / + / - : Modify
 F1 : Help               (Shift ) F2 : Change Color
```

The Standard CMOS Setup utility is used to configure the following components such as date, time, hard disk drive, floppy drive, display and memory.   Once a field is highlighted, on-line help information is displayed in the left bottom of the Menu screen.

Set Date: Month, Date, Year.

Set Time: Hour, Minute and Second.   Use 24-hour clock format (for p.m. time, add 12 to the hour number, you would enter 4:30 p.m. as 16:30).   When you select the "STANDARD CMOS SETUP" on the main program, the screen display will appears as:

Hard Disks: There are four hard disks listed: "Primary Master", "Primary Slave", "Secondary Master" and "Secondary Slave".   For each IDE channel, the first device is

"Master" and the second device is "Slave".   Hard disk types from 1 to 45 are the standard ones.   To select or change the configuration, move the cursor to the desired position and press <Page Up> or <Page Down> to change the option : (1) Press "Auto" for IDE HDD auto detection, (2) Press "User" for user definable, and Press "None" for not installed (e.g. SCSI).   There are six categories of information that you must enter for a HDD: "CYLS." for (number of cylinders), "HEADS" for (number of heads), "PRECOMP" for (write pre-compensation), "LANDZ" for (landing zone), "SECTOR" for (number of sectors) and "MODE" for (Normal, LBA, LARGE and AUTO). The hard disk vendor's or system manufacturer's documentation should provide you with the drive specifications.   For an IDE hard drive, you can set "TYPE" to "Auto" or use the "IDE HDD AUTO DETECTION" utility in the main program screen to enter the drive specifications.

Here is a brief explanation of drive specifications:
● **Type**: The BIOS contains a table of pre-defined drive types.   Each defined drive type has specified number of cylinders, number of heads, write compensation factor, landing zone, and number of sectors.   Drives whose specifications do not accommodate any pre-defined type are classified as type USER.
● **Size**: Disk drive capacity (approximate).   Note that this size is usually slightly greater than the size of a formatted disk given by a disk-checking program.
● **Cyls**: Number of cylinders.
● **Head**: Number of heads.
● **Precomp**: Write pre-compensation cylinder
● **Landz**: Landing zone.
● **Sector**: Number of sectors.
● **Mode**: Auto, Normal, Large, or LBA.
   • **Auto**: The BIOS automatically determines the optimal mode.
   • **Normal**: Maximum number of cylinders, heads, and sectors supported are 1024, 16, and 63.
   • **Large**: For drives that do not support LBA and have more than 1024 cylinders.
   • **LBA** (Logical Block Addressing): During drive accesses, the IDE controller transforms data address described by sector, head, and cylinder number into a physical block address, significantly improving data transfer rates.   For drives which with greater 1024 cylinders.
The AWARD BIOS supports three HDD modes: NORMAL, LBA and LARGE.

NORMAL mode: This is Generic Access mode in which neither the BIOS nor the IDE controller will make any transformation during the accession.   The maximum HDD size is supported by the NORMAL mode that is 528 Megabytes.

LBA mode: This is Logical Block Addressing mode which is a HDD accessing method that overcomes the 528 Megabytes restriction. The number of cylinders, heads and sectors that are shown in setup may not be the physical number contained in the HDD. During the HDD accessing, the IDE controller will transform the logical address that is described by the cylinder, head and sector numbers into its own physical address as contained inside the HDD. The maximum HDD size that is supported by the LBA mode is 8.4 Gigabytes.

LARGE mode: Some IDE HDD contains more than 1024 cylinders without the LBA support. This access mode tricks DOS (or other OS) with the number of cylinders that is less than 1024 by dividing it by 2. At the same time, the number of heads is multiplied by 2. A reverse transformation process will be made inside INT13H in order to access to the right HDD address. The maximum HDD size that is supported by the LARGE mode is 1 Gigabytes.

Note: 1. To support LBA or LARGE mode, there are softwares located in the AWARD HD Service Routine"INT13H". It may fail to access a HDD with LBA or LARGE modes selected if you are running under an Operating System that replaces the whole INT13H service routine.
2. Entering incorrect drive specifications will result in a hard disk drive that will function improperly or no function at all.

Drive A and Drive B: Select the correct specifications for the diskette drive(s) installed in the computer.

None	No diskette drive installed
360K, 5.25 in	5-1/4 inch PC-type standard drive; 360 kilobyte capacity
1.2M, 5.25 in	5-1/4 inch AT-type high-density drive; 1.2 megabyte capacity
720K, 3.5in	3 1-2 inch double-sided drive; 720 kilobyte capacity
1.44M, 3.5 in	3 1-2 inch double-sided drive; 1.44 megabyte capacity
2.88M, 3.5 in	3 1-2 inch double-sided drive; 2.88 megabyte capacity

Note: 1. Not Installed could be used as an option for diskless workstations.
2. Highlight the listing after each drive name and select the appropriate entry.

Floppy 3 Mode Support: When enable, the BIOS supports a type of 3.5-inch diskette drive that can read 720-KB, 1.2-MB, and 1.44-MB diskettes.

Video: Select the type of primary video subsystem in your computer. The BIOS usually detects the correct video type automatically. The BIOS supports a secondary video subsystem, but you do not select it in Setup.

EGA/VGA	Enhanced Graphics Adapter/Video Graphics Array. For EGA, VGA, SEGA, SVGA or PGA monitor adapters.
CGA 40	Color Graphics Adapter, power up in 40 column mode
CGA 80	Color Graphics Adapter, power up in 80 column mode
MONO	Monochrome adapter, includes high resolution monochrome adapters

Halt On: During the power-on-self-test (POST), the computer stops if BIOS detects a hardware error. You can tell BIOS to ignore certain errors POST and continue the boot-up process. These are the selections:

No errors	Whenever the BIOS detects a non-fatal error the system will not be stopped and you will be prompted
All errors	The system boot will be stopped for any error that may be detected.
All, But Keyboard	The system boot will not stop for a keyboard error ; it will stop for all Other errors.
All, But Diskette	The system boot will not stop for a disk error ; it will stop for all other Errors.
All, But Disk/Key	The system boot will not stop for a keyboard or disk error ; it will stop for all other errors.

