

SBC-356

Half-size All-in-one 386SX-40 CPU card

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 UNDESIRE 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 AGAINST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQUENCY ENERGY AND, IF NOT INSTALLED 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.

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Packing list

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

- 1 SBC-356 CPU card
- 1 6-pin mini-DIN dual outlet adapter for keyboard and PS/2 mouse
- 1 Hard disk drive (IDE) interface cable (40 pin)
- 1 Floppy disk drive interface cable (34 pin)
- 1 parallel port adapter (26-25 pin) and COM port (10-9 pin) adapter kit
- 1 utility disk with VGA utility programs and drivers

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

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General Information

This chapter provides background information for the SBC-356.

Sections include:

- Card specifications
- Board layout

Introduction

The SBC-356 is an all-in-one CPU card that intergrates VGA display and Disk-On-Chip card. The SBC-356 is a half-sized card that is based on the 386SX CPU running at 40MHz and supports up to 32 MB of Fast Page DRAM. The card has an on-board Watch-Dog timer, a Buzzer, and battery-backed Real Time Clock. It comes with AMI BIOS which is mapped to the upper 64K of memory.

The SBC-356 provides a floppy disk controller, an IDE disk controller, four high speed serial prots (RS-232/422/485) and one Multi-mode parallel port (ECC/EPP/ECP). The SBC-356 is also equipped with VGA controller. It uses C&T F65545 ISA-bus VGA controller which provides a flat panel I/F (interface) to support panel displays.

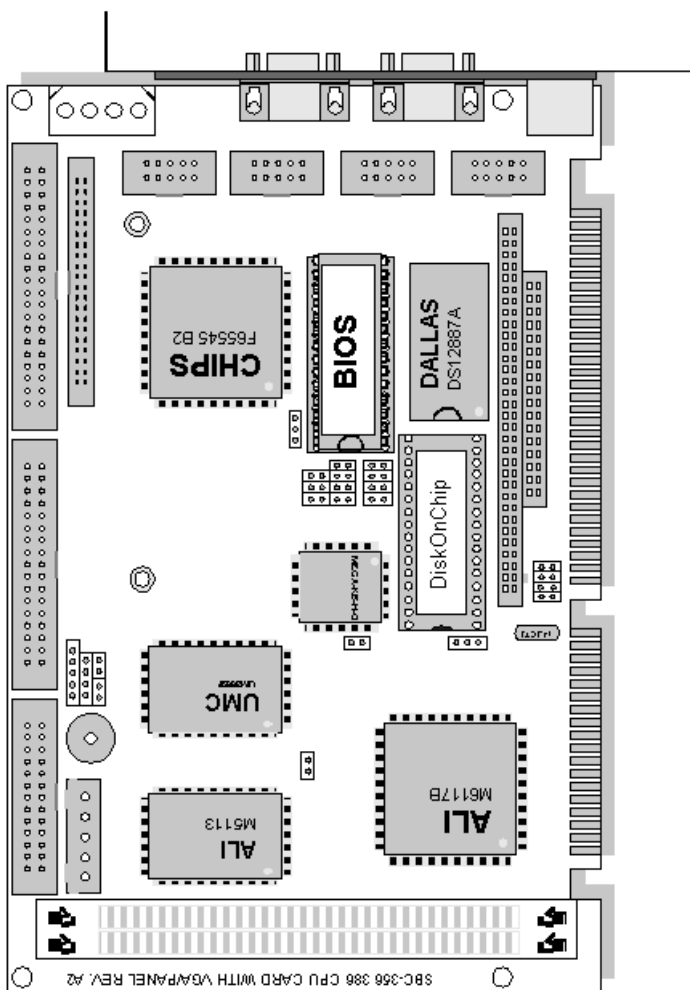
For applications that require Solid State Disk (SSD) memory, the SBC-356 is equipped with one 32-pin DIP IC socket which can accommodate DiskOnChip Solid State Disk memory. The SBC-356 supports from 2MB up to 24MB of SSD memory.

