



INDUSTRIAL COMPUTER SOURCE®

Product Manual

MANUAL NO. 8705388

Revision B

SB586TE/166

SB586TE/150

SB586TE/133

SB586TE/120

SB586TE/100

SB586TE/90



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FOREWORD

This instruction manual provides the necessary user information for the referenced product(s) manufactured or distributed by Industrial Computer Source for the user to install, operate and/or program the product properly. Please refer to the preceding pages for information regarding the warranty and repair policies.

Technical assistance is available at (800) 480-0044.

Manual Errors, Omissions and Bugs: A Bug Sheet is included as the last page of this manual. Please use it if you find a problem with the manual you believe should be corrected.

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INTRODUCTION

The SB586TE full-featured EISA processors are single board computers which feature Pentium™ CPU, DRAM, cache, floppy controller, EIDE interface, two serial ports, parallel port, speaker port and keyboard port on a single EISA card. These single-slot, high performance processors plug into PCXI-compliant EISA Bus passive backplanes and provide 100% EISA PC compatibility for the system expansion slots.

MODEL NUMBERS

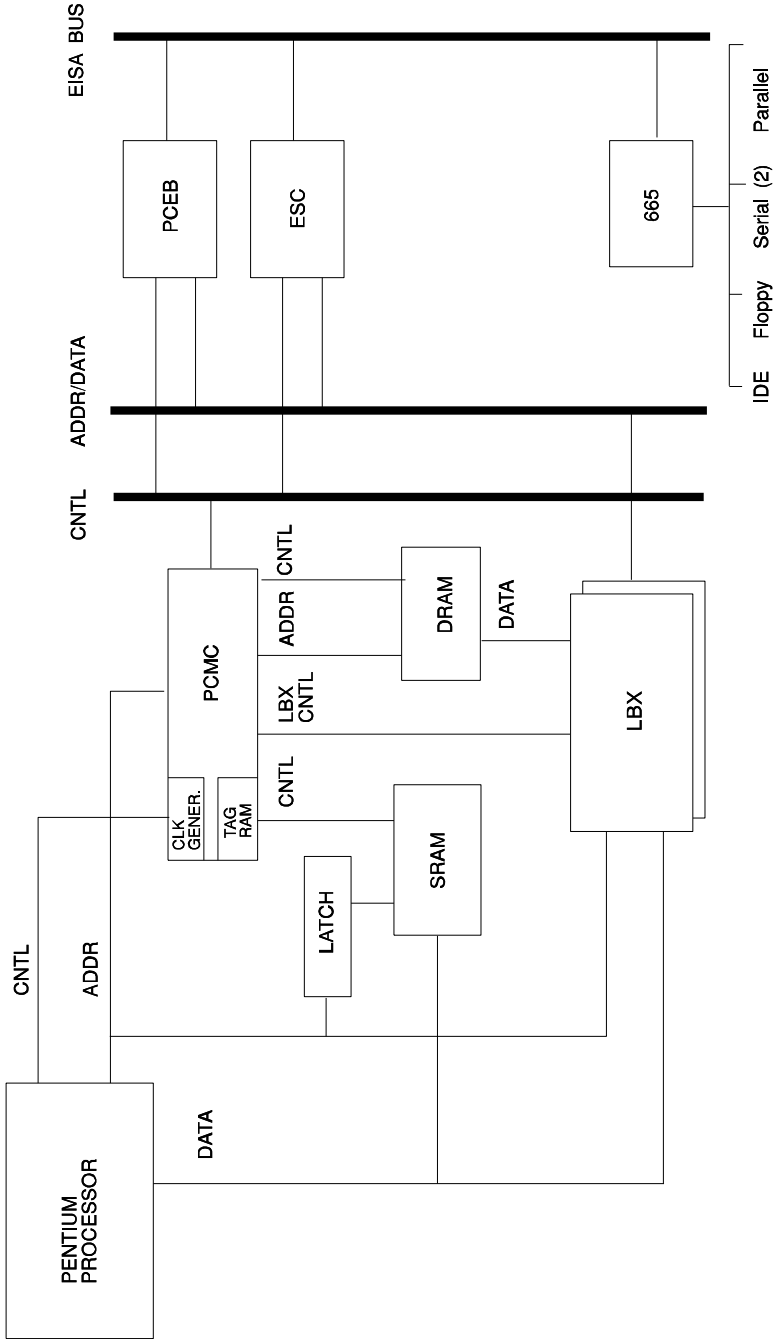
SB586TE/166	Pentium CPU at 166MHz
SB586TE/150	Pentium CPU at 150MHz
SB586TE/133	Pentium CPU at 133MHz
SB586TE/120	Pentium CPU at 120MHz
SB586TE/100	Pentium CPU at 100MHz
SB586TE/90	Pentium CPU at 90MHz

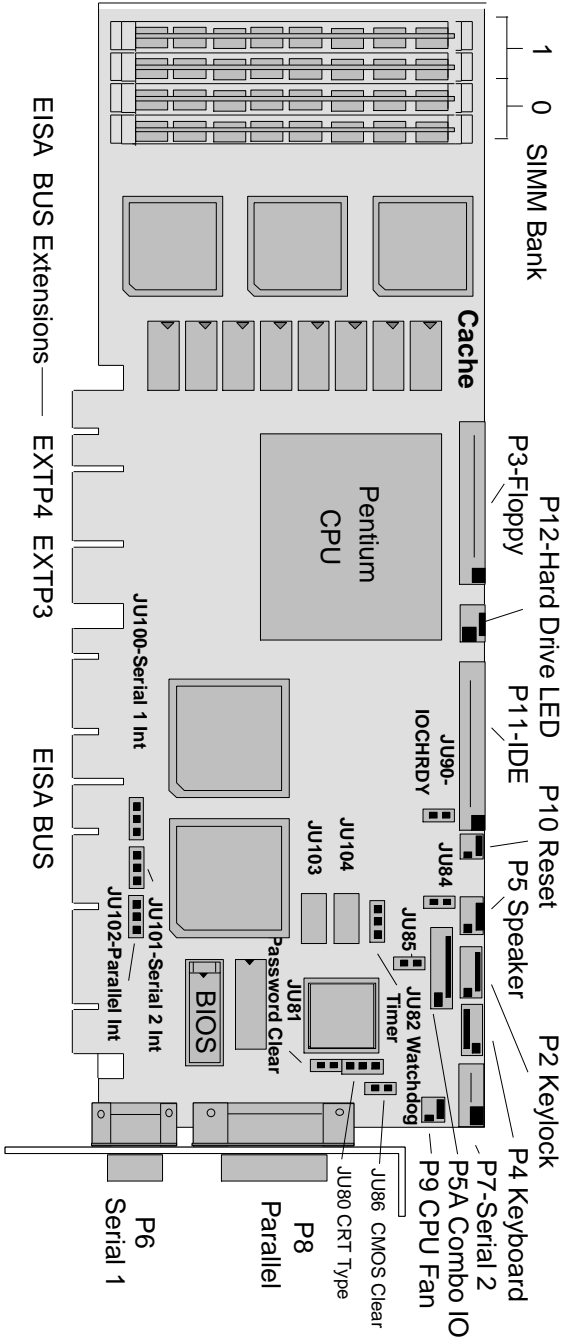
FEATURES

- Pentium microprocessor at 166MHz, 150MHz, 133MHz, 120MHz, 100MHz or 90MHz
- 256KB write-back cache memory, 64 bits wide with burst read and write
- Conforms to industry standard PCXI EISA Passive Backplane Specification
- Supports up to 256MB of DRAM on-board
- Two serial ports and one parallel port
- Floppy drive and EIDE drive interface
- Supports Host and EISA burst modes to/from host memory
- Supports up to 8 bus master peripheral controllers

FEATURES (continued)

- Addressing for the maximum 15 EISA slots
- Automatic or manual peripheral configuration
- Watchdog timer
- On-board 3.3V regulator
- Supports 256K x 36, 512K x 36, 1M x 36, 2M x 36, 4M x 36, 8M x 36 and 16M x 36 SIMM's
- Shadow RAM for System BIOS and peripherals increases system speed and performance
- Full EISA PC compatibility
- Intel Neptune chip set





PROCESSOR

- Pentium at 166MHz, 150MHz, 133MHz, 120MHz, 100MHz or 90MHz operation

CPU CLOCK

- 166MHz, 150MHz, 133MHz, 120MHz, 100MHz or 90MHz

BUS SPEED

- 8.33MHz for 166MHz, 133MHz or 100MHz
- 7.5MHz for 150MHz, 120MHz or 90MHz

ON-BOARD FEATURES

- Speaker port
- Keyboard port
- Keylock port
- Floppy disk controller supports two floppy drives. Drives can be 3-1/2" or 5-1/4" or one of each.
- Two serial ports
- Parallel printer port - bidirectional
- EIDE interface supports two integrated drive electronics hard drives. Supports drives larger than 528MB.
- On-board 3.3V regulator

RAM MEMORY - 2 MB to 256 MB**Processor Board RAM Memory:**

- The RAM memory array consists of two banks of 36-bit SIMM sockets. Bank 0 consists of sockets 1 and 2 (U52 & U53); bank 1 consists of sockets 3 and 4 (U62 & U63).

Processor Board RAM Memory (continued):

- Supported SIMM's are:
 - 256K x 36
 - 512K x 36
 - 1M x 36
 - 2M x 36
 - 4M x 36
 - 8M x 36
 - 16M x 36

NOTE: Two SIMM's of the same memory capacity must be used to fill a memory bank. All SIMM's must have gold contacts.

- RAM Speed
 - ≤ 70 nanoseconds fast page mode

ROM MEMORY

- BIOS ROM memory on the processor board is 1 27C010 (128K x 8)

PERFORMANCE

- Norton SI Version 6.0
 - 166MHz - 523.0
 - 150MHz - 476.0
 - 133MHz - 419.0
 - 120MHz - 380.0
 - 100MHz - 316.0
 - 90MHz - 288.0

POWER REQUIREMENTS**Voltage:**

+5V @ 3.7 Amps typical

+12V @ < 100 mAmps typical

- 12V @ < 100 mAmps typical

ENVIRONMENT

Operating Temperature: 0° C to 60° C.

Storage Temperature: - 40° C to 70° C.

Humidity Maximum: 90% non-condensing

CONFIGURATION JUMPERS

The setup of the configuration jumpers on the processor is described below. * indicates the default value of each jumper.

NOTE: For two-position jumpers (3-post), "RIGHT" is toward the bracket end of the board; "LEFT" is toward the memory sockets.

<u>Jumper</u>	<u>Description</u>
JU80	CRT Type Select Install on the TOP for a color CRT. * Install on the BOTTOM for a monochrome CRT.
JU81	Password Clear Install for one power-up cycle to reset the password to the default (null password). Remove for normal operation. *
JU82	Watchdog Timer Install on the LEFT for normal reset operation. * Install on the RIGHT to enable watchdog timer operation.
JU84	P5A Speaker Connect Install to connect speaker data signal to pin 8 of the Combo IO connector (P5A). * Remove to disconnect.
JU85	P5A Reset Connect Install to connect reset data signal to pin 1 of the Combo IO connector (P5A). * Remove to disconnect.

CONFIGURATION JUMPERS (continued)

<u>Jumper</u>	<u>Description</u>
JU86	CMOS Clear Install to clear. Remove to operate. *
<hr/> NOTE: The CMOS Clear jumper works on power-up. To clear the CMOS, install the jumper, then power on the system. CMOS is cleared during the POST routines. Remove the jumper before the next power-up. <hr/>	
JU90	IDE IOCHRDY Install to connect the IOCHRDY signal to the IDE drive connector. * Remove to disconnect the IOCHRDY signal from the IDE drive connector.
JU100	On-Board Serial Port 1 Interrupt Select Install on the LEFT for IRQ3. Install on the RIGHT for IRQ4. *
JU101	On-Board Serial Port 2 Interrupt Select Install on the LEFT for IRQ3. * Install on the RIGHT for IRQ4.
JU102	On-Board Parallel Port 1 Interrupt Select Install on the LEFT for IRQ5. Install on the RIGHT for IRQ7. *

CONFIGURATION JUMPERS (continued)

<u>Jumper</u>	<u>Description</u>		
JU103	Parallel Port DACK	<u>Pins</u>	
		DACK #7	1-2
		DACK #6	3-4
		DACK #5	5-6
		DACK #3	7-8
JU104	Parallel Port DREQ	<u>Pins</u>	
		DREQ #7	1-2
		DREQ #6	3-4
		DREQ #5	5-6
		DREQ #3	7-8

SYSTEM BIOS

The System BIOS is an AMI WinBIOS with ROM-resident setup utilities. The main WinBIOS Setup screen displays four windows which contain selectable Setup options. These windows are:

- Setup
- Utility
- Security
- Default

CONFIGURATION UTILITY

The EISA configuration utility, configuration utility manual, and configuration file are supplied with the processor board. AMIECU

is the configuration utility. The configuration file is !INT0091.CFG, which may be found on the AMIECU disk.

WATCHDOG TIMER

The watchdog timer is a hardware timer which resets the processor board if the timer is not refreshed by software periodically. The timer is typically used to restart an application which becomes hung on an external event. When the application is hung, it can no longer refresh the timer. The watchdog timer then times out and resets the processor board.

The watchdog timer has two levels of enable. First, the watchdog timer jumper must be moved to the "enabled" position, which puts the watchdog timer under software control. Second, user-supplied software must start the watchdog timer via Keyboard Controller (8042) Port 2, bit 3 (P23). P23 is set high from reset. Setting P23 low starts the watchdog timer timeout of 1.2 seconds (nominal). Before the end of the timeout, P23 must be toggled high then low to restart the timeout. If P23 is left low until the end of the timeout, the watchdog timer issues a hardware reset to the processor board. The timer should be refreshed by the software every 1.0 seconds to prevent a timeout.

A set of watchdog timer software is available from Technical Support. The software includes sample C code which can be embedded in a user program and demo software to demonstrate and test the watchdog timer.

CONNECTORS

NOTE: Pin 1 on the connectors is indicated by the square pad on the PCB.

