American Megatrends, Inc.

Series 62

Baby Screamer LC

80386 Motherboard

User's Guide

Revision History

7/8/92   Initial printing.

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Preface

To the OEM

Thank you for purchasing the high performance Series 62 Baby Screamer LC AT-compatible motherboard. It is assumed that you have also licensed the rights to use the American Megatrends documentation for the Baby Screamer LC.

This manual was written for the OEM to assist in the proper installation, use, and operation of the Baby Screamer LC motherboard. This manual is not meant to be read by the computer owner who purchases a computer with the Baby Screamer LC 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 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, Uma S. Monda, Vivek Saxena, and Robert Cheng.

Packing Slip

You should have received the following items:

- Baby Screamer LC motherboard, and the
- *Baby Screamer LC Motherboard User's Guide.*

Chapter 1

Introduction

Dimensions

The 80386 Baby Screamer LC is an IBM® AT®-compatible motherboard, approximately 8.6 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.
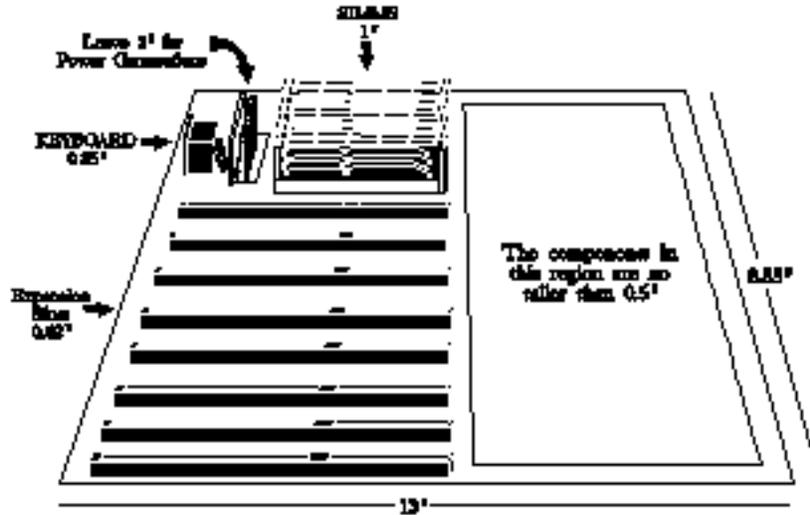
Series 62 Baby Screamer LC

Description

Microprocessor

The Baby Screamer LC motherboard is equipped with a 25 or 33 MHz Intel 80386DX.

Processor Speeds

The Baby Screamer LC operates at either of two processor speeds. The high speed is 25 or 33 MHz. The low speed is about 8 MHz. The processor speed is selected through the keyboard or via the Turbo switch connected to J8.

Cache Memory

The Baby Screamer LC can have 64 KB of two-way set-associative or 128 KB of direct-mapped cache memory. Cache memory is supplemented by a four-byte doubleword write buffer that allows it to operate at zero read and write wait states.

The cache memory operates on up to 128 MB of system memory.

System Memory

The Baby Screamer LC can have up to 128 MB on the motherboard. The Baby Screamer LC uses 256 KB x 9, 1 MB x 9, 4 MB x 9 SIMMs, or 16 MB x 9 SIMMs (Single Inline Memory Modules). The SIMM memory speed must be 70 ns.

Turbo Switch

The Baby Screamer LC has both hardware and software speed switching. Software speed switching is via the BIOS <Ctrl> <Alt> <+ or -> keychords. Hardware speed switching is via a turbo switch.

ROM

The Baby Screamer LC has 64 KB of ROM for the system BIOS, BIOS Setup, and hard disk utilities.

BIOS Shadowing

The system BIOS is always shadowed and cached. The Video BIOS memory area from C0000h–C7FFFh can be shadowed and cached.

AMIBIOS

The AMIBIOS used in the Baby Screamer LC has a built-in Setup utility, built-in hard disk drive utilities, user-definable hard disk drive types, and can configure systems with no monitor, floppy drive, or keyboard.

Real Time Clock and CMOS RAM with Built-in Battery

The Baby Screamer LC has a built-in Dallas Semiconductor DS1287 Real Time Clock/CMOS RAM chip that has a built-in rechargeable 3.6V battery. The Baby Screamer LC has 128 bytes of battery-backed CMOS RAM to store system configuration information.

Math Coprocessor Socket

The Baby Screamer LC has a socket for an optional Weitek® 3167 math coprocessor. It also has a slot for an Intel 80387, Cyrix® 83D87, or other 80387-compatible coprocessor.

Expansion Slots

The AM Baby Screamer LC has eight 16-bit expansion slots with 8 MHz bus timing.

System Support Functions

The Baby Screamer LC 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.
- 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 crystal-controlled real time clock with 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.	Inspect the cardboard carton for obvious damage. If damaged, call Technical Support at 404-246-8600. Leave the Baby Screamer LC motherboard in its original packing.
2.	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.
3.	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.
4.	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.
5.	If the motherboard is undamaged, it is ready to be installed.