3.4 BIOS FEATURES SETUP

When you select "BIOS FEATURES SETUP" on the main program, the screen display will appears as:

BIOS Features Setup Screen

ROM PCI / ISA BIOS (2A69KL7N)			
BIOS FEATURES SETUP			
AWARD SOFTWARE, INC			
Virus Warning	: Disabled	Video BIOS Shadow	: Enabled
CPU Internal Cache	: Enabled	C8000 -CBFFF Shadow	: Disabled
External Cache	: Enabled	CC000 -CFFFF Shadow	: Disabled
CPU L2 Cache ECC Checking	: Enabled	D0000 -D3FFF Shadow	: Disabled
Processor Number Feature	: Enabled	D4000 -D7FFF Shadow	: Disabled
Quick Power On Self Test	: Enabled	D8000 -DBFFF Shadow	: Disabled
Boot Sequence	: A,C,SCSI	DC000 -DFFFF Shadow	: Disabled
Swap Floppy Drive	: Disabled		
Boot Up Floppy Seek	: Disabled		
Boot Up NumLock Status	: On		
Gate A20 Option	: Fast		
Typematic Rate Setting	: Disabled		
Typematic Rate (Chars Sec.)	: 6		
Typematic Delay (M/Sec)	: 250		
Security Option	: Setup		
PS/2 mouse function control	: Enabled		
PCI/VGA Palette Snoop	: Disabled		
Assign IRQ For DRAM	: Disabled	ESC : Quit ↑↓→← : Select Item	
OS Select For DRAM >64MB	: Non-OS/2	F1 : Help PU /PD /+/ - : Modify	
Report No FDD For WIN 95	: Yes	F5 : Old Values (Shift) F2 : Color	
		F6 : Load BIOS Defaults	
		F7 : Load Setup Defaults	

The following explains the options for each of the features as listed in the above menu:

Virus Warning: The default setting of Virus Warning is "Disabled".   When it is enabled, any attempt to write the boot sector and partition table will halt the system and cause a warning message to appear.   If this happens, you can use an anti-virus utility on a virus free, bootable floppy diskette to reboot, to clean and to investigate your system.

CPU Internal Cache: The default setting is "Enabled". This setting enables the CPU internal cache.

External Cache: The default setting is "Enabled". This setting enables the external cache.

Quick Power On Self Test: The default setting is "Enabled". This speeds up the Power On Self Test (POST) by skipping some items that are normally checked during the full POST. If your system is functioning normally, you can choose this feature to speed up the booting process.

CPU L2 Cache ECC Checking: When you select Enabled, memory checking is enable when the external cache contains ECC SRAMs.

Boot Sequence: The default setting is "A:,C:,SCSI:"; the other options are "CDROM, C, A" and "A, C" and "C, CDROM, A". This setting determines where the computer looks first for an operating system, hard disk, floppy disk, or other. BIOS will load the operating system from the disk drives in the sequence as selected here.

Swap Floppy Drive: The default setting is "Disabled". This setting gives you an option to swap A and B floppy disks. Normally, floppy drive A is the one at the end of the cable and drive B is at the other end. If you set this option to "Enabled", Drive A will function as Drive B, and vice-versa under DOS.

Boot Up Floppy Seek: The defaults setting is "Disabled". When enabled, BIOS will check whether there is a floppy disk drive installed.

Boot Up Numlock Status: The default setting is "On". If set to "Off", the cursor controls will function on the numeric keypad.

Gate A20 Option: The default setting is "Fast". This is the optimal setting for the CPU card. The other option is "Normal".

Typematic Rate Setting: The default setting is "Disabled". If enabled, you can set the typematic rate and typematic delay.

Typematic Rate (Chars/Sec): This setting controls the speed at which the system registers the repeated keystrokes. The choices range from 6 to 30 Chars/Sec. The

default setting is "6" Chars/Sec.

Typematic Delay (Msec): This setting controls the time between the display of the first and second characters. There are four delay choices: 250ms, 500ms, 750ms and 1000ms. The default setting is "250" ms.

Security Option: This setting controls the password in the main screen. The options are "Setup" and "System". Select "Setup" and it will protect the Setup Utility settings from being tampered with. Select "System" if you want to use password feature every time the system boots up. The default setting is "Setup". You can create your password by using the "SUPERVISOR/USER PASSWORD" utility on the main program screen.If you have set a password, select whether the password is required every time the System boots , or only when you enter Setup.

PS/2 Mouse function control: If your system has a PS/2 mouse port and you installed a serial pointing device, select Disabled.

PCI/VGA Palette Snoop: The default setting is "Disabled". Set to "Enable" if any ISA adapter card installed requires VGA palette snooping.

OS Select For DRAM > 64MB: The default setting is "Non-OS2". Set to "OS2" if the system memory size is greater than 64MB and the operating system is OS/2.

Video BIOS Shadow: The default setting is "Enabled" which will copy the VGA display card BIOS into system DRAM to improve performance.

C8000-CBFFF Shadow to DC000-DFFFF Shadow: The default setting for the shadow feature is "Disabled". When enabled, the ROM with the specific address is copied into system DRAM. It will also reduce the size of memory available to the system.
After you have made your selection in the BIOS FEATURES SETUP, press the <ESC> key to go back to the main program screen.

3.5 CHIPSET FEATURES SETUP

When you select the "CHIPSET FEATURES SETUP" on the main program, the screen display will appears as:

Chipset Features Setup Screen

```
                    ROM PCI / ISA BIOS (2A69KL7N)
                      CHIPSET FEATURES SETUP
                        AWARD SOFTWARE, INC.
```

AUTO Configuration	: Enabled	Auto Detect DIMM/PCI Clk	Enabled
EDO DRAM Speed Selection	: 60 ns	Spread Spectrum Modulated	Disabled
EDO CASx# MA Wait State	: 2	CPU Host Clock (CPU/PCI)	: Default
EDO RASx# Wait State	: 2	CPU Warning Temperature	: Disabled
SDRAM RAS-to-CAS Delay	: 3	Current CPU Temperature	: 26°C/ 78°F
SDRAM RAS Precharge Time	: 3	Current CPUFAN1 Speed	: 0 RPM
SDRAM CAS latency Time	: 3	Current CPUFAN2 Speed	: 5106 RPM
SDRAM Precharge Control	: Disabled	Current Vin3 (V)	: 1.63 V
DRAM Data Integrity Mode	: Non-ECC	Current Vin1 (V)	: 3.23 V
System BIOS Cacheable	: Disabled	Current Vin2 (V)	: 11.39 V
Video BIOS Cacheable	: Disabled	Current Vdd (V)	: 4.87 V
Video RAM Cacheable	: Disabled		
8 Bit I /O Recovery Time	: 1		
16 Bit I /O Recovery Time	: 1		
Memory Hole At 15M-16M	: Disabled		
Passive Release	: Enabled		
Delayed Transaction	: Disabled	ESC : Quit ↑↓→←: Select Item	
AGP Aperture Size (MB)	: 64	F1 : Help PU /PD /+/ - : Modify	
		F5 : Old Values (Shift) F2 : Color	
		F6 : Load BIOS Defaults	
		F7 : Load Setup Defaults	

Auto Configuration: The default setting is "Enabled" which will optimize DRAM timing automatically depending on whether the DRAM used is either 70ns or 60ns. The other option is "Disabled" which allows you to change DRAM timing manually.

