

American Megatrends, Inc.

Series 42

Mark V Baby Screamer

80386 Motherboard

User's Guide

MAN-642 Rev C  
9/11/92

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## Preface

### **To the OEM**

Thank you for purchasing the high performance Series 42 Mark V Baby Screamer AT-compatible motherboard from American Megatrends. It is assumed that you have also licensed the rights to use the technical documentation for the Mark V Baby Screamer.

This manual was written for the OEM. It is the purpose of this manual to assist you in the proper installation, use, and operation of the Mark V Baby Screamer motherboard. This manual is not meant to be read by the computer owner who purchases a computer with the Mark V Baby Screamer motherboard. It is assumed that you, the computer manufacturer, will use this manual as a sourcebook of information, and that parts of this manual will be included in the computer owner's manual.

### **Technical Support**

If an American Megatrends motherboard fails to operate as described or you are in doubt about a configuration option, please call technical support at 404-246-8600.

### **Acknowledgments**

This manual was written by Paul Narushoff and Robert Cheng.

### **Packing Slip**

You should have received the following items:

- Mark V Baby Screamer motherboard,
- *Mark V Baby Screamer User's Guide*,
- two serial connecting cables, and
- one parallel cable.

## American Megatrends BBS

The American Megatrends BBS permits OEMs, VARs, and system integrators to access technical information about motherboard and BIOS products. Product Engineering Change Notices, Tech Tips, Technical Notes, and technical manuals are available on the BBS.

### Data Transmission Rates

The BBS automatically handles modems with data transmission rates from 1,200 to 14,400 bps. If using an HST modem, call 404-246-8780. If using a non-HST modem, call 404-246-8782.

### BBS Phone Numbers

The following table lists the BBS phone numbers. The BBS requires no parity, 8 data bits, and 1 stop bit.

Phone Number	Characteristics
404-246-8780	Supports HST and v.42.
404-246-8781	Supports HST and v.42.
404-246-8782	Dual standard. Can handle 2400 or 9600 bps. Supports v.32 and v.42. Can handle up to 14,400 baud.
404-246-8783	Supports v.32 and v.42.

# Chapter 1

## Introduction

### **Dimensions**

The American Megatrends 80386 Mark V Baby Screamer is an IBM® AT®-compatible motherboard, approximately 8.55 by 13 inches. It is identical in size to a standard XT motherboard with identical mounting hole locations. The height of the board components is no more than 1½ inches. Allow 2 inches of clearance for the power supply connectors. See the following graphic.



## Description

### **Microprocessor**

The Mark V Baby Screamer is equipped with a 33 MHz Intel 80386DX or an AMD 40 MHz AM386DXL.

### **Processor Speeds**

The Mark V Baby Screamer operates at either of two processor speeds. The high speed is 33 or 40 MHz. The low speed is about 8 MHz. The processor speed is selected through the keyboard by pressing <Ctrl> <Alt> <+> or <Ctrl> <Alt> <->, or by changing the Deturbo switch connected to J38.

### **Cache Memory**

The Mark V Baby Screamer can have either 64 KB or 256 KB of SRAM cache memory. The cache memory operates on up to 32 MB of system memory. Cache memory operates at zero wait state cache for both read and write hits.

### **System Memory**

The Mark V Baby Screamer can have up to 32 MB on the motherboard. The Mark V uses 256 KB x 9, 1 MB x 9, or 4 MB x 9 SIMMs (Single Inline Memory Modules). The SIMM memory speed must be 70 ns when operating at 40 or 33 MHz.

## Description, Continued

### **ROM**

The Mark V Baby Screamer has 64 KB of ROM, used for the system AMIBIOS, AMIBIOS Setup, and AMIBIOS hard disk utilities.

### **BIOS Shadowing**

Shadowing must be enabled by setting switches 3 and 4 on SW1 ON. Both the system BIOS and the video BIOS can be shadowed via AMIBIOS Setup, but switches 3 and 4 of SW1 must first be ON.

### **Onboard I/O**

The Mark V Baby Screamer has an IDE controller, a floppy drive controller, two serial ports and a parallel port adapter on the motherboard.

### **AMIBIOS**

The Hi-Flex AMIBIOS used in the Mark 5 Baby Screamer has a built-in Setup utility, built-in hard disk drive utilities, user-definable hard disk drive types, and error message suppression to permit the configuration of systems such as file servers that are missing a monitor, floppy drive, or keyboard.

### **CMOS RAM**

The Mark V has 128 bytes of battery-backed CMOS RAM to store system configuration information.

### **Math Coprocessor**

The Mark V has a socket for an optional Weitek® 3167, Intel 80387, Cyrix® 83D87, or other 80387-compatible coprocessor.

## System Support Functions

The Mark V motherboard has the following standard AT-compatible system elements:

- seven Direct Memory Access (DMA) channels,
  - Channels 0 - 3 for 8-bit data transfer, and
  - channels 5 - 7 for 16-bit data transfers.
- sixteen interrupt levels,  
Supports eleven levels of interrupt:  
IRQ3 - IRQ7, IRQ9 - IRQ12, IRQ14, and IRQ15.
- three programmable timers,
- a system clock,
- standard I/O capability, including:
  - uses 32-, 16-, and 8-bit memory devices, and
  - uses 16- and 8-bit I/O devices.
- I/O bus operating at 8 MHz for the 33 MHz Mark V and 10 MHz for the 40 MHz Mark V.
- 8- and 16-bit IBM AT-compatible expansion slots,
- the standard I/O address space of 100h through 3FFh,
- 24-bit memory addresses to access 16 MB of memory,
- uses the I/O channel check to generate an NMI,
- has I/O wait state generation,
- has an open bus structure (allowing multiple microprocessors to share the system's resources, including memory),
- allows system memory refresh from channel microprocessors,
- has a real time clock that is crystal controlled and has a battery back-up,
- provides a standard 5-pin IBM AT-compatible DIN connector for the keyboard,
- supports a hardware Deturbo switch,
- has a keyboard lock to prevent unauthorized access, and
- has a standard speaker attachment.

# Chapter 2

## Installation

### Unpacking

Step	Action
1.	<p>Inspect the cardboard carton for obvious damage. If damaged, call Technical Support at 404-246-8600.</p> <p>Leave the Mark V Baby Screamer motherboard in its original packing.</p>
2.	<p>Perform all unpacking and installation procedures on a ground connected anti-static mat. The operator should wear an anti-static wristband, grounded at the same point as the anti-static mat. Or use a sheet of conductive aluminum foil grounded through a 1 megohm resistor instead of the anti-static mat. Similarly, a strip of conductive aluminum foil wrapped around the wrist and grounded through a 1 megohm resistor serves the same purpose as the wrist-band.</p>
3.	<p>Inside the carton, the motherboard is packed in an anti-static bag, and sandwiched between sheets of sponge. Remove the sponge and remove the anti-static bag. Place the motherboard on a grounded anti-static surface component-side up. Save the original packing material in case of reshipment.</p>
4.	<p>Inspect the motherboard for damage. Press down on all ICs mounted in sockets to verify proper seating. Do not apply power to the motherboard if it has been damaged.</p>
5.	<p>If the motherboard is undamaged, it is ready to be installed.</p>



## Installation Steps

The steps for assembling a system that uses the 80386 Mark V Baby Screamer motherboard are shown in the following table. Each step is discussed in detail in the following pages.

<b>Step</b>	<b>Action</b>	<b>Turn to</b>
1	Set switch and jumper options	Page
2	Install memory	Page
3	Install coprocessors	Page
4	Install motherboard	Page
5	Connect the power supply	Page
6	Connect the keyboard	Page
7	Connect cables	Page
8	Install adapter cards	Page
9	Install floppy drives	Page
10	Install hard disk drive.	Page
11	Perform initial test and configuration	Page

Standoffs and mounting screws are not supplied with the 80386 Mark V Baby Screamer motherboard. They usually are supplied with the chassis.

## Step 1 Set Switch and Jumper Options

Set all user-configurable jumpers and switches, and install coprocessors before installing the motherboard in the chassis. There is one user-configurable switch and ten jumpers.

### SW1

SW1 is an 8-position 2-bit DIP switch. See the graphic on page for the location of SW1.

Switch	Description
1	Diagnostics is used for manufacturing diagnostics. The motherboard is shipped with this switch Off. The switch should remain Off.
2	COL/MONO sets the type of video display adapter card in the system. This switch is factory-set to Off, for a monochrome display adapter (MDA™). Set On for a color graphics adapter (CGA™). This switch has no effect on EGA® and VGA® adapters.
3	Video Shadow. The video ROM segment beginning at C000h is copied from ROM to faster RAM for faster video operation. This switch is factory-set to On (Enable).
4	System BIOS Shadow. Similar to video shadow except the entire system BIOS (64 KB in length) is shadowed. This switch is factory-set to On (Enable).
5, 6, 7, 8	Memory configuration. Positions 5, 6, 7, and 8 configure the system memory. See the section on configuring memory on page .

### J22 COM1 IRQ Select

J22 is a three-pin single-inline berg. Short pins 2-3 to select IRQ4 for COM1 (default). Short pins 1-2 to select IRQ3 for COM1.

