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AP-40AHD

486 Half-size CPU Card
with Flash Disk

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CHAPTER 1 : INTRODUCTION

1.1 Preface

Our appreciation for your selection of Lanner' s AP-40AHD CPU Card. The AP-40AHD is a 486 Half-Size CPU card with Flash Disk feature that is a highly performance card with vasive enhanced function. This board is designed to constitute noise tolerant and low power consumption CMOS technology that allows the AP-40AHD to withstand and adapt harsh industrial environments very well.

The AP-40AHD is built as an ISA expansion card that is simply upgraded by changing one card from another without replacing the whole system. It provides the primarily elements for building an IBM PC/AT compatible computer for a wide variety of embedded system applications. The AP-40AHD is fully compatible with the IBM PC/AT which means virtually all the software written for the IBM PC/AT will run on the AP-40AHD CPU card.

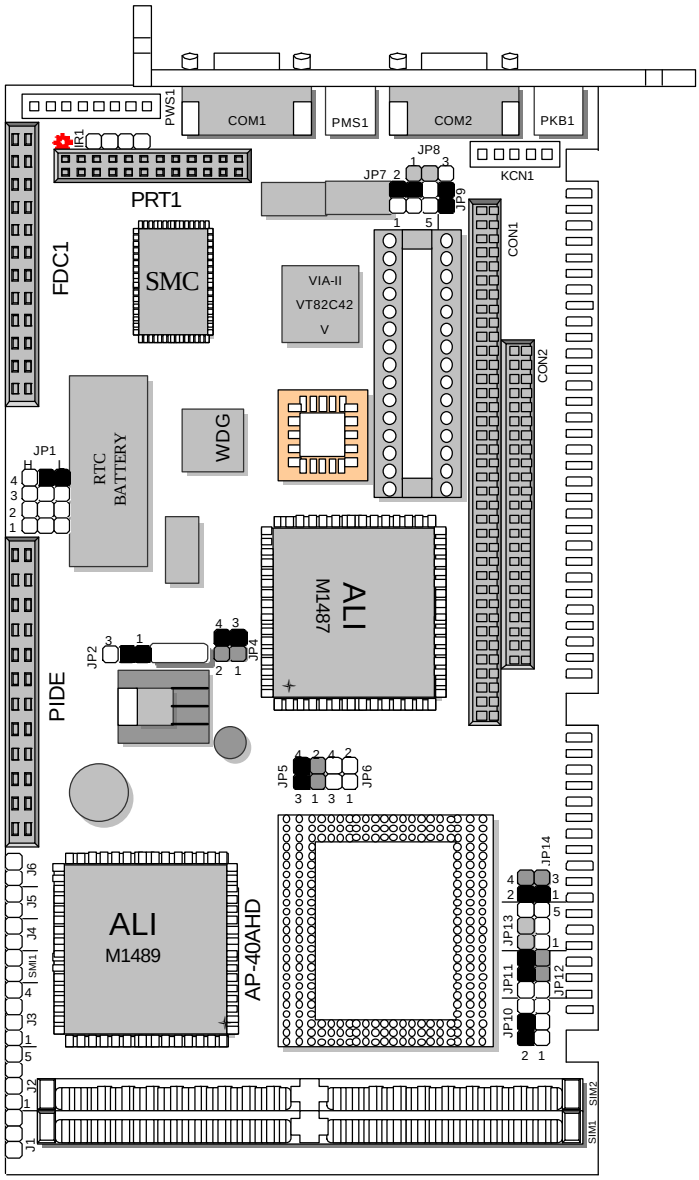
1.2 Specifications

Features	Supported Elements
CPU	: Intel 80486 series, AMD & Cyrix 5x86 series
Chipset	: ALI M1489/M1487 & SMC37C669 Chipsets
System Memory	: Two 72-pin SIMM sockets for FPM/EDO DRAM up to 128MB and support memory parity function
Cache Size	: 128KB~512KB L2 Cache (Default 256KB)
BIOS	: 128KB Award licensed BIOS
Flash memory Disk	: Reserved socket for DiskOnChip from M-System; support up to 24MB Flash memory disk.
Bus Interface	: ISA bus
DMA	: 8 DMA channels
RTC Battery	: DS-12887A RTC or compatible
Interrupts	: 16 levels of hardward interrupts
IDE Drive Interface	: One PCI IDE port supports up to two hard drives
Floppy Drive Interface	: One FDD port supports up to floppy drives
Serial Port	: Two 16550 compatible FIFO RS-232 serial ports
Parallel Port	: One multi-mode parallel port (SPP / EPP / ECP)
PS/2 Mouse Connector	: On-board PS/2 Mouse connector
Keyboard Connector	: 5-pin header and 6-pin Mini-Din connectors
External Power Connector	: 8-pin external power connector
Watchdog Timer	: 8 level time-out intervals (0.5/1/2/4/8/16/32/64 sec.)
PC/104 Expansion Bus	: Built-in PC/104 expansion bus
Operating Temperature	: 0℃~55℃
Humidity	: 10%~90% RH
Dimensions	: 185 x 122 mm
Net weight	: 235 g

