Customer Service Support System

BC 3030 Manual

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Customer Service Support System

BC 3030
Chapter 1 - Introduction

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BC 3030 (80386SX Bus Controller)

The BC 3030 board is a 80386SX computer on a single ATstyle, plugin board. It is ISA-bus compatible.

The BC 3030 computer provides all of the functionality of a standard AT PC. It includes VGA video support, two serial ports, one parallel port, keyboard and mouse support, compatibility with the 80387SX math coprocessor, and up to 16MB of memory.

Figure 1-1.

Customer Service Support System

BC 3030
Chapter 2 - Hardware

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Standard Features

* 80386SX, 25 MHz processor, and 80387SX Coprocessor socket

* Four standard SIMM sockets to expand memory up to 16MB total DRAM with parity

* Internal header connectors for

- Reset switch

- Hard Drive activity LED

- Power ON LED

- ON Battery Power LED

- Video/Keyboard MUX

- Speaker

- CMOS Battery

- Remotemounted PS/2 mouse connector

- Floppy controller for 5-1/4" and 3-1/2" drives

- IDE hard drive controller, supports two drives

- COM2 serial header

- LPT1 parallel header

* PS/2 compatible keyboard connector

* 8.33/10MHz AT ISA bus timing

* Real time clock

* VGA Video controller

* 8-bit EPROM BIOS

* VLSI Technology, Inc. TOPCAT AT chip set with LIM 4.0 support, supports system and video BIOS in shadow RAM

* Rear Panel Connectors for

- VGA monitor

- COM1

- PS/2 keyboard Figure 2-1

System Components

EPROM BIOS

An American Megatrends, Inc. (AMI) system BIOS with embedded setup and hard disk setup utilities resides on the board (27C512 EPROM). At boot time, the data can be transferred to 16bit shadow RAM. This option provides increased system performance, since RAM access is more efficient than EPROM access. (Chapter 3 contains the AMI BIOS documentation.)

Video Controller

The BC 3030 contains an extended high resolution VGA graphics controller (Oak Technology OTI067). With 512K of video memory, this controller supports all standard VGA modes and the following extended modes: 640 x 480 with 256 colors; 800 x 600 with 256 colors; and 1024 x 768 with 16 colors. The connector on the board (J11) is an industry standard VGA connector (15pin highdensity DSubminiature).

Keyboard Controller

The BC 3030 has a PS/2 compatible keyboard controller (8042 or 8742) with the AMI keyboard BIOS. The keyboard controller uses IRQ 1 for its interrupts, and requires no DMA channel.

The keyboard connector on the board (J10) is an industry standard PS/2 compatible 6-pin Mini-DIN connector. The keyboard controller also supports a PS/2 compatible mouse port. The mouse cable and connector are available as an optional item. If added to the board, the mouse port uses IRQ 12.

Video/Keyboard Multiplexer

The BC 3030 has a header connector (J14) for a Cubix internal video/keyboard multiplexor (MUX). Typically, the MUX is used in installations where multiple BC 3030 boards have been integrated into a system with a single monitor and keyboard. Refer to the *Video MUX Installation Guide* for more information.

IDE Hard Drive Interface

An IDE hard drive interface is included on the BC 3030 for applications that require a hard disk drive. IDE drives include an AT compatible disk controller. The IDE interface circuit will support one or two IDE drives, connected via the internal 40pin ribbon cable header (J2). When adding an IDE drive to the board, use the setup program to select the drive type. See the *BC 3030 Setup Program* Chapter for information on selecting IDE drive types.

Disabling the IDE Controller

The IDE disk controller can be disabled if necessary in the CMOS setup program. This would be necessary if, for example, a SCSI adapter was installed and the SCSI adapter's hard disk was to be used as a boot device. To completely disable the IDE hardware, a jumper must be placed on jumper block JP4, pins 3-4.

Floppy Disk Controller

The BC 3030 contains a Western Digital 37C65B floppy disk controller. It supports all PC/AT floppy disk configurations. The board has an internal 34pin ribbon cable header (J1) for cabling to the floppy disk drive. The controller is configured for industry standard singlespeed floppy disk drives, and supports up to two of any combination of 5-1/4 or 3-1/2 inch drives. The BIOS setup program must be configured for the proper drives. The floppy controller uses IRQ6 for its interrupt and DRQ2 for its DMA channel.

*** The floppy controller on the BC 3030 board cannot be disabled.**

Serial and Parallel Ports

Two serial ports and a parallel port are available on the BC 3030. One serial port is accessible through a standard DB-9 connector on the rear bracket (J9). The other serial port (COM2) and the parallel port (LPT1) are accessible internally through header connectors (J7 and J13). All ports comply fully with PC/AT® interrupt and I/O port standards.

The serial and parallel ports may be disabled by placing a jumper on jumper block JP4, pins 1-2. This recovers interrupts at IRQ 3, 4, and 7.

External access to the internal I/O connectors (COM2, LPT1, PS/2 mouse) is accomplished through Cubix supplied interface boards. Refer to the sections *Optional LPT1 Port* and *Optional COM2 and Mouse* later in this chapter for more information. Contact the Cubix Sales department to order the serial or parallel port expansion product required to access the mouse, COM2, or LPT1 ports.

Speaker

The BC 3030 has a header connection (J4) for an eight ohm permanent magnet type speaker. The speaker output comes from the output of TIMER 2 through a gate controlled by bit 0 of Port B, which is the standard AT speaker oscillator.

CMOS Battery

The CMOS Battery interface (J5) accepts a 6-volt external battery source to back up the CMOS setup RAM and time of day clock. It is highly recommended that this battery be installed, for without it the BC 3030 requires manual intervention to boot.

LEDs/Reset Switch

Internal header J3 provides an interface for three LEDs and an external reset switch. The LEDs are:

Power LED is illuminated when power is on

On Battery LED is illuminated when running on battery power (refer to Power Supply Status description)

Hard Disk LED is illuminated during hard disk activity

The external reset switch provides a method of performing a hard reset of the BC 3030. Figure 2-21Figure 2-2 describes the wiring information for this interface.

Power Supply Status

The BC 3030 has a power supply status connector (J6) to monitor the condition of the power supply. This connector would connect to a power supply which can provide the data required by the pin out shown below.

1 - Power Off (output)

2 - Low Battery (input)

3 - A.C. Fail (input)

4 - Power Good (input)

The output on pin 1 is to turn the power supply off. This would typically be done when the A.C. has failed and the backup batteries have reached their discharge state. Pin 2 is an input to the BC 3030 and is low when the batteries have discharged. Pin 3 is an input to the BC 3030 and is low when the A.C. to the power supply has failed and the power supply is running off of the batteries. This condition will cause the On Battery LED to illuminate. Pin 4 is an input to the BC 3030 and is raised high by the Power Supply when its D.C. output voltages are stable and within their limits. All of the signals on J6 are TTL compatible.

TOPCAT Chip Set

A VLSI Technology, Inc. TOPCAT AT chip set implements the memory controller and ISA bus controller functions. This twochip controller set also includes the logic necessary to implement the LIM (Lotus/Intel/Microsoft) Revision 4.0 memory management functions. The chip set includes a battery backed realtime clock and CMOS setup memory. It also contains the interrupt, timer, and DMA controllers and a pagemode DRAM memory controller.

Memory

All BC 3030 system memory is provided in 30-pin by 9-bit standard 70ns SIMM modules. These modules should be installed in the sockets provided. These sockets are labeled as U21, U22, U23, and U24 on Figure 2-1.

Memory size options include 2MB, 4MB, 8MB, 10MB, and 16MB. The configurations supported are represented in Table 2-1.

Table 2 - 1
SIMM Configurations

U21	U22	U23	U24	TOTAL MEMORY
1MB	1MB	None	None	2MB
1MB	1MB	1MB	1MB	4MB
4MB	4MB	None	None	8MB
1MB	1MB	4MB	4MB	10MB
4MB	4MB	4MB	4MB	16MB

Note that the SIMMs must be installed in matching pairs. Each pair must reside in either the first two sockets (U21 and U22) or the second two sockets (U23 and U24).

