SBC-357/4M

386SX-40 Half-size CPU card with LCD, SSD, & 4COMs

FCC STATEMENT

THIS DEVICE COMPLIES WITH PART 15 FCC RULES. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS: (1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE. (2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIRED OPERATION.

THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS "A" DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FCC RULES. THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINTST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND , IF NOT INSTATLLED AND USED IN ACCORDANCE WITH THE INSTRUCTION MANUAL, MAY CAUSE HARMFUL INTERFERENCE TO RADIO COMMUNICATIONS. OPERATION OF THIS EQUIPMENT IN A RESIDENTIAL AREA IS LIKELY TO CAUSE HARMFUL INTERFERENCE IN WHICH CASE THE USER WILL BE REQUIRED TO CORRECT THE INTERFERENCE AT HIS OWN EXPENSE.

Packing list

Before you begin installing your card, please make sure that the following materials have been shipped:

- 1 supporting CD-ROM
- 1 SBC-357/4M CPU card
- 1 Hard disk drive (IDE) interface cable (40 pin)
- 1 Floppy disk drive interface cable (34 pin)
- 1 6-pin mini-DIN dual outlet adapter for keyboard and PS/2 mouse
- 1 parallel port adapter (26-25 pin) and dual outlet adapter kit for COM port (10-9 pin) & (14-9 pin) adapter kit
- 2 serial adapter kit (9-10 Pin)
- 1 bag of screws and miscellaneous parts

If any of these items are missing or damaged, contact your distributor or sales representative immediately.

Notice

Dear Customer,

Thank you for purchasing the SBC-357/4M board. The user's manual is designed to help you to get the most out of the SBC-357/4M, please read it thoroughly before you install and use the board. This product that you have purchased comes with a two years limited warranty; EMAC will not be responsible for any misuse of the product. Therefore, we strongly urge that user first read the manual before using the product.

To receive the lastest version of the user manual, please visit our Web site at:

U.S.A : www.emacinc.com

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CHAPTER 1

General Information

This chapter provides background information for the SBC-357/4M.

Sections include:

- Card specifications
- Board layout

Introduction

The SBC-357/4M is an all-in-one single board 386 computer with an onboard flat panel/CRT SVGA controller. It packs all the functions of an industrial computer and its display capabilities onto a single, half-size card. This means the SBC-357/4M is your absolute best solution for embedded applications.

The onboard ISA-Bus, flat panel/CRT SVGA controller uses the CHIPS 65545 chipset with up to 1 MB of video memory (512KB onboard). It supports various LCD types including TFT, STN, Normal, and EL.

The SBC-357/4M supports the optional M-Systems DiskOnChip 2000 which is a new generation of high performance single-chip Flash Disk. It provides a Flash Disk (as a BIOS expansion) which doesn't require any bus, slots, or connectors. It is also the optimal solution for Single Board Computers because of its small size, easy integration, plug-and-play functionality, and its low power consumption. The DiskOnChip is available in capacities from 2MB to 288MB and fits in a standard 32-pin DIP socket.

The SBC-357/4M also features three high speed RS-232 serial ports, and one RS-232/422/485 serial port with 16C550 UARTs, one bidirectional SPP/EPP/ECP parallel port, and a floppy drive controller, all onboard.

If program execution is halted by a program bug or EMI, the board's watchdog timer can automatically reset the CPU or generate an interrupt. This ensures reliability in unmanned or standalone systems.

All configuration is done through software. A single Flash chip holds the system BIOS, VGA BIOS, and the network boot ROM image. This minimizes the number of chips and eases configuration. You can change the display BIOS or install a boot ROM simply by programming the Flash chip.

The SBC-357/4M supports 5 V EDO or FP DRAM. It also provides one 72-pin SIMM (Single In-line Memory Module) socket for its onboard system DRAM. These socket configures your system up to 20 MB of DRAM.

Features

- 386SX-40 compatible CPU
- DiskOnChip (SSD) up to 72MB
- Can display both CRT and LCD simultaneously
- Connector for PC/104 module expansion
- Supports 4 serial ports: Three RS-232 ports and one RS-232/422/485 port

Specifications

CPU: Embedded in ALI M6117C Chipset Intel 80386SX-40 compatible

Data bus: 16-bit

BIOS: AMI Flash BIOS (Supports LBA mode HDD)

Chipset: ALI M6117C

Super I/O Chipset: ITE8661F

RAM memory: Up to 20MB. Using one 72-pin SIMM socket

Shadow RAM memory: Supports system and video BIOS shadow memory

IDE hard disk drive interface: Supports up to one IDE (AT bus) hard disk drives. BIOS auto-detect.

Floppy disk drive interface: Supports up to two floppy disk drive, 5.25”(360KB and 2MB) and /or 3.5”(720KB, 1.44MB and 2.88MB)

Bi-directional parallel port: One Bi-directional printer port (Configurable LPT1, LPT2, LPT3 or disable). Support SPP, ECP and EPP modes.

Serial ports: Three RS-232 serial ports and one RS-232/422/485 serial port. Uses 16C550 UARTs with 16 byte FIFO. Supports speeds up to 115Kbps. Ports can be individually configured from COM1 to COM4 or disabled.

Real-time clock/calendar: ALI chipset RTC (internal) and quartz oscillator power by a lithium battery for 10 years of data retention.

DMA channel: 7

Interrupt levels: 15

KB/PS2 Mouse connector: 6 pin mini DIN connector supports a standard PC/AT keyboard and mouse.

Flat panel VGA interface

Chipset: C&T 65545

Display memory: 512KB standard, 1MB option

Display type: Supports CRT and flat panel (TFT , DSTN, mono and EL)display, Can display both CRT and flat panel simultaneously.

Resolution: Option up to 1024 x 768 @ 256 colors.(1MB-display memory). Standard 1024 x 768 @ 16 colors (512KB-display memory)

SSD interface

One 32-pin DIP socket supports M-systems DiskOnChip 2000 series, memory capacity from 2MB to 288 MB.

Expansion Slot

PC/104 connector: 104-pin connector for a 16 -bit bus expansion.

Mechanical and environmental

Power supply voltage: +5V (4.75V to 5.25V)

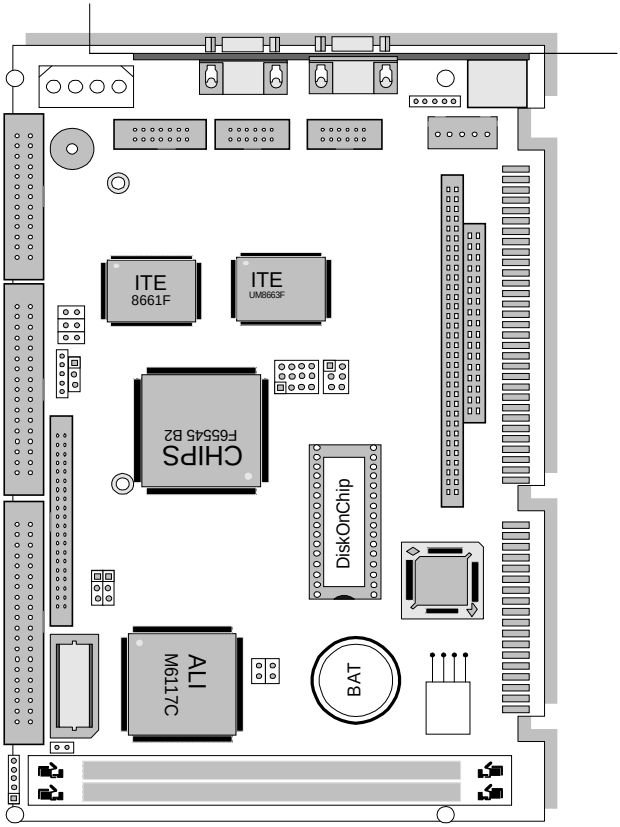
Max. power requirements: +5V @ 2A

Operating temperature: 32 to 140 °F (0 to 60°C)

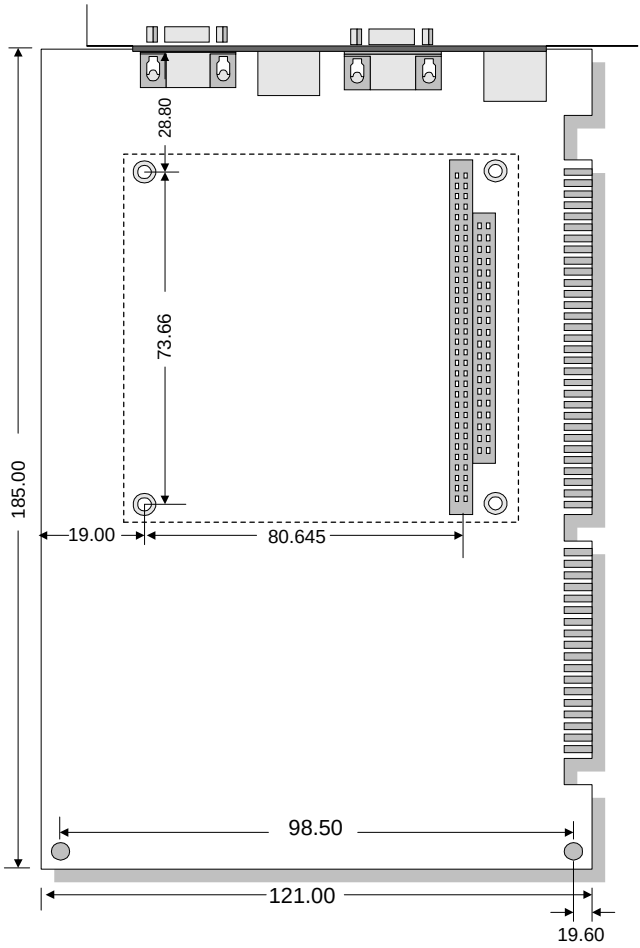
Board Size: 7.3" (L) X 4.8" (W) (185mm x 122mm)