Specifications

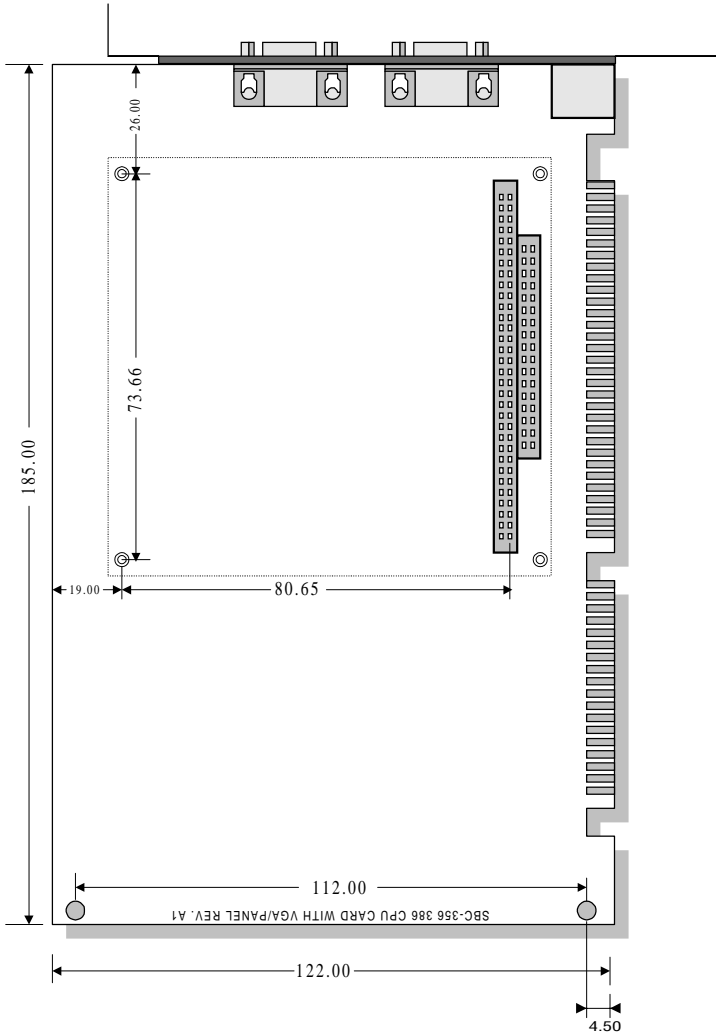
- **CPU:** 386SX 40 MHz
- **Bus interface:** ISA (PC/AT) bus
- **Data Bus:** 16 bit
- **Chipset:** ALI M6117B (Embedded CPU-386SX)
- **RAM memory:** Fast Page DRAM 512KB to 16 MB with access time 70 ns or faster. Uses two 72 pin SIMM sockets
- **Display controller:** C&T F65545 ISA-bus VGA controller
- **Video memory:** two 256k*16 DRAM (1MB) and one 256K*16 DRAM(512KB) used for improving performance with color DSTN panels
- **IDE HDD interface:** One primary IDE hard disk drive interface supports up to two IDE HDDs
- **Floppy disk drive interface:** One floppy disk drive interface supports up to two floppy disk drives, 5.25"(360KB and 1.2MB) and/or 3.5" (720KB, 1.44 and 2.88MB)
- **Parallel port:** One Multi-mode Parallel port(ECC/EPP/ECP models)
- **Serial port:** Four high speed serial ports. Three RS-232 and one RS-232/RS-422/RS-485
- **Real time clock:** Dallas DS12B887
- **Watchdog timer:** Jumper configured time interval: 1, 2, 10, 20, 110, 120 seconds
- **PC/104 connector:** 104 pins for 16-bit bus. Supports PC/104 modules such as Flash/RAM/ROM disk modules and/or PCMCIA modules
- **Solid State Disk (SSD) interface:** One 32-pin DIP socket supports M-system Disk-On-Chip 2000 series, memory capacity from 1MB to 24MB.
- **DMA channels:** 7

- **Interrupt channels:** 15
- **Keyboard interface:** Yes
- **PS/2 mouse support:** Yes
- **Voltage requirements:** +5V, +12V and -12V
- **Operating temperature:** +0°C to 60°C
- **Storage temperature:** -25°C to +85°C
- **Operating humidity range:** 0 to 90% non-condensing
- **Storage humidity range:** 0 to 90% non-condensing
- **Weight (without memory):** 260g
- **Dimensions:** 19.0(L)*12.5(W)*2.5(H)cm

Board layout



Card dimensions



CHAPTER 2

Installation

This chapter describes how to set up the SBC-356 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.

