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SBC-455

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

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FCC STATEMENT

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

THIS EQUIPMENT HAS BEEN TESTED AND FOUND TO COMPLY WITH THE LIMITS FOR A CLASS "A" DIGITAL DEVICE, PURSUANT TO PART 15 OF THE FCC RULES. THESE LIMITS ARE DESIGNED TO PROVIDE REASONABLE PROTECTION AGAINTST HARMFUL INTERFERENCE WHEN THE EQUIPMENT IS OPERATED IN A COMMERCIAL ENVIRONMENT. THIS EQUIPMENT GENERATES, USES, AND CAN RADIATE RADIO FREQENCY 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-455 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 pin) and COM2 adapter (9 pin) kit
- 5 Utility disks with CHIPS 65545/48 utility programs and drivers
- PC/104 Expansion connector converter (pin headers)
- PC/104 Module mounting supports

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

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CHAPTER 1

General Information

This chapter provides background information for the SBC-455.

Sections include:

- Card specifications
- Board layout

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Introduction

The SBC-455 is an all-in-one single board 486 computer with an **on-board flat panel/CRT SVGA controller**. It packs all the functions of an industrial computer and its display capabilities onto a single, half-size card. This means the SBC-455 is your absolute best solution for embedded applications.

The on-board PCI-bus, flat panel/CRT SVGA controller uses the CHIPS 65548 chipset with up to 1 MB of video memory. 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.

Another feature of the SBC-455 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 accomplish IDE boost performance improvements.

On-board features include two high speed RS-232 serial ports with 16C550 UARTs, one bidirectional SPP/EPP/ECP parallel port and a floppy drive controller. In addition to the 486's 16 KB of on-chip cache memory, the SBC-455 includes an extra 128 KB of second level on-board cache memory.

If program execution is halted by a program bug or EMI, the board's 16-stage watchdog timer can automatically reset the CPU or generate an interrupt. This ensures reliability in unmanned or standalone systems.

The SBC-455 **supports 5 V EDO DRAM**. It also provides two 72-pin SIMM (Single In-line Memory Module) sockets for its on-board system DRAM. These sockets give you the flexibility to configure your system from 1 MB to 64 MB of DRAM using the most economical combination of SIMMs.

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Features

- Accepts Intel, AMD, Cyrix or other compatible 486 processors, including the P24T Pentium OverDrive
- Half-size PC/AT-compatible ISA-bus CPU card
- AMI Flash BIOS
- Daughterboard available for various flat panel displays
- On-board 32-bit PCI-bus, flat panel/CRT SVGA controller
- Built-in PCI Enhanced IDE controller, supports two IDE devices (large hard disks, CD-ROM, tape backup, etc.)
- Up to 64 MB on-board DRAM
- Supports 5 V EDO DRAM
- Two high speed serial RS-232 ports (16C550 UARTs with 16-byte FIFO). IRQ 3, 4 or IRQ 10, 11 can be individually selected
- One enhanced bidirectional parallel port. Supports SPP/EPP/ECP
- Watchdog timer (15 steps, 2 seconds per step)
- On-board keyboard and PS/2 mouse connector
- Connectors for PC/104 module expansion
- "Green" function supports power management
- Clear CMOS function

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Specifications

CPU: 80486SX/DX/DX2/DX4 25/33/40/50/66/75/100/120 MHz, 5x86-100/120/133 or Pentium OverDrive processor

Bus interface: ISA bus

Data bus: 32-bit

Processing ability: 32-bit

Chipset: ALI/1489/1487

RAM memory: 1 MB to 64 MB. Uses two 72-pin SIMM sockets

L2 Cache memory size: 128/256/512 KB 2nd level cache memory

Shadow RAM memory: Supports system and video BIOS shadow memory

Flat panel/CRT SVGA controller: SVGA, PCI-bus, CHIPS 65548 chipset with 512 KB standard video memory, upgradable to 1 MB. Provides 32-bit graphic throughput. Features the ability to control most TFT, STN, B/W, EL flat panel displays as well as standard CRT. Supports resolutions up to 1024 x 768 in 256 colors. Daughterboards available for various flat panel displays.

Enhanced IDE hard disk drive interface: Fast PCI bus. Supports up to two Enhanced IDE (ATA-2) large hard disk drives or other Enhanced IDE devices. Supports mode 3 and mode 4 hard disks (data transfer rate 11.1 MB/sec. minimum)

Floppy disk drive interface: Supports up to two floppy disk drives, 5 1/4"¼" (360 KB and 1.2 MB) and/or 3 1/2" (720 KB, 1.44 and 2.88 MB)

Bidirectional parallel port: Configurable to LPT1, LPT2, LPT3 or disabled Supports SPP/EPP/ECP standards

Serial ports: Two serial RS-232 ports, uses 16C550 UARTs with 16-byte FIFO buffer. Supports speeds up to 115 Kbps. Ports can be individually configured from COM1 to COM4 or disabled.

BIOS: AMI Flash WIN BIOS

Watchdog timer: Can generate a system reset or IRQ15. The time interval is software selectable from 2 to 32 seconds (15 steps, 2 seconds per step).

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

DMA channels: 7

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Interrupt levels: 15

Keyboard/ PS/2 mouse connector: A 6-pin mini DIN keyboard connector is located on the mounting bracket for easy access to a keyboard and a PS/2 mouse

Bus speed: 8 MHz

System performance: 325 MHz in 80486 DX4-100 (Landmark V2.0)

Max. power requirements: +5 V @ 2.5 A

Power supply voltage: +5 V (4.75 V to 5.25 V), +12 V, -12 V; for DX4-100/120 and P24T CPUs, a cooler is necessary

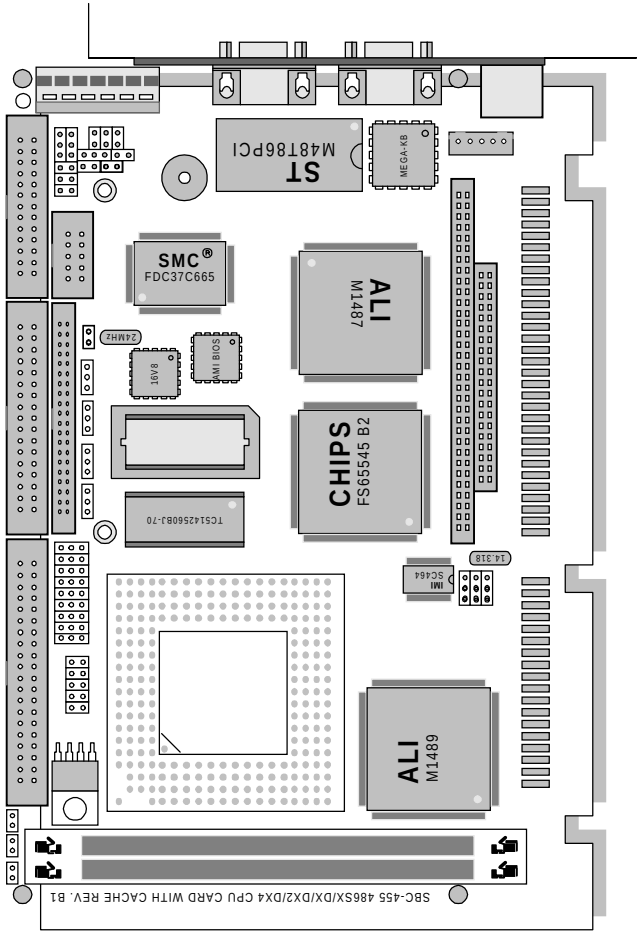
Operating temperature: 32 to 140˚F (0 to 60˚C)