Weight: 0.66 lb. (0.3Kg)

Board layout SBC-357



Card dimensions



CHAPTER 2

Installation

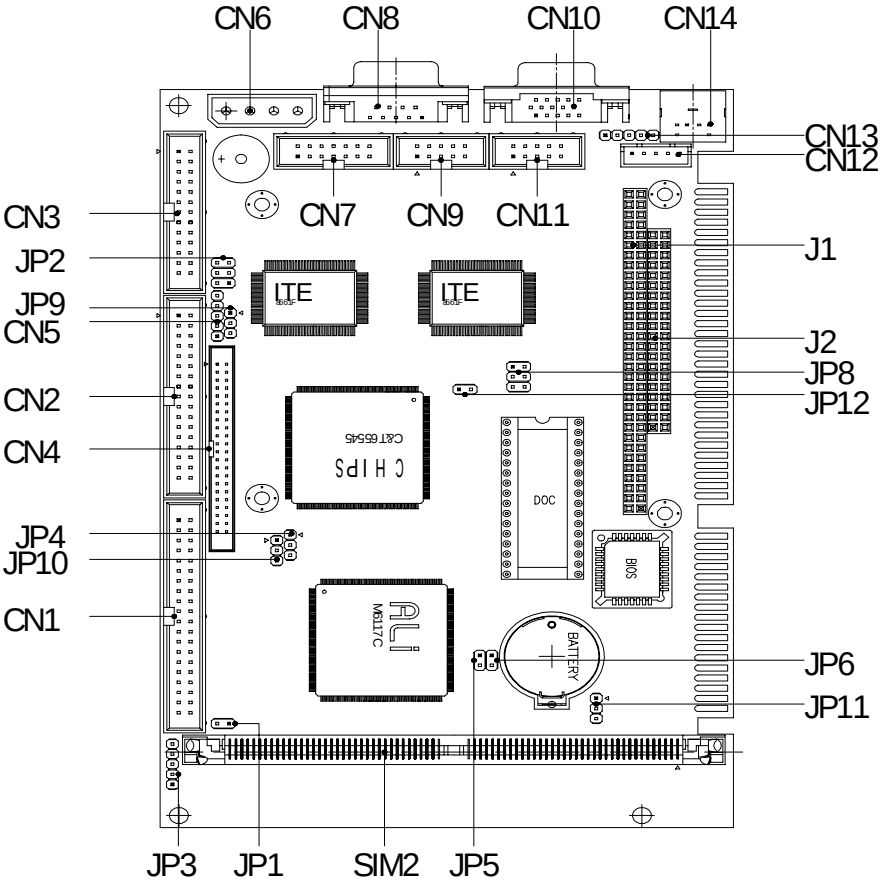
This chapter describes how to set up the SBC-357/4M hardware, including instructions on setting jumpers and connecting peripherals, switches, and indicators. Be sure to read all safety precautions before you begin the installation procedure.

Jumpers and connectors

Connectors on the board links to external devices such as hard disk drives, keyboard, or floppy drives. In addition, the board has a number of jumpers that allows you to configure your system to suit your application. The table below lists the function of each of the board jumpers and connectors.

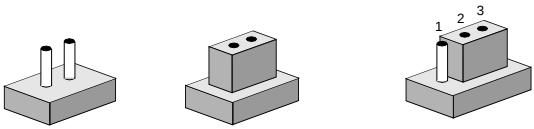
Name	Function
CN1	IDE drive connector
CN2	Floppy drive connector
CN3	Parallel (printer) connector
CN4	LCD connector
CN5	IR connector
CN6	Power connector
CN7	RS-232/422/485 connector (COM2)
CN8	COM1 connector
CN9	COM3 connector
CN10	VGA connector
CN11	COM4 connector
CN12	Internal keyboard connector
CN13	Keyboard lock
CN14	KB/PS2 mouse connector
JP1	IDE LED
JP2	RS-232/422/485 select
JP3	Buzzer or external speaker
JP4	LCD SHF/ASHF clock select
JP5	Green function select (SMI)
JP6	Hardware reset
JP8	DOC address select
JP9	LCD driving voltage select
JP10	LCD voltage select (VGA CHIPSET)
JP11	Clear CMOS selection
JP12	Assign IRQ9 to VGA controller

Locating jumpers and connectors



Setting jumpers

You configure your card to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To “close” a jumper you connect the pins with the clip. To “open” a jumper you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2, and 3. In this case you would connect either pins 1 and 2 or 2 and 3.



Open Closed Closed 2-3

The jumper settings are schematically depicted in this manual as follows:

Open Closed Closed 2-3

A pair of needle-nose pliers may be helpful when working with jumpers.

If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.

Generally, you simply need a standard cable to make most connections.

Safety precautions

Warning!

Always completely disconnect the power cord from your chassis whenever you are working on it. Do not make connections while the power is on because sensitive electronic components can be damaged by the sudden rush of power. Only experienced electronics personnel should open the PC chassis.

Caution!

Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis.

Installing DRAM (SIMMs)

The SBC-357/4M CPU card provides one 72-pin SIMM (Single In-line Memory Module) socket that supports up to 20MB DRAM.

When installing SIMM, make sure to follow instructions below.

* The SBC-357/4M CPU card supports single side F.P or EDO DRAM module only.

Installing SIMM

Note: The modules can only be fitted into a socket one way.

1. Ensure that all power source are disconnected.
2. Slip the memory module into the socket at a moderate angle.
3. Push the module toward the vertical posts at both ends of the socket until the module is upright and the retaining clips at both ends of the module click into place. When positioned correctly, the pins on top of the vertical posts should correspond to the circular holes on the ends of the module.

Removing SIMM

If you need to remove a SIMM, follow the procedures below:

1. Supporting the SIMM with a finger, use a pen or a similar shaped object and press one retaining clip straight down.
2. Repeat for the other side. When released, the retaining clips will push the SIMM up and out of its upright position.
3. Carefully pull the SIMM out of the socket with your fingers.

IDE hard drive connector (CN1)

You can attach two Enhanced Integrated Device Electronics hard disk drives to the SBC-357/4M's internal controller. The card comes with a 40-pin flat piggyback cable. This cable has three identical 40-pin flat-cable connectors.

Connecting the hard drive

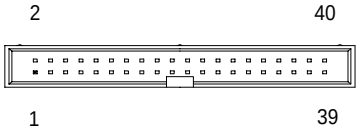
Wire number 1 on the cable is red or blue, and the other wires are gray.

1. Connect one end of the cable to the IDE connector. Make sure that the red (or blue) wire corresponds to pin 1 on the connector, which is labeled on the board (on the right side).
2. Plug the other end of the cable to the Enhanced IDE hard drive, with pin 1 on the cable corresponding to pin 1 on the hard drive. See your hard drive's documentation for the location of the connector.

Unlike floppy drives, you can make the connections with any of the connectors on the cable. If you install two drives, you will need to set one as the master and one as the slave. You do this using jumpers on the drives. If you install just one drive, set it as the master.

Pin assignments

The following table lists the pin numbers and their respective signals:



IDE Connector (CN1)

Pin	Signal	Pin	Signal
1	Reset #	2	GND
3	HD7	4	HD8
5	HD6	6	HD9
7	HD5	8	HD10
9	HD4	10	HD11
11	HD3	12	HD12
13	HD2	14	HD13
15	HD1	16	HD14
17	HD0	18	HD15
19	GND	20	N.C.
21	N.C.	22	GND
23	IOW #	24	GND
25	IOR #	26	GND
27	IORDY	28	BALE
29	N.C.	30	GND
31	IRQ 14	32	I/O CS16 #
33	SA1	34	N.C.
35	SA0	36	SA2
37	HDCS0	38	HDCS1
39	ACT #	40	GND

Floppy drive connector (CN2)

You can attach up to two floppy disks to the SBC-357/4M's onboard controller. You can use any combination of 5 1/4" (360 KB and 1.2 MB) and/or 3 1/2" (720 KB, 1.44 MB, and 2.88 MB) drives.

