

CM-589 low-power 6x86 PC/104 Plus CPU Module

***6x86-166/200/233/266/300 MMX CPU, TFT LCD/VGA,
RS-232/422/485, PC/104 Plus, IrDA, USBx2, WDT
Single +5V,DOC socket, IDE, FDD, Parallel, Low-
Power 0~85°C CPU, Audio signal pin header, DSTN
Signal pin header***

USER'S MANUAL

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This user's manual list necessary information to assist both Embedded Computer manufacturers and end users in installing and setting up the system. The information contained in this user's manual is subject to change without any notice.

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CHAPTER

1

INTRODUCTION

THIS CHAPTER SHOWS THE INFORMATION ABOUT CM-589 AND ITS SPECIFICATIONS.

SECTIONS INCLUDE

- * ABOUT THIS MANUAL**
- * SPECIFICATIONS**
- * SAFETY PRECAUTIONS**

1-1 ABOUT THIS MANUAL

Thank you for purchasing CM-589 low-power 6x86 CPU Module with TFT LCD/ VGA interface, Infrared interface, two USB interface. This manual is written to assist you to install and set up the system. It contents five chapters as following:

Chapter 1: INTRODUCTION

This chapter introduces you the background of this manual, and the specifications for this board. Final in this chapter will indicate how to avoid the damages for this CPU Module.

Chapter 2: HARDWARE CONFIGURATION

This chapter outlines the jumpers/connectors/components' locations and their functions. It shows the way how to set jumper and how to configure this board.

Chapter 3: LCD/VGA

This chapter shows the information about on-board 64-bit LCD/VGA. It supports CRT and TFT LCD flat panel up to 1280x1024x8 BPP and 1024x768x16 BPP, also support MPEG1 and MPEG2 assist.

Chapter 4: WDT SOFTWARE GUIDE

Helpful information describes the WatchDog-timer function.

Chapter 5: DiskOnChip FLASH DISK

This chapter brings you the information about DiskOnChip function.

Chapter 6: AWARD BIOS SETUP

This chapter indicates you how to set up the BIOS configurations.

Appendix A: TECHNICAL SUMMARY

This appendix gives you the information about the Award BIOS.

Appendix B: TROUBLE SHOOTING

This appendix outlines the errors and offers you the methods to isolate the problems.

1-2 SPECIFICATIONS

- * **CPU + Chipset:**
NS GXLV/GX1 processor and CX5530 chipset with on-chip 6x86-166/200/233/266/300 MMX CPU. GXLV Low-power 0°C ~ 85°C CPU support power consumption 1.3W ~ 5.4W and optional GX1 very-low-power 0°C ~ 85°C CPU support power consumption 0.8W ~ 1.5W.
- * **CACHE MEMORY:** 16KB L1 cache memory.
- * **I/O Chipset:** NS PC97317.
- * **BIOS:** Award, 128KB Flash BIOS for plug & play function.
Support I/O Setup.
- * **MEMORY:**
1 X 144-pin SO-DIMM on solder side support 8MB ~ 128MB SDRAM.
- * **LCD/VGA w/MPEG II:**
On-chip shared-memory 64-bit LCD/VGA, support CRT and TFT LCD flat panel up to 1280x1024x8 BPP and 1024x768x16 BPP, support both MPEG1 and MPEG2 assist. Using 41-pin Hirose connector for LCD.
- * **Audio signal pin header for optional Audio.**
- * **DSTN signal pin header for optional DSTN.**
- * **USB INTERFACE:** 5-pin header x 2.
- * **IrDA.**
- * **DiskOnChip Flash Disk socket.**
- * **BUS TYPE:** PC/104-Plus (PCI only) Connector.
- * **Speaker: Buzzer on Board.**
- * **CMOS Backup:** CMOS Back up by Li battery.
- * **KEYBOARD & MOUSE CONNECTOR:**
Support 5-pin Header PS/2 Keyboard Connector.
Support 5-Pin Header PS/2 Mouse Connector.
- * **IDE INTERFACE:** One IDE port support up to 2 x IDE devices.

*** FLOPPY DISK DRIVE INTERFACE:**

Support up to two Floppy Disk Drivers, 3.5" or 5.25" FDD (360K/720K/1.2M/1.44M/2.88M) Drives A, B swappable.

*** PARALLEL PORT:**

One bi-directional parallel port configured as LPT1, 2, 3 support IEEE 1284 compliant high-speed EPP and ECP modes.

*** SERIAL PORT x 2:**

16-byte FIFO 16C550 serial port, jumper selectable RS-232 x 1 + RS-232/422/485 x 1.

*** WATCHDOG:**

I/O port 0443H to enable watchdog.
I/O port 043H (1043H~D043H) to disable watchdog.
Time-out timing selectable 0 to 30 sec.

*** Miscellaneous Connectors/Jumpers:**

Reset, HDD LED, 4 single +5V Power connector.

*** DMA CONTROLLER: 82C37 X 2**

*** DMA CHANNELS: 7**

*** INTERRUPT CONTROLLERS: 82C59 X 2**

*** INTERRUPT LEVELS: 15**

*** OPERATING TEMPERATURE: 0°C to 70°C. 0°C to 85°C low-power CPU don't need fan cooler (just need metal cooler).**

*** 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
GX1-200 (1.6V)	1.6W	0.8W

*** SYSTEM POWER REQUIREMENT:**

Single +5V by using 4-pin Power connector.

*** BOARD DIMENSION: 95.6mm x 90mm**

*** BOARD WEIGHT: 0.125Kg.**

1-3 SAFETY PRECAUTIONS

Follow the messages below to avoid your system from damage.

- 1. Avoid your system from static electric power on all occasions.**
- 2. Stay safe from the electric shock. Don't touch any components of this card when the power is ON. Always disconnect power when the system is not in use.**
- 3. Remove power when you change any hardware devices. For instance, when you connect a jumper or install any cards, a surge of power may damage the electronic components or the whole system.**

CHAPTER

2

HARDWARE CONFIGURATION

THIS CHAPTER SHOWS YOU THE CONNECTORS & JUMPER SETTINGS, AND COMPONENTS' LOCATIONS.