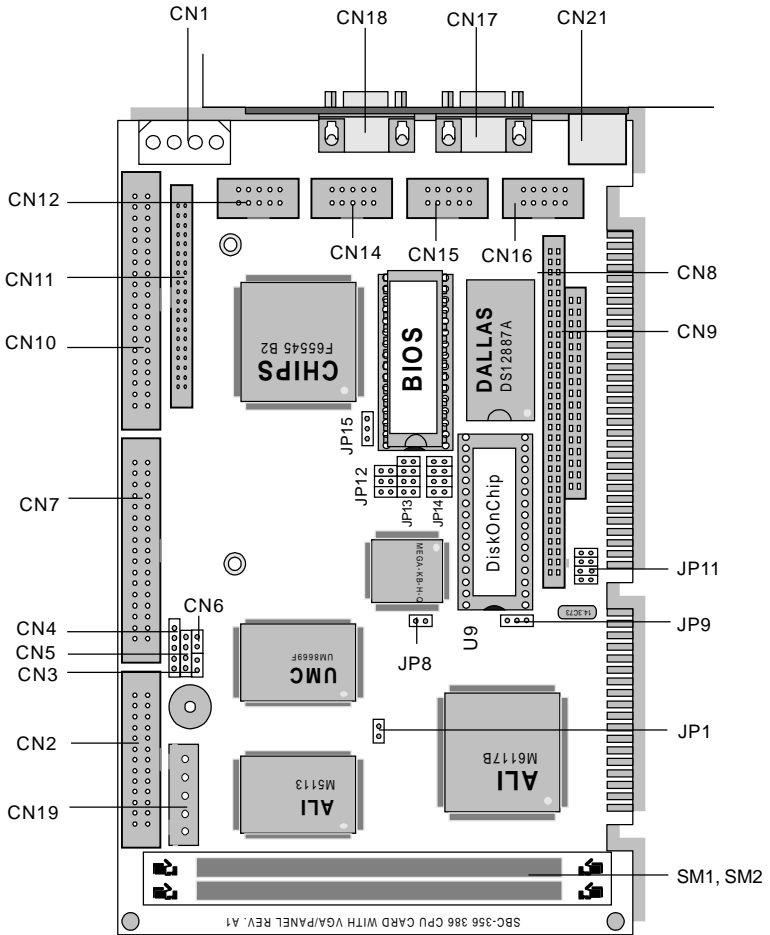
Jumpers and connectors

Connectors on the board link it to external devices such as hard disk drives, a 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	Power connector
CN2	Printer I/F connector
CN3	External reset connector
CN4	Key lock
CN5	Speaker
CN6	HDD LED (indicator)
CN7	FDD I/F connector
CN8	PC/104 I/F (XT Bus)
CN9	PC/104 I/F (AT Bus)
CN10	HDD connector (Primary)
CN11	LCD panel I/F connector
CN12	Serial I/F #4 (RS-422/485)
CN14	Serial I/F #2 (RS-232)
CN15	Serial I/F #3 (RS-232)
CN16	Serial I/F #4 (RS-232)
CN17	Serial I/F #1 connector
CN18	VGA I/F connector
CN19	Keyboard connector
CN21	Keyboard/Mouse connector
U9	Disk On Chip socket
SM1-2	System DRAM socket
JP1	COM4 Communication I/F
JP8	PS/2 interrupt (IRQ12)
JP9	Watch-dog timer out active
JP11	Disk On Chip address selection (DiskOnChip memory)

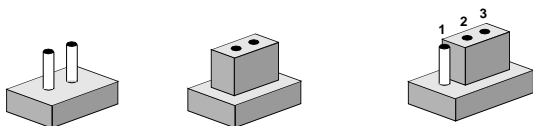
JP12	RS-422/485 RX control
JP13	RS-422/485 TX control
JP14	Watch-Dog Timer Timeout
JP15	Flash EPROM Select

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-356 are sold without system memory and disk on chip memory. Memory must be installed prior to using the SBC-356.

The SBC-356 has 2 SIMM (Single In-line Memory Module) DRAM module sockets. Each socket will accommodate a 72 pin DRAM module - 1MB, 4MB or 16MB. The memory access time should be 70ns or less. The SBC-356 can also accommodate memory modules with parity check bit. EDO DRAM memory modules are not supported by SBC-356.

Install memory as appropriate at locations SIMM1 - SIMM2.

SM1	SM2	Total Memory
1MB		1MB
1MB	1MB	2MB
4MB		4MB
4MB	4MB	8MB
16MB		16MB
16MB	16MB	32MB

Watchdog timer setup(JP9 and JP14)

The watch-dog timer is a circuit that should be refreshed periodically. If it is not refreshed within a certain time, the watch-dog timer will automatically reset the system. This prevents a system from hanging indefinitely. When the Watch-dog timer is enabled, the user must constantly refresh the Watch-dog timer within a certain time (Eg. 10 seconds). If the user fails to do so, the watch-dog timer will automatically reset the system or issue a non-maskable interrupt (NMI).

JP9 determines the watch-dog timer function, it can disable the watch-dog timer or connect watch-dog timer to reset trigger or NMI trigger.

Watch-dog Timer Selection(JP9)

Disable Watch-dog timer

1

2

3

System Reset (Default)

1

2

3

NMI

1

2

3

JP14 determines the time period of the watch-dog timer. It can be disabled or set as 1 second, 2 seconds, 10 seconds, 20 seconds, 110 seconds or 120 seconds.

Watch-Dog Timer Time Out Selection(JP 14)

1 second		2 seconds	
2	<input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> 8	2	<input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> 8
1	<input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> 7	1	<input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> <input checked="" type="radio"/> 7
10 seconds(Default)		20 seconds	
2	<input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> 8	2	<input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input checked="" type="radio"/> 8
1	<input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> 7	1	<input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input checked="" type="radio"/> 7
110 seconds		120 seconds	
2	<input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> 8	2	<input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> 8
1	<input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> 7	1	<input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input checked="" type="radio"/> 7

When the power of SBC-356 is turned on, the Watch-dog timer is disabled. The watch-dog timer can be enabled by reading the Watch-dog timer enable/refresh control port (443H), and disabled by reading the Watch-dog timer disable control port (43H). After the Watch-dog timer is enabled, the user must constantly refresh the Watch-dog timer by reading the Watch-dog timer enable/refresh port (443H) every 1, 2, 10, 20, 110 or 120 seconds. If the user fails to do so or the system hangs, the watch-dog timer will automatically reset the system or issue a NMI (Non-maskable interrupt).