## Step 1 Set Switch and Jumper Options, Continued

### J21 COM2 IRQ Select

J21 is a three-pin single-inline berg. Short pins 2-3 to select IRQ3 for COM2 (this is the default). Short pins 1-2 to select IRQ4 for COM2.

### J23 Parallel Port IRQ Select

J23 is a three-pin single-inline berg. Short pins 1-2 to select IRQ5 for the parallel port. Short pins 2-3 to select IRQ7 for the parallel port (this is the default).

### J14 ROM Access 0 Wait State

J14 is a two-pin single-inline berg. This jumper is factory shipped with pins 1-2 jumpered for 0 wait ROM access.

### J18 BIOS ROM Size Select

J18 is a three-pin single-inline berg. Short pins 1-2 to select 27256 ROM chips (this is the default). Short pins 2-3 to select 27512 ROM chips.

### Selecting the Cache Memory Size

The setting of four-pin berg jumpers J50 and J51 and the presence or absence of an SRAM DIP in U32 control the cache size setting:

Jumper/ SRAM	For 64 KB Cache	For 256 KB Cache
J50	OPEN	Short pins 1-2 and pins 3-4
J51	OPEN	Short pins 1-2 and pins 3-4
U32	PRESENT	ABSENT



## Step 1 Set Switch and Jumper Options, Continued

### Selecting the Motherboard Frequency

The motherboard frequency is set as follows:

Jumper/ Location	For 33 MHz Operation	For 40 MHz Operation
J37	OPEN	OPEN
J35	Short pins 2-3	Short pins 1-2
U38	PRESENT	PRESENT

### J38 Hardware Deturbo Jumper

J38 is a two-pin berg. Connect this berg to the hardware turbo switch that selects Low or High speed.

## Step 2 Install Memory

The main memory subsystem on the Mark V Baby Screamer motherboard consists of two 32-bit memory banks of four SIMM sockets each. Both banks house SIMM (Single In-line Memory Module) DRAM packages. The SIMM bank accepts 256 KB, 1 MB, or 4 MB x 9 bit SIMMs.

### Memory Configuration

The 80386 Mark V Baby Screamer supports 1 MB, 2 MB, 4 MB, 8 MB, 16 MB, and 32 MB memory configurations on the motherboard using SIMMs. The following table describes the memory configurations.

Bank0	Bank1	Switch 5	Switch 6	Switch 7	Switch 8	Total Memory
256 KB	None	ON	ON	ON	ON	640 KB
256 KB	256 KB	ON	OFF	ON	ON	1.64 MB
1 MB	None	ON	ON	ON	OFF	3712K
1 MB	1 MB	ON	OFF	ON	OFF	7808K
4 MB	None	ON	ON	OFF	OFF	16000K
4 MB	4 MB	ON	OFF	OFF	OFF	32384K

The amount of system memory displayed by AMIBIOS will be 384K less than the total amount of memory installed because the 384K segment between 640K and 1 MB is used by the system for BIOS shadowing and is not counted.

## Step 2 Install Memory, Continued

### Selecting SIMMs

The SIMMs must meet the following specifications:

Parameter	Specification
Page Mode	Fast
Refresh	CAS before RAS
$t_{CAC}$	$\leq 20$ ns
$t_{RAC}$	$\leq 80$ ns
$t_{AA}$	$\leq 45$ ns
$t_{RP}$	70 ns
$t_{CPA}$	$\leq 45$ ns

### SIMM Part Numbers

Memory Type	Manufacturer	Part Number
256 K x 9	Siemens®	HYB514256AJ-70
1 MB x 9	Fujitsu®	MB85235-70
	Toshiba®	THM91000AS-70
	NEC®	MC-42100A9-70
	Siemens	HYM910005-70
4 MB x 9	Okidata®	MSC2340-70459
	Toshiba	THM94000S-70
	NEC	MC-85235-70

## Step 2 Install Memory, Continued

### **Installing SIMMs**

Both Bank 0 and Bank 1 have four SIMM sockets. Use 256 KB x 9, 1 MB x 9, or 4 MB x 9 SIMMs. Use only one type of SIMM to fill each memory bank.

1. Place the motherboard on an anti-static mat.
2. Firmly push the SIMM into the socket with the component side facing the interior of the motherboard. When properly inserted, the SIMM will click into place. The following graphic illustrates SIMM installation.

### **SIMM Types**

The graphic below shows the two types of SIMMs.

### Step 3 Install Coprocessor

The 80386 Mark V Baby Screamer motherboard supports the Weitek WTK3167, Intel 80387, and Cyrix™ 83D87 or other 387-compatible coprocessors.

#### Choosing A Coprocessor

The coprocessor must operate at the same frequency as the system microprocessor. The following table lists math coprocessor parts.

Board Frequency	Intel Part No.	Cyrix Part No.	Weitek Part No.
25 MHz	80387-25	83D87-25	WTK3167-025
33 MHz	80387-33	83D87-33	WTK3167-033
40 MHz	None	83D87-40	None

#### Installing the WTK3167 on the Motherboard

U24 is the empty 121-pin PGA socket between the cache memory and microprocessor. The socket is labeled *Weitek*. Pin 1 of the socket is near the chamfered edge of the socket. This corner corresponds to pin 1 of the Weitek also identified by a chamfered edge (*on the bottom of the coprocessor*).

Check for bent pins on the coprocessor. Gently straighten any bent pins using a pair of pliers. Install the component into the socket. Align the pins and press the Weitek coprocessor firmly into the socket, making sure that pin 1 of the Weitek coprocessor is aligned with pin 1 of socket U24. See the following figure. Make sure that the Weitek coprocessor option in the ADVANCED CMOS SETUP is enabled. The Weitek math coprocessor will not work unless it is enabled in AMIBIOS Setup. See the ADVANCED CMOS SETUP Section on page .

### Step 3 Install Coprocessor, Continued

#### **Installing a Cyrix or Intel coprocessor on the Motherboard**

An Intel 80387 or Cyrix 83D87 coprocessor will fit in the Weitek 121-pin PGA socket. The 80387 and 83D87 are 64-pin PGA-mount coprocessors. Surface-mount coprocessors will not work.

When installing the Cyrix or Intel coprocessor, align pin 1 as described for the Weitek (remember, the chamfered edge is on the bottom of the coprocessor), and insert the coprocessor in the center of the socket, leaving the outer set of pin sockets empty. See the figures on the following page.

### Step 3 Install Coprocessor, Continued

#### **Test for Math Coprocessor**

The AMIBIOS displays a System Configuration screen at the end of AMIBIOS POST (Power On Self Test). The math coprocessor will be displayed here.

If the Installed message is not displayed, reinstall the coprocessor. Switch off the power, check the orientation of the coprocessor, press the chip firmly to make sure that it is fully inserted, and then power the system up again. If the same result occurs, call Technical Support.

### Step 4 Install the Motherboard

The mounting hole pattern on the Mark V Baby Screamer motherboard is identical to the mounting hole pattern on the IBM XT™ motherboard. See the following graphic.

## Step 4 Install the Motherboard, Continued

Step	Action
a	Place the chassis for the motherboard on an anti-static mat.
b	Connect the chassis to ground to avoid static damage during installation.
c	Connect an alligator clip with a wire lead to any unpainted part of the chassis. Ground the other end of the lead at the same point as the mat and the wristband.
d	Rotate the chassis so that the front is to the right, and the rear is to the left. The power supply is mounted at the far end of the chassis.
e	Push four nylon standoffs from the solder side of the motherboard in the holes provided for them. The standoffs lock in place.
f	Find the slots provided for the standoffs on the chassis.
g	Hold the motherboard, component-side up, with the edge with three standoffs toward the front, and the edge with the power supply connector away from the front. The edge connectors for the adapter cards should be on the left.
h	Carefully slide the motherboard into the chassis. Make certain that the standoffs fit the slots provided for them. If the standoffs are properly locked, the motherboard should not slide. It should also rest level with the chassis. The far edge should fit the slots in the plastic clips.
i	Place the two mounting screws in the holes provided for them and tighten them. If necessary, shift the motherboard slightly to align the mounting holes on the motherboard with the holes on the chassis.



## Step 5 Connect the Power Supply

The power supply should match the physical configuration of the chassis. Make sure that the power switch is Off before performing this step. Before attaching all components, make sure that the proper voltage has been selected. Power supplies often can run on a wide range of voltages, but must be set (usually with a switch) to the proper range. Use at least a 200 watt (or larger) power supply, which should have built-in filters to suppress radiated emissions. The filters will help pass the appropriate FCC certification testing.

The power supply is connected to P2 and P3 on the motherboard. The connectors should be keyed to prevent connecting the plugs to the wrong connectors.

The keys on the connector must be cut to fit on some power supplies. Key 6 on the top of P3 should have been cut. Key 3 on the top of P2 should have been removed. If these keys are still in place, remove them. See the following figure for the key locations.

