



NC-529
Low Power 6x86 3.5" Mini Board

Reference Manual

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Introduction

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1.1 Specifications

- CPU + Chipset: NS Geode GXLV/GX1 processor & CX5530/A chipset with low-power 6x86-166/200/233/300 MMX CPU built in chip. GXLV support low-power 0~85°C CPU (1.5W ~ 5.4W), GX1 support very-low-power 0~85°C CPU (0.8W ~ 3.0W).
- MEMORY: 1 X 144-pin SO-DIMM socket support 8MB ~ 128MB SDRAM Module.
- CACHE MEMORY: 16KB L1 cache memory.
- I/O Chipset: NS PC97317
- CMOS Backup: CMOS Back up by Li battery.
- BIOS: Award, 128KB Flash BIOS for plug & play function.
- PS/2 KEYBOARD + PS/2 MOUSE: Support 6-pin Mini-Din PS/2 Keyboard and PS/2 Mouse Connector.
- Touch Panel interface: Optional on board.
- AC97 Audio: Audio codec on board.
- IrDA & USB: Support IrDA x 1, USB x 2.
- BUS TYPE: PC/104 Connector.
- WATCHDOG: Programmable 0 ~ 1024 sec.
- LCD/VGA: On-chip shared-memory 64-bit LCD/VGA, support CRT and TFT LCD flat panel up to 1280x1024x8 BPP and 1024x768x16 BPP, support MPEG1 and MPEG2 assist. Using 44-pin LCD Connector.
- 100/10M Ethernet: Realtek 8139C 100/10M Ethernet.
- IDE INTERFACE: Support one port up to 2 x IDE devices.
- DOC FLASH DISK: 32-Pin Socket for DiskOnChip SSD 2MB ~ 288MB.
- Optional IDE FLASH DISK BOARD: Daughter board support 8/16/32/48/64/96/128/192MB IDE Flash Disk.
- FLOPPY DISK DRIVE INTERFACE: Support up to two Floppy Disk Drives, 3.5" or 5.25" FDD (360K/720K/1.2M/1.44M/2.88M) Drives A, B swappable.
- Serial Port x 2: 16-byte FIFO 16C550 serial port, jumper selectable RS- 232 x 1 + RS-232/422/485 x 1.



- Parallel Port: One bi-directional parallel port configured as LPT1, 2, 3 support IEEE1284 compliant high-speed EPP and ECP modes.
- Speaker: Buzzer on Board.
- Miscellaneous Connectors/Jumpers: Reset, HDD LED, single +5V 2-pin power connector and +5V/+12V4-pin Power connector....
- DMA CONTROLLER: 82C37 X 2
- DMA CHANNELS: 7
- Interrupt Controllers: 82C59 X 2
- Interrupt Levels: 15
- System Power Requirement: +5V/+12V power by using 4-pin HDD power connector, or, single +5V power by using 2-pin Power connector.
- Operating Temperature: 0~85°C CPU support low-power type (1.5W ~ 5.4W), or, optional very- low-power type (0.8W ~ 3W), just need metal cooler (doesn't need fan)
- Power Consumption:

	Peak Power	Average Power
GXLV-233 (2.5V)	5.4W	2.0W
GXLV-166 (2.2V)	3.7W	1.0W
GX1-300 (2.0V)	3.0W	1.5W
GX1-266 (1.8V)	2.3W	1.2W
GX1-233 (1.8V)	2.0W	1.0W
GX1-200 (1.6V)	1.6W	0.8W

- Board Dimension: 145mm x 102mm
- Board Weight: 0.20Kg.



1.2

Safety Precautions

Follow the warnings below to protect your system from damage and yourself from injury:

1. Avoid exposing your system to static electricity at any time.
2. Protect yourself from electric shock. Do not touch any components of this card when the power is ON. Always disconnect power when the system is not in use.
3. Disconnect power when you change any hardware devices.



Hardware Configuration

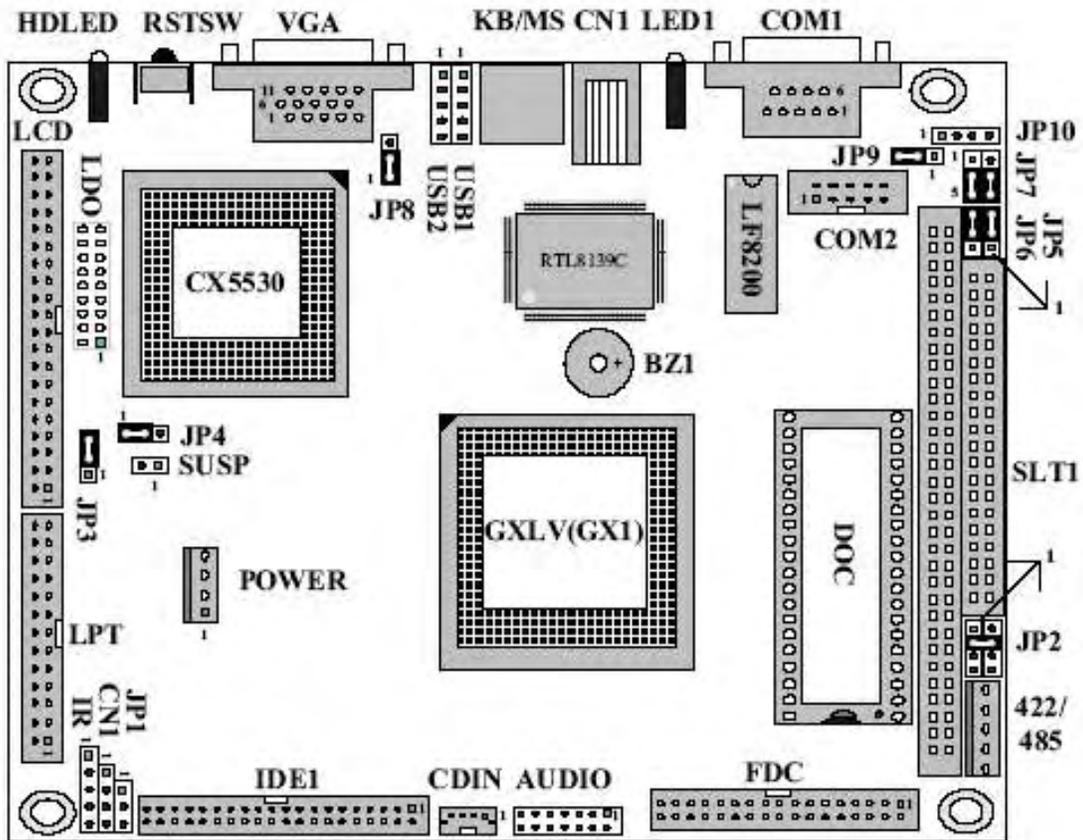
2

2.1 Jumper Connector Quick Reference

Floppy Disk Drive Connector	FDC
Printer Connector	LPT
IDE Connector	IDE1
COM1 Connector (RS-232)	COM1
Com2 RS-232 Connector	COM1
IrDA Connector	IR
4-Pin Power Connector	POWER
Mini Din PS/2 K/B & Mouse Connector	KB+MS
VGA Connector	VGA
LCD Connector	LCD
COM2 RS-422/485 Connector	422/485
USB1 Connector	USB1
USB2 Connector	USB2
Suspend Connector (Hardware Sleep)	SUSP
System Reset Switch	RSTSW
Hard Disk Active LED & Power LED	HDLED
Ethernet Active LED	LED1
Touch Panel Connector	CN1
Audio Connector	AUDIO
CD-ROM Audio In Connector	CDIN
LCD Backlight Inverter Power Connector	JP1
M-System Address Select	JP2
CMOS Battery Clear Jumper	JP4
WDT Output Selector	JP5
COM2 RS-232 Or RS-422/485 Selector	JP6
COM2 D-Sub PIN1, 9 Voltage or Signal Select	JP7
LCD Panel Voltage Select	JP8
RS-422/485 D-SUB PIN9 Voltage Output Select	JP9
Negative Voltage Input (At Mode)	JP10
Buzzer	BZ1
144 PIN SO-DIMM Socket	DIMM
Manufacturer Default Jumper List	JP3, JP5



2.2 Component Locations



**2.3****Floppy Disk Drive Connector (FDC)**

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	2	DENSEL
3	GND	4	NC
5	GND	6	DRATE0
7	GND	8	INDEX
9	GND	10	MTR0
11	GND	12	DRV1
13	GND	14	DRV0
15	GND	16	MTR1
17	GND	18	DIR
19	GND	20	STEP
21	GND	22	WDATA
23	GND	24	WGATE
25	GND	26	TRK0
27	GND	28	WRTPRT
29	MID1	30	RDATA
31	GND	32	SEL
33	MID0	34	DSKCHG

2.4**Printer Connector (LPT)**

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	STROB	2	AUTOFD
3	PD0	4	ERROR
5	PD1	6	INIT
7	PD2	8	SLCTIN
9	PD3	10	GND
11	PD4	12	GND
13	PD5	14	GND
15	PD6	16	GND
17	PD7	18	GND
19	ACK	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT	26	GND

2.5**IDE Connector (IDE1)**

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	RESET	2	HND
3	HD7	4	HD8
5	HD6	6	HD9
7	HD5	8	HD10
9	HD4	10	HD11



11	HD3	12	HD12
13	HD2	14	HD13
15	HD1	16	HD14
17	HD0	18	HD15
19	GND	20	NC
21	DREQ	22	GND
23	IOW	24	GND
25	IOR	26	GND
27	IORDY	28	GND
29	DAK	30	GND
31	IRQ	32	SINGLE GND
33	SA1	34	NC
35	SA0	36	SA2
37	HDCS0	38	HDCS1
39	DASP	40	GND

2.6 COM1 Connector (RS-232) (COM1)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	DCD1	2	RXD1
3	TXD1	4	DTR1
5	GND	6	DSR1
7	RTS1	8	DSR1
9	RI1		