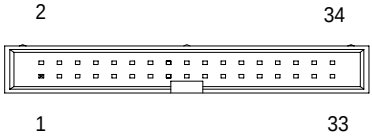
The SBC-357/4M CPU card comes with a 34-pin daisy-chain drive connector cable. On one end of the cable is a 34-pin flat-cable connector. There are two sets of floppy disk drive connectors, one in the middle, and one on the other end. Each set consists of a 34-pin flat-cable connector (usually used for 3.5" drives) and a printed-circuit board connector (usually used for 5.25" drives).

Connecting the floppy drive

1. Plug the 34-pin flat-cable connector into the CN2 connector.
2. Attach the appropriate connector on the other end of the cable to the floppy drive(s). You can use only one connector in the set. The set on the end (after the twist in the cable) connects to the A: drive. The set in the middle connects to the B: drive.

Pin assignments

The following table lists the pin assignments for the CN2 connector:



Floppy drive connector (CN2)

Pin	Signal	Pin	Signal
1~33 (odd)	GND	2	DENSEL (High density)
4, 6	NC	8	INDEX (Index)
10	MTRA (Motor enable)	12	DRVB (Driver select B)
14	DRVA (Driver select A)	16	MTRB (Motor enable B)
18	DIR (Direction)	20	STEP (Step pulse)
22	WDATA (Write data)	24	WGATE (Write enable)
26	TK0 (Track 0)	28	WPT (Write protect)
30	RDATA (Read data)	32	SIDE 1 (Select head)
34	DSKCHG (Disk change)		

Parallel (printer) connector (CN3)

Normally, the parallel port is used to connect the card to a printer. The SBC-357/4M includes an onboard parallel port, accessed through the CN3 connector, a 26-pin flat-cable connector. The CPU card comes with an adapter cable, which lets you use a traditional DB-25 connector. The cable has a 26-pin connector on one end and a DB-25 connector on the other, mounted on a retaining bracket.

Installing the retaining bracket

The retaining bracket installs at an empty slot in your system's chassis. It provides an external port that gives your parallel peripheral access to the card's parallel port connector.

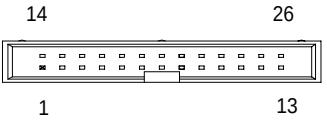
1. Find an empty slot in your chassis.
2. Unscrew the plate that covers the end of the slot.
3. Screw in the bracket in place of the plate.
4. Next, attach the flat-cable connector to the CN3 connector. Wire 1 of the cable is red or blue, and the other wires are gray. Make sure that Wire 1 connects to Pin 1 of the CN3 connector. Pin 1 is on the right side of the CN3 connector.

Pin assignments (Please see illustrated drawing on next page).

Parallel (printer) Connector (CN3)

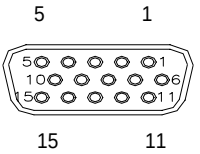
Pin	Signal	Pin	Signal
1	Strobe	2	Data 0
3	Data 1	4	Data 2
5	Data 3	6	Data 4
7	Data 5	8	Data 6
9	Data 7	10	Acknowledge #
11	Busy	12	Paper empty
13	Select	14	Auto feed #
15	Error #	16	Init printer #
17	Select input #	18~25	GND
		26	NC

(Continued from page 16, connector CN3 illustration)



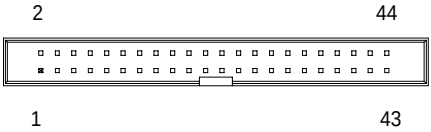
Display connectors (CN10, CN4)

The SBC-357/4M CPU card's SVGA connector (CN10) supports monochrome displays as well as high resolution color displays. The card also features an LCD connector (CN4), which allows you to connect various flat panel displays. The following table lists their pin assignments:



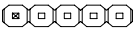
SVGA connector (CN10)

Pin	Signal
1	RED
2	GREEN
3	BLUE
4	NC
5	GND
6	AGND
7	AGND
8	AGND
9	NC
10	GND
11	NC
12	NC
13	HSYNC
14	VSYNC
15	NC



LCD connector (CN4)			
Pin	Signal	Pin	Signal
1	+12 V_{DC}	2	+12 V_{DC}
3	GND	4	GND
5	+5V_{DC} or +3.3V_{DC}	6	+5V_{DC} or +3.3V_{DC}
7	ENA VEE	8	GND
9	P0	10	P1
11	P2	12	P3
13	P4	14	P5
15	P6	16	P7
17	P8	18	P9
19	P10	20	P11
21	P12	22	P13
23	P14	24	P15
25	P16	26	P17
27	P18	28	P19
29	P20	30	P21
31	P22	32	P23
33	GND	34	GND
35	SHIFT CLK	36	FLM
37	M	38	LATCH CLK
39	GND	40	ENABKL
41	NC	42	NC
43	NC	44	NC

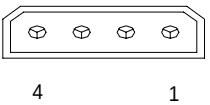
Reserved IR connector (CN5)



IR connector (CN5)	
Pin	Function
1	Vcc
2	FIR_RX
3	IR_RX
4	GND
5	IR_TX

Power connector (CN6)

In single board computer (non-passive backplane) applications, you will need to connect the power directly to the SBC-357/4M board using CN6. This connector is fully compatible with the standard PC power supply connectors. See the following table for its pin assignments:

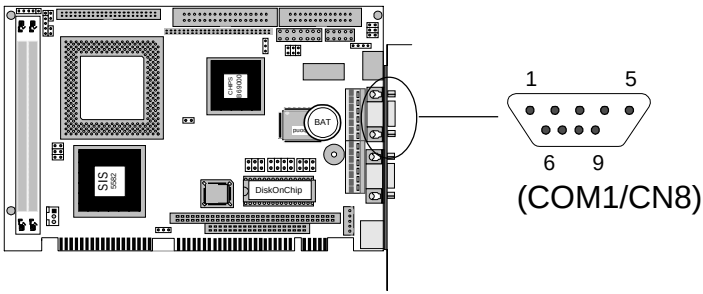


Power port connector (CN6)	
Pin	Signal
1	$+12V_{DC}$
2	GND
3	GND
4	$+5V_{DC}$

Serial port connectors (CN7, CN8, CN9, CN11)

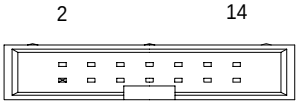
The SBC-357/4M offers three RS-232 serial ports, and one RS-232/422/485 serial port. You can select or disable the address for each port with the BIOS Peripheral Setup program.

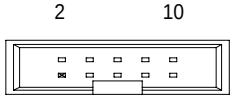
The card mounting bracket holds COM1(CN8), the DB-9 serial port connector for the first port. The COM port connectors on the SBC-357/4M board are CN7 (COM2), CN9 (COM3), CN11 (COM4). The



COM1 Pin Assignment (CN8)	
Pin	Function
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

COM 2 (CN7) COM 3 (CN9), COM 4 (CN11)





COM2 Pin Assignment (CN7)

Pin	Function (RS-232)	Function (RS-422/485)
1	DCD	DCD
2	DSR	DSR
3	RXD	RXD
4	RTS	RTS
5	TXD	TXD
6	CTS	CTS
7	DTR	DTR
8	RI	RI
9	GND	GND
10	NC	NC
11	NC	422 TXD+/485 TXD+
12	NC	422 TXD-/485 TXD-
13	NC	422 RXD+
14	NC	422 RXD-

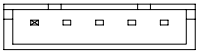
NOTE: Pin 11 & 12 functions are set by JP2 jumper setting.

COM3, COM4 Pin Assignment (CN9, CN11)

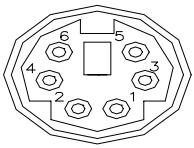
Pin	Function
1	DCD
2	DSR
3	RXD
4	RTS
5	TXD
6	CTS
7	DTR
8	RI
9	GND
10	NC

KB and PS/2 mouse connectors (CN12, CN14)

The SBC-357/4M board provides two keyboard and one PS/2 mouse connectors. A 5-pin connector (CN12) supports passive backplane applications. A second 6-pin mini-DIN keyboard and PS/2 mouse connector (CN14) on the card mounting bracket supports single board computer applications.



Keyboard connector (CN12)	
Pin	Function
1	K.B. clock
2	K.B. data
3	N.C.
4	GND
5	+5 V_{DC}



KB & PS/2 mouse connector (CN14)	
Pin	Function
1	K.B. data
2	PS/2 mouse data
3	GND
4	+5 V_{DC}
5	K.B. clock
6	PS/2 mouse clock

Keyboard lock function (CN13)

You can use a switch (or a lock) to disable the keyboard. In this state the PC will not respond to any input. This is useful if you don't want anyone to change or stop a running program. Simply connect the switch between Pins 4 and 5. The pin assignments appear in the following table:

keylock (CN13)

Pin	Function
1	LED Power (KVcc)
2	N.C
3	GND
4	Keyboard lock
5	GND

IDE LED (JP1)

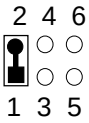
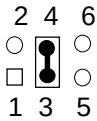
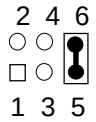
You can connect an LED to indicate that an IDE device is in use. The pin assignments for this jumper are as follows:

IDE LED (JP1)	
Pin	Signal
1	-R/W IDE
2	+Vcc

RS-232/422/485 setting select (JP2)

COM2 can also be assigned as RS-422 or RS-485 I/F. Setting JP2 to assign CN7 (COM2) as RS-422/RS-485 I/F, or otherwise assign CN7 (COM2) as RS-232 I/F.