1.3 Packing Check List

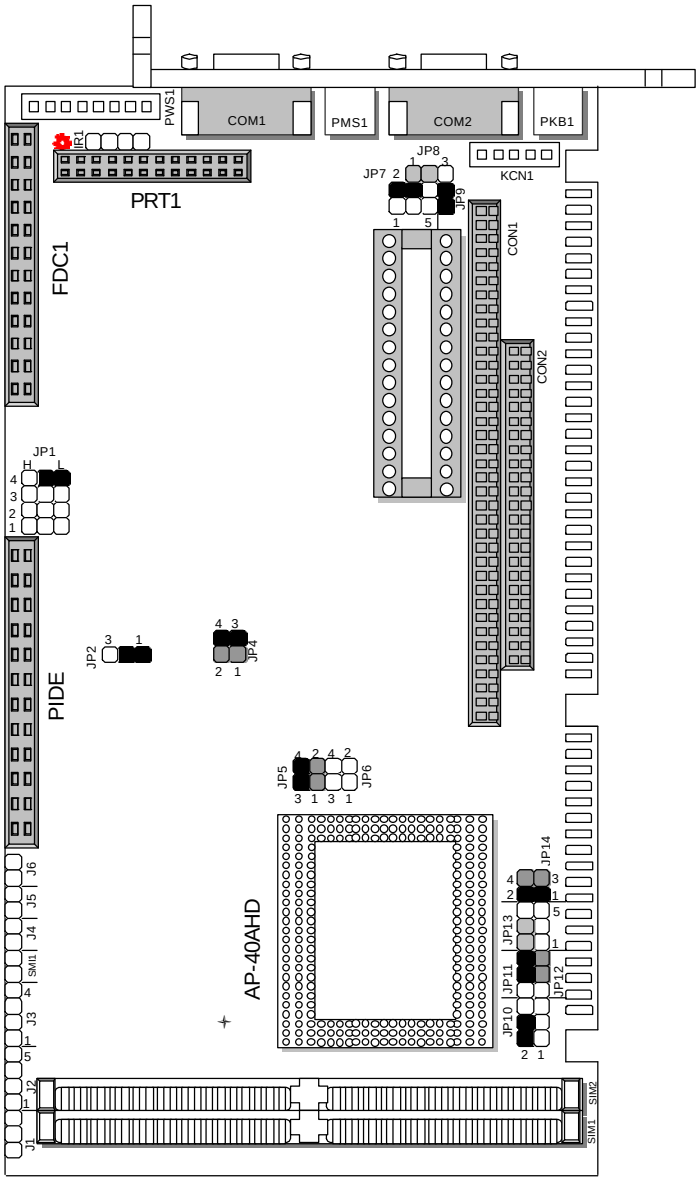
Item	Qty	Remark
AP-40AHD CPU Card	1 pc.	
5-pin header to 5-pin header keyboard adapter cable	1 pc.	
6-pin PS/2 Mini-Din to 5-pin AT Din keyboard adapter cable	1 pc,	
IDE/Floppy cable	1 set	1 x 34-pin female flat cable 1 x 40-pin female flat cable
Printer port cable	1 pc.	26-pin female flat connector to 25-pin D-sub female connector
PC/104 Mounting Kit	1 set	4 x brass spacer 4 x nut 1 x (2 x 20) pin header 1 x (2 x 32) pin header
User‘ s manual	1 pc.	

1.4 Board Outline of AP-40AHD



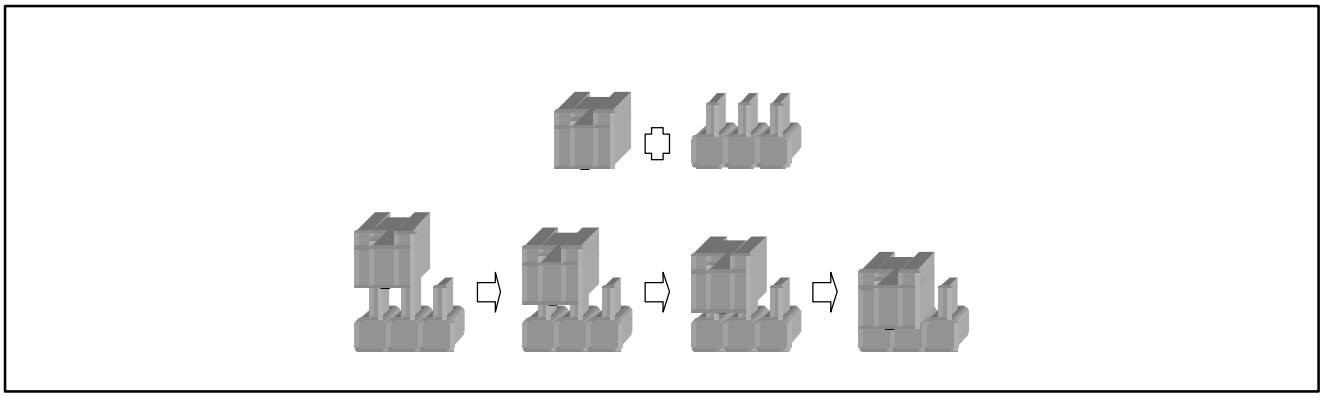
CHAPTER 2 : JUMPER SETTINGS & CONNECTORS

The figure below shows the jumpers and connectors location for the AP-40AHD :