2.7 COM2 RS-232 Connector (COM2)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	DCD2	2	DSR2
3	RXD2	4	RTS2
5	TXD2	6	CTS2
7	DTR2	8	RI2
9	GND	10	NC

2.8 IrDA Connector (IR)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	+5V	2	CIRRXD



3	IR-RXD	4	GND
5	IR-TXD		

2.9 4-Pin Power Connector (POWER)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	+5V	2	GND
3	GND	4	+12V

2.10 MINI DIN PS/2 K/B & Mouse Connector (KB+MS)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	KEYBOARD DATA	2	MOUSE DATA
3	GND	4	VCC
5	KEYBOARD	6	MOUSE CLOCK

2.11 VGA Connector (VGA)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	RED	2	GREEN
3	BLUE	4	NC
5	GND	6	GND
7	GND	8	GND
9	VCC	10	GND
11	NC	12	DCSDA
13	HSYNC	14	NSYNC
15	DCSCL		

2.12 LCD Connector (LCD)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	+12V	2	+12V
3	GND	4	GND
5	LCDVCC	6	LCDVCC
7	NC	8	GND
9	NC	10	NC
11	B0	12	B1
13	B2	14	B3
15	B4	16	B5
17	NC	18	NC
19	G0	20	G1
21	G2	22	G3
23	G4	24	G5
25	NC	26	NC
27	R0	28	R1



29	R2	30	R3
31	R4	32	R5
33	GND	34	GND
35	SHFCLK	36	VSYNC(FLM)
37	M(D.0)	38	HSYNC(LP)
39	GND	40	ENABKL
41	+5V	42	+5V
43	LCDVCC	44	LCDVCC

2.13 COM2 RS-422/485 Connector (422/485)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	RXD/TX+	2	DTR/RX-
3	DCD/TX-	4	TXD/RX+
5	CABLE-RI		

2.14 USB1 Connector (USB1)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC+5V	2	BD1-
3	DB1+	4	GND
5	GND		

2.15 USB2 Connector (USB2)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC+5V	2	BD2-
3	DB2+	4	GND
5	GND		

2.16 Hardware Suspend Connector (SUSP)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	SUSP SIGNAL	2	GND

2.17 System Reset Connector (RSTSW)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	SIGNAL	2	GND

2.18 Hard Disk Active LED & Power LED (HDLED)

1-2: Hard Disk Active LED		3-4: System Power On LED	
PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC	2	SIGNAL
3	VCC	4	GND

2.19 Ethernet Active LED (LED1)



PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC	2	SIGNAL
3	VCC	4	SIGNAL
5	VCC	6	SIGNAL

2.20 Touch Panel Connector (CN1)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	X+	2	X-
3	Y+	4	Y-

2.21 Audio Output Connector (EXTADO)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	LINE IN LEFT	2	GND
3	GND	4	LINE IN RIGHT
5	GND	6	MIC IN
7	MIC IN	8	GND
9	LINE OUT LEFT	10	LINE OUT RIGHT
11	GND	12	AMP OUT LEFT
13	AMP OUT RIGHT	14	GND

2.22 CD-ROM Audio In Connector (CDIN)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	CDL	2	GND
3	CDR	4	GND

2.23 LCD Backlight Inverter Power Connector (JP1)

PIN 1: +12V PIN 2: GND PIN 3: VCC5V

2.24 M-System Address Select (JP2)

ADDRESS SELECTION	JUMPER SETTING			
	PIN 1 & 2	PIN 3 & 4	PIN 5 & 6	PIN 7 & 8
C000	ON	OFF	OFF	OFF
C800	OFF	ON	OFF	OFF
D000	OFF	OFF	ON	OFF
D8000	OFF	OFF	OFF	ON

2.25 Internal Or External +12V Select (JP3)

1-2 ON: For AT Power +12V (External).

2-3 ON: Use Internal +12V.

2.26 CMOS Battery Clear Jumper (JP4)

1-2 ON: NORMAL.

2-3 ON: CMOS CLEAR.

2.27 WDT Output Select (JP5)



WatchDog Timer Output for System Reset or IRQ11 Selection.

When JP5 is set to position 1-2 ON, then the output signal of WDT TIMER will generate a interrupt signal to IRQ11. Once the system accepts the interrupt request, it will release an ISR address (CS:E000 IP:0000) for user. User can also write an interrupt routine to develop application software.

1-2 ON: IRQ11. 2-3 ON: SYSTEM RESET.

2.28 **COM2 RS-232/422/485 Select (JP6)**

1-2 ON: RS-232 for COM2. 2-3 ON: RS-422/485 for COM2.

2.29 **COM2 D-SUB PIN 1, 9 Voltage Or Signal Select (JP7)**

1-3 ON: SELECT +12V 3-5 ON: SELECT RI2
2-4 ON: SELECT VCC5V 4-6 ON: SELECT DCD2

2.30 **LCD Panel Voltage Select (JP8)**

1-2 ON: VCC5V For LCD Panel Voltage.
2-3 ON: VCC3V For LCD Panel Voltage.

2.31 **RS-422/485 PIN 9 Voltage Selector (JP9)**

1-2 ON: +12V for RS-422/485 connector (COM 2) PIN 9
2-3 ON: +5V for RS-422/485 connector (COM 2) PIN 9

2.32 **Negative Voltage Input (AT Mode) (JP10)**

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	2	-5V
3	GND	4	-12V

2.33 **Buzzer (BZ1)**

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC	2	SIGNAL

2.34 **144-Pin SODIMM Socket (DIMM)**

The NC-529 mini board uses a 144-pin SO-DIMM Module.

2.35 **Manufacturer Default Jumper List**

Factory default jumper list as below:

JP3: 2-3 ON

JP5: 1-2 ON



3.1 CRT Display Modes

Resolution	Colors	Refresh Rate (Hz)	DOTCLK Rate (Hz)	PCLK	Graphic Port Width (Bits)	
640 X 480	8 BPP 256 Colors	60	25.175	25.175	8	
		72	31.5	31.5	8	
		75	31.5	31.5	8	
	16 BPP 64K Colors RGB	60	25.175	50.35	8	
				25.175	16	
		72	31.5	63.0	8	
				31.5	16	
		75	31.5	63.0	8	
				31.5	16	
800 X 600	8 BPP 256 Colors	60	40.0	40.0	8	
		72	50.0	50.0	8	
		75	49.5	49.5	8	
	16 BPP 64K Colors RGB	60	40.0	80	8	
				40	16	
		72	50.0	100	8	
				50	16	
		75	49.5	99	8	
				49.5	16	
	1024 X 768	8 BPP 256 Colors	60	65.0	65.0	8
			70	75.0	75.0	8
			75	78.5	78.5	8
16 BPP 64K Colors RGB		60	65.0	65.0	16	
				75.0	16	
		70	75.0	75.0	16	
				78.5	16	
		75	78.5	78.5	16	
				78.5	16	
1280 X 1024	8 BPP 256 Colors	60	108.0	108.0	8	
				54.0	16	
		75	135.0	67.5	16	



3.2

TFT Panel Display Modes

Resolution	Simultaneous Colors	Refresh Rate (MHz)	DOTCLK Rate (MHz)	PCLK (MHz)	Panel Type (bits)
640 X 480	8 BPP 256 Colors	60	25.175	25.175	9
					12
					18
	16 BPP 64K Colors	60	25.175	25.175	9
					12
					18
800 X 600	8 BPP 256 Colors	60	40.0	40.0	9
					12
					18
	16 BPP 64K Colors	60	40.0	40.0	9
					12
					18
1024 X 768	8 BPP 256 Colors	60	65	32.5	9/18-I/F
	16 BPP 64K Colors	60	65	32.5	9/18-I/F



10/100M Ethernet

4

4.1 Introduction

The NC-529 is equipped with a high performance PCI Ethernet chipset which is fully compliant with IEEE 802.3 100 Mbps CSMA/CD standards. It is supported by major network operating systems. It is also both 100Base-T and 10Base-T compatible. The medium type can be configured via the Realtek 8139C.exe program included on the utility CD. The NC-529 provides one 10-pin header as ethernet connector.



DiskOnChip Flash Disk

5.1 Preface

The NC-529 features a DiskOnChip Flash Disk option. The DiskOnChip can be included on the board by order. The NC-529 is designed to use the DiskOnChip single chip Flash Disk to plug into a standard 32-pin EEPROM socket. The DiskOnChip Flash Disk should be mapped into an 8K Byte window in the BIOS expansion address space of the NC-529 CPU Card which is usually located between address 0C0000H to 0EFFFFH. The NC-529 can contain the operating system in DiskOnChip to allow systems to boot without a hard disk.

The DiskOnChip can run standard MS-DOS and the board can boot from DiskOnChip. Its commands are fully DOS Command compatible, such as Del, Deltree, Format, Copy, Xcopy, et al. Users can read and write DOS Commands or data to DiskOnChip in the same manner as using a Hard Disk Drive.

Users can take this DiskOnChip as physical HDD and its priority is software selectable. For example, if system has one HDD, either HDD & DiskOnChip could be assigned as C or D Drive. With two HDDs (Driver C & Driver D), the DiskOnChip could be assigned as C, D, or E Drive. If the system doesn't have an HDD, the DiskOnChip will be taken as C drive only. When it is taken as C drive, it can boot system just as when using a Hard Disk Drive.

The capacity of DiskOnChip has 2MB, 4MB, 8MB, 12MB, 24MB, 40MB, 72MB, 144MB and 288MB options.

The NC-529 supports M-system DiskOnChip socket which locate at position 'DOC'.

5.2 Quick Installation Guide

1. Make sure the NC-529 CPU card has power OFF.
2. Plug the DiskOnChip chip into socket DOC. Verify that the position is correct (pin1 of the DiskOnChip is aligned with pin1 of the DOC socket).
3. Power ON the system.
4. During Power ON, you may observe the message displayed by the DiskOnChip when its driver is automatically loaded into the system's memory.
5. At this stage the DiskOnChip can be accessed as any disk in the system would be.
6. If the DiskOnChip is the only disk in the system, it will appear as the first disk (drive C:).
7. If there are more disks besides the DiskOnChip, the DiskOnChip will appear by default as the last drive.