Port	Direction	Function
443H	I/O Read	Enable Watch-Dog Timer Refresh Watch-Dog Timer
43H	I/O Read	Disable Watch-Dog Timer

Please refer to Appendix A for a Watchdog timer demo program.

PS/2 Mouse Setup (JP8)

JP8 determines the PS/2 mouse interrupt signal. The PS/2 mouse uses IRQ12. If you do not use PS/2 mouse and wish to assign IRQ12 for other purposes, you may change JP8 to disconnect PS/2 interrupt from IRQ12.

PS/2 Interrupt select (JP8)

No interrupt for PS/2	<input type="radio"/>
	<input type="radio"/>
IRQ12 (Default)	

Flash EPROM Selection (JP15)

JP15 determines the programming voltage of Flash EPROM BIOS. The SBC-356 BIOS provides plug and play function, it can automatically reload system configuration to the system BIOS. The SBC-356 BIOS can use variety Flash EPROM, JP15 must set according to the Flash EPROM used.

Flash EPROM select(JP15)

Vpp=Vcc (Default)	1  <input type="radio"/> 3
Vpp=12V	1 <input type="radio"/>  3

COM4 Communication Setup (JP1, JP12, JP13)







COM4 can also be assigned as RS-422 or RS-485 I/F. Short JP1 to assign COM4 as RS-422/RS-485 I/F, or otherwise assign COM4 as RS-232 I/F.

COM4 communication select (JP1)









RS-422/RS-485 I/F (Default)	
RS-232 I/F	<input type="radio"/> <input type="radio"/>

When COM4 is assigned as RS-422/RS-485 I/F, JP12 and JP13 determine the RS-485 transmit and receive enable signals.

COM4 RS-422/RS-485 RX control (JP12)

RX is always enable (Default)	2		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	5
	1		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	6
RX is enabled if Port 2EFH D1=1	2	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	5
	1	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	6
RX is always disabled	2	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	5
	1	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	6

COM4 RS-422/RS-485 TX control (JP13)

TX is always enable (Default)	2		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	8
	1		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	7
TX is enabled if -RTS=0	2	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	8
	1	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	7
TX is enabled if Port 2EFH D0=1	2	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	8
	1	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	<input type="radio"/>	7
TX is always disabled	2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	8
	1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>		<input type="radio"/>	7

IDE Hard Disk I/F (CN10)

The SBC-356 provides a 40-pin DIL box header connector (CN10) for the IDE hard disk interface. The IDE hard disk interface supports two IDE hard disk drives.

This I/F can be enabled or disabled by BIOS CMOS Setup settings. If you want to use a ESDI or SCSI interface or you want to use another IDE interface card, you must disable the BIOS option " Onboard IDE ".

IDE hard disk connector (CN10)

Pin	Signal	Pin	Signal
1	Reset	2	Ground
3	D07	4	D08
5	D06	6	D09
7	D05	8	D10
9	D04	10	D11
11	D03	12	D12
13	D02	14	D13
15	D01	16	D14
17	D00	18	D15
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	PinInterrupt	32	IOCS16-
33	SA1	34	N.C.
35	SA0	36	SA2
37	HDC CS0-	38	HDC CS1-
39	HDD Active	40	Ground

Floppy Disk Connector I/F (CN7)

The SBC-356 provides a 34-pin DIL box header connector (CN7) for the floppy disk interface. This floppy disk interface supports two 360KB (5.25"), 720KB (3.5"), 1.2MB (5.25"), 1.44MB (3.5") and 2.88MB (3.5") floppy disk drive.

This floppy disk interface can be enabled or disabled by BIOS CMOS Setup setting. If you want to use another floppy disk interface card, you must disable the floppy disk interface on the SBC-356.

Floppy Disk Drive Interface (CN7)

Pin	Signal	Pin	Signal
1	Ground	2	Reduce Write Current-
3	Ground	4	N.C.
5	Ground	6	N.C.
7	Ground	8	Index-
9	Ground	10	Motor Enable A-
11	Ground	12	Driver Select B-
13	Ground	14	Driver Select A-
15	Ground	16	Motor Enable B-
17	Ground	18	Direction-
19	Ground	20	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 1 Select-
33	Ground	34	Disk Change-

Serial Communication I/F (CN17, CN14, CN15, CN16, CN12)

The SBC-356 provides four serial communication I/F. These interfaces can be enabled, disabled and COM port assignable individually. COM1, COM2 and COM3 are RS-232 I/F, COM4 can be assigned as RS-232 I/F or RS-422/RS-485 I/F.

