SBC-456/456E

Half-size 486 CPU Card with
Flat Panel/CRT SVGA Interface

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 RPEASONABLE 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.

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Packing list

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

- 1 SBC-456/456E CPU card
- 1 User Manual (this book)
- 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 pins) and COM 2 adapter (for RS-232/422/485) kit
- 1 RJ-45 adapter for 10Base-T Ethernet (SBC-456E only)
- 1 Utility disk with Ethernet driver (SBC-456E only)
- 4 Utility disks with PCI SVGA utility programs and drivers for DOS, Win 3.1, Win95, Win NT 3.51/4.0, and OS/2
- PC/104 Module mounting supports
- 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-456/456E board. The user manual is designed to help you get the most out of the SBC-456/456E, please read it thoroughly before you install and use the board. The product that you have purchased comes with a one-year warranty, but AAEON cannot be responsible for misuse of the product. Therefore, we strongly urge that the first read the manual before using the product.

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

Taiwan: www.aaeon.com.tw
U.S.A : www.aaeon.com

Contents

General Information

This chapter provides background information for the SBC-456/456E.

Sections include:

• Card specifications

• Board layout

Introduction

The SBC-456/456E is an all-in-one single board 486 computer with an **onboard flat panel/CRT SVGA controller** and **PCI Ethernet interface (SBC-456E)**. It packs all the functions of an industrial computer and its display capabilities onto a single, half-size card. This means the SBC-456/456E is your absolute best solution for embedded applications.

The onboard PCI-bus, flat panel/CRT SVGA controller uses the CHIPS 65550 chipset with up to 2 MB of video memory (onboard 1MB). This chipset, used with the local PCI-bus, enables 32-bit graphic throughput at up to 33 MHz. Excellent for display-intensive applications, it supports various LCD types including TFT, STN, B/W, and EL.

The onboard Ethernet Realtek RTL 8029AS PCI bus Ethernet controller supports remote boot ROM functions (SBC-456E only).

The SBC-456/456E supports the M-Systems DiskOnChip 2000 (optional) 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 72MB and fits in a standard 32-pin DIP socket.

Another feature of the SBC-456/456E is the inclusion of a high speed, local bus IDE controller. This controller supports (through ATA PIO) mode 3 and mode 4 hard disks, enabling data transfer rates in excess of 11 MB/second. Up to four IDE devices can be connected, including large hard disks, CD-ROM drives, tape backup drives, or other IDE devices. The built-in, enhanced IDE controller provides a 4-layer, 32-bit, posted write buffer and a 4-layer, 32-bit read-prefetch buffer to boost IDE performance.

Onboard features include one high speed RS-232 serial port, and one RS-232/422/485 serial port with 16C550 UARTs, one bidirectional SPP/EPP/ECP parallel port and a floppy drive controller. In addition to the 486's 16 KB of onchip cache memory, the SBC-456/456E includes an extra 128 KB of L2 onboard cache memory.

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 display and Ethernet (SBC-456E) 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-456/456E **supports 5 V EDO DRAM**. It also provides two 72-pin SIMM (Single In-line Memory Module) sockets for its onboard system DRAM. These sockets give you the flexibility to configure your system from 4 MB to 64 MB of DRAM using the most economical combination of SIMMs.

Features

- **CPU:** AMD DX5-133 CPU (SQFP Type)
- **Level 2 cache:** Onboard 128KB L2 cache
- **VGA controller:** C&T 65550 with display memory 1MB onboard, 2MB optional
- **DiskOnChip:** One 32-pin DIP socket supports the M-Systems DiskOnchip 2000 series, memory capacity from 2MB to 72MB
- **Ethernet interface (SBC-456E):** Supports 10Base-T, remote boot ROM function

Specifications

CPU: AMD DX5-133 (SQFP Type)

BIOS: AMI Flash BIOS

Chipset: ALi M 1487 / M1489

Level 2 cache: Onboard 128KB L2 cache

System memory: 4MB to 64MB. Two 72-pin SIMM sockets

DMA channel: 7

Interrupt levels: 15

Enhanced IDE: Supports up to two IDE drives, supports PIO mode 3/4 and Bus Master

FDD interface: Supports up to two floppy disk drives, 5.25" (360KB and 1.2MB) and/or 3.5" (720KB, 144MB, and 2.88MB)

Serial port: One RS-232 and one RS-232/422/485 serial port. Two 16C550 serial UARTs

IrDA interface: One IrDA connector reserved for future use

Keyboard connector: 6-pin mini-DIN connector supports standard PC/AT keyboard and PS/2 mouse

Watchdog Timer: Can generate a system reset, IRQ15, or NMI. Software selectable timeout interval (2sec ~ 128min, 1 sec/step)

VGA controller: C&T 65550

Display memory: 1MB onboard, 2MB optional

Display type: Supports CRT and LCD (TFT, STN, EL, and Mono) displays simultaneously

Resolution: Supports up to 1024 x 768 @ 64K colors

Ethernet controller (for 456E): Realtek RTL8029AS 10-BaseT PCI-Bus Ethernet controller

Ethernet interface (for 456E): Software drivers available. Supports remote boot ROM function

SSD interface: One 32-pin DIP socket supports the M-Systems DiskOn-Chip 2000 series, memory capacity from 2MB to 72MB

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

+12V (11.4V to 12.6V)

Max. power Requirement: +5V @ 3A

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

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

Weight: 0.23 kg

Board layout

20F001N
YCL® 9623GX

RTC

iTE
IT8661F

RTL8029AS

CHIPS
FS65550

ALi
M1487

Am486TMDX5-133V 168HC

ALi
M1489

P/N: 1907456001   SBC-456   Rev.A1.1

Card dimensions

4.1
4.1
17.8
185.00
178.00
76.2
21.5
80.65
98.5
19.5
122.00

P/N: 1907456001   SBC-456   Rev.A1.1
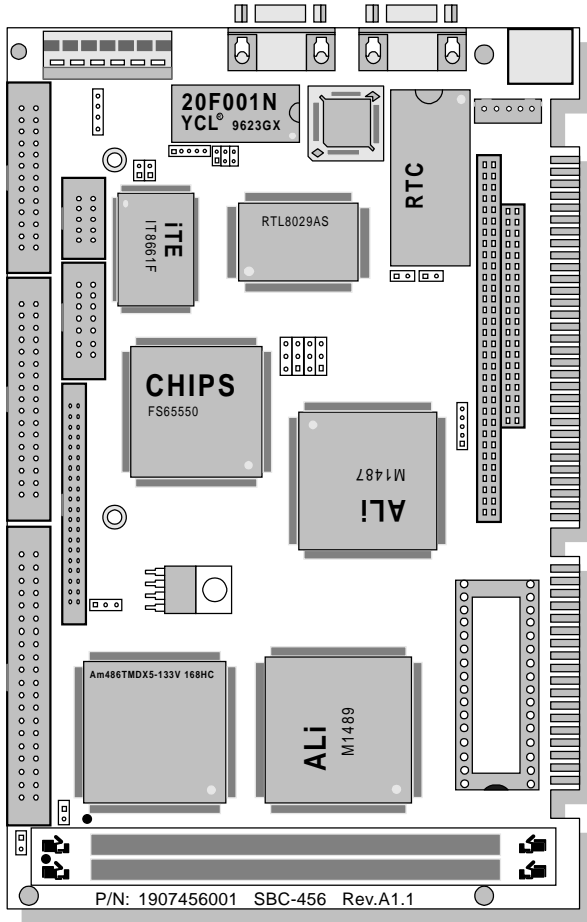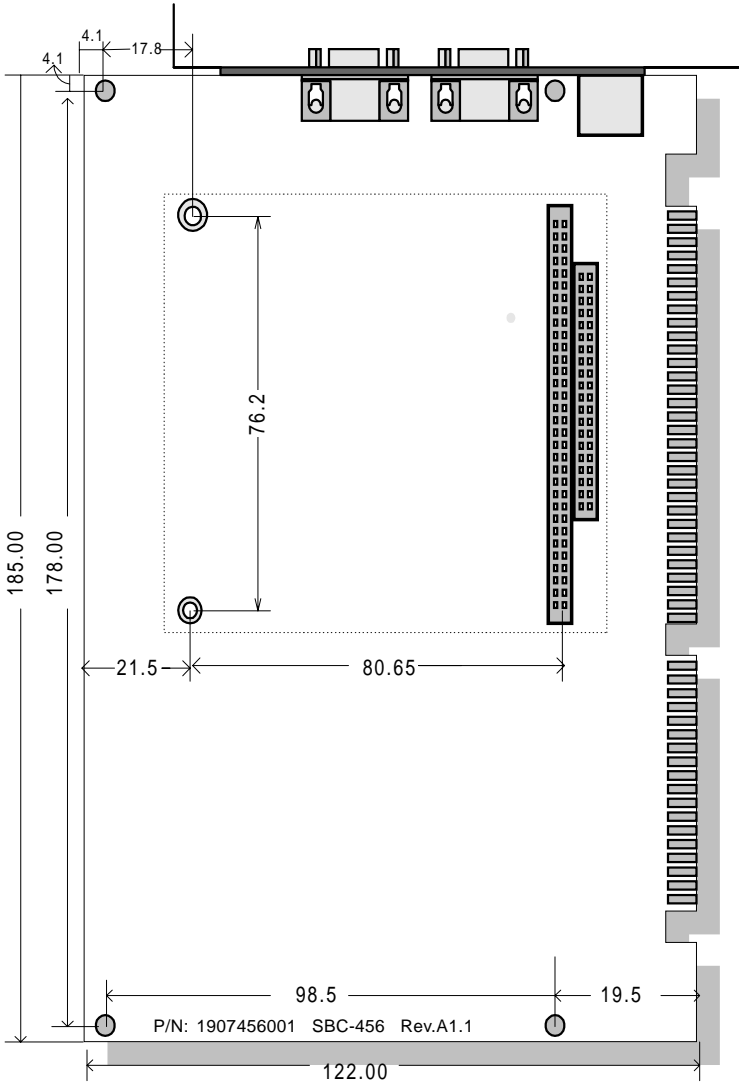
Installation

This chapter explains set up procedures for the SBC-456/456E 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 allow you to configure your system to suit your application.