Installation Steps

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

Step	Action	Turn to
1	Set switch and jumper options	Page 8
2	Install memory	Page 9
3	Install coprocessors	Page 12
4	Install motherboard	Page 14
5	Connect the power supply	Page 16
6	Connect the keyboard	Page 17
7	Connect cables	Page 18
8	Install adapter cards	Page 20
9	Perform initial test and configuration	Page 22

Standoffs and mounting screws are not supplied with the 80386 Baby Screamer LC 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 two-position DIP switch. See the graphic on page 6 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.

J100 Cache Size Select

J100 is a two-pin single-inline berg that selects the cache size. Place a shorting bridge on pins 1-2 (CLOSED) if 128 KB of cache memory is installed. Remove the shorting bridge (OPEN) if 64 KB of cache memory is installed.

Step 2 Install Memory

The main memory subsystem on the Baby Screamer LC motherboard consists of two 32-bit memory banks of four SIMM (Single Inline Memory Module) sockets each. The SIMM banks accept 256 KB, 1 MB, 4 MB, or 16 MB x 9 bit SIMMs.

Memory Configuration

The Baby Screamer LC supports the following motherboard memory configurations:

Bank0	Bank1	Total Memory
256 KB x 9 SIMMs	None	1 MB
256 KB x 9 SIMMs	256 KB x 9 SIMMs	2 MB
1 MB x 9 SIMMs	None	4 MB
1 MB x 9 SIMMs	1 MB x 9 SIMMs	8 MB
4 MB x 9 SIMMs	None	16 MB
4 MB x 9 SIMMs	4 MB x 9 SIMMs	32 MB
16 MB x 9 SIMMs	None	64 MB
16 MB x 9 SIMMs	16 MB x 9 SIMMs	128 MB

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

Selecting SIMMs

The SIMMs must meet the following specifications:

Parameter	Specification
Page Mode	Fast
Refresh	CAS before RAS
t^{CAC}	≤ 20 ns
t^{RAC}	≤ 70 ns
t^{AA}	≤ 45 ns
t^{RP}	70 ns
t^{CPA}	≤ 45 ns

SIMM Part Numbers

Memory Type	Manufacturer	Part Number
1 MB x 9	Fujitsu®	MB85235-70
	Toshiba®	THM91070AS-70 THM91000AS-70
	Motorola®	MCM91000S-70 MCM91430S-70
	Oki®	MSC2312A-704S9
	NEC®	MC-42100A9-70
	Samsung®	KMM591000AN-7
	Siemens	HYM910005-70
4 MB x 9	Motorola	MCM94000A-70
	Samsung	KMM594000A-70
	Oki	MSC2340-70459
16 MB x 9	Mitsubishi	MH16M09J-7
	Mitsubishi	MH16M09TJ-7
	Samsung	KMM5916000-7

Chapter 2 - Installation

Installing SIMMs

Both Bank 0 and Bank 1 have four SIMM sockets. Use 256 KB x 9, 1 MB x 9, 4 MB x 9, or 16 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.
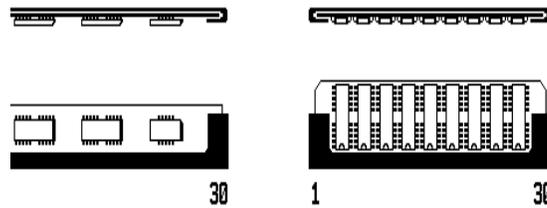
Types of SIMM Modules

Step 3 Install Coprocessor

The 80386 Baby Screamer LC 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	WTL3167-025
33 MHz	80387-33	83D87-33	WTL3167-033

Installing the WTK3167 on the Motherboard

U22 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 U22. 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 BIOS Setup. See the Advanced CMOS Setup Section on page 39.
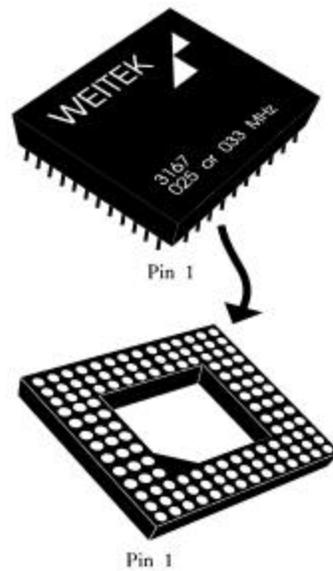
Installing a Cyrix or Motherboard   **Intel coprocessor on the**

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.

Fist, enable the *Numeric Coprocessor* option in Advanced CMOS Setup in the BIOS Setup utility (see page 41).

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.

Pin 1

Cyrix FasMath
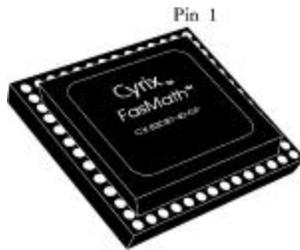
Cyrix 83D87 Coprocessor

Test for Math Coprocessor

The AMIBIOS displays a System Configuration screen at the end of BIOS 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

Pin 1

Intel 80387 Coprocessor

to make sure that it is fully inserted, and then power the system up again. If the same result occurs, call Technical Support at 404-246-8600.