2.1 Jumper Settings for AP-40AHD

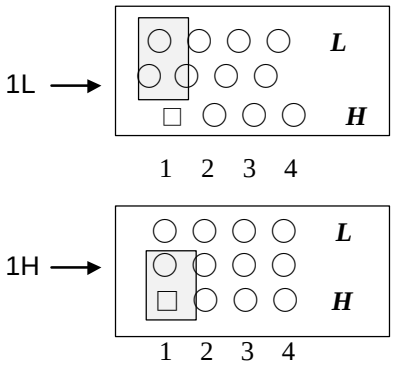
Jumpers are used to select the operation modes for your system.To set a jumper, a black cap containing metal contacts is placed over the jumper pin(s) according to the required configuration. A jumper is said to be "on" or "1-2" when the black cap has been placed on one or two of its pins, as show in the figure below:



✦ **JP1 : Select Watch-Dog Timeout Period**

Time Out Period	JP1
0.5 sec.	1L
1 sec.	2L
2 sec.	3L
4 sec. (Default)	4L
8 sec.	4H
16 sec.	3H
32 sec.	2H
64 sec.	1H

Example :



✦ **JP2, JP4 : External CPU Clock Select**

External CPU Clock	JP2	JP4	CPU Type
25 MHz	1-2	OFF	486SX-25, DX-25. SX2-50. DX2-50
33 MHz (Default)	1-2	1-2, 3-4	486SX/DX-33, SX2/DX2/DE2-66, DX4-100, 5x86-100/133
40 MHz	2-3	3-4	486DX-40, DX2-80, DX4-120
50 MHz	2-3	1-2	DX-50

- **JP5, JP6: CPU Voltage Select**

CPU Voltage Select	JP5	JP6
3.3 V (Default)	1-2, 3-4	OFF
5 V	OFF	1-2, 3-4

- **JP7: DiskOnChip (ROM Disk) Address Select**

Address	JP7
C8000 - CFFFF	1-2
D0000 - D7FFF	3-4
D8000 - DFFFF	5-6

Note: Default is OFF; and a spare jumper is available at 1-2.

- **JP8: Select Watch-Dog Active Type**

Watch-Dog Active Type	JP8
Reset System (Default)	1-2
NMI System	2-3
Disable	OFF

- **JP9: Select PS/2 Mouse & IRQ12 Function**

PS/2 Mouse & IRQ12 Function	JP9
Enable, IRQ12 use by PS/2 Mouse (Default)	ON
Disable, IRQ12 Release	OFF

✦ **JP10, JP11, JP12, JP13, JP14 : CPU Type Select**

CPU Type	JP10	JP11	JP12	JP13	JP14
I486SX	OFF	1-2	1-2	OFF	OFF
I486DX/DX2/ODP; AmDX4-V8T	OFF	1-2	2-3	OFF	OFF
I486DX4-100SK051/SL-Enhance	OFF	1-2	2-3	2-4	1-2, 3-4
I486DX4-100SK096/SL-Enhance	OFF	2-3	2-3	2-4	1-2, 3-4
Am486DX2-V8T	OFF	1-2	2-3	3-5	OFF
Am486DE2-66V8T	2-4	1-2	2-3	2-4, 3-5	1-2, 3-4
Write-Back Enhance CPU AMD+ Am486DX2/DX4-xxx SV8B AmDX4-xxx SV16B AMD+ Am5x86-P75 (Default : AmDX4-xxx SV8B)	2-4, 3-5 : AmDX2-SV8B; Am5x86-133 2-4 AmDX4-SV8B Intel W/B Enhance	2-3	2-3	2-4	1-2, 3-4
Cyrix Cx486 (DX/DX2/DX4)-GP	1-3, 4-6	1-2	2-3	1-3, 4-6	OFF
Cyrix Cx486DX/DX2/DX4; Cyrix Cx5X86	2-4	1-2	2-3	2-4	1-2, 3-4

Note: Please follow the above jumper setting of your selected CPU, otherwise the screen display will response slower after 15 seconds (instead of the normal 7 seconds).

SM: External SMI Switch

ON : Break (Sleep)

OFF : Normal

2.2 Connectors Description

The connectors allow the CPU card to connect with other parts of the system. Some problems encountered with your system may be caused by loose or improper connections. Ensure that all connectors are in place and firmly attached.

CONNECTOR	FUNCTION
COM1	RS-232 PORT#1 CONNECTOR
PMS1	PS/2 MOUSE CONNECTOR
COM2	RS-232 PORT#2 CONNECTOR
PKB1	PS/2 KEYBOARD CONNECTOR
KCN1	5-PIN HEADER KEYBOARD CONNECTOR
PIDE1	PRIMARY EIDE CONNECTOR
FDC1	FLOPPY CONNECTOR
PRT1	PRINTER CONNECTOR
IR1	IRDA CONNECTOR
CN1	PC104 8-BIT CONNECTOR
CN2	PC104 16-BIT CONNECTOR
PWS1	8-PIN EXTERNAL POWER CONNECTOR
J1	RESET CONNECTOR
J2	PIN1 & PIN 3 FOR POWER LED; 4-5 FOR KEYLOCK
J3	EXTERNAL SPEAKER CONNECTOR
J4	HDD ACTIVE LED CONNECTOR
J5	TURBO SWITCH CONNECTOR
J6	TURBO LED CONNECTOR

2.2.1 System Status Indicate and Control Connectors

CONNECTOR		PIN N0.	DESCRIPTION
J1	RESET CONNECTOR	1	GND
		2	Reset Signal
J2	POWER LED & KEYLOCK CONNECTOR	1	+5V
		2	NC
		3	GND
		4	Keylock Signal
		5	GND
J3	EXTERNAL SPEAKER CONNECTOR	1	Speaker Signal
		2	NC
		3	GND
		4	+5V
J4	HDD ACTIVE LED CONNECTOR	1	HDD ACTIVE # Signal
		2	+5V
J5	TURBO SWITCH	1	GND
		2	Turbo Signal
J6	TURBO LED CONNECTOR	1	+5V
		2	Active# Signal