EDO DRAM Speed Selection: The value in this field must correspond to the speed of the DRAM installed in your system. DO NOT change the default setting of this field, as determined by the system board manufacturer for the installed DRAM. This value is

access speed, so a lower value means a faster system. This field applies only if EDO DRAM is installed in the system.

EDO CASx# MA Wait State: The board designer may elect to insert one additional wait state before the assertion of the first CASx# for the leadoff page hit cycle. Do not change the manufacturer's default unless you are getting memory addressing errors. This field applies only if EDO DRAM is installed in the system.

SDRAM (CAS Lat/RAS-to-CAS): You can select a combination of CAS latency and RAS-CAS delay in HCLKs of 2/2 or 3/3. The system board designer should set the values in this field, depending on the DRAM installed. Do not change the values in this field unless you change specification of the installed DRAM or the installed CPU.

SDRAM RAS-to-CAS Delay: This field lets you insert a timing delay between the CAS and RAS strobe signals, used when DRAM is written to, read from, or refreshed. Fast gives faster performance. This field applies only when synchronous DRAM is installed in the system.

SDRAM RAS Precharge Time: If an insufficient number of cycles is allowed for the RAS to accumulate its charge before DRAM refresh, the refresh may be incomplete and the DRAM may fail to retain data. Fast gives faster performance; and Slow gives more stable performance. This field applies only when synchronous DRAM is installed in the system.

SDRAM CAS latency Time: When synchronous DRAM is installed, the number of clock cycles of CAS latency depends on the DRAM timing. Do not reset this field from the default value specified by the system designer.

SDRAM Precharge Control: When Enabled, all CPU cycles to SDRAM result in an All Banks Precharge Command on the SDRAM interface.

DRAM Data Integrity Mode: Select Parity or ECC(error-correcting code), according to the type of installed DRAM.

System BIOS Cacheable: Selecting Enabled allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance.   However, if any program writes to this memory area, a system error may result.

Video BIOS Cacheable: Selecting Enabled allows caching of the video BIOS ROM at C0000h to C7FFFh, resulting in better video performance. However, if any program writes to this memory area, a system error may result.

Video RAM Cacheable: Selecting Enabled allows caching of the video memory(RAM) at A0000h to AFFFFh, resulting in better video performance. However, if any program writes to this memory area, a memory access error may result.

8/16 Bit I/O Recovery Time: The I/O recovery mechanism adds bus clock cycles between PCI-originated I/O cycles to ISA bus.   This delay takes place because PCI bus is so much faster than ISA bus.   These two fields let you add recovery time (in bus clock cycles) for 16-bit and 8-bit I/O.

Memory Hole At 15M-16M: You can reserve this area of system memory for ISA adapter ROM. When this area is reserved, it cannot be cached. The user information of peripherals that need to use this area of system memory usually discusses their memory requirements.

Passive Release: When Enabled, CPU to PCI bus accesses are allowed during passive release. Otherwise, the arbiter only accepts another PCI master access to local DRAM.

Delayed Transaction: The chipset has an embedded 32-bit posted write buffer to support delay transaction cycles. Select Enabled to support compliance with PCI specification version 2.1.

AGP Aperture Size(MB): Select the size of the Accelerated Graphics Port (AGP) aperture . The aperture is a portion of the PCI memory address range dedicated for graphics memory address space. Host cycles that hit the aperture range are forwarded to the AGP without any translation. See www.agpforum.org for AGP information.

Auto Detect DIMM/PCI Clk: The default setting is "Enabled".   To reduce the occurrence of electromagnetic interference (EMI), BIOS detects the presence or absence of components of DIMM and PCI slots and turns off system clock generator pulses to empty slots.

Spread Spectrum: When the system clock generator pulses, the extreme values of the pulse generate excess EMI. Enabling pulse spectrum spread modulation changes the

extreme values from spikes to flat curves, thus reducing EMI. This benefit may in some cases but outweighed by problems with timing-critical devices, such as a clock-sensitive SCSI device.

CPU Host Clock(CPU/PCI): Select Default or select a timing combination for the CPU and the PCI bus. When set to Default, BIOS uses the actual CPU and PCI bus clock values.

CPU Warning Temperature: The default setting is "66°C/151°F". Select the combination of lower and upper limits for the CPU temperature. If the CPU temperature extends beyond either limit, any warning mechanism programmed into your system will be activated.

Current CPU Temperature: The default setting is "32°C/89°F". This field displays the current CPU temperature, if your computer contains a monitoring system.

Current CPUFAN Speed: The default setting is "3934 RPM". This field displays the current speed of the CPU fan, if your computer contains a monitoring system.

Current VCORE (V), Current VCC3 (V), Current +V12 (V) and Current VCC (V): This field detects the voltage input of the board, if your computer contains a monitoring system.

After you have made your selections in the CHIPSET FEATURES SETUP, press the <ESC> key to go back to the main program screen.

3.6 POWER MANAGEMENT SETUP

The "Power Management Setup" controls the CPU card's "Green" features. When you select the "POWER MANAGEMENT SETUP" on the main program, the screen display will appears as:

Power Management Setup Screen

ROM PCI / ISA BIOS (2A69KL7N) POWER MANAGEMENT SETUP AWARD SOFTWARE, INC.		
Power Management : User Define	** Reload Global Timer Events **	
PM Control by APM : Yes	IRQ [3 - 7, 9 - 15], NMI : Disabled	
Video Off Method : V /H SYNC+ Blank	Primary IDE 0 : Disabled	
Video Off After : Standby	Primary IDE 1 : Disabled	
MODEM Use IRQ : 3	Secondary IDE 0 : Disable	
Doze Mode : Disabled	Secondary IDE 1 : Disable	
Standby Mode : Disabled	Floppy Disk : Disabled	
Suspend Mode : Disabled	Serial Port : Disabled	
HDD Power Down : Disabled	Parallel Port : Disabled	
Throttle Duty Cycle : 62.5%		
PCI / VGA Act-monitor : Disabled		
Soft-Off by PWR-BTTN : Instant-Off		
PowerOn by Ring : Disabled		
Power On on PCI card : Disabled		
Wake Up On LAN : Enabled		
IRQ 8 Break Suspend : Disabled		
	ESC : Quit ↑↓→← : Select Item	
	F1 : Help PU /PD/+/- : Modify	
	F5 : Old Values (Shift) F2 : Color	
	F6 : Load BIOS Defaults	
	F7 : Load Setup Defaults	

Power Management: This setting controls the System Doze Mode, Standby Mode and Suspend Mode Timer features. There are four options namely --

- **User Define :** Allows you to customize all power saving timer features.