ISA Bus Connector

The ISA Bus connectors on the board use the same pinout and signals as all standard PC/AT bus connectors.

System Interrupts

The 16 system hardware interrupts on the BC 3030 are represented in the following table. Interrupts are managed by two standard 8259A Programmable Interrupt Controllers (PICs). Interrupts at IRQ 0 through 7 are located on the main PIC; IRQ 8 through 15 are on the slave PIC.

Table 2-2
Hardware IRQ Information

IRQ Description	IRQ Description
0 Timer Click	1 Keyboard
2 Second PIC Controller	3 COM2
4 COM1	5 Available
6 Floppy Disk Controller	7 LPT1
8 Real-Time Clock	9 Redirected IRQ2
10 Available or AC Fail (JP1)	11 Available
12 Available or Mouse (JP5)	13 Math Coprocessor
14 Fixed Disk Controller	15 Available or AC Fail (JP1)

Video Switch

Set the Video Switch to match the monitor. Figure 2-3 shows Video Switch (S1). Table 2-3 shows switch settings for each monitor.

Table 2-3

Switch Settings for Monitors

Video Mode	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
Reserved	OFF	OFF	OFF	OFF	OFF	OFF	OFF	*
Reserved	ON	OFF	OFF	OFF	OFF	OFF	OFF	*
Portrait	OFF	ON	OFF	OFF	OFF	OFF	OFF	*
NEC 4D/5D	ON	ON	OFF	OFF	OFF	OFF	OFF	*
NEC 3D	OFF	OFF	ON	OFF	OFF	OFF	OFF	*
NEC XL	ON	OFF	ON	OFF	OFF	OFF	OFF	*
NEC/NEC+	OFF	ON	ON	OFF	OFF	OFF	OFF	*
NEC 2A	ON	ON	ON	OFF	OFF	OFF	OFF	*
8514	OFF	OFF	OFF	ON	OFF	OFF	OFF	*
VGA (mono)	ON	OFF	OFF	ON	OFF	OFF	OFF	*
VGA	OFF	ON	OFF	ON	OFF	OFF	OFF	*

* SW8 is OFF for non-interlaced monitors, and ON for interlaced monitors.

Factory default is non-interlaced VGA (color).

* The BC 3030 video outputs are analog and will only function with analog compatible monitors.

Reset on Loss of DCD or DSR

The BC 3030 board can be configured to perform a hardware reset when the Data Carrier Detect (DCD) or Data Set Ready (DSR) signal changes from true to false. Jumpers on jumper block JP2 determine which signal from which COM port will reset the board. The figure below shows jumper block JP2 with a jumper in each position. Figure 2-4.

* A jumper across pins 1 and 2 resets the hardware when the DCD signal drops on COM1.

* A jumper across pins 3 and 4 resets the hardware when the DSR signal drops on COM1.

* A jumper across pins 5 and 6 resets the hardware when the DCD signal drops on COM2.

* A jumper across pins 7 and 8 resets the hardware when the DSR signal drops on COM2.

To disable reset on loss of DCD or DSR, remove all of the jumpers. This can also be accomplished by placing a jumper across pins 2 and 4 and a jumper across pins 6 and 8 (factory default).

Only one jumper for each COM port should be installed on the jumper block. Do not put jumpers simultaneously on pins 1, 2, 3, and 4. Do not put jumpers simultaneously on pins 5, 6, 7, and 8.

Table 2-4
Jumper Summary

JP1	AC Fail Interrupt Select	
	1-2	IRQ 10
	2-3	IRQ 15
	NONE	None selected (factory default)
JP2	COM Port Reset Select	
	1-2	Reset on COM1 DCD
	3-4	Reset on COM1 DSR
	5-6	Reset on COM2 DCD
	7-8	Reset on COM2 DSR
	2-4 & 6-8	No reset selected (factory default)
	NONE	No reset selected
JP3	Not Used	
JP4	COM/IDE Disable	
	1-2	Disable COM1, COM2, and LPT1 Ports
	3-4	Disable IDE hardware
	NONE	Hardware is enabled (factory default)
	* To recover IRQ 14, all IDE drives must be removed from the 40-pin header cable.	
JP5	Mouse Interrupt Select	
	1-2	IRQ 12 is used for the PS/2 Mouse Port
	NONE	IRQ 12 is available for use by other cards
		(factory default)

Optional LPT1 Port

A parallel port may optionally be added to function as LPT1 of the BC 3030. This requires a Cubix LPT1 printed circuit board (PCB) adapter and bracket, a panel opening where the DB-25 connector can be installed, and a 20-conductor ribbon cable.

INSTALLATION

Warning: ***Turn off the power to the system before beginning this procedure.***

1. Install the Cubix LPT1 adapter in a panel opening on the system. Typically, an opening provided for an empty board space is dedicated to the LPT1 connector. In this case, install the bracket next to the BC 3030 board requiring the LPT1 port and tighten the screw firmly.

Alternately, if the LPT1 connector is being installed into a Cubix auxiliary junction panel, the bracket provided with the LPT1 adapter should be removed. Unscrew the connector from the bracket and install the adapter into the desired panel opening.

2. Connect one end of the 20conductor ribbon cable to the LPT1 header (J13) on the BC 3030 board. The pin-one side of the ribbon cable is marked with a colored (blue or red) stripe. Pin one on the BC 3030 header is labeled with a triangular arrowhead (Ú). Align the pin-one side of the ribbon cable with pin one on the header.

3. Connect the other end of the ribbon cable to the LPT1 adapter. Pin one on the adapter is labeled with a triangular arrowhead. Align the pin-one side of the ribbon cable with pin one on the adapter.

4. Plug the peripheral device's cable into the DB25 connector. Figure 2-5.

Optional COM2 and Mouse

A second serial port may optionally be added to function as COM2 of the BC 3030. A PS/2 mouse input port may also be added. This requires a Cubix printed circuit board (PCB) adapter and bracket, and a single panel opening where the DB-9 and Mini-DIN 6 can be installed. Both the COM2 and the mouse interfaces are provided on the same PCB adapter. To connect COM2 requires a 10-conductor ribbon cable; the mouse port requires a 5-conductor cable.

INSTALLATION

Warning: ***Turn off the power to the system before beginning this procedure.***

1. Install the Cubix PCB adapter in a panel opening on the system. Typically, an opening provided for an empty board space is dedicated to the COM2 and mouse connectors. In this case, install the bracket next to the BC 3030 board requiring the COM2/mouse port, and tighten the screw firmly.

Alternately, if the COM2 and mouse connectors are being installed into a Cubix auxiliary junction panel, the bracket provided with the COM2/mouse adapter should be removed. Unscrew the connectors from the bracket and install the adapter into the desired opening.

2. Connect one end of the 10conductor ribbon cable to the COM2 header (J7) on the BC 3030 board. The pin-one side of the ribbon cable is marked with a colored (blue or red) stripe. Pin one on the BC 3030 header is labeled with a triangular arrowhead (Ú). Align the pin-one side of the ribbon cable with pin one on the header.

3. Connect the opposite end of the 10-conductor cable to the 10-pin header on the Cubix adapter board. Pin one on the adapter is indicated in Figure 2-6. Align the pin-one side of the ribbon cable with pin one of the 10-pin header on the adapter board.

4. Connect one end of the 5-conductor cable to the PS/2 mouse header (J8) on the BC 3030 board. Pin numbers one through five are indicated on the cable connector. Pin one of the BC 3030 header is indicated in Figure 2-6. Align pin one of the cable connector with pin one on the header.

5. Connect the opposite end of the 5-conductor cable to the 5-pin header on the Cubix adapter board. On the adapter board, pin one of the 5-pin header is the closest pin to the edge of the board. Align pin one of the

cable connector with pin one on the header.