RS-232/422/485 setting select (JP2)

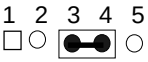
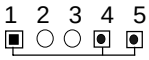
RS-232/422/485 setting select (JP2)	
RS-232*	
RS-422	
RS-485	

* default

Buzzer or external speaker (JP3)

The CPU card has its own buzzer. You can disable the internal buzzer and connect an external speaker to EXT SPK. Enabling the external speaker automatically disables the internal buzzer.

Buzzer or External Speaker (JP3)

Buzzer*	External Speaker
	

* default

Buzzer or External speaker (JP3)

Pin	Function
1	Vcc
2	N.C.
3	Buzzer in
4	Speaker output
5	Speaker output

LCD SHF/ASHF clock select (JP4)

You can select the LCD control signals by setting JP1. The following charts show the available options.

LCD SHF/ASHF Clock select (JP4)

SHF CLK from C&T65545*	ASHF CLK from SHF CLK

* default

System management interrupt (JP5)

The user can connect an external switch or jumper cap enabling the SMI (System Management Interrupt), makes the system enter Green function mode.

System management interrupt (JP5)

*	(SMI mode)
○ ○	

* default

Hardware Reset (JP6)

You can connect an external switch to easily reset your computer. This switch restarts your computer as if you turned off the power then turned it back on. The following table shows the pin assignments for JP6.

Reset switch (JP6)

Pin	Function
1	Reset
2	Ground

DiskOnChip Installation (U15, JP8)

Please refer to the DiskOnChip manual for detailed information about the DiskOnChip.

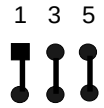
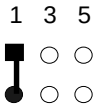
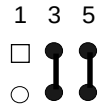
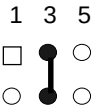
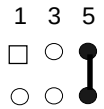
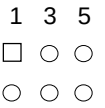
To install the DiskOnChip on the SBC-357/4M, follow the instructions below.

Step 1: Install the DiskOnChip in U15.

Step 2: Set SW1 for the memory address of the DiskOnChip memory.

SW1 determines the memory adddress of the DiskOnChip memory. If you have another add-on card in the system that uses the same memory, neither the SBC-357/4M nor the add-on card will function normally. In this case, please change the memory address.

DiskOnChip address select (JP8)

Disable	DC00
	
D800	D400
	
D000*	Disable
	

* Default

LCD driving voltage select (JP9, JP10)

You can select LCD connector (CN4) driving voltage by setting JP9 & JP10.

LCD driving voltage select (JP9, JP10)

	5V *	3.3V
JP9	1 3	1 3
JP10	1 3	1 3

* Default

Clear CMOS selection (JP11)

Users can use JP11 to clear the CMOS data if necessary. To reset the CMOS data, set J11 to 2-3 closed for just a few seconds, and then move the jumper back to 1-2 closed.

Clear CMOS selection (JP11)

*Protect	Clear CMOS
1 3	1 3

* default

IRQ9 assign to VGA controller (JP12)

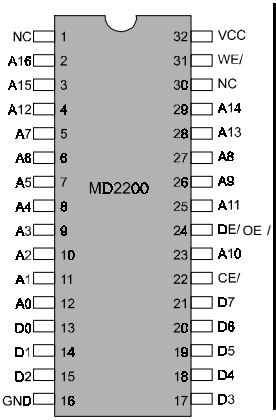
When jumper JP12 is close it assigns IRQ9 to VGA controller. When jumper JP12 is open IRQ9 will be released and assigned by system.

jumper open	jumper close

DiskOnChip socket (U15)

The DiskOnChip 2000 family of products provides a single chip solid-state flash disk in a standard 32-pin DIP package. The DiskOnChip 2000 is a solid-state disk with no moving parts, resulting in a significant reduction in power consumption and an increase in reliability. The DiskOnChip is a small, plug-and-play Flash disk. It is easy to use and saves integration overhead.

The DiskOnChip 2000 family of products is available in capacities ranging from 2MB up to 72MB, unformatted. In order to manage the disk, the DiskOnChip 2000 includes the TrueFFS, M-Systems Flash File System proprietary software. The DiskOnChip 2000 package is pin-to-pin compatible with standard 32-pin EPROM devices.



pin Name	Description	Pin Number	Direction	Note
A0-A12	Address bus	4-12,23,25-27	Inputs	
A13-A16	Address bus	2,3,28,29	Inputs	1
D0-D7	Data bus	13-15,17-21	I/O	
CE/	Chip Enable	22	Input	
OE/	Output Enable	24	Input	
WE/	Write Enable	31	Input	
NC	Not connected	1.30		2
VCC	Power	32		
GND	Ground	16		

Figure 1-MD2200 Pinout

Note 1: Pins A13 through A16 are not used by the MD2200. They are kept for socket backward compatibility with ED 1100 (DiskOnChip 1000)

Note 2: Pins 1 and 30 are not used by MD2200

CHAPTER 3

AMIBIOS Setup

This chapter describes how to set the BIOS configuration data.

General information

AMIBIOS Setup configures system information that is stored in CMOS RAM.

Starting AMIBIOS setup

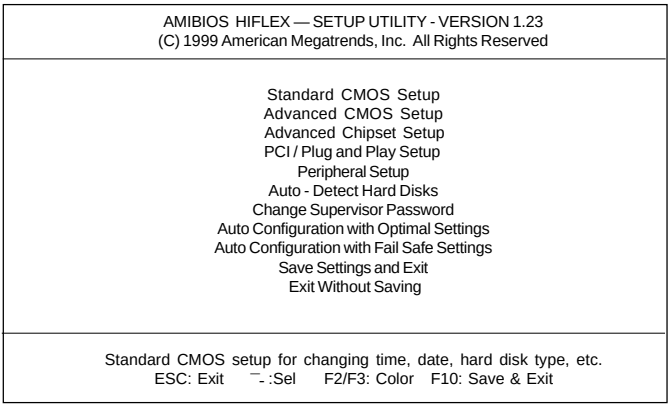
As POST executes, the following appears;

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

Press <DEL> to run AMIBIOS setup.

AMIBIOS main menu

The AMIBIOS setup screen appears as follows:



Using a mouse with AMIBIOS setup

AMIBIOS Setup can be accessed via keyboard, mouse. The mouse click functions are:

- single click to change or select both global and current fields
- double click to perform an operation in the selected field

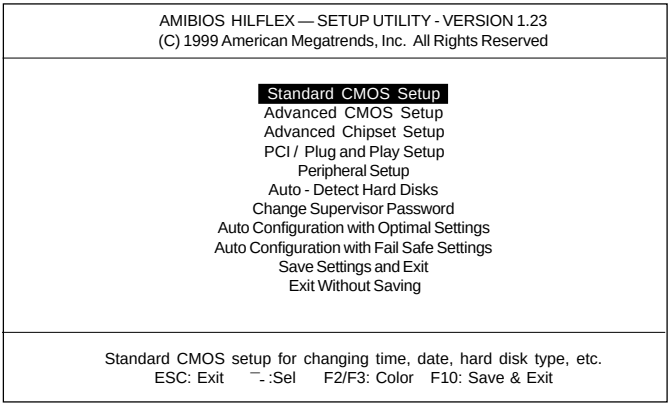
Using the keyboard with AMIBIOS setup

AMIBIOS Setup has a built-in keyboard driver that uses simple keystroke combinations:

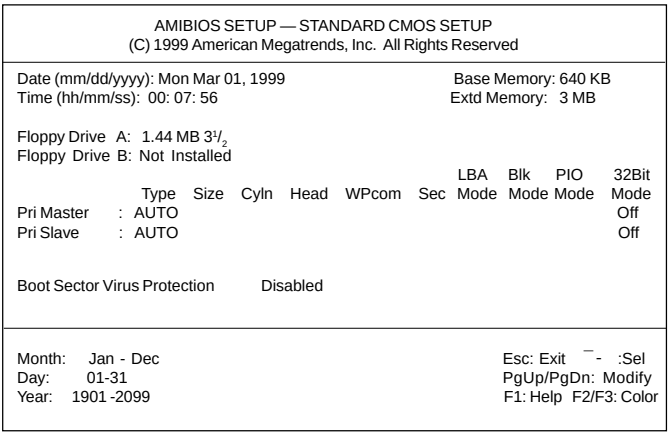
Keystroke	Function
<tab>	Move to the next window or field.
→, ←, ↑, ↓	Move to the next field to the right, left, above, or below.
<ENTER>	Select the current field.
+	Increments a value.
-	Decrements a value.
<ESC>	Close the current operation and return to the previous level.
<PgUp>	Return to the previous page.
<PgDn>	Advance to the next page.
<Home>	Return to the beginning of the text.
<End>	Advance to the end of the text.
<ALT>+H	Access a help window.
<ALT>+<Spacebar>	Exit AMIBIOS Setup.
Alphabetic keys	A to Z are used in the Virtual keyboard, and are not case sensitive.
Numeric keys	0 to 9 are in the Virtual keyboard and Numeric keypad.