Step 4 Install the Motherboard

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

Chapter 2 - Installation
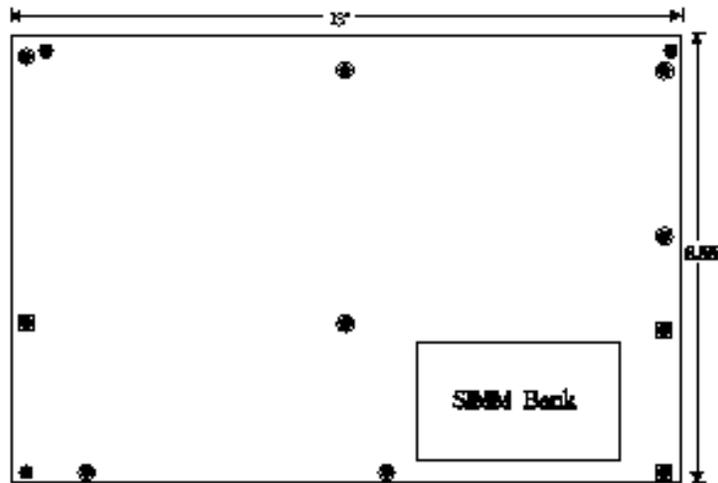
Step	Action
a	Place the chassis for the motherboard on an anti-static mat.
b	Connect the chassis to ground to avoid static damage during installation.
c	Connect an alligator clip with a wire lead to any unpainted part of the chassis.
d	Ground the other end of the lead at the same point as the mat and the wristband.
e	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.
f	Push four nylon standoffs from the solder side of the motherboard in the holes provided for them. The standoffs lock in place.
g	Find the slots provided for the standoffs on the chassis.
h	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 you. The edge connectors for the adapter cards are on the left.
i	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.
j	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.

AT-compatible power supplies have two six-pin connectors that are inserted in P1 and P2. The six-pin connector with three red wires and two black wires is connected to P2 and the remaining 6-pin connector is connected to P1.

Chapter 2 - Installation
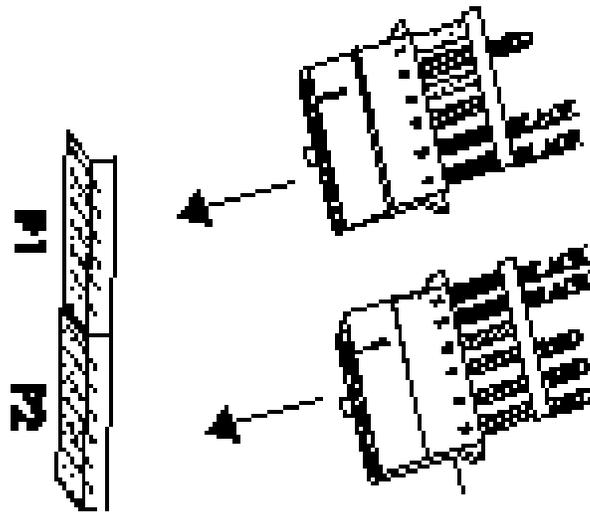
The connectors should be keyed to prevent connecting the plugs to the wrong connectors. The keys on the connector must be cut to fit on some power supplies. Key 6 on the top of P2 should have been cut. Key 3 on the top of P1 should have been removed. If these keys are still in place, remove them. See the following figure for the key locations.

Step 6 Connect   the Keyboard

The keyboard
labeled KEYBRD and
AT-compatible
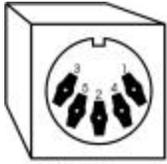
5-Pin Keyboard
Connector

P2

P1
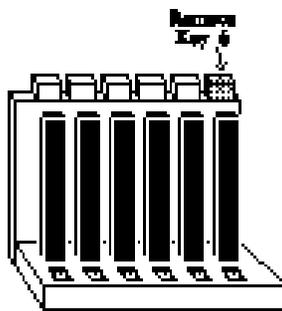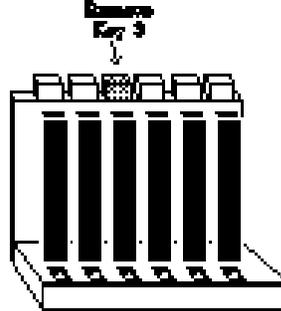
connector is a five-pin DIN socket
J1. It will accept a regular IBM
keyboard.

Pin	Assignment
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.

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

- Reset Switch cable to J6.
- Speaker cable to J7.
- Keyboard Lock cable to J14.
- Turbo LED cable to J13.
- Hardware Deturbo Switch to J8.