2.2.2 I/O Connectors Description

- **KCN1 : 5 PIN HEADER KEYBOARD CONNECTOR (HEADER)**

PIN NO.	DESCRIPTION
1	Keyboard Clock
2	Keyboard Data
3	External Power Good
4	Ground
5	+5V

- **PKB1 : PS/2 KEYBOARD CONNECTOR (Mini Din)**

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

- **PRT1 : PARALLEL PORT CONNECTOR (HEADER)**

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

- **COM2 : RS-232 PORT #2 CONNECTOR (D-Sub)**

PIN NO.	DESCRIPTION
1	Data Carrier Detect (DCD#)
2	Receive Data (RXD)
3	Transmit Data (TXD)
4	Data Terminal Ready (DTR#)
5	Ground (GND)
6	Data Set Ready (DSR#)
7	Request To Send (RTS#)
8	Clear To Send (CTS#)
9	Ring Indicator (RI#)

- **PMS1 : PS/2 MOUSE CONNECTOR (Mini Din)**

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

- **COM1 : RS-232 PORT #1 CONNECTOR (D-Sub)**

PIN NO.	DESCRIPTION
1	Data Carrier Detect (DCD#)
2	Receive Data (RXD)
3	Transmit Data (TXD)
4	Data Terminal Ready (DTR#)
5	Ground (GND)
6	Data Set Ready (DSR#)
7	Request To Send (RTS#)
8	Clear To Send (CTS#)
9	Ring Indicator (RI#)

✦ PIDE1 : PCI IDE INTERFACE 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	IRQ14	32	IOCS16#
33	SA1	34	NC
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD Active#	40	Ground

✦ IR1 : Alternate IrDa

PIN NO.	DESCRIPTION
1	IRRX2
2	Ground
3	IRTX2
4	+5V

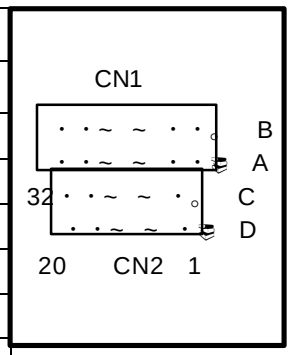
✦ FDC1 : FLOPPY INTERFACE CONNECTOR (HEADER)

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#

✦ PWS1 : EXTERNAL POWER CONNECTOR

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

CN1, CN2: PC104 CONNECTOR



PIN NO.	DESCRIPTION			
	CN1		CN2	
	ROW A	ROW B	ROW C	ROW D
1	IOCHCK#	GND	GND	GND
2	SD7	RSTDRV	SBHE#	MEMCS16#
3	SD6	+5V	LA23	IOCS16#
4	SD5	IRQ9	LA22	IRQ10
5	SD4	-5V	LA21	IRQ11
6	SD3	DRQ2	LA20	IRQ12
7	SD2	-12V	LA19	IRQ15
8	SD1	0 WS#	LA18	IRQ14
9	SD0	+12V	LA17	DACK0#
10	IOCHRDY	NC	MEMR#	DRQ0
11	AEN	SMEMW#	MEMW#	DACK5#
12	SA19	SMEMR#	SD8	DRQ5
13	SA18	IOW#	SD9	DACK6#
14	SA17	IOR#	SD10	DRQ6
15	SA16	DACK3#	SD11	DACK7#
16	SA15	DRQ3	SD12	DRQ7
17	SA14	DACK1#	SD13	+5V
18	SA13	DRQ1	SD14	MASTER#
19	SA12	REFRESH#	SD15	GND
20	SA11	SYSCLK	NC	GND
21	SA10	IRQ7	-	-
22	SA9	IRQ6	-	-
23	SA8	IRQ5	-	-
24	SA7	IRQ4	-	-
25	SA6	IRQ3	-	-
26	SA5	DACK2#	-	-
27	SA4	TC	-	-
28	SA3	BALE	-	-
29	SA2	+5V	-	-
30	SA1	OSC	-	-
31	SA0	GND	-	-
32	GND	GND	-	-

CHAPTER 3 : AWARD BIOS SETUP

The Award' s ROM BIOS provides a built-in Setup program, which allows the user to modify the basic system configuration and hardware parameters. The modified data will be stored in a battery-backed CMOS RAM; so the acquired 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 a configuration change in the system, such as hard drive replacement or new equipment is installed.

3.1 Running Award Bios

When the power of system is turned on, the BIOS will enter the Power On Self Test (POST) routines. These routines perform various diagnostic checks. If an error is encountered, then the error will be reported into two different ways namely: (1) If the error occurs before the display device is initialized, a series of beeps will be transmitted; (2) If the error occurs after the display device is initialized, the screen will display the error message.

After the POST routines are completed, the following message appears:

" Press DEL to enter SETUP"

To access the AWARD BIOS SETUP program, press the <DEL> key. The 「CMOS SETUP UTILITY」 screen will be displayed at this time.

3.2 CMOS Setup Utility

The Main Program Screen appears as ...