Standard CMOS setup

The AMIBIOS Setup options described in this section are selected by choosing the Standard CMOS Setup from the AMIBIOS Setup main menu selection screen, as shown below.



Press enter, the Standard CMOS Setup screen appears:



Date and Time Configuration

Select the Date and Time icon in the Standard CMOS setup. The current values for each category are displayed. Enter new values through the keyboard or hit the "+" or "-" key to change values.

Floppy A, Floppy B

Select the appropriate specifications to configure the type of floppy drive that is attached to the system: 360 KB 5¼", 1.2 MB 5¼", 720 KB 3½", and/or 1.44 MB 3½". The settings have not been pre-installed.

Master Disk, Slave Disk

Select the appropriate values to configure the hard disk type you are using for the master and the slave. Available types are 1~46, USER, AUTO, Not Installed, and CDROM. The settings have not been preinstalled.

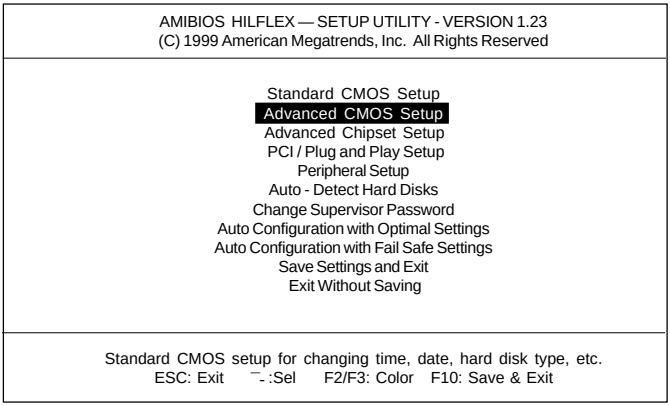
Boot Sector Virus Protection

Enabling this option allows the system to issue a warning when any program (or virus) issues a disk format command or attempts to write to the boot sector of the hard disk drive. Further confirmation is required before accessing this particular section of the hard disk drive.

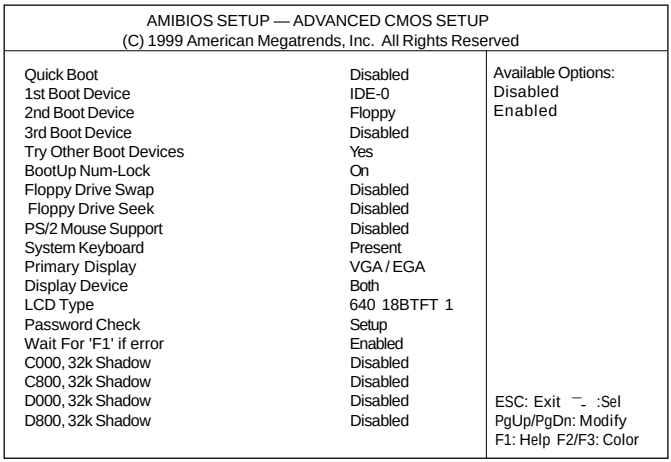
Advanced CMOS setup

Select the Advanced CMOS Setup icon from the AMIBIOS Setup main menu to enter Advanced CMOS setup.

The "Advanced CMOS Setup" options described in this section are the standard options as shown on the following screen.



Press enter, the Advanced CMOS Setup screen appears:



Quick Boot

Set this option to Enabled to instruct AMIBIOS to boot quickly when the computer is powered on. This option replaces the old "Above 1 MB Memory Test" Advanced Setup option.

Setting	Description
Disabled	AMIBIOS tests all system memory. AMIBIOS waits up to 40 seconds for a READY signal from the IDE hard disk drive. AMIBIOS waits for .5 seconds after sending a RESET signal to the IDE drive to allow the IDE drive time to get ready again. AMIBIOS checks for a <Del> key press and runs AMIBIOS Setup if the key has been pressed.
Enabled	AMIBIOS does not test system memory above 1 MB. AMIBIOS does not wait up to 40 seconds for a READY signal from the IDE hard disk drive. If a READY signal is not received immediately from the IDE drive, AMIBIOS does not configure that drive. AMIBIOS does not wait for .5 seconds after sending a RESET signal to the IDE drive to allow the IDE drive time to get ready again. You cannot run AMIBIOS Setup at system boot, because there is no delay for the Hit <Del> to run Setup message.

Boot Up Number Lock

Set this option to Off to turn the Num Lock key off when the computer is booted so you can use the arrow keys on both the numeric keypad and the keyboard. The settings are On or Off. The default setting is On.

1st, 2nd and 3rd Boot Devices

This option sets the sequence of boot drives (floppy drive A:, or hard disk drive C:) that the AMIBIOS attempts to boot from after AMIBIOS POST completes. The settings are C:,A:,CDROM, CDROM,A:,C:, or A:,C:,CDROM. The default setting is A:, C:, CDROM.

Floppy Drive Swap

Set this option to Enabled to permit drives A: or B: to be swapped. The settings are Enabled or Disabled. The default setting is Disabled.

PS/2 Mouse Support

When this option is set to Enabled, AMIBIOS supports a PS/2-type mouse. The settings are Enabled or Disabled. The default setting is Enabled.

System Keyboard

This option specifies that a keyboard is attached to the computer. The settings are Present or Absent. The default setting is Present.

Primary Display

This option specifies the type of display monitor and adapter in the computer. The settings are Mono, CGA40x25, CGA80x25, VGA/EGA, or Absent. The default setting is EGA/VGA.

Display Device

This option allows user to select the display device. The settings are CRT, LCD, and Both. The default setting is Both.

Password Check

This option enables password checking every time the computer is powered on or every time AMIBIOS Setup is executed. If Always is chosen, a user password prompt appears every time the computer is turned on. If Setup is chosen, the password prompt appears as AMIBIOS is executed. The default is Setup.

Wait for F1 if Error:

AMIBIOS POST error messages are followed by:

```
Press <F1> to continue
```

If this option is set to Disabled, AMIBIOS does not wait for you to press the <F1> key after an error message. The setting is Enabled or Disabled. The default setting is Enabled.

ROM Location Setting

C000, 32K Shadow	C800, 32K Shadow
D000, 32K Shadow	D800, 32K Shadow

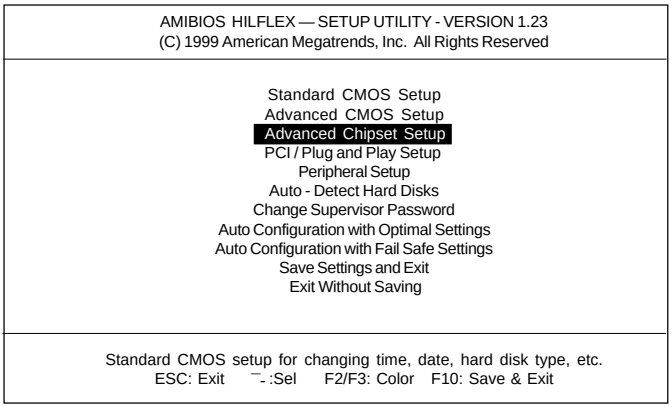
These options control the location of the contents of the 16KB of ROM beginning at the specified memory location. If no adapter ROM is using the named ROM area, this area is made available to the local bus. The settings are:

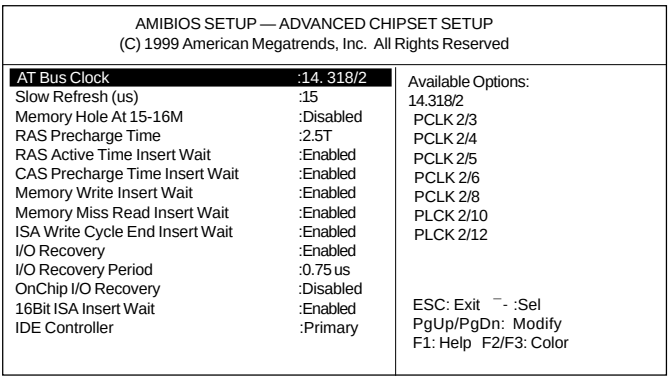
Setting	Description
Shadow	The contents of C0000h - C3FFFh are written to the same address in system memory (RAM) for faster execution.
Enabled	If an adapter ROM will be using the named ROM area, ROM area are written to the same address in system memory (RAM) for faster execution. Also, the contents of the RAM area can be read from and written to cache memory.
Disabled	The video ROM is not copied to RAM. The contents of the video ROM cannot be read from or written to cache memory.