- **Optimize:** This is the recommended setting for general use.
- **Test/Demo :** This is for test/demonstration purpose.
- **Disable :** Disable the power management features.

PM Control by APM: The default setting is "No".   If it is set to "Yes", the system BIOS will wait for APM's prompt before it enters any PM mode.

Note : If your system power management is controlled by APM and there is a task running, the APM will not prompt the BIOS to enter any power saving mode after time out.

Video Off Method: This setting controls the Video off method in power saving mode. The default setting is "V/H SYNC+Blank". This setting disables V/H SYNC signals and blanks the screen into the power saving mode.   Other options are "Blank Screen" and "DPMS".

Video Off After: As the system moves from lesser to greater power-saving modes, select the mode in which you want the monitor to blank.   The default setting is "Standby".

MODEM Use IRQ: Name the interrupt request (IRQ) line assigned to the modem (if any) on your system.   Activity of the selected IRQ always awakens the system. The default setting is "NA".

Doze Mode: Options are from "1 Min." to "1 Hour" and "Disable", if no Power Management events occur for a specified length of time, the system speed will change from turbo to slow and the video signal will be suspended, Full power function will return when a Wake-Up event is detected.

Standby Mode: Options are from "1 Min" to "1 Hour" and "Disable".   The system speed will change from turbo to slow and the video signal will be suspended, if no Power Management events occur for a specified length of time.   Full power function will return when a Wake-Up event is detected.

Suspend Mode: Option are from "1 Min" to "1 Hour" and "Disable", if no Power Management events occur for a specified length of time, the CPU clock will be stopped and the video signal will be suspended, Full power function will return when a Wake-Up event is detected.

HDD Power Down: Options are from "1 Min." to "15 Min." and "Disable".   The IDE hard drive will spin down if it is not accessed within a specified length of time.

Throttle Duty Cycle: When the system enters Doze mode, the CPU clock runs only part of the time.   You may select the percent of time that the clock runs.

PCI/VGA Act-Monitor: When Enabled, any video activity restarts the global timer for Standby mode.   The default setting is "Disabled".

Soft-Off by PWR-BTTN: When Enabled, turning the system off with the on/off button places the system in a very low-power-usage states, with only enough circuitry receiving power to detect power button activity or Resume by Ring activity.

IRQ 8 Break Suspend: You can turn On or Off monitoring of IRQ8 (the Real Time Clock) so it does not awaken the system from Suspend mode.

Reload Global Timer Events: When Enabled, an event occurring on each device listed below restarts the global time for Standby mode.
IRQ [3-7, 9-15], NMI
Primary IDE 0
Primary IDE 1
Secondary IDE 0
Secondary IDE 1
Floppy Disk
Serial Port
Parallel Port

After you have made your selection in the POWER MANAGEMENT SETUP, press the <ESC> key to go back to the main program screen.

3.7 PNP/PCI CONFIGURATION

Both ISA and PCI buses on the CPU card use system IRQs & DMAs.   You must set up IRQ and DMA assignments correctly through the PnP/PCI Configuration Setup utility, otherwise the SBC will not work properly.

When you select the "PnP /PCI CONFIGURATION" on the main program, the screen display will appears as:

PnP/PCI Configuration Setup Screen

```
                    ROM PCI / ISA BIOS (2A69KL7N)
                       PNP/PCI CONFIGURATION
                        AWARD SOFTWARE, INC.

 PNP OS Installed        : No        Used MEM base addr      : N/A
 Resources Controlled By : Manual
 Reset Configuration Data : Disabled  Assign IRQ For USB       : Disabled

 IRQ-3   assigned to     : Legacy  ISA
 IRQ-4   assigned to     : Legacy  ISA
 IRQ-5   assigned to     : PCI/ISA  PnP
 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     : PCI/ISA  PnP
 IRQ-15  assigned to     : PCI/ISA  PnP
 DMA-0   assigned to     : PCI/ISA  PnP
 DMA-1   assigned to     : PCI/ISA  PnP   ESC : Quit        ↑↓→←      : Select Item
 DMA-3   assigned to     : PCI/ISA  PnP   F1   : Help        PU /PD/+/-  : Modify
 DMA-5   assigned to     : PCI/ISA  PnP   F5   : Old Values  ( Shift ) F2  : Color
 DMA-6   assigned to     : PCI/ISA  PnP   F6   : Load BIOS Defaults
 DMA-7   assigned to     : PCI/ISA  PnP   F7   : Load Setup Defaults
```

PNP OS Installed: Select Yes if the system operating environment is Plug-and-Play aware (e.g., Windows 95).

Resources Controlled By: The Plug and Play BIOS can automatically configure all the boot and Plug and Play-compatible devices. If you select Auto, all the interrupt request (IRQ) and DMA assignment fields disappear, as the BIOS automatically assigns them.

Reset Configuration Data: Normally, you leave this field Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the operating system cannot boot.

IRQ n Assigned to: When resources are controlled manually, assign each system interrupt as one of the following types, depending on the type of device using the interrupt:

Legacy ISA Devices compliant with the original PC AT bus specification, requiring a specific interrupt (such as IRQ4 for serial port 1).

PCI/ISA PnP Devices compliant with the Plug and Play standard, whether designed for PCI or ISA bus architecture.

DMA n Assigned to: When resources are controlled manually, assign each system DMA channel as one of the following types, depending on the type of device using the interrupt:

Legacy ISA Devices compliant with the original PC AT bus specification, requiring a specific DMA channel.

PCI/ISA PnP Devices compliant with the Plug and Play standard, whether designed for PCI or ISA bus architecture.

Used MEM base addr: Select a base address for the memory area used by any peripheral that requires high memory.

Assign IRQ For USB: To use USB feature, set the IRQ to "Enabled". The default setting is "Disabled".

3.8 LOAD SETUP DEFAULTS

"**LOAD SETUP DEFAULTS**" loads the optimal settings which are stored in BIOS ROM. The defaults loaded affect only the BIOS Features Setup, Chipset Features Setup, Power Management Setup, PnP/PCI configuration setup and Integrated Peripherals Setup. There is no effect on the Standard CMOS Setup.   To use this feature, highlight the entry on the main screen and press <Enter>. A line will appear on the screen asking if you want to load the Setup default values.   Press the <Y> key and then press the <Enter> key if you want to load the Setup defaults.   Press <N> if you do not want to proceed.

3.9 LOAD BIOS DEFAULTS

The BIOS defaults have been set by the manufacturer which represent settings provided with the minimum requirements for your system to operate. " **Load BIOS Defaults** " loads the troubleshooting default values permanently recorded in the BIOS ROM. These settings are non-optimal and turn off all high performance features.