Connect the Reset Switch Connector

J6 is a two-pin single-inline berg that should be attached to the externally-mounted reset switch via a two-wire cable. When this switch is pressed, the system will perform a hard reset. Pin 1 is ground and Pin 2 is Hard Reset. See the following figure.

Chapter 2 - Installation

Step 7 Connect Cables, Continued

Connect the Speaker Cable

J7 is a four-pin single-inline berg that should be attached to the system speaker via a four-wire cable. Pin 1 on the motherboard is labeled. The J7 pinout is:

Pin	Descript
1	Data Out
2	Key
3	Ground
4	VCC

Connect the Keyboard Lock Connector

J14 is a five-pin single-inline berg that should be attached to the keyboard lock via a five-wire cable. This connector is keyed with a blank hole.

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

J13 Turbo LED

J13 is a two-pin berg that should be attached to the externally-mounted Turbo LED via a two-wire cable. The bipolar LED lights when the board runs at high speed. Connect the Turbo LED to J13.

J8 Turbo Switch

J8 is a two-pin berg that connects to a bipolar hardware speed selection switch on the chassis.

Step 8 Install Adapter Cards

The 80386 Baby Screamer LC 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	OWS-
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

Baby Screamer LC Motherboard User's Guide

Step 9 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. If the system operates normally, a display should appear on the monitor. The BIOS Power On Self Test (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 24) that 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.

Configure the System

Run AMIBIOS Setup. 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 35.

Chapter 2 - Installation

Chapter 3

BIOS Power-On Self Test (POST)

The AMIBIOS provides all IBM standard POST routines, as well as enhanced AMIBIOS POST routines. AMIBIOS POST supports CPU internal diagnostics. AMIBIOS POST codes are accessible via the Manufacturing Test Port (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 BIOS error messages are explained on page 25. A prompt to press <F1> can also appear with displayed errors.

Beep Codes

Errors can occur during POST (Power On Self Test), performed every time the system is powered on. Fatal errors are communicated through a series of audible beeps. 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 the BIOS can initialize the system video display, it displays error messages. Often, these messages (listed on page 25) allow the system to continue to boot.

AMIBIOS Beep Codes

Beeps	Error message	Description
1	Refresh Failure	The memory refresh circuitry on the motherboard is faulty.
2	Parity Error	Parity error in the first 64 KB memory block.
3	Base 64 KB Memory Failure	Memory failure in the first 64 KB memory block.
4	Timer Not Operational	Memory failure in the first 64 KB of memory, or Timer Number1 on the motherboard is not functioning.
5	Processor error	The CPU on the motherboard generated an error.
6	8042 - Gate A20 Failure	Gate A20 on the keyboard controller (8042) allows the CPU to operate in protected mode. The BIOS cannot switch to protected mode.
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 the BIOS.
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
```

The message is displayed first and then

```
Press the <F1> key to continue
```

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

```
RUN SETUP UTILITY.
```

may also appear. Press <F1> to run AMIBIOS Setup if this message is displayed.

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. 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 AMIDiag.
CH-2 Timer Error	Most AT motherboards have two timers. An error occurred in timer Number2.
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 by the BIOS. 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. 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	Some systems require a video switch on the motherboard 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	The BIOS cannot communicate with the floppy disk drive controller. Check all appropriate connections after the

Error Message	Explanation
	system is powered down.
HDD Controller Failure	The BIOS cannot communicate with the hard disk drive controller. Check all appropriate connections after the system is powered down.
INTR Number1 Error	Interrupt channel 1 failed POST.
INTR Number2 Error	Interrupt channel 2 failed POST.
Invalid Boot Diskette	The BIOS 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	Timing problem with the keyboard. Make sure an American Megatrends Keyboard Controller BIOS is installed. Set the *Keyboard* option in Standard CMOS Setup to *Not Installed* 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 diskette drive A: or hard disk drive C:. Cannot find ROM Basic.
Off Board Parity Error	Parity error in offboard memory installed. The format is: OFF BOARD PARITY ERROR ADDR (HEX) = (XXXX) *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) *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.

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 *Memory Parity Error ????*.
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/O Card Parity Error ????*.
DMA Bus Time-out	A device has driven the bus signal for more than 7.8 microseconds.

POST Memory Test

Normally, the only visible POST routine is the memory test. The power-on screen is shown below.

```
AMIBIOS (C) 1991 American Megatrends Inc.
Summit 386 BIOS
xxxxx KB OK


Hit <DEL> if you want to run SETUP



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

A BIOS Identification string is displayed in the left bottom corner of the screen. Press <Ins> during system boot to display two additional BIOS Identification strings. The strings contain a code that describes the BIOS options, options are 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.

1.   Enable *Wait for <F1> If any Error* 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 *Keyboard Error.*

The following message is displayed after POST is completed:

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

Press <Del> to access AMIBIOS Setup.

BIOS Configuration Summary Screen

The AMIBIOS displays the following screen when the POST routines are successfully completed.