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

Board weight: 0.6 lbs (0.26 Kg)

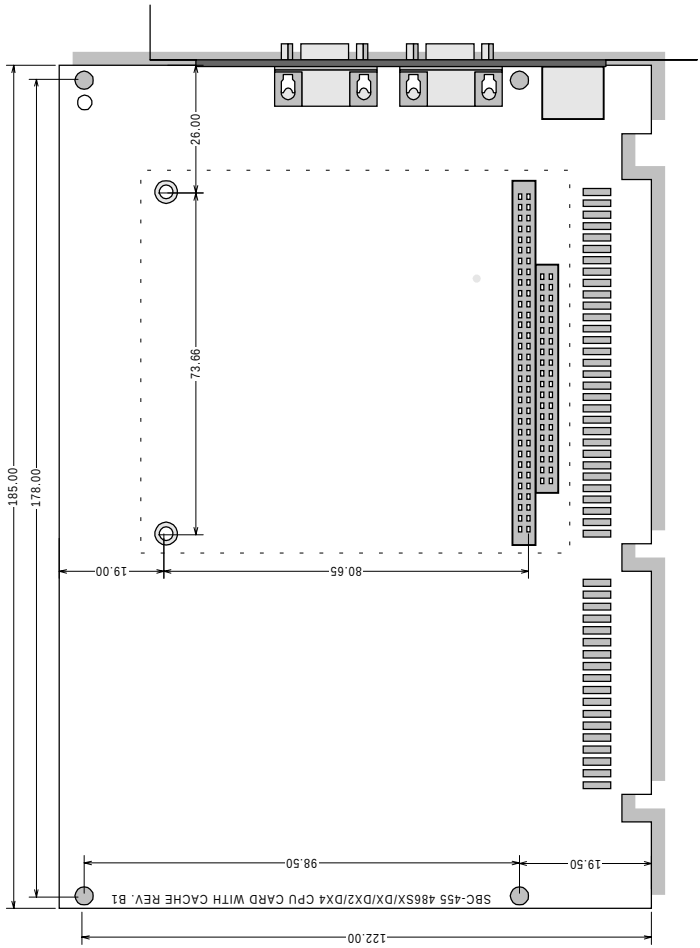
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Board layout



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Card dimensions



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CHAPTER 2

Installation

This chapter explains set up procedures for the SBC-455 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.

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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.

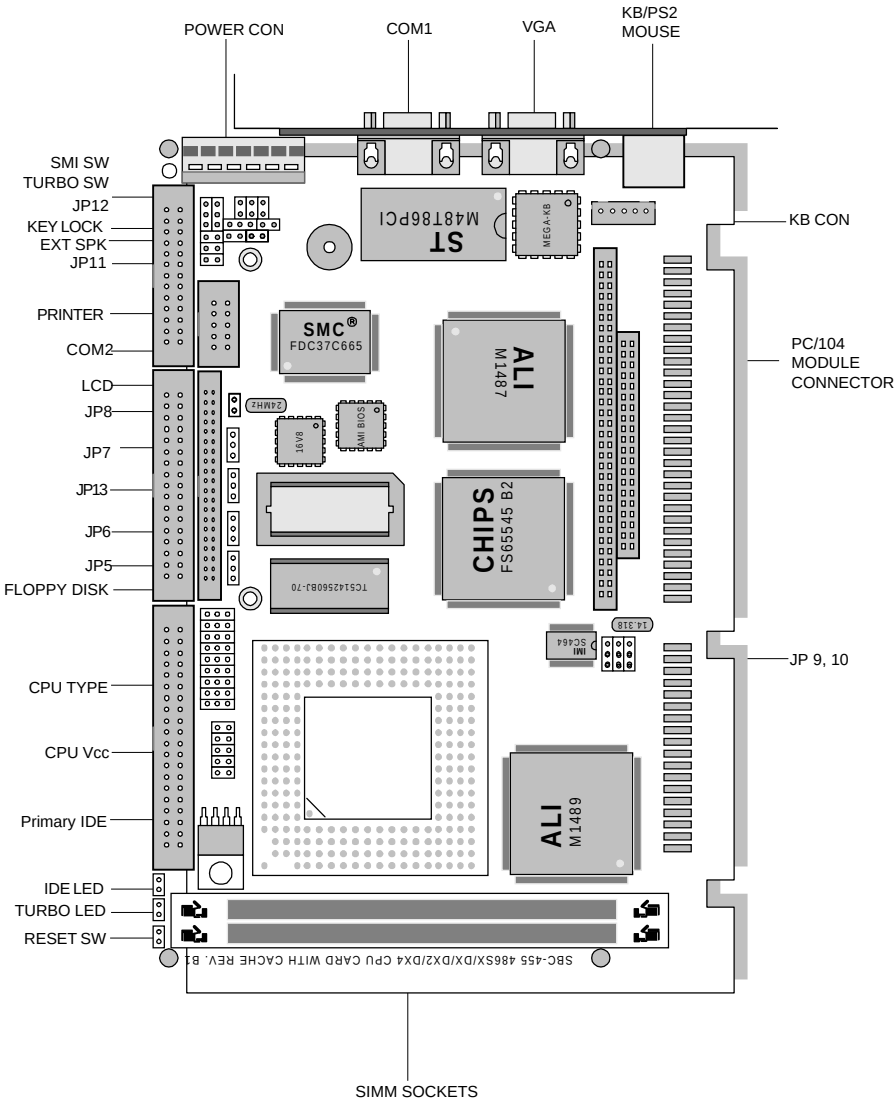
The table below lists the function of each of the board jumpers and connectors:

Jumpers and connectors

Label	Function
JP2	CPU voltage select
JP1,3,4	CPU type select
JP11	COM port IRQ and Parallel port DRQ/DACK select
JP5	LCD clock signal select
JP7	LCD enabled signal select
JP6	Watchdog out select
JP9, 10	CPU clock select
JP12	Clear CMOS
JP8	Flash BIOS Protect
JP13	Flash BIOS Write-enable Voltage
Primary IDE	Enhanced IDE connector
Floppy disk	FDD connector
Printer	Parallel port connector
LCD	LCD panel connector
COM B	Serial port 2
RESET SW	Reset Switch
EXT SPK	Ext. speaker
KEY LOCK	Power LED and KB lock
TURBO SW	Turbo Switch
SMI SW	SMI Switch
POWER CON	Power connector
IDE LED	IDE LED
TURBO LED	Turbo LED
COM A	Serial port 1
VGA	VGA connector
KB CON	External keyboard connector
KB/PS2 MOUSE	Keyboard or PS/2 mouse connector
J1,2	PC/104 module connector
SIMM1,2	DRAM module socket

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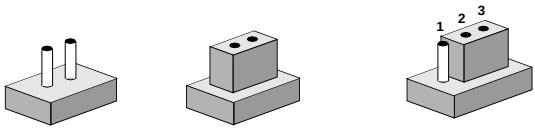
Locating jumpers and connectors



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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.