The table below lists the function of each of the board jumpers and connectors:

Jumpers and connectors	
Label	**Function**
CN1	HDD connector
CN2	LCD connector
CN3	Floppy drive connector
CN4	Parallel (printer) connector
CN5	Power connector
CN6	RS232/422/485 connector
CN7	Ethernet connector
CN8	RS-232 connector
CN9	VGA connector
CN10	Internal keyboard connector
CN11	KB/PS2 mouse connector
J1	HDD LED connector
J2	Ethernet link signal LED
J3	Ethernet active signal LED
J4	Buzzer or external speaker
J5	Reserved IR connector
J6	Clear CMOS
J7	Power LED & keylock
J8	Fan power connector
JP1	LCD SHF/ASHF clock select
JP2	LCD panel voltage setting
JP3	DOC address setting
JP4	Hardware reset
JP5	RS232/422/485 select

Locating jumpers and connectors

CN 5   J 5   JP 5   CN 8   CN 9

CN 11

CN 10

J 4

20F001N
YCL° 9623GX

J 2
J 3

CN 4

CN 7

iTE
IT8661F

RTL8029AS

RTC

J 6
JP 4

CN 6

JP 2

CN 3

JP 3

CHIPS
FS65550

J 7

CN 2

M1487
ALi

JP 1

CN 1

Am486TMDX5-133V 168HC

ALi
M1489

J 8

J 1

P/N: 1907456001   SBC-456   Rev.A1.1
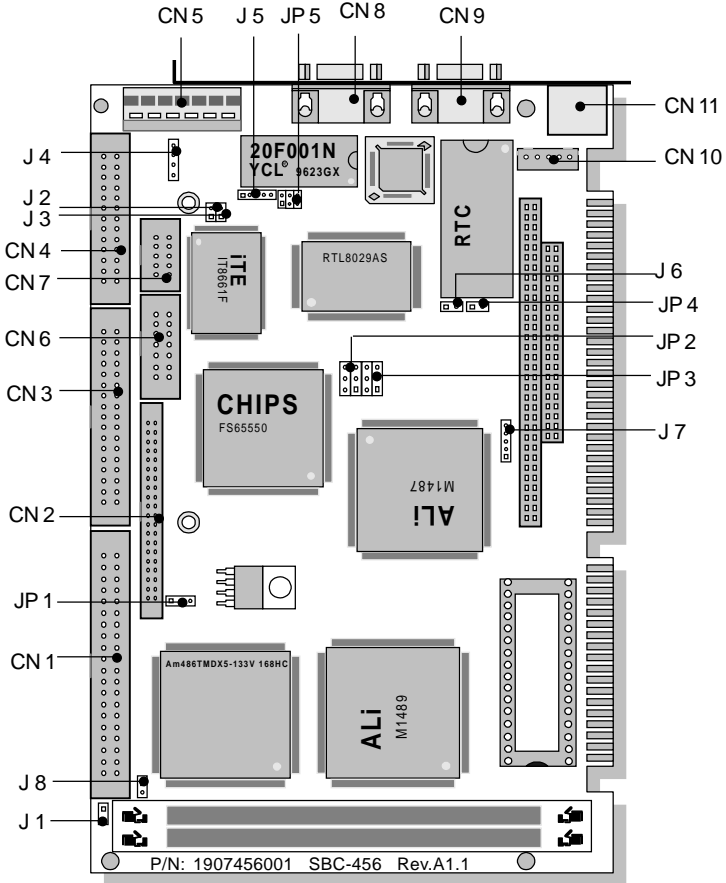
Setting jumpers

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.
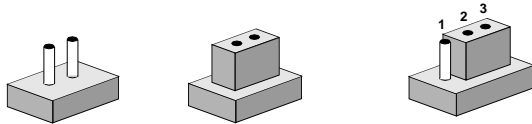
Open   **Closed**   **Closed 2-3**

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.

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-456/456E CPU card provides two 72-pin SIMM (Single In-line Memory Module) sockets and supports between 4MB and 64MB.

When installing SIMMs, make sure that Bank 1 is filled first.

Installing SIMMs

Note: that the modules can only fit into a socket one way.

1. Insert the memory module into the socket at a moderate angle.

2. 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.

3. Repeat steps 1 and 2 for each module you install.

Removing SIMMs

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

1. Supporting the SIMM with a finger, use a pen or a similarly 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.

4. Repeat the above steps for each module you remove.

IDE hard drive connector (CN1)

You can attach two Enhanced Integrated Device Electronics hard disk drives to the SBC-456/456E'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	D7	4	D8
5	D6	6	D9
7	D5	8	D10
9	D4	10	D11
11	D3	12	D12
13	D2	14	D13
15	D1	16	D14
17	D0	18	D15
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	A1	34	N.C.
35	A0	36	A2
37	CS0	38	CS1
39	-ACT	40	GND

IDE LED (J1)

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 (J1)

Pin	Signal
1	-R/W IDE
2	Pull high

Display connectors (CN9, CN2)

The SBC-456/456E CPU card's SVGA connector (CN9) with PCI bus supports monochrome display as well as high resolution color displays. The card also features an LCD connector (CN2), which allows you to connect various flat panel displays. The following table lists their pin assignments:

SVGA connector (CN9)	
Pin	**Signal**
1	Red video
2	Green video
3	Blue video
4	Not used
5	GND
6	Red return (GND)
7	Green return (GND)
8	Blue return (GND)
9	Key (no pin)
10	Sync return (GND)
11	Monitor ID (not used)
12	Monitor ID
13	Horizontal sync
14	Vertical sync
15	Not used

LCD connector (CN2)			
Pin	Signal	Pin	Signal
1	+12 V$_{DC}$	2	+12 V$_{DC}$
3	GND	4	GND
5	+5 V$_{DC}$	6	+5 V$_{DC}$
7	EN 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	SHFCLK	36	FLM (V SYS)
37	M	38	LP (H SYS)
39	GND	40	ENABKL
41	NC	42	NC
43	NC	44	NC

Floppy drive connector (CN3)

You can attach up to two floppy disks to the SBC-456/456E's on-board 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-456/456E 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 CN3 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: floppy. The set in the middle connects to the B: floppy.

Pin assignments
The following table lists the pin assignments for the CN3 connector:

FLOPPY drive connector (CN3)

Pin	Signal	Pin	Signal
1~33 (odd)	GND	2	High density
4, 6	Unused	8	Index
10	Motor enable A	12	Driver select B
14	Driver select A	16	Motor enable B
18	Direction	20	Step pulse
22	Write data	24	Write enable
26	Track 0	28	Write protect
30	Read data	32	Select head
34	Disk change		

Parallel (printer) connector (CN4)

Normally, the parallel port is used to connect the card to a printer. The SBC-456/456E includes an onboard parallel port, accessed through the CN4 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 CN4 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 CN4 connector. Pin 1 is on the right side of the CN4 connector.

Pin assignments

Parallel (printer) Connector (CN4)			
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

Power connector (CN5)

In single board computer (non-passive backplane) applications, you will need to connect the power directly to the SBC-456/456E board using CN5. This connector is fully compatible with the standard PC PS/2 power supply connector, P8. See the following table for its pin assignments:

Power connector (CN5)	
Pin	**Signal**
1	N.C.
2	+5 V_{DC}
3	+12 V_{DC}
4	-12 V_{DC}
5	GND
6	GND

Serial port connectors (CN8, CN6)

The SBC-456/456E offers one RS-232, 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 COM 1, the DB-9 serial port connector for the first port. The connector on the SBC-456/456E board (CN6) is COM 1 and COM 2 for RS-232/422/485. The following sections tell how to make connections.

RS-232 connector (CN8)

The following table shows the pin assignments for the card's RS-232 port:

RS-232 connector (CN8)	
Pin	**Signal**
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI
10	NC

RS-232/422/485 connector (CN6)

Pin	Signal
RS-232/422/485 connector (CN6)	
Pin	**Signal**
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI
10	NC
11	B485TXD+
12	B485TXD-
13	B422RXD+
14	B422RXD-

Ethernet connector (CN7)

The Ethernet connects to the SBC-456E via an adapter cable to a 10-pin polarized header (CN7). For 10Base-T RJ-45 operation, an adapter cable converting CN7 into a standard RJ-45 jack is required.