6. If COM2 is to be used, plug the peripheral device's cable into the DB9 connector.

7. If a mouse if to be used, plug the mouse connector into the Mini-DIN 6.

! Use jumper block JP5 to enable the mouse interrupt (IRQ 12). Also check advanced CMOS setup to make sure mouse support is enabled in the BIOS.

Connectors and Signals

Table 2-5
Switch Settings for Monitors

Video Mode	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
Reserved	OFF	OFF	OFF	OFF	OFF	OFF	OFF	*
Reserved	ON	OFF	OFF	OFF	OFF	OFF	OFF	*
Portrait	OFF	ON	OFF	OFF	OFF	OFF	OFF	*
NEC 4D/5D	ON	ON	OFF	OFF	OFF	OFF	OFF	*
NEC 3D	OFF	OFF	ON	OFF	OFF	OFF	OFF	*
NEC XL	ON	OFF	ON	OFF	OFF	OFF	OFF	*
NEC/NEC+	OFF	ON	ON	OFF	OFF	OFF	OFF	*
NEC 2A	ON	ON	ON	OFF	OFF	OFF	OFF	*
8514	OFF	OFF	OFF	ON	OFF	OFF	OFF	*
VGA (mono)	ON	OFF	OFF	ON	OFF	OFF	OFF	*
VGA	OFF	ON	OFF	ON	OFF	OFF	OFF	*

* SW8 is OFF for non-interlaced monitors, and ON for interlaced monitors.

Factory default is non-interlaced VGA (color).

Table 2-6
Floppy Diskette Connector J1 (34-Pin Header)

This 34-pin cable header is pinned-out to use a standard PC/AT style floppy disk cable. The drive should be shunted for single-speed operation (360 RPM).

Pin #	Description	Pin #	Description
1	GROUND	2	SPEED
3	GROUND	4	N/C
5	GROUND	6	N/C
7	GROUND	8	INDEX
9	GROUND	10	MOTOR ON 1
11	GROUND	12	DRIVE SEL 2
13	GROUND	14	DRIVE SEL 1
15	GROUND	16	MOTOR ON 2
17	GROUND	18	DIRECTION
19	GROUND	20	STOP STEP
21	GROUND	22	WRITE DATA
23	GROUND	24	WRITE GATE
25	GROUND	26	TRACK 0
27	GROUND	28	WRITE PROTECT
29	GROUND	30	READ DATA
31	GROUND	32	SIDE SELECT

33 GROUND   34 DISK CHANGE

Table 2-7
IDE Interface Connector J2 (40-Pin Header)

Pin	Desc.	Pin	Description
1	RESET	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GROUND	20	N/C
21	N/C	22	GROUND
23	IOW	24	GROUND
25	IOR	26	GROUND
27	N/C	28	BALE
29	N/C	30	GROUND
31	IDINT	32	N/C
33	SA1	34	N/C
35	SA0	36	SA2
37	CS5	38	HCS1
39	N/C	40	N/C

Table 2-8
Control Panel Connector J3 (5-Pin Header)

Contains connections for remote IDE drive LED, power on LED, battery
on LED, and external reset switch.

Pin #	Description
1	Resistor pull-up for Power on LED
2	ON Battery LED (running on Battery power)
3	Reset Switch (ground to reset computer)
4	IDE Drive LED
5	Ground

Table 2-9
Speaker Connector J4 (4-Pin Header)

For wiring to a panel-mounted speaker and keylock switch

Pin #	Description
1	Speaker data
2	N/C (no connection)
3	Ground
4	+5V (speaker power)

Table 2-10
CMOS Battery Connector J5 (2-Pin Polarized Header)

Connects to a battery holder with four alkaline AA cells, yielding
a 6-Volt battery pack.

Pin # Description

1 Positive
2 Negative

Table 2-11
Optional Mouse Connector J8 (5-Pin Header)

Pin # Description

1 DATA
2 N/C (no connection)
3 Ground
4 +5V
5 CLK (Clock)

Table 2-12
COM Port Connector J9 (DB-9), J7 (10 pin header)

The COM1 port is on the rear bracket of the board on a DSUB-9P
connector. To enable the optional COM2 port, it must be cabled
to a Cubix interface board. DO NOT cable connector J7 (COM2)
directly to a DB-9 or DB-25 connector.

Pin # Description

1 DCD (Data Carrier Detect)
2 RD (Receive Data)
3 TD (Transmit Data)
4 DTR (Data Terminal Ready)
5 GND (Ground)
6 DSR (Data Set Ready)
7 RTS (Request to Send)
8 CTS (Clear to Send)
9 RI (Ring Indicator)

Table 2-13
Keyboard Connector J10 (PS/2 compatible 6-pin Mini-DIN)

Pin # Description

1 DATA
2 N/C (no connection)
3 Ground
4 +5V
5 CLK (Clock)
6 N/C (no connection)

Table 2-14
Video Connector J11

(Standard VGA 15-Pin High-Density Female DSUB)

Pin # Description

1 Red
2 Green
3 Blue
4 N/C (no connection)

5 Ground
6 Ground
7 Ground
8 Ground
9 N/C (no connection)
10 Ground
11 N/C (no connection)
12 N/C (no connection)
13 VSYNC
14 HSYNC
15 N/C (no connection)

Table 2-15
Optional Parallel Port, LPT1 J13 (DB25)

A 20-pin ribbon header is provided on the board for connection to the optional DB25S parallel port printed circuit board that mounts on a rear panel.

Pin #	Description	Pin #	Description
1	GROUND	2	STROBE
3	BUSY	4	SELECT
5	ERROR	6	SLIN
7	INIT	8	AFT
9	PAPER OUT	10	ACKNOWLEDGE
11	DATA 0	12	DATA 1
13	DATA 2	14	DATA 3
15	DATA 4	16	DATA 5
17	DATA 6	18	DATA 7
19	GROUND	20	GROUND

Table 2-16
Video/Keyboard Mux Connector - J14 (14-Pin Header)

This connector contains the video and keyboard signals. In some Cubix systems it can be cabled to an internal video/keyboard multiplexer board.

1	RED	2	GROUND
3	GREEN	4	GROUND
5	BLUE	6	GROUND
7	HSYNC	8	GROUND
9	VSYNC	10	GROUND
11	KCLK	12	GROUND
13	KDATA	14	+5 (FUSED)

Specifications

Microprocessors

80386SX, 25MHz

80387SX, 25MHz (Optional)

Real Time CMOS Clock

Clock rate: 32.768 KHz

Power Requirements

Power: 12.7 - 13.7 watts

+5 VDC @ 2.2 amps maximum (without 80387SX)

+5 VDC @ 2.5 amps maximum (with 80387SX)

+12 VDC @ 0.03 amps maximum

-12 VDC @ 0.03 amps maximum

Operating Environment

0 - 500C

0 - 80% noncondensing

Floppy Controller

Supports one or two 3.5" or 5.25" drives

"AT" Chip Set

VLSI Technology, Inc. "TOPCAT" CHIPSET

Single and 2-way page mode interleave

LIM EMS 4.0 memory controller

Hard Disk Controller

Supports one or two IDE hard drives

COM1 Port

16C552 Controller with 8250 compatibility

Transmission Rate: 50-115 KBITS/sec, asynchronous

Data Bits: 8, 7, 6, or 5

Parity: None, Odd, Even

Stop Bits: 1, 1-1/2, 2

Access: DB-9 on board mounting bracket

COM2 Port

16C552 Controller with 8250 compatibility

Transmission Rate: 50-115 KBITS/sec, asynchronous

Data Bits: 8, 7, 6, or 5

Parity: None, Odd, Even

Stop Bits: 1, 1-1/2, 2

Access: 10-pin ribbon header, requires optional PCB to convert to DB-9.