P2 - Keylock Connector

5 pin single row header, Amp #640456-5

<u>PIN</u>	<u>SIGNAL</u>
1	LED Power
2	Key
3	Gnd
4	Keylock Data
5	Gnd

P3 - Floppy Drive Connector

34 pin dual row header, Molex #10-89-1341

<u>PIN</u>	<u>SIGNAL</u>	<u>PIN</u>	<u>SIGNAL</u>
1	Gnd	2	N-RPM
3	Gnd	4	NC
5	Gnd	6	NC
7	Gnd	8	P-Index
9	Gnd	10	N-Motoron 1
11	Gnd	12	N-Drive Sel2
13	Gnd	14	N-Drive Sel1
15	Gnd	16	N-Motoron 2
17	Gnd	18	N-Dir
19	Gnd	20	N-Stop Step
21	Gnd	22	N-Write Data
23	Gnd	24	N-Write Gate
25	Gnd	26	P-Track 0
27	Gnd	28	P-Write Protect
29	Gnd	30	N-Read Data
31	Gnd	32	N-Side Select
33	Gnd	34	Disk Chng

P4 - Keyboard Connector

5 pin single row header, Amp #640456-5

<u>PIN</u>	<u>SIGNAL</u>
1	Kbd Clock
2	Kbd Data
3	Key
4	Kbd Gnd
5	Kbd Power (+5V fused)

P5 - Speaker Port Connector

4 pin single row header, Amp #640456-4

<u>PIN</u>	<u>SIGNAL</u>
1	Speaker Data
2	Key
3	Gnd
4	+5V

P5A - Combo IO Connector

8 pin single row header, Amp #640456-8

<u>PIN</u>	<u>SIGNAL</u>
1	Reset
2	Gnd
3	NC
4	Kbd Clock
5	Kbd Data
6	Kbd Lock Data
7	Kbd Power (+5V fused)
8	Speaker Data

P6 - Serial Port 1 Connector

9 pin D, Amp #747840-3

<u>PIN</u>	<u>SIGNAL</u>	<u>PIN</u>	<u>SIGNAL</u>
1	Carrier Detect	6	Data Set Ready-I
2	Receive Data-I	7	Request to Send-O
3	Transmit Data-O	8	Clear to Send-I
4	Data Terminal Ready-O	9	Ring Indicator-I
5	Signal Gnd		

P7 - Serial Port 2 Connector

10 pin dual row header, Molex #10-89-1101

<u>PIN</u>	<u>SIGNAL</u>	<u>PIN</u>	<u>SIGNAL</u>
1	Carrier Detect	2	Data Set Ready-I
3	Receive Data-I	4	Request to Send-O
5	Transmit Data-O	6	Clear to Send-I
7	Data Terminal Ready-O	8	Ring Indicator-I
9	Signal Gnd	10	NC

P8 - Parallel Port Connector

25 pin D, Amp #747846-3

<u>PIN</u>	<u>SIGNAL</u>	<u>PIN</u>	<u>SIGNAL</u>
1	Strobe	14	Auto Feed XT
2	Data Bit 0	15	Error
3	Data Bit 1	16	Init
4	Data Bit 2	17	Slect In
5	Data Bit 3	18	Gnd
6	Data Bit 4	19	Gnd
7	Data Bit 5	20	Gnd
8	Data Bit 6	21	Gnd
9	Data Bit 7	22	Gnd
10	ACK	23	Gnd
11	Busy	24	Gnd
12	Paper End	25	Gnd
13	Slect		

P9 - CPU Fan

2 pin header, Amp #640456-2

<u>PIN</u>	<u>SIGNAL</u>
1	+12V
2	Gnd

P10 - External Reset Connector

2 pin header, Amp #640456-2

<u>PIN</u>	<u>SIGNAL</u>
1	Negative External Reset
2	Gnd

P11 - IDE Hard Drive Connector

40 pin dual row header, Molex #10-89-1401

<u>PIN</u>	<u>SIGNAL</u>	<u>PIN</u>	<u>SIGNAL</u>
1	Reset	2	Gnd
3	Data 7	4	Data 8
5	Data 6	6	Data 9
7	Data 5	8	Data 10
9	Data 4	10	Data 11
11	Data 3	12	Data 12
13	Data 2	14	Data 13
15	Data 1	16	Data 14
17	Data 0	18	Data 15
19	Gnd	20	NC
21	NC	22	Gnd
23	IOW	24	Gnd
25	IOR	26	Gnd
27	IOCHRDY (see JU90)	28	ALE
29	NC	30	Gnd
31	IRQ 14	32	IOCS16
33	Add 1	34	NC
35	Add 0	36	Add 2
37	CS 0	38	CS 1
39	Light	40	Gnd

P12 - Hard Drive LED Connector

4 pin single row header, Amp #640456-4

<u>PIN</u>	<u>SIGNAL</u>
1	+5V Pullup
2	Light
3	Light
4	+5V Pullup

EXTENDED INDUSTRY STANDARD ARCHITECTURE

EISA OVERVIEW

The Extended Industry Standard Architecture (EISA) is a superset of the ISA 8-bit and 16-bit architecture. It extends the capabilities of that standard while maintaining compatibility with ISA expansion boards.

EISA introduces the major advances described below.

Compatibility with ISA

EISA systems maintain full compatibility with the existing industry standard. EISA connectors are a superset of the 16-bit connectors on ISA system boards. ISA 8-bit and 16-bit expansion boards can be installed in EISA slots. All EISA performance and function enhancements are superset features that maintain full compatibility with ISA expansion boards and software.

Memory Capacity

EISA systems support a 32-bit address path. ISA memory cards can be used in the lower 16 megabytes without modification. EISA memory cards can add as much memory as needed for the application. The total memory supported is limited only by the packaging constraints of the individual product, not by the system architecture.

Synchronous Data Transfer Protocol

The EISA bus achieves its speed and flexibility through the use of a synchronous transfer protocol. Bus masters and multiple processors can synchronize their bus cycles to a common clock to achieve maximum performance. The synchronous transfer protocol also provides the cycle control necessary to execute Burst cycles with up to 33MB per second data transfers.

On the EISA synchronous bus, control signals, address lines and data bus use a bus clock generated by the system board as the reference for a transfer. Unlike many systems, however, the bus clock is not a fixed frequency. Since the system board is the source of most bus cycles, the system board adjusts the bus clock frequency and phase to achieve the maximum performance of the CPU and memory.

EISA provides a variety of cycle types to cover the range of speed and the complexity requirements for different applications. The standard transfer cycle requires two clock cycles, but CPU's are permitted to generate a 1.5 clock compressed cycle for slaves that request it. At the high end of the performance spectrum are Burst cycles which require one clock per transfer.

Enhanced DMA Functions

EISA systems provide a number of DMA enhancements, including 32-bit addressability, 8-bit, 16-bit and 32-bit data transfers and higher performance arbitration and data transfer cycles. EISA DMA provides ISA compatible modes, with ISA timing and function as the default.

DMA offers a lower cost alternative to an intelligent bus master. The EISA DMA functions are intended for I/O peripherals that do not require local intelligence on the peripheral interface.

32-bit Address Support for DMA Transfers

EISA 32-bit address support enables ISA, as well as EISA, DMA devices to transfer data to any 32-bit memory address. The default DMA supports ISA compatible 24-bit address with no software or hardware modifications. DMA software can be modified to support the 32-bit memory space without modifications to the DMA hardware.

8-bit, 16-bit or 32-bit Data Transfers from DMA Devices

Any DMA channel can be programmed for 8-bit, 16-bit or 32-bit data transfers. An 8-bit DMA device uses the low 8 bits of the data bus, a 16-bit device uses the low 16 bits, and a 32-bit device uses the full 32-bit data bus.

A 32-bit DMA device can perform up to 33MB per second data transfers using Burst cycles.

Performance Gains for DMA Devices

EISA DMA devices can be programmed for high-performance data transfers using one of four DMA cycle types. The default cycle type, compatible cycles, delivers a higher data transfer rate than ISA compatible computers. The improvement is the result of EISA's faster bus arbitration and requires no hardware or software modifications to ISA compatible DMA devices. Type "A" and Type "B" cycles are EISA modes that, with special programming, allow some ISA compatible DMA devices to achieve even higher performance. The Burst DMA (Type "C") cycle type is the highest performance DMA cycle and is only available to DMA devices designed specifically for Burst.

Bus Master Capabilities

EISA based computers support a bus master architecture for intelligent peripherals. The bus master architecture provides a high-speed data channel with data transfer rates up to 33MB per second using EISA Burst cycles. The bus master provides local intelligence by including a dedicated I/O processor and local memory. It can relieve the burden on the main CPU by performing sophisticated memory access functions, such as non-ordered scatter-gather data transfers. Examples of applications that might benefit from a bus master implementation include communication gateways, disk controllers, LAN interfaces, data acquisition systems, and certain classes of graphics controllers.

Data Size Translation

The EISA bus system provides a mechanism for EISA expansion boards to communicate with ISA compatible devices. The EISA bus master or slave generates EISA data and control signals, letting the system board copy the data to the appropriate byte lines and translate the control signals as necessary.

The system board provides the automatic translation for 16-bit ISA bus masters, 8-bit or 16-bit memory and I/O slaves, and DMA devices. The system board also provides automatic translation for transactions between 16-bit and 32-bit EISA devices.

Bus Arbitration

EISA systems also provide a centralized arbitration scheme that allows efficient bus sharing among multiple EISA bus masters and DMA devices. The centralized arbitration supports preemption of an active bus master or DMA device and can reset a device that does not release the bus after preemption.

The EISA arbitration method grants the bus to DMA devices, DRAM refresh, bus masters and CPU functions on a fair, rotational basis. The rotational scheme provides a short latency for DMA devices to assure compatibility with ISA DMA devices. Bus masters and the CPU, which typically have buffering available, have longer but deterministic latencies.

Edge/Level Triggered Interrupts

EISA systems provide level-triggered, shareable interrupts. Any EISA interrupt can be individually configured for level- or edge-triggered operation. Edge-triggered operation provides full compatibility with existing interrupt-driven ISA devices. Level-triggered operation facilitates the sharing of a single system interrupt by a number of devices. For example, level-triggered interrupts might be used to share a single interrupt between a number of serial ports.

Automatic System Configuration

EISA provides the capabilities for automatic configuration of system and expansion boards. EISA expansion board manufacturers include configuration files with expansion board products. The configuration files can be included with either new, fully programmable EISA boards or switch-configured ISA products. The configuration files are used at system configuration time to assign system resources (such as DMA channels, interrupt levels) and thus prevent conflicts between the installed expansion boards. For switch-configurable boards, the configuration files can be used to outline the proper assignment of resources and instruct the user about the proper selection of switch settings.

To accomplish the automatic system and expansion board configuration, EISA provides a method for accessing I/O port ranges that are slot specific. This means that a board using these ranges can be plugged into any slot in the system without the risk of I/O range conflicts. These I/O ranges can be used for expansion board initialization or for normal I/O port assignments that are guaranteed not to conflict with any other expansion board installed in the system.

EISA also includes a product identification mechanism for systems and expansion board products. The product identifier allows products to be identified during the configuration and initialization sequences for the system and expansion boards. EISA includes guidelines for selection of a product identifier. The identifier of each product is selected by the product manufacturer and does not need the approval of any other party in the industry.

EISA BUS PIN NUMBERING AND ASSIGNMENTS

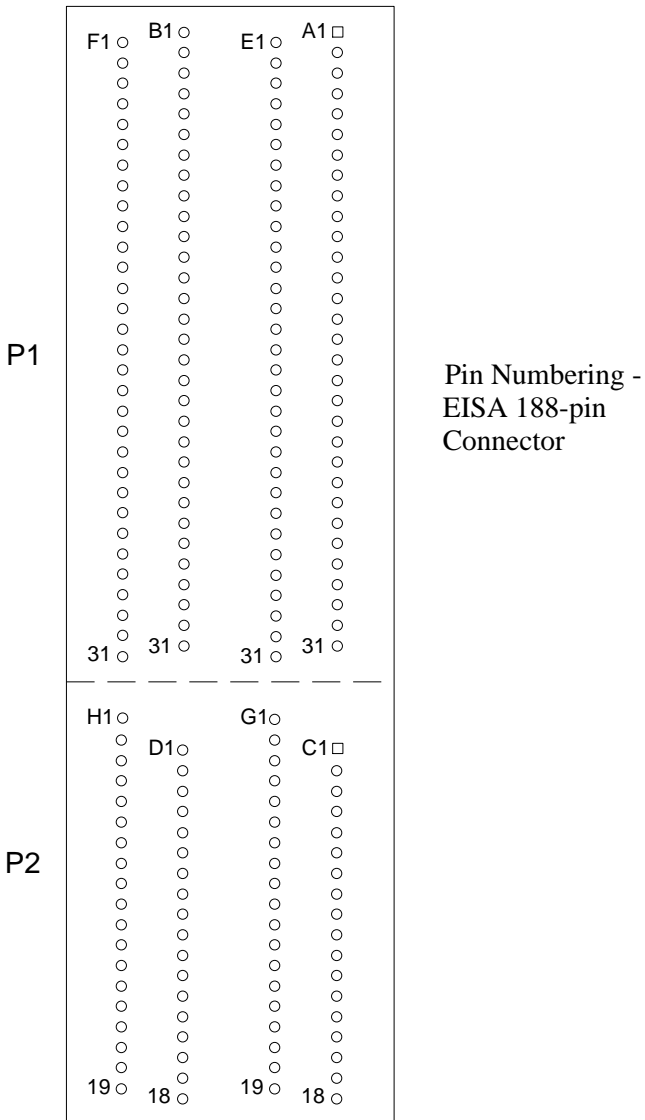
The EISA (P1/P2) 188-pin connector is a single unit and in appearance resembles the existing ISA connector. The difference between the ISA connector and the EISA connector is a second level of contacts in the EISA connector. The ISA contacts are the upper row (A, B, C and D); the EISA contacts are the lower row (E, F, G and H). The EISA (P1/P2) connector pinout is the standard pinout as specified in the EISA Specification.

ISA expansion boards can only be inserted into the EISA connector far enough to make contact with the upper row of contacts (ISA contacts). Stops, or "access keys," are molded into the EISA connector to prevent an ISA card edge from making contact with the EISA contacts. An EISA expansion board's card edge connector goes deeper into the connector and makes contact with the second row of contacts (EISA contacts). EISA expansion boards are notched to allow the card edge to be pushed further into the connector and use the additional contacts.

The PCXI Extension (P3/P4) 86-pin connector is an extension of the standard EISA connector. This connector contains the same characteristics as the standard EISA connector. P3 is reserved for future development and P4 is used to provide a passive backplane system with the needed slot-specific and miscellaneous signals.

The pin numbering and assignments for the EISA 188-pin connector are shown on the following pages. A # symbol at the end of a signal name indicates that the active state occurs when the signal is at a low voltage. When the # symbol is absent, the signal is active at a high voltage.

EISA BUS PIN NUMBERING



EISA BUS PIN ASSIGNMENTS

I/O Pin	Signal Name	I/O Pin	Signal Name	I/O Pin	Signal Name	I/O Pin	Signal Name
F1	Gnd	B1	Gnd	E1	CMD#	A1	IOCHK#
F2	+5V	B2	RESDRV	E2	START#	A2	D7
F3	+5V	B3	+5V	E3	EXRDY	A3	D6
F4	xxxxxx	B4	IRQ9	E4	EX32#	A4	D5
F5	xxxxxx	B5	-5V	E5	Gnd	A5	D4
F6	Access Key	B6	DRQ2	E6	Access Key	A6	D3
F7	xxxxxx	B7	-12V	E7	EX16#	A7	D2
F8	xxxxxx	B8	NOWS#	E8	SLBURST#	A8	D1
F9	+12V	B9	+12V	E9	MSBURST#	A9	D0
F10	M-I/O	B10	Gnd	E10	W-R	A10	CHRDY
F11	LOCK#	B11	SMWTC#	E11	Gnd	A11	AENx
F12	Reserved	B12	SMRDC#	E12	Reserved	A12	SA19
F13	Gnd	B13	IOWC#	E13	Reserved	A13	SA18
F14	Reserved	B14	IORC#	E14	Reserved	A14	SA17
F15	BE3#	B15	DAK3#	E15	Gnd	A15	SA16
F16	Access Key	B16	DRQ3	E16	Access Key	A16	SA15
F17	BE2#	B17	DAK1#	E17	BE1#	A17	SA14
F18	BE0#	B18	DRQ1	E18	LA31#	A18	SA13
F19	Gnd	B19	REFRESH#	E19	Gnd	A19	SA12
F20	+5V	B20	BCLK	E20	LA30#	A20	SA11
F21	LA29#	B21	IRQ7	E21	LA28#	A21	SA10
F22	Gnd	B22	IRQ6	E22	LA27#	A22	SA9
F23	LA26#	B23	IRQ5	E23	LA25#	A23	SA8
F24	LA24#	B24	IRQ4	E24	Gnd	A24	SA7
F25	Access Key	B25	IRQ3	E25	Access Key	A25	SA6
F26	LA16	B26	DAK2#	E26	LA15	A26	SA5
F27	LA14	B27	T-C	E27	LA13	A27	SA4
F28	+5V	B28	BALE	E28	LA12	A28	SA3
F29	+5V	B29	+5V	E29	LA11	A29	SA2
F30	Gnd	B30	OSC	E30	Gnd	A30	SA1
F31	LA10	B31	Gnd	E31	LA9	A31	SA0

EISA BUS PIN ASSIGNMENTS (continued)

I/O Pin	Signal Name	I/O Pin	Signal Name	I/O Pin	Signal Name	I/O Pin	Signal Name
H1	LA8	D1	M16#	G1	LA7	C1	SBHE#
H2	LA6	D2	IO16#	G2	Gnd	C2	LA23
H3	LA5	D3	IRQ10	G3	LA4	C3	LA22
H4	+5V	D4	IRQ11	G4	LA3	C4	LA21
H5	LA2	D5	IRQ12	G5	Gnd	C5	LA20
H6	Access Key	D6	IRQ15	G6	Access Key	C6	LA19
H7	D16	D7	IRQ14	G7	D17	C7	LA18
H8	D18	D8	DAK0#	G8	D19	C8	LA17
H9	Gnd	D9	DRQ0	G9	D20	C9	MRDC#
H10	D21	D10	DAK5#	G10	D22	C10	MWTC#
H11	D23	D11	DRQ5	G11	Gnd	C11	D8
H12	D24	D12	DAK6#	G12	D25	C12	D9
H13	Gnd	D13	DRQ6	G13	D26	C13	D10
H14	D27	D14	DAK7#	G14	D28	C14	D11
H15	Access Key	D15	DRQ7	G15	Access Key	C15	D12
H16	D29	D16	+5V	G16	Gnd	C16	D13
H17	+5V	D17	Master16#	G17	D30	C17	D14
H18	+5V	D18	Gnd	G18	D31	C18	D15
H19	MAKx#			G19	MREQx#		

EISA SIGNAL SUMMARY

The following table summarizes the EISA Bus signals added for EISA support.