## Step 5 Connect the Power Supply, Continued

See the following figure for the location of connectors P2 and P3. AT-compatible power supplies have two 6-pin connectors that are inserted in P2 and P3. The 6-pin connector with 3 red wires and 2 black wires is connected to P3 and the remaining 6-pin connector is connected to P2.

## Step 6 Connect the Keyboard

The keyboard connector is a 5-pin DIN socket and is labeled KEYBRD and J3 on the motherboard. It will accept a regular IBM AT-compatible keyboard. A 5-pin DIN to 6-pin mini DIN converter is needed to connect a PS/2-type keyboard.

Pin	Assignments
1	Keyboard clock
2	Keyboard data
3	Not used
4	Ground
5	VCC

## Step 7 Connect Cables

When connecting chassis connectors to the motherboard, connect the correct connector end. Most connector wires are color-coded. Match the color of the wires leaving the switch or LED to the same pin on the connector end. There may be more than one connector with the same color-coded wires. If so, follow the wire to the switch or LED. Pin 1 of all connectors is labeled to identify the pin orientation when plugging in cables.

## Step 7 Connect Cables, Continued

The following cables should be connected to the motherboard from the chassis:

- Reset Switch cable to J12.
- Speaker cable to J11.
- External Battery connector to J2.
- Keyboard Lock cable to J10.
- Turbo LED cable to J15.
- Connect DIAG LED to J13.
- Hardware Deturbo Switch to J38.

### **Connect the Reset Button Connector**

J12 is a two-pin single-inline berg. When this button is pressed, the system will perform a hard reset. Pin 1 is ground and Pin 2 is Hard Reset. See the following figure.

## Step 7 Connect Cables, Continued

### Connect the Speaker Cable

J11 is a four-pin single-inline berg. The AMIBIOS signals hardware problems through the speaker. Pin 1 on the motherboard is labeled by a 1. The following graphic shows how J11 must be connected. The J11 pinout is shown in the following table.

Pin	Description
1	Data Out
2	Key
3	Ground
4	VCC

### J2 External Battery Connector

J2 is a four-pin berg that connects to a 6-volt external battery. The positive (+) terminal, normally indicated by a red wire, connects to the pin labeled +. The pinout for J2 follows:

Pin	Description
1	6 Volt DC
2	Not used
3	Not used
4	Ground

## Step 7 Connect Cables, Continued

### Connect the Keyboard Lock Connector

J10 is a five-pin single-inline berg. The keyboard lock allows the user to lock the keyboard, protecting the system from unauthorized use. This connector is keyed with a blank hole. Pin 1 on the motherboard is labeled with a 1.

Pin	Description
1	LED power
2	Keyboard Lock
3	Ground
4	Ground
5	Vcc

### J15 Turbo LED

J15 is a two-pin berg. The LED lights when the board runs at high speed. Connect the Turbo LED to J15. See the figure on page .

### J38 Hardware Deturbo Switch

J38 is a two-pin berg that connects to a two-position hardware speed selection switch.

## Step 7 Connect Cables, Continued

### Onboard Adapters

The AMIBIOS Power On Self Test (POST) routine checks the expansion slots for hard disk/floppy controller and serial/parallel adapter cards. If a disk controller is found, the onboard IDE controller is automatically disabled. If a serial or parallel adapter is found, the onboard serial or parallel port is disabled. Be sure to properly connect the cables to the berg connectors. Pin 1 of each of the bergs is labeled "1". The wire leading to pin 1 on the cable usually has a colored stripe.

### P4 Serial Port 1 (COM1) and P1 Serial Port 2 (COM2)

P4 is a 10-pin dual-inline berg. P1 is a 10-pin dual-inline berg. P1 and P4 connect a serial port receptacle to the motherboard. These connectors provide an AT-compatible serial port interface. The connecting cable is a 10-pin double-row ribbon that connects the motherboard to a male 9-pin D-sub connector fastened to the chassis. The serial port pinout is shown below.

Pin	Use	Pin	Use
1	Carrier Detect	6	Data Set Ready
2	Receive Data	7	Request to Send
3	Transmit Data	8	Clear to Send
4	Data Terminal Ready	9	Ring Indicator
5	GND	10	Key (N/C)

### P5 Parallel Port for Printer

P5 is a 26-pin dual-inline berg. A 26-pin double-row ribbon cable connects P5 on the motherboard and a female 25-pin D-sub connector fastened to the parallel port connector on the chassis.

## Step 7 Connect Cables, Continued

### P5 Pinout

Pin	Use	Pin	Use
1	-STROBE	14	-AUTOFEED
2	PD0	15	-ERROR
3	PD1	16	-INIT
4	PD2	17	-SLCTIN
5	PD3	18	GND
6	PD4	19	GND
7	PD5	20	GND
8	PD6	21	GND
9	PD7	22	GND
10	-ACK	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SLCT	26	N/C

### Cutting Pins



## Step 8 Install Adapter Cards

The 80386 Mark V Baby Screamer motherboard provides full compatibility with all IBM XT or AT compatible adapter cards. It has eight 16-bit expansion slots, numbered on the motherboard from SLOT1 through SLOT8. The expansion slots can accept either 8- or 16-bit ISA (XT or AT compatible) adapter cards.

### 16-Bit ISA Extension Pinout

The following 16-bit pins are an extension of the 8-bit board layout and are used in conjunction with the 8-bit board standard pins.

Pin	Use	Pin	Use
C1	SBHE-	D1	MEMCS16-
C2	LA23	D2	IOCS16-
C3	LA22	D3	IRQ10
C4	LA21	D4	IRQ11
C5	LA20	D5	IRQ12
C6	LA19	D6	IRQ13
C7	LA18	D7	IRQ14
C8	LA17	D8	DACK0-
C9	MEMR-	D9	DREQ0
C10	MEMW-	D10	DACK5-
C11	SD08	D11	DREQ5
C12	SD09	D12	DACK6-
C13	SD10	D13	DREQ6
C14	SD11	D14	DACK7-
C15	SD12	D15	DREQ7
C16	SD13	D16	+5
C17	SD14	D17	MASTER-
C18	SD15	D18	GND

## Step 8 Install Adapter Cards, Continued

### 8-Bit ISA Slot Pinout

Pin	Use	Pin	Use
A1	IOCHCK-	B1	GND
A2	SD07	B2	RSTDRV
A3	SD06	B3	+5
A4	SD05	B4	IRQ9
A5	SD04	B5	-5
A6	SD03	B6	DREQ2
A7	SD02	B7	-12
A8	SD01	B8	OVS-
A9	SD00	B9	+12
A10	IOCHRDY	B10	GND
A11	AEN	B11	SMEMW-
A12	SA19	B12	SMEMR-
A13	SA18	B13	IOW-
A14	SA17	B14	IOR-
A15	SA16	B15	DACK3-
A16	SA15	B16	DREQ3
A17	SA14	B17	DACK1-
A18	SA13	B18	DREQ1
A19	SA12	B19	REF-
A20	SA11	B20	SYSCLK
A21	SA10	B21	IRQ7
A22	SA09	B22	IRQ6
A23	SA08	B23	IRQ5
A24	SA07	B24	IRQ4
A25	SA06	B25	IRQ3
A26	SA05	B26	DACK2-
A27	SA04	B27	T/C
A28	SA03	B28	BALE

A29	SA02	B29	+5
A30	SA01	B30	OSC
A31	SA00	B31	GND

## Step 9 Install Floppy Drive

### **P6 Floppy Disk Drive Connector**

P6 is a 34-pin dual-inline berg. Connect the cable from the floppy drive to P6. The onboard floppy controller cannot be used if a hard disk adapter card with floppy controller is installed. The following graphic depicts a floppy cable and the P6 34-pin floppy connector.

The Mark V Baby Screamer supports 3½" and 5¼" floppy disk drive in low density (360 KB/720 KB) and high density (1.2 MB/1.44 MB). Up to two floppy disk drives can be connected to the interface. The connecting cable is a 34-pin ribbon connector with two 34-pin edge connectors for connection to the floppy disk drives. There should be a small twist in the cable between the floppy connectors, and the last (end) connector should be connected to the floppy drive that will be drive A.