ROM PCI / ISA BIOS (2A4KDL79) CMOS SETUP UTILITY AWARD SOFTWARE, INC.	
STANDARD CMOS SETUP BIOS FEATURES SETUP CHIPSET FEATURES SETUP POWER MANAGEMENT SETUP PCI CONFIGURATION SETUP LOAD SETUP DEFAULTS LOAD BIOS DEFAULTS	INTEGRATED PERIPHERALS SUPERVISOR PASSWORD USER PASSWORD IDE HDD AUTO DETECTION HDD LOW LEVEL FORMAT SAVE & EXIT SETUP EXIT WITHOUT SAVING
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.

ARROW KEYS: Use the arrow keys ( ) to move cursor to the desired selection.

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

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

3.3 Standard CMOS Setup

Selecting " STANDARD CMOS SETUP" on the main program screen displays this menu:

The Standard CMOS Setup Screen appears as ...

ROM PCI / ISA BIOS (2A4KDL79)
STANDARD CMOS SETUP
AWARD SOFTWARE, INC.

Date (mm : dd : yy) : Tue, Mar 25 1997
Time (hh : mm : ss) : 14 : 16 : 48

		CYLS.	HEADS	PRECOMP	LANDZONE	SECTORS	MODE
Drive C	: Auto (0MB)	0	0	0	0	0	Auto
Drive D	: Auto (0MB)	0	0	0	0	0	Auto

Drive A: 1.44M, 3.5in
Drive B: None
Floppy 3 Mode Support: Disabled

Video: EGA /VGA
Halt On: All Errors

Base Memory:	640K
Extended Memory:	64512K
Other Memory:	384K
Total Memory:	65536 K

ESC: Quit : Select Item PU / PD / + / - : Modify
F1 : Help (shift) F2 : Change Color

The Standard CMOS Setup utility is used to configure the following features:

Set Date: Month, Date,Year.

Set Time: Hour, Minute and Second. Use 24-Hour clock format (for p.m., add 12 to the hour, so you should enter 4:30 p.m. as 16:30)

Hard Disks : There are four hard disks listed: "Primary Master", "Primary Slave", For each IDE channel, the first device is the "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 diskchecking program.
- Cyls : Number of cylinders.
- Head : Number of heads.
- Precomp : Write precompensation 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 that data address described by sector, head, and cylinder number into a physical block address, significantly improving data transfer rates. For drives with greater 1024 cylinders.

The AWARD BIOS supports three HDD modes: NORMAL, LBA and LARGE.

NORMAL mode : This is a 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 a Logical Block Addressing mode which is a HDD accessing method to overcome 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.

Flooy3 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 the BIOS detects a hardware error. You can tell the 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

Selecting the " BIOS Features Setup " and the Screen appears as...

ROM PCI / ISA BIOS (2A4KDL79)
BIOS FEATURES SETUP
AWARD SOFWARE, INC

Virus Warning	: Disabled	Video BIOS Shadow	: Enabled
CPU Internal Cache	: Enabled	C8000-CFFFF Shadow	: Disabled
External Cache	: Enabled	D0000-D7FFF Shadow	: Disabled
Quick Power On Self Test	: Enabled	D8000-DFFFF Shadow	: Disabled
Boot Sequence	: A,C,SCSI		
Swap Floppy Drive	: Disabled		
Boot Up Floppy Seek	: Disabled		
Boot Up NumLock Status	: On		
Boot up System Speed	: High		
Gate A20 Option	: Fast		
Memory Parity check	: Disabled		
Typematic Rate Setting	: Disabled		
Typematic Rate (Chars/Sec)	: 6		
Typematic Delay (Msec)	: 250	ESC: Quit	: Select Item
Security Option	: Setup	F1: Help	PU /PD /+/ - : Modify
PCI /VGA Palette Snoop	: Disabled	F5: Old Values	(Shift) F2 : Color
OS Select For DRAM > 64MB	: Non-OS2	F6: Load BIOS Defaults	
		F7: Load Setup Defaults	

The following explains the options for each feature:

Virus Warning : The Virus Warning' s default setting is " Disabled ". When 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 and clean 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 ". If enabled, this will skip some diagnostic checks during the Power On Self Test (POST) to speed up booting process.

Boot Sequence : The default setting is " A, C, SCSI ", the other option are " A, C, SCSI, " and " C, CDROM, A ". The BIOS will load the operating system from the disk drives in the sequence selected here.

Swap Floppy Drive : The default setting is " Disabled ". This setting gives you an option to swap A and B floppy disks. Normally the floppy drive A is the one at the end of the cable, if you set this option to " Enabled ", the drive at the end of the cable will be swapped to B.

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

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

Gate A20 Option : the defaults 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 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 1,000ms. The default setting is " 250 " ms.

Security Option : This setting controls the password feature. The options are " Setup " and " System ". Select " Setup " will protect the configuration 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.

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

Video BIOS Shadow : The default setting is " Enabled " which will copy the VGA BIOS into system DRAM.

C8000-CFFFF Shadow to D8000-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.

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.

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

Selecting " CHIPSET FEATURES SETUP " and the Screen appears as ...

ROM PCI / ISA BIOS (2A4KDL79)
CHIPSET FEATURES SETUP
AWARD SOFTWARE, INC.