The following are the pin assignments:

PIN	COM1 CN17	COM2 CN14	COM3 CN15	COM4 CN16	Signal (RS-232)
1	DCD	DCD	DCD	DCD	Data carry detect
2	RX	RX	RX	RX	Receive data
3	TX	TX	TX	TX	Transmit data
4	DTR	DTR	DTR	DTR	Data terminal ready
5	GND	GND	GND	GND	Ground
6	DSR	DSR	DSR	DSR	Data set ready
7	RTS	RTS	RTS	RTS	Request to send
8	CTS	CTS	CTS	CTS	Clear to send
9	RI	RI	RI	RI	Ring indicator
10		NC	NC	NC	Not connected

CN17 is a male D-type connector, CN14, CN15 and CN16 are 10 pin dual-in-line box header connector.

COM4 can also be assigned as RS-422 or RS-485 I/F.

If COM4 is assigned as RS-422/RS-485 I/F, CN12 is the COM4 connector, it is a dual-in-line box header connector.

Pin	COM4 CN12	Signal (RS-422/RS-485)
1	TX-	Transmit data
2	TX+	Transmit data
3	RX+	Receive data
4	RX-	Receive data
5	GND	Ground
6	RTS-	Request to send
7	RTS+	Request to send
8	CTS+	Clear to send
9	CTS-	Clear to send
10	NC	Not connected

Parallel Port I/F (CON2)

The SBC-356's parallel port can be enabled or disabled or configured as a different I/O address, mode (Standard, EPP or ECP), IRQ channel and DMA channel. All parallel port configurations can be set at BIOS CMOS Setup.

Parallel Port I/F (CN2)			
Pin	Signal	Pin	Signal
1	Strobe-	14	Auto FF-
2	D0	15	Error-
3	D1	16	Initialization-
4	D2	17	Printer Select In-
5	D3	18	Ground
6	D4	19	Ground
7	D5	20	Ground
8	D6	21	Ground
9	D7	22	Ground
10	Acknowledge-	23	Ground
11	Busy	24	Ground
12	Paper Empty	25	Ground
13	Printer Select	26	N.C.

VGA Monitor I/F (CN18)

The SBC-356 is equipped with an VGA I/F(CN18). CN18 is a 15 pin D-sub type connector.

VGA Monitor I/F (CN18)	
Pin number	CN18
1	R
2	G
3	B
4	NC
5	GROUND
6	GROUND
7	GROUND
8	GROUND
9	GROUND
10	GROUND
11	NC
12	NC
13	Hsync
14	Vsync
15	NC

Flat Panel I/F (CN11)

The SBC-356 provides a 44-pin box header connector (CN11) for Flat panel.

SBC-356 Flat panel display connector

Pin	Function	Pin	Function
1	+12 V	2	+12 V
3	GND	4	GND
5	V _{cc}	6	V _{cc}
7	ENAVEE	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	SHFCLK	36	FLM
37	M	38	LP
39	GND	40	ENABKL
41	GND	42	ASHFCLK
43	V _{cc}	44	V _{cc}

Cable and switch connections (CN1, CN3, CN4, CN5, CN19, CN21, CN6)

Pin	Power (CN1)	Reset Switch (CN3)	Keylock (CN4)
1	+5V	Reset	Power
2	GND	Gnd	Key
3	GND	*****	Gnd
4	+12v	*****	Lock
5	*****	*****	Gnd
6	*****	*****	*****
7	*****	*****	*****
8	*****	*****	*****

Pin	Speaker (CN5)	Internal keyboard (CN19)	External Keyboard (CN21)	HDD LED (CN6)
1	Speaker	Clock	Clock	-R/W IDE
2	N/C	Data	Data	Pull high
3	GND	N/C	N/C	*****
4	+5V	GND	Gnd	*****
5	*****	+5V	+5V	*****

CN21 is the keyboard connector. A converter cable is included to adapt the 5-pin keyboard DIN connector on the keyboard to the 6-pin Mini-DIN connector. Connect the keyboard converter cable to CN21 and connect the other end to the keyboard.

DiskOnChip Installation (U9, JP11)

Please refer to the DiskOnChip manual for detailed information on how to prepare the Disk On Chip function on the SBC-356.

To install DiskOnChip on the SBC-356, follow the instructions below.

Step 1: Install the DiskOnChip Memory (DiskOnChip) in U9 sockets.

Step 2: Set JP11 for the memory address of DiskOnChip memory.

JP11 determines the memory address of DiskOnChip memory. If you have another add-on card in the system that uses the same memory, neither the SBC-356 nor the add-on card will function normally. In this case, please change the memory address.

DiskOnChip address select (JP11)

Disable	D0000H-D7FFFH (32KB)
1 ○ ○ ○ ○ 7	1 <input checked="" type="checkbox"/> ○ ○ ○ 7
2 ○ ○ ○ ○ 8	2 ○ ○ ○ ○ 8
D8000H-DFFFFH (32KB)	*E0000H-E7FFFH (32KB)
1 ○ <input checked="" type="checkbox"/> ○ ○ 7	1 ○ ○ <input checked="" type="checkbox"/> ○ 7
2 ○ <input checked="" type="checkbox"/> ○ ○ 8	2 ○ ○ <input checked="" type="checkbox"/> ○ 8
E8000H-EFFFFH (32KB)	
1 ○ ○ ○ <input checked="" type="checkbox"/> 7	
2 ○ ○ ○ <input checked="" type="checkbox"/> 8	

* Default

CHAPTER 3

AMIBIOS Setup

This chapter describes how to set 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 if you want to run SETUP

Press to run AMIBIOS setup.