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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 the CPU

The SBC-455 CPU card supports most 486 CPUs. The system's performance depends on the CPU you choose. You can install or upgrade the CPU in the board's PGA socket by following the procedures outlined below. If your system has an existing CPU, you need to remove it before installing the new CPU.

Removing a CPU

1. Disconnect power from the chassis, and unplug all connections to the CPU card. Then, remove the CPU card from the chassis by following the instructions in the user's manual for your chassis.
2. Lift the CPU out of the PGA socket. The old chip may be difficult to remove. You may find spray chip lubricant, designed for pin-grid-array (PGA) devices, and a chip puller helpful. These are available at electronics hobbyists' supply stores.

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Installing a CPU

To install the CPU, follow the instructions that came with it. If no documentation was provided, the general procedures for installing a CPU are outlined below:

1. Lubricate the pins on the CPU with lubricant for PGA devices. This makes the CPU slide in much easier and greatly reduces the chance of damaging the pins and other components.
2. Carefully align the CPU so that it is parallel to the socket. Make sure that the notch on the corner of the CPU matches the notch on the inside of the socket.
3. Gently push the CPU into the socket. There will probably be a small gap between the CPU and the socket even when it is fully seated. DO NOT USE EXCESSIVE FORCE!

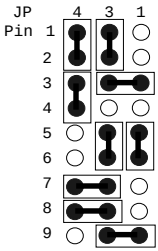
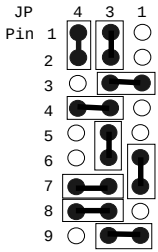
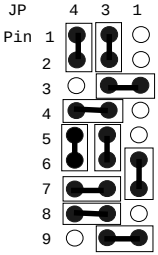
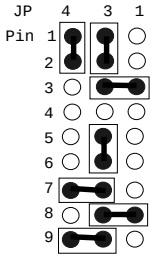
When you install a new CPU, you may have to adjust other settings on the board, such as CPU type, CPU clock, and PCI speed, to accommodate it. Make sure that the settings are correct for your CPU. **Improper settings may damage the CPU.**

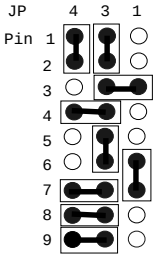
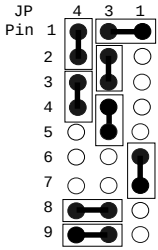
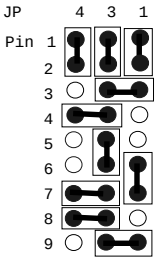
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CPU type select (JP1, JP3, JP4)

JP1, JP3, and JP4 must be set to match the CPU type. The chart below shows the proper jumper setting for their respective CPU.

CPU Type select (JP4, JP3, JP1)

Intel P24T	AMD/Intel DX4 Series Intel P24D Intel DX2-66 AMD DE2-66	AMD-X5-133/ AMD DX2-66(WB) (default)	Intel 486SX
			

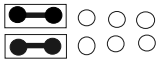
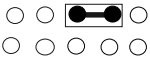
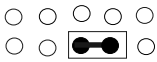
Cyrix/IBM/ST 5x86 , DX4 Series	Cyrix/IBM/ST/TI DX2 Series	AMD DX2-66(WT)
		

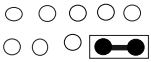
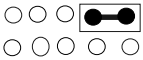
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CPU Vcc select (JP2)

JP2 must be set to match the CPU type. The chart below shows the proper jumper settings for their respective V_{cc}.

CPU Vcc select (JP2)

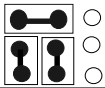
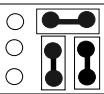
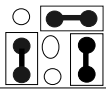
5.0 V	3.3 V	3.45 V (default)
		

4.0 V	3.6 V
	

CPU clock select (JP9, JP10)

JP9 and JP10 are used to synchronize the CPU clock with the CPU type. Set the CPU clock according to the base CPU speed.

CPU clock select (JP9, JP10)

25 MHz	33 MHz (default)	40 MHz	50MHz
			

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Installing DRAM (SIMMs)

The SBC-455 CPU card provides two 72-pin SIMM (Single In-line Memory Module) sockets and supports between 1 MB and 64 MB DRAM.

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.

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IDE hard drive connections (IDE)

You can attach two Enhanced Integrated Device Electronics hard disk drives to the SBC-455'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.

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Pin assignments

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

IDE Connector (PRIMARY IDE)

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 (IDE LED)

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 pin assignments (IDE LED)

Pin	Function
1	-R/W IDE
2	Pull high

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Floppy drive connections (FLOPPY DISK)

You can attach up to two floppy disks to the SBC-455'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-455 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 FLOPPY DISK 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 FLOPPY DISK connector:

FLOPPY DISK Connector

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		

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Parallel port (PRINTER)

Normally, the parallel port is used to connect the card to a printer. The SBC-455 includes an on-board parallel port, accessed through the PRINTER 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 allows your parallel peripheral to 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 PRINTER 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 PRINTER connector. Pin 1 is on the right side of the PRINTER connector.

Pin assignments

PRINTER Connector

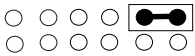
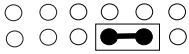
Pin	Signal	Pin	Signal
1	Strobe	2	Data 0
3	Data 1	4	Data 2
5	Data 3	6	Data 4
7	Data 5	8	Data 6
9	Data 7	10	-Acknowledge
11	Busy	12	Paper empty
13	+ Select	14	- Auto feed
15	- Error	16	- Init printer
17	- Select input	18~25	GND

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Parallel port DRQ and DACK (JP11)

You can select the parallel port DRQ and DACK by setting JP11. The following charts show the available options.

Parallel port DRQ and DACK selection (JP11)

DRQ1(default)	DRQ3
	
DACK 1 (default)	**DACK3**
	

Power supply connections (POWER CON)

Power supply connector

In single board computer (non-passive backplane) applications, you will need to connect power directly to the SBC-455 board using POWER CON. This connector is fully compatible with the standard PC power supply connector. See the following table for its pin assignments:

Power connector (POWER CON)

Pin	Function
1	N.C.
2	+5 V_{DC}
3	+12 V_{DC}
4	-12 V_{DC}
5	GND
6	GND

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Display connections (VGA, LCD)

The SBC-455 CPU card's SVGA connector (VGA) with PCI bus supports monochrome display as well as high resolution color displays. The card also features an LCD connector (LCD), which allows you to connect various flat panel displays. The following table lists their pin assignments:

LCD connector (LCD)

Pin	Function	Pin	Function
1	+12 V_{DC}	2	+12 V_{DC}
3	GND	4	GND
5	+5 V_{DC}	6	+5 V_{DC}
7	EN LCD	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	LCD clock	36	FLM (V SYS)
37	M	38	LP (H SYS)
39	GND	40	-blank
41	KB data	42	KB clock
43	PS/2 data	44	PS/2 clock

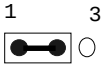
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SVGA connector (VGA)	
Pin	**Function**
1	Red video
2	Green video
3	Blue video
4	Not used
5	GND
6	Red return (GND)
7	Green return (GND)
8	Blue return (GND)
9	Key (no pin)
10	Sync return (GND)
11	Monitor ID (not used)
12	Monitor ID
13	Horizontal sync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

LCD signal select (JP5, JP7)

You can select the LCD control signals by setting JP5 and JP7. The following charts show the available options.