Watchdog Timer

6.1 Watchdog Timer Function

The Watchdog Timer is a device to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have been caused by external EMI or a software bug. When the CPU halts normal operation, hardware on the board will perform a hardware reset (cold boot) or a non-maskable interrupt (NMI) to bring the system back to a known state.

Three I/O port operations control the Watchdog Timer.

443(hex)	Write	Set Time period and start Watchdog operation
443(hex)	Read	Refresh the Watchdog Timer
043(hex)	Read	Stop the Watchdog Timer

Prior to enabling the Watchdog Timer, the Timer interval must be selected. When selecting the timer interval, consideration must be given to the design to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time consuming.

The timer interval value is from 01(hex) to FF (hex) and time interval 4 sec to 1020 sec. in 4 sec increments. (see chart).

Start: To start the watchdog timer, the program must write the timer value to I/O port address 443H. This will activate the countdown timer with the selected timer value which will eventually time out and reset the CPU or cause an NMI depending on the setting of JP5.

Operation: To ensure that this reset condition does not occur, the Watch-Dog Timer must be periodically refreshed by reading the same I/O port 443H. This must be done within the time out period selected. A 30% latitude is recommended, so for a 10 second interval, the WDT should be refreshed every 7 seconds.

Stop: To stop the watchdog timer, the program should issue a read command to I/O port 043 (hex).

Note: Before exiting a program it is necessary to disable the Watchdog Timer, otherwise the system will reset.



TIME BASE IS LISTED BELOW

VA = VALUE FOR COUNTER (HEXADECIMAL)

TIME = WDT SIGNAL RESPONSE TIME (IN SECONDS)

00	1024	10	64	20	128	30	192	40	256	50	320	60	384	70	448
01	4	11	68	21	132	31	196	41	260	51	324	61	388	71	452
02	8	12	72	22	136	32	200	42	264	52	328	62	392	72	456
03	12	13	76	23	140	33	204	43	268	53	332	63	396	73	460
04	16	14	80	24	144	34	208	44	272	54	336	64	400	74	464
05	20	15	84	25	148	35	212	45	276	55	340	65	404	75	468
06	24	16	88	26	152	36	216	46	280	56	344	66	408	76	472
07	28	17	92	27	156	37	220	47	284	57	348	67	412	77	476
08	32	18	96	28	160	38	224	48	288	58	352	68	416	78	480
09	36	19	100	29	164	39	228	49	292	59	356	69	420	79	484
0A	40	1A	104	2A	168	3A	232	4A	296	5A	360	6A	424	7A	488
0B	44	1B	108	2B	172	3B	236	4B	300	5B	364	6B	428	7B	492
0C	48	1C	112	2C	176	3C	240	4C	304	5C	368	6C	432	7C	496
0D	52	1D	116	2D	180	3D	244	4D	308	5D	372	6D	436	7D	500
0E	56	1E	120	2E	184	3E	248	4E	312	5E	376	6E	440	7E	504
0F	60	1F	124	2F	188	3F	252	4F	316	5F	380	6F	444	7F	508
VA	TIME														
80	512	90	576	A0	640	B0	704	C0	768	D0	832	E0	896	F0	960
81	516	91	580	A1	644	B1	708	C1	772	D1	836	E1	900	F1	964
82	520	92	584	A2	648	B2	712	C2	776	D2	840	E2	904	F2	968
83	524	93	588	A3	652	B3	716	C3	780	D3	844	E3	908	F3	972
84	528	94	592	A4	656	B4	720	C4	784	D4	848	E4	912	F4	976
85	532	95	596	A5	660	B5	724	C5	788	D5	852	E5	916	F5	980
86	536	96	600	A6	664	B6	728	C6	792	D6	856	E6	920	F6	984
87	540	97	604	A7	668	B7	732	C7	796	D7	860	E7	924	F7	988
88	544	98	608	A8	672	B8	736	C8	800	D8	864	E8	928	F8	992
89	548	99	612	A9	676	B9	740	C9	804	D9	868	E9	932	F9	996
8A	552	9A	616	AA	680	BA	744	CA	808	DA	872	EA	936	FA	1000
8B	556	9B	620	AB	684	BB	748	CB	812	DB	876	EB	940	FB	1004
8C	560	9C	624	AC	688	BC	752	CC	816	DC	880	EC	944	FC	1008
8D	564	9D	628	AD	692	BD	756	CD	820	DD	884	ED	948	FD	1012
8E	568	9E	632	AE	696	BE	760	CE	824	DE	888	EE	952	FE	1016
8F	572	9F	636	AF	700	BF	764	CF	828	DF	892	EF	956	FF	1020



6.2 Watchdog Software Guide

The following example shows how to program the watchdog timer.

Watchdog Enable:

```
MOV AL, 00xxH ;(Choose the needed values, from 0 to FF)
MOV DX, 0443H
OUT DX, AL
```

Watchdog Refresh

```
MOV DX, 0443H
IN DX, AL
```

Watchdog Disable:

```
MOV DX, 043H
IN DX, AL
```

The desired Timer Interval and the corresponding Hex value can be found on the preceding Watchdog Timer Control Table. VA Mean is the value for counter in hexadecimal units. Time mean is the WDT response time in seconds.



7.1 Introduction

The CPU Card on-board audio interface provides high-quality stereo sound and FM music synthesis (ESFM) by using the VIA VT1612 audio controller and Codec chip. The audio interface can record, compress, and play back voice, sound, and music with a built-in mixer control. The CPU CARD on-board AC97 audio interface also supports the Plug and Play (PnP) standard. The ESFM synthesizer is register compatible with the OPL3 and has extended capabilities.

7.2 Features

- AC'97 2.2 S/PDIF extension compliant codec
- 18-bit stereo full duplex $\Sigma\Delta$ codec
- 1Hz resolution VSR (Variable Sampling Rate)
- Integrated IEC958 line driver for S/PDIF
- S/PDIF compressed digital or LPCM audio out
- 3D stereo expansion for simulated surround
- 18-bit independent rate stereo ADC/DAC
- Hardware VU peak meters for PCM streams
- 4 stereo, 2 mono analog line-level inputs
- Alt. line-level output with volume control, or
- Headphone Amplifier with Thermal Protection
- Low Power consumption mode
- Exceeds Microsoft® WHQL logo requirements
- 3.3V digital, 3.3 or 5V analog power supply
- 48-pin LQFP small footprint package



Award BIOS Setup

8.1 Introduction

This section discusses the Phoenix-Award Setup program built into the ROM BIOS. The Setup program allows users to modify the basic system configuration. This special information is then stored in battery-backed RAM so that it retains the Setup information when the power is turned off.

The Phoenix-Award BIOS installed in the computer system's ROM (Read Only Memory) is a custom version of an industry standard BIOS. This means it supports VIA Eden ESP 7000 processors in a standard IBM AT compatible Input/ Output system. The BIOS provides critical low-level support for standard devices such as disk drives, serial and parallel ports. Also the BIOS has been customized by adding important, but non-standard, features such as virus and password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system. The rest of this chapter will guide users through the process of configuring the system by using Setup.

8.2 Starting Setup

The Phoenix-Award BIOS is immediately activated when the computer starts to power on. The BIOS reads the system information contained in the CMOS and starts the process of checking out the system and configuring it. When it finishes, the BIOS will seek an operating system on one of the disks and then launch and turn control over to the operating system.

While the BIOS is in control, the Setup program can be activated in one of two ways:

1. Press the key immediately after switching the system on, or
2. Press the key when the following message appears briefly at the bottom of the screen during the POST (Power On Self Test).

If the message disappears before you respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the "RESET" button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to...

PRESS F1 TO CONTINUE, DEL TO ENTER SETUP



- Standard CMOS Features: Use this menu for basic system configurations, such as time, date etc.
- Advanced BIOS Features: This setup includes all the items of Award special enhanced features.
- Advanced Chipset Features : Use this setup to change the value in the chipset registers and optimize the system's performance.
- Integrated Peripherals: This setup specifies settings for integrated peripherals.
- Power Management Setup: Use this setting to specify settings for power management.
- PnP / PCI Configuration: This setup appears if the system supports PnP / PCI.
- PC Health Status: This entry display the current status of the PC.
- Frequency/Voltage Control: Use this to specify settings for Frequency/Voltage control.
- Load Fail-Safe Defaults: This loads the BIOS default values for the minimal/stable performance of the PC.
- Load Optimized Defaults: This item loads the default factory settings for BIOS for optimal system performance.
- Supervisor / User Password Setting: Change, set, or disable password. It allows the user to limit access to the system and Setup.
- Save & Exit Setup: Save CMOS value changes to CMOS and exit setup.
- Exit Without Saving: Abandon all CMOS value changes and exit setup.



8.4 Standard CMOS Features

The items in the Standard CMOS Setup Menu are divided into 10 categories. Each category includes none, one or more than one setup items. Use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the desired value for each item.

Phoenix – AwardBIOS CMOS Setup Utility		
Standard CMOS Features		
Date(mm:dd:yy)	Wed Apr 24 2002	Item Help
Time(hh:mm:ss)	14 : 47: 30	
▶ IDE Primary Master	[ST33232A]	Menu Level ▶ Change the day, month Year and century
▶ IDE Primary Slave	[None]	
▶ IDE Secondary Master	[None]	
▶ IDE Secondary Slave	[None]	
Drive A	[1.44M, 3.5 in.]	
Drive B	[None]	
Video	[EGA/VGA]	
Halt On	[All , But Disk/Key]	
Base Memory	640K	
Extended Memory	228352K	
Total Memory	229376K	

↑ ↓ → ← : Move Enter : Select +/- /PU/PD : Value F10 : Save ESC : Exit F1 : General Help
 F5 : Previous Values F6 : Fail-Safe Defaults F7 : Optimized Defaults

- Date: To assign the system date, the format is “mm:dd:yy”. The input range for the Month is 1-12. Range for Date is 1-31. Range for Year is 1994-2099. System BIOS will calculate the day of the week automatically.
- Time: The time format is <hour> <minute> <second>. The time is calculated based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00.
- IDE Primary Master/Slave /Secondary Master/Slave: Press PgUp/<+> or PgDn/<-> to select the hard disk drive type. The specification of hard disk drive will show up on the right hand according to user selection.