## Step 9 Install Floppy Drive, Continued

### Floppy Pinout

Pin	Use	Pin	Use
1	GND	2	RPM/LC
3	GND	4	N/C
5	GND	6	N/C
7	GND	8	-INDEX
9	GND	10	-MOTOR0
11	GND	12	-FDSEL1
13	GND	14	-FDSEL0
15	GND	16	-MOTOR1
17	GND	18	DIR
19	GND	20	-STEP
21	GND	22	-WDATA
23	GND	24	-WGATE
25	GND	26	-TRK0
27	GND	28	-WRPROT
29	GND	30	-RDATA
31	GND	32	HDSEL
33	GND	34	DSKCHNG

### Twist in Floppy Cable

Floppy B to A	Floppy B to A	Floppy B to A	Floppy B to A
10 to 16	12 to 14	14 to 12	16 to 10
11 to 15	13 to 13	15 to 11	

## Step 10 Install Hard Disk

### P7 IDE Hard Disk Connector

P7 is a 40-pin dual-inline berg that connects a hard disk drive with an Integrated Drive Electronics (IDE) Interface. The IDE interface can be disabled via AMIBIOS Setup. Disable the onboard IDE interface to use an ISA bus ESDI, RLL, or MFM hard disk drive controller. The pinout is:

Pin	Use	Pin	Use
1	-RESET	2	GND
3	DATA7	4	DATA8
5	DATA6	6	DATA9
7	DATA5	8	DATA10
9	DATA4	10	DATA11
11	DATA3	12	DATA12
13	DATA2	14	DATA13
15	DATA1	16	DATA14
17	DATA0	18	DATA15
19	GND	20	KEY (N/C)
21	N/C	22	GND
23	-IOW	24	GND
25	-IOR	26	GND
27	N/C	28	ALE
29	N/C	30	GND
31	INT14	32	-IOCS16
33	HA1	34	N/C
35	HA0	36	HA2
37	-CS0	38	-CS1
39	-IDEACT	40	GND

## Step 11 Perform Initial Test and Configuration

Review the following before powering up the system:

- ✓ make sure that all adapter cards are seated properly,
- ✓ make sure all connectors are properly installed,
- ✓ if the math coprocessor is used, make sure it is seated properly,
- ✓ make sure there are no screws or other foreign material on the motherboard,
- ✓ plug the system into a surge-protected power strip, and
- ✓ make sure blank back panels are installed on the back of the chassis to minimize RF emissions.

### **Start the Test**

Plug everything in and turn the unit on. If there are any problems, turn off the unit immediately. Reinstall the connectors. Call Technical Support if there are additional problems.

### **BIOS Errors**

If the system operates normally, a display should appear on the monitor. POST should execute.

If POST does not run successfully, it will beep or display error messages. If the system beeps, a serious problem exists with the system configuration or hardware. The beeps are part of a Beep Code (see page ) that almost always indicates a bad or improperly installed component. Make sure the affected part is properly seated and connected.

An error message can appear on the monitor if the error is less serious. Recheck the system configuration or the connections and make sure proper installation procedures were followed.

## Step 11 Perform Initial Test and Configuration, Continued

### **Configure the System**

Run the AMIBIOS Setup utility. You must enter the requested information and save the configuration data in CMOS RAM. The system will then reset, run POST, and boot the operating system. See the documentation on configuring the system through STANDARD CMOS SETUP which begins on page .



# Chapter 3

## BIOS Power-On Self Test (POST)

The AMIBIOS provides all IBM standard POST routines, as well as enhanced AMIBIOS POST routines. POST supports CPU internal diagnostics. POST codes are accessible via I/O Port 80h.

### POST Phases

When the system is powered on, the AMIBIOS executes two types of routines:

- *System Test and Initialization* (test and initialize motherboards for normal operations) and
- *System Configuration Verification* (compare defined configuration with hardware actually installed).

### BIOS Error Reporting

Errors are reported in one of two ways:

If...	Then...
the error occurs before the display device is initialized,	a series of beeps will sound. Beep codes indicate that a fatal error has occurred. The AMIBIOS Beep Codes are described on the next page.
the error occurs after the display device is initialized,	an error message is displayed. Displayed AMIBIOS error messages are explained on page . A prompt to press <F1> can also appear with displayed errors.

## Beep Codes

Fatal errors, listed below, are communicated through a series of audible beeps. All errors except Beep Code 8 are fatal. Fatal errors do not allow the system to continue the boot process. Consult the component manufacturer for possible repairs if a fatal error occurs.

If AMIBIOS can initialize the system video display, it displays error messages. Often, these messages (listed on page ) are not as serious as beep codes and allow the system to continue the boot process.

Beeps	Error message	Description
1	Refresh Failure	The memory refresh circuitry on the motherboard is faulty.
2	Parity Error	Parity error in first 64 KB of memory.
3	Base 64 KB Memory Failure	Memory failure in first 64 KB.
4	Timer Not Operational	Memory failure in the first 64 KB of memory, or Timer 1 is not functioning.
5	Processor error	Error generated by the CPU on the motherboard.
6	8042 - Gate A20 Failure	Cannot switch to protected mode via the 8042.
7	Processor Exception Interrupt Error	The CPU on the motherboard has generated an exception interrupt.
8	Display Memory Read/Write Error	The system video adapter is either missing or its memory is faulty. This is not a fatal error.
9	ROM Checksum Error	The ROM checksum value does not match the value encoded in AMIBIOS.
10	CMOS Shutdown Register Read/Write Error	The shutdown register for CMOS RAM has failed.
11	Cache memory error	Cache memory is the wrong type or is not properly configured.

## AMIBIOS Displayed Messages

Error messages are displayed in the following format:

```

ERROR Message Line 1
ERROR Message Line 2
Press the <F1> key to continue
    
```

and the system halts. The system does not halt if *Wait for <F1> If Any Error* in *ADVANCED CMOS SETUP* is *Disabled*.

Error Message	Explanation
8042 Gate-A20 Error	Gate A20 on the 8042 keyboard controller is not working. Replace the 8042.
Address Line Short!	Error in the address decoding circuitry on the motherboard.
C: Drive Error	No response from hard disk drive C:. Drive C: may be missing. Run the Hard Disk Utility. Also check the C: hard disk type in STANDARD CMOS SETUP.
C: Drive Failure	No response from hard disk drive C:. It may be necessary to replace the hard disk.
Cache Memory Bad, Do Not Enable Cache!	Cache memory on the motherboard is defective. Run AMIDdiag.
CH-2 Timer Error	Most AT motherboards have two timers. An error occurred in Timer 2.
CMOS Battery State Low	CMOS RAM is powered by a battery. The battery power is low. Replace the battery.
CMOS Checksum Failure	After configuration values are saved, a checksum value is generated for error checking. The previous value is different than the current value. Run AMIBIOS Setup.
CMOS System Options Not Set	The configuration data in CMOS RAM is either corrupt or nonexistent. Run AMIBIOS Setup.
CMOS Display Type Mismatch	The video type in CMOS RAM does not match the type detected. Run AMIBIOS Setup.
CMOS Memory Size Mismatch	The amount of memory on the motherboard is different than the amount in CMOS RAM. Run AMIBIOS Setup.
CMOS Time & Date Not Set	Run STANDARD CMOS SETUP to set the date and time in CMOS RAM.
D: Drive Error	No response from hard disk drive D:. Drive D: may be missing. Run the Hard Disk Utility. Also check the D: hard disk type in STANDARD CMOS SETUP.
D: drive failure	No response from hard disk drive D:. It may be necessary to replace the hard disk.

Diskette Boot Failure	The boot diskette in drive A: is corrupt and cannot boot the system. Use another boot diskette and follow the screen instructions.
Display Switch Not Proper	A video switch on the motherboard must be set to either color or monochrome. Turn the system off, set the switch properly, then power on.
DMA Error	Error in the DMA controller on the motherboard.
DMA Number1 Error	Error in the first DMA channel on the motherboard.
DMA Number2 Error	Error in the second DMA channel on the motherboard.
FDD Controller Failure	AMIBIOS cannot communicate with the floppy disk drive controller. Check all connections after the system is powered down.
HDD Controller Failure	AMIBIOS cannot communicate with the hard disk drive controller. Check all connections after the system is powered down.
INTR Number1 Error	Interrupt channel 1 has failed POST.
INTR Number2 Error	Interrupt channel 2 has failed POST.
Invalid Boot Diskette	AMIBIOS can read the diskette in drive A:, but cannot boot the system with it. Use another boot diskette and follow the screen instructions.
Keyboard Is Locked...Unlock It	The keyboard lock on the system is engaged. The system must be unlocked to continue the boot process.
Keyboard Error	There is a timing problem with the keyboard. Make sure a Keyboard Controller AMIBIOS is installed. Set the <i>Keyboard</i> option in STANDARD CMOS SETUP to <i>Not Installed</i> to skip the keyboard POST routines.
KB/Interface Error	Error in the keyboard connector on the motherboard.
No ROM BASIC	Cannot find a proper bootable sector on either drive A: or drive C:. Cannot find ROM Basic.
Off Board Parity Error	Parity error in memory in an expansion slot. The format:  OFF BOARD PARITY ERROR ADDR (HEX) = (XXXX)  where XXXX is the hex address where the error occurred. Run AMIDiag to find and correct memory problems.
On Board Parity Error	Parity error in motherboard memory. The format is:  ON BOARD PARITY ERROR ADDR (HEX) = (XXXX)  where XXXX is the hex address where the error occurred. Run AMIDiag to find and correct memory problems.
Parity Error ????	Parity error in system memory at an unknown address. Run AMIDiag to find and correct memory problems.

## I/O Autodetect

The AMIBIOS detects serial and parallel ports, floppy controllers, and WD1003-compatible IDE hard disk drive controllers on adapter cards in the system expansion slots. The Mark V Baby Screamer also has two serial ports, one parallel port, a floppy controller, and an IDE hard disk drive controller on the motherboard.