AMIBIOS main menu

The AMIBIOS setup screen appears as follows:

AMIBIOS SETUP — BIOS SETUP UTILITIES (C) 1995 American Megatrends, Inc. All Rights Reserved
Standard CMOS Setup Advanced CMOS Setup Advanced Chipset Setup Change User Password Change Supervisor Password Change Language Setting Auto Configuration with Optimal Settings Auto Configuration with Fail Safe Settings Save Settings and Exit Exit Without Saving
Standard CMOS setup for changing time, date, hard disk type, etc. ESC: Exit -_ :Sel F2/F3: Color F10: Save & Exit

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.

The Standard CMOS Setup screen appears:

AMIBIOS SETUP — STANDARD CMOS SETUP												
(C) 1995 American Megatrends, Inc. All Rights Reserved												
Date (mm/dd/yyyy):		Wed Aug 21, 1996										
Time (hh/mm/ss):		12: 19: 46										
Floppy Drive A:		1.44 MB 3½"										
Floppy Drive B:		Not Installed										
	Type	Size	Cyln	Head	WPcom	Sec	LBA Mode	Blk Mode	PIO Mode	32Bit Mode		
Pri Master	: AUTO						On	On	AUTO	Off		
Pri Slave	: AUTO						On	On	AUTO	Off		
Boot Sector Virus Protection				Disabled								
Month:	Jan - Dec						Esc: Exit	-_	:Sel			
Day:	01-31						PgUp/PgDn:	Modify				
Year:	1901 -2099						F2/F3:	Color				

Date, Day and Time Configuration

The current values for each category are displayed. Enter new values through the keyboard.

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 from the AMIBIOS Setup main menu to enter Advanced setup.

The Advanced Setup options described in this section are the standard options as shown on the following screen. The following configurations are based on manufacture's default settings.

AMIBIOS SETUP — ADVANCED CMOS SETUP (C) 1995 American Megatrends, Inc. All Rights Reserved		
Quick Boot	Enabled	Available Options: Disabled Enabled
BootUp CPU Speed	High	
BootUp Sequence	A:,C:	
BootUp Num-Lock	On	
Floppy Drive Swap	Disabled	
Floppy Drive Seek	Disabled	
Mouse Support	Enabled	
Typematic Rate	Fast	
System Keyboard	Present	
Password Check	Setup	
Parity Check	Disabled	
Wait For 'F1' If Error	Enabled	
Hit 'DEL' Message Display	Enabled	
System BIOS Cacheable	Enabled	
Hard disk Delay	Disabled	
C000, 32k Shadow	Enabled	
C800, 32k Shadow	Disabled	
D000, 32k Shadow	Disabled	
D800, 32k Shadow	Disabled	
E000, 32k Shadow	Disabled	
E800, 32k Shadow	Disabled	
Onboard IDE	Enabled	
Onboard FDC	Enabled	
Onboard Serial Port1	3F8	
Onboard Serial Port2	2F8	
Onboard Serial Port3	3E8	
Onboard Serial Port3 IRQ	9	
Onboard Serial Port4	2E8	
Onboard Serial Port4 IRQ	5	
Onboard Parallel port	378	
Parallel port Mode	SPP	
ECP DMA	DMA 3	
Parallel Port IRQ	IRQ 5	ESC: Exit -_ :Sel
Flat Panel Display Type	12BTFT NEC 64	PgUp/PgDn: Modify
DISPLAY MODE	BOTH	F2/F3: Color

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
<i>Disabled</i>	AMIBIOS test 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 key press and runs AMIBIOS Setup if the key has been pressed.
<i>Enabled</i>	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 <i>Hit to run Setup</i> message.

Boot Up CPU Speed

This option sets the CPU speed when the computer boots.

Boot Up Sequence

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.

Boot Up Num 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.

Floppy Drive Swap

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

Floppy Drive Seek

Set this option to *Enabled* to specify that floppy drive will perform a Seek operation at system boot. The settings are *Enabled* or *Disabled*.

Mouse Support

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

Typematic Rate

This option specifies the typematic rate of a keyboard.

System Keyboard

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

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*.

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.

Parity Check

Set this option to *Enabled* to check the parity of all system memory. The settings are *Enabled* or *Disabled*.

OS/2 Compatible Mode

Set this option to *Enabled* to permit AMIBIOS to run with IBM OS/2. The settings are *Enabled* or *Disabled*.

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 settings are *Enabled* or *Disabled*.