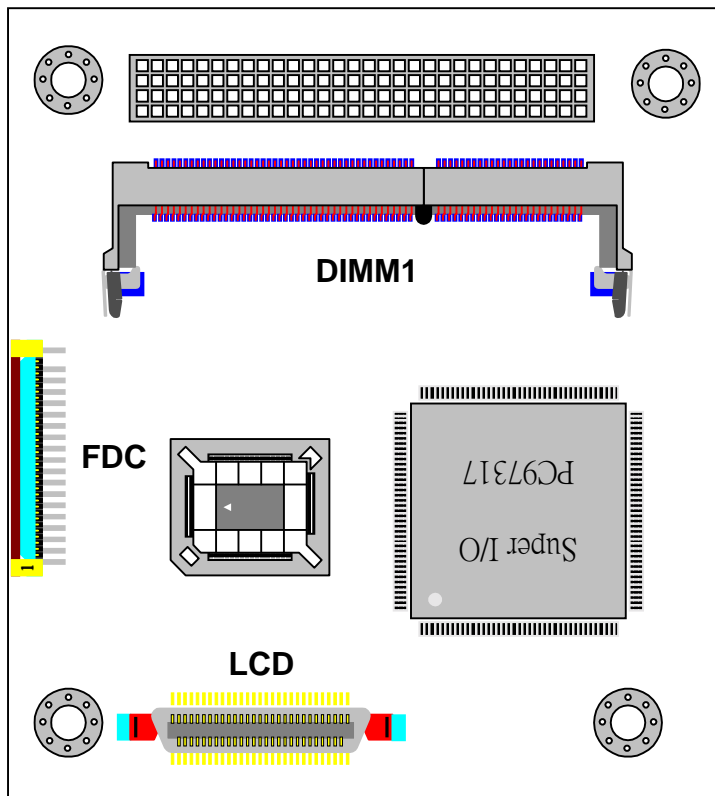
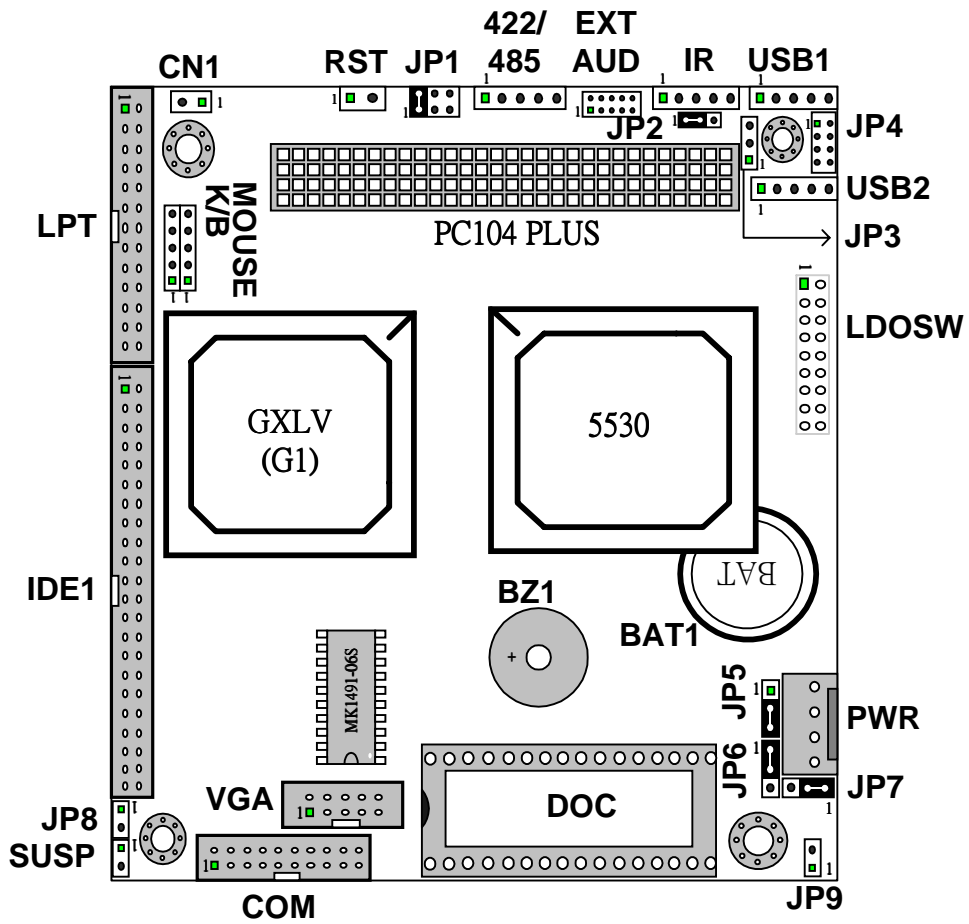
SECTIONS INCLUDE:

- * CONNECTORS/ JUMPER SETTINGS QUICK REFERENCE TABLE**
- * COMPONENTS' LOCATIONS**
- * CONFIGURATION AND JUMPER SETTINGS**
- * CONNECTORS PIN ASSIGNMENTS**

2-1 JUMPERS/CONNECTORS QUICK REFERENCE TABLE

FLOPPY DISK DRIVE CONNECTOR	FDC
PRINTER CONNECTOR	LPT
HARD DISK DRIVE CONNECTOR	IDE1
COM PORT X 2 (RS-232)	COM
IrDA CONNECTOR	IR
4-PIN POWER CONNECTOR	PWR
PS/2 KEYBOARD CONNECTOR	KB
PS/2 MOUSE CONNECTOR	MOUSE
VGA CONNECTOR	VGA
LCD CONNECTOR	LCD
RS-422/485 CONNECTOR	422/485
USB CONNECTOR 1	USB1
USB CONNECTOR 2	USB2
SUSPEND CONNECTOR	SUSP
EXTERNAL -12V INPUT CONNECTOR	CN1
SYSTEM RESET CONNECTOR	RST
EXTERNAL AUDIO CONNECTOR	EXTAUD
RS-232 OR RS-422/485 (COM B) SELECTOR	JP1
RS-422/485 PIN 5 VOLTAGE SELECTOR	JP2
LCD INVERTER POWER CONNECTOR	JP3
M-System ADDRESS SELECT	JP4
WDT OUTPUT ADDRESS SELECT	JP5
CMOS CLEAR JUMPER	JP7
HARD DISK ACTIVE LED	JP8
WDT TIME BASE SELECTOR	JP9
BUZZER	BZ1
144-PIN SO-DIMM MEMORY SOCKET	DIMM1
MANUFACTURE DEFAULT JUMPER LIST	JP6

2-2 COMPONENTS' LOCATIONS



2-3 FLOPPY DISK DRIVE CONNECTOR (FDC)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC	2	IND
3	VCC	4	DR0
5	VCC	6	DSKCHG
7	NC	8	NC
9	NC	10	MTR0
11	NC	12	DIR
13	NC	14	STEP
15	GND	16	WDATA
17	GND	18	WGATE
19	GND	20	TRK
21	GND	22	WPX
23	GND	24	RDATA
25	GND	26	HDSEL

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 HARD DISK DRIVE CONNECTOR (IDE1)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	IDEREST	2	GND
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	IOCHRDY	28	GND
29	DACK	30	GND
31	IRQ	32	IO16
33	SA1	34	NC
35	SA0	36	SA2
37	HDCS0	38	HDCS1
39	DASP	40	GND
41	VCC	42	VCC
43	GND	44	NC

2-6 COM PORT x 2 (RS-232) (COM)

COM: COM Port A (RS-232 Port) & B (RS-232 Port) Connector.