Keyboard and PS/2 mouse connectors (CN10, CN11)

The SBC-456/456E board provides two keyboard and PS/2 mouse connectors. A 5-pin connector (CN10) supports passive backplane applications. A second 6-pin mini-DIN keyboard and PS/2 mouse connector (CN11) on the card mounting bracket supports single board computer applications.
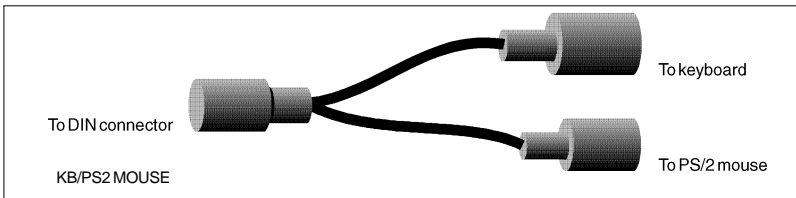
Keyboard connector (CN10)

Pin	Function
1	K.B. clock
2	K.B. data
3	N.C.
4	GND
5	+5 V$_{DC}$

Keyboard & PS/2 mouse connector (CN11)	
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

Ethernet link/active signal LED (J2)(J3)

The SBC-456E supports two sets of LED connectors for external LEDs.

Ethernet link signal LED (J2)

A continuously lit LED indicates good linkage between the SBC-456E and its supporting hub.

Ethernet active signal LED (J3)

A flashing LED indicates that the SBC-456E is transmitting or receiving data.

Buzzer or external speaker (J4)

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

Buzzer	External Speaker
1 2 3 4	1 2 3 4 OR 1 2 3 4
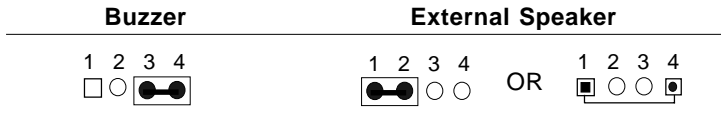
Buzzer or External speaker (J4)

Pin	Function
1	Vcc
2	Speaker output
3	Buzzer in
4	Speaker output

Reserved IR connector (J5)

IR connector (J5)

Pin	Function
5	IR_TX
4	GND
3	IR_RX
2	FIR_RX
1	Vcc

Clear CMOS (J6)

You can connect an external switch to clear the CMOS. This switch closes J6 and turns on the power, at which time the CMOS setup will be cleaned.

Clear CMOS (JP12)	
Protect (default)	**Clear CMOS**
○ ○	[●—●]

Power LED and keylock (J7)

You can connect an LED to indicate when the CPU card is on. Pin 1 of J7 supplies power to the LED; Pin 3 is the ground.

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:

Power LED and keylock (J7)	
Pin	**Function**
1	LED Power (+5 V)
2	No Connector
3	Ground
4	Keyboard lock
5	Ground

Fan power connector (J8)

You can connect a fan to the CPU. SBC456/456E offer +5V to drive a fan for CPU.

LCD SHF/ASHF clock select (JP1)

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

LCD SHF/ASHF Clock select	
SHF CLK from C&T65550*	**ASHF CLK from SHF CLK**
1 □ 2 ● 3 ●	1 ■ 2 ● 3 ○

* default

LCD panel's voltage setting (JP2)

You can select the LCD connector (CN2) driving voltage by setting JP2. The configuration is as follows:

LCD panel's voltage setting(JP2)	
3.3 V	**5 V(default)**
2 4 6	2 4 6
1 3 5	1 3 5

DOC address setting (JP3)

The DiskOnChip 2000 occupies a 8 KB window in the upper memory address range of C800 to E000. You should ensure this does not conflict with any other device's memory address. JP3 controls the memory address of the Flash disk.

DOC address setting (JP3)		
Address	CC00	D000
	2 4 6 ○ ○ ○ □ ○ ○ 1 3 5	2 4 6 ○ ○ ○ ○ 1 3 5
D400	D800	DC00
2 4 6 ○ ○ □ ○ 1 3 5	2 4 6 ○ ○ 1 3 5	2 4 6 ○ ○ □ ○ 1 3 5

Hardware Reset (JP4)

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 JP4.

Reset switch (JP4)	
Pin	**Function**
1	Ground
2	Reset

RS-232/422/485 select (JP5)

The SBC-456/456E offers two serial ports. One RS-232 (CN8) and one RS-232/422/485 (CN6).

The follwing charts show the available options:

RS-232/422/485 select (JP5)		
*RS-232	**RS-422**	**RS-485**
1 ■━● 2	1 □ ○ 2	1 □ ○ 2
3 ○ ○ 4	3 ●━● 4	3 ○ ○ 4
5 ○ ○ 6	5 ○ ○ 6	5 ●━● 6

* default

DiskOnChip socket (U13)

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 72 MB, 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		
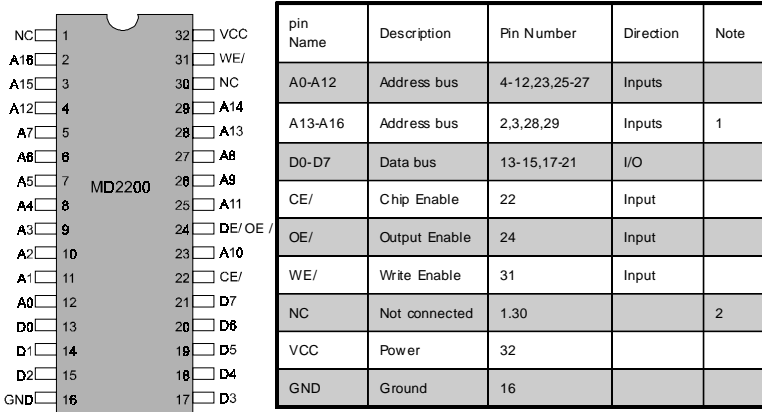
Figure1-MD2200 Pin-out

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

AMIBIOS Setup

This chapter describes the card's diagnostic tests and how to set BIOS configuration data in a Windows environment.

General Information

AMIBIOS Setup configures system information that is stored in CMOS RAM. Unlike conventional BIOS setup programs, AMIBIOS features a graphical user interface that is easy to use.

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, or pen. 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 in the current field.
+	Increments a value.
-	Decrements a value.
\<ESC\>	Close the current operation and return to 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.

Setup

Standard Setup

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

The Standard Setup screen appears:
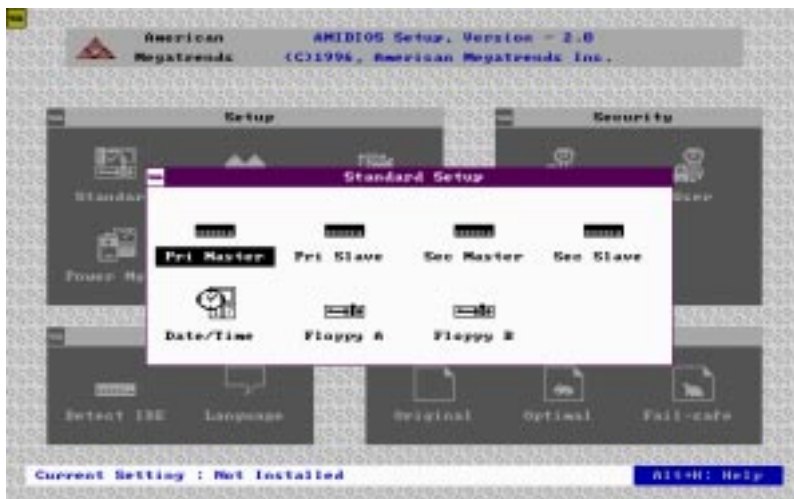
Pri Master, Pri Slave, Sec Master, and Sec Slave
Choose these icons to configure the hard disk drive named in the option. When you click on an icon, the following parameters are listed: Type, LBA/Large Mode, Block Mode, 32Bit Mode, and PIO Mode. All parameters relate to IDE drives except **Type.**

Date, Day and Time Configuration
Select the Date and Time icon in the Standard setup. The current values for each category are displayed. Enter new values through the keyboard.

Floppy A, Floppy B
Select these icons to configure the type of floppy drive that is
attached to the system: 360 KB 5 1/4", 1.2 MB 5 1/4", 720 KB 3 1/2",
1.44 MB 3 1/2", and/or 2.88 MB 3 1/2". The settings have not been
pre-installed.

User-Defined Drive
If you are configuring a SCSI drive or an MFM, RLL, ARLL, or
ESDI drive with drive parameters that do not match drive types 1-
46, you can select the *User* in the **Type** field. You must then enter
the drive parameters on the screen that appears. The drive
parameters include:

• Cylinder (number of cylinders),

• Hd (number of headers),

• WP (starting write precompensation cylinder),

• Sec (number of sectors),

• Size (drive capacity).

Advanced setup

Select the Advanced icon 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.
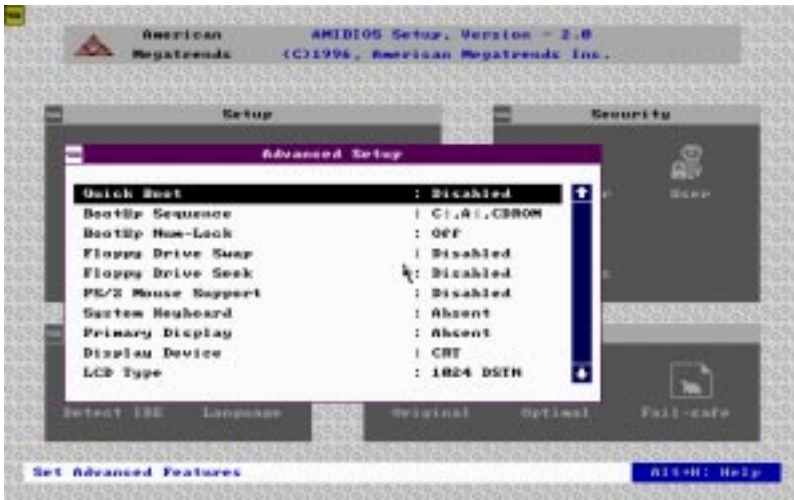
Quick Boot:

Set this option to *Enabled* to instruct AMIBIOS to boot quickly when the computer is powered on. This option replaces the old Above 4 MB Memory Test Advanced Setup option.