Bus Pins	Signal Name	Description
16	D[31::16]	Data Lines
8	LA[31::24]#	Address Lines
15	LA[16::2]	Address Lines
4	BE[3::0]#	Byte Enables
1	LOCK#	Bus Lock
1	EX32#	32-bit EISA Slave Indicator
1	EX16#	16-bit EISA Slave Indicator
1	START#	EISA Start of Cycle Control
1	CMD#	EISA End of Cycle Control
1	M-IO	EISA Memory or I/O Indicator
1	W-R	EISA Write or Read Indicator
1	EXRDY	EISA Ready Indicator
1	MREQx#	Slot Specific Bus Request
1	MAKx#	Slot Specific Bus Grant
1	SLBURST#	Burst Cycle Indicator from Slave
1	MSBURST#	Burst Cycle Control from Master

EISA BUS SIGNAL DESCRIPTIONS

The following are descriptions of the signals from each connector of the EISA Bus. They are separated into four categories:

- Address and Data Bus Signal Group
- Data Transfer Control Signal Group
- Bus Arbitration Signal Group
- Utility Signal Group

ADDRESS AND DATA BUS SIGNAL GROUP

The signals described in this section are used for memory and I/O addressing and for the transfer of data. These signals are a combination of new EISA signals and existing ISA signals.

AENx (ISA)

When negated (low), this slot-specific signal indicates that an I/O slave may respond to addresses and I/O commands on the bus. The "x" refers to the slot number. AENx is also used to disable I/O accesses to all other option slots during accesses to a particular slot's slot-specific I/O address range.

BE#[3::0] (EISA)

BE#[3::0] are the byte enable signals that identify the specific bytes addressed in a dword. BE#[3::0] are pipelined from one cycle to the next and must be latched by the addressed slave if required for the whole cycle.

D[7::0] (ISA)

D[7::0] are the low 8 bits of the data bus. 8-bit devices use these lines to transfer data. A 16-bit device uses these lines to transfer the low half of a word when the address line SA0 is low or when BE2# or BE0# is asserted. 32-bit devices use D[7::0] to transfer the first (lowest) byte of a dword when the address line BE0# is asserted.

D[15::8] (ISA)

D[15::8] are the high 8 bits of the 16-bit data bus. 16-bit devices use these lines to transfer the high half of a word when SBHE#, BE3# or BE1# is asserted. 32-bit devices use D[15::8] to transfer the second (third highest) byte of a dword when the address line BE1# is asserted.

D[23::16] (EISA)

D[23::16] are the second highest-order 8 bits of the 32-bit EISA data bus. A 32-bit device uses D[23::16] to transfer the third (second highest) byte of a dword when the address line BE2# is asserted.

D[31::24] (EISA)

D[31::24] are the highest-order 8 bits of the 32-bit EISA data bus. A 32-bit device uses D[31::24] to transfer the fourth (highest) byte of a dword when the address line BE3# is asserted.

LA[16::2] (EISA)

The LA[16::2] are a part of the latching address bus. The latching address lines (LA[31::2]) are pipelined from one cycle to the next and must be latched by the addressed slave if required for the whole cycle.

LA[23::17] (ISA)

LA[23::17] are a part of the 32-bit latching address bus. They have the same characteristics as LA[16::2], except that they are wired to the 16-bit portion of the ISA connector. An ISA slave can latch LA[23::17] with the trailing edge of BALE.

LA#[31::24] (EISA)

LA#[31::24] are the highest-order 8 bits of the 32-bit latching address line. They have the same characteristics as LA[16::2], except that they use inverted logic.

SA[19::0] (ISA)

The SA[19::0] lines address memory or I/O devices within the system. They form the low-order 20 bits of the 32-bit address.

SBHE# (ISA)

SBHE# (System Bus High Enable) indicates, when low, that expansion boards that support 16-bit data transfers should drive data on the high half of the D[15::0] data bus.

DATA TRANSFER CONTROL SIGNAL GROUP

The signals described in this section are used to control data transfer cycles on the 8-bit, 16-bit and 32-bit bus. These signals are a combination of new EISA signals and existing ISA signals.

BALE (ISA)

BALE, when high, indicates that a valid address is present on the LA[31::2] address lines.

BCLK (ISA)

BCLK is provided to synchronize events with the main system clock. BCLK operates at a frequency between 8.333MHz and 4MHz, with a normal duty cycle of 50 per cent. BCLK is driven only by the system board. The BCLK period is sometimes extended for synchronization to the main CPU or other system board devices.

CHRDY (ISA)

An ISA memory or I/O slave can negate CHRDY to lengthen a bus cycle from the default time.

CMD# (EISA)

CMD# provides timing control within the cycle. The system board asserts CMD# on the rising edge of BCLK, simultaneously with negation of START#. A bus master does not drive CMD#.

EX16# (EISA)

An EISA memory or I/O slave asserts EX16# to indicate that it supports 16-bit (word) transfers.

EX32# (EISA)

A memory or I/O slave asserts EX32# to indicate that it supports 32-bit (dword) transfers.

EXRDY (EISA)

EISA I/O and memory slaves negate EXRDY to request wait state timing (each wait state is one BCLK).

IO16# (ISA)

A 16-bit ISA I/O slave asserts IO16#, after decoding a valid address on SA[15::0], to indicate its 16-bit data size.

IORC# (ISA)

The system board or ISA bus master asserts IORC# to indicate that the addressed ISA I/O slave should drive its data onto the EISA bus.

IOWC# (ISA)

The system board or ISA bus master asserts IOWC# to indicate that the addressed ISA I/O slave may latch data from the EISA bus.

LOCK# (EISA)

The main CPU or a bus master may assert LOCK# to guarantee exclusive memory access during the time LOCK# is asserted. A bus master may also assert LOCK# to guarantee exclusive I/O access during the time LOCK# is asserted.

M16# (ISA)

M16# signals the system that the addressed ISA memory is capable of transferring 16 bits of data at once.

M-IO (EISA)

The main CPU or an EISA bus master asserts M-IO to indicate the type cycle in progress as a memory cycle (high) or I/O cycle (low). M-IO is pipelined from one cycle to the next and is latched by the addressed slave if needed for the whole cycle.

MRDC# (ISA)

The system board or ISA bus master asserts MRDC# to indicate that the addressed ISA memory slave should drive its data onto the memory bus.

MSBURST (EISA)

Bus master asserts MSBURST# to indicate to the burstable slave that the bus master will execute Burst cycles.

MWTC# (ISA)

The system board or ISA bus master asserts MWTC# to indicate that the addressed ISA memory slave may latch data from the memory bus.

NOWS# (ISA)

An ISA memory slave asserts NOWS# (No Wait State) after its address and a command have been decoded to indicate that the remaining clock cycles are not required.

SLBURST# (EISA)

A slave (typically, main memory) indicates its support of Burst cycles by asserting SLBURST#.

SMRDC# (ISA)

The system board asserts SMRDC# to indicate that the addressed memory slave should drive its data onto the memory bus.

SMWTC# (ISA)

The system board asserts SMWTC# to indicate that the addressed memory slave may latch data from the memory bus.

START# (EISA)

The START# signal provides timing control at the start of a cycle. The CPU or bus master asserts START# after LA[31::2] and M-I/O become valid.

W-R (EISA)

The status signal, W-R, identifies the cycle as a write (high) or read (low).

BUS ARBITRATION SIGNAL GROUP

The signals described in this section are used to arbitrate for bus control. These signals are a combination of new EISA signals and existing ISA signals.

DAK[7::5]#, DAK[3::0]# (ISA)

The system board asserts a DMA channel's DAKx# to indicate that the channel has been granted the bus. DAKx# can also be used to acknowledge grant of bus access to a 16-bit ISA bus master.

DRQ[7::5], DRQ[3::0] (ISA)

The DRQ[7::5] and DRQ[3::0] lines are used to request a DMA service from the DMA subsystem or for a 16-bit ISA bus master to request access to the system bus.

MAKx# (EISA)

MAKx# is a slot-specific signal that is asserted by the system board to grant bus access to an EISA bus master. The "x" refers to the slot number.

Master16# (ISA)

A bus master asserts Master16# to indicate 16-bit data size.

MREQx# (EISA)

MREQx# is a slot-specific signal used by EISA bus masters to request bus access. The "x" refers to the slot number.

REFRESH# (ISA)

When low, REFRESH# is used to indicate a refresh cycle in progress.

T-C (ISA)

This signal is bidirectional, acting in one of two modes, depending on the programming of the channel. In the output mode, the system board asserts

T-C to indicate that a DMA channel's word count has reached terminal count. In the input mode, T-C can be used by a DMA slave to stop a DMA transfer.

UTILITY SIGNAL GROUP

This section describes a variety of general utility signals. These signals are all on the ISA connector.

IOCHK# (ISA)

An EISA or ISA expansion board can assert IOCHK# to signal the main CPU that a serious error has occurred. Assertion of IOCHK# causes an NMI if Port 061H bit 3 is a "0" and NMI's are enabled. Parity errors and uncorrectable system errors exemplify problems which might cause an expansion board to assert IOCHK#.

IRQ[15::14], IRQ[12::9], IRQ[7::3] (ISA)

The IRQx lines are used to interrupt the CPU to request some service.

OSC (ISA)

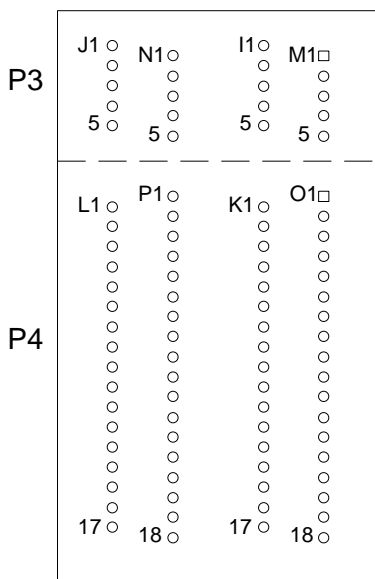
OSC is a clock for use in timing applications. Its frequency is 14.31818MHz with a 50 per cent duty cycle.

RESDRV (ISA)

Assertion of RESDRV causes a hardware reset of ISA and EISA expansion boards. RESDRV is asserted by the reset controller during power up or after a bus timeout. Software can cause assertion of RESDRV by setting I/O port 0461H bit 0 to a "1".

SLOT 0 CONTROLLER SPECIFICATION

On an EISA passive backplane, at least one slot must be defined as a CPU slot or Slot 0 controller slot. This slot allows the EISA slot-specific signals to be routed from the processor board to the backplane expansion slots. There are no specifications for the placement of Slot 0. Slot 0 has the connector for the extensions to the EISA bus, Extension P3 (EXTP3) and Extension P4 (EXTP4).



Pin Numbering -
EISA 86-pin
Extension Connector

SLOT 0 PIN ASSIGNMENTS

I/O Pin	Signal Name	I/O Pin	Signal Name	I/O Pin	Signal Name	I/O Pin	Signal Name
J1	Reserved	N1	Reserved	I1	Reserved	M1	Reserved
J2	Reserved	N2	Reserved	I2	Reserved	M2	Reserved
J3	Reserved	N3	Reserved	I3	Reserved	M3	Reserved
J4	Reserved	N4	Reserved	I4	Reserved	M4	Reserved
J5	Reserved	N5	Reserved	I5	Reserved	M5	Reserved

I/O Pin	Signal Name	I/O Pin	Signal Name	I/O Pin	Signal Name	I/O Pin	Signal Name
L1	Reserved	P1	Reserved	K1	AEN2	O1	AEN1
L2	Reserved	P2	Reserved	K2	AEN4	O2	AEN3
L3	Reserved	P3	Gnd	K3	AEN5	O3	Gnd
L4	Reset	P4	+5V	K4	AEN7	O4	AEN6
L5	Speaker	P5	Kbd Lock	K5	AEN9	O5	AEN8
L6	Mouse Clk	P6	Mouse Data	K6	AEN11	O6	AEN10
L7	Pwr Gd	P7	Access Key	K7	AEN12	O7	Access Key
L8	Kbd Clock	P8	Kbd Data	K8	AEN14	O8	AEN13
L9	Gnd	P9	ISA AEN	K9	Gnd	O9	AEN15
L10	MREQ1	P10	MREQ0	K10	MAK1	O10	MAK0
L11	MREQ3	P11	MREQ2	K11	MAK3	O11	MAK2
L12	MREQ4	P12	Access Key	K12	MAK4	O12	Access Key
L13	MREQ6	P13	MREQ5	K13	MAK6	O13	MAK5
L14	MREQ8	P14	MREQ7	K14	MAK8	O14	MAK7
L15	MREQ10	P15	MREQ9	K15	MAK10	O15	MAK9
L16	MREQ11	P16	Gnd	K16	MAK11	O16	Gnd
L17	MREQ13	P17	MREQ12	K17	MAK13	O17	MAK12
		P18	MREQ14			O18	MAK14

SLOT 0 EXTENSION P4 SIGNALS

The following are lines implemented on Extension P4 (EXTP4) of Slot 0.

ISA AEN	ISA Address enable line (goes low on any ISA operation)
AEN[15::1]	Slot-specific Address Enable (EISA Slot 1..15)
MREQ[14::0]	Bus Master Request - Master[14::0] (EISA Slot 1..15)
MAK[14::0]	Bus Master Acknowledge - Master[14::0] (EISA Slot 1..15)
Pwr Gd	Inhibits CPU boot-up until power is stable
Kbd Clock	Clock line for keyboard
Kbd Data	Data for keyboard
Kbd Lock	Short to ground to inhibit keyboard operation
Mouse Data	PS/2 compatible mouse data
Mouse Clk	PS/2 compatible mouse clock
Speaker	Speaker data - tie speaker between this line and VCC
Reset	Short to ground to reset system
Gnd	6 ground lines to reduce noise/crosstalk
+5 V	One +5 volt line for additional power

AEN_x goes to pin A11 on slot x

MREQ_x goes to pin G19 on slot x+1

MAK_x goes to pin H19 on slot x+1

I/O ADDRESS MAP

Hex Range	Device
000-01F	DMA Controller 1
020-03F	Interrupt Controller 1, Master
040-05F	Timer
060-06F	8042 (Keyboard)
070-07F	Realtime Clock, NMI (non-maskable interrupt) Mask
080-09F	DMA Page Register
0A0-0BF	Interrupt Controller 2
0C0-0DF	DMA Controller 2
0F0	Clear Math Coprocessor Busy
0F1	Reset Math Coprocessor
0F8-0FF	Math Coprocessor
1F0-1F8	Fixed Disk
200-207	Game I/O
278-27F	Parallel Printer Port 2
2F8-2FF	Serial Port 2
300-31F	Prototype Card
360-36F	Reserved
378-37F	Parallel Printer Port 1
380-38F	SDLC, Bisynchronous 2
3A0-3AF	Bisynchronous 1
3B0-3BF	Monochrome Display and Printer Adapter
3C0-3CF	Reserved
3D0-3DF	Color/Graphics Monitor Adapter
3F0-3F7	Diskette Controller
3F8-3FF	Serial Port 1

INTERRUPT ASSIGNMENTS

Interrupt	Description
IRQ0	Timer Output 0
IRQ1	Keyboard (Output Buffer Full)
IRQ2	Interrupt 8 through 15
IRQ3	Serial Port 2
IRQ4	Serial Port 1
IRQ5	Parallel Port 2
IRQ6	Diskette Controller
IRQ7	Parallel Port 1
IRQ8	Realtime Clock Interrupt
IRQ9	Software Redirected to INT 0AH (IRQ2)
IRQ10	Unassigned
IRQ11	Unassigned
IRQ12	Unassigned
IRQ13	Coprocessor
IRQ14	Fixed Disk Controller
IRQ15	Unassigned

BIOS OPERATION

Sections 3 through 7 of this manual describe the operation of the AMI WinBIOS and WinBIOS Setup. Refer to *Running WinBIOS Setup* later in this section for standard Setup screens, options and defaults.