AMIBIOS enables the onboard controllers or ports in a manner which prevents conflicts with the I/O in the expansion slots. For example, if AMIBIOS detects a serial port on the expansion slot, it will program the two onboard serial ports as serial port2 and serial port3. If AMIBIOS cannot resolve the conflict, it generates an error message that there is a conflict. The end user can override the autodetect feature by setting the On Board Serial Port1, On Board Serial Port 2, On Board Parallel Port, On Board IDE, and On Board Floppy options in ADVANCED CHIPSET SETUP.

## BIOS NMI Handler Messages

The AMIBIOS nonmaskable interrupt (NMI) messages are:

ISA NMIs	Explanation
Memory Parity Error at xxxxx	Memory failed. If the memory location is known, it is displayed as xxxxx. If not, the message is <i>Memory Parity Error ????</i> .
I/O Card Parity Error at xxxxx	An expansion card failed. If the address is known, it is displayed as xxxxx. If not, the message is <i>I/O Card Parity Error ????</i> .
DMA Bus Time-out	A device has driven the bus signal for more than 7.8 microseconds.

## POST Memory Test

The only visible POST routine is the memory test:

```

AMIBIOS (C) 1992 American Megatrends Inc.
xxxxx KB OK

Hit <DEL> if you want to run SETUP

(C) American Megatrends
XX-XXXX-XXXXXX-XXXXXXXX-XXXXXX-XXXX-X
    
```

An AMIBIOS Identification string is displayed at the left bottom corner of the screen. Press <Ins> during system boot to display two additional ID strings. These strings contain the options installed in the AMIBIOS, explained in the *AMIBIOS ISA and EISA Technical Reference*. If a problem occurs, copy these strings on a sheet of paper before calling technical support.

Step	Action
1	Enable <i>Wait for &lt;F1&gt; If any Error</i> in ADVANCED CMOS SETUP before using this method.
2	When a problem occurs, freeze the screen by powering on the system and holding a key down on the keyboard to cause a <i>Keyboard Error</i> .
3	The following is displayed after POST completes:  Hit <DEL> if you want to run SETUP  Press <Del> to access AMIBIOS Setup.

## BIOS Configuration Summary Screen

System Configuration (C) Copyright 1985-1991 American Megatrends Inc.			
Main Processor	: 80386	Base Memory Size	: 640 KB
Numeric Coprocessor	: Present	Ext. Memory Size	: 7808 KB
Floppy Drive A:	: 1.2 MB ½	Hard Disk C: Type	: 44
Floppy Drive B:	: 1.44 MB ¼	Hard Disk D: Type	: None
Display Type:	: VGA or EGA	Serial Port(s)	: 3F8
ROM-BIOS Date:	: 07/07/91	Parallel Port(s)	: 378

Video Shadow Is Enabled  
64KB External Cache Is Enabled

# Chapter 4

## AMIBIOS Setup

### BIOS Features

#### **Keyboard Speed Switching**

The end user can increase processor speeds at any time by pressing <Ctrl> <Alt> <+>. Processor speed can be decreased by pressing <Ctrl> <Alt> <->.

#### **Cache Memory Enable**

The end user can enable cache memory at any time by pressing <Ctrl> <Alt> <Shift> <+>, or disable cache by pressing <Ctrl> <Alt> <Shift> <->.

### Setup

The AMIBIOS Setup utility is divided into three parts:

- STANDARD CMOS SETUP,
- ADVANCED CMOS SETUP, and
- ADVANCED CHIPSET SETUP.

#### **STANDARD CMOS SETUP**

STANDARD CMOS SETUP configures and sets system components such as floppy drives, hard disk drives, time and date, monitor type, and keyboard. These options are described in Section 2 on page .

Setup, Continued

**ADVANCED CMOS SETUP**

ADVANCED CMOS SETUP configures advanced system options. ADVANCED CMOS SETUP is discussed in Section 3 on page .

**ADVANCED CHIPSET SETUP**

ADVANCED CHIPSET SETUP configures chipset-specific features and is discussed in Section 4 on page .



## Section 1

### Running AMIBIOS Setup

The system parameters (such as amount of memory, disk drives, video displays, and numeric coprocessors) are stored in CMOS RAM. When the computer is turned off, a back-up battery provides power to CMOS RAM, which retains these parameters.

Each time the system is powered-on, it is configured with these values, unless CMOS RAM has been corrupted. AMIBIOS Setup resides in ROM and is available when the computer is turned on.

If, for some reason, CMOS RAM becomes corrupted, the system is configured with the default values stored in this ROM file. There are two sets of values stored in the ROM file: the BIOS Setup default values and the Power-On default values.

#### **Starting Setup**

When POST has completed, the following message appears:

```
Hit <DEL> if you want to run SETUP
```

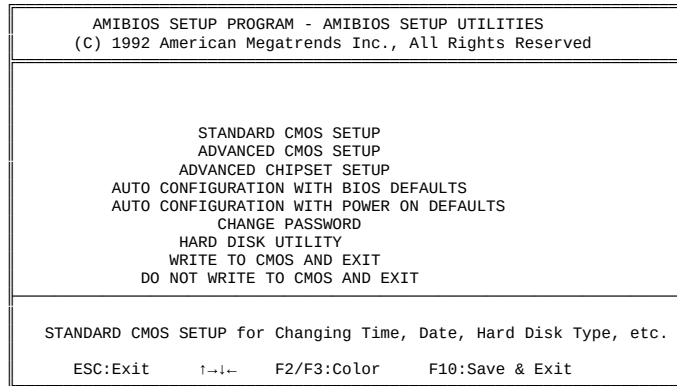
Press <Del> to run AMIBIOS Setup.

## Setup Keys

Keystroke	Action
Esc	Returns to previous screen.
→, ←, ↑, and ↓	Move the cursor from one option to the next.
<PgUp> and <PgDn>; <Ctrl><PgUp> and <Ctrl><PgDn>	Modify the default value of the options for the highlighted parameter. If there are fewer than 10 options, <Ctrl> <PgUp> and <Ctrl> <PgDn> operate like <PgUp> and <PgDn>.
<F1>	Displays Help.
<F2>	Change background colors.
<F3>	Change foreground colors.
<F5>	Restores the values resident when the current Setup session began. These values are taken from CMOS RAM if CMOS RAM was uncorrupted at the start of the session. Otherwise, they will be the BIOS Setup default values.
<F6>	Loads all features in the ADVANCED CMOS SETUP and ADVANCED CHIPSET SETUP with the BIOS Setup defaults.
<F7>	Loads all features in the ADVANCED CMOS SETUP and ADVANCED CHIPSET SETUP with the Power-On defaults.
<F10>	Saves all changes made to Setup and returns to DOS.

**Note:** The default value for <F5>, <F6>, and <F7> is always N. To execute these options, change the N to Y and press <Enter>.

## AMIBIOS Setup Main Menu



## Warning Message

A warning is displayed every time STANDARD CMOS SETUP, ADVANCED CMOS SETUP, or ADVANCED CHIPSET SETUP is selected.

## Auto Configuration With BIOS Defaults

Auto Configuration the BIOS default values, which are best-case values that should optimize system performance. If CMOS RAM is corrupted, the BIOS defaults are automatically loaded.

To use the BIOS defaults, select this option on the Setup Main Menu and press <Enter>. The following appears:

Default values loaded. Press any key to continue.

## Auto Configuration With Power-On Defaults

This option configures the default Power-On values, which do not provide optimal system performance, but are the most stable values. Use this option as a diagnostic aid if the system is behaving erratically.

Select this option on the Setup Main Menu and press <Enter> to use the Power-On defaults. The following appears:

Default values loaded. Press any key to continue.

## Write to CMOS and Exit

The features selected and configured in Standard Setup, ADVANCED CMOS SETUP, ADVANCED CHIPSET SETUP, and New Password Setup are stored in CMOS RAM when this option is selected. A checksum is calculated and written to CMOS RAM. Control is then passed to the BIOS. The following appears:

Write to CMOS and Exit (Y/N)?

Press *N* and <Enter> to return to the Main Menu. Press *Y* and <Enter> to save the system parameters and continue the boot process.

## Do Not Write to CMOS RAM and Exit

This option passes control to AMIBIOS without writing any changes to CMOS RAM.

Press *N* and <Enter> to return to the Main Menu. Press *Y* and <Enter> to continue the boot process without saving any system parameters.

## Section 2

### STANDARD CMOS SETUP

STANDARD CMOS SETUP is the first option on the Main Menu. Press <Enter> at the highlighted selection to display this option. The following screen appears.

#### STANDARD CMOS SETUP Options

##### **Date and Day**

Ranges for each value are shown in the lower right corner of the screen. Move the cursor to the Date field via → or ← and set the Date and Day by pressing <PgUp> and <PgDn> to change values.

##### **Time Configuration**

This option uses a 24-hour clock format. For PM numbers, add 12 to the hour. Enter 4:30 P.M. as 16:30:00. Move the cursor to the Time field via → or ← and set the time by pressing <PgUp> and <PgDn> to change values.