The Standard CMOS Setup screen is not affected.   To use this feature, highlight it on the main screen and press <Enter>.   A line will appear asking if you want to load the BIOS default values.   Press the <Y> key and the <Enter>.   The default settings will load. Press <N> if you do not want to proceed.

ROM PCI / ISA BIOS (2A69KL7N)	
CMOS SETUP UTILITY	
AWARD SOFTWARE, INC.	
STANDARD CMOS SETUP	INTEGRATED PERIPHERALS
BIOS FEATURES SETUP	SUPERVISOR PASSWORD
CHIPSET FEATURES SETUP	USER PASSWORD
POWER MANAGEMENT SETUP	IDE HDD AUTO DETECTION
PNP / PCI CONFIGURATION	HDD LOW LEVEL FORMAT
LOAD BIOS DEFAULTS Load BIOS Default (Y/N)? Y	SET\\UP
LOAD SETUP DEFAULTS	EXIT WITHOUT SAVING
ESC : Quit	↑ ↓ → ← : Select Item
F10 : Save & Exit Setup	(Shift) F2 : Change Color
Time, Date, Hard Disk Type....	

3.10 INTEGRATED PERIPHERALS

When you select the "INTEGRATED PERIPHERIALS" on the main program, the screen display will appears as:

Integrated Peripheral Setup Screen

ROM PCI / ISA BIOS (2A69KL7N)
INTEGRATED PERIPHERALS
AWARD SOFTWARE, INC.

IDE HDD Block Mode	: Enabled	Onboard Parallel Port	: 378/IRQ7
IDE Primary Master PIO	: Auto	Parallel Port Mode	: SPP
IDE Primary Slave PIO	: Auto		
IDE Secondary Master PIO	: Auto		
IDE Secondary Slave PIO	: Auto		
IDE Primary Master UMDA	: Auto		
IDE Primary Slave UMDA	: Auto		
IDE Secondary Master UDMA	: Auto		
IDE Secondary Slave UDMA	: Auto		
On-Chip Primary PCI IDE	: Enabled		
On-Chip Secondary PCI IDE	: Enabled		
Onboard PCI SCSI Chip	: Enabled		
USB Keyboard Support	: Disabled		
Init Display First	: PCI Slot		
KBC input clock	: 8 MHz		
Onboard FDC Controller	: Enabled	ESC : Quit ↑↓→← : Select Item
Onboard Serial Port 1	: 3F8 / IRQ4	F1 : Help PU /PD/+/- : Modify
Onboard Serial Port 2	: 2F8 / IRQ3	F5 : Old Values (Shift) F2 : Color
UART Mode Select	: Normal	F6 : Load BIOS Defaults
		F7 : Load Setup Defaults

IDE HDD Block Mode: Block mode is also called block transfer, multiple commands, or multiple sector read/write. If your IDE hard drive supports block mode (most new drives do), select Enabled for automatic detection of the optimal number of block read/writes per sector the drive can support.

IDE Primary/Secondary Master/Slave PIO: There are four IDE PIO (Programmed Input/Output) fields let you set a PIO mode (0-4) for each of the four IDE devices that the onboard IDE interface supports. Modes 0 through 4 provide successively increased performance. In Auto mode, the system automatically determines the best mode for each device.

IDE Primary/Secondary Master/Slave UMDA: Ultra DMA/33 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Window 95 OSR2 or a third-party IDE bus master driver). If your hard drive and your system software both support Ultra DMA/33, select Auto to enable BIOS support.

On-Chip Primary/Secondary PCI IDE: The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select Enabled to activate each channel separately.

Onboard PCI SCSI Chip: Select Enabled if your system contains a built-in PCI SCSI controller.

USB Keyboard Support: Select Enabled if your system contains a Universal Serial Bus (USB) controller and you have a USB keyboard.

KBC input clock: The system designer must select the correct frequency for the keyboard controller input clock. Do not change this value from default value.

Onboard FDC Controller: Select Enabled if your system has a floppy disk controller (FDC) installed on the system board and you wish to use it. If you install an add-in FDC or the system has no floppy drive, select Disabled in this field.

Onboard Serial Port 1 / 2: Select an address and corresponding interrupt for the first and second serial ports.

UART Mode Select: Select an operating mode for the second serial port:
Normal   RS-232C serial port
Standard   RS-232C serial port
IrDA 1.0   Infrared port compliant with IrDA 10
IrDA SIR   Specification
IrDA MIR   IrDA-compliant serial infrared port
IrDA FIR   1 MB/sec infrared port

FIR	Fast Infrared standard
MIR	Fast Infrared srandard
0.57M	0.57-MB/sec infrared port
MIR	1.15-MB/sec infrared port
1.15M	4-Mb/s data transmission
Sharp IR	IrDA-compliant serial infrared port
HPSIR	Amplitude shift keyed infrared port
ASK IR	

Onboard Parallel Port: Select a logical LPT port name and matching address for the physical parallel (printer) port.

Parallel Port Mode: Select an operating mode for the onboard parallel (printer) port. Select Normal, unless your hardware and software require one of the other modes offered in this field.

3.11 SUPERVISOR/USER PASSWORD

The "SUPERVISOR/USER PASSWORD" utility sets the password. The SBC is shipped with the password disabled. If you want to change the password, you must first enter the current password, then at the prompt -- enter your new password. The password is case sensitive, and can be up to 8 alphanumeric characters. Press <Enter> after you have finished typing in the password. At the next prompt, confirm the new password by re-typing it and pressing <Enter> again. When you are done, the screen automatically reverts to the main screen. Remember that when you use this feature, the "Security Option" line in BIOS FEATURES SETUP will determine when entering the password will be required.

To disable the password, press the <Enter> key instead of entering a new password when the "Enter Password" in the dialog box appears. A message will appear confirming that the password is disabled.

If you have set both supervisor and user password, only the supervisor password allows you to enter the BIOS SETUP PROGRAM.

3.12 IDE HDD AUTO DETECTION

If your system has an IDE hard drive, you can use this utility to detect its parameters and enter them into the Standard CMOS Setup automatically.

If the auto-detected parameters displayed do not match the ones that should used for your hard drive, do not accept them.   Press the <N> key to reject the values and enter the correct ones manually on the Standard CMOS Setup screen.

Note : If you are setting up a new hard disk drive (nothing on it) that supports LBA mode, more than one line will appear in the parameter box, choose the line that lists LBA for an LBA drive.

Do not choose Large or Normal if the hard disk drive is already fully formatted when you install it, choose the mode "HDD Low Level Format" to format it.