When the system is powered on, WinBIOS performs the Power-On Self Test (POST) routines. These routines are divided into two phases:

- 1) **System Test and Initialization.** Test and initialize system boards for normal operations.
- 2) **System Configuration Verification.** Compare defined configuration with hardware actually installed.

If an error is encountered during the diagnostic tests, the error is reported in one of two different ways. If the error occurs before the display device is initialized, a series of beeps is transmitted. If the error occurs after the display device is initialized, the error message is displayed on the screen. See *BIOS Errors* later in this section for more information on error handling.

The following are the Power-On Self Tests (POST's) which are performed when the system is powered on:

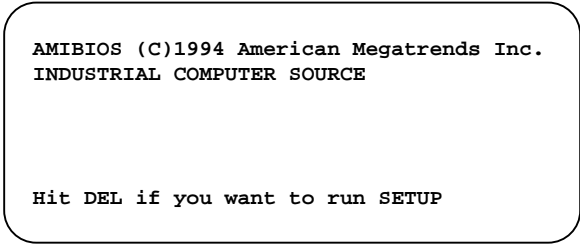
- Processor Register Test
- ROM BIOS Checksum Check
- Keyboard Controller Test
- CMOS Shutdown Register Test
- Channel 2, 1, 0 Timer Test
- Memory Refresh Test
- Base 64KB RAM Test
- CMOS Battery, Options Set, Checksum Check
- Display Type Verification

- Entering Protected Mode
- Address Line Test and Memory Size Finding
- Conventional and Extended Memory Test
- DMA Controller Test
- Keyboard Test
- System Configuration Verification and Setup

NOTE: When you perform a warm boot by pressing <Ctrl><Alt>, all memory tests are bypassed.

WinBIOS checks all system and cache memory and reports them on both the initial WinBIOS screen and the WinBIOS System Configuration screen which appears after POST is completed. WinBIOS attempts to initialize the peripheral devices by verifying the validity of the system setup information stored in the system CMOS RAM. (See the *Running WinBIOS Setup* section of this manual.) If WinBIOS detects a fault, the screen displays the error condition(s) which has/have been detected. If no errors are detected, WinBIOS attempts to load the system from any bootable device, such as a floppy disk or hard disk.

Normally, the only POST routine visible on the screen is the memory test. The following screen displays when the system is powered on:



AMIBIOS (C)1994 American Megatrends Inc.
INDUSTRIAL COMPUTER SOURCE

Hit DEL if you want to run SETUP

Initial Power-On Screen

You have two options:

- Press to access the WinBIOS Setup program.

This option allows you to change various system parameters such as date and time, disk drives, etc. The *Running WinBIOS Setup* section of this manual describes the options available.

You may be requested to enter a password before gaining access to the WinBIOS Setup program. (See *Password Entry* later in this section.)

If you enter the correct password or no password is required, the WinBIOS Setup Main Menu displays. (See *Running WinBIOS Setup* later in this section.)

- Allow the bootup process to continue without invoking the WinBIOS Setup program.

In this case, after WinBIOS loads the system, you may be requested to enter a password. (See *Password Entry* later in this section.)

Once the POST routines complete successfully, a screen displays showing the current configuration of your system, including processor type, base and extended memory amounts, floppy and hard drive types, display type and peripheral ports.

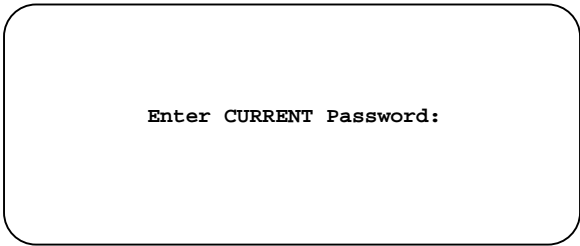
In systems with more than 1MB, WinBIOS reports 384KB less RAM than it finds, because it accounts for the address space between 640K and 1024K which is unavailable to DOS. This space is used for video RAM, video BIOS, system BIOS and adapter ROM's.

Password Entry

The system may be configured so that the user is required to enter a password each time the system boots or whenever an attempt is made to enter WinBIOS Setup. The password function may also be disabled so that the password prompt does not appear under any circumstances.

The Password Checking option in the Advanced Setup program allows you to specify when the password prompt displays: **Always** or only when **Setup** is attempted. The password may be changed using the Password icon in the Security window of the WinBIOS Setup Main Menu. If the password is null, the password prompt does not display at any time. A more detailed description of the password setup function may be found under SECURITY in the *Running WinBIOS Setup* section of this manual.

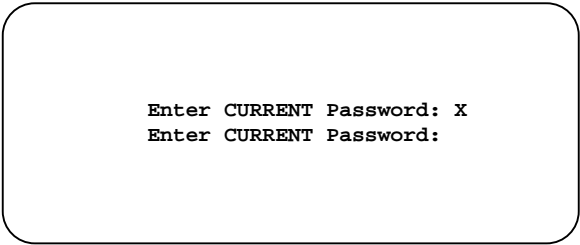
When password checking is enabled, the following password prompt displays:



Type the password and press <Enter>.

NOTE: The null password is the system default and is in effect if a password has not been assigned or if the CMOS is corrupted. In this case, the password prompt does not display. To set up a password, you may use the Password icon in the Security window of the WinBIOS Setup Main Menu. (See the *Running WinBIOS Setup* section of this manual.)

If an incorrect password is entered, the following screen displays:



You may try again to enter the correct password. If you enter the password incorrectly *three* times, the system responds in one of two different ways, depending on the value specified in the Password Checking option on the Advanced Setup screen:

- 1) If the Password Checking option is set to **Setup**, the system does not let you enter Setup, but does continue the booting process. You must reboot the system manually to retry entering the password.
- 2) If the Password Checking option is set to **Always**, the system locks and you must reboot. After rebooting, you will be requested to enter the password.

Once the password has been entered correctly, you are allowed to continue.

BIOS Errors

If an error is encountered during the diagnostic checks performed when the system is powered on, the error is reported in one of two different ways:

- 1) If the error occurs before the display device is initialized, a series of beeps is transmitted.
- 2) If the error occurs after the display device is initialized, the screen displays the error message. In the case of a non-fatal error, a prompt to press the <F1> key may also appear on the screen.

Explanations of the beep codes and BIOS error messages may be found in *Appendix A - BIOS Messages*.

As the POST routines are performed, test codes are presented on Port 80H. These codes may be helpful as a diagnostic tool and are listed in *Appendix A - BIOS Messages*.

If certain non-fatal error conditions occur, you will be requested to run the WinBIOS Setup utility. The error messages are followed by this screen:

```
AMIBIOS (C)1994 American Megatrends Inc.  
INDUSTRIAL COMPUTER SOURCE
```

```
RUN SETUP UTILITY  
Press F1 to RESUME
```

NOTE: Pausing the system after a non-fatal error may be bypassed by disabling the "Wait for "F1" If Any Error" option in the Advanced Setup program. See the *Advanced Setup* section of this manual.

Press <F1>. You may be requested to enter a password before gaining access to the WinBIOS Setup program. (See *Password Entry* earlier in this section.)

If you enter the correct password or no password is required, the WinBIOS Setup Main Menu displays.

RUNNING WINBIOS SETUP

WinBIOS Setup keeps a record of the system parameters, such as date and time, disk drives, and memory options. The Setup parameters reside in the Read Only Memory Basic Input/Output System (ROM BIOS) so that they are available each time the system is turned on. WinBIOS Setup stores the information in the complementary metal oxide semiconductor (CMOS) memory. When the system is turned off, a backup battery retains system parameters in the CMOS memory.

Each time the system is powered on, it is configured with these values, unless the CMOS has been corrupted or is faulty. The WinBIOS Setup program is resident in the ROM BIOS (Read Only Memory Basic Input/Output System) so that it is available each time the computer is turned on. If, for some reason, the CMOS becomes corrupted, the system is configured with the default values stored in this ROM file.

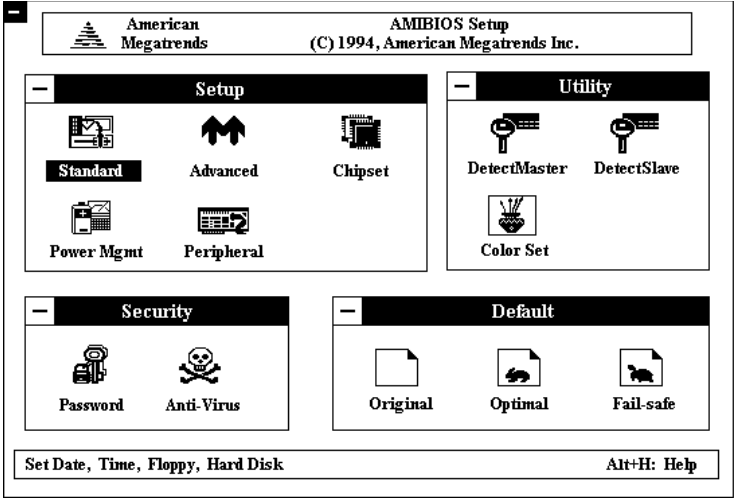
As soon as the system is turned on, the power-on diagnostic routines check memory, attempt to prepare peripheral devices for action, and offer you the option of pressing to run WinBIOS Setup.

If certain non-fatal errors occur during the Power-On Self Test (POST) routines which are run when the system is turned on, you may be prompted to run WinBIOS Setup by pressing <F1>.

When selecting a certain setting for one WinBIOS Setup option determines the available selections for one or more other WinBIOS Setup options, WinBIOS does not permit you to use these settings unless the setting for the first option is changed. For example, the Serial Port1 and Serial Port2 options in Peripheral Setup can be set to 2F8H, 3F8H, 2E8H or 3E8H. If 2F8H is selected for Serial Port1, WinBIOS disables 2F8H as an option for Serial Port2. Invalid options are grayed on the WinBIOS Setup screen and cannot be selected.

WINBIOS SETUP MENU

When you press <F1> in response to an error message received during the POST routines or when you press the key to enter the WinBIOS Setup Program, the following screen displays:



WinBIOS Setup Main Menu

The WinBIOS Setup Main Menu is organized into four windows, each of which contains several icons.

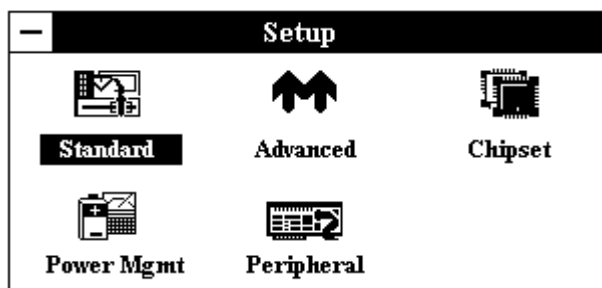
You may select an option in one of two ways:

- Use the mouse to double-click on the appropriate icon.
- Use the <Tab> key to move to the next window. Use the <Right Arrow> and <Left Arrow> keys to move to the desired option within the window and then press <Enter>.

The four windows on the WinBIOS Setup Main Menu screen are:

1) **SETUP Window**

The functions in the Setup window permit you to set system configuration options such as date and time, floppy drive type, hard disk type and many advanced features.



Four options are available:

- Select the **Standard** icon to make changes to Standard Setup. The Setup program is described in the *Standard Setup* section of this manual. The following options may be changed:
 - Date/Time
 - Floppy A Type
 - Floppy B Type
 - Master Disk Type
 - Slave Disk Type
- Select the **Advanced** icon to make changes to Advanced Setup. The Setup program is described in the *Advanced Setup* section of this manual. The following options may be changed:
 - System Keyboard
 - Primary Display
 - Above 1MB Memory Test

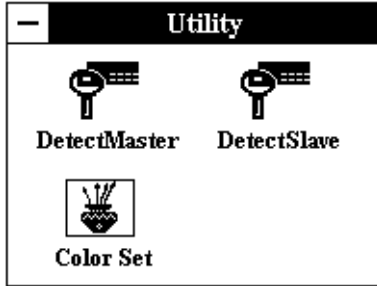
- Hit "DEL" Message Display
 - Wait for "F1" If Any Error
 - System Boot Up Num Lock
 - Floppy Drive Seek at Boot
 - Floppy Drive Swapping
 - System Boot Up Sequence
 - Password Checking
 - Cache Memory
 - Adapter Shadow Cacheable
 - System BIOS Shadow Cacheable
 - ISA Video Shadow
 - ISA Adaptor Shadow
 - IDE Block Mode
 - Primary Master LBA Mode
 - Primary Slave LBA Mode
 - Secondary Ctrl Drives Present
 - Secondary Master LBA Mode
 - Secondary Slave LBA Mode
- Select the **Chipset** icon to make changes to the Chipset Setup. The Setup program is described in the *Advanced Setup* section of this manual. The following options may be changed:
 - ISA VGA Frame Buffer Size
 - ISA VGA Frame Buf. Base Addr
 - Boot to PnP Operating System
 - OS2 Above 64MB Memory Support

- Select the **Power Mgmt** icon to make changes to Power Management Setup. The Setup program is described in the *Power Management Setup* section of this manual. The following options may be changed:
 - Advanced Power Management
 - IDE Drive Power Down
 - VESA Video Power Down
 - Timeout Value
 - IRQ Break Events

- Select the **Peripheral** icon to make changes to the Peripheral Setup. The Setup program is described in the *Peripheral Setup* section of this manual. The following options may be changed:
 - Programming Mode
 - OnBoard FDC
 - OnBoard IDE
 - Serial Port1
 - Serial Port2
 - Parallel Port
 - Parallel Port Mode

2) **UTILITY Window**

The functions in the Utility window permit you to perform system functions and are described later in this section.

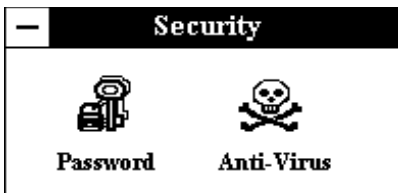


Three options are available:

- Select the **DetectMaster** icon if the Master Disk (Hard Disk C) is an IDE drive. The hard disk parameters will be detected automatically.
- Select the **DetectSlave** icon if the Slave Disk (Hard Disk D) is an IDE drive. The hard disk parameters will be detected automatically.
- Select the **Color Set** icon to set up WinBIOS Setup screen colors, if you have a color monitor.

3) **SECURITY Window**

The functions in the Security window control WinBIOS security functions and are described later in this section.

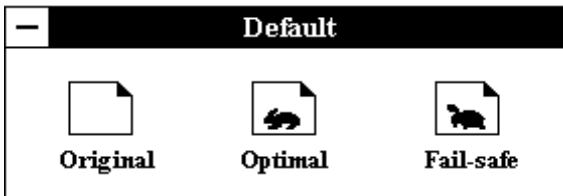


Two options are available:

- Select the **Password** icon to change the password required for access to the system or to the WinBIOS Setup programs.
- Select the **Anti-Virus** icon to request WinBIOS to issue a warning when any program or virus issues a Disk Format command or attempts to write to the boot sector of the hard disk drive.

4) **DEFAULT Window**

The options in the Default window permit you to select a group of default settings for all WinBIOS Setup options. These options are described later in this section.



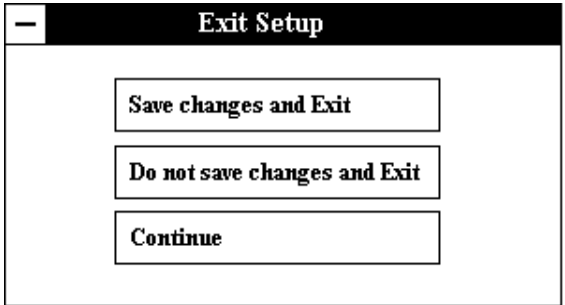
Three options are available:

- Select the **Original** icon to return to the system configuration values present in WinBIOS Setup when you first began the current Setup session.
- Select the **Optimal** icon to provide the best performance characteristics.
- Select the **Fail-safe** icon when you cannot boot your computer successfully. The fail-safe settings are more likely to configure a workable computer, but they do not provide optimal performance.