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	DCDA	11	DCDB
2	DSRA	12	DSRB
3	RXDA	13	RXDB
4	RTSA	14	RTSB
5	TXDA	15	TXDB
6	CTSA	16	CTSB
7	DTRA	17	DTRB
8	RIA	18	RIB
9	GND	19	GND
10	NC	20	NC

2-7 IrDA INFRARED CONNECTOR (IR)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC	2	CIRRXD
3	IR-RXD	4	GND
5	IR-TXD		

2-8 4-PIN POWER CONNECTOR (PWR)

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

2-9 PS/2 KEKBOARD CONNECTOR (KB)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	CLK	2	DATA
3	NC	4	GND
5	VCC		

2-10 PS/2 MOUSE CONNECTOR (MOUSE)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	CLK	2	DATA
3	NC	4	GND
5	VCC		

2-11 VGA CONNECTOR (VGA)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	RED	2	VCC
3	GREEN	4	DDCSDA
5	BLUE	6	DDCSCL
7	H-SYNC	8	GND
9	V-SYNC	10	GND

2-12 LCD CONNECTOR (LCD)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	R2	2	GND
3	NC	4	+5V
5	R3	6	NC
7	NC	8	NC
9	R4	10	NC
11	R0	12	NC
13	R5	14	B0
15	R1	16	G0
17	+5V	18	B1
19	V-SYNC	20	G1
21	M (DE)	22	B2
23	H-SYNC	24	G2
25	SHFCLK	26	B3
27	+3.3V	28	G3
29	+3.3V	30	B4
31	ENABKL	32	G4
33	NC	34	B5
35	NC	36	G5
37	GND	38	+12V
39	GND	40	+12V
41	NC		

2-13 RS-422/485 CONNECTOR (422/485)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	TX+	2	RX-
3	TX-	4	RX+
5	+5V or +12V		

2-14 USB1 CONNECTOR (USB1)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC	2	DR-
3	DR+	4	GND
5	GND		

2-15 USB2 CONNECTOR (USB2)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC	2	DR-
3	DR+	4	GND
5	GND		

2-16 SUSPEND CONNECTOR (SUSP)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	Signal active low	2	GND

2-17 EXTERNAL -12V INPUT CONNECTOR (CN1)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	GND	2	-12V

2-18 SYSTEM RESET CONNECTOR (RST)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	Signal active low	2	GND

2-19 EXTERNAL AUDIO CONNECTOR (EXTAUD)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	CLK	2	BEEP
3	SDATIN	4	VCC3V
5	SDAOUT	6	AUD
7	SYNC	8	MUTE
9	PRSTX	10	VCC5V

2-20 RS-232 OR RS-422/485 SELECTOR (JP1)

1-2 ON: RS-232 for COM B.

2-3 ON: RS-422/485 for COM B.

2-21 RS-422/485 PIN 5 VOLTAGE SELECTOR (JP2)

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

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

2-22 LCD INVERTER POWER CONNECTOR (JP3)

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

2-23 M-System ADDRESS SELECT (JP4)

ADDRESS SELECTION	JUMPER SETTING			
	PIN1&2	PIN3&4	PIN5&6	PIN7&8
C000	ON	OFF	OFF	OFF
C800	OFF	ON	OFF	OFF
D000	OFF	OFF	ON	OFF
D800	OFF	OFF	OFF	ON

2-24 WDT OUTPUT ADDRESS SELECT (JP5)

WatchDog Timer Output for System Reset or IRQ11 Selection.

When Jumper is set to position 1-2 ON, then the output signal of WDT TIMER will generate a interrupt signal to IRQ11. Once the system accept the interrupt request, will release a ISR address (CS:E000 IP:0000) for user.

User can write interrupt service routine to develop application software.

1-2 ON: IRQ11.

2-3 ON: SYSTEM RESET.

2-25 CMOS CLEAR JUMPER (JP7)

1-2 ON: NORMAL.

2-3 ON: CMOS CLEAR.

2-26 HARD DISK ACTIVE LED (JP8)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC	2	SIGNAL

2-27 WDT TIME BASE SELECTOR (JP9)

OFF: WDT Time base1 (1 – 30 sec. with 2 sec. segment)

ON: WDT Time base2 (1 – 15 sec. with 1 sec. segment)

2-28 BUZZER (BZ1)

PIN	ASSIGNMENT	PIN	ASSIGNMENT
1	VCC	2	SIGNAL

2-29 144-PIN SO-DIMM MEMORY SOCKET (DIMM1)

The CM-589 CPU Card use 144-pin SO-DIMM Module.

2-30 MANUFACTURER DEFAULT JUMPER LIST

Factory default jumper list as below:

JP6: 2-3 ON

CHAPTER

3

LCD/VGA

THIS CHAPTER SHOWS THE INFORMATION ABOUT LCD/VGA FUNCTIONS.

SECTIONS INCLUDE:

- * PREFACE**
- * UTILITY REFERENCE**
- * QUICK INSTALLATION GUIDE**

3-1 PREFACE

CRT Display Modes:

Resolution	Colors	Refresh Rate (Hz)	DOTCLK Rate(Hz)	PCLK	Graphic Port Width (Bits)
640x480	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
800X600	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
				50.0	16
		75	49.5	99	8
				49.5	16
1024X768	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
		70	75.0	75.0	16
		75	78.5	78.5	16
1280X1024	8 BPP 256 colors	60	108.0	108.0	8
				54.0	16
		75	135.0	67.5	16

TFT Panel Display Modes:

Resolution	Simultaneous Colors	Refresh Rate(MHz)	DOTCLK Rate(MHz)	PCLK (MHz)	Panel Type
640x480	8 BPP 256 colors	60	25.175	25.175	9-bit
					12-bit
					18-bit
	16 BPP 64K colors RGB	60	25.175	25.175	9-bit
					12-bit
					18-bit
800x600	8 BPP 256 colors	60	40.0	40.0	9-bit
					12-bit
					18-bit
	16 BPP 64 K Colors	60	40.0	40.0	9-bit
					12-bit
					18-bit
1024x768	8 BPP 256 colors	60	65	32.5	9-bit/18-I/F
	16 BPP 64K colors	60	65	32.5	9-bit/18-I/F

3-2 UTILITY REFERENCE

The CM-589 support on-chip VGA interface which use shared memory technology to share system memory as VGA display buffer.

The CM-589 delivered with following VGA driver:

- Driver for WIN98
- Driver for WIN95
- Driver for WIN31
- Driver for NT4.0
- Driver for NT3.51

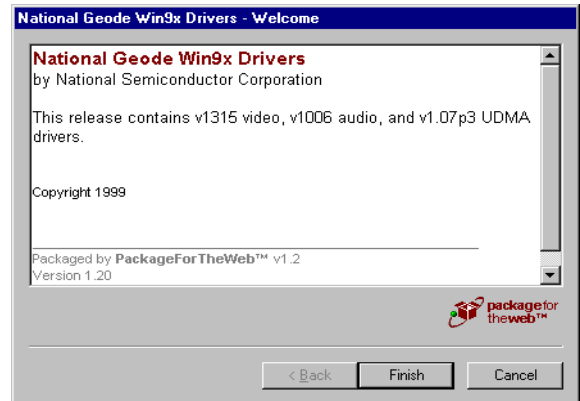
The driver will put on the diskette or CD. User should install the driver according the OS. Following shows the example about how to install the driver.