3.13 HDD LOW LEVEL FORMAT

Select and highlight this option press the <Enter> key to enable you to perform the low level format of hard disk drive.

3.14 SAVE & EXIT SETUP

Select this option and press the <Enter> key to save the new setting information in the CMOS memory and continue with the booting process.

3.15 EXIT WITHOUT SAVING

Select this option and press the <Enter > key to exit the Setup Utility without recording any new values or changing old ones.

4.1 DRIVERS OF CD-ROM LIST

The Table list below shows the drivers supported for AP-370AF.

Directory	Driver Function
LAN	Network driver
Ultra2SCSI	Ultra-2 SCSI driver
VGA	Display driver
Genesys	System Monitoring driver
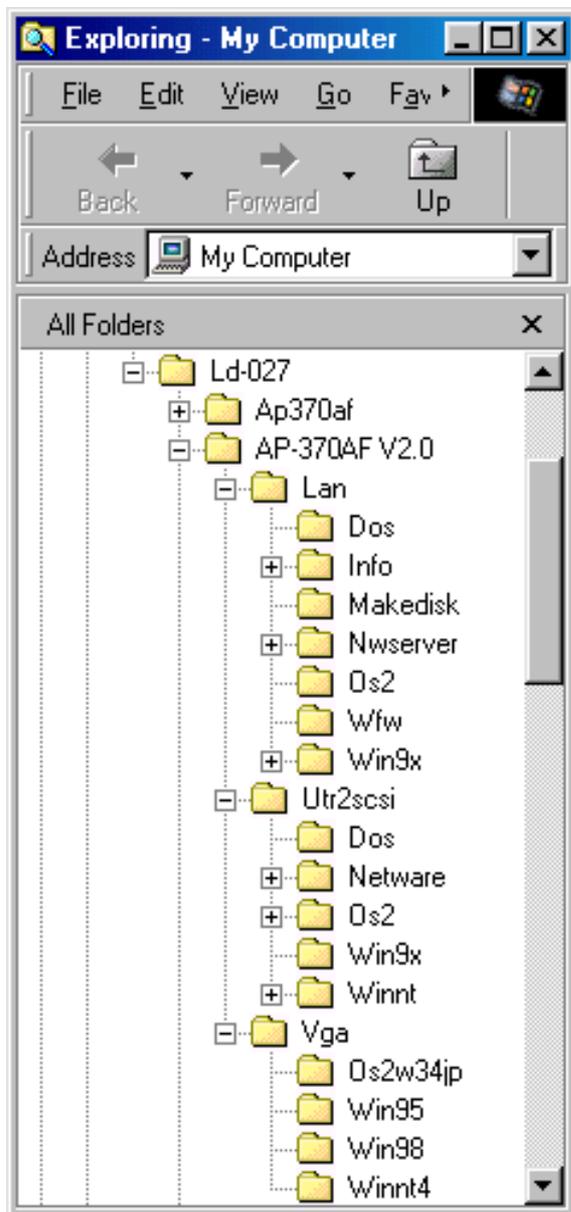
You can enable the watch-dog when your application software monitors an unexpected or not respond, then the timer generates a reset to reboot your system.   During the period of enable to reset, you could still cancel reset by disabling the watch-dog.   Decide the way you want to set the period for reset by selecting hardware or software watch-dog (if both of them are available).   For hardware setting period, select period by jumper.   For software setting period, normally setting hardware watch-dog timer period to 16 sec.

Software watch-dog using example

EX.1: For DOS

Enable	**Disable**
C:\DOS> DEBUG	**C:\DOS>DEBUG**
-o443F	**-o441F**

EX.2: For assemble Language

Enable :	**Disable :**
MOV DX, 443H	**MOV DX, 441H**
MOV AL, 0FH	**MOV AL, 0FH**
OUT DX, AL	**OUT DX, AL**

Note : "F" is the period of software watch-dog timer (normally "F" indicated 0 sec.). 0 to 9 and A to F are used for represent different period.   Normally, the step is 2 sec. That means "E" is 2, "D" is 4, "2" is 26, "1" is 28 and "0" is 30 seconds.

I/O PORT ADDRESS MAP

Address	Function
000 - 01F	DMA Controller #1
020 - 03F	Interrupt Controller #1
040 - 05F	Timer Chip
043	Disable Watch-Dog Times Operation (Read)
060 - 06F	Keyboard Controller
070 - 07F	Read Time Clock/NMI Mask
080 - 09F	DMA Page Register
0A0 - 0BF	Interrupt Controller #2
0C0 - 0DF	DMA Controller #2
0F0 - 0F1	Clear/Reset Math Coprocessor
1F0 - 1F7	Hard Disk Controller
200 - 210	Game Port
278 - 27F	Parallel Port #2
2E8 - 2EF	Serial Port #4 (COM 4)
2F8 - 2FF	Serial Port #2 (COM 2)
300 - 31F	prototype Card/Streaming Tape Adapter
360 - 36F	PC Network
378 - 3FF	Parallel Port #1
380 - 38F	SDLC #2
3A0 - 3AF	SDLC #1
3B0 - 3BF	MDA Video Card (Including LPTO)
3C0 - 3CF	EGA Card
3D0 - 3DF	CGA Card
3E8 - 3EF	Serial Port #3 (COM 3)
3F0 - 3F7	Floppy Disk Controller
3F8 - 3FF	Serial Port #1 (COM 1)
443	Enable Watch-dog Timer Operation (read)

MEMORY ADDRESS MAP

Address Range (Hex)	Description
000000H - 09FFFFH	640 KB of Conventional RAM
0A0000H - 0BFFFFH	128 KB of Video RAM
0C0000H - 0EFFFFH	256 KB of I/O Expansion ROM
0F0000H - 0FFFFFH	64 KB of System BIOS ROM
0100000H - 7FFFFFFFH	1 MB ~ 128MB of User RAM

DMA CHANNELS

CHANNEL	Function
DMA 0	Reserved
DMA 1	Reserved
DMA 2	Floppy Disk Controller
DMA 3	ECP Parallel Port
DMA 4	Cascade for DMA #1
DMA 5	Reserved
DMA 6	Reserved
DMA 7	Reserved

INTERRUPT CONTROLLER

IRQ	Function
IRQ 0	System timer output
IRQ 1	Keyboard
IRQ 2	Cascade for INTC #2
IRQ 3	Serial port #2
IRQ 4	Serial port #1
IRQ 5	Parallel port #2
IRQ 6	Floppy disk controller
IRQ 7	Parallel port #1
IRQ 8	Real time clock
IRQ 9	Software redirected to INT 0AH (IRQ 2)
IRQ 10	Reserved
IRQ 11	Reserved
IRQ 12	PS/2 Mouse
IRQ 13	Math Coprocessor (CPU Internal)
IRQ 14	Primary Hard disk
IRQ 15	Secondary Hard Disk
NMI	Parity Check Error

GLOSSARY

8-Bit Bus – Data is transmitted to expansion slots and other components on the bus only along 8 parallel data line.