AMIBIOS System Configuration (C) Copyright 1985-1991 American Megatrends Inc.			
Main Processor	: 80386	Base Memory Size	: 640 KB
Numeric Coprocessor	: None	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)	: None
AMIBIOS Date:	: 12/12/91	Parallel Port(s)	: None

Video Shadow Is Enabled
64KB, 2-WAY 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> <->.

AMIBIOS Setup

The AMIBIOS Setup utility for the Series 62 motherboard is divided into two parts:

- Standard CMOS Setup, and
- Advanced CMOS Setup.

Standard CMOS Setup

The AMIBIOS Standard CMOS Setup utility permits the end user to configure and set 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 35.

Advanced CMOS Setup

The Advanced CMOS Setup allows the end user to configure more advanced parts of memory configuration, peripheral support, and power management support. Advanced CMOS Setup is discussed in Section 3 on page 39.

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. The AMIBIOS Setup resides in the ROM BIOS (Read Only Memory Basic Input/Output System) and is available each time 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 BIOS values stored in the ROM file: the BIOS Setup default values and the Power-On default values.

Starting AMIBIOS Setup

When POST has completed, the following message appears:

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

Press <Del> to run AMIBIOS Setup.

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AMIBIOS 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 with the BIOS Setup defaults.
<F7>	Loads all features in the Advanced CMOS 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

```
 BIOS SETUP PROGRAM - AMIBIOS SETUP UTILITIES
(C) 1990 American Megatrends Inc., All Rights Reserved


     STANDARD CMOS SETUP
     ADVANCED CMOS SETUP
 AUTOCONFIGURATION WITH BIOS DEFAULTS
 AUTOCONFIGURATION WITH POWER ON DEFAULTS
     CHANGE PASSWORD
     HARD DISK UTILITY
WRITE TO CMOS AND EXIT
DO NOT WRITE TO CMOS AND EXIT

Standard CMOS Setup for Changing Time, Date, Hard Disk Type, etc.

ESC:Exit ↑→↓← F2/F3:Color F10:Save & Exit
```

The Standard CMOS Setup option is described on pages 35 through 38.

The Advanced CMOS Setup option is described on pages 39 through 42.

The Change Password option is discussed on page 43.

The Hard disk Utilities are described on pages 45 through 53.

Auto Configuration With BIOS Defaults

Auto Configuration With BIOS Defaults uses the default system settings for all BIOS options. The BIOS defaults are best-case settings that optimize system performance. If CMOS RAM is corrupted, the BIOS default settings are automatically loaded.

Type *Y* and press <Enter> to use BIOS defaults. The following message appears:

```
Default values loaded. Press any key to continue.
```

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Auto Configuration With Power-On Defaults

This option configures the Power-On default settings for all BIOS options. These are worst-case settings for system performance, but are the most stable settings. Use this option as a diagnostic aid if the system is behaving erratically. Type *Y* 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, and 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 the ROM BIOS 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.

```
┌────────────────────────────────────────────────────────────────────┐
│              BOIS SETUP PROGRAM — STANDARD CMOS SETUP                │
│              (C) 2001 American Megatrends Inc .. All  Rights Reserved │
├────────────────────────────────────────────────────────────────────┤
│ Date (mn/date/year) : Fri , Aug 07 2001        Base memory :640 KB   │
│ Time (hour/min/sec) : 09 : 38 : 09               EXt.  memory :2816 KB│
│                                         Cyln Head WPcom LZone Sect Size│
│ Hard disk C : type  : 40                820   6   820   820  17  41 MB│
│ Hard disk D : type  : Not Installed                                  │
│ Floppy Drive A :    : 1 . Z  MB, 5 ¼                                  │
│ Floppy Drive B:     : 1.4   MB, 3 ½     ┌────┬────┬────┬────┬────┬────┬────┐│
│ Primary Display     : VGA/PGA/EGA       │Sun │Mon │Tue │Wed │Thu │Fri │Sat ││
│ Keyboard            : Installed         ├────┼────┼────┼────┼────┼────┼────┤│
│                                         │ 30 │ 31 │  1 │  2 │  3 │  4 │  5 ││
│                                         ├────┼────┼────┼────┼────┼────┼────┤│
│  ┌──────────────────────────────────┐   │  6 │  7 │  8 │  9 │ 10 │ 11 │ 12 ││
│  │ Month : Jan , Feb,......Dec       │   │ 13 │ 14 │ 15 │ 16 │ 17 │ 18 │ 19 ││
│  │ Date  : 01 , 02, 03,....31        │   │ 20 │ 21 │ 22 │ 23 │ 24 │ 25 │ 26 ││
│  │ Year  :1901 , 1902,.....2099      │   │ 27 │ 28 │ 29 │ 30 │ 31 │  1 │  2 ││
│  └──────────────────────────────────┘   │  3 │  4 │  5 │  6 │  7 │  8 │  9 ││
│     ESC : EXIT ↑→↓←: Select   FZ:Color  PU/PD : Modify └────┴────┴──┘      │
└────────────────────────────────────────────────────────────────────┘
```

Time: Hour, Minute, and Second

Move the cursor to the Time fields via → or ← and set the hour, minute, and second by pressing <PgUp> and <PgDn> to change values. This option uses a 24 hour clock format. Add 12 to the hour for PM hours. For example, enter 4:30 P.M. as 16:30:00.