LPT1 Port

Centronics compatible

Access: 20-pin ribbon header, requires optional PCB to convert to DB-25.

Video Port

Super VGA video controller with .5MB of video memory

Max Resolution: 1024 x 768, 16 colors

Access: High Density DB-15 on board mounting bracket

Keyboard Port

PS/2 compatible keyboard controller

Access: Mini-DIN 6 on board mounting bracket

Mouse Port

PS/2 compatible mouse port

Access: 5-pin header, requires optional PCB to convert to Mini-DIN 6 connector.

Memory Configuration

Supports two or four 30-pin memory SIMMs

Standard memory is 2MB

Expandable to 4MB, 8MB, 10MB, or 16MB

Internal Header Connections for:

Reset switch

Hard drive activity LED

Power on LED

On battery power LED

Power supply status interface

Video/keyboard MUX

Speaker

CMOS battery

COM2

LPT1

PS/2 Mouse

Floppy drive

Customer Service Support System

BC 3030
Chapter 3 - Setup Program

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BC 3030 Setup Program

(The AMI HiFlex BIOS Documentation)

LIMITED WARRANTY

Buyer agrees if this product proves to be defective, that American Megatrends, Incorporated (hereinafter referred to as AMI) is only obligated to replace or refund the purchase price of this product at AMI's discretion. AMI shall not be liable in tort or contract for any loss or damage, direct, incidental or consequential.

Important Notice

AMI is not responsible for any errors or omissions in writing this manual. AMI reserves the right to change, modify or append any part or section of this manual at any time.

Trademarks

Any reference to a specific chip set is the trademark of the manufacturer referenced. All other brand and product names are trademarks or registered trademarks of their respective companies.

This manual was written and edited by Julia H. McDonald, Anindya Mukherjee, and Robert C. Cheng of AMI.

The AMI HiFlex BIOS Setup program provides maximum flexibility in configuring the system. Its various options may be selected for enduser requirements. This was written to document these features. Please review this document before using the program.

Notation Conventions

References to specific keys on the keyboard are enclosed by the symbols < >, for example, <DEL> for the Delete key or <F1> for the Function 1 key.

Getting Started

Running AMI HiFlex BIOS

When the system is powered on, the AMI HiFlex BIOS will enter the PowerOn Self Test (POST) routines. These routines are divided into two phases: System Test and Initialization (test and initialize system boards for normal operations) and System Configuration Verification (compare defined configuration with hardware actually installed).

The AMI HiFlex BIOS performs the various diagnostic checks at the time the system is powered up; if an error is encountered, it will be reported in one of two ways:

* If the error occurs before the display device is initialized, a series of beeps will be transmitted. Beep codes are found in Appendix A.

* If the error occurs after the display device is initialized, the screen will display the error message. BIOS error messages are found in Appendix B. In the case of a nonfatal error, a prompt to press the <F1> key may also appear on the screen.

Normally, the only routine visible on the screen will be the memory test. At the left bottom corner of the screen, below the copyright message, a reference string appears. To display the other two strings, press the <ESC> key during boot. This screen displays the options installed in the AMI HiFlex BIOS.

If a problem occurs with the system, copy these reference numbers down before consulting .

When a problem occurs, freeze the screen by powering on the system and holding a key down on the keyboard. This will cause a Keyboard Error message. Copy the three lines and report this information to . Press <F1> to continue the boot procedure.

* If the option *Wait for <F1> If any Error* in the Advanced CMOS Setup Program of the HiFlex BIOS Setup program is set to Disabled, you should set it to Enabled prior to using this method to freeze the screen.

After the POST routines are completed, the following message appears:

Hit <DEL> if you want to run SETUP

To access the AMI HiFlex BIOS Setup program, press the <DEL> key. A record of the computer's system parameters (such as amount of memory, disk drives, video displays, and numeric coprocessors) is stored in CMOS (Complementary Metal Oxide Semiconductor) memory. When the computer is turned off, a backup battery provides power to the CMOS RAM, which retains the system parameters in CMOS memory.

Each time the system is powered on, it is configured with these values, unless the CMOS has been corrupted or is faulty. AMI's Setup program is resident in the ROM BIOS (Read Only Memory Basic Input/Output System) so that it is available each time the computer is turned on.

If, for some reason, the CMOS becomes corrupted, the system is configured with the default values stored in this ROM file. The ROM file stores two sets of BIOS values: the BIOS Setup default values and the PowerOn default values.

The BIOS Setup default values are those which should provide optimum performance for the system. They are the bestcase default values. The PowerOn default values, which are the worstcase defaults, are the stable values for the system. They are to be used if the system is performing erratically because of hardware problems.

Keys

Listed below is an explanation of the keys displayed at the bottom of the screens accessed through the HiFlex BIOS Setup program:

<ESC> Exit to previous screen.

Arrow Keys Use arrow keys to move cursor to desired selection.

<PgUp>, <PgDn>, Modify the default value of the

<CTRL> <PgUp>, options for the highlighted feature.

<CTRL> <Pg Dn> If there are less than 10 available options, the Ctrl PgUp and Ctrl PgDn keys function the same as the PgUp and PgDn keys.

<F1> Displays help screen for selected feature.

<F2> and <F3> Change background and foreground colors.

<F5> Retrieves the values which were resident when the current setup session was started. These values will be CMOS values if the CMOS was uncorrupted at the start of the session, or they will be the BIOS Setup default values.

<F6> Loads all features in the Advanced CMOS Setup/Advanced Chip Set Setup with the BIOS Setup defaults.

<F7> Loads all features in the Advanced CMOS Setup/Advanced Chip Set Setup with the PowerOn defaults.

<F10> Saves all changes made to Setup and exits program.

When <F5>, <F6>, or <F7> is pressed, the default prompt value is always N (No). To execute these options, change the N to Y (Yes) and press <ENTER>.

A warning message is displayed each time one of the first three options (Standard CMOS Setup, Advanced CMOS Setup, and Advanced Chip Set Setup) is selected, before any changes are allowed to any of the setup parameters.

Auto Configuration With BIOS Defaults

The Auto Configuration With BIOS Defaults feature uses the default system values before the user has changed any CMOS values. If the CMOS is corrupted, the BIOS defaults will automatically be loaded.

To use the BIOS defaults, change the prompt to Y and press <ENTER>. The following message will appear on the screen:

Default values loaded. Press any key to continue.

Auto Configuration With PowerOn Defaults

This feature uses the default PowerOn values. Use this option as a diagnostic aid if the system is behaving erratically.

To use the PowerOn defaults, change the prompt to Y and press <ENTER>. The following message will appear on the screen:

Default values loaded. Press any key to continue.

Write to CMOS and Exit

The features selected and configured in the Standard Setup, Advanced CMOS Setup, Advanced Chip Set Setup, and the New Password Setup will be stored in the CMOS when this option is selected. The CMOS checksum is calculated and written to the CMOS. Control is then passed back to BIOS.

Pressing <N> (No) and <ENTER> will return the user to the Main Menu. Pressing <Y> (Yes) and <ENTER> will save the system parameters and continue with the booting process.

Do Not Write to CMOS and Exit

This option passes control back to BIOS without writing any changes to the CMOS. Pressing <N> (No) and <ENTER> will return the user to the Main Menu. Pressing <Y> (Yes) and <ENTER> will continue with the booting process without saving any system parameters.

Standard CMOS Setup

Standard CMOS Setup is the first option on the main setup menu. Press <ENTER> at the highlighted selection to access this option.

Configuration Options

The Standard CMOS Setup utility is used to configure the following options:

Date Month, Date, and Year. Ranges for each value are listed in the prompt box in the lower left corner of the CMOS Setup Screen.

Time Hour, Minute, and Second. Uses 24 hour clock format (for PM numbers, add 12 to the hour). For example, to set the clock time to 4:30 P.M., enter 16:30:00.