Phoenix – AwardBIOS CMOS Setup Utility		
IDE Primary Master		
IDE HDD Auto Detection	[Press Enter]	Item Help
IDE Primary Master Access Mode	[Auto]	Menu Level ►►
Capacity	10263MB	To auto-detect the HDD's size, head... on This channel
Cylinder	19885	
Head	16	
Precomp	0	
LandingZone	19884	
Sector	63	
↑ ↓ → ←: Move Enter: Select +/- /PU/PD: Value F10: Save ESC : Exit F1: General Help F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults		

Access Mode	The settings are Auto, CHS, LBA and Large
Capacity	The formatted size of the storage device
Cylinder	Number of cylinders
Head	Number of heads
Precomp	Write precompensation
Landing Zone	Cylinder location of the landing zone
Sector	Number of sectors

- Drive A Type / Drive B Type: The category identifies the types of Floppy Disk Drive A or Drive B that have been installed in the computer.
- Video: The category selects the type of video adapter used for the primary system monitor. Although secondary monitors are supported, you do not have to select the type 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 include high resolution mono adapters

- Halt On: This function allows the system to halt when an error is detected during Power-On Self-Test.

No errors	The system boot will not be stopped whenever any error is detected.
All errors	Whenever the BIOS detects a non-fatal error the system would be stopped and user will be prompted.
All, But Keyboard	The system boot will not stop for a keyboard error but it will stop for all other errors.
All, But Diskette	The system boot will not stop for a disk error but it will stop for all other errors
All, But Disk/Key	The system boot will not stop for a keyboard or disk error but it will stop for all other errors.



8.5 Advanced BIOS Features

This section allows the user to configure the system for basic operations. One can select the system's default speed, boot-up sequence, shadowing, keyboard operation and security.

Phoenix – AwardBIOS CMOS Setup Utility		
Advanced BIOS Features		
		Item Help
Virus Warning	[Disabled]	
CPU Internal Cache	[Enabled]	
External Cache	[Enabled]	
CPU L2 Cache ECC Checking	[Enabled]	
Quick Power On Self Test	[Enabled]	
First Boot Device	[Floppy]	
Second Boot Device	[HDD-0]	
Third Boot Device	[LS120]	
Boot Other Device	[Enabled]	
Swap Floppy Drive	[Disabled]	
Boot Up Floppy Seek	[Disabled]	
Boot Up NumLock Status	[On]	
Gate A20 Option	[Fast]	
Typematic Rate Setting	[Disabled]	
x Typematic Rate (Chars/Sec)	6	
x Typematic Delay (Msec)	250	
Security Option	[Setup]	
OS Select For DRAM > 64MB	[Non-OS2]	
Video BIOS Shadow	[Enabled]	
Menu Level ► Allows you to choose The VIRUS warning Feature for IDE Hard Disk boot sector Protection. If this Function is enabled and someone attempt to write data into this area , BIOS will show a warning message on Screen and alarm beep		
↑ ↓ → ← : Move Enter: Select +/- /PU/PD: Value F10: Save ESC : Exit F1: General Help F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults		

- Virus Warning: When this function is enabled, the BIOS monitor the boot sector and partition table of the hard disk drive for any attempt at modification. If an attempt is made, the BIOS will halt the system and then display an error message. Afterwards, if necessary, you can run an anti-virus program to locate and remove the problem before any damage is done. Many disk diagnostic programs will attempt to access the boot sector table, which can cause the above warning message. If you run such a program, we recommend that you first disable the Virus Warning function. The default value is disabled.
- CPU Internal Cache: This field configures the CPU internal cache (L1 cache). The default value is enabled.
- External Cache : This field configures the system's external cache (L2 cache). The default value is enabled.
- CPU L2 Cache ECC Checking: This field specifies whether the CPU L2 cache supports ECC or not. The default value is enabled.
- Quick Power On Self Test: This category speeds up Power On Self Test (POST) after you power up the computer. If it is set to Enable, BIOS will shorten or skip some check items during POST.
- First Boot Device: This option allows user to assign first boot of the system.



Available options are A, C, D, E, F, CD-ROM, LAN, SCSI and LS120/ZIP100.

- **Second Boot Device:** This option allows user to assign second boot of the system. Available options are A, C, D, E, F, CD-ROM, LAN, SCSI and LS120/ZIP100.
- **Third Boot Device:** This option allows user to assign third boot of the system. Available options are A, C, D, E, F, CD-ROM, LAN, SCSI and LS120/ZIP100.
- **Boot Other Device:** This option allows user to other Device , you can select Enabled or Disabled.
- **Swap Floppy Drive:** When enabled, physical drive A will be assigned to logical drive B, and physical drive B will be assigned to logical drive A.
- **Boot Up Floppy Seek:** The system will detect and verify operation of the floppy drive type.
- **Boot Up NumLock Status:** The option allows the <NumLock> key to be activated after system boot up.
- **Gate A20 Option:**This item allows one to select how the gate A20 is handled. The gate A20 is a device used to address memory above 1 Mbytes. Initially, the gate A20 was handled via a pin on the keyboard. Today, even though keyboards still provide this support, it is more common and much faster for the system chipset to provide gate A20 support.
- **Typematic Rate Setting:** This item determines if the typematic rate is to be used. When disabled, continually holding down a key on your keyboard will generate only one instance. In other words, the BIOS will only report that the key is down. When the typematic rate is enabled, the BIOS will report as before, but it will then wait a moment, and, if the key is still down, it will begin to report that the key has been depressed repeatedly. For example, one would use such a feature to accelerate cursor movements with the arrow keys.
- **Typematic Rate (Chars/Sec):** Use this option to set the rate at which a character keeps repeating while a key is held down.
- **Typematic Delay (Msec):** When the typematic rate is enabled, this selection allows one to select the delay between when the key was first depressed and the acceleration begins.
- **Security Option:** You can select whether the password is required every time the system boots or only when you enter the Setup. You can assign "Supervisor Password" and "User Password" in the main CMOS Setup Utility Screen.
- **OS Select for DRAM > 64:** If you are using OS/2 operating system and installed memory is larger than 64MB. You need to have the setting in the enable mode.
- **Video BIOS Shadow:** Video shadow copies BIOS code from slower ROM to faster RAM. BIOS can then execute from RAM.
- **C8000 - CBFFF Shadow/DC000 - DFFFF Shadow:** Optional firmware will be copied from ROM to RAM when this option is enabled.



8.6

Advanced Chipset Features

Phoenix – AwardBIOS CMOS Setup Utility Advanced Chipset Features		
		Item Help
DRAM Timing By SPD	[Enabled]	
x DRAM Clock	Host CLK	
x SDRAM Cycle Length	3	Menu Level ▶
x Bank Interleave	Disabled	
Memory Hole	[Disabled]	
P2C/C2P Concurrency	[Enabled]	
System BIOS Cacheable	[Disabled]	
Video RAM Cacheable	[Disabled]	
Frame Buffer Size	[32M]	
AGP Aperture Size	[64M]	
AGP-4X Mode	[Enabled]	
AGP Driving Control	[Auto]	
x AGP Driving Value	DA	
Panel Type	[00]	
Boot Device Select	[Auto]	
OnChip USB	[Enabled]	
USB Keyboard Support	[Disabled]	
OnChip Sound	[Auto]	
CPU to PCI Write Buffer	[Enabled]	

↑ ↓ → ← : Move Enter: Select +/- /PU/PD: Value F10: Save ESC :Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

- DRAM Timing by SPD: Selects whether DRAM timing is configured by reading the contents of the SPD (Serial Presence Detect) device on the DRAM module. Setting to Enabled makes both DRAM Cycle Length and DRAM Clock automatically determined by BIOS according to the configurations on the SPD.
- DRAM Clock: The chipset supports synchronous and asynchronous mode between the host clock and DRAM clock frequency.

The settings are:
Host CLK The DRAM clock will be equal to the Host Clock.
HCLK-33M The DRAM clock will be equal to the Host Clock minus 33MHz, For example, if the Host Clock is 133MHz, the DRAM clock will be 100MHz.
HCLK+33M The DRAM clock will be equal to the Host Clock plus 33MHz, For example, if the Host Clock is 100MHz, the DRAM clock will be 133MHz.
- SDRAM Cycle Length: The option controls the CAS latency, which determines the timing delay before SDRAM starts a read command after receiving it. Settings are 2 and 3 (clock cycles). 2 increases system performance while 3 provides more stable system performance.
- Memory Hole: In order to improve performance, certain space in memory can be reserved for ISA cards, This memory must be mapped into the memory space below 16MB. When this area is reserved, it cannot be cached. The settings Are Enabled and Disabled (default).



- **P2C/C2P Concurrency:** This field enables or disables the PCI to CPU and CPU to PCI concurrency feature, which allows synchronous data transmission from PCI to CPU and vice versa. Selecting the default Enabled will increase system performance.
- **System BIOS Cacheable:** System BIOS ROM at F000h-F0000h is always copied to RAM for faster execution. Selecting Enabled allows the contents of F0000h RAM memory segment to be written to and read from cache memory, resulting in better system performance. However, if any program writes to this memory area, a system error may result. The settings are Enabled and Disabled (default).
- **Video RAM Cacheable:** The field allows the caching of video memory, resulting in increased system performance. Settings are Enabled and Disabled (default).
- **Frame Buffer Size:** Frame Buffer is the video memory that stores data for video display (frame). This field is used to determine the memory size for frame Buffer. Larger frame buffer size increases video performance. Settings are 2M, 4M and 8M (default).
- **AGP Aperture Size:** Select the size of the Accelerated Graphics Port(AGP) aperture. 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. Options are 4M, 8M, 16M, 32M, 64M and 128M.
- **Panel Type:** This item selects LCD Panel type.