Date And Day Configuration

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

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Hard Disk Drive C:
Hard Disk Drive D:

Move the cursor to these fields via → or ← and select the correct hard disk drive type by pressing <PgUp> and <PgDn> to change values. The hard disk drive manufacturer supplies the hard drive parameters. Match these parameters to the Hard Disk Drive Type table on page 37. If the drive parameters do not match, select *Type 47* and enter the parameters directly into STANDARD CMOS SETUP. Use *Type 47* for IDE drives. Select *Not Installed* to configure SCSI drives.

Hard disk drive types are identified by the following parameters:

Parameter	Description
Type	The number designation 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 will normally park when the system is shut down.
Sectors	The number of sectors per track. Hard drives that use MFM have 17 sectors per track. RLL drives have 26 sectors per track. ARLL and ESDI drives have 34 sectors per track. IDE and SCSI drives can have even more sectors per track.
Capacity	The formatted capacity of the drive is Number of Heads * Number of Cylinders * Number of Sectors per Track * 512 (Number of Bytes per Sector).

Hard Drive Types

Hard 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 HARD DISK PARAMETERS SUPPLIED BY HARD DRIVE MANUFACTURER.					

Hard Disk Parameters, cont'd

Not Installed is used for diskless workstations and SCSI hard disk drives.

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.

Floppy Drive A:
Floppy Drive B:

Move the cursor to these fields via → or ← and select the floppy 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*, which is used for diskless workstations. The BIOS will not generate *missing floppy* error messages if *Not Installed* is selected.

Monitor

The settings are *Monochrome*, *Color 40x25*, *Color 80x25 VGA/PGA/EGA*, or *Not Installed*, which could be used for network file servers. The BIOS will not generate *missing monitor* messages if *Not Installed* is selected.

Keyboard

The settings are *Installed* or *Not Installed*. Use *Not Installed* in a keyboardless system such as a file server. The BIOS will not generate *missing keyboard* error messages if *Not Installed* is selected.

Chapter 4 AMIBIOS Setup

Section 3

Advanced CMOS Setup

The following options appear in Advanced CMOS Setup:

Typematic Rate Programming,
Typematic Rate Delay,
Typematic Rate (Chars/Sec),
System Boot Up Num Lock,
Numeric Processor,
Weitek Processor,
Floppy Drive Seek at Boot,
System Boot Up Sequence,
System Boot Up CPU Speed
Cache Memory,
Fast Gate A20 Option,
Password Checking Option,
Video ROM Shadow C000,16K, and
Video ROM Shadow C400,16K.

Help Screens

Advanced CMOS Setup has a series of help screens, accessed by pressing <F1>, which display the settings for the selected Advanced CMOS Setup option and provide a brief description of the option.

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     : Enabled
System Boot Up Num Lock    : Disabled
Numeric Processor          : Disabled
Weitek Processor           : Absent
Floppy Drive Seek At Boot  : Disabled
System Boot Up Sequence    : C:,A:
System Boot Up CPU Speed   : High
Cache Memory               : Enabled
Fast Gate A20 Option       : Enabled
Password Checking          : Always
Video  ROM Shadow C000,16K : Enabled
Video  ROM Shadow C400,16K : Enabled




         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
Typematic Rate

Typematic Rate Programming enables 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 option, when enabled, executes POST memory routines on the RAM above 1 MB (if present on the system). If disabled, the BIOS only checks the first 1 MB of RAM.

Chapter 4 AMIBIOS Setup

Advanced CMOS Setup Options,

Numeric Processor

This option enables the AMIBIOS test for a coprocessor. Make sure that this option is enabled if a math coprocessor is installed. The settings are *Enabled* or *Disabled.*

Weitek Processor

This option configures a Weitek numeric processor. The settings are *Absent* or *Present.*

Floppy Drive Seek At Boot

When enabled, a Seek command is performed on floppy drive A: at system boot. The settings are *Enabled* or *Disabled.*

System Boot Up Sequence

This option sets the boot sequence. The BIOS tries to boot from hard disk drive C: or floppy drive A: if C: is not available. The boot order can be reversed. The settings are *C:,A:* or *A:,C:.*

System Boot Up CPU Speed

This option sets the speed at which the system boots. The settings are *High* or *Low.*

Cache Memory

This option enables or disables external cache memory. The settings are *Enabled* or *Disabled.*

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 applications both enter protected mode and shut down via the BIOS. For them, Gate A20 must be constantly enabled and disabled via the keyboard controller, which is slow.

Fast Gate A20 is an alternate method of enabling Gate A20, which speeds up programs that constantly change from addressing conventional memory to addressing memory addresses above 1 MB. For example, enabling this option allows Microsoft® Windows® and network operating systems execute faster.

Password Checking Option

This option allows the end user to configure the password option. 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.