SAVING AND EXITING

When you have made all desired changes to the Setup, Utility, Security and Default options, press <Esc> to exit WinBIOS Setup. You may save the changes you have just made or you may exit from Setup without saving your changes.

The following screen displays:



Three options are available:

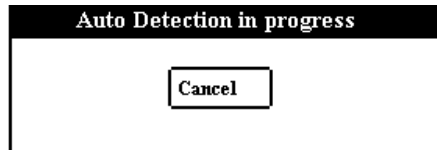
- Select **Save changes and Exit** to store your changes in the CMOS. The CMOS checksum is calculated and written to the CMOS. Control is then passed back to WinBIOS and the booting process continues, using the new CMOS values.
- Select **Do not save changes and Exit** to pass control back to WinBIOS *without* writing any changes to the CMOS. WinBIOS continues with the booting process.
- Select **Continue** to return to the WinBIOS Setup Main Menu if you want to continue making changes to other Setup options.

UTILITY FUNCTIONS

DetectMaster/DetectSlave

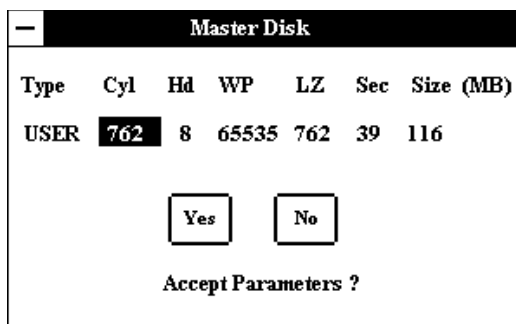
The **DetectMaster** and **DetectSlave** options allow you to have WinBIOS automatically detect the type of hard disk drive(s) in your system. The automatic detection functions only if you have IDE drives. The parameters are reported to the appropriate screen in WinBIOS Standard Setup (Master Disk or Slave Disk), so the hard drive can easily be configured.

If you select the **DetectMaster** or the **DetectSlave** icon from the Utility window of the WinBIOS Setup Main Menu, the following window displays:



WinBIOS searches for the hard disk, and if it can access the drive it reads the disk parameters. It then searches the WinBIOS drive table for matching parameters to determine the disk type and displays both the type and parameters on the screen. If no matching parameters are found in the table, WinBIOS specifies the type as "USER" and fills in the parameter values it found on the drive. If it cannot access the drive or if it is not an IDE drive, WinBIOS times out and specifies that the disk drive is "Not Detected."

The screen displays the parameters for the disk drive and asks if you accept the values:



NOTE: The auto detect feature displays disk parameter values as established by the drive manufacturer. If the drive has been formatted using any other values, accepting the auto detect values will cause erratic behavior. You must either reformat the drive to meet the manufacturer's specifications or use Standard Setup to enter parameters which match the current format of the drive.

You have two options for each disk drive:

- Select **No** if you do not want to accept the hard disk type and its associated parameters or if it is "Not Detected." You may use Standard Setup to set up the correct parameters for the drive.
- Select **Yes** to accept the hard disk type and its associated parameters. The disk type values will be displayed when you select either the **Master Disk** or **Slave Disk** option in Standard Setup.

Color Set

This option allows you to set up the WinBIOS screen colors if you have a color monitor.

If you select the **Color Set** icon from the Utility window of the WinBIOS Setup Main Menu, the following window displays:



Use the mouse or keyboard arrow keys to make your selection.

SECURITY FUNCTIONS

Password

WinBIOS Setup has an optional password feature which can be configured so that a password must be entered each time the system boots or just when a user attempts to enter WinBIOS Setup. (See the *Advanced Setup* section of this manual for information on how to enable the Password Checking option.)

If password checking is enabled, the **Password** option in the Security window of the WinBIOS Setup Main Menu allows you to change the current password or to disable the password prompt by entering a null password. If you select the **Password** icon, the following window displays:

The screenshot shows a window titled "Password". At the top, there is a five-character password input field. Below the field, the text "Enter New Password" is displayed. Below the text is a keyboard layout with keys for digits 0-9, letters A-Z, and an "Enter" key.

The window above displays the message "Enter New Password." This is the message you will see before you have established a new password, or if the last password entered was the null password.

The message shown in the Password window changes depending on where you are in the password procedure.

NOTE: The null password is the system default and will be in effect if a password has not been assigned or if the CMOS has been corrupted. In this case, the "Enter CURRENT Password" prompt is bypassed when you boot the system, and you must establish a new password.

The password cannot exceed six (6) characters in length. The screen does not display the characters as you enter them.

You may enter the password in one of two ways:

- Use the mouse to click on each letter in the password on the screen keypad and then click on **Enter**.
- Type the password and press the <**Enter**> key.

If a password has already been established, the Password window displays the following message when you select the Password icon:

Enter Current Password

Use the mouse or type in your current password.

If you enter the incorrect password, the following message displays:



When you select OK, you return to the WinBIOS Setup Main Menu. You must reselect the **Password** icon to try again.

After the current password has been correctly entered or if no password has been established previously, the Password window displays the message:

Enter New Password

After you have entered the new password, the following message displays in the Password window:

Confirm New Password

Re-key the new password as above.

If the password confirmation is miskeyed, WinBIOS Setup reissues the "Enter New Password" prompt and you must restart the procedure.

If the password confirmation is entered correctly, the following screen displays:



To *disable* password checking so that the password prompt does not appear under any circumstances, you may create a null password by selecting <Enter> without typing in a new password. You will be asked to confirm the password. Select <Enter> again and the following message displays:



Press <Esc> or <Enter> to return to the WinBIOS Setup Main Menu screen. If you save the changes when you exit WinBIOS Setup, the password is stored in CMOS RAM. The next time the system boots, you are prompted for the password if the password function is present and is enabled. (See *Advanced Setup* later in this manual for an explanation of how to enable password checking.)

NOTE: Be sure keep a record of the new password each time it is changed. If you forget it, use the Password Clear jumper to reset it to the default (null password). See the *Specifications* section of this manual for details.

Anti-Virus

This option allows you to request WinBIOS to issue a warning when any program or virus issues a Disk Format command or attempts to write to the boot sector of the hard disk drive.

If you select the **Anti-Virus** icon from the Security window of the WinBIOS Setup Main Menu, the following window displays:



If the **Anti-Virus** option is set to **Enabled**, the following message displays when a write is attempted to the boot sector.

Boot Sector Write!!! Possible VIRUS: Continue (Y/N)?

Select **Y** or **N** as appropriate. You may have to select **N** several times to prevent the boot sector write.

The following message displays if any attempt is made to format any cylinder, head or sector of any hard disk drive via the BIOS INT 13 Hard Disk Drive Service:

Format!!! Possible VIRUS: Continue (Y/N)?

Select **Y** or **N** as appropriate. If you select **Y** to continue, formatting proceeds normally. If you do not want to continue formatting, you may have to select **N** several times, depending on how many retries are performed by the upper-level software. For example, DOS does at least five retries before the Format utility is actually terminated.

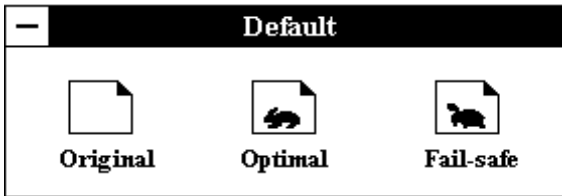
NOTE: You should *not* enable anti-virus protection when formatting a hard drive.

The DOS hard disk Format utility does not use INT 13H function AH=05H to format the hard disk. It only verifies the hard disk using the INT 13H Verify function (AH=04H). The virus warning message is not displayed during DOS hard disk drive formatting.

DEFAULT SETTINGS

Each WinBIOS Setup option has two default settings (Optimal and Fail-safe). These settings can be applied to all WinBIOS Setup options when you select the appropriate **Default** option.

The following shows the Default window of the WinBIOS Setup Main Menu:

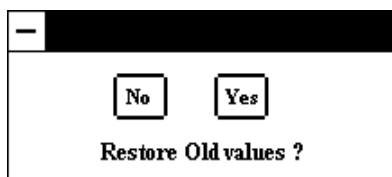


The icons available in this window allow you to select a group of settings for all WinBIOS Setup options. You can use these icons to quickly set system configuration parameters, or you can select a group of settings which have a better chance of working when the system is having configuration-related problems.

Three options are available:

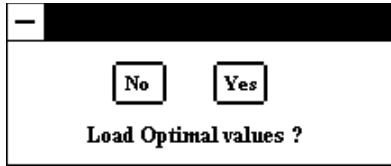
- Select the **Original** icon to return to the system configuration values present in WinBIOS Setup when you first began the current Setup session.

The following screen displays:



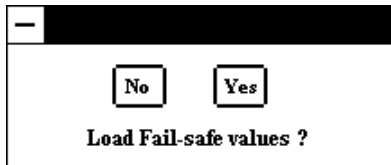
- Select **No** to leave the current values in effect.
- Select **Yes** to restore the values which were present when you first began Setup.
- Select the **Optimal** icon to load the Optimal default settings. These settings are best-case values which should provide the best performance characteristics. If CMOS RAM is corrupted, the Optimal settings are loaded automatically.

The following screen displays:



- Select **No** to leave the current values in effect.
- Select **Yes** to load the Optimal default settings.
- Select the **Fail-safe** icon when you cannot boot your computer successfully. The Fail-safe settings are more likely to configure a workable computer. They do not provide optimal performance, but are the most stable settings. You may use this option as a diagnostic aid if your system is behaving erratically. Select the Fail-safe settings and then try to diagnose the problem after the computer boots.

The following screen displays:



- Select **No** to leave the current values in effect.
- Select **Yes** to load the Fail-safe settings.

KEY CONVENTIONS

Navigation and selection in WinBIOS may be done using the keyboard, a mouse or a combination of both.

Listed below is an explanation of the keys you may use for navigation and selection in the WinBIOS Setup program:

Key	Task
<Esc>	Close the current operation and return to the previous level.
<Tab>	Move to the next window or field.
Arrow keys	Move to the next field in the desired direction.
Enter	Select the current item.
<Pg Up>	Return to the previous page.
<PgDn>	Advance to the next page.
<Home>	Return to the first option.
<End>	Advance to the last option.
<Alt> + <H>	Access the Help window.
<Alt> + <Spacebar>	Exit WinBIOS Setup.
<Alphabetic keys>	A to Z are used in the Virtual Keyboard, and are not case sensitive.
<Numeric keys>	0 to 9 are used in the Virtual Keyboard and Numeric Keypad.
Plus key (+)	Increment a value.
Minus key (-)	Decrement a value.

MOUSE CONVENTIONS

WinBIOS Setup can be accessed using a mouse. The following types of mouse devices are supported:

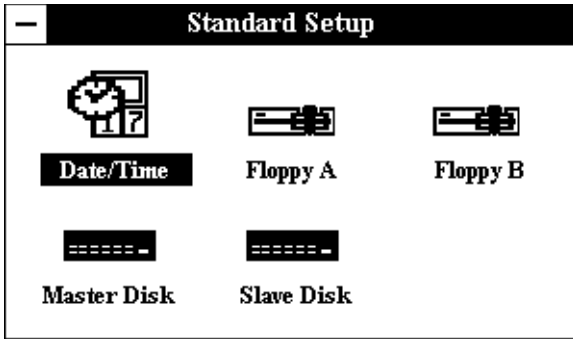
- PS/2-type mouse
- Bus mouse which uses IRQ3, IRQ4 or IRQ5 (IRQ2 is not supported)
- Microsoft-compatible mouse (the M, V, W Series using the M and M+ protocols)
- Logitech C-series-compatible mouse using the MM protocol

Listed below are the mouse click functions:

Action	Task
Single click	Change or select both global and current fields.
Double-click	Perform an operation in the selected field.

STANDARD SETUP

When you select the **Standard** icon from the WinBIOS Setup Main Menu, the Standard Setup window displays:



Standard Setup Window

The Standard Setup window allows you to select options to change the date and time, the floppy drive type(s) and the hard disk type(s). These options are described below.

You may select an option in one of two ways:

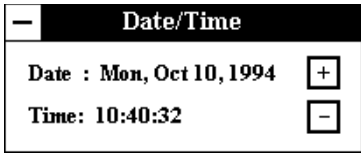
- Use the mouse to double-click on the appropriate icon.
- Use the <**Right Arrow**> and <**Left Arrow**> keys to move to the option and then press <**Enter**>.

STANDARD SETUP OPTIONS

Once values have been defined for the various Standard Setup options, they display each time Standard Setup is run.

Date/Time

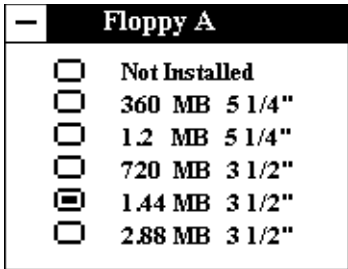
When you select the **Date/Time** icon from the Standard Setup window, the current values for the date, day and time display:



There are three fields for entering the date and three fields for entering the time. Use the mouse or the left and right arrow keys to move from one field to another. To change the values in each field, use the mouse to click on the plus and minus keys on the screen or use the plus and minus keys on the keyboard. When you change the month, date or year field, the day of the week changes automatically to reflect the new date.

Floppy A/Floppy B

When you select either the **Floppy A** or **Floppy B** icon from the Standard Setup window, the following window displays:



The **Not Installed** option can be used for diskless work stations.

Master Disk/Slave Disk

When you select either the **Master Disk** or **Slave Disk** icon from the Standard Setup window, a list of hard disk types displays.

Scroll through the list to locate the correct type of disk drive in your computer.

As you scroll through the disk types, the drive Type displays, along with values for cylinders, heads, write precompensation, landing zone, sectors and size. Available drive types are listed at the end of this section. If the parameters supplied by the manufacturer of your disk drive do not match any of these preprogrammed drive types, you may select the **USER** drive type to enter the parameters manually as described below.

Not Installed is available for use as an option. This option can be used for diskless work stations.

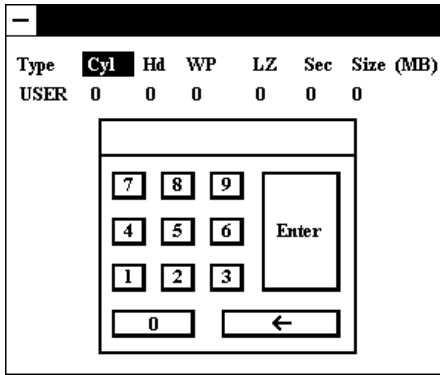
NOTE: If the hard disk is an IDE drive, you may use the **DetectMaster** or **DetectSlave** option in the Utility window of the WinBIOS Setup Main Menu to automatically configure the hard disk type. This allows WinBIOS to detect the IDE drive parameters and report them on the Master Disk and Slave Disk screens. The **DetectMaster** and **DetectSlave** options are described in the *Running WinBIOS Setup* section of this manual.

User-Defined Drive Types

If the parameters supplied by the manufacturer of your disk drive do not match any of the preprogrammed drive types in the drive type table, you may enter the parameters manually.

Scroll to the end of the drive type list, select the **USER** option and press the <**Enter**> key.

The following window displays:



You can manually enter the Cyl, Hd, WP, LZ and Sec parameters. The Size parameter is automatically calculated and displayed by the system based on the other parameters entered.

Once you have placed the cursor in a field by using either the mouse or the right and left arrow keys, you may enter the value in one of two ways:

- Use the mouse to click on each number on the screen keypad and then click on **Enter**.
- Type the parameter value and press the <**Enter**> key.

The numbers entered display above the line on the screen keypad. If an invalid value is entered, an "E" appears to the left of the number entered. The backspace key on the screen keypad (or on the keyboard) removes the last character entered.

The parameters for **USER** under Master Disk and Slave Disk may be different, which effectively allows two different user-definable hard disk types.

The following explains the drive parameters which you must enter for a drive type which is not in the list:

Type is the numeric designation for a drive with certain identification parameters.

Cylinders (Cyl) is the number of disk cylinders found in the specified drive type.

Heads (Hd) is the number of disk heads found in the specified drive type.