Hit 'DEL' Message Display

Set this option to *Disabled* to prevent :

Hit if you want to run Setup

from appearing on the first AMIBIOS screen when the computer boots. The settings are *Enabled* or *Disabled*.

System BIOS Cacheable

When this option is set to *Enabled*, the contents of the F000h system memory segment can be read from or written to the cache memory. The contents of the F000h memory segment are always copied from the BIOS ROM to system RAM for faster execution.

The settings are *Enabled* or *Disabled*.

Hard disk Delay

The settings of this option are *Disabled*, *3 sec*, *5 sec*, *10 sec*, *15 sec*.

C000,32k Shadow **D800,32k Shadow**
C800,32k Shadow **E000,32k Shadow**
D000,32k Shadow **E800,32k Shadow**

These options control the location of the contents of the 32KB 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
<i>Enabled</i>	The contents of C000h - C7FFh are written to the same address in system memory (RAM) for faster execution.
<i>Cached</i>	The contents of the named ROM area are written to the same address in system memory (RAM) for faster execution, if an adapter ROM will be using the named ROM area. Also, the contents of the RAM area can be read from and written to cache memory.
<i>Disabled</i>	The video ROM is not copied to RAM. The contents of the video ROM cannot be read from or written to cache memory.

Onboard IDE

This option specifies whether the onboard IDE controller is enabled.

Onboard FDC

This option enables or disables the floppy drive controller on the CPU board.

Onboard Serial Port 1

Onboard Serial Port 2

Onboard Serial Port 3

Onboard Serial Port 4

This option enables a serial port on the CPU board and specifies the base I/O port address for that serial port.

Onboard Serial Port 3 IRQ

Onboard Serial Port 4 IRQ

This option specifies an IRQ to a serial port.

OnBoard Parallel Port

This option enables the parallel port on the CPU board and specifies the parallel port base I/O port address. The settings are *Disabled, 378h, 278h, 3BCh*.

Parallel Port Mode

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

Setting	Description
<i>EPP</i>	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.
<i>ECP</i>	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.
<i>EPP&ECP</i>	Use this option to support both EPP and ECP on the parallel port.

Parallel Port IRQ

IRQ7 is used for the Parallel Port(LPT 1). The IRQ can be changed to IRQ5, or auto-selected(Auto) .

Flat Panel Display Type

This option specifies the type of flat panel display the BIOS will support.

Please refer to Appendix C for more information.

Display Mode

This option specifies the mode of display the BIOS will support.

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 manufacture'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.

AMIBIOS SETUP — ADVANCED CHIPSET SETUP (C) 1995 American Megatrends, Inc. All Rights Reserved		
AT Bus Clock	14. 318/2	Available Options: Disable Enabled ESC: Exit -:Sel PgUp/PgDn: Modify F2/F3: Color
Slow Refresh	120 us	
Memory Remap	Enabled	
RAS Precharge time	1.5T	
RAS Active Time Insert wait	Disable	
CAS Precharge Time Insert Wait	Disable	
Memory Write Insert Wait	Disable	
Memory Miss Read Insert Wait	Disable	
ISA I/O High Speed	Enabled	
ISA Memory High Speed	Enabled	
ISA Write cycle end Insert Wait	Enabled	
I/O Recovery	Enabled	
I/O Recovery Period	3.75 us	
On-Chip I/O Recovery	Enabled	
16Bit ISA Insert Wait	Enabled	

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 BIOS 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 setting for the AMIBOIS setup options by selecting it from the main menu. The Fail Safe setting provides 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 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.

SVGA Setup

The SBC-356 features an on-board flat panel/VGA 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 Display Driver Diskette #1 in drive A. In Windows Program Manager, choose *File* from the Options Menu. Then from the pull-down menu, choose *Run*. At the Command Line prompt, type A:\WINSETUP. 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 icon ChipCPL under the Control Panel allows you to select and load the installed drivers.

Another method of installing these drivers is through the File Manager. Click on *Drive A:*, and then double-click on WINSETUP.EXE to begin installation.

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 it. 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 Display Driver Diskette #1 in drive A. Type A :
<ENTER> to make this the default drive.
3. Type SETUP <ENTER> to run the driver SETUP program. Press any key to get to the applications list.
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 software utility supplied on the *Display Driver Diskettes*:

- 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 CHIPS Windows® 3.1 linear drivers. The **Control Panel** icon is in the *Main* Windows® group. To invoke the control panel applet, simply 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

By selecting the resolution first, it will determine the allowable selections for color depth.

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

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

By selecting the color depth first, it will determine the allowable selections for resolution.