Video ROM Shadow C000,16K
Video ROM Shadow C400,16K

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. These options enable ROM shadowing of the video BIOS. The settings are *Enabled* or *Disabled.*

Chapter 4 AMIBIOS Setup

Section 4

AMIBIOS Password Support

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 42). 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:
```

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.

Chapter 4 AMIBIOS Setup

Hard Disk Utility

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 47
Auto Interleave	Determines the optimum interleave factor and then performs a low level format of the hard disk drive.	Page 49
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 52.

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
AMIBIOS Hard Disk Utilities destroy 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.

```
          BOIS SETUP PROGRAM — HARD DISK UTILITY
      (C) 2001 American Megatrends Inc .. All Rights Reserved

                        Cyln   Head  Wpcom   LZone   Sect   Size (MB)
Hard Disk C: Type : 47 = USER TYPE   1314    7    1314    1314     7       76
Hard Disk D: Type : Not Installed

Hard Disk Type can be chaned form the STANDARD CMOS SETUP option in main menu



                        Hard Disk Format
                        Auto Interleave
                        Media Analysis



        ESC:Exit      ↑→↓← :Sel      FZ:Color
```

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                  |
+--------------------------------------------------+
|                                                  |
|  Disk Drive   (C/D)              ? C             |
|  Disk Drive  Type                ? 47            |
|  Interleave   (1-16)             ? 3             |
|  Mark Bad     (Y/N)              ?               |
|  Proceed      (Y/N)              ?               |
|                                                  |
+--------------------------------------------------+
```

Hard Disk Format Screen

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.

```
┌─────────────────────────────────────────────────────────────────────────┐
│                 BOIS SETUP PROGRAM — HARD  DISK UTILITY                   │
│              (C) 2001  American Megatrends Inc ..  All  Rights Reserved   │
│  ┌───────────────────────────────────────────────────────────────────┐   │
│  │                        Cyln   Head  Wpcom   LZone   Sect   Size (MB)│   │
│  │  Hard Disk C: Type : 47 = USER TYPE   1314    7    1314   1314   17    76 │
│  │  Hard Disk D: Type : Not Installed                                 │   │
│  └───────────────────────────────────────────────────────────────────┘   │
│  ┌──────────────────────┐ ┌─────────────────────┐ ┌──────────────────┐    │
│  │    Auto Interleave   │ │   Bad Track Edit Menu│ │   Bad Track # 0  │    │
│  ├──────────────────────┤ ├─────────────────────┤ ├──────────────────┤    │
│  │ Disk Drive (C / D)   ? C │ Add an Entry      │ │  No.  Cyln.  Head│    │
│  │ Disk Drive Type      ? 47 │ Revise an Entry  │ │                  │    │
│  │ Interleave (1-16)    ? 3  │ Delete an Entry  │ │                  │    │
│  │ Mark Bad Tracks (Y / N) ? Y │ Clear Bad Trk List│ │                │    │
│  │ Proceed  (Y / N)     ?    │                   │ │                  │    │
│  └──────────────────────┘ └─────────────────────┘ │                  │    │
│                      ┌──────────────────────────┐  │                  │    │
│                      │  Enter Cylinder  # :  0  │  │                  │    │
│                      │  Enter Head   #  :       │  │                  │    │
│                      │                          │  │                  │    │
│                      └──────────────────────────┘  └──────────────────┘    │
│  ┌────────────────────────────────────────────────────────────────────┐   │
│        ESC:Exit    ↑→↓← :Sel                                               │
└─────────────────────────────────────────────────────────────────────────┘
```

Type *Y* and press <Enter>. A warning screen appears. Press any key to continue.

```
┌───────────────────────────────┐
│      WARNING INFORMATION      │
│                               │
│       All Data on Specified   │
│       Hard disk will be LOST  │
│                               │
│   Want to Continue  (Y/N ) ? N│
└───────────────────────────────┘
```

press <Enter> to return the main Hard Disk Utility screen.To proceed,type Y and press <Enter>.

```
┌──────────────────────────────────────────┐
│                 Warning                  │
│  Data on the hard drive will be irrevocably lost. │
└──────────────────────────────────────────┘
```

Chapter 4 AMIBIOS Setup

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.

```
+------------------------------------------------------------------+
|          BOIS SETUP PROGRAM — HARD DISK UTILITY                  |
|       (C) 2001 American Megatrends Inc ..  All Rights Reserved   |
+------------------------------------------------------------------+
|                        Cyln   Head   Wpcom  LZone   Sect  Size (MB)|
| Hard Disk C: Type : 47 = USER TYPE  1314    7    1314   1314    17    76 |
| Hard Disk D: Type : Not Installed                                |
| +------------------------+        +------------------------+     |
| |    Auto Interleave     |        |      Bad Track  #  0    |    |
| |                        |        | No.  Cyln.  Head        |    |
| | Disk Drive (C / D)   ? C|       |                         |   |
| | Disk Drive Type      ? 47|      |                         |   |
| | Mark Bad Tracks (Y / N) ? N|    |                         |   |
| | Proceed  (Y / N)     ?  |       |                         |   |
| +------------------------+        |                         |   |
| +------------------------------------------------------------------+
|                     ESC:Exit    ↑→↓← :Sel                         |
+------------------------------------------------------------------+
```