Write Precompensation (WP) is the read delay circuitry which takes into account the timing differences between the inner and outer edges of the surface of the disk. The size of the sector gets progressively smaller as the track diameter diminishes. Yet each sector must still hold 512 bytes. Write precompensation circuitry on the hard disk compensates for the physical difference in sector size by boosting the write current for sectors on inner tracks. This parameter designates the track (cylinder) number where write precompensation begins.

Landing Zone (LZ) is the disk cylinder where the head lands. This number determines the cylinder location where the heads will normally park when the system is shut down.

Sectors (Sec) designates the number of disk sectors per track.

Size is the formatted capacity of the drive (in megabytes) based on the following formula:

$$\# \text{ of heads} \times \# \text{ of cylinders} \times \# \text{ of sects/cyln} \times 512 \text{ bytes/sect}$$

Saving and Exiting

When you have made all desired changes to Standard Setup, press <Esc> to return to the WinBIOS Setup Main Menu screen.

You may make changes to other Setup, Utility, Security or Default options or press <Esc> to exit WinBIOS Setup. You may save the changes you have just made or you may exit from Setup without saving your changes.

FIXED DRIVE TYPES

Default fixed drive types defined in WinBIOS are as follows:

- Cyl = Cylinders per drive
- Hd = Heads per drive
- WP = Write precompensation (0 = all; 65535 = none)
- LZ = Landing zone
- Sec = Nbr of sectors per cylinder
- Size = Total storage size (Megabytes)

Type	Cyl	Hd	WP	LZ	Sec	Size
1	306	4	128	305	17	10
2	615	4	300	615	17	20
3	615	6	300	615	17	31
4	940	8	512	940	17	62
5	940	6	512	940	17	47
6	615	4	65535	615	17	20
7	462	8	256	511	17	31
8	733	5	65535	733	17	30
9	900	15	65535	901	17	112
10	820	3	65535	820	17	20
11	855	5	65535	855	17	35
12	855	7	65535	855	17	50
13	306	8	128	319	17	20
14	733	7	65535	733	17	43
15			----- Invalid -----			
16	612	4	0	663	17	20
17	977	5	300	977	17	41
18	977	7	65535	977	17	57
19	1024	7	512	1023	17	60
20	733	5	300	732	17	30
21	733	7	300	732	17	43
22	733	5	300	733	17	30
23	306	4	0	336	17	10
24	925	7	0	925	17	54
25	925	9	65535	925	17	69
26	754	7	754	754	17	44
27	754	11	65535	754	17	69
28	699	7	256	699	17	41
29	823	10	65535	823	17	68
30	918	7	918	918	17	53
31	1024	11	65535	1024	17	94
32	1024	15	65535	1024	17	128
33	1024	5	1024	1024	17	43
34	612	2	128	612	17	10
35	1024	9	65535	1024	17	77

FIXED DRIVE TYPES (continued)

Type	Cyl	Hd	WP	LZ	Sec	Size
36	1024	8	512	1024	17	68
37	615	8	128	615	17	41
38	987	3	987	987	17	25
39	987	7	987	987	17	57
40	820	6	820	820	17	41
41	977	5	977	977	17	41
42	981	5	981	981	17	41
43	830	7	512	830	17	48
44	830	10	65535	830	17	69
45	917	15	65535	918	17	114
46	1224	15	65535	1223	17	152
USER						
ESDI						
SCSI						

USING A WORKSHEET FOR SETUP

Copy this worksheet to record the values needed for the initial WinBIOS Standard Setup program. Keep a copy in case of backup battery failure. Consult your drive manual if you are unsure about any of these values.

Floppy A Type _____				
Floppy B Type _____				
Master Disk Type _____				
** Cyl	Hd	WP	LZ	Sec
_____	_____	_____	_____	_____
Slave Disk Type _____				
** Cyl	Hd	WP	LZ	Sec
_____	_____	_____	_____	_____

** Values required only if Type = USER

ADVANCED SETUP

When you select the **Advanced** icon from the WinBIOS Setup Main Menu, the Advanced Setup window displays:

Advanced Setup	
System Keyboard	: Present
Primary Display	: VGA/EGA
Above 1MB Memory Test	: Enabled
Hit "DEL" Message Display	: Enabled
Wait for "F1" If Any Error	: Enabled
System Boot Up Num Lock	: On
Floppy Drive Seek At Boot	: Disabled
Floppy Drive Swapping	: Disabled
System Boot Up Sequence	: C:, A:
Password Checking	: Setup
Cache Memory	: Both
Adapter Shadow Cacheable	: Disabled
System BIOS Shadow Cacheable	: Enabled
ISA Video ROM C000,32K	: Enabled
ISA Adapter ROM C800,16K	: Disabled
ISA Adapter ROM CC00,16K	: Disabled
ISA Adapter ROM D000,16K	: Disabled
ISA Adapter ROM D400,16K	: Disabled
ISA Adapter ROM D800,16K	: Disabled
ISA Adapter ROM DC00,16K	: Disabled
IDE Block Mode	: Disabled
Primary Master LBA Mode	: Disabled
Primary Slave LBA Mode	: Disabled
Secondary Ctrl Drives Present	: None
Secondary Master LBA Mode	: Disabled
Secondary Slave LBA Mode	: Disabled

The Advanced Setup Window

When you display the Advanced Setup Window, the format is similar to the sample shown above, except the window displays only ten options at a time. If you need to change other options, use the scroll bar on the right or the down arrow key to locate the

appropriate option. If values display for all parameters, the Setup parameters have been defined previously.

NOTE: The values in this screen do not necessarily reflect the values appropriate for your processor board. Refer to the explanations below for specific instructions about entering correct information.

ADVANCED SETUP OPTIONS

The descriptions for the system options listed below show the values as they appear if you have not run the Advanced Setup program yet. Once values have been defined, they display each time Advanced Setup is run.

System Keyboard

This option enables the system keyboard.

The Setup screen displays the system option:

System Keyboard : **Present**

Available options are:

Absent
Present

Primary Display

This option specifies the type of display in the system.

The Setup screen displays the system option:

Primary Display : **VGA/EGA**

Available options are:

- Absent
- VGA/EGA
- CGA 40 x 25
- CGA 80 x 25
- Mono (monochrome)

Above 1MB Memory Test

This option, when enabled, executes the POST memory routines on *all* system memory. If the option is disabled, WinBIOS checks only the first 1MB of system memory.

The Setup screen displays the system option:

Above 1MB Memory Test : **Enabled**

Available options are:

- Disabled
- Enabled

Hit "DEL" Message Display

The "Hit DEL if you want to run SETUP" message displays when the system boots up. Disabling this option prevents the message from displaying.

The Setup screen displays the system option:

Hit "DEL" Message Display : **Enabled**

Available options are:

- Disabled
- Enabled

Wait For "F1" If Any Error

Before the system boots up, WinBIOS executes the Power-On Self Test (POST) routines, a series of system diagnostic routines. If any of these tests fail but the system can still function, a non-fatal error has occurred. WinBIOS responds with an appropriate error message followed by:

Press F1 to RESUME

If this option is disabled, a non-fatal error does not generate the "Press F1 to RESUME" message. WinBIOS still displays the appropriate error message, but continues the booting process without waiting for the <F1> key to be pressed. This eliminates the need for any user response to a non-fatal error condition message. Non-fatal error messages are listed in *Appendix A - BIOS Messages*.

The Setup screen displays the system option:

Wait For "F1" If Any Error : **Enabled**

Available options are:

Disabled
Enabled

System Boot Up Num Lock

This option enables you to turn off the Num Lock option on the enhanced keyboard when the system is powered on. If Num Lock is turned off, the arrow keys on the numeric keypad can be used, as well as the other set of arrow keys on the enhanced keyboard.

The Setup screen displays the system option:

System Boot Up Num Lock : **On**

Available options are:

Off
On

Floppy Drive Seek At Boot

This option causes the system to have the floppy drive(s) seek during bootup. The default for this option is **Disabled** to allow a fast boot and to decrease the possibility of damage to the heads.

The Setup screen displays the system option:

Floppy Drive Seek At Boot : **Disabled**

Available options are:

Disabled
Enabled

Floppy Drive Swapping

This option allows WinBIOS to boot from floppy drive B: instead of floppy drive A: when it searches for a bootable device. The search sequence is defined by the **System Boot Up Sequence** option described below.

The default for this option is **Disabled**, which causes the system to boot from floppy drive A:.

The Setup screen displays the system option:

Floppy Drive Swapping : **Disabled**

Available options are:

Disabled
Enabled

System Boot Up Sequence

This option specifies the disk drive sequence WinBIOS uses to search for a bootable device. WinBIOS normally attempts to boot from hard disk C:, if present. If it is unsuccessful, it then attempts to boot from the floppy drive (either floppy drive A: or floppy drive B:,

depending on the setting of the **Floppy Drive Swapping** option described above).

This option allows you to reverse the bootup sequence to search for the floppy drive first.

The Setup screen displays the system option:

System Boot Up Sequence : C:, A:

Available options are:

C:, A:

A:, C:

Password Checking

This option determines when a password is required for access to the system.

The Setup screen displays the system option:

Password Checking : Setup

Two options are available:

- Select **Setup** to have the password prompt appear only when an attempt is made to enter the WinBIOS Setup program. The Optimal and Fail-safe default settings are **Setup**.
- Select **Always** to have the password prompt appear each time the system is powered on.

NOTE: To *disable* password checking, a null password should be entered in the Password function in the Security window of the WinBIOS Setup Main Menu. (See the *Running WinBIOS Setup* section of this manual.) The null password is the system default and will be in effect if a password has not been assigned or if the CMOS is corrupted.

Cache Memory

Cache memory may be enabled or disabled using this option.

The Setup screen displays the system option:

Cache Memory : **Both**

Three options are available:

- Select **Disabled** to disable *all* cache memory.
- Select **Internal** to enable only the internal cache memory in the Pentium processor.
- Select **Both** to enable internal *and* external cache memory.

Adapter Shadow Cacheable

This option allows the caching of shadowed adapter ROM's.

The Setup screen displays the system option:

Adapter Shadow Cacheable : **Disabled**

Available options are:

Disabled
Enabled

System BIOS Shadow Cacheable

The System BIOS is automatically shadowed to RAM by the BIOS. This option allows the caching of the shadowed System BIOS.

The Setup screen displays the system option:

System BIOS Shadow Cacheable : **Enabled**

Available options are:

Disabled
Enabled

Video or Adaptor Shadow

ROM shadow is a technique in which BIOS code is copied from slower ROM to faster RAM. The BIOS is then executed from the RAM.

Each option allows for a segment of 16KB or 32KB to be shadowed from ROM to RAM. If one of these options is enabled and there is BIOS code present in that particular segment, the BIOS is shadowed.

ISA Video Shadow

Video BIOS shadowing may be done in a 32K segment at C000H. Enabling shadowing can speed up the operation of a machine because RAM can be accessed more rapidly than ROM and the data bus is wider to RAM.

The Setup screen displays the system option:

ISAVideo Shadow C000,32K : Enabled

Available options are:

Disabled
Enabled

ISA Adaptor Shadow

Other ROM's may be shadowed in the memory area from C800H to E000H, depending upon preferences and system requirements.

The Setup screen displays the system option:

ISA Adaptor Shadow XXXX,16K : Disabled

where XXXX is the base address of the segment of memory to be shadowed.

Available options are:

Disabled
Enabled

IDE Block Mode

This option supports transfer of multiple sectors to and from an IDE drive.

The Setup screen displays the system option:

IDE Block Mode : Disabled

Available options are:

Disabled
2 S/B
4 S/B
8 S/B
16 S/B
32 S/B
64 S/B
Auto

Primary Master LBA Mode

This option allows you to enable IDE LBA (Logical Block Address) Mode for the first (master) IDE drive attached to the primary IDE controller. Data is accessed by block addresses rather than by the traditional Cylinder-Head-Sector scheme. This allows you to use drives larger than 528MB.

The Setup screen displays the system option:

Primary Master LBA Mode : Disabled

Available options are:

Disabled
Enabled

Primary Slave LBA Mode

This option allows you to enable IDE LBA (Logical Block Address) Mode for the second (slave) IDE drive attached to the primary IDE controller. Data is accessed by block addresses rather than by the traditional Cylinder-Head-Sector scheme. This allows you to use drives larger than 528MB.

The Setup screen displays the system option:

Primary Slave LBA Mode : Disabled

Available options are:

Disabled
Enabled

Secondary Ctrl Drives Present

This option specifies the number of IDE drives controlled by the secondary IDE controller.

The Setup screen displays the system option:

Secondary Ctrl Drives Present : None

Available options are:

None
1
2

Secondary Master LBA Mode

This option allows you to enable IDE LBA (Logical Block Address) Mode for the first (master) IDE drive attached to the secondary IDE controller. Data is accessed by block addresses rather than by the traditional Cylinder-Head-Sector scheme. This allows you to use drives larger than 528MB.

If the **Secondary Ctrl Drives Present** option described above is set to **None**, this option is not available.

The Setup screen displays the system option:

Secondary Master LBA Mode : **Disabled**

Available options are:

Disabled
Enabled

Secondary Slave LBA Mode

This option allows you to enable IDE LBA (Logical Block Address) Mode for the second (slave) IDE drive attached to the secondary IDE controller. Data is accessed by block addresses rather than by the traditional Cylinder-Head-Sector scheme. This allows you to use drives larger than 528MB.

If the **Secondary Ctrl Drives Present** option described above is set to **None** or **1**, this option is not available.

The Setup screen displays the system option:

Secondary Slave LBA Mode : **Disabled**

Available options are:

Disabled
Enabled

Saving and Exiting

When you have made all desired changes to Advanced Setup, press <Esc> to return to the WinBIOS Setup Main Menu screen.

You may make changes to other Setup, Utility, Security or Default options or press <Esc> to exit WinBIOS Setup. You may save the changes you have just made or you may exit from Setup without saving your changes.

CHIPSET SETUP

When you select the **Chipset** icon from the WinBIOS Setup Main Menu, the following Setup window displays:

Chipset Setup		
ISA VGA Frame Buffer Size	: Disabled	↑
ISA VGA Frame Buf. Base Addr	: (N/A)	
Boot to PnP Operating System	: No	
OS2 Above 64MB Memory Support	: Disabled	↓

The Chipset Setup Window

When you display the Chipset Setup window, the format is similar to the sample shown above. If values display for all parameters, the Setup parameters have been defined previously.

NOTE: The values in this screen do not necessarily reflect the values appropriate for your processor board. Refer to the explanations below for specific instructions about entering correct information.

CHIPSET SETUP OPTIONS

The descriptions for the system options listed below show the values as they appear if you have not run the Chipset Setup program yet. Once values have been defined, they display each time Chipset Setup is run.

NOTE: Do *not* change the values for the options on this screen unless you understand the impact on system operation. Depending on your system configuration, selection of other values may cause unreliable system operation.

ISA VGA Frame Buffer Size

This option sets the size of the VGA frame buffer. It must be set to one of the size values if the VGA card installed in the system requires a frame buffer.

The Setup screen displays the system option:

ISA VGA Frame Buffer Size : Disabled

Available options:

Disabled
1MB
2MB
4MB

ISA VGA Frame Buf. Base Addr

This option displays the base address of the VGA frame buffer. If the VGA card installed in the system requires a frame buffer, the base address is displayed but may not be modified. The Base Address parameter is not applicable (N/A) if the **ISA VGA Frame Buffer Size** option is disabled.

The Setup screen displays the system option:

ISA VGA Frame Buf. Base Addr : (N/A)

The settings displayed for the base address of the VGA frame buffer are as follows:

<u>ISA VGA Frame Buffer Size</u>	<u>ISA VGA Frame Bfr. Base Addr</u>
Disabled	(N/A)
1MB	15 MB
2MB	14 MB
4MB	12 MB

Boot to PnP Operating System

This option indicates whether or not a Plug and Play operating system is being used. Setting this option to **Yes** allows full interaction between the BIOS and the operating system PnP features.

The Setup screen displays the system option:

Boot to PnP Operating System : No

Available options:

- No
- Yes

OS2 Above 64MB Memory Support

To load OS/2 2.11 or OS/2 Warp in a system with more than 64MB of on-board memory, this option must be set to **Enabled**.

The Setup screen displays the system option:

OS2 Above 64MB Memory Support : Disabled

Available options:

Disabled

Enabled

Saving and Exiting

When you have made all desired changes to Chipset Setup, press **<Esc>** to return to the WinBIOS Setup Main Menu screen.