Auto Configuration	: Enabled	
AT-BUS Clock	: CLK/4	
DRAM Read Timing	: Normal	
DRAM Write Timing	: Normal	
SRAM Read Timing	: 2-1-1-1	
SRAM Write Timing	: 0 Wait	
Hidden Refresh	: Disabled	
Memory Hole (15M - 16M)	: Disabled	
ISA I/O Recovery	: Enabled	
Fast-Back-to-Back	: Enabled	
		ESC: Quit : Select Item
		F1: Help PU /PD /+/ - : Modify
		F5: Old Values (Shift) F2 : Color
		F6: Load BIOS Defaults
		F7: Load Setup Defaults

This screen controls the settings for the board' s chipset. All the entries on the screen are automatically configured. However, you can change it according to your operating environment.

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.
Memory Hole At 15M-16M : The default setting is "Disabled". Set to "Enabled" when the system memory size is equal to or greater than 16M bytes, then the physical memory address from 15M to 16M will be passed to PCI or ISA. Thus, there will be 1M Bytes hole in your system memory. This option is designed for some OS with special add-on cards which need 15M-16M memory space.

ISA I/O Recovery : Use this option to activate the delay feature. The default setting is "Enabled".

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.

Selecting "POWER MANAGEMENT SETUP" and the Screen appears as ...

ROM PCI / ISA BIOS (2A4KDL79)
POWER MANAGEMENT SETUP
AWARD SOFTWARE, INC.

Power Management	: User Define	IRQ5 (LPT 2)	: ON
PM Control by APM	: Yes	IRQ6 (Floppy Disk)	: ON
Video Off Option	: Susp, Stby -> Off	IRQ7 (LPT 1)	: ON
Video Off Method	: V/H SYNC+ Blank	IRQ8 (RTC Alarm)	: OFF
MODEM Use IRQ	: 3	IRQ9 (IRQ2 Redir)	: ON
		IRQ10 (Reserved)	: OFF
** PM Timers **		IRQ11 (Reserved)	: OFF
HDD Power Down	: Disable	IRQ12 (PS/2 Mouse)	: ON
Doze Mode	: Disable	IRQ13 (Coprocessor)	: OFF
Standby Mode	: Disable	IRQ14 (Hard Disk)	: ON
Suspend Mode	: Disable	IRQ15 (Reserved)	: OFF
** PM Events **			
VGA	: OFF		
FDD (3FXh)	: ON		
LPT & COM	: LPT/COM	ESC: Quit	: Select Item
HDD (1FXh)	: ON	F1: Help	PU /PD/+/-: Modify
NMI	: OFF	F5: Old Values	(Shift) F2: Color
IRQ3 (COM 2)	: ON	F6: Load BIOS Defaults	
IRQ4 (COM 1)	: ON	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 "Yes". If it is set to "No", 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 Option: This Setting Controls the Video off option in power saving mode. The default setting is" Susp, Stby -> off " other option are " Always On"," Suspend ->Off and "All Modes->Off".

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

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 "3"。

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.

Doze 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.

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". The CPU clock will be stopped 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.

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 PCI Configuration

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

Selecting "PCI CONFIGURATION" and the Screen appears as ...

ROM PCI / ISA BIOS (2A4KDL79)
PCI CONFIGURATION SETUP
AWARD SOFTWARE, INC.

PnP BIOS Auto-Config. : Disabled	CPU to PCI Write Buffer : Enabled
	CPU to PCI Byte Merge : Enabled
Slot 1 Using INT# : Auto	PCI to DRAM Buffer : Enabled
Slot 2 Using INT# : Auto	
1st Available IRQ : NA	
2nd Available IRQ : NA	
3rd Available IRQ : NA	
4th Available IRQ : NA	
PCI IRQ Activated By : Level	
PCI IDE IRQ Map To : PCI-AUTO	
Primary IDE INT# : A	
Secondary IDE INT# : B	ESC : Quit ↑ ↓ ← → : Select Item F1 : Help PU /PD/+/- : Modify F5 : Old Values (Shift) F2 : Color F6 : Load BIOS Defaults F7 : Load Setup Defaults

Resources Controlled By: The defaults setting is "Auto" which will control all IRQs automatically. The other option is "Manual" which allows you to control IRQs individually.

IRQ Assigned to : If there is a legacy ISA device which uses an IRQ, set the corresponding IRQ to " Legacy ISA", otherwise you should set to PCI/ISA.

PCI IRQ Actived By: Options are "Level" or "Edge". The default setting is "Level". This option is used to select the IRQ's trigger method.

PCI IDE IRQ Map To, Primary IDE INT#, Secondary IDE INT#: If you disable onboard PCI IDE controller and install a PCI IDE card on the CPU Card, you need to set this option. If a PCI IDE Card which uses ISA IRQ directly through a paddle card installed on an ISA slot, select "ISA" for the option "PCI IDE IRQ Map To". If a PCI IDE Card uses PCI "INT" and is compliant to PCI Plug and Play specification, select "PCI-AUTO" for the option "PCI IDE IRQ Map To". Otherwise select "PCI-SLOT 1, PCI-SLOT 2 or PCI-SLOT 3, PCI-SLOT4) depends on which slot the PCI IDE Card is installed.

Only INT A and INT B are available for a PCI IDE Card, therefore you must set the PCI IDE Card's primary interrupt to INT A and secondary interrupt to INT B. The INT A is routed to IRQ 14 and the INT B is routed to IRQ 15 through a hardware router in the chipset.

3.8 Load BIOS Defaults

The BIOS defaults have been set by the manufacturer and represent settings which provide the minimum requirements for your system to operate.

3.9 Load Setup Defaults

" LOAD SETUP DEFAULTS" loads optimal settings which are stored in BIOS ROM.