Setting	Description
Disabled	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 <Del> key press and runs AMIBIOS Setup if the key has been pressed.
Enabled	AMIBIOS does not test system memory above 4 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 Sequence:

This option sets the sequence of boot drives (floppy drive A:, hard disk drive C:, or CD-ROM drive) 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 settings are *A:,C:,CDROM*.

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. The settings are *On* or *Off*. The default setting is *On*.

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.*

Floppy Drive Seek:
Set this option to *Enabled* to specify that floppy drive A: will perform a seek operation at system boot. 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*, *CGA40, CGA80, EGA/VGA,* or *Absent.* The default setting is *EGA/VGA.*

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

LCD type
This option allows user to select the LCD type.

The SBC456/456E supports the following LCD types:

Brand name	Model name	Format	SBC-456	SBC-456E
Sharp	LX 15X80	1024 x 768 DSTN	Yes	Yes
Sharp	LM 64183P	640 x 480 MONO	Yes	Yes
Sharp	LM 64C35P	640 x 480 DSTN	Yes	Yes
Sharp	LM 12S40	800 x 600 DSTN	Yes	Yes
NEC	NL 6448AC33-10	640 x 480 TFT	Yes	Yes
Toshiba	LTM 10C209A	640 x 480 (18 bits)TFT	Yes	Yes
NEC	NL 8060AC26-04	800 x 600 TFT	Yes	Yes

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 if AMIBIOS is executed. The Power-On default is *Setup*.

Parity Check:
Set this option to *Enabled* to check the parity of all system memory. The settings are *Enabled* or *Disabled.* The default setting is *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.* The default setting is *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.* The default setting is *Enabled.*

Hit Del Message Display:
Set this option to *Disabled* to prevent the message:

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

from appearing on the first AMIBIOS screen when the computer boots. The settings are *Enabled* or *Disabled.* The Optimal and Fail-Safe default settings are *Enabled.*

Internal Cache:
This option specifies the caching algorithm used for the L1 internal cache memory. The settings are:

Setting	Description
Shadow	The contents of C0000h - C3FFFh are written to the same address in system
WriteBack	Use the write-back caching algorithm.

External Cache
This option specifies the caching algorithm used for L2 secondary (external) cache memory. The settings are:

Setting	Description
Disabled	The contents of C0000h - C3FFFh are written to the same Neither L1 internal cache memory on the nor L2 secondary cache memory is enabled.
WriteThru	Use the write-through caching algorithm.
WriteBack	Use the write-back caching algorithm.

System BIOS Cacheable
When this option is set to *Enabled,* the contents of the F0000h system memory segment can be read from or written to L2 cache memory. The contents of the F0000h memory segment are always copied from the BIOS ROM to system RAM for faster execution.
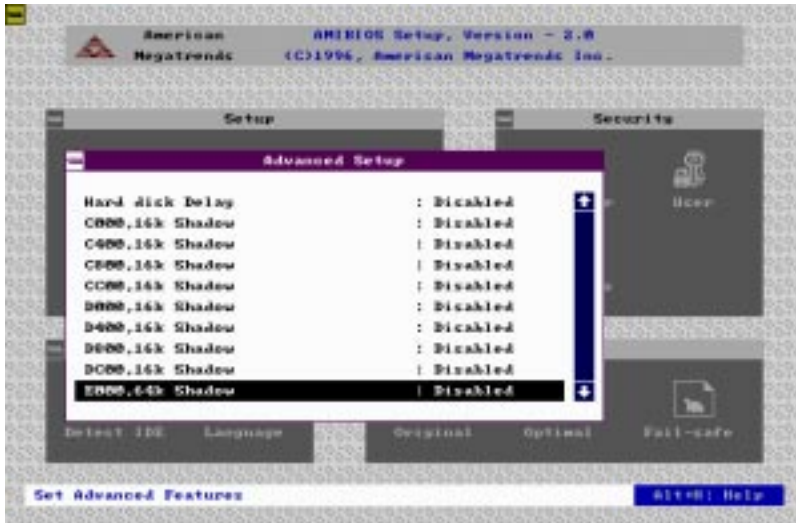
The settings are *Enabled* or *Disabled.*

Numeric Processor Test
Set this option to *Enbable* to permit numeric processor to be tested.

Hard Disk Delay
This option allows you to select hard disk delay time from 5 Sec to 15 Secs.

C000,16 KB Shadow	D400,16KB Shadow
C400,16 KB Shadow	D800,16KB Shadow
C800,16 KB Shadow	DC00,16KB Shadow
CC00,16 KB Shadow	E000, 64KB Shadow
D000,16KB 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	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.
Disabled	The video ROM is not copied to RAM. The contents of the video ROM cannot be read from or written to cache memory.

Chipset setup

The AMIBIOS Setup options deccribed in this section are selected by choosing the Chipset icon from the AMIBIOS setup main menu, shown below.
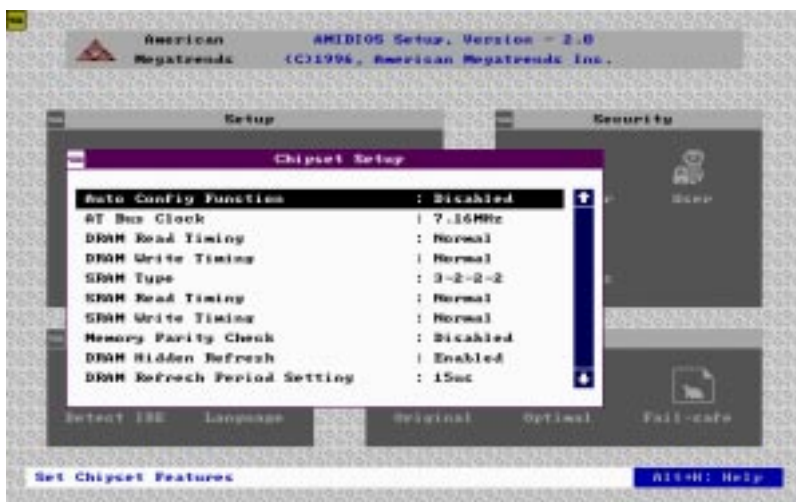
The following is an option list offered by Chipset Setup

Chipset setup options	
Function	**Options**
Auto Configuration Function	Disabled/Enabled
AT Bus Clock	7.16
	CPU Bus Speed/3
	CPU Bus Speed/4
	CPU Bus Speed/5
	CPU Bus Speed/6
	CPU Bus Speed/8
DRAM Read Timing	Slow
	Normal
	Faster
	Fastest

Function	Options
DRAM Write Timing	Slow
	Normal
	Faster
	Fastest
SRAM Type	2-1-1-1
	3-1-1-1
	3-2-2-2
	4-2-2-2
SRAM Read Timing	Fast
	Normal
SRAM Write Timing	Fast
	Normal
Memory Parity Check	Disabled
	Enabled
DRAM Hidden Refresh	Disabled
	Enabled
DRAM Refresh Period Setting	15 ms
	30 ms
	60 ms
	120 ms
Memory Hole at 15-16 MB	Disabled
	Enabled
ISA I/O Recovery	Disabled
	Enabled
ISA I/O Recovery Time	0.5 ms
	1.0 ms
	1.5 ms
	2.0 ms
	2.5 ms
	3.0 ms
	3.5 ms
System Hidden Refresh	15 ms
	30 ms
	60 ms
	120 ms
Cx586 Linear Wrapped Mode	Disabled
	Enabled

Power management Setup

The Power Management Setup offers options to help reduce power consumption. To see the options in this group, choose the Power Management Setup icon from the AMIBIOS Setup main menu.

Power Management Mode/APM Funtion (Advanced Power Management)

Set this option to *Enabled* to enable the power management and APM (Advanced Power Management) features.