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)

Watchdog Timer Demo Program

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

The following sample programs are examples of how to enable, disable and refresh the Watch-dog timer.

```
WDT_EN_RF      EQU      0443H
WDT_DIS        EQU      0043H

WT_Enable:     PUSH     AX                ;save AX DX
               PUSH     DX
               MOV      DX,WDT_EN_RF     ;enable the watch-dog timer
               IN       AL, DX
               POP      DX                ;reco AX, DX
               POP      AX
               RET

WT_Rresh:      PUSH     AX                ;save AX DX
               PUSH     DX
               MOV      DX,WDT_EN_RF     ;refresh the watch-dog timer
               IN       AL, DX
               POP      DX                ;reco AX, DX
               POP      AX
               RET

WT_Disable:    PUSH     AX                ;save AX DX
               PUSH     DX
               MOV      DX,WDT_DIS       ;disable the watch-dog timer
               IN       AL, DX
               POP      DX                ;reco AX, DX
               POP      AX
               RET
```


APPENDIX **B**

Installing PC/104 Modules

This appendix gives instructions for installing PC/104 Modules.

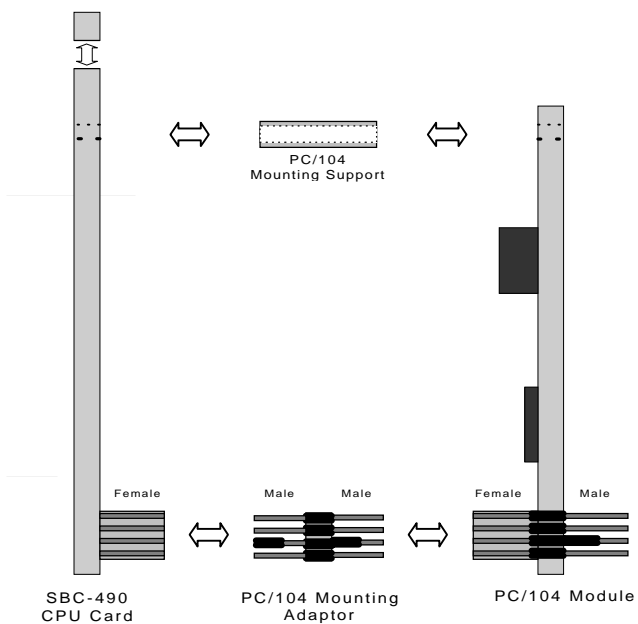
Installing PC/104 modules

The CPU card'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:

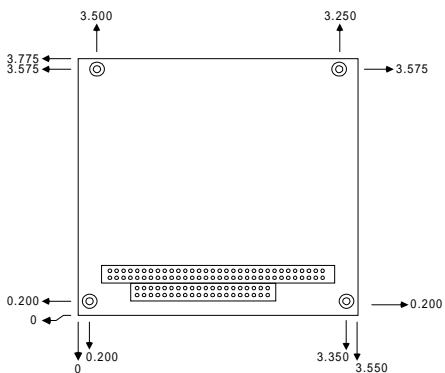
- **PCM-3335** 386 CPU Module w/ Flat Panel/CRT Interface
- **PCM-3600** FAX/Modem Module
- **PCM-3420** Fast SCSI-2 Module
- **PCM-3200** Sound Module
- **PCM-3810** Solid State Disk Module
- **PCM-3820** High Density Flash Disk Module
- **PCM-3115** PCMCIA Module (two slots)
- **PCM-3610** Isolated RS-232 and RS-422/485 Module
- **PCM-3660** Ethernet Module
- **PCM-3718** 30 KHz A/D Module
- **PCM-3724** 48-Channel DIO Module
- **PCM-3910** Breadboard Module

Installing these modules on the CPU card is quick and simple. The following steps show how to mount the PC/104 modules:

1. Remove the CPU card from your system paying particular attention to the safety instructions already mentioned.
2. 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.
3. Normal PC/104 modules have male connectors and mount directly onto the main card. However, to ensure better bus matching, the connectors on the CPU card and the PC/104 module are both female. For this reason, you may need to use the "male-male" adapter included with the CPU card in order to properly connect your PC/104 module. (Refer to the diagram on the following page.)
4. Mount the PC/104 module onto the CPU card by pressing the module firmly but carefully onto the mounting connectors.
5. Secure the PC/104 module onto the CPU card using the four mounting spacers and screws.



PC/104 Module Mounting Diagram



PC/104 module dimensions (inches $\pm 5\%$)

APPENDIX C

LCD Display BIOS Configuration

This appendix gives instructions for configuring various LCD displays.

This following table shows the BIOS settings (the first column) and flat panel model (the third column) that can work for the specified setting. For other types of flat panels that you need support to connect with CPU board, please contact our sales representative or distributor.

Setting	Type of Flat Panel	Flat Panel Model
1	640x480 12bit Color TFT	NL6448AC30-10(NEC)
2	640x480 18bit Color TFT	NL6448AC33-18(NEC)
3	640x480 18bit Color TFT	LQ10D41(SHARP)
4	800x600 18bit Color TFT	NL8060AC26-11(NEC)
5	640x480 16bit D-S Color STN	LM64C08P(SHARP)
6	640x480 8 bit Dual-Scan Mono STN	LM64P11 (SHARP)
7	640x480 4 bit Plasma	PG6404SORM16-3(OKI)
8	640x480 8 bit Dual-Scan EL	LJ64H052(SHARP)