The defaults loaded only affect the BIOS Features Setup, Chipset Features Setup, Power Management Setup, PCI configuration setup and Integrated Peripherals Setup. There is no effect on the Standard CMOS Setup. To use this feature, highlight on the main screen and press <Enter>. Aline 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 don' t want to proceed.

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 (2A4KDL79)
INTEGRATED PERIPHERALS
AWARD SOFTWARE, INC.

		Onboard Parallel Port	: 378/IRQ7
On-Chip Local Bus IDE	: Enabled	Parallel Port Mode	: SPP
IDE HDD Block Mode	: Enabled		
IDE Primary Master PIO	: Auto		
IDE Primary Slave PIO	: Auto		
Onboard FDC Controller	: Enabled		
Onboard UART 1	: 3F8/IRQ4		
Onboard UART 2	: 2F8/IRQ3		
Parallel Port Mode	: Normal		
		ESC : Quit	: Select Item
		F1 : Help	PU /PD/+/- : Modify
		F5 : Old Values	(Shift) F2 : Color
		F6 : Load BIOS Defaults	
		F7 : Load Setup Defaults	

On-Chip Local Bus IDE: If you install an add-in IDE interface, disable one or both on chip IDE channels.

IDE HDD Block Mode: The default setting is "Enabled". Enabled invokes multi-sector transfer instead of one sector per transfer. Not all HDDs support this function.

IDE Primary Master PIO, IDE Primary 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.

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 UART 1 and Onboard UART 2: These options are used to assign the I/O addresses for the two onboard serial ports. They can be assigned as follows:

3F8 / IRQ4 **[Default]**
2F8 / IRQ3 **[Default]**
3E8 / IRQ4
2E8 / IRQ3
Disabled (Disable the onboard serial port)

Onboard Parallel Port: This option is used to assign the I/O address for the onboard parallel port. The options are "378/IRQ7" (defaults),"278/IRQ7","3BC/IRQ7" and "Disbled" (disable the onboard parallel port).
Note: Printer port always use IRQ7 when set "378/IRQ7" or "278/IRQ7" or "3BE/IRQ7" to "Enabled".

Onboard Parallel Mode: There are four options "Normal" (default),"ECP", "ECP/EPP" and "EPP/SPP". Change the mode from "Normal" to the enhanced mode only if your peripheral device can support it. When set to ECP mode, the printer port always uses DMA3.

3.11 Supervisor/User Password

The "SUPERVISOR/USER PASSWORD" uitlity sets the password. The CPU card 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 you can use up to 8 alphanumeric characters,press <Enter> after entering the password.At the next prompt, confirm the new password by typing it and pressing <Enter> again.

To disable the password, press the <Enter> key instead of entering a new password when the "Enter Password" 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, only the supervisor password allows you to enter the BIOS SETUP PROGRAM.

Note:
If you forget your password, the only way to solve this problem is to discharge the CMOS memory by turning power off and placing a shunt on the S1 (open pad) for 5 seconds, then removing the shunt.

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 be 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

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

3.14 Save & Exit Setup

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

The Screen appears as ...

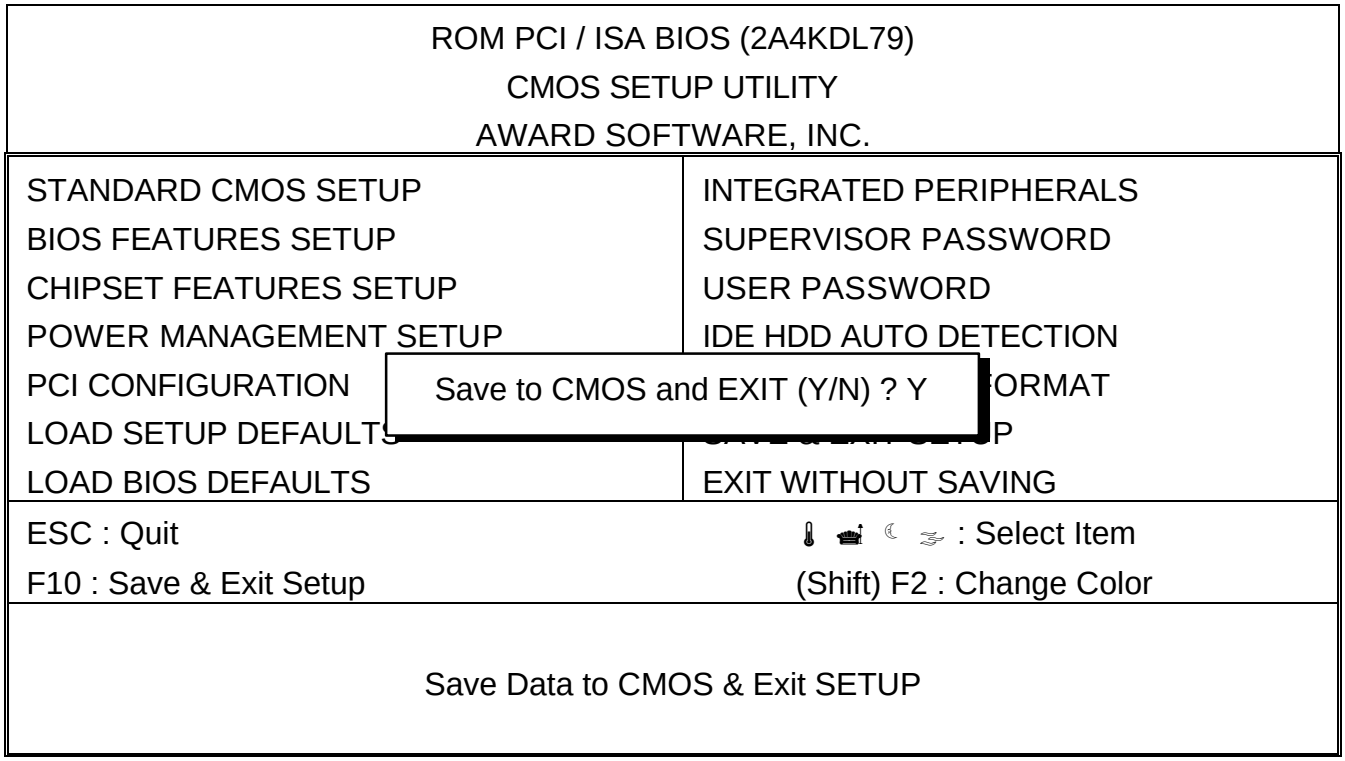
ROM PCI / ISA BIOS (2A4KDL79) CMOS SETUP UTILITY AWARD SOFTWARE, INC.	
STANDARD CMOS SETUP	INTEGRATED PERIPHERALS
BIOS FEATURES SETUP	SUPERVISOR PASSWORD
CHIPSET FEATURES SETUP	USER PASSWORD
POWER MANAGEMENT SETUP	IDE HDD AUTO DETECTION
PCI CONFIGURATION	FORMAT
LOAD SETUP DEFAUL	UP
LOAD BIOS DEFAULTS	EXIT WITHOUT SAVING
ESC : Quit	: Select Item
F10 : Save & Exit Setup	(Shift) F2 : Change Color
Load Setup Defaults except Standard CMOS SETUP	