Panel Type	Support Function
0	640 x 480 TFT
1	800 X 600 TFT
2	1024 X 768 TFT 2pixel/clock at 32MHz
3	1280 x 1024 TFT
4	640 X 480 DSTN
5	800 X 600 DSTN
6	1024 X 768 DSTN
7	1024 X 768 TFT 1pixel/clock at 65MHz
8	640 x 480 TFT
9	800 X 600 TFT
A	1024 X 768 TFT
B	1280 X 1024 TFT
C	1400x1050 TFT 2pixel/clock at 54Mhz
D	800 X 600 DSTN
E	1024 X 768 DSTN
F	1280 X 1024 DSTN

- **Boot Device Select:** This item selects Boot Device. The default is "Auto".
- **OnChip USB:** This is used to enable or disable the USB ports. Settings are Enabled and Disabled. The default is Enabled.



- **USB Keyboard Support:** Set to Enabled if you need to use a USB keyboard in the operating system that does not support or have any USB drivers installed, such as DOS and SCO Unix. Default is Disabled.
- **OnChip Sound:** Auto allows the main board to detect whether an audio device is used. If the device is detected, the onboard audio controller will be enabled; if not, the controller is disabled. Disable the controller if you want to use other controller cards to connect an audio device. Settings are Auto (default) and Disabled.
- **Memory Hole At 15M-16M:** Enabling this feature reserves 15MB to 16MB memory address space for ISA Expansion cards that specifically require this setting. This makes the memory from 15MB and up unavailable to the system. Expansion cards can only access memory up to 16MB.
- **Passive Release:** This function is used to meet the latency of the ISA bus master. Try to enable or disable it, if you have ISA card compatibility problems.
- **Delayed Transaction:** This function is used to meet the latency of PCI cycles to from ISA bus. Try to enable or disable it, if you have ISA card compatibility problems.
- **AGP Aperture Size (MB):** Choose 4, 8, 16, 32, 64, 128, 256MB. Memory-mapped, graphics data structures can reside in the Graphics Aperture.



8.7

Integrated Peripherals Setup

Phoenix – AwardBIOS CMOS Setup Utility			Item Help
Integrated Peripherals			
OnChip IDE Channel0		[Enabled]	
OnChip IDE Channel1		[Enabled]	
IDE Prefetch Mode		[Enabled]	Menu Level ▶
Primary Master	PIO	[Auto]	
Primary Slav	PIO	[Auto]	
Secondary Master	PIO	[Auto]	
Secondary Slave	PIO	[Auto]	
Primary Master	UDMA	[Auto]	
Primary Slav	UDMA	[Auto]	
Secondary Master	UDMA	[Auto]	
Secondary Slave	UDMA	[Auto]	
Init Display First		[PCI Slot]	
IDE HDD Block Mode		[Enabled]	
Onboard FDD Controller		[Enabled]	
Onboard Serial Port 1		[3F8/IRQ4]	
Onboard Serial Port 2		[2F8/IRQ3]	
UART 2 Mode		[Standard]	
x IR Function Duplex		Half	
x TX,RX inverting enable		No, Yes	
↑ ↓ → ← : Move Enter : Select +/- /PU/PD : Value F10 : Save ESC : Exit F1 : General Help F5 : Previous Values F6 : Fail-Safe Defaults F7 : Optimized Defaults			

- OnChip IDE Channel 0/1: The integrated peripheral controller contains an IDE interface with support for two IDE channels. Choose the default value Enabled to activate each channel separately.
- IDE Prefetch Mode: The onboard IDE drive interface support prefetching, for faster drive accesses. Set to Disabled if your primary and/or secondary add-in IDE interface does not support prefetching.
- Primary/Secondary Master/Slave PIO: The four fields allow you to set a PIO (Programmed Input/Output) mode for each of the four IDE devices that the onboard IDE interface supports. Modes 0~4 provide increased performance. In Auto mode, BIOS automatically determines the best mode for each IDE device.
- Primary/Secondary Master/Slave UDMA: Ultra DMA implementation is possible only if you IDE device supports it and your operating environment contains a DMA driver. If both your hard drive and software support Ultra DMA, select Auto (default) to enable BIOS support.
- Init Display First: This item specifies which VGA card is your primary graphics adapter. Available options are PCI Slot and AGP. Default value is AGP.
- IDE HDD Block Mode: This allows your hard disk controller to use the fast block mode to transfer data to and from the hard disk drive. Block mode is also called block transfer, multiple Commands or multiple sector read/write. Enabled enables IDE controller to use block mode; Disabled allows the controller to use standard mode. Default is Enabled.



- Onboard FDD Controller: This is to enable or disable the onboard Floppy controller. Set to Enabled if you have a floppy disk device installed on the main board and want to use it.
- Onboard Serial Port 1/2: These items specify the base I/O port address and IRQ for the onboard Serial Port 1 (COM 1)/ Serial Port 2 (COM 2). Selecting Auto allows BIOS to automatically determine the correct base I/O port address. Available options are Auto, 3F8/IRQ4, 2F8/IRQ3, 3E8/IRQ4, 2E8/IRQ3 and Disabled. Default is Auto. If you have an ISA add-on card, the suggested configuration is as follows:
- UART2 Mode: The item allows you to specify the operation mode for serial port "COM 2", Settings are:

Standard RS-232C Serial Port
HPSIR IrDA- compliant Serial Infrared Port.
ASKIR Amplitude Shift Keyed Infrared Port.
- IR Function Duplex: This field specifies a duplex value for the IR device connected to COM2. Full-Duplex Mode permits simultaneous two-direction transmission. Half-Duplex mode permits transmission in one direction only at a time. Settings are Half and Full. The default is Half.
- TX,RX inverting enable: This item allows one to enable the TX, RX inverting which depends on different H/W requirements. This field is not recommended to have its default setting changed to avoid system errors. Settings are "No, Yes" (default), "Yes, No", "Yes, Yes" and "No, No".
- Onboard Parallel Port: This specifies the base I/O port address and IRQ of the onboard Parallel Port. Settings are 378/IRQ7, 278/IRQ5, 3BC/IRQ7 and Disabled. Default is 378/IRQ7. If you have an ISA add-on card, the corresponding onboard serial port should be disabled if the accessory card port cannot be reassigned so there is no conflict in I/O address or IRQ.

If the ISA add-on card has			Onboard parallel port to be set as	
LPT1 278H	LPT2 278H	LPT3 3BCH	PORT ASSIGNED	IRQ ASSIGNED
✓	✓	✓	DISABLED	X
✓	✓	X	LPT3	5
✓	X	✓	LPT2	5
X	✓	✓	LPT1	7
✓	X	X	LPT2	5
X	✓	X	LPT1	7
X	X	✓	LPT1	7
X	X	X	LPT1	7

- Onboard Parallel Mode: Select an operating mode for the parallel port. Mode options are SPP, EPP1.7, EPP1.9, ECP and ECP/EPP1.7, ECP/EPP1.9 .



- ECP Mode Use DMA: This item specifies a DMA channel 1 or 3 for the Parallel Port when it is set to ECP or ECP+EPP mode.
- Parallel Port EPP Type: This item selects the EPP version used by the parallel port if the port is set to EPP or ECP+EPP mode. Settings are EPP1.7 and EPP1.9.
- Onboard Legacy Audio: This item enables or disables the onboard audio features of the main board and the following audio options in the BIOS.
- Sound Blaster: This item turns on/off the sound blaster feature of the board. To play Sound Blaster compatible games, set the field to Enabled.
- SB I/O Base Address: This item specifies the I/O Base Address for the Sound Blaster. Settings are 220H, 240H, 260H and 280H.
- SB IRQ Select: This item specifies the IRQ for the Sound Blaster. Settings are IRQ5, IRQ7, IRQ9 and IRQ10.
- SB DMA Select: This item specifies the DMA channel for the Sound Blaster. Settings are DMA 1, DMA 2, DMA 3, and DMA 0.
- MPU-401: The field enables or disables the MPU-401 interface (the Yamaha Sound Blaster mode).
- MPU-401 I/O Address: This item selects the base I/O port address for the MPU-401 interface. Settings are 330-333H, 300-303 and 310-313.



8.8

Power Management Setup



- **ACPI Function:** This item is to activate the ACPI (Advanced Configuration and PowerManagement Interface) Function. If your operating system is ACPI-aware, such as Windows 98 SE/2000/ME, select Enabled. Settings are Enabled and Disabled. Default is Enabled.
- **Power Management:** This item allows you to select the type (or degree) of power saving and it is directly related to the following modes: There are three selections for Power management, four of which have fixed mode settings.

Disabled	The system operates in Normal condition (Non-GREEN), and the Power Management function is disabled.
Max. saving	Maximum Power Management. Doze Mode = 10 sec, Suspend Mode = 10 sec, and HDD Power Down= Disabled.
Min. saving	Minimum Power Management. Doze Mode = 1 hour, Suspend Mode = 1 hour, and HDD Power Down= Disabled.
User Define	Allow end users to configure each mode separately. Each of the ranges are from 1 min. to 1 hour except for HDD Power Down which ranges from 1 min to 15 min..



- **HDD Power Down:** If HDD activity is not detected for the length of time specified in this field, The hard disk drive will be powered down while all other devices remain active. Settings are Disable and 1 through 15 Min.
- **Doze Mode:** If System activity is not detected for the length of time specified in this field, the CPU clock will run at slower speed while other devices still run at full speed. Settings are Disable, 1Min, 2 Min, 4 Min, 6 Min, 8Min, 10 Min, 20 Min, 30 Min, 40 Min and 1 Hour.
- **Suspend Mode:** If system activity is not detected for the length of time specified in this field, all devices except CPU will be shut off. Settings are Disable, 1Min, 2 Min, 4 Min, 6 Min, 8Min, 10 Min, 20 Min, 30 Min, 40 Min and 1 Hour.
- **PM Control by APM:** Setting to Yes will activate an Advanced Power Management (APM) device to enhance Max Saving mode and stop CPU internal clock. Settings are Yes and No. Default is Yes.
- **Video Off Option** The settings are Always On, Suspend and All Modes, This option is for choosing the settings for which the monitor will turn off.