3-3 QUICK INSTALLATION GUIDE

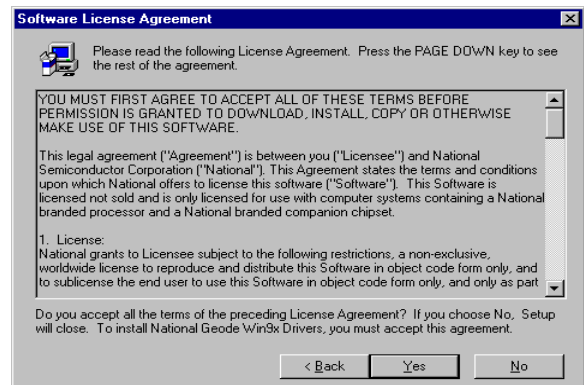
VGA DRIVER FOR WIN95 & 98

A. Install CD Select
D:\GXMNC\WIN9X“National
Geode Win9x Drivers 1.2.exe”

B. Click
“National Geode Win9x Drivers
1.2.exe”



A. Click “Yes”.



A. Click “Next>”.

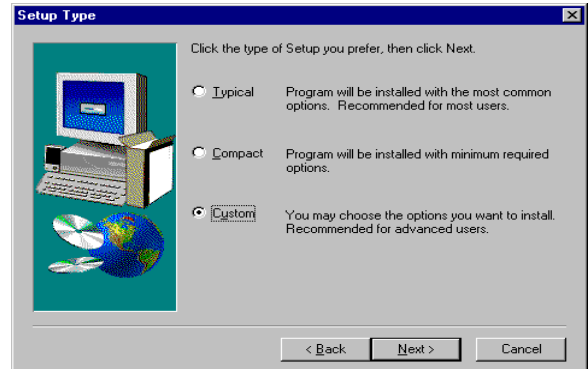


A. Select “Next >”.



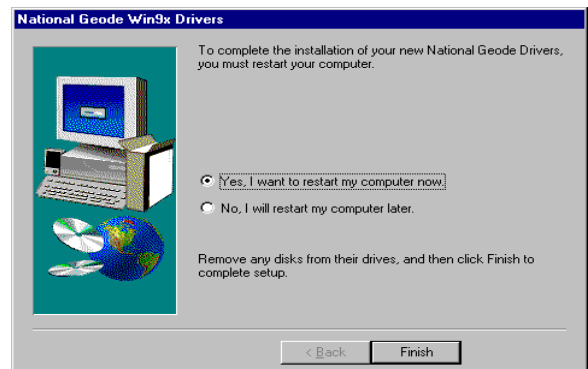
A. Select “Typical” or “Custom” but the Default is “Typical”.

B. Click “Next >”.



A. Select “ Yes, I want to restart my computer now”.

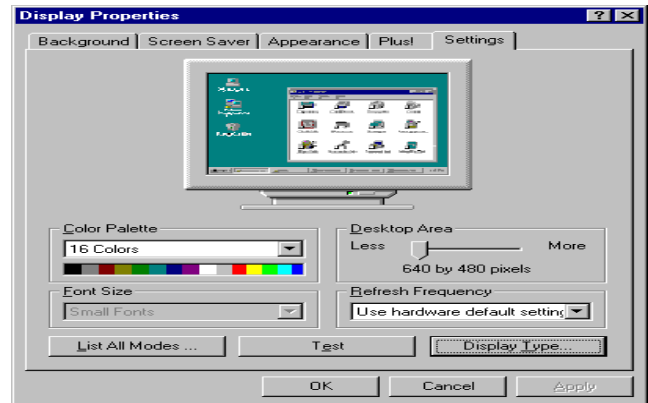
B. Click “Finish”.



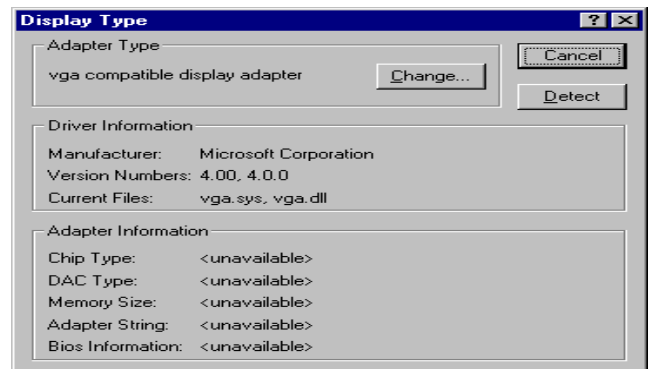
☆ VGA DRIVER FOR NT40

A. Select “Start” → ”Seting” → ”Control Panel” → ”Display” → ”Display Properties”.

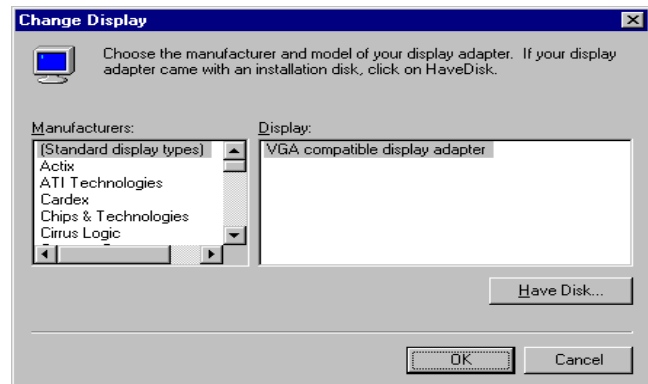
B. Click “Display Type”.



A. Click “Change”.

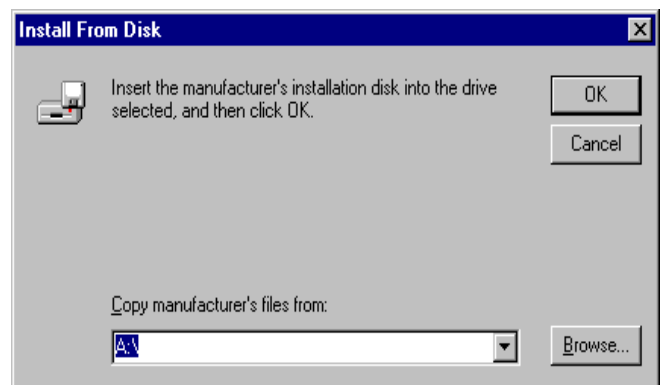


A. Click “Have Disk”.



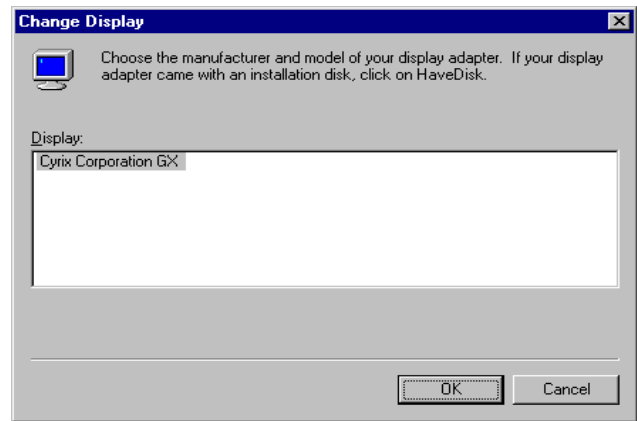
A. Insert CD-ROM Select
D:\vga\gxm\cyrix\nt40\vga