Advanced chipset setup

Select the Advanced Chipset Setup from the AMIBIOS Setup main menu to enter the Chipset Setup. The following configurations are based on the manufacturer's default settings.

This section allows you to configure the system based on the specific features of the installed chipset. This chipset manages bus speeds and access to system memory resources, such as DRAM and the external cache. It also coordinates communications between the conventional ISA bus and the PCI bus. It must be stated that these items should never need to be altered. The default settings have been chosen, because they provide the best operating conditions for your system.





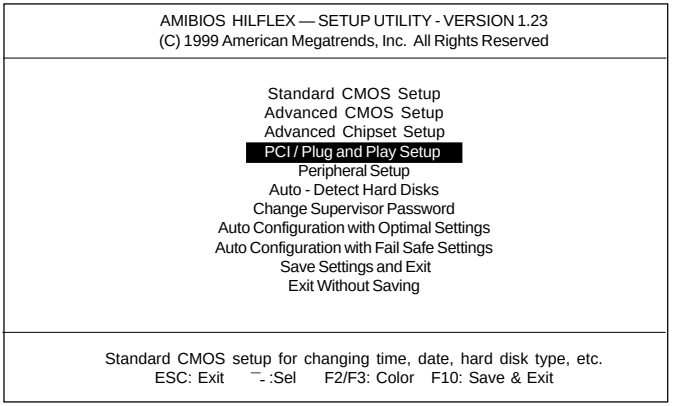
Chipset setup options

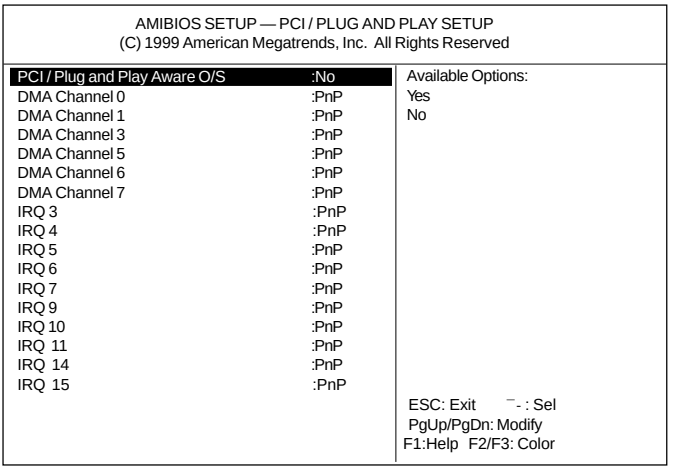
Function	option
At Bus Clock	14.318/2
	PCLK 2/3
	PCLK 2/4
	PCLK 2/5
	PCLK 2/6
	PCLK 2/8
	PCLK 2/10
	PCLK 2/12
Slow Refresh	15 µs
	60 µs
	120 µs
Memory Hole At 15-16M	Disabled
	Enabled
RAS Precharge Time	2.5T
	1.5T
	3.5T
RAS Active Time Insert Wait	Disabled
	Enabled
CAS Precharge Time Insert Wait	Disabled
	Enabled
Memory Write Insert Wait	Disabled
	Enabled
Memory Miss Read Insert Wait	Disabled
	Enabled
ISA Write Cycle and Insert Wait	Disabled
	Enabled

I/O Recovery	Disabled Enabled
I/O Recovery Period	0 µs 0.25 µs 0.50 µs 0.75 µs 1.00 µs 1.25 µs 1.50 µs 1.75 µs 2.00 µs 2.25 µs 2.50 µs 2.75 µs 3.00 µs 3.25 µs 3.50 µs
OnChip I/O Recovery	Disabled Enabled
16 Bit ISA Insert Wait	Disabled Enabled

PCI / plug and play setup

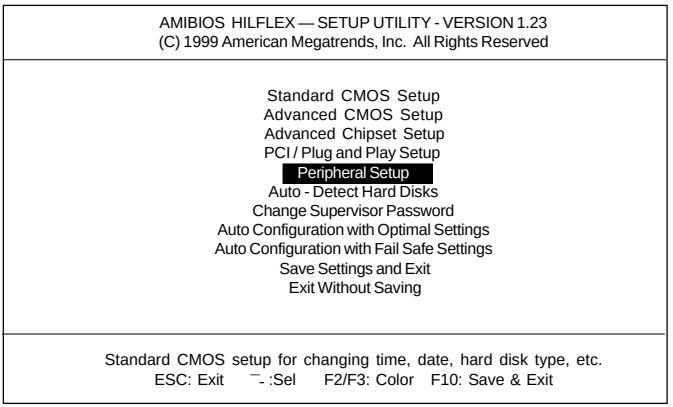
The PCI / plug and play setup offers options in the selection of the setup choice. To see the options in this group, choose the PCI / plug and play setup icon from the AMIBIOS setup main menu.

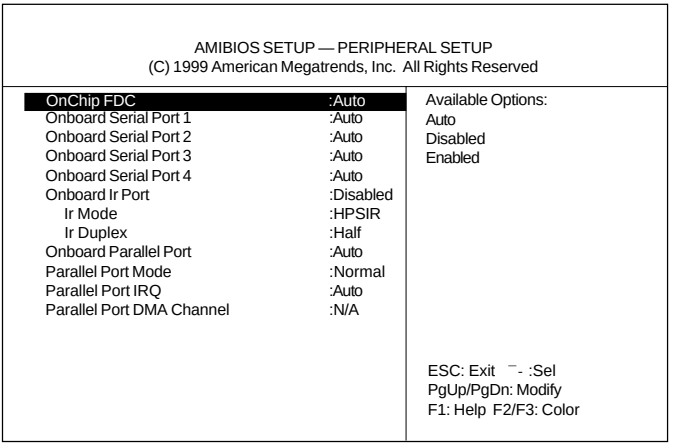




Peripheral Setup

Peripheral Setup options are displayed by choosing the Peripheral Setup icon from the AMIBIOS Setup main menu. All Peripheral Setup options are described in this section:





OnChip FDC

This option specifies the OnChip FDC controller channels that will be used. The settings are Disabled or Enabled.

Parallel Port Mode

This option specifies the parallel port mode. ECP and EPP are both bidirectional data transfer sechemes that adhere to the IEEE P1284 specification. The settings are:

Setting	Description
Normal	The normal parallel port mode is used. This is the default setting.
EPP	The parallel port can be used with devices that adhere to the Enhanced Parallel Port (EPP) specification. EPP uses the existing parallel port signals to provide asymmetric bidirectional data transfer driven by the host device.
ECP	The parallel port can be used with devices that adhere to the Extended Capabilities Port (ECP) specification. ECP uses the DMA protocol to achieve transfer rates of approximately 2.5 Mbs. ECP provides symmetric bidirectional communications.

ECP DMA

This option is setting for the Parallel Port Mode.

The settings are DMA, CH (channel) 0, DMA CH 1, DMA CH2, or DMA CH3.

Parallel Port IRQ

IRQ7 is used for the Parallel Port (LPT 1). The IRQ can be changed to IRQ5.

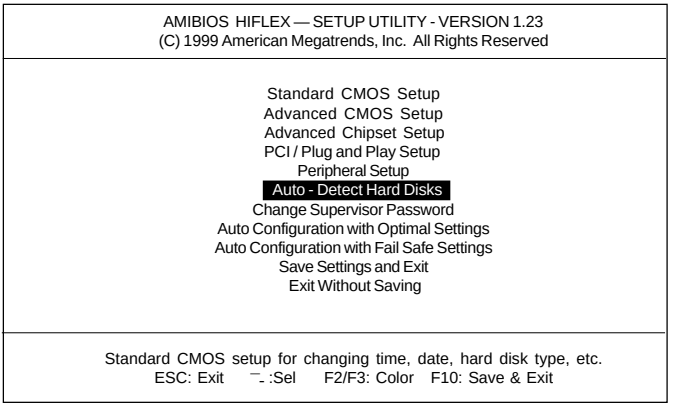
Onboard Serial Port 1/2/3/4

This option enables serial port 1 on the motherboard and specifies the base I/O port address for serial port 1~4.

The settings are Disabled, 3F8h, 3E8h, 2E8h, and 2F8h.

Auto-Detect hard disks

Select this option on the menu, then press enter. The Standard CMOS Setup shows up. Try to check with the Standard CMOS Setup illustration in this chapter.