## STANDARD CMOS SETUP Options, Continued

### **Hard Disk Drive C: Hard Disk Drive D:**

Move the cursor to these fields via → or ← and select a hard disk drive type by pressing <PgUp> and <PgDn> to change values. Match the parameters of the hard disk drive in the system to the list on page to find the correct hard drive type. The hard disk drive manufacturer should provide a list of all hard disk drive parameters.

Choose *Not Installed* to configure SCSI drives.

Choose Type 47 to configure IDE drives and drives whose hard disk parameters do not match the parameters for the hard disk drive in the system. Type 47 can be used for both hard disks C: and D:. The parameters for type 47 under Hard Disk C: and Hard Disk D: can be different, permitting user-definable hard disk drives.

If you choose type 47, you must enter all hard drive parameters. These parameters are described below.

### **Configuring ESDI Drives**

Choose hard disk drive type 1 when configuring an ESDI drive to bypass the AMIBIOS and use the Adaptor ROM BIOS on the ESDI controller.

If you select type 47 for an ESDI hard disk drive, AMIBIOS will only use the first 1,024 cylinders on the drive. Many ESDI drives have more than 1,024 cylinders.

## STANDARD CMOS SETUP Options, Continued

### Hard Disk Drive Parameters

Hard disk drive types are identified by the following parameters:

Parameter	Description
Type	The number for a drive with certain identification parameters.
Cylinders	The number of cylinders in the disk drive.
Heads	The number of heads.
Write Precompensation	The size of a 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 is the track number where write precompensation begins.
Landing Zone	This number is the cylinder location where the heads normally park when the system is shut down.
Sectors	The number of sectors per track. MFM drives have 17 sectors per track. RLL drives have 26 and ESDI drives have 34 sectors per track. IDE and SCSI drives have even more sectors per track.
Capacity	The formatted capacity of the drive is the Number of Heads * Number of Cylinders * Number of Sectors per Track * 512 (Number of Bytes per Sector)

## STANDARD CMOS SETUP Options, Continued

### Hard Disk Drive Types

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



32	1024	15	65535	1024	17	128 MB
33	1024	5	1024	1024	17	43 MB
34	612	2	128	612	17	10 MB
35	1024	9	65535	1024	17	77 MB
36	1024	8	512	1024	17	68 MB
37	615	8	128	615	17	41 MB
38	987	3	987	987	17	25 MB
39	987	7	987	987	17	57 MB
40	820	6	820	820	17	41 MB
41	977	5	977	977	17	41 MB
42	981	5	981	981	17	41 MB
43	830	7	512	830	17	48 MB
44	830	10	65535	830	17	69 MB
45	917	15	65535	918	17	114 MB
46	1224	15	65535	1223	17	152 MB
47	Enter the parameters provided by the hard disk drive manufacturer.					

## STANDARD CMOS SETUP Options, Continued

### **Floppy Drive A:**

### **Floppy Drive B:**

Move the cursor to these fields via → or ← and select a hard disk drive type by pressing <PgUp> and <PgDn> to change values. The settings are *360 KB 5¼ inch, 1.2 MB 5¼ inch, 720 KB 3½ inch, 1.44 MB 3½ inch, or Not Installed*. *Not Installed* can be used for diskless workstations.

### **Monitor**

Move the cursor to these fields via → or ← and select a hard disk drive type by pressing <PgUp> and <PgDn> to change values. The settings are *Monochrome, Color 40x25, VGA/PGA/EGA, Color 80x25, or Not Installed*. *Not Installed* can be used for network file servers.

### **Keyboard**

Move the cursor to these fields via → or ← and select a hard disk drive type by pressing <PgUp> and <PgDn> to change values. The settings are *Installed or Not Installed*. Use *Not Installed* in a keyboardless system such as a file server.



## Section 3

### ADVANCED CMOS SETUP

The following options appear in ADVANCED CMOS SETUP. These options are described in this section.

Typematic Rate Programming,  
Typematic Rate Delay,  
Typematic Rate (Chars/Sec),  
Above 1 MB Memory Test,  
Memory Test Tick Sound,  
Memory Parity Error Check,  
Hit <DEL> Message Display,  
Hard Disk Type 47 RAM Area,  
Wait for <F1> if Any Error,  
System Boot Up Num Lock  
Weitek Processor,  
Floppy Drive Seek at Boot,  
System Boot Up Sequence,  
System Boot Up CPU Speed  
Fast Gate A20 Option,  
Turbo Switch Option,  
Password Checking Option, and  
Shadow Ram Option.

## Help Screens

ADVANCED CMOS SETUP has a series of help screens, accessed by pressing <F1>, which will display the settings for all ADVANCED CMOS SETUP options.

## Warning Message

A warning message is displayed when ADVANCED CMOS SETUP is selected. Press any key to continue.

## ADVANCED CMOS SETUP Screen

The ADVANCED CMOS SETUP screen is shown below. Use the ↑ or ↓ keys to scroll through the options.

```
AMIBIOS SETUP PROGRAM - ADVANCED CMOS SETUP
(C) 1992 American Megatrends Inc., All rights reserved

Typematic Rate Programming : Disabled
Typematic Rate Delay (msec): 250
Typematic Rate (Chars/Sec) : 30.0
Above 1 MB Memory Test    : Disabled
Memory Test Tick Sound    : Disabled
Memory Parity Error Check  : Enabled
Hit <DEL> Message Display  : Disabled
Hard Disk Type 47 RAM Area : 0:300
Wait for <F1> If Any Error : Enabled
System Boot Up Num Lock   : On
Weitek Processor          : Absent
Floppy Drive Seek At Boot : Disabled
System Boot Up Sequence   : C:, A:
System Boot Up CPU Speed  : High
Fast Gate A20 Option      : Enabled
Turbo Switch Function     : Enabled
Password Checking Option  : Disabled
Shadow RAM Option        : Disabled

=====|ESC:Exit  ↑↓:Sel (Ctrl)Pu/Pd:Modify  F1:Help  F2:Color |=====
=====|F5:Old Values  F6:BIOS Setup Defaults  F7:Power-On Defaults |=====
```

## ADVANCED CMOS SETUP Options

### **Typematic Rate Programming, Typematic Rate Delay, and Typematic Rate**

Typematic Rate Programming enables or disables the following two options. Typematic Rate Delay (select 250, 500, 750, or 1,000 milliseconds) and Typematic Rate (select 6, 8, 10, 12, 15, 20, 24, or 30 characters per second) control the speed at which a keystroke is repeated. The selected character is displayed when a key is held down after a delay set by the Typematic Rate Delay. It then repeats at a rate set by the Typematic Rate value.

### **Above 1 MB Memory Test**

The settings are Enabled or Disabled. This feature, when enabled, will execute the POST memory routines on the RAM above 1 MB (if present on the system). If disabled, AMIBIOS only checks the first 1 MB of RAM.

### **Memory Test Tick Sound**

The settings are Enabled or Disabled. Enables or disables the ticking sound during the memory test.

### **Memory Parity Error Check**

The settings are Enabled or Disabled. Enables or disables parity error checking of all RAM. Parity error checking slows system boot speed slightly.

### **Hit <DEL> Message Display**

Disabling this option prevents

Hit <DEL> if you want to run Setup

from appearing when the system boots. The settings are Enabled or Disabled.

## ADVANCED CMOS SETUP Options, Continued

### **Hard Disk Type 47 RAM Area**

You can specify a user-definable hard disk type for drive C: and drive D:. The type 47 drive parameters must be entered in STANDARD CMOS SETUP (see page ). This option specifies the type 47 data storage area - 0:300h in lower system RAM or in the top 1 KB of applications memory, starting at address 639K or 511K (depending on how much base memory the system has). Type 47 data is stored in shadow RAM if shadowing is enabled. The following graphic illustrates type 47 data storage.

## ADVANCED CMOS SETUP Options, Continued

### **Wait For <F1> If Any Error**

When disabled, AMIBIOS does not halt after displaying a POST error message and

Press <F1> to continue

### **System Boot Up Num Lock**

Turns off *Num Lock* when the system is powered so you can use the arrow keys on both the numeric keypad and the keyboard. AMIBIOS default is *Num Lock* on. The settings are On or Off.

### **Weitek Processor**

Specifies that a Weitek numeric processor (WTK3167) is configured. The settings are Absent or Present.

### **Floppy Drive Seek At Boot**

The settings are Enabled or Disabled. The default for this option is *Disabled* to allow a fast boot and to decrease the possibility of damage to the heads.

### **System Boot Up Sequence**

The settings are *C:,A:* or *A:,C:*. AMIBIOS boots from floppy drive A:, and if unsuccessful, boots from hard disk drive C:.

### **System Boot Up CPU Speed**

Sets the speed at which the system boots. The settings are *High* or *Low*.



## ADVANCED CMOS SETUP Options, Continued

### **Fast Gate A20 Option**

The settings are Enabled or Disabled. Gate A20 controls the ability to access memory addresses above 1 MB by enabling or disabling access to the processor address line A20. To remain XT-compatible and be able to access conventional memory (from 0 - 1024K), address line A20 must always be low, so Gate A20 must be disabled. However, some software programs both enter protected mode and shut down through AMIBIOS, so A20 must be constantly enabled or disabled. The Fast Gate A20 hardware circuitry is an alternate method of enabling Gate A20, which speeds up programs that constantly change from conventional memory to memory addresses above 1 MB.