Daylight Savings Leave Disabled (function not supported)

Hard Disk C and Hard disk types from 1 to 46 are

Hard Disk D standard ones; type 47 is user definable. The user must enter the hard disk parameters for each drive. The USER definition entry lets the user enter the drive parameters for a disk drive not previously defined in ROM.

Drive Type Characteristics

The drive types are identified by the following characteristics:

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

Cyl This is the number of cylinders found in the specified drive type.

Heads This is the number of heads found in the specified drive type.

WPcom This is the read delay circuitry that takes into account the timing differences between the inner and outer edges of the surface of the disk platter. The number designates the starting cylinder of the signal.

Lzone Lzone is the landing zone of the heads. This number determines the cylinder location where the heads will normally park when the system is shut down.

Sectors Every track is normally divided into 17 sectors.

Capacity This is the formatted capacity of the drive based on the following formula: (# of heads) X (# of cylinders) X (17 secs/cyl) X (512 bytes/sec)

Floppy Drive A and The options are 360 KB 5-1/4",

Floppy Drive B 1.2 MB 5-1/4", 720 KB 3-1/2", 1.44 MB 3-1/2", and Not Installed. Not Installed could be used as an option for diskless workstations.

Primary Display Options are Monochrome, Color 40x25, VGA/PGA/EGA, Color 80x25, and Not Installed. The Not Installed option could be used for network file servers.

Keyboard Options are Installed or Not Installed.

Table 31 lists the attributes for disk types 1 through 46.

Not Installed is available for use as an option. This option could be used for diskless workstations and SCSI hard disks. Type 47 may be used for both hard disks C: and D:.

The parameters for type 47 under Hard Disk C: and Hard Disk D: may be different, which effectively allows 2 different userdefinable hard disk types.

Table 3 - 1

Disk Types 1 Through 46

Type	Cyl	Heads	Wpcom	Lzone	Secs	Size
1	1024	12	65535	1023	17	102MB
2	755	16	65535	755	17	100MB
3	615	6	300	615	17	31MB
4	940	8	512	940	17	62MB
5	940	6	512	940	17	47MB
6	615	4	65535	615	17	20MB
7	462	8	256	511	17	31MB
8	733	5	65535	733	17	30MB
9	900	15	65535	901	17	112MB
10	820	3	65535	820	17	20MB
11	855	5	65535	855	17	35MB
12	855	7	65535	855	17	50MB
13	306	80	128	319	17	20MB
14	733	7	65535	733	17	43MB
15	0	0	0	0	0	0MB
16	612	4	0	663	17	20MB
17	977	5	300	977	17	41MB

18	977	7	65535	977	17	57MB
19	1024	7	512	1023	17	60MB
20	733	5	300	732	17	30MB
21	733	7	300	732	17	43MB
22	733	5	300	733	17	30MB
23	306	4	0	336	17	10MB
24	925	7	0	925	17	54MB
25	925	9	65535	925	17	69MB
26	754	7	754	754	17	44MB
27	754	11	65535	754	17	69MB
28	699	7	256	699	17	41MB
29	823	10	65535	823	17	68MB
30	918	7	918	918	17	53MB
31	1024	11	65535	1024	17	94MB
32	1024	15	65535	1024	17	128MB
34	612	2	128	612	17	10MB
35	1024	9	65535	1024	17	77MB
36	1024	8	512	1024	17	68MB
37	615	8	128	615	17	41MB
38	987	3	987	987	17	25MB
39	987	7	987	987	17	57MB
40	820	6	820	820	17	41MB
41	977	5	977	977	17	41MB
42	981	5	981	981	17	41MB
43	830	7	512	830	17	48MB
44	830	10	65535	830	17	69MB
45	917	15	65535	918	17	114MB
46	1224	15	65535	1223	17	152MB

Advanced CMOS Setup

The Advanced CMOS Setup program is equipped with a series of help screens, accessed by the <F1> key, which will display the options available for a particular configuration feature and special help for some of the options.

The options for the following features of the Advanced CMOS setup are either Disabled or Enabled:

* Typematic Rate Programming

* Above 1MB Memory Test

* Memory Test Tick Sound

* Memory Parity Error Check

* Hit <DEL> Message Display

* Wait for <F1> If Any Error

* Numeric Processor Test

* Fast Gate A20 Option *

* Video or Adapter ROM Shadow *

*** Denotes chip set specific option**

The options for Weitek Processor are either Present or Absent.

The options for PowerOn Up Num Lock are On or Off.

The options for System Boot Up Speed are High or Low.

Setup Screen Options

Typematic Rate Programming

By enabling this option, the user can adjust the rate at which a keystroke is repeated. The options Typematic Rate Delay and Typematic Rate affect this rate. When a key is pressed and held down, the character appears on the screen and after a delay set by the Typematic Rate Delay, it keeps on repeating at a rate set by the Typematic Rate value. When two or more keys are pressed and held down simultaneously, only the last key pressed will be repeated at the typematic rate. This stops when the last key pressed is released, even if other keys are depressed.

Above 1MB Memory Test

This feature, when enabled, will execute the POST memory routines on the RAM above 1 MB (if present on the system). If disabled, the BIOS will only check the first 1 MB of RAM.

Memory Test Tick Sound

This option will enable (turn on) or disable (turn off) the ticking sound during the memory test.

Memory Parity Error Check

The user may disable the memory parity error checking routines in the BIOS.

Hit <DEL> Message Display

Disabling this option will prevent the message

Hit <DEL> if you want to run Setup

from appearing on the screen when the system boots.

Hard Disk Type 47 Data Area

The AMI HiFlex BIOS Setup features two userdefinable hard disk types. Normally, the data for these disk types are stored at 0:300 in lower system RAM. If a problem occurs with other software, this data can be located at the upper limit of the DOS conventional memory area (640 KB). If the option is set to DOS 1 KB, the DOS conventional memory area is shortened to 639 KB, and the top 1 KB is used for the hard disk data storage.

Wait for F1 If Any Error

Before the system boots, the BIOS will execute the POST routines, a series of system diagnostic routines. If any of these tests fail, but a nonfatal error has occurred and the system can still function, the BIOS will respond with an appropriate error message followed by the following statement:

Press <F1> to continue.

If this option is disabled, any nonfatal error which occurs will not generate the above statement, but the BIOS will still display the appropriate error message. This will eliminate the need for any user response to a nonfatal error condition message. Appendix B has a list of error messages and their corresponding explanations.

System Boot Up Num Lock

The user may turn off the Num Lock option on his Enhanced Keyboard when the system is powered on. This will allow him to use the arrow keys on the numeric keypad as well as the other set of arrow keys on the Enhanced Keyboard. The BIOS will default to turning the Num Lock on.

Numeric Processor Test

The default for this option is Disabled to avoid any problems which might occur when there is no numeric processor on the board and the option is enabled.

Weitek Processor

The option allows the user to mark the Weitek numeric processor (WTL3167 or 4167) as present or absent.

Floppy Drive Seek At Boot

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 AMI BIOS will normally attempt to boot from floppy drive A: (if present), and if unsuccessful, it will attempt to boot from hard disk C:. This sequence can be switched using this option. If the option is set to C:, A:, the system will attempt to boot from the hard drive C:, and then A:. If the option is set to A:, C:, the sequence is reversed.

System Boot Up CPU Speed

The speed at which the system will boot is determined with this option. Choices for this option are high or low. The default speed is low.

Password Check Option

Controlled by the system manufacturer's preferences, the password feature can be used to prevent unauthorized system boot or unauthorized use of HiFlex BIOS Setup. The option in the HiFlex BIOS Setup only allows the user to enable the password check option every time the system boots or upon entering Setup. A third option is to disable the password option entirely.

The default option is Disabled. The prompt for the password will not appear when the system is rebooted.

If the Always option is chosen at Setup, each time the system is turned on, the prompt for user password will appear.