The settings are *Enabled* or *Disabled.* The default setting is *Disabled.*
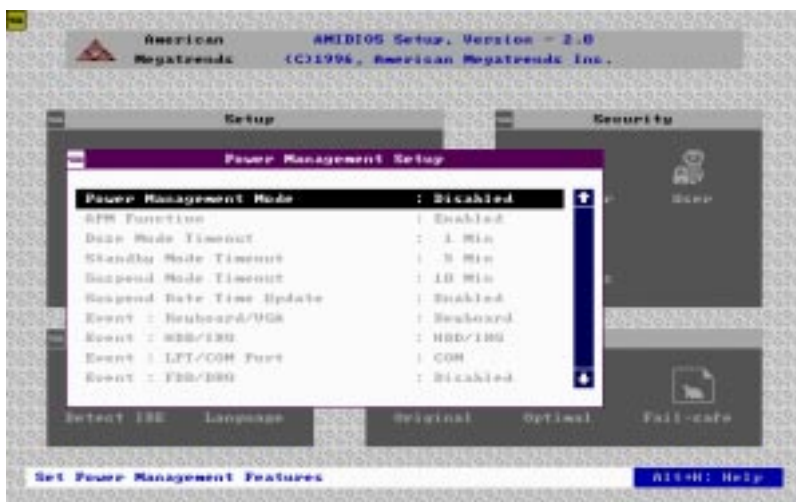
If your change the setting "Power Management mode" from *Disabled* to *Enabled*, the picture bellow is shown:

PCI/PnP Setup

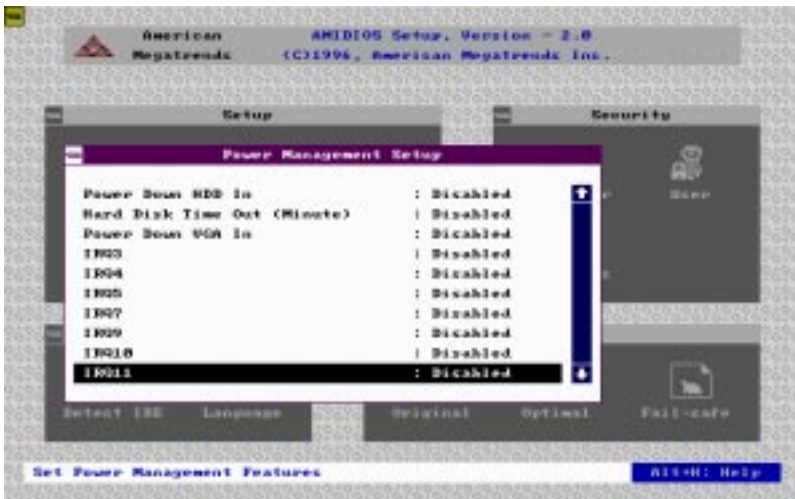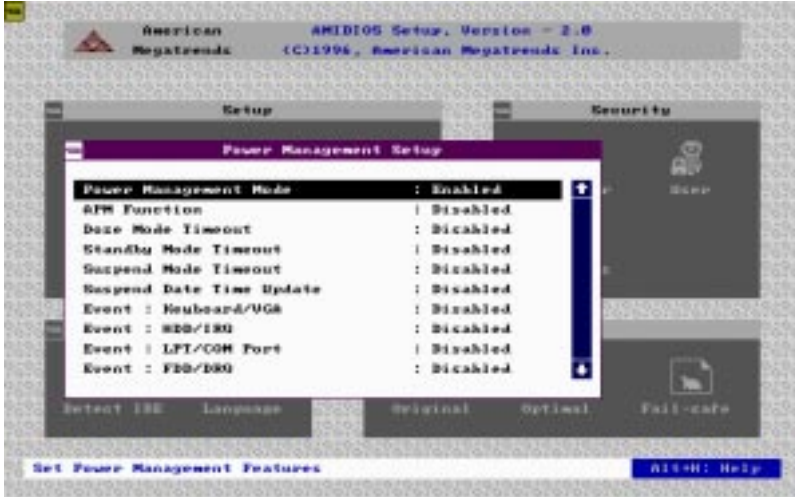PCI/PnP Setup options are displayed by choosing the PCI/PnP Setup icon from the AMIBIOS Setup main menu. All PCI/PnP Setup options are described in this section.
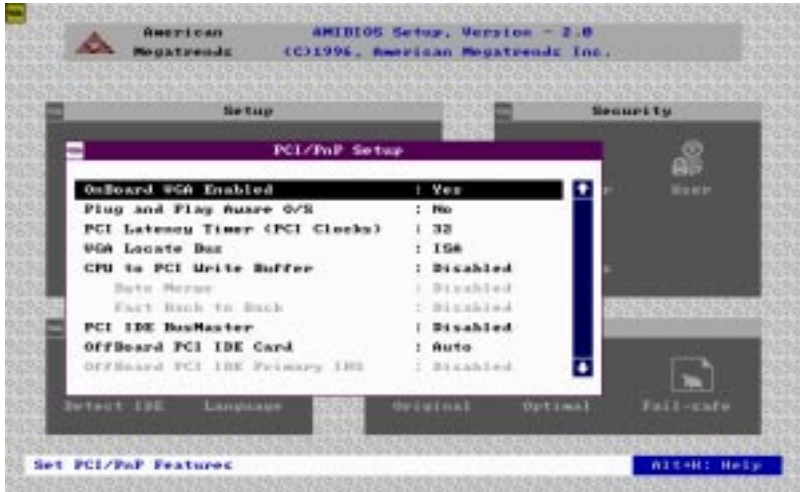
Onboard VGA Enabled
AMIBIOS supports this function.

If users put another VGA card in one of the PCI slots. Then the VGA Card has a higher priority than onboard VGA.

Plug and Play Aware OS
Set this option to *Yes* if the operating system installed in the computer is Plug and Play aware. AMIBIOS only detects and enables PnP ISA adapter cards that are required for system boot. The Windows 95 operating system detects and enables all other PnP-aware adapter cards. Set this option to *No* if the operating system (such as DOS, OS/2, Windows 3.x) does not use PnP.

You must set this option correctly or PnP-aware adapter cards installed in your computer will not be configured properly.

The settings are *Yes* or *No*. The Optimal and Fail-Safe default settings are *Yes*.

PCI Latency Timer (in PCI Clocks)
This option sets the latency of all PCI devices on the PCI bus. The settings are in units equal to PCI clocks. The settings are *32, 64, 96, 128, 160, 192, 224,* or *248.* The Optimal and Fail-Safe default settings are *64*.

VGA Locate Bus
This option allows you to select which bus VGA will use. The settings are PCI and ISA (Default).

CPU to PCI Write Buffer
This option sets the write buffer between the CPU and PCI bus. The default setting is *Enabled*.

PCI IDE BusMaster
Set this option to *Enabled* to specify that the IDE controller on the PCI local bus has bus mastering capability. The settings are *Disabled* or *Enabled*. The default setting is *Disabled*.

Offboard PCI IDE Card
This option specifies if an offboard PCI IDE controller adapter card is used in the computer. You must also specify the PCI expansion slot on the motherboard where the offboard PCI IDE controller card is installed. If an offboard PCI IDE controller is used, the onboard IDE controller on the motherboard is automatically disabled. The settings are *Disabled*, *Auto*, *Slot1*, *Slot2*, *Slot3*, or *Slot4*.

If *Auto* is selected, AMIBIOS automatically determines the correct setting for this option. The Optimal and Fail-Safe default settings are *Auto*.
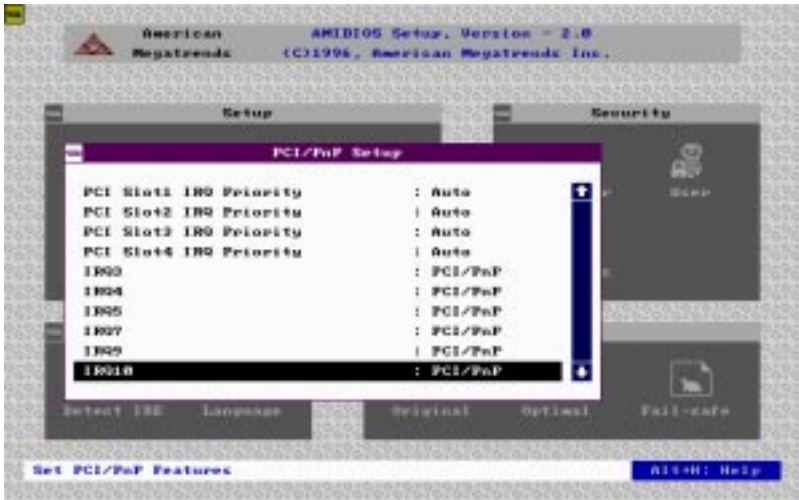
PCI Slot1 IRQ Priority
PCI Slot2 IRQ Priority
PCI Slot3 IRQ Priority
PCI Slot4 IRQ Priority

This option sets PCI slot IRQ priority.

The settings are *Auto*, 3, 4, 5, 7, 9, 10, 11. The default setting is *Auto*.
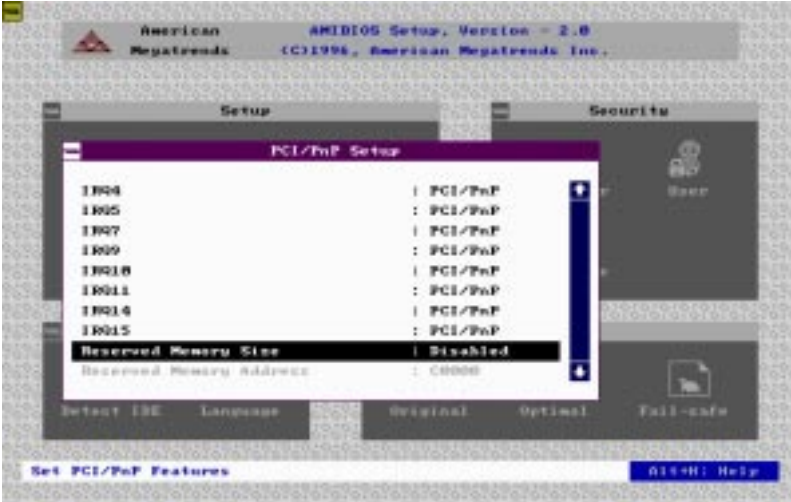
IRQ3
IRQ4
IRQ5
IRQ7
IRQ9
IRQ10
IRQ11
IRQ14
IRQ15

These options specify the bus that the named interrupt request lines (IRQs) are used on. These options allow you to specify IRQs for use by legacy ISA adapter cards.

These options determine if AMIBIOS should remove an IRQ from the pool of available IRQs passed to BIOS configurable devices. The available IRQ pool is determined by reading the ESCD NVRAM. If more IRQs must be removed from the pool, the end user can use these PCI/PnP Setup options to remove the IRQ by assigning the option to the *ISA/EISA* setting. Onboard I/O is configurable by AMIBIOS. The IRQs used by onboard I/O are configured as *PCI/PnP*.