B. Click “OK”.



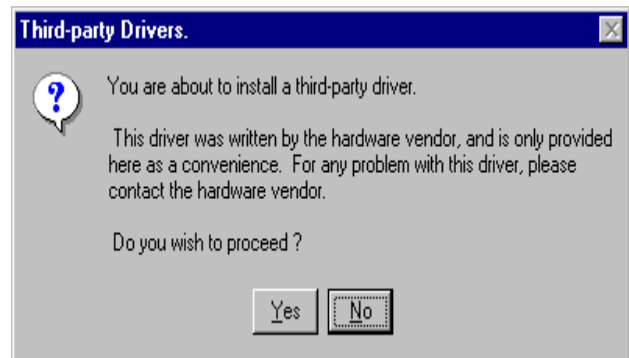
A. You can see “Cyrix Corporation GX “

B. Click “OK”.



A. Can see “Third-party Drivers”.

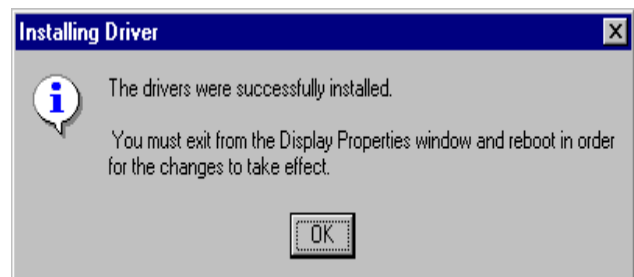
B. Click “Yes”.



A. Can see “Installing Driver”.

B. Click “OK”.

C. Restart computer.



CHAPTER

4

WDT SOFTWARE GUIDE

THIS CHAPTER SHOWS THE INFORMATION OF WDT FUNCTION, ALSO DESCRIBES HOW TO INSTALL THE WATCHDOG CONFIGURATION.

SECTIONS INCLUDE:

- * WATCHDOG TIMER FUNCTION**
- * WATCHDOG TIMER SOFTWARE GUIDE**

4-1 WATCHDOG TIMER FUNCTION

The watchdog timer can reset the system or generate a IRQ11 signal automatically. It is defined at I/O port 0443H. When you want to enable the watchdog timer, please write code to I/O port 0443H, then the system will generate a reset or IRQ11 signal. When you want to disable the function, write I/O port 043H (1043H ~ D043H), the system will stop the WDT function.

The CM-589 watchdog functions: write I/O port address 0443 to enable watchdog and write I/O port address 043 (1043, 2043, 3043,...D043) to disable watchdog. The following program shows you how to program the watchdog timer in your program.

WatchDog Enable program:

For Example

```
MOV    AX, 000FH    (choose the values you need; start from 0 to FF )
MOV    DX, 0443H
OUT    DX, AX
```

Watchdog Disable program:

```
MOV    AX, 000FH    (please ignore this value.)
MOV    DX, 043H
OUT    DX, AX
```

Please find the time you need and the corresponding value from the following Watchdog Timer Control Table:

VA Mean is Value for counter : Unit Hexdecimal
 Time Mean is WDT Signal response time : Unit Decimal (second)

Level	Value	Time/sec		Level	Value	Time/sec	
		Base 1	Base 2			Base 1	Base 2
1	F	0	0	9	7	16	8
2	E	2	1	10	6	18	9
3	D	4	2	11	5	20	10
4	C	6	3	12	4	22	11
5	B	8	4	13	3	24	12
6	A	10	5	14	2	26	13
7	9	12	6	15	1	28	14
8	8	14	7	16	0	30	15

4-2 WATCHDOG TIMER SOFTWARE GUIDE

User can use WDT function by following way:

1. Direct start WDT function as procedure which described on Sec. 4-1.
2. Or, user can change WDT timing by choosing the items on WATCH DOG TIMER in AWARD BIOS CHIPSET FEATURES SETUP.

If user control WDT by changing BIOS SETUP, application software must note: one byte setup value was put on CMOS location 44H so application software designer must read (access) the data on the CMOS location 44H and put the data to a register then, at the time when you need, send the register data to I/O port 0443H to start the WDT function.

FOR EXAMPLE:

```
MOV AL, 44
OUT 70, AL
IN  AL, 71
MOV DX, 0443
OUT DX, AL
RET
```

The above simple software was written under DOS DEBUG. It shows you how to get the SETUP VALUE from CMOS location 44H.

If you want to read the data correctly, you must put the data 44 value on register AL first.

Then you must put the register value (44) on port 70H (this mean you need to addressing the port 70H)

Third you can read one byte data from port 71H (this data is changeable by BIOS FEATURE SETUP)

Whenever you need, you can send the data to IO port 0443H to trigger the WDT timer and for your application.

CHAPTER

5

DiskOnChip FLASH DISK

THIS CHAPTER SHOWS THE INFORMATION ABOUT M-System DiskOnChip FUNCTIONS.

SECTIONS INCLUDE:

- * PREFACE
- * QUICK INSTALLATION GUIDE
- * UTILITY REFERENCE

5-1 PREFACE

The CM-589 features a DiskOnChip Flash Disk optional function. The DiskOnChip can be build on board by order. The CM-589 is designed to use the DiskOnChip single chip Flash Disk to plug into a standard 32-pin EEPROM socket which built on board. The DiskOnChip Flash Disk should be mapped into an 8K Byte window in the BIOS expansion address space of the CM-589 CPU Card which is usually located between address 0C0000H to 0EFFFFH. The CM-589 can contain the operating system in DiskOnChip to allow systems to boot without a hard disk.

The DiskOnChip of CM-589 can install standard MS-DOS and the DOS can boot from DiskOnChip, its command is fully DOS Command compatible, such as Del, Deltree, Format, Copy, Xcopy, MD....., users can read and write DOS Command or data to DiskOnChip same as when using Hard Disk Drive.

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

The capacity of DiskOnChip have 2MB, 4MB, 8MB, 12MB, 24MB, 40MB, 72MB, 144MB and 288MB option. User can select the proper one before order to meet their needs.

The CM-589 supports M-system DiskOnChip socket which locate at 'DOC'.

5-2 QUICK INSTALLATION GUIDE

1. Make sure the CM-589 CPU Card is power OFF
2. Plug the DiskOnChip chip into socket 'DOC'. Verify the direction 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 automatically loaded into system's memory.
5. At this stage the DiskOnChip can be accessed as any disk in the system.
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.

5-3 UTILITY REFERENCE

A driver diskette will be included with DiskOnChip to offer detail information. If you need more information beside the diskette, please reach the M-System web { [HYPERLINK http://www.m-sys.com](http://www.m-sys.com) } to get the information.