LCD clock signal select (JP5)	
* **SHF CLK from C&T65548 pin 70**	**ASHF CLK from SHF CLK inverse**
	

LCD enable signal select (JP7)	
* **ENVEE from C&T65548 pin 61**	**ENVDD from C&T65548 pin 62**
	

*Default

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Keyboard and PS/2 KB/ mouse connections (KB CON, KB/PS2 MOUSE)

The SBC-455 board provides two keyboard connectors. A 5-pin connector (KB CON) supports passive backplane applications. A second 6-pin mini-DIN connector (KB/PS2 MOUSE) on the card mounting bracket supports single board computer applications. The card comes with an adapter to convert the 6-pin mini-DIN connector, used for the mouse, to the standard DIN connector for the keyboard.

Keyboard connector (KB CON)

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

Keyboard or PS/2 mouse connector (KB/PS2 MOUSE)

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

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Serial ports

The SBC-455 offers two RS-232 serial ports. You can select or disable the address for each port with the BIOS Peripheral Setup program.

The card mounting bracket holds COM A, the DB-9 serial port connector for the first port. The parallel port and serial port adapter kit (supplied with the card) holds COM B, the DB-9 connector for the second port. This lets you connect and disconnect the cables after you install the card. The following sections tell how to make RS-232 connections.

RS-232 connections (COM A, COM B)

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

RS-232 connector pin assignment (COM A, COM B)

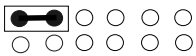
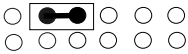
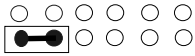
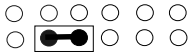
Pin	Signal
1	DCD
2	RX
3	TX
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

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Serial ports IRQ select (JP11)

You can select the serial port IRQs by setting JP11 as follows:

Serial ports IRQ selection (JP11)

	IRQ4 (default)	IRQ11
COM A		
	IRQ3 (default)	**IRQ10**
COM B		

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Watchdog timer setup

Watchdog timer time-out signal select (JP6)

If CPU processing comes to a halt because of EMI or software bugs, the watchdog timer can either reset the CPU or signal an interrupt on IRQ15.

Watchdog timer time-out signal select (JP6)

Reset CPU(default)	IRQ15
	

Watchdog timer programming

The watchdog timer must be programmed to write to I/O port address 443 at an interval shorter than the timer's preset interval. The timer's interval has a tolerance of ±5%, so you should program an instruction that will refresh the timer before a time-out occurs. The following steps illustrate how you might program the watchdog timer.

1. Write to I/O port 443 (Hex) and designate a time-out interval. This will enable the watchdog and set up its time-out interval.
2. Write to I/O port 080 (Hex) and any random value. This will in turn disable the watchdog timer.

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The watchdog timer-out interval can be set at 15 levels between 2 and 32 seconds. The following table shows the Hex values for the appropriate time-out intervals:

Watchdog timer delay values

Delay time	Value (Hex)	Delay time	Value (Hex)
0~2	F	16~18	7
2~4	E	18~20	6
4~6	D	20~22	5
6~8	C	22~24	4
8~10	B	24~26	3
10~12	A	26~28	2
12~14	9	28~30	1
14~16	8	30~32	0

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External switches and LEDs

Power LED and keylock (KEY LOCK)

You can connect an LED to indicate when the CPU card is on. Pin 1 of KEY LOCK 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 (KEY LOCK)

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

External speaker (EXT SPK)

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.

External speaker (EXT SPK)

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

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Reset switch (RESET SW)

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

Reset switch (RESET SW)

Pin	Function
1	Ground
2	Reset

Turbo LED (TURBO LED)

You can connect a LED indicator across TURBO LED to indicate when the CPU is in Turbo mode. Marks on the circuit board indicate LED polarity (the pin on the left is positive).

Turbo LED (TURBO LED)

Pin	Function
1	Turbo
2	Ground

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SMI (System Management Interrupt) switch (SMI SW)

You can connect an external switch to allow your computer to enter the suspend mode.

SMI switch (SMI SW)

Pin	Function	Suspend mode	Normal mode(default)
1	SMI		
2	Ground		

Turbo Switch (TURBO SW)

You can connect a switch across TURBO SW to change the CPU speed between Turbo and non-Turbo mode. When you leave the pins open, the CPU card operates at full speed. When you close the pins, the card operates at slow speed for compatibility with older software.

Turbo switch pin assignments (TURBO SW)

Pin	Function	Low Speed	High Speed (default)
1	-Deturbo		
2	Pull low		

Clear CMOS (JP12)

You can connect an external switch to clear CMOS. This switch closes JP12 and turns on the power, at which time the CMOS setup can be clear.

Clear CMOS (JP12)

Protect (default)	Clear CMOS
	

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Flash BIOS Protect (JP8)

You can set the JP8 to protect BIOS write-enable. The configuration is as follows:

Flash BIOS Protect (JP8)

Write protect (default)	Write-enable
	

Flash BIOS Write-enable Voltage (JP13)

This jumper sets the voltage supplied to the Flash BIOS Write-enable. The figure below shows the proper jumper settings for both 5V and 12V voltage.

Flash BIOS Write-enable Voltage (JP13)

5 V (default)	12 V
	

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CHAPTER 3

AMI WinBIOS Setup

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

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General information

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

Starting WinBIOS setup

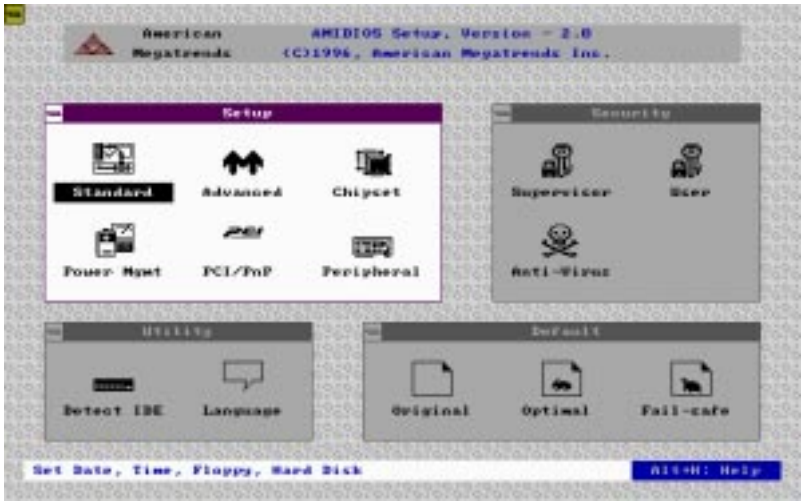
As POST executes, the following appears;

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

Press <DEL> to run WinBIOS setup.