Always On	Always turned on.	
Suspend	Off	During Suspend mode, the monitor will be turned off.
All Mode	Off	The monitor is turned off during Doze, Standby or Suspend Mode.
- **Video Off Method:** This determines the manner in which the monitor is blanked.

V/H SYNC+Blank	This selection will cause the system to turn off the vertical and horizontal synchronization ports and write blanks to the video buffer.
Blank Screen	This option only writes blanks to the video buffer
DPMS Support	Initial display power management signaling

- **MODEM Use IRQ:** Name the interrupt request (IRQ) line assigned to the modem(if any) on the system. Activity of the selected IRQ always awakens the system. Settings are 3,4,5,7,9,10,11 and NA.
- **Soft-Off by PWRBTN:** This feature allows users to configure the power button as a normal Power on/off button or a soft-off button. Settings are:

Instant-Off	The power button functions as a normal power –on/ -off button.
Delay 4 Sec.	Pressing the power button for more than 4 seconds will place the system in a very low-power-usage State (Soft-Off state), with only enough circuitry receiving power to detect power button activity or Wake Up On LAN/Ring activity.



Phoenix – AwardBIOS CMOS Setup Utility		Item Help
Wake Up Events		
VGA	[OFF]	
LPT & COM	[LPT/COM]	
HDD & FDD	[ON]	
PCI Master	[OFF]	
PowerOn by PCI Card	[Disabled]	
Wake Up On LAN/Ring	[Enabled]	
RTC Alarm Resume	[Disabled]	
X Data (of Month)	0	
X Resume Time (hh:mm:ss)	0 : 0 : 0	
Primary INTR	[ON]	
▶ IRQs Activity Monitoring	[Press Enter]	
		Menu Level ▶▶

↑ ↓ → ← : Move Enter : Select +/- /PU/PD : Value F10 : Save ESC : Exit F1 : General Help
F5 : Previous Values F6 : Fail-Safe Defaults F7 : Optimized Defaults

- VGA, LPT & COM, HDD & FDD, PCI Master, Wake Up On LAN, PowerOn by PCI Card, Modem Ring Resume. These items specify whether the system will be awakened from power saving modes when activity or input signal of the specified hardware peripheral or component is detected.

Note: To use the function of Wake Up On LAN and Modem Ring Resume, you need to install a LAN card/modem supporting the power on function.

- RTC Alarm Resume: This is to enable or disable the feature of booting up the system on a scheduled time/date. Settings are Enabled and Disabled(default).
- Data(of Month): Specifies the data for RTC Alarm Resume. Settings are 0~31.
- Resume Time(hh:mm:ss): Specifies the time for RTC Alarm Resume. Format is <hour><minute><second>.



Phoenix – AwardBIOS CMOS Setup Utility		
IRQs Activity Monitoring		
IRQ3	(COM 2)	[Enabled]
IRQ4	(COM1)	[Enabled]
IRQ5	(LPT 2)	[Enabled]
IRQ6	(Floppy Disk)	[Enabled]
IRQ7	(LPT1)	[Enabled]
IRQ8	(RTC Alarm)	[Enabled]
IRQ9	(IRQ2 Redir)	[Disabled]
IRQ10	(Reserved)	[Disabled]
IRQ11	(Reserved)	[Disabled]
IRQ12	(PS/2 Mouse)	[Enabled]
IRQ13	(Coprocessor)	[Enabled]
IRQ14	(Hard Disk)	[Enabled]
IRQ15	(Reserved)	[Disabled]

Item Help
Menu Level ▶▶▶

↑ ↓ → ←: Move Enter: Select +/- /PU/PD: Value F10: Save ESC :Exit F1: General Help
F5: Previous Values F6: Fail-Safe Defaults F7: Optimized Defaults

- IRQ [3-15]: Enables or disables the monitoring of the specified IRQ line. If set to Enabled, the activity of the specified IRQ line will prevent the system from entering power saving modes or awaken it from power saving modes.

Note: IRQ (Interrupt Request) lines are system resources allocated to I/O devices. When an I/O device needs to gain attention of the operating system, it signals this by causing an IRQ to occur. After receiving the signal, when the operating system is ready, the system will interrupt itself and perform the service required by the I/O device.



8.9

PNP/PCI Configuration Setup

This section describes configuring the PCI bus system. PCI (Personal Computer Interconnect) is a bus standard which allows I/O devices to operate at a speed near to the speed which is the CPU itself uses when communicating with its own special components. This section covers some very technical items and it is strongly recommended that only experienced users should make any changes to the default settings.

Phoenix – AwardBIOS CMOS Setup Utility PnP/PCI Configurations		
PNP OS Installed	[No]	Item Help
Reset Configuration Data	[Disabled]	
Resources Controlled By	[Auto (ESCD)]	Menu Level ►
x IRQ Resources	Press Enter	Select Yes if you are Using a Plug and Play Capable operating System Select No if You need the BIOS to Configure non-boot devices
x DMA Resources	Press Enter	
PCI/VGA Palette Snoop	[Disabled]	
Assign IRQ For VGA	[Enabled]	
Assign IRQ For USB	[Enabled]	
↑ ↓ → ← : Move Enter : Select +/- /PU/PD : Value F10 : Save ESC : Exit F1 : General Help F5 : Previous Values F6 : Fail-Safe Defaults F7 : Optimized Defaults		



- PNP OS Installed: When set to YES, BIOS will only initialize the PnP cards used for booting (VGA, IDE, SCSI). The rest of the cards will be initialized by the PnP operating system (such as Windows 95 or 98). When set NO, BIOS will initialize all the PnP cards. So, select Yes if the operating system is Plug & Play aware
- Reset Configuration Data: The ESCD (Extended System Configuration Data) is a method that the BIOS uses to store resource information for both PNP and non PNP devices in a bit string format. When Enabled, the system will rebuild ESCD and you will see the message “ESCD Update Successfully” on boot up.
- Resources Controlled By: If user selects Auto (ESCD), BIOS will automatically configure all the boot and PnP. (Plug & Play) compatible devices and assigns system resources like IRQ to these devices. However, this feature is not applicable in the absence of a Plug and Play operating system such as Windows 95/98. For user defined configuration, select Manual. Default is Auto(ESCD).
- IRQ/DMA Resources: The items are adjustable only when Resources Controlled By is set to Manual. Press<Enter> and you will enter the sub-menu of the items. IRQ Resources & DMA Resources list IRQ 3/4/5/7/9/10/11/12/14/15 and DMA 0/1/3/5/6/7 for users to set each IRQ/DMA a type depending on the type of device using the IRQ/DMA.
Settings are:
PCI/ISA PnP For Plug & Play compatible devices designed for PCI or ISA bus architecture.
Legacy ISA For devices compliant with the PC AT bus specification, Requiring a specific interrupt.
- PCI/VGA Palette Snoop: When set to Enabled, multiple VGA devices operating on different buses can handle data from the CPU on each set of palette registers on every video device. Bit 5 of the command register in the PCI device configuration space is the VGA palette Snoop bit(0 is disabled). For example, if there are two VGA devices in the computer (one PCI and one ISA):

Snoop Bit Setting	Action
Disabled	Data read or written by the CPU is only directed to the PCI VGA device’s palette registers.
Enabled	Data read or written by the CPU is directed to both the PCI VGA device’s palette registers and the ISA VGA device’s palette registers, permitting the palette registers of both VGA devices to be identical.

The setting must be set to Enabled if any ISA adapter card installed in the system requires VGA palette snooping. The Setup and BIOS default values are Disabled.

- Assign IRQ For VGA/USB: Setting to Enabled allows BIOS to assign an IRQ to VGA card/USB device. Choose Disabled if you want to release the IRQ. Default is Enabled.



8.10

PC Health Status

Phoenix – AwardBIOS CMOS Setup Utility		
PC Health Status		
		Item Help
Current CPU Temp	0°C/ 32°F	
Current System Temp	33°C/ 91°F	
Current CPUFAN1 Speed	0RPM	Menu Level ▶
Current CPUFAN2 Speed	0RPM	
Vcore	1.25V	
2.5V	2.54V	
3.3V	3.38V	
5V	5.17V	
12V	12.60V	

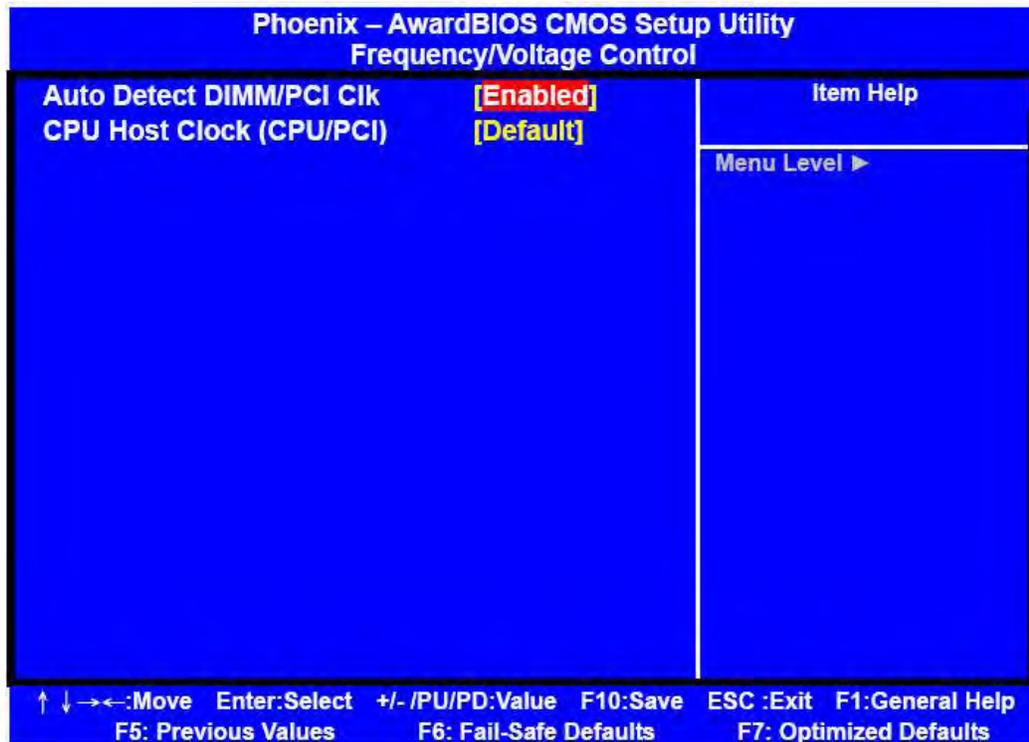
↑ ↓ → ← : Move Enter : Select +/- /PU/PD : Value F10 : Save ESC : Exit F1 : General Help
F5 : Previous Values F6 : Fail-Safe Defaults F7 : Optimized Defaults

- Current CPU Temp; Current System Temp; Current CPUFAN1,2 Speed; Vcore, 2.5V/3.3V/5V/12V:
This item displays the current status of all of the monitored hardware devices/components such as CPU voltage, temperatures and all fan speeds.