10Base-T – It is a 10Mbps IEEE 802.3/Ethernet standard that uses un-shielded twisted pair cable specification.   10Base-T supports network configuration using the CSMA/CD access method over a twisted pair transmission system up to 100 meters in length without the use of repeater.

16-Bit Bus or ISA Bus – Data is transmitted along either 8 or 16 data lines, depending on what kind of adapter card is used in an expansion slot.   ISA is the abbreviation of Industry Standard Architecture.

100Base-TX – It is a 100Mbps IEEE 802.3/Ethernet standard that uses UTP cable.   Also called Fast Ethernet, it uses RJ-45 connectors and EIA/TIA T568B pinning.   Maximum cable length from hub to node is 100 meters without a repeater.

Adapter – It is also called an expansion board, expansion card, or adapter card.   It is a small circuit board that is installed in the expansion slots on the motherboard.   You can install a particular adapter that connects a new device such as internal modem, sound card, and scanner.

AGP (Accelerated Graphic Port) – is a 32-bit, 66MHz external frequency data bus that transmit a maximum of 528MB/s of data (4 times the speed of PCI transmission); this design improves the speed of large amount in video transaction.

BIOS (Basic Input /Output System) – This is a chip on the motherboard that contains the instructions for starting up, or booting, the computer, and more.

Bus – Data that travels in a computer along the circuits on the motherboard are called buses.   Although three main buses (data bus, address bus, and control bus) manage the computer's operation, often these are collectively called the bus.   The bus carries instructions back and forth between the CPU and other devices in the system.   ISA, EISA, VL-Bus, PCI and SCSI are examples of PC buses.

bps – Bits per second.   Also often preceded by K (kilo/thousands), Kbps – Kilo bytes per second, and M (mega/million), Mbps – Mega bytes per second.

Bus Mastering – A method of transferring data through a bus in which the device takes over the bus and directly controls the transfer of data to the computer's memory.   Bus mastering is a method of Direct Memory Access (DMA) transfer.

Cache – Cache RAM is an extra holding area for program instructions that need to be frequently used by the CPU or swapped in and out of RAM.   Your CPU can usually access those instructions from the cache more quickly than it could from a hard disk or even RAM, so a cache helps the system work more efficiently.   Most systems sold today offer either 256K or 512K cache.

CPU (Central Processing Unit) – executes all commands and controls the flow of data, providing the " brain " that enables the PC to calculate and perform the operations like sorting information more quickly than a human could.   The CPU makes perhaps the greatest contribution to a PC's speed and power.   Note: Any additional information is subject to change without prior revision from the supplier.

Table 1 -- CPU Speeds	
Processor type	Speed ratings (MHz)
486DX2	66, 80
486DX4	75, 100, 120
Pentium	90, 100, 120, 133, 166, 200
Pentium MMX	166, 200, 233
Pentium Pro	166, 180, 200
Pentium II	233, 266, 300, 333

EIDE (Enhanced IDE) – It is a hard drive controller that enables your system to be able to handle fast hard disk drives at a speed of 10Mbps.

EISA or MCA Bus – Data is transmitted along 32 data lines to adapter cards designed specifically to work with the 32-bit buses.   MCA expansion slots cannot accept 8-bit or 16-bit adapter cards.   EISA stands for Extended Industry Standard Architecture, while MCA stands for Micro Channel Architecture.   MCA is architecture used in IBM Microcomputer.

Expansion slots – Expansion slots are plug-in connectors that allow you to insert additional circuit boards that attach to the rest of the PC through special circuitry called the bus.   By inserting the right circuit board -- usually called an adapter or an expansion card – you can increase the resolution and the number of colors used by the display, or you can transform your PC into a machine for recording and playing music.

Fast SCSI – The common nomenclature associated with SCSI-2, the second generation of SCSI offering mandatory parity checking improvements over SCSI-1.

IDE (Integrated Drive Electronics) – It was developed from ST-506 type hard drive interface, utilizes BIOS INT 13h hard drive secondary software and supports two hard drives (Master and Slave).   Do not need extra software to drive since it is directly initiated in the BIOS.   Data transfer rate is 4.1 Mbps.   Take note that this interface cannot support other drive like CD-ROM drive.

IEEE (Institute of Electrical and Electronic Engineers) – It is an international professional society that issues its own standard, and is a member of ANSI and ISO. Popular known standards is:
IEEE802.3   –   is a physical layer standard for 10Base-T,
                 100Base-T, Ethernet, and StarLAN.
IEEE802.5   –   is a physical layer standard for Token Ring.
IEEE802.11 –   is a physical layer standard for Wireless
                 LAN/WAN compatibility.
IEEE802.12 –   is a physical layer standard for 100VG AnyLAN.

LAN (Local Area Network) – A data communications network spanning a limited area. It provides communications between three or more computers and peripherals, in most cases using a high-speed media as it's backbone.

Keyboard – This is a component that comes in direct contact for you with your PC.   The mechanism of keyboard converts a key cap's movement into a signal sent to the computer.   The most common key mechanism are " capacitate " and " hard contact ". Capacitate keyboard has a spring that causes the plastic and the metal plunger to move nearer to two pads that have large plates (plated in tin, nickel, and copper).   These pads are connected to the keyboard's printed circuit board.   Hard contact keyboard causes the key cap to collapse a foam rubber dome that presses against a sheet of plastic on the bottom of which is metallic area connected to the rest of the keyboard's circuit board.

LDCM (LANDesk Client Manager) – With the help of LDCM, PCs that are either stand-alone or on a network can not escape the control of a system administrator. Alerts will be sent to the user if an abnormal condition is encountered in a PC. It allows the administrator to give each PC a thorough check-up. Additionally, this feature is available to multiple OS's on the market today. LDCM Key Features include the following : ①Health Monitoring，②Real-Time Alerting，③Remote Accessibility，④Extensive Instrumentation. This is a product from Intel.

Mouse – The keyboard is a barrier to learn how to use a computer. Xerox Corporation first developed the concept of a pointing device, something a computer user could move with his or her hand, causing a corresponding move on screen. Because of its size and tail like cable, the device was named for the mouse. Apple Computer made the mouse a standard feature of its Macintosh computers, and with the popularity of Windows, a mouse is becoming standard equipment on all PCs, as well. The " Trackball " have survived more awkward methods of navigating with the keyboard. " Digitizing tablets " are popular with architects and engineers who must translate precise movements of a pen into lines on the screen. " Touch screens ", on which you press either your finger and a special light pen to control the software, are too tiring to use for any length of time.