If the Setup option is chosen at Setup, the password prompt will not appear when the system is turned on, but will appear if the user attempts to enter the Setup program. The program allows three attempts to enter the correct password. After each incorrect attempt, the prompt to enter the current password will appear, followed by an X. After the third incorrect attempt, the system will lock and it will be necessary to reboot. The screen will not display the characters entered.

See the **Change Password** Section for instructions on changing the user password.

The Internal Cache Memory and External Cache Memory options should appear on 486TM systems. On 386TM systems, the option appearing on the screen will be Cache Memory.

Internal Cache Memory

This option will appear only on 486 systems which use CPUs (Central Processing Units) with an internal cache structure. With this option, the user may enable or disable the internal cache of the system CPU.

External Cache Memory

This option appears only on 486 systems that can have a caching scheme external to the CPU. With this option, the user may specify whether the external cache is present or absent.

Fast Gate A20

This option uses the fast gate A20 line, supported in some chip sets, to access any memory above 1 MB. Normally, all RAM access above 1 MB is handled through the keyboard controller chip. Using this option will make the access faster than the normal method. This option is useful in networking operating systems.

Video or Adaptor ROM Shadow

ROM shadow is a technique in which BIOS code is copied from slower ROM to faster RAM. The BIOS is then executed from the RAM. These options are chip set specific and are dependent on the system hardware. They may or may not appear on the Advanced CMOS Setup screen. Each option, when it does appear, allows for a segment of 16 KB to be shadowed from ROM to RAM. If one of these options is enabled, and there is BIOS code present in that particular 16 KB segment, the BIOS will be shadowed.

System ROM Shadow

The same concept applies here as above, except that in this case, the entire system BIOS (64 KB in length) is shadowed.

Turbo Switch Option

If this option is enabled, speed switching through the keyboard will be enabled, if the switch is connected to the keyboard controller.

Advanced Chip Set Setup

This portion of the HiFlex BIOS Setup is entirely chip set specific and requires knowledge about the particular chip set in use in this system. This option is used to change the values for the chip set registers. These registers control the operation of many system features.

Change Password

The HiFlex BIOS Setup program has an optional password feature. Depending on the particular hardware manufacturer or system integrator, the system may be configured so that the user is required to enter a password every time the system boots, or whenever an attempt is made to enter the Setup programs. The password function may also be disabled, which means that the prompt will not appear under any circumstances.

This section describes changing the user password. The password check function is enabled or disabled in Advanced CMOS Setup. The password check function is enabled by choosing either Always or Setup.

F The Change Password option will generate an error message if the Password Checking Option is disabled in the Advanced CMOS Setup. The Password Checking Option MUST be enabled to change the password.

The password, which will be stored in the CMOS, cannot exceed 6 characters in length. A default password, to be used if the CMOS is corrupted, is stored in the ROM. The default password is AMI.

To change the user password, select the Change Password option from the main Setup screen by using the arrow keys to move the cursor to this selection and pressing <ENTER>.

The first time this option is selected, enter the default password AMI, then press <ENTER> to complete the selection.

The screen will not display the characters entered. After the current password has been correctly entered, a prompt for the new password will be displayed.

After the new password is entered, a prompt appears. Rekey the new password and press <ENTER>.

If the password confirmation is miskeyed, an error screen appears. If the new password confirmation is entered without error, the final screen appears. Press <ESC> to return to the Main Setup menu.

Once Setup is completed, the changed values are stored in CMOS memory. When the system next boots, the user will be prompted for the password if the password function is present and has been enabled. When and if the prompt appears is dependent upon the options chosen in Advanced CMOS Setup:

! If the Always option was chosen in Advanced CMOS Setup, the prompt will appear each time the system is powered on.

! If the Setup option was chosen in Advanced CMOS Setup, the prompt will not appear when the system is powered on, but will appear each time an attempt is made to enter the Setup program.

! If the Disabled option was chosen in Advanced CMOS Setup, the password prompt will never appear.

Enter the new password when the password prompt appears, and press the <ENTER> key. If the CMOS is corrupted, for example, the batteries fall out or are loosened, the default ROM password mentioned above should be used instead.

*** When the password is changed, it is important that a record of the change be kept in a safe place. In the event the password check has been enabled in Setup and the user forgets or loses the new password, the default password stored in the ROM cannot be used unless the CMOS is disabled. A relatively safe way to do this would be to remove the CMOS battery for at least 20 minutes, then replace it, reboot and reconfigure the system.**

Hard Disk Utility

*** These routines will not support a SCSI Disk Drive.**

The Hard Disk Format option performs a low level format of the hard drives. The user should check with the system or hard drive manufacturer to determine if this option should be taken.

The Auto Interleave option determines the optimum interleave factor prior to the format of the hard drives.

The Media Analysis option performs an analysis of each track of the hard drive to determine whether it is usable. If it is not usable, the track is marked as bad so that data cannot be stored there.

A more detailed explanation of the above options is found in the individual sections on the options. See Appendix C for a list of error messages which may occur during these procedures. If a new hard disk drive is being installed, the manufacturer of the hard drive usually provides a list of bad tracks.

If the bad tracks and interleave factor are known, it will not be necessary to take the auto interleave and media analysis options. Simply follow the instructions in the Hard Disk Format section below. If a bad track list has been provided but the optimum interleave factor is not known, follow the instructions in the Auto Interleave section.

If installing a used hard disk or reformatting an existing hard disk, perform the Media Analysis and then follow the instructions in the Auto Interleave section.

Use the Arrow Keys to select one of the three options and press <ENTER>.

Hard Disk Format Utility

*** This routine will not support a SCSI Disk Drive.**

Use the Hard Disk Format option to integrate a new hard disk into the system, or to reformat a used hard disk which has developed bad tracks as a result of aging or poor handling. Select the Media Analysis option to find bad tracks.

When <ENTER> is pressed at the Hard Disk Format option, a screen appears. The box on the left of the screen contains a series of prompts (questions) which must be answered before performing the Hard Disk Format. The first two questions may already have been answered if the value was previously entered for one disk only at the Standard CMOS Setup screen.

The value for Disk Drive is C for a C: Drive or D for a D: Drive. If two disk drives have been previously entered at the Standard CMOS Setup Screen, then the ID (C/D) will appear to the right of the question mark following the Disk Drive field. Choose which drive is to be formatted by selecting the appropriate letter and pressing <ENTER>. If only one drive was selected at the Standard CMOS Setup screen, the cursor will automatically be placed at the interleave prompt.

The Disk Drive Type is read from CMOS. The Interleave factor can be selected manually, or can be determined with the Auto Interleave feature of the Setup program.

The manufacturer of the hard drive usually provides a list of bad tracks. These tracks should be entered with this option. They will then be marked as bad to prevent data from being stored there.

Edit the bad tracks list by changing the prompt to Mark Bad Tracks to Y, and press <ENTER>. Select an option to add, delete, revise, or clear from the Bad Track Edit Menu.

After identifying the bad tracks, a new screen is displayed with a **Proceed** prompt. Change the **Proceed** prompt to Y and press <ENTER>. A warning screen is displayed with a **Continue** prompt.

The default for the **Continue** prompt is N to prevent accidental formatting of the hard drive and subsequent loss of data.

Once this prompt is changed to Y and the <ENTER> key pressed, any data residing on the hard drive will be irrevocably lost.

AutoInterleave Utility

*** This routine will not support a SCSI Disk Drive.**

The Auto Interleave utility calculates the optimum interleave value through trial and error by measuring the transfer rate for four different interleave values. To determine the best interleave factor, the system will format a portion of the hard disk for each transfer rate calculated. The cylinders, heads and sectors formatted for each value will be displayed in the activity box on the screen.

To begin the Auto Interleave process, use the arrow keys to select this function on the main Hard Disk Utility Screen. Press <ENTER> to select this option. A new screen appears. The cursor will be placed at the Mark Bad Tracks prompt. The default for this prompt is N. To mark additional bad tracks, change the prompt to Y and press <ENTER>. A new screen appears.