The settings are *PCI/PnP* or *ISA/EISA*. The default settings are *PCI/PnP*.

Reserved Memory Size

This option specifies the size of the memory area reserved for legacy ISA adapter cards.

The settings are *Disabled, 16K, 32K,* and *64K.* The default settings are *Disabled.*

Reserved Memory Address

This option specifies the beginning address (in hex) of the reserved memory area. The specified ROM memory area is reserved for use by legacy ISA adapter cards.

The settings are *C0000, C4000, C8000, CC000, D0000, D4000, D8000,* or *DC000.*

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:
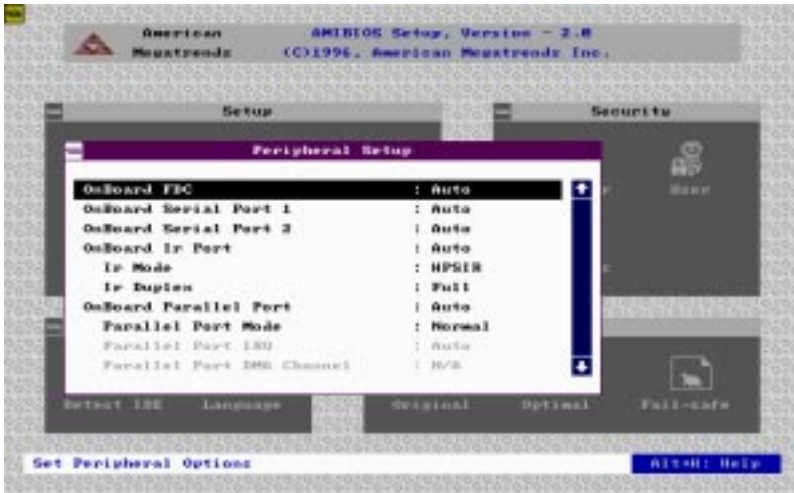
Onboard FDC
This option enables the floppy drive controller on the motherboard. The settings are *Auto*, *Enabled,* or *Disabled*.

Onboard Serial Port 1
This option enables serial port 1 on the motherboard and specifies the base I/O port address for serial port 1.

The settings are *Auto, Disabled, 3F8h, 3E8h, 2E8h,* and *2F8h.* The Fail-Safe default setting is *Auto*.

Onboard Serial Port2
This option enables serial port 2 on the motherboard and specifies
the base I/O port address for serial port 2. The settings are *Auto*.
Disabled, 3F8h, 2F8h, 3E8h, and *2E8h*. The default setting is
Auto.

Onboard Parallel Port
This option enables the parallel port on the motherboard and
specifies the parallel port base I/O port address. The settings are
Auto, Disabled, 378, 378, and *3BC*. The default setting is *Auto.*

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.

Parallel Port DMA Channel
This option is only available if the setting for the **Parallel Port Mode** option is *ECP.*

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

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

Onboard IDE
This option specifies the onboard IDE controller channels that will be used. The settings are *Primary, Both,* or *Disabled.*

Security

The following icons appear in this section:
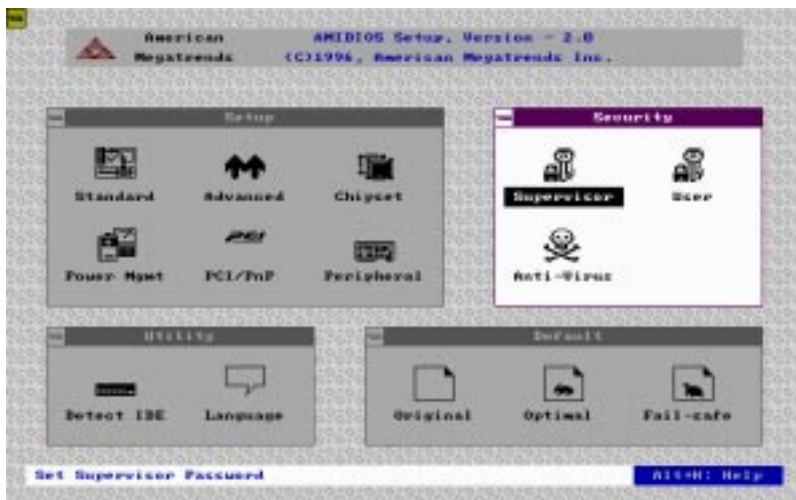
Two Levels of Passwords
Both the Supervisor and the User icons configure password
support. If you use both, the Supervisor password must be set. If
this feature is enabled, you can select AMIBIOS. The setup
messages are in different languages. The default setting is *English*.

The system can be configured so that all users must enter a
password every time the system boots or when AMIBIOS Setup is
executed, using either or both the Supervisor or User password.

The following screen appears when you select the password icon
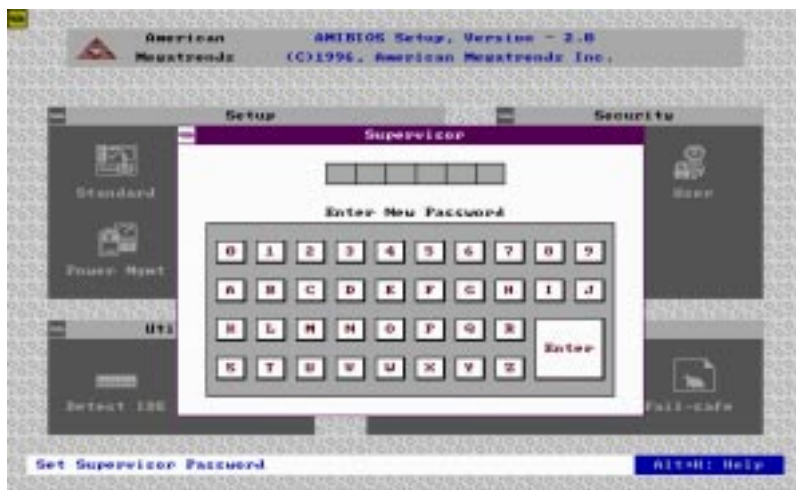
You can enter a password by:

- typing the password on the keyboard
- selecting each letter via the mouse
- selecting each letter via the pen stylus (pen access must be customized for each specific hardware platform).

If you do not want to use a password, simply press <ENTER> when the password prompt appears.

Setting a Password
The password check option is enabled in Advanced Setup by choosing either *Always* or *Setup*. Here, you determine the password to be used. The password is stored in CMOS RAM.

To assign a password,

1. Enter a 1-6 character password. The password does not appear on the screen when typed.

2. Retype the password when prompted by AMIBIOS.

A message box will appear when the password is confirmed.

Keep a record of the password. If you forget the password, you must reset CMOS RAM and reconfigure the system.

Changing a password

1. Select the Supervisor or User icon from the Security section of the AMIBIOS Setup main menu.

2. Enter the password and press <ENTER>. The screen does not display the characters entered.

3. After the new password is entered, retype the new password as prompted and press <ENTER>.

If the password confirmation is incorrect, an error message appears. If the new password is entered without error, press <ESC> to return to the AMIBIOS Setup Main Menu. The password is stored in CMOS RAM after AMIBIOS Setup completes. The next time the system boots, you are prompted for the password if the password function is present and is enabled.
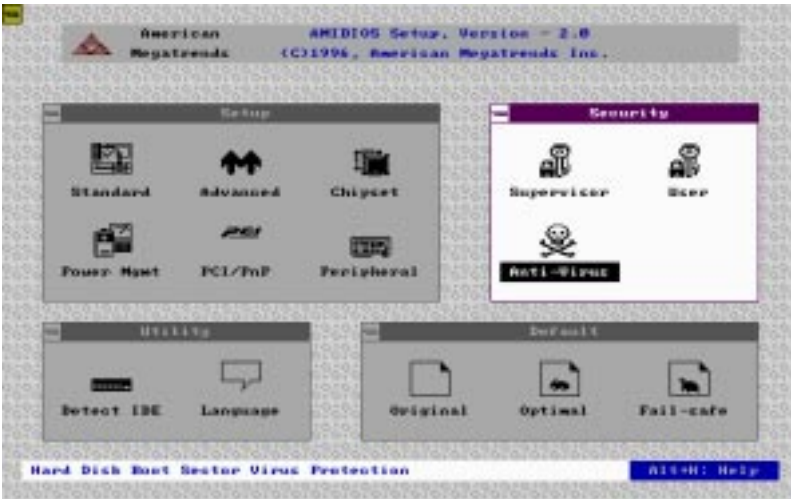
Anti-virus

Select the Anti-virus icon from the Security section of the AMI-BIOS Setup main menu. AMIBIOS issues 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. The settings are *Enabled* or *Disabled*.

If enabled, the following appears when a write is attempted to the boot sector.

<div align="center">
Boot Sector Write !!!
Possible VIRUS: Continue (Y/N)? _
</div>

You may have to type "N" several times to prevent the boot sector write.

The following is displayed after any attempt to format any cylinder, head, or sector of any hard disk drive via the BIOS INT 13 Hard Disk Drive Service:

<div align="center">
Format !!!
Possible VIRUS: Continue (Y/N)? _
</div>

Utility

The following icons appear in this section:

Detect IDE:
If drive C is an IDE drive, the hard disk drive parameters for drive C:
are automatically detected and reported to the Hard Disk Drive C
screen in Standard Setup, so that you can easily configure drive C.
Drive D and the CD-ROM could also be automatically detected and
reported to screen if drive D and CD-ROM are IDE drives.