CHAPTER

6

A W A R D B I O S S E T U P

THIS CHAPTER SHOWS HOW TO SET UP THE AWARD BIOS.

SECTIONS INCLUDE:

- * MAIN MENU**
- * STANDARD CMOS SETUP**
- * BIOS FEATURES SETUP**
- * CHIPSET FEATURES SETUP**
- * POWER MANAGEMENT SETUP**
- * PNP/PCI CONFIGURATION SETUP**
- * INTEGRATED PERIPHERALS**
- * SUPERVISOR/USER PASSWORD SETTING**
- * BIOS DEFAULT DRIVE TABLE**

6-1 MAIN MENU

Once you enter the Award BIOS CMOS Setup Utility, the Main Menu will appear on the screen. The Main Menu allows you to select from several setup functions and two exit choices. Use the arrow keys to select among the items and press <Enter> to accept and enter the sub-menu.

ROM PCI / ISA BIOS (XXXXXXXX)
CMOS SETUP UTILITY
AWARD SOFTWARE, INC.

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

Note that a brief description of each highlighted selection appears at the bottom of the screen.

Setup Items:

The main menu includes the following main setup categories. Please note that some systems may not include all entries.

- **STANSARD CMOS SETUP**

This setup includes all the items in a standard AT-compatible BIOS.

- **BIOS FEATURES SETUP**

This setup includes all the items of Award special enhanced features.

- **CHIPSET FEATURES SETUP**

This setup includes all the items of chipset special features.

- **POWER MANAGEMENT SETUP**

This setup only appears if your system supports Power Management, “Green PC”, standard.

- **PNP / PCI CONFIGYRATION**

This setup appears if your system supports PnP / PCI.

- **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.

- **LOAD SETUP DEFAULTS**

The chipset defaults are settings which provided for maximum system performance. While Award has designed the custom BIOS to maximize performance, the manufacturer has the right to change these defaults to meet their needs.

- **INTEGRATED PERIPHERALS**

This section includes all the items of IDE hard disk drive and Programmed Input / Output features. See also Section “Chipset Features Setup”.

- **SUPERVISOR / USER PASSWORD SETTING**

Change, set, or disable password. It allows you to limit access to the system and Setup, or just to Setup.

- **IDE HDD AUTO DETECTION**

Automatically detect and configure hard disk parameters. The Award BIOS includes this ability in the event you are uncertain of your hard disk’s parameters. See also Section “Standard CMOS Setup”.

- **SAVE & EXIT SETUP**

Save CMOS value changes to CMOS and exit setup.

- **EXIT WITHOUT SAVE**

Abandon all CMOS value changes and exit setup.

6-2 STANDARD CMOS SETUP

The items in 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 value you want in each item.

**ROM PCI/ISA BIOS (XXXXXXXX)
STANDARD CMOS SETUP
AWARD SOFTWARE, INC.**

Date(mm:dd:yy) :		Thu, Mar 23 2000								
Time(hh:mm:ss):		12 : 30 : 30								
HARD DISKs	TYPE	SIZE	CYLS	HEAD	COM	LANDS	SECTOR	MODE		
Primary Master	: Auto	0	0	0	0	0	0	0	Auto	
Primary Slave	: Auto	0	0	0	0	0	0	0	Auto	
Secondary Master	: Auto	0	0	0	0	0	0	0	Auto	
Secondary Slave	: Auto	0	0	0	0	0	0	0	Auto	
Drive A : 1.44 M, 3.5 in.					Base Memory :					640 K
Drive B : None					Extended Memory :					29184 K
Video : EGA/VGA					Other Memory :					384 K
Halt On : All Errors					Total Memory :					30208 K
ESC :Quit		↑ ↓ → ←:Select Item			PU / PD / + / - : Modify					
F1 :Help		(Shift)F2:Change Color								

- **Date**

To assign the system date, the format is “mm:dd:yy”. The input range for the Month is 1-12. Rang for Date is 1-31. Rang for Year is 1994-2079. 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.

● Hard Disks Setting

The BIOS supports Dual-Channel PIO and PCI Bus Master IDE ports. Each port supports one master and one slave hard drive. You can use <PageUp> or <PageDown> key to change hard drive type. Incorrect setting may result in boot up error or system hang. If your hard disk drive is not listed, you can select Type “USER” to define your own drive manually. We recommend that you select Type “Auto” for all drives. The BIOS will auto-detect the hard disk drive and CD-ROM drive at the POST stage. If your hard disk drive is a SCSI device, please select “None” for your hard drive setting.

● 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	Whenever the BIOS detects a non-fatal error the system Would be stopped and you will be prompted.
All errors	The system boot will not be stopped whenever any error Detected.
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.

6-3 BIOS FEATURES SETUP

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

ROM PCI/ ISA BIOS (XXXXXXXX)
 BIOS FEATURES SETUP
 AWARD SOFTWARE, INC.

Virus Warning	: Disabled	Video BIOS Shadow	: Enabled
CPU Internal Cache	: Enabled	C8000-CBFFF	Shadow : Disabled
Quick Power On Self Test	: Disabled	CC000-CFFFF	Shadow : Disabled
Boot Sequence	: A,C,SCSI	D0000-D3FFF	Shadow : Disabled
Swap Floppy Drive	: Disabled	D4000-D7FFF	Shadow : Disabled
Boot Up Floppy Seek	: Disabled	D8000-DBFFF	Shadow : Disabled
Boot Up NumLock Status	: On	DC000-DFFFF	Shadow : Disabled
Boot Up System Speed	: High		
Gate A20 Option	: Fast		
Memory Parity Check	: Enabled		
Typematic Rate Setting	: Disabled		
Typematic Rate (Chars/Sec)	: 6		
Typematic Delay (Msec)	: 250		
Security Option	: Setup		
PCI/VGA Palette Snoop	: Disabled		
OS Select For DRAM>64MB	: Non-OS2		
Report No FDD For WIN 95	: NO		
		ESC:Quit	↑ ↓ → ←:Select Item
		F1 : Help	Pu/Pd/+/-:Modify
		F5 : Old Values	(Shift)F2 :Color
		F6	: Load BIOS Defaults
		F7	: Load Setup Defaults

● Virus Warning

When enabled, the BIOS will monitor the boot sector and the partition table on the hard drive for any attempt to modify. If an attempt is detected, the BIOS will halt the system and prompt the warning message. Select "Disabled" if you are installing a new operating system.

● CPU Internal Cache

These two categories speed up memory access. However, it depends on CPU/ chipset design. The default value is enable.

- **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.

- **Boot Sequence**

This option allows user to assign boot sequence of the system. Available options are A, C, D, E, F, CD-ROM, SCSI and LS120/ZIP.

- **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.

- **Boot Up System Speed**

Selects the default system speed--the normal operating speed at power on.

- **Gate A20 Option**

This item allows you 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 keyboards still provide this support, it is more common and much faster for the system chipset to provide gate A20 support.