After making the desired selections at the Bad Tracks Edit Menu, press <ESC>. The cursor will be moved to the Proceed prompt.

To proceed with the Auto Interleave process, change the prompt to Y and press <ENTER>. A warning screen appears.

Press <ENTER> to return to the main Hard Disk Utility screen. To proceed, change the warning prompt to Y and press <ENTER>.

Media Analysis Utility

*** This routine will not support a SCSI Disk Drive.**

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 may require several minutes to complete. For best results, run this test in its entirety.

To run the Media Analysis utility, use the arrow keys to select the option from the main Hard Disk Utility Menu and press <ENTER>. A new screen appears.

The cursor will appear at the Proceed prompt. When <ENTER> is pressed, a warning screen appears.

Press the <ENTER> key and the main Hard Disk Utility screen appears. To proceed with the analysis, change the prompt to Y and press <ENTER>.

Customer Service Support System

BC 3030
Chapter 4 - Memory Configurations

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Memory Configurations

The BC 3030 supports from 2 to 16MB of system memory. The minimum configuration supplied by Cubix is 2MB.

Memory below 1MB is divided into two defined sections, Conventional DOS addressable or Transient Program Area (TPA) and Upper Memory.

DOS compatible executable programs load and execute in the TPA. Upper Memory is memory reserved for system BIOS and devices that require an addressable memory window. Video adapters, mass storage device interfaces, network interface cards, and other add-in cards reside in the Upper Memory area. An Expanded Memory page frame as defined by the Lotus-Intel-Microsoft, or LIM, specification can also occupy part of the Upper Memory area.

Memory above 1MB can be utilized by DOS as Extended Memory (XMS), Expanded Memory (EMS), or a combination of both. Extended Memory is compatible with XMS and VCPI standards. Expanded Memory is compatible with LIM 3.2 and 4.0 specifications. To configure memory above 1MB as EMS or XMS memory, an Extended or Expanded Memory Driver must be installed. Cubix does not supply a memory driver with the BC 3030. Extended and Expanded Memory drivers are available in Microsoft DOS 5.x, Digital Research DOS 6.x, and from several third-party vendors.

Use memory below 1MB according to the memory map illustrated in Figure 4-1.

Memory between 640KB and 1MB not required by hardware memory windows or BIOS can be made available to DOS. By configuring these areas as EMS page frames or Upper Memory Blocks, they can be used for loading and executing application software such as TSRs (Terminate and Stay Resident programs) and network drivers.

DOS Versions and Memory Management

Microsoft DOS 3.x and DOS 4.x

MS DOS versions 3.x and 4.x require third party memory managers to utilize memory between 640KB and 1MB.

Microsoft DOS 5.x

MS DOS 5 includes memory management for 80386 class processors to allow memory between 640KB and 1MB to be remapped as Upper Memory Blocks (UMBs). The DOS *LOADHIGH* command can be used to relocate programs such as NetWare's IPX and NETX into available UMBs.

Since the DOS 5.x memory manager runs in Extended Memory above 1MB, the processor must have enough available memory defined as Extended Memory to load the memory manager. The remaining memory can be allocated as Extended or Expanded Memory.

Digital Research DOS 6.x

DR DOS 6.x includes memory management for 80386 class processors and other processors with LIM 4.0 compatible memory systems allowing memory between 640KB and 1MB to be remapped as UMBs. The DOS *HIGHLOAD* command can be used to relocate programs such as NetWare's IPX and NETX into available UMBs.

Video Memory Options

The BC 3030 has a VGA controller built into the board. This controller cannot be disabled; the video BIOS on the card will always occupy the upper memory window at C0000-C7FFF. If the application being executed on the BC 3030 card does not require all of the graphics capabilities of the VGA controller, other Upper Memory areas normally devoted to video may be used as an extension of the DOS TPA.

If graphics applications will not be run on the BC 3030 board, the VGA Graphics Buffer (A0000-AFFFF) can be mapped by the memory manager drivers as an extension of the 640KB of conventional (TPA) DOS memory area. This will increase the TPA to 704KB. If the BC 3030 is to be used for applications that require only CGA Graphics support, the VGA Graphics Buffer (A0000-AFFFF) and the MDA (Monochrome Display Adapter) Text Buffer (B0000-B7FFF) areas of memory may be mapped by the memory manager as an extension of DOS, increasing TPA to 736KB.

VGA memory applications do not require use of the MDA text buffer (B0000-B7FFF). The memory manager can map and use this area as Upper Memory Blocks (UMBs).

* Any application that attempts to use a video buffer that has been remapped by a memory manager will cause the processor to fail. Cubix does not recommend remapping video memory with MS DOS 5.0 or DR DOS 6.0 unless care is taken to restrict the ability of the user to run applications that can access these areas as video memory.

Memory Configuration Hints

1. The memory management drivers provided with MS DOS 5.0 or DR DOS 6.0 require a minimum of 2MB of RAM.

2. Remember to EXCLUDE memory areas which are mapped as memory windows for LAN adapters.

3. In order to form the largest continuous blocks of Upper Memory, set the LAN adapter to use the memory window starting at the end of the VGA BIOS area, at memory location C8000.

For Ethernet set the adapter to use the 16KB of RAM from addresses C8000 to CBFFF.

For IBM Token Ring Adapters use the IBM default settings:

* set the ROM address to 16KB from RAM addresses CC000-CFFFF

* set the 8KB shared RAM address to C8000-C9FFF with an IPX parameter in the AUTOEXEC.BAT file:

IPX o,mem=C800

4. Set the EMS Page Frame address to E0000 to leave the largest possible free block between the LAN adapter memory window and the Page Frame.

Customer Service Support System

BC 3030
Appendix A - BIOS Error Beep Codes

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BIOS Error Beep Codes

During the POST (Power On Self Test) routines, which are performed each time the system is booted, errors may occur. Nonfatal errors are those which, in most cases, allow the system to continue the boot process. The error messages normally appear on the screen. See Appendix B for BIOS Error Messages.

Fatal errors are those which will not allow the system to continue the boot procedure. If a fatal error occurs, consult Cubix Technical Support for possible repairs. These fatal errors are usually communicated through a series of audible beeps. The number of beeps corresponds to the error number in the following list. All errors except of #8 are fatal errors.

1 Beep - Refresh Failure

The memory refresh circuitry of the motherboard is faulty.

2 Beeps - Parity Error

A parity error was detected in the base memory (the first block of 64 KB) of the system.

3 Beeps - Base 64 KB Memory Failure

A memory failure occurred within the first 64 KB of memory.

4 Beeps - Timer Not Operational

Timer #1 on the system board has failed to function properly.

5 Beeps - Processor Error

The CPU (Central Processing Unit) on the system board has generated an error.

6 Beeps - 8042 Gate A20 Failure

The keyboard controller (8042) contains the Gate A20 switch which allows the CPU to operate in virtual mode. This error message indicates that the BIOS is not able to switch the CPU into protected mode.

7 Beeps - Processor Exception Interrupt Error

The CPU on the motherboard has generated an exception interrupt.

8 Beeps - Display Memory Read/Write Error

The system video adapter is either missing or its memory is faulty. This is not a fatal error.

9 Beeps - ROM Checksum Error

The ROM checksum value does not match the value encoded in the BIOS.

10 Beeps - CMOS Shutdown Register Read/Write Error

The shutdown register for the CMOS memory has failed.

Customer Service Support System

BC 3030
Appendix B - BIOS NonFatal Errors

Table of Contents

BIOS NonFatal Error Messages

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

ERROR Message Line 1

ERROR Message Line 2

Press <F1> to RESUME

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

*** If the *Wait for <F1> If Any Error* option in the Advanced CMOS Setup portion of the HiFlex BIOS Setup Program has been set to disabled, the prompt will not appear on the third line.**

For most of the error messages, there is no ERROR Message Line 2. Generally, for those messages containing a line 2 ERROR Message, the text will be

RUN SETUP UTILITY

Pressing the <F1> key will invoke the HiFlex BIOS SETUP Program.