Load SETUP Defaults (Y/N) ? Y

3.15 Exit Without Saving

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

The Screen appears as



APPENDIX A : HOW TO USE WATCH-DOG TIMER

Enable and Retrigger the Watch-Dog timer: **443H**
Disable: **43H**

EX.1: For DOS

Execute the **DEBUG.EXE** file under DOS, Then key-in **i443**. The system will reboot automatically according to the time-out you set.

For example, if you want to Set **4 seconds** for the time-out, you should set **JP1 : 4L ON** and **JP8 : 1-2 ON** to enable watch-dog timer.

```
C:\DOS>  DEBUG
         -i443
```

EX.2 : For assemble Language

```
Enable  :
        :
        :
MOV   DX, 443H
IN AL, DX
        :
        :

Disable :
        :
        :
IN AL, 43H
        :
        :
```

APPENDIX B : TECHNICAL REFERENCE

I/O PORT ADDRESS MAP

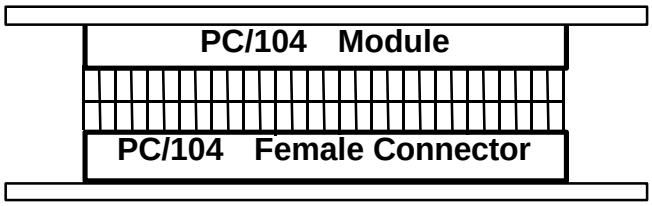
Address	Function
000 - 01F	DMA Controller #1
020 - 03F	Interrupt Controller #1
040 - 05F	Timer Chip
043	Disable Watch-Dog Times Operation (Read)
060 - 06F	Keyboard Controller
070 - 07F	Read Time Clock/NMI Mask
080 - 09F	DMA Page Register
0A0 - 0BF	Interrupt Controller #2
0C0 - 0DF	DMA Controller #2
0F0 - 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 (Includeing 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)

APPENDIX C : PC/104 MODULE INSTALLATION

There are two steps to install the PC/104 module on AP-40AHD Single Board Computer.

1. Plug the Dual Side Male Connector into the PC/104 female connector.

2. Plug the PC/104 module‘ s female connector into the AP-40AHD male connector.



Dual-Side Male Connector

AP-40AHD Single Board Computer

Terms and Conditions

Date:1997.10.20

Warranty Policy

1. All products are warranted against defects in materials and workmanship for 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 return to user freight charges 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.

When requesting RMA service, please fill out this **"RMA Service Request Form"**.

Without this form your RMA will be REJECTED!!!

RMA No:	Reasons to Return: ☐ Repair(Please include failure details) ☐ Testing Purpose
Company:	Contact Person:
Phone No.	Purchased Date:
Fax No.:	Applied Date:
Return Shipping Address:	
Shipping by: ☐Air Freight ☐Sea ☐Express :_____ ☐Others:_____	

Item	Model Name	Serial Number	Configuration

Item	**Problem Code**	Failure Status

***Problem Code:**

01:D.O.A.	07: BIOS Problem	13: SCSI	19: DIO
02: Second Time R.M.A.	08: Keyboard Controller Fail	14: LPT Port	20: Buzzer
03: CMOS Data Lost	09: Cache RMA Problem	15: PS2	21: Shut Down
04: FDC Fail	10: Memory Socket Bad	16: LAN	22: Panel Fail
05: HDC Fail	11: Hang Up Software	17: COM Port	23: CRT Fail
06: Bad Slot	12: Out Look Damage	18: Watchdog Timer	24: Others (Pls specify)

Request Party ***Confirmed By Supplier***

Authorized Signatures / Date

Authorized Signatures / Date

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