You may make changes to other Setup, Utility, Security or Default options or press **<Esc>** to exit WinBIOS Setup. You may save the changes you have just made or you may exit from Setup without saving your changes.

POWER MANAGEMENT SETUP

When you select the **Power Mgmt** icon from the WinBIOS Setup Main Menu, the following Setup window displays:

Power Management Setup		
Advanced Power Management	: Disabled	↑
IDE Drive Power Down	: Disabled	
VESA Video Power Down	: Disabled	
Timeout Value	: 5 Min.	
IRQ1 Break Event	: Enabled	
IRQ3 Break Event	: Disabled	
IRQ4 Break Event	: Disabled	
IRQ5 Break Event	: Disabled	
IRQ6 Break Event	: Enabled	
IRQ7 Break Event	: Disabled	
IRQ8 Break Event	: Disabled	
IRQ9 Break Event	: Disabled	
IRQ10 Break Event	: Disabled	
IRQ11 Break Event	: Disabled	
IRQ12 Break Event	: Enabled	
IRQ13 Break Event	: Disabled	
IRQ14 Break Event	: Disabled	
IRQ15 Break Event	: Disabled	↓

The Power Management Setup Window

When you display the Power Management Setup window, the format is similar to the sample shown above. If values display for all parameters, the Setup parameters have been defined previously.

NOTE: The values in this screen do not necessarily reflect the values appropriate for your processor board. Refer to the explanations below for specific instructions about entering correct information.

POWER MANAGEMENT SETUP OPTIONS

The descriptions for the system options listed below show the values as they appear if you have not run the Power Management Setup program yet. Once values have been defined, they display each time Power Management Setup is run.

Advanced Power Management

This option allows you to enable Advanced Power Management (APM) on your system. If this option is set to **Disabled**, you cannot change the other options on the Power Management Setup screen.

The Setup screen displays the system option:

Advanced Power Management : **Disabled**

Available options are:

Disabled
Enabled

IDE Drive Power Down

This option indicates whether or not WinBIOS is allowed to power down the IDE drive.

The Setup screen displays the system option:

IDE Drive Power Down : **Disabled**

Available options are:

Disabled
Enabled

VESA Video Power Down

This option indicates whether or not WinBIOS is allowed to power down the video adapter and monitor.

The Setup screen displays the system option:

VESA Video Power Down : Disabled

Available options are:

Disabled
Standby
Suspend
Off

Timeout Value

This option specifies the length of time WinBIOS waits before turning off power to the drive if the drive remains inactive.

The Setup screen displays the system option:

Timeout Value : 5 Min.

Available options are:

5 Min.	45 Min.
10 Min.	50 Min.
15 Min.	55 Min.
20 Min.	60 Min.
25 Min.	65 Min.
30 Min.	70 Min.
35 Min.	75 Min.
40 Min.	

IRQ1 Break Event through IRQ15 Break Event

This option allows you to enable break ("wake-up") events for the specified interrupt request line (IRQ).

The Setup screen displays the system option:

IRQ# Break Event : **Enabled**

where # is the IRQ line number.

Available options are:

Disabled

Enabled

Saving and Exiting

When you have made all desired changes to Power Management Setup, press <Esc> to return to the WinBIOS Setup Main Menu screen.

You may make changes to other Setup, Utility, Security or Default options or press <Esc> to exit WinBIOS Setup. You may save the changes you have just made or you may exit from Setup without saving your changes.

PERIPHERAL SETUP

When you select the **Peripheral** icon from the WinBIOS Setup Main Menu, the following Setup window displays:

Peripheral Setup		
Programming Mode	: Auto	↑
OnBoard FDC	: Enabled	
OnBoard IDE	: Emu-PRI	
Serial Port1	: 3F8H	
Serial Port2	: 2F8H	
Parallel Port	: 378H	
Parallel Port Mode	: Normal	↓

The Peripheral Setup Window

When you display the Peripheral Setup window, the format is similar to the sample shown above. If values display for all parameters, the Setup parameters have been defined previously.

NOTE: The values in this screen do not necessarily reflect the values appropriate for your processor board. Refer to the explanations below for specific instructions about entering correct information.

PERIPHERAL SETUP OPTIONS

The descriptions for the system options listed below show the values as they appear if you have not run the Peripheral Setup program yet. Once values have been defined, they display each time Peripheral Setup is run.

Programming Mode

This option allows automatic or manual setup of peripheral devices.

The Setup screen displays the system option:

Programming Mode : **Auto**

Two options are available:

- Select **Auto** to have WinBIOS configure the peripherals automatically as described below under *Automatic BIOS Configuration Features*.
- Select **Manual** to have WinBIOS configure the peripherals as they have been defined on the Peripheral Setup screen. See the *Manual BIOS Configuration Features* section below.

Automatic BIOS Configuration Features

When Programming Mode is set to **Auto**, WinBIOS automatically detects all adapter cards installed in the system and configures the on-board I/O (floppy controllers, IDE controller, serial ports and parallel port). Any floppy controller, IDE controller, serial port or parallel port on an adapter card in an expansion slot is configured before on-board I/O.

OnBoard FDC

WinBIOS attempts to enable any floppy drive controller on the ISA Bus. If no floppy controller is found on the ISA Bus, the on-board floppy controller is enabled.

OnBoard IDE

WinBIOS attempts to enable any hard disk drive controller on the ISA Bus. If no hard disk drive controller is found on the ISA Bus, the on-board IDE controller is enabled.

Serial Port 1 and Serial Port 2

WinBIOS also attempts to avoid address conflicts. If the off-board serial ports are configured to specific starting I/O ports via jumper settings, WinBIOS configures the on-board serial ports to avoid conflicts.

WinBIOS checks the ISA Bus for serial ports. Any off-board serial ports found on the ISA Bus are left at their assigned addresses. Serial Port 1, the first on-board serial port, is configured with the first available address and Serial Port 2, the second on-board serial port, is configured with the next available address. The default address assignment order is 3F8H, 2F8H, 3E8H, 2E8H. Note that this same assignment order is used by WinBIOS to place the active serial port addresses in lower memory (BIOS data area) for configuration as logical COM devices.

After all addresses have been assigned, any remaining on-board serial ports are disabled.

For example, if there is one off-board serial port on the ISA Bus and its address is set to 2F8H, Serial Port 1 is assigned address 3F8H and Serial Port 2 is assigned address 3E8H. Configuration is then as follows:

COM1 - Serial Port 1 (at 3F8H)
COM2 - off-board serial port (at 2F8H)
COM3 - Serial Port 2 (at 3E8H)

The interrupts used by Serial Port 1 and Serial Port 2 may be assigned by jumpers on some processor boards. For those boards on which the selectable interrupt jumpers are not available, Serial Port 1 utilizes interrupt 4 (IRQ4) and Serial Port 2 utilizes interrupt 3 (IRQ3).

Parallel Port

WinBIOS checks the ISA Bus for off-board parallel ports. Any parallel ports found on the ISA Bus are left at their assigned addresses. The on-board Parallel Port is automatically configured with the first available address not used by an off-board parallel port. The default address assignment order is 3BCH, 378H, 278H. Note that this same assignment order is used by WinBIOS to place the active parallel port addresses in lower memory (BIOS data area) for configuration as logical LPT devices.

The interrupts used by the Parallel Port may be assigned by a jumper setting on some processor boards. For those boards on which the selectable interrupt jumper is not available, IRQ7 is used for the on-board Parallel Port (LPT1).

Manual BIOS Configuration Features

When Programming Mode is set to **Manual**, the options you set up manually are used by WinBIOS when booting the system. WinBIOS reports any I/O conflicts after displaying the BIOS Configuration Summary screen.

OnBoard FDC

The on-board floppy drive controller may be enabled or disabled using this option.

The Setup screen displays the system option:

OnBoard FDC : **Enabled**

Available options are:

Disabled
Enabled

OnBoard IDE

The on-board IDE (Integrated Drive Electronics) controller may be enabled or disabled using this option.

The Setup screen displays the system option:

OnBoard IDE : Enb-PRI

Available options are:

Disabled
Enb-PRI (Enable Primary)
Enb-SEC (Enable Secondary)

Serial Port 1

The address of Serial Port 1, the first on-board serial port, may be set using this option. The interrupts used by Serial Port 1 and Serial Port 2 may be assigned by jumper settings on some processor boards. For those boards on which the selectable interrupt jumpers are not available, IRQ4 is used for Serial Port 1 (COM1).

The Setup screen displays the system option:

Serial Port1 : 3F8H

Available options are:

Disabled
3F8H
2F8H
3E8H
2E8H

Serial Port 2

The address of Serial Port 2, the second on-board serial port, may be set using this option. The interrupts used by Serial Port 1 and Serial Port 2 may be assigned by jumper settings on some processor boards.

For those boards on which the selectable interrupt jumpers are not available, IRQ3 is used for Serial Port 2 (COM2).

The Setup screen displays the system option:

Serial Port2 : **2F8H**

Available options are:

Disabled
3F8H
2F8H
3E8H
2E8H

Parallel Port

The address of the on-board Parallel Port may be set using this option. The interrupts used by the Parallel Port may be assigned by a jumper setting on some processor boards. For those boards on which the selectable interrupt jumper is not available, IRQ7 is used for the Parallel Port (LPT1).

The Setup screen displays the system option:

Parallel Port : **378H**

Available options are:

Disabled
3BCH
378H
278H

Parallel Port Mode

This option allows configuration of the on-board parallel port.

The Setup screen displays the system option:

Parallel Port Mode : **Normal**

Available options are:

Normal
Bi-Dir (Bi-directional)
ECP (Enhanced Capabilities Port)
EPP (Enhanced Parallel Port)

Saving and Exiting

When you have made all desired changes to Peripheral Setup, press <Esc> to return to the WinBIOS Setup Main Menu screen.

You may make changes to other Setup, Utility, Security or Default options or press <Esc> to exit WinBIOS Setup. You may save the changes you have just made or you may exit from Setup without saving your changes.

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APPENDIX A - BIOS MESSAGES

BIOS BEEP CODES

Errors may occur during the POST (Power-On Self Test) routines which are performed each time the system is powered on.

Non-fatal errors are those which, in most cases, allow the system to continue the bootup process. The error message normally appears on the screen. See *BIOS Error Messages* later in this section for descriptions of these messages.

Fatal errors are those which will not allow the system to continue the bootup procedure.

These fatal errors are usually communicated through a series of audible beeps. Each error message has its own specific beep code, defined by the number of beeps following the error detection. The following table lists the errors which are communicated audibly.

All errors listed, *with the exception of #8*, are fatal errors.

Beep Count	Message	Description
1	Refresh Failure	The memory refresh circuitry of the processor board is faulty.
2	Parity Error	A parity error was detected in the base memory (the first block of 64KB) of the system.
3	Base 64KB Memory Failure	A memory failure occurred within the first 64KB of memory.
4	Timer Not Operational	A memory failure occurred within the first 64KB of memory, or Timer #1 on the processor board has failed to function properly.
5	Processor Error	The CPU (Central Processing Unit) on the processor board has generated an error.
6	8042 - Gate A20 Failure	The keyboard controller (8042) contains the Gate A20 switch which allows the CPU to operate in protected mode. This error message means that the BIOS is not able to switch the CPU into protected mode.
7	Processor Exception Interrupt Error	The CPU on the processor board has generated an exception interrupt.

BIOS BEEP CODES (continued)

Beep Count	Message	Description
8	Display Memory Read/Write Error	The system video adaptor is either missing or its memory is faulty. NOTE: This is <i>not</i> a fatal error.
9	ROM Checksum Error	The ROM checksum value does not match the value encoded in the BIOS.
10	CMOS Shutdown Register Read/Write Error	The shutdown register for the CMOS memory has failed.
11	Cache Memory Bad; Do Not Enable Cache	The cache memory test failed. Cache memory is disabled. <i>Do not press <Ctrl><Alt><Shift><+> to enable cache memory.</i>

BIOS ERROR MESSAGES

If a non-fatal error occurs during the POST routines performed each time the system is powered on, the error message will appear on the screen in the following format:

ERROR Message Line 1
ERROR Message Line 2
Press <F1> to RESUME

Note the error message and press the <F1> key to continue with the bootup procedure.

NOTE: If the "Wait for <F1> If Any Error" option in the Advanced Setup portion of the BIOS Setup Program has been set to **Disabled**, the "Press <F1> to RESUME" prompt will not appear on the third line.

For most of the error messages, there is no ERROR Message Line 2. Generally, for those messages containing an ERROR Message Line 2, the text will be "RUN SETUP UTILITY." Pressing the <F1> key will invoke the BIOS Setup Program.

BIOS ERROR MESSAGES (continued)

A description of each error message appears below. The errors are listed in alphabetical order, not in the order in which they may occur.

Message	Description
8042 Gate-A20 Error	The gate-A20 portion of the keyboard controller (8042) has failed to operate correctly. Replace the 8042 chip.
Address Line Short!	An error has occurred in the address decoding circuitry of the processor board.
C: Drive Error	The BIOS is not receiving any response from hard disk drive C:. Check Standard Setup using the WinBIOS Setup Program to see if the correct hard disk drive has been selected.
C: Drive Failure	The BIOS cannot get <i>any</i> response from hard disk drive C:. It may be necessary to replace the hard disk.
Cache Memory Bad, Do Not Enable Cache!	Cache memory is defective.
CH-2 Timer Error	Most AT standard system boards include two timers. An error with Timer #1 is a fatal error, explained in <i>BIOS Beep Codes</i> earlier in this section. If an error occurs with Timer #2, this error message appears.
CMOS Battery State Low	There is a battery in the system which is used for storing the CMOS values. This battery appears to be low in power and needs to be replaced.
CMOS Checksum Failure	After the CMOS values are saved, a checksum value is generated to provide for error checking. If the previous value is different from the value currently read, this error message appears. To correct the error, run the WinBIOS Setup Program.
CMOS Display Type Mismatch	The type of video stored in CMOS does not match the type detected by the WinBIOS. Run the WinBIOS Setup Program to correct the error.
CMOS Memory Size Mismatch	If the BIOS finds the amount of memory on the system board to be different from the amount stored in CMOS, this error message is generated. Run the WinBIOS Setup Program to correct the error.
CMOS System Options Not Set	The values stored in the CMOS are either corrupt or nonexistent. Run the WinBIOS Setup Program to correct the error.

BIOS ERROR MESSAGES (continued)

Message	Description
CMOS Time & Date Not Set	Use Standard Setup in the WinBIOS Setup Program to set the date and time of the CMOS.
D: Drive Error	The BIOS is not receiving any response from hard disk drive D:. Check Standard Setup using the WinBIOS Setup Program to see if the correct hard disk drive has been selected.
D: Drive Failure	The BIOS cannot get <i>any</i> response from hard disk drive D:. It may be necessary to replace the hard disk.
Diskette Boot Failure	The disk used to boot up in floppy drive A: is corrupt, which means it cannot be used to boot up the system. Use another boot disk and follow the instructions on the screen.
Display Switch Not Proper	Some systems require that a video switch on the processor be set to either color or monochrome, depending upon the type of video being used. To correct this situation, set the switch properly after the system is powered off.
DMA Error	An error has occurred in the DMA controller on the processor board.
DMA #1 Error	An error has occurred in the first DMA channel on the processor board.
DMA #2 Error	An error has occurred in the second DMA channel on the processor board.
FDD Controller Failure	The BIOS is not able to communicate with the floppy disk drive controller. Check all appropriate connections after the system is powered off.
HDD Controller Failure	The BIOS is not able to communicate with the hard disk drive controller. Check all appropriate connections after the system is powered off.
INTR #1 Error	The interrupt channel #1 has failed the POST routine.
INTR #2 Error	The interrupt channel #2 has failed the POST routine.
Invalid Boot Diskette	The BIOS can read the disk in floppy drive A:, but it <i>cannot</i> boot up the system with it. Use another boot disk and follow the instructions on the screen.
KB/Interface Error	The BIOS has found an error with the keyboard connector on the processor board.