A description of the error messages appears below.

CH2 Timer Error

Most ATcompatible system boards include two timers. An error with timer #1 is a fatal error, explained in Appendix A. If an error occurs with timer #2, this error message appears.

INTR #1 Error

The interrupt channel #1 has failed the POST routine.

INTR #2 Error

The interrupt channel #2 has failed the POST routine.

CMOS Battery State Low

There is a battery in the system which is used for storing the CMOS values. This battery appears to be low in power and needs to be replaced.

CMOS Checksum Failure

After the CMOS values are saved, a checksum value is generated to provide for error checking. If the previous value is different from the value currently read, this error message appears. To correct this error, run the HiFlex BIOS Setup Program.

CMOS System Options Not Set

The values stored in the CMOS are either corrupt or nonexistent. Run the HiFlex BIOS Setup Program to correct this error.

CMOS Display Type Mismatch

The type of video stored in CMOS does not match the type detected by the BIOS. Run the HiFlex BIOS Setup Program to correct this error.

Display Switch Not Proper

Some systems require that a video switch on the motherboard be set to either color or monochrome, depending upon the type of video being used. To correct this situation, set the switch properly. (Remember to shut down the system first.)

Keyboard Is Locked . . . Unlock It

The keyboard lock on the system is engaged. The system must be unlocked to continue the boot procedure.

Keyboard Error

The BIOS has encountered a timing problem with the keyboard. Make sure an AMI Keyboard BIOS is installed in the system. An option is to set the Keyboard option in the HiFlex BIOS Setup Program Standard CMOS Setup to Not Installed, which will cause the BIOS to skip the keyboard POST routines.

KB/Interface Error

The BIOS has found an error with the keyboard connector on the system board.

CMOS Memory Size Mismatch

If the BIOS finds the amount of memory on the system board to be different from the amount stored in CMOS, this error message is generated. Run the HiFlex BIOS Setup Program to correct this error.

FDD Controller Failure

The BIOS is not able to communicate with the floppy disk drive controller. Check all appropriate connections after the system is powered off.

HDD Controller Failure

The BIOS is not able to communicate with the hard disk drive controller. Check all appropriate connections after the system is powered off.

C: Drive Error

The BIOS is not receiving any response from hard disk drive C:. It may be necessary to run the Hard Disk Utility to correct this problem. Also, check the type of hard disk selected in the Standard CMOS Setup of the HiFlex BIOS Setup program to see if the correct hard disk drive has been selected.

D: Drive Error

The BIOS is not receiving any response from hard disk drive D:. It may be necessary to run the Hard Disk Utility to correct this problem. Also, check the type of hard disk selected in the Standard CMOS Setup of the HiFlex BIOS Setup program to see if the correct hard disk drive has been selected.

C: Drive Failure

The BIOS cannot get any response from the hard disk drive C:. It may be necessary to replace the hard disk.

D: Drive Failure

The BIOS cannot get any response from the hard disk drive D:. It may be necessary to replace the hard disk.

CMOS Time & Date Not Set

Run the Standard CMOS Setup of the HiFlex BIOS Setup Program to set the date and time of the CMOS.

Cache Memory Bad, Do Not Enable Cache!

The BIOS has found the cache memory of the motherboard to be defective. Consult to repair this problem.

8042 GateA20 Error

The gateA20 portion of the keyboard controller (8042) has failed to operate correctly. The 8042 chip should be replaced.

Address Line Short!

An error has occurred in the address decoding circuitry of the motherboard.

DMA #2 Error

An error has occurred with the second DMA channel on the motherboard.

DMA #1 Error

An error has occurred with the first DMA channel on the motherboard.

DMA Error

An error has occurred with the DMA controller on the motherboard.

No ROM BASIC

This error occurs when a proper bootable sector cannot be found on either the floppy diskette drive A: or the hard disk drive C:. The BIOS will try at this point to run ROM Basic, and the error message will be generated when the BIOS does not find it.

Diskette Boot Failure

The diskette used to boot in floppy drive A: is corrupt, which means it cannot be used to boot the system. Use another boot diskette and follow the instructions on the screen.

Invalid Boot Diskette

The BIOS can read the diskette in floppy drive A:, but it cannot boot the system with it. Use another boot diskette and follow the instructions on the screen.

On Board Parity Error*

The BIOS has encountered a parity error with some memory installed on the system board. The message will appear as follows:

ON BOARD PARITY ERROR ADDR (HEX) = (XXXX)

where *XXXX* is the address (in hexadecimal) at which the error has occurred. On Board means that it is part of the memory attached directly to the system board, as opposed to memory installed via an expansion card in an I/O (BUS) slot.

Off Board Parity Error*

The BIOS has encountered a parity error with some memory installed in an I/O (BUS) slot. The message will appear as follows:

OFF BOARD PARITY ERROR ADDR (HEX) = (XXXX)

where *XXXX* is the address (in hexadecimal) at which the error has occurred. Off Board means that it is part of the memory installed via an expansion card in an I/O (BUS) slot, as opposed to memory attached directly to the system board.

Parity Error ????*

The BIOS has encountered a parity error with some memory in the system, but it is not able to determine the address of the error.

* Memory diagnostic software, such as AMIDIAG, can be used to find and correct memory problems.

Customer Service Support System

BC 3030
Appendix C - Hard Disk Utility Errors

Table of Contents

Hard Disk Utility Error Messages

Messages

The following messages may appear during execution of the Hard Disk Utility section of the AMI HiFlex BIOS Setup Program.

The first group of errors listed below may appear during the initialization process.

No Hard Disk Installed

The program could not find a hard disk drive installed on the system. This message appears if there is no hard disk on the system and the user has chosen to run the Hard Disk Utility.

FATAL ERROR Bad Hard Disk

The program is not getting a 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

The program is getting an error response from the reset command sent to the hard disk controller. Check to see that the controller is seated properly in the BUS slot.

C: (D:) Hard Disk Failure

The hard disk drive (C: or D:) is not responding to commands sent to it by the program. Check power and cable connections to the hard disk.

The errors listed below may appear during operations.

Undefined Error

Command Aborted

An error condition has occurred which the program cannot identify.

Address Mark Not Found

The address mark (initial address) on the hard disk could not be found by the program.

Requested Sector Not Found

The sector currently requested on the hard disk could not be found.

Reset Failed

The program issued a reset command to the hard disk, but this command did not properly reset the hard disk.

Drive Parameter Activity Failed

The program has sent a reset command to the controller, followed by the drive parameters. Using the parameters sent to it, the controller is not getting a response from the hard disk drive. Check to see if the drive type selected in the Standard CMOS Setup is correct for the disk drive being used.

Bad Sector Flag Detected

The program has tried to perform an operation on a sector which has been flagged as bad.

Bad ECC on Disk Read

When the program attempts to write 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. If the value read back is different from the one calculated, then this error will occur.

ECC Corrected Data Error

The ECC (Error Correction Code) value read from the disk is not the same value which was written to the disk; therefore, the program assumes that the data is not correct. It then attempts to correct the data, but the ECC value is not corrected. In this situation, this message appears.

Controller Has Failed

The program has issued a diagnostic command to the controller, which has failed; therefore, the controller has failed as well.

Seek Operation Failed

The program has issued a seek command to the drive and this operation has failed. A seek operation is the act of finding a particular sector on the hard disk.

Attachment Failed to Respond

No response has been received from the hard disk drive. This message appears if an operation has already begun and the hard disk does not respond, when it had responded earlier.

Drive Not Ready

The program is trying to perform an operation on the hard disk drive, and it has waited beyond a preset specified time limit. This situation is known as a timeout.

Write Fault on Selected Drive

A write fault has occurred during the write operation on the hard disk drive.