### **Turbo Switch Option**

This option enables or disables use of the turbo switch. The settings are Enabled or Disabled.

### **Password Check Option**

This option allows the end user to enable password check every time the system boots or runs Setup. The settings are Setup or Always. If Always is chosen, a user password prompt appears every time the system is turned on. If Setup is chosen, the password prompt does not appear when the system is turned on but appears when the end user runs Setup.

### **Shadow RAM Option**

ROM shadow is a technique in which code is copied from slower ROM to faster RAM. AMIBIOS is then executed from the RAM. In the Mark V Baby Screamer AMIBIOS, the system and video BIOS are shadowed from ROM to RAM. The settings are Enabled or Disabled.

## Section 4

### ADVANCED CHIPSET SETUP

Only advanced users should modify the values in these options. The warning screen appears when ADVANCED CMOS SETUP is selected. Press any key to continue. The following screen is displayed.

# ADVANCED CHIPSET SETUP Options

## On Board Serial Port 1

Enables or disables serial port 1 on the Mark V Baby Screamer motherboard. The settings are I/O ports 3F8h - 3FFh, I/O ports 3E8h -3EFh, or *Disabled*.

If the configuration data stored in CMOS RAM is corrupted when the system is powered on, AMIBIOS automatically configures onboard serial port 1 according to the presence or absence of serial ports on adapter cards in the expansion slots (offboard serial ports). Autoconfiguration will only occur when CMOS RAM data is corrupted. The result for serial port 1 is:

If the Offboard Serial Port is	the Onboard Serial Port 1 is Autoconfigured as	
None	3F8h	Can be disabled or changed to 3E8h via ADVANCED CHIPSET SETUP.
3F8h	3E8h	Can be disabled via ADVANCED CHIPSET SETUP. If changed to 3F8h, an I/O port address conflict occurs.
3E8h	3F8h	Can be disabled via ADVANCED CHIPSET SETUP. If changed to 3E8h, an I/O port address conflict occurs.
3F8h, 3E8h	Disabled	If changed to 3F8h or 3E8h, an I/O port address conflict occurs.

P4 is serial port 1 on the Mark V Baby Screamer motherboard. If disabled through Setup, do not attach any device to P4 or to any cable attached to P4. J22 is used to configure the interrupt request line (IRQ) for onboard serial port 1. The J22 settings are:

Jumper	Pins Shorted	Description
J22	Pins 1-2	IRQ3 selected for onboard serial port 1.
J22	Pins 2-3	IRQ4 selected for onboard serial port 1 (Default).

If onboard serial port 1 is disabled, you can remove the jumper block from J22 to disable the onboard serial port 1 interrupt.

## ADVANCED CHIPSET SETUP Options, Continued

### On Board Serial Port 2

This option enables or disables serial port 2 on the Mark V motherboard. The settings are I/O Ports *2F8h - 2FFh*, *2E8h - 2EFh*, or *Disabled*.

If the configuration data stored in CMOS RAM is corrupted when the system is powered on, AMIBIOS automatically configures onboard serial port 2 according to the presence or absence of serial ports on adapter cards in the expansion slots (offboard serial ports). Autoconfiguration only occurs when CMOS RAM data is corrupted. The result for serial port 2 is:

If the Offboard Serial Port is	the Onboard Serial Port 2 is Autoconfigured as	
None	2F8h	Can be disabled or changed to 2E8h via ADVANCED CHIPSET SETUP.
2F8h	2E8h	Can be disabled via ADVANCED CHIPSET SETUP. If changed to 2F8h, an I/O port address conflict occurs.
2E8h	2F8h	Can be disabled via ADVANCED CHIPSET SETUP. If changed to 2E8h, an I/O port address conflict occurs.
2F8h, 2E8h	Disabled	If changed to 3F8h or 3E8h, an I/O port address conflict occurs.

P1 is serial port 2 on the Mark V Baby Screamer motherboard. If disabled through Setup, do not attach any device to P1 or to any cable attached to P1. J21 is used to configure the interrupt request line (IRQ) for onboard serial port 2. The J21 settings are:

Jumper	Pins Shorted	Description
J21	Pins 1-2	IRQ4 selected for onboard serial port 2.
J21	Pins 2-3	IRQ3 selected for onboard serial port 2 (Default).

If onboard serial sort 2 is disabled, you can remove the jumper block from J21 to disable the onboard serial port 2 interrupt.

## ADVANCED CHIPSET SETUP Options, Continued

### On Board Parallel Port

This option enables or disables the onboard parallel port. The settings are I/O port address *378h-37Fh*, *278h-27Fh*, or *Disabled*. P5 is the onboard parallel port. If the configuration data stored in CMOS RAM is corrupted when the system is powered on, AMIBIOS automatically configures the onboard parallel port according to the presence or absence of parallel ports on adapter cards in the expansion slots (offboard parallel ports). Autoconfiguration only occurs when CMOS RAM data is corrupted. The result for the onboard parallel port is:

If the Offboard Parallel Port is	the Onboard Parallel Port is Autoconfigured as	
None or 3BCh	378h	Can be disabled or changed to 278h via ADVANCED CHIPSET SETUP.
378h	278h	Can be disabled via ADVANCED CHIPSET SETUP. If changed to 378h, an I/O port address conflict occurs.
278h	378h	Can be disabled via ADVANCED CHIPSET SETUP. If changed to 278h, an I/O port address conflict occurs.
378h, 278h	Disabled	If changed to 378h or 278h, an I/O port address conflict occurs.

P5 is the parallel port on the Mark V motherboard. If disabled through Setup, do not attach any device to P5 or to any cable attached to P5. J23 is used to configure the interrupt request line (IRQ) for the onboard parallel Port. The J23 settings are:

Jumper	Pins Shorted	Description
J23	Pins 1-2	IRQ5 selected for the onboard parallel port.
J23	Pins 2-3	IRQ7 selected for the onboard parallel port (Default).

If the onboard parallel port is disabled, you can remove the jumper block from J23 to disable the onboard parallel port interrupt.

## ADVANCED CHIPSET SETUP Options, Continued

### **On Board Floppy Controller**

The settings are Enabled or Disabled. Enable to use the onboard floppy controller. Make sure that the floppy cable is connected to P6 on the motherboard.

### **On Board IDE Controller**

The settings are Enabled or Disabled. Enable to use the onboard IDE hard disk drive controller. Make sure that the IDE cable is connected to P7 on the motherboard.

### **8-bit DMA Active Clock**

The settings are 2, 3, or 4 CLKs. This option sets the number of clock cycles that the command is active for 8-bit DMA cycles.

### **16-bit DMA Active Clock**

The settings are 2, 3, or 4 CLKs. This option sets the number of clock cycles that the command is active for 16-bit DMA cycles.

### **DMA Clocks**

This option sets the DMA clock rate. The settings are SCLK/2 or SCLK.

### **Command Delay, 8-bit Cycle**

If Yes is selected, this option sets one extra command delay for 8- and 16-bit I/O and 8-bit memory cycles. The settings are Yes or No.

## ADVANCED CHIPSET SETUP Options, Continued

### **Command Delay, 16-bit Cycle**

If Yes is selected, this option sets one extra command delay for 16-bit memory cycles. The settings are Yes or No.

### **8-bit I/O Wait States**

The PC AT-compatible value is 4 wait states. The settings are 4 wait states or 5 wait states.

### **16-bit I/O Wait States**

The PC AT-compatible setting is 0 wait states. The settings are 0 or 1 wait states.

## Section 5

### AMIBIOS Password Support

The AMIBIOS Setup has an optional password feature. The system can be configured so the end user is required to enter a password every time the system boots, or when the end user runs Setup.

#### Changing a Password

The password check option is enabled in ADVANCED CMOS SETUP (Page ). The password check function is enabled by choosing either *Always* or *Setup*.

The password (1 - 6 characters) is stored in CMOS RAM.

To change a password, select the Change Password option from the main Setup screen and press <Enter>. The following prompt appears.

Enter CURRENT Password:



## Changing a Password, Continued

The first time this option is selected, enter a password and press <Enter>. The characters entered are not displayed. After the current password has been correctly entered, the end user is prompted for the new password.

After the new password is entered, retype it and press <Enter>. If the password confirmation is incorrect, an error message appears. If the new password is entered without error, press <Esc> to return to the Setup Main Menu. The password is stored in CMOS RAM after Setup completes. The next time the system boots, the end user is prompted for the password.

### **Password Options Control Prompt**

When and if the prompt appears is dependent upon the options chosen in ADVANCED CMOS SETUP. If *Always* was set in ADVANCED CMOS SETUP, the prompt appears each time the system is powered on. If *Setup* was set in ADVANCED CMOS SETUP, the prompt does not appear when the system is powered on, but appears each time Setup is run.