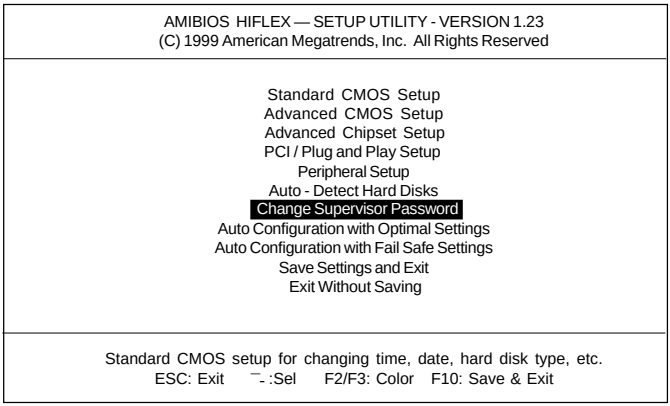
Change supervisor password

1) Select this option from the main menu

2) Enter the Password and Press <Enter>

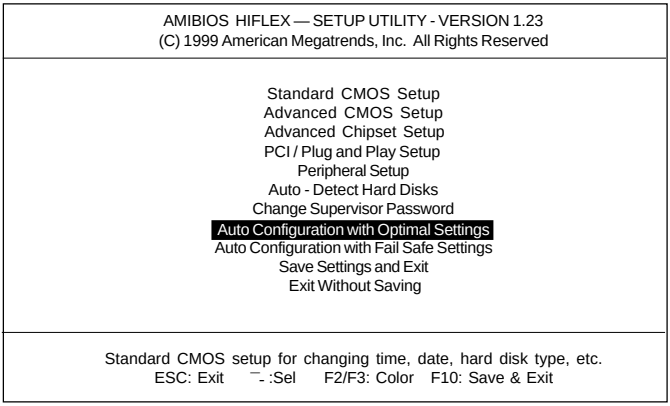
3) Retype the Password and Press <Enter>

If you forget the password, please contact your distributor for another password which you can use to enter the AMIBIOS setup and change your own password.



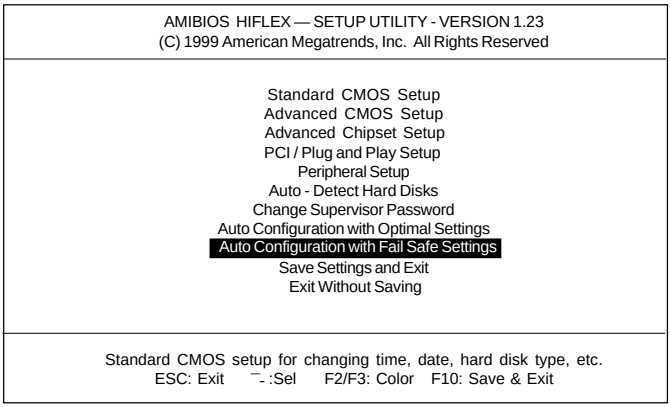
Auto configuration with optimal settings

You can load the optimal default settings for the AMIBOIS setup options by selecting it from the main menu. The optimal default settings are best case values that should optimize system performance. If CMOS RAM is corrupted, the optimal settings are loaded automatically.



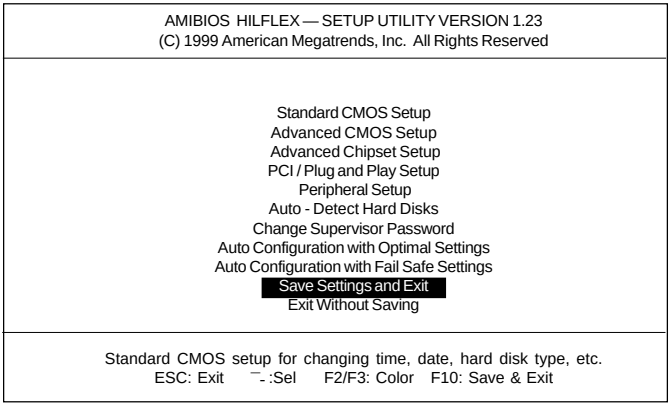
Auto configuration with fail safe settings

You can load the Fail Safe settings for the AMIBOIS setup options by selecting it from the main menu. The Fail Safe settings provide the most stable settings, though they may not provide optimal performance. Use this option as a diagnostic aid if the system is behaving erratically.



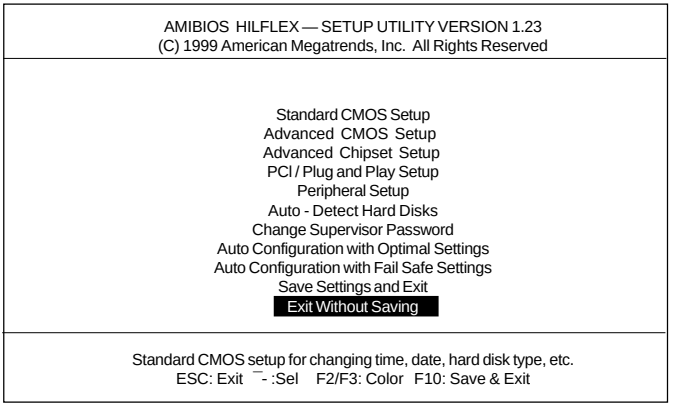
Save settings and exit

If you select this option and press <Enter>, the values entered in the setup utilities will be recorded in the chipset's CMOS memory. The microprocessor will check this every time you turn your system on and compare this to what it finds as it checks the system. This record is required for the system to operate.



Exit without saving

Selecting this option and pressing <Enter> lets you exit the Setup program, without recording any new values or changing old ones.



CHAPTER 4

SVGA Setup

The SBC-357/4M features an onboard flat panel/SVGA interface. This chapter provides instructions for installing and operating the software drivers on the included display driver diskette.

Windows 3.1

These drivers are designed to work with Microsoft Windows Version 3.1. You may install these drivers either through Windows or in DOS.

Driver installation - Windows Setup

1. Install Windows as you normally would for a VGA display. Run Windows to make sure that it is working correctly.
2. Place the Supporting CD-ROM into your CD-ROM drive. In the Windows Program Manager, choose File from the Options Menu. Then from the pull-down menu, choose Run. At the Command Line prompt, type

   cd-rom drive: \CD ROM\model name\sbc-357\vga driver \Oemsetup.inf.

   "cd-rom": the drive letter of your CD-ROM drive

   "model name": the model number of your product

   Press the <ENTER> key or click OK to begin the installation. At this point the setup program locates the directory where Windows is installed. For proper operation, the drivers must be installed in the Windows subdirectory.
3. Press <ENTER> to complete the installation. Once completed, the Display Driver Control Panel appears on the screen. You can find the ChipCPL under the Control Panel. The icon allows you to select and load the installed drivers.

Changing Display Drivers from Windows

To change display drivers from Windows, select the Windows Setup icon from the Main window. You will be shown the current setup configuration. Select Change System Settings from the Option menu. Click on the arrow at the end of the Display line. You will be shown a list of display drivers. Click on the driver you want to select. Then click on the OK button. Follow the directions to complete the setup.

Changing Color Schemes

After you change display drivers, you may notice that the color scheme used by Windows looks strange. This is because different drivers have different default colors. You can correct this by choosing the same color scheme or a new color scheme. First select the Control Panel from the Main window. Select the Color icon. You will be shown the current color scheme. Choose a new color scheme and click the OK button.

DOS

Driver installation - DOS Setup

1. Install Windows as you normally would for a VGA display. Run Windows to make sure that it is working correctly. Then exit from Windows.
2. Place the Supporting CD-ROM into yur CD-ROM drive. Type

   cd-rom drive:

   <ENTER> to make this the default drive.
3. Type "\CD ROM\model name\sbc-357\357\vga driver\setup"

   <ENTER> to run the driver SETUP program. Press any key to get to the applications list.

   "cd-rom": the drive letter of your CD-ROM drive

   "model name": the model number of your product
4. Using the arrow keys, select Windows Version 3.1 and press the <ENTER> key. Press the <ENTER> key to select All Resolutions, then press <END> to begin the installation.
5. At this point you will be asked for the path to your Windows System directory (default C:\WINDOWS). When the installation is complete, press any key to continue. Press <ESC> followed by Y to exit to DOS.
6. Change to the directory where you installed Windows (usually C:\WINDOWS).

7. Type SETUP <ENTER> to run the Windows Setup program. It will show the current Windows configuration. Use the up arrow key to move to the Display line and press <ENTER>.
8. A list of display drivers will be shown. Use the arrow keys to select one of the drivers starting with an asterisk (*) and press <ENTER>.
9. Follow the directions on the screen to complete the setup. In most cases, you may press <ENTER> to accept the suggested option.

Start Windows with the new display driver.

Changing Display Drivers from DOS

To change display drivers from DOS, change to the Windows directory and run Setup, repeating steps 4 and 5 from the previous page. Besides the special display drivers marked by an asterisk (*), you should be able to use the following standard drivers:

VGA	640 x 480, 16 colors
Super VGA	800 x 600, 16 colors

Panning Drivers

Special panning drivers are provided to allow high-resolution modes to be displayed on a flat panel or CRT. These drivers will show a section of a larger screen, and will automatically pan or scroll the screen horizontally and vertically when the mouse reaches the edge of the display.

SOFTWARE UTILITIES

This chapter describes the operation and installation of the display drivers supplied on the Supporting CD-ROM that are shipped with your product.