WinBIOS main menu

The WinBIOS setup screen appears as follows:



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Using a mouse with WinBIOS setup

WinBIOS 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 WinBIOS setup

WinBIOS 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 WinBIOS 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.

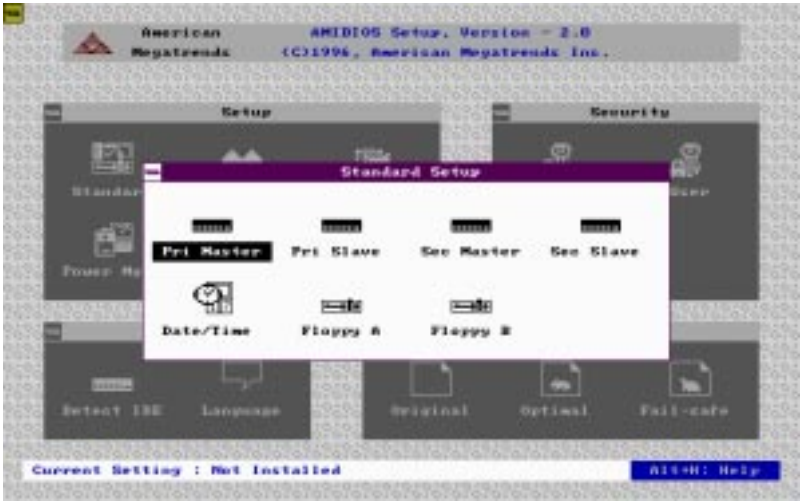
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Setup

Standard Setup

The WinBIOS Setup options described in this section are selected by choosing the Standard icon from the WinBIOS 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.

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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:

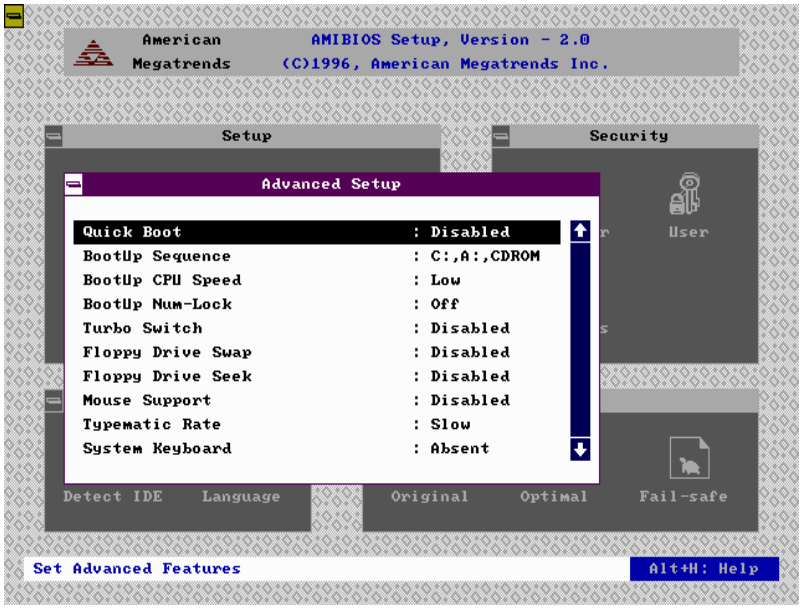
- Cylinder (number of cylinders),
- Hd (number of headers),
- WP(starting write precompensation cylinder),
- Sec (number of sectors),
- Size (drive capacity).

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Advanced Setup

Select the Advanced icon from the WinBIOS 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.



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

Setting	Description
Disabled	AMIBIOS 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 WINBIOS Setup if the key has been pressed.
Enabled	AMIBIOS does not test system memory above 1 MB. AMIBIOS does not wait up to 40 seconds for a READY signal from the IDE hard disk drive. If a READY signal is not received immediately from the IDE drive, AMIBIOS does not configure that drive. AMIBIOS does not wait for .5 seconds after sending a RESET signal to the IDE drive to allow the IDE drive time to get ready again. You cannot run WINBIOS 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 settings are on.

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Turbo Switch:
Set this option to *Enabled* to permit AMIBIOS to control the hardware turbo (speed) switch. The settings are *Enabled* or *Disabled.*

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 settings are *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 Optimal and Fail-Safe default settings are *Disabled.*

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

System Keyboard:
This option specifies that a keyboard is attached to the computer. The settings are *Present* or *Absent.* The Optimal and Fail-Safe default settings are *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 Optimal and Fail-Safe default settings are EGA/VGA..*

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

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Password Check:
This option enables password checking every time the computer is powered on or every time WINBIOS 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 WINBIOS is executed. The Optimal and Power-On defaults are *Setup*.

Parity Check:
Set this option to Enabled to check the parity of all system memory. The settings are *Enabled* or *Disabled.* The Optimal and Fail-Safe default settings are *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 settings are *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 Optimal and Fail-Safe default settings are *Enabled.*