BIOS ERROR MESSAGES (continued)

Message	Description
Keyboard Error	The BIOS has encountered a timing problem with the keyboard. The Keyboard option in the Standard Setup portion of the WinBIOS Setup Program may be set to Not Installed , which will cause the BIOS to skip the keyboard POST routines.
Keyboard Is Locked... Unlock It	The keyboard lock on the system is engaged. It must be unlocked to continue the bootup procedure.
No ROM BASIC	This error occurs when a proper bootable sector cannot be found on either floppy disk drive A: or hard disk drive C:. The BIOS will try at this point to run ROM Basic, and the error message is generated when the BIOS does not find it.
Off Board Parity Error	<p>The BIOS has encountered a parity error in memory installed on an adapter card in an I/O (Bus) expansion slot. The message appears as follows:</p> <p style="text-align: center;">OFF BOARD PARITY ERROR ADDR (HEX) = (XXXX)</p> <p>where XXXX is the address (in hexadecimal) at which the error has occurred. "Off Board" means that it is part of the memory installed via an expansion card in an I/O (Bus) slot, as opposed to memory attached directly to the processor board.</p>
On Board Parity Error	<p>The BIOS has encountered a parity error in memory installed on the processor board. The message appears as follows:</p> <p style="text-align: center;">ON BOARD PARITY ERROR ADDR (HEX) = (XXXX)</p> <p>where XXXX is the address (in hexadecimal) at which the error has occurred. "On Board" means that it is part of the memory attached directly to the processor board, as opposed to memory installed via an expansion card in an I/O (Bus) slot.</p>
Parity Error ????	The BIOS has encountered a parity error with some memory in the system, but it is not able to determine the address of the error.

EISA ERROR MESSAGES

An EISA BIOS can generate additional error messages, since EISA systems have added functionality. These are all non-fatal error messages.

A description of each error message appears below. The errors are listed in alphabetical order, not in the order in which they may occur.

Message	Description
EISA CMOS Checksum Failure	The Checksum for EISA CMOS is bad. The battery for EISA CMOS may be bad.
EISA CMOS Inoperational	A Read/Write error occurred in extended CMOS. The battery may be bad.
Expansion Board Not Ready at Slot X, Y, Z	The BIOS cannot find the expansion board in Slot X, Y or Z. Make sure the board is in the correct slot and is correctly seated.
Fail-Safe Timer NMI Inoperational	Devices that depend on the fail-safe NMI timer will not operate correctly.
ID Information Mismatch for Slot X, Y, Z	The ID of the EISA Expansion Board in Slot X, Y or Z does not match the ID in EISA CMOS.
Invalid Configuration Information for Slot X, Y, Z	The configuration information for EISA Expansion Board X, Y or Z is not correct. The board cannot be configured. Run the EISA Configuration Utility.
Software Port NMI Inoperational	The software port NMI is not working.

ISA NMI HANDLER MESSAGES

The EISA WinBIOS may generate any ISA-compatible NMI (non-maskable interrupt) message. The ISA NMI messages are described below.

Message	Description
Memory Parity Error	Memory failed. The message appears as follows: MEMORY PARITY ERROR AT XXXXX where XXXXX is the address (in hexadecimal) at which the error has occurred. If the memory location cannot be determined, the message is "Memory Parity Error ?????"
I/O Card Parity Error	An expansion card failed. The message appears as follows: I/O PARITY ERROR AT XXXXX where XXXXX is the address (in hexadecimal) at which the error has occurred. If the address cannot be determined, the message is "I/O Card Parity Error ?????"
DMA Bus Time-Out	A device has driven the bus signal for more than 7.8 microseconds.

EISA NMI ERROR MESSAGES

The EISA WinBIOS can generate additional NMI (non-maskable interrupt) messages, which are described below.

Message	Description
BUS Timeout NMI at Slot <i>n</i>	There was a Bus Timeout NMI at Slot <i>n</i> .
(E)nable (D)isable Expansion Board?	Type "E" to enable the expansion board that had an NMI or "D" to disable it.
Expansion Board Disabled at Slot <i>n</i>	The expansion board in Slot <i>n</i> has been disabled.
Expansion Board NMI at Slot <i>n</i>	An expansion board NMI was generated at Slot <i>n</i> .
Fail-Safe Timer NMI	A fail-safe timer NMI has been generated.
Software Port NMI	A software port NMI has been generated.

PORT 80 CODES

The following codes are presented on Port 80H as the BIOS performs its reset procedure.

Code	Description
Uncompressed INIT code checkpoints:	
C2	NMI is disabled. Power-on delay starting.
C5	Power-on delay complete. Going to disable cache if any.
C6	Calculating ROM BIOS checksum.
C7	ROM BIOS checksum passed. CMOS shutdown register test to be done next.
C8	CMOS shutdown register test done. CMOS checksum calculation to be done next.
CA	CMOS checksum calculation is done, CMOS diagnostic byte written. CMOS status register about to init for date and time.
CB	CMOS status register init done. Any initialization before keyboard BAT to be done next.
CD	BAT command to keyboard controller is to be issued.
CE	Keyboard controller BAT result verified. Any initialization after keyboard controller BAT to be done next.
CF	Initialization after keyboard controller BAT done. Keyboard command byte to be written next.
D1	Keyboard controller command byte is written. Going to check pressing of <Ins> key during power-on.
D2	Checking for pressing of <Ins> key during power-on done. Going to disable DMA and interrupt controllers.
D3	DMA controllers #1 and #2 and interrupt controllers #1 and #2 disabled. Chipset init/auto memory detection about to begin.
D4	Chipset initialization/auto memory detection over. To uncompress the RUNTIME code next.
D5	RUNTIME code is uncompressed.
DD	Transfer control to uncompressed code in shadow RAM at F000:FFF0.

PORT 80 CODES (continued)

Code	Description
	Runtime code is uncompressed in F000 shadow RAM.
03	NMI is disabled. To check soft reset/power-on next.
05	Soft reset and power-on determined. Going to disable cache if any.
06	POST code to be uncompressed.
07	POST code is uncompressed. CPU init and CPU data area init to be done next.
08	CPU and CPU data area init done. CMOS checksum calculation to be done next.
09	CMOS checksum calculation is done, CMOS diagnostic byte written. CMOS init to begin (if the "Init CMOS at every boot" option is set).
0A	CMOS initialization done (if any). CMOS status register about to init for date and time.
0B	CMOS status register init done. Any initialization before keyboard BAT to be done next.
0C	Keyboard controller I/B free. Going to issue the BAT command to keyboard controller.
0D	BAT command to keyboard controller is issued. Going to verify the BAT command.
0E	Keyboard controller BAT result verified. Any initialization after keyboard controller BAT to be done next.
0F	Initialization after keyboard controller BAT done. Keyboard command byte to be written next.
10	Keyboard controller command byte is written. Going to issue Pin 23,24 blocking/unblocking command.
11	Pins 23, 24 of keyboard controller is blocked/unblocked. Going to check pressing of <Ins> key during power-on.
12	Checking for pressing of <Ins> key during power-on done. Going to disable DMA and interrupt controllers.
13	DMA controllers #1 and #2 and interrupt controllers #1 and #2 disabled. Video display is disabled and port B is initialized. Chipset init about to begin.
15	Chipset initialization over. 8254 timer test about to start.

PORT 80 CODES (continued)

Code	Description
19	8254 timer test over. About to start memory refresh test.
1A	Memory refresh line is toggling. Going to check 15 microsecond ON/OFF time.
20	Memory refresh period 30 microsecond test complete. Base 64KB memory to be initialized.
23	Base 64KB memory initialized. Going to set BIOS stack and do any setup before interrupt vector init.
24	Setup required before vector initialization complete. Interrupt vector initialization about to begin.
25	Interrupt vector initialization done. Going to read input port of the 8042 for turbo switch (if any) and clear password if POST diagnostic switch is on.
26	Input port of 8042 is read. Going to initialize global data for turbo switch.
27	Global data initialization for turbo switch is over. Any initialization before setting video mode to be done next.
28	Initialization before setting video mode is complete. Going for monochrome mode and color mode setting.
2A	Different Buses init (system, static, output devices) to start if present. (See end of Port 80H Codes for details of different Buses.)
2B	About to give control for any setup required before optional video ROM check.
2C	Processing before video ROM control is done. About to look for optional video ROM and give control.
2D	Optional video ROM control is done. About to give control to do any processing after video ROM returns control.
2E	Return from processing after the video ROM control. If EGA or VGA not found, then do display memory read/write test.
2F	EGA/VGA not found. Display memory read/write test about to begin.
30	Display memory read/write test passed. About to look for the retrace checking.
31	Display memory read/write test or retrace checking failed. About to do alternate display memory read/write test.

PORT 80 CODES (continued)

Code	Description
32	Alternate display memory read/write test passed. About to look for the alternate display retrace checking.
34	Video display checking over. Display mode to be set next.
37	Display mode set. Going to display the power-on message.
38	Different Buses init (input, IPL, general devices) to start if present. (See end of Port 80H Codes for details of different Buses.)
39	Display different Buses initialization error messages. (See end of Port 80H Codes for details of different Buses.)
3A	New cursor position read and saved. Going to display "Hit " message.
3B	"Hit " message displayed. The virtual mode memory test about to start.
40	Going to prepare the descriptor tables.
42	Descriptor tables prepared. Going to enter in virtual mode for memory test.
43	Entered virtual mode. Going to enable interrupts for diagnostics mode.
44	Interrupts enabled (if diagnostics switch is on). Going to initialize data to check memory wraparound at 0:0.
45	Data initialized. Going to check for memory wraparound at 0:0 and find the total system memory size.
46	Memory wraparound test done. Memory size calculation over. About to go for writing patterns to test memory.
47	Pattern to be tested written in extended memory. Going to write patterns in base 640KB memory.
48	Patterns written in base memory. Going to find out amount of memory below 1MB memory.
49	Amount of memory below 1MB found and verified. Going to find out amount of memory above 1MB memory.
4B	Amount of memory above 1MB found and verified. Check for soft reset and going to clear memory below 1MB for soft reset. (If power-on, go to checkpoint 4EH.)
4C	Memory below 1MB cleared. (SOFT RESET) Going to clear memory above 1MB.

PORT 80 CODES (continued)

Code	Description
4D	Memory above 1MB cleared. (SOFT RESET) Going to save the memory size. (Go to checkpoint 52H.)
4E	Memory test started. (NOT SOFT RESET) About to display the first 64KB memory size.
4F	Memory size display started. This will be updated during memory test. Going for sequential and random memory tests.
50	Memory testing/initialization below 1MB complete. Going to adjust the displayed memory size for relocation/shadow.
51	Memory size display adjusted due to relocation/shadow. Memory test above 1MB to follow.
52	Memory testing/initialization above 1MB complete. Going to save memory size information.
53	Memory size information is saved. CPU registers are saved. Going to enter in real mode.
54	Shutdown was successful, CPU in real mode. Going to disable Gate A20 line and disable parity/NMI.
57	A20 address line, parity/NMI disable successful. Going to adjust memory size depending on relocation/shadow.
58	Memory size adjusted for relocation/shadow. Going to clear "Hit " message.
59	"Hit " message cleared. "Wait..." message displayed. About to start DMA and interrupt controller tests.
60	DMA page register test passed. To do DMA#1 base register test next.
62	DMA#1 base register test passed. To do DMA#2 base register test next.
65	DMA#2 base register test passed. To program DMA units 1 and 2 next.
66	DMA units 1 and 2 programming over. To initialize the 8259 interrupt controller next.
67	8259 initialization over.
7F	Extended NMI sources enabling is in progress.
80	Keyboard test started. Clearing output buffer, checking for stuck key. About to issue keyboard reset command.

PORT 80 CODES (continued)

Code	Description
81	Keyboard reset error/stuck key found. About to issue keyboard controller interface test command.
82	Keyboard controller interface test over. About to write command byte and init circular buffer.
83	Command byte written, global data init done. About to check for lock-key.
84	Lock-key checking over. About to check for memory size mismatch with CMOS.
85	Memory size check done. About to display soft error and check for password or bypass Setup.
86	Password checked. About to do programming before Setup.
87	Programming before Setup complete. Going to uncompress Setup code and execute CMOS Setup.
88	Returned from CMOS Setup program and screen is cleared. About to do programming after Setup.
89	Programming after Setup complete. Going to display power-on screen message.
8B	First screen message displayed. "Wait..." message displayed. About to do video BIOS shadow.
8C	Video BIOS shadow successful. Setup options programming after CMOS Setup about to start.
8D	Setup options are programmed, mouse check and init to be done next.
8E	Mouse check and initialization complete. Going for hard disk controller reset.
8F	Hard disk controller reset done. Floppy setup to be done next.
91	Floppy setup complete. Hard disk setup to be done next.
94	Hard disk setup complete. To set base and extended memory sizes.
95	Memory size adjusted due to mouse support. Init of different Buses optional ROM's from C800 to start. (See end of Port 80H Codes for details of different Buses.)
96	Going to do any init before C800 optional ROM control.
97	Any init before C800 optional ROM control is over. Optional ROM check and control to be done next.

PORT 80 CODES (continued)

Code	Description
98	Optional ROM control is done. About to give control to do any required processing after optional ROM returns control.
99	Any initialization required after optional ROM test over. Going to set up timer data area and printer base address.
9A	Return after setting timer and printer base address. Going to set the RS-232 base address.
9B	Returned after RS-232 base address. Going to do any initialization before coprocessor test.
9C	Required initialization before coprocessor test is over. Going to initialize the coprocessor next.
9D	Coprocessor initialized. Going to do any initialization after coprocessor test.
9E	Initialization after coprocessor test is complete. Going to check extended keyboard, keyboard ID and Num Lock.
9F	Extended keyboard check is done, ID flag is set, Num Lock key on or off as specified in Setup. Keyboard ID command to be issued.
A0	Keyboard ID command issued. Keyboard ID flag to be reset.
A1	Keyboard ID flag reset. Cache memory test to follow.
A2	Cache memory test over. Going to display any soft errors.
A3	Soft error display complete. Going to set keyboard typematic rate.
A4	Keyboard typematic rate set. To program memory wait states next.
A5	Memory wait states programming over. Going to clear the screen and enable parity/NMI.
A7	NMI and parity enabled. Going to do any initialization required before giving control to optional ROM at E000.
A8	Initialization before E000 ROM control over. E000 ROM to get control next.
A9	Returned from E000 ROM control. Going to do any initialization required after E000 optional ROM control.
AA	Initialization after E000 optional ROM control is over. Going to display the system configuration.

PORT 80 CODES (continued)

Code	Description
B0	System configuration is displayed.
B1	Going to copy any code to a specific area.
00	Copying of code to a specific area done. Going to give control to INT 19H boot loader.

The System BIOS gives control to the different Buses at the following checkpoints to do various tasks on the different Buses.

<u>Code</u>	<u>Description</u>
2A	Different Buses init (system, static, output devices)
38	Different Buses init (input, IPL, general devices)
39	Display different Buses initialization error messages
95	Init of different Buses optional ROM's from C800

While control is inside the different Bus routines, additional checkpoints are output to Port 80H as WORD to identify the routines under execution. These are WORD checkpoints. The LOW BYTE of checkpoint is the system BIOS checkpoint from where the control is passed to the different Bus routines, and the HIGH BYTE of checkpoint is the indication of which routine is being executed in different Buses. The details of the HIGH BYTE of these checkpoints are as follows:

HIGH BYTE XY

The upper nibble 'X' indicates the function # is being executed. 'X' can be from 0 to 7.

- 0 = func#0, disable all devices on the Bus concerned
- 1 = func#1, static devices init on the Bus concerned
- 2 = func#2, output device init on the Bus concerned
- 3 = func#3, input device init on the Bus concerned
- 4 = func#4, IPL device init on the Bus concerned
- 5 = func#5, general device init on the Bus concerned
- 6 = func#6, error reporting for the Bus concerned
- 7 = func#7, add-on ROM init for all Buses

PORT 80 CODES (continued)

The lower nibble 'Y' indicates the Bus on which the different routines are being executed. 'Y' can be from 0 to 5.

- 0 = Generic DIM (device initialization manager)
- 1 = On-board system devices
- 2 = ISA devices
- 3 = EISA devices
- 4 = ISA PnP devices
- 5 = PCI devices

BUG REPORT

While we have tried to assure this manual is error free, it is a fact of life that works of man have errors. We request you to detail any errors you find on this "BUG REPORT" and return it to us. We will correct the errors/problems and send you a new manual as soon as available. Please return to:



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