- **Memory Parity Check**

This item allows you to select memory's parity check function. The factory default is Disable (recommended value).

- **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, you 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 you hold down a key.

- **Typematic Delay (Msec)**

When the typematic rate is enabled, this selection allows you 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.

- **PCI / VGA Palette Snoop**

Enabled this option to correct screen color shifts, when there is a combination of VGA cards, accelerator cards, or MPEG cards present.

- **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.

6-5 POWER MANAGEMENT SETUP

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

Power Management	: User Define	IRQ1 (KeyBoard)	: ON
		IRQ3 (COM 2)	: OFF
		IRQ4 (COM 1)	: OFF
** PM Timers **		IRQ5 (LPT 2)	: OFF
Doze Mode	: Disabled	IRQ6 (Floppy Disk)	: OFF
Standby Mode	: Disabled	IRQ7 (LPT 1)	: OFF
HDD Power Down	: Disabled	IRQ9 (IRQ2 Redir)	: OFF
MODEM Use IRQ	: NA	IRQ10 (Reserved)	: OFF
		IRQ11 (Reserved)	: OFF
Throttle Duty Cycle	: 33.3 %	IRQ12 (PS/2 Mouse)	: ON
		IRQ13 (Coprocessor)	: OFF
		IRQ14 (Hard Disk)	: OFF
		IRQ15 (Reserved)	: OFF
		:	
		:	
		ESC:Quit ↑ ↓ → ←:Select Item	
		F1: Help Pu/Pd/+/-:Modify	
		F5 : Old Values (Shift)F2 : Color	
		F6 : Load BIOS Defaults	
		F7 : Load Setup Defaults	

● Power Management

This 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 conditions (Non-GREEN), and the Power Management function is disabled.
Max. saving	This mode will maximize the power saving capability.
Min. saving	This mode will minimize the power saving capability.
User define	Allow user to define time-out parameters to control power saving. Refer item shown below.

● PM Timers

The following four modes are Green PC power saving functions which are only user configurable when User Defined Power Management has been selected. See above for available selections.

1. Doze Mode

When system is inactive after the predefined time limit, system performance will drop down. This is the first level of Power Management.

2. Standby Mode

System turns off the video signal and the fixed drives. This is the second level of Power Management.

3. HDD Power Down

This instructs hard drives to shut off while in the Power Management modes.

4. MODEM Use IRQ

This item tells the Power Management BIOS which IRQ is assigned to the installed MODEM. Option are NA, 3, 4,5,7, 9,10, and 11.

● Power Down & Resume Events

Power Down and Resume events are I/O events whose occurrence can prevent the system from entering a power saving mode or can awaken the system from such a mode. In fact, the system remains alert for anything occurs to a device which is configured as ON, even when the system is in a Power Down mode. The following is a list of IRQ's, Interrupt Requests, which can be exempted as much as the above COM ports and LPT ports can. When an I/O device wants to gain the attention of the operating system, it activate this by causing an IRQ to occur. When the operating system respond to the request, it interrupts itself and performs the service. The choices are ON and OFF (Default). When set to ON, activity will neither prevent the system from going into a power management mode nor awaken it.

- | | | |
|----------------------|-----------------------|---------------------|
| * IRQ3 (COM2) | * IRQ4 (COM1) | * IRQ5 (LPT 2) |
| * IRQ6 (Floppy Disk) | * IRQ7 (LPT 1) | * IRQ8 (RTC Alarm) |
| * IRQ9 (IRQ2 Redir) | * IRQ10 (Reserve) | * IRQ11 (Reserved) |
| * IRQ12 (PS/2 Mouse) | * IRQ13 (Coprocessor) | * IRQ14 (Hard Disk) |
| * IRQ15 (Reserved) | | |

6-6 PNP/PCI CONFIGURATION SETUP

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

ROM PCI/ISA BIOS (XXXXXXXX)
PNP/PCI CONFIGURATION
AWARD SOFTWARE, INC.

PNP OS Installed : NO
Resources Controlled By : Auto
Reset Configuration Data : Disabled

PCI IRQ Actived By : Level

ESC:Quit ↑ ↓ → ←:Select Item
F1: Help Pu/Pd/+/-:Modify
F5 : Old Values (Shift)F2:Color
F6 : Load BIOS Defaults
F7 : Load Setup Defaults

- **PNP OS Installed**

This Field allows you to use a Plug-and-Play (PnP) operating system. Please set it as “ No” if the operating system has no PnP function or to avoid reassigning the IRQs by the operating system.

- **Resources Controlled By**

Default setting is “ Auto”. This setting allows the BIOS to self detect setting and Plug-and-Play devices during start up. The user can select and configure IRQs under “Manual” mode.

- **Reset Configuration Data**

In case a conflict occurs after you assign the IRQs or after you configure you system, you can enable this function to allow your system to automatically reset your configuration and reassign the IRQs, DMAs, and I/O address.

- **IRQ-XX assigned to**

If your ISA card is not PnP compatible and requires a special IRQ to support its function, set the select IRQ-x assigned to : “Legacy ISA”. This setting informs the PnP BIOS to reserve the selected IRQ for the installed legacy ISA card.

- **DMA-X assigned to**

If your ISA card is not PnP compatible and requires a special DMA channel to support its function, set the select DMA channel to : “Legacy ISA”. This setting informs the PnP BIOS to reserve the selected DMA channel for the installed legacy ISA card.

6-7 INTEGRATED PERIPHERALS

ROM PCI/ISA BIOS (XXXXXXXX)
 CMOS SETUP UTILITY
 AWARD SOFTWARE, INC.

IDE HDD Block Mode	: Disabled	Parallel Port Mode	: Normal
Primary IDE Channel	: Enabled	ECP Mode Use DMA	: 3
Master Drive PIO Mode	: Auto	Build in CPU Audio	: Disabled
Slave Driver PIO Mode	: Auto		
Secondary IDE Channel	: Enabled		
Master Drive PIO Mode	: Auto		
Slave Driver PIO Mode	: Auto		
IDE Primary Master UDMA	: Auto		
IDE Primary Slave UDMA	: Auto		
IDE Secondary Master UDM	: Auto	Multiple Monitor Support	: Onboard
IDE Secondary Slave UDMA	: Auto		
KBC input clock	: 8 MHz	Video Memory Size	: 2.5 M
Onboard FDC Controller	: Enabled	Flat Panel Status	: Disabled
Onboard Serial Port 1	: 3F8/IRQ4	Flat Panel Resolution	: 640x480
Onboard Serial Port 2	: 2F8/IRQ3	ESC:Quit	↑ ↓ → ←:Select Item
UR2 Mode	: Standard	F1: Help	Pu/Pd/+/- : Modify
Onboard Parallel Port	: 378/IRQ7	F5: Old Values (Shift)	F2 : Color
		F6: Load BIOS Defaults	
		F7: Load Setup Defaults	

NOTE: If you don't use the on-board IDE connector, then use on-card (ISA Card) IDE connector. You will set Onboard Primary IDE: Disabled an Onboard Secondary IDE: Disabled from CHIPSET FEATURES SETUP UTILITY.