Hit Del Message Display:
Set this option to Disabled to prevent :

```
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.*

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

Setting	Description
Disabled	Neither L1 internal cache memory on the CPU nor L2 secondary cache memory is enabled.
WriteBack	Use the write-back caching algorithm.
WriteThru	Use the write-through caching algorithm.

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

Setting	Description
Disabled	Neither L1 internal cache memory on the CPU nor L2 secondary cache memory is enabled.
WriteBack	Use the write-back caching algorithm.
WriteThru	Use the write-through 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 secondary 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.* The Fail-Safe default setting is *Disabled.*

Numeric Processor Test
Set this option to *Enbable* to permit numeric processor to be tested. The deault setting is *Disabled.*

Hard Disk Delay
This option allows you to select hard disk delay time from 5 Sec to 15 Sec. The default setting is *Disabled.*

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C000,16 KB Shadow **D000,16KB Shadow**
C400,16 KB Shadow **D400,16KB Shadow**
C800,16 KB Shadow **D800,16KB Shadow**
CC00,16 KB Shadow **DC00,16KB Shadow**
E000,64KB Shadow

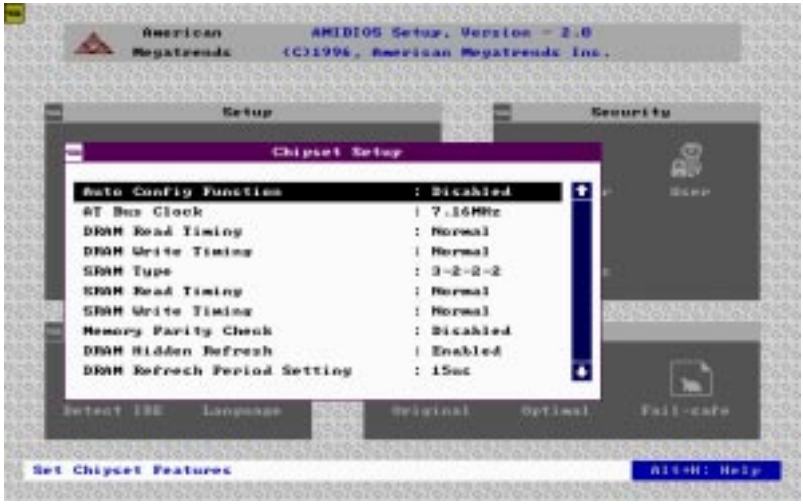
These options control the location of the contents of the 16KB of ROM beginning at the specified memory location. If no adapter ROM is using the named ROM area, this area is made available to the local bus. The settings are:

Setting	Description
Shadow	The contents of *C*0000h - 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.

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Chipset Setup

The WinBIOS Setup options deccribed in this section are selected by choosing the Chipset icon from the WinBIOS 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

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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 M	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
Cx5x86 Linear Wrapped Mode	Disabled Enabled
System Hidden Refresh	15 ms 30 ms 60 ms 120 ms

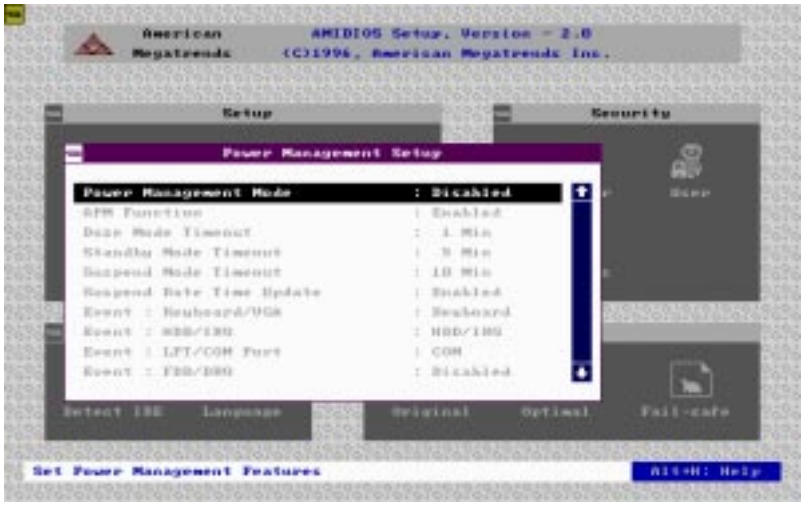
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Power Management Setup

As part of the "Green" function, 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 WinBIOS Setup main menu.

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

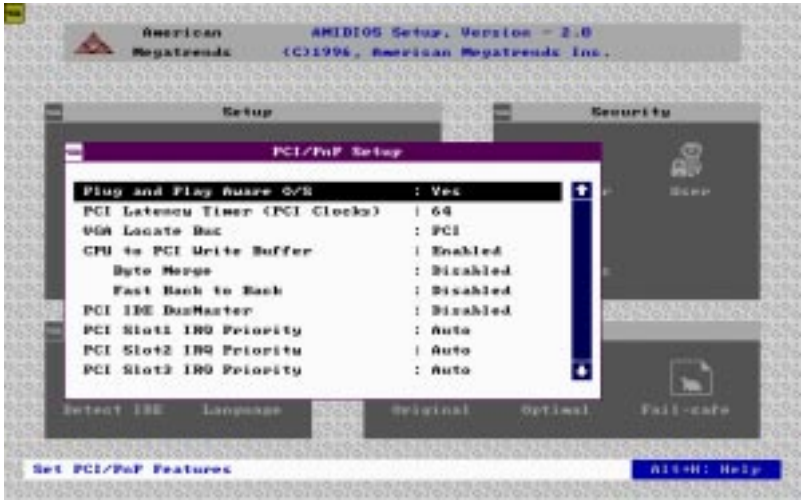
The settings are *Enabled* or *Disabled.* The default settings are *disabled.*



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PCI/PnP Setup

PCI/PnP Setup options are displayed by choosing the PCI/PnP Setup icon from the WINBIOS Setup main menu. All PCI/PnP Setup options are described in this section.



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. Windows 95 is PnP-aware. 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 *No* or *Yes*. The Optimal and Fail-Safe default settings are *Yes*.

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PCI Latency Timer (in PCI Clocks)
This option sets 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 VGA bus. The setting is PCI and ISA (Default).

CPU to PCI Write Buffer
This option sets the write buffer between 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 Optimal and Fail-safe default settings are *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 Optionmal and Fail-Safe default settings are *Auto*.

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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
IRQ12
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 Optimal and Fail-Safe default settings are *PCI/PnP*.

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

The settings are *Disabled, 16K, 32K*, or *64K* and Fail-Safe default settings are *Disabled.*

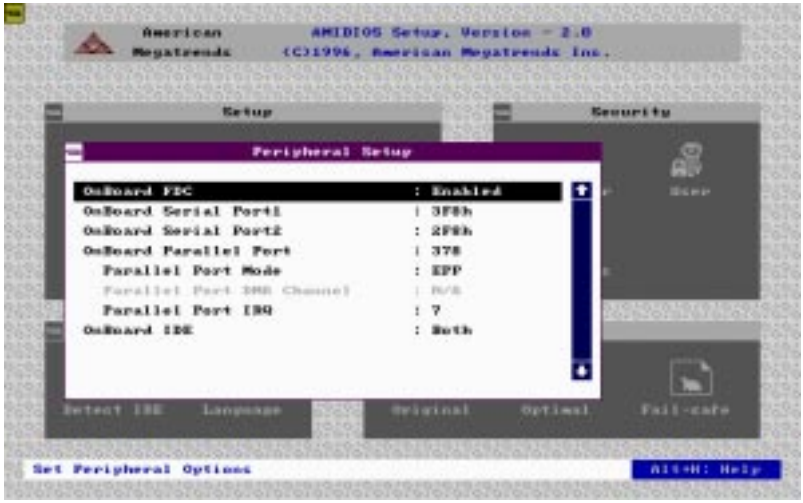
Reserved Memory Address
This option specifies the beginning address (in hex) of the reserved memory area. The specified ROM memory area is reserved for use by legacy ISA adapter cards.

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

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Peripheral Setup

Peripheral Setup options are displayed by choosing the Peripheral Setup icon from the WINBIOS 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,2F8h.* The Fail-Safe default setting is *Auto*.

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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, 2E8h.* The Fail-Safe 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, 3BC*. The Fail-Safe 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 exiting 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 communlations.

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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.

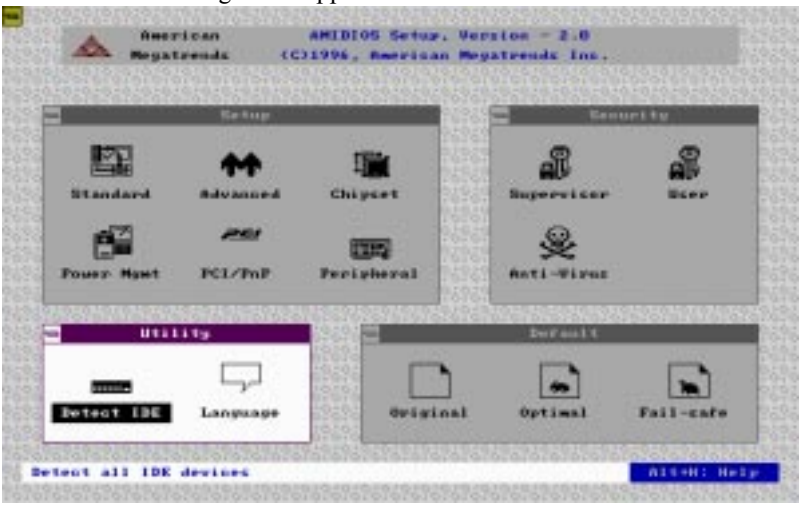
Onboard IDE

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

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Utility

The following icons appear in this section:



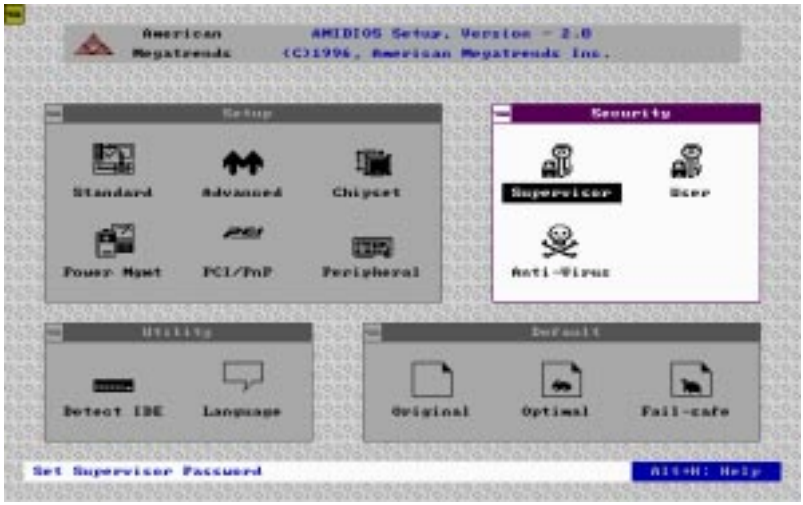
Detect IDE:
If drive C: is an IDE drive, the hard disk drive parameters for drive C: are automatically detected and reported to the Hard Disk Drive C: screen in Standard Setup, so you can easily configure drive C:. Drive D and CD-ROM could also be automatically detected and reported to screen if drive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

Language:
If this feature is enabled, you can select WINBIOS. Setup message is in different languages. The default setting is *English*.

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Security

The following icons appear in this section:



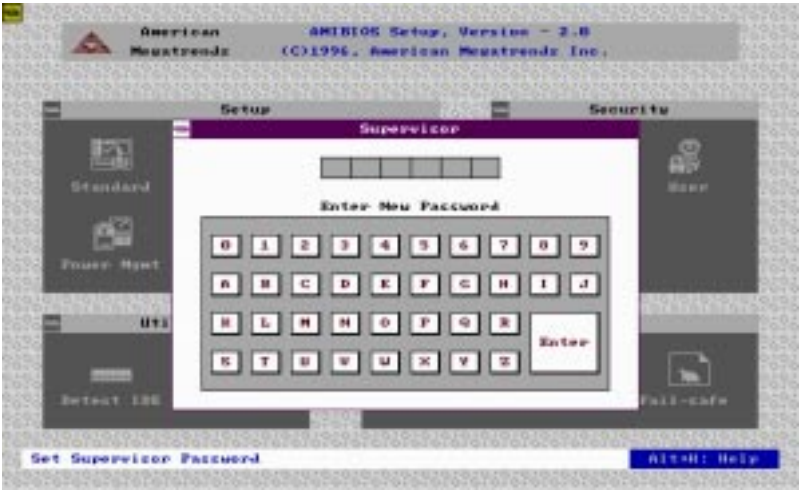
Two Levels of Passwords

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 WINBIOS. Setup message is in different languages. The default settings is *English*.

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

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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.)

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 WinBIOS.

A message box will appear when the password is confirmed.

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

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Changing a password

1. Select the Supervisor or User icon from the Security section of the WinBIOS 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 WinBIOS setup Main Menu. The password is stored in CMOS RAM after WinBIOS 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 WinBIOS Setup main menu. WinBIOS 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. You may have to type N several times to prevent the boot sector write.