Language:
If this feature is enabled, you can select AMIBIOS. The setup
messages are in different languages. The default setting is
English.

Default

The icons in this section permit you to select a group of settings for all AMIBIOS Setup options. Not only can you use these icons to quickly set system configuration parameters, you can also choose a group of settings that have a better chance of working when the system is having configuration-related problems.

Original
Choose the Original icon to return to the system configuration values present in AMIBIOS Setup when you first begin this AMIBIOS Setup session.

Optimal
You can load the optimal default settings for the AMIBIOS Setup options by selecting the Optimal icon. The Optimal default settings are the values that optimize system performance. If CMOS RAM is corrupted, the Optimal settings are loaded automatically.

Fail-Safe
You can load the Fail-Safe AMIBIOS Setup options settings by selecting the Fail-Safe icon.

The Fail-Safe settings provide the most stable settings, though they do not provide optimal performance. Use this option as a diagnostic aid if the system is behaving erratically.

Exiting AMIBIOS

You can exit AMIBIOS by pressing the <ESC> key while in the
AMIBIOS main menu screen.

The following screen appears:

```
┌─────────────────────────────────────────┐
│ ■         Exit Setup                     │
│                                          │
│  ┌────────────────────────────────────┐  │
│  │ Save changes and Exit              │  │
│  │                                    │  │
│  └────────────────────────────────────┘  │
│                                          │
│  ┌────────────────────────────────────┐  │
│  │ Do not save changes and Exit       │  │
│  │                                    │  │
│  └────────────────────────────────────┘  │
│                                          │
│  ┌────────────────────────────────────┐  │
│  │ Continue                           │  │
│  │                                    │  │
│  └────────────────────────────────────┘  │
│                                          │
└─────────────────────────────────────────┘
```
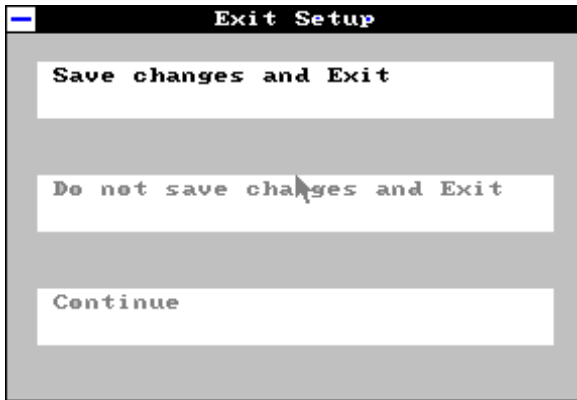
Select the option you desire, and the system will continue its boot
up sequence.

Flat Panel/CRT Controller Display Drivers and Utilities

This chapter provides information about:

- Driver types and installation

- Software utility installation and use

Software drivers

This chapter describes the operation and installation of the software drivers supplied on the *Display Driver Diskettes* that are shipped with your VGA adapter.

Your VGA adapter is based on the CHIPS VGA Flat Panel/CRT controller and is fully IBM VGA compatible. This controller offers a large set of extended functions and higher resolutions. If you intend to use your VGA adapter in standard VGA modes only, you do not need to install any of these drivers. Since your VGA adapter is fully compatible, it does not require any special drivers to operate in standard modes.

The purpose of the enclosed software drivers is to take advantage of the extended features of the CHIPS VGA Flat Panel/CRT controller.

Hardware configuration

Some of the high-resolution drivers provided in this package will work only in certain system configurations. If a driver does not display correctly, try the following:

1. Change the display controller to CRT-only mode, rather than flat panel or simultaneous display mode. Some high-resolution drivers will display correctly only in CRT mode.

2. If a high-resolution mode is not supported on your system, try using a lower-resolution mode. For example, 1024 x 768 mode will not work on some systems, but 800 x 600 mode is supported on most.

Necessary prerequisites

The instructions in this manual assume that you understand elementary concepts of MS-DOS and the IBM Personal Computer. Before you attempt to install any driver or utility, you should:

• Know how to copy files from a floppy disk to a directory on the hard disk

• Understand the MS-DOS directory structure

• Know how to format a floppy disk

If you are uncertain about any of these concepts, please refer to the DOS or OS/2 user reference guides for more information, *before* you proceed with the installation.

Before you begin

Before you begin the driver software installation, you should make backup copies of the *Display Driver Diskettes*. Store the original disks in a safe place.

Make sure you know the version of the application for which you are installing drivers. Your *Display Driver Diskettes* contain drivers for several versions of certain applications. For your driver to operate properly, you must install the driver for your version of the application program.

Windows Ô 95

These drivers are designed to work with Microsoft Õ Windows Ô. You just install these drivers through the Windows Ô operating system.

Driver installation

1. Install Windows Ô 95 as you normally would for a VGA display. Click the **Start** button, go to **Settings** and click on **Control Panel**. Choose the **Display** icon and double click on the icon. In the *Display Properties* window, click on the **Settings** tab. Then click on **Change Display Type**. In the *Change Display Type* window, click on the **Change** button under *Adapter Type*. This will bring up the *Select Device* window.

2. Place the Windows Ô 95 *Display Driver Diskette* in drive A. In the *Select Device* window, click on **Have Disk**, Press <**ENTER**> and the name of the *Chips and Technologies*, *Inc*. *Video Controller* driver will appear highlighted in the *Models* list box. Select Chips and Tech. 65550 PCI (new) and Click **OK** to install the selected driver. Click OK to install the selected driver.

3. Once the installation is complete, the *Change Display Type* window will reappear. Click on Close to close the window. Then the *Display Properties* window will reappear. Click on **Apply**. Restart the system for the new settings to take effect.

Windowsô 3.1

These drivers are designed to work with Microsoft Windows Version 3.1. You may install these drivers either through Windowsô 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 the 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. This 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. When Setup is done, it will return to DOS. Type WIN <ENTER> to 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.

OS/2

These drivers are designed to function with the OS/2 Version 3 and 2.1 operating systems.

Driver installation

NOTE: *Always use the INSTxx.CMD for the* FIRST *installation of the video device drivers. To change video resolutions, follow* Step 3 *below.*

To install the drivers, follow these instructions:

1. The system display must be set to VGA mode before installing the OS/2 SVGA drivers. Open an OS/2 full screen or windowed session.

2. Place the OS/2 Display Driver Diskette in drive A. Type
A:<ENTER> to make this the default drive. Then type INST2X
A: C: <ENTER> (for OS/2 2.1x systems) or INST30 A: C:
<ENTER> (for OS/2 Version 3 systems). Once the Install Program is
completed, do a system shutdown and reboot.

3. After the system has rebooted, follow these instructions:

   A) OS/2 2.1x

   Open an OS/2 full-screen or windowed session. At the OS/2
   prompt, type DSPINSTL <ENTER> to install the new device
   driver and configure the video system.

   B) OS/2 Version 3

   Go to the System Setup folder and run Selective Install to install the
   new device driver and configure the video system.

   Follow the instructions of the program to set up the OS/2 drivers in
   your system. First, select *Primary Display*. From the list of Primary
   Display Adapter Types, select *Chips and Technologies 655XX*.
   From the list of available Display Resolutions, select a display
   resolution. The correct source directory must be specified. Once
   the installation is complete, the system must be shut down and
   restarted for changes to take effect.

WIN-OS/2

Please note the following limitations regarding WIN-OS/2.

1. The WIN-OS/2 full screen session should be set to Enhanced
   Capability. The default setting is Standard Mode. If this setting is
   not changed, Windows will not run.

2. WIN-OS/2 should be started by selecting the WIN-OS/2 Full
   Screen Icon in the Command Prompts folder, or with the WIN
   command in a DOS Full Screen or OS/2 Full Screen session.

3. Do not start WIN-OS/2 in a DOS or OS/2 Window. The system
   does not support the enhanced video mode being used in a
   window, and therefore will not run.

4. When running WIN-OS/2, DO NOT use <ALT>+<HOME> to switch a DOS or OS/2 Full Screen session to Windows. If this happens, do a system shutdown and reboot.

Driver diskette copy

NOTE: *Diskette copies of the OS/2 drivers must have a VOLUME LABEL that reads "DISP 1" in order to be an installable diskette.*

To copy the OS/2 *Display Driver Diskette*, follow these instructions:

1. Copy all files on the *OS/2 Display Driver Diskette* as you normally would onto another diskette.

2. Place the diskette copy in drive A. At the C prompt, type `LABEL A: DISP 1` to properly label your diskette. Then store your diskette copy in a safe place.

For proper installation of OS/2 drivers, all diskette copies must be properly labeled "DISP 1".

Windowsô NT 3.51

These drivers are designed to work with Microsoftô Windowsô.

Driver installation

1. Install Windowsô NT 3.51 as you normally would for a **VGA** display. Run Windowsô NT Control Panel from the Main Group. Choose the **Display** option. In the *Display Settings* dialog box, click on *Change Display Type*. Click on **Change** from the Adapter Type in the Display Type dialog box. Click on **Other** in the *Select Device* dialog box.

2. Place the Windowsô *NT Display Driver Diskette* in drive A. Press <**ENTER**> and the following driver names will appear highlighted in the *Models* list box:

   CHIPS Video Accelerator (64310,65545,65548,65550)
   CHIPS Video Accelerator (65510,65530,65535,65540)

   Click on Install to **Install** the selected driver. Once the installation is complete, shutdown and restart the system.