MMX™ – CPU's with MMX™ technology are optimized to run multimedia application, and therefore, offer faster multimedia playback than standard CPUs. However, when manufacturers introduce any new hardware technology, the software makers need to catch up. At this time of compilation, most applications can't yet take advantage of MMX™ capabilities.

Parallel port – Parallel ports (labeled LPT1, LPT2, and so on) are usually for plugging in printers. It is also often called a Centronics port – has been almost synonymous with printer port. Although a serial port can also be used to send data from a PC to some models of printers, the parallel port is faster. A serial port sends data one bit at a time over a single one-way wire; a parallel port can send several bits of data across eight parallel wires simultaneously. Take note that a serial connection sends a single bit, a parallel port send an entire byte.

PCI Bus (Peripheral Component Interconnect) – It is a connection slot in a motherboard that supports 32-bit bus transfer rates. The now standard PCI Local Bus carries data along at least 32 lines, that is, at least 32 bits at a time. Local bus computer designs add special buses so the CPU can communicate directly with key components like the monitor, resulting in much better performance. You should look for

PCI local bus capabilities in any system you buy, especially PCI local bus video (which helps the monitor display more quickly).

POST (Power-On Self-Test) – is the first thing your PC does when you turn it on, and it's your first warning of trouble with any of the components.   When the POST detects an error from the display, memory, keyboard, or other basic components, it produces an error warning in the form of a message on your display and — in case your display is part of the problem — in the form of a series of beeps.

RAM (Random Access Memory) – consists of a bank of chips that act as " working memory ", holding program instructions and data only while your computer's on.   Unless the instructions and data are saved to a disk, RAM forgets them when you turn your computer off.   RAM is measured in megabytes (M).   Most computers today come with 32M of RAM, though some sell with only 16M installed.   There are a few different flavors and speeds of RAM, as well.   One of the most prominent today is Extended Data Output (EDO) RAM, but an even faster type of RAM that has just hit the market is called SyncDRAM.

Serial port – Serial ports are also sometimes called COM (short for COMmunications) ports, and are labeled COM1, COM2, and so on.   It is simple in concept: one line to send data, another line to receive data, and a few other lines to regulate how data is sent over the other two lines – from commonplace modems and printers to plotters and burglar alarms.   The most common use for serial port is with a mouse or modem.   The reason for this is that a serial port is not a very efficient way to transfer data, so little data that speed is not crucial, and perfect for modems because.   With current technology, phone lines cannot transport more than one signal at a time anyway.   The serial port is often referred to as an RS-232 port.

SCSI (Small Computer System Interface) – An intelligent bus for transmitting data commands between varieties of devices.   There are many implementations of SCSI, including Fast SCSI, Wide SCSI, Fast Wide SCSI, Fast-20, and Fast-40.

SCSI-2 – The second generation of SCSI; includes many improvements to SCSI-1, including Fast SCSI, Wide SCSI, and mandatory parity checking.

SCSI-3 – The third generation of SCSI; introduces Fast-20 and Fast-40 as improvements to the parallel bus.   The standard also includes a number of specifications for high-speed serial bus architectures such as SSA, Fiber Channel, and IEEE 1394.   Also known as Ultra SCSI.

Ultra SCSI – Also known as SCSI-3, is a third generation SCSI standard that introduced parallel bus speed improvements (FAST-20 and FAST-40), an the miniaturized 68-pin micro connector.

USB (Universal Serial Bus) – USB consolidates serial, parallel, keyboard, mouse, and game ports into one asynchronous and isochroous communications port with bandwidth for data transfer speeds up to 12 Mbps without termination.   By daisy-chaining USB hubs, up to 127 I/O devices can be connected to one USB port on the PC.   USB is completely plug-and play meaning peripherals can be correctly detected and configured automatically as soon as they are connected.

UTP (Unshielded Twisted Pair) – Twisted pair cable with neither individual nor overall shielding.   Twisted Pair are two wires twisted together to reduce susceptibility to RF crosswalk.

VGA (Video Graphics Array) – A video adapter that supports 640x480 pixels color resolution. The Windows OS provides medium text & graphics standard.

VL-Bus – It is also known as Local Bus; this is an I/O interface that is directly connected and depended of the system CPU.   The VL-Bus is an abbreviation of VESA Local Bus.

Terms and Conditions

Warranty Policy

1. All products are warranted against defects in materials and workmanship on a period of two years from the date of purchase by the customer.

2. The buyer will bear the return freight charges for goods that are returned for repair within the warranty period whereas manufacturer will bear the other way after repair.

3. The buyer will pay for repair (for the replaced materials plus service time) and transportation charges (both ways) for items after the expiration of the warranty period.

4. If the RMA Service Request Form does not meet the stated requirement as listed on "RMA Service ", RMA goods will be returned at the customer expense.

5. The following conditions are excluded from this warranty：

   A. Improper or inadequate maintenance by the customer.

   B. Unauthorized modification or misuse.

   C. Operation outside of the environmental specifications for the product.

RMA Service

1. ***Request a RMA# :***

   Complete and fax to Supplier the "RMA Request Form" to obtain a RMA number.

2. ***Shipping:***

   A. The customer is requested to fill up the problem code as listed. If none of the code is selected, please write the symptom description on the remark.

   B. Ship the defective units with freight prepaid.

   C. Mark the RMA # clearly on the box.

   D. Shipping damage as a result of inadequate packing is the customer's responsibility.

   E. Use the original packing materials whenever possible.

3. ***All RMA# are valid for 30 days only:***

   When RMA goods are received after valid RMA# period, the goods will be rejected.

RMA Service Request Form

When requesting RMA service, please fill out this "RMA Service Request Form". This form needs to be shipped with your returns. Service cannot begin until we have this information.

Company:	Person to contact:
Phone No.	Purchased Date:
Fax No.:	Applied Date:

Return Shipping Address _____

_____

*For Supplier only   **RMA No:**

Account Sales:

Model No.	Serial No.	Problem Code	Remark
			*This form could be copied for more description

***Problem Code**:

01:D.O.A.	06: HDC Fail	11: Memory Socket Bad
02: Second Time R.M.A.	07: Bad Slot	12: Hang Up Hardware
03: No Screen	08: BIOS Problem	13: Hang Up Software
04: CMOS Data Lost	09: Keyboard Controller Fail	14: Other (Pls. Specify)
05: FDC Fail	10: Cache RMA Problem	

Request Party   *Confirmed By Supplier*

Authorized Signatures   Authorized Signatures