```
Boot Sector Write !!!
Possible VIRUS: Continue (Y/N)? _
```

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:

```
Format!!!
Possible VIRUS: Continue (Y/N)? _
```


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Default

The icons in this section permit you to select a group of settings for all WinBIOS 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 WinBIOS Setup when you first begin this WinBIOS Setup session.

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

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

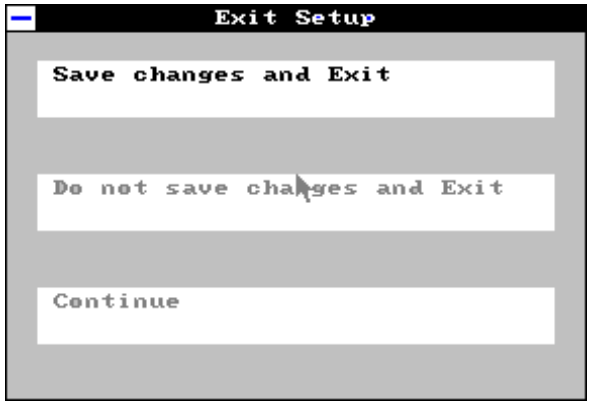
The Fail-Safe settings provide the most stable settings, though they do not provide optimal performance. Use this option as a diagnostic aid if the system is behaving erratically.

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Exiting WinBIOS

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

The following screen appears:



Select the option you desire, and the system will continue its boot up sequence.

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CHAPTER 5

Flat Panel/CRT Controller Display Drivers and Utilities

This chapter provides information about:

- Driver types and installation
- Software utility installation and use

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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.

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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.

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Windows® 95

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

Driver installation

1. Install Windows® 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® 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. 65548 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.

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Windows ô 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. 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.

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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>.

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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.

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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.

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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".

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Windows® NT 3.51

These drivers are designed to work with Microsonft® Windows®.

Driver installation

1. Install Windows® NT3.51 as you normally would for a **VGA** display. Run Windows® 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 Windows® *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 instal lation 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.

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Windows 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 Windowsô 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. 65548 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.

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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 Microsoftò 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 installling 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>**

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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.

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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:

- 640x480
- 800x600
- 1024x786
- 1280x1024

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 (15bpp)
- 64K (16bpp)
- 16M (24bpp)

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

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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.

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APPENDIX A

Watchdog Timer Demo Program

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

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```
#include<stdio.h> #include<dos.h> #include<conio> #include
<time.h> #include<graphics.h> void mydelay(void);
/* MAIN PROGRAM */ void main (void) {
unsigned int   dog=0
               run_time=0;
         char inkey;
clrscr();
gotoxy(15, 6);printf("AAEON TECHNOLOGY, INC.");
gotoxy(15, 7);printf("WATCHDOG TIMER TEST & DEMO
PROGRAM");
gotoxy(15, 9);printf("Please setup watchdog delay
time:(2 Sec-30 Sec)");
/* Set watchdog timer time-out interval */
scanf("%2d",&dog);     /* Input watchdog timer time-
out interval (Sec) */
dog=dog/2;             /* Convert time-out interval
to designated Hex */
dog=15-dog;
outportb (0x443,dog);  /* Enable watchdog timer */
/* Setup screen display format */
gotoxy(15,11);printf("Now enable watchdog!");
gotoxy(15,12);printf("You can put keyboard reset or
disable watchdog.");
gotoxy(15,13);printf(" [1]. Reset watchdog.");
gotoxy(15,14);printf(" [2]. Disable watchdog.");
gotoxy(15,15);printf(" [3]. Return to O.S.");
/* Read key pressed */
while(1){
       if(kbhit()){
              inkey=getch();
              switch(inkey){
                     case '1': /* Reset Watchdog timer */
                            gotoxy(15,11);printf("Now enable
                            watchdog timer!");
                            outportb(0x443,dog);
                            run_time=0;
                            break;
                     case '2': /* Disable Watchdog timer */
                            gotoxy(15,12);printf("Now
                            disable watchdog timer!");
                            outportb (0x80,dog);
                            return;
                     default : break;
              }
       }
```