- CHIPSCPL

The CHIPSCPL utility program

This utility program is designed to work with Microsoft® Windows® Version 3.1.

Installing the utility

CHIPSCPL.CPL is a Windows® based utility to select resolutions and color depth. It is a Control Panel Applet with its own icon that is automatically installed when installing the CHIPS Windows® 3.1 linear drivers. The Control Panel icon is in the Main Windows® group. To invoke the control panel applet, simply-double click on the icon. The driver resolution and color depth take effect only after Windows is rebooted with the new driver.

How to use the utility

SCREEN SIZE <ALT S> allows you to select from the following resolutions:

- 640 x 480
- 800 x 600
- 1024 x 786
- 1280 x 1024

If you select the resoution first, the allowable color depth choices will automatically be shown.

COLOR <ALT O> allows you to select the number of colors from the following:

- 16 (4 bits per pixel)
- 256 (8 bpp)
- 32K (15 bpp)
- 64K (16 bpp)
- 16M (24 bpp)

If you select color depth first, the allowable resolution choices will automatically be shown.

DPI<ALT P> allows you to select a large or small font.

DISPLAY<ALT D> allows you to select the display type from the following:

- CRT only
- LCD (Flat Panel) only
- Both CRT and LCD (flat Panel)

APPENDIX A

Watchdog Timer Sample Programs

The following sample programs illustrates the programming steps required to enable, set, and disable the watchdog timer.

Watchdog timer

The watchdog timer uses 32.768 MHz frequency source to counter a 24-bit Counter, so the timer range is from 30.5u sec to 512 sec with resolution 30.5u sec. When timer times out, a system reset, NMI or IRQ may happen to be decided by user's programming.

Configuration register

The watchdog timer of SBC-357/4M is located on the chipset - ALI M6117C. If you want to use it, you have to know how to read/ write the configuration register of M6117C. Following is the basic procedure.

1. Open the chip.
2. Write/Read data to/from register.
3. Close the chip.

To Open/Close the chip is to write a specific value to register 13h.

Index 13h:

c5h: open the chip

ooh: close the chip

Here we give you an example of writing data to register.

```
mov     al, 13h
Out     22h, al
jmp     $+2     ;;delay
jmp     $+2     ;;delay
mov     al, oc5h
out     23h, al
```

* note: 22h is the index I/O port, 23h is the data I/O port.

How to set the watchdog timer

1. Set index 37h bit 6 = o to disable the timer.

2. Write the desired counter value to 3Bh, 3Ah, 39h.
3. Set index 37h bit 6 = 1 to enable the timer.
4. When counter reaches the setting value, the timer will generate signal setting by index 38h bit [7:4]

Index 3Bh, 3Ah, 39H

	3Bh	3Ah	39h
	D7.....D0	D7.....D0	D7.....D0
counter	MSB		LSB

Index 38h

D[7:4]	time out signal
0000	Reserved
0001	IRQ3
0010	IRQ4
0011	IRQ5
0100	IRQ6
0101	IRQ7
0110	IRQ9
0111	IRQ10
1000	IRQ11
1001	IRQ12
1010	IRQ14
1011	IRQ15
1100	NMI
1101	System reset
1110	Reserved
1111	Reserved

Example

Following is an example of programming 1 sec period for watchdog timer in assembly language. When timer times out, is will generate system reset.

```
IO_Delay MACRO
         jcxz   $+2
         jcxz   $+2
         ENDM

Open_Chip MACRO
         push   ax
         mov    al,013h
         out    22h,al
         IO_Delay
         mov    al,0c5h
         out    23h,al
         IO_Delay
         pop    ax
         ENDM

Close_Chip MACRO
         push   ax
         mov    al,13h
         out    22h,al
         IO_Dealy
         mov    al,0
         out    23h,al
         IO_Delay
         pop    ax
         ENDM

Write_To_Chip PROC
;;Input: ah - Data
;;       al - Index#
         cli
         Open_Chip
         out    22h,al
         IO_Delay
         xchg   ah,al
         out    23H,AL
         IO_Delay
         Close_Chip
         sti
         ret
         ENDP
```

```
Read_From_Chip PROC
;;Input: al - Index#
;;Output al - Data

        cli
        Open_Chip
        out     22h,al
        IO_Delay
        in      al,23h
        IO_Delay
        Close_chip
        sti
        ret
        ENDP

Watchdog_Timer_Program:
               Open_Chip
               mov    al,37h
               call   Read_From_Chip
                      mov    bl,al         ;;save
register data                          and
al,10111111b    ;;set bit6=0 to disable
                          timer
mov     ah,al
 mov    al,37h
 call   Write_To_Chip
 mov    ah,33          ;;1 msec=33x30.5u sec
        mov    al,39h
        call   Write_To_Chip
        mov    ax,003ah
        call   Write_To_Chip
        mov    ax,003bh
        call   Write_To_Chip
        mov    al,bl
        mov    al,38h
        call   Read_From_Chip
        and    al,00001111B
        or     al,11010000b   ;;set time-out event aas
                                system reset
        mov    ah,al
        mov    al,38h

        call   Write_to_Chip
        mov    al,bl
        or     al,01000000b   ;;set bit6 = 1 to enable
                                          timer
        mov    ah,al
        mov    al,37h
        call   Write_To_Chip
```

APPENDIX B

Installing PC/104 Modules

This appendix gives instructions for installing PC/104 Modules.

Installing PC/104 modules

The SBC-357/4M's PC/104 connectors give you the flexibility to attach PC/104 expansion modules. These modules perform the functions of traditional plug-in expansion cards, but save space and valuable slots. Modules include:

- PCM-3110B PCMCIA Module (one-slot)
- PCM-3115B PCMCIA Module (two-slot)
- PCM-3200 PC/104 Sound Module
- PCM-3420 PC/104 Fast SCSI Module
- PCM-3521 Advanced Flat-Panel/CRT VGA Module
- PCM-3522 LCD Panel Adapter
- PCM-3600 PC/104 Fax/Modem Module
- PCM-3610 Isolated RS-232 and RS-422/485 Module
- PCM-3640 PC/104 4-port RS-232 Module
- PCM-P50 PC/104 vehicle Power Supply
- PCM-3660 Ethernet Module
- PCM-3718 30 KHz A/D Module
- PCM-3724 48-channel DIO Module
- PCM-3910 Breadboard Module
- PCM-3810 Solid State Disk Module
- PCM-3820 High Density Flash Solid State Disk Module

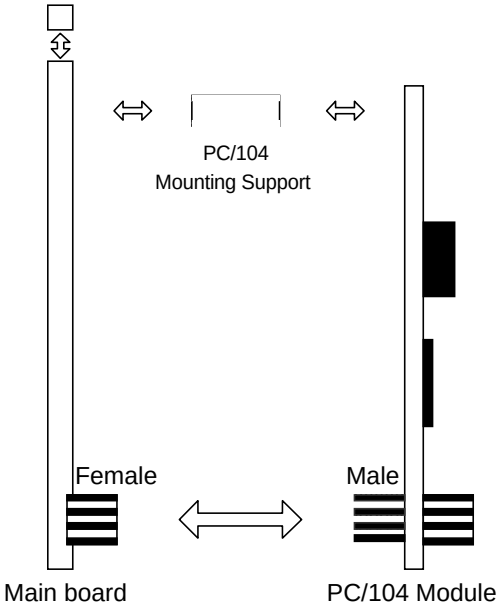
Installing these modules on the SBC-357/4M is a quick and simple operation. The following steps show how to mount the PC/104 modules:

Step1 Remove the SBC-357/4M from your system, paying particular attention to the safety instructions already mentioned above.

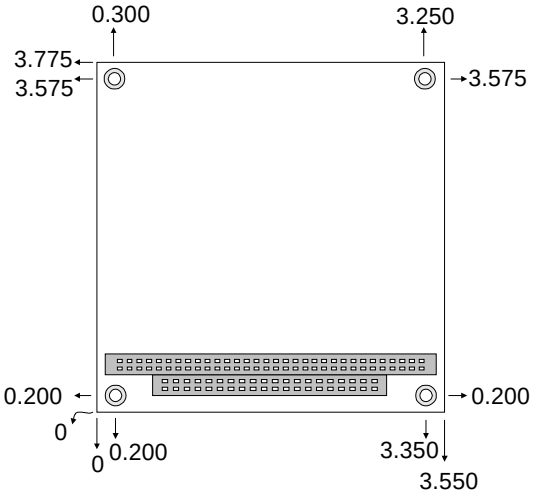
Step2 Make any jumper or link changes required to the CPU card now. Once the PC/104 module is mounted, you may have difficulty in accessing these.

Step3 Mount the PC/104 module onto the CPU card. Do this by pressing the module firmly but carefully onto the mounting connectors.

Step4 Secure the PC/104 module onto the CPU card using the four mounting spacers and srews.



PC/104 Module Mounting Diagram



PC/104 module dimensions (inches ±5%)

OZONE SAFE
RECYCLABLE