### **Using a Password**

Enter the new password when the password prompt appears and press <Enter>. Use the default password if CMOS RAM is corrupted. The end user should keep a record of the new password when the password is changed. If the end user forgets the password and password protection is enabled, the only way to boot the system is to disable CMOS RAM by removing the battery for at least 20 minutes, replacing it, rebooting, and reconfiguring.

## Section 6

### Hard Disk Utility

The AMIBIOS includes three hard disk utilities:

Utility	Purpose	Turn to
Hard Disk Format	Performs a low level format of the hard drive(s). Read the system or hard disk drive documentation to find out if the hard disk has been preformatted.	Page
Auto Interleave	Determines the optimum interleave factor and then performs a low level format of the hard disk drive.	Page
Media Analysis	Analyzes each hard disk drive track to determine whether it is usable. The track is labeled bad if unusable.	Page 55

The hard disk utility error messages are described on page .

These routines work on drives that use the MFM, RLL, ARLL, or ESDI data recording techniques. *They do not work on IDE or SCSI Disk Drives.*

**Warning**

*The AMIBIOS Hard Disk Utilities destroys all hard disk data. Back up the data on the hard disk before running this utility.*

## When to Use AMIBIOS Hard Disk Utilities

When	Conditions	Run...
Installing a new hard disk.	The hard disk drive manufacturer provided a list of bad tracks, the system documentation includes the optimum interleave factor, and the drive is preformatted .	None
Installing a new hard disk.	You do not have a list of bad tracks.	Media Analysis
Installing a new hard disk.	You do not know the optimum interleave factor.	Auto Interleave
Installing a new hard disk.	The drive is not formatted.	Hard Disk Format
Installing a used hard disk drive.	N/A	All Hard Disk Utilities

When Hard Disk Diagnostics is selected, the following screen appears.

Select an option and press <Enter>.

## Hard Disk Format Utility

**Warning**

*The Hard Disk Format utility destroys all hard disk data. Back up the data on the hard disk before running this utility.*

This routine does not work on IDE or SCSI drives. Use Hard Disk Format to integrate a new hard disk to the system, or to reformat a used hard disk which has developed bad tracks as a result of aging or poor handling. Select Media Analysis to find bad tracks. The following screen appears when Hard Disk Format is selected.

## Hard Disk Format Utility, Continued

Answer the questions on the screen. The first two questions are already completed if only one hard disk drive was selected in STANDARD CMOS SETUP and the cursor is on *Interleave*. The Disk Drive Type is read from CMOS RAM. The interleave factor can be selected manually or determined by the Auto Interleave routine.

The hard disk drive manufacturer usually provides a list of bad tracks. Enter these tracks. They are then labeled as bad to prevent data from being stored on them. The following screen is displayed after entering *Y* in Mark Bad Tracks, pressing <Enter>, and selecting add, delete, revise, or clear from the Bad Track Edit Menu. Type *Y* and press <Enter>. A warning screen appears. Press any key to continue.

<p style="text-align: center;"><i>Warning</i> Data on the hard drive will be irrevocably lost.</p>
--

## Auto Interleave Utility

**Warning**

*The Auto Interleave utility destroys hard disk data.  
Back up the data on the hard disk before running  
this utility.*

The Auto Interleave utility calculates the optimum interleave factor through trial and error by measuring the transfer rate for four different interleave values. To determine the best interleave factor, the system formats a portion of the hard disk for each transfer rate calculated. The cylinders, heads and sectors formatted for each value is displayed in the activity box. It does not work on IDE or SCSI drives.

Select Auto Interleave on the main Hard Disk Utility Screen and press <Enter>. The following appears.

The cursor is on *Mark Bad Tracks*. The default is *N*. To mark additional bad tracks, type *Y* and press <Enter>. After selecting options from the Bad Tracks Edit Menu, press <Esc>. Type *Y* and press <Enter> to proceed with the Auto Interleave process. A warning screen appears. Press <Enter> to return to the main Hard Disk Utility screen. To proceed, type *Y* and press <Enter>.

## Media Analysis Utility

The Media Analysis utility performs a series of tests to locate bad or damaged tracks on the hard disk as a result of aging or poor handling. This utility locates all bad tracks and lists them in the Bad Track List Box. Since this test writes to all cylinders and heads on the hard disk to verify any bad tracks, the test requires several minutes to complete. For best results, run this test in its entirety. Media Analysis does not work on IDE or SCSI drives.

Select *Media Analysis* from the main Hard Disk Utility Menu and press <Enter>. The following screen appears.

The cursor is on *Proceed*. The warning screen appears. Press <Enter> to stop. The main Hard Disk Utility screen appears. Type Y and press <Enter> to perform the hard disk drive analysis.

## Hard Disk Utility Error Messages

### Initialization Errors

Message	Explanation
No Hard Disk Installed	There is no hard disk drive in the system but Hard Disk Utility was selected.
FATAL ERROR Bad Hard Disk	No response from the hard disk, or the hard disk is not repairable. Check all cable and power connections to the hard disk.
Hard Disk Controller Failure	Error response from the reset command sent to the hard disk controller. The controller may not be seated properly in the BUS slot.
C: (D:) Hard Disk Failure	The hard disk drive (C: or D:) is not responding to commands. Check power and cable connections to the hard disk.



# Hard Disk Utility Error Messages, Continued

## Operation Errors

Message	Explanation
Address Mark Not Found	The address mark (initial address) on the hard disk could not be found.
Attachment Failed to Respond	No response has been received from the hard disk drive.
Bad ECC on Disk Read	When the hard disk drive utility writes to the disk, it also calculates an ECC (Error Correction Code) value for the data being written. This ECC value is written to the drive and then read back. The value read back is different from the one calculated.
Bad Sector Flag Detected	An operation was performed on a sector that has been flagged as bad.
Controller Has Failed	A diagnostic command was issued to the controller failed.
Drive Not Ready	An operation on the hard disk drive has timed out. The hard disk drive utility has waited beyond a preset specified time limit.
Drive Parameter Activity Failed	A reset command was sent to the controller followed by drive parameters. Using these parameters, the controller did not get a response from the hard disk. Make sure the drive type is correct.
ECC Corrected Data Error	The ECC value (explained above) read from the disk is not the same value which was written to the disk. The data is not correct. An attempt was made to correct the data, but the ECC value is not corrected.
Requested Sector Not Found	The requested sector could not be found.
Reset Failed	The reset command did not properly reset the hard disk.
Seek Operation Failed	A seek command failed. A seek operation is the act of finding a particular sector on the hard disk.
Undefined Error - Command Aborted	An unidentifiable error condition occurred.
Write Fault on Selected Drive	A write fault occurred during the write operation on the hard disk drive.



# Appendix A

## Upgrading to 256 KB Cache Memory

To upgrade to 256 KB cache memory, use 64 KB x 4 static RAM chips. There are ten pieces in this part, available from American Megatrends (part numbers):

CPU Speed	Access Time	Part Number
33 MHz	15 ns	Motorola® MCM6208-15
40 MHz	12 ns	Toshiba TC5546P-12

The Cache Selection Jumper settings are:

Jumper/ Location	64 KB Cache	256 KB Cache
J50	OPEN	Short pins 1-2 and pin 3-4
J51	OPEN	Short pins 1-2 and pins 3-4
U32	PRESENT	ABSENT

### Motherboard Speed Selection

The following table shows the jumper settings to select the motherboard speed.

Jumper	33 MHz	40 MHz
J37	OPEN	OPEN
J35	Short pins 2-3	Short pins 1-2
U38	Present	Present

U38 is occupied by a 22-pin 64 KB x 1 SRAM with a 12 ns access time.

## Upgrading Cache Memory, Continued

### Upgrade Procedure

Step	Action
1	Move all SW1 switches to ON.
2	Remove all old SRAM chips from U31, U32, U34, U37, U39, U41, U42, U44, U45, U46, and U47.
3	<p>Place the new 24-pin 64 KB x 4 static RAM chips in U31, U34, U37, U39, U41, U42, U44, U45, U46, and U47. Make sure that the pins are straight and that all pins are inserted in the receptacles.</p> <p><i>Do not install a Static RAM chip in U32 when upgrading to 256 KB cache memory.</i></p>
4	Turn the system on. The Boot Screen should display 256 KB of cache memory. If 256 KB does not display, check for bent pins on the new SRAM chips.

SRAM Locations

## SRAM Type by Location

The following table shows the SRAM types that should be installed for each SRAM socket for both 64 KB and 256 KB Cache Memory at 33 MHz operation.

Socket	64 KB Cache	256 KB Cache
U31	16 KB x 4	64 KB x 4
U32	16 KB x 4	Not Installed
U34	16 KB x 4	64 KB x 4
U37	16 KB x 4	64 KB x 4
U38	64 KB x 1	64 KB x 1
U39	16 KB x 4	64 KB x 4
U41	16 KB x 4	64 KB x 4
U42	16 KB x 4	64 KB x 4
U44	16 KB x 4	64 KB x 4
U45	16 KB x 4	64 KB x 4
U46	16 KB x 4	64 KB x 4
U47	16 KB x 4	64 KB x 4

U32 is a 22-pin SRAM DIP. All other SRAMs are 22/24 pins DIPs.

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