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```
        mydelay();
        run_time=run_time+1;

        /* Display time elapsed */
        gotoxy(45,11);printf(%2d.%1d sec",run_time/
        10,run_time%10);
 }
}
/* USER FUNCTION LIBRARY */ void mydelay(void) /*
Delay program: */ /* Delay 109.89ms (18.2Hz*2) */{
        clock_t start,end;
        start=clock();
        end=start;
        while((end-start)<2){
              end=clock();
        }
}
```


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APPENDIX B

Installing PC/104 Modules

This appendix gives instructions for installing PC/104 modules.

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Installing PC/104 modules

The SBC-455'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-3810** Solid State Disk Module
- **PCM-3820** High Density Flash Disk Module
- **PCM-3110** PCMCIA Module
- **PCM-3111** Secondary PCMCIA Module
- **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

To install these modules on the SBC-455 is a quick and simple operation. The following steps show how to mount the PC/104 modules:

Step1 Remove the SBC-455 from your system paying particular attention to the safety instructions already mentioned above.

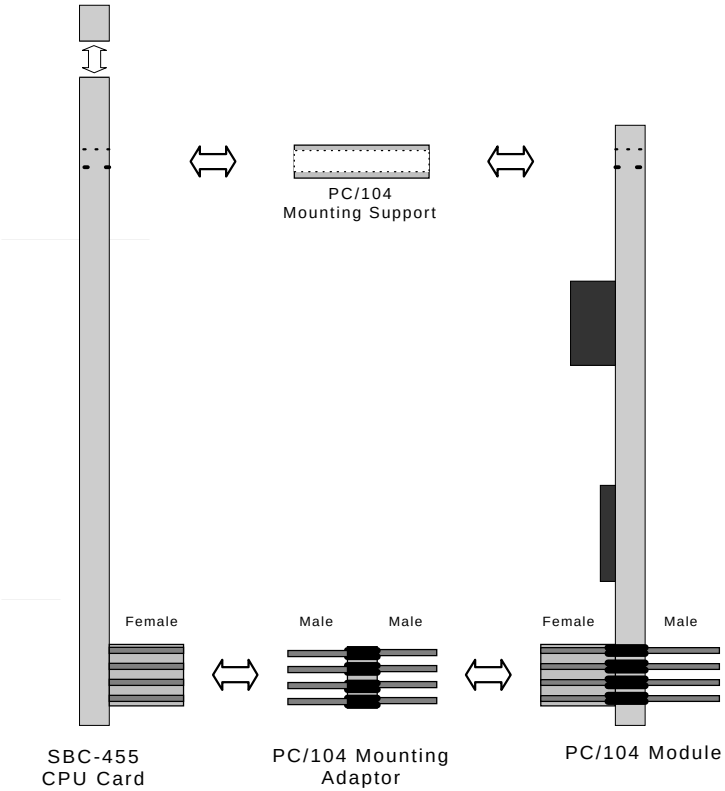
Step2 Make any jumper or link changes required to the CPU card now. Once the PC/104 module is mounted, you may have difficulty in accessing these.

Step3 Normal PC/104 modules have "male" connectors and mount directly onto the main card. However, for reasons that ensure better bus matching, the connectors on the SBC-455 and the PC/104 module are both "female". For this reason you need to plug-in a "male-male" adapter (included with the SBC-455). Please refer to the following PC/104 module mounting diagram on the following page. After this is in place, you have the correct mounting connector to accept your PC/104 module.

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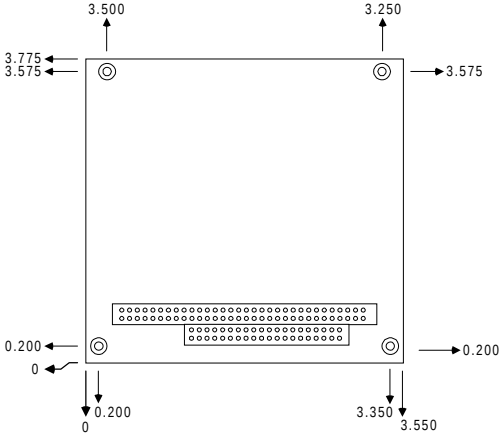
Step4 Mount the PC/104 module onto the CPU card. Do this by pressing the module firmly but carefully onto the mounting connectors.

Step5 Secure the PC/104 module onto the CPU card using the four mounting spacers and srews.



PC/104 Module Mounting Diagram

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PC/104 module dimensions (inches ±5%)

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APPENDIX C

LCD Display BIOS Configuration

This appendix gives instructions for configuring various LCD displays.

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Configuring various LCD display

Follow the instructions below to modify the VGA BIOS:

1. To update your SBC-455 with the newly created BIOS, execute the following command on enclosed Diskette of VGA BIOS.

   AAFLASH FILENAME.ROM

   Note : Before you execute the AAFLASH.COM utility program, please make sure you bypass both CONFIG.SYS and AUTOEXEC.BAT.

2. The VGA Tool Diskette allows OEMs to prepare the 65548 VGA BIOS for use. The enclosed BMP utility program enables OEMs to prepare a custom version of the BIOS. The BMP548 (32KB BIOS) and BMPLARGE (44KB BIOS) enable OEMs to customize the 65548 BIOS for their own specific requirement.

   ## Usage

   BMP548 [FILE] or

   BMPlarge [FILE]

For more details, please read the Refguide in the Diskette of VGA TOOl.

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