8.11

Frequency/Voltage Control



Warning: Over-clocking is not guaranteed. Users must have substantial knowledge of CPU relative to adjusting CPU speeds. Over-clocking should be done only by experienced engineers who are familiar with conducting appropriate tests.

- Auto Detect DIMM/PCI Clk: Use this item to enable or disable the feature of auto detecting the clock frequency of the installed DRAM DIMM and PCI cards. Settings are Enabled (default) and Disabled.
- CPU Host Clock (CPU/PCI): This item specifies the clock frequency of CPU host bus (FSB) and PCI bus and provides a method for end users to overclock the processor accordingly. If the item shows Default, the clock frequency will use the default value for both the CPU host bus and PCI bus.

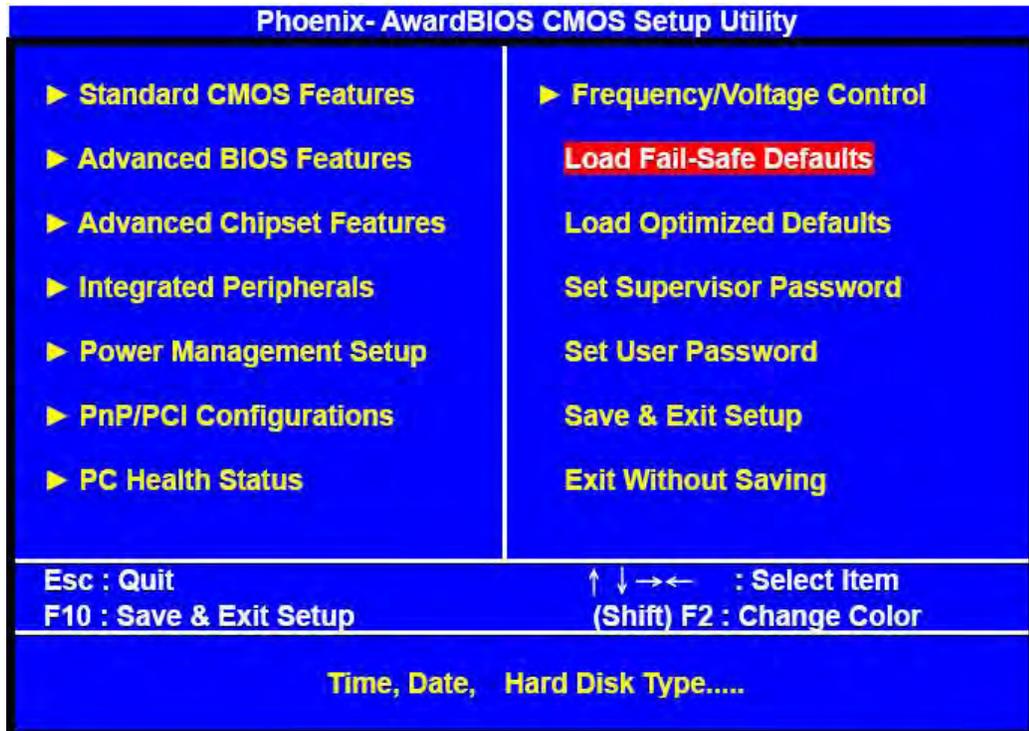


8.12

Load Fail-Safe/Optimized Defaults

The two options on the main menu allow users to restore all of the BIOS Settings to the default Fail-Safe or Optimized values. The Optimized Defaults are the default values set by the IPC manufacturer specifically for the optimal performance of the IPC. The Fail-Safe Defaults are the default values set by the BIOS vendor for stable system performance.

When one selects Load Fail-Safe Defaults, a message as below appears:



Pressing Y loads the BIOS default values for the most stable, minimal system performance.

**8.13****Supervisor/User Password Setting**

User can set either supervisor or user password, or both of them. The differences between them are: 'supervisor password' can enter and change the options of the setup menus and 'user password' just can enter but does not have the right to change the options of the setup menus.

When one selects this function, the following message will appear at the center of the screen to assist in creating a password:

ENTER PASSWORD :

Type the password, up to eight characters in length, and press <Enter>. The password typed now will clear any previously entered password from CMOS memory. User will be asked to confirm the password. Type the password again and press <Enter>. One may also press <Esc> to abort the selection and not enter a password.

To disable a password, just press <Enter> when user is prompted to enter the password. A message will confirm the password will be disabled. Once the password is disabled, the system will boot and Setup can be entered freely.

PASSWORD DISABLED

When a password has been enabled, user will be prompted to enter it upon attempting to enter Setup. This prevents an unauthorized person from changing any part of the system configuration. Additionally, when a password is enabled, one can also require the BIOS to request a password every time the system is rebooted. This would help prevent unauthorized use of the computer. User can determine when the password is required within the BIOS Features Setup Menu and its Security option. If the Security option is set to "System", the password will be required both at boot and at entry to Setup. If set to "Setup", prompting only occurs when trying to enter Setup.



Appendix A: Technical Summary

A

A-1 Interrupt Map

IRQ	ASSIGNMENT
0	System TIMER interrupt from TIMER-0
1	Keyboard output buffer full
2	Cascade for IRQ 8-15
3	Serial port 2
4	Serial port 1
5	Parallel port 2
6	Floppy Disk adapter
7	Parallel port 1
8	RTC clock
9	Available
10	Available
11	Available
12	Available
13	Math coprocessor
14	Hard Disk adapter
15	Available

A-2 Timer & DMA Channel Maps

Timer Channel	Timer Channel
0	System timer interrupt
1	DRAM Refresh request
2	Speaker tone generator

DMA Channel	Assignment
0	Available
1	IBM SDLC
2	Floppy Disk adapter
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available



A-3

RTC & CMOS RAM Map

CODE	ASSIGNMENT
00	Seconds
01	Second alarm
02	Minutes
03	Minutes alarm
04	Hours
05	Hours alarm
06	Day of week
07	Day of month
08	Month
09	Year
0A	Status register A
0B	Status register B
0C	Status register C
0D	Status register D
0E	Diagnostic status byte
0F	Shutdown byte
10	Floppy Disk drive type byte
11	Reserved
12	Hard Disk type byte
13	Reserved
14	Equipment byte
15	Base memory low byte
16	Base memory high byte
17	Extension memory low byte
18	Extension memory high byte
30	Reserved for extension memory low byte
31	Reserved for extension memory high byte
32	Date Century byte
33	Information Flag
34-3F	Reserved
40-7F	Reserved for Chipset Setting Data



A-4

Memory & I/O Maps

MEMORY MAP	ASSIGNMENT
0000000-009FFFF	System memory used by DOS and applications
00A0000-00BFFFF	Display buffer memory for VGA/EGA/CGA/MONO adapters
00C0000-00DFFFF	Reserved for I/O device BIOS ROM or RAM buffer.
00E0000-00EFFFF	Reserved for PCI device ROM
00F0000-00FFFFFF	System BIOS ROM
0100000-BFFFFFFF	System extension memory

I/O MAP	ASSIGNMENT
000-01F	DMA controller (Master)
020-021	Interrupt controller (Master)
022-023	Chipset controller registers I/O ports
040-05F	Timer control registers
060-06F	Keyboard interface controller (8042)
070-07F	RTC ports & CMOS I/O ports
080-09F	DMA register
0A0-0BF	Interrupt controller (Slave)
0C0-0DF	DMA controller (Slave)
0F0-0FF	Math coprocessor
1F0-1F8	Hard Disk controller
278-27F	Parallel port-2
2B0-2DF	Graphics adapter controller
2F8-2FF	Serial port-2
360-36F	Network ports
378-37F	Parallel port-1
3B0-3BF	Monochrome & Printer adapter
3C0-3CF	EGA adapter
3D0-3DF	CGA adapter
3F0-3F7	Floppy disk controller
3F8-3FF	Serial port-1



Appendix B: Troubleshooting

B

B-1 Troubleshooting POST Messages

During the Power On Self Test (POST), if the BIOS detects an error requiring user action, it will either sound a beep code or display a message. If a message is displayed, it will be accompanied by:

PRESS F1 TO CONTINUE, CTRL-ALT-ESC OR DEL TO ENTER SETUP

B-2 Troubleshooting POST Beep

Currently there are two kind of beep codes in BIOS. One code indicates that a video error has occurred and the BIOS cannot initialize the video screen to display any additional information. This beep code consists of a single long beep followed by three short beeps. The other code indicates that a DRAM error has occurred. This beep code consists of a single long repeated beep.