- **IDE HDD Block Mode**

This feature enhances disk performance by allowing multi-sector data transfers and eliminates the interrupt handling time for each sector.

- **IDE Primary Master & Secondary Master/Slave PIO:**

These four PIO fields let you set a PIO mode (0-4) for each of four IDE devices. When under “Auto” mode, the system automatically set the best mode for each device.

- **IDE Primary Master & Secondary Master/Slave UDMA:**

When set to “Auto” mode, the system will detect if the hard drive supports Ultra DMA mode.

- **Onboard FDC Controller:**

Select “Enabled” to activate the on-board FDC
Select “Disabled” to activate an add-on FDC

- **Onboard Serial Port 1 & 2**

Select an address and corresponding interrupt for the first/second serial port. The default value for the first serial port is “3F8/IRQ4” and the second serial port is “2F8/IRQ3”.

- **UR2 Mode:** Select to activate the Infrared transfer function.

- **Onboard Parallel port:** Select address and interrupt for the Parallel port.

- **Parallel Port 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 .

- **Video Memory Size:** This item is setting Video Memory Size.

- **Flat Panel Status:** This item is setting Flat Panel Enabled or Disabled.

- **Flat Panel Resolution:** This item is setting Flat Panel Show is 640x480 or 800x600 or 1024x768 LCD Panel.

6-8 SUPERVISOR/USER PASSWORD SETTING

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

When you select this function, the following message will appear at the center of the screen to assist you 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. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the selection and not enter a password.

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

PASSWORD DISABLED.

When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

Additionally, when a password is enabled, you can also require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of your computer.

You 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.

6-9 BIOS DEFAULT DRIVE TABLE

This is the current list of the drive type table contained in Setup.

Type	Size (MB)	Cylinders	Heads	Sectors	Write Precomp	Land Zone	Example Model
1	10	306	4	17	128	305	TEAC SD510, MMI 112, 5412
2	21	615	4	17	300	615	Seagate ST225, ST4026
3	32	615	6	17	300	615	
4	65	940	8	17	512	940	
5	49	940	6	17	512	940	
6	21	615	4	17	65535	615	Seagate ST125, Tandon TM262
7	32	462	8	17	256	511	
8	31	733	5	17	65535	733	Tandon TM 703
9	117	900	15	17	65535	901	
10	21	820	3	17	65535	820	
11	37	855	5	17	65535	855	
12	52	855	7	17	65535	855	
13	21	306	8	17	128	319	Disctron 526, MMI M125
14	44	733	7	17	65535	733	
15		Reserved					
16	21	612	4	17	0	663	Microscience HH725, Syquest 3250,3425
17	42	977	5	17	300	977	
18	59	977	7	17	65535	977	
19	62	1024	7	17	512	1023	
20	31	733	5	17	300	732	
21	44	733	7	17	300	732	
22	31	733	5	17	300	733	Seagate ST4038
23	10	306	4	17	0	336	
24	42	977	5	17	65535	976	Seagate ST4051
25	80	1024	9	17	65535	1023	Seagate ST4096
26	74	1224	7	17	65535	1223	Maxtor 2085
27	117	1224	11	17	65535	1223	Maxtor 2140, Priam S14
28	159	1224	15	17	65535	1223	Maxtor 2190, Priam S19
29	71	1024	8	17	65535	1023	Maxtor 1085, Micropolis 1325

30	98	1024	11	17	65535	1023	Maxtor 1105, 1120, 4780
31	87	918	11	17	65535	1023	Maxtor 1170
32	72	925	9	17	65535	926	CDC 9415
33	89	1024	10	17	65535	1023	
34	106	1024	12	17	65535	1023	
35	115	1024	13	17	65535	1023	
36	124	1024	14	17	65535	1023	
37	17	1024	2	17	65535	1023	
38	142	1024	16	17	65535	1023	
39	119	918	15	17	65535	1023	Maxtor 1140, 4380
40	42	820	6	17	65535	820	Seagate ST251
41	44	1024	5	17	65535	1023	Seagate 4053 Miniscribe3053/6053
42	68	1024	5	26	65535	1023	Miniscribe 3053/ 6053 RLL
43	42	809	6	17	65535	852	Miniscribe 3650
44	64	809	6	26	65535	852	Miniscribe 3675 RLL
45	104	776	8	33	65535	775	Conner CP3104
User							

APPENDIX

A

TECHNICAL SUMMARY

THIS SECTION SHOWS YOU THE MAPS CONCISELY.

SECTIONS INCLUDE:

- * INTERRUPT MAP**
- * RTC & CMOS RAM MAP**
- * TIMER & DMA CHANNELS MAP**
- * I/O & MEMORY MAP**

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 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	Reserve
12	Hard Disk type byte
13	Reserve
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	Reserve
40-7F	Reserved for Chipset Setting Data

A-3 TIMER & DMA CHANNELS MAP

● Timer Channel Map

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

● DMA Channel Map

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

A-4 I/O & MEMORY MAP

● Memory Map

MEMORY MAP	ASSIGNMENT
0000000-009FFFF	System memory used by DOS and application
00A0000-00BFFFF	Display buffer memory for VGA/EGA/CGA/MONO Adapter
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-BFFFFFF	System extension memory

● I/O Map

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	Net work 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

TROUBLE SHOOTING

THIS SECTION SHOWS THE ERRORS MAY OCCUR WHEN YOU OPERATE THE SYSTEM, ALSO GIVES YOU THE SUGGESTIONS ON SOLVING THE PROBLEMS.

SECTIONS INCLUDE:

- * TROUBLE SHOOTING POST MESSAGE**
- * TROUBLE SHOOTING POST BEEP**
- * TROUBLE SHOOTING FOR POST CODES**

B-1 TROUBLE SHOOTING POST MESSAGES

During the Power On Self Test (POST), if the BIOS detects an error requiring you to do something to fix, 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 TROUBLE SHOOTING POST BEEP

Currently there are two kind of beep codes in BIOS.

The 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 your DRAM error has occurred. This beep code consists of a single long beep repeatedly.

● 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 you assumed the system would 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. You 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**

PLEASE 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 you 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 you are purposely configure 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. You can use this location along with the memory map for your system to find and replace the bad memory chips.

- **MEMORY PARITY ERROR AT ...**

Indicates a memory parity error at a specific location. You can use this location along with the memory map for your 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 your 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 you 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 you to disable the NMI and continue to boot, or you 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 TROUBLE SHOOTING 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.
6	Reserved	
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 8259-1 Mask Bits	Verify 8259 Channel 1 masked interrupts by alternately turning off and on the interrupt lines.
16	Test 8259-2 Mask Bits	Verify 8259 Channel 2 masked interrupts by alternately turning off and on the interrupt lines.
17	Test Stuck 8259's Interrupt Bits	Turn off interrupts then verify no interrupt mask register is on.
18	Test 8259 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.

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	Reserved	
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 reboot.
E1-EF	Setup Pages	E1 - Page 1, E2 – Page 2, etc.
FF	Boot	