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The cursor is on *Mark Bad Tracks.* The default is *N.* To mark additional bad tracks, type *Y* and press <Enter> The following screen appears.

```
┌──────────────────────────────────────────────────────────────────────┐
│           BOIS SETUP PROGRAM — HARD DISK UTILITY                       │
│           (C) 2001 American Megatrends Inc .. All Rights Reserved      │
├──────────────────────────────────────────────────────────────────────┤
│                         Cyln   Head   Wpcom   LZone   Sect   Size (in MB)│
│  Hard Disk C: Type : 47=USER TYPE   1314    7    1314    1314    17    76 │
│  Hard Disk D: Type : Not Installed                                      │
│  ┌──────────────────────┐ ┌──────────────────────┐ ┌────────────────┐ │
│  │    Auto Interleave    │ │   Bad Track Edit Menu │ │  Bad Track # 0 │ │
│  │                       │ │ Add an Entry          │ │  No. Cyln. Head│ │
│  │ Disk Drive (C / D)  ? C│ │ Revise an Entry       │ │                │ │
│  │ Disk Drive Type    ? 40│ │ Delete an Entry       │ │                │ │
│  │ Mark Bad Tracks (Y/N) ? Y│ Clear Bad Trk List    │ │                │ │
│  │ Proceed  (Y / N)    ?  │ └──────────────────────┘ │                │ │
│  └──────────────────────┘ ┌──────────────────────┐ │                │ │
│                           │ Enter Cylinder # : 0  │ │                │ │
│                           │ Enter Head    # :     │ │                │ │
│                           └──────────────────────┘ └────────────────┘ │
├──────────────────────────────────────────────────────────────────────┤
│              ESC:Exit    ↑→↓← :Sel                                     │
└──────────────────────────────────────────────────────────────────────┘
```

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.

```
┌──────────────────────────────┐
│      WARNING INFORMATION      │
│                               │
│      All Data on Specified    │
│      Hard disk will be LOST   │
│                               │
│    Want to Continue (Y/N) ? N │
└──────────────────────────────┘
```

Press <Enter> to return to the main Hard Disk Utility screen. To proceed, type *Y* and press <Enter>..

Chapter 4 AMIBIOS Setup

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.

```
                        Media Analysis
┌──────────────────────────────────────────────────────────┐
│  Disk Drive (C/D)              ? C                        │
│  Disk Drive Type              ? 47                        │
│  Proceed  (Y/N)                ? 3                        │
└──────────────────────────────────────────────────────────┘
```

The cursor is on *Proceed.* The warning screen appears.

```
┌────────────────────────────────┐
│      WARNING INFORMATION       │
│                                │
│        All Data on Specified   │
│        Hard disk will be LOST   │
│                                │
│   Want to Continue  (Y/N ) ? N  │
└────────────────────────────────┘
```

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

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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.

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 128 KB Cache Memory

To upgrade to 128 KB cache memory, use four 32 KB x 4 static RAM chips. These four SRAMs can be installed in either SRAM bank. The following table lists SRAM manufacturer and part numbers.

Cache Size	Number of SRAMs	Board Speed	SRAM Speed	SRAM Type	Manufacturer Part Number
64 KB	Eight	25 MHz	20 ns	8 KB x 8	Cypress® CY7C185-20PC
128 KB	Four	25 MHz	20 ns	32 KB x 4	Motorola® MCM6206NP20
64 KB	Eight	33 MHz	15 ns	8 KB x 8	
128 KB	Four	33 MHz	15 ns	32 KB x 4	

Upgrade SRAM Installation Procedure

Step	Action
1	Remove the eight 8 KB x 8 SRAM chips. See the graphic on the following page to pinpoint the location. The socket designators are U3, U4, U9, U10, U11, U12, U15, and U16.
2	Remove the shorting bridge on J100.
3	Insert four 32 KB x 8 SRAM chips in the four empty SRAM sockets nearest the Coprocessor socket. Make sure that the pins are straight and that all pins are inserted in the receptacles.
4	Turn the system on. The BIOS System Configuration screen should display 128 KB of cache memory. If 128 KB cache memory does not display, check for bent pins on the new SRAM chips.

SRAM Locations

Labels visible in the diagram:

- J1 Keyboard
- F1 Fuse
- P2
- SIMM Bank 1
- SIMM Bank 0
- Aux BIOS
- BIOS ROM
- SW1
- 80686
- Dag LED
- J100 Cache Select
- Math Coprocessor Socket
- Install Four 32 KB x 8 SRAM chips here
- J14 HSDLOCK
- J13 Turbo LED
- J8 Turbo SW
- J7 Speaker
- J6 Reset

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Index, Continued