- Error Messages: One or more error messages may be displayed if the BIOS detects an error during the POST. This list includes messages for both the ISA and the EISA BIOS.
- CMOS BATTERY HAS FAILED: CMOS battery is no longer functional. It should be replaced.
- CMOS CHECKSUM ERROR: Checksum of CMOS is incorrect. This can indicate that CMOS has become corrupt. This error may have been caused by a weak battery. Check the battery and replace if necessary.
- DISK BOOT FAILURE, INSERT SYSTEM DISK AND PRESS ENTER: No boot device was found. This could mean that either a boot drive was not detected or the drive does not contain proper system boot files. Insert a system disk into Drive A: and press <Enter>. If the system was expected to boot from the hard drive, make sure the controller is inserted correctly and all cables are properly attached. Also be sure that the disk is formatted as a boot device. Then reboot the system.
- DISKETTE DRIVES OR TYPES MISMATCH ERROR - RUN SETUP: Type of diskette drive installed in the system is different from the CMOS definition. Run Setup to reconfigure the drive type correctly.
- DISPLAY SWITCH IS SET INCORRECTLY: Display switch on the motherboard can be set to either monochrome or color. This indicates the switch is set to a different setting than indicated in Setup. Determine which setting is correct, and then turn off the selection.
- DISPLAY TYPE HAS CHANGED SINCE LAST BOOT: Since last power off the system, the display adapter has been changed. User must configure the system for the new display type.
- ERROR ENCOUNTERED INITIALIZING HARD DRIVE: Hard drive cannot be



initialized. Be sure the adapter is installed correctly and all cables are correctly and firmly attached. Also be sure the correct hard drive type is selected in Setup.

- **ERROR INITIALIZING HARD DISK CONTROLLER:** Cannot initialize controller. Make sure the card is correctly and firmly installed in the bus. Be sure the correct hard drive type is selected in Setup. Also check if any jumper needs to be set correctly on the hard drive.
- **FLOPPY DISK CNTRLR ERROR OR NO CNTRLR PRESENT:** Cannot find or initialize the floppy drive controller. Make sure the controller is installed correctly and firmly. If there are no floppy drives installed, be sure the Diskette Drive selection in Setup is set to NONE.
- **Invalid EISA Configuration: RUN EISA CONFIGURATION UTILITY.** The non-volatile memory containing EISA configuration information was programmed incorrectly or has become corrupt. Re-run EISA configuration utility to correctly program the memory.

NOTE: When this error appears, the system will boot in ISA mode, which allows user to run the EISA Configuration Utility.

- **KEYBOARD ERROR OR NO KEYBOARD PRESENT:** Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot. If user is purposely configuring the system without a keyboard, set the error halt condition in Setup to HALT ON ALL, BUT KEYBOARD. This will cause the BIOS to ignore the missing keyboard and continue the boot.
- **MEMORY ADDRESS ERROR AT ...:** Indicates a memory address error at a specific location. One can use this location along with the memory map for the system to find and replace the bad memory chips.
- **MEMORY PARITY ERROR AT ...:** Indicates a memory parity error at a specific location. One can use this location along with the memory map for the system to find and replace the bad memory chips.
- **MEMORY SIZE HAS CHANGED SINCE LAST BOOT:** Memory has been added or removed since the last boot. In EISA mode, use Configuration Utility to reconfigure the memory configuration. In ISA mode, enter Setup and enter the new memory size in the memory fields.
- **MEMORY VERIFY ERROR AT ...:** Indicates an error verifying a value already written to memory. Use the location along with the system's memory map to locate the bad chip.
- **OFFENDING ADDRESS NOT FOUND:** This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem which cannot be isolated.
- **OFFENDING SEGMENT:** This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem which has been isolated.



- **PRESS A KEY TO REBOOT:** This will be displayed at the bottom screen when an error occurs that requires the user to reboot. Press any key and the system will reboot.
- **PRESS F1 TO DISABLE NMI, F2 TO REBOOT:** When BIOS detects a Non-maskable Interrupt condition during boot, this will allow the user to disable the NMI and continue to boot, or one can reboot the system with the NMI enabled.
- **RAM PARITY ERROR - CHECKING FOR SEGMENT ...:** Indicates a parity error in Random Access Memory.
- **SYSTEM HALTED, (CTRL-ALT-DEL) TO REBOOT ...:** Indicates the present boot attempt has been aborted and the system must be rebooted. Press and hold down the CTRL and ALT keys and press DEL.

B-3 Troubleshooting for POST Codes

NOTE: EISA POST codes are typically output to port address 300h.
ISA POST codes are output to port address 80h.

POST (hex)	Name	Description
C0	Turn Off Chipset Cache	OEM Specific - Cache control
1	Processor Test 1	Processor Status (1 FLAG) Verification. Tests the following processor status flags carry, zero, sign, overflow. The BIOS will set each of these flags, verify they are set, then turn each flag off and verify it is off.
2	Processor Test 2	Read/Write/Verify all CPU registers except SS, SP, and BP with data pattern FF and 00
3	Initialize Chips	Disable NMI, PIE, AIE, UEI, SQWV. Disable Video, parity checking, DMA. Reset math Coprocessor. Clear all page registers, CMOS shutdown byte. Initialize timer 0, 1, And 2, including set EISA timer to a known State. Initialize DMA controllers 0 and 1. Initialize interrupt controllers 0 and 1. Initialize EISA extended registers.
4	Test Memory Refresh Toggle	RAM must be periodically refreshed in order to keep the memory from decaying. This function assures that the memory refresh Function is working properly.
5	Blank video, Initialize keyboard	Keyboard controller initialization.



7	Test CMOS Interface and Battery Status	Verifies CMOS is working correctly, detects bad battery.
BE	Chipset Default Initialization	Program chipset registers with power on BIOS defaults.
C1	Memory presence test	OEM Specific-Test to size on-board memory
C5	Early Shadow	OEM Specific – Early Shadow enable for fast boot.
C6	Cache presence test	External cache size detection
8	Setup low memory	Early chipset initialization Memory presence test OEM chipset routines Clear low 64K of memory Test first 64K memory.
9	Early Cache Initialization	Cyrix CPU initialization Cache initialization
A	Setup Interrupt Vector Table	Initialize first 120 interrupt vectors with SPURIOUS_INT_HDLR and initialize INT 00h-1Fh according to INT_TBL
B	Test CMOS RAM Checksum	Test CMOS RAM Checksum, if bad, or Insert key pressed, load defaults.
C	Initialize keyboard	Detect type of keyboard controller (optional) Set NUM_LOCK status.
D	Initialize Video Interface	Detect CPU clock. Read CMOS location 14h to find out type of video in use. Detect and Initialize video adapter.
E	Test Video Memory	Test video memory, write sign-on message to screen. Setup shadow RAM - Enable shadow according to Setup.
F	Test DMA Controller 0	BIOS checksum test. Keyboard detect and Initialization
10	Test DMA Controller 1	
11	Test DMA Page Registers	Test DMA Page Registers.
12-13	Reserved	
14	Test Timer Counter 2	Test 8254 Timer 0 Counter 2.
15	Test 82559-1 Mask Bits	Verify 82559 Channel 1 masked interrupts by alternately turning off and on the interrupt lines.
16	Test 82559-2 Mask Bits	Verify 82559 Channel 2 masked interrupts by alternately turning off and on the interrupt lines.



17	Test Stuck 82559's Interrupt Bits	Turn off interrupts then verify no interrupt mask register is on.
18	Test 82559 Interrupt Functionality	Force an interrupt and verify the interrupt occurred
19	Test Stuck NMI Bits (Parity I/O Check)	Verify NMI can be cleared.
1A	Display CPU clock.	Display CPU clock.
1B-1E	Reserved	
1F	Set EISA Mode	If EISA non-volatile memory checksum is correct, execute EISA initialization. If not, execute ISA tests and clear EISA mode flag. Test EISA Configuration Memory integrity (checksum & communication interface).
20	Enable Slot 0	Initialize slot 0 (System Board).
21-2F	Enable Slots 1-15	Initialize slots 1 through 15.
30	Size Base and Extended Memory	Size base memory from 256K to 640K and Extended memory above 1MB.
31	Test Base and Extended Memory	Test base memory from 256K to 640K and Extended memory above 1MB by using various patterns. NOTE: This will be skipped in EISA mode and can be skipped with ESC key in ISA Mode.
32	Test EISA Extended Memory	If EISA Mode flag is set then test EISA Memory found in slots initialization. NOTE: This will be skipped in ISA mode and can be skipped with ESC key in EISA Mode.
33-3B	Reserved	
3C	Setup Enabled	
3D	Initialize & Install Mouse	Detect if mouse is present, initialize mouse, install interrupt vectors.
3E	Setup Cache Controller	Initialize cache controller.
3F	Reserved	
BF	Chipset Initialization	Program chipset registers with Setup values
40		Display virus protect disable or enable
41	Initialize Floppy Drive & Controller	Initialize floppy disk drive controller and any drives.



42	Initialize Hard Drive & Controller	Initialize hard drive controller and any drives.
43	Detect & Initialize Serial/Parallel Ports	Initialize any serial and parallel ports (also Game port).
44	Reserved	
45	Detect & Initialize math Coprocessor	Initialize math coprocessor.
46-47	Reserved	
48-4D	Reserved	
4E	Manufacturing POST Loop or Display Messages	Reboot if Manufacturing POST Loop pin is set. Otherwise display any messages (i.e., any non-fatal errors that were detected during POST) and enter Setup.
4F	Security Check	Ask password security(optional).
50	Write CMOS	Write all CMOS values back to RAM and clear screen.
51	Pre-boot Enable	Enable parity checker. Enable NMI, Enable Cache before boot.
52	Initialize Option ROMs	Initialize any option ROMs present from C8000h to EFFFFh. NOTE: When FSCAN option is enabled, will Initialize from C8000h to F7FFFh.
53	Initialize Time Value	Initialize time value in 40h: BIOS area.
60	Setup Virus Protect	Setup virus protect according to Setup.
61	Set Boot Speed	Set system speed for boot.
62	Setup NumLock	Setup NumLock status according to Setup
63	Boot Attempt	Set low stack. Boot via INT 19h.
B0	Spurious	If interrupt occurs in protected mode.
B1	Unclaimed NMI	If unmasked NMI occurs, display. Press F1 to disable NMI, F2 to reboot.
E1-EF	Setup Pages	E1 - Page 1, E2 – Page 2, etc.
FF	Boot	