3. Upon restart, at the *Invalid Display Selection* message, click on **OK** and select the desired display settings from the Display Settings dialog box. Click on **Test** to test the newly selected graphic mode. A color test screen should appear, followed by the *Testing Mode* window. Click on **Yes** to contiune. The Display Settings Change window will appear. Click on **Restart Now** for the new settings to take effect.

Windows Ô NT 4.0

Driver Installation

1. Install Windows NT4.0 as you normally would for a **VGA** display. First click the **Start** button, go to **Settings** and click on **Control Panel**. Choose the **Display** icon and click on the icon. In the *Display Properties* window, click on the **Settings** tab. Then click on **Change Display Type**. In the *Change Display Type* window, click on the **Change** button under *Adapter Type*. This will bring up the Select Device window.

2. Place the Windows Ô NT *Display Driver Diskette* in drive A. In the *Select Device* window, click on **Have Disk**. Press <**ENTER**> and the name of the *Chips and Technologies*, *Inc*. *Video Controller* driver will appear highlighted in the *Models* list box. Select Chips and Tech. 65550 PCI (new) and Click **OK** to install the selected driver. Click OK to install the selected driver.

3. Once the installation is complete, the *Change Display Type* window will reappear. Click on Close to close the window. Then the *Display Properties* window will reappear. Click on **Apply**. Restart the system for new settings to take effect.

SOFTWARE UTILITIES

This chapter describes the operation and installation of the following software utilities supplied on the *Display Driver Diskettes*:

- CHIPSDSP
- CHIPSCPL

The CHIPSDSP utility program

This utility program is designed to work with Microsoft© Windowsô 95.

Installing the utility

CHIPSDSP.DLL is located on the CHIPS Windowsô 95 driver disk. This file is a Winsowsô 95 based utility for selecting display type and refresh rate. It is a *Display Properties Refresh* window that is automatically installed when installing CHIPS Windowsô 95 display drivers. The **Display** icon is in the **Control Panel** group. To invoke the **Display** icon, simply click on the Start button, go to **Settings**, click on **Control Panel**, and then double click on the **Display** icon. Click on the property sheet with the heading *Refresh*.

How to use the utility

DISPLAY DEVICE allows you to select the display type from the following:

- CRT Only   **<ALT C>**
- LCD (Flat Panel) only   **<ALT I >**
- Both CRT and LCD (Flat Panel) **<ALT B>**

REFRESH RATE allows you to select the refresh rate from the following:

- Interlaced

- 56 Hz

- 60 Hz

- 70 Hz

- 72 Hz

- 75 Hz

- 85 Hz

The refresh rate is available in **CRT Mode** only.

Note: 1. The refresh rates that are supported by the selected monitor are the only refresh rates that will show and be selectable.

2. The above refresh rates may not be supported by all Chips products.

WINDOWSÔ DEFAULT allows you to return to the default refresh rate setting for the selected monitor in WindowsÔ 95.

The CHIPSCPL utility program

This utility program is designed to work with Microsoft◊ Windowsô Version 3.1.

Installing the utility

CHIPSCPL.CPL is a Windowsô 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 Windowsô 3.1 linear drivers. The **Control Panel** icon is in the *Main* Windowsô group. To invoke the control panel applet, simply click on the icon. The driver resolution and color depth take effect only after Windowsô 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 resoution 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 (15 bpp)
- 64K (16 bpp)
- 16M (24 bpp)

By selecting the color depth first, will be displayed the allowable resolutions.

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)

MONITOR SELECTION <ALT M> allows you to select from the list of monitors.

REFRESH<ALT R> allows you to select the refresh rate from the following:

- Interlaced

- 56 Hz

- 60 Hz

- 70 Hz

- 72 Hz

- 75 Hz

The refresh rate is available on **CTR Mode** only. The refresh rates supported by the selected monitor are the only available refresh rates that can be selected.

CURSOR-ANIMATION <ALT A> allows you to select an animated cursor instead of the hour glass wait cursor.

BIG CURSOR <ALT G> allows you to select a big cursor for better visibility on the Flat Panel.

Version <ALT V> displays version information about the current driver.

HELP <ALT H> displays help information on how to use the Display Driver Control Panel.

Ethernet Software Configuration

This chapter describes how to configure the Etherent Card to match your application requirements (SBC-456E only).

Ethernet software configuration

The onboard Ethernet interface supports all major network operating systems. I/O addresses and interrupts are easily configured via the AMIBIOS Setup. To configure the medium type, to view the current configuration, or to run diagnostics, please refer to the following istructions:

1. Power the mainboard on. Ensure that the RSET8029.EXE file is located in the working drive.

2. At the prompt, type RSET8029.EXE and press <ENTER>. The Ethernet configuration program will then be displayed.

3. This simple screen shows all the available options for the Ethernet interface. Just highlight the option you wish to change by using the Up and DOWN keys. To change a selected item, press <ENTER>, and a screen will appear with the available options. Highlight your option and press <ENTER>. Each highlighted option has a helpful message guide displayed at the bottom of the screen for additional information.

4. After you have made your selections and the configuration is what you want, press <ESC>. A prompt will appear asking if you want to save the configuration. Press "Y" if you want to save.

The Ethernet Setup Menu also offers three very useful diagnostic functions. These are:

1. Run EEPROM test

2. Run Diagnostics on Board

3. Run Diagnostics on Network

Each option has its own display screen which shows the format and result of any diagnostic tests undertaken.

A

Watchdog Timer Demo Program

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

Programming the watchdog timer

How to program the WATCHDOG TIMER

1. To set the time-out interval of watchdog timer:

   -- output the desired value to port **0x443**. Since the data is of 1 byte, the maximum value will be 255. In our design 1 ~ 127 will denote 1sec ~ 127sec, though 129 ~ 255 will denote lmin ~ 127min. e.g.

   outportb(0x443, 30);   // set interval to 30 seconds
   outportb(0x443, 0x85);   // set interval to 5 minutes

2. To set the time-out event:

   -- output data to **prot 0x444,**

   • 0: reset system
   • 1, 2, 3: IRQ 10, 15, 11 respectively
   • 4: NMI
   e.g.
   outportb(0x444, 0);   // set time-out event to reset-system

3. To disable watchdog timer:

   -- output any value to port 0x80, e.g.
   outportb(0x80, data);   // disable watchdog timer

4. To ebable or refresh watchdog timer(the watchdog timer will return to its initial value, then count down):

   -- access the I/O port *0x443*, e.g.
   outportb(0x80, 0);   // disable watchdog timer
   inportb(0x443);   // refresh watchdog timer

   * note: if you want to refresh the watchdog timer, you have to disable it first.

Demo program

```
outportb(0x444, 0):          // set time-out event to reset-system

outportb(0x443x 10);         // set time-out interval to 10 seconds

iutportb(0x443);             // enable watchdog timer

customer_job();              // execute your job here, be sure your
                             //    job will finished within 10 seconds

outportb(0x80, 0);           //  refresh watchdog timer, otherwise
                             //    the system will reset after time-out

outputb(0x443, 20);          //  set time-out interval to 20 seconds

inportb(0x443);              //  enable watchdog  timer

another_job();               // another job finished in 20 seconds

outportb(0x80, 0)            // disable watchdog timer

...

...
```

Installing PC/104 Modules

This appendix gives instructions for installing PC/104 modules.

Installing PC/104 modules

The SBC-456/456E'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-456/456E is a quick and simple operation. The following steps show how to mount the PC/104 modules:

Step1   Remove the SBC-456/456E 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.
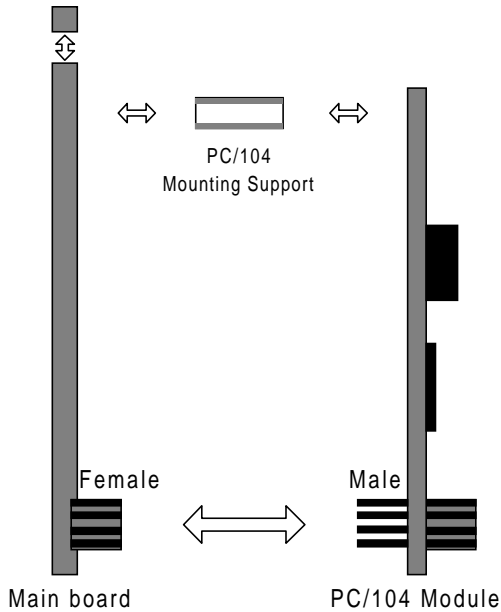
PC/104 Module Mounting Diagram
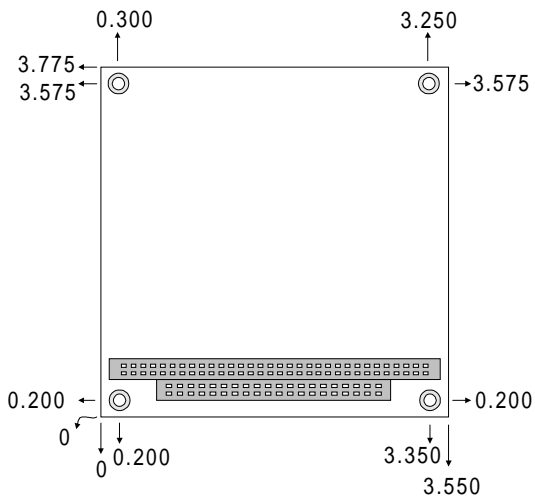
PC/104 module dimenstions (inches ± 5%)